[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Parts 429 and 430

[Docket No. EERE-2016-BT-TP-0005]

RIN 1904-AD64

Energy Conservation Program: Test Procedures for Certain Categories of General Service Lamps

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

ACTION: Final rule.

SUMMARY: This final rule adopts test procedures for certain categories of general service lamps (GSLs). Specifically, this rulemaking adopts new test procedures for determining the initial lumen output, input power, lamp efficacy, power factor, and standby mode power of GSLs that are not integrated light-emitting diode (LED) lamps, compact fluorescent lamps (CFLs), or general service incandescent lamps (GSILs). DOE also adopts clarifying references to the existing lamp test procedures and sampling plans for determining the represented values of integrated LED lamps, general service fluorescent lamps, GSILs, and incandescent reflector lamps.

DATES: The effective date of this rule is [**INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**]. The final rule changes will be

mandatory for product testing starting [**INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**]. The incorporation by reference of certain publications listed in this rule was approved by the Director of the Federal Register on **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].**

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 www.regulations.gov. All documents in the docket are listed in the www.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 https://www.regulations.gov/docket?D=EERE-2016-BT-TP-0005. The docket 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 the Appliance and Equipment Standards staff at (202) 586-6636 or Appliance_Standards_Public_Meetings@ee.doe.gov.

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SUPPLEMENTARY INFORMATION: This final rule incorporates by reference into 10 CFR part 430 specific sections of the following industry standards:

1) Illuminating Engineering Society of North America, (IES) LM-9-09 ("IES LM-9-09-DD"), IES Approved Method for the Electrical and Photometric Measurement of Fluorescent Lamps.
2) IES LM-20-13, IES Approved Method of Photometry of Reflector Type Lamps.
3) IES LM-45-15, IES Approved Method for the Electrical and Photometric Measurement of General Service Incandescent Filament Lamps.
4) IES LM-79-08 ("IES LM-79-08-DD"), IES Approved Method for the Electrical and Photometric Measurement of Solid-State Lighting Products.

Copies of IES LM-9-09-DD, IES LM-20-13, IES LM-45-15, and IES LM-79-08-DD can be obtained from Illuminating Engineering Society of North America, 120 Wall Street, Floor 17, New York, NY 10005-4001, or by going to www.ies.org/store.

5) International Electrotechnical Commission, IEC 62301 ("IEC 62301-DD"), Household electrical appliances—Measurement of standby power (Edition 2.0, 2011-01).

A copy of IEC 62301 may be obtained 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.

For a further discussion of these standards, see section IV.M.

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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" or, "the Act")[1] sets forth a variety of provisions designed to improve energy efficiency. Part B of title III, which for editorial reasons was redesignated as Part A upon incorporation into the U.S. Code (42 U.S.C. 6291–6309, as codified), establishes the "Energy Conservation Program for Consumer Products Other Than Automobiles." This program includes general service lamps, the subject of this final rule.

Under EPCA, the energy conservation program consists essentially of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. The testing requirements consist of test procedures that manufacturers of covered products must use as the basis for (1) certifying to DOE that their products comply with the applicable energy conservation standards adopted under EPCA (42 U.S.C. 6295(s)) and (2) making representations about the energy use or efficiency of those products (42 U.S.C. 6293(c)). Similarly, DOE must use these test

[1] All references to EPCA refer to the statute as amended through the Energy Efficiency Improvement Act of 2015, Public Law 114-11 (April 30, 2015).

procedures to determine whether the products comply with any relevant standards promulgated under EPCA. (42 U.S.C. 6295(s))

DOE issued a notice of proposed rulemaking (NOPR) on March 17, 2016, proposing energy conservation standards for general service lamps (GSLs). 81 FR 14528 (March 2016 GSL ECS NOPR). In support of the standards rulemaking, DOE has undertaken several rulemakings to amend existing test procedures and to adopt new test procedures for lamps that are GSLs. On July 1, 2016, DOE published a final rule adopting test procedures for integrated lighting-emitting diode (LED) lamps. 81 FR 43404 (July 2016 LED TP final rule). On August 29, 2016, DOE published a final rule amending test procedures for medium base compact fluorescent lamps (MBCFLs) and adopting test procedures for new metrics for all compact fluorescent lamps (CFLs) including hybrid CFLs and CFLs with bases other than medium screw base. 81 FR 59386 (August 2016 CFL TP final rule).

The March 2016 GSL TP NOPR, which is the basis for this final rule, proposed test procedures for certain categories of GSLs not currently covered under these existing test procedures. 81 FR 14632 (March 17, 2016). DOE published a supplemental notice of proposed rulemaking (SNOPR) on July 20, 2016, that revised the March 2016 GSL TP NOPR proposal by referencing Illuminating Engineering Society (IES) LM-79-08 for the testing of non-integrated LED lamps. 81 FR 47071 (July 2016 GSL TP SNOPR). This final rule adopts test procedures for certain categories of GSLs not currently covered under existing test procedures. Manufacturers of the lamps subject to this final rule will be required to use these test procedures to assess performance relative to any potential

energy conservation standards the lamps must comply with in the future and for any representations of energy efficiency.

Under 42 U.S.C. 6293(b), EPCA sets forth the criteria and procedures DOE must follow when prescribing or amending test procedures for covered products. EPCA provides, in relevant part, that any test procedures prescribed or amended under this section shall be reasonably designed to produce test results which measure energy efficiency, energy use or estimated annual operating cost of a covered product during a representative average use cycle or period of use and shall not be unduly burdensome to conduct. (42 U.S.C. 6293(b)(3)) Pursuant to this authority, DOE adopts test procedures in this final rule for certain categories of GSLs in support of the GSL standards rulemaking.

Finally, EPCA directs DOE to amend its test procedures for all covered products to integrate measures of standby mode and off mode energy consumption, if technically feasible. (42 U.S.C. 6295(gg)(2)(A)) Standby mode and off mode energy must be incorporated into the overall energy efficiency, energy consumption, or other energy descriptor for each covered product unless the current test procedures already account for and incorporate standby and off mode energy consumption or such integration is technically infeasible. If an integrated test procedure is technically infeasible, DOE must prescribe a separate standby mode and off mode energy use test procedure for the covered product. Id. Any such amendment must consider the most current versions of the International Electrotechnical Commission (IEC) Standard 62301 and IEC Standard 62087, as applicable. DOE has determined that GSLs can operate in standby mode but not in off mode. Consistent with EPCA's requirement, DOE addresses measurement of

standby mode power in appendix DD to subpart B of 10 CFR part 430, as detailed in section III.C of this final rule.

II. Synopsis of the Final Rule

In this final rule, DOE adopts test procedures for determining initial lumen output, input power, lamp efficacy, power factor, and standby mode power for certain categories of GSLs for which DOE does not have an existing regulatory test procedure. DOE also notes that, beginning 180 days after the publication of this final rule, representations of energy use or energy efficiency must be based on testing in accordance with the test procedure adopted in this rulemaking.

III. Discussion

A. Scope of Applicability

GSL is defined by EPCA to include general service incandescent lamps (GSILs), CFLs, general service LED or organic light-emitting diode (OLED) lamps, and any other lamp that DOE determines is used to satisfy lighting applications traditionally served by GSILs. (42 U.S.C. 6291(30)(BB)) In the March 2016 GSL ECS NOPR, DOE proposed to implement the statutory definition of GSL and to include in the definition any lamp that has an ANSI[2] base, operates at any voltage, has an initial lumen output of 310 lumens or greater (or 232 lumens or greater for modified spectrum GSILs), is not a light fixture, is not an LED downlight retrofit kit, and is used in general lighting applications. 81 FR 14541. In the March 2016 GSL TP NOPR, DOE proposed test procedures for

[2] A lamp base standardized by the American National Standards Institute.

certain categories of general service lamps that do not have existing DOE regulatory procedures and clarified references to the existing DOE regulatory procedures for integrated LED lamps, CFLs, and GSILs. 81 FR 14632 (March 17, 2016) As there were no new comments received on the July 2016 GSL TP SNOPR regarding the scope of applicability of this rulemaking, this final rule adopts test procedures for GSLs that are not GSILs, CFLs, or integrated LED lamps.

