ADDENDA

ASHRAE Addendum g to
ASHRAE Guideline 10-2011

Interactions Affecting the Achievement of Acceptable Indoor Environments

Approved by ASHRAE on May 13, 2016.

This addendum was approved by a Standing Guideline Project Committee (SGPC) 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 guideline. 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.

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SPECIAL NOTE

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Development of ASHRAE Guidelines follows procedures similar to those for ASHRAE Standards except that (a) committee balance is desired but not required, (b) an effort is made to achieve consensus but consensus is not required, (c) Guidelines are not appealable, and (d) Guidelines are not submitted to ANSI for approval.

The Senior Manager of Standards of ASHRAE should be contacted for

a. interpretation of the contents of this Guideline,
b. participation in the next review of the Guideline,
c. offering constructive criticism for improving the Guideline, or
d. permission to reprint portions of the Guideline.

(This foreword is not part of this guideline. It is merely informative and does not contain requirements necessary for conformance to the guideline.)

FOREWORD

This addendum revises and updates Sections 5.3 and 7 on lighting and its interactions to add more detail, and updates references.

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 g to Guideline 10-2011

Modify the guideline as follows.

5.3 Thermal Environment—Lighting (Daylight). Poorly designed windows and skylights can lead to substantial direct or reflected solar radiation that can heat people and objects in the space; solar radiation can also cause heat to be stored in the thermal mass of the structure. Likewise, the same fenestration can result in radiant losses from an occupant to the interior glazed surface of the fenestration when the outdoor environment is cold.

Implications: The design and orientation of fenestration should take into account its thermal effects, both in heat-load calculations and in the radiant effects on occupants. Shading should be provided as appropriate, with particular attention paid to the elimination of direct solar radiation of all regularly occupied spaces. The use of special glazing having selective transmission, reflection, or absorption properties may also be considered. Controlling the admission of daylight should not exclude the need to achieve a minimum lux level (such as 500 lux) to reset the biological clock of occupants.

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7. LIGHTING (DAYLIGHT)

Studies of illumination usually focus on the distribution of energy by intensity and sometimes by frequency in the visible portion of the electromagnetic spectrum. Energy in the nonvisible portion of the electromagnetic spectrum, including both infrared and ultraviolet, can strongly affect occupants, materials, and even chemical, physical, and biological agents in a space. The main focus of most investigations of illumination is on the support provided for task visual performance. In some locations, especially regions more distant from the equator, the absence of daily exposure to bright light can cause seasonal affective disorder (SAD). Even in lower latitudes closer to the equator, chronic illumination to dim light can increase the risk for depression and psychiatric diseases (Lewy 2015). Brief exposure to very bright lights has been used to counteract this effect (Lewy et al. 1985). Illumination of less than 500 lux is less potent in entraining the circadian clock to daytime. There is evidence that chronic dim illumination can cause circadian disruption which has been linked to breast and prostate cancers, obesity, and early-onset diabetes (Basiley et al. 2014; Innominato et al. 2014).

7.1 Daylight Interactions. Some studies have found that access to daylight or windows is associated with lower prevalence of sick building syndrome (SBS) symptoms. However, it appears that an important contributor to the measured outcomes is access to views to the outside, whether they are real or virtual, static or moving.

In one study, researchers found that the larger the view available from occupants' desks, the fewer complaints the occupants had about all other ambient factors, regardless of objective measurements of those conditions (Heschong Mahone Group 2003).

7.2 Daylight—Electrical Interactions. Light from either an electric or a daylight source is necessary for use of most building spaces. Dynamic lighting has been shown to improve energy efficiency with increased dependence on natural light and reduced reliance on electrical lighting uniformity (Kiliccote et al. 2006). The spectral distribution, intensity, and direction will affect people's responses to the light in a space. Light can affect mood, alertness, and performance. Recent discovery of a dedicated light sensitive system in the human retina (with peak sensitivity in blue spectrum 480 nm) has offered a scientific basis for light management to influence health in indoor environments (Hatori and Panda, 2010; Lucas et al. 2014). Proper color rendition is necessary for artists and textile and other product designers, as well as medical diagnostics and many other tasks, including personal hygiene. Sunlight is rich in blue light. While daylight harnessing to enhance indoor light level in the blue spectrum for alertness is desirable, design and controls should be optimized to reduce illumination particularly blue spectrum after dusk to the minimum level necessary for any task and to allow complete darkness during sleep to promote better sleep hygiene.

[. . .]

10. REFERENCES AND BIBLIOGRAPHY

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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.

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