

Tested Light Source - 1\_PHOT\_SKIN+BONES-4300lmChip-3000K-Spreader-HoneycombLouve\_2303

Laboratory and Equipment

Laboratory Owner and Location	Factorylux, Greenhill Mills, Hebden Bridge, HX7 5QF, UK
Goniospectrometer System and Type	BaseSpion – Type C, horizontal
Spectrometer Manufacturer and Model	Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

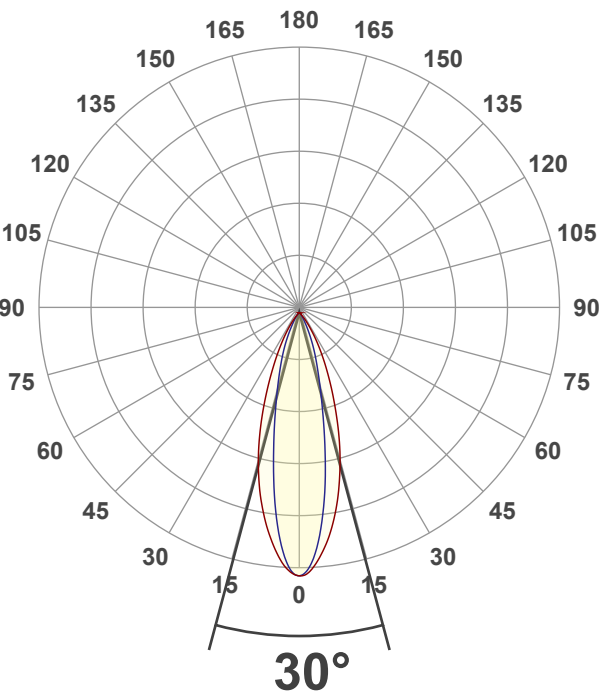
Measurement Conditions

Number of C-planes and Resolution	16 planes – 22.5°
γ (gamma)-Resolution	1°
Test Distance	1.50 m
Input Power, Power and Displ. Factors	41.4 W – PF 0.97 – DPF 0.97
Input RMS Voltage and Current	242 V – 0.177 A
Frequency of Input Power	50 Hz

Main Light Measurement Results

Output	2180 lm
Efficiency	53 lm/W
Peak Intensity and Beam Angle	5955 cd – 30°
Color Rendering Index	CRI 92.6

Light Intensity Distribution



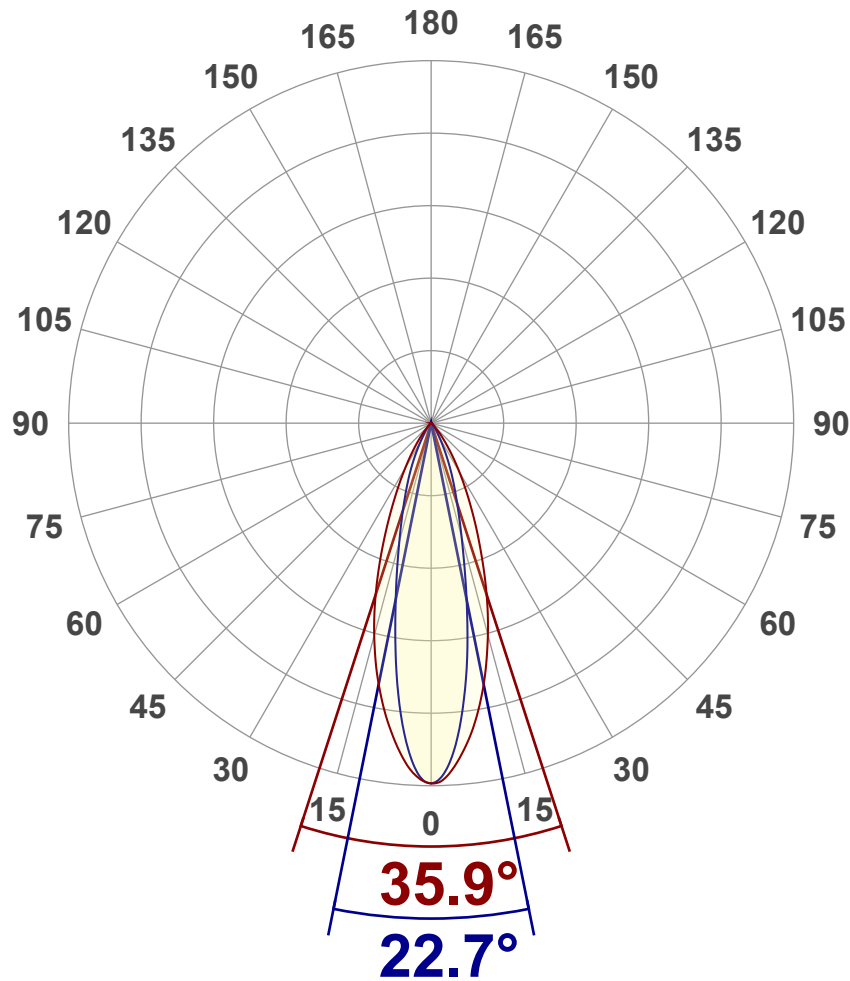
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2180 lm
Peak Intensity	5955 cd
Beam Angle (50%)	30°
Beam Angle (90%)	22.7°
Beam Angle (10%)	35.9°

