stack and flue gases for vented heaters to determine the concentration by volume of carbon dioxide present in the dry gas with instrumentation which will result in a reading having an accuracy of ±0.1 percentage point.

2.8 *Energy flow instrumentation.* Install one or more instruments, which measure the rate of gas flow or fuel oil supplied to the vented heater, and if appropriate, the electrical energy with an error no greater than one percent.

2.9 *Room ambient temperature.* The room ambient temperature shall be the arithmetic average temperature of the test area, determined by measurement with four No. 24 AWG bead-type thermocouples with junctions shielded against radiation using shielding meeting the material and minimum thickness requirements from section 8.14.1 of ANSI Z21.86–2016, located approximately at 90-degree positions on a circle circumscribing the heater or heater enclosure under test, in a horizontal plane approximately at the vertical midpoint of the appliance or test enclosure, and with the junctions approximately 24 inches from sides of the heater or test enclosure and located so as not to be affected by other than room air.

The value T_{RA} is the room ambient temperature measured at the last of the three successive readings taken 15 minutes apart described in section 3.1.1 or 3.1.2 as applicable. During the time period required to perform all the testing and measurement procedures specified in section 3.0 of this appendix, maintain the room ambient temperature within ±5 °F (±2.8 C) of the value T_{RA}. At no time during these tests shall the room ambient temperature exceed 100 °F (37.8 C) or fall below 65 °F (18.3 C).

Locate a thermocouple at each elevation of draft relief inlet opening and combustion air inlet opening at a distance of approximately 24 inches from the inlet openings. The temperature of the air for combustion and the air for draft relief shall not differ more than ±5 °F from the room ambient temperature as measured above at any point in time. This requirement for combustion air inlet temperature does not need to be met once the burner is shut off during the testing described in sections 3.3 and 3.6 of this appendix.

2.10 *Equipment used to measure mass flow rate in flue and stack.* The tracer gas chosen for this task should have a density which is less than or approximately equal to the density of air. Use a gas unreactive with the environment to be encountered. Using instrumentation of either the batch or continuous type, measure the concentration of tracer gas with an error no greater than 2 percent of the value of the concentration measured.

2.11 *Equipment with multiple control modes.*

2.11.1 For equipment that has both manual and automatic thermostat control modes, test the unit according to the procedure for its automatic control mode, *i.e.* single-stage, two-stage, or step-modulating.

2.11.2 For equipment that has multiple automatic thermostat control modes, test in the default mode (or similarly-named mode identified for normal operation) as defined by the manufacturer in its I&O manual. If a default mode is not defined in the I&O manual, test in the mode that the equipment operates in as shipped from the manufacturer.

* * * * *

3.1.2 *Oil-fueled vented home heating equipment (including direct vent systems).* Set up and adjust the vented heater as specified in sections 2.1, 2.2, and 2.3.4 of this appendix. Begin the steady-state performance test by operating the burner and the circulating air blower, on units so equipped, with the adjustments specified by sections 2.4.2 and 2.5 of this appendix, until steady-state conditions are attained as indicated by a temperature variation of not more than ±5 °F (2.8 C) in the flue gas temperature in three successive readings taken 15 minutes apart. The measurements described in this section are to coincide with the last of these 15 minutes readings.

For units equipped with power burners, do not allow smoke in the flue to exceed a No. 1 smoke during the steady-state performance test as measured by the procedure described in ASTM D2156–09 (RA 2018). Maintain the average draft over the fire and in the breeching during the steady-state performance test at that recommended by the manufacturer ±0.005 inches of water gauge.

Measure the room temperature (T_{RA}) as described in section 2.9 of this appendix. Measure the steady-state flue gas temperature ($T_{F,SS}$) using nine thermocouples located in the flue pipe as described in section 2.6.2 of this appendix. From the plane where $T_{F,SS}$ was measured, collect a sample of the flue gas and determine the concentration by volume of CO_2 (X_{CO2F}) present in dry flue gas. Measure and record the steady-state heat input rate (Q_{in}).

For manually controlled oil fueled vented heaters, determine the steady-state efficiency at a fuel input rate that is within ±5 percent of 50 percent of the maximum fuel input rate; or, if the design of the heater is such that the fuel input rate cannot be set to ±5 percent of 50 percent of the maximum rated fuel input rate, determine the steady-state efficiency at the minimum rated fuel input rate as measured in section 3.1.2 of this appendix for manually controlled oil fueled vented heaters.

* * * * *

3.2 *Jacket loss measurement.* Conduct a jacket loss test for vented floor furnaces. Measure the jacket loss (Lj) in accordance with ASHRAE 103–2017 section 8.6, applying the provisions for furnaces and not the provisions for boilers.

* * * * *

3.6.2.4.2 If absolutely no smoke is drawn into the combustion air intake, the vented heater meets the requirements to allow use of the default draft factor of 0.05.

* * * * *

3.8.2 *Cyclic condensate collection tests.* If existing controls do not allow for cyclical operation of the tested unit, install control devices to allow cyclical operation of the vented heater. Run three consecutive test cycles. For each cycle, operate the unit until flue gas temperatures at the end of each on-cycle, rounded to the nearest whole number, are within 5 °F of each other for two consecutive cycles. On-cycle and off-cycle times are 4 minutes and 13 minutes respectively. Control of ON and OFF operation actions shall be within ±6 seconds of the scheduled time. For fan-type vented heaters, maintain circulating air adjustments as specified in section 2.5 of this appendix. Begin condensate collection at one minute before the on-cycle period of the first test cycle. Remove the container one minute before the end of each off-cycle period. Measure condensate mass for each test-cycle. The error associated with the mass measurement instruments shall not exceed ±0.5 percent of the quantity measured.

Record fuel input during the entire test period starting at the beginning of the on-time period of the first cycle to the beginning of the on-time period of the second cycle, from the beginning of the on-time period of the second cycle to the beginning of the on-time period of the third cycle, *etc.,* for each of the test cycles. Record fuel HHV, temperature, and pressure necessary for determining fuel energy input, Q_C. Determine the mass of condensate for each cycle, M_C, in pounds. If at the end of three cycles, the sample standard deviation is less than or equal to 20 percent of the mean value for three cycles, use total condensate collected in the three cycles as Mc; if not, continue collection for an additional three cycles and use the total condensate collected for the six cycles as M_C. Determine the fuel energy input, Q_C, during the three or six test cycles, expressed in Btu.

For units with step-modulating controls, conduct the cyclic condensate collection test at reduced input rate only. For units with two-stage controls, the cyclic condensate collection test is conducted at both maximum and reduced input rates unless the balance-point temperature (T_C) as determined in section 4.1.10 of this Appendix O is equal to or less than the typical outdoor design temperature of 5 °F (−5 °C), in which case test at reduced input rate only.

* * * * *

[FR Doc. 2021–07137 Filed 4–15–21; 8:45 am]

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DEPARTMENT OF ENERGY

10 CFR Parts 429 and 431

[EERE–2020–BT–TP–0032]

Energy Conservation Program: Test Procedure for Commercial & Industrial Pumps

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

ACTION: Request for information.

SUMMARY: The U.S. Department of Energy (''DOE'') is undertaking the preliminary stages of a rulemaking to consider amendments to the test procedure for Commercial and Industrial Pumps (''pumps''). Through this request for information (''RFI''), DOE seeks data and information

regarding issues pertinent to whether amended test procedures would more accurately or fully comply with the requirement that the test procedure produces results that measure energy use during a representative average use cycle for the product without being unduly burdensome to conduct, or that reduce testing burden. DOE welcomes written comments from the public on any subject within the scope of this document (including topics not raised in this RFI), as well as the submission of data and other relevant information.

DATES: Written comments and information are requested and will be accepted on or before June 1, 2021.

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–2020–BT–TP–0032, by any of the following methods:

1. *Federal eRulemaking Portal: http://www.regulations.gov.* Follow the instructions for submitting comments.

2. *Email:* To *Pumps2020TP0032@ee.doe.gov.* Include docket number EERE–2020–BT–TP–0032 in the subject line of the message.

