

Tested Light Source - 1\_PHOT\_SKIN+BONES-4050lmChip-2700K-WallWash-HoneycombLouvre\_2309

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)

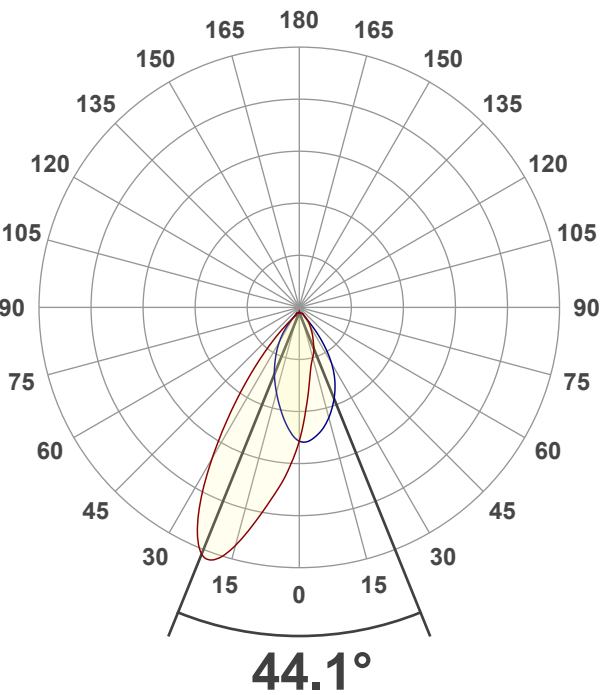
Measurement Conditions

Number of C-planes and Resolution	24 planes – 15°
γ (gamma)-Resolution	2°
Test Distance	1.50 m
Input Power, Power and Displ. Factors	40.7 W – PF 0.97 – DPF 0.97
Input RMS Voltage and Current	241 V – 0.175 A
Frequency of Input Power	49.9 Hz

Main Light Measurement Results

Output	1116 lm
Efficiency	27 lm/W
Peak Intensity and Beam Angle	1782 cd – 44.1°
Color Rendering Index	CRI 91.4

Light Intensity Distribution



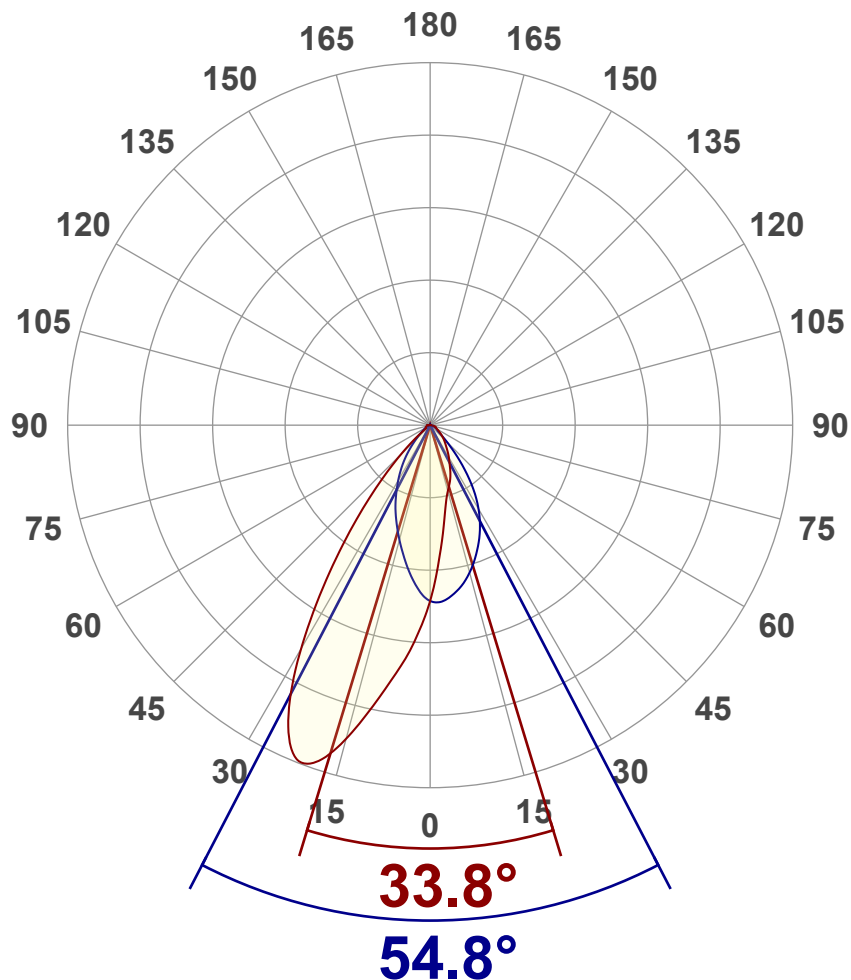
# Goniophotometry Report

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## Luminous Intensity diagram

