

ADDENDA

**ANSI/ASHRAE/IES Addendum bg to
ANSI/ASHRAE/IES Standard 90.1-2019**

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on June 25, 2022; by the ASHRAE Board of Directors on June 29, 2022; by the Illuminating Engineering Society on June 17, 2022; and by the American National Standards Institute on July 29, 2022.

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. Instructions for how to submit a change can be found on the ASHRAE® website (<https://www.ashrae.org/continuous-maintenance>).

The latest edition of an ASHRAE Standard may be purchased on the ASHRAE website (www.ashrae.org) or from ASHRAE Customer Service, 180 Technology Parkway, Peachtree Corners, GA 30092. 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.

© 2022 ASHRAE

ISSN 1041-2336



ASHRAE Standard Project Committee 90.1

Cognizant TC: 7.6 Systems Energy Utilization

SPLS Liaison: Charles Barnaby

ASHRAE Staff Liaisons: Emily Toto

IES Liaison: Mark Lien

Donald Brundage*, <i>Chair</i>	Melissa Goren*	Michael Lane*	Steven Rosenstock*
Thomas Culp*, <i>Co-Vice Chair</i>	Krishnan Gowri	Toby Lau	Loren Ross
Richard Lord*, <i>Co-Vice Chair</i>	Aaron Gunzner	Chonghui Liu	Robert Ross*
Rahul Athalye	David Handwork*	Joel Martell*	Marty Salzberg*
William Babbington	David Herron*	Christopher Mathis*	Greg Schluterman
John Bade*	Armin Hauer	Merle McBride	Amy Schmidt
Sean Beilman*	Gary Heikkinen	James McClendon*	Leonard Sciarra*
Kyle Bergeron	Mark Heizer	Benjamin Meyer*	Kelly Seeger*
Jeffrey Boldt*	Scott Hintz*	Darren Meyers	Sean Smith
Scott Campbell	Emily Hoffman	Harry Misuriello	Wayne Stoppelmoor*
Elizabeth Cassin	Mike Houston*	Frank Morrison*	Matthew Swenka
Paula Cino*	Jonathan Humble*	Michael Myer	Christian Taber*
Glen Clapper	Michael Ivanovich	Frank Myers*	Steven Taylor*
Ernest Conrad*	Harold Jepsen	James C. Moore	Douglas Tucker
Jay Crandell*	Greg Johnson	Michael Patterson*	Martha VanGeem*
Brandon Damas*	Chad Johnson	Timothy Peglow*	McHenry Wallace*
Julie Donovan*	Duane Jonlin*	Tien Peng	Jerry White*
Craig Drumheller*	Michael Jouaneh	Amber Wood*	Jeremiah Williams*
David Fouss	Maria Karpman*	Laura Petrillo-Groh*	
Phillip Gentry	Andrew Klein	Catherine Rivest	
Jason Glazer*	Vladimir Kochkin	Michael Rosenberg*	

* Denotes members of voting status when the document was approved for publication

ASHRAE STANDARDS COMMITTEE 2021–2022

Rick M. Heiden, <i>Chair</i>	Srinivas Katipamula	Julie Majurin	Christian R. Taber
Susanna S. Hanson, <i>Vice-Chair</i>	Gerald J. Kettler	Lawrence C. Markel	Russell C. Tharp
Charles S. Barnaby	Essam E. Khalil	Margret M. Mathison	William F. Walter
Robert B. Burkhead	Malcolm D. Knight	Gwelen Paliaga	Craig P. Wray
Thomas E. Cappellin	Jay A. Kohler	Justin M. Prosser	Jaap Hogeling, BOD ExO
Douglas D. Fick	Cesar L. Lim	David Robin	Tim J. McGinn, CO
Michael W. Gallagher	Paul A. Lindahl, Jr.	Lawrence J. Schoen	
Patricia Graef	James D. Lutz	Steven C. Sill	

Connor Barbaree, *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 Senior Manager of Standards of ASHRAE should be contacted for

- interpretation of the contents of this Standard,
- participation in the next review of the Standard,
- offering constructive criticism for improving the Standard, or
- 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.

(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

Addendum bg modifies Section 8, "Power," Section 9, "Lighting," Section 10, "Equipment," Section 11, "Energy Cost Budget (ECB)," and Normative Appendix G, "Performance Rating Method" to account for changes to title, purpose, and scope made by published Addendum cb to Standard 90.1-2019. Addendum cb includes definitions and clarifications to sites associated with buildings, as well as stand-alone sites.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~striking through~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum bg to Standard 90.1-2019

Modify Section 3.2 as shown (I-P and SI).

3.2 Definitions

[...]

lighting power allowance (LPA), exterior: the maximum lighting power in watts allowed for the exterior of a ~~building property~~.

[...]

property: building or site

[...]

Modify Section 8 as shown (I-P and SI).

8.1.2 New Buildings, New Site Systems and Equipment. Building power distribution eEquipment installed in new buildings shall comply with the requirements of ~~this s~~Section 8.2.