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

Although DOE has routinely accepted public comment submissions through a variety of mechanisms, including the Federal eRulemaking Portal, email, postal mail, or hand delivery/courier, the Department has found it necessary to make temporary modifications to the comment submission process in light of the ongoing Covid–19 pandemic. DOE is currently suspending receipt of public comments via postal mail and hand delivery/courier. If a commenter finds that this change poses an undue hardship, please contact Appliance Standards Program staff at (202) 586–1445 to discuss the need for alternative arrangements. Once the Covid–19 pandemic health emergency is resolved, DOE anticipates resuming all of its regular options for public comment submission, including postal mail and hand delivery/courier.

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 *https://beta.regulations.gov/docket/EERE-2020-BT-TP-0032.* The docket web page contains 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 Dommu, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, EE–5B, 1000 Independence Avenue SW, Washington, DC 20585–0121. Telephone: (202) 586–9870. Email: *ApplianceStandardsQuestions@ee.doe.gov.*

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. *Email: Michael.Kido@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) 287–1445 or by email: *ApplianceStandardsQuestions@ee.doe.gov.*

SUPPLEMENTARY INFORMATION:

Table of Contents

I. Introduction

Commercial and industrial pumps (collectively, ''pumps'') are among the industrial equipment for which DOE is authorized to establish and amend test procedures and energy conservation standards. (42 U.S.C. 6311(1)(A)) DOE's test procedures for pumps are prescribed in title 10 of the Code of Federal Regulations (''CFR''), subpart Y of part 431. Relevant to this document, DOE has established a test procedure for pumps at 10 CFR 431.464 and appendix A to subpart Y of part 431 (''Appendix A''). The following sections discuss DOE's authority to establish and amend test procedures for pumps, 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, as amended (''EPCA''),[1] authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. (42 U.S.C. 6291–6317) Title III, Part C of EPCA,[2] added by the National Energy Conservation Policy Act, Public Law 95–619 (Nov. 9, 1978), Title IV, § 441(a) (42 U.S.C. 6311–6317 as codified), established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve industrial equipment energy efficiency. The equipment addressed under these provisions include pumps, the subject of this RFI. (42 U.S.C. 6311(1)(A))

The energy conservation program under EPCA consists essentially of four parts: (1) Testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of EPCA include definitions (42 U.S.C. 6311), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), energy conservation standards (42 U.S.C. 6313), 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(a) and 42 U.S.C. 6316(b); 42 U.S.C. 6297). 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

[1] All references to EPCA in this document refer to the statute as amended through the Energy Act of 2020, Public Law 116–260 (Dec. 27, 2020).

[2] For editorial reasons, upon codification in the U.S. Code, Part C was redesignated Part A–1.

to DOE that their equipment complies with the applicable energy conservation standards adopted pursuant to EPCA (42 U.S.C. 6316(a); 42 U.S.C. 6295(s)), and (2) making representations about the efficiency of that equipment (42 U.S.C. 6314(d)). Similarly, DOE must use these test procedures to determine whether the equipment complies with relevant standards promulgated under EPCA. (42 U.S.C. 6316(a); 42 U.S.C. 6295(s))

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 that reflect the energy efficiency, energy use or estimated annual operating cost of a given type of covered equipment during a representative average use cycle and requires that test procedures not be unduly burdensome to conduct. (42 U.S.C. 6314(a)(2))

EPCA also requires that, at least once every 7 years, DOE review test procedures for all types of covered equipment, including pumps, to determine whether amended test procedures would more accurately or fully comply with the requirements that the test procedures 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 not be unduly burdensome to conduct. (42 U.S.C. 6314(a)(1)) In addition, if the Secretary determines that a test procedure amendment is warranted, the Secretary must publish proposed test procedures in the **Federal Register**, and afford interested persons an opportunity (of not less than 45 days' duration) to present oral and written data, views, and arguments on the proposed test procedures. (42 U.S.C. 6314(b)). If DOE determines that test procedure revisions are not appropriate, DOE must publish its determination not to amend the test procedures. DOE is publishing this RFI to collect data and information to inform its decision in satisfaction of the 7-year review requirement specified in EPCA. (42 U.S.C. 6314(a)(1))

B. Rulemaking History

DOE's test procedure for determining pump energy efficiency was established in a final rule published on January 25, 2016. 81 FR 4086 (''January 2016 Final Rule'').[3] The January 2016 Final Rule established definitions for the terms ''pump,'' ''driver,''[4] and ''controls,''[5] and described several categories and configurations of pumps. The pumps test procedure currently incorporates by reference the Hydraulic Institute (''HI'') Standard 40.6–2014, ''Methods for Rotodynamic Pump Efficiency Testing'' (''HI 40.6–2014''), along with several modifications to that testing method related to measuring the hydraulic power, shaft power, and electric input power of pumps, inclusive of electric motors and any continuous or non-continuous controls.[6]

On September 28, 2020, DOE published an early assessment review RFI in which it sought data and information pertinent to whether amended test procedures would (1) more accurately or fully comply with the requirement that the test procedure produces results that measure energy use during a representative average use cycle for the equipment without being unduly burdensome to conduct, or (2) reduce testing burden. 85 FR 60734 (''September 2020 Early Assessment RFI''). DOE received comments in response to the September 2020 Early Assessment RFI from the interested parties listed in Table I.1. A parenthetical reference at the end of a comment quotation or paraphrase provides the location of the item in the public record.[7]

TABLE I.1—WRITTEN COMMENTS RECEIVED IN RESPONSE TO THE SEPTEMBER 2020 EARLY ASSESSMENT RFI

Organization(s)	Reference in this RFI	Organization type
California Investor-Owned Utilities	CA IOUs	Utility.
Grundfos Americas Corporation	Grundfos	Manufacturer.
Hydraulic Institute	HI	Trade Association.
National Electrical Manufacturers Association	NEMA	Trade Association.
Northwest Energy Efficiency Alliance	NEEA	Efficiency Organization.
People's Republic of China	PRC	Nation/Government.

Based on DOE's review of the test procedure for pumps and the comments received, DOE has determined it is appropriate to continue the test procedure rulemaking after the early assessment process. *See* 10 CFR 431.4; 10 CFR part 430 subpart C appendix A section 8(b). Specific comments are discussed in the sections that follow.

II. Request for Information

In the following sections, DOE has identified a variety of issues on which it seeks input to determine whether, and if so how, an amended test procedure for pumps would (1) more accurately or fully comply with the requirements in EPCA that test procedures be reasonably designed to produce test results which reflect energy use during a representative average use cycle, without being unduly burdensome to conduct, or (2) reduce testing burden. (42 U.S.C. 6314(a)(2))

Further, DOE issued an Early Assessment RFI (85 FR 60734) to seek more general information on whether its test procedures are reasonably designed, as required by EPCA, to produce results that measure the energy use or efficiency of equipment during a representative average use cycle or period of use. See also 84 FR 9721 (March 18, 2019) (RFI seeking public comment on the measurement of average use cycles or periods of use in DOE's test procedures). DOE seeks comment on this issue as it pertains to the test procedure for pumps.

[3] On March 23, 2016, DOE published a correction to the January 2016 Final Rule to correct the placement of the product-specific enforcement provisions related to pumps under 10 CFR 429.134 at paragraph (i). 81 FR 15426.

[4] A ''driver'' provides mechanical input to drive a bare pump directly or through the use of mechanical equipment. Electric motors, internal combustion engines, and gas/steam turbines are examples of drivers. (10 CFR 431.462)

[5] A ''control'' is used to operate a driver. (10 CFR 431.462)

[6] A ''continuous control'' is a control that adjusts the speed of the pump driver continuously over the driver operating speed range in response to incremental changes in the required pump flow, head, or power output. A ''non-continuous control'' is a control that adjusts the speed of a driver to one of a discrete number of non-continuous preset operating speeds, and does not respond to incremental reductions in the required pump flow, head, or power output. 10 CFR 431.462.

[7] The parenthetical reference provides a reference for information located in DOE's test procedure rulemaking docket. (Docket No. EERE–2020–BT–TP–0032, which is maintained at *http://www.regulations.gov/#!docketDetail;D=EERE-2020-BT-TP-0032*). The references are arranged as follows: (commenter name, comment docket ID number, page of that document).

As stated previously, DOE received multiple comments to the 2020 Early Assessment RFI. These comments are summarized in this RFI and DOE asks for additional information and comment on these issues. In addition, DOE notes that since publication of the January 2016 Final Rule, as well as the subsequent energy conservation standards final rule,[8] it has received inquiries from stakeholders related to implementation of and compliance with the regulatory requirements for pumps. This RFI discusses these issues and notes the additional information that would be needed if DOE decided to propose amending its current test procedure.

