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.

CONTENTS

ANSI/ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy

NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE Web site at www.ashrae.org/technology.

(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.)

FOREWORD

ANSI/ASHRAE Standard 55-2013 is the latest edition of Standard 55. This edition incorporates eighteen addenda to the 2010 edition that were written with a renewed focus on application of the standard by practitioners and use of clear, enforceable language.

The core of the standard in Sections 4 and 5 specifies methods to determine thermal environmental conditions (temperature, humidity, air speed, and radiant effects) in buildings and other spaces that a significant proportion of the occupants will find acceptable at a certain metabolic rate and clothing level. The comprehensive analytical method to determine these conditions uses calculation algorithms included in the standard and appendices, all of which are implemented in the ASHRAE Thermal Comfort Tool.[4]

The standard contains a graphical method of compliance, which is familiar to many users, yet is permitted to be used only in limited circumstances. Given the widespread and easy accessibility of computing power and third-party implementations of the analytical method, it is expected that more users will favor the comprehensive analytical methods over the graphical method.

Section 6 contains requirements for demonstrating that a design of an occupied space or building meets the comfort requirements in Sections 4 and 5. Section 7 includes requirements for the measurement and evaluation of existing thermal environments and is also applicable to commissioning.

Since the two personal characteristics of occupants (metabolic rate and clothing level) vary, operating setpoints for buildings are not mandated by this standard.

Standard 55 was first published in 1966 and republished in 1974, 1981, and 1992. Beginning in 2004, it is now updated using ASHRAE's continuous maintenance procedures. According to these procedures, Standard 55 is continuously revised by addenda that are publicly reviewed, approved by ASHRAE and ANSI, and published and posted for free on the ASHRAE website.

The eighteen addenda published since 2010 are summarized in detail in Informative Appendix M, and the most noteworthy changes are summarized here:

a. The normative body of the standard, comprising Sections 3 through 8, have been rewritten and reorganized. Requirements are more clearly stated, definitions are added to Section 3, and informative supporting information has been moved from the body to informative appendices.
b. Procedures are clarified and appear in a more sequential manner. For example, a "representative occupant" with representative "clothing insulation" and "metabolic rate" shall be defined as input into thermal comfort calculations.
c. The cooling effect of air movement now applies to naturally conditioned spaces as well as mechanically conditioned spaces, and in each case correction factors are given that adjust the comfort boundaries when air movement is present.
d. A new alternate procedure for estimating occupant clothing insulation based on outdoor weather was added. This procedure is based on extensive field research and can be used for design calculations, annual simulations, and control of occupied spaces.
e. Major revisions to Section 7 procedures for measuring comfort in existing spaces including survey and physical measurement methods and a new section on evaluating and reporting results.
f. The standard now says that two of the key comfort parameters, air speed and air temperature, must be calculated as an average that the occupant experiences at three heights across the body and over a period of time.

1. PURPOSE

The purpose of this standard is to specify the combinations of indoor thermal environmental factors and personal factors that will produce thermal environmental conditions acceptable to a majority of the occupants within the space.

2. SCOPE

2.1 The environmental factors addressed in this standard are temperature, thermal radiation, humidity, and air speed; the personal factors are those of activity and clothing.

2.2 It is intended that all of the criteria in this standard be applied together since comfort in the indoor environment is complex and responds to the interaction of all of the factors that are addressed.

2.3 This standard specifies thermal environmental conditions acceptable for healthy adults at atmospheric pressure equivalent to altitudes up to 3000 m (10,000 ft) in indoor spaces designed for human occupancy for periods not less than 15 minutes.

2.4 This standard does not address such nonthermal environmental factors as air quality, acoustics, and illumination or other physical, chemical, or biological space contaminants that may affect comfort or health.

3. DEFINITIONS

adaptive model: a model that relates indoor design temperatures or acceptable temperature ranges to outdoor meteorological or climatological parameters. ***Note:*** *Adaptive model* is another name for the method described in Section 5.4, "Determining Acceptable Thermal Conditions in Occupant-Controlled Naturally Conditioned Spaces.")

air speed: the rate of air movement at a point, without regard to direction.

air speed, average (V_a): the average air speed surrounding a representative occupant. The average is with respect to location and time. The spatial average is for three heights as defined for average air temperature (t_a). The air speed is averaged over an interval not less than one and not more than three minutes. Variations that occur over a period greater than three minutes shall be treated as multiple different air speeds.