[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Parts 429 and 430

[Docket No. EERE-2014-BT-TP-0044]

RIN 1904-AD45

Energy Conservation Program: Test Procedures for Battery Chargers

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

ACTION: Notice of Proposed Rulemaking.

SUMMARY: The U.S. Department of Energy (DOE) is proposing to revise its test procedure for battery chargers established under the Energy Policy and Conservation Act of 1975, as amended (EPCA). These proposed revisions, if adopted, would harmonize the instrumentation resolution and uncertainty requirements with the second edition of the International Electrotechnical Commission (IEC) 62301 standard and other international standards for measuring standby power. Additionally, the proposed amendments would update and propose new battery selection criteria for multi-voltage, multi-capacity battery chargers, and provide specific steps on how to select a battery for those chargers when more than one battery meets the selection criteria, such as with a multi-chemistry battery charger. The proposal also outlines new provisions for conditioning and discharging lead acid batteries.

DATES: Comments: DOE will accept comments, data, and information regarding this notice of proposed rulemaking before and after the public meeting, but no later than [INSERT DATE 75

DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]. See section V, "Public Participation," for details.

Meeting: DOE will hold a public meeting on Tuesday, September 15, 2015 from 9 a.m. to 4 p.m., in Washington, DC. The meeting will also be broadcast as a webinar. See section V, "Public Participation," for webinar registration information, participant instructions, and information about the capabilities available to webinar participants.

ADDRESSES: The public meeting will be held at the U.S. Department of Energy, Forrestal Building, Room 8E-089, 1000 Independence Avenue, SW., Washington, DC 20585.

Any comments submitted must identify the NOPR for Test Procedures for battery chargers and provide docket number EERE-2014-BT-TP-0044 and/or regulatory information number (RIN) number 1904-AD45. Comments may be submitted using any of the following methods:

1. Federal eRulemaking Portal: www.regulations.gov. Follow the instructions for submitting comments.
2. E-mail: BatteryChargers2014TP0044@EE.Doe.Gov Include the docket number and/or RIN in the subject line of the message.
3. Mail: Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, Mailstop EE-2J, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. If possible, please submit all items on a CD. It is not necessary to include printed copies.

4. Hand Delivery/Courier: Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, 950 L'Enfant Plaza, SW., Suite 600, Washington, DC, 20024. Telephone: (202) 586-2945. If possible, please submit all items on a CD. It is not necessary to include printed copies.

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

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

A link to the docket web page can be found at: http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx?productid=84.

This web page will contain a link to the docket for this notice on the regulations.gov site. The regulations.gov web page will contain simple instructions on how to access all documents, including public comments, in the docket. See section V for information on how to submit comments through regulations.gov.

FOR FURTHER INFORMATION CONTACT: Direct requests for additional information may be sent to Mr. Jeremy Dommu, 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) 586-9870.

E-mail: battery_chargers_and_external_power_supplies@EE.Doe.Gov

In the office of the General Counsel, contact Mr. Michael Kido, U.S. Department of Energy, Office of the General Counsel, GC-33, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 586–8145. E-mail: Michael.Kido@hq.doe.gov.

For further information on how to submit a comment, review other public comments and the docket, or participate in the public meeting, contact Ms. Brenda Edwards at (202) 586-2945 or by email: Brenda.Edwards@ee.doe.gov.

SUPPLEMENTARY INFORMATION:

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I. Authority and Background

Title III of the Energy Policy and Conservation Act of 1975 (42 U.S.C. 6291 et seq.; "EPCA" or, "the Act") sets forth a variety of provisions designed to improve energy efficiency. (All references to EPCA refer to the statute as amended through the Energy Efficiency Improvement Act of 2015, Pub. L. 114-11 (April 30, 2015). Part B of Title III, which for editorial reasons was re-designated as Part A upon incorporation into the U.S. Code (42 U.S.C. 6291–6309, as codified), establishes the "Energy Conservation Program for Consumer Products Other Than Automobiles." Battery chargers are among the products affected by these provisions.

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

General Test Procedure Rulemaking Process

Under 42 U.S.C. 6293, EPCA sets forth the criteria and procedures DOE follows when prescribing or amending test procedures for covered products. EPCA provides in relevant part that any test procedures prescribed or amended under this section shall be reasonably designed to

produce test results that measure the energy efficiency, energy use, or estimated annual operating cost of a covered product during a representative average use cycle or period of use and shall not be unduly burdensome to conduct. (42 U.S.C. 6293(b)(3))

In addition, when DOE determines that a test procedure requires amending, it publishes a notice with the proposed changes and offers the public an opportunity to comment on the proposal. (42 U.S.C. 6293(b)(2)) As part of this process, DOE determines the extent to which, if any, the proposed test procedure would alter the measured energy efficiency of any covered product as determined under the existing test procedure. (42 U.S.C. 6293(e)(1))

Section 135 of the Energy Policy Act of 2005 ("EPACT 2005"), Pub. L. No. 109-58 (Aug. 8, 2005), amended sections 321 and 325 of EPCA by adding certain provisions related to battery chargers. Among these provisions were new definitions defining what constitutes a battery charger and a requirement that DOE 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 a test procedure final rule on December 8, 2006, that established a new Appendix Y to address the testing of battery chargers to measure their energy consumption and adopted several definitions related to the testing of battery chargers. See 71 FR 71340 (codified at 10 CFR Part 430, Subpart B, Appendix Y "Uniform Test Method for Measuring the Energy Consumption of Battery Chargers"). Lastly, DOE incorporated by reference specific sections of the EPA's "Test Methodology for Determining the Energy Performance of Battery Charging Systems" when measuring inactive mode energy consumption.

Section 310 of the Energy Independence and Security Act of 2007 ("EISA 2007"), Pub. L. No. 110-140 (Dec. 19, 2007) then amended section 325 of EPCA by defining active mode, standby mode, and off mode. (42 U.S.C. 6295(gg)(1)(A)) This section also directed DOE to amend its existing test procedures by December 31, 2008, to measure the energy consumed in standby mode and off mode for battery chargers. (42 U.S.C.6295(gg)(2)(B)(i)) Further, it authorized DOE to amend, by rule, any of the definitions for active, standby, and off modes (42 U.S.C. 6295(gg)(1)(B)) Accordingly, the Department issued a notice of proposed rulemaking (NOPR) in 2008, 73 FR 48054 (Aug. 15, 2008), and a final rule in early 2009 to establish definitions for these terms. (74 FR 13318 (March 27, 2009))

Subsequently, in response to numerous testing issues raised by commenters in the context of DOE's energy conservation standards rulemaking efforts for battery chargers,[1] DOE issued another NOPR on April 2, 2010 (75 FR 16958). The NOPR proposed adding a new active mode energy consumption test procedure for battery chargers that would assist in developing potential energy conservation standards for these products. DOE also proposed amending portions of its standby and off mode battery charger test procedure to shorten the overall measurement time. DOE held a public meeting to discuss its test procedure NOPR on May 7, 2010, where it also received comments on the proposals set forth in the NOPR.

After receiving comments at the public meeting, DOE published a final rule that codified a new active-mode test procedure and amended the standby and off-mode test procedures then-

[1] U.S. Department of Energy—Office of Energy Efficiency and Renewable Energy. Energy Conservation Program for Consumer Products *Energy Conservation Standards Rulemaking for Battery Chargers and External Power Supplies.* May 2009. Washington, DC. Available at: *http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/bceps_frameworkdocument.pdf*

present in Appendix Y to Subpart B of Part 430 in the CFR. 76 FR 31750 (June 1, 2011). That rule became effective 30 days after publication in the Federal Register, but manufacturers were allotted 180 days from the rule's publication to use the new test procedure when making written representations of the energy efficiency of their chargers. As federal standards for battery chargers have yet to be finalized, DOE has not required manufacturers to submit energy efficiency data for their products tested under the battery charger test procedure.