A. Pump and Related Component Definitions

This RFI covers pumps and relevant components of pumps, such as the ''bare pump'', ''mechanical equipment'', ''driver'', and ''control'', all of which are defined at 10 CFR 431.462.

Some manufacturers distribute kits of unassembled components that customers (including end users or distributors) may purchase and assemble into finished equipment that meets the definition of a pump or a bare pump (see additional discussion in section II.D.2 of this RFI). Manufacturers may also otherwise distribute various pump parts together in commerce.

Issue 1: DOE requests comment on the definitions of ''pump'' and its components and whether any of the terms should be amended, and if so, how the terms should be amended. In particular, DOE requests comment on whether the terms are sufficient to identify which equipment is subject to the test procedure and whether any test procedure amendments are required to ensure that all such equipment can be appropriately tested in accordance with the test procedure.

B. Applicable Scope for Test Procedure

The following sections address in detail various elements related to the scope of the test procedure. DOE seeks input regarding these elements to help determine what specific changes, if any, might be needed to improve the current test procedure's ability to determine pump energy efficiency in a manner consistent with the requirements set out in 42 U.S.C. 6314.

1. Pump Categories and Definitions

The current DOE test procedure for pumps applies only to certain rotodynamic pumps [9] that are defined as ''clean water pumps''. 10 CFR 431.462. Specifically, it applies to five categories of clean water pumps with specific characteristics. 10 CFR 431.464(a)(1). Pumps are further delineated into equipment classes based on nominal speed of rotation and operating mode (*i.e.,* constant load or variable load). 10 CFR 431.465.

The five categories of clean water pumps to which the test procedure applies are: End suction close-coupled (''ESCC''); end suction frame mounted/own bearings (''ESFM''); in-line (''IL''); radially split, multi-stage, vertical, in-line diffuser casing (''RSV''); and submersible turbine (''ST'') pumps. 10 CFR 431.464(a)(1)(i). DOE defines each of these five categories in 10 CFR 431.462.

Issue 2: DOE requests comment on whether DOE's five pump categories sufficiently represent the market and technology available for clean water pumps; whether these categories are sufficiently defined in order to ensure that the categories are mutually exclusive; or whether any of these categories or descriptions should be amended.

Definitions relevant to the pump categories listed above and applicable to this test procedure include ''close-coupled pump,'' ''end suction pump,'' ''mechanically-coupled pump,'' and ''single axis flow pump,'' See 10 CFR 431.462 (defining each of these terms).

Determining the applicability of the pump categories relies in part on the defined terms ''close-coupled pump'' and ''mechanically-coupled pump'' DOE defines a close-coupled pump as a pump having a motor shaft that also acts as the impeller shaft, while a mechanically-coupled pump is one that has its own impeller shaft and bearings separate from the motor shaft. (*Id.*) DOE is aware that certain pumps may have their own shaft, but with no bearings to support that shaft. Additionally, DOE notes that while its close-coupled pump definition describes a pump in which the motor shaft also serves as the pump shaft, the definition does not provide any detail on how the motor and pump shaft may be connected. DOE has observed that some manufacturers describe close-coupled pumps as using an adapter to mount the impeller directly to the motor shaft. The coupling type is the only differentiator between end suction close-coupled pumps, which are ''close-coupled pumps'', and end suction frame mounted/own bearings pumps, which are ''mechanically-coupled pumps''. In the January 2016 Final Rule, DOE noted that it intended for the equipment category definitions for ESFM and ESCC pumps to be mutually exclusive, to ensure that pumps that are close-coupled to the motor and have a single impeller and motor shaft would be part of the ESCC equipment category while all other end suction pumps that are mechanically-coupled to the motor and for which the bare pump and motor have separate shafts would be part of the ESFM equipment category. 81 FR 4096.

Issue 3: DOE requests comment on the definitions of ''close-coupled pump'' and ''mechanically-coupled pump'' and whether the terms should be revised to achieve the differentiation described above—and if so, how. DOE also requests comment on whether the terms themselves are specific enough to ensure that end suction close-coupled pumps and end suction frame mounted/own bearings pumps remain mutually exclusive. Specifically, DOE seeks information on whether there are pumps being sold in commerce that may not meet the ''close-coupled'' or ''mechanically-coupled'' definitions but would otherwise meet the definition for an ''end suction'' pump.

Determining the applicability of the pump categories also relies in part on the defined terms ''single axis flow pump'' and ''end suction pump.'' IL pumps are defined as single axis flow pumps, and ESCC pumps are defined as end suction pumps. The definition of single axis flow pump does not explicitly state whether the axis is defined by the suction opening to the volute [10] or the suction opening at the perimeter of the pump. A close-coupled pump can be designed with a tangential discharge volute (*i.e.,* a design in which the suction and discharge openings do not share a common axis).

Issue 4: DOE requests comment on how manufacturers are currently categorizing close-coupled pumps with tangential discharge volutes relative to the five pump categories defined at 10 CFR 431.464.

Issue 5: DOE requests comment on whether it should provide additional detail in the definitions of single-axis flow pumps and/or end suction pumps regarding tangential discharge volute configurations, or whether the existing

[8] See Docket EERE–2011–BT–STD–0031, at *https://www.regulations.gov/docket?D=EERE-2011-BT-STD-0031.*

[9] A rotodynamic pump is one in which energy is continuously imparted to the pumped fluid by means of a rotating impeller, propeller, or rotor. 10 CFR 431.462. This kind of pump (also known as a ''centrifugal pump'') is in contrast to a positive displacement pump, which has an expanding cavity on the suction side and a decreasing cavity on the discharge side that moves a constant volume of fluid for each cycle of operation.

[10] A volute may also be referred to as a ''housing'' or ''casing.''

definitions are sufficient to determine individual pump classifications.

2. Pump Characteristics

The applicable scope for the test procedure is limited to the five pump categories discussed previously, with flow rate, maximum head, design temperature range, motor type, bowl diameter, and speed additionally specified in 10 CFR 431.464(a)(1)(ii).

The applicable scope for the test procedure also excludes fire pumps, self-priming pumps, prime-assist pumps, magnet driven pumps, pumps for nuclear facilities, and pumps meeting certain military specifications. 10 CFR 431.464(a)(1)(iii).

In response to the September 2020 Early Assessment RFI, NEEA commented that while the test procedure scope covers a large portion of the U.S. commercial and industrial pump market, pumps with similar characteristics may be subject to the DOE test procedure and standards while some are not. NEEA stated that this may create market confusion and inconsistency in ratings (NEEA, No. 8 at p. 8). NEEA specifically highlighted small vertical inline pumps (''SVIL'') below 1 horsepower as recommended by DOE's Circulator Working Group,[11] pumps operating with motors at speeds different than 1800 rpm or 3600 rpm, and submersible turbine pumps with a bowl diameter greater than 6 inches as examples of pumps that DOE should consider including as part of an expanded scope. (*Id.*)

Issue 6: DOE seeks comment on the percentage of manufacturer pump models that fall within the scope of the current test procedure and those models that fall outside the scope of the procedure. DOE also seeks information regarding how manufacturers address this situation when communicating performance in catalogs and other related literature.

Issue 7: DOE requests shipment and market performance data for SVIL pumps below 1 horsepower (''hp''); pumps operating with motors at speeds different than 1800 rpm or 3600 rpm (*e.g.,* non-induction motors with a range of speed of rotation starting above 4,320 revolutions per minute, as further discussed in section II.C.3); submersible turbine pumps with a bowl diameter greater than 6 inches; and other pumps that are currently excluded from scope based on the pump characteristics provided at 10 CFR 431.464(a)(1)(ii) (*e.g.,* pumps designed to operate with greater than 4 pole induction motors) that should be considered for inclusion in the test procedure scope.

NEEA also supported the Circulator Working Group recommendation to adopt test procedures for Circulator Pumps (NEEA, No. 8 at p. 8). DOE notes that it may consider the testing of circulator pumps in a separate rulemaking. DOE also notes that the Circulator Working Group characterized SVIL pumps as potential substitutes for circulator pumps and recommended using the pumps test procedure to measure the performance of SVIL pumps, with necessary modifications made as determined by DOE (EERE–2016–BT–STD–0004–0058, recommendation #1B).

