



ANSI/ASHRAE/IESNA 100b-1997
(Addendum to ANSI/ASHRAE/IESNA 100-1995)

ASHRAE[®] STANDARD

Addendum *b* to

Energy Conservation in Existing Buildings

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120 Wall Street, 17th Floor, New York, NY 10005-4001

**AMERICAN SOCIETY OF HEATING,
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1791 Tullie Circle, NE • Atlanta, GA 30329

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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.

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(This foreword is not a part of this standard but is included for information purposes only.)

FOREWORD

Standard 100-1995 and Addendum 100a-1996 were approved for publication by ASHRAE, IESNA, and ANSI in 1995 and 1996, respectively. The changes in Addendum 100b were made to resolve the concerns of an individual whose comments on the original standard were unresolved. The text of Addendum 100b replaces the text in the original standard for:

- Section 7.5, including all its subsections and Table 7;
- Section 7.8, excluding all its subsections but 7.8.2.6;
- Subsection 7.8.2.6; and
- References 15 and 16 in Section 8.

7.5 Electric Motors. When electric motors rated at 1 hp and above are replaced, the replacement motors shall conform to this section. All permanently wired polyphase motors of 1 hp or more shall meet the requirements of Sections 7.5.1 and 7.5.2.

7.5.1 Design A & B squirrel-cage, foot-mounted, T-frame induction motors having synchronous speeds of 3600, 1800, 1200, and 900 rpm expected to operate more than 1000 hours per year shall have a nominal full-load motor efficiency no less than that shown in Table 7.

Exceptions:

- (a) Motors used in systems designed to use more than one speed of a multispeed motor.
- (b) Motors used as a component of the equipment meeting the minimum equipment efficiency requirements of Section A2.1 of Appendix A provided that the motor input is included when determining the equipment efficiency.

Alternatively, the efficiency of replacement motors shall comply with Equation 4A;

$$A = B - 14 + (C \times D)^{1/4} \quad (4A)$$

where

- A = required replacement motor efficiency (but not higher than B),
 B = nominal motor efficiency from Table 7,
 C = average cents per kilowatt-hour from 5.3.3.1,
 D = estimated annual hours of operation.

7.5.2 Motor Sizing. Motor horsepower rating should not exceed 125% of the calculated maximum load being served. If a standard rated motor is not available within the range, the next larger standard motor size may be used.

7.5.3 Motors with Variable Output. Whenever variable output of a motor-driven device is required, variable-speed operation shall be provided unless an economic evaluation demonstrates that an alternative such as throttling, bypass, or similar devices has a lower life-cycle cost.

TABLE 7
Minimum Acceptable Nominal Full-Load Motor Efficiency for Single-Speed Polyphase Squirrel-Cage Induction Motors Having Synchronous Speeds of 3600, 1800, 1200, and 900 rpm^a

Number of Poles ⇒	Minimum Nominal Full-Load Efficiency (%)							
	Open Motors				Enclosed Motors			
	2	4	6	8	2	4	6	8
Synchronous Speed (RPM)⇒	3600	1800	1200	900	3600	1800	1200	900
Motor Horsepower								
1 (.8 kW)		82.5	80.0	74.0	75.5	82.5	80.0	74.0
1.5 (1.1 kW)	82.5	84.0	84.0	75.5	82.5	84.0	85.5	77.0
2 (1.5 kW)	84.0	84.0	85.5	85.5	84.0	84.0	86.5	82.5
3 (2.2 kW)	84.0	86.5	86.5	86.5	85.5	87.5	87.5	84.0
5 (3.7 kW)	85.5	87.5	87.5	87.5	87.5	87.5	87.5	85.5
7.5 (5.6 kW)	87.5	88.5	88.5	88.5	88.5	89.5	89.5	85.5
10 (7.5 kW)	88.5	89.5	90.2	89.5	89.5	89.5	89.5	88.5
15 (11.1 kW)	89.5	91.0	90.2	89.5	90.2	91.0	90.2	88.5
20 (14.9 kW)	90.2	91.0	91.0	90.2	90.2	91.0	90.2	89.5
25 (18.7 kW)	91.0	91.7	91.7	90.2	91.0	92.4	91.7	89.5
30 (22.4 kW)	91.0	92.4	92.4	91.0	91.0	92.4	91.7	91.0
40 (29.8 kW)	91.7	93.0	93.0	91.0	91.7	93.0	93.0	91.0
50 (37.3 kW)	92.4	93.0	93.0	91.7	92.4	93.0	93.0	91.7
60 (44.8 kW)	93.0	93.6	93.6	92.4	93.0	93.6	93.6	91.7
75 (56.0 kW)	93.0	94.1	93.6	93.6	93.0	94.1	93.6	93.0
100 (74.6 kW)	93.0	94.1	94.1	93.6	93.6	94.5	94.1	93.0
125 (93.3 kW)	93.6	94.5	94.1	93.6	94.5	94.5	94.1	93.6
150 (111.9 kW)	93.6	95.0	94.5	93.6	94.5	95.0	95.0	93.6
200 (149.2 kW)	94.5	95.0	94.5	93.6	95.0	95.0	95.0	94.1

^a For many applications, efficiencies greater than those listed are likely to be cost-effective. Guidance for evaluating the cost-effectiveness of high-efficiency energy efficient motor applications is given in NEMA MG 10-1994¹⁵ and MG 11-1992.¹⁶

7.8 Lighting Systems. When lighting systems or portions thereof are replaced, the replacement lighting systems shall conform to Section 7.8.

7.8.2.6 General. The total connected lighting power (CLP) for all the rooms or areas where lighting is replaced shall not exceed the greater of (a) that required by 7.8 or (b) the existing CLP.

8. REFERENCES

- 15 *NEMA MG 10-1994, Energy Management Guide for Selection and Use of Fixed Frequency Medium AC Squirrel-Cage Polyphase Induction Motors*, National Electrical Manufacturers Association, 2001 L Street, N.W., Washington DC, 20037.
- 16 *NEMA MG 11-1992, Energy Management Guide for Selection and Use of Single-Phase Motors*, National Electrical Manufacturers Association, 2001 L Street, N.W., Washington DC, 20037.

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.