Unit: 0-100% of peak intensity



## Main Values

Output (total Lumen)	1116 lm
Peak Intensity	1782 cd
Beam Angle (50%)	44.1°
Beam Angle (90%)	54.8°
Beam Angle (10%)	33.2°

## Cut-off Angle

Average 2,5%	114.7°
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## Field Angle

Average 10%	85.5°
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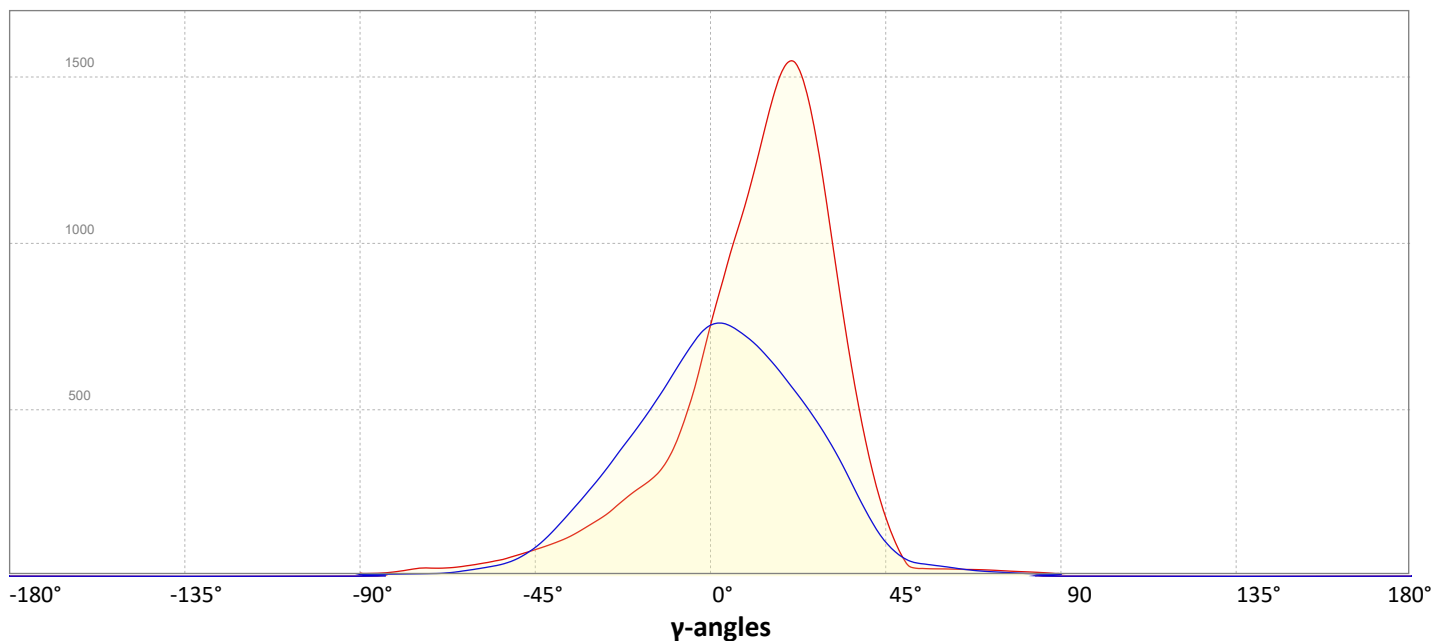
## Intensity Ratio

