

# ADDENDA

**ANSI/ASHRAE/IES Addendum af to  
ANSI/ASHRAE/IES Standard 90.1-2022**

# **Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings**

Approved by ASHRAE and the American National Standards Institute on May 30, 2025; and by the Illuminating Engineering Society on May 2, 2025.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. Instructions for how to submit a change can be found on the ASHRAE® website (<https://www.ashrae.org/continuous-maintenance>).

The latest edition of an ASHRAE Standard may be purchased from the ASHRAE website ([www.ashrae.org](http://www.ashrae.org)) or from ASHRAE Customer Service, 180 Technology Parkway, Peachtree Corners, GA 30092. E-mail: [orders@ashrae.org](mailto:orders@ashrae.org). Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to [www.ashrae.org/permissions](http://www.ashrae.org/permissions).

© 2025 ASHRAE

ISSN 1041-2336



**ASHRAE Standard Project Committee 90.1**

**Cognizant TC: 7.6 Systems Energy Utilization**

**SPLS Liaison: Jennifer Isenbeck · ASHRAE Staff Liaison: Emily Toto · IES Liaison: Mark Lien**

Richard Lord*, <i>Chair</i>	Benjamin Edwards	Nathan Kahre	Robert Ross*
Thomas Culp*, <i>Co-Vice Chair</i>	Kurt Fester	Maria Karpman*	Marty Salzberg*
Leonard Sciarra*, <i>Co-Vice Chair</i>	Francisco Flores	Andrew Klein	Christopher Schaffner
Rahul Athalye*	D. Andrew Fouss	Vladimir Kochkin*	Greg Schluterman
William Babbington	Phillip Gentry*	Toby Lau	Kelly Seeger*
John Bade*	Jason Glazer*	Chonghui Liu	Wayne Stoppelmoor*
Sean Beilman*	Melissa Goren*	Emily Lorenz	Matthew Swenka*
Daniel Bersohn	Skye Gruen	Samuel Mason*	Christian Taber*
Paula Cino*	Charles Haack*	Benjamin Meyer*	Steven Taylor*
Glen Clapper	David Handwork*	Julian Mills-Beale	Kevin Teakell
Ernest Conrad*	Armin Hauer	Nazme Mohsina	Douglas Tucker
Shannon Corcoran*	Rick Heiden	Frank Morrison*	Jason Vandever
Jay Crandell*	Gary Heikkinen	Michael Myer	Martha VanGeem*
Kelly Cunningham	Mark Heizer*	Frank Myers*	Michael Waite*
Brandon Damas*	David Herron*	Michael Patterson*	McHenry Wallace*
Hayley Davis	Mike Houston*	Timothy Peglow*	Theresa Weston
Thomas Deary*	Harold Jepsen*	Christopher Perry*	Jerry White*
Darryl Dixon	Greg Johnson*	Laura Petrillo-Groh	Jeffrey Whitelaw
Julie Donovan*	Zac Johnson	Patrick Riley	Jeremiah Williams
Craig Drumheller*	Duane Jonlin*	Michael Rosenberg*	
James Earley	Michael Jouaneh*	Steven Rosenstock*	

\* Denotes members of voting status when the document was approved for publication

---

**ASHRAE STANDARDS COMMITTEE 2024–2025**

Douglas D. Fick, <i>Chair</i>	Jaap Hogeling	Kenneth A. Monroe	Paolo M. Tronville
Adrienne G. Thomle, <i>Vice Chair</i>	Jennifer A. Isenbeck	Daniel H. Nall	Douglas K. Tucker
Hoy R. Bohanon, Jr.	Satish N. Iyengar	Philip J. Naughton	William F. Walter
Kelley P. Cramm	Phillip A. Johnson	Kathleen Owen	David P. Yuill
Abdel K. Darwich	Paul A. Lindahl, Jr.	Gwelen Paliaga	Susanna S. Hanson, <i>BOD ExO</i>
Drake H. Erbe	Julie Majurin	Karl L. Peterman	Wade H. Conlan, <i>CO</i>
Patricia Graef	Lawrence C. Markel	Justin M. Prosser	
William M. Healy	Margaret M. Mathison	Christopher J. Seeton	

Ryan Shanley, *Senior Manager of Standards*

---

**SPECIAL NOTE**

This American National Standard (ANS) is a national voluntary consensus Standard developed under the auspices of ASHRAE. *Consensus* is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this Standard as an ANS, as “substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution.” Compliance with this Standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.

ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Senior Manager of Standards of ASHRAE should be contacted for

- interpretation of the contents of this Standard,
- participation in the next review of the Standard,
- offering constructive criticism for improving the Standard, or
- permission to reprint portions of the Standard.

**DISCLAIMER**

ASHRAE uses its best efforts to promulgate Standards and Guidelines for the benefit of the public in light of available information and accepted industry practices. However, ASHRAE does not guarantee, certify, or assure the safety or performance of any products, components, or systems tested, installed, or operated in accordance with ASHRAE's Standards or Guidelines or that any tests conducted under its Standards or Guidelines will be nonhazardous or free from risk.

