[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Part 430

[Docket No. EERE-2009-BT-TP-0016]

RIN 1904-AB99

Energy Conservation Program: Clarification for Energy Conservation Standards and Test Procedures for Fluorescent Lamp Ballasts

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

ACTION: Final rule.

SUMMARY: On December 29, 2014, the U.S. Department of Energy (DOE) issued a notice of proposed rulemaking (NOPR) to clarify the test procedures for fluorescent lamp ballasts. That proposed rulemaking serves as the basis for the final rule. DOE is issuing a final rule to reorganize, reformat, correct, and clarify the scope of the energy conservation standards for fluorescent lamp ballasts. In addition, DOE is removing the outdated test procedure at Appendix Q and redesignating the current test procedure at Appendix Q1 as Appendix Q. DOE is also clarifying the test procedure setup at redesignated Appendix Q. Finally, DOE is revising the laboratory accreditation language and is providing clarification on the process for evaluating compliance with standards.

DATES: The effective date of this rule is [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]. Representations must be based on testing in

accordance with the final rule starting [INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The incorporation of reference of certain publications listed in this rule was approved by the Director of the Federal Register on March 23, 2009.

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: http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/62 . 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. Brenda Edwards at (202) 586-2945 or by email: Brenda.Edwards@ee.doe.gov.

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SUPPLEMENTARY INFORMATION:

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I. Authority and Background

Title III, Part B[1] of the Energy Policy and Conservation Act of 1975 (42 U.S.C. 6291, et seq.; "EPCA" or, "the Act") sets forth a variety of provisions designed to improve energy efficiency and established the "Energy Conservation Program for Consumer Products Other Than Automobiles."[2] These include fluorescent lamp ballasts, the subject of this final rule. (42 U.S.C. 6292(a)(13))

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, and (2) making representations about the efficiency of those products. Similarly, DOE must use these test procedures to determine whether the products comply with any relevant standards promulgated under EPCA.

[1] For editorial reasons Part B was redesignated as Part A upon incorporation into the U.S. Code (42 U.S.C. 6291–6309, as codified.

[2] All references to EPCA refer to the statute as amended through the American Energy Manufacturing Technical Corrections Act (AEMTCA), Pub. L. 112-210 (Dec. 18, 2012) Part B of title III. For editorial reasons was redesignated as Part A upon incorporation into the U.S. Code (42 U.S.C. 6291–6309, as codified.

DOE published test procedure final rules on April 24, 1991, October 22, 2009, and May 4, 2011 (hereafter the "May 2011 test procedure final rule"), establishing active mode test procedures, standby and off mode test procedures, and revised active mode test procedures, respectively. 56 FR 18677, 74 FR 54445, and 76 FR 25211. The May 2011 test procedure final rule established Appendix Q1 to subpart B of 10 CFR part 430. DOE also published final rules establishing and amending energy conservation standards for fluorescent lamp ballasts on September 19, 2000, and November 14, 2011 (hereafter the "November 2011 standards final rule"), which completed the two energy conservation standard rulemakings required under 42 U.S.C. 6295(g)(7). 65 FR 56740 and 76 FR 70547. The November 2011 standards final rule established the regulations located at 10 CFR 430.32(m)(8) through(10).

This final rule clarifies the contents of the energy conservation standards and test procedures promulgated by DOE. On January 6, 2015, DOE published a NOPR (hereafter the January 2015 NOPR) proposing clarifications to the test procedures for fluorescent lamp ballasts. 80 FR 404. That notice of proposed rulemaking serves as the basis for this final rule.

II. Synopsis of the Final Rule

In this final rule, DOE discusses key aspects of the energy conservation standards and test procedures for fluorescent lamp ballasts and clarifies the corresponding requirements and specifications in the CFR. DOE is modifying the organization of 10 CFR 430.32(m) to clarify the applicability of the standards and exemptions. DOE is also consolidating 10 CFR 430.32(m)

by deleting standards that are obsolete. In addition, DOE is clarifying definitions relating to ballast luminous efficiency (BLE) standards.

DOE is removing the outdated test procedure for ballast efficacy factor (BEF) at Appendix Q and redesignating the test procedure for BLE at Appendix Q1 as Appendix Q. In addition, DOE is adding testing clarifications to redesignated Appendix Q and is modifying redesignated Appendix Q to clarify the reference lamp pairings for testing. DOE is also clarifying the redesignated Appendix Q for test setup and measurement. In addition, DOE is making general changes to definitions, language, and corrections to the text. Finally, DOE is revising the laboratory accreditation language at 10 CFR 430.25. This final rule also discusses the process for evaluating compliance with standards by providing example calculations for evaluating compliance with BLE standards.

Representations of energy efficiency must be based on testing in accordance with this rulemaking within 180 days after the publication of the final rule.

III. Discussion

A. Energy Conservation Standards

In the second rulemaking cycle required by 42 U.S.C. 6295(g)(7), DOE amended existing energy conservation standards and adopted standards for additional ballasts in a final rule published on November 14, 2011 (hereafter "2011 Ballast Rule"). 76 FR 70548. The standards adopted as a result of this rulemaking are based on BLE and apply to all products listed in Table III.1. DOE has required compliance with these BLE standards since November 14, 2014.

Table III.1 Ballast Luminous Efficiency Standards implemented by the 2011 Ballast Rule

Fluorescent lamp ballasts shall have a ballast luminous efficiency no less than A/(1+B*total lamp arc power^-C) where A, B, and C are as follows:			
Product Class	**A**	**B**	**C**
Instant start and rapid start ballasts (not classified as residential) that are designed to operate: 4-foot medium bipin lamps 2-foot U-shaped lamps 8-foot slimline lamps	0.993	0.27	0.25
Programmed start ballasts (not classified as residential) that are designed to operate: 4-foot medium bipin lamps 2-foot U-shaped lamps 4-foot miniature bipin standard output lamps 4-foot miniature bipin high output lamps	0.993	0.51	0.37
Instant start and rapid start ballasts (not classified as sign ballasts) that are designed to operate: 8-foot high output lamps	0.993	0.38	0.25
Programmed start ballasts (not classified as sign ballasts) that are designed to operate: 8-foot high output lamps	0.973	0.70	0.37
Sign ballasts that operate: 8-foot high output lamps	0.993	0.47	0.25
Instant start and rapid start residential ballasts that operate: 4-foot medium bipin lamps 2-foot U-shaped lamps 8-foot slimline lamps	0.993	0.41	0.25
Programmed start residential ballasts that are designed to operate: 4-foot medium bipin lamps 2-foot U-shaped lamps	0.973	0.71	0.37

Several ballasts are exempt from BLE and power factor standards established by the 2011 Ballast Rule. See 10 CFR 430.32(m)(9). These exemptions consist of:

(1) Low frequency T8 ballasts that are designed, labeled, and marketed for use only in electromagnetic-interference-sensitive-environments and shipped in packages of 10 or fewer;

(2) Programmed start ballasts that operate 4-foot medium bipin (MBP) T8 lamps and deliver on average less than 140 milliamperes to each lamp; and

(3) Dimming ballasts except for those specified in 10 CFR 430.32(m)(10).

See 10 CFR 430.32(m)(9).

Dimming ballasts designed for the operation of one F34T12, two F34T12, two F96T12/ES, and two F96T12HO/ES lamps and that meet the specifications found at 10 CFR 430.32(m)(10)(i) and (ii) are subject to BLE standards specified in 10 CFR 430.32(m)(10)(iii).

DOE is adopting several changes to the energy conservation standards section of the CFR for ballasts (10 CFR 430.32(m)) to clarify the applicability of standards and exemptions and improve readability. These changes are described in detail in the following sections.

1. Changes to Organization

In the January 2015 NOPR, DOE proposed modifications to the organization of 10 CFR 430.32(m) to clarify the applicability of standards and exemptions. 80 FR at 417. DOE proposed to consolidate 10 CFR 430.32(m) by deleting standards that are no longer applicable. 10 CFR 430.32(m) currently contains the standards established by NAECA 1988, the 2000 Ballast Rule, EPACT 2005, and the 2011 Ballast Rule. The standards established by each of these actions are accompanied by compliance dates and exemptions. DOE proposed to remove the sections of 10 CFR 430.32(m) that have become obsolete (i.e., existing sections 10 CFR 430.32(m)(1) - (m)(7)). DOE proposed to reorganize the remaining sections of 10 CFR 430.32(m) to enhance readability.

Additionally, in the January 2015 NOPR, DOE proposed to modify the standards table in 10 CFR 430.32(m). 80 FR at 419. In many cases, several different types of ballasts are subject to the same BLE standards. However, due to a formatting error, the table in existing section 430.32(m)(8) added additional lines and borders between these ballast types subject to the same BLE standards. For example, instant start and rapid start ballasts (not classified as residential) that are designed to operate 4-foot MBP, 2-foot U-shaped, and 8-foot slimline lamps are all subject to the same BLE standards. To clarify that certain groups of ballasts are subject to the same standards, DOE proposed to remove some lines and borders to accurately group the ballasts and standards. The chart will conform to what is shown in Table III.1.

DOE received no comment in response to the proposed organizational changes in the January 2015 NOPR. Based on the reasons presented in the January 2015 NOPR, DOE is adopting these changes in this final rule.