In 120° cone	95.9%
In 90° cone	89.4%

C000-C180

C090-C270

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

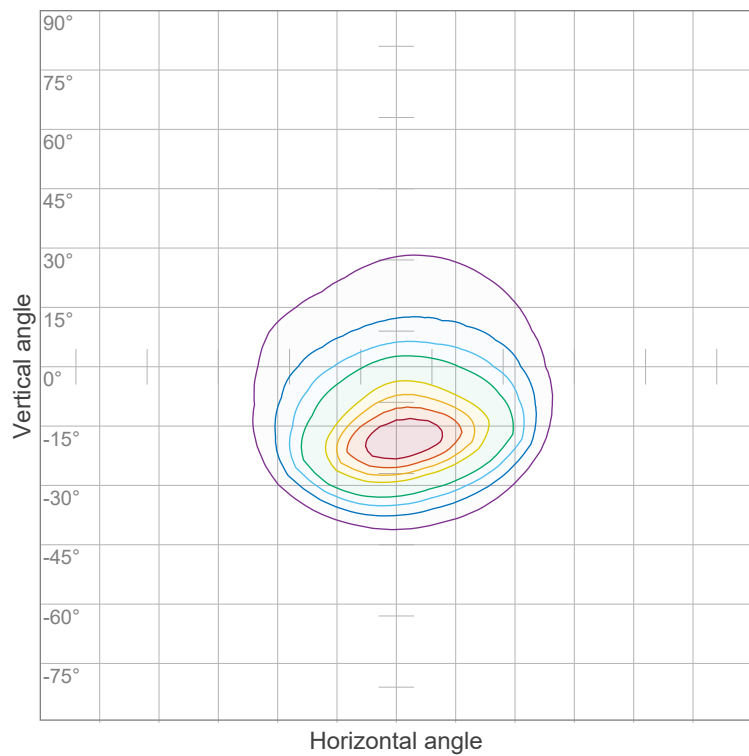


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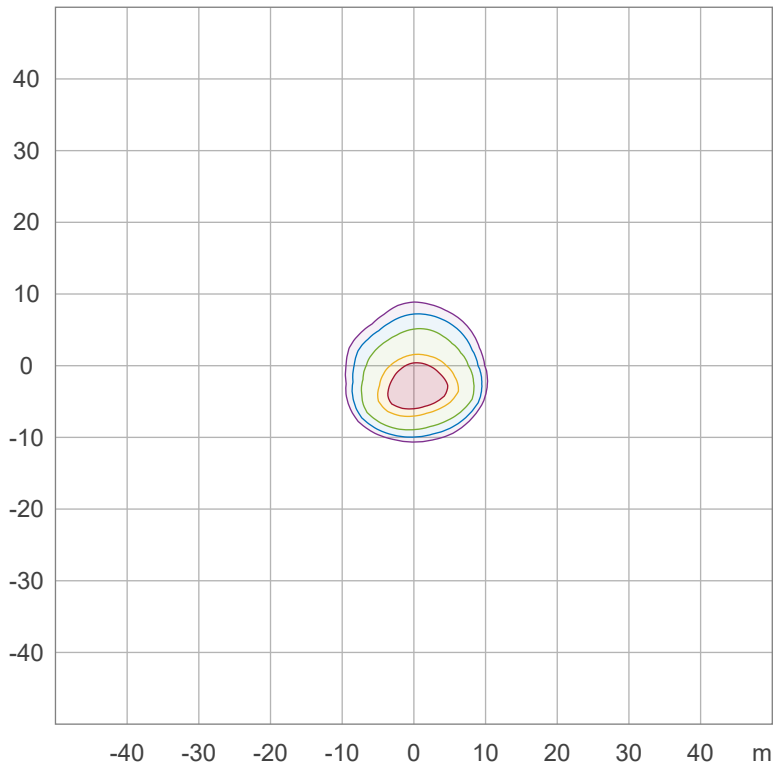
Iso-intensity Diagram (Iso-candela)



90 %	1603.3 cd
80 %	1425.2 cd
70 %	1247.0 cd
60 %	1068.9 cd
50 %	890.7 cd
40 %	712.6 cd
30 %	534.4 cd
20 %	356.3 cd
10 %	178.1 cd

Peak intensity: 1781.5 cd  
Number of c-planes: 24

Iso-illuminance Diagram (Iso-lux)



