This final document represents the definitive view of the agency on the questions addressed and may be relied upon by the regulated industry and members of the public.

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The U.S. Department of Energy (DOE) has received a number of inquiries related to whether specific basic models of motors are covered by the amended standards for small electric motors adopted in the March 9, 2010 final rule (75 FR 10873, with a technical correction published on April 5, 2010 at 75 FR 17036), codified at 10 C.F.R. § 431.446. DOE previously explained what motors would be subject to these standards in the course of the rulemaking adopting the March 9, 2010 final rule, defining small electric motors at 10 C.F.R. § 431.442, and explaining DOE's interpretation of the definition in the preamble to the rule adopting the standard. *See* 75 FR 10873. DOE has further articulated the scope of coverage in the course of litigation in *NEMA v. DOE*, 654 F.3d 496 (4th Cir. 2011). In the interest of further helping manufacturers to understand how to apply the scope of coverage to specific motor designs, DOE issued draft guidance based upon these previous public statements on January 27, 2014. In response, DOE received comments from the National Electric Manufacturers Association (NEMA), Baldor Electric Company, and Nidec Motor Corp. Generally, these comments pointed to specific areas upon which the commenters requested further clarification. These comments can be reviewed at EERE-2014-BT-GUID-0001. In response to these comments and in an effort to give clear guidance to the industry, DOE has modified this guidance from the draft.

Through this guidance, which details the characteristics of those motors that are covered by the 2010 final rule, DOE identifies some key design elements that manufacturers should consider when determining whether a given individual motor meets the small electric motor definition and is subject to the energy conservation standards promulgated for small electric motors. DOE does not intend to provide model-by-model guidance.

A small electric motor is "a NEMA general purpose alternating current single-speed induction motor, built in a two-digit frame number series in accordance with NEMA Standards Publication MG1-1987." 42 U.S.C. § 6311(13)(G); *see also* 10 C.F.R. § 431.442 (adding clause "including IEC metric equivalent motors" to the end of the definition). DOE has set energy conservation standards for small electric motors at 10 C.F.R. § 431.446. In determining whether a particular electric motor design would need to meet these standards, a manufacturer must ask whether the following design elements apply to the motor:

1) Single–speed induction?

2) NEMA general purpose alternating current?

3) Built in a two-digit frame number series in accordance with NEMA MG1-1987?

We discuss each of these design elements below, as well as mention two additional design elements that limit the scope of DOE's coverage.

Single-speed induction motor

The term "single-speed induction" is self-explanatory and generally understood within the motors industry. To be clear, however, in an effort to respond to a comment from NEMA, multi-speed and variable speed motors cannot meet the definition of a small electric motor.

NEMA general purpose alternating current

The term "alternating current" is self-explanatory and generally understood within the motors industry. The first portion of this design requirement, "NEMA general purpose," however, requires additional discussion.

First, as a baseline, DOE has previously found that for the purposes of the 2010 final rule, split-phase, shaded-pole, and permanent-split capacitor (PSC) motors do not qualify as NEMA general purpose motors – and, therefore, cannot meet the definition of a small electric motor. *See* 74 FR 61421; *see also* 75 FR 10883 (reaffirming DOE's interpretation that split-phase, shaded-pole, and PSC motors are not general purpose and are therefore not included in the definition of small electric motors). That means that only: (1) capacitor-start, induction-run (CSIR); (2) capacitor-start, capacitor-run (CSCR); and (3) polyphase motors can qualify as NEMA general purpose motors and therefore be considered small electric motors as defined in the 2010 final rule.

