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6450-01-P

DEPARTMENT OF ENERGY

10 CFR Part 429 and 431

[EERE-2017-BT-TP-0055]

Energy Conservation Program: Test Procedure for Distribution Transformers

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

ACTION: Request for information (RFI).

SUMMARY: The U.S. Department of Energy (“DOE”) is initiating a data collection process through this RFI to consider whether to amend DOE’s test procedure for distribution transformers. To inform interested parties and to facilitate this process, DOE has gathered data, identifying several issues associated with the currently applicable test procedure on which DOE is interested in receiving comment. The issues outlined in this document mainly concern the degree to which the per-unit load (“PUL”) testing measurement accurately represents in-service distribution transformer performance, and provides test results that reflect energy efficiency, energy use, and estimated operating costs during a representative average use cycle of an in-service transformer; sampling; representations; alternative energy determination methods (“AEDMs”); and any additional topics that may inform DOE’s decisions in a future test procedure rulemaking, including methods to reduce regulatory burden while ensuring the procedure’s accuracy.

DOE welcomes written comments from the public on any subject within the scope of this document (including topics not raised in this RFI).

DATES: Written comments and information are requested and will be accepted on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at <http://www.regulations.gov>. Follow the instructions for submitting comments. Alternatively, interested persons may submit comments, identified by docket number EERE-2017-BT-TP-0055, by any of the following methods:

1. *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.
2. *E-mail:* DistributionTransformers2017TP0055@ee.doe.gov. Include docket number EERE-2017-BT-TP-0055 in the subject line of the message.
3. *Postal Mail:* Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Program, Mailstop EE-5B, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Telephone: (202) 287-1445. If possible, please submit all items on a compact disc (“CD”), in which case it is not necessary to include printed copies.
4. *Hand Delivery/Courier:* Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Program, 950 L’Enfant Plaza, SW,

Suite 600, Washington, DC 20024. Phone: (202) 287-1445. If possible, please submit all items on a CD, in which case it is not necessary to include printed copies.

No telefacsimiles (faxes) will be accepted. For detailed instructions on submitting comments and additional information on the rulemaking process, see section III of this document.

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

The docket web page can be found at <http://www.regulations.gov/#!docketDetail;D=EERE-2017-BT-TP-0055>. The docket web page contains simple instructions on how to access all documents, including public comments, in the docket. See section III for information on how to submit comments through <http://www.regulations.gov>.

FOR FURTHER INFORMATION CONTACT: Mr. Jeremy Domm, U.S.

Department of Energy, Office of Energy Efficiency and Renewable Energy, Building

Technologies Program, EE-5B 1000 Independence Avenue SW, Washington, DC 20585-0121. Telephone: (202) 586-9870. E-mail: *ApplianceStandardsQuestions@ee.doe.gov*.

Ms. Mary Greene, U.S. Department of Energy, Office of the General Counsel, GC-33, 1000 Independence Avenue SW, Washington, DC 20585-0121. Telephone: (202) 586-1817. E-mail: *mary.greene@hq.doe.gov*.

For further information on how to submit a comment or review other public comments and the docket, contact the Appliance and Equipment Standards Program staff at (202) 586-6636 or by e-mail: *ApplianceStandardsQuestions@ee.doe.gov*.

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I. Introduction

DOE is authorized to establish and amend energy conservation standards and test procedures for certain industrial equipment, including distribution transformers. (42 U.S.C. 6317(a)) DOE's test procedures for distribution transformers are prescribed at 10 CFR 431.193 and appendix A to subpart K of part 431. The following sections discuss DOE's authority to establish and amend test procedures for distribution transformers, as well as relevant background information regarding DOE's consideration of test procedures for this equipment.

A. Authority and Background

The Energy Policy and Conservation Act of 1975 ("EPCA" or "the Act"),¹ Public Law 94-163 (42 U.S.C. 6291–6317, as codified), among other things, authorizes DOE to regulate the energy efficiency of a number of covered consumer products and industrial equipment. Title III, Part C² of EPCA, added by Public Law 95-619, Title IV, §441(a), established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve energy efficiency. This equipment includes distribution transformers, the subject of this RFI. (42 U.S.C. 6317(a))

Under EPCA, DOE's energy conservation program consists of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and

¹ All references to EPCA in this document refer to the statute as amended through the Energy Efficiency Improvement Act of 2015 (EEIA 2015), Public Law 114–11 (April 30, 2015).

