

Tested Light Source - 1\_PHOT\_NINETY-NINE-2000lmChip-2700K-WallWash\_2309

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

24 planes – 15°

1.5°

1.50 m

16.1 W – PF 0.99 – DPF 0.99

241 V – 0.068 A

50.1 Hz

Main Light Measurement Results

Output

Efficiency

Peak Intensity and Beam Angle

Color Rendering Index

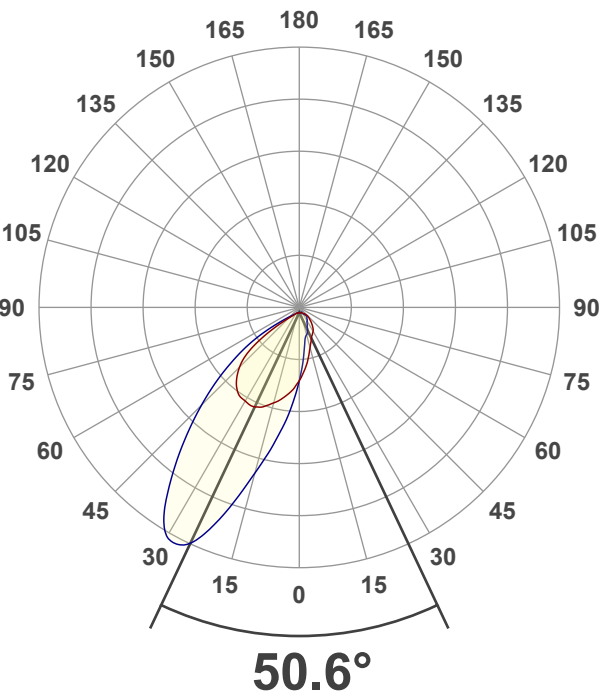
1368 lm

85 lm/W

1472 cd – 50.6°

CRI 91.9

Light Intensity Distribution



# Goniophotometry Report

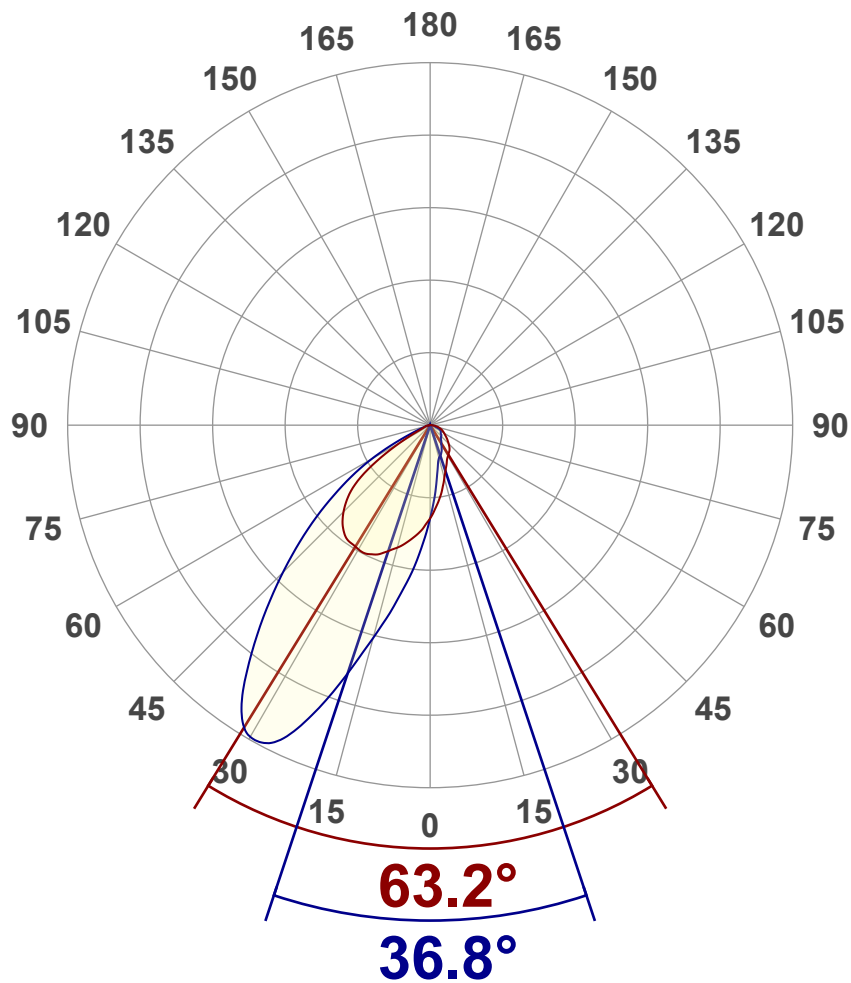
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## Luminous Intensity diagram

