

Tested Light Source - 1\_PHOT\_SKIN+BONES-4050lmChip-2700K-38Deg-HoneycombLouve\_2303

Laboratory and Equipment

Laboratory Owner and Location

Goniospectrometer System and Type

Spectrometer Manufacturer and Model

Factorylux, Greenhill Mills, Hebden Bridge, HX7 5QF, UK

BaseSpion – Type C, horizontal

Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

Measurement Conditions

Number of C-planes and Resolution

γ (gamma)-Resolution

Test Distance

Input Power, Power and Displ. Factors

Input RMS Voltage and Current

Frequency of Input Power

4 planes – 90°

1.5°

1.50 m

41.5 W – PF 0.97 – DPF 0.97

242 V – 0.177 A

50 Hz

Main Light Measurement Results

Output

Efficiency

Peak Intensity and Beam Angle

Color Rendering Index

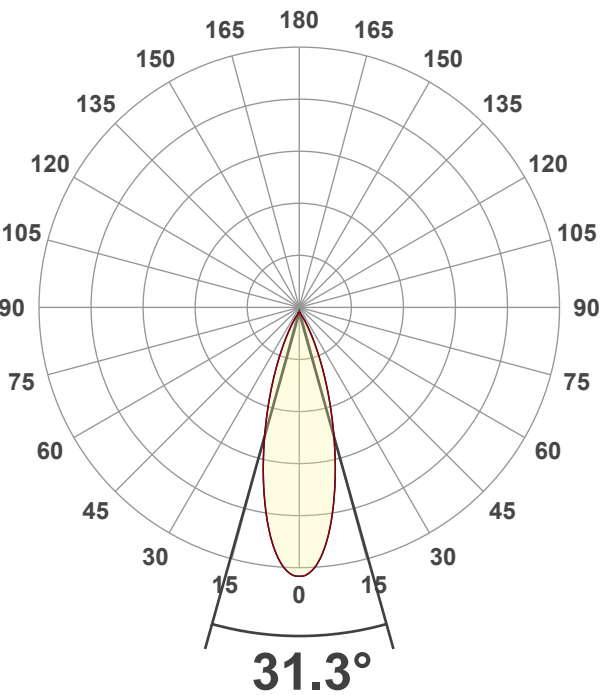
2263 lm

55 lm/W

6467 cd – 31.3°

CRI 92.6

Light Intensity Distribution



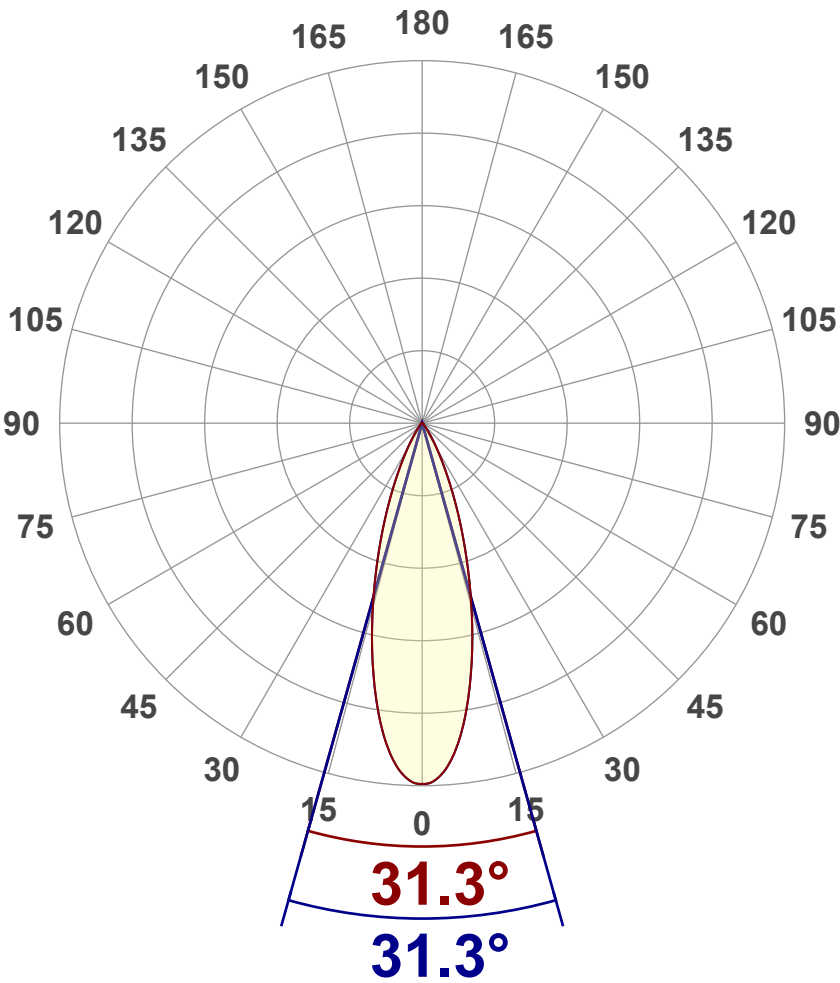
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2263 lm
Peak Intensity	6467 cd
Beam Angle (50%)	31.3°
Beam Angle (90%)	31.3°
Beam Angle (10%)	31.3°