Following the publication of the most recent final rule, DOE continued to receive additional questions and requests for clarification regarding the testing, rating, and classification of battery chargers. As part of the continuing effort to establish federal efficiency standards for battery chargers and to develop a clear and widely applicable test procedure, DOE published a Notice of Data Availability (NODA) on May 15, 2014 (79 FR 27774). This NODA sought comment from stakeholders concerning the repeatability of the test procedure when testing battery chargers with several consumer configurations, and on the anticipated market penetration of new battery charging technologies that may require further revisions to DOE's regulations. DOE also sought comment on the reporting methodologies for manufacturers attempting to comply with the California Energy Commission's (CEC's) efficiency standards for battery chargers in order to understand certain data discrepancies in the CEC database. DOE indicated its interest in soliciting feedback to determine whether the current procedure contained any ambiguities requiring clarification. These issues were discussed during DOE's NODA public meeting on June 3, 2014.

To ensure the test procedure's clarity, DOE's proposal, which is based on commenter feedback to the NODA, would make certain clarifications to Appendix Y to Subpart B of 10 CFR Part 430 and include a sampling plan for battery chargers in 10 CFR Part 429. These proposed changes would include updated references to the latest version of IEC 62301 and clarify DOE's test methods for specific types of battery chargers to better reflect evolving technologies.

II.Summary of the Notice of Proposed Rulemaking

This proposal seeks to make several changes to the current test procedure for measuring the energy use of battery chargers.

First, DOE is proposing to amend the existing battery selection criteria to limit the number of batteries selected for testing to a single battery. DOE is proposing that only the battery with the highest rated voltage and/or highest rated charge capacity, from those among which the battery charger is capable of charging, would be tested for each basic model. Additionally, DOE is proposing that if at least two distinct batteries meet the criteria of having the highest rated voltage and highest rated charge capacity, the battery charger and battery combination with the highest maintenance mode power would be selected for testing. ("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." See 10 CFR Part 430, Subpart B, Appendix Y, Sec. 2.8.)

Second, the proposed changes would exclude back-up battery chargers embedded in continuous use devices from being required to be tested under the DOE procedure. This

proposed exclusion would harmonize with DOE's approach currently under consideration regarding the potential regulation of battery back-up systems (including uninterruptible power supplies (UPSs)) as part of the Computer and Back-up Battery Systems rulemaking.

Third, the proposed changes would harmonize DOE's test procedure with the latest version of IEC 62301 by providing specific resolution and measurement tolerances. These specifications would assist in ensuring that testing is performed with equipment that is capable of reaching these tolerances and that the resulting measurements are repeatable and reproducible.

Fourth, DOE is proposing to change how lead acid batteries are conditioned and discharged by applying the protocol currently used for all other battery chemistries (excluding lithium-ion) to lead acid batteries. DOE has become aware that a lead acid battery's condition may vary upon purchase and this variation can impact lead acid battery performance. In an effort to minimize these effects, DOE is proposing to require that the batteries be conditioned prior to testing. Additionally, DOE has been informed that discharge rate can significantly impact the nominal battery energy of lead acid batteries, especially in the case of flooded lead acid batteries. Stakeholders have claimed that the discharge rate as determined by the current DOE test procedure is higher than that during typical use, and therefore does not give an accurate representation of the battery energy in lead acid batteries. (NMMA, No. 12, p. 4) Accordingly, DOE is proposing to lengthen the discharge time for lead acid batteries to mitigate these effects.

Fifth, DOE is proposing to add product-specific certification reporting requirements into 10 CFR 429.39(b), which is currently reserved. DOE is also proposing to add a sampling methodology to be used for determining representations of efficiency, energy and power

consumption, and other key battery charger characteristics. These proposals would specify the required data elements to certify compliance with any energy conservation standards for battery chargers that DOE may adopt, and also would provide a method for DOE to enforce compliance with any energy conservation standards for battery chargers that DOE may promulgate.

Sixth, DOE is proposing to correct an internal cross-reference in the current version of Table 3.1 contained in 10 CFR Part 430, Subpart B, Appendix Y and to add units to the measured and calculated values in the table. The updates would also remove the empty value column currently found in Table 3.1. DOE is also proposing to specify in section 430.23(aa) that battery discharge energy should be measured according to section 3.8 of appendix Y.

The table below summarizes the changes and the affected sections of 10 CFR parts 429 and 430.

Table II.1 – Summary of Proposed Changes and Affected Sections of 10 CFR Parts 429 and 430

Sections to Modify	Summary of proposed modifications
Subpart B of Part 429—Certification	
429.39(b) Certification Reports	• Create new paragraph (b), specifying requirements for certifications of compliance with energy conservation standards for battery chargers
Subpart C of Part 429—Enforcement	
Appendix D	• Create new appendix to include sampling plan for enforcement testing
Subpart A of Part 430—General Provisions	
§430.2. Definitions	• Amend definitions of “direct operation external power supply” • Add definition of “back-up battery charger”

Appendix Y to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Battery Chargers	
1.Scope	• Insert exceptions for back-up battery chargers embedded in continuous use devices and wireless charging systems that do not fix the position of the device during charging
3.Standard Test Conditions	• Incorporate by reference the uncertainty requirements of IEC 62301 (2nd Ed.) in 3.2(a). • Correct the internal cross-reference in Table 3.1 for item 4 and modify the table by removing the current "value" column and adding units to the table as appropriate.
4.Unit Under Test (UUT) Setup Requirements	• Clarify in section 4.3.b that a single battery should be selected as a result of applying the battery selection criteria in Table 4.1. • Insert section 4.3.b.1 to require selecting the single battery resulting in the highest maintenance mode power when following Table 4.1 results in two or more distinct batteries. • Update Table 4.1 to remove instances of multiple batteries for test and to instruct that, where applicable, the highest voltage or highest charge capacity battery, or combination for multi-port battery chargers, must be tested. Remove column "number of tests."
5.Test Measurement	• Remove reference to lead acid batteries from section 5.3(a). • Insert provision for lead acid batteries to be discharged to 50% of rated voltage in section 5.3(c)(2)(i). • Remove reference to lead acid from section 5.3(d). • Removed discharge current value ".2C" from section 5.8(c)(2). • Updated discharge rate and termination voltage for VRLA and Flooded Lead Acid in Table 5.2.

III. Discussion

In response to the May 2014 NODA, DOE received written comments from 15 interested parties, including manufacturers, trade associations, standards development organizations, and

energy efficiency advocacy groups. Table III.1 lists the entities that commented on that NODA and their affiliation. These comments are discussed in more detail below, and the full set of comments can be found at: http://www.regulations.gov/#!docketBrowser;rpp=25;po=0;D=EERE-2014-BT-NOA-0012;dct=PS.

Table III-1 Interested Parties That Commented on the May 2014 NODA

Commenter	**Acronym**	**Organization type/affiliation**	**Comment No.(Docket Reference)**
Alliance for Wireless Power	A4WP	Trade Association	17
Arris Group, Inc.	ARRIS	Manufacturer	12
Association of Home Appliance Manufacturers	AHAM	Standard Development Organization	18
California Investor-Owned Utilities	CA IOUs	Utilities	15
Consumer Electronics Association	CEA	Trade Association	21
Energizer Holdings, Inc.	Energizer	Manufacturer	8
Information Technology Industry Council	ITI	Trade Association	19
Johnson Outdoors Marine Electronics	JOME	Manufacturer	9
National Electrical Manufacturers Association	NEMA	Trade Association	7
National Marine Manufacturers Association	NMMA	Trade Association	11
Natural Resources Canada/ECOVA	NRCan (ECOVA)_	Efficiency Advocacy Group	16
National Resources Defense Council	NRDC	Efficiency Advocacy Group	20
Power Tool Institute	PTI	Trade Association	13
Proctor & Gamble	P&G	Manufacturer	10
Telecommunications	TIA	Standard	14

Commenter	Acronym	Organization type/affiliation	Comment No.(Docket Reference)
Industry Association		Development Organization	