50.0 %	7.5 lx
30.0 %	4.5 lx
10.0 %	1.5 lx
5.0 %	0.7 lx
3.0 %	0.4 lx

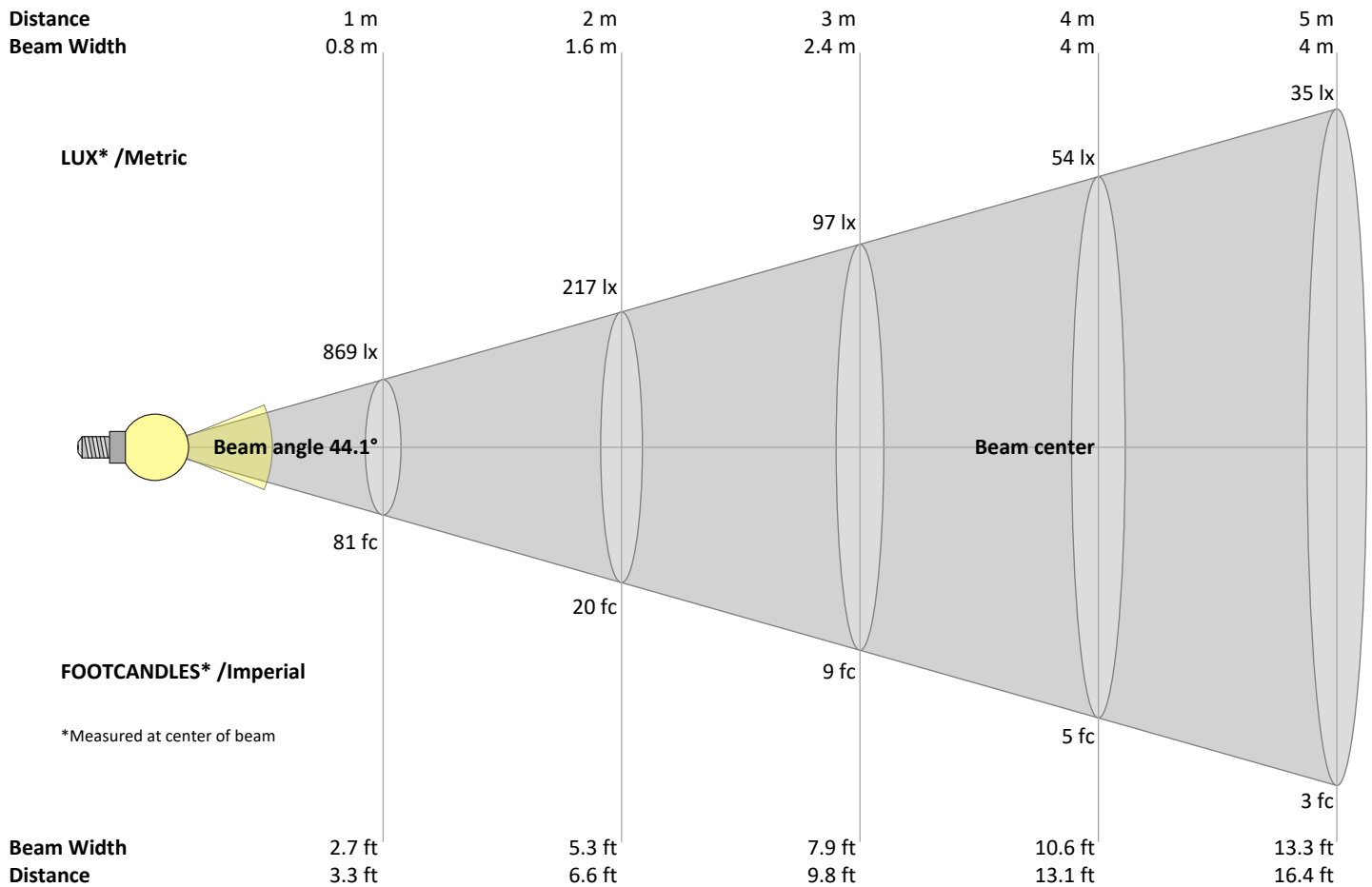
Peak illuminance: 14.9 lx  
Mounting height: 10.0 m  
Number of c-planes: 24

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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
869	217	97	54	35	24	18	14	11	9	7	6	5	4	4	3	3	3	2	2	lux
80.7	20.2	9	5	3.2	2.2	1.6	1.3	1	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	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
869	762	656	569	492	430	383	351	327	308	289	267	245	221	202	186	169	153	138	126	cd
100%	88%	75%	65%	57%	49%	44%	40%	38%	35%	33%	31%	28%	25%	23%	21%	19%	18%	16%	15%	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
869	876	873	860	842	821	797	769	739	706	671	636	600	562	522	479	432	383	329	275	cd
100%	101%	100%	99%	97%	95%	92%	89%	85%	81%	77%	73%	69%	65%	60%	55%	50%	44%	38%	32%	of 0°val

