STANDARD

ANSI/ASHRAE/IES Addendum b to
ANSI/ASHRAE/IES Standard 90.1-2022

Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings

Approved by ASHRAE and the American National Standards Institute on September 14, 2023, and by the Illuminating Engineering Society on July 25, 2023.

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).

The latest edition of an ASHRAE Standard may be purchased from the ASHRAE website (www.ashrae.org) or from ASHRAE Customer Service, 180 Technology Parkway, Peachtree Corners, GA 30092. E-mail: orders@ashrae.org. Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to www.ashrae.org/permissions.

 ISSN 1041-2336

Approved American National Standard
www.ansi.org

SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus Standard developed under the auspices of ASHRAE. *Consensus* is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this Standard as an ANS, as "substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution." Compliance with this Standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.

ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Senior Manager of Standards of ASHRAE should be contacted for

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

DISCLAIMER

ASHRAE uses its best efforts to promulgate Standards and Guidelines for the benefit of the public in light of available information and accepted industry practices. However, ASHRAE does not guarantee, certify, or assure the safety or performance of any products, components, or systems tested, installed, or operated in accordance with ASHRAE's Standards or Guidelines or that any tests conducted under its Standards or Guidelines will be nonhazardous or free from risk.

ASHRAE INDUSTRIAL ADVERTISING POLICY ON STANDARDS

ASHRAE Standards and Guidelines are established to assist industry and the public by offering a uniform method of testing for rating purposes, by suggesting safe practices in designing and installing equipment, by providing proper definitions of this equipment, and by providing other information that may serve to guide the industry. The creation of ASHRAE Standards and Guidelines is determined by the need for them, and conformance to them is completely voluntary.

In referring to this Standard or Guideline and in marking of equipment and in advertising, no claim shall be made, either stated or implied, that the product has been approved by ASHRAE.

(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

Addendum b addresses several topics. First, it moves the exterior lighting power section (currently Section 9.4.2) from Section 9.4 to a new subparagraph (9.5.3) in Section 9.5. The existing Section 9.2.2, "Prescriptive Requirements," already includes exterior lighting power. The move from Section 9.4 to 9.5.3 is an alignment of the prescriptive requirements into a single section.

Second, the addendum makes an additional clarification by removing the incorrect terms "lighting power density allowance" and "LPD allowance." This editorial change will reduce confusion. The following terms are defined "exterior lighting power allowance"; "interior lighting power allowance"; "lighting power allowance, exterior"; "lighting power allowance, interior"; and "lighting power density (LPD)."

There is a misconception that projects must meet the LPD. This is incorrect. The area is multiplied by the applicable LPD value in the applicable table to determine the lighting power allowance (lighting power budget). For example, a retail building using the Building Area Method has an LPD of 0.84 W/ft^2. If the retail store is 1000 ft^2, the interior lighting power allowance is 840 W under the Building Area Method.

This is a clarification and formatting change. This addendum does not affect the cost of a project.

Informative 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 b to Standard 90.1-2022

Modify Section 3 as shown (I-P and SI).

3.2 Definitions

[. . .]

exterior lighting power allowance: ~~see *lighting power allowance, exterior*.~~ the maximum lighting power permitted for a *building*, *site*, or exterior application, expressed in W.

[. . .]

interior lighting power allowance: ~~see *lighting power allowance, interior*.~~ the maximum lighting power permitted for the interior of a *building*, expressed in W.

[. . .]

~~***lighting power allowance (LPA), exterior:*** the maximum lighting power in watts allowed for the exterior of a *property*.~~

~~***lighting power allowance (LPA), interior:*** the maximum lighting power in watts allowed for the interior of a building.~~

lighting power allowance (LPA): the maximum lighting power permitted for a *building*, *space*, *site*, or exterior application, expressed in W.

lighting power density (LPD): the lighting power per unit area of a *building*, *space*, *site*, or exterior application, ~~outdoor area~~ expressed in W/ft^2 (W/m^2).

[. . .]

3.3 Abbreviations and Acronyms

LPA	~~maximum *lighting power allowance* in watts (W)~~ *lighting power allowance*

Modify Section 9 as shown (I-P and SI).

9.1 General

9.1.1 Scope

[. . .]