B. Adopted Method for Determining Initial Lumen Output, Input Power, Lamp Efficacy, and Power Factor

As described in section III.A, both the statutory definition and proposed regulatory definition of GSL cover many types of lamps using a variety of lighting technologies. For several of the included lamp types, energy conservation standards and test procedures already exist. GSILs are required to comply with the energy conservation standards in 10 CFR 430.32(x), and test procedures for these lamps are specified in appendix R to subpart B of 10 CFR part 430. In a separate test procedure rulemaking, DOE recently amended the test procedures for MBCFLs and established new test procedures for all other CFLs. 81 FR 59386. The updated and new test procedures appear at appendix W to subpart B of 10 CFR part 430. In addition, DOE recently adopted test procedures for integrated LED lamps. 81 FR 43404. The test procedures for integrated LED lamps are located in appendix BB to subpart B of 10 CFR part 430.

DOE proposed in the March 2016 GSL TP NOPR that, if DOE test procedures already exist or were proposed in an ongoing rulemaking (such as for GSILs, CFLs, and integrated LED lamps), DOE would reference those specific provisions in the GSL test

procedures. For all other GSLs, DOE proposed new test procedures, intending to reference the most recently published versions of relevant industry standards. 81 FR 14633-14634. DOE proposed modifications to the test procedures for non-integrated LED lamps in the July 2016 GSL TP SNOPR. 81 FR 47074-47075. The following discussion summarizes those changes and comments received on the modifications to the proposed test procedures for non-integrated LED lamps.

In the March 2016 GSL TP NOPR, DOE proposed testing non-integrated LED lamps according to the industry test standard CIE S025. 81 FR 14634. In the analysis phase of that NOPR, DOE determined that IES LM-79-08 was not intended for non-integrated LED lamps given that IES LM-79-08 states in section 1.1 that the test method covers "LED-based SSL products with control electronics and heat sinks incorporated, that is, those devices that require only AC mains power or a DC voltage power supply to operate." Non-integrated LED lamps require external electronics; that is, the lamps are intended to connect to ballasts/drivers rather than directly to the branch circuit through an ANSI base and corresponding ANSI standard lamp holder (socket).

However, stakeholder feedback on the March 2016 GSL TP NOPR indicated that non-integrated LED lamps are commonly tested within industry according to IES LM-79-08. Further, based on a review of manufacturer specifications and input from independent testing laboratories, DOE determined that IES LM-79-08 is the most relevant industry standard, at the present time, for testing non-integrated LED lamps. 81 FR 47074. Although most manufacturers do not publish the test method used to determine performance characteristics of non-integrated LED lamps, DOE found that for those that

did, IES LM-79-08 was the test method used to measure the performance of non-integrated LED lamps. See, for example, manufacturer specifications provided by Maxlite and Eiko available in the docket at: https://www.regulations.gov/docket?D=EERE-2016-BT-TP-0005. In addition, DOE contacted independent test laboratories and found that the laboratories generally used IES LM-79-08 when testing non-integrated LED lamps because, even though it does not specifically include them, the laboratories view IES LM-79-08 as the most applicable industry standard for these lamp types. 81 FR 47074. In the July 2016 GSL TP SNOPR, DOE also preliminarily concluded that once it is determined how to supply the power to the lamp or on which ballast/driver to operate the lamp for testing, there was little difference in testing an integrated versus a non-integrated LED lamp. Further, DOE noted that some of these products had been tested and the results reported in the LED Lighting Facts database and the qualified products list for the Lighting Design Lab. Both of these organizations specify IES LM-79-08 as a test method for all included products. Id.

Thus, upon reviewing the available information, DOE tentatively determined in the July 2016 GSL TP SNOPR that for the testing of non-integrated LED lamps, IES LM-79-08 was the most relevant industry standard at the time. Further, DOE reviewed IES LM-79-08 and found it appropriate for testing non-integrated LED lamps for the purpose of determining compliance with energy efficiency standards that may be applicable in the future. However, because non-integrated LED lamps are not included in the scope of the industry standard, DOE prescribed additional instruction to ensure consistent and repeatable results. Specifically, DOE found that IES LM-79-08 provided no information on which external ballast/driver or power supply to use for testing. After

reviewing the approaches of independent test laboratories, DOE proposed that non-integrated LED lamps be tested according to IES LM-79-08, using the manufacturer-declared input voltage and current as the power supply. Because these metrics are typically not reported on the product packaging or in manufacturer literature, DOE also proposed revising the requirements for certification reports to include these quantities for non-integrated LED lamps. While manufacturers usually list compatible ballasts/drivers for these products, DOE noted that it is unknown with which ballast/driver these lamps may operate when installed in the field. By requiring these lamps to be tested using the manufacturer-declared input voltage and current as the power supply, DOE's approach is consistent with the industry practice of using reference ballasts for non-integrated lamps, such as non-integrated CFLs and general service fluorescent lamps (GSFLs). For those products, industry standards (and DOE's test procedures) specify electrical settings for reference ballasts and each specific lamp type is tested using those same settings. Because industry had not yet developed reference ballast/driver settings for non-integrated LED lamps, DOE proposed that a manufacturer report the settings that are used, which allows for a consistent and comparable assessment of the lamp's performance. Therefore, DOE proposed the requirement that non-integrated LED lamps be tested according to IES LM-79-08, using the manufacturer-declared input voltage and current as the power supply. Id.

DOE received comments on the proposed modifications to the test procedures for non-integrated LED lamps. Philips Lighting (Philips) agreed with DOE's reference to IES LM-79-08 for the testing of non-integrated LED lamps but with suggested

modifications. (Philips, No. 12 at p. 3)[3] Specifically, Philips argued that requiring non-integrated LED lamps to be operated at the manufacturer-declared input voltage and current may create issues with non-integrated LED lamps that operate directly on an existing (i.e., already installed) ballast or with a dedicated LED driver that utilizes a pulse width modulated (PWM) output voltage. Philips suggested the following alternative wording to address the issue: "For non-integrated LED lamps, operate the lamp at the manufacturer-declared input voltage waveform and current, or using a manufacturer-declared commercial ballast." Philips noted that the alternative wording captures any frequency that needs to be included if operated on a ballast, addresses PWM operation, and allows for the use of a specific ballast during testing. (Philips, No. 12 at p. 4)

DOE notes that the test procedure must produce consistent and repeatable results as well as balance testing burden. Because a ballast and/or a provided input voltage and current can affect lamp performance, specific input settings need to be identified for testing. Otherwise, manufacturers would need to test every combination of lamp voltage and current with each ballast distributed in commerce. DOE notes that the alternative wording proposed by Philips allows the lamp to be operated on a manufacturer-declared input voltage and current or using a manufacturer-declared commercial ballast; however, only one of these options should be specified to improve the consistency and repeatability of results. DOE is therefore adopting that testing be conducted at the manufacturer-declared input voltage and current. These inputs can likely be supplied by existing lab

[3] A notation in this form provides a reference for information that is in the docket of DOE's rulemaking to develop test procedures for GSLs (Docket No. EERE-2016-BT-TP-0005), which is maintained at www.regulations.gov. This notation indicates that the statement preceding the reference was made by Philips, is from document number 12 in the docket, and appears at page 3 of that document.

equipment and do not require the purchase of additional ballasts for testing. DOE notes that certain ballasts may be difficult to acquire or possibly contain features that affect lamp performance. DOE therefore prefers to have manufacturers specify an input voltage and current to use for testing. In their alternative wording, Philips also suggested adding "waveform" when specifying the input voltage to account for drivers that provide a PWM output voltage. DOE notes that a PWM output voltage could affect the measured performance of the lamp. PWM operation modifies the time the input signal is on versus the time it is off at a given frequency, and thereby the resulting input waveform can vary the average total input voltage. Varying the input voltage could impact the temperature and subsequently the performance of LED lamps. Therefore, test settings should be specified at one voltage and waveform so that test results for one lamp are consistent and repeatable. Rather than the manufacturer selecting this voltage and waveform, DOE is specifying, as proposed in the July 2016 GSL TP SNOPR, that manufacturers test the lamp at the voltage and waveform present at maximum input power. This provision for testing captures the most consumptive state and also allows for performance to be more fairly compared among available products. DOE understands a PWM output voltage to be a common output of dimming ballasts/drivers. By specifying the lamp be tested at the maximum input power, DOE not only captures the most consumptive state but also allows dimmable products to be more fairly compared to products that cannot dim by operating all lamps at maximum input power (i.e., full light output). In requiring that manufacturers specify input voltage and current and operate the lamp at full light output, DOE finds that no changes to the proposed wording are necessary for the testing of non-integrated LED lamps.