Cut-off Angle

Average 2,5%	78.9°
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Field Angle

Average 10%	59.9°
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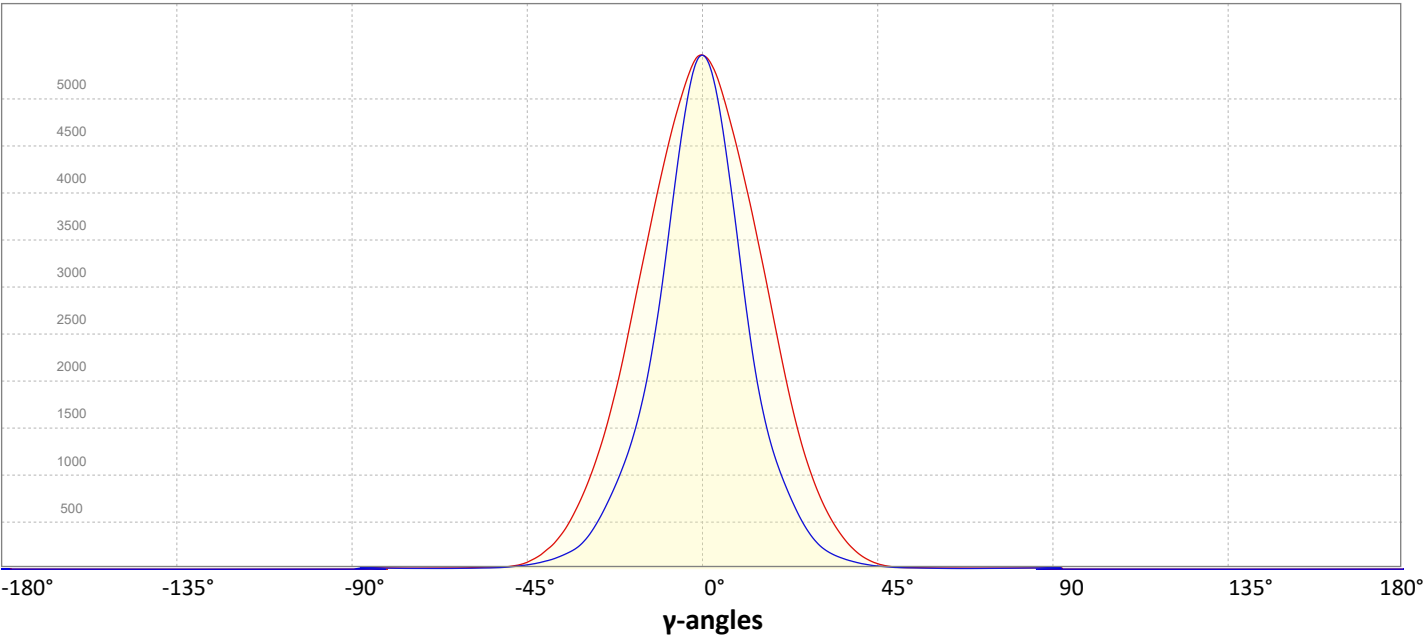
Intensity Ratio