8.1.3 Additions to Existing Buildings-Systems and Equipment. Building power distribution eEquipment installed in addition to existing buildings and existing sites shall comply with the requirements of ~~this s~~Section 8.2.

8.1.4 Alterations to Existing Buildings-Service Equipment, Systems and Equipment

[...]

8.1.4.1 Alterations to building service equipment and systems shall comply with the requirements of ~~this s~~Section 8, as applicable to those specific portions of the ~~building and its systems~~ that are being altered.

8.1.4.2 Alterations to systems shall comply with the requirements of Section 8, as applicable to those specific portions that are being altered.

8.1.4.2.3 Any new *equipment* subject to the requirements of this section that is installed in conjunction with the *alterations* as a direct replacement of *existing equipment* shall comply with the specific requirements applicable to that *equipment*.

[...]

8.7.3.1 Record Documents. *Construction documents* shall require that within 90 days after the date of *system* acceptance, *record documents* shall be provided to the ~~building property~~ owner including

- a ~~single line diagram~~ single-line diagram of the ~~building property~~ electrical ~~distribution system~~ distribution system, and
- floor plans indicating location and area served for all distribution, and
- site plans indicating location and area served for all distribution.

8.7.3.2 Manuals. *Construction documents* shall require that an operating manual and maintenance manual be provided to the building property owner.

[...]

Modify Section 9 as shown (I-P and SI).

9.1.1 Scope

9.1.1.1 New Buildings, New Site Systems and Equipment. ~~Lighting equipment and systems serving the lighting needs of new buildings, or new site systems and equipment, shall comply with the requirements of this section as described in Section 9.2.~~

This section shall apply to the following:

- a. Lighting equipment and systems serving interior spaces of buildings.
- b. Lighting equipment and systems serving Exterior applications lighting that is powered through the building's electrical service.

Exceptions to 9.1.1.1:

1. Emergency lighting that is *automatically* off during normal ~~building~~ operation.

[...]

9.1.1.2 Additions to Existing Buildings Systems and Equipment. ~~Lighting Equipment and systems~~ installed in additions to existing buildings and existing sites shall comply with the requirements of Section 9.1.1.1.

9.1.1.3 Alterations to Existing Buildings Systems and Equipment. The alteration of a ~~lighting Equipment and systems~~ in an interior *space* shall comply with Section 9.1.2.1. The alteration of a ~~lighting system~~ in an exterior ~~area~~ application shall comply with Section 9.1.2.2.

[...]

9.4.1 Lighting Control. ~~Building~~ Lighting controls shall be installed to meet the provisions of Sections 9.4.1.1, 9.4.1.2, 9.4.1.3, and 9.4.1.4.

[...]

9.6.3.1 Record Documents. *Construction documents* shall require that within 90 days after the date of system acceptance, *record documents* be provided to the building property owner or the designated representative of the building property owner. *Record documents* shall include, as a minimum, the location *luminaire* identifier, *control*, and circuiting for each piece of *lighting equipment*.

9.6.3.2 Manuals. *Construction documents* shall require for all *lighting equipment* and *lighting controls* that an operating manual and maintenance manual be provided to the building property owner or the designated representative of the building property owner within 90 days after the date of system acceptance. These manuals shall include, at a minimum, the following:

[...]

Modify Section 10 as shown (I-P and SI).

10.1.1.1 New Buildings, New Site Systems and Equipment. Other *equipment* installed in ~~new buildings~~ shall comply with the requirements of ~~this Section 10.2.~~

10.1.1.2 Additions to Existing Buildings Systems and Equipment. Other *equipment* installed in additions to existing buildings and existing sites shall comply with the requirements of ~~this Section 10.2.~~

10.1.1.3 Alterations to Existing Buildings Service Equipment, Systems and Equipment

10.1.1.3.1 Alterations to other building service equipment or systems shall comply with the requirements of ~~this Section 10.2~~ applicable to those specific portions of the *building and its systems* that are being altered.

10.1.1.3.2 Alterations to systems shall comply with the requirements of Section 10.2, as applicable to those specific portions that are being altered.

10.1.1.3.3 Any new *equipment* subject to the requirements of this section that is installed in conjunction with the *alterations* as a direct replacement of *existing equipment* or *control devices* shall comply with the specific requirements applicable to that *equipment* or *control devices*.

[...]

Modify Section 11 as shown (I-P and SI).

Exception to 11.5.1: Energy used to recharge or refuel vehicles that are used for off-~~building-site~~ transportation purposes shall not be modeled for the *design energy cost* or the *energy cost budget*.