The California Investor Owned Utilities (CA IOUs) contended that because operating non-integrated LED lamps at the manufacturer-declared input voltage and current does not account for ballast losses which can be up to several watts, the test procedure does not accurately measure system luminous efficacy. CA IOUs noted that if only lamp wattage is measured and ballast losses are not accounted for, these lamps will appear more efficient than they are in practice. CA IOUs added that the test procedure should account for the energy consumption of each component necessary for the starting and stable operation of the lamp, which includes a ballast if paired with a non-integrated LED lamp. Thus, CA IOUs recommended DOE require that manufacturers use a commercially-available reference ballast for testing non-integrated LED lamps and report to DOE the ballast utilized in testing. CA IOUs concluded that a commercially-available ballast would better approximate actual installed conditions rather than using customized testing equipment designed to achieve low power losses. (CA IOUs, No. 11 at pp. 1-2)

As stated by CA IOUs, when testing on a commercially available ballast/driver, the losses associated with the ballast/driver would be included in the measured performance of the lamp. Including the ballast/driver losses in the measured performance of the lamp would result in a lower efficacy value (i.e., system efficacy) than when measuring the performance of the lamp using manufacturer-declared input voltage and current as the power supply. In addition, allowing testing on commercially available ballasts/drivers could generate inconsistent test results across products as lamps would not be tested using the same settings, and the performance of the lamp would be dictated by the ballast/driver it was paired with during testing. Hence, consistent test results for the same lamp would not be possible. Therefore, DOE is adopting the requirement that

manufacturers operate non-integrated LED lamps during testing using the manufacturer-declared input voltage and current, and is not allowing for testing on commercially available ballast/drivers. DOE notes that although the testing of integrated lamps includes ballast/driver losses, integrated lamps can operate on only one ballast (i.e., the ballast contained within the lamp unit that cannot be removed) and therefore the inclusion of that ballast reflects typical performance. Non-integrated lamps can be commonly operated on more than one ballast/driver and therefore DOE is specifying test settings to consistently characterize the performance of the lamp. DOE also notes that the approach being adopted today for non-integrated LED lamps is comparable to DOE's regulatory approach for other non-integrated lamps (e.g., GSFLs). While DOE acknowledges there may be losses associated with the commercially available ballasts paired with non-integrated lamps, DOE is declining to adopt the recommendation of the CA IOUs at this time. DOE does not believe consumers will be confused by this difference in approach for integrated lamps and non-integrated lamps because consumers do not typically compare these two categories of products because they serve different installations. The metric reflects the performance of the product tested rather than its performance on a unique, external component, which would significantly increase the burden due to the number of lamp and ballast/driver combinations. DOE will continue to work with stakeholders to monitor the ballast/driver losses and may consider an alternative approach in a future rulemaking.

Regarding the requirement for manufacturers to report the manufacturer-declared input voltage and current used for testing non-integrated LED lamps, Philips agreed with the proposal but noted that these settings should not be made available to the public as

they do not typically appear on datasheets. (Philips, No. 12 at p. 3) DOE notes that it found some publicly available datasheets with input voltage and current listed for non-integrated LED lamps indicating that this information is not likely to be considered proprietary. See, e.g., https://www.regulations.gov/docket?D=EERE-2016-BT-TP-0005. Additionally, publishing manufacturer-declared input voltage and current allows for comparison of performance across products. Therefore, DOE adopts the requirement in this final rule for manufacturers to include the manufacturer-declared input voltage and current used for testing in the certification reports for non-integrated LED lamps.

In the July 2016 GSL TP SNOPR, DOE referred to appendix R for general service incandescent lamps, to appendix BB for integrated LED lamps, to IES LM-45-15 for other incandescent lamps that are not reflector lamps, and to IES LM-79-08 for OLED lamps. DOE reviewed all references to industry standards to ensure that only necessary sections were referenced. DOE removed all references to sections describing luminous intensity and/or color measurements as these are not necessary for the metrics covered by the test procedure. DOE also made references to IES LM-79-08 consistent with sections referenced in the July 2016 LED TP final rule; that is, DOE added a reference to section 1.3 (Nomenclature and Definitions) and removed the reference to section 6.0 (Operating Orientation). Additionally, DOE specified the appropriate operating orientation directly in appendix DD. 81 FR 47075.

Philips commented in general agreement with DOE's references to industry standards; however, Philips recommended DOE reference IES LM-79-08 in its entirety rather than selected sections. (Philips, No. 12 at p. 3) When providing comprehensive test

procedures for multiple test metrics, DOE often has to clarify, limit, or add further specification to industry standards that are referenced to ensure consistent, repeatable results. Therefore, instead of incorporating an industry standard in its entirety, DOE references the relevant sections of the industry standard and clearly states any directions that differ from those in the industry standard.

Philips also commented on the language proposed in the July 2016 GSL TP SNOPR regarding operating orientation. In section 3.3 of appendix DD, DOE proposed an equal number of lamps in a sample be tested in the base-up and base-down orientation, except if the manufacturer restricts the position, in which case all units would be tested in the manufacturer-specified position. Philips argued that this is not a practical requirement for non-integrated LED lamps intended to replace linear lamps, which do not have a base-up or base-down orientation and are operated and tested horizontally in practice. Therefore, Philips suggested the operating orientation during testing should be as specified by the manufacturer. (Philips, No. 12 at p. 4) DOE notes that operating orientation is not typically specified on the packaging or specification sheets of LED lamps. DOE agrees, however that certain non-integrated LED lamps, such as double base non-integrated LED lamps designed to replace linear fluorescent lamps, cannot be operated in a base-up or base-down position since there are bases on both ends. Thus, DOE is modifying the operating orientation requirement in this final rule for testing double base lamps to state that manufacturers are to test all units in the horizontal orientation except that, if the manufacturer restricts the position, manufacturers are to test all of the units in the sample in the manufacturer-specified position. DOE is also

specifying in this final rule that orientation is to be maintained as prescribed in the active mode test procedure when determining standby mode power.

In the March 2016 GSL TP NOPR, DOE proposed a new paragraph to be added to 10 CFR 430.23 to establish test procedures for all GSLs. 81 FR 14640. As stated previously, if test procedures already existed for a lamp type that meets the definition of GSL, DOE referenced the existing test procedure. Thus, in the paragraph proposed to be added to 10 CFR 430.23, DOE included references to the existing paragraphs in §430.23 for those GSLs that already have test procedures and the metrics required by those existing test procedures. DOE received a comment from Philips on the proposed amendments to §430.23. Specifically, Philips objected to the inclusion of start time as a metric for both integrated and non-integrated CFLs. Philips noted that it should not be included for non-integrated CFLs, as start time is highly dependent on the type of ballast paired with the non-integrated CFL. (Philips, No. 12 at p. 4) As stated previously, DOE simply referenced existing DOE test procedures in §430.23 when possible. DOE further notes that for CFLs, the GSL test procedure references the test procedures adopted and amended in the August 2016 CFL TP final rule, which established a start time test procedure only for integrated CFLs. 81 FR 59396.

DOE did not receive any additional comments on its approach to referring to DOE test procedures if they already exist and referring to the most recent versions of relevant industry standards for lamp types that do not have existing DOE test procedures. Thus, DOE adopts this approach in the final rule. Table III.1 summarizes the test procedures that DOE is adopting for general service lamps.

