DEPARTMENT OF ENERGY

10 CFR Part 430

[Docket No. EERE–2008–BT–TP–0004]

RIN 1904–AB75

Energy Conservation Program: Test Procedures for Battery Chargers and External Power Supplies (Standby Mode and Off Mode) and for Multiple-Voltage External Power Supplies

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

ACTION: Notice of proposed rulemaking and public meeting.

SUMMARY: The Department of Energy (DOE) proposes to amend its test procedures for battery chargers and external power supplies to include provisions for measuring standby mode and off mode energy consumption, as directed by the Energy Independence and Security Act of 2007. DOE also proposes to add a test procedure for measuring the energy consumption of multiple-voltage external power supplies. In addition, DOE proposes to make revisions to the single-voltage external power supply test procedure. DOE also proposes to extend the current certification reporting requirements to the Class A external power supplies for which Congress established energy efficiency standards in the Energy Independence and Security Act of 2007. Finally, DOE announces a public meeting to receive comment on this proposal and the issues presented in this notice.

DATES: DOE will hold a public meeting in Washington, DC, on Friday, September 12, 2008, from 9 a.m. to 5 p.m. to discuss the test procedure Notice of Proposed Rulemaking (NOPR). DOE must receive requests to speak at this public meeting no later than 4 p.m., Friday, August 29, 2008. DOE must receive a signed original and an electronic copy of statements to be given at the public meeting no later than 4 p.m., Friday, September 5, 2008.

DOE will accept comments, data, and information regarding the NOPR (proposed rule) until October 29, 2008. See section IV, ''Public Participation,'' of this proposed rule for details.

ADDRESSES: The public meeting will be held at the U.S. Department of Energy, Forrestal Building, Room 1E–245, 1000 Independence Avenue, SW., Washington, DC 20585–0121. (Please note that foreign nationals participating in the public meeting are subject to advance security screening procedures which may take up to 30 days. If a foreign national wishes to participate in the workshop, please inform DOE as soon as possible by contacting Ms. Brenda Edwards at (202) 586–2945 so that the necessary procedures can be completed.)

Any comments submitted must identify the NOPR on Test Procedures for Battery Chargers and External Power Supplies, and provide the docket number EERE–2008–BT–TP–0004 and/or Regulation Identifier Number (RIN) 1904–AB75. Comments may be submitted using any of the following methods:

- *Federal eRulemaking Portal: http://www.regulations.gov.* Follow the instructions for submitting comments.
- *E-mail: BC&EPS_Test_Proc@ee.doe.gov.* Include the docket number EERE–2008–BT–TP–0004 and/or RIN 1904–AB75 in the subject line of the message.
- *Postal Mail:* Mrs. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, Mailstop EE–2J, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Please submit one signed paper original.
- *Hand Delivery/Courier:* Mrs. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, 6th Floor, 950 L'Enfant Plaza, SW., Washington, DC 20024. Telephone: (202) 586–2945. Please submit one signed paper original.

For detailed instructions on submitting comments and additional information on the rulemaking process, see section IV, ''Public Participation,'' of this document.

Docket: For access to the docket to read background documents or comments received, visit the U.S. Department of Energy, 6th Floor, 950 L'Enfant Plaza, SW., Washington, DC 20024, (202) 586–2945, between 9 a.m. and 4 p.m., Monday through Friday, except Federal holidays. Please call Ms. Brenda Edwards at (202) 586–2945 for additional information about visiting the Resource Room.

FOR FURTHER INFORMATION CONTACT: Mr. Victor Petrolati, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, EE–2J, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Telephone: (202) 586–4549. E-mail: *Victor.Petrolati@ee.doe.gov.*

Ms. Francine Pinto or Mr. Michael Kido, U.S. Department of Energy, Office of the General Counsel, GC–72, 1000 Independence Avenue, SW., Washington, DC 20585. Telephone: (202) 586–9507. E-mail: *Francine.Pinto@hq.doe.gov* or *Michael.Kido@hq.doe.gov.*

For information on how to submit or review public comments and on how to participate in the public meeting, contact Ms. Brenda Edwards, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, EE–2J, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Telephone: (202) 586–2945. E-mail: *Brenda.Edwards@ee.doe.gov.*

SUPPLEMENTARY INFORMATION:

I. Background and Legal Authority

Title III of the Energy Policy and Conservation Act (EPCA) (42 U.S.C. 6291, *et seq.*) sets forth a variety of provisions designed to improve energy efficiency. Part A of Title III (42 U.S.C. 6291–6309) establishes the ''Energy Conservation Program for Consumer Products Other Than Automobiles.'' The consumer and commercial products currently subject to this program (hereinafter referred to as ''covered products'') include battery chargers and external power supplies (collectively referred to as ''BCEPS''). Manufacturers of covered products are required to use the relevant DOE test procedures to certify compliance with the energy conservation standards adopted under EPCA. The statutory provisions of particular relevance to today's notice of proposed rulemaking (NOPR) are discussed immediately below.

Section 323(b) of EPCA authorizes DOE to amend or establish new test procedures as appropriate for each of the covered products. (42 U.S.C. 6293(b)) This section provides that ''[a]ny test procedures prescribed or amended under this section shall be reasonably designed to produce test results which measure energy efficiency, energy use, water use (in the case of showerheads, faucets, water closets and urinals), or estimated annual operating cost of a covered product during a representative average use cycle or period of use, as determined by the Secretary [of Energy], and shall not be unduly burdensome to conduct.'' (42 U.S.C. 6293(b)(3)) In addition, EPCA states that DOE ''shall determine, in the rulemaking carried out with respect to prescribing such procedure, to what extent, if any, the proposed test procedure would alter the measured energy efficiency, measured energy use, or measured water use of any covered product as determined under the existing test procedure.'' (42 U.S.C. 6293(e)(1))

Of particular relevance to the present rulemaking, section 135 of the Energy Policy Act of 2005 (EPACT), Public Law 109–58, amended sections 321 and 325 of EPCA by providing definitions for battery chargers and external power supplies and directing the Secretary to prescribe ''definitions and test procedures for the power use of battery chargers and external power supplies.'' (42 U.S.C. 6295(u)(1)(A)) DOE complied with this requirement by publishing the test procedure final rule, 71 FR 71340, on December 8, 2006, which included definitions and test procedures for battery chargers and external power supplies. DOE codified a test procedure for battery chargers in Appendix Y to subpart B of part 430 in Title 10 of the Code of Federal Regulations (CFR) (''Uniform Test Method for Measuring the Energy Consumption of Battery Chargers'') (hereinafter referred to as ''Appendix Y'') and a test procedure for external power supplies in Appendix Z to subpart B of 10 CFR part 430 (''Uniform Test Method for Measuring the Energy Consumption of External Power Supplies'') (hereinafter referred to as ''Appendix Z'').

DOE published a subsequent notice of public meeting and availability of documentation for public review on December 29, 2006. 71 FR 78389. This public meeting was called a ''Scoping Workshop'' and focused on DOE's plans for developing energy conservation standards for battery chargers and external power supplies. The Scoping Workshop was held at DOE's Forrestal Building in Washington, DC, on January 24, 2007. Information pertaining to the Scoping Workshop is available at *http://www.eere.energy.gov/buildings/appliance_standards/residential/battery_external.html* .

On December 19, 2007, the Energy Independence and Security Act of 2007 (EISA), Public Law 110–140, amended sections 321, 323, and 325 of EPCA with regard to external power supplies and battery chargers. Section 301 of EISA amended section 321 of EPCA, by modifying some of the definitions pertaining to external power supplies. EPACT had amended EPCA to define an external power supply as ''an external power supply circuit that is used to convert household electric current into DC current or lower-voltage AC current to operate a consumer product'' [1] (42 U.S.C. 6291(36)(A)) but section 301 of EISA further amended this definition by creating a subset of external power supplies called Class A External Power Supplies. EISA defined this subset as those external power supplies that, in addition to meeting several other requirements common to all external power supplies,[2] are ''able to convert to only 1 AC or DC output voltage at a time'' and that have ''nameplate output power that is less than or equal to 250 watts.'' (42 U.S.C. 6291(36)(C)(i)) Section 301 also amended EPCA to establish minimum standards for these products, effective July 1, 2008, see 42 U.S.C. 6295(u)(3)(A), and directed DOE to publish a final rule by July 1, 2011 to determine whether these energy conservation standards for external power supplies should be amended. (42 U.S.C. 6295(u)(3)(D))

Further, section 309 of EISA amended EPCA by directing DOE to issue a final rule by July 1, 2011 that prescribes energy conservation standards for battery chargers or classes of battery chargers or determine that no energy conservation standard is technologically feasible and economically justified for battery chargers. (42 U.S.C. 6295(u)(1)(E)(i)(II)) DOE plans to bundle this battery charger rulemaking proceeding with the requirement to evaluate amendments to the energy conservation standards for external

[1] The terms ''AC'' and ''DC'' refer to the polarity (*i.e.*, direction) and amplitude of current and voltage associated with electrical power. For example, mains power, that which is found in a household wall socket, is alternating current, or ''AC'', and it varies in amplitude and reverses polarity. In contrast, the power supplied by a battery or solar cell is direct current, or ''DC,'' which is constant in both amplitude and polarity.

[2] The full EISA definition of a class A external power supply includes a device that ''(I) is designed to convert line voltage AC input into lower voltage AC or DC output; (II) is able to convert to only 1 AC or DC output voltage at a time; (III) is sold with, or intended to be used with, a separate end-use product that constitutes the primary load; (IV) is contained in a separate physical enclosure from the end-use product; (V) is connected to the end-use product via a removable or hard-wired male/female electrical connection, cable, cord, or other wiring; and (VI) has nameplate output power that is less than or equal to 250 watts.'' (42 U.S.C. 6291(36)(C)(i))

power supplies mentioned above, since both must be completed by July 1, 2011. See EISA, section 301(c).

In addition, section 309 of EISA amended section 325(u)(1)(E) of EPCA, instructing DOE to issue ''a final rule that determines whether energy conservation standards shall be issued for external power supplies or classes of external power supplies.'' (42 U.S.C. 6295(u)(1)(E)(i)(I)) DOE, however, cannot conduct a determination analysis on whether it should issue conservation standards for a product for which standards have already been set by Congress in section 301(c) of EISA (*i.e.*, Class A external power supplies). Furthermore, section 325(u)(1)(E) of EPCA, as amended by EISA, directs DOE to complete this determination analysis ''No later than 2 years after the date of enactment of this subsection.'' (42 U.S.C. 6295(u)(1)(E)(I)) This subsection, however, is a result of EPACT, which was signed into law on August 8, 2005. Interpreting this subsection strictly as amended by EISA would place the determination analysis final rule issue date on August 8, 2007, almost four months prior to the passage of EISA.

To resolve these inconsistencies, DOE interprets the ''date of enactment of this subsection'' (42 U.S.C. 6295(u)(1)(E)(I)) as the date of passage of EISA, namely December 19, 2007. In this context, DOE interprets sections 301 and 309 of EISA jointly as a requirement to determine, by December 19, 2009, whether energy conservation standards shall be issued for non-Class A external power supplies. Examples of non-Class A external power supplies include those with a nameplate output power rating greater than 250 watts (W) and those able to convert to more than one AC or DC output voltage at the same time (*i.e.*, multiple-voltage external power supplies). These non-Class A external power supplies appear to constitute a significant group of products, powering applications such as radio transceivers, video game consoles, and printers. Although the current DOE external power supply test procedure (Appendix Z) can test high-power external power supplies, it cannot accommodate external power supplies that convert to more than one output voltage simultaneously. Therefore, in today's notice, DOE proposes to amend its test procedure to allow for the testing of multiple-voltage external power supplies.

EISA also amended section 325 of EPCA to establish definitions for active mode, standby mode, and off mode and directs DOE to amend its existing test procedures by December 31, 2008 for both battery chargers and external power supplies to measure the energy consumed in standby mode and off mode. See EISA, section 310. It also authorizes the Department to amend, by rule, any of the definitions for active, standby, and off mode so long as the Department takes into consideration the most current versions of Standards 62301 (''Household Electrical Appliances—Measurement of Standby Power'') and 62087 (''Methods of Measurement for the Power Consumption of Audio, Video and Related Equipment'') of the International Electrotechnical Commission (IEC). (See EPCA Sec. 325(gg)(2)(A) and 42 U.S.C. 6295(gg)(2)(A)). Consistent with this authority, today's NOPR proposes amended definitions for these terms that take into consideration IEC Standards 62031 and 62087 and adapt the definitions to how consumers use battery chargers and external power supplies.

Finally, in light of Congress's establishment of energy efficiency standards for Class A external power supplies, DOE proposes to extend the certification reporting requirements of 42 U.S.C. 6296, which are promulgated at 10 CFR 430.62, to cover these products. This extension is consistent with current requirements for manufacturers of covered products and would continue to use the existing requirements and form found in 10 CFR part 430, subpart F, appendix A.[3]

DOE plans to publish a final rule by December 31, 2008, the statutory deadline for a final rule amending the test procedure, to measure energy consumption in off mode and standby mode for battery chargers and external power supplies. (42 U.S.C. 6295(gg)(2)(B)) Because of this deadline, the sections of this proposal concerning standby mode and off mode are of highest priority. If commenters clearly indicate that further evaluation of the other issues presented in this NOPR is needed, these issues will be addressed in a separate rulemaking. This approach would avoid delaying the standby mode and off mode test procedure final rule.

For each of the various items discussed below, DOE invites stakeholder comments on these proposed amendments to the Department's test procedures.

II. Summary of the Proposal

In this NOPR, DOE proposes to modify the current test procedures for battery chargers and external power supplies to achieve the following objectives:

(1) Address the statutory requirement to expand test procedures to incorporate measurement of standby mode and off mode energy consumption;

(2) Expand the external power supply test procedure to accommodate certain non-Class A external power supplies that DOE will evaluate in the determination analysis;

(3) Revise and adopt definitions pertaining to testing of external power supplies for increased clarity;

(4) Incorporate certain technical changes and clarifications to the test procedure for single-voltage external power supplies to improve the accuracy and practicability of the test procedure; and

(5) Incorporate requirements for the submission of certification test data pertaining to external power supplies subject to minimum efficiency standards effective July 1, 2008.

Table 1 lists the sections of 10 CFR part 430 affected by the amendments proposed in this NOPR. The left column in Table 1 cites the locations in the CFR where DOE proposes changes, which are listed in the right column.

TABLE 1—SUMMARY OF CHANGES PROPOSED IN THIS NOPR AND AFFECTED SECTIONS OF 10 CFR PART 430

Existing section in 10 CFR part 430	Summary of proposed modifications
Section 430.22 of subpart B—Reference Sources	• Inserts new technical references.

[3] The Office of Management and Budget (OMB) previously approved the collection of this information on September 27, 2007. See Notice of Office of Management and Budget Action, OMB Control No. 1910–1400, available at *http://www.reginfo.gov/public/do/PRAMain*. The supporting statement accompanying DOE's request for an extension of its clearance under the Paperwork Reduction Act to collect this information identifies the potential inclusion of additional respondents as a result of changes introduced by the Energy Policy Act of 2005. See DOE Supporting Statement for Paperwork Reduction Act Submission, OMB Control Number 1910–1400 (May 31, 2007). Battery charger and external power supply manufacturers were part of this new group of potential respondents.

TABLE 1—SUMMARY OF CHANGES PROPOSED IN THIS NOPR AND AFFECTED SECTIONS OF 10 CFR PART 430—Continued

Existing section in 10 CFR part 430	Summary of proposed modifications
Section 430.23 of subpart B—Test procedures for the measurement of energy and water consumption.	• Modifies '(aa) battery charger' and '(bb) external power supply' to include energy consumption in standby mode and off mode.
Appendix Y to subpart B of part 430—Uniform Test Method for Measuring the Energy Consumption of Battery Chargers:	
1. Scope	• No change.
2. Definitions	• Modifies the definition for standby mode. • Inserts a definition for off mode.
3. Test Apparatus and General Instructions	• No change.
4. Test Measurement	• Inserts procedures to measure energy consumption in standby mode and off mode.
Appendix Z to subpart B of part 430—Uniform Test Method for Measuring the Energy Consumption of External Power Supplies:	
1. Scope	• Modifies scope to encompass all types of energy consumption of external power supplies.
2. Definitions	• Modifies existing definitions for: ○ Active mode. ○ Active mode efficiency. ○ No-load mode. ○ Total harmonic distortion. ○ True power factor. • Inserts new definitions for: ○ Active power. ○ Ambient temperature. ○ Apparent power. ○ Instantaneous power. ○ Minimum output current. ○ Multiple-voltage external power supply. ○ Nameplate input frequency. ○ Nameplate input voltage. ○ Nameplate output current. ○ Nameplate output power. ○ Nameplate output voltage. ○ Off mode. ○ Output bus. ○ Standby mode. ○ Switch-selectable single-voltage external power supply. ○ Unit under test.
3. Test Apparatus and General Instructions	• Divides section 3 into 3(a) for single-voltage EPSs and 3(b) for multiple-voltage EPSs. • Maintains the existing test procedure for single-voltage EPSs in 3(a). ○ Considers adopting slightly revised requirements in 3(a), to be consistent with proposal in 3(b). • Inserts 3(b) for multiple-voltage external power supplies with requirements based on other established test procedures.
4. Test Measurement	• Demarcates 4(a) for single-voltage external power supplies. ○ Maintains existing procedure for active mode and standby mode measurements. ○ Inserts new procedure for measuring off mode. • Inserts 4(b) for multiple-voltage external power supplies. ○ Inserts new procedures for measuring active mode, standby mode, and off mode.
Section 430.62 of subpart F—Submission of Data	• Inserts submission requirement for active mode efficiency and no-load power consumption data for Class A external power supplies.

In developing today's proposed test procedure amendments, DOE examined IEC Standard 62301 [4] and the ENERGY STAR test procedures for battery charging systems,[5] external power supplies,[6] and internal power supplies.[7]

[4] IEC 62301 ''Household Electrical Appliances—Measurement of Standby Power,'' International Electrotechnical Commission, First edition, June 2005.

[5] ''Test Methodology for Determining the Energy Performance of Battery Charging Systems,'' Environmental Protection Agency, December 2005.

[6] ''Test Method for Calculating the Energy Efficiency of Single-Voltage External Ac-Dc and Ac-Ac Power Supplies,'' California Energy Commission Public Interest Energy Research Program, August 11, 2004.

