ADDENDA

ANSI/ASHRAE Addendum e to
ANSI/ASHRAE Standard 55-2020

Thermal Environmental Conditions for Human Occupancy

Approved by ASHRAE and the American National Standards Institute on June 30, 2021.

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 NW, 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.

 ISSN 1041-2336

Approved American National Standard
ANSI
www.ansi.org

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 e to Standard 55-2020 changes the paragraph that describes the basis for the calculation of prevailing mean temperature in Section 5.4.2.1. This change eliminates an equation that is easily misused and leaves a functionally equivalent equation that cannot be misused.

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 e to Standard 55-2020

Revise Informative Appendix J as shown. The remainder of Informative Appendix J is unchanged.

INFORMATIVE APPENDIX J
OCCUPANT-CONTROLLED NATURALLY CONDITIONED SPACES

[. . .]

The input variable in the adaptive model in Figure 5-8 is prevailing mean outdoor air temperature $\overline{t_{pma(out)}}$. This temperature is based on the arithmetic average of the mean daily outdoor temperatures over some period of days. It represents the broader external climatic environment to which building occupants have become physiologically, behaviorally, and psychologically adapted. At its simplest, $\overline{t_{pma(out)}}$ can be approximated by the climatically normal monthly mean air temperature from the most representative local meteorological station available. ~~When used in conjunction with dynamic thermal simulation software in which outdoor weather data are formatted as a TMY, the preferred expression for $\overline{t_{pma(out)}}$ is an exponentially weighted, running mean of a sequence of mean daily outdoor temperatures prior to the day in question.~~ However, because d~~D~~ays in the more remote past have less influence on the building occupants' comfort temperature than more recent days, Equation J-1 should be used to calculate $\overline{t_{pma(out)}}$ ~~and this can be reflected by attaching exponentially decaying weights to the sequence of mean daily outdoor temperatures~~:

~~$$\overline{t_{pma(out)}} = (1-\alpha)[t_{e(d-1)} + \alpha t_{e(d-2)} + \alpha^2 t_{e(d-3)}) + \alpha^3 t_{e(d-4)} + \ldots \quad \text{(J-1)}$$~~

$$\overline{t_{pma(out)}} = (1-\alpha)t_{e(n-1)} + \alpha t_{rm(n-1)}$$

where $t_{e(n-1)}$ is the mean daily outdoor temperature for the day before the day in question, $t_{rm(n-1)}$ is the running mean temperature for the day before the day in question $(n-1)$, and α is a constant between 0 and 1 that controls the speed at which the running mean responds to changes in weather (outdoor temperature). Recommended values for α are between 0.9 and 0.6, corresponding to a slow- and fast-response running mean, respectively. See Figure J-1 for examples. Adaptive comfort theory suggests that a slow-response running mean ($\alpha = 0.9$) could be more appropriate for climates in which synoptic-scale (day-to-day) temperature dynamics are relatively minor, such as the humid tropics. But for midlatitude climates, where people are more familiar with synoptic-scale weather variability, a lower value of α could be more appropriate. ~~In Equation J-1, $t_{e(d-1)}$ represents the mean daily outdoor temperature for the previous day, $t_{e(d-2)}$ is the mean daily outdoor temperature for the day before that, and so on. The equation contains a sum to infinity, but is reducible to this more convenient form:~~

~~$$\overline{t_{pma(out)}} = (1-\alpha)t_{e(n-1)} + \alpha t_{rm(n-1)} \quad \text{(J-2)}$$~~

~~where $t_{e(n-1)}$ is the mean daily outdoor temperature for the day before the day in question, and $t_{rm(n-1)}$ is the running mean temperature for the day before the day in question $(n-1)$.~~ For example, if $\alpha = 0.7$, the prevailing mean outdoor temperature for today would be 30% of yes-

terday's mean daily outdoor temperature plus 70% of yesterday's running mean outdoor temperature. This form of the equation advances the value of the running mean from one day to the next and is convenient both for computer algorithms and for manual calculations. A value for running mean temperature has to be assumed for day one in order to seed the sequence, but from then on it can be calculated with Equation J-~~2~~1. The running mean may be initiated seven days prior to the start of the period of interest, and the actual daily mean outdoor temperature can be used for that first day to seed the sequence.

[. . .]

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 NW · 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.

6/21