Table 11.5.1 Modeling Requirements for Calculating *Design Energy Cost* and *Energy Cost Budget*

<i>Proposed Design (Column A)</i> <i>Design Energy Cost (DEC)</i>	<i>Budget Building Design (Column B)</i> <i>Energy Cost Budget (ECB)</i>
[...]	
12. Miscellaneous Loads	
Receptacle, motor, and <i>process loads</i> shall be modeled and estimated based on the <i>building area type</i> or <i>space type</i> category and shall be assumed to be identical in the proposed and <i>budget building designs</i> . These loads shall be included in simulations of the <i>building</i> and shall be included when calculating the <i>energy cost budget</i> and <i>design energy cost</i> . All end-use load components within and associated with the <i>building property</i> shall be modeled, unless specifically excluded by Section 13 of Table 11.5.1, including but not limited to exhaust fans, parking garage <i>ventilation</i> fans, exterior <i>building property</i> lighting, swimming <i>pool</i> heaters and pumps, elevators and escalators, and cooking <i>equipment</i> .	Same as <i>proposed design</i> .
[...]	

[...]

Modify Normative Appendix G as shown (I-P and SI).

[...]

G1.2.2 Performance Rating Calculation. The performance of the *proposed design* is calculated in accordance with provisions of this appendix using the following formula:

$$\text{Performance Cost Index} = \frac{\text{Proposed building performance}}{\text{Baseline building performance}}$$

Both the *proposed building performance* and the *baseline building performance* shall include all end-use load components within and associated with the ~~*building property*~~ when calculating the Performance Cost Index.

Exception to G1.2.2: Energy used to recharge or refuel vehicles that are used for off-~~building-site~~ transportation purposes shall not be modeled in the *baseline building performance* or the *proposed building performance*.

[...]

Table G3.1 Modeling Requirements for Calculating Proposed Building Performance and Baseline Building Performance

No.	Proposed Building Performance	Baseline Building Performance
1. Design Model		
a.	The simulation model of the <i>proposed design</i> shall be consistent with the design documents, including proper accounting of <i>fenestration</i> and <i>opaque building</i> envelope types and areas; interior lighting power and <i>controls</i> ; <i>HVAC system</i> types, sizes, and <i>controls</i> ; and <i>service water-heating systems</i> and <i>controls</i> . All end-use load components within and associated with the <i>building-property</i> shall be modeled, including but not limited to exhaust fans, parking garage ventilation fans, snow-melt and freeze-protection <i>equipment</i> , facade lighting, swimming pool heaters and pumps, elevators and escalators, refrigeration, and cooking. Where the <i>simulation program</i> does not specifically model the functionality of the installed system, spreadsheets or other documentation of the assumptions shall be used to generate the power demand and operating schedule of the systems.	<p>The <i>baseline building design</i> shall be modeled with the same number of floors and <i>identical conditioned floor areas</i> as the <i>proposed design</i>.</p> <p>The <i>baseline building design</i> shall be developed by modifying the <i>proposed design</i> as described in Section G3. Except as specifically instructed, all <i>building-systems</i> and <i>equipment</i> shall be modeled identically in the <i>proposed design</i> and <i>baseline building design</i>.</p>
[...]		
10. HVAC Systems		
[...]		
		<p>[...]</p> <p>Exception: For <i>fossil fuel systems</i> where natural gas is not available for the proposed <i>building-site</i> as determined by the <i>rating authority</i>, the baseline <i>HVAC systems</i> shall be modeled using propane as their <i>fuel</i>.</p> <p>[...]</p>
[...]		
11. Service Water-Heating Systems		
[...]		
		<p>[...]</p> <p>Exception to (h): Where natural gas is not available for the proposed <i>building-site</i>, as by the <i>rating authority</i>, gas storage <i>water heaters</i> shall be modeled using propane as their <i>fuel</i>.</p> <p>[...]</p>
[...]		

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 • 180 Technology Parkway • Peachtree Corners, GA 30092 • www.ashrae.org

About ASHRAE

Founded in 1894, ASHRAE is a global professional society committed to serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration, and their allied fields.

As an industry leader in research, standards writing, publishing, certification, and continuing education, ASHRAE and its members are dedicated to promoting a healthy and sustainable built environment for all, through strategic partnerships with organizations in the HVAC&R community and across related industries.

To stay current with this and other ASHRAE Standards and Guidelines, visit www.ashrae.org/standards, and connect on LinkedIn, Facebook, Twitter, and YouTube.

Visit the ASHRAE Bookstore

ASHRAE offers its Standards and Guidelines in print, as immediately downloadable PDFs, and via ASHRAE Digital Collections, which provides online access with automatic updates as well as historical versions of publications. Selected Standards and Guidelines are also offered in redline versions that indicate the changes made between the active Standard or Guideline and its previous version. For more information, visit the Standards and Guidelines section of the ASHRAE Bookstore at www.ashrae.org/bookstore.

IMPORTANT NOTICES ABOUT THIS STANDARD

To ensure that you have all of the approved addenda, errata, and interpretations for this Standard, visit www.ashrae.org/standards to download them free of charge.

Addenda, errata, and interpretations for ASHRAE Standards and Guidelines are no longer distributed with copies of the Standards and Guidelines. ASHRAE provides these addenda, errata, and interpretations only in electronic form to promote more sustainable use of resources.