[7] ''Proposed Test Protocol for Calculating the Energy Efficiency of Internal Ac-Dc Power Supplies,'' Revision 6.2, California Energy

Continued

These industry references were either statutorily mandated (as in the case of IEC Standard 62301), or were developed in a publicly-consultative process and adopted by the U.S. Environmental Protection Agency (EPA) for the purpose of testing performance characteristics of these same products to determine their qualification for the ENERGY STAR program. Consistent with EISA's requirements, DOE also considered the requirements of IEC Standard 62087, which addresses the methods to measure the power consumption of audio, video and related equipment. Since this IEC Standard focuses only on audio, video, and related equipment that tends to incorporate internal power supplies, DOE found the scope of IEC Standard 62087 to be too narrow for the purposes of evaluating standby mode and off mode test procedures for battery chargers and external power supplies, which are used with a large variety of products beyond audio and video equipment, such as telecommunications devices and computers. DOE therefore concludes that this standard's provisions are not germane in assisting the Department with developing standby mode and off mode test procedures for the products covered in today's NOPR. As to Standard 62301 and the ENERGY STAR test procedures, DOE considered the impact of each proposed change to ensure that these revisions would not result in test procedures that are unduly burdensome to conduct.

DOE also examined whether the proposed amendments to its test procedures would significantly change the measured power consumption or efficiency of the battery charger or external power supply. This issue is particularly important for external power supplies because EISA amended section 325 of EPCA to establish minimum efficiency standards for external power supplies that took effect on July 1, 2008. As explained in greater detail later, DOE believes that today's proposed amendments neither alter the measured energy efficiency of the tested products nor do they add any additional burden on the industry to implement because the proposed changes only provide additional clarifications to the test procedures for devices that have an on-off switch. Thus, DOE proposes to amend its test procedures in the manner discussed in the following sections.

DOE welcomes comments on all aspects of this proposal.

Commission Public Interest Energy Research Program, November 2007.

A. Standby Mode and Off Mode

Section 310 of EISA amended section 325(gg) of EPCA by directing DOE to amend its test procedures to incorporate a measure of standby mode and off mode energy consumption if feasible. (42 U.S.C. 6295(gg)(2)) Section 310 also inserted definitions for off mode and standby mode, which affected EPCA sections 325(gg)(1)(A)(ii) and (iii). These definitions, however, as fully explained in the later discussion, do not apply appropriately to all battery chargers and external power supplies. For instance, under the definition for standby mode for battery chargers, it is unclear whether a battery charger is in standby mode when a thermal sensor triggers a cooling fan. Consequently, these definitions would create confusion in how certain features contained in these products should be treated during testing.

In today's notice, DOE proposes to (1) adapt the definitions of standby mode and off mode that would more appropriately apply to battery chargers and external power supplies, and (2) revise the test procedures for battery chargers and external power supplies to measure standby mode and off mode energy consumption.

For battery chargers, DOE proposes to define standby mode as the condition in which the charger is connected to the main electricity supply and no battery is installed in the charger. For external power supplies, DOE proposes to define standby mode as the condition in which the power supply is connected to the main electricity supply and the output is not connected to any consumer product. Additionally, if the battery charger or external power supply has any on-off switches, DOE proposes that all switches be turned on during the measurement of energy consumption in standby mode.

For off mode, DOE proposes that this condition apply only to battery chargers and external power supplies equipped with on-off switches. For these products, DOE proposes that off mode power consumption be measured as the power consumed while all switches are turned off. A detailed discussion of the proposed definitions and test procedures for standby and off mode follows in section III.A, below.

B. Multiple-Voltage External Power Supplies

Section 309 of EISA amended section 325 of EPCA to direct DOE to conduct a determination analysis for external power supplies not subject to the Class A external power supply standard. This broad group includes external power supplies with multiple simultaneous outputs at more than one voltage. DOE is not aware of any existing test procedure developed specifically to measure the efficiency or energy consumption of multiple-voltage external power supplies. To help in developing such a procedure, DOE reviewed related test procedures currently in use. As a result, today's proposed rule is based on two California Energy Commission (CEC) test procedures, the ''Test Method for Calculating the Energy Efficiency of Single-Voltage External Ac-Dc and Ac-Ac Power Supplies,'' August 11, 2004 (hereinafter called the ''CEC EPS Test Procedure''), and the ''Proposed Test Protocol for Calculating the Energy Efficiency of Internal Ac-Dc Power Supplies, Revision 6.2,'' November 2007 (hereinafter called the ''CEC IPS Test Procedure'').

DOE's proposed amendment follows the structure of the CEC EPS Test Procedure but incorporates language addressing test methods from both CEC test procedures. As part of this amendment, DOE is also proposing new language necessary for testing multiple-voltage external power supplies and certain test method changes to improve the overall accuracy and practicability of the procedure. Incorporating this amendment into the external power supply test procedure would enable DOE to evaluate power consumption for multiple-voltage external power supplies in all modes of operation: Active mode, no-load mode (*i.e.*, ''standby mode''), and off mode. A detailed discussion of DOE's proposed test procedure for multiple-voltage external power supplies can be found in section III.B, below.

C. External Power Supply Definitions

In light of the EISA amendments to EPCA, DOE reviewed the relevant portions of 10 CFR part 430 and determined that amending some of the definitions in part 430 would help improve the clarity of the external power supply test procedure. To achieve this goal, DOE proposes to update certain definitions in Appendix Z based on CEC's test procedures for external and internal power supplies, IEC Standard 62301, Institute of Electrical and Electronics Engineers (IEEE) Standard 1515–2000,[8] and IEEE Standard 100.[9] More specifically, DOE

[8] IEEE 1515–2000. ''IEEE Recommended Practice for Electronic Power Subsystems: Parameter Definitions, Test Conditions, and Test Methods,'' Institute of Electrical and Electronics Engineers. March 2000.

[9] IEEE 100. ''The IEEE Standard Dictionary of Electrical and Electronics Terms'' Institute of

proposes modifications to the current definitions of ''active mode,'' ''active mode efficiency,'' ''no-load mode,'' ''total harmonic distortion,'' and ''true power factor.'' In addition, today's notice proposes to add definitions for ''active power,'' ''ambient temperature,'' ''apparent power,'' ''instantaneous power,'' ''minimum output current,'' ''multiple-voltage external power supply,'' ''nameplate input frequency,'' ''nameplate input voltage,'' ''nameplate output current,'' ''nameplate output power,'' ''nameplate output voltage,'' ''off mode,'' ''output bus,'' ''switch-selectable single-voltage external power supply,'' ''standby mode,'' and ''unit under test.'' A detailed discussion of these proposed modified and new definitions follows in section III.C, below.

D. Single-Voltage External Power Supply Test Procedure Amendments

DOE is also considering making limited changes to the test procedure for single-voltage external power supplies. Specifically, DOE would revise the test conditions (section 3 of Appendix Z) to account for the limitations of test equipment and laboratory conditions. DOE believes that these changes would reduce the testing burden and would not negatively affect the accuracy or repeatability of measurement results. DOE is also considering making a revision to the test measurement procedure (section 4 of Appendix Z) to amend the test measurements to require increased stability before conducting power measurements. Increased stability before conducting power measurements will enhance the accuracy and repeatability of the measurements. Specific descriptions of the changes under consideration, as well as additional discussion, can be found in section III.D, below.

E. Switch-Selectable Single-Voltage External Power Supplies

Finally, DOE proposes to clarify in today's notice the method by which single-voltage external power supplies that incorporate a switch-selectable output voltage should be tested because the scope of the current test procedure includes switch-selectable EPSs, but the test procedure does not sufficiently specify how to test them. For these external power supplies, DOE proposes that testing be conducted twice: First with the output voltage set to the minimum voltage and second with the output voltage set to the maximum voltage. Under DOE's proposed procedure, an external power supply with a switch-selectable output voltage would be considered in compliance with an energy efficiency standard when it meets or exceeds the minimum requirements at both its lowest and highest selectable output voltages.

DOE proposes this approach for two reasons. First, the efficiency of a switch-selectable external power supply is highest at the highest output voltage setting and lowest at the lowest setting. Measuring the efficiency at the two voltage extremes bounds the range of possible efficiencies of the device such that the efficiency at any other voltage setting would fall between these two measurements. Second, this proposal is consistent with how other countries, including New Zealand and Australia,[10] are considering requiring the testing of switch-selectable single-voltage external power supplies.

F. Submission of Certification Test Data to DOE

As part of the overall national regulatory program, manufacturers of covered and regulated products must report to DOE that the products they manufacture are in compliance with the applicable energy conservation standards. EISA established standards for Class A external power supplies that took effect on July 1, 2008. Given that development, DOE must now establish the certification and enforcement procedures that manufacturers of these covered products would follow.

DOE proposed certification and enforcement procedures for battery chargers and external power supplies on July 25, 2006. 71 FR 42178. While some of the provisions from that proposal remain pending, DOE finalized two aspects of that NOPR on December 8, 2006: (1) Definitions in 10 CFR 430.2 of ''basic model'' and ''covered product'' as they apply to battery chargers and external power supplies and (2) test procedures for measuring the energy efficiency of battery chargers (Appendix Y) and external power supplies (Appendix Z). 71 FR 71340.

Also in the July 25, 2006 notice, DOE proposed a sampling plan for battery chargers and external power supplies to be codified under 10 CFR 430.24, ''Units to be tested.'' 71 FR at 42204. The sampling plan would provide manufacturers with guidance on selecting units from their production run of covered products, to test those samples and demonstrate compliance with the new standard.

EISA amended section 325(u) of EPCA by establishing minimum efficiency standards for ''Class A'' external power supplies. (42 U.S.C. 6295(u)(6)) Previously, DOE had no reporting requirements for either battery chargers or external power supplies since there was no Federal standard in place for either product because EPACT's amendments (Pub. L. 109–58, section 135(c)(4)) to EPCA directed DOE only to determine whether to adopt energy conservation standards for battery chargers and external power supplies. Consistent with the EISA amendment and the requirements already contained in 10 CFR part 430, DOE proposes that manufacturers of Class A external power supplies report the active mode efficiency (as a percentage) and the no-load mode power consumption (in watts) of these products to DOE. This proposal is discussed further in section III.F.

III. Discussion

As noted above, Congressional directives and the need to incorporate definitions used in test procedures to improve the current test procedures employed by DOE serve as the primary reasons for this NOPR. Each element that DOE proposes to modify in today's notice to satisfy the new statutory requirements from EISA is discussed in detail below.

A. Standby Mode and Off Mode

DOE developed today's proposed amendments to the battery charger and external power supply test procedures to satisfy the standby mode and off mode requirements in EPCA, as amended by EISA. Section 310(3) of EISA amended section 325 of EPCA by inserting new subsection (gg) (42 U.S.C. 6295(gg)) to require that DOE amend its test procedures for battery chargers and external power supplies to include measurements of standby mode and off mode energy consumption. Congress authorized DOE to amend these definitions so long as the Department took into consideration the most current versions of IEC standards 62301 and 62087 when amending the definitions. DOE test procedures are based on CEC and ENERGY STAR test procedures, both of which reference IEC 62301. Thus, in addition to directly considering IEC 62301, DOE also considered the standard indirectly, as parts of it were used in other test procedures. Section 310(3) also provided definitions of off mode and standby mode that modified EPCA sections 325(gg)(1)(A)(ii) and (iii). As is explained later below, these definitions, however, are not appropriate when applied to battery

Electrical and Electronics Engineers. Sixth Edition, 1999.

[10] DOE is not aware of any other countries that specifically address the testing of switch-selectable external power supplies.

chargers and external power supplies because of potential confusion in how to treat particular features that may be contained in these products.

Under EISA, DOE is required to amend its test procedures to measure standby mode and off mode for both battery chargers and external power supplies by December 31, 2008. Consequently, consistent with the authority granted by Congress, DOE is modifying the definitions for these terms and the proposed amendments in this notice would (1) adopt appropriate definitions of standby mode and off mode that provide a better fit for these products, and (2) revise the test methods for measuring energy consumption in these two modes as needed to incorporate them into DOE's test procedures. These proposed revisions to the test procedures would apply to both battery chargers and external power supplies and are discussed below.

1. Battery Chargers

DOE adopted a test procedure for battery chargers (Appendix Y) in a final rule published on December 8, 2006. 71 FR at 71368. DOE's test procedure measures the energy consumed by battery chargers in battery maintenance mode and standby mode (also called no-load mode) and combines these two measured quantities into a single energy ratio. Although both the current DOE test procedure and EISA define the term ''standby mode'' in the context of battery chargers, as discussed below, the definitions are different. Furthermore, applying the definition of ''off mode'' contained in EISA to battery chargers requires modification to ensure that all modes of battery charger use are tested by DOE's test procedure. The revisions proposed in today's notice would help ensure that DOE's test procedures sufficiently cover the appropriate elements of both modes of use. Accordingly, DOE proposes to revise the definitions of standby mode and off mode as applied to battery chargers.

i. Definitions

Standby Mode

In its 2006 final rule, DOE defined ''standby mode'' as ''the mode of operation when the battery charger is connected to the main electricity supply and the battery is not connected to the charger.'' 71 FR at 71368. In layman's terms, standby mode is the state of an appliance when it is not performing its primary function—in the case of battery chargers, that function would be maintaining a fully charged battery or recharging a discharged battery. This definition was adapted from the December 2005 *ENERGY STAR Eligibility Criteria for Products with Battery Charging Systems,* which defines standby mode, in part, as ''the condition in which no battery is present in the charger, or where the battery is integral to a product, the product is not attached to the charger, but the charger is plugged in and drawing power.'' The ENERGY STAR definition also notes that standby mode ''represents the lowest power consumption mode which cannot be switched off (influenced) by the user and that may persist for an indefinite time when an appliance is connected to the main electricity supply and used in accordance with the manufacturer's instructions.'' This part of the definition is derived from the definition of standby power found in IEC Standard 62301.[11]

In contrast, section 310(3) of EISA defined ''standby mode'' as

> the condition in which an energy-using product—(I) is connected to a main power source; and (II) offers 1 or more of the following user-oriented or protective functions: (aa) To facilitate the activation or deactivation of other functions (including active mode) by remote switch (including remote control), internal sensor, or timer. (bb) Continuous functions, including information or status displays (including clocks) or sensor-based functions.

DOE believes that Congress drafted this definition to be applicable to a diverse population of energy-using appliances and equipment, including clothes washers and microwave ovens, as well as battery chargers and external power supplies.

However, after carefully examining this definition and considering its impact with respect to battery chargers, DOE believes that applying this definition without modification to these products would be problematic because it would create confusion in how certain features contained in these products should be treated during testing. For instance, under this definition, it is unclear whether a battery indicator light would constitute a user-oriented function or a status display. Similarly, the definition provides no guidance as to whether a cooling fan would constitute a protective function or a sensor-based function if triggered by a thermal sensor. Such ambiguities would create confusion among the public, including manufacturers, in understanding the scope of coverage of these definitions and in determining which product designs would be affected by these definitions.

Because of the vagueness of this definition, DOE is concerned about problems that both the public and the industry would likely encounter if the EISA definition of standby mode were adopted verbatim for battery chargers. Therefore, DOE is exercising its authority under section 325 of EPCA, as amended by section 310(3) of EISA, to amend the definitions of the modes, as they apply to this particular product, by rule. (EPCA 325(gg)(1)(B); 42 U.S.C. 6295(gg)(1)(B)) In so doing, DOE has considered IEC Standard 62301 in revising the definition of standby mode by reviewing the standard and incorporating appropriate parts of IEC 62301 into the proposed amendments.

In today's notice, DOE proposes inserting the following definition of ''standby mode'' for battery chargers into Appendix Y, section 2.j: ''the condition in which (1) the battery charger is connected to the main electricity supply; (2) the battery is not connected to the charger; and (3) for battery chargers with manual on-off switches, all switches are turned on.'' DOE believes this definition is appropriate because it provides clarity of application to test technicians and is consistent with the IEC Standard 62301 and ENERGY STAR definitions of standby mode.

In proposing a procedure to incorporate standby mode, which section 310 of EISA directed DOE to include in its energy efficiency evaluation, DOE examined its current procedure, which is based on the ENERGY STAR test procedure. The ENERGY STAR test procedure focuses on measuring the energy used during standby mode and battery maintenance mode, which means that DOE's current battery charger procedure already accounts for energy consumption in standby mode and satisfies section 310 of EISA. As a result, today's proposal satisfies the conditions set by Congress that permit the Secretary to modify this definition to make it applicable to battery chargers. DOE's proposal also clarifies how to measure energy consumption for battery chargers that incorporate on-off switches and is consistent with the IEC Standard 62301 and ENERGY STAR definitions of standby mode for this product.

DOE understands that there are at least three types of battery-charged consumer products: (1) Those that are stand-alone chargers which operate with removable batteries such as professional power tools and certain digital cameras;

[11] IEC Standard 62301 defines standby power as the ''lowest power consumption mode which cannot be switched off (influenced) by the user and that may persist for an indefinite time when an appliance is connected to the main electricity supply and used in accordance with the manufacturer's instructions.'' IEC Standard 62301, section 3.1.

(2) those that have the battery affixed into the product so that it is not removed for charging such as an electric toothbrush or hand-held vacuum cleaner; and (3) those that incorporate all the charging circuitry and battery into the product and have only a detachable power cord. For a product with a non-detachable battery (category 2, above) to be placed into standby mode according to the above proposed definition, the product itself must be disconnected from the portion of the charger apparatus connected to the main electricity supply (i.e., the wall socket) to ensure that the battery is disconnected from the charger. For example, to place a cordless telephone in standby mode, one would remove the handset (which contains the battery) from its charging cradle while keeping the cradle connected to the main electricity supply. This example of standby mode for this product would still be appropriate even if some of the battery charging circuitry resided in the telephone handset (instead of the cradle), because that standby mode would represent a typical use scenario for a consumer. The end user would continue to operate the device in the same manner, regardless of whether the charging circuit is located in the product or its charging cradle.

In instances where *all* of the charging and power conversion circuitry resides in the product (category 3, above), the product is connected to the main electricity supply by a detachable AC power cord. During standby mode, the AC power cord is the only part of this battery charging system that would remain connected to the main electricity supply. By itself, the cord consumes no power; therefore, the standby mode power consumption for this category of products would be zero watts. In the case of consumer products for which all of the charging and power conversion circuitry resides in the product, and where the AC power cord is *not* detachable, no component of the product remains connected to the main electricity supply during standby mode. Thus, standby mode power consumption is undefined or inapplicable to this group of products. However, DOE is not concerned about this exclusion of permanently corded non-removable battery operated products from any standby mode power consumption standard, because it believes very few or no current products feature both a non-detachable battery and non-detachable AC power cord. Further, DOE believes that this category will not grow in the future because a non-detachable AC power cord decreases the portability of a consumer product by adding bulk and weight, which makes it unlikely that this product category will be accepted by consumers.