Table III.1 Test Procedures for General Service Lamps

Lamp Type	Referenced Test Procedure
General service incandescent lamps	Appendix R to subpart B of 10 CFR 430
Compact fluorescent lamps	Appendix W to subpart B of 10 CFR 430
Integrated LED lamps	Appendix BB to subpart B of 10 CFR 430
Other incandescent lamps that are not reflector lamps	IES LM-45-15, sections 4-6, and section 7.1
Other incandescent lamps that are reflector lamps	IES LM-20-13, sections 4-6, and section 8
Other fluorescent lamps	IES LM-9-09, sections 4-6, and section 7.5
OLED lamps	IES LM-79-08, sections 1.3 (except 1.3[f]), 2.0, 3.0, 5.0, 7.0, 8.0, 9.1 and 9.2
Non-integrated LED lamps	IES LM-79-08, sections 1.3 (except 1.3[f]), 2.0, 3.0, 5.0, 7.0, 8.0, 9.1 and 9.2

C. Adopted Method for Determining Standby Mode Power

As described in section I, EPCA directs DOE to amend its test procedures for all covered products to integrate measures of standby mode and off mode energy consumption, if technically feasible. (42 U.S.C. 6295(gg)(2)(A)) In the March 2016 GSL TP NOPR, DOE proposed both active mode and standby mode test procedures for general service lamps. DOE did not propose a test procedure for off mode energy consumption because DOE initially determined that it would not be possible for GSLs included in the scope of the energy conservation standards rulemaking to meet the off-mode criteria. 81 FR 14634. DOE found that there was no condition in which a GSL connected to main power is not already in a mode accounted for in either active or

standby mode. Id. DOE proposed to use the standby mode test procedures outlined in the IEC Standard 62301, which applies generally to household electrical appliances. Referencing IEC 62301 is consistent with the standby mode test procedures adopted for CFLs and integrated LED lamps. 81 FR 59401 and 81 FR 43415.

DOE received several comments in response to the March 2016 GSL TP NOPR regarding the proposed method for determining standby mode power. Osram Sylvania, Inc. (OSI) and National Electrical Manufacturers Association (NEMA) supported DOE's proposed test method for measuring standby mode power use, which they stated is consistent with other DOE test procedures and with industry practices. (OSI, No. 3 at p. 3; NEMA, No. 6 at p. 3) However, CA IOUs suggested a change to the standby mode test procedure. CA IOUs recommended that DOE specify testing with the communication protocol expected to have the highest energy consumption and provide a prioritization of the potential communication protocols available. If multiple communication protocols (Wi-Fi, Bluetooth, ZigBee, etc.) are available, CA IOUs recommended specifying that the communication protocol should be selected based on the following order: 1) Wi-Fi; 2) ZigBee; 3) ANT; 4) Bluetooth; 5) Other Radio Frequency (RF) Protocols; 6) Infrared (IR); 7) Other; 8) Wired. CA IOUs also recommended DOE require testing be conducted in the applicable communication mode that is representative of the operation mode that is typical of the end user (i.e., normal operating mode as shipped). (CA IOUs, No. 11 at p. 2)

DOE reviewed lamps that can operate in standby mode and found that average standby power did not vary consistently by communication protocol. DOE reviewed the

test data published in the technical support document[4] of the March 2016 GSL ECS NOPR and also test data submitted in a comment by the Pacific Gas and Electric Company, Southern California Gas Company, San Diego Gas and Electric, Southern California Edison, Arizona Public Service, and National Grid (Utility Coalition) in support of the GSL ECS rulemaking.[5] In both datasets, DOE found that the standby power of the communication protocols tested were generally available in a range of values and one communication protocol did not have consistently higher or lower power consumption than another. For example, data provided by CA IOUs showed the standby mode power of lamps operating using Wi-Fi varying from a minimum of 0.237 W to a maximum of 0.401 W (excluding the noted outlier of 2.42 W) and the standby mode power of lamps operating using ZigBee varying from a minimum of 0.185 W to a maximum of 0.439 W. With no clear trend, DOE is not specifying a prioritization order for testing at this time. DOE will continue to monitor the market and will revise the test procedure as needed as the market develops.

CA IOUs also commented that for connected products that may continue to search for control signals after receiving the last signal, waiting at least 60 minutes after the last signal before performing a standby mode power measurement would allow such products to enter a lower power state. CA IOUs noted that this would ensure that the product mode under test is representative of the power drawn the majority of the time the product is in standby mode. (CA IOUs, No. 11 at p. 2) In the March 2016 GSL TP NOPR, DOE

[4] The technical support document of the March 2016 GSL ECS NOPR is available at https://www.regulations.gov/#!documentDetail;D=EERE-2013-BT-STD-0051-0042.
[5] Comments submitted in support of the GSL ECS rulemaking are available at the rulemaking docket at https://www.regulations.gov/#!docketDetail;D=EERE-2013-BT-STD-0051.

proposed that standby mode power measurements be taken after the lamp had stabilized according to section 5 of IEC 62301. 81 FR 14640. The stabilization requirements ensure that the lamp has reached steady-state operation prior to taking measurements. Requiring a minimum period of at least 60 minutes before taking measurements is an unnecessary instruction because the stabilization requirements achieve the same goal of ensuring that the product is consuming a consistent amount of power. Therefore, in this final rule, DOE is not adding a requirement to wait at least 60 minutes after receiving the last communication signal before measuring standby mode power consumption.

As there were no other comments received on DOE's proposed method for determining standby mode power, DOE adopts the standby mode test procedure proposed in the March 2016 GSL TP NOPR in this final rule.

D. Laboratory Accreditation

In the July 2016 GSL TP SNOPR, DOE proposed to require that testing of initial lumen output, input power, lamp efficacy, power factor, and standby mode power (if applicable) for GSLs be conducted by test laboratories accredited by an Accreditation Body that is a signatory member to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA). 81 FR 47076. DOE noted that under existing test procedure regulations, testing for other regulated lighting products (such as general service fluorescent lamps, incandescent reflector lamps, and fluorescent lamp ballasts), in addition to general service lamps that must already comply with energy conservation standards (such as general service incandescent lamps and medium base compact fluorescent lamps), must be conducted in a similarly accredited facility. 10 CFR

430.25. DOE also proposed to align the proposed certification report language in §429.57(b) with the proposed changes in §430.25. Similarly, DOE proposed to update §429.27(b) and §429.35(b) to align with the proposed changes regarding accreditation bodies in §430.25. Id.

DOE received a comment from Philips on the proposed certification report language regarding ILAC accreditation in §429.35(b)(2). Philips noted that ILAC does not assign identification numbers to test laboratories; instead, the identification numbers come from accreditation bodies. Philips suggested DOE modify the language to state that the certification report must include the "testing laboratory's identification number, or other approved identification, as assigned by the accreditation body…" (Philips, No. 12 at p. 4) DOE notes that the language requiring "the testing laboratory's ILAC accreditation body's identification number or other approved identification assigned by the ILAC accreditation body" is not intended to imply that ILAC assigns the identification number to test laboratories, rather the language suggests that the ILAC-approved accreditation body would supply an identification number or another form of identification. Thus, DOE maintains that using "ILAC" as a designator to "accreditation body" in the regulatory text is necessary to ensure that the accreditation bodies are ILAC-approved.

DOE notes that the certification report language revision in §429.35(b) was previously adopted in the August 2016 CFL TP final rule and therefore is no longer included in this test procedure.

E. Represented Values, Certification, and Rounding Requirements

In the March 2016 GSL TP NOPR, DOE proposed to create a new section for GSLs, 10 CFR 429.57, to provide sampling, represented value, certification, and rounding requirements. 81 FR 14634. Existing sampling procedures in 10 CFR part 429 are referenced, where applicable. If a test procedure does not currently exist, sampling and represented value calculations reference the existing DOE test procedure with the most similar lamp technology. For example, sampling and represented value calculations for OLED lamps are to be as described in section 10 CFR 429.56, the section that addresses integrated LED lamps. DOE also proposed certification and rounding requirements to include the relevant metrics for general service lamps. Rounding requirements are consistent with those for GSILs, CFLs, and integrated LED lamps. 81 FR 59415-59416 and 81 FR 43425-43426.

