BSR/ASHRAE/IES Addendum t
 to ANSI/ASHRAE/IES Standard 90.1-2022

Public Review Draft

Proposed Addendum t to
Standard 90.1-2022, Energy Standard
for Sites and Buildings Except Low-
Rise Residential Buildings

First Public Review (March 2024)
(Draft Shows Proposed Changes to Current Standard)

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FOREWORD

Section 9.5.2.3 Control Factors was established in 2013 to allow for advanced lighting controls. Many of those advanced controls are now part of the standard. In 2013, inefficiencies with fluorescent dimming technology required more power than standard fluorescent ballasts to work with certain controls. The industry has shifted from fluorescent to LED technology. LED technology does not have the same electrical efficiencies.

For these reasons, Section 9.5.2.3 is no longer necessary. It is also been noted that this table

This is removing an optional allowance and a cost effectiveness analysis is not required.

[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 t to 90.1-2022

Modify the text in Table 9.5.2.3 as follows:

9.5.2.3 Additional Interior Lighting Power Using Nonmandatory Controls. An additional interior lighting power allowance shall be permitted for space types with nonmandatory controls installed as identified in Table 9.5.2.3 when all mandatory controls are used according to Section 9.4. This allowance is added to the interior lighting power allowance and is calculated as follows:

Additional Interior Lighting Power Allowance = Lighting Power Under Control × Control Factor

where

Lighting Power Under Control = the total input watts of all lamps being controlled using the control method indicated

Control Factor = the value given in Table 9.5.2.3 for the corresponding space type and control method

Table 9.5.2.3 Control Factors Used in Calculating Additional Interior Lighting Power Allowance

<table>
<thead>
<tr>
<th>Additional Control Method (in Addition to Mandatory Requirements)</th>
<th>Open Office</th>
<th>Private Office</th>
<th>Conference Room, Meeting Room, Classroom (Lecture/Training)</th>
<th>Retail Sales Area</th>
<th>Lobby, Atrium, Dining Area, Corridors/Stairways, Gym/Pool, Mall Concourse, Parking Garage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programmable multilevel dimming control using programmable time scheduling scene control</td>
<td></td>
<td></td>
<td></td>
<td>0.05</td>
<td>0</td>
</tr>
<tr>
<td><strong>Occupancy sensors controlling the downlight component of workstation specific luminaires with continuous dimming to off capabilities</strong></td>
<td></td>
<td></td>
<td>0.25</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Occupancy sensors controlling the downlight component of workstation specific luminaires with continuous dimming to off operation, in combination with personal continuous dimming control of downlight illumination by workstation occupant</strong></td>
<td></td>
<td></td>
<td>0.30</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Control factor is limited to workstation-specific luminaires in partitioned single occupant work spaces contained within an open office environment (i.e. direct-indirect luminaires with separately controlled downlight and uplight components, with the downward component providing illumination to a single occupant in an open plan workstation). Within 30 minutes of the occupant leaving the space, the downward component shall continuously dim to off over a minimum of two minutes. Upon the occupant entering the space, the downward component shall turn on at the minimum level and continuously raise the illumination to a preset level over a minimum of 30 seconds. The uplight component of workstation specific luminaire shall comply with Section 9.4.1.1(h) (automatic full OFF).</strong></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td><strong>In addition to the requirements described in footnote (a), the control shall allow the occupant to select their preferred light level via a personal computer, handheld device, or similarly accessible device located within the workstation.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[...]
or power of controlled lighting shall be initially reduced by at least 15% from full output. The average maximum light output or power of the controlled lighting shall be documented without high-end trim and with high-end trim in accordance with Section 9.9.1 to verify reduction of light output or power by at least 15% when tuned.

b. Where lumen maintenance control without lighting sensors is used, controls shall be configured to limit the initial maximum lumen output or maximum lighting power to 85% or less of full light output or full power draw.

c. High-end trim and lumen maintenance controls shall be accessible only to authorized personnel.

d. Where this credit is taken, the additional interior lighting power allowance in Section 9.5.2.3 related to dimming control is not permitted to be used. For hotel and multifamily building use types, the gross lighted floor area is for common areas not including dwelling units or guest rooms...

