

Addendum A for IESNA TM-15-07: Backlight, Uplight, and Glare (BUG) Ratings

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 calculations for secondary solid angles defined in TM-15-07. 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)

		Backlight Rating						
		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)

		Uplight Rating						
		Secondary Solid Angle	U0	U1	U2	U3	U4	U5
Uplight / Skyglow	UH		0	10	100	500	1000	>1000
	UL		0	10	100	500	1000	>1000
	FVH		10	75	150	>150		
	BVH		10	75	150	>150		

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

**Glare Rating for
Asymmetrical Luminaire Types (Type I, Type II, Type III, Type IV)**

	Secondary Solid Angle	G0	G1	G2	G3	G4	G5
	Glare / Offensive Light	FVH	10	250	375	500	750
BVH		10	250	375	500	750	>750
FH		660	1800	5000	7500	12000	>12000
BH		110	500	1000	2500	5000	>5000

**Glare Rating for
Quadrilateral Symmetrical Luminaire Types (Type V, Type V Square)**

	Secondary Solid Angle	G0	G1	G2	G3	G4	G5
	Glare / Offensive Light	FVH	10	250	375	500	750
BVH		10	250	375	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 (for 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 degrees 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 distribution 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 octants (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 octants.

“BUG” RATING EXAMPLE:



A 250-watt MH area luminaire, Type IV forward throw optical distribution.

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

Forward Light	Lumens	% Lamp Lumens
FL (0 - 30 degrees)	1618	5.9%
FM (30 - 60 degrees)	6093	22.2%
FH (60 – 80 degrees)	3748	13.6%
FVH (80 – 90 degrees)	27	0.1%
Back Light		
BL (0 – 30 degrees)	985	3.6%
BM (30 – 60 degrees)	930	3.4%
BH (60 – 80 degrees)	136	0.5%
BVH (80 – 90 degrees)	16	0.1%
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 **B2** based on the BL 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 **U1** based on the FVH and BVH lumen limits.

Glare Rating:

Determine the lowest rating where the lumens for all of 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 **G2** based on the FH lumen limit.

Therefore, the BUG rating for this luminaire would be: **B2 U1 G2**