² For editorial purposes, upon codification into the U.S. Code, Part C was redesignated as Part A-1.

enforcement procedures. Relevant provisions of the Act for distribution transformers include definitions (42 U.S.C. 6291; 42 U.S.C. 6311), energy conservation standards (42 U.S.C. 6295; 42 U.S.C. 6317), test procedures (42 U.S.C. 6293; 42 U.S.C. 6314), labeling provisions (42 U.S.C. 6294; 42 U.S.C. 6315), and the authority to require information and reports from manufacturers (42 U.S.C. 6316).

Federal energy efficiency requirements for covered equipment established under EPCA generally supersede State laws and regulations concerning energy conservation testing, labeling, and standards. (42 U.S.C. 6316) DOE may, however, grant waivers of Federal preemption for particular State laws or regulations, in accordance with the procedures and other provisions of EPCA. (42 U.S.C. 6316(b)(2)(D))

The Federal testing requirements consist of test procedures that manufacturers of covered equipment must use as the basis for: (1) certifying to DOE that their equipment complies with the applicable energy conservation standards adopted pursuant to EPCA (42 U.S.C. 6316(b); 42 U.S.C. 6296), and (2) making representations about the efficiency of that equipment. (42 U.S.C. 6314(d)) Similarly, DOE uses these test procedures to determine whether the equipment complies with relevant standards promulgated under EPCA.

Under 42 U.S.C. 6314, EPCA sets forth the criteria and procedures DOE must follow when prescribing or amending test procedures for covered equipment. EPCA requires that any test procedures prescribed or amended under this section must be

reasonably designed to produce test results which measure energy efficiency, energy use or estimated annual operating cost of a covered equipment during a representative average use cycle or period of use and requires that test procedures not be unduly burdensome to conduct. (42 U.S.C. 6314(a)(2))

If DOE determines that a test procedure amendment is warranted, it must publish proposed test procedures and offer the public an opportunity to present oral and written data, views and arguments on the proposed test procedures. (42 U.S.C. 6314(b))

EPCA also requires that, at least once every 7 years, DOE evaluate test procedures for each type of covered equipment, including distribution transformers, to determine whether amended test procedures would more accurately or fully comply with the requirements for the test procedures to not be unduly burdensome to conduct and to be reasonably designed to produce test results that reflect energy efficiency, energy use, and estimated operating costs during a representative average use cycle. (42 U.S.C. 6314(a)(1)).

DOE is publishing this RFI to collect data and information to inform DOE's 7-year review requirement specified in EPCA, which requires that DOE publish either an amendment to the test procedures or a determination that amended test procedures are not required. (42 U.S.C. 6314(a)(1))

B. Rulemaking History

DOE's current test procedure for distribution transformers is prescribed at 10 CFR 431.193 and appendix A to subpart K of part 431. EPCA states that the testing requirements for distribution transformers shall be based on the “Standard Test Method for Measuring the Energy Consumption of Distribution Transformers” prescribed by the National Electrical Manufacturers Association (NEMA TP 2-1998). (42 U.S.C. 6293(b)(10)(A))

Accordingly, DOE prescribed the test procedure for distribution transformers on April 27, 2006 (hereafter “April 2006 DT TP final rule”). 71 FR 24972. In an April 2013 final rule amending the standards for distribution transformers (hereafter “April 2013 DT ECS final rule”), DOE determined that the test procedures did not require amendment at that time, concluding that the test procedure as established in the April 2006 DT TP final rule was reasonably designed to produce test results that reflect energy efficiency and energy use, as required by 42 U.S.C. 6314(a)(2). 78 FR 23336, 23347 (April 18, 2013). However, in the April 2013 DT ECS final rule, DOE responded to stakeholder comments regarding the appropriateness of the test PUL³ requirement in its test procedure, stating that it may examine the topic of potential loading points in a dedicated test procedure rulemaking in the future. 78 FR 23336, 23350. Therefore, as part of this RFI DOE is

³ PUL is the same concept and quantity as the “percent of nameplate-rated load” used in 10 CFR 431.196 and “percent of the rated load” used in section 3.5 of 10 CFR part 431, subpart K, appendix A.

giving further consideration to the appropriateness of the test PUL requirements, as discussed in the April 2013 DT ECS final rule.