DOE did not make any modifications to this approach in the July 2016 GSL TP SNOPR and received no comments on these requirements; therefore, DOE adopts them in this final rule.

F. Effective Date and Compliance Dates

The test procedures adopted in this final rule for GSLs that are not integrated LED lamps, CFLs, or GSILs, are effective 30 days after publication in the Federal Register (referred to as the "effective date"). DOE notes that manufacturers may voluntarily begin to make representations with respect to the energy use or efficiency of GSLs that are not integrated LED lamps, CFLs, and GSILs using the results of testing pursuant to this final rule, starting on the effective date of this final rule. Pursuant to EPCA, manufacturers of

covered products are required to use the applicable test procedure as the basis for determining that their products comply with the applicable energy conservation standards 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 (i.e., the test method and sampling plan), EPCA requires that, beginning 180 days after publication of this final rule in the Federal Register, representations must reflect testing in accordance with the DOE test procedure. (42 U.S.C. 6293(c)(2)) Therefore, on or after 180 days after publication of this final rule, any representations, including certifications of compliance (if required), made with respect to the energy use or efficiency of GSLs that are not integrated LED lamps, CFLs, and GSILs must reflect the results of testing pursuant to this final rule.

DOE received comments regarding the dates discussed in the July 2016 GSL TP SNOPR. Philips commented that due to the volume of lamps covered under the scope of the rulemaking, DOE should require that manufacturers make representations based on this test procedure only for GSLs that have initiated testing after the effective date of the test procedure (i.e., only new products should be tested under the test procedure). Philips noted that DOE could add "test start date" to the certification reports to ensure manufacturers comply. Philips concluded that retesting lamps is unproductive, burdensome on industry, and diverts resources from testing new products that are more efficient. (Philips, No. 12 at p. 3) DOE notes that existing basic models need only be retested if their representative values would no longer be valid under the test procedures adopted in this rulemaking. Because DOE has referenced the most recent versions of relevant industry standards for the lamp types covered by this rulemaking, it is unlikely

that all of a manufacturer's existing basic models will need to be re-tested. After the effective date of this final rule (i.e., 30 days after publication in the Federal Register), all new basic models must be tested in accordance with appendix DD. EPCA requires that on or after 180 days after publication of this final rule, the representations of existing basic models of GSLs that will no longer be valid must reflect testing in accordance with the adopted test procedures in appendix DD. In addition, DOE notes that under 42 U.S.C. 6293(c)(3), manufacturers may petition the Secretary for an extension of the compliance date for up to 180 days. Manufacturers may be granted an extension if the Secretary determines that the requirements would impose an undue hardship on the petitioner. (See 42 U.S.C. 6293(c)(3))

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 the OMB.

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 et seq.) requires that when an agency promulgates a final rule under 5 U.S.C. 553, after being required by that section or any other law to publish a general notice of proposed rulemaking, the agency shall prepare a final regulatory flexibility analysis (FRFA), unless the agency certifies that the

rule 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 potential impacts of its rules on small entities are properly considered during the DOE rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General Counsel's website: http://energy.gov/gc/office-general-counsel.

DOE reviewed this final rule under the provisions of the Regulatory Flexibility Act and the procedures and policies published on February 19, 2003. DOE certifies that the rule will not have a significant economic impact on a substantial number of small entities. The factual basis for this certification is set forth in the following sections.

The Small Business Administration (SBA) considers a business entity to be a small business, if, together with its affiliates, it employs less than a threshold number of workers specified in 13 CFR part 121. These size standards and codes are established by the North American Industry Classification System (NAICS). Manufacturing of GSLs is classified under NAICS 335110, "Electric Lamp Bulb and Part Manufacturing." The SBA sets a threshold of 1,250 employees or less for an entity to be considered as a small business for this category.

In the July 2016 GSL TP SNOPR, to estimate the number of companies that could be small businesses that sell GSLs, DOE conducted a market survey using publicly available information. DOE's research involved information provided by trade

associations (e.g., the National Electrical Manufacturers' Association) and information from DOE's Compliance Certification Management System (CCMS) Database, the Environmental Protection Agency's ENERGY STAR Certified Light Bulbs Database, LED Lighting Facts Database, previous rulemakings, individual company websites, SBA's database, and market research tools (e.g., Hoover's reports). DOE screened out companies that did not meet the definition of a "small business" or are completely foreign owned and operated. DOE determined that nine companies are small businesses that maintain domestic production facilities for GSLs. 81 FR 47077. DOE did not receive comments on this determination, therefore it was maintained in the final rule.

In the July 2016 GSL TP SNOPR, DOE proposed test procedures for determining initial lumen output, input power, lamp efficacy, power factor, and standby power of GSLs. DOE noted that several of the lamp types included in the definition of general service lamp must already comply with energy conservation standards and therefore test procedures already existed for these lamps. If DOE test procedures already existed or were proposed in an ongoing rulemaking (such as for GSILs, CFLs, and integrated LED lamps), DOE proposed to reference them directly. For all other general service lamps, DOE proposed new test procedures in the July 2016 GSL TP SNOPR. For the new test procedures, DOE proposed to reference the most recent versions of relevant industry standards.

DOE estimated the testing costs and burden associated with conducting testing according to the new test procedures proposed in the July 2016 GSL TP SNOPR for GSLs. DOE did not consider the costs and burdens associated with DOE test procedures

that already exist or that have been proposed in other ongoing rulemakings because these have been or are being addressed separately. DOE also assessed elements (testing methodology, testing times, and sample size) in the CFL and integrated LED lamp test procedures that could affect costs associated with complying with this rule. Having received no comments on the topic, the cost estimates of this final rule are the same as those determined under the July 2016 GSL TP SNOPR. The following is an analysis of both in-house and third party testing costs associated with this rulemaking.

In the July 2016 GSL TP SNOPR, DOE estimated that the labor costs associated with conducting in-house testing of initial lumen output, input power, and standby mode power were $41.68 per hour. DOE determined that calculating efficacy and power factor of a GSL would not result in any incremental testing burden beyond the cost of conducting the initial lumen output and input power testing. The cost of labor was then calculated by multiplying the estimated hours of labor by the hourly labor rate. For lamps not capable of operating in standby mode, DOE estimated that testing in-house in accordance with the appropriate proposed test procedure would require, at most, four hours per lamp by an electrical engineering technician. For lamps capable of operating in standby mode, DOE estimated that testing time would increase to five hours per lamp due to the additional standby mode power consumption test. DOE noted that these estimates are representative of the time it would take to test the most labor intensive technology, LED lamps. In total, DOE estimated that using the test method prescribed in the July 2016 GSL TP SNOPR to determine initial light output and input power would result in an estimated labor burden of $1,670 per basic model of certain GSLs and $2,080 per basic model of certain GSLs that can operate in standby mode. 81 FR 47078.

Because accreditation bodies[6] impose a variety of fees during the accreditation process, including fixed administrative fees, variable assessment fees, and proficiency testing fees, DOE included the costs associated with maintaining a NVLAP-accredited facility or a facility accredited by an organization recognized by NVLAP in the July 2016 GSL TP SNOPR. In the first year, for manufacturers without NVLAP accreditation who choose to test in-house, DOE estimated manufacturers on average would experience a maximum total cost burden of about $2,210 per basic model tested or $2,630 per basic model with standby mode power consumption testing.[7] Id.

Additionally, DOE requested pricing from independent testing laboratories for testing GSLs. DOE estimated the cost for testing at an independent laboratory to be up to $1,070 per basic model. This estimate included the cost of accreditation as quotes were obtained from accredited laboratories. Id.

