ADDENDA

ANSI/ASHRAE/IES Addendum cg to
ANSI/ASHRAE/IES Standard 90.1-2013

Energy Standard for Buildings Except Low-Rise Residential Buildings

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FOREWORD

Addendum cg modifies the exterior lighting power densities (LPDs) by changing the basis for determining an energy effective and achievable power density from typical high-intensity discharge (HID) or fluorescent technologies to light-emitting diode (LED) technology where practical. The LED technology basis was developed by directly comparing the efficacy of appropriate replacement LED products with the efficacy of comparable HID or fluorescent products. The ratios determined were applied to the applicable area type LPDs to produce this revised LED based set of LED requirements. In almost all cases this resulted in a reduction in LPD, emphasizing the advanced efficacy of LED technology.

This addendum makes proposed changes to the current standard. These changes are indicated in the text by <u>underlining</u> (for additions) and ~~strikethrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes.

Addendum cg to 90.1-2013

Modify the standard as follows (I-P and SI):

9. LIGHTING

9.1 General

9.1.1 Scope. This section shall apply to the following:

a. Interior spaces of buildings
<u>b. Exterior lighting that is powered through the building's electrical service</u>
~~b. Exterior building features, including façades, illuminated roofs, architectural features, entrances, exits, loading docks, and illuminated canopies~~
~~c. Exterior building grounds lighting provided through the building's electrical service~~

Exceptions:
1. Emergency lighting that is automatically off during normal building operation
2. Lighting <u>controlled from</u> within dwelling units
3. Lighting that is specifically designated as required by a health or life safety statute, ordinance, or regulation
4. Decorative gas lighting systems

9.1.2 Lighting Alterations. For the alteration of any lighting system in an interior space, that space shall comply with the lighting power density (LPD) requirements of Section 9 applicable to that space and the automatic shutoff requirements of Section 9.4.1.1. For the alteration of any lighting system ~~in~~ <u>for the</u> ~~an~~ exterior <u>of a</u> building application, that lighting system shall comply with the lighting power density (LPD) requirements of Section 9 applicable to the area illuminated by that lighting system and the applicable control requirements of Sections 9.4.1.4(a) and 9.4.1.4(b). Such alterations shall include all luminaires that are added, replaced or removed. This requirement shall also be met for alterations that involve only the replacement of lamps plus ballasts. Alterations do not include routine maintenance or repair situations.

9.4.2 Exterior Building Lighting Power. The total exterior lighting power allowance for all exterior building applications is the sum of the base site allowance plus the individual allowances for areas that are designed to be illuminated and are permitted in Table 9.4.2-1 for the applicable lighting zone. 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 "Tradable Surfaces" section. The lighting zone for the building exterior is determined from Table 9.4.2-1 unless otherwise specified by the local jurisdiction.

Exceptions:
1. Lighting used for the following exterior applications is exempt when equipped with a control device that complies with the requirements of Section 9.4.1.4 and is independent of the control of the nonexempt lighting:

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a. Lighting that is integral to signage and installed in the signage by the manufacturer
b. Lighting for athletic playing areas
c. Lighting for industrial production, material handling, transportation sites, and associated storage areas
d. Theme elements in theme/amusement parks
e. Lighting used to highlight features of public monuments, public art displays, and registered historic landmark structures or buildings.
f. Lighting for water features