3. Inline Shaft and Cantilever Pumps

HI and the American Petroleum Institute (''API'') publish standards that include design criteria for different pump configurations. Section 2.1.3.4 of ANSI/HI[12] Standard 2.1–2.2, ''Rotodynamic Vertical Pumps of Radial, Mixed, and Axial Flow Types for Nomenclature and Definitions,'' describes vertically separate discharge sump pumps, a category of pump that includes line shaft (''VS4'') pumps and cantilever (''VS5'') pumps. Section 9.3 of API Standard 610, ''Centrifugal Pumps for Petroleum, Petrochemical, and Natural Gas Industries'' [13] also provides a description of VS4 and VS5 pumps. Both VS4 and VS5 pumps are vertically suspended, volute pumps with a single casing and with a discharge column that is separate from the shaft column. The line shaft of a VS4 pump is supported by one or more bearings throughout the center column, while the line shaft of a VS5 pump is cantilevered and has no support bearing within the shaft column. The pump equipment categories defined by DOE do not explicitly reference VS4 or VS5 pumps, and some pumps may simultaneously fit the DOE definition of an ESFM pump and the API definition of a VS4 or VS5 pump. However, the scope of the current DOE test procedure includes only clean water pumps (see 10 CFR 431.464(a)(i)) and most VS4 and VS5 pumps are not designed for clean water. To the extent that a VS4 or VS5 pump is a ''clean water pump'' that meets the definition of ESFM and the other applicable criteria, it would be within the scope of equipment subject to DOE's Appendix A test procedure.

Issue 9: DOE requests comment on whether the test procedure should be amended to explicitly address line shaft pumps and cantilever pumps such as VS4 and VS5 pumps as described in the HI and API standards, and if so, how the definition should be amended.

4. Between-Bearing Pumps

Section 1.2.9.2 of ANSI/HI Standard 1.1–1.2, ''Rotodynamic Centrifugal Pumps for Nomenclature and Definitions'' and section 9.2 of API Standard 610 describe between-bearing (''BB'') pumps with bearings on both ends of the rotating assembly. ''BB1'' pumps are axially-split, one- or two-stage pumps that are mounted to a baseplate and driven by a motor via a flexible coupling. BB1 pumps are not explicitly excluded from the scope of coverage and the definition of IL pumps could be understood to include BB1 pumps. However, BB1 pumps are not typically designed for clean water (the scope of the current DOE test procedure includes only clean water pumps) and have horsepower ratings greater than the 200 hp limit of pumps currently within the scope of the DOE test procedure.

In addition, BB1 pumps do not have an ''overhung impeller.'' An ''overhung impeller'' generally is an impeller that is mounted on the end of a shaft and that is cantilevered or ''overhung'' from the bearing supports. Although not included in the definition of ''in-line pump,'' IL pumps that are single-stage generally have an overhung impeller.

Issue 10: DOE requests comment on whether any pumps that meet the description of BB1 pumps (as described in the HI and API standards) are designed for clean water use and are rated below 200 hp.

Issue 11: DOE requests comment on whether pumps that meet the description of BB1 pumps (as described in the HI and API standards) may be tested according to the DOE test procedure for pumps, or if special instructions or accommodations would be needed to test BB1 pumps.

C. Test Procedure

DOE specifies the constant load pump energy index (''PEI_{CL}'') as the test metric for pumps sold without continuous or non-continuous controls, and the variable load pump energy index (''PEI_{VL}'') as the test metric for pumps sold with continuous or non-continuous controls. 10 CFR 431.465. As noted, a ''continuous control'' is a control that adjusts the speed of the pump driver continuously over the driver operating speed range in response to incremental changes in the required pump flow, head, or power output. 10 CFR 431.462.

[11] See docket EERE–2013–BT–STD–0039, at *https://www.regulations.gov/docket?D=EERE-2013-BT-NOC-0039.*

[12] ''ANSI'' refers to American National Standards Institute.

[13] API standards are available for purchase from the API website at: *https://www.api.org/Standards/.*

A ''non-continuous control'' is a control that adjusts the speed of a driver to one of a discrete number of non-continuous preset operating speeds, and does not respond to incremental reductions in the required pump flow, head, or power output. *Id.*

Generally, the PEI metric is a ratio of the pump energy rating (''PER'') of the tested pump to the PER of a minimally compliant pump (''PER_{STD}''). The pump energy rating for constant load pumps (''PER_{CL}'') represents an average of driver power input at 75%, 100%, and 110% of flow at the best efficiency point (''BEP''),[14] in which the flows are achieved by varying the operating head to follow the pump performance curve. The pump energy rating for variable load pumps (''PER_{VL}'') represents an average of driver power input at 25, 50, 75, and 100 percent of flow at BEP, in which the flows are achieved by speed reduction to follow a specified system curve. As noted, BEP is defined as the pump hydraulic power operating point (consisting of both flow and head conditions) that results in the maximum efficiency. 10 CFR 431.462

1. Updates to Industry Test Standards

DOE's established practice is to adopt industry standards as DOE test procedures unless such methodology would be unduly burdensome to conduct or would not produce test results that reflect the energy efficiency, energy use, water use (as specified in EPCA) or estimated operating costs of that product during a representative average use cycle. 10 CFR 431.4; 10 CFR part 430 subpart C Appendix A section 8(c). In cases where the industry testing standard does not meet the EPCA statutory criteria for test procedures, DOE will make any necessary modifications to these testing standards through the rulemaking process when adopting them for inclusion into DOE's regulations.

DOE sought comment in the September 2020 Early Assessment RFI on whether another consensus-based test procedure could be adopted, with or without modification, and meet the criteria in EPCA related to representativeness and test burden (85 FR 60736–60737). HI noted that it was not aware of any consensus-based test procedures that could be adopted (HI, No. 6, p. 3). NEEA stated that it was not aware of any test procedure that would improve on the DOE test procedure and that they found DOE's test procedure to be the only one that satisfies the criteria in EPCA related to representativeness and test burden (NEEA, No. 8, p. 6).

a. HI Standard 40.6

DOE's test procedure for pumps generally incorporates HI 40.6–2014. 10 CFR 431.463. Since publication of the January 2016 Final Rule, the Hydraulics Institute updated HI 40.6–2014 with the publication of HI Standard 40.6–2016, ''Methods for Rotodynamic Pump Efficiency Testing'' (''HI 40.6–2016''), The 2016 update aligned the definitions and procedures described in HI Standard 40.6–2014 with the DOE test procedure for pumps published in the January 2016 Final Rule. HI 40.6–2016 revisions to HI 40.6–2014 are summarized below, with the referenced sections noted in parentheses:

- Clarified that the standard covers efficiency testing of rotodynamic pumps that are included in DOE regulations for energy conservation. (Section 40.6.1 ''Scope'')
- Updated the calculation of bare pump efficiency to match the current DOE test procedure requirements for plotting test data to determine the BEP rate of flow. (Section 40.6.6.3 ''Performance curve'')
- Updated the description and requirements of the pressure tap configuration for measurement sections at inlet and outlet of the pump. (Section A.3.1.3 ''Pressure taps'')
- Expanded the requirements for measurement of driver power input with power quality and measurement requirements that meet the requirements of the current DOE test procedure. (Section C.4.3 ''Electric power measurements,'' and section C.4.3.1 ''Additional requirements for measurement of driver power input to the motor and controls'')
- Added an informative appendix with examples regarding the determination of systematic uncertainty of the devices for measurement of required quantities on test. (Appendix G ''Determination, application, and calculation of instrument (systematic) uncertainty (informative)'')

DOE is aware that HI plans to publish another updated version of HI 40.6, ''Methods for Rotodynamic Pump Efficiency Testing'' (''HI 40.6–2021''). HI 40.6–2021 contains the following modifications to HI 40.6–2014, in addition to the HI 40.6–2016 changes listed previously:

- References ANSI/HI 14.1–14.2 ''Rotodynamic Pumps for Nomenclature and Definitions'' (''ANSI/HI 14.1–14.2'') which supersedes ANSI/HI 1.1–1.2–2014 ''American National Standard for Rotodynamic Centrifugal Pumps for Nomenclature and Definitions'' and ANSI/HI 2.1–2.2–2014 ''Rotodynamic Vertical Pumps of Radial, Mixed and Axial Flow Types for Nomenclature and Definitions''. (Section 40.6.4.1 ''Vertically suspended pumps''; Section 40.6.4.3 ''All other pump types'')
- Includes a new appendix (Appendix E) for the testing of circulator pumps. (Appendix E ''Testing Circulator Pumps'')