**ASHRAE INDUSTRIAL ADVERTISING POLICY ON STANDARDS**

ASHRAE Standards and Guidelines are established to assist industry and the public by offering a uniform method of testing for rating purposes, by suggesting safe practices in designing and installing equipment, by providing proper definitions of this equipment, and by providing other information that may serve to guide the industry. The creation of ASHRAE Standards and Guidelines is determined by the need for them, and conformance to them is completely voluntary.

In referring to this Standard or Guideline and in marking of equipment and in advertising, no claim shall be made, either stated or implied, that the product has been approved by ASHRAE.

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objections on informative material are not offered the right to appeal at ASHRAE or ANSI.)

## FOREWORD

*Addendum af modifies Section 10.4.1, covering electric motor efficiency, to align with DOE 10 CFR 431. U.S. DOE published a Federal Register direct final rule on June 1, 2023, pertaining to energy conservation standards for electric motors. In this direct final rule, DOE is adopting new and amended standards for electric motors. Starting June 1, 2027, the efficiency of 100 to 250 hp (75 to 186 kW) NEMA Design A motor; NEMA Design B motor; and IEC Design N (including NE, NEY, or NY variants) motor; but excluding fire pump electric motors and air-over electric motors (manufactured alone or as a component of another piece of equipment), has been changed. DOE also has published the minimum efficiency of an air-over electric motor built in a standard frame size and specialized frame size of an air-over electric motor with a power rating from 1 to 20 hp.*

*DOE published the final rule on October 20, 2023, confirming the effective date and compliance date with the new standards established in the direct final rule, which is required on and after June 1, 2027.*

*Cost justification: This is a DOE regulation.*

**Informative Note:** In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~striketrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

## Addendum af to Standard 90.1-2022

### **Modify Section 3 as shown (I-P and SI).**

[ ... ]

**air-over electric motor:** an electric motor that does not reach thermal equilibrium (i.e., thermal stability), during a rated load temperature test according to Section 2 of Appendix B, DOE 10 CFR 431, without the application of forced cooling by a free flow of air from an external device not mechanically connected to the motor within the motor enclosure.

[ ... ]

**IEC Design NE:** an electric motor that

- Is an induction motor designed for use with three-phase power;
- Contains a cage rotor;
- Is capable of direct-on-line starting;
- Has 2, 4, 6, or 8 poles;
- Is rated from 0.12 to 1600 kW at a frequency of 60 Hz; and
- Conforms to Section 6.1, Table 3, and Section 6.3 of the IEC 60034–12:2016 specifications for starting torque, locked rotor apparent power, and starting requirements, respectively.

**IEC Design NEY:** an electric motor that

- Is an induction motor designed for use with three-phase power;
- Contains a cage rotor;
- Is capable of star-delta starting;
- Has 2, 4, 6, or 8 poles;
- Is rated from 0.12 to 1600 kW at a frequency of 60 Hz; and
- Conforms to Section 5.4, Table 3, and Section 6.3 of the IEC 60034–12:2016 specifications for starting torque, locked rotor apparent power, and starting requirements, respectively.

**IEC Design NY:** an electric motor that

- Is an induction motor designed for use with three-phase power;
- Contains a cage rotor;
- Is capable of star-delta starting;
- Has 2, 4, 6, or 8 poles;
- Is rated from 0.12 to 1600 kW at a frequency of 60 Hz; and

- Conforms to Section 5.4, Section 6.2 and Section 6.3 of the IEC 60034-12:2016 specifications for starting torque, locked rotor apparent power, and starting requirements, respectively.

[ . . . ]

**specialized frame size:** an electric motor frame size for which the rated output power of the motor exceeds the motor frame size limits specified for standard frame size. Specialized frame sizes have maximum diameters corresponding to the NEMA frame sizes shown in Table 10.8-9.

***Modify Section 10.4.1 as shown (I-P and SI).***

**10.4.1 Electric Motors.** Electric motors manufactured alone or as a component of another piece of equipment with a rated motor power of 1 hp or more, and less than or equal to ~~200~~750 hp (559 kW), shall comply with the requirements shown in Table 10.8-1 for NEMA Design A motors, NEMA Design B motors, and IEC Design N, ~~NE~~, ~~NEY~~, or ~~NY~~ motors, and Table 10.8-2 for NEMA Design C motors and IEC Design H motors. General purpose small electric motors with a rated motor power of 0.25 hp (0.18 kW) or more, and less than or equal to 3 hp (2.2 kW), shall have a minimum average full-load efficiency that is not less than as shown in Table 10.8-3 for polyphase small electric motors and Table 10.8-4 for capacitor-start capacitor-run small electric motors and capacitor-start induction-run small electric motors.

Fire pump electric motors shall have a minimum nominal full-load efficiency ~~that is~~ not less than that shown in Table 10.8-5. Air-over electric motors shall have a minimum nominal full-load efficiency not less than that shown in Table 10.8-7 and Table 10.8-8.

