ANSI/ASHRAE/IESNA Addendum y to
ANSI/ASHRAE/IESNA Standard 90.1-2004

# ASHRAE STANDARD

# Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on June 24, 2006; by the ASHRAE Board of Directors on June 29, 2006; by IESNA on June 18, 2006; and by the American National Standards Institute on March 3, 2007.

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 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 US 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.

**(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. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)**

## FOREWORD

*The high albedo roof provisions of Standard 90.1-2004 were reviewed with the intent of coordinating with Standard 90.2-2004. It is recommended to modify the exception to Section 5.5.3.1 by adding the ASTM test method E 1980-Standard Practice for Calculating Solar Reflectance Index (SRI) of Horizontal and Low Sloped Opaque Surfaces. This test method employs the use of the solar reflectance and thermal emittance values of a roof product in the ASTM E1980 calculation to derive the SRI. The SRI minimum value of 82 was chosen as it represents the rounded value when applying the two current minimum values, solar reflectance of 0.70 and thermal emittance of 0.75, when applied to the calculation at medium wind speed condition.*

*The reasons for this are twofold. First, this is another test method that will allow additional roof products to meet the high albedo roof requirements of Standard 90.1 and in our view more paths toward compliance will encourage energy efficiency. Second, Standard 90.2-2004 contains this test method; therefore, there is an attempt to bring both standards into near agreement on the subject of high albedo roof provisions.*

*It is proposed to modify Chapter 12, "Normative References" to introduce ASTM E1980 in the listing of ASTM references.*

***Note:** In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes. Only these changes are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed substantive changes.*

## Addendum y to 90.1-2004 (I-P and SI Editions)

*Revise 5.5.3.1 as follows:*

**5.5.3.1 Roof Insulation.** All *roofs* shall comply with the insulation values specified in Tables 5.5-1 through 5.5-8. Skylight curbs shall be insulated to the level of roofs with insulation entirely above deck or R-5, whichever is less.

**Exception to 5.5.3.1:** For *roofs* where the exterior surface has a minimum total solar reflectance of 0.70 when tested in accordance with one of the solar reflectance test methods listed below and has a minimum thermal emittance of 0.75 when tested in accordance with one of the thermal emittance test methods listed below, or a minimum Solar Reflective Index of 82 when determined in accordance with the Solar Reflectance Index method listed below, other than roofs with ventilated attics or roofs with semiheated spaces, the U-factor of the proposed roof shall be permitted to be adjusted using Equation 5-1 for demonstrating compliance:

$$U_{roofadj} = U_{roofproposed} \times Factor_{roofmultiplier} \qquad (5\text{-}1)$$

where

$U_{roofadj}$ = the adjusted roof U-factor for use in demonstrating compliance

$U_{roofproposed}$ = the U-factor of the proposed roof, as designed

$Factor_{roofmultiplier}$ = the roof U-factor multiplier from Table 5.5.3.1

**TABLE 5.5.3.1 Roof U-Factor Multipliers for Exception to 5.5.1.1.**

| Climate Zone | Roof U-Factor Multiplier |
|---|---|
| 1 | 0.77 |
| 2 | 0.83 |
| 3 | 0.85 |
| 4 through 8 | 1.00 |

Solar Reflectance Test Methods: ASTM E903, ASTM E1175, or ASTM E1918.

Thermal Emittance Test Methods: ASTM C835, ASTM C1371, or ASTM E408.

Solar Reflectance Index Method: ASTM E1980 calculated at medium wind speed conditions.

*Add the following reference to Section 12:*

**American Society for Testing and Materials,**

**100 Barr Harbor Dr., West Conshohocken, PA 19428-2959**

ASTM E1980-(2001), Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low Sloped Opaque Surfaces

*Revise Table G3.1, 5 Building Envelope, exception (c) as follows:*

…

c. For exterior roofs, the roof surface may be modeled with a reflectance of 0.45 if the reflectance of the *proposed design* roof is greater than 0.70 and its emittance is greater than 0.75, or it has a minimum SRI of 82. Reflectance values shall be based on testing in accordance with ASTM E903, ASTM E1175, or ASTM E1918, ~~and the~~ emittance values shall be based on testing in accordance with ASTM C835, ASTM C1371, or ASTM E408, and SRI shall be based on ASTM E1980 calculated at medium wind speed. All other roof surfaces shall be modeled with a reflectance of 0.30.

## 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.