

# Public Review Draft

Proposed Addendum bh to Standard 189.1-2017

# Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings

First Public Review (February 2020)  
(Draft Shows Proposed Changes to Current Standard)

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## Foreword

This addendum updates the outdoor light pollution requirements in Chapter 5. It removes the outdoor lighting requirements that are provided in ANSI/ASHRAE/IES Standard 90.1, which already appear in Sections 7.4.6 of this standard, and simplifies section numbering accordingly. It also combines Tables 5.3.6.2A and B into one Table 5.3.5.1 in order to reduce confusion about how the requirements are integrated.

Furthermore, this update clarifies that there are no backlight requirements for building mounted luminaires, as shown in a new row added to Table 5.3.6.1. Note that these changes are editorial and do not affect the stringency of the BUG ratings.

One of the existing options for uplight compliance that appeared in Section 5.3.6.3(b) and Table 5.3.6.3 is also being removed because it does not align with the IDA/IES Model Lighting Ordinance (MLO) and is based on a metric that is generally going out of use.

*[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 bh to 189.1-2017

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*Revise Section 5.3.6 as follows:*

### 5.3.6 Reduction of Light Pollution

**5.3.6.1 General.** ~~Exterior lighting systems shall comply with ANSI/ASHRAE/IES Standard 90.1, Sections 9.1, 9.4.1.4, 9.4.2, 9.4.3, and 9.7, and with Sections 5.3.6.2 and 5.3.6.3 of this standard.~~

### 5.3.6.2 Backlight and Glare

- ~~a. All building-mounted luminaires located less than two mounting heights from any property line shall meet the maximum allowable glare ratings in Table 5.3.6.2A.~~
- ~~b. All other luminaires shall meet the maximum allowable backlight and glare ratings in Table 5.3.6.2B.~~

**5.3.6.3 Uplight.** ~~All exterior lighting shall meet one of the following uplight requirements:~~

- a. ~~Exterior luminaires shall meet the maximum allowable Uplight Ratings of Table 5.3.6.2B.~~
- b. ~~Exterior lighting shall meet the uplight requirements of Table 5.3.6.3.~~

**5.3.6.1 Backlight Uplight, Glare (BUG) ratings.** Exterior luminaire Backlight, Uplight, and Glare (BUG) Ratings shall be in accordance with IES TM-15. Luminaire mounting heights shall be determined as the distance between the lowest point of a luminaire and the ground. All exterior lighting shall comply with items (a) through (c).

- a. **Backlight.** Building mounted exterior lighting with backlight oriented towards the building is not required (NR) to have a maximum Backlight Rating. All other exterior lighting, not building mounted and building mounted where backlight is not oriented towards the building, shall have a Backlight Rating that is no greater than the maximum Backlighting Rating value in Table 5.3.6.1 that is a function of the horizontal distance between the luminaire and closest property line in multiples of luminaire mounting height and the *Lighting Zone*. Luminaires not building mounted and located within 2 mounting heights of the nearest property line, shall be oriented so the backlight portion of light output is oriented perpendicular towards the closest property line.
- b. **Uplight.** Exterior luminaires shall have an Uplight Rating that is no greater than the maximum Uplight Rating value in Table 5.3.6.1 for the *Lighting Zone*.

**Exceptions to 5.3.6.1(b) 5.3.6.3:**

- 1. Lighting in *LZ3* and *LZ4*, solely for uplighting structures, building façades, or landscaping.
  - 2. Lighting in *LZ1* and *LZ2*, solely for uplighting structures, building façades, or landscaping, provided the applicable lighting power densities (LPDs) do not exceed 50% of the *lighting power allowances* in ANSI/ASHRAE/IES Standard 90.1, Table 9.4.2-2.
- c. **Glare.** Building mounted exterior lighting with forward light oriented towards the building is not required (NR) to have a maximum Glare Rating. All other building mounted lighting shall have a Glare Rating that is no greater than the maximum Glare Rating value in Table 5.3.6.1 as a function of the horizontal distance between the luminaire and closest property line in multiples of luminaire mounting height and the *Lighting Zone*. All exterior lighting, not building mounted shall have a Glare Rating that is no greater than the maximum Glare Rating value in Table 5.3.6.1 for the *Lighting Zone*.