**Exceptions to 10.4.1:** The standards in this section do not apply to the following exempt electric motors:

- ~~1. Air-over electric motors.~~
- ~~2~~1. Component sets of an electric motor.
- ~~3~~2. Liquid-cooled electric motors.
- ~~4~~3. Submersible electric motors.
- ~~5~~4. Inverter-only electric motors.

**Modify Table 10.8-1 as shown (I-P).**

**Table 10.8-1 Minimum Nominal Full-Load Efficiency for NEMA Design A, NEMA Design B, and IEC Design N, NE, NEY, or NY Motors (Excluding Fire Pump Electric Motors) at 60 Hz<sup>a,b,c</sup>**

Motor Power hp	Manufactured Date	Nominal Full-Load Efficiency, %							
		2-Pole		4-Pole		6-Pole		8-Pole	
		Enclosed	Open	Enclosed	Open	Enclosed	Open	Enclosed	Open
1	<u>All</u>	77.0	77.0	85.5	85.5	82.5	82v.5	75.5	75.5
1.5	<u>All</u>	84.0	84.0	86.5	86.5	87.5	86.5	78.5	77.0
2	<u>All</u>	85.5	85.5	86.5	86.5	88.5	87.5	84.0	86.5
3	<u>All</u>	86.5	85.5	89.5	89.5	89.5	88.5	85.5	87.5
5	<u>All</u>	88.5	86.5	89.5	89.5	89.5	89.5	86.5	88.5
7.5	<u>All</u>	89.5	88.5	91.7	91.0	91.0	90.2	86.5	89.5
10	<u>All</u>	90.2	89.5	91.7	91.7	91.0	91.7	89.5	90.2
15	<u>All</u>	91.0	90.2	92.4	93.0	91.7	91.7	89.5	90.2
20	<u>All</u>	91.0	91.0	93.0	93.0	91.7	92.4	90.2	91.0
25	<u>All</u>	91.7	91.7	93.6	93.6	93.0	93.0	90.2	91.0
30	<u>All</u>	91.7	91.7	93.6	94.1	93.0	93.6	91.7	91.7
40	<u>All</u>	92.4	92.4	94.1	94.1	94.1	94.1	91.7	91.7
50	<u>All</u>	93.0	93.0	94.5	94.5	94.1	94.1	92.4	92.4
60	<u>All</u>	93.6	93.6	95.0	95.0	94.5	94.5	92.4	93.0
75	<u>All</u>	93.6	93.6	95.4	95.0	94.5	94.5	93.6	94.1
100	<u>On or before May 31, 2027</u>	94.1	93.6	95.4	95.4	95.0	95.0	93.6	94.1
	<u>On or after June 1, 2027</u>	<u>95.0</u>	<u>94.5</u>	<u>96.2</u>	<u>96.2</u>	<u>95.8</u>	<u>95.8</u>	<u>94.5</u>	<u>95.0</u>
125	<u>On or before May 31, 2027</u>	95.0	94.1	95.4	95.4	95.0	95.0	94.1	94.1
	<u>On or after June 1, 2027</u>	<u>95.4</u>	<u>94.5</u>	<u>96.2</u>	<u>96.2</u>	<u>95.8</u>	<u>95.8</u>	<u>95.0</u>	<u>95.0</u>
150	<u>On or before May 31, 2027</u>	95.0	94.1	95.8	95.8	95.8	95.4	94.1	94.1
	<u>On or after June 1, 2027</u>	<u>95.4</u>	<u>94.5</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>95.8</u>	<u>95.0</u>	<u>95.0</u>
200	<u>On or before May 31, 2027</u>	95.4	95.0	96.2	95.8	95.8	95.4	94.5	94.1
	<u>On or after June 1, 2027</u>	<u>95.8</u>	<u>95.4</u>	<u>96.5</u>	<u>96.2</u>	<u>96.2</u>	<u>95.8</u>	<u>95.4</u>	<u>95.0</u>
250	<u>On or before May 31, 2027</u>	95.8	95.0	96.2	95.8	95.8	95.8	95.0	95.0
	<u>On or after June 1, 2027</u>	<u>96.2</u>	<u>95.4</u>	<u>96.5</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>95.4</u>	<u>95.4</u>
300	<u>All</u>	95.8	95.4	96.2	95.8	95.8	95.8	NR	NR
350	<u>All</u>	95.8	95.4	96.2	95.8	95.8	95.8	NR	NR
400	<u>All</u>	95.8	95.8	96.2	95.8	NR	NR	NR	NR
450	<u>All</u>	95.8	96.2	96.2	96.2	NR	NR	NR	NR
500	<u>All</u>	95.8	96.2	96.2	96.2	NR	NR	NR	NR
550	<u>On or after June 1, 2027</u>	<u>95.8</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>

a. Nominal efficiencies shall be established in accordance with DOE 10 CFR 431.

b. For purposes of determining the required minimum nominal full-load *efficiency* of an electric motor that has a horsepower or *kilowatt* rating between two horsepower or two *kilowatt* ratings listed in this table, each such motor shall be deemed to have a listed horsepower or *kilowatt* rating, determined as follows:

1. A horsepower at or above the midpoint between the two consecutive horsepower shall be rounded up to the higher of the two horsepower.
2. A horsepower below the midpoint between the two consecutive horsepower shall be rounded down to the lower of the two horsepower.
3. A *kilowatt* rating shall be directly converted from *kilowatts* to horsepower using the formula 1 *kilowatt* = (1/0.746) horsepower. The conversion should be calculated to three significant decimal places, and the resulting horsepower shall be rounded in accordance with paragraph (1) or (2), whichever applies.

c. NR = no requirement.

