ADDENDA

ANSI/ASHRAE/IES Addendum db to
ANSI/ASHRAE/IES Standard 90.1-2013

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on June 25, 2016; by the ASHRAE Technology Council on June 29, 2016; by the IES Board of Directors on June 27, 2016; and by the American National Standards Institute on June 30, 2016.

This addendum was approved 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 website (www.ashrae.org) or in paper form from the Senior Manager of Standards.

The latest edition of an ASHRAE Standard may be purchased on the ASHRAE website (www.ashrae.org) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 678-539-2129. 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.

© 2016 ASHRAE ISSN 1041-2336

ASHRAE

IES Illuminating ENGINEERING SOCIETY

Approved American National Standard ANSI www.ansi.org

ASHRAE Standing Standard Project Committee 90.1
Cognizant TC: 7.6, Systems Energy Utilization
SPLS Liaison: Roger Hedrick
ASHRAE Staff Liaison: Steven C. Ferguson
IES Liaison: Rita M. Harrold

Drake Erbe*, *Chair*	Harry Misuriello*	John Dunlap
Thomas Culp*, *Vice-Chair*	Frank Morrison*	Chuck Foster
Richard, Lord*, *Vice-Chair*	Frank Myers*	Sam Francis
Peter Baselici *	Ron Nickson*	John Green
Sean Beilman*	Tim Peglow*	Chad Groshart
Jeff Boldt*	Eric Richman*	David Handwork
Ernie Conrad*	Steve Rosenstock*	Stan Harbuck
Charles Cottrell*	Bob Ross*	Mike Houston
Jay Crandall*	Marty Salzburg*	Richard Hermans
Craig Drumheller*	Leonard Sciarra*	Michael Ivanovich
Jim Garrigus*	Frank Stanonik*	Hy Kaplan
Jason Glazer*	Wayne Stoppelmoor*	Neil Leslie
Krishnan Gowri*	Christian Taber*	Merle McBride
Pekka Hakkarainen*	William Talbert*	Benjamin Meyer
Susanna Hanson*	Steven Taylor*	Keith Nelson
Richard Heinisch*	Martha VanGeem*	Steve Orlowski
Ned Heminger*	McHenry Wallace*	Amy Schmidt
Dave Herron*	Jerry White*	David Shepherd
Scott Hintz*	Jeremy Williams*	Don Surrena
John Hogan*	Karim Amrane	Stephen Szoke
Jonathan Humble*	Gary Ash	Mike Tillou
Itzhak Maor*	Joseph Brooks	Doug Tucker
Chris Mathis*	Don Brundage	Richard Watson
Michael Mehl*	Brandon Damas	Jason Wilen

** Denotes voting member at time of publication.*

ASHRAE STANDARDS COMMITTEE 2015–2016

Douglass T. Reindl, *Chair*
Rita M. Harrold, *Vice-Chair*
James D. Aswegan
Niels Bidstrup
Donald M. Brundage
John A. Clark
Waller S. Clements
John F. Dunlap
James W. Earley, Jr.
Keith I. Emerson
Steven J. Emmerich
Julie M. Ferguson
Walter T. Grondzik
Roger L. Hedrick
Srinivas Katipamula
Rick A. Larson
Lawrence C. Markel
Arsen K. Melikov
Mark P. Modera
Cyrus H. Nasseri
Heather L. Platt
David Robin
Peter Simmonds
Dennis A. Stanke
Wayne H. Stoppelmoor, Jr.
Jack H. Zarour
Julia A. Keen, *BOD ExO*
James K. Vallort, *CO*

Stephanie C. Reiniche, *Senior Manager of Standards*

SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus standard developed under the auspices of 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, or
d. permission to reprint portions of the Standard.

DISCLAIMER

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.

ASHRAE INDUSTRIAL ADVERTISING POLICY ON STANDARDS

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.

© ASHRAE (www.ashrae.org). For personal use only. Additional reproduction, distribution,
or transmission in either print or digital form is not permitted without ASHRAE's prior written permission.

(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

This addendum modifies the standard to use consistent terminology when a building official or rating authority is responsible for reviewing a design seeking compliance in accordance with Section 4.2.1.1 or a submission using the Performance Rating Method.

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.

Addendum db to 90.1-2013

Revise the standard as follows (I-P and SI):

building official: the officer or other designated ~~representative authorized to act on behalf of the authority having jurisdiction~~ authority having jurisdiction charged with the administration and enforcement of this standard, or a duly authorized representative.