Off Mode

Section 310 of EISA defines ''off mode'' as ''the condition in which an energy-using product—(I) is connected to a main power source; and (II) is not providing any standby or active function.'' DOE has not previously defined ''off mode'' for battery chargers, but today's notice proposes an alternative definition for this term as it applies to battery chargers. As previously noted, DOE is proposing to amend the definitions contained in section 325 of EPCA, as amended by section 310(3) of EISA (42 U.S.C. 6295(gg)(1)(B)) under the authority granted to DOE by Congress.

DOE's current test procedure for battery chargers measures inactive energy consumption when there is no battery inserted into the charger and the charger is still connected to the main electricity supply. DOE understands that some chargers incorporate manual on-off switches (*i.e.*, those activated by the user) and can thereby achieve an even lower state of inactive energy consumption. For these products, the switches may conflict with the ENERGY STAR and IEC Standard 62301 definitions of standby mode, which both state that standby mode is the lowest-power consumption mode. This is because in some cases, the switches will reduce the power consumption to zero, but in other cases, there may still be some power consumption, depending on how the switches are incorporated into the circuit of the battery charger. For this reason, DOE proposes to interpret ''off mode'' as applicable only to battery chargers with switches that are in the off position. Thus, in today's notice, DOE proposes inserting the following definition of ''off mode'' for battery chargers into Appendix Y, section 2.i:

Off mode means the condition, applicable only to units having manual on-off switches, in which the battery charger is (1) connected to the main electricity supply, (2) is not connected to the battery, and (3) all switches are turned off.

DOE believes that this definition is appropriate because it satisfies the requirements of EISA that DOE measure energy consumption in inactive modes (in this case, off mode), provides clarity of application to laboratory technicians, and is consistent with the ''standby mode'' definition used by IEC Standard 62301 and ENERGY STAR.

As discussed earlier, DOE understands that there are at least three types of battery-charged consumer products: (1) Those that are stand-alone chargers which operate with removable batteries; (2) those that have the battery affixed into the product so that it is not removed for charging; and (3) those that incorporate all the charging circuitry and battery into the product and have only a detachable power cord. For those products that incorporate a non-detachable battery and those that incorporate a non-detachable battery and non-detachable AC power cord, DOE proposes that the off mode definition not apply to any of these battery chargers that incorporate an on-off switch because the battery cannot be disconnected from the charger. DOE is not concerned that the exclusion of these devices will constitute a loophole in the regulation because consumer products with non-detachable batteries and AC power cords (*e.g.*, certain uninterruptible power supplies) spend most of their time in battery maintenance mode.[12] Also, DOE's battery charger test procedure already measures the power consumption in battery maintenance mode.

ii. Test Method

As discussed above, DOE previously codified a test procedure based on ENERGY STAR's procedure for measuring the standby mode and battery-maintenance mode energy consumption of battery chargers. 71 FR at 71368. Section 323 of EPCA, as amended by section 310 of EISA, directs DOE to develop test procedures for the measurement of standby mode and off mode energy consumption for battery chargers by December 31, 2008. DOE believes that its existing test procedure already incorporates a method under which standby mode and off mode energy consumption can be measured and proposes minor revisions in today's notice to improve the clarity and applicability of this test procedure to standby mode and off mode. Section 3 of Appendix Y, which covers test apparatus and general instructions, does not require modification, since no changes are necessary to the required test apparatus.

In section 4 of Appendix Y, DOE proposes to add a new subsection ''(c) Standby-Mode and Off-Mode Power Consumption Measurement.'' This subsection would describe the manner

[12] Battery maintenance mode is defined as ''the mode of operation when the battery charger is connected to the main electricity supply and the battery is fully charged, but is still connected to the charger.'' Appendix Y to Subpart B of Part 430, Section 2(e).

in which to measure standby mode and off mode energy consumption separately. To measure standby mode, DOE proposes that users ''conduct a measurement of standby power consumption while the battery charger is connected to the power source.'' Specifically, the proposed subsection (c) would require the user to

> [r]emove the battery from the charger and record the power (*i.e.*, watts) consumed as the time series integral of the power consumed over a one-hour test period, divided by the period of measurement. If the battery charger has manual switches, all must be turned on for the duration of the standby mode test.

This language is based largely on the test measurement language incorporated by reference in section 4 of Appendix Y for Inactive Mode Energy Consumption, which refers to section 5, ''Determining BCS Energy Ratio,'' of the EPA's *Test Methodology for Determining the Energy Performance of Battery Charging Systems* (December 2005). Section 5 of the EPA battery charger test procedure, subsection 5.1, step 3, provides guidance to users for measuring power consumed when the battery is removed from the charger. In that step, EPA's procedure instructs the user to remove the battery from the charger while continuing to measure standby power. The procedure provides two options in this regard—a full test for 12 hours or an abbreviated test for 1 hour.

In today's notice, DOE proposes language for the measurement of standby mode energy consumption based on the abbreviated test, which directs technicians as follows: ''Measure energy used for a period of not less than 1 hour. Energy use may be measured as a time series integral of power. * * *'' In other words, technicians would measure the cumulative energy consumed in standby mode over a defined period of time: $E = \int P \cdot dt$, where E is energy, P is power, and t is time. DOE believes that the abbreviated test, which gathers data for one hour, would provide sufficiently accurate results for determining the power consumption of battery chargers without a battery installed because the time period is sufficient enough to permit the vast majority of battery chargers to stabilize and any power consumption in standby mode to be easily measured. DOE recognizes, however, the possibility that measurements conducted over a one hour period of battery chargers with low-frequency, pulsed operation in standby mode may not be representative of the energy consumption of these types of commonly used devices. Because of this potential limitation, DOE is particularly interested in comments that address increased required testing times beyond one hour up to a maximum of 12 hours.

For off mode, DOE proposes virtually identical test procedure language, changing only the requirement that if the battery charger has any switches, that those switches should be turned off. For this test procedure as well, DOE invites comment on the required duration of 1 hour of data collection, and other appropriate durations, including those between 1 hour and 12 hours.

For both modes, DOE proposes to include language based on the ENERGY STAR test procedure that clarifies the testing conditions for measuring the no-battery mode. Similar to the discussion in section III.A.1.i above, DOE's proposal would rely on an approach for standby and off mode similar to the one proposed above for battery chargers.

As discussed above, standby mode and off mode may also apply to products with non-detachable batteries. If the product uses a cradle and/or adapter for power conversion and charging, then only that part of the system will remain connected to the main electricity supply, and standby and off mode power consumption will equal that of the cradle and/or adapter. If the product contains integrated power conversion and charging circuitry but is powered through a detachable AC power cord, then only the cord will remain connected to mains AC power supply, and standby and off mode power consumption will equal that of the AC power cord (*i.e.*, zero watts). If the product contains integrated power conversion and charging circuitry but is powered through a non-detachable AC power cord, then no part of the system will remain connected to mains, and standby and off mode power consumption are not applicable.

2. External Power Supplies

DOE adopted a test procedure for external power supplies (Appendix Z) in a final rule published on December 8, 2006. 71 FR at 71368. DOE's test procedure measures the energy consumed by external power supplies in both active mode and no-load mode. However, the test procedure does not define the terms ''standby mode'' or ''off mode,'' although it does define ''no-load mode'' as ''the mode of operation when the external power supply is connected to the main electricity supply and the output is not connected to a load.'' 10 CFR 430, subpart B, Appendix Z, 2.c.

i. Definitions

DOE reviewed the definitions for standby mode and off mode in section 325 of EPCA, as amended by section 310 of EISA and found that the broad language used in the definitions might make these terms confusing or result in misapplication of the test procedure when measuring the energy consumed in these two modes. Furthermore, the statute provides no guidance on how to handle external power supplies that incorporate on-off switches. Therefore, DOE proposes to revise the definitions of standby mode and off mode as they apply to external power supplies to help clarify their application and provide this necessary guidance (*i.e.*, some external power supplies are sold today with on-off switches). DOE also proposes a method by which manufacturers can measure the energy consumed in these two modes that is based on the approach already followed for measuring no-load-mode energy consumption in the EPS Test Procedure.

Standby Mode, No-Load Mode

Because of the broad coverage of section 325 of EPCA, as amended by section 310(3) of EISA, and for the reasons cited in the battery chargers discussion above, DOE is concerned about problems that might arise if it were to adopt the language of the EISA definition of standby mode verbatim and apply it to external power supplies. In light of this situation, and consistent with Congressional directives to the Department, DOE is exercising its authority under section 325 of EPCA, as amended by EISA, to amend the definitions of the modes as they apply to this product, by rule, while considering IEC 62301. (42 U.S.C. 6295(gg)(1)(B) (as amended by EISA))

Additionally, since DOE does not currently have a definition of standby mode for external power supplies, DOE is proposing to incorporate a definition for this term into DOE's regulations in Appendix Z, section 2.s. The definition would provide that standby mode would mean ''the condition in which the external power supply is in no-load mode and, for external power supplies with on-off switches, all switches are turned on.'' DOE is also proposing to modify the definition of the term ''no-load mode'' to take into account multiple-voltage external power supplies. DOE's proposed definition for no-load mode in Appendix Z, section 2.n is ''the mode of operation when an external power supply is connected to the main electricity supply and the output is (or 'all outputs are' for a multiple-voltage external power supply) not connected to a load (or 'loads' for a multiple-voltage external power supply).'' This definition is based on the no-load mode definition in the CEC EPS

Test Procedure, which references IEC 62301. Thus, DOE's proposed definition reflects its consideration of IEC 62301. These definitions satisfy sections 321 and 325 of EPCA, as amended by sections 301 and 310 of EISA, provide clarity on testing external power supplies (including those with switches), and are consistent with IEC 62301's and ENERGY STAR's definition of standby mode.

The external power supply test procedure that DOE adopted in the December 2006 final rule, which is based on the ENERGY STAR test procedure, incorporated a measurement of no-load mode. DOE's current test procedure already accounts for the energy consumption in one of the inactive modes that the Secretary is directed to consider under section 325 of EPCA, as amended by section 310 of EISA. DOE's proposed definition of standby mode is consistent with the existing no-load mode definition in the CFR and the definition of standby mode in EPCA, while also providing clarity on the measurement of standby mode energy consumption for external power supplies that incorporate on-off switches. DOE's proposed definition is also consistent with the ENERGY STAR definition of no-load mode (and, by extension, standby mode) for this product.

Off Mode

As discussed in section III.A.1.i of this notice on battery chargers, section 310(3) of EISA amended EPCA to define ''off mode'' as ''the condition in which an energy-using product—(I) is connected to a main power source; and (II) is not providing any standby or active mode function.'' (42 U.S.C. 6295(gg)(1)(A)(ii)) DOE has not previously defined ''off mode'' for external power supplies, and is unaware of any definitions or test procedures that measure off mode for external power supplies. Furthermore, similar to battery chargers, the definition Congress included in EISA, lacks specificity and instruction on the measurement of energy consumption in off mode for external power supplies. To address this issue, under the authority Congress granted to the Department under EISA, DOE is proposing a definition for off mode as applied to external power supplies. (42 U.S.C. 6295(gg)(1)(B))

As with battery chargers, external power supplies can also incorporate on-off switches and may achieve a lower state of energy consumption than in standby mode. After considering IEC 62301, DOE believes that this lower state of energy consumption could conflict with the IEC Standard 62301 definition of ''standby mode,'' which states that standby mode is ''the lowest power consumption mode.'' See IEC Standard 62301 at section 3.2. The conflict could arise depending on where the on-off switch is placed in the EPS circuit: when the switch is set to the ''off'' position the EPS may or may not continue to consume power. For instance, if the switch interrupts the output on the secondary side of the EPS, then the EPS would continue to consume power when attached to mains and switched off. For this reason, DOE proposes to treat external power supplies with on-off switches turned off as being in off mode. Thus, in today's NOPR, DOE proposes to define ''off mode'' for external power supplies in Appendix Z, Section 2.o as:

> the condition, applicable only to units having on-off switches, in which the external power supply is (1) connected to the main electricity supply, (2) the output is not connected to any load, and (3) all switches are turned off.

As with DOE's proposed battery charger definition for off mode, DOE believes this proposed definition satisfies Congress's directives that DOE provide a means to measure energy consumption in inactive modes and is consistent with the IEC Standard 62301 definition of standby mode.

ii. Test Method

Prior to the enactment of EISA, DOE promulgated a test procedure regulation addressing sections 3 and 4 of Appendix Z for external power supplies that relied on the CEC EPS test procedures, which in turn, incorporated a means to measure the no-load energy mode. See 71 FR at 71368. Section 310 of EISA directs DOE to develop additional test procedures to cover standby mode and off mode energy consumption for external power supplies by December 31, 2008. See EPCA Section 325(gg). DOE reviewed its existing test procedure, and believes that Appendix Z already incorporates an appropriate method under which standby mode and off mode energy consumption can be measured. Consequently, a new test procedure is not required to comply with section 325(gg) of EPCA. However, DOE is making minor revisions to improve the clarity and applicability of this test procedure to the standby and off modes.

Section 3 of Appendix Z (''Test Apparatus and General Instructions'') requires no modification, because the external power supply test set-up does not need changing to comply with the amended requirements provided by EISA.

To section 4 of Appendix Z (''Test Measurement''), DOE proposes several modifications. In addition to testing requirements for standby mode and off mode, the proposed amendments require the Department to accommodate testing of multiple-voltage external power supplies and switch-selectable single-voltage external power supplies. To avoid confusion, DOE proposes to create separate standby mode and off mode test methods for single-voltage versus multiple-voltage external power supplies within two new subsections in section 4, with one addressing single-voltage testing requirements and the other addressing multiple-voltage testing requirements.

For single-voltage external power supplies, DOE proposes to specify in Appendix Z that standby mode measurements ''shall conform to the requirements specified in section 5, 'Measurement Approach' of the CEC's 'Test Method for Calculating the Energy Efficiency of Single-Voltage External AC–DC and AC–AC Power Supplies,' August 11, 2004, (Incorporated by reference, see 10 CFR Part 430.22).'' The only difference between the proposed amended test method and the one DOE previously adopted is the definition of standby mode, which, under the proposal, would require measurement with all on-off switches turned on.

For off mode measurement of single-voltage external power supplies, DOE also proposes test procedure language that is virtually identical to language DOE adopted in the December 2006 final rule specifying the no-load mode measurement. DOE's proposed regulatory text for Appendix Z, section 4(a)(ii) provides that during off mode, all on-off switches on the external power supply must be switched off and the technician need only measure Loading Condition 5 (no-load mode). For standby mode and off mode measurements of multiple-voltage external power supplies, DOE proposes to incorporate a no-load mode measurement in the multiple-voltage external power supply section. This proposal parallels the approach DOE is proposing for single-voltage power supplies. Manufacturers would be required to conduct a power consumption measurement with all on-off switches turned on and attribute the power consumption to standby mode. Manufacturers would then conduct the no-load mode measurement again with all switches turned off and attribute that power consumption to off mode. DOE believes that this approach is reasonable, not excessively burdensome to manufacturers, and will result in accurate, repeatable results.

B. Multiple-Voltage External Power Supplies

Section 325 of EPCA, as amended by section 309 of EISA, directs DOE to promulgate by December 19, 2009 a final rule determining whether energy conservation standards shall be issued for external power supplies or classes of them. Currently, these classes consist of Class A and non-Class A external power supplies. Under Section 301 of EISA, Congress required that Class A power supplies meet specifically prescribed standards that became effective on July 1, 2008. The Department is examining the possibility of developing standards for the remaining non-Class A external power supplies that are not covered by these statutorily-mandated standards.

Multiple-voltage external power supplies (*i.e.*, external power supplies that provide more than one output voltage simultaneously) have the highest shipments and widest range of consumer product applications of the external power supplies that fall outside of Class A. Because it must develop test procedures prior to developing a particular efficiency standard for a product, DOE reviewed numerous test procedures to help develop a standardized test procedure to apply to these products. Currently, DOE is unaware of any test procedure developed for measuring the efficiency of multiple-voltage external power supplies. However, DOE did identify two test procedures, the components of which may serve as a basis for a new test procedure. These procedures are the EPS and IPS test procedures developed by the CEC.

These test procedures meet many of the needs of a multiple-voltage external power supply test procedure. For example, the CEC IPS Test Procedure prescribes methods for safely dividing the test load between the multiple simultaneous outputs of a multiple-voltage power converter, while the CEC EPS Test Procedure contains loading conditions that more appropriately represent the various products powered by multiple-voltage external power supplies. The CEC EPS Test Procedure also contains measurement conditions for standby mode and warm-up times that DOE believes to be appropriate for testing multiple-voltage external power supplies because of their similarity to single-voltage external power supplies with respect to loads and construction, which result in similar standby mode conditions and warm-up times, respectively.

Furthermore, the CEC EPS Test Procedure already forms the basis for the DOE (single-voltage) external power supply test procedure and both the CEC EPS and IPS test procedures have been adopted by ENERGY STAR programs for external power supplies and personal computers, respectively. More broadly, industry uses the CEC IPS Test Procedure to test compliance with the 80 Plus voluntary efficiency guidelines [13] for internal power supplies, while the CEC EPS Test Procedure is widely recognized and forms the basis for voluntary and mandatory external power supply regulations in Australia, Canada, China, the European Union, Israel, Korea, and New Zealand.

Multiple-voltage external power supplies share features of both single-voltage external power supplies and multiple-voltage internal power supplies, and the CEC EPS and IPS Test Procedures complement each other in matters regarding the testing of multiple-voltage external power supplies. Because of their widespread use and acceptance, as well as their applicability to multiple-voltage external power supplies, DOE is proposing to incorporate sections from both the CEC EPS and IPS Test Procedures into its new multiple-voltage test procedure.

The multiple-voltage external power supply test procedure DOE is proposing in today's NOPR generally follows the structure of the CEC EPS Test Procedure and maintains the order in which the test set-up requirements and test method are presented. As the CEC EPS Test Procedure (incorporated by reference into Appendix Z) explains, the tested unit is placed in a standard test room and connected to calibrated metering equipment with a certain measurement uncertainty and resolution. The unit is then supplied with power from a regulated AC source, and all of its output busses are loaded so that the unit is delivering its nameplate output power. Following set-up of the test apparatus, the unit is allowed to warm up and stabilize, and its input and total output power are measured. The load conditions are then adjusted and the measurements repeated.