9.1.1.3.1 Lighting Alterations for Interior Building Spaces. The *alteration* of a *lighting system* in an interior *space* shall meet one of the following requirements:

a. The *alteration* shall comply with Section 9.2 when the total number of new and retrofitted *luminaires* is greater than 2000 W.
b. When the total wattage of all new and retrofitted *luminaires* is 2000 W or less, each altered *space* shall comply with the *LPA* determined by the *LPD* values in ~~of~~ Tables 9.5.2-1 and 9.5.2-2 and Section 9.5.2.2, or the *alteration* shall result in a new wattage at least 50% below the original wattage of each altered *lighting system*. Additionally, the new and retrofitted lighting shall comply with the control requirements of Section 9.4.1.1(a), 9.4.1.1(h), 9.4.1.1(i) as applicable to each altered *space* as shown in Tables 9.5.2.1-1 and 9.5.21-2 and Section 9.5.2.2.

9.1.1.3.2 Lighting Alterations for Exterior Building Areas. The *alteration* of a *lighting system* for an exterior area shall use only the area-specific *LPD* values ~~allowances~~ in ~~Table 9.4.2-2~~ Table 9.5.3-2 and shall not use the base *site* allowance~~s~~ to determine the *LPA*. Additionally, the exterior alteration shall meet one of the following:

a. The *alteration* shall comply with Section 9.2 when the total number of new and retrofitted *luminaires* is greater than 10, or where the combined length of new and retrofitted linear *luminaires* is greater than 20 linear feet.
b. Where the total number of new and retrofitted *luminaires* is not greater than 10 or where the combined length of new and retrofitted linear *luminaires* is not greater than 20 linear feet of linear *luminaires*, the total wattage of the *alteration* shall be no greater than the *LPA* determined by multiplying the area by the *LPD* values in ~~the maximum *LPA* permitted by Table 9.4.2-2~~Table 9.5.3-2, or the total new wattage shall be at least 50% below the total original wattage of that *lighting system*. Additionally, the new and retrofitted lighting shall comply with the control requirements of Section 9.4.1.4(a).

[. . .]

9.1.3 Installed Lighting Power. The *luminaire* wattage for all interior and exterior applications shall include all power used by the *luminaires*, including *lamps*, *ballasts/drivers*, *transformers*, and *control devices*, except as specifically exempted in Section 9.1.1, 9.2.2.1, or ~~9.4.2~~9.5.3.

[. . .]

9.2.2 Prescriptive Requirements

[. . .]

9.2.2.1 Interior Lighting Power Allowance. The *interior lighting power allowance* for a *building* or a separately metered or permitted portion of a *building* shall be determined by either Simplified Building Method described in Section 9.3, the Building Area Method described in Section 9.5.1, or the Space-by-Space Method described in Section 9.5.2.

Trade-offs of *interior lighting power allowance* among portions of the *building* for which a different calculation method has been used for compliance are not permitted.

9.2.2.2 Exterior Lighting Power Allowance. The *exterior lighting power allowance* shall be determined by

a. Section 9.3.2, "Simplified Building Method of Calculating Exterior Lighting Power Allowance," when using Section 9.3 to determine the interior lighting power allowance, or
b. ~~Section 9.4.2~~Section 9.5.3, "Exterior Building Lighting Power."

[. . .]

9.3 Simplified Building Method Compliance Path

9.3.1 Simplified Building Method of Calculating Interior Lighting Power Allowance. *Buildings* (new and *alterations*) shall comply with the *interior lighting power allowance* and control requirements of Table 9.3.1-1, Table 9.3.1-2, or Table 9.3.1-3.

The *interior lighting allowance* using the Simplified Building Method shall be determined as follows:

a. Determine the applicable simplified *building* type from Table 9.3.1-1, Table 9.3.1-2, or Table 9.3.1-3 and corresponding *LPD* value for each space type.
b. Determine the *gross lighted floor area* in ft^2 (m^2) of the *building* interior space.
c. Multiply the *gross lighted floor area* in ft^2 (m^2) of the *building* interior space times the *LPD* value to determine the *interior lighting power allowance* for the *building* interior space.
d. Multiply the *gross lighted floor area* in ft^2 (m^2) of the parking garage times the *LPD* value to determine the *interior lighting power allowance* for the parking garage.
e. *Building* interior space and parking garage *interior lighting power allowances* shall not be combined or traded between space types.