2. Changes to Definitions and Terminology

In the January 2015 NOPR, DOE proposed changes to the definitions and terminology used in 10 CFR 430.32(m) pertaining to BLE standards. 80 FR at 418-419. DOE proposed to remove descriptions of terminology at existing (m)(8)(iv) through (vi) and instead reference redesignated Appendix Q (see section III.B) for definitions of the terms average total lamp arc power, instant start, programmed start, rapid start, residential ballast, and sign ballast. In addition, DOE proposed to use the phrase “that are not residential ballasts” in amended sections 10 CFR 430.32(m)(1)(ii)(A) and (m)(2)(ii)(A) to refer to any ballasts that do not meet the

definition of residential ballast in redesignated Appendix Q. The NOPR reasoned that this change would improve clarity through consistent usage of a single phrase and reducing cross-references to other paragraphs. 80 FR at 406.

Finally, DOE proposed to replace the phrase "designed, labeled, and marketed" with the phrase "designed and marketed" as defined at 10 CFR 430.2, in the description of a low frequency ballast at amended section 10 CFR 430.32(m)(3)(ii). 80 FR at 419. The definition of "designed and marketed" at 10 CFR 430.2 clarifies that a ballast is recognized as designed and marketed if the intended application of the lamp is stated in a publicly available document (e.g., product literature, catalogs, packaging labels, and labels on the product itself).[3]

Similarly, DOE proposed to replace the phrase "for use in connection with" with the phrase "designed and marketed to operate" at amended section 10 CFR 430.32(m)(2) and amended section 10 CFR 430.32(m)(3)(i). 80 FR at 419. DOE also proposed to replace the phrase "that operate" with "that are designed to operate" at amended section 10 CFR 430.32(m)(1)(ii)(B). These revisions eliminate potential confusion or ambiguity by clarifying the original intent of this language. 80 FR at 418.

The National Electrical Manufacturers Association (NEMA) agreed with the proposed revision regarding consistent use of the phrase "designed and marketed for operation." (NEMA,

[3] The definition of "designed and marketed" was established in the general service fluorescent lamp and incandescent reflector lamp energy conservation standard rulemaking. See http://www.regulations.gov/#!docketDetail;D=EERE-2011-BT-STD-0006.

No. 30 at p. 3)[4] DOE received no further comments in response to the proposed changes to definitions and terminology in the January 2015 NOPR. Based on the reasons presented in the January 2015 NOPR, DOE is adopting these changes in this final rule. In this final rule, DOE is also changing the column heading at amended section 10 CFR 430.32(m)(2)(ii)(B) from "Ballast input voltage" to "Nominal input voltage" to align with usage in section 430.32(m)(2)(i)(A) and eliminate potential confusion.

B. Test Procedure

Manufacturers were previously required to use the test procedure for ballasts at 10 CFR part 430, subpart B, appendix Q to determine compliance with BEF standards. The May 2011 test procedure final rule established appendix Q1 to subpart B of 10 CFR part 430 to determine compliance with BLE standards. As stated in section III.A, compliance with BLE standards has been required since November 14, 2014. Because the BEF standards are no longer applicable, DOE is removing the test procedure for BEF at Appendix Q and redesignating the Appendix Q1 test procedure for BLE as Appendix Q. DOE is revising any references to Appendix Q1 in the CFR to reference redesignated Appendix Q. DOE is also making several changes to redesignated Appendix Q to clarify the test procedures for measuring BLE. These changes are described in detail in the following sections.

[4] A notation in this form provides a reference for information that is in the docket of DOE's rulemaking to develop test procedures for fluorescent lamp ballasts (Docket No. EERE-2009-BT-TP-0016), which is maintained at www.regulations.gov. This notation indicates that the statement preceding the reference is document number 30 in the docket for the fluorescent lamp ballasts test procedure rulemaking, and appears at page 3 of that document.

1. Lamp Pairing for Testing

In the May 2011 test procedure final rule, DOE specified that ballasts are to be paired with the most common wattage lamp and provided a table (Table A of existing appendix Q1 of subpart B of part 430) to indicate which lamp should be used with each ballast. 76 FR 25211 (May 4, 2011). Table A lists the ballast description along with the lamp type intended for testing. Though ballasts can frequently operate lamps of the same diameter but different wattages, DOE requires testing with only one lamp wattage per ballast. To clarify this requirement, in the January 2015 NOPR, DOE proposed to indicate in section 2.3.1.7 of redesignated Appendix Q that each ballast should be tested with only one lamp type corresponding to the lamp diameter and base type the ballast is designed and marketed to operate. 80 FR at 415. For example, a ballast designed and marketed to operate both 32 watt (W) 4-foot MBP T8 lamps and 28 W 4-foot MBP T8 lamps should only be tested with the 32 W lamp. Additionally, stakeholders requested clarification on testing ballasts that are designed and marketed as operating both T8 and T12 lamps. Therefore, DOE also proposed to indicate in section 2.3.1.5 of redesignated Appendix Q that a ballast designed and marketed to operate both T8 and T12 lamps must be tested with T8 lamps. DOE explained in the NOPR that it believes T8 lamps will be the most common lamp type paired with these ballasts. 80 FR at 406.

Regarding this proposal, NEMA commented that there may be some confusion with lamp pairings for the electronic sign ballasts in the proposed language because these ballasts can operate both T12 HO and T8 HO lamps. NEMA recommended that DOE adopt the American

National Standards Institute (ANSI) lamp abbreviations from ANSI C78.81.[5] (NEMA, No. 30 at p. 2) DOE agrees that referencing the ANSI and International Electrotechnical Commission (IEC) lamp specifications may further clarify the lamp pairings used for testing. However, the lamp specifications for U-shaped and T5 lamps (i.e., ANSI_IEC C78.901-2005[6] and IEC 60081[Amendment 4, Edition 5.0][7]) are not currently incorporated by reference in the CFR for existing Appendix Q1. Therefore, DOE will address this lamp identification issue for all lamp types collectively in a separate rulemaking.

In this final rule, DOE is also specifying that ballasts designed and marketed to operate both 4-foot MBP lamps and 2-foot U-shaped lamps must be tested with 4-foot MBP lamps. DOE believes there could be confusion on testing these ballasts similar to the sign ballasts cited by NEMA which are also capable of operating multiple lamp types. This clarification supports DOE's requirement of testing with only one lamp type per ballast. DOE is adding the requirement to redesignated Appendix Q at section 2.3.1.5 and is renumbering the sections thereafter.

DOE notes that 34 W MBP T12 U-shaped lamps (commonly referred to as 2-foot U-shaped lamps) are not listed in ANSI_ANSLG C78.81-2010, ANSI_IEC C78.901-2005, or IEC 60081 (Amendment 4, Edition 5.0). This prevents identification of a 34W T12 2-foot U-shaped reference lamp to pair with a ballast for BLE testing. However, DOE could not identify ballasts

[5] "American National Standard for Electric Lamps: Double-Capped Fluorescent Lamps —Dimensional and Electrical Characteristics" (approved Jan. 14, 2010).

that are capable of only operating 34W T12 2-foot U-shaped lamps. Instead, all ballasts capable of operating 34W T12 2-foot U-shaped lamps could also operate 34W T12 MBP lamps.[8] Because there is not a current market need, and because DOE does not anticipate a need in the future, DOE is not providing 34W T12 2-foot U-shaped lamp specifications.

In the January 2015 NOPR, DOE proposed to revise Table A of existing Appendix Q1 to further clarify the requirement of testing with only one lamp type per ballast. 80 FR at 415. DOE proposed to add borders to Table A in redesignated Appendix Q to emphasize that testing with only one lamp type per ballast is necessary. DOE also proposed to revise the column heading corresponding to the lamp description to read "Lamp Type" to provide a clear linkage to the direction that only one lamp type should be paired with each ballast for testing. Table III.2 and Table III.3 present an example from Table A, highlighting the existing and proposed versions, respectively.

Table III.2 - Existing Table A Excerpt

Ballast Type	Nominal Lamp Wattage	Lamp Diameter and Base	Frequency Adjustment Factor	
			Low-frequency	High-frequency
Ballasts that operate straight-shaped lamps (commonly referred to as 4-foot medium bipin lamps) with medium bipin bases and a nominal overall length of 48 inches	32 34	T8 MBP T12 MBP	0.94 0.93	1.0 1.0

[8] DOE requires that ballasts designed and marketed to operate both 4-foot MBP lamps and 2-foot U-shaped lamps must be tested with 4-foot MBP lamps.

Table III.3 Revisions to Table A Excerpt

Ballast Type	Lamp Type		Frequency Adjustment Factor	
	Nominal Lamp Wattage	Lamp Diameter and Base	Low-frequency	High-frequency
Ballasts that operate straight-shaped lamps (commonly referred to as 4-foot medium bipin lamps) with medium bipin bases and a nominal overall length of 48 inches	32	T8 MBP	0.94	1.0
	34	T12 MBP	0.93	1.0

For clarity, DOE also proposed in the January 2015 NOPR to revise the ballast type description for sign ballasts in Table A to read "Sign ballasts that operate rapid-start lamps (commonly referred to as 8-foot high output lamps) with recessed double contact bases and a nominal overall length of 96 inches." 80 FR at 415. Additionally, DOE proposed to add a definition for "sign ballast" in redesignated Appendix Q based on the existing description of sign ballast in 10 CFR 430.32(m). 80 FR at 414. See section III.B.4 for more information.

DOE received no comment in response to the proposed changes to Table A in the January 2015 NOPR. Based on the reasons presented above, DOE is adopting these changes in this final rule.