Even though the test set-up and measurement are based on the CEC EPS Test Procedure, the particulars are supplemented by details from the CEC IPS Test Procedure, as necessary. In sections where neither test procedure had appropriate language or instruction, DOE proposes its own language to provide guidance and clarity, and to ensure that consistent test results are obtained without excessive test burden. Some of the details in this proposed test procedure represent what DOE believes are improvements over the test conditions and apparatus set-up instructions in the CEC EPS Test Procedure. These changes seek to maintain (or improve) measurement accuracy and repeatability while avoiding excessive testing burdens and acknowledging the limitations of commercially available test equipment.

While the changes proposed in this section apply to the multiple-voltage external power supply test procedure, DOE is also considering similar amendments to the single-voltage external power supply test procedure. These include changes to (1) the measurement resolution and uncertainty requirement, (2) the AC source voltage requirement, (3) the AC source distortion requirement, (4) test-lead loss measurement, and (5) the power measurement stability requirement. DOE considers these test condition modifications, incorporated into today's proposed amendment for multiple-voltage external power supplies, to be improvements over the particular test conditions used in the current (single-voltage) test procedure. DOE is therefore also considering adopting these changes to the single-voltage external power supply test procedure. This means that DOE could adopt the same revised test conditions for both single- and multiple-voltage external power supplies. These modifications are discussed in greater detail in section III.D below in the context of single-voltage external power supply testing.

1. Test Apparatus and General Instructions

Although the proposed multiple-voltage test procedure is based in large part on the CEC EPS Test Procedure, DOE proposes to make changes to several aspects of the test setup in order to reduce testing burden and/or improve testing accuracy. These changes consist primarily of the elements outlined below.

i. Measurement Resolution and Uncertainty

The first test condition change incorporated into the proposed amendment concerns power-measurement accuracy. The CEC EPS Test Procedure requires power-measurement equipment to have a resolution greater than or equal to 0.01

[13] 80 PLUS is a program funded by utility companies that is designed to integrate more energy-efficient power supplies into desktop computers and servers. Among its various activities, the program assigns labels to distinguish between different levels of efficiency achieved by products. For more information on this program, please see *http://www.80plus.org.*

watts (W) for active power measurements (CEC EPS Test Procedure section 4.b), while the CEC IPS Test Procedure allows for lower resolution when measuring higher power levels (CEC IPS Test Procedure section 5.5). The resolution for power-measurement equipment in the CEC IPS Test Procedures has three ranges, depending on the magnitude of the wattage being measured. This approach is identical to that used in IEC Standard 62301,which serves as the industry reference document for standby power measurements.

According to DOE calculations, this three-tiered power-measurement equipment resolution requirement would result in, at most, a 0.5 percent error over the range of power measurements where the two resolution requirements differ, namely above 10 W. Because this error is significantly less than the 2 percent error due to measurement uncertainty permitted by the proposed amendment, discussed in detail below, DOE does not believe the proposed requirement will impact efficiency measurement. It will, however, significantly decrease the burden on testing laboratories, as they would no longer require equipment with 0.01 W resolution at power levels greater than 100 W, to comply with the requirements of the test procedure. In turn, this permits the use of cheaper and more readily available equipment for testing. DOE therefore proposes to adopt the three-tier power-measurement equipment resolution requirements, namely: (1) 0.01 W or better for measurements of 10 W or less; (2) 0.1 W or better for measurements of greater than 10 W up to 100 W; and (3) 1 W or better for measurements of greater than 100 W.

The proposed amendment would impose uncertainty requirements on the power measurement, which have also been drawn from section 5.5 of the CEC IPS Test Procedure, which requires that ''[m]easurements of power of 0.5 W or greater shall be made with an uncertainty of less than or equal to 2 percent at the 95 percent confidence level,'' while ''[m]easurements of power of less than 0.5 W shall be made with an uncertainty of less than or equal to 0.01 W at the 95 percent confidence level.'' These uncertainty requirements are equivalent to those in the current DOE test procedure, with the addition of an explicit confidence qualifier. This qualifier, which is necessary when expressing uncertainty in measurement, is the 95 percent confidence level customarily employed in experimental work, which accounts for errors that fall within two standard deviations of the mean of a normal distribution. The proposed uncertainty requirements are also equivalent to those used in the IEC Standard 62301 test method and their adoption would complete the test procedure and make it consistent with standard engineering practice.

Furthermore, unlike the CEC test procedures, the proposed amendment is explicit regarding the calibration required of the instruments used to measure the power. The proposed amendment requires the instruments to be calibrated in accordance with either American National Standards Institute (ANSI) and National Conference of Standards Laboratories (NCSL) Standard Z540.1 [14] or International Standards Organization (ISO) and IEC Standard 17025,[15] two standards in wide use by calibration laboratories. Although there are differences in scope and stringency between the two standards, both address calibration laboratory competency and traceability of calibration measurements to national standards. Finally, the proposed amendment requires the instrument to be within its calibration period, as specified on a dated label or certificate of calibration.

ii. AC Source Voltage Requirement

The second test condition change DOE is proposing would apply to the input voltage source. The CEC EPS Test Procedure requires that ''[t]he input voltage source * * * be capable of delivering at least 10 times the nameplate input power of the unit under test (as is specified in IEEE Standard 1515–2000).'' (CEC EPS Test Procedure section 4.e) The IEEE standard does not require the input voltage source to be capable of delivering 10 times the nameplate input power of the unit under test, but rather recommends it ''[a]s a rule of thumb.'' (IEEE Standard 1515–2000 section B.2.1) Furthermore, a requirement of 10 times greater output power may be difficult to meet when testing high-wattage power supplies. For example, testing a 250 W external power supply would require a 2.5 kilowatt source, capable of delivering 21.7 amperes at 115 V. A current this high exceeds the 20 amperes typically provided by commercial distribution wiring and would require non-standard circuit breakers, wires, and outlets, which would reduce the practicability of testing without an appreciable benefit in measuring energy efficiency. Finally, despite its stringency in regard to output power, this requirement may not ensure an ideal voltage source for units under test that have a low power factor (i.e., units that draw significant reactive power in addition to their (active) nameplate input power). As a result, DOE proposes to adopt CEC IPS Test Procedure, section 5.2, by recommending an AC source output power that is 10 times greater where practicable and specifying that the AC source voltage remain within 1 percent of 115 volts. This latter voltage requirement can be achieved by using an AC voltage regulator, even if the line voltage varies by more than 10 percent.

iii. AC Source Distortion Requirement

In addition to the amplitude of the AC source voltage waveform, AC voltage regulators can also control its distortion, which describes how closely the waveform approaches the ideal (*i.e.*, a sine wave). AC source voltage distortion is caused by the nonlinear current waveform the power supply under test, as well as other loads connected to mains, impose on the impedance of the source. The interaction between the two can result in a decrease in the peak AC source voltage due to heavier load on the AC source near the waveform peaks, which is observable as ''flat-topping'' of the AC voltage waveform. This lengthens the time that the rectifier diodes are conducting and consequently reduces the peak current during conduction. The net effect is a slight decrease in losses in the input filter, rectifier diodes, and bulk capacitor. While these components are minor contributors to the total losses, severe flat-topping will slightly improve the supply's overall efficiency. Existing power supply test procedures therefore limit the permitted AC source distortion to ensure consistent measurement results.

The specifications of commercially available AC voltage regulators that DOE has examined can, at best, ensure a total harmonic distortion (THD) of the AC source voltage waveform below 3 percent. DOE is concerned about this issue because the existing DOE external power supply test procedure in Appendix Z, as well as the CEC EPS and IPS Test Procedures and IEC Standard 62301, all require an AC source voltage with a THD below 2 percent.

One method of achieving an AC source-voltage THD below 2 percent is using an uninterruptible power supply (UPS) that generates its own AC voltage and current waveforms from batteries. DOE is concerned that UPS equipment

[14] ANSI/NCSL Z540.1. ''Calibration Laboratories and Measuring and Test Equipment—General Requirements,'' American National Standards Institute. 1994.

[15] ISO/IEC 17025. ''General Requirements for the Competence of Testing and Calibration Laboratories.'' International Electrotechnical Commission. May 2005.

is not intended for this purpose and is therefore not commonly found in testing laboratories. After carefully considering this issue, DOE does not believe that relaxing the upper limit of the THD requirement from 2 to 3 percent will noticeably affect the measurement accuracy of no-load power or active-mode efficiency. Therefore, to decrease the testing burden, DOE proposes to require 3 percent THD in the multiple-voltage external power supply test procedure. DOE is also, however, considering the adoption of the more stringent, and more difficult to meet, 2 percent requirement in the final rule for this test procedure, for harmonization with the CEC EPS and IPS test procedures. The Department is particularly interested in commenter views regarding the proposed THD requirements. Commenters should present the Department with an explanation and data supporting whichever option they believe should apply.

iv. Test Lead Loss Measurement

Although errors in measurement can occur due to the resistance of the test leads (*i.e.*, wires) used to connect the unit under test to the measurement equipment, these errors can be minimized by adhering to correct laboratory practice. Nonetheless, section 5.4 of the CEC IPS Test Procedure requires that testing laboratories explicitly account for test-lead losses. In today's notice, DOE proposes to adopt this same requirement to quantify losses in test leads. DOE also proposes to require testing laboratories to follow Table B.2 in Appendix B of IEEE Standard 1515–2000 when selecting the wire gauge of the test leads. Whereas the previous requirement seeks to account and correct for measurement errors due to test lead losses, this proposed requirement is preventative because it seeks to minimize these losses by requiring the selection of appropriate gauge wire.

DOE believes that these requirements will not significantly add to the testing burden, since testing laboratories routinely calculate test lead losses. The only additional burden would be documenting test lead losses, which would involve a calculation of, and a correction for, voltage drops across the test leads. These requirements are consistent with the CEC IPS Test Procedure and would result in more accurate and repeatable efficiency measurements. In addition to comments on this particular proposal, DOE is interested in alternate testing approaches that would ensure that lead losses are insignificant or otherwise accounted.

2. Test Measurement

The test measurement method for external power supplies and battery chargers in today's proposed rule is based on the requirements presented in the CEC EPS and IPS Test Procedures. In preparing DOE's proposed test measurement method, departures from the two CEC-developed test procedures were sometimes necessary because of the particular requirements of multiple-voltage external power supplies. These departures are mostly superficial and the proposed test measurement method otherwise remains consistent with the requirements of the CEC EPS and IPS Test Procedures. The specific elements of DOE's proposal are discussed below.

i. Power Measurement Stability Requirement

Before measuring the energy consumption of the external power supply in active and standby mode, both the CEC EPS and IPS Test Procedures require that the unit under test warm up and its input AC power stabilize. These test procedures conflict, however, regarding the time required for initial warm-up, the time for the power supply to stabilize following a change from one loading condition to another, and the stability criterion for accurate measurement. Each of these differences is explained below.

Initial Warm-up

Because the operation of electronic components varies with temperature, power supplies must be allowed to operate under full load for a period of time long enough such that all their components reach a steady temperature. Until this happens, a power supply will exhibit variation in its input and output conditions (also known as ''thermal transients''), even as the load remains constant.

The CEC EPS Test Procedure requires 30 minutes for initial warm-up, whereas the CEC IPS Test Procedure requires 15 minutes. Although the time the thermal transients need to settle will vary from one unit under test to the next, the warm-up times of external power supplies will generally be longer than those of internal power supplies, because external power supplies do not have a cooling fan or vents in the enclosure that promote convection like internal power supplies do. Because of these differences, DOE is proposing to use a 30-minute warm-up time for multiple-voltage external power supplies but with no specific settling time when changing between loading conditions.

Stabilizing Time

Because an EPS unit under test will dissipate varying amounts of power at each loading condition, its internal components will change temperature when transitioning from one load condition to the next. Since these temperature changes lead to thermal transients that affect efficiency, both the CEC EPS and IPS Test Procedures require a period of temperature stabilization before taking a measurement. However, DOE believes that the 15-minute period recommended by the CEC IPS Test Procedure may impose an unnecessary burden on the testing laboratory, since, typically, the inputs and outputs of external power supply that DOE tested tended to stabilize within 5 minutes. In light of this concern, DOE is proposing to follow the CEC EPS Test Procedure by permitting measurement as soon as the AC input power drawn by the unit under test stabilizes.

Stability Criterion

However, the CEC EPS and IPS Test Procedures use different stability criteria. The CEC EPS Test Procedure requires a change in the AC input power of less than 5 percent over 5 minutes, whereas the CEC IPS Test Procedure requires a change of less than 1 percent. DOE believes that permitting a 5-percent variation in the AC input power might compromise the quality of the efficiency measurement, given that the proposal limits uncertainty in power measurements to 2 percent (at the 95 percent confidence level) in paragraph III.B.1.i, above. However, this same uncertainty limit may make stability to within 1 percent difficult to achieve. Consequently, DOE is proposing that if 1-percent stability cannot be achieved, the testing laboratory may calculate average power over a 5-minute period through mathematical integration, which is consistent with IEC Standard 62301.[16]

ii. Loading Conditions

Using elements of the CEC EPS and IPS procedures, DOE proposes a hybrid loading condition that would be used to measure the energy efficiency of multiple-voltage external power supplies. Because the efficiency of a power supply is a function of load current, a test procedure must specify loading conditions to make the results

[16] DOE is also proposing to amend the single-voltage test procedure to include this stricter requirement on power supply stability, as discussed in section III.D.5 of this notice.

comparable and representative of actual usage. Section 4.3 of the CEC IPS Test Procedure requires that the unit under test be tested at 100, 50, 20 percent, and, in some cases, 10 percent of full load. The 100, 50, and 20 percent loading represent the current draw of a computer operating at full, medium, and light load, respectively, while the 10-percent loading condition represents the scenario where the internal power supply operates redundantly as part of a pair of power supplies in a server application.

The CEC IPS loading conditions presented above represent specific operating modes of a computer, and may not reflect the typical loads presented by the wider range of applications powered by multiple-voltage external power supplies. Because of these differences, DOE proposes instead that multiple-voltage external power supply loading conditions be based on the same ones used in DOE's current (single-voltage) external power supply test procedure, which is based on the CEC EPS test procedure. Specifically, the loads DOE proposes to use are 100, 75, 50, and 25 percent of full load. These loading conditions are accepted by industry as representative of the loads presented by the wider range of consumer products beyond computers. Like the current single-voltage test procedure, the proposed amendment also requires the reported efficiency to equal the simple average of the four efficiencies measured at each loading point (*i.e.*, 100, 75, 50, and 25 percent of full load).

iii. Proportional Allocation

DOE investigated several approaches to loading the outputs of a multiple-voltage external power supply. For example, DOE considered the possibility of testing each output bus independently of the others, by loading each bus sequentially to 100, 75, 50, and 25 percent of its nameplate output current while leaving the others unloaded. However, this approach is unacceptable for two reasons. First, even when an output bus is loaded to 100 percent of its nameplate output current, the output power (output current multiplied by voltage) delivered by the bus will be much smaller than the nameplate output power of the power supply as a whole. Because certain components in the power supply will not be operating near their maximum rated power, they are likely to remain cool, so any losses in efficiency caused by internal heating will not be captured by this approach. Second, many multiple-output power supplies place restrictions on the minimum output current, which can prevent one output from operating while others remain unloaded, possibly invalidating the measurement.

Comparing the differences between single and multiple-voltage external power supplies helps to highlight the practical considerations DOE is weighing in its proposal. For this discussion, the DC output of a single-voltage external power supply can be fully characterized by three parameters: Output voltage, output current, and their product, output power. Because each parameter can be calculated from the other two, only two are typically listed on the power supply nameplate: voltage and current, or voltage and power.

Loading a single-voltage power supply for measuring efficiency begins with reading the output current listed on the nameplate, or if not listed, calculating it by dividing the nameplate output power by the output voltage. A test load connected to the output of the power supply is then adjusted such that the power supply produces an output of 100, 75, 50, and 25 percent of this nameplate current. At each loading condition, the output power into the load is divided by the input power into the external power supply to calculate the efficiency.

By comparison, loading multiple-voltage power supplies is more complicated because they feature multiple outputs capable of delivering power to a load (termed ''output busses'' to distinguish them from non-power outputs used in some systems for communication between the power supply and the load). In addition to the nameplate output power of the power supply, the test method must take into account the parameters that characterize each output bus: Nameplate output voltage and current or power. To load a multiple-voltage external power supply to 100, 75, 50, and 25 percent of full load while operating within the specifications of the output busses and the power supply as a whole, DOE proposes to use a loading method termed ''proportional allocation.''

The ''proportional allocation'' method, which is found in section 6.1.1 of the CEC IPS Test Procedure, requires all output busses to be simultaneously loaded to, in sequence, 100, 75, 50, and 25 percent of their individual nameplate output currents. These loads are scaled (or ''derated'') so as not to exceed the nameplate output power of the power supply as a whole. The derating process is explained below.

As mentioned previously, each output bus of a multiple-voltage power supply is characterized by a nameplate output voltage and current, which, when multiplied together, result in the nameplate output power of the bus. Additionally, the power supply as a whole has its own nameplate output power, which may differ from the sum of the bus nameplate output powers. If the nameplate output power were smaller than the sum, and each output bus were loaded to 100 percent of its nameplate output currents, the busses' combined output power would exceed the supply's nameplate output power, forcing the integrated safety circuitry to shut the device down, rendering any efficiency measurement invalid. The proportional allocation method in the proposed amendment would require the testing technician to derate the load currents for each bus so that the sum of their output powers does not exceed the nameplate output power of the power supply. This method would permit a valid measurement to be conducted even in the above case where the sum of the output bus nameplate output powers exceeds the nameplate output power of the supply.

Prior to loading the output busses and conducting measurements, a derating factor is calculated by dividing the nameplate output power of the supply by the sum of the bus nameplate output powers. If the derating factor is *greater* than or equal to 1, the sum of the bus nameplate output powers is smaller than the nameplate output power of the supply. The power output by the busses at 100 percent of their nameplate output current will not exceed the nameplate output power of the supply, so no derating is necessary. Efficiency testing is conducted while simultaneously loading all the busses sequentially to 100, 75, 50, and 25 percent of their nameplate output currents. If, on the other hand, the derating factor is less than 1, the sum of the bus nameplate output powers is *greater* than the nameplate output power of the supply. The power output by the busses at 100 percent of their nameplate output current will exceed the nameplate output power of the power supply. To prevent the power supply from shutting down during testing, due to excessive output power, derating is necessary. Efficiency testing would be conducted while simultaneously loading all the busses sequentially to 100, 75, 50, and 25 percent of their nameplate output currents, multiplied by the derating factor.

iv. Minimum Output Current Requirement

DOE is aware of many multiple-voltage external power supply specifications that require a certain

minimum output current on one or more of the output busses. In a few of the external power supplies DOE examined, the minimum output current for one bus is greater than the 25 percent of nameplate current required for testing under proposed Loading Condition 1 (*i.e.*, 100 percent of derated nameplate output current). Although the power supply may still operate, it may not be able to regulate the output voltage of the affected bus, which would cause the output voltage to fall outside of the nameplate value.