Table 9.3.1-1 Simplified Building Method for Office Buildings

Interior Space Type and LPA	Controls
Interior office LPD: 0.56 W/ft^2 (6.0 W/m^2)	
All *spaces* in office *buildings* ~~other than parking garages~~ ~~The total *LPA* for the *building* other than parking garages shall not exceed 0.56 W/ft^2.~~	All lighting shall be *automatically* controlled to turn off when individual *spaces* are either unoccupied or scheduled to be unoccupied. (**Exception:** Lighting load not exceeding 0.02 W/ft^2 multiplied by the gross lighted area of the *space* shall be permitted to operate at all times.) ~~Each *space* shall have a *manual control device* that allows the occupant to reduce lighting power by a minimum of 50% and to turn the lighting off.~~
Office *spaces* ≤150 ft^2, classrooms, conference rooms, meeting rooms, training rooms, storage rooms, and break rooms	These *spaces* shall ~~also~~ be controlled by *manual*-ON *occupant sensors*.
Office *spaces* >150 ft^2 and restrooms	These *spaces* shall ~~also~~ be controlled by *occupant sensors*.
Stairwells and corridors in office *buildings*	These *spaces* shall ~~also~~ be controlled by *occupant sensors* that reduce the lighting power by a minimum of 50% when no activity is detected for not longer than 15 minutes and be controlled to turn off when the *building* is either unoccupied or scheduled to be unoccupied.
All other *spaces* in office *buildings*	Each *space* shall have a *manual control* device that allows the occupant to reduce lighting power by a minimum of 50% and to turn the lighting off.
Parking garages *LPD*: ~~The *LPA* shall not exceed~~ 0.14 W/ft^2 for the interior parking floors. Uncovered floors of a garage shall comply with the requirements ~~use *LPA* and control requirements in~~ of Table 9.3.2 for parking lots.	All lighting shall be controlled by *occupant sensors*. Controls shall reduce the power by a minimum of 50% when no activity is detected for not longer than 15 minutes. No device shall *control* more than 3600 ft^2 (~~336~~334 m^2).

Table 9.3.1-2 Simplified Building Method for Retail Buildings

Interior Space Type	Controls
Interior Retail *LPD*: 0.70 W/ft^2 (7.5 W/m^2)	
All *spaces* in retail *buildings* ~~other than parking garages~~ ~~The total *LPA* for the *building* other than parking garages shall not exceed 0.70 W/ft^2.~~	All lighting shall be *automatically* controlled to turn off when individual *spaces* are either unoccupied or scheduled to be unoccupied. (**Exception:** Lighting load not exceeding 0.02 W/ft^2 multiplied by the gross lighted area of the *space* shall be permitted to operate at all times.) ~~Each *space* shall have a *manual control device* that allows the occupant to reduce lighting power by a minimum of 50% and to turn the lighting off.~~
Sales area	These *spaces* shall ~~also~~ be *automatically* controlled to • reduce the *general lighting* power by a minimum of 75% during nonbusiness hours, • to turn off all lighting other than *general lighting* during nonbusiness hours, and • by *continuous daylight dimming* controls in *spaces* with *toplighting*.
Stock rooms, dressing/fitting rooms, locker rooms, and restrooms	These *spaces* shall ~~also~~ be controlled by; auto-ON or *manual*-ON *occupant sensors*, and *continuous daylight dimming* controls in *spaces* with *toplighting*.
Office *spaces*, conference rooms, meeting rooms, training rooms, storage rooms, break rooms, and utility *spaces*	These *spaces* shall ~~also~~ be controlled by; *manual*-ON *occupant sensors*, and *continuous daylight dimming* controls in *spaces* with *toplighting*.
Stairwells and corridors in retail *buildings*	These *spaces* shall ~~also~~ be controlled by *occupant sensors* that reduce the lighting power by a minimum of 50% when no activity is detected for not longer than 15 minutes and be controlled to turn off when the *building* is either unoccupied or scheduled to be unoccupied.

Table 9.3.1-2 Simplified Building Method for Retail Buildings

Interior Space Type	Controls
All other *spaces* in retail *buildings*	Each *space* shall have a *manual control device* that allows the occupant to reduce lighting power by a minimum of 50% and to turn the lighting off.
Parking garages *LPD*: ~~The *LPA* shall not exceed~~ 0.14 W/ft^2 for the interior parking floors. Uncovered floors of a garage shall comply with the requirements of ~~use *LPA* and control requirements in~~ Table 9.3.2 for parking lots.	All lighting shall be controlled by *occupant sensors*. Controls shall reduce the power by a minimum of 50% when no activity is detected for not longer than 15 minutes. No device shall *control* a more than 3600 ft^2 (~~336~~334 m^2).