Unit: 0-100% of peak intensity



## Main Values

Output (total Lumen)	1368 lm
Peak Intensity	1472 cd
Beam Angle (50%)	50.6°
Beam Angle (90%)	36.8°
Beam Angle (10%)	80.3°

## Cut-off Angle

Average 2,5%	149.6°
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## Field Angle

Average 10%	99.5°
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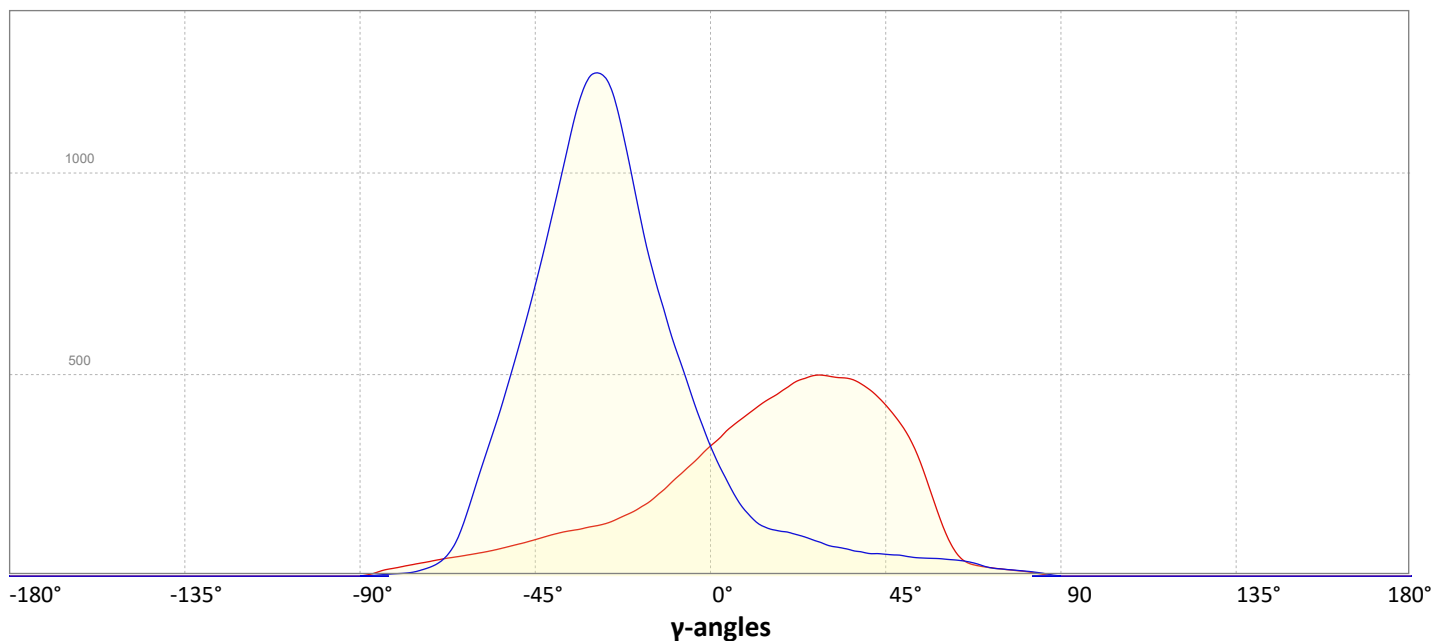
## Intensity Ratio