In the September 2020 Early Assessment RFI, DOE asked stakeholders to comment on the potential effect of incorporating HI 40.6–2016 by reference as the DOE test procedure for pumps. 85 FR 60734, 60737. Specifically, DOE requested information on whether the updates in HI 40.6–2016 impact the measured values, and if so, to what extent. *Id.* DOE also requested information on the impact of the updates in HI 40.6–2016 to the test burden and the representativeness of the test results. *Id.*

In response, Grundfos, NEEA, and HI urged DOE to incorporate by reference HI 40.6–2021 rather than HI 40.6–2016 (Grundfos, No. 7, p. 2; NEEA, No. 8, p. 6; HI, No. 6, p. 1). HI stated that HI 40.6–2016 included updates to match DOE's test procedure and did not impact measured values, burden or representativeness (HI, No. 6 at p. 3). Both HI and NEEA stated that HI 40.6–2021 further includes editorial revisions and adds circulator pump testing, that also would not impact measured values, burden, or representativeness. (HI, No. 6 at p. 3; NEEA, No. 8, p. 6) Grundfos agreed that HI 40.6–2021 does not affect overall implementation of the standard, but stated that if DOE decides not to incorporate HI 40.6–2021 by reference, then it should at least incorporate HI 40.6–2016 by reference (Grundfos, No. 7, p. 2). More generally, NEMA indicated that it would be unduly burdensome to require manufacturers to switch from using the current HI testing standard to a different method of testing and evaluation in light of the relatively short time that the current method has been in place. (NEMA, No. 4, p. 2).

Issue 12: DOE requests comments on whether it should adopt HI 40.6–2016 or HI 40.6–2021 as the DOE test procedure for pumps, and requests that stakeholders provide specific information as to why one version of HI 40.6 should be incorporated by reference over the other. DOE also seeks information on whether the incorporation by reference of HI 40.6–2016 or HI 40.6–2021 would impact measured values, and if so, by how much. Additionally, the current DOE test procedure currently incorporates by reference ANSI/HI 2.1–2.2–2014 which

[14] Best efficiency point (''BEP'') means the pump hydraulic power operating point (consisting of both flow and head conditions) that results in the maximum efficiency. 10 CFR 431.462.

was replaced by ANSI/HI 14.1–14.2. DOE seeks comment on ANSI/HI 14.1–14.2, referenced by HI 40.6–2021, including whether, and if so how, it would affect the scope of DOE's test procedures and energy consumption standards for commercial and industrial pumps.

b. IEC 61800–9–2:2017 and Other Industry Test Standards Related to Motor and Control Combinations

In the September 2020 Early Assessment RFI, DOE noted that while its test procedure for pumps incorporates by reference HI 40.6–2014, DOE also includes additional provisions related to measuring the hydraulic power, shaft power, and electric input power of pumps, inclusive of electric motors and any continuous or non-continuous controls. 85 FR 60734, 60737. Since publication of the January 2016 Final Rule, the International Electrotechnical Commission (''IEC'') published standard IEC 61800–9–2:2017 ''Adjustable speed electrical power drive systems—Part 9–2: Ecodesign for power drive systems, motor starters, power electronics and their driven applications—Energy efficiency indicators for power drive systems and motor starters,'' (''IEC 61800–9–2:2017'') which addresses test methods and reference losses for ''power drive systems'' (*i.e.,* motors and their associated controllers). Specifically, Annex A of IEC 61800–9–2:2017 describes reference losses for complete drive modules (*i.e.* controls) and power drive systems at different operating points comparable to the approach already presented in section VII.E.1.2 of Appendix A of that testing standard. DOE requested comments on whether it should consider substituting the model in Annex A of IEC 61800–9–2:2017 for the current calculations in section VII of Appendix A, or whether any considerations for updates should be postponed until the second edition of IEC 61800–9–2 is published. *Id.* A second edition of this standard is expected to be published in March 2022 to further address the test method and reference losses.[15]

In response to DOE's request for comment, the majority of commenters urged DOE to maintain the current test approach in section VII.E.1.2 of Appendix A. (Grundfos, No. 7, p. 2; NEEA, No. 8, p. 7; CA IOUs, No. 5, p. 4; HI, No. 6, p. 3; NEMA, No. 4, p. 2). Grundfos, NEEA, the Hydraulic Institute, and NEMA all asserted that substituting IEC 61800–9–2 for the current approach would add burden without achieving additional energy savings (Grundfos, No. 7, p. 2; NEEA, No. 8, p. 7;; HI, No. 6, p. 3; NEMA, No. 4, p. 2). However, NEMA stated that it is an active participant in efforts to revise IEC 61800–9–2 and that consideration of this standard may be warranted for future test procedure development for equipment classes not yet covered by DOE regulation (NEMA, No. 4, p. 2). The PRC requested that DOE consider incorporating IEC 61800–9–2 as a consensus-based standard to facilitate international trade (PRC, No. 3, p. 2). The CA IOUs stated that substituting IEC 61800–9–2 for the current approach would overstate motor losses. (CA IOUs, No. 5, p. 4)

Since publication of the January 2016 Final Rule, the Air Movement and Control Association (''AMCA'') published AMCA 207–17 ''Fan System Efficiency and Fan System Input Power Calculation'' (''AMCA 207–17'').[16] AMCA 207–17 provides default values and equations to calculate the performance of various motors and control combinations, including currently regulated motors and control combinations (*i.e.,* variable frequency drives (''VFD''), variable-speed drives, inverter drives). See AMCA 207–17 section 4.1.3.1, ''Regulated polyphase induction motors controlled by a VFD''.

In response to the September 2020 Early Assessment RFI, the CA IOUs suggested that DOE reconsider the combined VFD and motor loss equations created for section VII, ''Calculation-Based Approach for Pumps Sold With Motors and Controls,'' of Appendix A in favor of the methods in AMCA 207–17. (CA IOUs, No. 5, pp. 1–4). Specifically, the CA IOUs stated that the efficiency of a motor/control combination determined using the calculations in section VII of Appendix A showed more variation as a function of horsepower than values predicted by AMCA 207–17. (CA IOUs, No. 5, p. 2). The CA IOUs also stated that the full-load efficiency of the motor and control combination calculated using section VII of Appendix A led to lower efficiency values than those predicted by AMCA 207–17. (CA IOUs, No. 5, p. 3). The CA IOUs further commented that updating the calculations in section VII of Appendix A with relevant equations from AMCA 2017–17 should not require any repeat testing, but the change would impact the PEI calculation and might impact pump compliance with the pump energy conservation standards. (CA IOUs, No. 5, p. 4).

DOE notes that the calculations in section VII of Appendix A were developed during the 2015 Appliance Standards and Rulemaking Federal Advisory Committee (''ASRAC'') negotiations and were voted on by the members of the working group, including the CA IOUs (Docket EERE–2013–BT–NOC–0039–0092). As noted by the CA IOUs, the equations in section VII of Appendix A were considered the best available method of calculation at the time (CA IOUs, No. 5, p. 2).

Issue 13: DOE requests comment on the applicability of the VFD/motor efficiencies in AMCA 207–17 to pumps, and whether DOE should consider replacing the calculations in section VII of Appendix A with those in AMCA 207–17. DOE also requests comment on whether adoption of the AMCA 207–17 approach would be representative for pumps. Additionally, DOE requests comment on whether such a change would impact PEI ratings (and if so, how), manufacturer testing burden, or manufacturer pump designs.

c. ISO/ASME 14414

In response to DOE's September 2020 Early Assessment RFI, the PRC recommended that DOE incorporate by reference ISO/ASME 14414 ''Pumps System Energy Assessment'' (''ISO/ASME 14414'') in order to facilitate international trade (PRC, No. 3, p. 3). DOE understands that ISO/ASME 14414 (the most recent version of which was published in January 2019) provides a method for evaluating pump system energy consumption, including the effects of heat, noise and vibration on over-sizing of pump system components (*i.e.,* pumps, process components, and control valves), and provides methods for identifying and documenting opportunities for improvement in energy use.[17] Consequently, ISO/ASME 14414's scope appears to go beyond determining the representative energy use of individual bare pumps or pumps sold with motors and/or controls.