2. Testing at Full Output

In section 2.5.1.2 of existing Appendix Q1, DOE specifies that the ballast should be operated at full output during the stabilization process, and measurements should be made after the stabilization condition is reached. In the January 2015 NOPR, DOE proposed to revise this statement in redesignated Appendix Q to make clear that the ballast should remain at full output

while the measurements are taken. 80 FR at 417. This is consistent with DOE's intent that both dimming and fixed light output ballasts are tested at full light output. Id at 407.

NEMA agreed with the clarification that ballasts be tested at full output. (NEMA, No. 30 at p. 2) DOE received no further comments on this clarification. Thus, based on the reasons presented in the January 2015 NOPR, DOE is adopting this clarification in this final rule.

3. Measurement Clarification

DOE specifies in section 2.3.2.1 of existing Appendix Q1 that the power analyzer must have n+1 channels where n is the number of lamps a ballast operates. DOE notes that, for certain ballasts, it is possible for n+1 to be greater than the number of channels supplied by a single power analyzer. In the January 2015 NOPR, DOE proposed to clarify in redesignated Appendix Q that the test lab use the minimum number of power analyzers possible during testing. 80 FR at 415. DOE explained in the NOPR that a power analyzer commonly used in the lighting industry has six channels but can be linked to a second power analyzer when additional channels are needed. If a test lab needed seven channels to test a ballast that operates six lamps, for example, they should use only two analyzers. Id at 407.

NEMA disagreed with the proposed clarification to the measurement, noting that it is possible for the "connection" between power analyzers to be achieved through the data acquisition computer and software. As written, NEMA commented the instruction at section 2.3.2.1 of existing Appendix Q1 would limit instrumentation options unnecessarily. NEMA recommended that the language be stated as: "The power analyzer test setup must have n+1

channels where n is the number of lamps a ballast operates. Use the minimum number of power analyzers possible during testing. A system may be used to synchronize the power analyzers, and the power analyzers must be synchronized in time." (NEMA, No. 30 at pp. 2-3)

DOE reviewed NEMA's recommendation, including the insertion of the words "test setup" in the existing text, and the new sentence specifying how multiple power analyzers should be used. DOE agrees that insertion of the word "test setup" clarifies the intent of the sentence that the sum of the number of channels in all power analyzers used in the test setup must be at least the number of lamps plus one. DOE agrees that a data acquisition software system can be used to connect the power analyzers used in the test setup and also agrees that adding the third sentence recommended by NEMA may help clarify this requirement. While electrical measurements must be taken after the ballast has been stabilized, synchronization of multiple power analyzers in time is still the best practice, and most closely simulates the simultaneous measurements taken by a single power analyzer. Therefore DOE is amending section 2.3.2.1 of redesignated Appendix Q to read, "The power analyzer test setup must have n+1 channels where n is the number of lamps a ballast operates. Use the minimum number of power analyzers possible during testing. A system may be used to synchronize the power analyzers, and all power analyzers must be synchronized in time."

4. Changes to Definitions

In the January 2015 NOPR, DOE proposed changes to existing Appendix Q1 relating to definitions used in the test procedure. 80 FR at 414 through 418. DOE proposed to modify the definition of "residential ballast" in the definitions section of existing Appendix Q1 to align with

the existing description at 10 CFR 430.32(m)(8)(vi) and the definition of "designed and marketed" at 10 CFR 430.2 (see section III.A.2 for more information). DOE proposed to define residential ballast in redesignated Appendix Q as "a fluorescent lamp ballast that meets FCC consumer limits as set forth in 47 CFR part 18 and is designed and marketed for use only in residential applications." DOE also proposed to remove the definition of "commercial ballast" that is in the existing Appendix Q1 and instead use the phrase "that are not residential ballasts" in redesignated Appendix Q when referring to any ballasts that do not meet the definition of residential ballast. In the NOPR, DOE explained that this proposed change would align redesignated Appendix Q with the proposed terminology changes in the energy conservation standards at 430.32(m). 80 FR at 407.

In addition, DOE proposed in the January 2015 NOPR to add several terms to the definitions section of redesignated Appendix Q pertaining to BLE standards. 80 FR at 414. First, DOE proposed to add a definition for average total lamp arc power to clarify how to calculate the applicable BLE standard. Average total lamp arc power is referenced in the BLE standards equation (at 10 CFR 430.32(m)(8)) shown in Table III.1. The proposed definition for average total lamp arc power was "the average of the total lamp arc power (as defined and measured in section 2.6.1) of the ballast units tested." 80 FR at 414.

DOE also proposed in the January 2015 NOPR to add a definition for "dimming ballast" to redesignated Appendix Q. 80 FR at 414. The proposed definition for a dimming ballast is "a ballast that is designed to vary its output and that can achieve an output less than or equal to 50 percent of its maximum electrical output." This proposed definition aligned with and clarifies the

dimming ballast exemptions currently specified in 10 CFR 430.32(m). Thus, DOE also proposed to remove the description of a dimming ballast currently at 10 CFR 430.32(m)(9)(i). As proposed, 10 CFR 430.32 would instead reference the new definition for "dimming ballast" in redesignated Appendix Q. 80 FR at 418, 419.

In addition, in the January 2015 NOPR, DOE proposed to add a definition for "sign ballast" to the definitions section of redesignated Appendix Q. 80 FR at 414. DOE proposed to define sign ballast based on the description currently at 10 CFR 430.32(m)(8)(v) and the definition of "designed and marketed" at 10 CFR 430.2 (see section III.A.2 for more information). DOE proposed to define a sign ballast as "a ballast that has an Underwriters Laboratories Inc. Type 2 rating and is designed and marketed for use only in outdoor signs." Rather than listing a description of sign ballast, as does section 2.3.1.4 of existing Appendix Q1, DOE proposed that section 2.3.1.6 of redesignated Appendix Q reference the term in the definitions section of that appendix. 80 FR at 415.

DOE also proposed in the January 2015 NOPR to simplify the language in redesignated Appendix Q by relying on newly defined terms in the definitions within that appendix. 80 FR at 414 through 418. Specifically, in section 2.4.3, DOE proposed to replace the language "For ballasts designed and labeled for residential applications" with "For residential ballasts." In addition, DOE proposed to replace the language "For ballasts designed and labeled as cold-temperature outdoor sign ballasts" with "For sign ballasts." 80 FR at 417.

Finally, DOE proposed in the January 2015 NOPR to remove the terms "active mode" and "standby mode" from redesignated Appendix Q because these terms are already defined at 10 CFR 430.2. The NOPR explained that the definitions in existing Appendix Q1 are consistent with the definitions in 10 CFR 430.2 and are therefore redundant. 80 FR at 408.

Regarding these proposed changes, NEMA commented in support of the changes to the definitions to "residential ballast," "average of the total lamp power," "dimming ballast," and "sign ballast." (NEMA, No. 30 at p. 3) DOE received no further comments regarding the proposed changes to the redesignated Appendix Q. Thus, based on the reasons presented in the January 2015 NOPR, DOE is adopting these changes in this final rule.

In this final rule, DOE is also moving existing definitions of certain lamp types from existing Appendix Q to redesignated Appendix Q that were inadvertently omitted from the NOPR. These lamp types include F34T12, F96T12/ES, and F96T12HO/ES lamps. The omission of these definitions from the NOPR was a technical oversight as ballasts capable of operating these lamp types are subject to energy conservation standards under 10 CFR 430.32(m).

5. Rounding Ballast Luminous Efficiency

Currently, rounding requirements are not provided for the reported value of BLE. When developing standards in the November 2011 standards final rule, DOE rounded BLE to the thousandths place when analyzing the costs and benefits of the adopted standard. For consistency with the intent of the 2011 standards final rule, DOE proposed to specify rounding the reported value of BLE to the nearest thousandths place in the January 2015 NOPR. 80 FR at 414.

NEMA commented that rounding to the thousandths place is acceptable as long as significant figures are handled correctly. (NEMA, No. 30 at p. 3) DOE received no further comments on rounding BLE. However, DOE has since determined that rounding requirements would be more appropriately addressed in 10 CFR 429.26. Therefore, DOE will provide rounding requirements for BLE in a separate rulemaking

6. Language Changes and Corrections to the Text

In the January 2015 NOPR, DOE proposed to add new language at redesignated Appendix Q for some of the testing requirements. 80 FR at 414-418. DOE proposed to use the terminology "designed and marketed for operation" to clarify references to the intended ballast types. See section III.A.2 for more information on the definition of "designed and marketed." Within sections 2.3.1.2, 2.3.1.4.1, 2.3.1.4.2, 2.3.1.4.3, and 2.4.3 of existing Appendix Q1, DOE proposed to change all instances of the following phrases to "designed and marketed for operation" in redesignated Appendix Q:

(1) "Designed to operate;"

(2) "That only operate;" and

(3) "Capable of operating."

80 FR at 414-418.

The National Electrical Manufacturers Association (NEMA) agreed with the proposed revision regarding consistent use of the phrase "designed and marketed for operation." Further, NEMA agreed with the redesignation of Appendix Q1 and clarification changes to redesignated Appendix Q. (NEMA, No. 30 at p. 3) DOE received no further comments in response to the

proposed organizational changes in the January 2015 NOPR. Based on the reasons presented in the January 2015 NOPR, DOE is adopting these changes in this final rule.