**Table 10.8-1 Minimum Nominal Full-Load Efficiency for NEMA Design A, NEMA Design B, and IEC Design N, NE, NEY, or NY Motors (Excluding Fire Pump Electric Motors) at 60 Hz<sup>a,b,c</sup>**

<u>Motor Power</u> <u>hp</u>	<u>Manufactured</u> <u>Date</u>	Nominal Full-Load Efficiency, %							
		2-Pole		4-Pole		6-Pole		8-Pole	
		Enclosed	Open	Enclosed	Open	Enclosed	Open	Enclosed	Open
<u>600</u>	<u>On or after June 1, 2027</u>	<u>95.8</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>
<u>650</u>	<u>On or after June 1, 2027</u>	<u>95.8</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>
<u>700</u>	<u>On or after June 1, 2027</u>	<u>95.8</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>
<u>750</u>	<u>On or after June 1, 2027</u>	<u>95.8</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>

a. Nominal efficiencies shall be established in accordance with DOE 10 CFR 431.

b. For purposes of determining the required minimum nominal full-load *efficiency* of an electric motor that has a horsepower or *kilowatt* rating between two horsepower or two *kilowatt* ratings listed in this table, each such motor shall be deemed to have a listed horsepower or *kilowatt* rating, determined as follows:

1. A horsepower at or above the midpoint between the two consecutive horsepower shall be rounded up to the higher of the two horsepower.
2. A horsepower below the midpoint between the two consecutive horsepower shall be rounded down to the lower of the two horsepower.
3. A *kilowatt* rating shall be directly converted from *kilowatts* to horsepower using the formula 1 *kilowatt* = (1/0.746) horsepower. The conversion should be calculated to three significant decimal places, and the resulting horsepower shall be rounded in accordance with paragraph (1) or (2), whichever applies.

c. NR = no requirement.

**Modify Table 10.8-1 as shown (SI):**

**Table 10.8-1 Minimum Nominal Full-Load Efficiency for NEMA Design A, NEMA Design B, and IEC Design N, NE, NEY, or NY Motors (Excluding Fire Pump Electric Motors) at 60 Hz<sup>a,b,c</sup>**

Motor Power kW	Manufactured Date	Nominal Full-Load Efficiency, %							
		2-Pole		4-Pole		6-Pole		8-Pole	
		Enclosed	Open	Enclosed	Open	Enclosed	Open	Enclosed	Open
0.75	<u>All</u>	77.0	77.0	85.5	85.5	82.5	82.5	75.5	75.5
1.1	<u>All</u>	84.0	84.0	86.5	86.5	87.5	86.5	78.5	77.0
1.5	<u>All</u>	85.5	85.5	86.5	86.5	88.5	87.5	84.0	86.5
2.2	<u>All</u>	86.5	85.5	89.5	89.5	89.5	88.5	85.5	87.5
3.7	<u>All</u>	88.5	86.5	89.5	89.5	89.5	89.5	86.5	88.5
5.5	<u>All</u>	89.5	88.5	91.7	91.0	91.0	90.2	86.5	89.5
7.5	<u>All</u>	90.2	89.5	91.7	91.7	91.0	91.7	89.5	90.2
11	<u>All</u>	91.0	90.2	92.4	93.0	91.7	91.7	89.5	90.2
15	<u>All</u>	91.0	91.0	93.0	93.0	91.7	92.4	90.2	91.0
18.5	<u>All</u>	91.7	91.7	93.6	93.6	93.0	93.0	90.2	91.0
22	<u>All</u>	91.7	91.7	93.6	94.1	93.0	93.6	91.7	91.7
30	<u>All</u>	92.4	92.4	94.1	94.1	94.1	94.1	91.7	91.7
37	<u>All</u>	93.0	93.0	94.5	94.5	94.1	94.1	92.4	92.4
45	<u>All</u>	93.6	93.6	95.0	95.0	94.5	94.5	92.4	93.0
55	<u>All</u>	93.6	93.6	95.4	95.0	94.5	94.5	93.6	94.1
75	<u>On or before May 31, 2027</u>	94.1	93.6	95.4	95.4	95.0	95.0	93.6	94.1
	<u>On or after June 1, 2027</u>	<u>95.0</u>	<u>94.5</u>	<u>96.2</u>	<u>96.2</u>	<u>95.8</u>	<u>95.8</u>	<u>94.5</u>	<u>95.0</u>
90	<u>On or before May 31, 2027</u>	95.0	94.1	95.4	95.4	95.0	95.0	94.1	94.1
	<u>On or after June 1, 2027</u>	<u>95.4</u>	<u>94.5</u>	<u>96.2</u>	<u>96.2</u>	<u>95.8</u>	<u>95.8</u>	<u>95.0</u>	<u>95.0</u>
110	<u>On or before May 31, 2027</u>	95.0	94.1	95.8	95.8	95.8	95.4	94.1	94.1
	<u>On or after June 1, 2027</u>	<u>95.4</u>	<u>94.5</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>95.8</u>	<u>95.0</u>	<u>95.0</u>
150	<u>On or before May 31, 2027</u>	95.4	95.0	96.2	95.8	95.8	95.4	94.5	94.1
	<u>On or after June 1, 2027</u>	<u>95.8</u>	<u>95.4</u>	<u>96.5</u>	<u>96.2</u>	<u>96.2</u>	<u>95.8</u>	<u>95.4</u>	<u>95.0</u>
186	<u>On or before May 31, 2027</u>	95.8	95.0	96.2	95.8	95.8	95.8	95.0	95.0
	<u>On or after June 1, 2027</u>	<u>96.2</u>	<u>95.4</u>	<u>96.5</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>95.4</u>	<u>95.4</u>
224	<u>All</u>	95.8	95.4	96.2	95.8	95.8	95.8	NR	NR
261	<u>All</u>	95.8	95.4	96.2	95.8	95.8	95.8	NR	NR
298	<u>All</u>	95.8	95.8	96.2	95.8	NR	NR	NR	NR
336	<u>All</u>	95.8	96.2	96.2	96.2	NR	NR	NR	NR
373	<u>All</u>	95.8	96.2	96.2	96.2	NR	NR	NR	NR
410	<u>On or after June 1, 2027</u>	<u>95.8</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>