A. Battery Selection and Testing of Multi-Voltage, Multi-Capacity Battery Chargers

DOE sought comments on the existing battery selection methodology included in section 4.3 "Selection of Batteries To Use for Testing" of the test procedure in its recent NODA as it relates to multi-voltage, multi-voltage and multi-capacity, and multi-chemistry battery chargers. See 79 FR 27774, 27776-27777 (May 15, 2014).The submitted comments suggested that errors may be introduced when testing these types of battery chargers and raised questions about the repeatability of the test procedure when testing battery chargers capable of charging batteries of different chemistries (i.e., chargers capable of handling multiple battery chemistries such as lithium and nickel metal hydride). PTI urged DOE to state explicitly how each battery charger and battery combination should be rated. (PTI, Pub. Mtg. Transcript, No. 6 at p. 77) ITI commented that the current test procedure leaves significant room for error and does not employ effective, reasonable and repeatable test conditions for these types of battery chargers. (ITI, No. 19, pp. 2-3) The CA IOUs and NRDC both offered solutions to eliminate ambiguity in battery selection for these battery chargers by suggesting that the least expensive battery or the battery which represents the most common intended use be selected. (California IOUs, No. 15, p. 2, NRDC, No. 20, p. 2) DOE took all of these comments into account when developing its proposal.

Under the current provisions for battery selection, a multi-voltage, multi-capacity battery charger must be tested with as many as three distinct battery types. The battery selection procedure under Appendix Y, Section 4, Table 4.1, lays out three sets of testing scenarios:

a) Test unit with the lowest voltage, lowest capacity battery utilizing only one port.

b) Test unit with the highest voltage, lowest capacity battery utilizing only one port.

c) Use all ports and use the battery or configuration of batteries with the highest total rated energy capacity.

Per section 4.3.a(2), if no batteries are packaged with the charger, but the instructions specify or recommend batteries for use with the charger, batteries for testing must be those recommended or specified in the instructions and must be selected according to the procedure in section 4.3.b, which generally requires that a tester use Table 4.1 to determine which batteries to use when testing the efficiency of a given battery charger. In the case of multi-chemistry battery chargers, multiple batteries of differing chemistries may meet the criteria outlined in 4.3.b for a single battery selection and test. Specifically, the current test procedure is not clear which battery chemistry, or chemistries, should be selected for testing---it indicates only that the battery with the highest voltage or highest rated charge capacity be selected. In this case, the test results for each battery of differing chemistries may be inconsistent even though they have the same voltage and charge capacity. Finally, DOE realizes that the current battery selection criteria can result in the selection of up to three separate batteries for testing, which increases testing burden and may create ambiguity as to which test result to use when making a representation about the energy efficiency of a battery charger. DOE is proposing an approach that would reduce ambiguity and testing burden, while yielding repeatable measurements of a tested unit's energy use.

Specifically, to eliminate potential ambiguity and reduce testing burden, DOE is proposing to modify Table 4.1 to eliminate the multiple tests currently required for multi-voltage

and multi-capacity battery chargers and instead require that only the battery with the highest voltage and/or highest charge capacity be selected. In doing so, DOE's goal is to test the charger in the mode for which the battery charger is designed to operate optimally. Based on feedback from industry representatives and consultation with subject matter experts, DOE understands that, if required to operate over a range of outputs, power electronics, including battery chargers, are typically designed to optimize components at the high output range of the device. Therefore, DOE believes these test results will be representative of the typical energy consumption of the battery charger and reduce the possibility of placing undue burden on manufacturers of chargers that are able to charge lower voltage, lower capacity batteries.

To address these same issues, DOE is also proposing that if a battery charger is multi-voltage and multi-capacity and capable of charging batteries of multiple chemistries (such that two or more batteries, each with a unique chemistry, meet the proposed selection criteria) the battery and battery charger combination resulting in the highest maintenance mode power would be chosen for testing.

DOE anticipates that, with these proposed changes, there will be only one set of test results, and a single rating, for each basic model of battery charger. The resulting energy consumption calculation would be repeatable and representative of each basic model's energy use for which it has been optimized, while eliminating the ambiguity that appears to be present in the current version of the procedure. Additionally, by reducing the number of tests required, DOE believes that the overall test burden would be reduced. DOE seeks comment on the proposed methodology for selecting batteries for multi-voltage, multi-capacity battery chargers,

and for those cases when the battery selection criteria results in two or more unique batteries (e.g., multi-chemistry battery chargers).

DOE notes that it also considered several other options to modify the test procedure to clarify how to measure the energy use of, and obtain a single set of energy consumption ratings for, multi-voltage and multi-capacity battery chargers. First, DOE considered requiring the existing battery selection criteria to be applied and then averaging the test results to produce one set of test results. Second, DOE considered modifying the battery selection criteria to require that only the battery with the lowest voltage and/or lowest rated charge capacity be selected for testing. Lastly, in the case of multi-chemistry battery chargers, DOE considered requiring the battery charger be considered a basic model for each base chemistry it was capable of charging and apply the battery selection criteria separately for each chemistry, or basic model.

Each one of these proposed solutions, however, resulted in solutions that did not fully accomplish DOE's goals. The first option, while producing a single set of test results, could result in an unrepresentative measurement of the true energy consumption consistent with any configuration of batteries the battery charger is capable of charging. The second option, while similar to DOE's proposal, would not produce results representative of the higher range for which battery chargers are, typically, optimally designed when capable of charging multiple voltages and capacities. Finally, in addressing battery chemistry, treating each chemistry mode as a unique basic model, with either of the previous options discussed above, did not produce a single metric and could increase the testing burden on some manufacturers. In DOE's view, this approach would produce test results that are repeatable and representative of the typical energy

consumption of the battery charger under test and at the same time reduce testing burden on manufacturers. While DOE's preliminary determination is that these options conflict with those intentions, DOE is seeking comment on these other options as well.

B. Back-up Battery Chargers

DOE sought comments on applying the current test procedure to battery chargers embedded in continuous use products, or back-up battery chargers, in the recent NODA. See 79 FR 27774. Based on comments received from interested parties and DOE's own analysis, DOE is proposing to define back-up battery chargers and exclude them from the scope of this test procedure. DOE is proposing to define back-up battery chargers in 10 CFR 430.2 as a battery charger that: (1) is embedded in a separate end-use product that is designed to continuously operate using main power (AC or DC) and (2) has as its sole purpose to recharge a battery used to maintain continuity of load power in case of input power failure. DOE previously referred to these battery chargers in the context of continuous use devices in the May 2014 NODA. Examples of such devices that integrate back-up battery chargers include UPSs and some cable modems. Interested parties noted to DOE that continuous use devices are becoming increasingly integrated with a variety of products that do not perform back-up battery charging as a primary function of the device. As a result of this integrated approach, the battery charging function in these products often cannot be isolated during testing (ARRIS, No. 22, p. 2). While the test procedure is designed to measure the energy consumption and efficiency of the battery charging functionality, the method is limited when applied to a battery charger that is embedded among other functions that cannot be isolated during testing. Citing this reason, ARRIS suggested that these types of devices be excluded from the scope of the test procedure. (ARRIS, No. 22, p. 2).

ARRIS also noted that, in the event that DOE does not exclude these types of back-up battery chargers embedded in continuous use devices from the scope of this procedure, DOE should add provisions specifically to address the testing of these units. ARRIS suggested amending the test procedure to provide for measurement of only the battery charging functionality of continuous use devices that lack an on/off switch and for which the battery cannot be removed. The suggested alternative includes measuring 24-hour energy consumption ("E24") with a fully charged battery, then again measuring E24 with a discharged battery. ARRIS's approach would use the absolute difference between these two values to represent the 24-hour energy consumption of the unit under test (UUT). (ARRIS, No. 12, p. 4-6)

Additionally, the CA IOUs and NRDC both suggested that if DOE plans to require back-up battery chargers embedded in continuous use devices to be tested under the current test procedure, manufacturers should add an on-off switch to turn off all additional functionality. (CA IOUs, No. 15, p. 3, NRDC, No. 20, p.3) ARRIS argued, however, that adding switches to disable non-charging functionality in a device where multiple functions, including battery charging, have been integrated at the system or chipset level – which helps achieve lower manufacturing costs and increased reliability and energy efficiency – is not feasible. (ARRIS, No. 22, p.3).