II. Request for Information

In the following sections, DOE has identified a variety of issues on which it seeks input to aid in the development of the technical and economic analyses regarding whether amended test procedures for distribution transformers may be warranted. Specifically, DOE is requesting comment on any opportunities to streamline and simplify testing requirements for distribution transformers.

Additionally, DOE welcomes comments on other issues relevant to the conduct of this process that may not specifically be identified in this document. In particular, DOE notes that under Executive Order 13771, “Reducing Regulation and Controlling Regulatory Costs,” Executive Branch agencies such as DOE are directed to manage the costs associated with the imposition of expenditures required to comply with Federal regulations. See 82 FR 9339 (Feb. 3, 2017). Pursuant to that Executive Order, DOE encourages the public to provide input on measures DOE could take to lower the cost of its regulations applicable to distribution transformers consistent with the requirements of EPCA.

A. Scope and Definitions

A “transformer” is a device consisting of 2 or more coils of insulated wire that transfers alternating current by electromagnetic induction from 1 coil to another to change the original voltage or current value. 10 CFR 431.192. A “distribution transformer” is a transformer that: (1) has an input voltage of 34.5 kV or less; (2) has an output voltage of 600 V or less; (3) is rated for operation at a frequency of 60 Hz; and (4) has a capacity of 10 kVA to 2500 kVA for liquid-immersed units and 15 kVA to 2500 kVA for dry-type units. Id. The term “distribution transformer” does not include a transformer that is an autotransformer; drive (isolation) transformer; grounding transformer; machine-tool (control) transformer; nonventilated transformer; rectifier transformer; regulating transformer; sealed transformer; special-impedance transformer; testing transformer; transformer with tap range of 20 percent or more; uninterruptible power supply transformer; or welding transformer. Id.

A “liquid-immersed distribution transformer” is a distribution transformer in which the core and coil assembly is immersed in an insulating liquid. Id. A “low-voltage dry-type distribution transformer” is a distribution transformer that has an input voltage of 600 volts or less; is air-cooled; and does not use oil as a coolant. Id. A “medium-voltage dry-type distribution transformer” means a distribution transformer in which the core and coil assembly is immersed in a gaseous or dry-compound insulating medium, and which has a rated primary voltage between 601 V and 34.5 kV. Id.

B. Test Procedure

1. PUL Testing Requirements

PUL specification is a key component of the distribution transformer test procedure because the efficiency of the transformer varies based on PUL. The test procedure for distribution transformers must be reasonably designed to produce test results that reflect energy efficiency, energy use, and estimated operating costs during a representative average use cycle, and to have a test procedure is not unduly burdensome to conduct. To this end, the test PUL is intended to represent the typical⁴ PUL experienced by in-service distribution transformers. However, some complications exist, including: (1) a given customer may not operate the transformer at a single constant PUL, and (2) a transformer model may be used at different PULs by different customers. To further examine the test PUL specification, DOE reviewed the test PUL requirements in the current test procedure and the load analysis from the April 2013 DT ECS final rule.

The current PUL specifications required for rating transformers are specified in 10 CFR 431.196 and section 3.5 of 10 CFR part 431, subpart K, appendix A (hereafter “Appendix A”). The current test procedure in Appendix A requires that both liquid-immersed transformers and medium-voltage, dry-type (“MVDT”) transformers are rated at 50 percent PUL, and that low-voltage, dry-type (“LVDT”) transformers are rated at 35 percent PUL. Specifically, in section 3.5(a) of Appendix A, the test procedure requires

⁴ Industry commonly uses the root mean square (“RMS”) PUL as an estimate of the “typical” or “average” PUL experienced by a transformer in service.

that the reference temperature at which winding resistance is measured is 55 °C for liquid-immersed transformers and MVDT transformers loaded at 50 percent of the rated load, and is 75 °C for LVDT transformers loaded at 35 percent of the rated load. In addition, 10 CFR 431.196 notes that all efficiency values are at 35 percent of nameplate-rated load for LVDT transformers, and at 50 percent of nameplate-rated load for liquid-immersed and MVDT transformers, determined according to the DOE test procedure in Appendix A. These test PULs are consistent with NEMA TP 2-1998, the test method required by EPCA. (42 U.S.C. 6293(b)(10)) DOE is requesting input as to whether the test PUL values used in the test method reflect PULs experienced in practice.