a. Nominal efficiencies shall be established in accordance with DOE 10 CFR 431.

b. For purposes of determining the required minimum nominal full-load *efficiency* of an electric motor that has a horsepower or *kilowatt* rating between two horsepower or two *kilowatt* ratings listed in this table, each such motor shall be deemed to have a listed horsepower or *kilowatt* rating, determined as follows:

1. A horsepower at or above the midpoint between the two consecutive horsepower shall be rounded up to the higher of the two horsepower.
2. A horsepower below the midpoint between the two consecutive horsepower shall be rounded down to the lower of the two horsepower.
3. A *kilowatt* rating shall be directly converted from *kilowatts* to horsepower using the formula 1 *kilowatt* = (1/0.746) horsepower. The conversion should be calculated to three significant decimal places, and the resulting horsepower shall be rounded in accordance with paragraph (1) or (2), whichever applies.

NR = no requirement.

**Table 10.8-1 Minimum Nominal Full-Load Efficiency for NEMA Design A, NEMA Design B, and IEC Design N, NE, NEY, or NY Motors (Excluding Fire Pump Electric Motors) at 60 Hz<sup>a,b,c</sup>**

<u>Motor Power</u> <u>kW</u>	<u>Manufactured</u> <u>Date</u>	Nominal Full-Load Efficiency, %							
		2-Pole		4-Pole		6-Pole		8-Pole	
		Enclosed	Open	Enclosed	Open	Enclosed	Open	Enclosed	Open
<u>447</u>	<u>On or after June 1, 2027</u>	<u>95.8</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>
<u>485</u>	<u>On or after June 1, 2027</u>	<u>95.8</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>
<u>522</u>	<u>On or after June 1, 2027</u>	<u>95.8</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>
<u>559</u>	<u>On or after June 1, 2027</u>	<u>95.8</u>	<u>96.2</u>	<u>96.2</u>	<u>96.2</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>

a. Nominal efficiencies shall be established in accordance with DOE 10 CFR 431.

b. For purposes of determining the required minimum nominal full-load *efficiency* of an electric motor that has a horsepower or *kilowatt* rating between two horsepower or two *kilowatt* ratings listed in this table, each such motor shall be deemed to have a listed horsepower or *kilowatt* rating, determined as follows:

1. A horsepower at or above the midpoint between the two consecutive horsepower shall be rounded up to the higher of the two horsepower.
2. A horsepower below the midpoint between the two consecutive horsepower shall be rounded down to the lower of the two horsepower.
3. A *kilowatt* rating shall be directly converted from *kilowatts* to horsepower using the formula 1 *kilowatt* = (1/0.746) horsepower. The conversion should be calculated to three significant decimal places, and the resulting horsepower shall be rounded in accordance with paragraph (1) or (2), whichever applies.

NR = no requirement.