Cut-off Angle

Average 2,5%	74.3°
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Field Angle

Average 10%	57.4°
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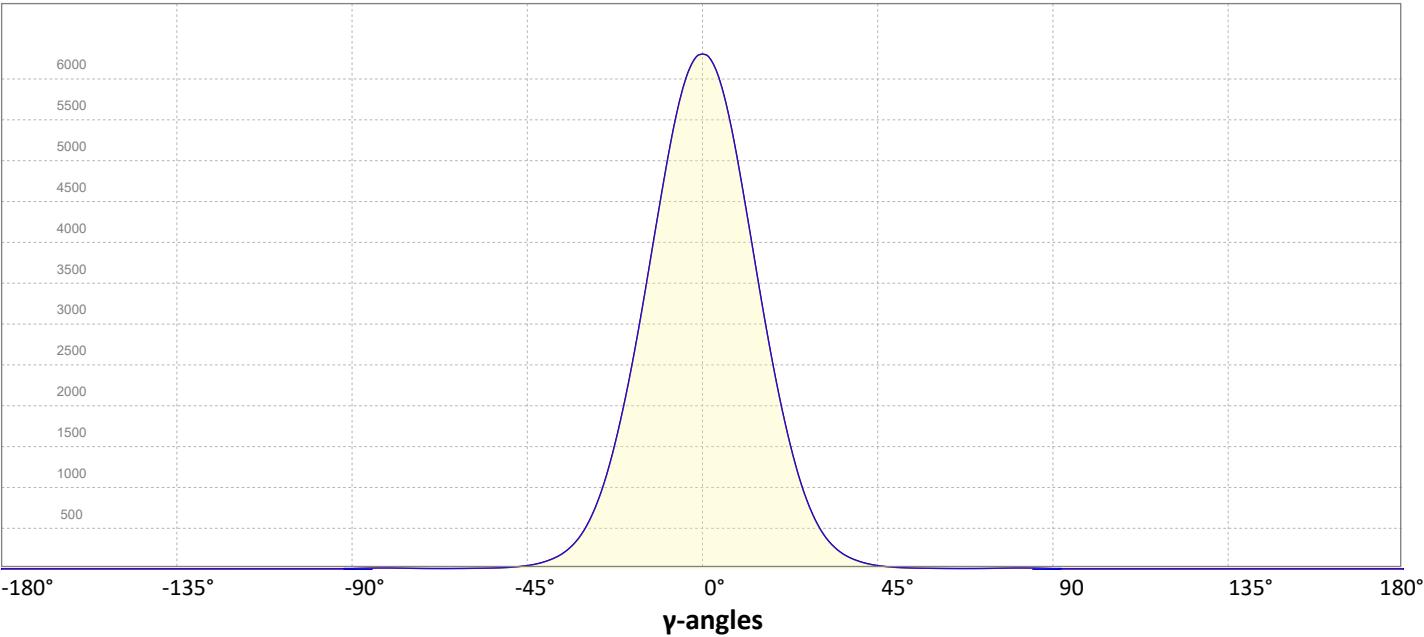
Intensity Ratio