TABLE 9.4.2-2 Individual Lighting Power Allowances for Building Exteriors

	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4
Base Site Allowance (base allowance may be used in tradable or non-tradable surfaces)					
	No allowance ~~No base site in Zone 0~~	~~500~~ 350 W	~~600~~ 400 W	~~750~~ 500 W	~~1300~~ 900 W
Tradable Surfaces (LPDs 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	~~0.04~~ 0.03 W/ft^2 (0.32 W/m2)	~~0.06~~ 0.04 W/ft^2 (0.43 W/m2)	~~0.10~~ 0.06 W/ft^2 (0.65 W/m2)	~~0.13~~ 0.08 W/ft^2 (0.86 W/m2)
Building Grounds					
Walkways/Ramps less than 10 ft wide	No allowance	~~0.7~~ 0.5 W/linear foot (1.6 W/m)	~~0.7~~ 0.5 W/linear foot (1.6 W/m)	~~0.8~~ 0.6 W/linear foot (2.0 W/m)	~~1.0~~ 0.7 W/linear foot (2.3 W/m)
Walkways/Ramps 10 ft wide or greater, Plaza areas, Special feature areas	No allowance No allowance No allowance	~~0.14~~ 0.10 W/ft^2 (1.1 W/m2)	~~0.14~~ 0.10 W/ft^2 (1.1 W/m2)	~~0.16~~ 0.11 W/ft^2 (1.2 W/m2)	~~0.2~~ 0.14 W/ft^2 (1.5 W/m2)
Dining Areas	No allowance	0.65 W/ft^2(7.0 W/m2)	0.65 W/ft^2(7.0 W/m2)	0.75 W/ft^2(8.1 W/m2)	0.95 W/ft^2(10.2 W/m2)
Stairways	No allowance	~~0.75~~ 0.6 W/ft^2(6.5 W/m2)	~~1.0~~ 0.7 W/ft^2(7.5 W/m2)	~~1.0~~ 0.7 W/ft^2(7.5 W/m2)	~~1.0~~ 0.7 W/ft^2(7.5 W/m2)
Pedestrian tunnels	No allowance	~~0.15~~ 0.12 W/ft^2(1.3 W/m2)	~~0.15~~ 0.12 W/ft^2(1.3 W/m2)	~~0.2~~ 0.14 W/ft^2(1.5 W/m2)	~~0.3~~ 0.21 W/ft^2(2.3 W/m2)
Landscaping	No allowance	~~0.04~~ 0.03 W/ft^2(0.32 W/m2)	~~0.05~~ 0.04 W/ft^2(0.43 W/m2)	~~0.05~~ 0.04 W/ft^2(0.43 W/m2)	~~0.05~~ 0.04 W/ft^2(0.43 W/m2)
Building Entrances, Exits and Loading Docks					
Pedestrian and vehicular entrances and exits ~~Main entries~~	No allowance	~~20~~ 14 W/linear foot of opening ~~W/lin ft of door width~~(46 W/m)	~~20~~ 14 W/linear foot of opening ~~W/lin ft of door width~~(46 W/m)	~~30~~ 21 W/linear foot of opening ~~W/lin ft of door width~~(69 W/m)	~~30~~ 21 W/linear foot of opening ~~W/lin ft of door width~~(69 W/m)
~~Other doors~~	~~No allowance~~	~~20 W/lin ft of door width~~	~~20 W/lin ft of door width~~	~~20 W/lin ft of door width~~	~~20 W/lin ft of door width~~
Entry canopies	No allowance	~~0.25~~ 0.2 W/ft^2(2.1 W/m2)	0.25 W/ft^2(2.7 W/m2)	0.4 W/ft^2(4.3 W/m2)	0.4 W/ft^2(4.3 W/m2)
Loading docks	No allowance	~~0.5~~ 0.35 W/ft^2(3.8 W/m2)	~~0.5~~ 0.35 W/ft^2(3.8 W/m2)	~~0.5~~ 0.35 W/ft^2(3.8 W/m2)	~~0.5~~ 0.35 W/ft^2(3.8 W/m2)
Sales Canopies					
Free standing and attached	No allowance	~~0.6~~ 0.4 W/ft^2(4.3 W/m2)	~~0.6~~ 0.4 W/ft^2(4.3 W/m2)	~~0.8~~ 0.6 W/ft^2(6.5 W/m2)	~~1.0~~ 0.7 W/ft^2(7.5 W/m2)
Outdoor Sales					
Open areas (including vehicle sales lots)	No allowance	~~0.25~~ 0.2 W/ft^2(6.5 W/m2)	~~0.25~~ 0.2 W/ft^2(6.5 W/m2)	~~0.5~~ 0.35 W/ft^2(6.5 W/m2)	~~0.7~~ 0.5 W/ft^2(6.5 W/m2)
Street frontage for vehicle sales lots in addition to "open area" allowance	No allowance	No allowance	~~10~~ 7 W/linear foot (23 W/m)	~~10~~ 7 W/linear foot (23 W/m)	~~30~~ 21 W/linear foot (69 W/m)
Nontradable Surfaces (LPD calculations 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"					

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section of this table.)					
Building facades (The allowance for each illuminated facade orientation shall be calculated by multiplying the allowable value by the entire *facade area* or facade length for that orientation)	No allowance	No allowance	0.1 W/ft^2 of *façade area* (1.1 W/m2)or 2.5 W/linear foot (8.2 W/m)of façade length ~~0.1 W/ft2 for each illuminated wall or surface or 2.5 W/linear foot for each illuminated wall or surface length~~	0.15 W/ft^2 of *façade area* (1.6 W/m2)or 3.75 W/linear foot (12.3 W/m)of façade length ~~0.15 W/ft2 for each illuminated wall or surface or 3.75 W/linear foot for each illuminated wall or surface length~~	0.2 W/ft^2 of *façade area* (2.2 W/m2)or 5.0 W/linear foot (16.4 W/m)of façade length ~~0.2 W/ft2 for each illuminated wall or surface or 5.0 W/linear foot for each illuminated wall or surface length~~
Automated teller machines and night depositories	No allowance	~~270W~~ 135W per location plus ~~90W~~ 45W per additional ATM per location	~~270W~~ 135W per location plus ~~90W~~ 45W per additional ATM per location	135W per location plus 45W per additional ATM per location	~~270W~~ 135W per location plus ~~90W~~ 45W per additional ATM per location
Uncovered entrances ~~Entrances~~ and gatehouse inspection stations at guarded facilities	No allowance	~~0.75~~ 0.5 W/ft^2 (5.4 W/m2)~~of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")~~	~~0.75~~ 0.5 W/ft^2 (5.4 W/m2)~~of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")~~	~~0.75~~ 0.5 W/ft^2 (5.4 W/m2)~~of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")~~	~~0.75~~ 0.5 W/ft^2 (5.4 W/m2)~~of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")~~
Uncovered loading ~~Loading~~ areas for law enforcement, fire, ambulance, and other emergency service vehicles	No allowance	~~0.5~~ 0.35 W/ft^2 (3.8 W/m2)~~of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")~~	~~0.5~~ 0.35 W/ft^2 (3.8 W/m2)~~of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")~~	~~0.5~~ 0.35 W/ft^2 (3.8 W/m2)~~of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")~~	~~0.5~~ 0.35 W/ft^2 (3.8 W/m2)~~of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")~~
Drive-through windows/doors	No allowance	~~400W~~ 200W per drive-through	~~400W~~ 200W per drive-through	~~400W~~ 200W per drive-through	~~400W~~ 200W per drive-through
Parking near 24-hour retail entrances	No allowance	~~800W~~ 400W per main entry	~~800W~~ 400W per main entry	~~800W~~ 400W per main entry	~~800W~~ 400W per main entry
Roadway/parking entry, trail head, and toilet facility, or other locations approved by the authority having jurisdiction.	A single luminaire of ~~60W~~ 25W or less ~~may be installed for each roadway/ parking entry, trail head, and toilet facility, or other locations approved by the authority having jurisdiction~~	No additional allowance	No additional allowance	No additional allowance	No additional allowance

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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.

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