Based on its own testing data and the feedback received from commenters, at this time, DOE is proposing to exclude back-up battery chargers that are embedded in continuous devices from the testing requirements of the DOE battery charger test procedure. DOE may revisit this decision in the future as circumstances permit.

Consistent with this proposed approach, DOE is also proposing to define the term "back-up battery charger" in § 430.2 and add to Section 1 of Appendix Y language specifying that back-up battery chargers would be excluded from the scope of the test procedure. DOE recognizes that its previously proposed standards for battery chargers considered products that would now be excluded from the scope of the test procedure. If back-up battery chargers were removed from the scope of test procedure, DOE would no longer consider establishing conservation standards for these types of products as part of a standards rulemaking for battery chargers. However, DOE is considering energy conservation standards for some battery back-up systems (including UPSs) as part of the Computer and Back-up Battery Systems rulemaking. DOE seeks comments on this approach.

C. Measurement Accuracy and Precision

On June 13, 2005, the IEC published its first edition of testing standard IEC 62301, which provided a method for measuring standby power of household appliances. The standard quantified minimum resolution requirements for energy measurement instruments and outlined the necessary procedures to ensure stable energy readings for any UUT. The standard also set limits on the uncertainties associated with any measurement taken that is meant to represent the energy consumption of a household device. It has since become recognized by many regulatory bodies as the default guideline for any power or energy measurement required for formal certification. DOE subsequently adopted instrumentation resolution and measurement uncertainty requirements for testing battery chargers identical to those in the IEC 62301 standard

and codified these requirements at 10 CFR part 430, Subpart B, Appendix Y on June 1, 2011. 76 FR 31750.

The IEC published Edition 2.0 of IEC 62301 in January 2011. This revised version of the testing standard refined the test equipment specifications, measuring techniques, and uncertainty determination to improve the method for measuring loads with high crest factors and/or low power factors, such as the low power modes typical of battery chargers operating in standby mode. These provisions were contained in Section 4 of IEC 62301, with informative guidance provided in Annex B and Annex D on measuring low power modes and determining measurement uncertainty.

To continue to ensure test methods are harmonized, DOE is proposing to incorporate by reference the resolution parameters for power measurements and uncertainty methodologies found in Section 4 of the second edition of the IEC 62301 standard. DOE seeks comment on the merits of incorporating these revisions into the current battery chargers test procedure in Appendix Y. DOE also seeks comment regarding whether the use of Annex B and Annex D should be mandatory to ensure the most accurate test results.

D. Conditioning and Discharge Rate for Lead Acid Battery Chargers

DOE received several comments from stakeholders suggesting changes to both the conditioning of lead acid batteries and the discharge rate for lead acid batteries. In some cases, DOE's own research also points to a potential need to modify the current procedure to better account for the specific characteristics of lead acid batteries. Currently, no conditioning is performed for lead acid batteries. See 10 CFR part 430, Appendix Y, sec. 5.3.a.

First, Johnson Outdoor Marine Electronics (JOME) provided test results with its comments indicating that the discharge energy of lead acid batteries varies over several cycles. These results are contrary to certain lead acid battery manufacturers' claims that conditioning is not required. JOME stated that typical lead acid batteries are only at 75 to 80 percent capacity when they are delivered in new condition, and JOME's test results show that lead acid battery discharge energy could increase after just two cycles, the current value for all other battery chemistries. (JOME, No. 9, p. 4-5) These data suggest that applying the conditioning protocol outlined in the current Appendix Y, section 5.3.c (for batteries of other chemistries) as a prerequisite, prior to testing lead acid batteries, will produce a more accurate representation of battery discharge energy.

Providing the option of various discharge rates during battery conditioning would also allow manufacturers to increase conditioning if needed. JOME's data suggest that additional conditioning may be needed to maximize discharge energy -- in some cases up to 4 cycles or more. Furthermore, JOME added that its conversations with battery manufacturers indicate that a 50%-80% depth of discharge would produce more accurate and representative results for lead acid batteries. (JOME, No. 9, p.4) To account for these issues, DOE is proposing to apply the same battery conditioning provisions found in Appendix Y, Section 5.3.c, to lead acid batteries and use a 50% depth of discharge during conditioning. DOE is seeking comment on applying the conditioning protocol (two charges and two discharges, followed by a charge, as a minimum) outlined in section 5.3.c of the test procedure to lead acid batteries. DOE also seeks comment on amending the depth of discharge requirement, during conditioning only, to 50% of the rated

voltage of the battery and what alternative depth of discharge requirements (if any) should apply to lead acid batteries.

Second, JOME, the National Marine Manufacturers Association (NMMA), and DOE's own research, indicate that the amount of usable energy extracted from a lead acid battery is inversely proportional to its discharge rate.[2] (NMMA, No. 12, p. 3) Thus, a lead acid battery discharged over a span of 10 hours produces a higher amount of overall measured energy than one discharged over a period of 5 hours. To address this issue, NMMA suggested that DOE allow for a longer discharge cycle than the current 5 hours required in the battery charger test procedure. (NMMA, No. 12, p. 4) Given that a longer discharge rate may be more representative for certain lead acid batteries, particularly those used in marine applications, DOE is proposing to amend its procedure by providing manufacturers with the option to choose between a 5-hour (C/5 or .2C), 10-hour (C/10 OR .1C), or 20-hour (C/20 OR .05C) discharge rate when testing with batteries that are rated above 1000 watt-hours (Wh). DOE is limiting this option to those batteries that are above 1000 Wh because a longer discharge cycle would do little to maximize discharge energy for batteries under 1000 Wh, but would have a more significant impact on maximizing discharge energy for batteries greater than 1000 Wh. DOE seeks comment on its proposed approach for lead acid batteries and whether the approach as described above would require any adjustments. Should adjustments be needed, DOE seeks feedback on what those adjustments should be.

[2] Perez, Richard. "Lead-Acid Battery State of Charge vs. Voltage." Home Power #36 (August/September 1993). Web 2014. http://www.zetatalk4.com/docs/Batteries/FAQ/State_Of_Charge_Ver_Voltage_2004+.pdf

E. Sampling and Certification Requirements

DOE is proposing to update 10 CFR 429.39, section (a), "Determination of represented value", and reserved section (b), "Certification Reports", to detail how to apply the sampling plan to calculate a represented value for each measure of energy consumption, time, and power recorded as part of the battery charger test procedure, and subsequently report those ratings during certification. For each basic model, these ratings would be determined by applying the statistical requirements outlined in 10 CFR 429.39 to a sample of battery charger units that are tested according to the test procedure in Appendix Y. Specifically, a represented value would be calculated in watts (W) for the measured maintenance mode power, the measured standby mode power, and the measured off mode power; the Wh rating would be calculated for the measured battery discharge energy and the measured 24-hour energy consumption. Additionally, the proposal would require the certification report for each basic model of battery charger to include each of the aforementioned represented values, along with the manufacturer and model of the test battery used; the nameplate battery voltage of the test battery in volts (V); the nameplate charge capacity of the test battery in ampere-hours (Ah); the nameplate charge energy, if available, of the battery in watt hours (Wh); the brand and model, when applicable, of the external power supply (EPS) used for testing[3]; and the average duration of the charge and maintenance mode test in hours (hr).

[3] The test procedure states in Section 4.1.a that "[t]he battery charger system shall be prepared and set up in accordance with the manufacturer's instructions." See 10 CFR 430 Appendix Y to Subpart B. Battery charger systems that include an EPS should be tested with the EPS that is sold with the battery charger system in accordance with the manufacturer's instructions. For battery chargers that use an EPS but are not sold with an EPS, the system should be tested according to the manufacturer's instructions on how to supply power to the battery charger. Providing the manufacturer and model for the EPS in the certification report would help ensure test result repeatability in cases where the EPS necessary to supply power to the charger is not included.

