**ANSI/ASHRAE/IESNA Standard 90.1-2001**
**(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, and ANSI.**

**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 are given at the back of this document and may be obtained in electronic form from ASHRAE's Internet Home Page, *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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b. participation in the next review of the Standard,
c. offering constructive criticism for improving the Standard,
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## ANSI/ASHRAE/IESNA 90.1-2001
## Energy Standard for Buildings Except Low-Rise Residential Buildings

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

## FOREWORD

The original Standard 90 was published in 1975 and again in 1980, 1989, and 1999 using the ANSI and ASHRAE periodic maintenance procedures. Thus, the entire standard was publicly reviewed and published in its entirety each time. As technology and energy prices are changing more rapidly, the ASHRAE Board of Directors voted in 1999 to place the standard on continuous maintenance.

This 2001 edition of the standard has several new features. The standard will now be issued on a regular three-year cycle. It will be published in its entirety every third year in the fall, starting in 2001. 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 will be included in the new edition every three years. It also allows users to have some certainty about when new editions will be published.

This is also the first time that the standard includes changes resulting from continuous maintenance proposals from the public. 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. The form for Submittal of Proposed Change to ASHRAE Standard Under Continuous Maintenance is included in the back of this standard. The committee will take formal action on every proposal received.

The 2001 edition is the first version to be published using the ANSI and ASHRAE continuous maintenance procedures. Thus, the project committee is continually considering changes and proposing addenda for public review. When addenda are approved, notices will be published on the ASHRAE website. Users are encouraged to sign up for the free ASHRAE internet list server for this standard to receive notice of all public reviews and approved and published addenda and errata.

Changes from the previous 1999 edition of the standard are marked in the margins. A vertical line in the margin shows where something has been changed or added. An arrow in the margin shows where something has been deleted from the prior edition of the standard.

This edition corrects all known typographical errors in the 1999 standard. It includes the content of 34 addenda that were processed by the committee and approved by the ASHRAE and IESNA Boards of Directors.

## 1. PURPOSE

The purpose of this standard is to provide minimum requirements for the energy-efficient design of buildings except low-rise residential buildings.

## 2. SCOPE

**2.1** This standard provides

a. minimum energy-efficient requirements for the design and construction of
   (1) new buildings and their systems,
   (2) new portions of buildings and their systems, and
   (3) new systems and equipment in existing buildings and

b. criteria for determining compliance with these requirements.

**2.2** The provisions of this standard apply to

a. the envelope of buildings, provided that the enclosed spaces are
   (1) heated by a heating system whose output capacity is greater than or equal to 3.4 Btu/h·ft$^2$ or
   (2) cooled by a cooling system whose sensible output capacity is greater than or equal to 5 Btu/h·ft$^2$, and

b. the following systems and equipment used in conjunction with buildings:
   (1) heating, ventilating, and air conditioning,
   (2) service water heating,
   (3) electric power distribution and metering provisions,
   (4) electric motors and belt drives, and
   (5) lighting.

**2.3** 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),
b. buildings that do not use either electricity or fossil fuel, or
c. equipment and portions of building systems that use energy primarily to provide for industrial, manufacturing, or commercial processes.

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

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

## 3. DEFINITIONS, ABBREVIATIONS, AND ACRONYMS

### 3.1 General

Certain terms, abbreviations, and acronyms are defined in this section for the purposes of this standard. These definitions are applicable to all sections of this standard. Terms that are not defined shall have their ordinarily accepted meanings within the context in which they are used. Ordinarily accepted meanings shall be based upon American standard English language usage as documented in an unabridged dictionary accepted by the adopting authority.

### 3.2 Definitions

***above-grade wall:*** see *wall.*

***access hatch:*** see *door.*

***addition:*** an extension or increase in floor area or height of a building outside of the existing building envelope.

***adopting authority:*** the agency or agent that adopts this standard.

***alteration:*** a replacement or addition to a building or its systems and equipment; routine maintenance, repair, and service or a change in the building's use classification or category shall not constitute an alteration.

***annual fuel utilization efficiency (AFUE):*** an efficiency descriptor of the ratio of annual output energy to annual input energy as developed in accordance with the requirements of U.S. Department of Energy (DOE) 10CFR Part 430.

***application part-load value (APLV):*** a single number part-load efficiency figure of merit calculated in accordance with the method described in ARI Standard 550 or 590 referenced to modified rating conditions described in those standards.

***attic and all other roofs:*** see *roof.*

***authority having jurisdiction:*** the agency or agent responsible for enforcing this standard.

***automatic:*** self-acting, operating by its own mechanism when actuated by some nonmanual influence, such as a change in current strength, pressure, temperature, or mechanical configuration. (See *manual.*)

***automatic control device:*** a device capable of automatically turning loads off and on without manual intervention.

***balancing, air:*** adjusting air flow rates through air distribution system devices, such as fans and diffusers, by manually adjusting the position of dampers, splitter vanes, extractors, etc., or by using automatic control devices, such as constant air volume or variable air volume boxes.

***balancing, hydronic:*** adjusting water flow rates through hydronic distribution system devices, such as pumps and coils, by manually adjusting the position valves, or by using automatic control devices, such as automatic flow control valves.

***ballast:*** a device used in conjunction with an electric-discharge lamp to cause the lamp to start and operate under the proper circuit conditions of voltage, current, wave form, electrode heat, etc.

(a) ***electronic ballast:*** a ballast constructed using electronic circuitry.