ANSI/ASHRAE/IESNA Addendum *i* to
ANSI/ASHRAE/IESNA Standard 90.1-2001

# ASHRAE® STANDARD

# Energy Standard for Buildings Except Low-Rise Residential Buildings

**Approved by the ASHRAE Standards Committee on June 28, 2003; by the ASHRAE Board of Directors on July 3, 2003; and by the American National Standards Institute on August 6, 2003.**

**This standard is under continuous maintenance 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. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE web site, *http://www.ashrae.org*, or in paper form from the Manager of Standards. The latest edition of an ASHRAE Standard and printed copies of a public review draft may be purchased from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: *orders@ashrae.org*. Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in U.S. and Canada).**



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## SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus standard developed under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (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 Manager of Standards of ASHRAE should be contacted for:

a. interpretation of the contents of this Standard,
b. participation in the next review of the Standard,
c. offering constructive criticism for improving the Standard,
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**(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.)**

## FOREWORD

*During the development of Standard 90.1-2001, the project committee explicitly chose not to revise standards for three-phase air-cooled air conditioners and heat pumps less than 65,000 Btu/h (19 kW). This decision was based on the close relationship the design of these products has to single-phase air-cooled air conditioners and heat pumps less than 65,000 Btu/h (19 kW), products whose efficiency is regulated in the USA under the National Appliance Energy Conservation Act (NAECA).*

*Concurrent with the development of Standard 90.1-2001, the U.S. Department of Energy (DOE) conducted standards rulemaking to develop and set new efficiency standards for these single-phase products. DOE completed its analysis and published a Final Rule on it in the* Federal Register *(67 FR100, Page 36368) on May 23, 2002. This rule sets efficiency standards for single-phase air-cooled air conditioners and heat pumps at a seasonal energy efficiency ratio, or SEER, rating of 12.0 (SCOP = 3.52) for both split and single-package systems and a heating seasonal performance factor (HSPF) of 7.4 (SCOP = 2.17) for both single-package and split-system heat pumps.*

*In the interest of supporting efficiency improvements to ANSI/ASHRAE/IESNA Standard 90.1, the project committee has adoped a 12 SEER level (SCOP = 3.52) for < 65,000 Btu/h (19 kW) capacity three-phase air-cooled unitary air conditioners and heat pumps, with an additional 7.4 HSPF level (SCOP = 2.17) for such heat pumps.*

*The DOE final rule for single-phase residential central air conditioners sets a new product class for through-the-wall (TTW) systems. For these products, DOE adopted a 10.9 SEER (SCOP = 3.19) for split air conditioners, a 10.6 SEER (SCOP = 3.11) for packaged air conditioners, a 10.9 SEER (SCOP = 3.19) and 7.1 HSPF (SCOP = 2.08) for split heat pumps, and a 10.6 SEER (SCOP = 3.11) and 7.0 HSPF (SCOP = 2.05) for packaged heat pumps. DOE is limiting the size to TTWs with a cooling capacity up to 30,000 Btu/h (8.8 kW) and is proposing the new class for four years only (for products manufactured until January 23, 2010). After January 23, 2010, the standards for these products will be 12 SEER (SCOP = 3.52) and 7.4 HSPF (SCOP = 2.17). The DOE Final Rule also sets a new product class for small-duct, high-velocity (SDHV) systems.*[1] *DOE concluded that the NAECA-prescribed minimum efficiency standards of 10 SEER/6.8 HSPF (SCOP 2.93/1/99) should remain applicable to SDHV systems pending further study to establish appropriate higher standard levels. DOE intends to conduct a separate rulemaking for SDHV systems.*

*The adoption date for the new standards under Standard 90.1 is specified as January 23, 2006, in order to harmonize with the effective date mandated in the DOE Final Rule for single-phase central air conditioner products.*

*The DOE justification of the recommended efficiency levels can be found in its Technical Support Document,* Energy Conservation Standards for Consumer Products: Central Air Conditioners and Heat Pumps, *October 2000* (*posted on DOE's website at* http://www.eere.energy.gov/buildings/appliance_standards/residential/ac_central.html).

