

ANSI/ASHRAE/ICC/USGBC/IES Addendum av to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017

Standard for the Design of High-Performance Green Buildings

Except Low-Rise Residential Buildings

The Complete Technical Content of the International Green Construction Code®

Approved by ASHRAE and the American National Standards Institute on July 6, 2020; by the International Code Council on June 1, 2020; by the U.S. Green Building Council on June 3, 2020; and by the Illuminating Engineering Society on July 1, 2020.

These addenda were 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 (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, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305, telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in the United States and Canada), or e-mail: orders@ashrae.org. For reprint permission, go to www.ashrae.org/permissions.

© 2020 ASHRAE

ISSN 1041-2336



ASHRAE Standing Standard Project Committee 189.1
Cognizant TC: 2.8 Building Environmental Impacts and Sustainability
SPLS Liaison: Walter T. Grondzik
ASHRAE Staff Liaisons: Emily Toto
ICC Liaison: Mike Pfeiffer
IES Liaison: Mark Lien
USGBC Liaison: Wes Sullens

Roger Hedrick*, <i>Chair</i>	John Cross*	Stephen Kanipe	Kathleen Petrie
Charles Eley*, <i>Co-Vice-Chair</i>	Michael Cudahy*	James Kendzel	Teresa Rainey
Josh Jacobs*, <i>Co-Vice-Chair</i>	Thomas Culp*	Andrew Klein	Steven Rosenstock*
Michael Jouaneh*, <i>Co-Vice-Chair</i>	David Delaquila	Gary Klein	Loren Ross
Lawrence Schoen*, <i>Co-Vice-Chair</i>	Jim Edelson*	Vladimir Kochkin	Michael Schmeida
Anand Achari	Anthony Floyd*	Thomas Lawrence	Kent Sovocool*
Vinay Ananthachar	Mark Frankel	Neil Leslie*	Dennis Stanke
Constantinos Balaras*	Patricia Fritz	Christine Locklear	Wayne Stoppelmoor
James Bogdan	Susan Gitlin*	Richard Lord	Christine Subasic*
Jeff Bradley*	Gregg Gress*	David Madsen	Michael Temple
Susan Bronson	Maureen Guttman	C. Webster Marsh	Martha VanGeem*
Scott Buckley	Katherine Hammack	Joel Martell	Scott West*
Julie Chandler	Thomas Hogarth*	Jonathan McHugh*	Daniel Whittet
Ernest Conrad*	Donald Horn*	Adam McMillen*	Joe Winters*
Glen Clapper	Jonathan Humble	Erik Miller-Klein	Jian Zhang*
Dru Crawley	Ksenija Janjic	Gwelen Paliaga	
John Cribbs	Greg Johnson	Thomas Pape*	

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

ASHRAE STANDARDS COMMITTEE 2019–2020

Wayne H. Stoppelmoor, Jr., <i>Chair</i>	Walter T. Grondzik	Karl L. Peterman	Theresa A. Weston
Drury B. Crawley, <i>Vice-Chair</i>	Susanna S. Hanson	Erick A. Phelps	Michael W. Woodford
Els Baert	Rick M. Heiden	Lawrence J. Schoen	Craig P. Wray
Charles S. Barnaby	Jonathan Humble	Steven C. Sill	Jaap Hogeling, <i>BOD ExO</i>
Robert B. Burkhead	Srinivas Katipamula	Richard T. Swierczyna	Malcolm D. Knight, <i>CO</i>
Thomas E. Cappellin	Essam E. Khalil	Christian R. Taber	
Douglas D. Fick	Larry Kouma	Russell C. Tharp	
Michael W. Gallagher	Cesar L. Lim	Adrienne G. Thomle	

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

- 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.

(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 av updates Table 7.5.1, “Energy Cost and CO₂e Building Performance Factors (BPF),” to reflect increases in the energy efficiency requirements in Standard 189.1-2020.

These BPF values are based on a draft energy savings analysis conducted by Pacific Northwest National Laboratory (PNNL) for Standard 189.1-2017 compared to Standard 90.1-2016 using the USDOE Commercial Prototype Building Models (https://www.energycodes.gov/development/commercial/prototype_models) with enhancements using EnergyPlus v9.0. The BPFs are calculated using the following formula:

$$\text{BPF}_{189.1-2020} = (1 - \text{Energy Cost Savings \% for Regulated Energy End Uses}) \times \text{BPF}_{90.1-2019}$$

Addendum av shows changes to the 2017 standard as modified by recently published addendum k, which added the “Renewable Fraction” column to Table 7.5.1. The table now lists BPF for each building type by climate zone.

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

Addendum av to Standard 189.1-2017

Modify Table 7.5.1 as shown (I-P and SI units)

Table 7.5.1 Energy Cost and CO₂e Building Performance Factors (BPF)

Building Type	Building Performance Factor (BPF)	BPF per Climate Zone																Renewable Fraction (RF)	
		0A and 1A	0B and 1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7		8
Multifamily	0.71	0.61	0.62	0.58	0.58	0.61	0.59	0.50	0.66	0.66	0.67	0.63	0.65	0.66	0.62	0.65	0.61	0.65	0.50
Healthcare/hospital	0.56	0.56	0.55	0.53	0.50	0.53	0.50	0.50	0.51	0.49	0.50	0.53	0.47	0.49	0.54	0.49	0.55	0.55	0.35
Hotel/motel	0.58	0.51	0.49	0.49	0.47	0.49	0.48	0.48	0.48	0.48	0.47	0.45	0.47	0.46	0.46	0.47	0.46	0.47	0.50
Office	0.54	0.48	0.52	0.45	0.51	0.49	0.51	0.42	0.47	0.47	0.45	0.47	0.47	0.44	0.49	0.48	0.46	0.49	0.50
Restaurant	0.59	0.62	0.62	0.58	0.59	0.58	0.60	0.57	0.61	0.56	0.60	0.62	0.59	0.63	0.65	0.62	0.66	0.69	0.10
Retail	0.50	0.48	0.51	0.46	0.52	0.48	0.52	0.48	0.48	0.52	0.51	0.47	0.50	0.51	0.47	0.48	0.46	0.47	0.50
School	0.37	0.37	0.45	0.36	0.41	0.36	0.41	0.39	0.36	0.39	0.38	0.36	0.39	0.36	0.35	0.36	0.35	0.36	0.50
Semiheated Warehouse ^a	0.44	0.36	0.40	0.38	0.40	0.41	0.42	0.40	0.42	0.41	0.44	0.47	0.44	0.45	0.51	0.48	0.54	0.53	0.50
All others	0.54	0.51	0.53	0.46	0.48	0.46	0.50	0.47	0.50	0.48	0.50	0.47	0.47	0.45	0.47	0.47	0.47	0.43	0.50

a. Conditioned warehouses shall use the "All others" category.

**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.

Standard 189.1 and the International Green Construction Code

Standard 189.1 serves as the complete technical content of the International Green Construction Code® (IgCC). The IgCC creates a regulatory framework for new and existing buildings, establishing minimum green requirements for buildings and complementing voluntary rating systems. For more information, visit www.iccsafe.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 edition. 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.