In 120° cone	98.2%
In 90° cone	96.5%

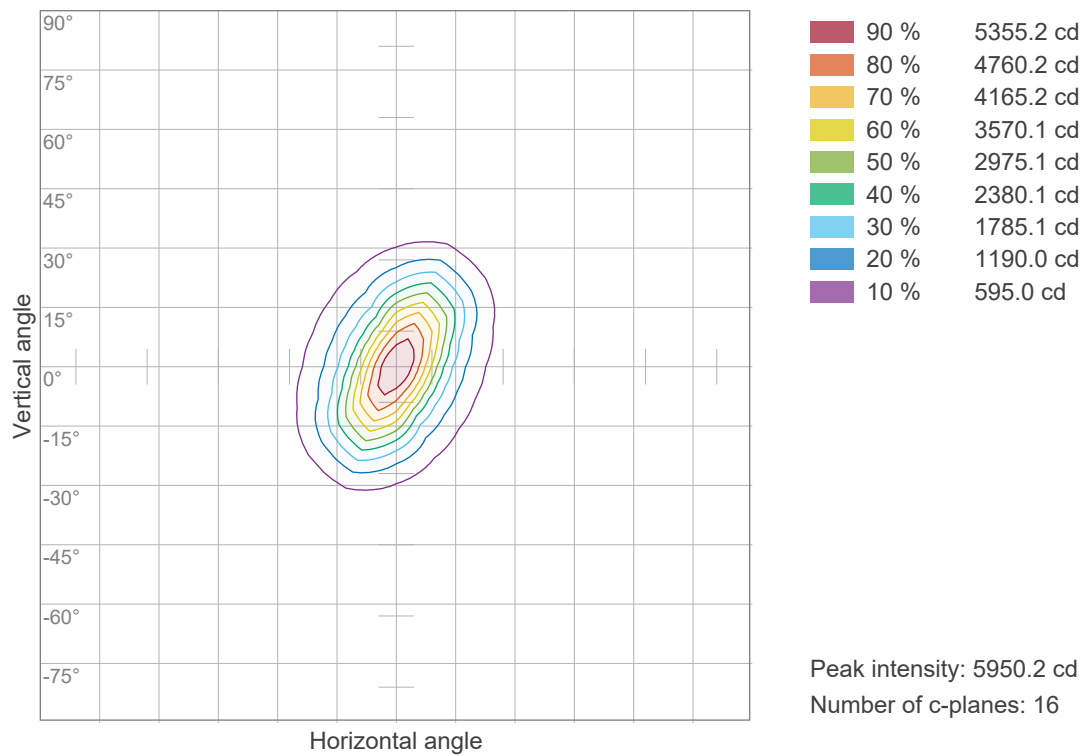
C000-C180

C090-C270

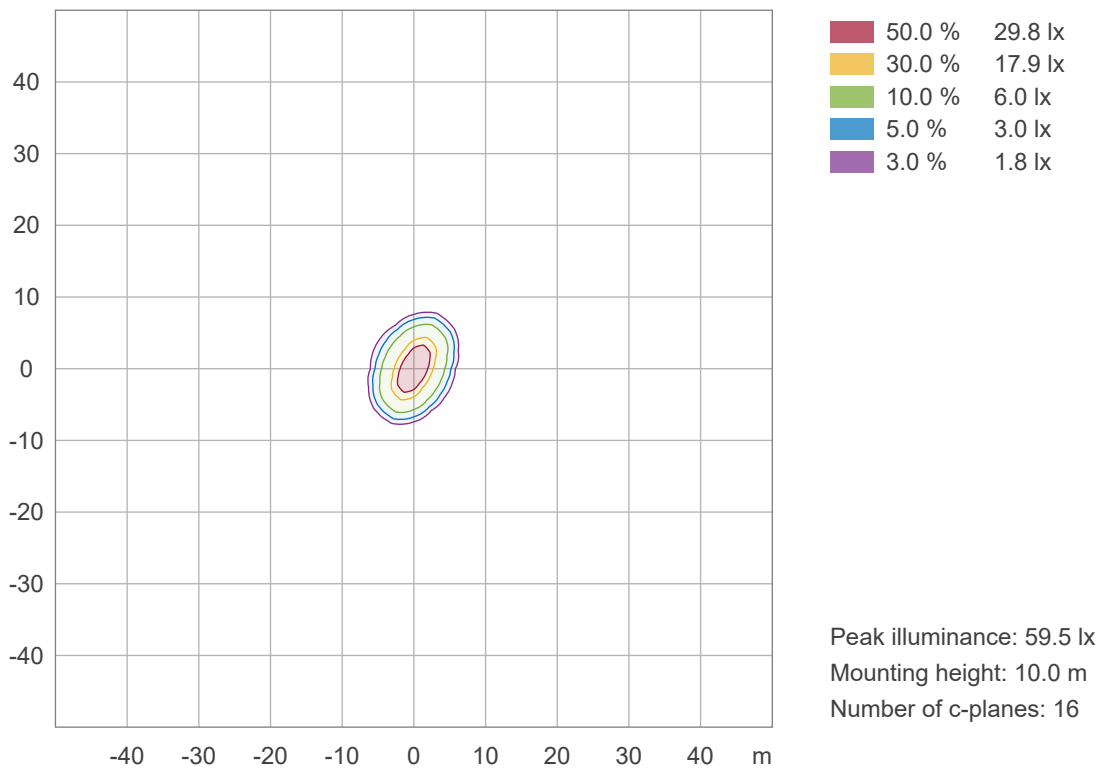
Linear distribution diagram - Intensity (candela) vs γ-angle



Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



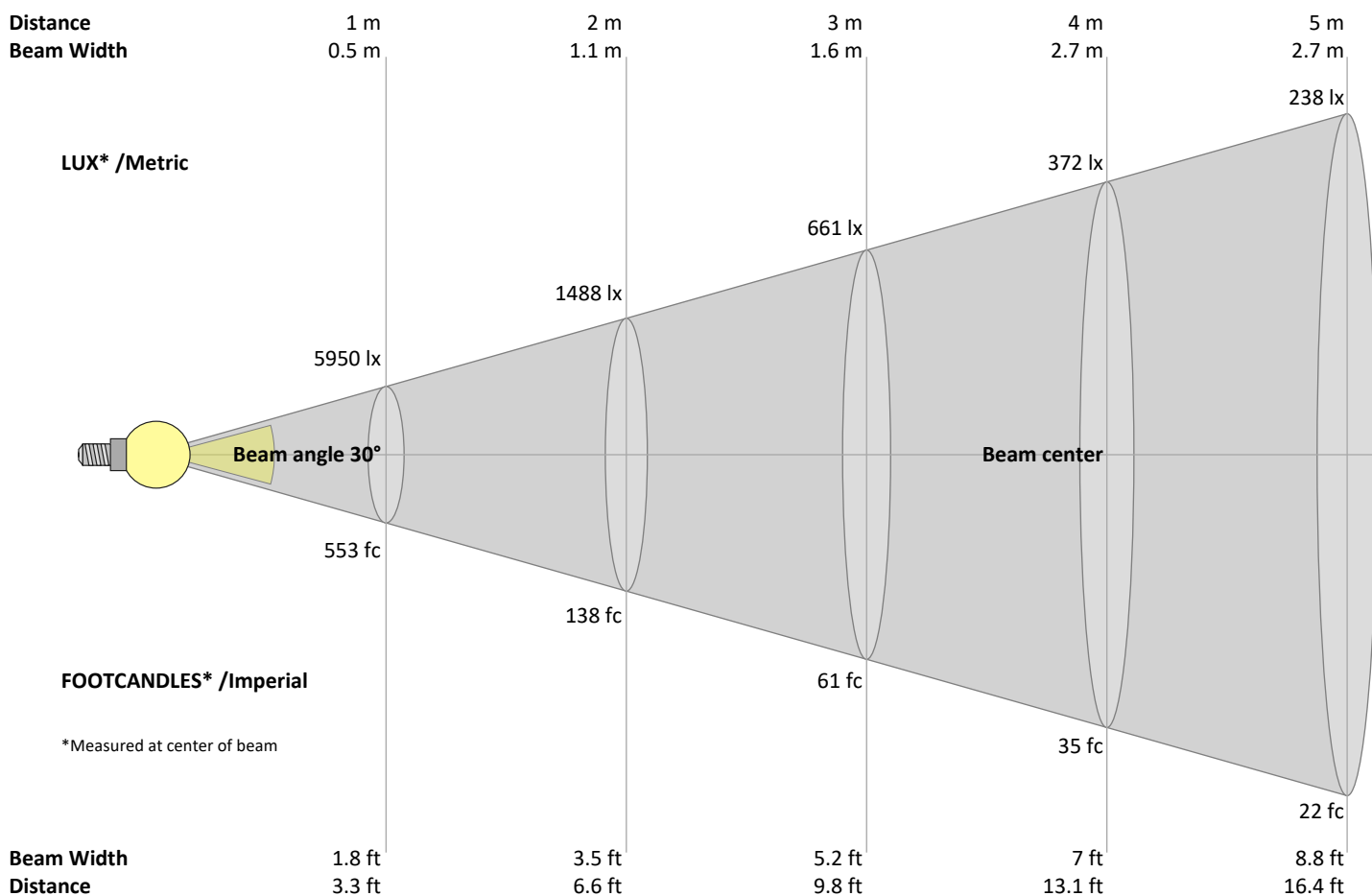
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## Beam Details