### Intensities in 180° c-plane

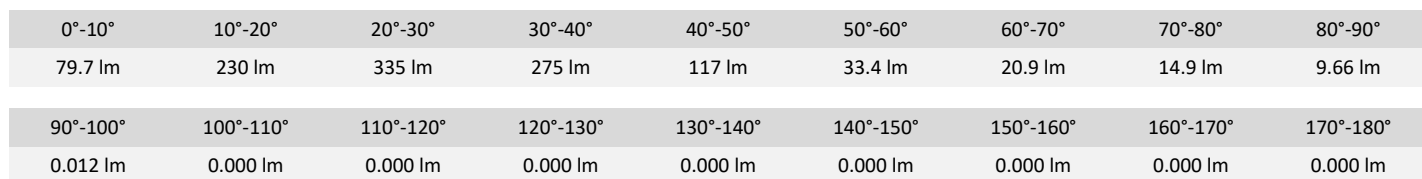
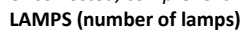
0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
869	969	1065	1159	1247	1341	1444	1553	1656	1738	1780	1771	1706	1596	1449	1276	1093	913	744	592	cd
100%	112%	123%	133%	144%	154%	166%	179%	191%	200%	205%	204%	196%	184%	167%	147%	126%	105%	86%	68%	of 0°val

### 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
869	849	816	777	735	692	648	607	567	529	493	457	421	385	350	316	284	253	222	192	cd
100%	98%	94%	89%	85%	80%	75%	70%	65%	61%	57%	53%	48%	44%	40%	36%	33%	29%	26%	22%	of 0°val



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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	80 lm	7.1%
10-20°	230 lm	20.6%
20-30°	335 lm	30.1%
30-40°	275 lm	24.6%
40-50°	117 lm	10.5%
50-60°	33 lm	3.0%
60-70°	21 lm	1.9%
70-80°	15 lm	1.3%
80-90°	10 lm	0.9%
90-100°	0 lm	0.0%
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	1116 lm	100.0%

Intensity peaks

Max intensity	1782 cd
Intensity, 90°	7 cd
Intensity, 0°	869 cd

Zonal Lumen summary

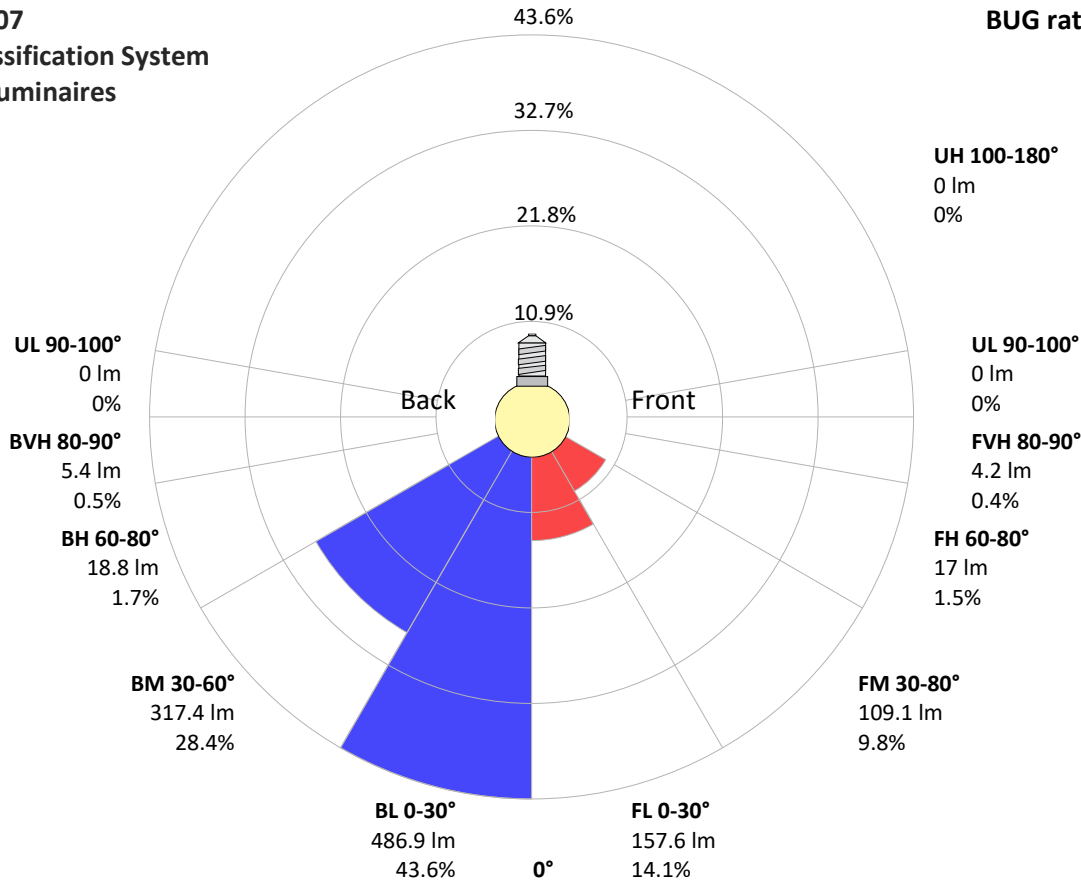
Zone (γ)	Lumen	% Total
0-30°	645 lm	57.8%
0-40°	920 lm	82.4%
0-60°	1070 lm	95.9%
60-90°	45 lm	4.1%
70-100°	25 lm	2.2%
90-120°	0 lm	0.0%
0-90°	1116 lm	100.0%
90-180°	0 lm	0.0%
0-180°	1116 lm	100.0%

BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	158 lm	14.1%
Medium(30-60°)	109 lm	9.8%
High(60-80°)	17 lm	1.5%
Very high(80-90°)	4 lm	0.4%
<b>Back light</b>		
Low(0-30°)	487 lm	43.6%
Medium(30-60°)	317 lm	28.4%
High(60-80°)	19 lm	1.7%
Very high(80-90°)	5 lm	0.5%
<b>Uplight</b>		
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 B1 U1 G0



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## Power Details

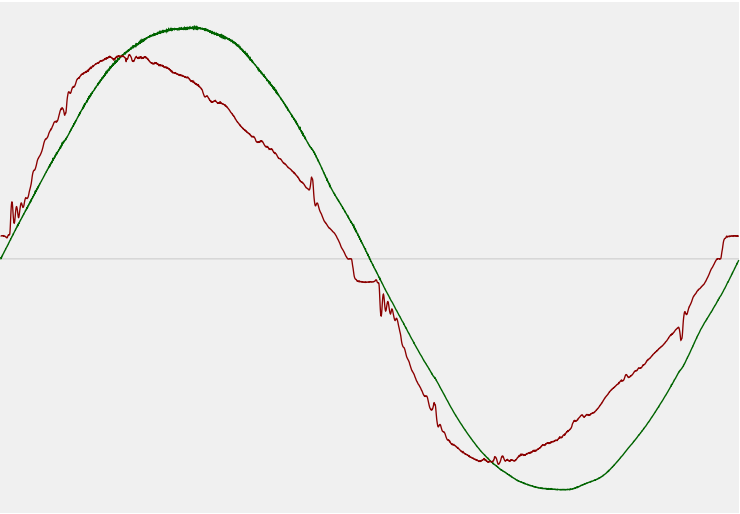
### Input Power

Power feed to light source	40.7 W
Frequency of input power	49.9 Hz
RMS Input voltage feed, $V_{RMS}$	241 V
RMS Input current feed, $I_{RMS}$	0.175 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	42.03 VA
Displacement factor of AC power feed	0.97
Power factor of AC current feed	0.97
Total harmonic distortion of the current	10.79%
Total harmonic distortion of the voltage	1.1%

### Efficiency

Radiated power efficiency	10.0%
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Lumen efficiency	27 lm/W
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### Input Power Curve