DOE's research in support of its April 2013 DT ECS final rule indicated that distribution transformers in service experience a large load diversity and, on average, are operated at a difference of a RMS PUL from those at which they are rated for some equipment classes. 78 FR 23336, 23349-23350. DOE's analysis produced a distribution of typical RMS PULs for the considered liquid-immersed and MVDT, and LVDT distribution transformers.⁵

DOE estimated that, on average, the initial (first year) RMS PUL for liquid-immersed transformers ranged from 34 and 40 percent for single- and three-phase

⁵ The details of this analysis are documented in the final rule Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment Distribution Transformers; chapter 7 and appendix 7A. (available at: <https://www.regulations.gov/document?D=EERE-2010-BT-STD-0048-0760>)

equipment, respectively, with a one percent annual increase over the life of the transformer to account for connected load growth. This resulted in a lifetime⁶ average PUL of 49 and 56 percent for single- and three-phase liquid-immersed transformers, respectively.⁷ This is consistent with the current test procedure requirements of rating liquid-immersed transformers at 50 percent PUL. In the April 2013 DT ECS final rule, DOE it had received public comment stating that utilities had oversized transformers due to their inability to accurately monitor transformer loading and due to their assumption that loading will increase in the future. In the case of liquid-immersed transformers, this may account for the relatively low PUL as a function of transformer capacity. See, 78 FR 23336, 23349, citing comment from Baltimore Gas and Electric.

Further, in the April 2013 DT ECS final rule, DOE estimated that, on average, the RMS PUL for LVDT transformers ranged from 20 and 25 percent for commercial and industrial customers, respectively.⁸ Finally, DOE estimated that, on average, the PUL for MVDT transformers ranged from 32 and 38 percent for commercial and industrial customers, respectively.⁹ However, the current test procedure requirements for rating

⁶ DOE estimated the average lifetime for distribution transformers to be 32 years. 78 FR 23336, 23377.

⁷ The result of DOE's transformer load analysis for medium-voltage liquid-immersed distribution transformers are contained in the Life-cycle Cost and Payback Period spreadsheet tools for design lines (DL) 1 through 5 on the Forecast Cells tab. (available at: <https://www.regulations.gov/document?D=EERE-2010-BT-STD-0048-0767>)

⁸ The result of DOE's transformer load analysis for low-voltage dry-type distribution transformers are contained in the Life-cycle Cost and Payback Period spreadsheet tools for DLs 6 through 8 on the Forecast Cells tab. (available at: <https://www.regulations.gov/document?D=EERE-2011-BT-STD-0051-0085>)

⁹ The result of DOE's transformer load analysis for medium-voltage dry-type distribution transformers are contained in the Life-cycle Cost and Payback Period spreadsheet tools for DL 9 through 13B on the Forecast Cells tab. (available at: <https://www.regulations.gov/document?D=EERE-2010-BT-STD-0048-0764>)

LVDT and MVDT transformers are 35 and 50 percent PUL, respectively. DOE also assumed in its April 2013 DT ECS final rule that there would be no load growth over the life of LVDT and MVDT distribution transformers. 78 FR 23336, 23375.

Therefore, the PUL requirements in the test procedure might not fully reflect the PUL experienced by in-service distribution transformers. Consequently, the degree of alignment of test PUL with in-service PUL of a customer's individual distribution transformer may affect how closely the test procedure-estimated energy use mirrors the actual energy use experienced by the customer.

Currently, a customer can specify that transformer efficiency be optimized to their in-service PUL, but that customer is limited to purchasing transformers that comply with the energy conservation standard at the test PUL. However, DOE estimated that approximately 10 percent of liquid-immersed, and 2 percent of LVDT and MVDT customers evaluate transformer efficiency when making a purchase, indicating that the remainder of customers prioritize low price (and ignore efficiency) when purchasing transformers of their required specification. 77 FR 7323.