Additionally, DOE proposed in the January 2015 NOPR to modify the language of section 2.1 of redesignated Appendix Q to clarify the references to industry standards. 80 FR at 415. DOE believes the sentence as currently written does not clearly explain that the industry standards incorporated by reference in the CFR must be used in place of those listed in the industry standard ANSI C82.2. DOE proposed to add the word "standards" as noted in the following sentence: "In addition when applying ANSI C82.2, the standards ANSI C78.81, ANSI C82.1, ANSI C82.11, and ANSI C82.13 (all incorporated by reference; see §430.3) must be used instead of the versions listed as normative references in ANSI C82.2." 80 FR at 415.

DOE also proposed in the January 2015 NOPR a correction in redesignated Appendix Q relating to an error in existing Appendix Q1 that occurred during publication of the May 2011 test procedure final rule. In section 2.3.1, the heading numbers skip from 2.3.1 to 2.3.1.1.1 (i.e., 2.3.1.1 is omitted). DOE proposed to correct this heading numbering error in redesignated Appendix Q. 80 FR at 415.

Finally, in the January 2015 NOPR, DOE proposed to revise a grammatical issue in redesignated Appendix Q that is in existing section 1.7 of Appendix Q1, which defines "instant-start." In section 1.7 of redesignated Appendix Q, DOE proposed to insert the word "in" so that the definition of instant-start reads "is the starting method used in instant-start systems as defined in ANSI C82.13 (incorporated by reference; see §430.3)." 80 FR at 414.

DOE did not receive any additional comments regarding the language changes and corrections to redesignated Appendix Q proposed in the January 2015 NOPR. Based on the reasons presented in the January 2015 NOPR, DOE is adopting these changes in this final rule.

7. Standby Mode Test Procedure

DOE published a test procedure final rule addressing standby mode energy consumption for ballasts on October 22, 2009. 74 FR at 54445. However, DOE did not adopt standards for standby mode energy use because DOE could not find any ballasts subject to standards that were capable of operating in standby mode. 76 FR 70548, 70553-4 (Nov. 14, 2011). DOE did not address standby mode testing in the January 2015 NOPR. However, DOE received a comment from NEMA stating that ANSI C82.2-2002[9] does not list a test procedure for standby power. NEMA expressed concern that DOE does not appreciate the scale of control signal power when compared to the range of power supplied by the mains to dimming ballasts, and added that standby power measurement of electronic lighting is still a new field. Further, NEMA remarked that it is equally challenging to measure standby mode power consumption for some control interfaces, and that high-end power analyzer uncertainty will be higher than the targeted power. (NEMA, No. 30 at pp. 5-6)

DOE investigated the uncertainty associated with high-end power analyzers commonly used by industry to conduct testing in accordance with ANSI C82.2-2010. Uncertainty is a function of factors such as the magnitude of the current and voltage signal, frequency, and power

[9] "American National Standards for Lamp Ballasts – High Frequency Lamp Ballasts – Supplements" (approved January 17, 2002).

factor. Power analyzer uncertainty is specified by the power analyzer manufacturer and is the ratio of the measured value (frequently referred to as "the reading") and the range over which the power analyzer is configured to measure (frequently referred to as "the range"), reported as a percentage. DOE reviewed the calculation example provided by NEMA and agrees with the approach. However, DOE disagrees with the range selected for current measurements in the example. A power analyzer offers a discrete set of range options, and the range generally selected for a given measurement would be the smallest value that is greater than the expected reading.[10] Had NEMA selected a range of 0.1 amps rather than two amps for the reading of 0.0083 amps, the uncertainty in the power measurement would be much smaller (on the order of two percent of the reading rather than NEMA's calculated 30 percent).

Therefore, DOE finds no reason to amend the standby mode test procedure on the basis of power analyzer measurement uncertainty. While ANSI C82.2-2010 does not discuss standby mode power measurements specifically, DOE finds that in concert with instructions to place the ballast in standby mode, ANSI C82.2-2010 is an appropriate basis for measurement. DOE will retain incorporation by reference of ANSI C82.2-2010 in its standby mode test procedure at redesignated Appendix Q to subpart B of 10 CFR part 430.

C. Compliance and Certification

1. Laboratory Accreditation

DOE has received feedback that the language in 10 CFR 430.25 is causing confusion. Specifically, there has been confusion over the role of the National Voluntary Laboratory

[10] The range typically provides some buffer in excess of the reading to account for non-sinusoidal signals and high instantaneous peak signal values.

Accreditation Program (NVLAP), other accrediting bodies, Underwriter's Laboratories (UL), and Council of Canada. In the January 2015 NOPR, DOE proposed to revise the text to read that testing "must be conducted by test laboratories accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) or by an accreditation body that has a mutual recognition agreement for which NVLAP is a signatory." 80 FR at 414. DOE received several comments regarding this clarification.

The American Association for Laboratory Accreditation (A2LA) agreed with the clarifications made in 10 CFR 430.25 regarding the revisions to the laboratory accreditation language. A2LA recommended further simplifying the requirement by stating that testing could 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) and removing the specific references to NVLAP. A2LA added that if there is concern regarding the use of additional laboratories or MRA-signatory Accreditation Bodies, that DOE use a vetting process similar to that used to recognize Accreditation Bodies for the Lighting Facts program. (A2LA, No. 28 at p. 1)

DOE agrees with A2LA's recommendation to consolidate the accreditation requirement by stating testing could be conducted by test laboratories accredited by an Accreditation Body that is a signatory member to the ILAC MRA. The statement simplifies the accreditation requirements while also maintaining the change to allow for testing at laboratories accredited by NVLAP as well as laboratories accredited by other organizations with equivalent functions as NVLAP. Therefore, DOE is adopting the requirement that testing "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)."

CSA Group (CSA) expressed support for the clarification that testing "must be conducted by test laboratories accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) or by an accreditation body that has a mutual recognition agreement for which NVLAP is a signatory" provided the clarification does not preclude the use of a NVLAP accredited lab's Supervised Manufacturer's Testing Laboratory (SMTL) Program or Witnessed Manufacturer's Testing Laboratory (WMTL) Program. CSA added that SMTL/WMTL Programs are used by manufacturers for third-party compliance of Canadian Energy Efficiency Regulations, California Energy Commission Regulations, and U.S. EPA ENERGY STAR® Specifications. (CSA, No. 29 at p. 1)

For fluorescent lamp ballast certification testing, DOE does not currently allow the practice of testing by first party laboratories through witness testing programs. DOE found that witness testing programs, such as SMTL and WMTL programs, vary depending on the regulatory body. Further, DOE determined that the program requirements were not well-defined. Because the program requirements varied among regulatory bodies and were not always clearly defined, DOE believes that allowing for witness testing may produce results that are not consistent or repeatable. Therefore, DOE declines to add a provision permitting use of a witnessed or supervised testing program. All testing must be conducted at a laboratory accredited by an Accreditation Body that is a signatory member to the ILAC MRA, including manufacturer

laboratories. Additionally, DOE is maintaining the existing clarification that states a manufacturer's or importer's own laboratory, if accredited, may conduct the applicable testing.

NEMA proposed that the changes to the existing 10 CFR 430.25 read "must be conducted by test laboratories accredited by the National Voluntary Laboratory Accreditation Program (NVLAP), or by an Nationally Recognized Testing Laboratory (NRTL), or by an accreditation body that has a mutual recognition agreement for which NVLAP is a signatory." (NEMA, No. 30 at p. 4)

DOE considered whether NRTLs should be added to the laboratory accreditation requirements and found that the DOE test procedure at Appendix Q1 and the industry standards incorporated by reference in Appendix Q1 are not included in the list of test standards determined to be appropriate for use under the Occupational Safety and Health Administration's (OSHA) NRTL program. Because the laboratory accreditation requirements specified at 10 CFR 430.25 only apply to the DOE test procedure, DOE does not find it necessary to add NRTLs to the list of acceptable test laboratories.

Additionally, DOE proposed in the January 2015 NOPR to remove the statement at 10 CFR 430.25 noting that testing for fluorescent lamp ballasts performed in accordance with the existing Appendix Q is not required to be conducted by test laboratories accredited by NVLAP or an accrediting organization recognized by NVLAP. 80 FR at 414. The NOPR reasoned that, because DOE proposed to remove the BEF test procedure at existing Appendix Q and replace it with the BLE test procedure from existing Appendix Q1, this statement is also no longer

relevant. 80 FR at 408. DOE received no comment in response to these additional proposed text changes to 10 CFR 430.25 in the January 2015 NOPR. Based on the reasons presented above, DOE is adopting these changes in this final rule.

Finally, DOE proposed in the January 2015 NOPR to remove statements at 10 CFR 430.25 indicating the relevant Appendix for testing specific lighting products. 80 FR at 414. The NOPR explained that DOE proposed to remove these unnecessary statements so that 10 CFR 430.25 is focused solely on laboratory accreditation. 80 FR at 408.

NEMA commented that these proposed changes are too far reaching, and suggested that DOE limit the change to passages pertaining only to fluorescent ballasts. (NEMA, No. 30 at p. 4) DOE is not certain what NEMA intended by its comment that the proposed changes are too far reaching, given that the other proposed changes to 430.25 were to remove obsolete and/or redundant provisions. Therefore, to provide clarity and simplify the text of 10 CFR 430.25, DOE is removing all statements indicating the relevant Appendix for testing specific lighting products, not just for fluorescent lamp ballasts.