Issue 14: DOE requests comment on whether DOE should consider incorporating any aspect of ISO/ASME 14414 into its test procedure for pumps—and if so, which aspects and why.

2. Testing and Calculation Options

DOE's test procedure for pumps includes calculation-based and testing-based options that apply based on pump configuration (including style of motor and control) as distributed in commerce.

[15] See *https://webstore.iec.ch/publication/31527.*

[16] See *https://www.techstreet.com/amca/standards/amca-207-17?product_id=1949776.*

[17] A summary of ISO/ASME 14414–2019 is available at: *https://www.asme.org/codes-standards/find-codes-standards/iso-asme-14414-pump-system-energy-assessment.*

See Appendix A, Table 1. The calculation-based options rely on a bare pump test and are described in sections III, V, and VII of Appendix A. The testing-based options rely on a ''wire-to-water'' test and are prescribed in sections IV and VI of Appendix A. The calculation-based options may reduce test burden by allowing a manufacturer to test a sample of bare pumps and use that data to rate multiple pump configurations using calculation-based methods. Although testing-based methods require wire-to-water testing of individual pump configurations, they may allow manufacturers to more accurately represent pump, motor, or control performance if so desired. DOE's definition of a ''basic model'' for pumps provides additional options for reducing test burden within the parameters of Table 1 (see section II.D.1 of this RFI).

In the September 2020 Early Assessment RFI, DOE noted that its calculations of testing costs assumed that the majority of pump basic models would be certified based on the bare pump configuration and that subsequent ratings for the same bare pump sold with any number of applicable motors and continuous controls could be generated using the calculation-based approach. DOE also sought comment on whether any modifications to the test procedure could reduce test burden while still allowing for accurate determinations of energy use during a representative average use cycle. 85 FR 60734, 60736.

In response, HI stated that, based on a survey of HI members, industry testing costs significantly exceeded DOE's estimates, and that wire-to-water testing represented 20 percent of total industry testing (HI, No. 6, p. 2). Grundfos commented that approximately 45 percent of its testing was wire-to-water testing—specifically, for pumps sold with motors that can only operate when driven by an inverter (*i.e.,* inverter-only motors) (Grundfos, No. 7, p. 2). HI, Grundfos, NEEA, and NEMA stated that in order to reduce test burden, DOE should work with stakeholders to develop a calculation method for pumps sold with inverter-only motors (HI, No. 6 at p. 1–2; Grundfos No. 7 at p. 1; NEEA, No. 8 at pp. 5–6; NEMA, No. 4 at p. 2). The potential for development of a calculation-based method for pumps sold with inverter-only motors is further discussed in section II.C.3 of this RFI.

Grundfos, HI and NEEA further recommended that DOE make no additional changes to the test procedure that would require re-testing. HI commented that such changes would add industry burden and result in no additional energy savings, while NEEA added that the current test procedure provides a sufficiently accurate indicator of energy consumption (Grundfos, No. 7, p. 2; HI, No. 6 at p. 2; NEEA, No. 8 at p. 1).

Issue 15: In order to further assess opportunity for reducing burden, DOE requests additional information on how manufacturers are implementing Table 1 of Appendix A (aside from inverter-only motors). Specifically, DOE seeks comment on the extent to which pumps sold with multiple motor and control configurations are tested multiple times using testing-based methods; the extent to which pumps sold with single-phase motors are being rated as bare pumps (using a calculation-based approach) rather than by a testing-based approach; and the extent to which pumps sold with motors (other than inverter-only motors) are being tested with a calculation-based approach as opposed to a testing-based approach.

Issue 16: DOE requests comment on whether any revisions to Table 1 of Appendix A could be considered to maintain or improve the information derived from the test procedure while reducing burden with no impact on the PEI rating for currently regulated pumps.

3. Calculation Method for Inverter-Only Motors

This section addresses how DOE could consider amending the test procedure for pumps sold with inverter-only motors to reduce test burden.

Inverter-only motors are currently not subject to DOE's electric motor energy conservation standards, and as such, based on Table 1, currently require wire-to-water testing. As discussed in section II.C.2 of this RFI, commenters requested that DOE work with stakeholders to develop a calculation-based method for pumps sold with inverter-only motors. In addition, based on Table 1, pumps sold with inverter-only motors but without controls must use a testing-based approach resulting in a PEI_{CL} rating, rather than a PEI_{VL} rating. HI and Grundfos commented that a calculation method for pumps sold with inverter-only motors and without controls should allow for a PEI_{VL} rating in order to appropriately represent energy use to the consumer (HI, No. 6 at p. 2; Grundfos, No. 7 at p.1). HI and NEEA, noted that a calculation-based method resulting in a PEI_{VL} rating for inverter-only motors would help encourage the expanded use of this more efficient equipment. (HI, No. 6 at p. 2; NEEA, No. 8, p. 5).

In consideration of developing such a method, DOE is contemplating constructing a table (or tables) [18] similar to Table 2—''Default Nominal Full Load Submersible Motor Efficiency by Motor Horsepower and Pole,'' as well as a table (or tables) similar to Table 4—''Motor and Control Part Load Loss Factor Equation Coefficients for Section VII.E.1.2.2 of Appendix A.'' This strategy was suggested by NEEA, HI, and NEMA (NEEA, No. 8, p. 6; HI, No. 6, p. 2; NEMA, No. 4, p. 2). More generally, Grundfos recommended that DOE work with stakeholders to establish a calculation-based method for pumps with inverter-only motors. (Grundfos, No. 7, p. 1)

Issue 17: DOE requests information and feedback on the categories of motors for which DOE should consider allowing the use of a calculation-based method. Specifically, DOE requests information on the categories of inverter-only motors (*e.g.,* electronically commutated motors, permanent magnet alternative current motors (''PMACs''), or other AC induction motors) that should evaluate using a calculation-based method.

Issue 18: DOE requests feedback and comments on the general approach for including default values and equations to represent inverter-only motor performance. DOE requests data and information to support the development of default values for inverter-only motors (similar to the values developed for submersible motors in Table 2 of Appendix A) as well as equations that would represent the part-load efficiency or losses of these motors (similar to the equations developed for certain motor and drive combinations in Table 4 of Appendix A). To the extent DOE should consider a different approach, DOE requests information on the methodology it should consider and supporting data.

Issue 19: DOE requests information on the percentage of pumps sold with inverter-only motors without controls (and thus would be impacted by a change in rating from PEICL to PEIVL).

4. Representative Average Use Cycle

As previously discussed, in response to the September 2020 Early Assessment RFI, Grundfos, HI, and NEEA commented that the current test procedure produces results that sufficiently measure energy use during a representative average use cycle and recommended that DOE make no substantial changes to the current test approach (Grundfos, No. 7, p. 2; HI, No. 6, p. 2; NEEA, No. 8, pp. 1–2). However, the following sections discuss two

[18] The different categories of inverter-only motors may require separate models.

specific topics raised by stakeholders that may impact the representative average use cycle.

a. Load Profile

The current test procedure requires that constant load PER be determined using 75%, 100% and 110% of BEP flow, with each value multiplied by 0.33 and the results summed to determine PER_{CL} (See Appendix A, sections III.E, IV.E, V.E). Similarly, for variable load pumps, energy ratings are determined at 25%, 50%, 75%, and 100% of BEP flow with each point weighted by 0.25 and summed to obtain a value for PER_{VL} (See Appendix A, sections VI.E, VII.E).

In response to the September 2020 Early Assessment RFI, NEEA referenced its pumps database that was developed through the Regional Technical Forum [19] and suggested that DOE use the database to evaluate the impact of pump load profile on estimated energy savings (NEEA, No. 8, p. 3). In its comments, NEEA provided constant speed load profile data for pumps at 25%, 50%, 75%, 100%, 110% and greater than 110% of BEP flow, which indicate that real-world operating hours may be different than those assumed in the DOE test procedure (NEEA, No. 8, pp. 3–4). NEEA observed that while the data may be representative of load profiles in commercial application, they stated that modifying the load profile for either constant or variable load pumps would likely increase burden while having little impact on final PEI values. (NEEA, No. 8, pp. 4–5). NEEA recommended that DOE maintain the current load profiles in the test procedure (NEEA, No. 8, p. 5).