In 120° cone	91.9%
In 90° cone	66.4%

C000-C180

C090-C270

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

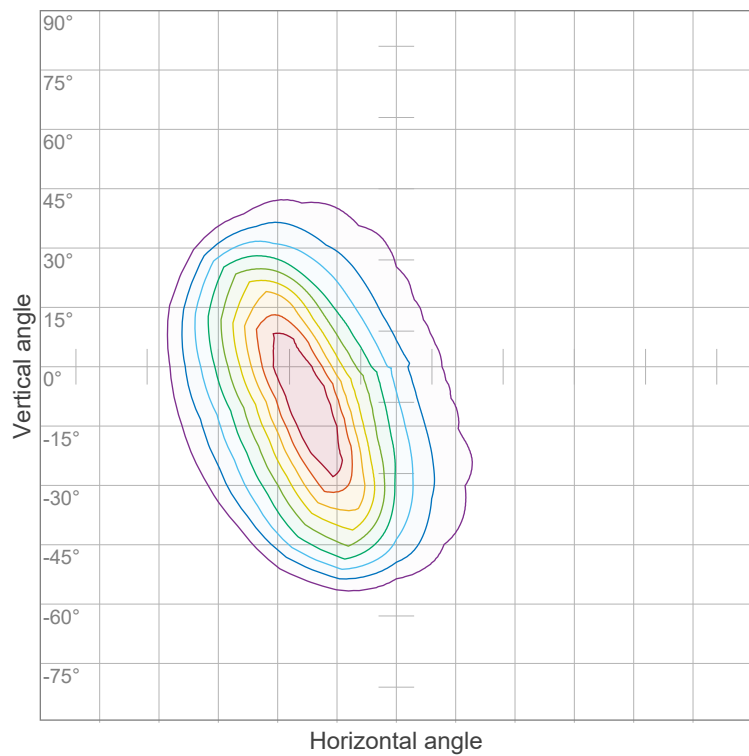


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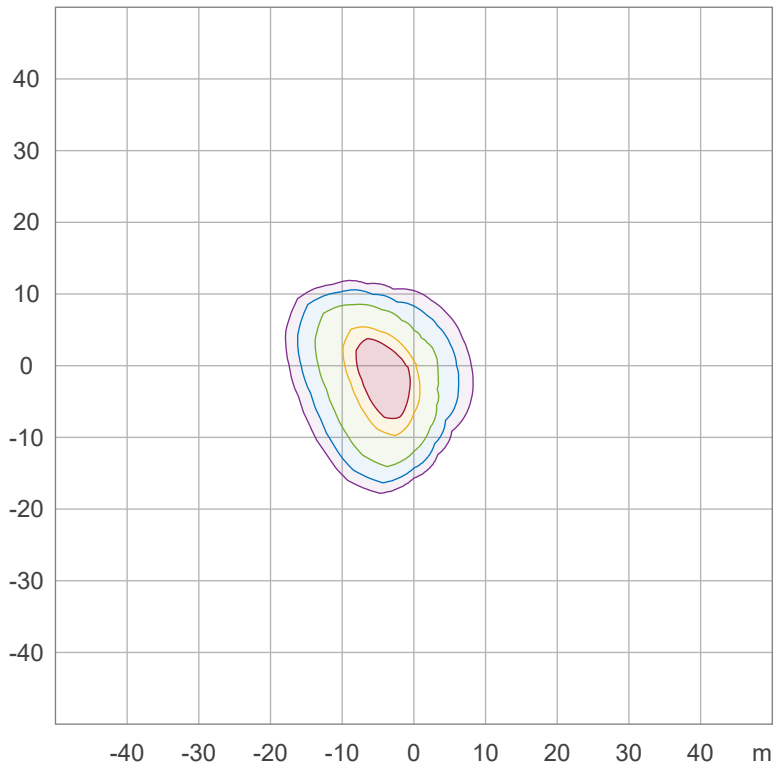
## Iso-intensity Diagram (Iso-candela)



90 %	1324.7 cd
80 %	1177.5 cd
70 %	1030.3 cd
60 %	883.1 cd
50 %	735.9 cd
40 %	588.8 cd
30 %	441.6 cd
20 %	294.4 cd
10 %	147.2 cd