Although it is possible to conduct measurements disregarding output voltage, DOE does not believe that this will result in a meaningful measurement of efficiency, since a power supply in typical usage is unlikely to operate outside its specified current range. Therefore, to address this situation, DOE proposes to include in its test procedure for multiple-voltage external power supplies procedures that are consistent with section 4.3 of the IPS Test Procedure. Specifically, DOE's proposed procedure would require the laboratory technician to continue increasing the load current for each affected output until it equals the minimum output current and to measure the input and output power only when the external power supply is operating within its specifications.

v. No-Load Mode Testing

In addition to requiring measurements under the four active mode loading conditions, the proposed amendment also requires measurement at 0 percent load, *i.e.*, the standby or no-load mode. The proposed amendment follows the current DOE test procedure rather than the standby mode definition and measurement method of the CEC IPS Test Procedure, which involves placing the power supply into a low-power mode by using an external control signal. While the CEC IPS approach may work for some multiple-voltage external power supplies, most of the multiple-voltage external power supplies DOE examined do not have any control inputs or explicit low-power modes. The proposed amendment therefore would require standby mode energy consumption testing under the same conditions as the existing DOE single-voltage external power supply test procedure, which would make the no-load condition applicable to all multiple-voltage external power supplies.

C. External Power Supply Test Procedure Definitions

In reviewing Appendix Z, DOE found that some of its existing test procedure definitions differ slightly from the ones stakeholders currently use, while other terms were undefined and may have caused confusion. To address the problem, today's notice proposes modifications to the definitions of ''active mode,'' ''active-mode efficiency,'' ''no-load mode,'' ''total harmonic distortion,'' and ''true power factor.'' In addition, DOE proposes new definitions for the terms ''active power,'' ''ambient temperature,'' ''apparent power,'' ''instantaneous power,'' ''minimum output current,'' ''multiple-voltage external power supply,'' ''nameplate input frequency,'' ''nameplate input voltage,'' ''nameplate output current,'' ''nameplate output power,'' ''nameplate output voltage,'' ''off mode,'' ''output bus,'' ''standby mode,'' ''switch-selectable single-voltage external power supply,'' and ''unit under test.'' By amending these definitions and incorporating new ones, DOE aims to improve the clarity and utility of its test procedure for external power supplies. The new definitions of ''standby mode'' and ''off mode'' are discussed above in section III.A.2.i. While DOE is not proposing changes to the definitions for ''single-voltage AC–AC power supply'' and ''single-voltage AC–DC power supply'', they are included with the proposed amendments to Section 2 of Appendix Z because their numbering would change within the section.

1. Revisions to Existing Definitions

In December 2006, DOE codified definitions for technical terms used in the test procedure for external power supplies. 71 FR at 71368. In a recent review of the definitions of these same terms in IEEE Standard 1515–2000, IEEE Standard 100, and the CEC EPS and IPS Test Procedures, DOE found differences between its definitions and those used in these technical documents. If DOE's proposed test procedure for multiple-voltage external power supplies is adopted in the final rule, some of DOE's terms will require modification or additions to permit testing of multiple-voltage units.

To address these issues, DOE proposes to make the following changes to the Appendix Z definitions: (1) Modify the definition of ''active mode'' to encompass multiple-voltage external power supplies; (2) add a citation to IEEE Standard 1515–2000 to the ''active-mode efficiency'' definition; (3) modify the definition of ''no-load mode'' to apply to multiple-voltage external power supplies; and (4) revise the definitions of ''total harmonic distortion'' and ''true power factor'' to be consistent with IEEE Standard 1515–2000.

Within the proposed change to ''active mode'' described above, DOE also proposes a minor revision to the definition to make it consistent with the definition of ''active mode'' contained in section 321 of EPCA, as amended by section 301(a)(1)(B) of EISA. This definition reads: ''The term 'active mode' means the mode of operation when an external power supply is connected to the main electricity supply and the output is connected to a load.'' Except for the use of the verb ''is'' rather than ''means'' immediately following the words ''active mode'', this definition is identical to the definition DOE codified in its December 2006 final rule. In today's notice, DOE proposes to replace ''is'' with ''means'' to conform the proposed definition to the EISA amendments. DOE also proposes to insert two parenthetical statements to make the definition of ''active mode'' applicable to multiple-voltage external power supplies, which have more than one output. This proposed change is necessitated by DOE's desire to provide adequate test procedures covering multiple-voltage power supplies. The proposed definition for ''active mode efficiency'' to be inserted in Appendix Z to Subpart B of Part 430, Section 2.a. would read as follows:

> *Active mode* means the mode of operation when the external power supply is connected to the main electricity supply and the output is (or ''all outputs are'' for a multiple-voltage external power supply) connected to a load (or ''loads'' for a multiple-voltage external power supply).

DOE also proposes amending the definition of ''active mode efficiency'' in Section 2.b of Appendix Z to include a reference to section 4.3.1.1 of IEEE Standard 1515–2000, which the CEC EPS Test Procedure references. DOE believes it appropriate to reference IEEE Standard 1515–2000 because it provides a formula for calculating the efficiency that applies to external power supplies with one or more outputs. DOE's proposed revised definition of ''active mode efficiency'' would make it more consistent with the CEC EPS definition. The only difference remaining between the definitions of ''active mode efficiency'' used in the DOE external power supply and the CEC EPS test procedures is that the CEC definition states that output power is AC or DC and input power is AC. DOE is not proposing to include this statement about the type of input or output power in its definition because DOE does not consider it to be crucial to the definition.

DOE also proposes to revise the definition of ''no-load mode'' to make it applicable to multiple-voltage external power supplies by inserting parenthetical statements that change specific statements in the definition from singular to plural to account for the fact that multiple-voltage external power supplies have more than one output. Notwithstanding these revisions, the language of the ''no-load mode'' definition is the same as the language DOE codified in its December 2006 final rule (71 FR at 71368) and contained in section 321 of EPCA, as amended by section 301(a)(1)(A) of EISA. Section III.A.2.i above discusses the definition as it relates to ''no-load mode.''

Additionally, DOE proposes revising the definition of ''total harmonic distortion'' to make it consistent with the definitions of total harmonic distortion contained in the IEEE Standard 1515–2000 and the CEC IPS Test Procedure. DOE's current definition, also codified in the December 2006 test procedure final rule (71 FR at 71368), describes total harmonic distortion in general terms but does not include a mathematical equation, which would enhance the clarity of the definition. DOE found in its recent review of definitions used by IEEE Standard 1515–2000 and the CEC EPS and IPS Test Procedures all include an equation in helping to define total harmonic distortion. Therefore, to ensure consistency and uniformity with these other definitions, DOE proposes to add an equation to the definition of total harmonic distortion.

Further, the proposed DOE definition for total harmonic distortion includes all harmonic components up to and including the nth harmonic, which is consistent with IEEE Standard 1515–2000 and the CEC IPS Test Procedure. However, in practice, the measurement of total harmonic distortion is limited to harmonics up to and including the 13th harmonic. This limitation is due to the CEC EPS Test Procedure referenced in section 3 of Appendix Z that the ''THD of the supply voltage * * * shall not exceed 2%, up to and including the 13th harmonic.'' Thus, although the proposed DOE definition is more expansive than the definition contained in the CEC EPS Test Procedure, barring any other variables, the proposed test method incorporates limits that would yield the same measured results as the IEEE and IPS test methods. Accordingly, DOE believes that this revision will improve the clarity of the definition and align it with the industry's definitions of total harmonic distortion. DOE's proposed definition for THD would be inserted in Appendix Z, Section 2.u. and read as follows:

Total harmonic distortion, expressed as a percent, is the RMS value of an AC signal after the fundamental component is removed and interharmonic components are ignored, divided by the RMS value of the fundamental component. THD of current is defined as:

$$THD_I = \frac{\sqrt{I_2^2 + I_3^2 + I_4^2 + I_5^2 + ...I_n^2}}{I_1}$$

where I_n is the RMS value of the nth harmonic of the current signal.

Finally, DOE proposes revising the definition of ''true power factor'' in 10 CFR Part 430 by adding a statement to incorporate the effects of distortion and displacement. This statement clarifies that ''true power factor'' should account for both components of power factor-distortion and displacement. *Distortion* refers to harmonic components that prevent the current waveform from being a perfect sine wave; *displacement* refers to a phase shift between the current and voltage waveforms. DOE believes that adding this statement to the definition of true power factor would remove any ambiguity of its interpretation. This proposed change would also allow DOE to align its definition with the definitions in the EPS Test Procedure, IEEE Standard 1515–2000, and IEEE Standard 100, all of which include this statement. The revised definition, which incorporates the effects of both distortion and displacement, would if adopted, be inserted into Appendix Z, Section 2.v. and read as follows:

True power factor (PF) is the ratio of the active power (P) consumed in watts to the apparent power (S), drawn in volt-amperes.

$$PF = \frac{P}{S}$$

2. New Definitions

Although the December 2006 final rule included numerous definitions related to battery charger and external power supply energy efficiency ratings, it did not define some terms that were omitted from the external power supply test procedure or common electrical engineering terms. DOE is concerned, however, that not clarifying these terms could lead to confusion or inconsistency in how the test procedure is applied. Accordingly, DOE is proposing to incorporate these new terms and definitions in section 2—''Definitions''—of Appendix Z.

Specifically, DOE proposes to define separately ''active power'' and ''apparent power,'' which were previously defined within the definition of ''true power factor.'' DOE is also proposing definitions for ''ambient temperature'' and ''unit under test'' that are consistent with IEEE Standard 1515–2000. The Department is also proposing to define the terms ''minimum output current,'' ''multiple-voltage external power supply,'' and ''output bus,'' which are used in the context of the multiple-voltage external power supply test procedure. Additionally, DOE is proposing definitions of ''instantaneous power,'' ''nameplate input frequency,'' ''nameplate input voltage,'' ''nameplate output current,'' ''nameplate output power,'' and ''nameplate output voltage'' that are consistent with definitions in the CEC EPS Test Procedure. Finally, DOE proposes to add a definition for ''switch-selectable single-voltage external power supply'' similar to one under consideration by other countries. These proposed definitions are detailed below.

Active Power

DOE proposes to define the term ''active power'' in its external power supply test procedure using the CEC EPS Test Procedure definition and including a reference to IEEE Standard 1515–2000. DOE has inserted a citation to IEEE Standard 1515–2000 because the IEEE definition contains a formula that could be helpful in explaining how voltage and current should be multiplied and integrated to determine active power. DOE is not proposing to include the IEEE Standard 1515–2000 equation in its definition because this equation is not part of the CEC EPS Test Procedure. DOE believes that its proposed definition for ''active power'' harmonizes with existing industry definitions and adds clarity to DOE's test procedure. The proposed definition, which would replace the definition

currently in Appendix Z, section 2.c., would read as follows:

Active power means the RMS[17] value of the instantaneous power taken over one period. (See IEEE Standard 1515–2000).

Ambient Temperature

The proposed definition for ''ambient temperature'' is the same as the definition in the CEC EPS Test Procedure, IEEE Standard 1515–2000, and IEEE Standard 100, except that DOE uses the phrase ''unit under test,'' while the EPS Test Procedure simply uses the acronym ''UUT,'' and the IEEE Standard 100 definition uses the phrase ''object under consideration.'' While these are minor language differences, it is clear that in all cases the definitions are referring to the external power supply being tested and are otherwise substantially identical to each other. DOE believes that its proposed definition, which is exactly the same as IEEE Standard 1515–2000, aligns with the industry definitions of ambient temperature and clarifies the external power supply test procedure. Accordingly, DOE's proposed definition for ambient temperature would be inserted into Appendix Z, Section 2.d. and read as follows:

Ambient temperature means the temperature of the ambient air immediately surrounding the unit under test.

Apparent Power

DOE proposes to use the same definition for ''apparent power'' in its test procedure as the one found in the CEC EPS Test Procedure, IEEE Standard 1515–2000, and IEEE Standard 100. All three definitions specify that apparent power is the product of RMS voltage and RMS current. IEEE Standard 100 also describes how to calculate RMS voltage and RMS current. DOE believes that its proposed definition, which would be inserted in Appendix Z, Section 2.e. and be defined as ''the product of RMS voltage and RMS current,'' aligns with existing industry definitions of apparent power and clarifies the external power supply test procedure.

Instantaneous Power

DOE proposes to include and define the term ''instantaneous power'' in its test procedure. The proposed definition adopts the language from the CEC EPS Test Procedure definition verbatim and represents the product of the instantaneous voltage and instantaneous current at a port (the terminal pair of a load). DOE believes that the CEC EPS Test Procedure definition is accurate and complete, and its adoption would help clarify this term for any users of the DOE test procedure. In addition, DOE cannot conceive of any reason why this definition would not be applicable to both single-voltage and multiple-voltage external power supplies. For all of these reasons, DOE proposes to define instantaneous power in Appendix Z, Section 2.f. as follows:

Instantaneous power means the product of the instantaneous voltage and instantaneous current at a port (the terminal pair of a load).

Minimum Output Current

DOE's proposed definition for minimum output current would describe this term precisely and clarify the external power supply test procedure, which uses the term minimum output current to specify the loading conditions for multiple-voltage units. DOE is proposing to define this term in Appendix Z, Section 2.g. as follows:

Minimum output current means the minimum current that must be drawn from an output bus for an external power supply to operate within its specifications.

Multiple-Voltage External Power Supply

DOE proposes to define the term ''multiple-voltage external power supply'' in its test procedure. As discussed in section III.B, DOE proposes to incorporate into its test procedure a method that manufacturers can use to test and report on the efficiency of a multiple-voltage external power supply. The proposed definition is based on the language used in the CEC EPS Test Procedure for single-voltage external power, adapted to multiple-voltage units with more than one output. DOE believes that its proposed definition is accurate and complete, and its adoption would help to clarify this term for any users of the DOE test procedure. Accordingly, DOE is proposing to define this term in Appendix Z, Section 2.h. as follows:

Multiple-voltage external power supply means an external power supply that is designed to convert line voltage AC input into more than one simultaneous lower-voltage output.

Nameplate Input Frequency, Input Voltage, Output Current, Output Power, and Output Voltage

DOE proposes to define the terms ''nameplate input frequency,'' ''nameplate input voltage,'' ''nameplate output current,'' ''nameplate output power,'' and ''nameplate output voltage'' in its test procedure. These terms all refer to the manufacturers' ratings affixed to the outside of the case of an external power supply denoting the maximum or typical input and output parameters. The proposed DOE definitions are consistent with the CEC EPS Test Procedure definitions but more concise. DOE found in its review of definitions that the CEC EPS Test Procedure definitions included illustrative language or examples, which DOE believes extraneous to its purposes. Accordingly, DOE is proposing to define these terms in Appendix Z, Sections 2.i–2.m as follows:

i. *Nameplate input frequency* means the AC input frequency of the power supply as specified on the manufacturer's label on the power supply housing.

j. *Nameplate input voltage* means the AC input voltage of the power supply as specified on the manufacturer's label on the power supply housing.

k. *Nameplate output current* means the current output of the power supply as specified on the manufacturer's label on the power supply housing (either DC or AC).

l. *Nameplate output power* means the power output of the power supply as specified on the manufacturer's label on the power supply housing.

m. *Nameplate output voltage* means the voltage output of the power supply as specified on the manufacturer's label on the power supply housing (either DC or AC).

Output Bus

DOE proposes to define the term ''output bus'' in its test procedure for external power supplies. An output bus is physically composed of output wires from the power supply that are able to deliver power to a load. DOE proposes to define this term in Appendix Z, Section 2.p. as follows:

Output bus means any of the outputs of the power supply, to which loads can be connected and from which power can be drawn, as opposed to signal connections used for communication.

Switch-Selectable Single-Voltage External Power Supply

Since this rulemaking proposes a test method under which manufacturers would test and state the efficiency of their switch-selectable single-voltage external power supplies, DOE also proposes to include and define in its test procedure the term ''switch-selectable single-voltage external power supply.'' DOE seeks to clarify the distinction between a ''switch-selectable single-voltage power supply,'' which provides only one of several output voltages at a time, and a ''multiple-voltage external power supply,'' which provides multiple voltages simultaneously. DOE's proposed definition for this term is based on a draft Australian/New Zealand standards

[17] RMS stands for ''Root Mean Square'' and is the square root of the average of the squares of a set of numbers (in this case, measured levels of instantaneous power consumption).

document and, if adopted, would help harmonize its usage. Accordingly, DOE is proposing to define this term in Appendix Z, Section 2.t. as follows:

Switch-selectable single-voltage external power supply means a single-voltage AC–AC or AC–DC power supply that allows users to choose from more than one output voltage.

Unit Under Test

Finally, DOE proposes to define the term ''unit under test'' in its external power supply test procedure. The proposed definition into Appendix Z to Subpart B of Part 430, Section 2.w states that the unit under test means ''the external power supply being tested.'' Since the unit under test in this test procedure always applies to the external power supply being tested, DOE's proposed definition is consistent with how this term is interpreted by industry when using the external power supply test procedure.

DOE welcomes stakeholder comments on all of the proposed definitions for the external power supply test procedure.

D. Single-Voltage External Power Supply Test Procedure Amendments

During the development of the test procedure for multiple-voltage external power supplies, DOE found areas for improvement in its existing (single-voltage) external power supply test procedure codified in Appendix Z. To improve the existing (single-voltage) external power supply test procedure, DOE is weighing the incorporation of a number of changes to Appendix Z. These changes would involve sections 3 and 4 and would, among other things, help tighten the testing requirements to help improve the accuracy of test results.

Specifically, DOE is considering four changes to the Test Apparatus and General Instructions (section 3 of Appendix Z): (1) Adopting the same three-step resolution requirement for equipment at powers greater than 10 W; (2) replacing the requirement on AC input voltage source output power with a requirement that the AC source voltage remain within 1 percent of 115 volts; (3) loosening the AC source voltage THD requirement from less than or equal to 2 percent to less than or equal to 3 percent; and (4) requiring full accounting of losses associated with the test leads. These proposed changes are designed to improve the existing test conditions and clarify the test procedure instructions.