DOE notes that its adopted test procedures directly reference existing industry standards that have been approved for widespread use by lamp manufacturers and test laboratories. The quantities that are directly measured, namely initial lumen output and input power, are commonly reported by the manufacturer on product packaging and on product specification sheets. Thus, testing for these quantities is already being conducted. Additionally, these quantities are required to be reported to ENERGY STAR if manufacturers certify the lamps as meeting the program requirements. Standby mode

[6] As discussed in section III.D, laboratories can be accredited by any accreditation body that is a signatory member to the ILAC MRA. DOE based its estimate of the costs associated with accreditation on the NVLAP accreditation body.
[7] NVLAP costs are fixed and were distributed based on an estimate of 28 basic models per manufacturer.

power consumption is also a reported quantity for the ENERGY STAR program, though it may not be a commonly reported value for lamps that are not certified with ENERGY STAR. In reviewing the lamps for which DOE adopts test procedures in this final rule, DOE notes that very few products can operate in standby mode and therefore very few products would be required to make representations of standby mode energy consumption. Although DOE is adopting the requirement that all testing be conducted in accredited laboratories, DOE notes that many manufacturers of these products have already accredited their own in-house laboratories because they also make products such as GSILs and CFLs that are required to be tested in similarly accredited laboratories.

In summary, DOE does not consider the test procedures adopted in this final rule to have a significant economic impact on small entities. The final cost per manufacturer primarily depends on the number of basic models the manufacturer sells. These are not annual costs because DOE does not require manufacturers to retest a basic model annually. The initial test results used to generate a certified rating for a basic model remain valid as long as the basic model has not been modified from the tested design in a way that makes it less efficient or more consumptive, which would require a change to the certified rating. If a manufacturer has modified a basic model in a way that makes it more efficient or less consumptive, new testing is required only if the manufacturer wishes to make representations of the new, more efficient rating.

Based on the criteria outlined earlier and the reasons discussed in this preamble, DOE certifies that the test procedures adopted in this final rule would not have a significant economic impact on a substantial number of small entities, and the preparation

of a final regulatory flexibility analysis is not warranted. DOE has submitted a certification and supporting statement of factual basis to the Chief Counsel for Advocacy of the SBA for review under 5 U.S.C. 605(b).

C. Review Under the Paperwork Reduction Act of 1995

DOE established regulations for the certification and recordkeeping requirements for certain covered consumer products and commercial equipment. 10 CFR part 429, Subpart B. This collection-of-information requirement was approved by OMB under OMB control number 1910-1400.

DOE requested OMB approval of an extension of this information collection for three years, specifically including the collection of information proposed in the present rulemaking, and estimated that the annual number of burden hours under this extension is 30 hours per company. In response to DOE's request, OMB approved DOE's information collection requirements covered under OMB control number 1910-1400 through November 30, 2017. 80 FR 5099 (January 30, 2015).

Notwithstanding any other provision of the law, no person is required to respond to, nor must any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA, unless that collection of information displays a currently valid OMB control number.

D. Review Under the National Environmental Policy Act of 1969

In this final rule, DOE adopts test procedures for certain categories of GSLs that will be used to support the ongoing GSL standards rulemaking. DOE has determined that this rule falls into a class of actions that are categorically excluded from review under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) and DOE's implementing regulations at 10 CFR part 1021. Specifically, this final rule adopts existing industry test procedures for certain categories of general service lamps, so it will not affect the amount, quality or distribution of energy usage, and, therefore, will not result in any environmental impacts. Thus, this rulemaking is covered by Categorical Exclusion A6 under 10 CFR part 1021, subpart D. Accordingly, neither an environmental assessment nor an environmental impact statement is required.

E. Review Under Executive Order 13132

Executive Order 13132, "Federalism," 64 FR 43255 (August 4, 1999), imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have Federalism implications. The Executive Order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have Federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE examined this final rule and determined that it will not have a substantial direct effect on

the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. EPCA governs and prescribes Federal preemption of State regulations as to energy conservation for the products that are the subject of this final rule. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6297(d)) No further action is required by Executive Order 13132.

F. Review Under Executive Order 12988

Regarding the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, "Civil Justice Reform," 61 FR 4729 (Feb. 7, 1996), imposes on Federal agencies the general duty to adhere to the following requirements: (1) eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; (3) provide a clear legal standard for affected conduct rather than a general standard; and (4) promote simplification and burden reduction. Section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation (1) clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in sections 3(a) and 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the

extent permitted by law, this final rule meets the relevant standards of Executive Order 12988.

G. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. Public Law 104-4, sec. 201 (codified at 2 U.S.C. 1531). For a regulatory action resulting in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of $100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a proposed "significant intergovernmental mandate," and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect small governments. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA. 62 FR 12820; also available at http://energy.gov/gc/office-general-counsel. DOE examined this final rule according to UMRA and its statement of policy and determined that the rule contains neither an intergovernmental mandate, nor a mandate that may result in the expenditure of $100 million or more in any year, so these requirements do not apply.

H. Review Under the Treasury and General Government Appropriations Act, 1999

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Public Law 105-277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This final rule will not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

I. Review Under Executive Order 12630

DOE has determined, under Executive Order 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights" 53 FR 8859 (March 18, 1988), that this regulation will not result in any takings that might require compensation under the Fifth Amendment to the U.S. Constitution.

J. Review Under Treasury and General Government Appropriations Act, 2001

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for agencies to review most disseminations of information to the public under guidelines established by each agency pursuant to general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). DOE has reviewed this final rule under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

K. Review Under Executive Order 13211

Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," 66 FR 28355 (May 22, 2001), requires Federal agencies to prepare and submit to OMB, a Statement of Energy Effects for any significant energy action. A "significant energy action" is defined as any action by an agency that promulgated or is expected to lead to promulgation of a final rule, and that (1) is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (3) is designated by the Administrator of OIRA as a significant energy action. For any significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use if the regulation is implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

This regulatory action to adopt test procedures for certain categories of GSLs is not a significant regulatory action under Executive Order 12866. Moreover, it would not have a significant adverse effect on the supply, distribution, or use of energy, nor has it been designated as a significant energy action by the Administrator of OIRA. Therefore, it is not a significant energy action, and, accordingly, DOE has not prepared a Statement of Energy Effects.

L. Review Under Section 32 of the Federal Energy Administration Act of 1974

Under section 301 of the Department of Energy Organization Act (Public Law 95–91; 42 U.S.C. 7101), DOE must comply with section 32 of the Federal Energy

Administration Act of 1974, as amended by the Federal Energy Administration Authorization Act of 1977. (15 U.S.C. 788; FEAA) Section 32 essentially provides in relevant part that, where a proposed rule authorizes or requires use of commercial standards, the notice of proposed rulemaking must inform the public of the use and background of such standards. In addition, section 32(c) requires DOE to consult with the Attorney General and the Chairman of the Federal Trade Commission (FTC) concerning the impact of the commercial or industry standards on competition.

The test procedures for certain categories of GSLs adopted in this final rule incorporate test methods contained in certain sections of the following commercial standards:

1) IES LM-9-09, "IES Approved Method for the Electrical and Photometric Measurement of Fluorescent Lamps," 2009;
2) IES LM-20-13, "IES Approved Method for Photometry of Reflector Type Lamps," 2013;
3) IES LM-45-15, "IES Approved Method for the Electrical and Photometric Measurement of General Service Incandescent Filament Lamps," 2015;
4) IES LM-79-08, "Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products," 2008; and
5) IEC Standard 62301 (Edition 2.0), "Household electrical appliances – Measurement of standby power," 2011.

DOE has evaluated these standards and is unable to conclude whether they fully comply with the requirements of section 32(b) of the FEAA (i.e., that they were developed in a manner that fully provides for public participation, comment, and review.) DOE has consulted with both the Attorney General and the Chairman of the FTC about the impact on competition of using the methods contained in these standards and has received no comments objecting to their use.

M. Description of Materials Incorporated by Reference

In this final rule, DOE incorporates by reference specific sections of the test standard published by IES, titled "IES Approved Method for the Electrical and Photometric Measurement of Fluorescent Lamps," IES LM-9-09. IES LM-9-09 is an industry accepted test standard that specifies procedures to be observed in performing measurements of electrical and photometric characteristics of fluorescent lamps under standard conditions. The test procedures adopted in this final rule reference sections of IES LM-9-09 for performing electrical and photometric measurements of other fluorescent lamps. IES LM-9-09 is readily available on IES's website at www.ies.org/store/.