2. Evaluating Compliance with Standards

Manufacturers must evaluate compliance with BLE standards according to 10 CFR 429.26. As prescribed at 10 CFR 429.26(a)(2), for each basic model of fluorescent lamp ballast, a minimum of four units must be randomly selected and tested using redesignated Appendix Q. The manufacturer must then evaluate compliance with the standard by comparing the mean from testing and the lower 99 percent confidence limit (LCL) of the true mean divided by 0.99. The

mean of the sample is computed using the equation at section 429.26(a)(2)(ii)(A), and the equation to evaluate the LCL is found at section 429.26(a)(2)(ii)(B). The following is an example calculation for evaluating compliance with BLE standards.

Table III.4 presents example test data used to evaluate compliance with standards for a fluorescent lamp ballast designed and marketed for operation of a maximum of two F96T8 lamps.

Table III.4 Example Test Data for Two-Lamp F96T8 Ballast*

Ballast Number	Number of Lamps	Input to Ballast			Lamp 1			Lamp 2			BLE	Power Factor
		Input Voltage (V)	Input Current (A)	Input Power (W)	Output Voltage (V)	Output Current (A)	Output Power (W)	Output Voltage (V)	Output Current (A)	Output Power (W)		
Unit 1	2	277.5	0.5118	140.0	260.8	0.2556	64.83	259.6	0.2566	65.07	0.9279	0.99
Unit 2	2	277.2	0.5134	140.3	261.4	0.2549	64.77	259.6	0.2580	65.40	0.9278	0.99
Unit 3	2	276.9	0.5023	137.1	251.9	0.2569	63.55	250.0	0.2598	63.81	0.9290	0.99
Unit 4	2	276.8	0.5139	140.3	260.7	0.2570	65.13	261.1	0.2558	65.18	0.9288	0.99
* Example test data includes data necessary for example calculation.												

The example ballast is a universal voltage, high frequency ballast designed to operate 8-foot slimline lamps and is intended for use in non-residential applications. Four units of the basic model are tested using the test procedure at redesignated Appendix Q. Each unit is tested while operating two 59 W F96T8 lamps, and the resulting measurements are shown in Table III.4. The required calculations are performed for each ballast and include computing the BLE and power factor. To calculate the BLE of unit 1, Equation 1 is utilized.

$$Ballast\ Luminous\ Efficiency = \frac{Total\ Lamp\ Arc\ Power}{Input\ Power} \times \beta$$

Equation 1

Where:

Total Lamp Arc Power = sum of the lamp arc powers for all lamps operated by the ballast (as determined by section 2.5.1.5 of amended Appendix Q),

Input Power = measured input power to the ballast (as determined by section 2.5.1.6 of amended Appendix Q), and

β = frequency adjustment factor (Table A of amended Appendix Q).

Equation 2 shows the calculation for BLE using the data from Table III.4 for unit 1.

$$\text{Ballast Luminous Efficiency}_{\text{Unit1}} = \frac{(64.83 + 65.07)}{140.0} \times 1.0 = 0.9279$$

Equation 2

The power factor is also calculated for unit 1 using Equation 3.

$$\text{Power Factor} = \frac{\text{Input Power}}{\text{Input Voltage} \times \text{Input Current}}$$

Equation 3

Equation 4 shows the calculation for power factor using the data from Table III.4 for unit 1.

$$\text{Power Factor}_{\text{Unit1}} = \frac{140.0}{277.5 \times 0.5118} = 0.99$$

Equation 4

The same process is repeated for each of the three remaining ballast units. The resulting BLE and power factor values are shown in Table III.4.

To determine the minimum BLE that a basic model must meet or exceed to be compliant with standards, manufacturers must average the total lamp arc power of the units and input the average into the appropriate energy conservation standard efficiency level. The reported BLE for each basic model must meet or exceed the output of Equation 5. For instant start ballasts that are designed to operate 8-foot slimline lamps, A=0.993; B=0.27; and C=0.25.

$$\text{BLE} = \frac{\text{A}}{1 + \text{B} \times \text{power}^{-\text{c}}}$$

Equation 5

Where:

power = average total lamp arc power.

The total lamp arc power is calculated using the data from Table III.4 for each of the tested ballasts as shown in Equation 6 for Unit 1. The average total lamp arc power of the sample is then calculated as shown in Equation 7. Equation 8 uses the resulting average total lamp arc power to calculate the BLE standard.

$$\text{Total Lamp Arc Power}_{\text{Unit1}} = 64.83 + 65.07 = 129.90$$

Equation 6

$$\text{Average Total Lamp Arc Power} = \frac{129.90 + 130.17 + 127.36 + 130.31}{4} = 129.44$$

Equation 7

$$\text{BLE} = \frac{0.993}{1 + 0.27 \times 129.44^{-0.25}} = 0.919$$

Equation 8

Next, as stated previously, manufacturers must follow the provisions laid out in section 429.26 to certify for compliance. The mean BLE of the sample is calculated using Equation 9.

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

Equation 9

Where:

$\bar{x}$ = sample mean,

n = number of samples, and

x_i = i^{th} sample.

The mean BLE calculation using the data from Table III.4 is shown in Equation 10.

$$\bar{x} = \frac{1}{4}(0.9279 + 0.9278 + 0.9290 + 0.9288) = 0.928$$

Equation 10

The lower 99 percent confidence limit of the true mean is calculated using Equation 11.

$$LCL = \bar{x} - t_{0.99}\left(\frac{s}{\sqrt{n}}\right)$$

Equation 11

Where:

$\bar{x}$ = sample mean,

s = sample standard deviation,

n = number of samples, and

$t_{0.99}$ = t statistic for a 99% one-tailed confidence interval with n-1 degrees of freedom.

Equation 12 and Equation 13 show calculations for LCL and LCL divided by 0.99, respectively, using the test data from Table III.4.

$$LCL = 0.9284 - 4.541\left(\frac{0.0006131}{\sqrt{4}}\right) = 0.9270$$

Equation 12

$$\frac{LCL}{0.99} = \frac{0.9270}{0.99} = 0.936$$

Equation 13

Manufacturers may report that products perform within a range of values constrained by the standard and the statistical value based on test data. The standard serves as the minimum allowable BLE, and the lower of the mean BLE or LCL of the true mean divided by 0.99 serves as the maximum allowable BLE value reported for compliance. In this example, the mean is 0.928, and the LCL/0.99 is 0.936. Therefore, in this example, the minimum allowable BLE reported for compliance is the standard of 0.919, and the maximum BLE allowable to be reported is 0.928. No additional tolerances are provided when determining BLE.

3. Compliance Date for this Final Rule

Compliance with existing standards has been required since the dates discussed in section III.A. The amendments in this rulemaking will be effective 30 days following publication of this final rule. Consistent with 42 U.S.C. 6293(c), any representations of energy efficiency or energy use will be required to be based on the amended test procedure no later than 180 days after the publication of the final rule in the Federal Register.

4. Compliance Certification Management System

DOE did not discuss the contents of the DOE's Compliance Certification Management System (CCMS) in the January 2015 NOPR. However, DOE received a comment from NEMA stating that the template for submitting products to the DOE's CCMS includes categories no longer in use now that compliance is required with the energy conservation standards adopted in the November 2011 standards final rule. NEMA commented that DOE should remove the outdated categories. (NEMA, No. 30 at p. 6) DOE will remove the categories corresponding to outdated energy conservation standards in a future revision of the certification template.

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 Office of Management and Budget.

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 (IFRA) for any rule that by law must be proposed for public comment, 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 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.

This rulemaking clarifies existing requirements for testing and compliance with standards and does not change the burden associated with fluorescent lamp ballast regulations on any entity large or small. Therefore, DOE concludes and certifies that this rulemaking does not have a significant economic impact on a substantial number of small entities.

Accordingly, DOE has not prepared a regulatory flexibility analysis for this rulemaking. DOE's certification and supporting statement of factual basis will be provided to the Chief Counsel for Advocacy of the SBA[11] for review under 5 U.S.C. 605(b). DOE certifies that this rule has no significant impact on a substantial number of small entities.

C. Review Under the Paperwork Reduction Act of 1995

Manufacturers of fluorescent lamp ballasts must certify to DOE that their products comply with any applicable energy conservation standards. In certifying compliance, manufacturers must test their products according to the DOE test procedures for fluorescent lamp ballasts, including any amendments adopted for those test procedures. DOE has established regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment, including fluorescent lamp ballasts. 76 FR 12422 (March 7,

[11] Small Business Administration.

2011). The collection-of-information requirement for the certification and recordkeeping is subject to review and approval by OMB under the Paperwork Reduction Act (PRA).

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 shall 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 amends its test procedures for fluorescent lamp ballasts. 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 would clarify the existing energy conservation standards and test procedures without affecting the amount, quality or distribution of energy usage, and, therefore, would not result in any environmental impacts. Thus, this rulemaking is covered by Categorical Exclusion A5 under 10 CFR part 1021, subpart

D, which applies to any rulemaking that interprets or amends an existing rule without changing the environmental effect of that rule. 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 would 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 today's 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, the 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. Pub. L. No. 104-4, sec. 201 (codified at 2 U.S.C. 1531). For a proposed regulatory action likely to result 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 (Pub. L. 105-277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This rule would 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 would 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 proposed 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 clarify the energy conservation standards and test procedures for measuring the energy efficiency of fluorescent lamp ballasts 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 (Pub. L. 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 final rule 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. This final rule does not revise the existing incorporation of industry standards regarding fluorescent lamp ballasts. Therefore, DOE concludes that the requirements of section 32(b) of the FEAA, (i.e., that the standards were

developed in a manner that fully provides for public participation, comment, and review) do not apply to this rulemaking.