A further change to section 4 of Appendix Z would tighten the stability requirement for power measurement from 5 percent to 1 percent, yielding more repeatable and accurate test results. DOE specifically requests stakeholder comments on the possibility of amending some of the same requirements in its single-voltage external power supply test procedure as are proposed in section III.B above for multiple-voltage external power supplies (section III.B).

DOE believes that incorporating the proposed changes for multiple-voltage external power supplies into the single-voltage test procedure would improve the accuracy and repeatability of measurements and, on the whole, ease the testing burden on manufacturers. However, while DOE believes that the proposed amendments for multiple-voltage EPSs are both reasonable and appropriate, DOE is also concerned about departures from the CEC EPS Test Procedure (single-voltage) requirements, which have been adopted internationally. Consequently, DOE is not proposing revised regulatory text for single-voltage EPSs, but is considering whether to revise the current test procedure in the manner described in the sections that follow. Stakeholder comments are sought on this issue to help DOE decide whether to incorporate these revisions in the final rule. As discussed in the following sections, DOE is considering amending the single-voltage test procedure, regarding measurement resolution and uncertainty, AC source voltage requirements, AC source distortion requirements, test lead loss measurements, and power measurement stability requirements. DOE is requesting comments on these changes under consideration.

1. Measurement Resolution and Uncertainty

The Test Apparatus and General Instructions section (section 3 of Appendix Z) of the DOE power supply test procedure references the CEC EPS Test Procedure, which sets out in section 4.b a requirement that all power measurements shall be made with a measurement resolution of 0.01 W or better. As discussed in section III.B.1.i above, this requirement would likely be burdensome and not result in significant gains in measurement accuracy. This measurement resolution requirement is also in conflict with IEC Standard 62301, which incorporates the aforementioned three-tiered approach for measurement resolution. To address this difference between the DOE test procedure and IEC Standard 62301, DOE is considering adopting the IEC 62301 approach by amending the single-voltage external power supply test procedure in section 3(a) of Appendix Z to include the following resolution requirement for power measurements: (1) 0.01 W or better for measurements of 10 W or less, (2) 0.1 W or better for measurements of greater than 10 W up to 100 W, and (3) 1 W or better for measurements of greater than 100 W.

Similarly, the CEC IPS Test Procedure qualifies its measurement uncertainty requirements by including confidence levels, which are missing both from the CEC EPS and DOE single-voltage test procedure. Adopting these confidence levels would complete the single-voltage test procedure and align it with general engineering practice and IEC Standard 62301.

2. AC Source Voltage Requirement

The Test Apparatus and General Instructions section of the DOE test procedure (section 3 of Appendix Z) references the CEC EPS Test Procedure, which sets a requirement in section 4.e that the AC source voltage have an output power 10 times greater than the nameplate output power of the unit under test. As discussed in section III.B.1.ii above, this requirement may be burdensome for testing laboratories and may not guarantee a constant voltage in cases of significant reactive power draw due to a unit under test with a low power factor. DOE is therefore considering amending its single-voltage external power supply test procedure in section 3(a) of Appendix Z to include a requirement that the AC source voltage not deviate by more than 1 percent from its nominal value, achievable with an AC voltage regulator and, where practicable, the input voltage source be capable of delivering at least 10 times the nameplate input power of the unit under test (as recommended by IEEE Standard 1515–2000).

3. AC Source Distortion Requirement

The Test Apparatus and General Instructions section of the DOE test procedure (section 3 of Appendix Z) references the CEC EPS Test Procedure, which includes a requirement in section 4.e that the AC source have a THD of less than 2 percent. As discussed in section III.B.1.iii of this notice, this requirement may be burdensome, since the specifications of common laboratory-grade AC regulators that DOE has reviewed can only guarantee a THD of less than 3 percent, not 2 percent. DOE is therefore considering amending the single-voltage external power supply test in section 3(a) of Appendix Z procedure to include a requirement that the AC source THD be no greater than 3 percent, consistent with DOE's proposal for multiple-voltage external power supplies.

4. Test Lead Loss Measurement

The Test Apparatus and General Instructions section of the DOE test procedure (section 3 of Appendix Z) references the CEC EPS Test Procedure, which sets a requirement that the test apparatus use leads with ''large gauge and short length.'' CEC EPS Test Procedure, section 4.f. As discussed in section III.B.1.iv, this requirement does not fully account for, or explicitly limit, the error that may be introduced into the measurements due to test lead resistance. DOE is therefore considering following the approach used in the CEC IPS Test Procedure by amending the single-voltage external power supply test procedure in section 3(a) of Appendix Z to include a requirement that the testing laboratory account for and document the losses in the test leads.

5. Power Measurement Stability Requirement

The Test Measurement section of the DOE test procedure (section 4 of Appendix Z) references the CEC EPS Test Procedure, which sets a requirement in section 5.d that the AC input power into the unit under test must not drift by more than 5 percent from the maximum value observed when conducting instantaneous measurements. As discussed in section III.B.2.i, DOE believes that this 5-percent stability requirement is not stringent enough and could introduce some error into the efficiency measurement.

To address this issue, DOE is considering adopting part of the procedures presented in the CEC IPS Test Procedure by amending the requirements in the single-voltage external power supply test procedure in section 4(a) of Appendix Z to require a 1-percent stability criterion, while retaining provisions for the calculation of average power through integration when that stability requirement cannot be met.

E. Switch-Selectable Voltage External Power Supplies

In reviewing the DOE test procedure (Appendix Z), DOE noted that it does not explain to manufacturers how they should test and rate external power supplies that incorporate a switch that enables users to vary the output voltage of the unit under test. To remedy this gap, DOE proposes that external power supplies with a switch-selectable output voltage shall be tested at the maximum and minimum voltage setting. Under this proposal, an external power supply with a switch-selectable output voltage would be considered in compliance with an energy efficiency standard if it meets or exceeds the minimum requirements at both its lowest and highest selectable output voltage. Conducting both tests makes DOE's procedures consistent with those of the ENERGY STAR [18] and Australian and New Zealand [19] external power supply efficiency programs.

F. Submission of Certification Test Data to DOE

Manufacturers of covered and regulated products must file documentation with DOE to certify that the products they are distributing into commerce in the United States are compliant with the Federal energy conservation standards. EISA modified EPCA by establishing standards for Class A external power supplies, including minimum active-mode efficiency and maximum no-load power consumption. In prescribing these standards, Congress effectively extended the pre-existing certification requirements to apply to Class A external power supplies. Consequently, DOE is including these products in the requirements of 10 CFR part 430.

1. Background

In its July 2006 NOPR, DOE had proposed several components of the certification and enforcement procedure for both battery chargers and external power supplies, including definitions of ''basic model'' and ''covered product,'' a sampling plan, and test procedures. 71 FR at 42178. In December 2006, DOE codified some of the measures proposed in the July 2006 NOPR, including modifications to the definitions of ''basic model'' and ''covered product'' and the test procedures. 71 FR at 71340.

In the following section, DOE provides a summary review and several cross-references to its actions with respect to the certification and enforcement provisions for battery chargers and external power supplies.

i. Definition of ''Basic Model''

In its December 2006 Final Rule, DOE codified amendments to the definition of ''basic model'' in 10 CFR 430.2 to make it applicable to battery chargers and external power supplies. 71 FR at 71365. These amendments to the definition of a basic model establish how this term applies to these two products. The basic model concept is important because it represents the level at which manufacturers must demonstrate that they comply with any Federal regulation. By including discussion of this term in today's NOPR, DOE is not re-opening and revising the definitions of basic model for battery chargers or external power supplies. Instead, DOE is including this discussion to facilitate stakeholder interpretation of how this term, previously defined, applies to these two products.

The codified language adopted in December 2006 concerning the basic model definitions for battery chargers and external power supplies read as follows:

> Basic model means all units of a given type of covered product (or class thereof) manufactured by one manufacturer and—
>
> * * * * *
>
> (25) With respect to battery chargers, which have electrical characteristics that are essentially identical, and which do not have any different physical or functional characteristics that affect energy consumption.
>
> (26) With respect to external power supplies, which have electrical characteristics that are essentially identical, and which do not have any different physical or functional characteristics that affect energy consumption.

As previously discussed, EISA established energy conservation standards for Class A external power supplies. Starting on the effective date of that standard, manufacturers are required to track the efficiency of their designs and certify compliance at the basic model level. The phrase ''any different physical or functional characteristics that affect energy consumption'' means that any modification for a particular product which changes the efficiency becomes a new basic model. In other words, three 50 W power supplies having similar electrical design characteristics but having 8 V, 18 V and 40 V outputs would be classified as three different basic models because the functional characteristic of output voltage will affect efficiency. Similarly, three 50 W power supplies having exactly the same electrical design characteristics but having a 4 foot, 6 foot, and 8 foot output cords would be classified as three different basic models because this physical characteristic affects energy consumption. In essence, if an EPS manufacturer creates a custom design to fulfill an order from a customer, that design would represent a new basic model if any modification to that design affects the energy consumption of the device.

[18] ''ENERGY STAR® Program Requirements for Single Voltage-voltage External Ac-Dc and Ac-Ac Power Supplies Eligibility Criteria (Version 2.0),'' Final Draft, February 19, 2008.

[19] AS/NZS 4665.2, ''Minimum Energy Performance Standards (MEPS) Requirements,'' Draft.

ii. Definition of ''Covered Product''

In its December 2006 Final Rule, DOE codified an amendment to the definition of ''covered product'' in 10 CFR 430.2 to clarify that the term applies to a ''battery charger'' and an ''external power supply.'' 71 FR at 71366. Following that amendment, the definition of a covered product reads as follows:

Covered product means a consumer product: (1) Of a type specified in section 322 of the Act, or (2) That is a ceiling fan, ceiling fan light kit, medium base compact fluorescent lamp, dehumidifier, battery charger, external power supply, or torchiere.

iii. Sampling Plan

DOE is in the process of completing and publishing its Final Rule to address those items that were not addressed in the December 2006 final rule. These items include codifying the sampling plans that were proposed in July 2006, including one each for battery chargers and external power supplies. The sampling plan determines the number of units of each basic model a manufacturer must test as the basis for rating the model and determining whether it complies with an applicable Federal standard.

The sampling plans follow the same approach as for other regulated products listed in 10 CFR Part 430. When proposing these sampling plans for battery chargers and external power supplies, DOE considered four factors: (1) Minimizing manufacturers' testing time and costs; (2) assuring compatibility with other sampling plans the Department has promulgated; (3) providing a highly statistically valid probability that basic models that are tested meet applicable energy conservation standards; and (4) providing a highly statistically valid probability that a manufacturer preliminarily found to be in noncompliance will actually be in noncompliance.

In the July 2006 NOPR, DOE proposed the following rule language with respect to the sampling plan for battery chargers (71 FR at 42204):

(aa) For each basic model of battery charger selected for testing, a sample of sufficient size shall be selected at random and tested to ensure that—(1) Any represented value of the estimated nonactive energy ratio or other measure of energy consumption of a basic model for which consumers would favor lower values shall be no less than the higher of: (i) The mean of the sample, or (ii) The upper 97.5 percent confidence limit of the true mean divided by 1.05, and (2) Any represented value of the estimated nonactive energy ratio or other measure of energy consumption of a basic model for which consumers would favor higher values shall be no greater than the lower of: (i) The mean of the sample, or (ii) The lower 97.5 percent confidence limit of the true mean divided by 0.95.

In the July 2006 NOPR, DOE proposed the following rule language with respect to the sampling plan for external power supplies (71 FR at 42204):

(bb) For each basic model of external power supply selected for testing, a sample of sufficient size shall be selected at random and tested to ensure that—(1) Any represented value of the estimated energy consumption of a basic model for which consumers would favor lower values shall be no less than the higher of: (i) The mean of the sample, or (ii) The upper 97.5 percent confidence limit of the true mean divided by 1.05, and (2) Any represented value of the estimated energy consumption of a basic model for which consumers would favor higher values shall be no greater than the lower of: (i) The mean of the sample, or (ii) The lower 97.5 percent confidence limit of the true mean divided by 0.95.

iv. Test Procedures

In the December 2006 Final Rule, DOE codified two test procedures for measuring the performance of battery chargers and external power supplies. 71 FR at 71366 and 71368. These same test procedures are discussed extensively in this **Federal Register** notice, as DOE is proposing modifications to the test procedures for both products. The two test procedures are codified in Appendices Y and Z.

DOE anticipates that, like most other regulated products, manufacturers will test and certify their own products as being compliant with any national regulatory standard. Some manufacturers may choose to outsource this testing to a third-party test facility that is certified for efficiency measurements of battery chargers and external power supplies; however, DOE does not require independent test lab results. Rather, DOE does accept test reports from manufacturers if (1) their in-house testing facilities are capable of complying with all the requirements of DOE's test procedures, including equipment tolerances and accuracy requirements, and (2) the technicians conducting the testing on the unit under test follow the test procedure methodology exactly.

v. Enforcement Provisions

Once DOE has adopted the sampling requirements for battery chargers and external power supplies at the conclusion of this rulemaking, each product will automatically become subject to the existing certification and enforcement provisions in 10 CFR part 430. These provisions include section 430.62 for certification, and sections 430.61, 430.71, 430.72, 430.73, and 430.74 for enforcement. DOE discussed the applicability of the enforcement provisions in its July 2006 NOPR. 71 FR at 42191–42195.

The required certification report would be submitted for all basic models of a covered product, limited currently to Class A external power supplies, and shall include for each basic model the product type, product class, the manufacturer's name, the private labeler's name(s) (if applicable), the manufacturer's model number(s), and the active-mode efficiency and no-load-mode power consumption of that basic model. As discussed in sections II.E and III.E of today's notice, DOE is proposing that manufacturers of Class A external power supplies incorporating a switch-selectable output voltage report the measured active-mode efficiency and no-load-mode power consumption at the lowest and highest selectable output voltages.

2. Alternative Reporting Methodology Under Consideration

DOE's standard certification reporting procedure requires manufacturers to report on the efficiency or energy or water consumption of each basic model of a covered product. As discussed in section III.F.1.i, a basic model constitutes those designs that have no differentiating electrical, physical, or functional features that affect energy consumption. For external power supplies, DOE understands that many of these devices are custom-built to OEM specifications. These custom designs often incorporate customer-specified features or performance criteria that impact the energy consumption of the power supply and establish the design as a new and unique basic model. Therefore, due to the way in which external power supplies are specified and manufactured, customized designs will virtually always be a different basic model. DOE understands that some manufacturers could produce significant numbers of basic models each year and is concerned that by applying the standard certification and reporting requirements as found in 10 CFR part 430, it may be placing significant burden on manufacturers.

While manufacturers would be required to report to DOE on each basic model manufactured, DOE is also considering allowing manufacturers to choose an alternative approach to certification reporting which may alleviate some manufacturer burden. DOE may adopt this alternative approach in the final rule if DOE concludes that this alternative approach would reduce manufacturer testing and

reporting burden while ensuring compliance with the mandatory standards.

DOE's alternative approach is based on how the Environmental Protection Agency allows for reporting and certification of ''families'' of external power supplies in the ENERGY STAR program. In this approach, manufacturers establish design families, which are groups of basic models that have the same wattage rating, input voltage(s), and fundamental electrical circuit design, but which have different output voltages. For example, a design family may consist of five EPSs, all rated at 20 W, but having output voltages ranging from 5 V through 40 V. In the ENERGY STAR program, manufacturers may choose to certify only the highest and lowest rated voltage within that design family, and then certify compliance on all basic models within that group if both models are in compliance. Manufacturers are still held responsible for the individual compliance of all basic models within certified design families.

DOE's main concern about allowing manufacturers to establish a ''design family'' approach to certifying groups of basic models is that manufacturers could change the wire gauge and potentially the length of the output cable. Due to the fact that the resistance of output wire can contribute to approximately 10 to 20 percent of the total losses incurred by an external power supply, DOE is concerned that manufacturers may use particular output wires to qualify the highest and lowest voltage EPS in a design family, and then use output wires with higher losses for the interim voltages, which may cause one or more of those basic models to be non-compliant. For this reason, like EPA, DOE would require manufacturers who may choose this so-called alternative approach to certify compliance of all basic models, even if they are only reporting on a limited subset within a design family.

DOE is considering this alternative approach because (1) manufacturers would still be held accountable for the compliance of all basic models manufactured or imported; (2) it offers a means by which reporting burden on manufacturers could be reduced; and (3) DOE believes that the external power supply market dynamics (*i.e.*, how orders are placed and fulfilled) may warrant this approach. DOE invites stakeholder comment on this alternative approach for reducing manufacturer burden when reporting on the compliance of basic models produced.

DOE provided a suggested format for the compliance statement and certification report in Appendix A to Subpart F of part 430—Compliance Statement and Certification Report, which was published in a final rule in March 1998 (63 FR 13321).[20] These reporting requirements are consistent with requirements and burdens placed on manufacturers of other covered and regulated products. DOE is also providing stakeholders the suggested format below in Figure III.1.

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[20] Available at *http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=5ab6957c4063b1109f3ab2aaf331c894&rgn=div9&view=text&node=10:3.0.1.4.16.6.9.13.28&idno=10.*

COMPLIANCE STATEMENT AND CERTIFICATION REPORT

COMPLIANCE STATEMENT

Product: _____
Manufacturer's or Private Labeler's Name and Address:
_____
_____
_____

This compliance statement and all certification reports submitted are in accordance with 10 CFR Part 430 (Energy or Water Conservation Program for Consumer Products) and the Energy Policy and Conservation Act, as amended. The compliance statement is signed by a responsible official of the above named company. The basic model(s) listed in certification reports comply with the applicable energy conservation standard or water (in the case of faucets, showerheads, water closets, and urinals) conservation standard. All testing on which the certification reports are based was conducted in conformance with applicable test requirements prescribed in 10 CFR part 430 subpart B. All information reported in the certification report(s) is true, accurate, and complete. The company is aware of the penalties associated with violations of the Act, the regulations there under, and is also aware of the provisions contained in 18 U.S.C. 1001, which prohibits knowingly making false statements to the Federal Government.