In 120° cone	97.5%
In 90° cone	96.4%

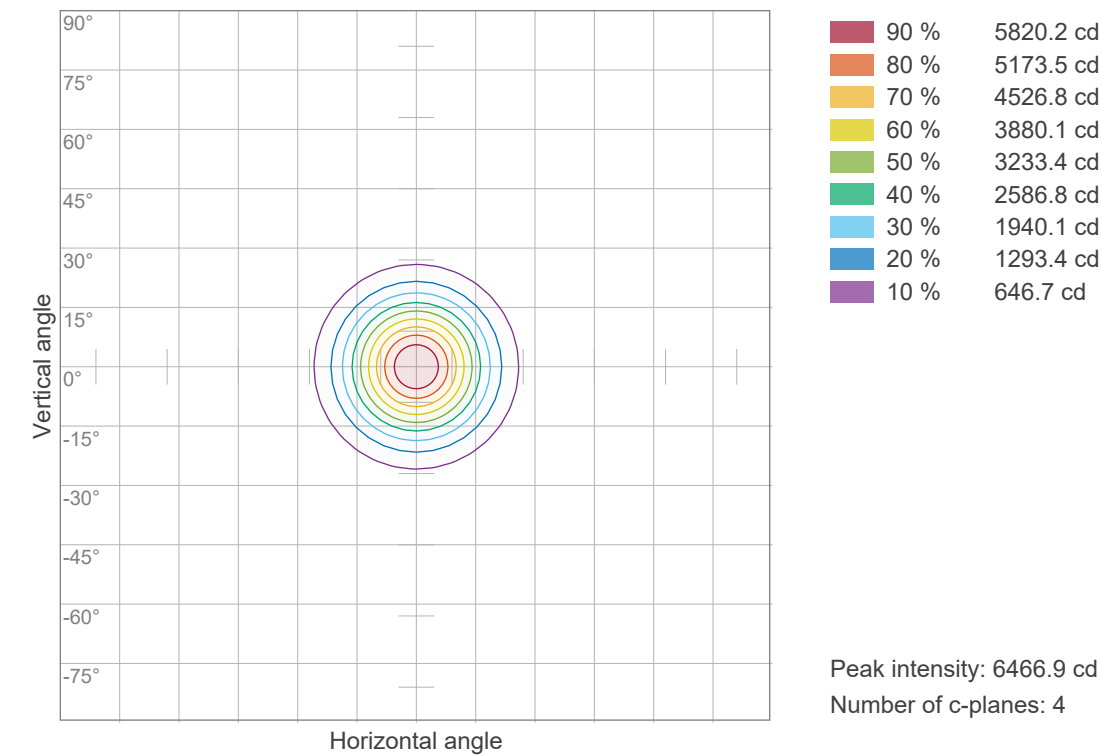
C000-C180

C090-C270

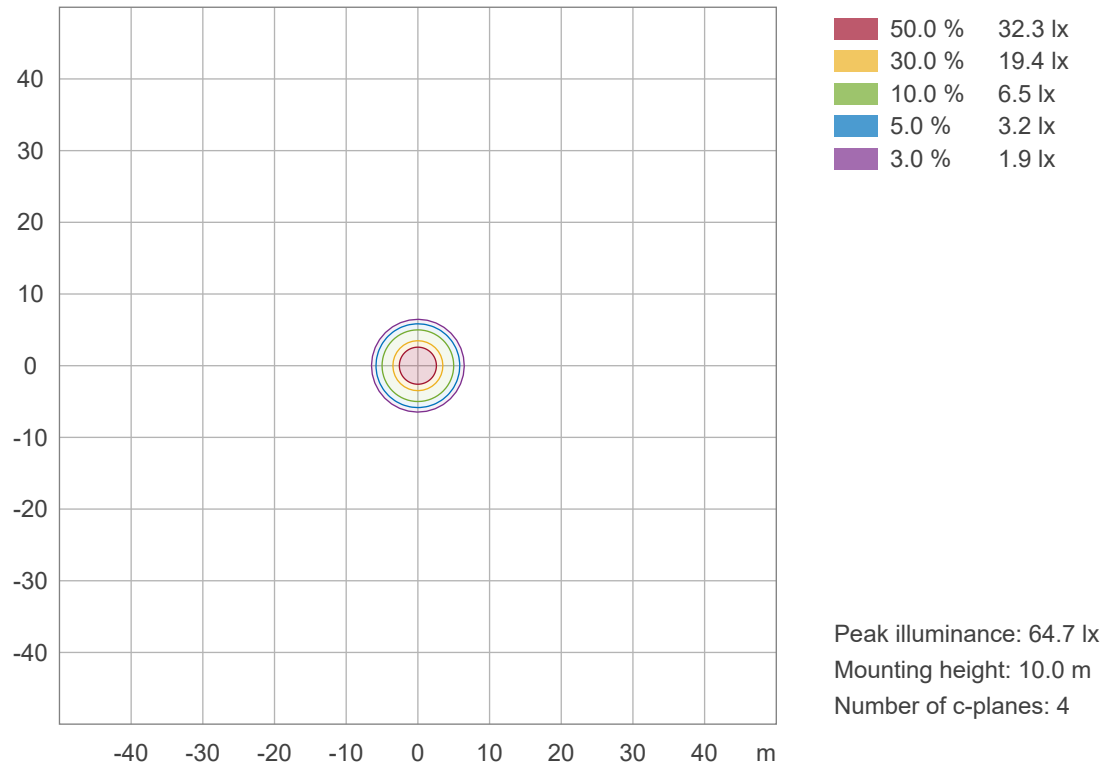
Linear distribution diagram - Intensity (candela) vs γ-angle



Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)

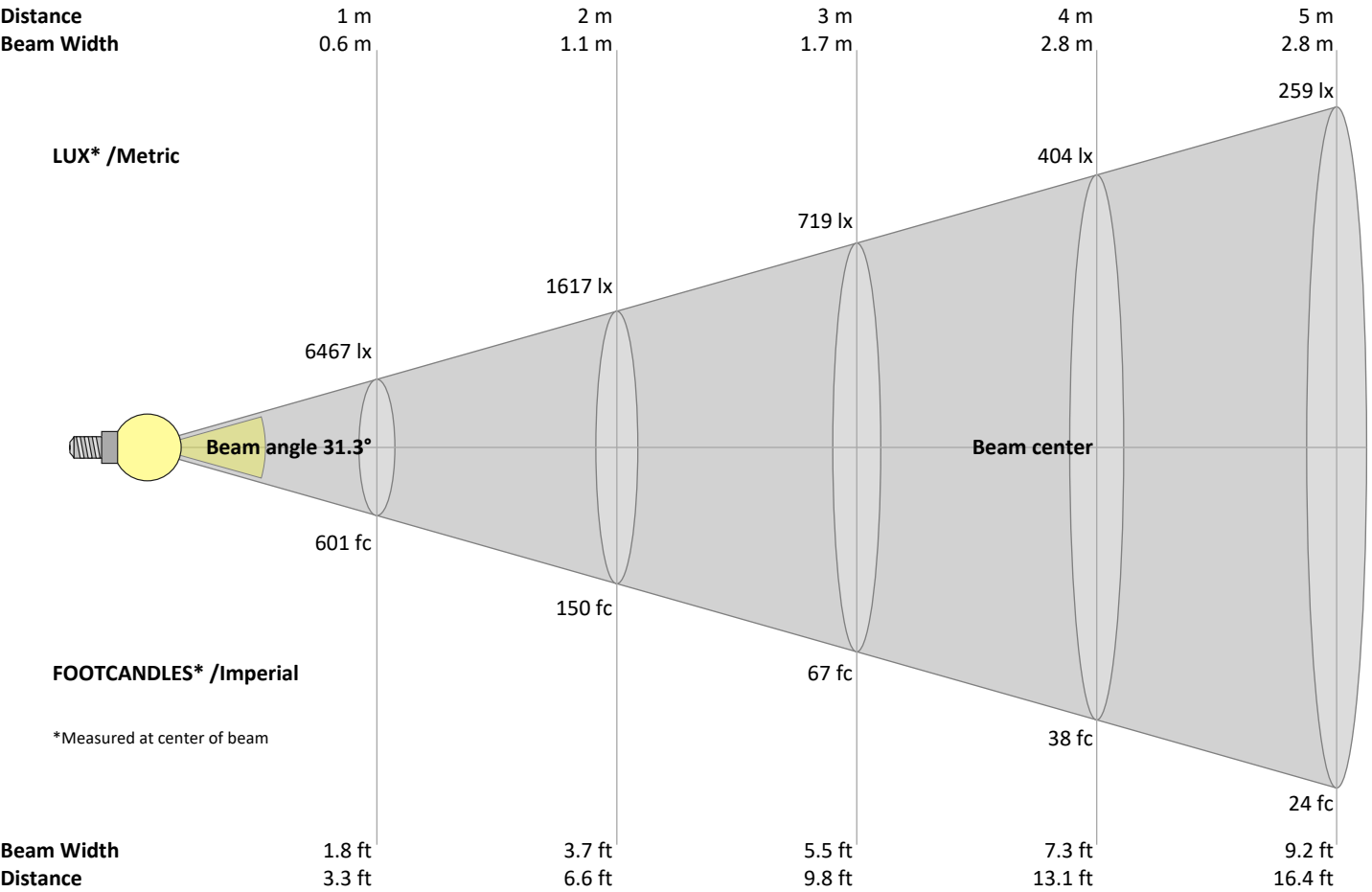


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Beam Details



Beam intensities from 1 – 20 m

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	m
3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6	ft
6467	1617	719	404	259	180	132	101	80	65	53	45	38	33	29	25	22	20	18	16	lux
600.8	150.2	66.8	37.5	24	16.7	12.3	9.4	7.4	6	5	4.2	3.6	3.1	2.7	2.3	2.1	1.9	1.7	1.5	fc

