

ANSI/ASHRAE/IESNA Addendum p to  
ANSI/ASHRAE/IESNA Standard 90.1-2001



# ASHRAE<sup>®</sup> STANDARD

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

Approved by the ASHRAE Standards Committee on October 5, 2003; by the ASHRAE Board of Directors on January 29, 2004; and by the American National Standards Institute on February 25, 2004.

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](mailto: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,
- d. permission to reprint portions of the Standard.

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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.

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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.)**

## **FOREWORD**

The “Energy Cost Budget” section relies on the use of a building energy simulation program to estimate the energy cost difference between the design building model and a budget building model. The building designer can select any building energy simulation program for performing these estimates as long as the program complies with a list of requirements (see Section 11.2.1) describing the minimum capabilities of the software. The current section does not contain any requirements that would indicate the minimum quality of the program being used. This addendum starts to address this omission by requiring that the simulation program be tested with ANSI/ASHRAE Standard 140-2001, Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs.

The addendum proposes a new section that requires that building energy simulation programs be tested using Standard 140 and that the test results be made available. The tests contained in Standard 140 focus primarily on the software’s ability to simulate the building envelope and how that envelope responds to the climate. This is the most fundamental requirement of a building energy simulation program, and, clearly, if this requirement is not met, it does not matter how well chillers and cooling towers are simulated.

The first tests in Standard 140 model a very simple “shoe-box” building. Subsequent tests progressively add new

features to this model so that the impact of each new feature can be separately understood. The results of each test include the simulated annual heating load, annual cooling load, peak heating load, and peak cooling load. An informative appendix to Standard 140 contains the results of these tests for eight different programs including DOE-2, BLAST, ESP, and TRNSYS.

No one simulation program provides the correct answers. There is no “right” answer. These programs use many different algorithms and simulation assumptions, and none can perfectly simulate a building’s actual energy consumption. The best these programs can do is estimate the energy consumption using various degrees of simplification. The Standard 140 method of test requires the testing of the building energy simulation program by the software developer and for the developer to examine the differences between the performance of its program and the other programs. In this way, errors in the software can be diagnosed.

Requiring the building energy simulation program to be tested using the Standard 140 procedure provides benefits to persons using the energy cost budget method by prompting developers to fix bugs found during the testing.

### **Addendum p to 90.1-2001 (I-P and SI editions)**

*Add the following subsection to Section 11.2.1:*

**11.2.1.4** The simulation program shall be tested according to ANSI/ASHRAE Standard 140 and the results shall be furnished by the software provider.

*Add the following normative reference to Section 12:*  
ANSI/ASHRAE Standard 140-2001, *Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs*

## **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.