To the extent that transformer purchases are market-price driven, DOE would expect that the lowest-cost transformer design would likely have an efficiency peak at or near the test PUL. This low-cost transformer would experience reduced efficiency when operated at PULs other than the test PUL for which it was likely optimized. If in-service PUL differs from test PUL, equipment may be suboptimal for the expected operating

conditions. If instead, the test procedure (via PUL specification) incentivized optimization at the in-service PUL, increased in-service performance may be possible with no increase in purchase price relative to transformers designed to meet existing standards via the existing test procedure. DOE also recognizes that many transformer purchasers are utilities that likely well understand these relationships. As such, as described above, factors other than efficiency (such as requirements by Public Utility Commissions) are likely driving purchasing decisions. DOE understands there may be variation between the PUL specified in the test procedure and actual use and seeks comment on how these factors should be considered given the sophisticated nature of transformer purchases.

As discussed, in-service distribution transformers experience a wide range of load conditions. In addition, based on DOE's initial analysis, distribution transformers may be operated at PULs different from those at which they are rated. To evaluate in-service PUL further, DOE is seeking to understand the relation between in-service PUL as compared to rated PUL. To that end, DOE requests any related information or data that commenters believe would assist DOE in its understanding. This information may include PUL data for liquid-immersed, MVDT, and LVDT distribution transformers in operation, including the kVA ranges, number of phases (single- or three-phase) and application type associated with the PUL data. In addition, DOE also requests data on the potential annual load growth expected for newly installed transformers. Finally, DOE requests information on the extent to which the identified issue is taken into account by utilities purchasing transformers.

DOE is interested in PUL data gathered from distribution transformers in operation, including information from manufacturers, utilities, and industry groups (e.g., the Institute of Electrical and Electronics Engineers).

Issue 1. DOE seeks comment, data, and information regarding initial (first year of service) PUL data for distribution transformers.

Issue 2. DOE requests input on the initial RMS PUL values presented in section I.B of this RFI. More broadly, DOE requests input on the distribution of PUL values experienced by the population of

Issue 3. transformers of a given category (e.g., specific kVA, phases, application, etc.). Specifically, commenters should specify whether the distributional data they provide represents the first year of service, or the full lifetime.

Issue 4. DOE seeks comment, data and information regarding the load growth estimate over the life of distribution transformers currently being installed. Specifically, DOE seeks comment, data and information on whether loads will increase over time, and if so, what the annual load growth would be for liquid-immersed, LVDT, and MVDT transformers, respectively.

Issue 5. DOE seeks comment, data and information regarding the extent to which efficiency is taken into account in transformer purchasing decisions.

2. Temperature Correction

DOE's current test procedure specifies temperature correction of measured loss values, a process that calculates the losses of a transformer as though its internal temperature during testing was equal to a "reference" temperature. The reference temperature provides a common point of comparison, so that the effect of temperature on efficiency is diminished. In general, higher internal temperature increases load losses, in part due to increased resistivity of the conductor/windings. If transformers in service do not reach the same internal temperature (under identical operating conditions, including ambient temperature and PUL), temperature correction may weaken the ability of the test procedure to predict relative in-service performance. For example, two otherwise-identical transformers may have different inherent abilities to shed heat. As a result, one may operate at a lower internal temperature under identical operating conditions, and produce lower losses. If a test procedure evaluates both units as though they had reached the same internal temperature, then those lower in-service losses (which are an advantage to the customer) may not be reflected.

DOE is requesting comments, data, and information from interested parties on whether the current temperature correction is appropriate or whether alternative approaches should be considered.

Issue 6. DOE seeks comments, data, and information regarding the appropriateness of the current test procedure requirements with respect to temperature correction. Specifically, DOE requests comment on whether testing at specified ambient

conditions or correcting to the same internal temperature is more representative of distribution transformer in-service performance.

Issue 7. DOE seeks comments, data, and information regarding how temperature varies with PUL, and how significantly it affects transformer performance over a PUL range. Specifically, under the current internal temperature correction methodology, DOE requests comment on how it could specify the reference temperature for testing at PULs other than the current test PUL.