Intensities in 0° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
6467	6409	6207	5858	5406	4866	4293	3708	3136	2598	2111	1675	1293	978	723	526	379	272	196	141	cd
100%	99%	96%	91%	84%	75%	66%	57%	48%	40%	33%	26%	20%	15%	11%	8%	6%	4%	3%	2%	of 0°val

Intensities in 90° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
6467	6409	6207	5858	5406	4866	4293	3708	3136	2598	2111	1675	1293	978	723	526	379	272	196	141	cd
100%	99%	96%	91%	84%	75%	66%	57%	48%	40%	33%	26%	20%	15%	11%	8%	6%	4%	3%	2%	of 0°val

Intensities in 180° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
6467	6409	6207	5858	5406	4866	4293	3708	3136	2598	2111	1675	1293	978	723	526	379	272	196	141	cd
100%	99%	96%	91%	84%	75%	66%	57%	48%	40%	33%	26%	20%	15%	11%	8%	6%	4%	3%	2%	of 0°val

Intensities in 270° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
6467	6409	6207	5858	5406	4866	4293	3708	3136	2598	2111	1675	1293	978	723	526	379	272	196	141	cd
100%	99%	96%	91%	84%	75%	66%	57%	48%	40%	33%	26%	20%	15%	11%	8%	6%	4%	3%	2%	of 0°val

Light Planning – UGR table

Uncorrected, comprehensive UGR table according to 117-1995

Reflectances											
	p Ceiling	70	70	50	50	30	70	70	50	50	30
	p Walls	50	30	50	30	30	50	30	50	30	30
	p Floor	20	20	20	20	20	20	20	20	20	20
Room size											
H = mounting height above eye level		Viewed Crosswise					Viewed Endwise				
X	Y	(Viewing direction orthogonal to lamp length axis)					(Viewing direction parallel to lamp length axis)				
2H	2H	14.6	15.1	14.7	15.3	15.4	14.6	15.1	14.7	15.3	15.4
	3H	14.5	15.1	14.8	15.3	15.5	14.5	15.1	14.8	15.3	15.5
	4H	14.7	15.3	15.1	15.5	15.8	14.7	15.3	15.1	15.5	15.8
	6H	15.4	15.9	15.7	16.2	16.6	15.4	15.9	15.7	16.2	16.6
	8H	15.9	16.4	16.2	16.7	17.1	15.9	16.4	16.2	16.7	17.1
	12H	16.4	16.9	16.8	17.2	17.7	16.4	16.9	16.8	17.2	17.7
4H	2H	14.3	14.9	14.7	15.1	15.3	14.3	14.9	14.7	15.1	15.3
	3H	14.5	15.0	14.8	15.3	15.7	14.5	15.0	14.8	15.3	15.7
	4H	14.9	15.3	15.3	15.7	16.2	14.9	15.3	15.3	15.7	16.2
	6H	15.9	16.4	16.4	16.7	17.1	15.9	16.4	16.4	16.7	17.1
	8H	16.6	17.1	17.1	17.4	17.8	16.6	17.1	17.1	17.4	17.8
	12H	17.3	17.7	17.8	18.1	18.5	17.3	17.7	17.8	18.1	18.5
8H	4H	15.1	15.5	15.6	15.9	16.2	15.1	15.5	15.6	15.9	16.2
	6H	16.5	16.8	17.0	17.2	17.8	16.5	16.8	17.0	17.2	17.8
	8H	17.5	17.7	18.0	18.3	18.9	17.5	17.7	18.0	18.3	18.9
	12H	18.4	18.6	19.0	19.1	19.7	18.4	18.6	19.0	19.1	19.7
12H	4H	15.2	15.5	15.7	15.9	16.4	15.2	15.5	15.7	15.9	16.4
	6H	16.8	17.0	17.3	17.5	18.1	16.8	17.0	17.3	17.5	18.1
	8H	17.8	18.0	18.4	18.5	19.1	17.8	18.0	18.4	18.5	19.1
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		1.9 / -0.7					1.9 / -0.7				
S = 1.5H		3.7 / -0.8					3.7 / -0.8				
S = 2.0H		5.2 / -0.9					5.2 / -0.9				