~~***code official: see building official.***~~

rating authority: the organization~~, building official,~~ or agency that adopts~~, enforces,~~ or sanctions use of ~~this rating method~~ Normative Appendix G when quantifying performance that exceeds the requirements of this standard.

6.5.3.1.2 Motor Nameplate Horsepower. For each fan, the selected fan motor shall be no larger than the first available motor size greater than the bhp. The fan bhp must be indicated on the design documents to allow for compliance verification by the ~~code~~ building official.

11. ENERGY COST BUDGET METHOD

TABLE 11.5.1 Modeling Requirements for Calculating Design Energy Cost and Energy Cost Budget *(Continued)*

6. Lighting – Proposed Building Design

e. The lighting schedules in the proposed building design shall reflect the mandatory automatic lighting control requirements in Section 9.4.1 (e.g., programmable controls or occupancy sensors).

Exception: Automatic daylighting controls required by Section 9.4.1 shall be modeled directly in the proposed building design or through schedule adjustments determined by a ~~separate~~ daylighting analysis approved by the ~~rating authority~~ building official.

11.5.2 HVAC Systems. The HVAC system type and related performance parameters for the budget building design shall be determined from Figure 11.5.2, the system descriptions in Table 11.5.2-1 and accompanying notes and the following rules…

i. The equipment capacities for the budget building design shall be sized proportionally to the capacities in the proposed building design based on sizing runs, i.e., the ratio between the capacities used in the annual simulations and the capacities determined by the sizing runs shall be the same for both the proposed building design and budget building design. Unmet load hours for the proposed design or baseline building designs shall not exceed 300. The unmet load hours for the proposed design shall not exceed the unmet load hours for the budget building. Alternatively, unmet load hours exceeding these limits may be accepted ~~at the discretion of the rating authority~~ as approved by the building official, provided that sufficient justification is given indicating that the accuracy of the simulation is not significantly compromised by these unmet loads.

© ASHRAE (www.ashrae.org). For personal use only. Additional reproduction, distribution, or transmission in either print or digital form is not permitted without ASHRAE's prior written permission.

NORMATIVE APPENDIX G PERFORMANCE RATING METHOD

G1. GENERAL

G1.1 Performance Rating Method Scope. ~~This building performance rating method is a modification of the Energy Cost Budget (ECB) Method in Section 11 and is intended for use in rating the energy efficiency of building designs that exceed the requirements of this standard.~~ This Appendix offers an alternative ~~compliance~~ path for minimum Standard compliance ~~per~~ in accordance with Section 4.2.1.1 when administered by a building official. It ~~and~~ is also provided for those wishing to use ~~the methodology developed for this standard~~ this appendix to quantify performance that ~~substantially~~ exceeds the requirements of this standard when administered by a rating authority and, not seeking minimum standard compliance in accordance with Section 4.2.1.1. It shall be used for evaluating the performance of all such proposed designs, including alterations and additions to existing buildings, except designs with no mechanical systems. In the case where this appendix is administered solely by a building official to determine compliance with this standard in accordance with Section 4.2.1.1, all references to "*rating authority*" shall be replaced with "*building official*."

G1.3 Trade-Off Limits. When the proposed modifications apply to less than the whole building, only parameters related to the systems to be modified shall ~~be allowed to~~ vary. Parameters relating to unmodified existing conditions or to future building components shall be identical for determining both the baseline building performance and the proposed building performance. Future building components shall meet the prescriptive requirements of Sections 5.5, 6.5, 7.5, and either 9.5 or 9.6.

When using ~~the Performance Rating Method~~ this appendix as an alternative path for minimum standard compliance ~~per~~ in accordance with Section 4.2.1.1, trade-offs and credits for energy efficiency improvement shall be limited to the scope of work identified in the building permit. For new buildings or additions, the ~~Performance Rating Method~~ results from the use of this appendix shall not be submitted for building permit approval to the ~~rating authority~~ building official prior to submittal for approval of the building envelope design.

G2.5 Exceptional Calculation Methods. When the simulation program does not model a design, material, or device of the proposed design, an Exceptional Calculation Method shall be used ~~if~~ as approved by the rating authority. ~~If~~ Where there are multiple designs, materials, or devices that the simulation program does not model, each shall be calculated separately and Exceptional Savings determined for each. At no time shall the total Exceptional Savings constitute more than half of the difference between the baseline building performance and the proposed building performance. All applications for approval of an exceptional method shall include:

TABLE G3.1 Modeling Requirements for Calculating Proposed and Baseline Building Performance *(Continued)*

4. Schedules - Proposed Building Performance

Schedules capable of modeling hourly variations in occupancy, lighting power, miscellaneous equipment power, thermostat setpoints, and HVAC system operation shall be used. The schedules shall be typical of the proposed building type as determined by the designer and approved by the rating authority.