**Exceptions to 5.3.6.1 5.3.6.2 and 5.3.6.3:**

- 1. Specialized signal, directional, and marker lighting associated with transportation.
- 2. Advertising signage or directional signage.
- 3. Lighting integral to equipment or instrumentation and installed by its manufacturer.
- 4. Lighting for theatrical purposes, including performance, stage, film production, and video production.
- 5. Lighting for athletic playing areas.
- 6. Lighting that is in use for no more than 60 continuous days and is not reinstalled any sooner than 60 days after being uninstalled.
- 7. Lighting for industrial production, material handling, transportation *sites*, and associated storage areas.
- 8. Theme elements in theme/amusement parks.
- 9. Roadway lighting required by governmental authorities.

- 10. Lighting classified for and used in hazardous locations as specified in NFPA 70.
- 11. Lighting for swimming pools and water features.

**Combine Tables 5.3.6.2A, 5.3.6.2B into renumbered Table 5.3.6.1 and delete Table 5.3.6.3**

**Table 5.3.6.2A Maximum Allowable Glare Ratings for Building Mounted Luminaires within Two Mounting Heights of Any Property Line<sup>a,b</sup>**

Distance in Mounting Heights to Nearest Property Line	LZ0	LZ1	LZ2	LZ3	LZ4
≥1 and <2	G0	G0	G1	G1	G2
≥0.5 and <1	G0	G0	G0	G1	G1
<0.5	G0	G0	G0	G0	G1

- a. For property lines that abut public walkways, bikeways, plazas, and parking lots, the property line may be considered to be 5 ft (1.5 m) beyond the actual property line for the purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public transit corridor for the purpose of determining compliance with this section.
- b. Backlight, uplight, and glare ratings are defined based on specific lumen limits per IES TM-15 Addendum A.

**Table 5.3.6.2B 5.3.6.1 Maximum Allowable Backlight, Uplight, and Glare (BUG) Ratings<sup>a,b,c,d</sup>**

Lighting Zone	LZ0	LZ1	LZ2	LZ3	LZ4
<b><u>Allowed Backlight Rating – Building Mounted and Backlight Oriented Towards Building<sup>e</sup></u></b>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>
<b>Allowed Backlight Rating – <u>All Other Luminaires</u></b>					
>2 mounting heights from property line	B1	B3	B4	B5	B5
≥1 to 2 mounting heights from property line	B1	B2	B3	B4	B4
0.5 to 1 mounting height to property line	B0	B1	B2	B3	B3
<0.5 mounting height to property line	B0	B0	B0	B1	B2
<b>Allowed Uplight Rating – <u>All Exterior Lighting</u></b>					
	U0	U1	U2	U3	U4
<b><u>Allowed Glare Rating – Building Mounted and Forward Light Oriented Towards Building<sup>e</sup></u></b>					
	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>	<u>NR</u>
<b><u>Allowed Glare Rating – All Other Building Mounted Lighting</u></b>					
>2 mounting heights from property line	<u>G0</u>	<u>G1</u>	<u>G2</u>	<u>G3</u>	<u>G4</u>
>1 to 2 mounting heights from property line	<u>G0</u>	<u>G0</u>	<u>G1</u>	<u>G1</u>	<u>G2</u>
0.5 to 1 mounting height to property line	<u>G0</u>	<u>G0</u>	<u>G0</u>	<u>G1</u>	<u>G1</u>
<0.5 mounting height to property line	<u>G0</u>	<u>G0</u>	<u>G0</u>	<u>G0</u>	<u>G1</u>
<b>Allowed Glare Rating – <u>All Other Luminaires</u></b>					
	G0	G1	G2	G3	G4

- a. Except where installed on a building surface, luminaires that are located at a distance of two times the mounting height of the luminaire or less from a property line shall have the backlight of the luminaire aimed toward and perpendicular to the nearest property line. Backlight is that part of the luminaire’s lumen output that was used to determine the backlight rating in its final angular position.
- b. For property lines that abut public walkways, bikeways, plazas, and parking lots, the property line may be considered to be 5 ft (1.5 m) beyond the actual property line for the purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public transit corridor for the purpose of determining compliance with this section.
- c. If the luminaire is installed in other than the intended manner, or is an adjustable luminaire for which the aiming is specified, the rating shall be determined by the actual photometric geometry in the aimed orientation.
- d. Backlight, uplight, and glare ratings are defined based on specific lumen limits per IES TM-15 Addendum A.
- e. NR = not required

**Table 5.3.6.3 Maximum Allowable Percentage of Uplight**

	<b>LZ0</b>	<b>LZ1</b>	<b>LZ2</b>	<b>LZ3</b>	<b>LZ4</b>
-					
Percentage of total exterior fixture lumens allowed to be emitted above 90 degrees or higher from nadir (straight down)	0%	0%	1%	2%	5%