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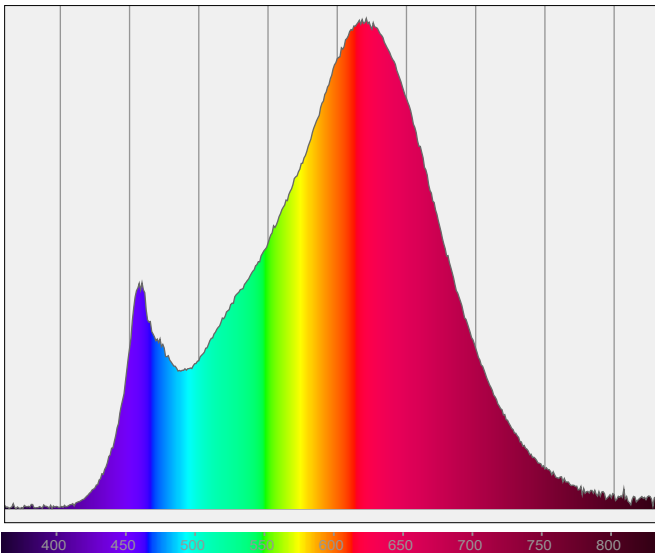
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## Color Measurements

Correlated Color Temperature	CCT = 2700 K
Color Rendering TM30-18	R <sub>f</sub> 90.6 — R <sub>g</sub> 98.8
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 91.4	Color coordinate CIEs 1960	(u;v) = (0.263;0.352)
Color Rendering Index, R9 (red component)	R9 = 58.9	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R <sub>f</sub> 90.6 — R <sub>g</sub> 98.8	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.263;0.263)
Color Quality Scale	CQS = 89.0		

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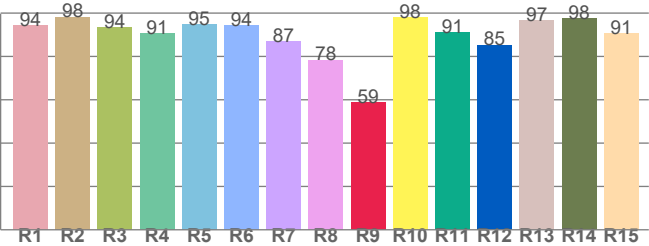
CIE 1931



CIE 1931 – zoomed on Planckian locus



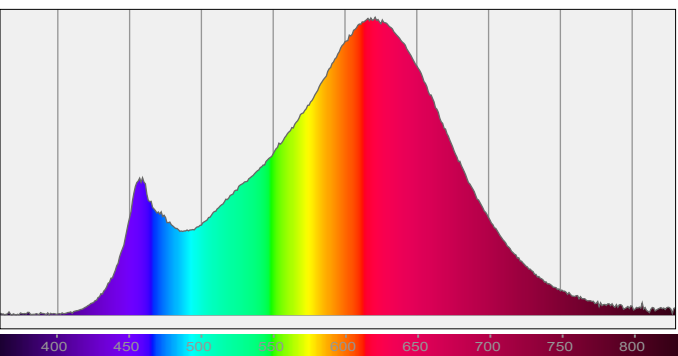
Color Rendering Index per reference color (CIE 1995)



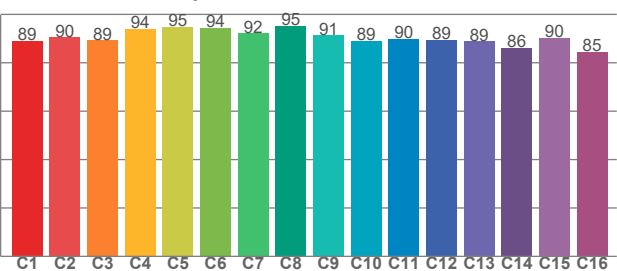
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
94.3	98.3	93.6	90.5	94.9	94.2	86.9	78.4	58.9	98.0	91.1	85.3	96.6	97.6	90.7

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



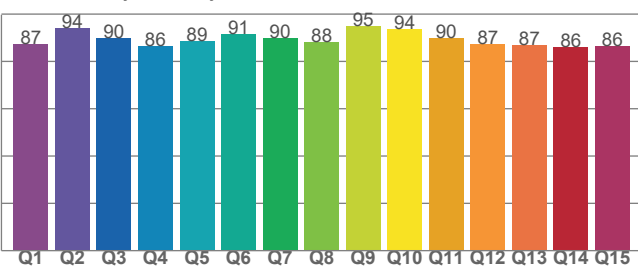
TM30-18 Rf-values per hue bin



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
89.1	90.5	89.2	94.1	94.9	94.5	92.1	95.2	91.3	88.9	89.9	89.4	88.7	86.2	90.4	84.5

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
87.4	94.1	89.7	86.4	88.8	91.5	89.7	88.3	94.7	93.6	89.9	87.4	87.1	86.1	86.3