In 2012, DOE proposed to regulate battery charger energy use with a single metric -- Unit Energy Consumption (UEC) – derived from a calculation of the amount of energy consumed by the battery charger over the course of year. 77 FR 18478. The inputs into this calculation would include the represented values that DOE is proposing to include as part of the certification requirements, along with constants used to represent the estimated number of charges per day and the number of hours each day that the battery charger spends in each mode of operation. These usage profile assumptions were originally proposed as part of the March 2012 NOPR. Therefore, should DOE finalize energy conservation standards using the same UEC approach proposed in the NOPR, the represented values included on the certification report would allow DOE to calculate the UEC of each certified basic model of battery charger and ensure compliance with energy conservation standards.

DOE seeks comment on its proposal to update the sampling requirements and reporting requirements for battery chargers to include the data required to identify the battery charger and battery, as well as measured ratings recorded in the test procedure. DOE is particularly interested in whether the inclusion of these proposed categories of information would present a significant burden on manufacturers to produce as part of a submitted certification report – and if so, why.

F. Enforcement Testing Sampling Plan

To ensure that manufacturers of consumer products comply with the applicable energy conservation standards, DOE conducts enforcement testing by randomly selecting a sample of units and testing them according to the test procedure. DOE then compares the results obtained

through this enforcement testing to the applicable energy conservation standard to determine whether the basic model meets that standard. DOE is proposing a sampling and calculation method for DOE to assess the compliance of battery charger basic models.

When conducting enforcement testing for battery chargers, DOE is proposing to test a sample of at least 4 units of a battery charger basic model according to the provisions of the test procedure. DOE would then determine the sample mean for each of the output metrics of the test procedure, and then use those sample means to calculate the basic model's UEC according to the UEC equation that would be set forth as part of an energy conservation standard for battery chargers. DOE would then determine compliance by comparing the UEC calculated as part of enforcement testing to the applicable energy conservation standard. DOE is proposing to add Appendix D to Subpart C of Part 429 of the CFR to describe the methodology that DOE would use when conducting enforcement testing of battery chargers. DOE seeks comments on this proposal.

G. Other Proposed Updates

DOE is also proposing to update Table 3.1 of Appendix Y to correct a cross-reference error and eliminate a redundant column. The Active and Maintenance Mode Energy Consumption item on the fourth line in this table currently references Section 5.8, when it should reference section 5.6, "Testing Charge Mode and Battery Maintenance Mode." Additionally, DOE is proposing to remove the current "Value" column because the information from that column can be inserted in the column labeled "Name of measured or calculated value" column to reduce the table's complexity. DOE seeks comment on these proposed simplification changes.

H. Effective Date and Compliance Date of Test Procedure

If adopted, the effective date for the battery charger test procedure would be 30 days after publication of the test procedure final rule in the Federal Register. At that time, any measure of energy consumption relying on these metrics may be represented pursuant to the final rule. Consistent with 42 U.S.C. 6293(c), representations of the energy consumption or energy efficiency of battery chargers must be based on the new test procedure and sampling plans as of 180 days after the date of publication of the test procedure final rule. Starting on that date, any such representations, including those made on marketing materials, websites (including qualification with a voluntary or State program), and product labels would be required to be based on results generated using the proposed procedure as well as the sampling plan in 10 CFR part 429.

I. Impact from the Test Procedure

When proposing to amend a test procedure, DOE typically determines the extent to which, if any, the proposed test procedure would alter the measured energy efficiency of any covered product when compared to the existing test procedure. (42 U.S.C. 6293(e)(1)). Because DOE does not currently have energy conservation standards for battery chargers, this proposal would not affect this provision.

J. Wireless Power

In a March 2012 standards NOPR for battery chargers and EPSs, DOE noted that there are a number of different products under the broad umbrella of “wireless power,” including both battery chargers and EPSs. See 77 FR 18478 (March 27, 2012) (notice of proposed rulemaking

to set standards for battery chargers and external power supplies). In the May 2014 battery charger NODA, DOE sought input on wireless charging stations that are specifically designed to operate in dry environments, although DOE did not explicitly consider these products when first developing the battery charger test procedure. (79 FR at 27776-27777) DOE plans to address this issue in a separate rulemaking.

IV.Procedural Issues and Regulatory Review

A. Review Under Executive Order 12866

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

B.Review Under the Regulatory Flexibility Act

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

rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General Counsel's website: http://energy.gov/gc/office-general-counsel.

For manufacturers of battery chargers, the Small Business Administration (SBA) has set a size threshold, which defines those entities classified as "small businesses" for the purposes of the statute. DOE used the SBA's small business size standards to determine whether any small entities would be subject to the requirements of the rule. 65 FR 30836, 30848 (May 15, 2000), as amended at 65 FR 53533, 53544 (Sept. 5, 2000) and codified at 13 CFR part 121. The size standards are listed by North American Industry Classification System (NAICS) code and industry description and are available at http://www.sba.gov/content/summary-size-standards-industry. Battery charger manufacturers are classified under NAICS 335999, "All Other Miscellaneous Electrical Equipment and Component Manufacturing." The SBA sets a threshold of 500 employees or less for an entity to be considered as a small business for this category.

As discussed in the March 2012 NOPR, DOE identified one battery charger original device manufacturer with domestic manufacturing. Based on manufacturer interviews and DOE's research, DOE believes that almost all battery charger manufacturing takes place abroad. Also, in the NOPR and at the NOPR public meeting DOE asked for comment regarding the impacts on small battery charger manufacturers and it received no comments. Therefore, based on the information DOE currently has at hand, DOE certifies that this proposed rule is unlikely to have a significant impact on a substantial number of small entities.

DOE reviewed this proposed rule under the provisions of the Regulatory Flexibility Act and the procedures and policies published on February 19, 2003. This proposed rule prescribes certain limited clarifying amendments to an already-existing test procedure that will help manufacturers and testing laboratories to consistently conduct that procedure when measuring the energy efficiency of a battery charger, including in those instances where compliance with the applicable Federal energy conservation standard is being assessed. DOE has tentatively concluded that the proposed rule would not have a significant impact on a substantial number of small entities. Accordingly, DOE has not prepared a regulatory flexibility analysis for this rulemaking. DOE will transmit the certification and supporting statement of factual basis to the Chief Counsel for Advocacy of the SBA for review under 5 U.S.C. 605(b).

C.Review Under the Paperwork Reduction Act of 1995

If DOE adopts energy conservation standards for battery chargers, manufacturers of battery chargers will be required to certify that their products comply with those standards. In certifying compliance, manufacturers must test their products according to the applicable DOE test procedure, including any amendments adopted for those test procedures. DOE has established regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment and is proposing specific requirements for battery chargers in this rule. See 10 CFR Part 429, Subpart B. The collection-of-information requirement for the certification and recordkeeping is subject to review and approval by OMB under the Paperwork Reduction Act (PRA). This requirement has been approved by OMB under OMB control number 1910-1400. This information collection was renewed in January 2015 to include certification requirements for battery chargers. 80 FR 5099 (Jan. 30, 2015). Public

reporting burden for the certification is estimated to average 30 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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

D. Review Under the National Environmental Policy Act of 1969

The proposed test procedure amendments will likely be used to develop and implement future energy conservation standards for battery chargers. DOE has determined that this rule falls into a class of actions that are categorically excluded from review under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) and DOE's implementing regulations at 10 CFR part 1021. Specifically, this proposed rule would amend the existing test procedures without affecting the amount, quality or distribution of energy usage, and, therefore, would not result in any environmental impacts. Thus, this rulemaking is covered by Categorical Exclusion A5 under 10 CFR part 1021, subpart D, which applies to any rulemaking that interprets or amends an existing rule without changing the environmental effect of that rule. Accordingly, neither an environmental assessment nor an environmental impact statement is required.