C. Efficiency Metric

As noted, the current DOE test procedure measures efficiency at a single test PUL. Based on the data and information received in response to this RFI, DOE may consider either continuing to use the current single test PUL requirements for rating distribution transformers, or revising the single test PUL to an alternative single test PUL, if it better reflects how distribution transformers operate in service. Alternatively, DOE may consider an alternative efficiency metric altogether, such as a multiple-PUL weighted-average efficiency metric. Use of a weighted-average efficiency metric comprised of more than one test PUL may better reflect how distribution transformers operate in service because a given distribution transformer commonly experiences a range of PULs in service depending on the end-use of the customer. In addition, a given customer is unlikely to operate a distribution transformer at a single, constant PUL equal to the typical PUL. Thus, a single test PUL may not fully capture how distribution transformers operate in service.

While a weighted-average efficiency could result in additional test burden, DOE understands that this metric may more effectively characterize operation in-service. In addition, the additional test burden could be mitigated via the AEDM for distribution transformers. This is because AEDMs would allow manufacturers to determine the efficiency of one or more of its untested basic models using a mathematical model instead of testing.

Issue 8. DOE seeks comments, data, and information on the continued use of a single test PUL requirement. Further, if a single test PUL requirement is maintained, DOE seeks comment on whether the existing single test PUL requirements should be maintained or whether alternate single test PUL requirements may better match the typical or RMS value in service. In addition, DOE seeks comment on the testing burden using an alternate single test PUL as compared to the current test procedure.

Issue 9. DOE seeks comments, data, and information regarding testing a single transformer at multiple PULs. Specifically, DOE seeks comment on the degree to which a multiple-PUL weighted-average efficiency would more accurately reflect distribution transformer operation in service, as compared to the current test procedure. In addition, DOE seeks comment on any additional testing burden that might be associated with testing at multiple PULs.

Issue 10. DOE seeks comments, data, and information regarding the number of PULs (and the corresponding test PUL values) that parties believe may be appropriate for a multiple PUL test procedure. In addition, DOE seeks comments, data, and information

regarding what weightings or additional requirements may be necessary under a multiple PUL test procedure.

Issue 11. DOE seeks comments, data, and information on whether there are any other options or alternative metrics not presented in this RFI that should be considered for measuring and rating the efficiency of distribution transformers.

D. Sampling, Representations, AEDMs

The certification and compliance requirements for distribution transformers are codified under 10 CFR 429.11, 429.12, 429.47, 429.70, 429.110, and in Appendix C to Subpart C of Part 429. DOE's sampling requirements are listed at 10 CFR 429.47. The sampling requirements, among other things, state that, (1) the provisions of 10 CFR 429.11 apply, (2) efficiency of a basic model may be determined through testing or through application of an AEDM under the requirements of 10 CFR 429.70, and (3) a manufacturer must use a sample of at least five units if more than five units have been manufactured over a span of six months (10 CFR 429.47(a)(2)(i)(B)), or as many as have been produced if five or fewer have been manufactured over a span of six months (10 CFR 429.47(a)(2)(i)(A)).

Issue 12. DOE seeks comment regarding the sampling requirements for distribution transformers. Specifically, DOE seeks information on how manufacturers have been applying the sampling provisions. DOE also seeks comments from

manufacturers on whether there are instances in which there are questions as to how to apply the sampling requirements or select the appropriate sample size.

10 CFR 429.47(a)(2)(ii) states that any represented value of efficiency of a basic model must be less than or equal to:

$$\frac{100}{1 + \left(\frac{100 - \bar{x}}{\bar{x}} \right) \left(\frac{\sqrt{n}}{\sqrt{n} + .08} \right)} \quad \text{Equation 1}$$

Where:

\bar{x} = the arithmetic mean of the sample units' tested efficiencies, and

n = number of units in the sample.

This provision permits representation of a basic model efficiency greater than the arithmetic mean of the sample units' tested efficiencies. The degree to which it may exceed the mean is a function of the sample size; smaller samples may exceed the mean by a greater amount. As a result, manufacturers may represent an efficiency for a basic model between the value of Equation 1 and the minimum efficiency requirements at 10 CFR 431.196.