Coefficients of Utilization

Ceiling reflectance	80			70			50			30			10			0		
Wall reflectance	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
Floor reflectance	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0
RCR		(RCR: Room Cavity Ratio)			Room Values are expressed as percentage of Lumen delivered to the task surface													
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	101	101	101	99
1	114	111	109	107	111	109	107	105	105	103	102	101	100	99	98	97	96	94
2	109	105	102	99	107	103	100	98	100	98	95	97	95	93	94	93	91	89
3	105	100	96	92	103	98	94	91	96	92	90	93	91	88	91	89	87	85
4	101	95	90	87	99	94	90	86	92	88	85	90	87	84	88	85	83	82
5	97	91	86	82	96	90	85	82	88	84	81	86	83	80	85	82	80	78
6	94	87	82	78	93	86	81	78	84	80	77	83	79	77	82	79	76	75
7	91	83	78	75	89	82	78	75	81	77	74	80	76	74	79	76	73	72
8	87	80	75	72	86	79	75	71	78	74	71	77	73	71	76	73	70	69
9	85	77	72	69	84	76	72	69	75	71	68	75	71	68	74	70	68	67
10	82	74	69	66	81	74	69	66	73	69	66	72	68	66	71	68	65	64

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**LAMPS (number of lamps)**

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
539 lm	933 lm	528 lm	156 lm	38.2 lm	11.9 lm	8.18 lm	11.1 lm	12.9 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
4.79 lm	3.91 lm	3.67 lm	3.31 lm	2.86 lm	2.32 lm	1.71 lm	1.05 lm	0.353 lm

Outdoor Light Planning

Lumen per Zone		
Zone (γ)	Lumen	% Total
0-10°	539 lm	23.8%
10-20°	933 lm	41.2%
20-30°	528 lm	23.4%
30-40°	156 lm	6.9%
40-50°	38 lm	1.7%
50-60°	12 lm	0.5%
60-70°	8 lm	0.4%
70-80°	11 lm	0.5%
80-90°	13 lm	0.6%
90-100°	5 lm	0.2%
100-110°	4 lm	0.2%
110-120°	4 lm	0.2%
120-130°	3 lm	0.1%
130-140°	3 lm	0.1%
140-150°	2 lm	0.1%
150-160°	2 lm	0.1%
160-170°	1 lm	0.0%
170-180°	0 lm	0.0%
Total	2263 lm	100.0%

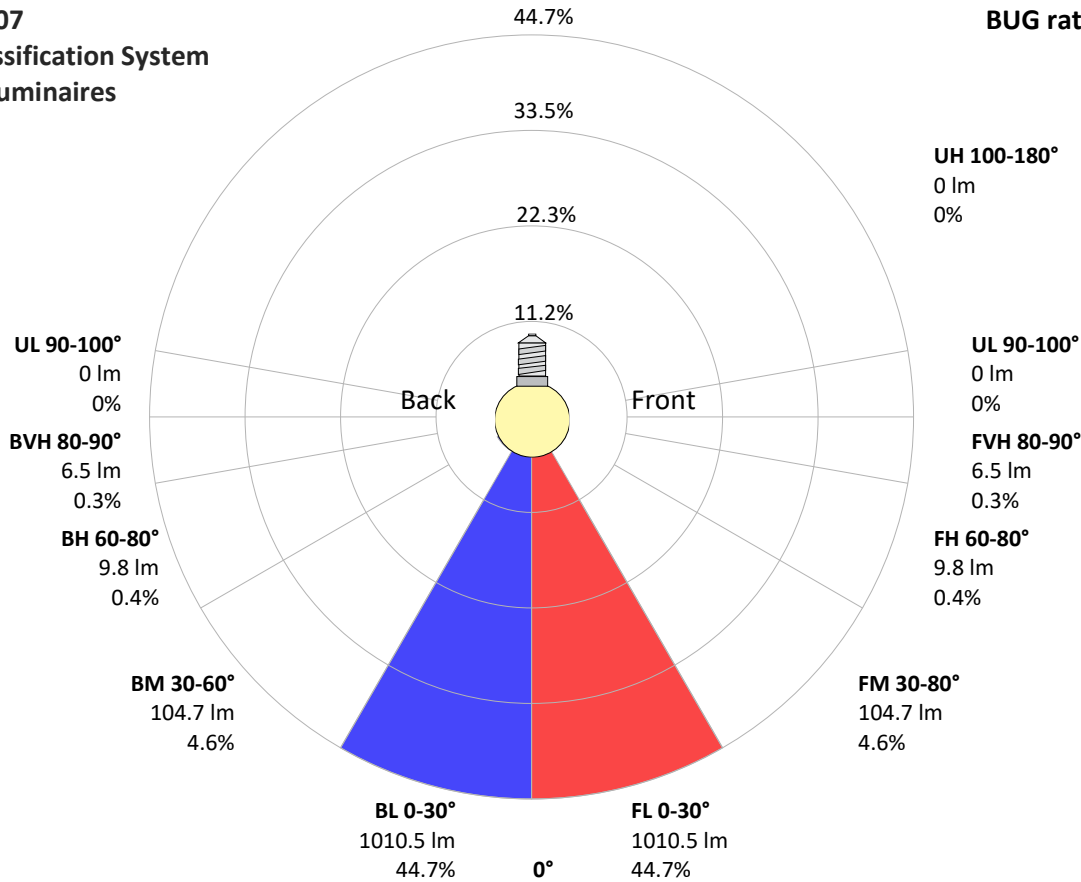
Intensity peaks	
Max intensity	6467 cd
Intensity, 90°	7 cd
Intensity, 0°	6467 cd