Second, for purposes of the 2010 final rule, DOE interpreted the term "NEMA general purpose alternating current single-speed induction motor" used in 42 U.S.C. § 6311(13) as referring to elements within paragraph MG1-1.05 of NEMA MG1-1987, which provides a list of characteristics to help determine whether a particular motor is a general purpose alternating current motor. These characteristics (as identified by that NEMA document) include the following elements that DOE considered for purposes of defining small electric motors in the 2010 final rule:

1) Built with an open construction;

2) Rated for continuous duty;

3) Incorporates the service factor in MG1-12.47 of MG1-1987;

4) Uses insulation that satisfies *at least* the minimum Class A insulation system temperature rise specifications detailed in MG1-12.42 of MG1-1987;

5) Designed in standard ratings (e.g., horsepower (hp) or kilowatt (kW) ratings);

6) Has standard operating characteristics;

7) Has standard mechanical construction;

8) Designed for use under usual service conditions; and

9) Is not restricted to a particular application.

We discuss each of these in turn:

Open construction

The small electric motor definition established in the 2010 final rule applied only to "open" construction motors. This term is already widely understood in the industry. At the time of the 2010 final rule, DOE did not consider "enclosed" motors to qualify as NEMA general purpose motors and therefore were not considered small electric motors as defined in the 2010 final rule.

NEMA pointed out in their comments on the draft guidance that they define "open machine" in NEMA MG 1-1.25. DOE agrees that, consistent with the reference to NEMA MG1, an open motor is one constructed with ventilating openings that permit external cooling air to pass over and around the windings of the motor. An enclosed motor is constructed to prevent the free exchange of air between the inside and outside of the housing. *See* 75 FR at 10882 n. 4.

NEMA also points to the specific ingress protection (i.e. "IP") codes they believe apply to open motors under IEC specifications. DOE does not think it is necessary to explicitly identify IEC IP codes that include open motors given the clear distinction between "open" and "enclosed" motors provided by the definitions above.

Rated for continuous duty

This term is widely understood in the industry and includes, as NEMA pointed out in its comments, what is referred to in IEC standards as continuous running duty type S1.

Incorporates service factor in MG1-12.47 of MG1-1987

DOE has previously explained that the "service factor" of an electric induction motor "is a measure of the overload capacity at which a motor can operate without thermal damage, while operating normally within the correct voltage tolerances." 75 FR at 10885. MG1-12.47 further refers to Table 12-2. DOE agrees that for purposes of the 2010 final rule this table should generally be the source of determining the service factor, except wherein the table draws a line separating small and medium motors. In other words, the dashed line in the original Table 12-2 in MG1-12.47 has no application in DOE's regulations and should not be used in determining the scope of coverage of DOE's small motor regulations. In response to a request from NEMA, the table as DOE refers to it, is reproduced below, modified to show only the service factors incorporated for motors with the combinations of horsepower and number of poles to which standards apply in 10 C.F.R. § 431.446:

	Service Factor		
	Synchronous Speed, Rpm		
Hp	3600	1800	1200
0.25	1.35	1.35	1.35
0.33	1.35	1.35	1.35
0.5	1.25	1.25	1.25
0.75	1.25	1.25	1.15
1	1.25	1.15	1.15
1.5-3	1.15	1.15	1.15

Related to the above, Nidec asked that DOE make clear that the service factor requirements apply to small electric motors that have a service factor up to and including the values shown in NEMA MG1-1987. DOE has already concluded that motors that fail to meet service factor requirements in MG1–12.47 are not ''small electric motors'' as EPCA uses that term. 75 FR at 10885; see also 74 FR 61421. DOE agrees with Nidec that the service factors listed in the table should be viewed as upper limits. This approach is consistent with DOE's position that an electric motor built to IEC specifications can meet the small electric motor definition. Thus, a motor must have the service factor at or below those specified in the table to be considered a small electric motor as defined in the 2010 final rule.

Insulation satisfies at least the minimum Class A specifications detailed in MG1-12.42 of MG1-1987

As explained in the final rule adopting energy conservation standards for small electric motors, the temperature rise requirement for Class A systems is the lowest of the four systems defined in NEMA MG1–1987, which means that all other insulation classes meet Class A requirements. 75 FR at 10884-5. In other words, all motors with insulation that at least meets the Class A requirements would meet this requirement and so this factor would not prove dispositive of whether a motor is a small electric motor.