Name of Company Official:_____
Signature: _____
Title: _____Date:_____

Firm or Organization: _____
Address: _____
Telephone Number: _____ Facsimile Number: _____

Third Party Representation (if applicable)
For certification reports prepared and submitted by a third party organization under the provisions of §430.62 of 10 CFR part 430, the company official who authorized said third party representation is:

Name: _____
Title: _____
Address: _____
Telephone Number: _____ Facsimile Number: _____

The third party organization submitting the certification report on behalf of the company is:

Third Party Organization: _____
Address: _____
Telephone Number: _____ Facsimile Number: _____

CERTIFICATION REPORT

Date: _____
Product Type: _____ Product Class: _____
Manufacturer: _____
Private Labeler (if applicable):_____
Name: _____
Title: _____
Address: _____
Telephone Number: _____ Facsimile Number: _____

For Existing, New or Modified Models: Provide specific product information including, for each basic model, the manufacturer's model numbers and the information required in § 430.62(a)(4)(i) through (a)(4)(xvii).
For Discontinued Models: Provide manufacturer's model number.

Figure III.1 Compliance Statement and Certification Report Format

BILLING CODE 6450–01–C

IV. Public Participation

A. Attendance at Public Meeting

The time and date of the public meeting are listed in the **DATES** section at the beginning of this NOPR. The public meeting will be held at the U.S. Department of Energy, Forrestal Building, Room 1E–245, 1000 Independence Avenue, SW., Washington, DC 20585–0121. To attend the public meeting, please notify Ms. Brenda Edwards at (202) 586–2945. (Please note that foreign nationals participating in the public meeting are subject to advance security screening procedures which may take up to 30 days. If a foreign national wishes to participate in the workshop, please inform DOE as soon as possible by contacting Ms. Brenda Edwards at the number above so that the necessary procedures can be completed.)

B. Procedure for Submitting Requests To Speak

Any person who has an interest in the topics addressed in this notice, or who is a representative of a group or class of persons that has an interest in these issues, may request an opportunity to make an oral presentation at the public meeting. Such persons may hand deliver requests to speak to the address shown in the **ADDRESSES** section at the beginning of this notice between 9 a.m. and 4 p.m., Monday through Friday, except Federal holidays. Requests may also be sent by mail or e-mail to: Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, 6th Floor, 950 L'Enfant Plaza, SW., Washington, DC 20024, or *Brenda.Edwards@ee.doe.gov*. Persons who wish to speak should include in their request a computer diskette or CD in WordPerfect, Microsoft Word, PDF, or text (ASCII) file format that briefly describes the nature of their interest in this rulemaking and the topics they wish to discuss. This person should also provide a daytime telephone number where he or she can be reached. DOE requests that those persons who are scheduled to speak submit a copy of their statements at least two weeks prior to the public meeting. DOE may permit any person who cannot supply an advance copy of this statement to participate if that person has made alternative arrangements with the Building Technologies Program in advance. When necessary, the request to give an oral presentation should ask for such alternative arrangements.

C. Conduct of Public Meeting

DOE will designate a DOE official to preside at the public meeting and may also employ a professional facilitator to aid discussion. The public meeting will be conducted in an informal conference style. The meeting will not be a judicial or evidentiary public hearing, but DOE will conduct it in accordance with 5 U.S.C. 553 and section 336 of EPCA (42 U.S.C. 6306). There shall be no discussion of proprietary information, costs or prices, market share, or other commercial matters regulated by U.S. antitrust laws.

DOE reserves the right to schedule the order of presentations and to establish the procedures governing the conduct of the public meeting. A court reporter will record the proceedings and prepare a transcript.

At the public meeting, DOE will provide an opportunity to stakeholders to present summaries of any comments they submitted to DOE before the public meeting, and encourage all interested parties to share their views on issues affecting this rulemaking. Each participant may present a prepared general statement (within time limits determined by DOE) before the discussion of specific topics. Other participants may comment on any general statements. After the completion of all prepared statements, participants may clarify their statements and comment on statements made by others. Participants should be prepared to answer questions from DOE and other participants. Department representatives may also ask questions about other matters relevant to this rulemaking. The official conducting the public meeting will accept additional comments or questions from those attending as time permits. The presiding official will announce any further procedural rules or modification of procedures needed for the proper conduct of the public meeting.

DOE will make the entire record of this proposed rulemaking, including the transcript from the public meeting, available for inspection at the U.S. Department of Energy, 6th Floor, 950 L'Enfant Plaza, SW., Washington, DC 20024, (202) 586–9127, between 9 a.m. and 4 p.m., Monday through Friday, except Federal holidays. A copy of the transcript will be posted online.

D. Submission of Comments

DOE will accept comments, data, and information regarding this notice, the proceeding of the public meeting, or any aspect of the rulemaking no later than the date provided at the beginning of this notice. Comments, data, and information submitted to DOE's e-mail address for this rulemaking should be provided in WordPerfect, Microsoft Word, PDF, or text (ASCII) file format. Stakeholders should avoid the use of special characters or any form of encryption, and wherever possible, comments should include the electronic signature of the author. Absent an electronic signature, comments submitted electronically must be followed and authenticated by submitting a signed original paper document to the address provided at the beginning of this notice. Comments, data, and information submitted to DOE by mail or hand delivery/courier should include one signed original paper copy. No telefacsimiles (faxes) will be accepted.

According to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit two copies: one copy of the document including all the information believed to be confidential, and one copy of the document with the information believed to be confidential deleted. DOE will make its own determination as to the confidential status of the information and treat it according to its determination.

Factors of interest to DOE when evaluating requests to treat submitted information as confidential include (1) a description of the items; (2) whether and why such items are customarily treated as confidential within the industry; (3) whether the information is generally known or available from public sources; (4) whether the information has previously been made available to others without obligation concerning its confidentiality; (5) an explanation of the competitive injury to the submitting person which would result from public disclosure; (6) a date after which such information might no longer be considered confidential; and (7) why disclosure of the information would be contrary to the public interest.

After the public meeting and the expiration of the period for submission of written statements, DOE will begin conducting the analyses as discussed at the public meeting and reviewing the comments received.

E. Issues on Which DOE Seeks Comment

Comments are welcome on all aspects of this rulemaking. However, DOE is particularly interested in receiving comments and views of interested parties concerning the following issues:

1. Standby Mode and Off Mode

DOE invites stakeholder comments on the proposed approach for defining

standby mode and off mode for both battery chargers and external power supplies. DOE also invites comment on the proposed test methods for measuring standby mode and off mode energy consumption for external power supplies, including whether the duration of the measurement is sufficiently long. (See section III.A.)

2. Definitions in the Test Procedures

DOE proposes to revise certain existing definitions and to add several new definitions to harmonize with ENERGY STAR test procedures and enhance the clarity and transparency of DOE's test procedure. DOE also proposes some new definitions that are necessary for the multiple-voltage external power supply test procedure proposed in today's notice. DOE invites comments from stakeholders on all the definitions proposed in today's notice. (See section III.C.)

3. Measurement Resolution and Uncertainty

DOE seeks comment on its proposal to allow measurement resolution to scale with the magnitude of power measured, which would make DOE's test procedure consistent with IEC Standard 62301. More specifically, DOE proposes changing the measurement equipment minimum resolution to 0.1 watts for measurements taken that are greater than 10 watts up to 100 watts and 1 watt for measurements taken that are greater than 100 watts. In making this change, the DOE proposal maintains a resolution of 0.5 percent or better at all times. DOE proposes to fully qualify the uncertainty of measurement specification by requiring a 95-percent confidence level on the measurement resolution requirements. DOE invites comments from stakeholders on this proposed change, and any possible impacts of these changes on testing burden and measurement accuracy. (See sections III.B.1.i and III.D.1.)

4. AC Source Voltage Requirements

DOE seeks comments on the proposed changes to the specification regarding regulation and harmonic distortion of the AC input voltage source. In particular, DOE welcomes comments on the impacts of the changes on the testing burden or measurement accuracy and repeatability. (See sections III.B.1.ii, III.B.1.iii, III.D.2 and III.D.3.)

5. Test Lead Loss Measurement

DOE seeks comments on the proposed requirement that the testing laboratory explicitly account for losses due to the test leads. In particular, DOE invites comments on the impacts of this requirement on measurement accuracy and testing burden. (See sections III.B.1.iv and III.D.4.)

6. Power Measurement Stability Requirements

DOE invites stakeholder comments on its proposed requirements that measured power stabilization to within 1 percent before measurements are recorded. The proposal allows for average measurements in case sufficient stability cannot be achieved. DOE welcomes comments on the impacts of this proposal on testing burden and measurement accuracy and repeatability. (See sections III.B.2.i and III.D.5.)

7. Loading Conditions for Multiple-Voltage External Power Supplies

DOE seeks comments on all issues pertaining to loading of multiple-voltage external power supplies. In particular, DOE invites comments on the nominal loading conditions (100 percent, 75 percent, 50 percent, and 25 percent of nameplate output current), the proportional allocation method for derating load currents, possible further adjustments to loading conditions due to minimum output current requirements, and no-load mode testing requirements. (See section III.B.2.)

8. Single-Voltage External Power Supply Test Procedure

DOE seeks comments on the changes under consideration to the single-voltage external power supply test procedure, specifically whether these changes would improve the accuracy and repeatability of measurements, bringing the test procedure more in line with current industry standards and test methods. (See section III.D.)

9. Switch-Selectable Single-Voltage External Power Supplies

DOE invites comments on its proposed method for testing switch-selectable single-voltage external power supplies. In particular, DOE welcomes comments on its proposal for testing such units at both their highest and lowest voltage settings, and requiring they meet appropriate standards at both settings. (See section III.E.)

10. Submission of Certification Test Data to DOE

DOE seeks comment on whether manufacturers should be required to file paperwork on every basic model or whether they should be allowed to form ''design families'' and only certify the highest and lowest voltage design within each family (while still being held accountable for compliance of all basic models within that family). (See section III.F.)

V. Procedural Issues and Regulatory Review

A. Review Under Executive Order 12866

This proposed rule has been determined to be not a ''significant regulatory action'' under section 3(f)(1) of Executive Order 12866, ''Regulatory Planning and Review.'' 58 FR 51735 (October 4, 1993). Accordingly, OMB did not review this document.

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996) requires preparation of an initial regulatory flexibility analysis for any rule that by law must be proposed for public comment, unless the Department certifies that the rule, if promulgated, will have no significant economic impact on a substantial number of small entities. A regulatory flexibility analysis examines the impact of the rule on small entities and considers alternative ways of reducing negative impacts. Also, 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 Web site: *http://www.gc.doe.gov*.

EPACT amended EPCA to incorporate into DOE's energy conservation program certain additional consumer products and commercial and industrial equipment, including battery chargers and external power supplies. With regard to these products, EPCA, as amended by EPACT, directed DOE to codify relevant definitions and test procedures, hold a Scoping Workshop public meeting to discuss DOE's plans for developing energy conservation standards, and finally, conduct a determination analysis on the feasibility of standards. On December 8, 2006, DOE published definitions and test procedures for battery chargers and external power supplies in the **Federal Register**. 71 FR 71340. Today, DOE proposes amendments to some of these definitions and test procedures in compliance with EPCA, as amended by EISA.

DOE reviewed today's proposed rule under the provisions of the Regulatory Flexibility Act and the policies and procedures published on February 19, 2003. As part of this rulemaking, DOE examined the existing compliance costs already borne by manufacturers and compared them to the revised compliance costs due to the proposed amendments in this NOPR, namely, the adoption of test procedures for multiple-voltage external power supplies and the measurement of energy consumption of battery chargers and external power supplies during standby and off-mode, amendments to the current single-voltage external power supply test procedure, and reporting requirements for Class A external power supplies.

The proposed amendments to the single-voltage test procedure are based on tests commonly used by industry and would, in some respects, reduce testing costs by introducing changes designed to ensure testing repeatability and practicability. Regarding the reporting requirements for Class A external power supplies, since manufacturers would routinely need to test their products to ensure that they comply with the new standards set forth in EISA, the submission of a single page certifying compliance with those standards would not likely increase manufacturer costs significantly.

Accordingly, DOE does not find that the revisions proposed in this document would result in any significant increase in testing or compliance costs and tentatively concludes and certifies that this rulemaking would not impose a significant impact on a substantial number of small businesses manufacturing covered battery chargers and external power supplies. 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 Small Business Administration pursuant to 5 U.S.C. 605(b).

C. Review Under the Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3500 *et seq.*), a person is not required to respond to a collection of information by a Federal agency unless the collection displays a valid OMB control number. This NOPR would not impose any new information or recordkeeping requirements, since it does not change the existing manufacturer certification and reporting requirements adopted in DOE's December 8, 2006, final rule. Accordingly, no OMB clearance is required under the PRA.

D. Review Under the National Environmental Policy Act

In this proposed rule, DOE proposes test procedure amendments that it expects will be used to develop and implement future energy conservation standards for battery chargers and external power supplies. 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.*) (NEPA) and DOE's implementing regulations at 10 CFR part 1021. Specifically, the rule is covered by Categorical Exclusion A5, for rulemakings that interpret or amend an existing rule without changing the environmental effect, as set forth in DOE's NEPA regulations in Appendix A to Subpart D, 10 CFR part 1021. Today's proposed rule will not affect the amount, quality or distribution of energy usage, and, therefore, will not result in any environmental impacts. 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 developing 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 developing such regulations. 65 FR 13735. DOE examined this proposed rule and determined that it does 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. Accordingly, Executive Order 13132 requires no further action.

F. Review Under Executive Order 12988

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, ''Civil Justice Reform,'' 61 FR 4729 (February 7, 1996), imposes on Federal agencies the 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 promote simplification and burden reduction. Section 3(b) of Executive Order 12988 specifically requires, among other things, 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; (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 rulemaking 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) (Pub. L. No. 104–4, codified at 2 U.S.C. 1501 *et seq.*) generally requires Federal agencies to examine closely the impacts of regulatory actions on State, local, or Tribal governments. Subsection 101(5) of Title I of that law defines a Federal intergovernmental mandate to include a regulation that would impose upon State, local, or Tribal governments an enforceable duty, except a condition of Federal assistance or a duty arising from participating in a voluntary Federal program. Title II of that law requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments, in the aggregate, or the private sector, other than to the extent such actions merely incorporate requirements specifically set forth in a statute. Section 202 of the title requires a Federal agency to perform as detailed assessment of the anticipated costs and benefits of any rule that includes a Federal mandate which may result in costs State, local, or Tribal governments, or the private sector of $100 million or more in any

one year (adjusted annually for inflation). 2 U.S.C. 1532(a) and (b). Section 204 of that title requires each agency that proposed a rule containing a significant Federal intergovernmental mandate to develop an effective process for obtaining meaningful and timely input by elected officers of State, local, and Tribal governments. 2 U.S.C. 1534. 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://www.gc.doe.gov*). Today's proposed rule would amend the definitions and test procedures that would be used in measuring the energy efficiency of battery chargers and external power supplies. The proposed rule would not result in the expenditure of $100 million or more in any year. Accordingly, no assessment or analysis is required under the UMRA.

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. Today's proposed rule to amend DOE test procedures would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is unnecessary to prepare a Family Policymaking Assessment.

I. Review Under Executive Order 12630

Pursuant to Executive Order 12630, ''Governmental Actions and Interference with Constitutionally Protected Property Rights,'' 53 FR 8859 (March 18, 1988), DOE has determined that this rule would not result in any takings that might require compensation under the Fifth Amendment to the United States Constitution.

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

Section 515 of the Treasury and General Government Appropriations Act, 2001 (Pub. L. 106–554, codified at 44 U.S.C. 3516 note) provides for agencies to review most disseminations of information to the public under information quality guidelines established by each agency under general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (February 22, 2002), and DOE's guidelines were published at 67 FR 62446 (October 7, 2002). DOE has reviewed today's proposed 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 a final rule 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 proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use. Because this rulemaking is not expected to be a significant regulatory action under E.O. 12866; would not have a significant adverse effect on the supply, distribution, or use of energy; and has not been designated a significant energy action by the Administrator of OIRA, DOE has tentatively determined that this rule is not a significant energy action. Accordingly, DOE has not prepared a Statement of Energy Effects for this rulemaking.

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), the Department of Energy must comply with section 32 of the Federal Energy Administration Act of 1974 (Pub. L. 93–275), as amended by the Federal Energy Administration Authorization Act of 1977 (Pub. L. 95–70). 15 U.S.C. 788. Section 32 provides that where a proposed rule authorizes or requires use of commercial standards, the NOPR must inform the public of the use and background of such standards. In addition, section 32(c) requires DOE to consult with the Department of Justice (DOJ) and the FTC concerning the impact of the commercial or industry standards on competition.

The rule proposed in this notice incorporates testing methods contained in the following commercial standards: (1) CEC 2007 Appliance Efficiency Regulations, Section 1604(u)(1) that directly cites ''Test Method for Calculating the Energy Efficiency of Single-Voltage External AC–DC and AC–AC Power Supplies,'' (2) IEEE Std 1515–2000, ''IEEE Recommended Practice for Electronic Power Subsystems: Parameter Definitions, Test Conditions, and Test Methods,'' and (3) IEC Standard 62301 ''Household electrical appliances—Measurement of standby power.'' DOE has evaluated these revised standards and is unable to conclude whether they fully comply with the requirements of section 32(b) of the Federal Energy Administration Act, (*i.e.*, that they were developed in a manner that fully provides for public participation, comment, and review). DOE will consult with the Attorney General and the Chairman of the FTC concerning the impact of these test procedures on competition of requiring use of methods contained in these standards to test battery chargers and external power supplies.

VI. Approval of the Office of the Secretary

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

List of Subjects in 10 CFR Part 430

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

Issued in Washington, DC, on August 1, 2008.

Alexander A. Karsner,

Assistant Secretary, Energy Efficiency and Renewable Energy.

For the reasons stated in the preamble, DOE proposes to amend 10 CFR part 430 as follows:

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. In § 430.22 add new paragraphs (b)(1)9, (b)(4)3, (b)(4)4, (b)(4)5, (b)(11)2 and (b)(12) to read as follows:

§ 430.22 Reference sources.

* * * * *

(b) * * *

(1) * * *

9. ANSI/NCSL Z540.1–1994, ''Calibration Laboratories and

Measuring and Test Equipment—General Requirements.''

* * * * *

(4) * * *

3. IEC 62301, ''Household electrical appliances—Measurement of standby power,'' Edition 1.

4. IEC 60050, ''International Electrotechnical Vocabulary.''

5. ISO/IEC 17025, ''General requirements for the competence of testing and calibration laboratories'' (2005).

* * * * *

(11) * * *

2. ''Proposed Test Protocol for Calculating the Energy Efficiency of Internal AC–DC Power Supplies, Revision 6.2,'' November 2007.