Zonal Lumen summary		
Zone (γ)	Lumen	% Total
0-30°	2000 lm	88.4%
0-40°	2157 lm	95.3%
0-60°	2207 lm	97.5%
60-90°	32 lm	1.4%
70-100°	29 lm	1.3%
90-120°	12 lm	0.5%
0-90°	2239 lm	98.9%
90-180°	24 lm	1.1%
0-180°	2263 lm	100.0%

BUG rating		
	Lumen	% Total
Forward light		
Low(0-30°)	1011 lm	44.7%
Medium(30-60°)	105 lm	4.6%
High(60-80°)	10 lm	0.4%
Very high(80-90°)	6 lm	0.3%
Back light		
Low(0-30°)	1011 lm	44.7%
Medium(30-60°)	105 lm	4.6%
High(60-80°)	10 lm	0.4%
Very high(80-90°)	6 lm	0.3%
Uplight		
Low(90-100°)	0 lm	0.0%
High(100-180°)	0 lm	0.0%

IESNA TM-15-07  
Luminaire Classification System  
For Outdoor Luminaires

BUG rating B3 U1 G0



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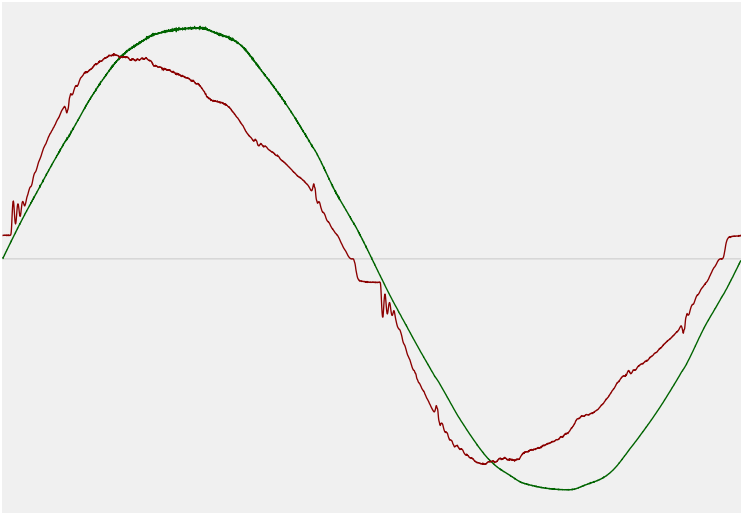


## Power Details

### Input Power

Power feed to light source	41.5 W
Frequency of input power	50 Hz
RMS Input voltage feed, $V_{RMS}$	242 V
RMS Input current feed, $I_{RMS}$	0.177 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	42.92 VA
Displacement factor of AC power feed	0.97
Power factor of AC current feed	0.97
Total harmonic distortion of the current	11.01%
Total harmonic distortion of the voltage	1.23%

### Input Power Curve



### Efficiency

Radiated power efficiency	19.7%
<div><div></div></div>	
Lumen efficiency	55 lm/W
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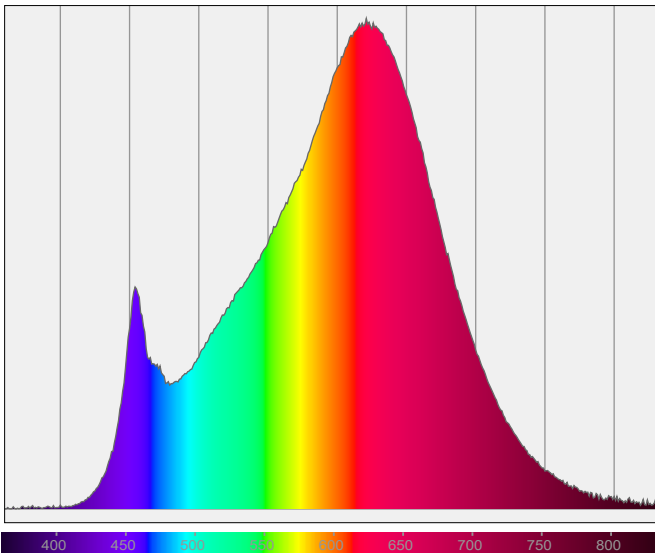
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## Color Measurements