Peak intensity: 1471.9 cd  
Number of c-planes: 24

## Iso-illuminance Diagram (Iso-lux)



50.0 %	5.5 lx
30.0 %	3.3 lx
10.0 %	1.1 lx
5.0 %	0.5 lx
3.0 %	0.3 lx

Peak illuminance: 11.0 lx  
Mounting height: 10.0 m  
Number of c-planes: 24

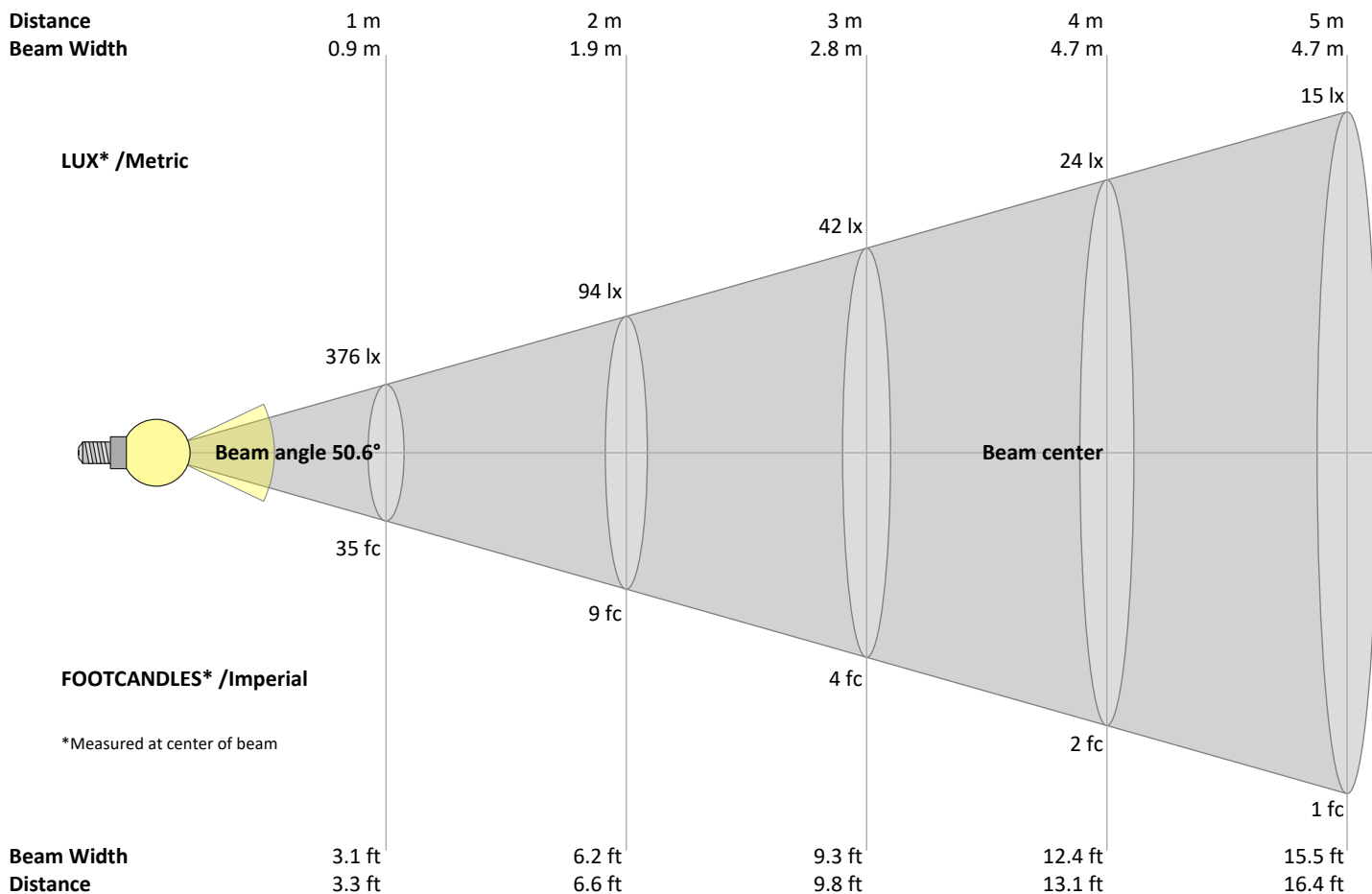
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## Beam Details



### 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
376	94	42	24	15	10	8	6	5	4	3	3	2	2	2	1	1	1	1	1	lux
35	8.7	3.9	2.2	1.4	1	0.7	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	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
376	352	329	309	289	268	247	228	210	197	184	174	163	154	147	143	139	134	130	126	cd
100%	93%	87%	82%	77%	71%	66%	61%	56%	52%	49%	46%	43%	41%	39%	38%	37%	35%	35%	33%	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
376	322	278	236	201	175	153	141	133	129	125	119	113	105	98	89	84	80	75	71	cd
100%	86%	74%	63%	53%	46%	41%	37%	35%	34%	33%	32%	30%	28%	26%	24%	22%	21%	20%	19%	of 0°val