Table 9.3.1-3 Simplified Building Method for School Buildings

Interior Space Type	Control*s*
Interior School *LPD*: 0.63 W/ft^2 (6.8 W/m^2)	
All *spaces* in school *buildings* ~~other than parking garages~~ ~~The total *LPA* for the *building* other than parking garages shall not exceed 0.63 W/ft^2~~	All lighting shall be *automatically* controlled to turn off when individual *spaces* are either unoccupied or scheduled to be unoccupied. (**Exception:** Lighting load not exceeding 0.02 W/ft^2 multiplied by the gross lighted area of the *space* shall be permitted to operate at all times.) ~~Each *space* shall have a *manual control device* that allows the occupant to reduce lighting power by a minimum of 50% and to turn the lighting off.~~
Classrooms, offices *spaces*, conference rooms, meeting rooms, library, storage rooms, and break rooms	These *spaces* shall ~~also~~ be controlled by *manual*-ON *occupant sensors*.
Gymnasiums and cafeterias	These *spaces* shall ~~also~~ be controlled by *occupant sensors*.
Restrooms	These *spaces* shall ~~also~~ be controlled by *occupant sensors*.
Stairwells and corridors in school *buildings* and parking garages	These *spaces* shall ~~also~~ be controlled by *occupant sensors* that reduce the lighting power by a minimum of 50% when no activity is detected for not longer than 15 minutes and be controlled to turn off when the *building* is either unoccupied or scheduled to be unoccupied.
All other *spaces* in school *buildings*	Each *space* shall have a *manual control device* that allows the occupant to reduce lighting power by a minimum of 50% and to turn the lighting off.
Parking Garages *LPD*: ~~The *LPA* shall not exceed~~ 0.14 W/ft^2 for the interior parking floors. Uncovered floors of a garage shall ~~use *LPA* and control requirements in~~ comply with the requirements of Table 9.3.2 for parking lots.	All lighting shall be controlled by *occupant sensors*. Controls shall reduce the power by a minimum of 50% when no activity is detected for not longer than 15 minutes. No device shall *control* a more than 3600 ft^2 (~~336~~334 m^2).

9.3.2 Simplified Building Method of Calculating Exterior Lighting Power Allowance. For all *building* types listed in Section 9.3, exterior areas (new and *alterations*) shall comply with the *exterior lighting power allowance* and *control* requirements of Table 9.3.2.

The *exterior lighting power allowance* using the Simplified Building Method shall be determined as follows:

a. Determine the applicable simplified exterior area(s) type from Table 9.3.2 and corresponding *LPD* value.
b. The exterior area in ft^2 (m^2) is the area designed to be illuminated.
c. Multiply each exterior area in ft^2 times the *LPD* value to determine the ex*terior lighting power allowance* of each area.
d. The total *exterior lighting power allowance* for all exterior *building* applications is the sum of the base allowance and all individual area lighting power allowances.

9.4 Mandatory Provisions

9.4.1 Lighting Control. Lighting *controls* shall be installed to meet the provisions of Sections 9.4.1.1, 9.4.1.2, 9.4.1.3, and 9.4.1.4.

Table 9.3.2 Simplified Building Method for Building Exteriors

Exterior Area Type	Exterior Lighting Power ~~Allowance~~ Density [a,b]	Controls
All exterior areas		All lighting shall be *automatically* controlled to shut off the lighting when daylight is available.
Base allowance of 200 W, which may be used in any exterior area in addition to the *exterior lighting power allowance*	~~200 W~~	*Luminaires* shall be turned off or the power reduced by a minimum of 75% during nonoperating hours.
Façade lighting	0.10 W/ft^2	*Luminaires* shall be turned off or the power reduced by a minimum of 75% during nonoperating hours.
Roof terraces, special feature areas, walkways, plazas and ramps	0.07 W/ft^2	*Luminaires* shall be turned off or the power reduced by a minimum of 75% during nonoperating hours.
Landscape	0.036 W/ft^2	*Luminaires* shall be turned off or the power reduced by a minimum of 75% during nonoperating hours.
Entry doors	14 W/linear ft	*Luminaires* shall be turned off or the power reduced by a minimum of 75% during nonoperating hours.
Stairs	Exempt	No additional controls required.
Parking lots and drives	0.037 W/ft^2	*Luminaires* mounted 25 ft or less above *grade* shall be controlled to reduce the power by at least 50% when no activity is detected for not longer than 15 minutes.
All other areas not listed	0.20 W/ft^2	*Luminaires* shall be turned off or the power reduced by a minimum of 75% during nonoperating hours.