Issue 20: DOE seeks additional comment on the load profile distribution for constant and variable load pumps and the effect of the distribution on PEI value.

b. Nominal Speed

The scope of the test procedure is limited to pumps designed to operate with either a 2- or 4-pole induction motor or a non-induction motor with a speed of rotation operating range between 2,880 and 4,320 rpm and/or 1,440 and 2,160 rpm. 10 CFR 431.464(a)(1)(ii). Section I.C.1 of Appendix A specifies selection of nominal speed of rotation of either 1,800 or 3,600 rpm, depending on the number of poles of the motor or the operating range of non-induction motors.

In response to the 2020 Early Assessment RFI, the CA IOUs recommended that DOE evaluate whether rating pumps at nominal speeds higher than 3600 rpm, when paired with a variable-speed drive, would provide consumer value and be cost effective. (CA IOUs, No. 5 at p. 4) The CA IOUs stated that incorporating a higher nominal speed(s) in the test procedure would require retesting and urged DOE to consider if ratings for pumps at higher nominal speeds might be determined by calculation rather than wire-to-water testing. *Id.* NEEA also commented that the energy use of pumps capable of operating with motors at speeds higher than 3600 rpm, such as high-speed permanent magnet motors, may not be appropriately represented by the current DOE test procedure (NEEA, No. 8, p. 8–9).

DOE notes that pumps with speeds higher than 3600 rpm have historically made up a small percentage of the market, and DOE has had limited access to shipment and efficiency data for this equipment (See Docket No. EERE–2013–BT–NOC–0039–0060, at p. 4, which provides a summary of the fourth negotiated rulemaking working group meeting for commercial and industrial pumps held on March 26–27, 2014).

Issue 21: DOE requests comment on whether the nominal motor speeds of 1800 rpm and 3600 rpm used in the current DOE test procedure appropriately represent the operation and energy use of pumps that are capable of higher speeds. If these motor speeds are not representative, DOE requests comment on which speeds would be representative and whether a testing-based or calculation-based approach would provide more representative energy use values and the expected cost burden of each. Additionally, DOE requests test data at speeds other than the nominal speeds specified in the current test procedure in order to determine if a calculation-based method is appropriate.

5. Rounding and Represented Values

The DOE test procedure includes provisions for calculations and rounding in Section I.D.3 of Appendix A. Generally, all measured data must be normalized such that it represents performance at nominal speed of rotation in accordance with HI 40.6–2014, and all calculations must be carried out using raw measured values without rounding. See Appendix A, section I.D.3. PER is rounded to three significant digits and PEI is rounded to the hundredths place. *Id.* Explicit rounding directions are not provided for other parameters.

In addition, 10 CFR 429.59(a) includes requirements for determining the represented value of PEI based on a tested sample. DOE's certification requirements include reporting of other parameters that are derived from the test procedure, including pump total head in feet at BEP and nominal speed; volume per unit time (*i.e.,* flow rate) in gallons per minute at BEP and nominal speed; and calculated driver power input at each load point *i.e.,* corrected to nominal speed in horsepower. 10 CFR 429.59(b)(2).

DOE is considering whether to propose that these values be represented by the mean of the value for each tested unit in the sample, or whether there is a more appropriate approach. DOE is also considering specifying rounding requirements for these values in the test procedure (for a given tested unit) and/or in the requirements for determination of represented values (for a sample of tested units).

Issue 22: DOE requests comment on whether the test procedure should specify rounding requirements for parameters other than PER and PEI; and if so, what those rounding requirements should be.

Issue 23: DOE requests comment on whether it should specify an approach for determining represented values for parameters other than PEI, and if so, what approach should be established and why.

D. Other Test Procedure Topics

1. Basic Model

DOE's certification regulations for pumps at 10 CFR 429.59 require that manufacturers determine the represented value for each basic model through testing in accordance with the sampling provisions specified in that section. As applied to pumps, DOE defines the term ''basic model'' in 10 CFR 431.462.

Pump manufacturers may elect to group similar individual pump models within the same equipment class into the same basic model to reduce testing burden, provided all representations regarding the energy use of pumps within that basic model are identical and based on the most consumptive unit. 81 FR 4086, 4093. Accordingly, manufacturers may pair a given bare pump with several different motors (or motor and controls) and can include all combinations under the same basic model if the certification of energy use and all representations made by the manufacturer are based on the most consumptive bare pump/motor (or motor and controls) combination for each basic model and all individual

[19] The Regional Technical Forum (''RTF'') is a technical advisory committee to the Northwest Power and Conservation Council established to develop standards and evaluate energy efficiency savings. See *https://rtf.nwcouncil.org.*

models are in the same equipment class. *Id.*

In addition, clauses (1) and (2) of the basic model definition align the scope of the ''basic model'' definition for pumps with the requirements that testing be conducted at a certain number of stages for RSV and ST pumps and at full impeller diameter).[20] 10 CFR 431.462. Clause (3) of the definition addresses basic models inclusive of pump models for which the bare pump differs in number of stages or impeller diameter. (*Id.*) Specifically, variation in motor sizing (*i.e.,* variation in the horsepower rating of the paired motor as a result of different impeller trims or stages within a basic model) is not a basis for requiring units to be rated as unique basic models. However, variation in motor sizing may also be associated with variation in motor efficiency, which is a performance characteristic; typically, larger motors are more efficient than smaller motors.

In order to group pumps sold with motors into a single basic model, clause (3)(i) provides that for basic models inclusive of pump models for which the bare pump differs in number of stages or impeller diameter, each motor offered in a pump included in that basic model must have a full-load efficiency at the Federal minimum for NEMA Design B electric motors (10 CFR 431.25) or the same number of bands above the Federal minimum for each respective motor horsepower as described in Table 3 of Appendix A. (*Id.*) Clause (3)(ii) provides a similar allowance for submersible turbine pumps, where, in order to group pumps sold with motors into a single basic model, each motor offered in a pump included in that basic model must have a full load motor efficiency at the default nominal full load submersible motor efficiency shown in Table 2 of Appendix A, or the same number of bands above the default nominal full load submersible motor efficiency for each respective motor horsepower as described in Table 3 of Appendix A. (*Id.*)

Issue 24: DOE requests comment on how manufacturers are currently making use of the basic model grouping provisions when rating their pumps, and whether any general clarifications or modifications are needed.

DOE has received several inquiries related to application of the basic model definition to pumps sold with VFDs of varying phase, voltage, and/or efficiency; pumps sold with inverter-only motors such as PMAC motors; and pumps sold with both single-phase and polyphase motors.

For pumps sold with motors, when determining how to group models within a basic model, manufacturers must consider clause (3), which currently allows grouping of models based on the number of bands above ''nominal full load motor efficiency rated at the Federal minimum (see the current table for NEMA Design B electric motors at § 431.25)'', or for submersible turbine pumps, based on the number of bands above the default nominal full load submersible motor efficiency. DOE may consider inclusion of explicit language that applies this clause to pumps sold with specific kinds of motors, or to pumps sold with VFDs. For example, inverter-only motors may have a rated efficiency (*i.e.,* nameplate efficiency) that exceeds the Federal minimum for NEMA Design B electric motors (10 CFR 431.25) (based on hp, poles, and enclosure construction of that motor), as might certain single-phase motors subject to the energy efficiency standards in 10 CFR 431.446 and tested in accordance with 10 CFR 431.444.[21] In addition, as discussed in section II.C.3. of this RFI, stakeholders have recommended that DOE develop default nominal full load efficiency values for inverter-only motors, which could also provide a baseline for grouping pumps sold with those motors. (NEEA, No. 8, p. 6; Grundfos, No. 7, p. 1; HI, No. 6, p. 2; NEMA, No. 4, p. 2).

DOE notes that for motors not currently subject to the DOE test procedure for electric motors, it is not clear how manufacturers would determine the full-load efficiency of a given motor, or specifically, determine the number of bands above the Federal minimum or above the default efficiency. For inverter-only motors, DOE notes that IEC recently published an industry test procedure that provides test methods for measuring the efficiency of these motors: IEC 60034–2–3:2020, ''Rotating electrical machines—Part 2–3: Specific test methods for determining losses and efficiency of converter-fed AC motors'' (''IEC 60034'') and IEC 61800–9–2:2017 (discussed in section II.C.1.b of this RFI).

Issue 25: DOE requests comment on whether to amend clause (3) in the basic model definition for pumps to provide additional detail regarding pumps sold with inverter-only motors, single-phase motors, or other non-NEMA Design B electric motors.