**Add new Table 10.8-7 as shown (I-P).**

**Table 10.8-7 Minimum Nominal Full-Load Efficiencies of NEMA Design A, NEMA Design B, and IEC Design N, NE, NEY or NY Standard Frame Size Air-Over Electric Motors (Excluding Fire Pump Electric Motors) at 60 Hz<sup>a,b,c</sup>**

<u>Motor Power</u> <u>hp</u>	<u>Manufactured</u> <u>Date</u>	<u>Nominal Full-Load Efficiency, %</u>							
		<u>2-Pole</u>		<u>4-Pole</u>		<u>6-Pole</u>		<u>8-Pole</u>	
		<u>Enclosed</u>	<u>Open</u>	<u>Enclosed</u>	<u>Open</u>	<u>Enclosed</u>	<u>Open</u>	<u>Enclosed</u>	<u>Open</u>
1	On or after June 1, 2027	77.0	77.0	85.5	85.5	82.5	82.5	75.5	75.5
1.5		84.0	84.0	86.5	86.5	87.5	86.5	78.5	77.0
2		85.5	85.5	86.5	86.5	88.5	87.5	84.0	86.5
3		86.5	85.5	89.5	89.5	89.5	88.5	85.5	87.5
5		88.5	86.5	89.5	89.5	89.5	89.5	86.5	88.5
7.5		89.5	88.5	91.7	91.0	91.0	90.2	86.5	89.5
10		90.2	89.5	91.7	91.7	91.0	91.7	89.5	90.2
15		91.0	90.2	92.4	93.0	91.7	91.7	89.5	90.2
20		91.0	91.0	93.0	93.0	91.7	92.4	90.2	91.0
25		91.7	91.7	93.6	93.6	93.0	93.0	90.2	91.0
30		91.7	91.7	93.6	94.1	93.0	93.6	91.7	91.7
40		92.4	92.4	94.1	94.1	94.1	94.1	91.7	91.7
50		93.0	93.0	94.5	94.5	94.1	94.1	92.4	92.4
60		93.6	93.6	95.0	95.0	94.5	94.5	92.4	93.0
75		93.6	93.6	95.4	95.0	94.5	94.5	93.6	94.1
100		95.0	94.5	96.2	96.2	95.8	95.8	94.5	95.0
125		95.4	94.5	96.2	96.2	95.8	95.8	95.0	95.0
150		95.4	94.5	96.2	96.2	96.2	95.8	95.0	95.0
200		95.8	95.4	96.5	96.2	96.2	95.8	95.4	95.0
250		96.2	95.4	96.5	96.2	96.2	96.2	95.4	95.4

a. Nominal efficiencies shall be established in accordance with DOE 10 CFR 431.

b. For purposes of determining the required minimum nominal full-load *efficiency* of an electric motor that has a horsepower or *kilowatt* rating between two horsepower or two *kilowatt* ratings listed in this table, each such motor shall be deemed to have a listed horsepower or *kilowatt* rating, determined as follows:

1. A horsepower at or above the midpoint between the two consecutive horsepower shall be rounded up to the higher of the two horsepower.
2. A horsepower below the midpoint between the two consecutive horsepower shall be rounded down to the lower of the two horsepower.
3. A *kilowatt* rating shall be directly converted from *kilowatts* to horsepower using the formula 1 *kilowatt* = (1/0.746) horsepower. The conversion should be calculated to three significant decimal places, and the resulting horsepower shall be rounded in accordance with paragraph (1) or (2), whichever applies.

**Add new Table 10.8-7 as shown (SI).**

**Table 10.8-7 Minimum Nominal Full-Load Efficiencies of NEMA Design A, NEMA Design B, and IEC Design N, NE, NEY or NY Standard Frame Size Air-Over Electric Motors (Excluding Fire Pump Electric Motors) at 60 Hz<sup>a,b,c</sup>**

Motor Power kW	Manufactured Date	Nominal Full-Load Efficiency, %							
		2-Pole		4-Pole		6-Pole		8-Pole	
		Enclosed	Open	Enclosed	Open	Enclosed	Open	Enclosed	Open
0.75	On or after June 1, 2027	77.0	77.0	85.5	85.5	82.5	82.5	75.5	75.5
1.1		84.0	84.0	86.5	86.5	87.5	86.5	78.5	77.0
1.5		85.5	85.5	86.5	86.5	88.5	87.5	84.0	86.5
2.2		86.5	85.5	89.5	89.5	89.5	88.5	85.5	87.5
3.7		88.5	86.5	89.5	89.5	89.5	89.5	86.5	88.5
5.5		89.5	88.5	91.7	91.0	91.0	90.2	86.5	89.5
7.5		90.2	89.5	91.7	91.7	91.0	91.7	89.5	90.2
11		91.0	90.2	92.4	93.0	91.7	91.7	89.5	90.2
15		91.0	91.0	93.0	93.0	91.7	92.4	90.2	91.0
18.5		91.7	91.7	93.6	93.6	93.0	93.0	90.2	91.0
22		91.7	91.7	93.6	94.1	93.0	93.6	91.7	91.7
30		92.4	92.4	94.1	94.1	94.1	94.1	91.7	91.7
37		93.0	93.0	94.5	94.5	94.1	94.1	92.4	92.4
45		93.6	93.6	95.0	95.0	94.5	94.5	92.4	93.0
55		93.6	93.6	95.4	95.0	94.5	94.5	93.6	94.1
75		95.0	94.5	96.2	96.2	95.8	95.8	94.5	95.0
90		95.4	94.5	96.2	96.2	95.8	95.8	95.0	95.0
110		95.4	94.5	96.2	96.2	96.2	95.8	95.0	95.0
150		95.8	95.4	96.5	96.2	96.2	95.8	95.4	95.0
186		96.2	95.4	96.5	96.2	96.2	96.2	95.4	95.4

a. Nominal efficiencies shall be established in accordance with DOE 10 CFR 431.