Designed in standard ratings

DOE notes that the term "standard ratings" is not defined by NEMA MG1 and DOE does not view this term as referring to or depending on an MG1 designation of ratings for small motors – nor does the statute require that DOE interpret the small electric motor definition as being constrained in this manner. DOE's approach is consistent with the fact that manufacturers routinely market and sell two-digit frame series motors in excess of 1 horsepower as general purpose motors. By viewing this term in a broad manner, the likelihood of potential loopholes created for those motors that do not fit within the precise confines laid out as industry guidance – such as NEMA MG1 – is minimized. Consistent with this approach, DOE explained in the 2010 final rule that non-standard horsepower and kilowatt rated motors should be considered NEMA general purpose motors. 75 FR at 10885. Therefore, while NEMA MG1 specifies ratings in terms of standard horsepower units, DOE specifically did not require motors to have standard horsepower ratings in order to qualify as small electric motors. In fact, DOE's regulations incorporate a method of determining the required average full load efficiency for a non-standard rating – whether based on fractional horsepower increments or non-horsepower ratings, such as kilowatts. 10 C.F.R. § 431.446(b).

Has standard operating characteristics

As we noted in the final rule, NEMA defines several performance requirements, including breakdown torque, locked rotor torque, and locked rotor current that motors must meet in order to be considered general-purpose; a motor that satisfies these performance characteristics would be considered by DOE to be a small electric motor. See 75 FR 10883-10884.

Has standard mechanical construction

DOE has determined that the issue of construction, alone, is not determinative of whether a motor is a small electric motor. For example, if a motor uses a longer shaft than that found in motors of similar design that are built according to the standard dimensions in NEMA MG1, this motor would still be considered to have standard mechanical construction and would be treated as a small electric motor. If

a shaft were modified to the point where the motor would be limited to a single and unique application, DOE would no longer consider that motor to be of standard mechanical construction.

NEMA specifically asks that DOE provide a clear statement as to "what may be too long, or too short, for a small electric motor." This question misses the intended point of the guidance and so necessitates this further clarification. As long as the modification to the construction does not restrict the motor to a particular application or impact one of the other characteristics necessary to be a small electric motor, a specific motor with a nonstandard construction that otherwise meets all of these requirements would still be considered a small electric motor under DOE's regulations.

In its comments on the draft guidance, Nidec also requested clarification on certain items two of which appears to be related to standard mechanical construction. Specifically, Nidec noted that the list of "usual service conditions" in table 14.02 of MG1-1987 includes installation on a rigid mounting surface, and indicated that this would include motors with resilient bases, motors without feet (footless motors), and motors with welded bases. Consistent with the view stated previously with respect to general purpose applications, as long as these particular aspects of its construction would not limit the motor's use to specific applications, this characteristic in itself would not exclude a motor from coverage.

Nidec also requested guidance on a particular type of small motor built to IEC specifications that uses a specific flange type, commonly referred to as a B14 flange, which has no respective equivalent flange type in NEMA MG1 for small electric motors (although Nidec indicated that it corresponds to a D-flange for medium motors). As for mountings and other features, this specific feature in itself would not exclude a given motor from coverage as long as it does not limit the motor's use to a specific application.

Designed for use under usual service conditions

DOE did not specifically address this element in the energy conservation standards final rule for small electric motors. In its comments, NEMA indicated its view that the term "usual service conditions" as used in the definition of "general-purpose alternating-current motor" refers to the conditions specified in section 14.02 of NEMA MG1-1987. In considering NEMA's view, DOE notes that the definition of the term "general purpose electric motor" in 10 C.F.R. § 431.12 for electric motors identifies usual service conditions as those specified in NEMA MG1-2009, paragraph 14.2. Accordingly, DOE believes NEMA's reference to the equivalent section in the 1987 version of the MG1 standard is appropriate, and clarifies that the term "usual service conditions" for the purposes of the small electric motor definition as defined in the 2010 final rule refer to those listed in section 14.02 of NEMA MG1-1987.