E.Review Under Executive Order 13132

Executive Order 13132, "Federalism," 64 FR 43255 (August 4, 1999) imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have Federalism implications. The Executive Order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have Federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE has examined this proposed rule and has determined that it would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. EPCA governs and prescribes Federal preemption of State regulations as to energy conservation for the products that are the subject of this proposed rule. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6297(d)) No further action is required by Executive Order 13132.

F. Review Under Executive Order 12988

Regarding the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, "Civil Justice Reform," 61 FR 4729 (Feb. 7, 1996), imposes on Federal agencies the general duty to adhere to the following requirements: (1) eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; (3) provide

a clear legal standard for affected conduct rather than a general standard; and (4) promote simplification and burden reduction. Section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in sections 3(a) and 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, the proposed rule meets the relevant standards of Executive Order 12988.

G. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. Pub. L. No. 104-4, sec. 201 (codified at 2 U.S.C. 1531). For a proposed regulatory action likely to result in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of $100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal

governments on a proposed "significant intergovernmental mandate," and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect small governments. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA. 62 FR 12820; also available at http://energy.gov/gc/office-general-counsel. DOE examined this proposed rule according to UMRA and its statement of policy and determined that the rule contains neither an intergovernmental mandate, nor a mandate that may result in the expenditure of $100 million or more in any year, so these requirements do not apply.

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

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

I.Review Under Executive Order 12630

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

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

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for agencies to review most disseminations of information to the public under guidelines established by each agency pursuant to general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). DOE has reviewed this 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 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 of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

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

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

Under section 301 of the Department of Energy Organization Act (Pub. L. 95–91; 42 U.S.C. 7101), DOE must comply with section 32 of the Federal Energy Administration Act of 1974, as amended by the Federal Energy Administration Authorization Act of 1977. (15 U.S.C. 788; FEAA) Section 32 essentially provides in relevant part that, where a proposed rule authorizes or requires use of commercial standards, the notice of proposed rulemaking must inform the public of the use and background of such standards. In addition, section 32(c) requires DOE to consult with the Attorney General and the Chairman of the Federal Trade Commission (FTC) concerning the impact of the commercial or industry standards on competition.

Certain of the proposed amendments would incorporate testing methods contained in the following commercial standards: IEC Standard 62301 ‘‘Household electrical appliances—Measurement of standby power.’’ DOE has evaluated these testing standards and believes that the IEC standard complies 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 is, however, consulting with the Attorney General

and the Chairwoman of the FTC concerning the effect on competition of requiring manufacturers to use the test method in this standard.

M. Description of Material Incorporated by Reference

DOE previously adopted instrumentation resolution and measurement uncertainty requirements for testing battery chargers identical to those in the IEC 62301 standard and codified these requirements at 10 CFR part 430, Subpart B, Appendix Y on June 1, 2011. 76 FR 31750. The IEC published Edition 2.0 of IEC 62301 in January 2011, which is available from the American National Standards Institute, 25 W. 43rd Street, 4th Floor, New York, NY 10036 or at http://webstore.ansi.org/. This revised version of the testing standard refined the test equipment specifications, measuring techniques, and uncertainty determination to improve the method for measuring loads with high crest factors and/or low power factors, such as the low power modes typical of battery chargers operating in standby mode. These provisions were contained in Section 4 of IEC 62301, with informative guidance provided in Annex B and Annex D on measuring low power modes and determining measurement uncertainty. DOE has already incorporated by reference Edition 2.0 of IEC 62301in 10 CFR Part 430 for use with other test procedures, and is now proposing to also incorporate by reference Edition 2.0 in Appendix Y as well.

V. Public Participation

A. Attendance at Public Meeting

The time, date and location of the public meeting are listed in the DATES and ADDRESSES sections at the beginning of this document. If you plan to attend the public meeting, please notify Ms. Brenda Edwards at (202) 586-2945 or Brenda.Edwards@ee.doe.gov.

Please note that foreign nationals visiting DOE Headquarters are subject to advance security screening procedures which require advance notice prior to attendance at the public meeting. If a foreign national wishes to participate in the public meeting, please inform DOE of this fact as soon as possible by contacting Ms. Regina Washington at (202) 586-1214 or by e-mail: Regina.Washington@ee.doe.gov so that the necessary procedures can be completed.

DOE requires visitors to have laptops and other devices, such as tablets, checked upon entry into the building. Any person wishing to bring these devices into the Forrestal Building will be required to obtain a property pass. Visitors should avoid bringing these devices, or allow an extra 45 minutes to check in. Please report to the visitor's desk to have devices checked before proceeding through security.

Due to the REAL ID Act implemented by the Department of Homeland Security (DHS), there have been recent changes regarding ID requirements for individuals wishing to enter Federal buildings from specific states and U.S. territories. Driver's licenses from the following states or territory will not be accepted for building entry and one of the alternate forms of ID listed below will be required. DHS has determined that regular driver's licenses (and ID cards) from the following jurisdictions are not acceptable for entry into DOE facilities: Alaska,

American Samoa, Arizona, Louisiana, Maine, Massachusetts, Minnesota, New York, Oklahoma, and Washington. Acceptable alternate forms of Photo-ID include: U.S. Passport or Passport Card; an Enhanced Driver's License or Enhanced ID-Card issued by the states of Minnesota, New York or Washington (Enhanced licenses issued by these states are clearly marked Enhanced or Enhanced Driver's License); a military ID or other Federal government issued Photo-ID card.

In addition, you can attend the public meeting via webinar. Webinar registration information, participant instructions, and information about the capabilities available to webinar participants will be published on DOE's website: http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx?productid=84 Participants are responsible for ensuring their systems are compatible with the webinar software.

B. Procedure for Submitting Prepared General Statements For Distribution

Any person who has plans to present a prepared general statement may request that copies of his or her statement be made available at the public meeting. Such persons may submit requests, along with an advance electronic copy of their statement in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format, to the appropriate address shown in the ADDRESSES section at the beginning of this NOPR. The request and advance copy of statements must be received at least one week before the public meeting and may be emailed, hand-delivered, or sent by mail. DOE prefers to receive requests and advance copies via email. Please include a telephone number to enable DOE staff to make a follow-up contact, if needed.

C.Conduct of Public Meeting

DOE will designate a DOE official to preside at the public meeting and may also use a professional facilitator to aid discussion. The meeting will not be a judicial or evidentiary-type public hearing, but DOE will conduct it in accordance with section 336 of EPCA (42 U.S.C. 6306). A court reporter will be present to record the proceedings and prepare a transcript. DOE reserves the right to schedule the order of presentations and to establish the procedures governing the conduct of the public meeting. After the public meeting and until the end of the comment period, interested parties may submit further comments on the proceedings and any aspect of the rulemaking.

The public meeting will be conducted in an informal, conference style. DOE will present summaries of comments received before the public meeting, allow time for prepared general statements by participants, and encourage all interested parties to share their views on issues affecting this rulemaking. Each participant will be allowed to make a general statement (within time limits determined by DOE), before the discussion of specific topics. DOE will permit, as time permits, other participants to comment briefly on any general statements.

At the end of all prepared statements on a topic, DOE will permit participants to clarify their statements briefly and comment on statements made by others. Participants should be prepared to answer questions by DOE and by other participants concerning these issues. DOE representatives may also ask questions of participants concerning 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 the above procedures that may be needed for the proper conduct of the public meeting.

A transcript of the public meeting will be included in the docket, which can be viewed as described in the Docket section at the beginning of this NOPR. In addition, any person may buy a copy of the transcript from the transcribing reporter.

D.Submission of Comments

DOE will accept comments, data, and information regarding this proposed rule before or after the public meeting, but no later than the date provided in the DATES section at the beginning of this proposed rule. Interested parties may submit comments using any of the methods described in the ADDRESSES section at the beginning of this NOPR.