b. For purposes of determining the required minimum nominal full-load efficiency of an electric motor that has a horsepower or kilowatt rating between two horsepower or two kilowatt ratings listed in this table, each such motor shall be deemed to have a listed horsepower or kilowatt rating, determined as follows:

1. A horsepower at or above the midpoint between the two consecutive horsepower shall be rounded up to the higher of the two horsepower.
2. A horsepower below the midpoint between the two consecutive horsepower shall be rounded down to the lower of the two horsepower.
3. A kilowatt rating shall be directly converted from kilowatts to horsepower using the formula 1 kilowatt = (1/0.746) horsepower. The conversion should be calculated to three significant decimal places, and the resulting horsepower shall be rounded in accordance with paragraph (1) or (2), whichever applies.

**Add Table 10.8-8 as shown (I-P).**

**Table 10.8-8 Minimum Nominal Full-Load Efficiencies of NEMA Design A, NEMA Design B and IEC Design N, NE, NEY or NY Specialized Frame Size Air-Over Electric Motors (Excluding Fire Pump Electric Motors) at 60 Hz<sup>a,b,c</sup>**

Motor Power hp	Manufactured Date	Nominal Full-Load Efficiency, %							
		2-Pole		4-Pole		6-Pole		8-Pole	
		Enclosed	Open	Enclosed	Open	Enclosed	Open	Enclosed	Open
1	On or after June 1, 2027	74.0	NR	82.5	82.5	80.0	80.0	74.0	74.0
1.5		82.5	82.5	84.0	84.0	85.5	84.0	77.0	75.5
2		84.0	84.0	84.0	84.0	86.5	85.5	82.5	85.5
3		85.5	84.0	87.5	86.5	87.5	86.5	84.0	86.5
5		87.5	85.5	87.5	87.5	87.5	87.5	85.5	87.5
7.5		88.5	87.5	89.5	88.5	89.5	88.5	85.5	88.5
10		89.5	88.5	89.5	89.5	89.5	90.2	NR	NR
15		90.2	89.5	91.0	91.0	NR	NR	NR	NR
20		90.2	90.2	91.0	91.0	NR	NR	NR	NR

a. Nominal efficiencies shall be established in accordance with DOE 10 CFR 431.

b. For purposes of determining the required minimum nominal full-load *efficiency* of an electric motor that has a horsepower or *kilowatt* rating between two horsepower or two *kilowatt* ratings listed in this table, each such motor shall be deemed to have a listed horsepower or *kilowatt* rating, determined as follows:

1. A horsepower at or above the midpoint between the two consecutive horsepower shall be rounded up to the higher of the two horsepower.
2. A horsepower below the midpoint between the two consecutive horsepower shall be rounded down to the lower of the two horsepower.
3. A *kilowatt* rating shall be directly converted from *kilowatts* to horsepower using the formula 1 *kilowatt* = (1/0.746) horsepower. The conversion should be calculated to three significant decimal places, and the resulting horsepower shall be rounded in accordance with paragraph (1) or (2), whichever applies.

c. NR = no requirement.

**Add Table 10.8-8 as follows (SI).**

**Table 10.8-8 Minimum Nominal Full-Load Efficiencies of NEMA Design A, NEMA Design B and IEC Design N, NE, NEY or NY Specialized Frame Size Air-Over Electric Motors (Excluding Fire Pump Electric Motors) at 60 Hz<sup>a,b,c</sup>**

Motor Power kW	Manufactured Date	Nominal Full-Load Efficiency, %							
		2-Pole		4-Pole		6-Pole		8-Pole	
		Enclosed	Open	Enclosed	Open	Enclosed	Open	Enclosed	Open
0.75	On or after June 1, 2027	74.0	NR	82.5	82.5	80.0	80.0	74.0	74.0
1.1		82.5	82.5	84.0	84.0	85.5	84.0	77.0	75.5
1.5		84.0	84.0	84.0	84.0	86.5	85.5	82.5	85.5
2.2		85.5	84.0	87.5	86.5	87.5	86.5	84.0	86.5
3.7		87.5	85.5	87.5	87.5	87.5	87.5	85.5	87.5
5.5		88.5	87.5	89.5	88.5	89.5	88.5	85.5	88.5
7.5		89.5	88.5	89.5	89.5	89.5	90.2	NR	NR
11		90.2	89.5	91.0	91.0	NR	NR	NR	NR
15		90.2	90.2	91.0	91.0	NR	NR	NR	NR

a. Nominal efficiencies shall be established in accordance with DOE 10 CFR 431.