DOE notes that distribution transformer test reports do not always indicate how efficiency is calculated, nor do they always provide information about the measured values.

Issue 13. DOE seeks comment regarding the represented values of efficiency relative to calculated values, specifically, whether manufacturers typically represent the minimum efficiency standard, the maximum represented efficiency (RE) allowable, or a different value; how manufacturers determine what value to represent; and why.

Issue 14. DOE's requirements related to AEDMs are at 10 CFR 429.70. This section specifies under which circumstances an AEDM may be developed, validated, and applied to product performance ratings for certain covered products and equipment. AEDM application to distribution transformers is permitted pursuant to 10 CFR 429.47(a)(2) and may serve a manufacturer who finds it burdensome to physically test units of each basic model sold. However, DOE notes that currently, manufacturers frequently test every basic model instead of calculating efficiency using the AEDM provisions.

Issue 15. DOE seeks information regarding the usefulness of the AEDM provisions, and whether and why manufacturers select the option to use AEDMs.

E. Other Test Procedure Topics

In addition to the issues identified earlier in this document, DOE welcomes comment on any other aspect of the existing test procedures for distribution transformers

not already addressed by the specific areas identified in this document. DOE particularly seeks information that would improve the repeatability, reproducibility, and consumer representativeness of the test procedures. DOE also requests information that would help DOE create a procedure that would limit manufacturer test burden through streamlining or simplifying testing requirements. Comments regarding the repeatability and reproducibility are also welcome.

DOE also requests feedback on any potential amendments to the existing test procedure that could be considered to address impacts on manufacturers, including small businesses. Regarding the Federal test method, DOE seeks comment on the degree to which the DOE test procedure should consider and be harmonized with the most recent relevant industry standards for distribution transformers and whether there are any changes to the Federal test method that would provide additional benefits to the public. DOE also requests comment on the benefits and burdens of adopting any industry/voluntary consensus-based or other appropriate test procedure, without modification. As discussed, the Federal test method for distribution transformers is based on the industry standard NEMA TP 2-1998. The Federal test method is also based on IEEE C57.12.90–1999 “IEEE Standard Test Code for Liquid-Immersed Distribution, Power and Regulating Transformers and IEEE Guide for Short Circuit Testing of Distribution and Power Transformers;” IEEE C57.12.91–2001, “IEEE Standard Test Code for Dry-Type Distribution and Power Transformers;” IEEE C57.12.00–2000, “IEEE Standard General Requirements for Liquid-Immersed Distribution, Power and Regulating Transformers;” and IEEE C57.12.01–1998, “IEEE Standard General

Requirements for Dry-Type Distribution and Power Transformers Including those with Solid Cast and/or Resin Encapsulated Windings.” When establishing the Federal test procedure for distribution transformers, DOE determined that basing the procedure on multiple industry standards, as opposed to adopting an industry test procedure (or procedures) without modification, was necessary to provide the detail and accuracy required for the Federal test procedure, with the additional benefit of providing manufacturers the Federal test procedure in a single reference. 71 FR 24972, 24982.

Additionally, DOE requests comment on whether the existing test procedures limit a manufacturer’s ability to provide additional features to consumers on distribution transformers. DOE particularly seeks information on how the test procedures could be amended to reduce the cost of new or additional features and make it more likely that such features are included on distribution transformers.

III. Submission of Comments

DOE invites all interested parties to submit in writing by **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**, comments, and information on matters addressed in this notice and on other matters relevant to DOE’s consideration of amended test procedures for distribution transformers. These comments and information will aid in the development of a test procedure NOPR for distribution transformers if DOE determines that amended test procedures may be appropriate for these products.

Submitting comments via <http://regulations.gov>. The <http://www.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.

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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).

DOE considers public participation to be a very important part of the process for developing test procedures and energy conservation standards. DOE actively encourages the participation and interaction of the public during the comment period in each stage of the rulemaking process. Interactions with and between members of the public provide a balanced discussion of the issues and assist DOE in the rulemaking process. Anyone who wishes to be added to the DOE mailing list to receive future notices and information about this rulemaking should contact Appliance and Equipment Standards Program staff at (202) 287-1445 or via e-mail at ApplianceStandardsQuestions@ee.doe.gov.

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