### 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
5950	1488	661	372	238	165	121	93	73	60	49	41	35	30	26	23	21	18	16	15	lux
552.8	138.2	61.4	34.5	22.1	15.4	11.3	8.6	6.8	5.5	4.6	3.8	3.3	2.8	2.5	2.2	1.9	1.7	1.5	1.4	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
5950	5887	5670	5384	5055	4678	4272	3838	3407	2962	2521	2117	1760	1446	1174	939	736	560	417	306	cd
100%	99%	95%	90%	85%	79%	72%	64%	57%	50%	42%	36%	30%	24%	20%	16%	12%	9%	7%	5%	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
5950	5805	5418	4845	4178	3455	2768	2185	1736	1389	1120	894	693	520	382	279	209	160	125	96	cd
100%	98%	91%	81%	70%	58%	47%	37%	29%	23%	19%	15%	12%	9%	6%	5%	4%	3%	2%	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
5950	5867	5665	5371	5034	4666	4275	3852	3417	2962	2511	2081	1698	1367	1092	859	665	506	374	267	cd
100%	99%	95%	90%	85%	78%	72%	65%	57%	50%	42%	35%	29%	23%	18%	14%	11%	8%	6%	4%	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
5950	5819	5409	4821	4130	3417	2789	2261	1842	1508	1237	1008	807	625	470	346	257	201	159	123	cd
100%	98%	91%	81%	69%	57%	47%	38%	31%	25%	21%	17%	14%	11%	8%	6%	4%	3%	3%	2%	of 0°val



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**LAMPS (number of lamps)**

[illegible]

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	468 lm	21.5%
10-20°	792 lm	36.3%
20-30°	562 lm	25.8%
30-40°	236 lm	10.8%
40-50°	64 lm	2.9%
50-60°	17 lm	0.8%
60-70°	11 lm	0.5%
70-80°	13 lm	0.6%
80-90°	15 lm	0.7%
90-100°	2 lm	0.1%
100-110°	0 lm	0.0%
110-120°	0 lm	0.0%
120-130°	0 lm	0.0%
130-140°	0 lm	0.0%
140-150°	0 lm	0.0%
150-160°	0 lm	0.0%
160-170°	0 lm	0.0%
170-180°	0 lm	0.0%
Total	2180 lm	100.0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	1823 lm	83.6%
0-40°	2059 lm	94.4%
0-60°	2140 lm	98.2%
60-90°	38 lm	1.8%
70-100°	29 lm	1.3%
90-120°	2 lm	0.1%
0-90°	2178 lm	99.9%
90-180°	2 lm	0.1%
0-180°	2180 lm	100.0%

