



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

Public Review Draft

Proposed Addendum o to Standard 90.1-2019, Energy Standard for Buildings Except Low-Rise Residential Buildings

**First Public Review (July 2019)
(Draft Shows Proposed Changes to Current Standard)**

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(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

This addendum reduces the minimum connected load for daylighting responsive controls (9.4.1.1) for sidelighting (e) and toplighting (f). In 2013, the Standard was amended and established 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 was conducted and found that most spaces no longer have connected load in the daylighted zones that would require daylight responsive controls. This reduced load is because of the shift to LEDs. Therefore, an analysis was conducted to determine a wattage threshold that is both cost effective and spaces would meet the wattage threshold.

Costs have shifted since 2013. In 2013, the fluorescent system needed either a dimming ballast or multiple ballasts adding between (\$30 - \$100 per fixture adder). Dimming drivers are a standard no-cost feature of LED equipment. Other costs have changed between 2013 and now 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 to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.]

Addendum o to 90.1-2016

Modify the standard as follows (IP and SI Units)

9.4.1.1

- 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).

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- 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*.

Exception 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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