[1] A small-duct, high-velocity product is a product that contains a blower and indoor coil combination that is designed for, and produces, at least 1.2 in. (299 Pa) of external static pressure when operated at the certified air volume rate of 220-350 CFM (103.8-165.2 L/s) per rated ton (3.52 kW) of cooling. When applied in the field, small-duct products use high-velocity room outlets (i.e., outlets with velocities generally greater than 1000 fpm [5.1 m/s]) having less than 6.0 in.$^2$ (38.7 cm$^2$) of free area.

**ADDENDUM *i* to 90.1-2001 (I-P and SI Editions)**

***Revise Tables 6.2.1A and 6.2.1B for air conditioners and heat pumps less than 65,000 Btu/h (19 kW) as follows:***

***I-P Edition:***

**TABLE 6.2.1A**
**Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements**

| Equipment Type | Size Category | Heating Section Type | Subcategory or Rating Condition | Minimum Efficiency[b] | Test Procedure[a] |
|---|---|---|---|---|---|
| Air Conditioners, Air Cooled | <65,000 Btu/h[c] | All | Split System | ~~10.0 SEER~~ 10.0 SEER (before 1/23/2006) 12.0 SEER (as of 1/23/2006) | ARI 210/240 |
| | | | Single Package | ~~9.7 SEER~~ 9.7 SEER (before 1/23/2006) 12.0 SEER (as of 1/23/2006) | |
| Through-the-Wall, Air Cooled | ≤ 30,000 Btu/h[c] | All | Split System | 10.0 SEER (before 1/23/2006) 10.9 SEER (as of 1/23/2006) 12 SEER (as of 1/23/2010) | ARI 210/240 |
| | | | Single Package | 9.7 SEER (before 1/23/2006) 10.6 SEER (as of 1/23/2006) 12.0 SEER (as of 1/23/2010) | |
| Small-Duct High-Velocity, Air Cooled | < 65,000 Btu/h[c] | All | Split System | 10 SEER | ARI 210/240 |

***Remainder of table left unchanged.***

**TABLE 6.2.1B**
**Electrically Operated Unitary and Applied Heat Pumps—Minimum Efficiency Requirements**

| Equipment Type | Size Category | Heating Section Type | Subcategory or Rating Condition | Minimum Efficiency[b] | Test Procedure[a] |
|---|---|---|---|---|---|
| Air Cooled (Cooling Mode) | <65,000 Btu/h[c] | All | Split System | ~~10.0 SEER~~ 10.0 SEER (before 1/23/2006) 12.0 SEER (as of 1/23/2006) | ARI 210/240 |
| | | | Single Package | ~~9.7 SEER~~ 9.7 SEER (before 1/23/2006) 12.0 SEER (as of 1/23/2006) | |
| Through-the-Wall (Air Cooled, Cooling Mode) | ≤ 30,000 Btu/h[c] | All | Split System | 10.0 SEER (before 1/23/2006) 10.9 SEER (as of 1/23/2006) 12 SEER (as of 1/23/2010) | ARI 210/240 |
| | | | Single Package | 9.7 SEER (before 1/23/2006) 10.6 SEER (as of 1/23/2006) 12.0 SEER (as of 1/23/2010) | |
| Small-Duct High-Velocity (Air Cooled, Cooling Mode) | < 65,000 Btu/h[c] | All | Split System | 10 SEER | ARI 210/240 |
| Air Cooled (Heating Mode) | <65,000 Btu/h[c] (cooling capacity) | - | Split System | ~~6.8 HSPF~~ 6.8 HSPF (before 1/23/2006) 7.4 HSPF as of 1/23/2006) | ARI 210/240 |
| | | | Single Package | 6.6 HSPF (before 1/23/2006) 7.4 HSPF as of 1/23/2006) | |
| Through-the-Wall, (Air Cooled, Heating Mode) | ≤ 30,000 Btu/h[c] (cooling capacity) | - | Split System | 6.8 HSPF (before 1/23/2006) 7.1 HSPF (as of 1/23/2006) 7.4 HSPF as of 1/23/2010) | ARI 210/240 |
| | | | Single Package | 6.6 HSPF (before 1/23/2006) 7.0 HSPF (as of 1/23/2006) 7.4 HSPF (as of 1/23/2010) | |
| Small-Duct High-Velocity (Air Cooled, Heating Mode) | < 65,000 Btu/h[c] (cooling capacity) | - | Split System | 6.8 HSPF | ARI 210/240 |

***Remainder of table left unchanged.***

***SI Edition:***

**TABLE 6.2.1A**
**Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements**

| Equipment Type | Size Category | Heating Section Type | Subcategory or Rating Condition | Minimum Efficiency[b] | Test Procedure[a] |
|---|---|---|---|---|---|
| Air Conditioners, Air Cooled | <19 kW[c] | All | Split System | ~~2.93 SCOP~~ 2.93 SCOP (before 1/23/2006) 3.52 SCOP (as of 1/23/2006) | ARI 210/240 |
| | | | Single Package | ~~2.84 SCOP~~ 2.84 SCOP (before 1/23/2006) 3.52 SCOP (as of 1/23/2006) | |
| Through-the-Wall, Air Cooled | ≤ 8.8 kW[c] | All | Split System | 2.93 SCOP (before 1/23/2006) 3.19 SCOP (as of 1/23/2006) 3.52 SCOP (as of 1/23/2010) | ARI 210/240 |
| | | | Single Package | 2.84 SCOP (before 1/23/2006) 3.11 SCOP (as of 1/23/2006) 3.52 SCOP (as of 1/23/2010) | |
| Small-Duct High-Velocity, Air Cooled | < 19 kW[c] | All | Split System | 2.93 SCOP | ARI 210/240 |

***Remainder of table left unchanged.***

**TABLE 6.1.2B**
**Electrically Operated Unitary and Applied Heat Pumps—Minimum Efficiency Requirements**

| Equipment Type | Size Category | Heating Section Type | Subcategory or Rating Condition | Minimum Efficiency[b] | Test Procedure[a] |
|---|---|---|---|---|---|
| Air Cooled (Cooling Mode) | <19 kW[c] | All | Split System | ~~2.93 SCOP$_C$~~ 2.93 SCOP$_C$ (before 1/23/2006)<br>3.52 SCOP$_C$ (as of 1/23/2006) | ARI 210/240 |
| | | | Single Package | ~~2.84 SCOP$_C$~~ 2.84 SCOP$_C$ (before 1/23/2006)<br>3.52 SCOP$_C$ (as of 1/23/2006) | |
| Through-the-Wall (Air Cooled, Cooling Mode) | ≤8.8 kW[c] | All | Split System | 2.93 SCOP$_C$ (before 1/23/2006)<br>3.19 SCOP$_C$ (as of 1/23/2006)<br>3.52 SCOP$_C$ (as of 1/23/2010) | ARI 210/240 |
| | | | Single Package | ~~2.84~~ SCOP$_C$ (before 1/23/2006)<br>3.11 SCOP$_C$ (as of 1/23/2006)<br>3.52 SCOP$_C$ (as of 1/23/2010) | |
| Small-Duct High-Velocity (Air Cooled, Cooling Mode) | < 19 kW[c] | All | Split System | 2.93 SCOP$_C$ | ARI 210/240 |
| Air Cooled (Heating Mode) | <19 kW[c] (cooling capacity) | - | Split System | ~~1.99 SCOP$_H$~~ 1.99 SCOP$_H$ (before 1/23/2006)<br>2.17 SCOP$_H$ (as of 1/23/2006) | ARI 210/240 |
| | | | Single Package | ~~1.93 SCOP$_H$~~ 1.93 SCOP$_H$ (before 1/23/2006)<br>2.17 SCOP$_H$ (as of 1/23/2006) | |
| Through-the-Wall (Air Cooled, Heating Mode) | ≤ 8.8 kW[c] (cooling capacity) | - | Split System | 1.99 SCOP$_H$ (before 1/23/2006)<br>2.08 SCOP$_H$ (as of 1/23/2006)<br>2.17 SCOP$_H$ as of 1/23/2010) | ARI 210/240 |
| | | | Single Package | 1.93 SCOP$_H$ (before 1/23/2006)<br>2.05 SCOP$_H$ (as of 1/23/2006)<br>2.17 SCOP$_H$ (as of 1/23/2010) | |
| Small-Duct High-Velocity (Air Cooled, Heating Mode) | < 19 kW[c] (cooling capacity) | - | Split System | 1.99 SCOP$_H$ | ARI 210/240 |

***Remainder of table left unchanged.***

## 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.