4. Schedules - Baseline Building Performance

Same as proposed building design

Exceptions …

2. Schedules may be allowed to differ between proposed design and baseline building design when necessary to model nonstandard efficiency measures, provided that the revised schedules have ~~the approval of~~ been approved by the rating authority. Measures that may warrant use of different schedules include, but are not limited to, automatic lighting controls, automatic natural ventilation controls, automatic demand control ventilation controls, and automatic controls that reduce service water heating loads. In no case shall schedules differ where the controls are manual (e.g., manual operation of light switches or manual operation of windows).

[. . .]

© ASHRAE (www.ashrae.org). For personal use only. Additional reproduction, distribution,
or transmission in either print or digital form is not permitted without ASHRAE's prior written permission.

12. Receptacle and Other Loads – Proposed Building Performance

Receptacle and process loads, such as those for office and other equipment, shall be estimated based on the building type or space type category and shall be assumed to be identical in the proposed and baseline building designs, except as specifically ~~authorized~~ approved by the rating authority. These loads shall be included in simulations of the building and shall be included when calculating the baseline building performance and proposed building performance.

12. Receptacle and Other Loads – Proposed Building Performance

Receptacle and process loads, such as those for office and other equipment, shall be estimated based on the building type or space type category and shall be assumed to be identical in the proposed and baseline building designs, except as specifically ~~authorized~~ approved by the rating authority only when quantifying performance that exceeds the requirements of Standard 90.1, but not when the Performance Rating Method is used as an alternative path for minimum standard compliance ~~per~~ in accordance with Section 4.2.1.1. These loads shall always be included in simulations of the building. These loads shall be included when calculating the baseline building performance and proposed building performance as required by Section G1.2.2.

12. Receptacle and Other Loads – Baseline Building Performance

Other systems, such as motors covered by Section 10, and miscellaneous loads shall be modeled as identical to those in the proposed design including schedules of operation and control of the equipment. Where there are specific efficiency requirements listed in Sections 5 through 10, these systems or components shall be modeled as having the lowest efficiency allowed by those requirements. Where no efficiency requirements exist, power and energy rating or capacity of the equipment shall be identical between the baseline building and the proposed design with the following exception:

Exception: When quantifying performance that exceeds the requirements of Standard 90.1 (but not when using the Performance Rating Method as an alternative path for minimum standard compliance per Section 4.2.1.1),variations of the power requirements, schedules, or control sequences of the equipment modeled in the baseline building from those in the proposed design shall be ~~allowed by~~ approved by the rating authority based upon documentation that the equipment installed in the proposed design represents a significant verifiable departure from documented conventional practice. The burden of this documentation is to demonstrate that accepted conventional practice would result in baseline building equipment different from that installed in the proposed design. Occupancy and occupancy schedules shall not be changed.

G3.1.2.4 Modeling Building Envelope Infiltration.

Exception: A multi-zone airflow model alternate method to model building envelope infiltration may be used provided the following criteria are met:

1. ~~If~~ Where the calculations are made independently of the energy simulation program, the proposed method must comply with Section G2.5.
2. The method for converting the air infiltration rate of the building envelope at 0.3 in. w.c., or 1.57 psf, to the appropriate units for the simulation program is fully documented and submitted to the rating authority for approval.

G3.1.2.3 Unmet Loads. Unmet load hours for the proposed design or baseline building designs shall not exceed 300 (of the 8,760 hours simulated). Alternatively, unmet load hours exceeding these limits ~~may~~ shall be permitted to be accepted ~~at the discretion of~~ upon approval by the rating authority, provided that sufficient justification is given indicating that the accuracy of the simulation is not significantly compromised by these unmet loads.

G3.1.2.6 Ventilation. Minimum ventilation system outdoor air intake flow shall be the same for the proposed and baseline building designs.

Exceptions …

3. ~~If~~ Where the minimum outdoor air intake flow in the proposed design is provided in excess of the amount required by the building code or the rating authority, ~~or building official then~~ the baseline building design shall be modeled to reflect the greater of that required by either the rating authority or the building code ~~official~~ and will be less than the proposed design.

© ASHRAE (www.ashrae.org). For personal use only. Additional reproduction, distribution,
or transmission in either print or digital form is not permitted without ASHRAE's prior written permission.

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.

ASHRAE · 1791 Tullie Circle NE · Atlanta, GA 30329 · www.ashrae.org

8/16