~~a. To calculate the exterior allowance, multiply the *space* or area square footage by the allowed W/ft^2 and sum the exterior allowances and the base allowance. Façade lighting shall be calculated separately by multiplying the facade area by the allowed W/ft^2. Façade allowance shall not be traded with other exterior areas or between separate *facade areas*.~~

a~~b~~. For *buildings* in Lighting Zone 2, as defined in ~~Table 9.4.2-1~~ Table 9.5.3-1, multiply ~~exterior allowances~~ *exterior lighting power allowance* by 0.7. For *buildings* in Lighting Zone 4, as defined in ~~Table 9.4.2-1~~ Table 9.5.3-1, multiply ~~exterior allowances~~ *exterior lighting power allowance* by 1.4.

[. . .]

9.4.1.4 Exterior Lighting Control. For each surface or area, all of the lighting *control* functions indicated in ~~Table 9.4.2-2~~ Table 9.5.3-2 shall be implemented. Lighting for exterior applications not exempted in Section 9.1 shall meet the requirements defined here and listed in ~~Table 9.4.2.2~~ Table 9.5.3-2:

a. OFF control: There shall be one or more lighting *control(s)* that turns off all of the lighting in the area or surface.
b. Daylight OFF *control*: Lighting shall *automatically* turn off when sufficient daylight is available or within 30 minutes of sunrise.
c. Scheduled OFF control: lighting shall be *automatically* shut off between mid- night or business closing, whichever is later, and 6 a.m. or business opening, whichever comes first, or between times established by the *authority having jurisdiction*.
d. Scheduled light reduction control: Lighting and signage shall be controlled to *automatically* reduce the connected lighting power by at least 50% from midnight or within one hour of the end of business operations, whichever is later, until 6 a.m. or the beginning of business operations, whichever is earlier.
e. Occupancy-sensing light reduction *control*: Lighting shall be *controlled* to *automatically* reduce the connected lighting power by a minimum of 50% when no activity has been detected in the area illuminated by the controlled *luminaires* for a time of no longer than 15 minutes. No more than 1500 W of lighting power shall be controlled together.

All time switches shall be capable of retaining programming and the time setting during loss of power for a period of at least ten hours.

Renumber existing Section 9.4.2 and revise as shown (I-P and SI).

~~9.4.2~~ 9.5.3 Exterior Lighting Power. The total *exterior lighting power allowance* for all exterior *building* applications is the sum of the base site allowance ~~plus~~and all the individual area lighting power allowances

~~for areas~~ that are designed to be illuminated and are permitted in ~~Table 9.4.2-2~~Table 9.5.3-2 for the applicable lighting zone in ~~Table 9.4.2-1~~Table 9.5.3-1. The *installed exterior lighting power* identified in accordance with Section 9.1.3 shall not exceed the *exterior lighting power allowance* developed in accordance with this section. Trade-offs are allowed only among exterior lighting applications listed in the ~~Table 9.4.2-2~~ Table 9.5.3-2 "Tradable Surfaces" section. The lighting zone for exterior applications is determined from ~~Table 9.4.2-1~~ Table 9.5.3-1 unless otherwise specified by the local jurisdiction.

~~Table 9.4.2-1~~ Table 9.5.3-1 Exterior Lighting Zones

Lighting Zone	Description
0	Undeveloped areas within national parks, state parks, forest land, rural areas, and other undeveloped areas as defined by the *authority having jurisdiction*
1	Developed areas of national parks, state parks, forest land, and rural areas
2	Areas predominantly consisting of *residential* zoning, neighborhood business districts, light industrial with limited nighttime use and *residential* mixed use areas
3	All other areas
4	High-activity commercial districts in major metropolitan areas as designated by the local jurisdiction

~~Table 9.4.2-2~~ Table 9.5.3-2 Individual Lighting Power ~~Allowances~~ Densities for Building Exteriors Applications