Not restricted to a particular application

If a motor is a special or definite purpose motor, it is not general purpose and would not meet the definition of a small electric motor.

Built in a two-digit frame number series

The third significant design element is "built in a two-digit frame number series in accordance with NEMA MG1-1987." As we noted in the final rule, the 1987 version of NEMA MG1 designates three two-digit frame series: 42, 48, and 56.[1] 75 FR at 10884.

As made clear by the clause added to the regulatory definition of "small electric motor" at 10 C.F.R. § 431.442, this design element includes those motors built to IEC specifications that are comparable to these NEMA frame sizes. DOE has adopted this position because of the fact that electric motors built to IEC specifications are based on metric units, rather than the English or Imperial units used by NEMA MG1. Consequently, building an electric motor in accordance with IEC specifications (e.g., using metric measurements) should not be a basis for exempting these electric motors from coverage.

In sum, motors built in a 42-, 48-, or 56-frame series (or the IEC equivalent) could qualify as small electric motors if they meet the other design elements described above. At this time, it is DOE's understanding that other two-digit frame series motors would be unable to satisfy the "general purpose" requirement discussed in detail above. Accordingly, DOE expects that these other two-digit frame series motors (e.g., 66-frame series motors) would not satisfy the small electric motor definition.

Additional design elements limiting coverage

If a single-speed capacitor-start or polyphase induction motor built in a two-digit frame number series in accordance with NEMA MG1-1987 meets all of the above conditions, DOE considers it a small electric motor. If it is a small electric motor, a manufacturer should consider that the energy conservation standards found at 10 C.F.R. § 431.446 only apply to those small electric motors that:

1) have a horsepower level ranging from between 0.25 to 3.0 hp (or the metric equivalent in kW); and

2) are built in a 2-, 4-, or 6-pole configuration.

See 75 FR at 10883. Small electric motors that do not meet these two additional requirements are not covered by the energy conservation standards set forth by the March 2010 final rule.

Consideration of previous discussion documents

NEMA and Baldor both discussed a 2007 document DOE had previously provided stakeholders prior to the initiation of the rulemaking process for small electric motors entitled "The Scope of Coverage for the Small Electric Motors Energy Conservation Standards Rulemaking." This document, which simply laid out the statutory definition of small electric motor and included various excerpts from MG1-1987, was used by DOE to frame the discussion on the issue of what types of motors DOE should consider regulating as part of the small electric motor rulemaking process. The document should not be relied upon as guidance for interpreting the final scope of the regulations governing small electric motors. Interested parties should instead rely upon the statements in the March 9, 2010 final rule (75 FR 10873), the technical correction published on April 5, 2010 (75 FR 17036), and this guidance.

[1] DOE specifically excluded 66-frame motors as those motors appeared to never be used in general purpose applications. If DOE becomes aware of other frame sizes that are general purpose, DOE will consider evaluating these for inclusion. See discussion at 75 FR at 10884.

Compliance, Certification and Enforcement

The comments from NEMA, Baldor, and Nidec also included questions regarding compliance, certification and enforcement, including labeling. DOE is addressing these issues through rulemaking.

No exception for Thermally Protected Motors

In its comments, NEMA inquired as to whether thermally protected motors would be given an additional 2-year compliance extension, citing a previous decision by the Department to provide such an accommodation to electric motors. The decision NEMA cited was part of a policy statement issued by DOE in 1997 regarding implementation of the initial set of energy efficiency regulations for electric motors. 62 FR 59978 (November 5, 1997) In that notice, DOE found that manufacturers had mistakenly assumed that thermally protected motors were excluded from the scope of the regulations for electric motors and provided an additional 2-year period for them to redesign their products as necessary to make them compliant. Because DOE already made clear at that time that a motor being thermally protected in itself does not exempt the motor from coverage as a general purpose motor, the same situation does not exist for small electric motors as did for electric motors in 1997. DOE will not grant an additional 2-year compliance extension to a small electric motor solely due to it being a thermally protected motor.