BUG rating

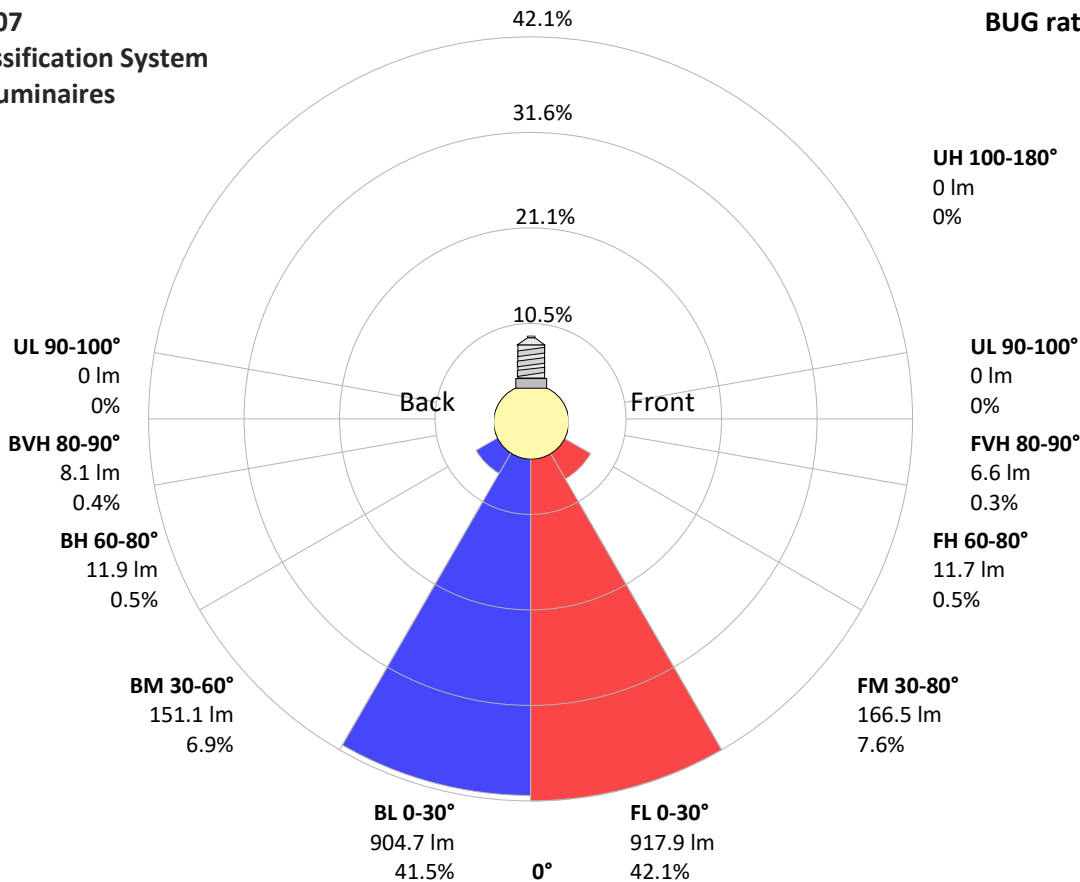
	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	918 lm	42.1%
Medium(30-60°)	167 lm	7.6%
High(60-80°)	12 lm	0.5%
Very high(80-90°)	7 lm	0.3%
<b>Back light</b>		
Low(0-30°)	905 lm	41.5%
Medium(30-60°)	151 lm	6.9%
High(60-80°)	12 lm	0.5%
Very high(80-90°)	8 lm	0.4%
<b>Uplight</b>		
Low(90-100°)	0 lm	0.0%
High(100-180°)	0 lm	0.0%

