

**CALIFORNIA BUILDING STANDARDS COMMISSION
GREEN BUILDING
WORKSHOP
May 31, 2016 - Agenda Item 4b-REVISED**

**DRAFT EXPRESS TERMS for the 2016
CALIFORNIA GREEN BUILDING STANDARDS CODE,
(CALGreen), PART 11,
CALIFORNIA BUILDING STANDARDS CODE,
TITLE 24, CALIFORNIA CODE OF REGULATIONS
Proposed code language for the 2016 Intervening Code Adoption Cycle**

<p>LEGEND FOR DRAFT EXPRESS TERMS</p> <ol style="list-style-type: none">1. New California amendments: All such language appears <u>underlined</u>.2. Repealed text: All such language appears in strikeout. <i>[Information for the reader is bracketed and in red italics]</i>

5.106.8 Light Pollution Reduction

- **Statement of specific purpose, problem, rationale and benefits:**
CBSC is proposing clarification language to address Light Pollution Reduction reference to the lighting zones found in the California Energy Code part 6. Also, to update table 5.106.8 to include lighting zone zero and adding the acronym LZ (lighting zone) to align with the Energy Commission's tables. Additionally, CBSC is proposing to reprint the uplight and glare ratings tables from the Energy Code for reference as well as including the backlight ratings table from the IES TM-15-11 standard. This proposed code amendment will provide convenience and clarity for the code by having the reference standards listed in one single location.

**SECTION 5.106
SITE DEVELOPMENT**

...

5.106.8 Light pollution reduction. [N] Outdoor lighting systems shall be designed and installed to comply with the following:

1. The minimum requirements in the *California Energy Code* for Lighting Zones 04--4 as defined in Chapter 10, Section 10-114 of the California Administrative Code; and
2. Backlight, Uplight and Glare (BUG) ratings as defined in IES TM-15-11; and
3. Allowable BUG ratings not exceeding those shown in Table 5.106.8, or
Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent.

Exceptions: [N]

1. Luminaires that qualify as exceptions in Section 140.7 of the *California Energy Code*.
2. Emergency lighting.
3. Building facade meeting the requirements in Table 140.7-B of the California Energy Code, Part 6.
4. Custom lighting features as allowed by the local enforcing agency, as permitted by Section 101.8 Alternate materials, designs and methods of construction

Note: [N] See also *California Building Code*, Chapter 12, Section 1205.6 for college campus lighting requirements for parking facilities and walkways.

**TABLE 5.106.8 [N]
MAXIMUM ALLOWABLE BACKLIGHT, UPLIGHT AND GLARE (BUG) RATINGS^{1,2}**

ALLOWABLE RATING	LIGHTING ZONE LZ0	LIGHTING ZONE LZ1	LIGHTING ZONE LZ2	LIGHTING ZONE LZ3	LIGHTING ZONE LZ4
Maximum Allowable Backlight Rating³ (B)					
Luminaire greater than 2 mounting heights (MH) from property line	<u>N/A</u>	No Limit	No Limit	No Limit	No Limit
Luminaire back hemisphere is 1 – 2 MH from property line	<u>N/A</u>	B2	B3	B4	B4
Luminaire back hemisphere is 0.5 – 1 MH from property line	<u>N/A</u>	B1	B2	B3	B3
Luminaire back hemisphere is less than 0.5 MH from property line	<u>N/A</u>	B0	B0	B1	B2
Maximum Allowable Uplight Rating (U)					
For area lighting ⁴	<u>N/A</u>	U0	U0	U0	U0
For all other outdoor lighting, including decorative luminaires	<u>N/A</u>	U1	U2	U3	U4
Maximum Allowable Glare Rating⁵ (G)					
Luminaire greater than 2 MH from property line	<u>N/A</u>	G1	G2	G3	G4
Luminaire front hemisphere is 1 – 2 MH from property line	<u>N/A</u>	G0	G1	G1	G2
Luminaire front hemisphere is 0.5 – 1 MH from property line	<u>N/A</u>	G0	G0	G1	G1
Luminaire back hemisphere is less than 0.5 MH from property line	<u>N/A</u>	G0	G0	G0	G1

1. IESNA Lighting Zones 0 and 5 are not applicable; refer to Lighting Zones as defined in the *California Energy Code* and Chapter 10 of the *California Administrative Code*.

