# ADDENDUM A FOR IES TM-15-11:

## BACKLIGHT, UPLIGHT, AND GLARE (BUG RATINGS)

This Addendum replaces Addendum A in IESNA TM-15-07.
The following Backlight, Uplight, and Glare ratings may be used to evaluate luminaire optical performance related to light trespass, sky glow, and high angle brightness control. These ratings are based on a zonal lumen calculation for secondary solid angles defined in TM-12-11. The zonal lumen thresholds listed in the following three tables are based on data from photometric testing procedures approved by the Illuminating Engineering Society for outdoor luminaires (LM-31 or LM-35).

### Table A-1: Backlight Ratings (maximum zonal lumens)

| Secondary Solid Angle | | B0 | B1 | B2 | B3 | B4 | B5 |
|---|---|---|---|---|---|---|---|
| Backlight / Trespass | BH | 110 | 500 | 1000 | 2500 | 5000 | >5000 |
| | BM | 220 | 1000 | 2500 | 5000 | 8500 | >8500 |
| | BL | 110 | 500 | 1000 | 2500 | 5000 | >5000 |

### Table A-2: Uplight Ratings (maximum zonal lumens)

| Secondary Solid Angle | | U0 | U1 | U2 | U3 | U4 | U5 |
|---|---|---|---|---|---|---|---|
| Uplight / Skyglow | UH | 0 | 10 | 50 | 500 | 1000 | >1000 |
| | UL | 0 | 10 | 50 | 500 | 1000 | >1000 |

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**Table A-3: Glare Ratings (maximum zonal lumens)**

| Secondary Solid Angle | | G0 | G1 | G2 | G3 | G4 | G5 |
|---|---|---|---|---|---|---|---|
| Glare / Offensive Light | FVH | 10 | 100 | 1000 | 2500 | 5000 | >5000 |
| | BVH | 10 | 100 | 255 | 500 | 750 | >750 |
| | FH | 660 | 1800 | 5000 | 7500 | 12000 | >12000 |
| | BH | 110 | 500 | 1000 | 2500 | 5000 | >5000 |

| Secondary Solid Angle | | G0 | G1 | G2 | G3 | G4 | G5 |
|---|---|---|---|---|---|---|---|
| Glare / Offensive Light | FVH | 10 | 100 | 225 | 500 | 750 | >750 |
| | BVH | 10 | 100 | 255 | 500 | 750 | >750 |
| | FH | 660 | 1800 | 5000 | 7500 | 12000 | >12000 |
| | BH | 660 | 1800 | 5000 | 7500 | 12000 | >12000 |

**Notes to Tables A-1, A-2, and A-3:**

1. Any one rating is determined by the maximum rating obtained for that table. For example, if the BH zone is rated B1, the BM zone is rated B2, and the BL zone is rated B1, then the backlight rating for the luminaire is B2

2. To determine BUG ratings, the photometric test data must include data in the upper hemisphere unless no light is emitted above 90 degrees vertical (fir example, if the luminaire has a flat lens and opaque sides), per the IES Testing Procedures Committee recommendations.

3. It is recommended that the photometric test density include values at least every 2.5 degree vertically. If a photometric test does not include data points every 2.5 degrees vertically, the BUG ratings shall be determined based on appropriate interpolation.

4. A "quadrilateral symmetric" luminaire shall meet one of the following definitions:

   a. A type V luminaire is one with a distributions that has circular symmetry, defined by the IESNA as being essentially the same at all lateral angles around the luminaire

   b. A Type VS luminaire is one where the zonal lumens for each of the eight horizontal octant's (0-45, 45-90, 90-135, 135-180, 180-225, 225-270, 270-315, 315-360) are within ± 10 percent of the average zonal lumens of all octant's.

**“BUG” Rating Example:**

A 60W SSL area luminaire, Type IV forward throw optical distribution.

Based on the photometric test data, the luminaire has the following zonal lumen distribution:

| | Lumens | % Lamp Lumens |
|---|---|---|
| **Forward Light** | | |
| FL (0-30 degrees) | 325 | 5.7% |
| FM (30-60 degrees) | 2500 | 43.7% |
| FH (60-80 degrees) | 1742 | 30.4% |
| FVH (80-90 degrees) | 51 | 0.9% |
| **Back Light** | | |
| BL (0-30 degrees) | 101 | 1.8% |
| BM (30-60 degrees) | 585 | 10.2% |
| BH (60-80 degrees) | 378 | 7.2% |
| BVH (80-90 degrees) | 44 | 0.8% |
| **Uplight** | | |
| UL (90-100 degrees) | 0 | 0.0% |
| UH (100-180 degrees) | 0 | 0.0% |

**Backlight Rating:**
Determine the lowest rating where the lumens for all of the secondary solid angles do not exceed the threshold lumens from **Table A-1**. In this example the backlight rating would be **B1** based on the **BM** lumen limit.

**Uplight Rating:**
Determine the lowest rating where the lumens for all of the secondary solid angles do not exceed the threshold lumens from **Table A-2**. In this example the uplight rating would be **UO** based on the **UL** and **UH** lumen limits.

**Glare Rating:**
Determine the lowest rating where the lumens for all the secondary solid angles do not exceed the threshold lumens from **Table A-3** for a Type IV distribution. In this example, the glare rating would be **G1** based on the FH lumen limit.

Therefore, the BUG rating for this luminaire would be: **B1 U0 G1**