Intensity peaks

Max intensity	5955 cd
Intensity, 90°	0 cd
Intensity, 0°	5950 cd

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

BUG rating B2 U1 G0



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## Power Details

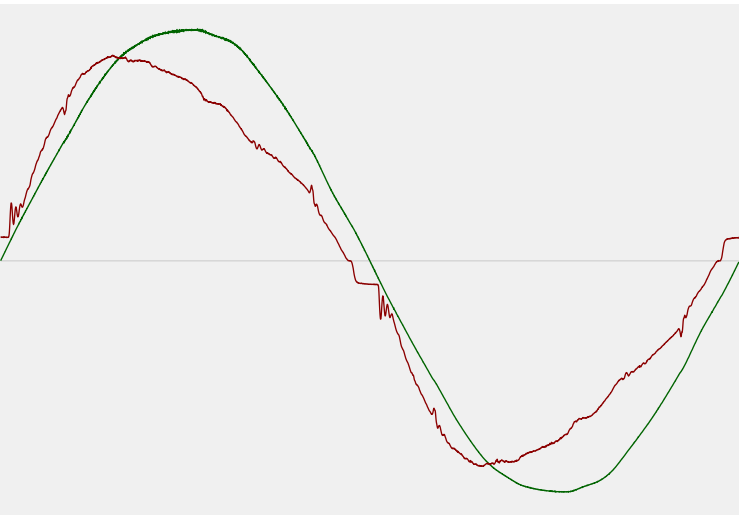
### Input Power

Power feed to light source	41.4 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 = $V_{RMS} \cdot I_{RMS}$	42.82 VA
Displacement factor of AC power feed	0.97
Power factor of AC current feed	0.97
Total harmonic distortion of the current	11.06%
Total harmonic distortion of the voltage	1.26%

### Efficiency

Radiated power efficiency	19.1%
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Lumen efficiency	53 lm/W
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### Input Power Curve





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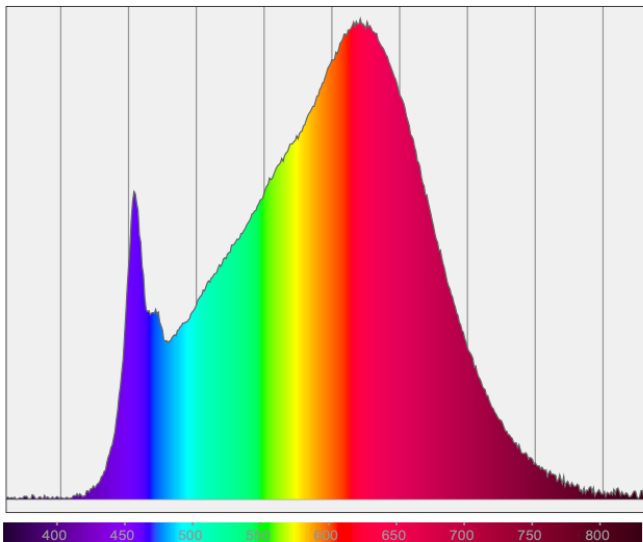
## Color Measurements

Correlated Color Temperature      CCT = 3000 K

Color Rendering TM30-18      R<sub>f</sub> 91.0 — R<sub>g</sub> 97.7

Color Shift, CIE duv      Duv ±0.0003

## Spectral distribution



## Color details

Correlated Color Temperature	CCT = 3000 K	Color coordinates CIE 1931	(x;y) = (0.437;0.404)
Color Rendering Index	CRI 94.1	Color coordinate CIEs 1960	(u;v) = (0.251;0.348)
Color Rendering Index, R9 (red component)	R9 = 68.6	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R <sub>f</sub> 91.0 — R <sub>g</sub> 97.7	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.251;0.251)
Color Quality Scale	CQS = 91.8		