DOE also incorporates by reference specific sections of the test standard published by IES, titled "IES Approved Method for Photometry of Reflector Type Lamps," IES LM-20-13. IES LM-20-13 is an industry accepted test standard that specifies photometric test methods for reflector lamps. The test procedures adopted in this final rule reference sections of IES LM-20-13 for performing electrical and

photometric measurements of other incandescent lamps that are reflector lamps. IES LM-20-13 is readily available on IES's website at www.ies.org/store.

DOE also incorporates by reference specific sections of the test standard published by IES, titled "IES Approved Method for the Electrical and Photometric Measurement of General Service Incandescent Filament Lamps," IES LM-45-15. IES LM-45-15 is an industry accepted test standard that specifies procedures to be observed in performing measurements of electrical and photometric characteristics of general service incandescent filament lamps under standard conditions. The test procedures adopted in this final rule reference sections of IES LM-45-15 for performing electrical and photometric measurements of other incandescent lamps that are not reflector lamps. IES LM-45-15 is readily available on IES's website at www.ies.org/store/.

DOE also incorporates by reference specific sections of the test standard published by IES, titled "IES Approved Method for the Electrical and Photometric Measurement of Solid-State Lighting Products," IES LM-79-08. IES LM-79-08 is an industry accepted test standard that specifies electrical and photometric test methods for solid-state lighting products. The test procedures adopted in this final rule reference sections of IES LM-79-08 for performing electrical and photometric measurements of OLED lamps and non-integrated LED lamps. IES LM-79-08 is readily available on IES's website at www.ies.org/store.

DOE incorporates by reference certain sections of the test standard published by IEC, titled "Household electrical appliances – Measurement of standby power (Edition

2.0),” IEC 62301. IEC 62301 is an industry accepted test standard that describes measurements of electrical power consumption in standby mode, off mode, and network mode. The test procedures adopted in this final rule reference sections of IEC 62301 for testing standby mode power consumption of GSLs. IEC 62301 is readily available on IEC’s website at https://webstore.iec.ch/home.

N. Congressional Notification

As required by 5 U.S.C. 801, DOE will report to Congress on the promulgation of this rule before its effective date. The report will state that it has been determined that the rule is not a "major rule" as defined by 5 U.S.C. 804(2).

V. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this final rule.

List of Subjects

10 CFR Part 429

Administrative practice and procedure, Confidential business information, Energy conservation, Household appliances, Reporting and recordkeeping requirements.

10 CFR Part 430

Administrative practice and procedure, Confidential business information, Energy conservation, Household appliances, Imports, Incorporation by reference, Intergovernmental relations, Small businesses.

Issued in Washington, DC, September 30, 2016.

Kathleen B. Hogan
Deputy Assistant Secretary for Energy Efficiency
Energy Efficiency and Renewable Energy

For the reasons stated in the preamble, DOE amends parts 429 and 430 of chapter II of title 10, Code of Federal Regulations as set forth below:

PART 429--CERTIFICATION, COMPLIANCE, AND ENFORCEMENT FOR CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT

1. The authority citation for part 429 continues to read as follows:

Authority: 42 U.S.C. 6291-6317; 28 U.S.C. 2461 note.

2. Section 429.27 is amended by revising paragraphs (b)(2)(i), (ii) and (iii) to read as follows:

§429.27 General service fluorescent lamps, general service incandescent lamps, and incandescent reflector lamps.

* * * * *

(b) * * *

(2) * * *

(i) General service fluorescent lamps: The testing laboratory's ILAC accreditation body's identification number or other approved identification assigned by the ILAC accreditation body, production dates of the units tested, the 12-month average lamp efficacy in lumens per watt (lm/W), lamp wattage (W), correlated color temperature in Kelvin (K), and the 12-month average Color Rendering Index (CRI).

(ii) Incandescent reflector lamps: The testing laboratory's ILAC accreditation body's identification number or other approved identification assigned by the ILAC

accreditation body, production dates of the units tested, the 12-month average lamp efficacy in lumens per watt (lm/W), and lamp wattage (W).

(iii) General service incandescent lamps: The testing laboratory's ILAC accreditation body's identification number or other approved identification assigned by the ILAC accreditation body, production dates of the units tested, the 12-month average maximum rate wattage in watts (W), the 12-month average minimum rated lifetime (hours), and the 12-month average Color Rendering Index (CRI).

* * * * *

3. Section 429.57 is added to read as follows:

§429.57 General service lamps.

(a) Determination of represented value. Manufacturers must determine represented values, which includes certified ratings, for each basic model of general service lamp in accordance with following sampling provisions.

(1) The requirements of §429.11 are applicable to general service lamps, and

(2) For general service incandescent lamps, use §429.27(a);

(3) For compact fluorescent lamps, use §429.35(a);

(4) For integrated LED lamps, use §429.56(a);

(5) For other incandescent lamps, use §429.27(a);

(6) For other fluorescent lamps, use §429.35(a); and

(7) For OLED lamps and non-integrated LED lamps, use §429.56(a).

(b) Certification reports.

(1) The requirements of §429.12 are applicable to general service lamps;

(2) Values reported in certification reports are represented values;

(3) For general service incandescent lamps, use §429.27(b);

(4) For compact fluorescent lamps, use §429.35(b);

(5) For integrated LED lamps, use §429.56(b); and

(6) For other incandescent lamps, for other fluorescent lamps, for OLED lamps and non-integrated LED lamps, pursuant to §429.12(b)(13), a certification report must include the following public product-specific information: The testing laboratory's ILAC accreditation body's identification number or other approved identification assigned by the ILAC accreditation body, initial lumen output, input power, lamp efficacy, and power factor. For non-integrated LED lamps, the certification report must also include the input voltage and current used for testing.

(c) Rounding requirements.

(1) Round input power to the nearest tenth of a watt.

(2) Round initial lumen output to three significant digits.

(3) Round lamp efficacy to the nearest tenth of a lumen per watt.

(4) Round power factor to the nearest hundredths place.

(5) Round standby mode power to the nearest tenth of a watt.

PART 430--ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

4. The authority citation for part 430 continues to read as follows:

Authority: 42 U.S.C.6291-6309; 28 U.S.C. 2461 note.

5. Section 430.3 is amended by:

a. Redesignating paragraph (o)(16) as (o)(20); paragraph (o)(15) as (o)(19); paragraph (o)(14) as (o)(18); paragraph (o)(13) as (o)(16); paragraph (o)(12) as (o)(15); paragraph (o)(11) as (o)(14); paragraph (o)(10) as (o)(13); paragraph (o)(9) as (o)(12); paragraph (o)(8) as (o)(11); paragraph (o)(7) as (o)(10); paragraph (o)(6) as (o)(9); paragraph (o)(5) as (o)(7); paragraph (o)(4) as (o)(5); and paragraph (o)(3) as (o)(4);

b. Adding new paragraphs (o)(3); (6); (8); and (17);

c. Redesignating paragraphs (p)(6) and (p)(7) as (p)(7) and (p)(8), respectively; and

d. Adding a new paragraph (p)(6).

The additions read as follows:

§430.3 Materials incorporated by reference.

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(o) * * *

(3) IES LM-9-09 ("IES LM-9-09-DD"), IES Approved Method for the Electrical and Photometric Measurement of Fluorescent Lamps, approved January 31, 2009; IBR approved for appendix DD to subpart B, as follows:

(i) Section 4.0 – Ambient and Physical Conditions;

(ii) Section 5.0 – Electrical Conditions;

(iii) Section 6.0 – Lamp Test Procedures; and

(iv) Section 7.0 – Photometric Test Procedures: Section 7.5 – Integrating Sphere Measurement.