	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Section 9.4.1.4 Required Controls
Base Site Allowance (Base allowance may be used in tradable or non-tradable surfaces.)						
	~~No allowance~~	160 W	280 W	400 W	560 W	
Tradable Surfaces (*LPD* for uncovered parking areas, *building* grounds, *building entrances*, exits and loading docks, canopies and overhangs, and outdoor sales areas may be traded.)						
Uncovered Parking Areas						
Parking areas and drives	~~No allowance~~	0.015 W/ft^2	0.026W/ft^2	0.037 W/ft^2	0.052 W/ft^2	(b) and either (d) or (e)
Parking areas and drives with *luminaires* >78W and mounting height <24 ft	~~No allowance~~	0.015 W/ft^2	0.026 W/ft^2	0.037 W/ft^2	0.052 W/ft^2	(b) and (e)
Grounds						
Walkways/ramps	~~No allowance~~	0.5 W/linear ft	0.5 W/linear ft	0.55W/linear ft	0.60 W/linear ft	(b) and either (d) or (e)
Plaza areas	~~No allowance~~	0.028 W/ft^2	0.049 W/ft^2	0.070 W/ft^2	0.098 W/ft^2	(b) and either (d) or (e)
Roof terraces and special features	~~No allowance~~	0.04 W/ft^2	0.07 W/ft^2	0.10 W/ft^2	0.140 W/ft^2	(b) and either (d) or (e)
Dining areas	~~No allowance~~	0.156 W/ft^2	0.273 W/ft^2	0.390 W/ft^2	0.546 W/ft^2	(b) and either (d) or (e)
Pedestrian tunnels	~~No allowance~~	0.063 W/ft^2	0.110 W/ft^2	0.157 W/ft^2	0.220 W/ft^2	(d) or (e)
Landscaping	~~No allowance~~	0.014 W/ft^2	0.025 W/ft^2	0.036 W/ft^2	0.050 W/ft^2	(b) and (c)
Building Entrances, Exits, and Loading Docks						
Pedestrian and vehicular entrances and exits	~~No allowance~~	5.6 W/linear ft of opening	9.8W/linear ft of opening	14.0 W/linear ft of opening	19.6 W/linear ft of opening	(b) and either (d) or (e)

~~Table 9.4.2-2~~ Table 9.5.3-2 Individual Lighting Power ~~Allowances~~ Densities for Building Exteriors Applications

	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Section 9.4.1.4 Required Controls
Entry canopies	~~No allowance~~	0.072 W/ft^2	0.126 W/ft^2	0.180 W/ft^2	0.252 W/ft^2	(b) and either (d) or (e)
Loading docks	~~No allowance~~	0.104 W/ft^2	0.182 W/ft^2	0.260 W/ft^2	0.364 W/ft^2	(b) and either (d) or (e)
Sales Canopies						
Free standing and attached	~~No allowance~~	0.20 W/ft^2	0.35 W/ft^2	0.50 W/ft^2	0.70 W/ft^2	(b) and either (d) or (e)
Outdoor Sales						
Open areas (including vehicle sales lots)	~~No allowance~~	0.072 W/ft^2	0.126 W/ft^2	0.180 W/ft^2	0.252 W/ft^2	(b) and either (d) or (e)
Street frontage for vehicle sales lots in addition to "open area" allowance	~~No allowance~~	~~No allowance~~	7.2 W/linear ft	10.3 W/linear ft	14.4 W/linear ft	(b) and either (d) or (e)
Nontradable Surfaces (*LPD* for the following applications can be used only for the specific application and cannot be traded between surfaces or with other exterior lighting. The following allowances are in addition to any allowance otherwise permitted in the "Tradable Surfaces" section of this table.)						
Stairways	Exempt	Exempt	Exempt	Exempt	Exempt	(b)
Building facades (The allowance for each illuminated facade *orientation* shall be calculated by multiplying the allowable value by the entire *facade area* or facades length for that *orientation*.)	~~No allowance~~	0.056 /ft^2 of *facade area* or 1.4 W/linear ft of facade length	0.098 W/ft^2 of *facade area* or 2.4 W/linear ft of facade length	0.140 W/ft^2 of *facade area* or 3.4 W/ linear ft of facade length	0.196 W/ft^2 of *facade area* or 4.8 W/linear ft of facade length	(b) and (c)
Automated teller machines and night depositories	~~No allowance~~	90 W per location plus 35 W per additional ATM per location	90 W per location plus 35 W per additional ATM per location	90 W per location plus 35 W per additional ATM per location	90 W per location plus 35 W per additional ATM per location	(b)
Uncovered entrances and gatehouse inspection stations at guarded facilities	~~No allowance~~	0.144 W/ft^2	0.252 W/ft^2	0.360 W/ft^2	0.504 W/ft^2	(b) and either (d) or (e)
Uncovered loading areas for law enforcement, fire, ambulance, and other emergency service vehicles	~~No allowance~~	0.104 W/ft^2	0.182 W/ft^2	0.260 W/ft^2	0.364 W/ft^2	(b) and either (d) or (e)
Drive-through windows/doors	~~No allowance~~	53 W per drive-through	92 W per drive-through	132 W per drive-through	185 W per drive-through	(b) and either (d) or (e)
Parking near 24-hour retail entrances	~~No allowance~~	80 W per main entry	140 W per main entry	200 W per main entry	280 W per main entry	(b) and either (d) or (e)
For areas that are not listed in this table or are not comparable to areas listed in this table, use the comparable interior *space* type from Tables 9.5.2.1-1 and 9.5.2.1-2 as modified by factors in this row.	~~No allowance~~	22% of the *interior lighting power* ~~*allowance*~~ *density* value	39% of the *interior lighting power* ~~*allowance*~~ *density* value	55% of the *interior lighting power* ~~*allowance*~~ *density* value	77% of the *interior lighting power* ~~*allowance*~~ *density* value	(b) and either (d) or (e)
Roadway/parking entry, trail head, and toilet facility, or other locations approved by the *authority having jurisdiction*.	A single *luminaire* of 10 W or less	~~No additional allowance~~	~~No additional allowance~~	~~No additional allowance~~	~~No additional allowance~~	(b) and either (d) or (e)