Correlated Color Temperature	CCT = 2700 K
Color Rendering TM30-18	R <sub>f</sub> 91.5 — R <sub>g</sub> 99.5
Color Shift, CIE duv	Duv ±0.0003

## Spectral distribution



## Color details

Correlated Color Temperature	CCT = 2700 K	Color coordinates CIE 1931	(x;y) = (0.460;0.411)
Color Rendering Index	CRI 92.6	Color coordinate CIEs 1960	(u;v) = (0.263;0.352)
Color Rendering Index, R9 (red component)	R9 = 61.4	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R <sub>f</sub> 91.5 — R <sub>g</sub> 99.5	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.263;0.263)
Color Quality Scale	CQS = 89.9		

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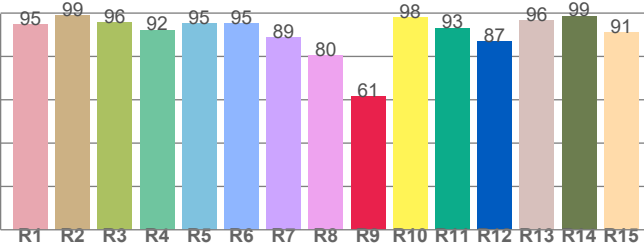
CIE 1931



CIE 1931 – zoomed on Planckian locus



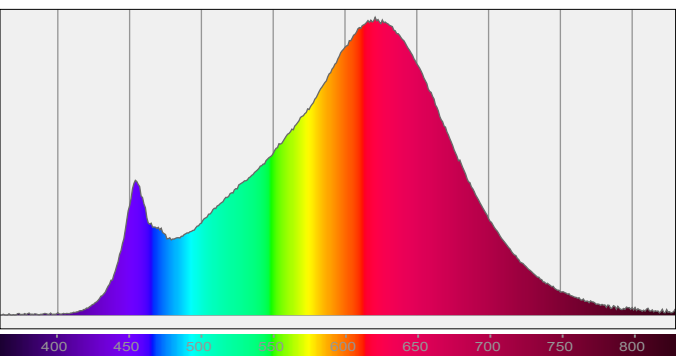
Color Rendering Index per reference color (CIE 1995)



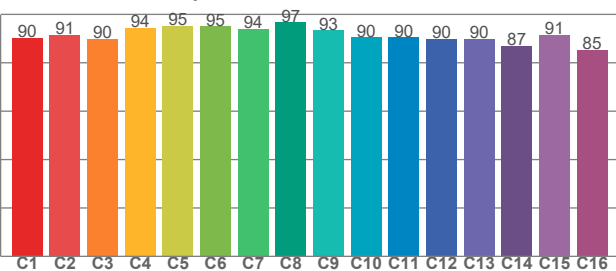
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
94.6	98.8	95.7	92.2	95.1	95.4	88.7	80.4	61.4	98.0	93.2	86.9	96.5	98.7	90.9

Spectral power distribution (SPD) / W/nm – 0-100%



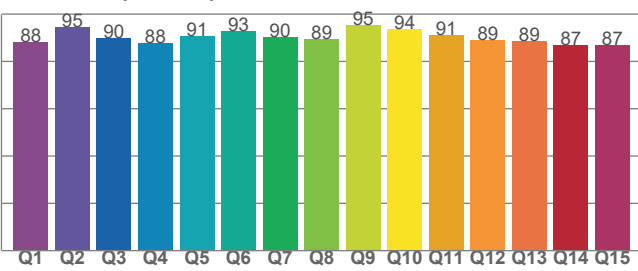
TM30-18 Rf-values per hue bin



TM30 C values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
90.3	91.5	89.7	94.4	95.3	94.9	93.8	96.7	93.4	90.5	90.4	89.7	89.7	86.9	91.3	85.4

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
88.0	94.5	89.7	87.8	90.7	92.9	90.2	89.4	95.3	93.7	91.0	89.0	88.7	87.0	87.1