M.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 in 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, on May 29, 2015.

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

For the reasons stated in the preamble, DOE is amending part 430 of Chapter II of Title 10, Code of Federal Regulations as set forth below:

PART 430 - ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

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

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

2. Section 430.2 is amended by revising the definition of "ballast luminous efficiency" to read as follows:

§430.2 Definitions.

*** * * * ***

Ballast luminous efficiency means the total fluorescent lamp arc power divided by the fluorescent lamp ballast input power multiplied by the appropriate frequency adjustment factor, as defined in appendix Q of subpart B of this part.

*** * * * ***

§430.3 [Amended]

3. Section 430.3 is amended by:

a. Removing "appendix Q1" in paragraphs (d)(5), (6), (13), and (14); and

b. Removing "and appendix Q1" in paragraphs (d)(11), (12), and (15).

§430.23 [Amended]

4. Section 430.23 is amended by removing "appendix Q1" and adding in its place, "appendix Q" in paragraphs (q)(1)(i), (q)(2), and (q)(3)(iii).

5. 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), incandescent reflector lamps, medium base compact fluorescent lamps, and fluorescent lamp ballasts 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.

Appendix Q to Subpart B of Part 430 [Removed]

6. Appendix Q to subpart B of part 430 is removed.

7. Appendix Q1 to subpart B of part 430 is redesignated as appendix Q to subpart B of part 430 and revised to read as follows:

Appendix Q to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Fluorescent Lamp Ballasts

1. Definitions

1.1. AC control signal means an alternating current (AC) signal that is supplied to the ballast using additional wiring for the purpose of controlling the ballast and putting the ballast in standby mode.

1.2. Average total lamp arc power means the average of the total lamp arc power (as defined and measured in section 2.6.1) of the ballast units tested.

1.3. Cathode heating refers to power delivered to the lamp by the ballast for the purpose of raising the temperature of the lamp electrode or filament.

1.4. DC control signal means a direct current (DC) signal that is supplied to the ballast using additional wiring for the purpose of controlling the ballast and putting the ballast in standby mode.

1.5. Dimming ballast means a ballast that is designed to vary its output and that can achieve an output less than or equal to 50 percent of its maximum electrical output.

1.6. F34T12 lamp (also known as a "F40T12/ES lamp") means a nominal 34 watt tubular fluorescent lamp that is 48 inches in length and one and a half inches in diameter, and conforms to ANSI C78.81 (Data Sheet 7881-ANSI-1006-1) (incorporated by reference; see §430.3).

1.7. F96T12/ES lamp means a nominal 60 watt tubular fluorescent lamp that is 96 inches in length and one and a half inches in diameter, and conforms to ANSI C78.81 (Data Sheet 7881-ANSI-3006-1) (incorporated by reference; see §430.3).

1.8. F96T12HO/ES lamp means a nominal 95 watt tubular fluorescent lamp that is 96 inches in length and one and a half inches in diameter, and conforms to ANSI C78.81 (Data Sheet 7881-ANSI-1017-1) (incorporated by reference; see §430.3).

1.9. High-frequency ballast is as defined in ANSI C82.13 (incorporated by reference; see §430.3).

1.10. Instant-start is the starting method used in instant-start systems as defined in ANSI C82.13 (incorporated by reference; see §430.3).

1.11. Low-frequency ballast is a fluorescent lamp ballast that operates at a supply frequency of 50 to 60 Hz and operates the lamp at the same frequency as the supply.

1.12. PLC control signal means a power line carrier (PLC) signal that is supplied to the ballast using the input ballast wiring for the purpose of controlling the ballast and putting the ballast in standby mode.

1.13. Programmed-start is the starting method used in programmed-start systems as defined in ANSI C82.13 (incorporated by reference; see §430.3).

1.14. Rapid-start is the starting method used in rapid-start type systems as defined in ANSI C82.13 (incorporated by reference; see §430.3).

1.15. Reference lamp is a fluorescent lamp that meets certain operating conditions as defined by ANSI C82.13 (incorporated by reference; see §430.3).

1.16. Residential ballast means a fluorescent lamp ballast that meets FCC consumer limits as set forth in 47 CFR part 18 and is designed and marketed for use only in residential applications.

1.17. RMS is the root mean square of a varying quantity.

1.18. Sign ballast means a ballast that has an Underwriters Laboratories Inc. Type 2 rating and is designed and marketed for use only in outdoor signs.

1.19. Wireless control signal means a wireless signal that is radiated to and received by the ballast for the purpose of controlling the ballast and putting the ballast in standby mode.

2. Active Mode Procedure

2.1. Where ANSI C82.2 (incorporated by reference; see §430.3) references ANSI C82.1-1997, the operator must use ANSI C82.1 (incorporated by reference; see §430.3) for testing low-frequency ballasts and must use ANSI C82.11 (incorporated by reference; see § 430.3) for testing high-frequency ballasts. In addition when applying ANSI C82.2, the standards ANSI

C78.81, ANSI C82.1, ANSI C82.11, and ANSI C82.13 must be used instead of the versions listed as normative references in ANSI C82.2.

2.2. Instruments

2.2.1. All instruments must be as specified by ANSI C82.2 (incorporated by reference; see §430.3).

2.2.2. Power Analyzer. In addition to the specifications in ANSI C82.2 (incorporated by reference; see §430.3), the power analyzer must have a maximum 100 pF capacitance to ground and frequency response between 40 Hz and 1 MHz.

2.2.3. Current Probe. In addition to the specifications in ANSI C82.2 (incorporated by reference; see §430.3), the current probe must be galvanically isolated and have frequency response between 40 Hz and 20 MHz.

2.3. Test Setup

2.3.1. The ballast must be connected to a main power source and to the fluorescent lamp load according to the manufacturer's wiring instructions and ANSI C82.1 (incorporated by reference; see §430.3) and ANSI C78.81 (incorporated by reference; see §430.3).

2.3.1.1. Wire lengths between the ballast and fluorescent lamp must be the length provided by the ballast manufacturer. Wires must be kept loose and not shortened or bundled.

2.3.1.2. If the wire lengths supplied with the ballast are of insufficient length to reach both ends of lamp, additional wire may be added. Add the minimum additional wire length necessary, and the additional wire must be the same wire gauge as the wire supplied with the ballast. If no wiring is provided with the ballast, 18 gauge or thicker wire must be used. The wires must be separated from each other and grounded to prevent parasitic capacitance for all wires used in the

apparatus, including those wires from the ballast to the lamps and from the lamps to the measuring devices.

2.3.1.3. The fluorescent lamp must meet the specifications of a reference lamp as defined by ANSI C82.13 (incorporated by reference; see §430.3) and be seasoned at least 12 hours.

2.3.1.4. The ballast must be connected to the number of lamps equal to the maximum number of lamps the ballast is designed and marketed to operate.

2.3.1.5 Ballasts designed and marketed to operate both 4-foot medium bipin lamps and 2-foot U-shaped lamps must be tested with 4-foot medium bipin lamps.

2.3.1.6. With the exception of sign ballasts (described in section 2.3.1.7 and its subsections), ballasts designed and marketed to operate both T8 and T12 lamps must be tested with T8 lamps.

2.3.1.7. For sign ballasts (as defined in section 1.18):

2.3.1.7.1. Use a T8 lamp as specified in Table A of this section for sign ballasts that are designed and marketed to operate only T8 lamps.

2.3.1.7.2. Use a T12 lamp as specified in Table A of this section for sign ballasts that are designed and marketed to operate only T12 lamps.

2.3.1.7.3. Use a T12 lamp as specified in Table A of this section for sign ballasts that are designed and marketed to operate both T8 and T12 lamps.

2.3.1.8. Test each ballast with the lamp type specified in Table A of this section that corresponds to the lamp diameter the ballast is designed and marketed to operate. Test each ballast with only one lamp type.

TABLE A—LAMP-AND-BALLAST PAIRINGS AND FREQUENCY ADJUSTMENT FACTORS

	Lamp type		**Frequency adjustment factor (β)**	
Ballast type	**Lamp diameter**	**Nominal**	**Low-**	**High-**

	and base	lamp wattage	frequency	frequency
Ballasts that operate straight-shaped lamps (commonly referred to as 4-foot medium bipin lamps) with medium bipin bases and a nominal overall length of 48 inches	T8 MBP	32	0.94	1.0
	T12 MBP	34	0.93	1.0
Ballasts that operate U-shaped lamps (commonly referred to as 2-foot U-shaped lamps) with medium bipin bases and a nominal overall length between 22 and 25 inches	T8 MBP	32	0.94	1.0
	T12 MBP	34	0.93	1.0
Ballasts that operate rapid-start lamps (commonly referred to as 8-foot-high output lamps) with recessed double contact bases and a nominal overall length of 96 inches	T8 HO RDC	86	0.92	1.0
	T12 HO RDC	95	0.94	1.0
Ballasts that operate instant-start lamps (commonly referred to as 8-foot slimline lamps) with single pin bases and a nominal overall length of 96 inches	T8 slimline SP	59	0.95	1.0
	T12 slimline SP	60	0.94	1.0
Ballasts that operate straight-shaped lamps (commonly referred to as 4-foot miniature bipin standard output lamps) with miniature bipin bases and a nominal length between 45 and 48 inches	T5 SO Mini-BP	28	0.95	1.0
Ballasts that operate straight-shaped lamps (commonly referred to as 4-foot miniature bipin high output lamps) with miniature bipin bases and a nominal length between 45 and 48 inches	T5 HO Mini-BP	54	0.95	1.0
Sign ballasts that operate rapid-start lamps (commonly referred to as 8-foot high output lamps) with recessed double contact bases and a nominal overall length of 96 inches	T8 HO RDC	86	0.92	1.0
	T12 HO RDC	110*	0.94	1.0
MBP, Mini-BP, RDC, and SP represent medium bipin, miniature bipin, recessed double contact, and single pin, respectively. A ballast must be tested with only one lamp type based on the ballast type description and lamp diameter it is designed and marketed to operate. * Lamp type is commonly marketed as 110 W, however ANSI C78.81 Data Sheet lists nominal wattage of 113 W.				