Submitting comments via regulations.gov. The regulations.gov web page will require you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies staff only. Your contact information will not be publicly viewable except for your first and last names, organization name (if any), and submitter representative name (if any). If your comment is not processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

However, your contact information will be publicly viewable if you include it in the comment or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. Persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to regulations.gov information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information (CBI)). Comments submitted through regulations.gov cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section.

DOE processes submissions made through regulations.gov before posting. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are being processed simultaneously, your comment may not be viewable for up to several weeks. Please keep the comment tracking number that regulations.gov provides after you have successfully uploaded your comment.

Submitting comments via email, hand delivery, or mail. Comments and documents submitted via email, hand delivery, or mail also will be posted to regulations.gov. If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information on a cover

letter. Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments

Include contact information each time you submit comments, data, documents, and other information to DOE. If you submit via mail or hand delivery, please provide all items on a CD, if feasible. It is not necessary to submit printed copies. No facsimiles (faxes) will be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format. Provide documents that are not secured, written in English and free of any defects or viruses. Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. 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 via email, postal mail, or hand delivery two well-marked copies: one copy of the document marked confidential including all the information believed to be confidential, and one copy of the document marked non-confidential with the information believed to be confidential

deleted. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about 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 by or available from other 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) when such information might lose its confidential character due to the passage of time; and (7) why disclosure of the information would be contrary to the public interest.

It is DOE's policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

E.Issues on Which DOE Seeks Comment

Although DOE welcomes comments on any aspect of this proposal, DOE is particularly interested in receiving comments and views of interested parties concerning the following issues:

1. DOE seeks comments on the methodology for selecting a battery for multi-capacity, multi-voltage, multi-chemistry battery chargers. (See section III.A.1)

2. DOE seeks comments on the methodology for selecting a single battery based on the battery and battery charger combination that results in the highest maintenance mode power when Table 4.1 results in two or more unique batteries. (See section III.A.1)
3. DOE seeks comment on the other options considered for addressing multi-voltage, multi-capacity battery chargers. (See section III.A.1)
4. DOE seeks comments on the exclusion of back-up battery chargers from the scope of the test procedure. (See section III.A.2)
5. DOE seeks comments on the merits of incorporating IEC 62301 V.2 updates into the current battery chargers test procedure in Appendix Y. (See section III.A.3)
6. DOE seeks comments on amending the depth of discharge to 50% of the rated voltage of the battery for lead acid batteries during conditioning. (See section III.A.4)
7. DOE seeks comment on adding optional discharge rates at 10 hrs. (or C/10) and 20 hrs. (or C/20) in the Battery Discharge Energy Test for lead acid batteries. (See section III.A.4)
8. DOE seeks comment on its proposal to amend the sampling and certification requirements for battery chargers. (See section III.A.5)
9. DOE seeks comment on the updates to Table 3.1 to correct for a reference error and update units for the required values identified in the table. (See section III.A.7)
10. DOE seeks comment on the burden estimates outlined in the review of the Paperwork Reduction Act. (See section IV.C)

VI. Approval of the Office of the Secretary

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

List of Subjects

10 CFR Part 429

Confidential business information, Energy conservation, Household appliances, Imports, Reporting and recordkeeping requirements.

10 CFR Part 430

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

Issued in Washington, DC, on July 27, 2015.

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

For the reasons stated in the preamble, DOE is proposing to amend parts 429 and 430 of Chapter II of Title 10, Code of Federal Regulations as set forth below:

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

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

Authority: 42 U.S.C. 6291-6317.

2. Revise § 429.39 to read as follows:

§429.39 Battery chargers.

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

(1) *Represented values include*: battery discharge energy in watt hours (Wh), 24-hour energy consumption in watt hours (Wh), maintenance mode power in watts (W), standby mode power in watts (W), and off mode power in watts (W).

(2) *Units to be tested.* The requirements of §429.11 are applicable to battery chargers; and, for each basic model of battery charger, a sample of sufficient size must be randomly selected and tested to ensure that –

(i) Any represented value of energy consumption or power for which consumers would favor lower values must be greater than or equal to the higher of:

(A) The mean of the sample, where:

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

And, $\bar{x}$ is the sample mean; η is the number of samples; and x_i is the i_{th} sample; or,

(B) The upper 97.5 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{.975}\left(\frac{s}{\sqrt{\eta}}\right)$$

And $\bar{x}$ is the sample mean; s is the sample standard deviation; n is the number of samples; and $t_{0.975}$ is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A to subpart B of part 429).

and

(ii) Any represented value energy consumption or power of a basic model for which consumers would favor higher values must be less than or equal to the lower of:

(A) The mean of the sample, where:

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

And, $\bar{x}$ is the sample mean; η is the number of samples; and x_i is the i_{th} sample;

Or,

(B) The lower 97.5 percent confidence limit (LCL) of the true mean divided by 1.05, where:

$$LCL = \bar{x} - t_{.975}\left(\frac{s}{\sqrt{\eta}}\right)$$

And $\bar{x}$ is the sample mean; s is the sample standard deviation; n is the number of samples; and $t_{0.975}$ is the t statistic for a 97.5% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A to subpart B of part 429).

(b) *Certification reports*. (1) The requirements of §429.12 are applicable to battery chargers;

(2) Pursuant to §429.12(b)(13), a certification report must include the following public product-specific information: The manufacturer and model of the test battery; the nameplate battery voltage of the test battery in volts (V); the nameplate charge capacity of the test battery in ampere-hours (Ah); the nameplate charge energy, if available, of the battery in watt hours (Wh); the manufacturer and model, when applicable, of the external power supply used for testing; the average duration of the charge and maintenance mode test in hours (hr) for the units sampled; battery discharge energy in watt hours (Wh); 24-hour energy consumption in watt hours (Wh); maintenance mode power in watts (W); standby mode power in watts (W); and off mode power in watts (W).

3. Revise paragraph (e) of section 429.110 to read as follows:

(e) Basic model compliance. DOE will evaluate whether a basic model complies with the applicable energy conservation standard(s) based on testing conducted in accordance with the applicable test procedures specified in parts 430 and 431, and with the following statistical sampling procedures:

(1) For products with applicable energy conservation standard(s) in §430.32, and commercial prerinse spray valves, illuminated exit signs, traffic signal modules and pedestrian modules, commercial clothes washers, and metal halide lamp ballasts, DOE will use a sample size of not more than 21 units and follow the sampling plans in appendix A of this subpart (Sampling for Enforcement Testing of Covered Consumer Products and Certain High-Volume Commercial Equipment).

(2) For automatic commercial ice makers; commercial refrigerators, freezers, and refrigerator-freezers; refrigerated bottled or canned vending machines; and commercial HVAC and WH equipment, DOE will use an initial sample size of not more than four units and follow the sampling plans in appendix B of this subpart (Sampling Plan for Enforcement Testing of Covered Equipment and Certain Low-Volume Covered Products).

(3) If fewer than four units of a basic model are available for testing when the manufacturer receives the notice, then:

(i) DOE will test the available unit(s); or

(ii) If one or more other units of the basic model are expected to become available within 30 calendar days, DOE may instead, at its discretion, test either:

(A) The available unit(s) and one or more of the other units that subsequently become available (up to a maximum of four); or

(B) Up to four of the other units that subsequently become available.

(4) For battery chargers, DOE will use a sample size of not more than 21 units and follow the sampling plan in appendix D of this subpart (Sampling Plan for Enforcement Testing of Battery Chargers).

(5) For distribution transformers, DOE will use an initial sample size of not more than five units and follow the sampling plans in appendix C of this subpart (Sampling Plan for Enforcement Testing of Distribution Transformers). If fewer than five units of a basic model are available for testing when the manufacturer receives the test notice, then:

(i) DOE will test the available unit(s); or

(ii) If one or more other units of the basic model are expected to become available within 30 calendar days, the Department may instead, at its discretion, test either:

(A) The available unit(s) and one or more of the other units that subsequently become available (up to a maximum of five); or

(B) Up to five of the other units that subsequently become available.