11.5.2.5.3 L03: Occupancy Sensor Control Areas. To achieve this credit, either buildings shall use Section 9.3, "Simplified Building Method Compliance Path," or in all spaces where automatic partial OFF (See Section 9.4.1.1[g]) or automatic full OFF (See Section 9.4.1.1[h]) is not required, it shall be installed as follows:

a. Automatic shutoff or light reduction shall occur within 15 minutes of all occupants leaving each control zone.

b. For spaces with multiple control zones or automatic partial OFF control, automatic full shutoff shall occur within 15 minutes of all occupants leaving the space.

c. For spaces with one control zone, automatic full OFF control shall be used.

d. All areas of the project with automatic partial OFF or automatic full OFF control shall have one control device for every 600 ft² of gross lighted area.

Where this credit is taken, additional interior lighting power allowance in Section 9.5.2.3 related to occupancy sensor control shall not be used.

Table 12.5.1 Modeling Requirements for Calculating Design Energy Cost and Energy Cost Budget

<table>
<thead>
<tr>
<th>Proposed Design (Column A) Design Energy Cost (DEC)</th>
<th>Budget Building Design (Column B) Energy Cost Budget (ECB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Lighting</td>
<td></td>
</tr>
<tr>
<td>Lighting power in the proposed design shall be determined as follows:</td>
<td>a. Where a complete lighting system exists, lighting power in the budget building design shall be the same as in the proposed design.</td>
</tr>
<tr>
<td>a. Where a complete lighting system exists, the actual lighting power for each thermal block shall be used in the model.</td>
<td>b. Where a lighting system has been designed, the interior lighting power allowance shall be determined using either the Building Area Method or Space-by-Space Method, and the space use classification shall be the same as the proposed design with lighting power set equal to the maximum allowed for the corresponding method and category in Section 9.2. Additional interior lighting power for nonmandatory controls allowed under Table 9.5.2.3 shall not be included in the budget building design. Lighting power density in dwelling units shall be 0.60 W/ft².</td>
</tr>
<tr>
<td>b. Where a complete lighting system has been designed, lighting power for each thermal block shall be determined in accordance with Sections 9.1.3 and 9.1.4.</td>
<td>c. Where lighting neither exists nor is submitted with design documents, the lighting power in the budget building design shall be the same as in the proposed design.</td>
</tr>
<tr>
<td>c. Where no lighting exists or is specified, lighting power shall be determined in accordance with the Building Area Method for the appropriate building area type.</td>
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</tr>
<tr>
<td>d. Lighting system power shall include all lighting system components shown or provided for on plans (including lamps, ballasts, task fixtures, and furniture-mounted fixtures). For dwelling units, hotel/motel guest rooms, and other spaces in which lighting systems consist of plug-in light fixtures that are not shown or provided for on design documents, assume identical lighting power for the proposed design and baseline building design in the simulations.</td>
<td></td>
</tr>
<tr>
<td>e. The lighting schedules in the proposed design shall reflect the mandatory automatic lighting control requirements in Section 9.4.1 (e.g., programmable controls or occupancy sensors).</td>
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<tr>
<td>f. Automatic daylighting controls included in the proposed design may be modeled directly in the building simulation or be modeled</td>
<td></td>
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</tbody>
</table>
in the building simulation through schedule adjustments determined by a separate analysis approved by the authority having jurisdiction. Modeling and schedule adjustments shall separately account for primary sidelighted areas, secondary sidelighted areas, and toplighted areas.

**g. Automatic lighting controls** included in the proposed design but not required by Section 9.4.1 shall be modeled using the following methods for each luminaire under control:

1. **Manual-on** or partial-auto-on occupancy sensors shall be modeled by reducing the lighting schedule each hour by the occupancy sensor reduction factors in Table G3.7-1 and G3.7-2 for the applicable space type multiplied by 0.25.

2. Automatic lighting controls listed in Table 9.5.2.3 shall be modeled using the sum of the applicable control factors (CF). Apply control factors to only the portion of wattage of the fixtures in the space controlled by said lighting control. Divide each hour of the lighting schedule by \((1 + \Sigma CF)\), where \(\Sigma CF\) indicates the sum of all applicable control factors for that space per Section 9.5.2.3 and Table 9.5.2.3.

2. For luminaires that meet requirements in Section 11.5.2.5.2 “L02 Continuous Dimming and High-End Trim,” the lighting schedule each hour shall be reduced by 7.5% compared to the budget building design.

3. For lighting in dwelling units with controls meeting requirements in Section 11.5.2.5.5 “L05 Lighting Control for Multifamily Buildings,” the lighting schedule each hour shall be reduced by 10%.