- 2. ...
- 3. ...
- 4. ...
- 5. ...

Note: The following table have been duplicated from IES TM-15-11 for reference only.

TABLE A-1 Backlight Ratings (Maximum Zonal Lumens)

Secondary Solid Angle	Maximum Zonal Lumens per Outdoor Lighting Zone				
	<u>LZ0</u>	<u>LZ 1</u>	<u>LZ 2</u>	<u>LZ 3</u>	<u>LZ 4</u>
<u>Backlight High (BH)</u> <u>60 to 80 degrees</u>	<u>110</u>	<u>500</u>	<u>1000</u>	<u>2500</u>	<u>5000</u>
<u>Backlight Medium (BM)</u> <u>30 to <60 degrees</u>	<u>220</u>	<u>1000</u>	<u>2500</u>	<u>5000</u>	<u>8500</u>
<u>Backlight Low (BL)</u> <u>0 to < 30 degrees</u>	<u>110</u>	<u>500</u>	<u>1000</u>	<u>2500</u>	<u>5000</u>

Note: The following tables have been reprinted from the 2016 California Energy Code for reference only.

TABLE 130.2-A Uplight Ratings (Maximum Zonal Lumens)

Secondary Solid Angle	Maximum Zonal Lumens per Outdoor Lighting Zone				
	<u>LZ0</u>	<u>LZ 1</u>	<u>LZ 2</u>	<u>LZ 3</u>	<u>LZ 4</u>
<u>Uplight High (UH)</u> 100 to 180 degrees	<u>0</u>	<u>10</u>	<u>50</u>	<u>500</u>	<u>1,000</u>
<u>Uplight Low (UL)</u> 90 to <100 degrees	<u>0</u>	<u>10</u>	<u>50</u>	<u>500</u>	<u>1,000</u>
<u>Forward high (FH)</u> 60 to < 80 degrees		<u>1,800</u>	<u>5,000</u>	<u>7,500</u>	<u>12,000</u>
<u>Backlight high (BH)</u> 60 to < 80 degrees		<u>1,800</u>	<u>5,000</u>	<u>7,500</u>	<u>12,000</u>

TABLE 130.2-B Glare Ratings (Maximum Zonal Lumens)

Glare Rating for Asymmetrical Luminaire Types (Type I, Type II, Type III, Type IV)					
Secondary Solid Angle	Maximum Zonal Lumens per Outdoor Lighting Zone				
	<u>LZ 0</u>	<u>LZ 1</u>	<u>LZ 2</u>	<u>LZ 3</u>	<u>LZ 4</u>
<u>Forward Very High (FVH)</u> 80 to 90 degrees	<u>10</u>	<u>100</u>	<u>225</u>	<u>500</u>	<u>750</u>
<u>Backlight Very High (BVH)</u> 80 to 90 degrees	<u>10</u>	<u>100</u>	<u>225</u>	<u>500</u>	<u>750</u>
<u>Forward High (FH)</u> 60 to <80 degrees	<u>660</u>	<u>1,800</u>	<u>5,000</u>	<u>7,500</u>	<u>12,000</u>
<u>Backlight High (BH)</u> 60 to <80 degrees	<u>110</u>	<u>500</u>	<u>1,000</u>	<u>2,500</u>	<u>5,000</u>
Glare Rating for Quadrilateral Symmetrical Luminaire Types (Type V, Type V Square)					
Secondary Solid Angle	Maximum Zonal Lumens per Outdoor Lighting Zone				
	<u>LZ 0</u>	<u>LZ 1</u>	<u>LZ 2</u>	<u>LZ 3</u>	<u>LZ 4</u>
<u>Forward Very High (FVH)</u> 80 to 90 degrees	<u>10</u>	<u>100</u>	<u>225</u>	<u>500</u>	<u>750</u>
<u>Backlight Very High (BVH)</u> 80 to 90 degrees	<u>10</u>	<u>100</u>	<u>225</u>	<u>500</u>	<u>750</u>
<u>Forward High (FH)</u> 60 to <80 degrees	<u>660</u>	<u>1,800</u>	<u>5,000</u>	<u>7,500</u>	<u>12,000</u>
<u>Backlight High (BH)</u> 60 to <80 degrees	<u>660</u>	<u>1,800</u>	<u>5,000</u>	<u>7,500</u>	<u>12,000</u>