b. For purposes of determining the required minimum nominal full-load *efficiency* of an electric motor that has a horsepower or *kilowatt* rating between two horsepower or two *kilowatt* ratings listed in this table, each such motor shall be deemed to have a listed horsepower or *kilowatt* rating, determined as follows:

1. A horsepower at or above the midpoint between the two consecutive horsepower shall be rounded up to the higher of the two horsepower.
2. A horsepower below the midpoint between the two consecutive horsepower shall be rounded down to the lower of the two horsepower.
3. A *kilowatt* rating shall be directly converted from *kilowatts* to horsepower using the formula 1 *kilowatt* = (1/0.746) horsepower. The conversion should be calculated to three significant decimal places, and the resulting horsepower shall be rounded in accordance with paragraph (1) or (2), whichever applies.

c. NR = no requirement.

*Add Table 10.8-9 as shown (I-P).*

**Table 10.8-9 Maximum NEMA Specialized Frame Sizes of Air-Over Electric Motors**

<b>Motor Power</b>	<b>Maximum NEMA Specialized Frame Sizes</b>							
	<b>2-Pole</b>		<b>4-Pole</b>		<b>6-Pole</b>		<b>8-Pole</b>	
	<b>Enclosed</b>	<b>Open</b>	<b>Enclosed</b>	<b>Open</b>	<b>Enclosed</b>	<b>Open</b>	<b>Enclosed</b>	<b>Open</b>
<b>hp</b>								
1	48	NR	48	48	48	48	140	140
1.5	48	48	48	48	140	140	140	140
2	48	48	48	48	140	140	180	180
3	140	48	140	140	180	180	180	180
5	140	140	140	140	180	180	210	210
7.5	180	140	180	180	210	210	210	210
10	180	180	180	180	210	210	N/A	N/A
15	210	180	210	210	N/A	N/A	N/A	N/A
20	210	210	210	210	N/A	N/A	N/A	N/A

*Add Table 10.8-9 as shown (SI).*

**Table 10.8-9 Maximum NEMA Specialized Frame Sizes of Air-Over Electric Motors**

<b>Motor Power</b>	<b>Maximum NEMA Specialized Frame Sizes</b>							
	<b>2-Pole</b>		<b>4-Pole</b>		<b>6-Pole</b>		<b>8-Pole</b>	
	<b>Enclosed</b>	<b>Open</b>	<b>Enclosed</b>	<b>Open</b>	<b>Enclosed</b>	<b>Open</b>	<b>Enclosed</b>	<b>Open</b>
<b>kW</b>								
0.75	48	NR	48	48	48	48	140	140
1.1	48	48	48	48	140	140	140	140
1.5	48	48	48	48	140	140	180	180
2.2	140	48	140	140	180	180	180	180
3.7	140	140	140	140	180	180	210	210
5.5	180	140	180	180	210	210	210	210
7.5	180	180	180	180	210	210	N/A	N/A
11	210	180	210	210	N/A	N/A	N/A	N/A
15	210	210	210	210	N/A	N/A	N/A	N/A

## **POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES**

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

**ASHRAE · 180 Technology Parkway · Peachtree Corners, GA 30092 · [www.ashrae.org](http://www.ashrae.org)**

## **About ASHRAE**

Founded in 1894, ASHRAE is a global professional society committed to serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration, and their allied fields.

As an industry leader in research, standards writing, publishing, certification, and continuing education, ASHRAE and its members are dedicated to promoting a healthy and sustainable built environment for all, through strategic partnerships with organizations in the HVAC&R community and across related industries.

To stay current with this and other ASHRAE Standards and Guidelines, visit [www.ashrae.org/standards](http://www.ashrae.org/standards), and connect on LinkedIn, Facebook, Twitter, and YouTube.

## **Visit the ASHRAE Bookstore**

ASHRAE offers its Standards and Guidelines in print, as immediately downloadable PDFs, and via ASHRAE Digital Collections, which provides online access with automatic updates as well as historical versions of publications. Selected Standards and Guidelines are also offered in redline versions that indicate the changes made between the active Standard or Guideline and its previous edition. For more information, visit the Standards and Guidelines section of the ASHRAE Bookstore at [www.ashrae.org/bookstore](http://www.ashrae.org/bookstore).

### **IMPORTANT NOTICES ABOUT THIS STANDARD**

**To ensure that you have all of the approved addenda, errata, and interpretations for this Standard, visit [www.ashrae.org/standards](http://www.ashrae.org/standards) to download them free of charge.**

**Addenda, errata, and interpretations for ASHRAE Standards and Guidelines are no longer distributed with copies of the Standards and Guidelines. ASHRAE provides these addenda, errata, and interpretations only in electronic form to promote more sustainable use of resources.**