(12) Institute of Electrical and Electronics Engineers, Inc., 3 Park Avenue, 17th Floor, New York, N.Y., 10016–5997, (212) 419–7900.

1. IEEE Standard 1515–2000, ''Standardizing specification language.''

2. IEEE 100, ''Authoritative Dictionary of IEEE Standards Terms,'' Seventh Edition.

3. In § 430.23 revise paragraphs (aa) and (bb) to read as follows:

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

* * * * *

(aa) *Battery Chargers.* The energy consumption of a battery charger, expressed as the nonactive energy ratio, shall be measured in accordance with section 4(a) of Appendix Y of this subpart. The energy consumption of a battery charger in standby mode and off mode shall be measured in accordance with section 4(c) of Appendix Y of this subpart.

(bb) *External Power Supplies.* The energy consumption of an external power supply, including active-mode efficiency in a percentage and the no-load-, off-, and standby mode energy consumption levels in watts, shall be measured in accordance with section 4 of Appendix Z of this subpart.

4. Appendix Y to Subpart B of Part 430 is amended by:

a. Revising paragraph 2(i); and

b. Adding new paragraphs 2(j), 4(c) and 4(d).

The revisions and additions read as follows:

Appendix Y to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Battery Chargers

1. *Scope:* * * *

2. *Definitions:*

* * * * *

i. *Off Mode* is the condition, for battery chargers with manual on-off switches, in which the battery charger is (1) connected to the main electricity supply, (2) is not connected to the battery, and (3) all switches are turned off.

j. *Standby Mode* (also *No-Load Mode*) means the condition in which (1) the battery charger is connected to the main electricity supply, (2) the battery is not connected to the charger, and (3) for battery chargers with manual on-off switches, all switches are turned on.

* * * * *

4. *Test Measurement:*

* * * * *

(c) Standby Mode Energy Consumption Measurement. Conduct a measurement of standby power consumption while the battery charger is connected to the power source. Remove the battery from the charger and record the power (*i.e.*, watts) consumed as the time series integral of the power consumed over a one-hour test period, divided by the period of measurement. If the battery charger has manual switches, all must be turned on for the duration of the standby mode test.

Standby mode may also apply to products with non-detachable batteries. If the product uses a cradle and/or adapter for power conversion and charging, then only that part of the system will remain connected to the main electricity supply, and standby mode power consumption will equal that of the cradle and/or adapter. If the product contains integrated power conversion and charging circuitry but is powered through a detachable AC power cord, then only the cord will remain connected to mains, and standby mode power consumption will equal that of the AC power cord (*i.e.*, zero watts). If the product contains integrated power conversion and charging circuitry but is powered through a non-detachable AC power cord, then no part of the system will remain connected to mains and standby mode power consumption is not applicable.

(d) Off Mode Energy Consumption Measurement. If the battery charger has manual switches, record a measurement of off mode energy consumption while the battery charger is connected to the power source. Remove the battery from the charger and record the power (*i.e.*, watts) consumed as the time series integral of the power consumed over a one-hour test period, divided by the period of measurement, with all switches turned off. If the battery charger does not have manual switches, record that the off mode measurement is not applicable to this product.

Off mode may also apply to products with non-detachable batteries. If the product uses a cradle and/or adapter for power conversion and charging, then only that part of the system will remain connected to the main electricity supply, and off mode power consumption will equal that of the cradle and/or adapter. If the product contains integrated power conversion and charging circuitry but is powered through a detachable AC power cord, then only the cord will remain connected to mains, and off mode power consumption will equal that of the AC power cord (*i.e.*, zero watts). If the product contains integrated power conversion and charging circuitry but is powered through a non-detachable AC power cord, then no part of the system will remain connected to mains and off mode power consumption is not applicable.

5. Appendix Z to Subpart B of Part 430 is amended by:

a. Revising paragraphs 1 and 2;

b. Revising paragraph 3 by adding after the introductory heading ''3. Test Apparatus and General Instructions'' a paragraph designation ''(a) Single-Voltage External Power Supply'';

c. Adding a new paragraph 3 (b); and

d. Revising paragraph 4.

The revisions and additions read as follows:

Appendix Z to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of External Power Supplies

1. *Scope:* This appendix covers the test requirements used to measure energy consumption of external power supplies.

2. *Definitions:* The following definitions are for the purposes of understanding terminology associated with the test method for measuring external power supply energy consumption.[1]

a. *Active mode* means the mode of operation when the external power supply is connected to the main electricity supply and the output is (or ''all outputs are'' for a multiple-voltage external power supply) connected to a load (or ''loads'' for a multiple-voltage external power supply).

b. *Active mode efficiency* is the ratio, expressed as a percentage, of the total real output power produced by a power supply to the real input power required to produce it. (See IEEE Standard 1515–2000, 4.3.1.1.)

c. *Active power (also real power) (P)* means the root-mean-square (RMS) value of the instantaneous power taken over one period. (See IEEE Standard 1515–2000.)

d. *Ambient temperature* means the temperature of the ambient air immediately surrounding the unit under test.

e. *Apparent power* (S) is the product of RMS voltage and RMS current (VA).

f. *Instantaneous power* means the product of the instantaneous voltage and instantaneous current at a port (the terminal pair of a load).

g. *Minimum output current* means the minimum current that must be drawn from an output bus for an external power supply to operate within its specifications.

h. *Multiple-voltage external power supply* means an external power supply that is designed to convert line voltage AC input into more than one simultaneous lower-voltage output.

i. *Nameplate input frequency* means the AC input frequency of the power supply as specified on the manufacturer's label on the power supply housing.

j. *Nameplate input voltage* means the AC input voltage of the power supply as specified on the manufacturer's label on the power supply housing.

[1] For clarity on any other terminology used in the test method, please refer to IEC 60050 or IEEE Standard 100.

k. *Nameplate output current* means the current output of the power supply as specified on the manufacturer's label on the power supply housing (either DC or AC).

l. *Nameplate output power* means the power output of the power supply as specified on the manufacturer's label on the power supply housing.

m. *Nameplate output voltage* means the voltage output of the power supply as specified on the manufacturer's label on the power supply housing (either DC or AC).

n. *No-load mode* means the mode of operation when an external power supply is connected to the main electricity supply and the output is (or ''all outputs are'' for a multiple-voltage external power supply) not connected to a load (or ''loads'' for a multiple-voltage external power supply).

o. *Off mode* is the condition, applicable only to units having on-off switches, in which the external power supply is (1) connected to the main electricity supply, (2) the output is not connected to any load, and (3) all switches are turned off.

p. *Output bus* means any of the outputs of the power supply to which loads can be connected and from which power can be drawn, as opposed to signal connections used for communication.

q. *Single-voltage external AC–AC power supply* means an external power supply that is designed to convert line voltage AC input into lower voltage AC output and is able to convert to only one AC output voltage at a time.

r. *Single-voltage external AC–DC power supply* means an external power supply that is designed to convert line voltage AC input into lower-voltage DC output and is able to convert to only one DC output voltage at a time.

s. *Standby mode* means the condition in which the external power supply is in no-load mode and, for external power supplies with on-off switches, all switches are turned on.

t. *Switch-selectable single voltage external power supply* means a single-voltage AC–AC or AC–DC power supply that allows users to choose from more than one output voltage.

u. *Total harmonic distortion,* expressed as a percent, is the RMS value of an AC signal after the fundamental component is removed and interharmonic components are ignored, divided by the RMS value of the fundamental component. THD of current is defined as:

$$THD_I = \frac{\sqrt{I_2^2 + I_3^2 + I_4^2 + I_5^2 + ...I_n^2}}{I_1}$$

where I_n is the RMS value of the nth harmonic of the current signal.

v. *True power factor* (PF) is the ratio of the active power (P) consumed in watts to the apparent power (S), drawn in volt-amperes.

$$PF = \frac{P}{S}$$

This definition of power factor includes the effect of both distortion and displacement.

w. *Unit under test* is the external power supply being tested.

3. *Test Apparatus and General Instructions*

(a) Single-Voltage External Power Supply.

* * *

(b) Multiple-Voltage External Power Supply. Unless otherwise specified, measurements shall be made under test conditions and with equipment specified below.

(i) Measuring equipment. Power measurements shall be made with a voltmeter and ammeter (for output power measurements) or power analyzer (for input power measurements), calibrated in accordance with ANSI/NCSL Standard Z540.1 or ISO/IEC Standard 17025 and within the calibration period as specified by an accompanying dated calibration certificate or label. Measurements of power of 0.5 W or greater shall be made with an uncertainty of less than or equal to 2 percent at the 95-percent confidence level. Measurements of power of less than 0.5 W shall be made with an uncertainty of less than or equal to 0.01 W at the 95-percent confidence level. The power measurement instrument shall have a resolution of:

(A) 0.01 W or better for power measurements of 10 W or less;

(B) 0.1 W or better for power measurements of greater than 10 W up to 100 W;

(C) 1 W or better for power measurements of greater than 100 W.

(ii) Test room. The tests shall be conducted in a room that has an air speed within 0.1 m of the unit under test of ≤ 0.5 m/s, and the ambient temperature shall be maintained at 23 °C ± 5 °C throughout the test, as specified in IEC Standard 62301. There shall be no intentional cooling of the unit under test by use of separately powered fans, air conditioners, or heat sinks. The unit under test shall be tested on a thermally non-conductive surface. Products intended for outdoor use may be tested at additional temperatures, provided those are in addition to the conditions specified above and are noted in a separate section on the test report.

(iii) Input AC reference source. An AC reference source shall be used to provide input voltage to the unit under test. The input to the unit under test shall be the specified voltage ± 1 percent and the specified frequency ± 1 percent, as specified in IEC Standard 62301. The unit under test shall be tested at the following voltage and frequency combination: 115 V at 60 Hz. If testing under this condition is not possible, or if voltage and/or frequency ranges are not specified by the manufacturer (or the nameplate value is unclear), the unit under test shall not be tested.

The input voltage source shall be capable of delivering at least 10 times the nameplate input power of the unit under test where practicable (as recommended by IEEE Standard 1515–2000). The input voltage source shall be deemed inadequate and a different voltage source shall be used if the input voltage varies at any point during the test by more than ± 1 percent of the specified source voltage for the test.

Regardless of the AC source type, the THD of the supply voltage when supplying the unit under test in the specified mode shall not exceed 3 percent, up to and including the 13th harmonic, as specified in IEC Standard 62301. The peak value of the test voltage shall be within 1.34 and 1.49 times its RMS value as specified in IEC Standard 62301.

(iv) Test leads. Appropriate wires must be selected for wiring connections depending on the maximum current carried by and the length of the conductor, in accordance with Table B.2 in Annex B of IEEE Standard 1515–2000. The voltage drop across the conductor carrying the current must be added to or subtracted from the input and output voltage measurements if these measurements of the unit under test are not taken directly at the connector pins of the unit under test.

4. *Test Measurement*

(a) Single-Voltage External Power Supply

(i) Standby Mode and Active Mode Measurement—The measurement of standby mode (also no load-mode) energy consumption and active-mode efficiency shall conform to the requirements specified in section 5, ''Measurement Approach'' of the CEC's ''Test Method for Calculating the Energy Efficiency of Single-Voltage External AC–DC and AC–AC Power Supplies,'' August 11, 2004 (incorporated by reference, see § 430.22). Switch-selectable single-voltage external power supplies shall be tested twice, once at the highest nameplate output voltage and once at the lowest.

(ii) Off-Mode Measurement—If the external power supply unit under test incorporates on-off switches, the unit under test shall be placed in off mode, and its power consumption in off mode measured and recorded. The measurement of the off mode energy consumption shall conform to the requirements specified in section 5, ''Measurement Approach,'' of the CEC's ''Test Method for Calculating the Energy Efficiency of Single-Voltage External AC–DC and AC–AC Power Supplies,'' August 11, 2004 (incorporated by reference, see § 430.22), except that in section 5.a, ''Preparing UUT [Unit Under Test] for Test,'' the built-in switches shall be placed in the ''off'' position for the measurement. The only loading condition that will be measured for off mode is ''Loading Condition 5.'' Switch-selectable single-voltage external power supplies shall have their off mode power consumption measured twice, once at the highest nameplate output voltage and once at the lowest.

(b) Multiple-Voltage External Power Supply—Power supplies that are packaged for consumer use to power a product must be

tested with the output cord packaged with the unit for sale to the consumer, which is considered part of the unit under test. There are two options for connecting metering equipment to the output of this type of power supply: Cut the cord immediately adjacent to the output connector, or attach leads and measure the efficiency from the output connector itself. If the power supply is attached directly to the product that it is powering, cut the cord immediately adjacent to the powered product and connect output measurement probes at that point. The tests should be conducted on the sets of output wires that constitute the output busses. If the product has additional wires, these should be left electrically disconnected unless they are necessary for controlling the product. In this case, the manufacturer shall supply a connection diagram or test jig that will allow the testing laboratory to put the unit under test into active mode.

(i) Standby-Mode and Active-Mode Measurement—The measurement of the multiple-voltage external power supply standby-mode (also no-load-mode) energy consumption and active-mode efficiency shall be as follows:

(A) Loading conditions and testing sequence. If the unit under test has on-off switches, all switches shall be placed in the ''on'' position. Loading criteria for multiple-voltage external power supplies shall be based on nameplate output current and not on nameplate output power because output voltage might not remain constant.

The unit under test shall operate at 100 percent of nameplate current output for at least 30 minutes immediately before conducting efficiency measurements.

After this warm-up period, the technician shall monitor AC input power for a period of 5 minutes to assess the stability of the unit under test. If the power level does not drift by more than 1 percent from the maximum value observed, the unit under test can be considered stable and measurements can be recorded at the end of the 5-minute period. Measurements at subsequent loading conditions, listed in Table 1, can then be conducted under the same 5-minute stability guidelines. Only one warm-up period of 30 minutes is required for each unit under test at the beginning of the test procedure.

If AC input power is not stable over a 5-minute period, the technician shall follow the guidelines established by IEC Standard 62301 for measuring average power or accumulated energy over time for both input and output.

The unit under test shall be tested at the loading conditions listed in Table 1, derated per the proportional allocation method presented in the following section.

TABLE 1—LOADING CONDITIONS FOR UNIT UNDER TEST

Loading Condition 1	100% of Derated Nameplate Output Current ± 2%.
Loading Condition 2	75% of Derated Nameplate Output Current ± 2%.
Loading Condition 3	50% of Derated Nameplate Output Current ± 2%.
Loading Condition 4	25% of Derated Nameplate Output Current ± 2%.
Loading Condition 5	0%.

Input and output power measurements shall be conducted in sequence from Loading Condition 1 to Loading Condition 4, as indicated in Table 1. For Loading Condition 5, the unit under test shall be placed in no-load mode, any additional signal connections to the unit under test shall be disconnected, and input power shall be measured.

(B) Proportional allocation method for loading multiple-voltage external power supplies. For power supplies with multiple voltage busses, defining consistent loading criteria is difficult because each bus has its own nameplate output current. The sum of the power dissipated by each bus loaded to its nameplate output current may exceed the overall nameplate output power of the power supply. The following proportional allocation method must be used to provide consistent loading guidelines for multiple-voltage external power supplies. For additional explanation, please refer to section 6.1.1 of the California Energy Commission's ''Proposed Test Protocol for Calculating the Energy Efficiency of Internal AC-DC Power Supplies Revision 6.2,'' November 2007.

Assume a multiple-voltage power supply with N output busses, and nameplate output voltages $V_1, \ldots, V_N$, corresponding output current ratings $I_1, \ldots, I_N$, and a nameplate output power P. Calculate the derating factor D by dividing the power supply nameplate output power P by the sum of the nameplate output powers of the individual output busses, equal to the product of bus nameplate output voltage and current $I_i V_i$, as follows:

$$D = \frac{P}{\sum_{i=1}^{N} V_i I_i},$$

If $D \geq 1$, then loading every bus to its nameplate output current does not exceed the overall nameplate output power for the power supply. In this case, each output bus will simply be loaded to the percentages of its nameplate output current listed in Table 1. However, if $D < 1$, it is an indication that loading each bus to its nameplate output current will exceed the overall nameplate output power for the power supply. In this case, and at each loading condition, each output bus will be loaded to the appropriate percentage of its nameplate output current listed in Table 1, multiplied by the derating factor D.

(C) Minimum output current requirements. Depending on their application, some multiple-voltage power supplies may require a minimum output current for each output bus of the power supply for correct operation. In these cases, ensure that the load current for each output at Loading Condition 4 in Table 1 is greater than the minimum output current requirement. Thus, if the test method's calculated load current for a given voltage bus is smaller than the minimum output current requirement, the minimum output current must be used to load the bus. This load current shall be properly recorded in any test report.

(D) Test loads. Active loads such as electronic loads or passive loads such as rheostats used for efficiency testing of the unit under test shall be able to maintain the required current loading set point for each output voltage within an accuracy of ± 0.5 percent. If electronic load banks are used, their settings should be adjusted such that they provide a constant current load to the unit under test.

(E) Efficiency calculation. Efficiency shall be calculated by dividing the measured active output power of the unit under test at a given loading condition by the active AC input power measured at that loading condition. Average efficiency shall also be calculated and reported as the arithmetic mean of the efficiency values calculated at Loading Conditions 1, 2, 3, and 4 in Table 1.

(F) Power consumption calculation. Power consumption of the unit under test at Loading Conditions 1, 2, 3, and 4 is the difference between the active output power at that Loading Condition and the active AC input power at that Loading Condition. The power consumption of Loading Condition 5 (no-load) is equal to the AC active input power at that Loading Condition.

(ii) Off-Mode Measurement—If the multiple-voltage external power supply unit under test incorporates any on-off switches, the unit under test shall be placed in off mode, and its power consumption in off mode measured and recorded. The measurement of the off mode energy consumption shall conform to the requirements specified above in subparagraph (4)(b)(i) of this appendix, except that all built-in switches shall be placed in the off position for the measurement. Note that the only loading condition that will be measured for off mode is ''Loading Condition 5'' paragraph (A), ''Loading conditions and testing sequence.''

6. In § 430.62 add and reserve paragraphs (a)(4)(xviii) through (xxii) and add new paragraph (a)(4)(xxiii) to read as follows:

§ 430.62 Submission of data.

(a) * * *

(4) * * *

(xviii)–(xxii) [Reserved]

(xxiii) External power supplies, the active-mode efficiency percentage and no-load mode watts. For external power supplies with switch-selectable output voltage, the active-mode efficiency

percentage and no-load mode watts at the lowest and highest selectable output voltage.

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