~~9.4.3~~ 9.4.2 Dwelling Units. *Dwelling unit lamps*, *luminaires*, and lighting controls shall be installed to meet the provisions of Sections 9.4.3.1, 9.4.3.2, and 9.4.3.3. No other provisions of Section 9 apply to *dwelling units*.

9.5 Prescriptive Compliance Path. ~~*Interior lighting power*~~ Interior lighting power shall comply with either Section 9.5.1 or Section 9.5.2. Lighting control requirements shall comply with Section 9.4.1 and Table 9.5.2.1

Exterior lighting power shall comply with Section 9.5.3. Trade-offs between the *installed interior lighting power* and *installed exterior lighting power* are not allowed.

9.5.1 Building Area Method Compliance Path. Use the following steps to determine the *interior lighting power allowance* by the Building Area Method:

a. Determine the appropriate *building* area type from Table 9.5.1 and the corresponding *LPD* value ~~allowance~~. For *building* area types not listed, selection of a reasonably equivalent type shall be permitted.
b. Determine the *gross lighted floor area* in ft^2 (m^2) of the *building* area type.
c. Multiply the *gross lighted floor areas* ~~gross lighted *floor* areas~~ of the *building* area types times the *LPD* value.
d. The *interior lighting power allowance* for the *building* is the sum of the ~~lighting power allowances~~ *lighting power allowances* of all *building* area types. Trade-offs among *building* area types are permitted, provided that the total *installed interior lighting power* does not exceed the *interior lighting power allowance*.

Table 9.5.1 Lighting Power Density ~~Allowances~~ Using the Building Area Method

Building Area Type[a]	LPD, W/ft^2
[. . .]	[. . .]

a. In cases where both a general *building* area type and a specific *building* area type are listed, the specific *building* area type shall apply.

[. . .]

9.5.2 Space-by-Space Method Compliance Path

9.5.2.1 Space-by-Space Method of Calculating Interior Lighting Power Allowance. Use the following steps to determine the *interior lighting power allowance* by the Space-by- Space Method:

a. For each *space* enclosed by partitions that are 80% of the ceiling height or taller, determine the appropriate *space* type and the corresponding *LPD* value ~~allowance~~ from Tables 9.5.2.1-1 and 9.5.2.1-2. If a *space* has multiple functions, where more than one *space* type is applicable, that *space* shall be broken up into smaller subspaces, each using its own *space* type from Tables 9.5.2.1-1 and 9.5.2.1-2. Any of these subspaces that are smaller in floor area than 20% of the original *space* and less than 1000 ft^2 (300 m^2) need not be broken out. Include the floor area of balconies and other projections in this calculation.
b. In calculating the area of each *space* and subspace, the limits of the area are defined by the centerline of interior walls, the dividing line between subspaces, and the outside surface of *exterior walls* or *semiexterior walls*. For the purposes of this section, *semiexterior walls* that separate *semiheated space* from *conditioned space* shall be considered interior walls.
c. Based on the *space* type selected for each *space* or subspace, determine the ~~lighting power allowance~~ *lighting power allowance* of each *space* or subspace by multiplying the calculated area of the *space* or subspace by the appropriate *LPD* value ~~allowance~~ determined in Section 9.5.2.1(a). For *space* types not listed, selection of a reasonable equivalent category shall be permitted.
d. The *interior lighting power allowance* is the sum of ~~lighting power allowances~~ *lighting power allowances* of all *spaces* and subspaces. Trade-offs among *spaces* and subspaces are permitted, provided that the total *installed interior lighting power* does not exceed the *interior lighting power allowance*.