(6) Notwithstanding paragraphs (e)(1) through (e)(4) of this section, if testing of the available or subsequently available units of a basic model would be impractical, as for example when a basic model has unusual testing requirements or has limited production, DOE may in its discretion decide to base the determination of compliance on the testing of fewer than the otherwise required number of units.

(7) When DOE makes a determination in accordance with section (e)(6) to test less than the number of units specified in paragraphs (e)(1) through (e)(4) of this section, DOE will base the compliance determination on the results of such testing in accordance with appendix B of this subpart (Sampling Plan for Enforcement Testing of Covered Equipment and Certain Low-Volume Covered Products) using a sample size (n_1) equal to the number of units tested.

(8) For the purposes of this section, available units are those that are available for distribution in commerce within the United States.

4. Add appendix D to subpart C of part 429 to read as follows:

Appendix D to Subpart C of Part 429 – Sampling Plan for Enforcement Testing of Battery Chargers

a. The initial sample size (n) for enforcement testing of battery chargers is four units.

b. Test each unit in the sample according to the test procedure in 10 CFR Part 430, Subpart B, Appendix Y, recording the following metrics: 24-hour energy (Wh), battery discharge energy (Wh), maintenance mode power (W), standby mode power (W), off mode power (W), and the duration of the charge and maintenance mode test.

c. Compute the sample mean for each of the metrics, where

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

and, $\bar{x}$ is the sample mean; n is the number of samples; and x_i is the i^{th} sample.

d. Compute Unit Energy Consumption (UEC) for the sample using the applicable equation from the applicable energy conservation standard for battery chargers in §430.32 and the sample means for each of the metrics, as calculated in step c.

e. Determine the applicable standard for the basic model being tested (ECS), using the sample mean for battery discharge energy.

f. Compare the UEC to the ECS.

If the UEC of the sample is greater than the ECS, then the basic model is not compliant.

PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

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

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

6. Section 430.2 is amended by adding in alphabetical order a definition for "back-up battery charger" to read as follows:

§430.2 Definitions.

* * * * *

Back-up battery charger means a battery charger:

(1) That is embedded in a separate end-use product that is designed to continuously operate using main power (AC or DC); and

(2) Whose sole purpose is to recharge a battery used to maintain continuity of load power in case of input power failure.

* * * * *

§430.3 [Amended]

7. In §430.3, paragraph (p)(4) is amended by removing "and X" and adding in its place "X, and Y".

8. In §430.23, revise paragraph (aa) to read as follows:

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

* * * * *

(aa) *Battery Chargers.* Measure battery discharge energy, expressed in watt-hours, in accordance with section 5.8 of appendix Y of this subpart. Measure the 24-hour energy consumption of a battery charger in active and maintenance modes, expressed in watt-hours, and the power

consumption of a battery charger in maintenance mode, expressed in watts, in accordance with section 5.10 of appendix Y of this subpart. Measure the power consumption of a battery charger in standby mode and off mode, expressed in watts, in accordance with sections 5.11 and 5.12, respectively of appendix Y of this subpart.

* * * * *

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

a. Revising the introductory text to appendix Y;
b. Revising section 1, Scope;
c. Revising Table 3.1 and section 3.2;
d. Revising the undesignated center heading directly above section 4.1. General Setup;
e. Revising section 4.3 (b) and Table 4.1;
f. Revising sections 5.3(a), 5.3(c)2(i), 5.3(d), 5.8(c)(2) and Table 5.2.
g. Moving Table 5.2 after section 5.8(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

NOTE: On or after [DATE 180 DAYS AFTER PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER], any representation regarding the energy consumption of battery chargers must be based upon results generated under this test procedure. Upon the compliance date(s) of any energy conservation standard(s) for battery chargers, use of the applicable provisions of this test procedure to demonstrate compliance with the energy conservation standard will also be required.

1. SCOPE

This appendix covers the test requirements used to measure the energy consumption for battery chargers operating at either DC or United States AC line voltage (115V at 60Hz). This appendix does not provide a method for testing back-up battery chargers.

* * * * *

3. * * *

* * * * *

Table 3.1 – List of Measured or Calculated Values

	Name of Measured or Calculated Value	Reference
1	Duration of the charge and maintenance mode test (Hrs)	Section 5.2
2	Battery Discharge Energy (Wh)	Section 4.6
3	Initial time and power (W) of the input current of connected battery (A)	Section 5.8
4	Active and Maintenance Mode Energy Consumption (W, Hrs)	Section 5.6
5	Maintenance Mode Power (W)	Section 5.9
6	24 Hour Energy Consumption (Wh)	Section 5.10
7	Standby Mode Power (W)	Section 5.11
8	Off Mode Power (W)	Section 5.12

3.2. *Verifying Accuracy and Precision of Measuring Equipment*

Any power measurements recorded, as well as any power measurement equipment utilized for testing, shall conform to the uncertainty and resolution requirements outlined in Section 4, "General conditions for measurements", as well as Annexes B, "Notes on the measurement of low power modes", and D, "Determination of uncertainty of measurement", of IEC 62301 (incorporated by reference, see §430.3).

* * * * *

UNIT UNDER TEST SETUP REQUIREMENTS

. * * * * *

4.3. * * *

b. From the detachable batteries specified above, use Table 4.1 to select the batteries to be used for testing depending on the type of battery charger being tested. Each row in the table represents a mutually exclusive battery charger type. In the table, find the single applicable row for the UUT, and test according to those requirements. Select a single battery configuration for testing, according to the battery selection criteria in Table 4.1.

If the battery selection criteria outlined in Table 4.1 results in two or more batteries of differing configurations, but with equal voltage and capacity ratings, use the battery that results in the highest maintenance mode power, as determined in section 5.9, for testing.

* * * * *

Table 4.1 Battery Selection for Testing

Type of charger			Tests to perform
Multi-voltage	**Multi-port**	**Multi-capacity**	**Battery selection (from all configurations of all associated batteries)**
No	No	No	Any associated battery
No	No	Yes	Highest charge capacity battery
No	Yes	Yes or No	Use all ports and use the maximum number of identical batteries with the highest rated charge capacity that the charger can accommodate
Yes	No	No	Highest voltage battery
Yes	Yes to either or both		Use all ports and use the battery or the configuration of batteries with the highest individual voltage and highest total rated energy capacity

* * * * *

5. * * *

5.3. * * *

a. No conditioning is to be done on lithium-ion batteries. Proceed directly to battery preparation, section 5.4, when testing chargers for these batteries.

* * * * *

c. * * *

(2) * * *

(i) A battery analyzer at a rate not to exceed 1 C, until its average cell voltage under load reaches the end-of-discharge voltage specified in Table 5.2 for the relevant battery chemistry, with the exception of VRLA and Flooded Lead Acid batteries with a capacity of greater than 1000Wh which may be discharged at .2C, .1C, or .05C and must be discharged to 50% of their rated voltage; or

* * * * *

d. Batteries of chemistries, other than lithium-ion, that are known to have been through at least two previous full charge/discharge cycles shall be fully charged only once as in step c.(1) of this section.

* * * * *

5.8. * * *

c. * * *

(2) Set the battery analyzer for a constant discharge current and the end-of-discharge voltage in Table 5.2 for the relevant battery chemistry.

* * * * *

Table 5.2—Required Battery Discharge Rates and End-of-Discharge Battery Voltages

Battery chemistry	Discharge rate C	End-of-discharge voltage volts per cell
Valve-Regulated Lead Acid (VRLA)	0.1	1.75
Flooded Lead Acid	0.1	1.70
Nickel Cadmium (NiCd)	0.2	1.0
Nickel Metal Hydride (NiMH)	0.2	1.0
Lithium Ion (Li-Ion)	0.2	2.5
Lithium Polymer	0.2	2.5
Rechargeable Alkaline	0.2	0.9
Nanophosphate Lithium Ion	0.2	2.0
Silver Zinc	0.2	1.2

* * * * *