2.3.2. Power Analyzer

2.3.2.1. The power analyzer test setup must have n+1 channels where n is the number of lamps a ballast operates. Use the minimum number of power analyzers possible during testing. A system may be used to synchronize the power analyzers, and all power analyzers must be synchronized in time.

2.3.2.2. Lamp Arc Voltage. Leads from the power analyzer should attach to each fluorescent lamp according to Figure 1 of this section for rapid- and programmed-start ballasts, Figure 2 of this section for instant-start ballasts operating single pin (SP) lamps, and Figure 3 of this section for instant-start ballasts operating medium bipin (MBP), miniature bipin (mini-BP), or recessed double contact (RDC) lamps. The programmed- and rapid-start ballast test setup includes two 1000 ohm resistors placed in parallel with the lamp pins to create a midpoint from which to measure lamp arc voltage.

2.3.2.3. Lamp Arc Current. A current probe must be positioned on each fluorescent lamp according to Figure 1 for rapid- and programmed-start ballasts, Figure 2 of this section for instant-start ballasts operating SP lamps, and Figure 3 of this section for instant-start ballasts operating MBP, mini-BP, and RDC lamps.

2.3.2.3.1. For the lamp arc current measurement, the full transducer ratio must be set in the power analyzer to match the current probe to the power analyzer.

$$Full\ Transducer\ Ratio = \frac{I_{in}}{V_{out}} \times \frac{R_{in}}{R_{in} + R_s}$$

Where: I_{in} is the current through the current transducer, V_{out} is the voltage out of the transducer, R_{in} is the power analyzer impedance, and R_s is the current probe output impedance.

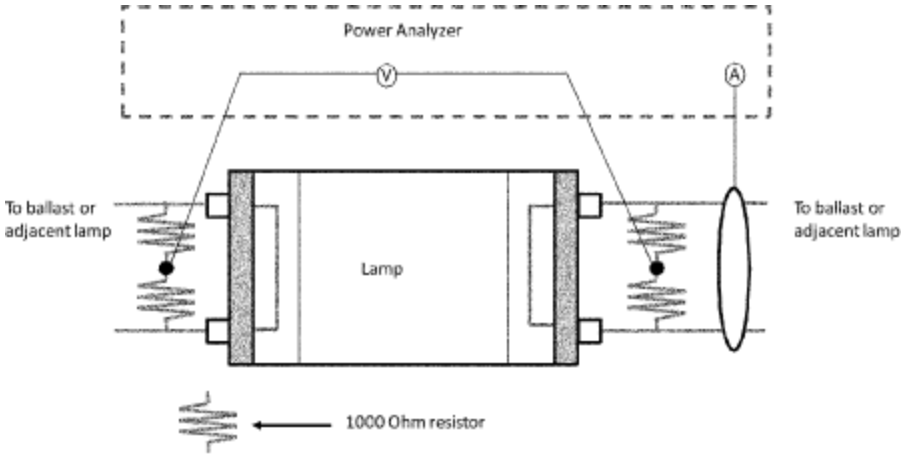

Figure 1: Programmed- and Rapid-Start Ballast Instrumentation Setup

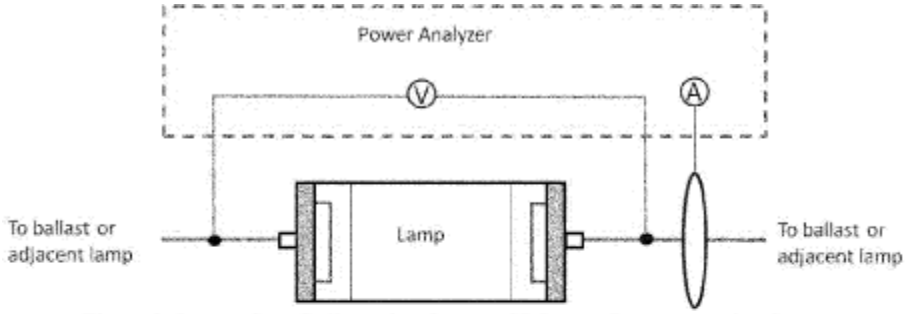

Figure 2: Instant-Start Ballasts that Operate SP Lamps Instrumentation Setup

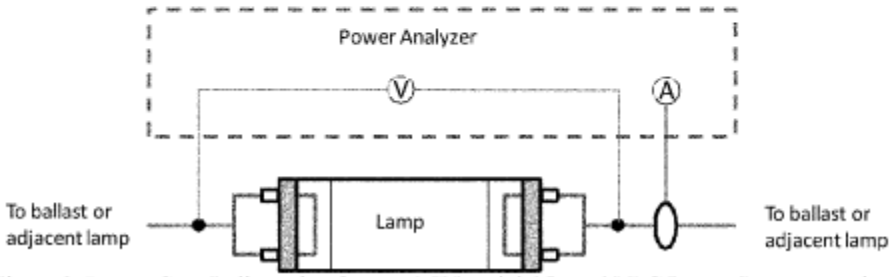

Figure 3: Instant-Start Ballasts that Operate MBP, mini-BP, and RDC Lamps Instrumentation Setup

2.4. Test Conditions

2.4.1. The test conditions for testing fluorescent lamp ballasts must be done in accordance with ANSI C82.2 (incorporated by reference; see §430.3). DOE further specifies that the following revisions of the normative references indicated in ANSI C82.2 should be used in place of the references directly specified in ANSI C82.2: ANSI C78.81 (incorporated by reference; see

§430.3), ANSI C82.1 (incorporated by reference; see §430.3), ANSI C82.3 (incorporated by reference; see §430.3), ANSI C82.11 (incorporated by reference; see §430.3), and ANSI C82.13 (incorporated by reference; see §430.3). All other normative references must be as specified in ANSI C82.2.

2.4.2. Room Temperature and Air Circulation. The test facility must be held at 25 ±2 °C, with minimal air movement as defined in ANSI C78.375 (incorporated by reference; see §430.3).

2.4.3. Input Voltage. Disregard the directions in ANSI C82.2 (incorporated by reference; see §430.3) section 4.1, and use the following directions for input voltage instead. For ballasts designed and marketed for operation at multiple voltages that are not residential ballasts, test the ballast at 277V ±0.1%. For residential ballasts designed and marketed for operation at multiple voltages, test the ballast at 120V ±0.1%. For sign ballasts designed and marketed for operation at multiple voltages, test the ballast at 120V ±0.1%. Ballasts designed and marketed for operation at only one input voltage must be tested at that specified voltage.

2.5. Test Method

2.5.1. Ballast Luminous Efficiency.

2.5.1.1. The ballast must be connected to the appropriate fluorescent lamps and to measurement instrumentation as indicated by the Test Setup in section 2.3.

2.5.1.2. The ballast must be operated at full output for at least 15 minutes but no longer than 1 hour until stable operating conditions are reached. Once this condition is reached, and with the ballast continuing to operate at full output, measure each of the parameters described in sections 2.5.1.3 through 2.5.1.9 concurrently.

2.5.1.2.1. Stable operating conditions are determined by measuring lamp arc voltage, current, and power once per second in accordance with the setup described in section 2.3. Once the

difference between the maximum and minimum values for lamp arc voltage, current, and power do not exceed one percent over a four minute moving window, the system is considered stable.

2.5.1.3. Lamp Arc Voltage. Measure lamp arc voltage (volts) using the setup described in section 2.3.2.2.

2.5.1.4. Lamp Arc Current. Measure lamp arc current (amps) using the setup described in section 2.3.2.3.

2.5.1.5. Lamp Arc Power. The power analyzer must calculate output power by using the measurements described in sections 2.5.1.3 and 2.5.1.4.

2.5.1.6. Input Power. Measure the input power (watts) to the ballast in accordance with ANSI C82.2 (incorporated by reference; see §430.3), section 7.

2.5.1.7. Input Voltage. Measure the input voltage (volts) (RMS) to the ballast in accordance with ANSI C82.2 (incorporated by reference; see §430.3), section 3.2.1 and section 4.

2.5.1.8. Input Current. Measure the input current (amps) (RMS) to the ballast in accordance with ANSI C82.2 (incorporated by reference; see §430.3), section 3.2.1 and section 4.

2.5.1.9. Lamp Operating Frequency. Measure the frequency of the waveform delivered from the ballast to any lamp in accordance with the setup in section 2.3.