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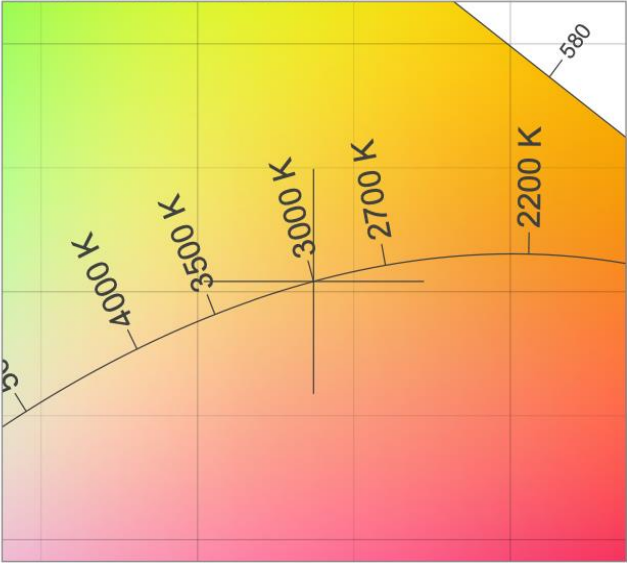
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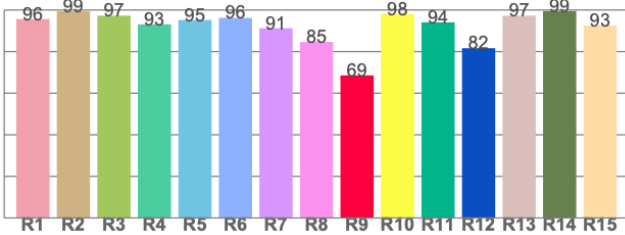
CIE 1931



CIE 1931 – zoomed on Planckian locus



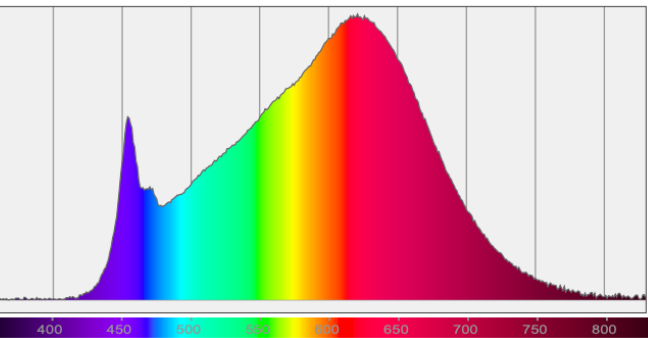
Color Rendering Index per reference color (CIE 1995)



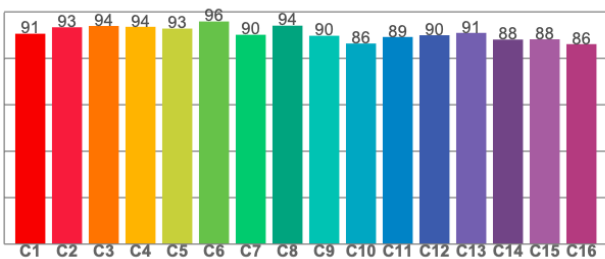
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
95.7	99.5	97.3	93.1	95.2	96.2	91.3	84.6	68.6	98.2	94.1	81.6	97.2	99.5	92.5

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



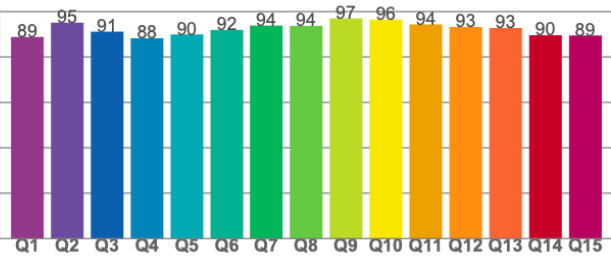
TM30-18 Rf-values per hue bin



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
90.6	93.4	93.9	93.6	92.8	95.9	90.1	94.0	89.7	86.4	89.2	89.9	90.9	88.1	88.2	86.1

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
88.8	95.1	91.2	88.2	89.9	91.9	93.8	93.7	97.0	96.5	94.4	93.2	92.8	89.6	89.5