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(6) IES LM-20-13, IES Approved Method for Photometry of Reflector Type Lamps, approved February 4, 2013; IBR approved for appendix DD to subpart B, as follows:

(i) Section 4.0 – Ambient and Physical Conditions;

(ii) Section 5.0 – Electrical and Photometric Test Conditions;

(iii) Section 6.0 – Lamp Test Procedures; and

(iv) Section 8.0 – Total Flux Measurements by Integrating Sphere Method.

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(8) IES LM-45-15, IES Approved Method for the Electrical and Photometric Measurement of General Service Incandescent Filament Lamps, approved August 8, 2015; IBR approved for appendix DD to subpart B as follows:

(i) Section 4.0 – Ambient and Physical Conditions;

(ii) Section 5.0 – Electrical Conditions;

(iii) Section 6.0 – Lamp Test Procedures; and

(iv) Section 7.0 – Photometric Test Procedures: Section 7.1 – Total Luminous Flux Measurements with an Integrating Sphere.

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(17) IES LM-79-08 (“IES LM-79-08-DD”), Approved Method: Electrical and Photometric Measurement of Solid-State Lighting Products, approved December 31, 2007; IBR approved for appendix DD to subpart B as follows:

(i) Section 1.0 Introduction: Section 1.3 – Nomenclature and Definitions (except section 1.3f);

(ii) Section 2.0 – Ambient Conditions;

(iii) Section 3.0 – Power Supply Characteristics;

(iv) Section 5.0 – Stabilization of SSL Product;

(v) Section 7.0 – Electrical Settings;

(vi) Section 8.0 – Electrical Instrumentation;

(vii) Section 9.0 – Test Methods for Total Luminous Flux measurement: Section 9.1 Integrating sphere with a spectroradiometer (Sphere-spectroradiometer system); and Section 9.2 – Integrating sphere with a photometer head (Sphere-photometer system).

* * * * *

(p) * * *

(6) IEC 62301, ("IEC 62301-DD"), Household electrical appliances—Measurement of standby power, (Edition 2.0, 2011-01); Section 5 – Measurements, IBR approved for appendix DD to subpart B.

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6. Section 430.23 is amended by adding paragraph (gg) to read as follows:

§430.23 Test procedures for the measurement of energy and water consumption.

* * * * *

(gg) General Service Lamps. (1) For general service incandescent lamps, use paragraph (r) of this section.

(2) For compact fluorescent lamps, use paragraph (y) of this section.

(3) For integrated LED lamps, use paragraph (ee) of this section.

(4) For other incandescent lamps, measure initial light output, input power, lamp efficacy, power factor, and standby mode power in accordance with appendix DD of this subpart.

(5) For other fluorescent lamps, measure initial light output, input power, lamp efficacy, power factor, and standby mode power in accordance with appendix DD of this subpart.

(6) For OLED and non-integrated LED lamps, measure initial light output, input power, lamp efficacy, power factor, and standby mode power in accordance with appendix DD of this subpart.

7. Section 430.25 is revised to read as follows:

§430.25 Laboratory Accreditation Program.

The testing for general service fluorescent lamps, general service incandescent lamps (with the exception of lifetime testing), general service lamps (with the exception of applicable lifetime testing), incandescent reflector lamps, compact fluorescent lamps, and fluorescent lamp ballasts, and integrated light-emitting diode lamps must be conducted by test laboratories accredited by an Accreditation Body that is a signatory member to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition

Arrangement (MRA). A manufacturer's or importer's own laboratory, if accredited, may conduct the applicable testing.

8. Appendix DD to subpart B of part 430 is added to read as follows:

Appendix DD to Subpart B of Part 430 – Uniform Test Method for Measuring the Energy Consumption and Energy Efficiency of General Service Lamps that are not General Service Incandescent Lamps, Compact Fluorescent Lamps, or Integrated LED Lamps.

Note: On or after **[INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, any representations, including certifications of compliance (if required), made with respect to the energy use or efficiency of general service lamps that are not general service incandescent lamps, compact fluorescent lamps, or integrated LED lamps must be made in accordance with the results of testing pursuant to this appendix DD.

1. Scope: This appendix DD specifies the test methods required to measure the initial lumen output, input power, lamp efficacy, power factor, and standby mode energy consumption of general service lamps that are not general service incandescent lamps, compact fluorescent lamps, or integrated LED lamps.
2. Definitions:

   Measured initial input power means the input power to the lamp, measured after the lamp is stabilized and seasoned (if applicable), and expressed in watts (W).

Measured initial lumen output means the lumen output of the lamp, measured after the lamp is stabilized and seasoned (if applicable), and expressed in lumens (lm).

Power factor means the measured initial input power (watts) divided by the product of the input voltage (volts) and the input current (amps) measured at the same time as the initial input power.

3. Active Mode Test Procedures

3.1. Take measurements at full light output.

3.2. Do not use a goniophotometer.

3.3 For single base OLED and non-integrated LED lamps, position a lamp in either the base-up and base-down orientation throughout testing. Test an equal number of lamps in the sample in the base-up and base-down orientations, except that, if the manufacturer restricts the orientation, test all of the units in the sample in the manufacturer-specified orientation. For double base OLED and non-integrated LED lamps, test all units in the horizontal orientation except that, if the manufacturer restricts the orientation, test all of the units in the sample in the manufacturer-specified orientation.

3.4. Operate the lamp at the rated voltage throughout testing. For lamps with multiple rated voltages including 120 volts, operate the lamp at 120 volts. If a lamp is not rated for 120 volts, operate the lamp at the highest rated input voltage. For non-integrated LED lamps, operate the lamp at the manufacturer-declared input voltage and current.

3.5. Operate the lamp at the maximum input power. If multiple modes occur at the same maximum input power (such as variable CCT or CRI), the manufacturer may select any of these modes for testing; however, all measurements must be taken at the same selected mode. The manufacturer must indicate in the test report which mode was selected for testing and include detail such that another laboratory could operate the lamp in the same mode.

3.6. To measure initial lumen output, input power, input voltage, and input current use the test procedures in the table in this section.

Table 3.1 References to Industry Standard Test Procedures

Lamp Type	**Referenced Test Procedure**
General service incandescent lamps	Appendix R to subpart B of 10 CFR part 430
Compact fluorescent lamps	Appendix W to subpart B of 10 CFR part 430
Integrated LED lamps	Appendix BB to subpart B of 10 CFR part 430
Other incandescent lamps that are not reflector lamps	IES LM-45-15, sections 4-6, and section 7.1*
Other incandescent lamps that are reflector lamps	IES LM-20-13, sections 4-6, and section 8*
Other fluorescent lamps	IES LM-9-09-DD, sections 4-6, and section 7.5*
OLED lamps	IES LM-79-08-DD, sections 1.3 (except 1.3[f]), 2.0, 3.0, 5.0, 7.0, 8.0, 9.1 and 9.2*
Non-integrated LED lamps	IES LM-79-08-DD, sections 1.3 (except 1.3[f]), 2.0, 3.0, 5.0, 7.0, 8.0, 9.1 and 9.2*

* Incorporated by reference, see §430.3.

3.7. Determine initial lamp efficacy by dividing the measured initial lumen output (lumens) by the measured initial input power (watts).

3.8. Determine power factor by dividing the measured initial input power (watts) by the product of the measured input voltage (volts) and measured input current (amps).

4. Standby Mode Test Procedure

4.1. Measure standby mode power only for lamps that are capable of standby mode operation.

4.2. Maintain lamp orientation as specified in section 3.3 of this appendix.

4.3. Connect the lamp to the manufacturer-specified wireless control network (if applicable) and configure the lamp in standby mode by sending a signal to the lamp instructing it to have zero light output. Lamp must remain connected to the network throughout testing.

4.4. Operate the lamp at the rated voltage throughout testing. For lamps with multiple rated voltages including 120 volts, operate the lamp at 120 volts. If a lamp is not rated for 120 volts, operate the lamp at the highest rated input voltage.

4.5. Stabilize the lamp prior to measurement as specified in section 5 of IEC 62301-DD (incorporated by reference; see §430.3).

4.6. Measure the standby mode power in watts as specified in section 5 of IEC 62301-DD (incorporated by reference; see §430.3).