_____**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**~~

~~**Additional Control Method (in Addition to Mandatory Requirements)**~~	~~**Space Type**~~				
	~~**Open Office**~~	~~**Private Office**~~	~~**Conference Room, Meeting Room, Classroom (Lecture/ Training)**~~	~~**Retail Sales Area**~~	~~**Lobby, Atrium, Dining Area, Corridors/ Stairways, Gym/ Pool, Mall Concourse, Parking Garage**~~
~~Programmable multilevel dimming control using programmable time scheduling scene control~~		~~0.05 0~~		~~0.10~~	~~0.10~~
~~*Occupancy sensors* controlling the downlight component of workstation specific *luminaires* with continuous dimming to off capabilities~~	~~0.25ᵃ~~	~~0~~	~~0~~	~~0~~	~~0~~
~~*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~~	~~0.30 0.10ᵃ,ᵇ~~	~~0~~	~~0~~	~~0~~	~~0~~

~~a. 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).~~

~~b. 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.~~

[…]

11.5.2.5.2 **L02: Continuous Dimming and High-End Trim.** To achieve this credit, *general lighting* in 75% or more of *gross lighted floor area* shall have *luminaires* configured for *continuous dimming* with the following:

a. *High-end trim* shall be implemented, and *construction documents* shall state that maximum light output

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 ft^2 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**

Proposed Design (Column A) Design Energy Cost (DEC)	Budget Building Design (Column B) Energy Cost Budget (ECB)
6. Lighting	
Lighting power in the *proposed design* shall be determined as follows: a. Where a complete *lighting system* exists, the actual lighting power for each *thermal block* shall be used in the model. 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. c. Where no lighting exists or is specified, lighting power shall be deter- mined in accordance with the *Building* Area Method for the appropriate *building area type*. 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. 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*). f. *Automatic* daylighting controls included in the *proposed design* may be modeled directly in the *building* simulation or be modeled	a. Where a complete *lighting system* exists, lighting power in the *budget building* design shall be the same as in the *pro- posed design*. 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/ft^2. 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*.

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 G3.7-2for 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 + ∑CF), where ∑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%.