

ADDENDA

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

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by ASHRAE and the American National Standards Institute on July 30, 2021, and by the Illuminating Engineering Society on June 9, 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>).

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FOREWORD

Addendum o reduces the minimum connected load for daylighting responsive controls for sidelighting (Section 9.4.1.1[e]) and toplighting (Section 9.4.1.1[ff]). In 2013, the standard was amended to establish a wattage threshold. If the connected load in the daylighted area is less than this minimum threshold, daylight responsive lighting controls are not required. The primary sidelighted area minimum wattage is 150 W, and the primary and secondary sidelighted areas is 300 W. Similarly, the minimum wattage for toplighted spaces is also set at 150 W.

A study found that, due to the shift to LED lights, most spaces no longer have connected load in the daylighted zones that would require daylight responsive controls. An analysis was conducted to determine a wattage threshold that is both cost effective and feasible for most spaces.

Costs have shifted since 2013. In 2013, the fluorescent system needed either a dimming ballast or multiple ballasts, adding between \$30 and \$100 per fixture adder. Dimming drivers are a standard no-cost feature of LED equipment. Other costs have changed since 2013 because of the advent of sensors that are integral to the fixtures.

Table 9.6.1 details the allowed lighting power density as well as control requirements for each space. Daylight responsive controls are potentially required for 89 space types (84 spaces for toplighting, 89 spaces for sidelighting, and virtually all overlap). This addendum does not change any of the space types that may or may not be required to consider daylight responsive controls. Note, retail spaces are addressed in Table 9.6.1. This addendum removes Exception 3 in 9.4.1.1(e) where retail spaces are mentioned, because these spaces are addressed in the table.

Energy Savings:

- *This addendum maintains energy saving requirements established in 2013.*

Cost Effectiveness:

- *This addendum meets the scalar threshold prescribed by Standard 90.1 practices. This addendum assumed a 15-year device life (same life used in the previous analysis) using the standard blended rate.*

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

Addendum o to Standard 90.1-2019

Modify the standard as shown (I-P and SI units).

9.4.1.1 Interior Lighting Controls.

[...]

- e. *Automatic daylight responsive controls for sidelighting:* In any space where the combined input power of all *general lighting* completely or partially within the *primary sidelighted* areas is ~~75-150~~ W or greater, the *general lighting* in the *primary sidelighted* areas shall be controlled by photocontrols

In any space where the combined input power of all general lighting completely or partially within the primary sidelighted area and secondary sidelighted area is 150-300 W or greater, the general lighting in the primary sidelighted area and secondary sidelighted area shall be controlled by photocontrols. General lighting in the secondary sidelighted area shall be controlled independently of the general lighting in the primary sidelighted area.

The control system shall have the following characteristics:

1. *The calibration adjustment control shall be located no higher than 11 ft above the finished floor. Calibration shall not require the physical presence of a person at the sensor while it is processing.*

2. The photocontrol shall reduce electric lighting power in response to available daylight using continuous dimming to 20% or less and off.
3. When an automatic partial OFF control has reduced the lighting power to the unoccupied *set point* in accordance with Section 9.4.1(g), the daylight responsive control shall adjust the electric light in response to available daylight, but it shall not allow the lighting power to be above the unoccupied *set point*.

Exception to 9.4.1.1(e): The following areas are exempted from Section 9.4.1.1(e):

1. *Primary sidelighted areas* where the top of any existing adjacent structure or natural object is at least twice as high above the windows as its horizontal distance away from the windows.
 2. Sidelighted areas where the total glazing area is less than 20 ft².
 3. ~~Retail spaces.~~
 4. *Primary sidelighted areas* adjacent to *vertical fenestration* that have external projections and no *vertical fenestration* above the external projection, where the external projection has a *projection factor* greater than 1.0 for *north-oriented* projections or where the external projection has a *projection factor* greater than 1.5 for all other orientations (see Figure 3.2-6).
- f. Automatic daylight responsive controls for toplighting: In any space where the combined input power for all general lighting completely or partially within daylight area under skylights and daylight area under roof monitors is ~~75~~ 150 W or greater, general lighting in the daylight area shall be controlled by photocontrols. The control system shall have the following characteristics:
1. The calibration adjustment *control* shall be located no higher than 11 ft above the finished *floor*. Calibration shall not require the physical presence of a person at the sensor while it is processing.
 2. The photocontrol shall reduce electric lighting power in response to available daylight using continuous dimming to 20% or less and off.
 3. When an *automatic* partial OFF control has reduced the lighting power to the unoccupied *set point* in accordance with Section 9.4.1(g), the daylight responsive control shall adjust the electric light in response to available daylight, but it shall not allow the lighting power to be above the unoccupied *set point*.
 4. *General lighting* in overlapping toplighted and sidelighted *daylight areas* shall be controlled together with *general lighting* in the *daylight area under skylights* or *daylight area under roof monitors*.

Exceptions to 9.4.1.1(f): The following areas are exempted from Section 9.4.1.1 (f):

1. *Daylight area under skylights* where it is documented that existing adjacent structures or natural objects block direct sunlight for more than 1500 daytime hours per year between 8 a.m. and 4 p.m.
2. *Daylight area under skylights* where the overall *skylight effective aperture* for the *enclosed space* is less than 0.006.
3. In each space within buildings in Climate Zone 8 where the input power of the general lighting within daylight areas is less than 200 W.

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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.

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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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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.

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