[. . .]

Table 9.5.2.1-1 Maximum ~~Space-by-Space~~ Lighting Power Density ~~Allowances~~ Using the Space-by-Space Method and Minimum Control Requirements Using Either Method

Table 9.5.2.1-2 Maximum ~~Space-by-Space~~ Lighting Power Density ~~Allowances~~ Using the Space-by-Space Method and Minimum Control Requirements Using Either Method

[. . .]

9.5.2.3 Additional Interior Lighting Power Using Nonmandatory Controls. An additional *interior lighting power allowance* ~~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:

[. . .]

9.5.2.4 Room Geometry Adjustment. When using the Space-by-Space Method, an adjustment of the *space LPD* value ~~allowance~~ is permitted for individual *spaces* where *room cavity ratio* (*RCR*) calculated for the empty room is documented to be greater than the *RCR* threshold for that *space* type shown in Tables 9.5.2.1-1 and 9.5.2.1-2.

$$RCR = 2.5 \times \text{Room Cavity Height} \times \text{Room Perimeter Length}/\text{Room Area}$$

where Room Cavity Height = *Luminaire* Mounting Height – Workplane.

For corridor/transition *spaces*, this adjustment is allowed when the corridor is less than 8 ft wide, regardless of the *RCR*.

The *LPD* value ~~allowance~~ for these *spaces* may be increased by the following amount:

$$LPD \text{ Increase} = \text{Base } Space\ LPD \times 0.20$$

where Base *Space LPD* = the applicable *LPD* value ~~allowance~~ from Tables 9.5.2.1-1 and 9.5.2.1-2.

[. . .]

Modify Section G1.2.1 as shown.

G1.2.1 Mandatory Provisions. The *proposed building design* shall comply with all of the following:

a. Sections 5.2.1, 6.2.1, 7.2.1, 8.2.1, 9.2.1, and 10.2.1.
b. Interior lighting power shall not exceed the *interior lighting power allowance* determined using either
   1. 1. Table G3.7 and the methodology described in Section 9.5.2, or
   2. 2. Table G3.8 and the methodology described in Section 9.5.1.
c. The *installed exterior lighting power* shall not exceed the *exterior lighting power allowance* determined using Table G3.6 and the methodology described in Section 9.5.3.
~~e~~d. Energy efficiency levels of installed components and *systems* that meet or exceed the efficiency levels used to calculate the *proposed building performance*.

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.

ASHRAE · 180 Technology Parkway · Peachtree Corners, GA 30092 · www.ashrae.org

About ASHRAE

Founded in 1894, ASHRAE is a global professional society committed to serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration, and their allied fields.

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.

To stay current with this and other ASHRAE Standards and Guidelines, visit www.ashrae.org/standards, and connect on LinkedIn, Facebook, Twitter, and YouTube.

Visit the ASHRAE Bookstore

ASHRAE offers its Standards and Guidelines in print, as immediately downloadable PDFs, and via ASHRAE Digital Collections, which provides online access with automatic updates as well as historical versions of publications. Selected Standards and Guidelines are also offered in redline versions that indicate the changes made between the active Standard or Guideline and its previous edition. For more information, visit the Standards and Guidelines section of the ASHRAE Bookstore at www.ashrae.org/bookstore.

IMPORTANT NOTICES ABOUT THIS STANDARD

To ensure that you have all of the approved addenda, errata, and interpretations for this Standard, visit www.ashrae.org/standards to download them free of charge.

Addenda, errata, and interpretations for ASHRAE Standards and Guidelines are no longer distributed with copies of the Standards and Guidelines. ASHRAE provides these addenda, errata, and interpretations only in electronic form to promote more sustainable use of resources.

9/23