Issue 26: DOE requests comment on which motor categories not currently subject to DOE's test procedure and standards are commonly combined with pumps, as well as their relative efficiency compared to regulated NEMA Design B electric motors, and which corresponding industry test procedure (if any) should be used to establish their ''rated'' efficiency.

Issue 27: DOE requests comment on how VFDs are typically paired with pumps and motors; for example, whether motors of various sizes are paired with the same VFD. DOE further requests comment on whether a pump manufacturer would know which VFD commonly paired with its pumps would result in the most consumptive rating.

DOE notes that in order to group pumps sold with both single-phase motors and pumps sold with polyphase motors into a single basic model, manufacturers would need to utilize a testing-based approach on the most consumptive configuration, as pumps sold with polyphase motors cannot be rated as bare pumps, and pumps sold with single-phase motors cannot be rated using a calculation-based approach (see Table 1 to Appendix A).

Issue 28: DOE requests comment on whether the allowed grouping under the same basic model for pumps sold with both single phase and polyphase motors requires more explicit direction in 10 CFR part 431.

2. Labeling Requirement

The test procedure for pumps provides the basis for the labeling requirement at 10 CFR 431.466. The following specific information must be included on the nameplate and in marketing materials: PEI_{CL} or PEI_{VL}, as applicable; bare pump model number; and if transferred directly to an end user, the impeller diameter. 10 CFR 431.466(a)(1)(i). The representations included on the nameplate and in marketing materials must be based on testing of the pump in accordance with Appendix A and the representation must fairly disclose the results of such testing. (*See* 42 U.S.C. 6314(d))

DOE is aware of certain situations in which the test procedure and labeling requirements do not explicitly address how the results of testing are to be included on the nameplate or in marketing materials. One example is a bare pump distributed as a pump kit that could be assembled as either an ESCC or ESFM pump. As required by Appendix A, this pump kit would be tested as a bare pump, if distributed

[20] ''Full impeller diameter'' means the maximum diameter impeller with which a given pump basic model is distributed in commerce. 10 CFR 431.462.

[21] DOE notes that this discussion is relevant only to the option in Table 1 to Appendix A to rate pumps sold with single-phase motors using a testing-based method. Per Table 1, manufacturers also have the option to rate pumps sold with single-phase motors as bare pumps, regardless of the single-phase motor's efficiency.

without a motor (see Table 1 to Appendix A). As part of the DOE test procedure, PER_{STD} is calculated based on the category and nominal speed of rotation of the tested pump. Appendix A, Sections I.C.1 and II.B. In this case, the pump kit would be ''tested'' twice, once using a calculation based on ESCC and once based on ESFM, and must be labeled with the most consumptive PEI relevant to the kit. Another example is that pumps distributed with motors (and rated as such in accordance with Table 1 to Appendix A) may be more appropriately labeled with the manufacturer's individual model number than with a bare pump model number.

An additional example would be a pump distributed in commerce with multiple stages—including different sized impellers in different stages. As required by Appendix A, this pump would be tested at full impeller diameter (*i.e.,* the maximum diameter impeller with which a given pump basic model is distributed in commerce). Appendix A, Section I.C. In this case manufacturers may include on the nameplate the largest impeller diameter only, as well as sufficient identifying information in the individual model number to identify inclusion of reduced impeller sizes.

Issue 29: DOE requests comment on whether the test procedure should explicitly specify how to determine the information required to be marked on a label in accordance with 10 CFR 431.466, and if so, how.

Issue 30: DOE requests comment on whether the term ''full impeller diameter'' should be modified to explicitly address pumps with multiple stages and varying impeller diameters, and if so, how.

3. Any Additional Information

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

Issue 31: DOE requests comment on whether the existing test procedures limit a manufacturer's ability to provide additional features to consumers on pumps. 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 pumps, while still meeting the requirements of EPCA.

Issue 32: DOE requests comments on any potential amendments to the existing test procedures that would address impacts on manufacturers, including small businesses.

Finally, DOE published an RFI on the emerging smart technology appliance and equipment market. 83 FR 46886 (Sep. 17, 2018) (''September 2018 RFI''). In that RFI, DOE sought information to better understand market trends and issues in the emerging market for consumer appliances and commercial equipment that incorporate smart technology. DOE's intent in issuing the RFI was to ensure that DOE did not inadvertently impede such innovation in fulfilling its statutory obligations in setting efficiency standards for covered products and equipment.

Issue 33: DOE seeks, as part of this RFI, comments, data and information on the issues presented in the September 2018 RFI as they may be applicable to pumps.

III. Submission of Comments

DOE invites all interested parties to submit in writing by the date under the **DATES** heading comments and information on matters addressed in this RFI and on other matters relevant to DOE's early assessment of whether more stringent energy conservation standards are not warranted for commercial and industrial pumps.

Submitting comments via http://www.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. Following this instruction, 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 *http://www.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 *http://www.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 *http://www.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 *http://www.regulations.gov* provides after you have successfully uploaded your comment.

Submitting comments via email. Comments and documents submitted via email will be posted to *http://www.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. Faxes will not 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 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. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

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 this process. Interactions with and between members of the public provide a balanced discussion of the issues and assist DOE in the process. Anyone who wishes to be added to the DOE mailing list to receive future notices and information about this process should contact Appliance and Equipment Standards Program staff at (202) 287–1445 or via email at *ApplianceStandardsQuestions@ee.doe.gov.*

Signing Authority

This document of the Department of Energy was signed on April 9, 2021, by Kelly Speakes-Backman, Principal Deputy Assistant Secretary and Acting Assistant Secretary for Energy Efficiency and Renewable Energy, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the **Federal Register**.

Signed in Washington, DC, on April 12, 2021.

Treena V. Garrett,

Federal Register Liaison Officer, U.S. Department of Energy.

[FR Doc. 2021–07701 Filed 4–15–21; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA–2021–0303; Project Identifier MCAI–2020–01367–T]

RIN 2120–AA64

Airworthiness Directives; Airbus SAS Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The FAA proposes to adopt a new airworthiness directive (AD) for certain Airbus SAS Model A350–941 and –1041 airplanes. This proposed AD was prompted by a determination that new or more restrictive airworthiness limitations are necessary. This proposed AD would require revising the existing maintenance or inspection program, as applicable, to incorporate new or more restrictive airworthiness limitations, as specified in two European Union Aviation Safety Agency (EASA) ADs, which are proposed for incorporation by reference. The FAA is proposing this AD to address the unsafe condition on these products.

DATES: The FAA must receive comments on this proposed AD by June 1, 2021.

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- *Federal eRulemaking Portal:* Go to *https://www.regulations.gov.* Follow the instructions for submitting comments.
- *Fax:* 202–493–2251.
- *Mail:* U.S. Department of Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE, Washington, DC 20590.
- *Hand Delivery:* Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For material that will be incorporated by reference (IBR) in this AD, contact EASA, Konrad-Adenauer-Ufer 3, 50668 Cologne, Germany; telephone +49 221 8999 000; email *ADs@easa.europa.eu;* internet *www.easa.europa.eu.* You may find this IBR material on the EASA website at *https://ad.easa.europa.eu.* You may view this IBR material at the FAA, Airworthiness Products Section, Operational Safety Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206–231–3195. It is also available in the AD docket on the internet at *https://www.regulations.gov* by searching for and locating Docket No. FAA–2021–0303.

Examining the AD Docket

You may examine the AD docket on the internet at *https://www.regulations.gov* by searching for and locating Docket No. FAA–2021–0303; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this NPRM, any comments received, and other information. The street address for Docket Operations is listed above.

FOR FURTHER INFORMATION CONTACT: Kathleen Arrigotti, Aerospace Engineer, Large Aircraft Section, International Validation Branch, FAA, 2200 South 216th St., Des Moines, WA 98198; telephone and fax 206–231–3218; email *kathleen.arrigotti@faa.gov.*

SUPPLEMENTARY INFORMATION:

Comments Invited

The FAA invites you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under **ADDRESSES**. Include ''Docket No. FAA–2021–0303; Project Identifier MCAI–2020–01367–T'' at the beginning of your comments. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. The FAA will consider all comments received by the closing date and may amend the proposal because of those comments.

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will post all comments received, without change, to *https://www.regulations.gov,* including any personal information you provide. The agency will also post a report summarizing each substantive verbal contact received about this proposed AD.

Confidential Business Information

CBI is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted