



**ANSI/ASHRAE/IES Standard 90.1-2010**  
**(Supersedes ANSI/ASHRAE/IESNA Standard 90.1-2007)**  
Includes ANSI/ASHRAE/IESNA Addenda listed in Appendix F

# ASHRAE STANDARD

## Energy Standard for Buildings Except Low-Rise Residential Buildings

**I-P Edition**

See Appendix F for approval dates by the ASHRAE Standards Committee, the ASHRAE Board of Directors, the IES Board of Directors, and the American National Standards Institute.

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 ([www.ashrae.org](http://www.ashrae.org)) or in paper form from the Manager of Standards. The latest edition of an ASHRAE Standard may be purchased from the ASHRAE Web site ([www.ashrae.org](http://www.ashrae.org)) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: [orders@ashrae.org](mailto:orders@ashrae.org). Fax: 404-321-5478. 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).

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#### NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE Web site at [www.ashrae.org/technology](http://www.ashrae.org/technology).

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## FOREWORD

The original Standard 90 was published in 1975 and revised editions were published in 1980, 1989, and 1999 using the ANSI and ASHRAE periodic maintenance procedures. Based upon these procedures, the entire standard was publicly reviewed and published in its entirety each time. As technology and energy prices began changing more rapidly the ASHRAE Board of Directors voted in 1999 to place the standard on continuous maintenance, permitting the standard to be updated several times each year through the publication of approved addenda to the standard. Starting with the 2001 edition, the standard is now published in its entirety in the fall of every third year. This schedule allows the standard to be submitted and proposed by the deadline for inclusion or reference in model building and energy codes. All approved addenda and errata are included in the new edition, issued every three years. This procedure allows users to have some certainty of the timing of publication of new editions.

The 2010 edition of the standard has extensive changes resulting from continuous maintenance proposals from the public and the committee volunteers. The committee welcomes suggestions for improving the standard. Users of the standard are encouraged and invited to use the continuous maintenance procedure to suggest changes. A form for submitting continuous maintenance proposals (CMP) to suggest changes is included in the back of this standard. The committee takes formal action on every CMP received.

The Committee's unanimously approved Workplan goal for the 2010 edition was to reduce energy cost by 30% compared to the 2004 version of the standard. Toward that goal, 109 addenda were processed by the committee and approved by the ASHRAE and IES Boards of Directors and are included in this edition. This edition also corrects all known typographical errors in the 2007 standard.

The most significant changes included are:

1. The Scope has been expanded so that 90.1 can cover receptacles and process loads (e.g. data centers).
2. The building envelope (opaque elements and fenestration) requirements have become more stringent. Continuous air barrier and cool/high albedo roof requirements have been added.
3. Most interior lighting power densities have been lowered, additional occupant sensing controls and mandatory daylighting requirements are added for specific spaces, and a new five-zone exterior lighting power density table has been added.
4. Most equipment efficiencies are higher, energy recovery is required in more applications, economizers are required in

more climates, and more energy-conserving controls are required.

5. Modeling requirements (e.g. for LEED® certification) have been clarified and expanded.

For brief descriptions and publication dates of the addenda to 90.1-2007, see Appendix F.

At the time of printing, energy cost savings are estimated to be 23.4% and energy savings are estimated at 24.8%. However, not all addenda had been included in analysis for these energy savings estimates. Final saving estimates will be issued by ASHRAE when available.

The 90.1 standard is a fluid document. As technology evolves the project committee is continually considering new changes and proposing addenda for public review. When addenda are approved, notices will be published on the ASHRAE and IES Web sites. Users are encouraged to sign up for the free ASHRAE and IES Internet Listserv for this standard to receive notice of all public reviews and approved and published addenda and errata.

The Chair and Vice Chairs extend grateful thanks to the committee volunteers, public review commentors, and all involved throughout the open, consensus-building process.

## 1. PURPOSE

To establish the minimum energy efficiency requirements of buildings, other than low rise residential buildings, for:

1. design, construction, and a plan for operation and maintenance, and
2. utilization of on-site, renewable energy resources.

## 2. SCOPE

2.1 This standard provides:

- a. minimum energy-efficient requirements for the design, construction, and a plan for operation and maintenance of:
  1. new buildings and their systems
  2. new portions of buildings and their systems
  3. new systems and equipment in existing buildings
  4. new equipment or building systems specifically identified in the standard that are part of industrial or manufacturing processes

- b. criteria for determining compliance with these requirements.

2.2 The provisions of this standard do not apply to:

- a. single-family houses, multi-family structures of three stories or fewer above grade, manufactured houses (mobile homes), and manufactured houses (modular), or
- b. buildings that use neither electricity nor fossil fuel.

2.3 Where specifically noted in this standard, certain other buildings or elements of buildings shall be exempt.

2.4 This standard shall not be used to circumvent any safety, health, or environmental requirements.