2.6. Calculations

2.6.1. Calculate ballast luminous efficiency (BLE).

$$Ballast\ Luminous\ Efficiency = \frac{Total\ Lamp\ Arc\ Power}{Input\ Power} \times \beta$$

Where: Total Lamp Arc Power is the sum of the lamp arc powers for all lamps operated by the ballast as determined by section 2.5.1.5, Input Power is as determined by section 2.5.1.6, and β is equal to the frequency adjustment factor in Table A.

2.6.2. Calculate Power Factor (PF).

$$PF = \frac{Input\ Power}{Input\ Voltage\ \times Input\ Current}$$

Where: Input Power is determined in accordance with section 2.5.1.6, Input Voltage is determined in accordance with section 2.5.1.7, and Input Current is determined in accordance with section 2.5.1.8.

3. Standby Mode Procedure

3.1. The measurement of standby mode power need not be performed to determine compliance with energy conservation standards for fluorescent lamp ballasts at this time. On or after [**INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**], if a manufacturer makes any representations with respect to the standby mode power use of fluorescent lamp ballasts, then testing must also include the provisions of this test procedure related to standby mode energy consumption.

3.2. Test Conditions

3.2.1. The test conditions for testing fluorescent lamp ballasts must be established in accordance with ANSI C82.2 (incorporated by reference; see § 430.3). The test conditions for measuring standby power are described in sections 5, 7, and 8 of ANSI C82.2. Fluorescent lamp ballasts that are designed and marketed for connection to control devices must be tested with all commercially available compatible control devices connected in all possible configurations. For each configuration, a separate measurement of standby power must be made in accordance with section 3.3 of the test procedure.

3.3. Test Method and Measurements

3.3.1. The test for measuring standby mode energy consumption of fluorescent lamp ballasts must be done in accordance with ANSI C82.2 (incorporated by reference; see §430.3).

3.3.2. Send a signal to the ballast instructing it to have zero light output using the appropriate ballast communication protocol or system for the ballast being tested.

3.3.3. Input Power. Measure the input power (watts) to the ballast in accordance with ANSI C82.2, section 13, (incorporated by reference; see §430.3).

3.3.4. Control Signal Power. The power from the control signal path must be measured using all applicable methods described below.

3.3.4.1. AC Control Signal. Measure the AC control signal power (watts), using a wattmeter (W), connected to the ballast in accordance with the circuit shown in Figure 4 of this section.

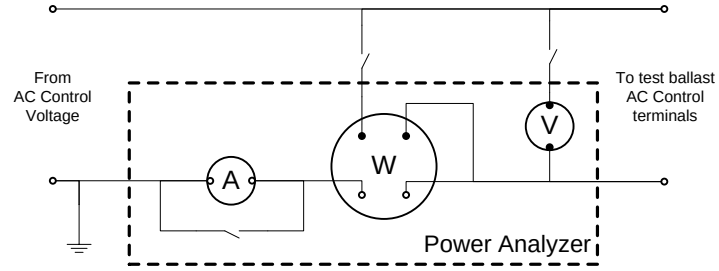

Figure 4. Circuit for Measuring AC Control Signal Power in Standby Mode

3.3.4.2. DC Control Signal. Measure the DC control signal voltage, using a voltmeter (V), and current, using an ammeter (A), connected to the ballast in accordance with the circuit shown in Figure 5 of this section. The DC control signal power is calculated by multiplying the DC control signal voltage and the DC control signal current.

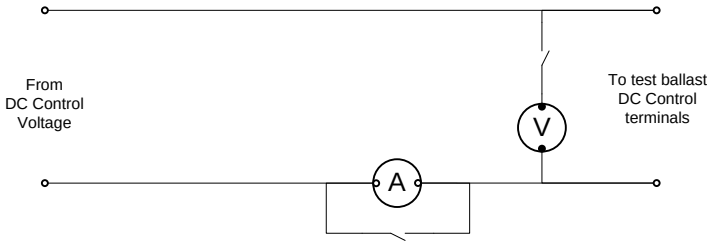

Figure 5: Circuit for Measuring DC Control Signal Power in Standby Mode

3.3.4.3. Power Line Carrier (PLC) Control Signal. Measure the PLC control signal power (watts) using a wattmeter (W) connected to the ballast in accordance with the circuit shown in Figure 6 of this section. The wattmeter must have a frequency response that is at least 10 times higher than the PLC being measured in order to measure the PLC signal correctly. The wattmeter must also be high-pass filtered to filter out power at 60 Hertz.

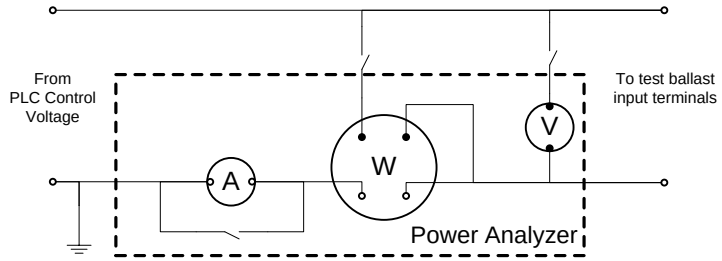

Figure 6: Circuit for Measuring PLC Control Signal Power in Standby Mode

3.3.4.4. Wireless Control Signal. The power supplied to a ballast using a wireless signal is not easily measured but is estimated to be well below 1.0 watt. Therefore, the wireless control signal power is not measured as part of this test procedure.

8. Section 430.32 is amended by revising paragraph (m) to read as follows:

§430.32 Energy and water conservation standards and their compliance dates.

* * * * *

(m) Fluorescent lamp ballasts.

(1) Standards for fluorescent lamp ballasts (other than dimming ballasts)

Except as provided in paragraphs (m)(2) and (m)(3) of this section, each fluorescent lamp ballast manufactured on or after November 14, 2014,

(i) Designed and marketed —

(A) To operate at nominal input voltages at or between 120 and 277 volts;

(B) To operate with an input current frequency of 60 Hertz; and

(C) For use in connection with fluorescent lamps (as defined in § 430.2)

(ii) Must have —

(A) A power factor of:

(*1*) 0.9 or greater for ballasts that are not residential ballasts; or

(*2*) 0.5 or greater for residential ballasts; and

(B) A ballast luminous efficiency not less than the following:

BLE = A/(1+B×average total lamp arc power ^ −C) Where A, B, and C are as follows:			
Description	**A**	**B**	**C**
Instant start and rapid start ballasts (not classified as residential ballasts) that are designed and marketed to operate 4-foot medium bipin lamps; 2-foot U-shaped lamps; or 8-foot slimline lamps.	0.993	0.27	0.25
Programmed start ballasts (not classified as residential ballasts) that are designed and marketed to operate 4-foot medium bipin lamps; 2-foot U-shaped lamps; 4-foot miniature bipin standard output lamps; or 4-foot miniature bipin high output lamps.	0.993	0.51	0.37
Instant start and rapid start ballasts (not classified as sign ballasts) that are designed and marketed to operate 8-foot high output lamps.	0.993	0.38	0.25
Programmed start ballasts (not classified as sign ballasts) that are designed and marketed to operate 8-foot high output lamps.	0.973	0.70	0.37
Sign ballasts that are designed and marketed to operate 8-foot high output lamps	0.993	0.47	0.25
Instant start and rapid start residential ballasts that are designed and marketed to operate 4-foot medium bipin lamps; 2-foot U-shaped lamps; or 8-foot slimline lamps.	0.993	0.41	0.25

Programmed start residential ballasts that are designed and marketed to operate 4-foot medium bipin lamps or 2-foot U-shaped lamps.	0.973	0.71	0.37

(2) Standards for certain dimming ballasts

Except as provided in paragraph (m)(3) of this section, each dimming ballast manufactured on or after November 14, 2014; designed and marketed to operate one F34T12, two F34T12, two F96T12/ES, or two F96T12HO/ES lamps; and

(i) Designed and marketed —

(A) To operate at nominal input voltages at or between 120 and 277 volts;

(B) To operate with an input current frequency of 60 Hertz; and

(C) For use in connection with fluorescent lamps (as defined in §430.2)

(ii) Must have –

(A) A power factor of:

(*1*) 0.9 or greater for ballasts that are not residential ballasts; or

(*2*) 0.5 or greater for residential ballasts; and

(B) A ballast luminous efficiency not less than the following:

			Ballast luminous efficiency	
Designed and marketed for operation of a maximum of	**Nominal input voltage**	**Total nominal lamp watts**	**Low frequency ballasts**	**High frequency ballasts**
One F34T12 lamp	120/277	34	0.777	0.778
Two F34T12 lamps	120/277	68	0.804	0.805
Two F96T12/ES lamps	120/277	120	0.876	0.884
Two F96T12HO/ES lamps	120/277	190	0.711	0.713

(3) Exemptions

The power factor and ballast luminous efficiency standards described in paragraph (m)(1)(ii) and (m)(2)(ii) of this section do not apply to:

(i) A dimming ballast designed and marketed to operate exclusively lamp types other than one F34T12, two F34T12, two F96T12/ES, or two F96T12HO/ES lamps;

(ii) A low frequency ballast that is designed and marketed to operate T8 diameter lamps; is designed and marketed for use in electromagnetic-interference-sensitive-environments only; and is shipped by the manufacturer in packages containing 10 or fewer ballasts; or

(iii) A programmed start ballast that operates 4-foot medium bipin T8 lamps and delivers on average less than 140 milliamperes to each lamp.

(4) For the purposes of this paragraph (m), the definitions found in appendix Q of subpart B of this part apply.

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