### Intensities in 180° c-plane

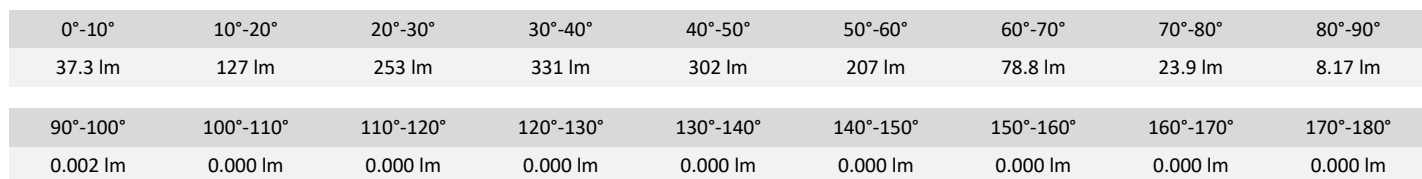
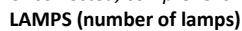
0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
376	392	415	433	450	467	484	500	513	528	542	557	565	573	576	573	570	568	564	555	cd
100%	104%	110%	115%	120%	124%	129%	133%	136%	140%	144%	148%	150%	152%	153%	152%	151%	151%	150%	147%	of 0°val

### 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
376	430	490	557	622	688	764	840	925	1026	1135	1243	1339	1406	1437	1438	1410	1348	1259	1161	cd
100%	114%	130%	148%	165%	183%	203%	223%	246%	272%	302%	330%	356%	374%	382%	382%	375%	358%	335%	309%	of 0°val



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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	37 lm	2.7%
10-20°	127 lm	9.3%
20-30°	253 lm	18.5%
30-40°	331 lm	24.2%
40-50°	302 lm	22.1%
50-60°	207 lm	15.1%
60-70°	79 lm	5.8%
70-80°	24 lm	1.7%
80-90°	8 lm	0.6%
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	1368 lm	100.0%

Intensity peaks

Max intensity	1472 cd
Intensity, 90°	0 cd
Intensity, 0°	376 cd

Zonal Lumen summary

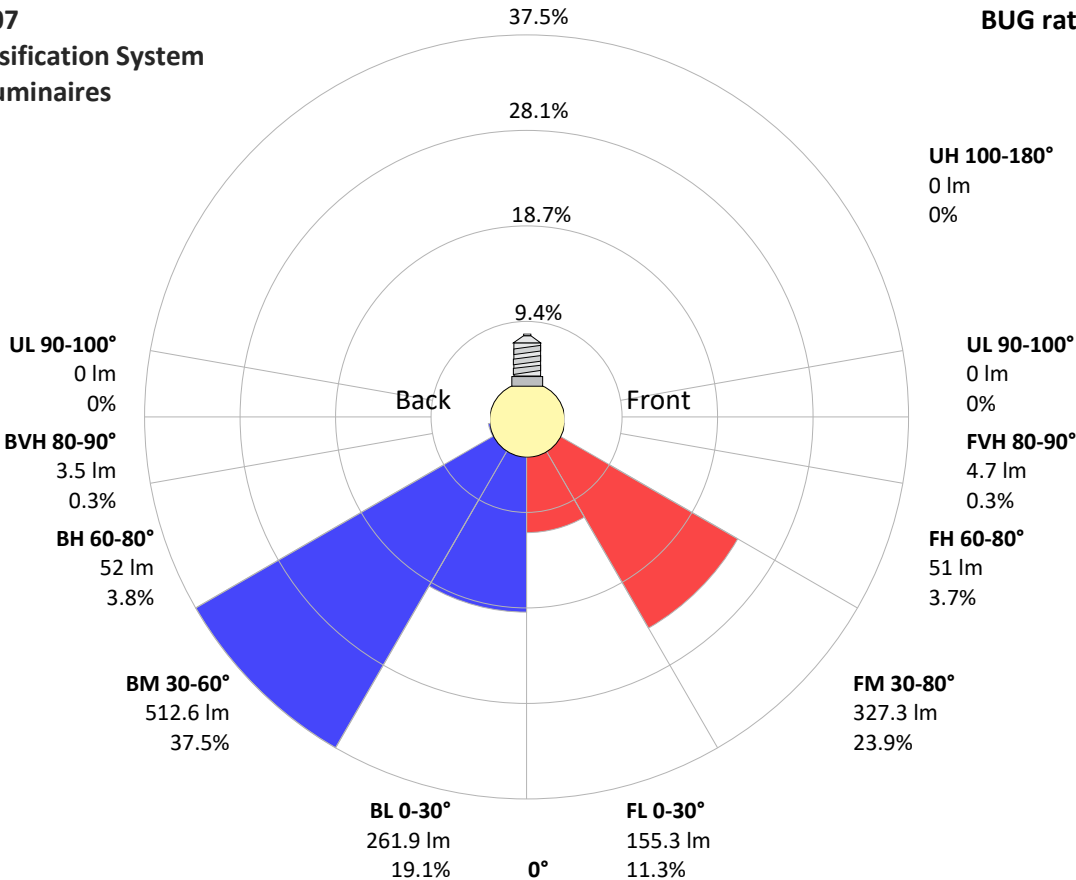
Zone (γ)	Lumen	% Total
0-30°	417 lm	30.5%
0-40°	749 lm	54.7%
0-60°	1257 lm	91.9%
60-90°	111 lm	8.1%
70-100°	32 lm	2.3%
90-120°	0 lm	0.0%
0-90°	1368 lm	100.0%
90-180°	0 lm	0.0%
0-180°	1368 lm	100.0%

BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	155 lm	11.3%
Medium(30-60°)	327 lm	23.9%
High(60-80°)	51 lm	3.7%
Very high(80-90°)	5 lm	0.3%
<b>Back light</b>		
Low(0-30°)	262 lm	19.1%
Medium(30-60°)	513 lm	37.5%
High(60-80°)	52 lm	3.8%
Very high(80-90°)	3 lm	0.3%
<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	16.1 W
Frequency of input power	50.1 Hz
RMS Input voltage feed, $V_{RMS}$	241 V
RMS Input current feed, $I_{RMS}$	0.068 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	16.29 VA
Displacement factor of AC power feed	0.99
Power factor of AC current feed	0.99
Total harmonic distortion of the current	6.77%
Total harmonic distortion of the voltage	1.16%

### Efficiency

Radiated power efficiency	31.3%
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Lumen efficiency	85 lm/W
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### Input Power Curve





# Goniophotometry Report

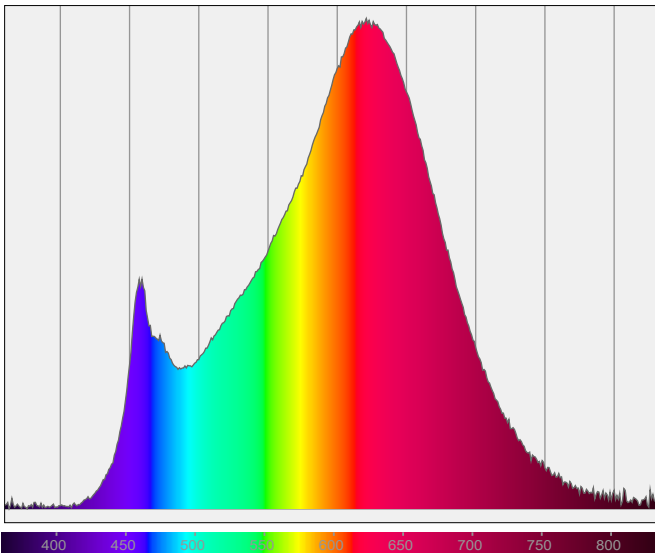
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## Color Measurements

Correlated Color Temperature	CCT = 2700 K
Color Rendering TM30-18	R <sub>f</sub> 90.8 — R <sub>g</sub> 98.5
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 91.9	Color coordinate CIEs 1960	(u;v) = (0.263;0.352)
Color Rendering Index, R9 (red component)	R9 = 64.2	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R <sub>f</sub> 90.8 — R <sub>g</sub> 98.5	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.263;0.263)
Color Quality Scale	CQS = 89.9		

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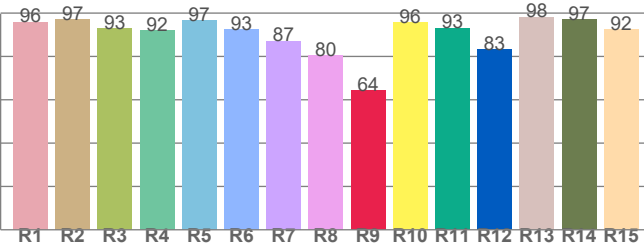
CIE 1931



CIE 1931 – zoomed on Planckian locus



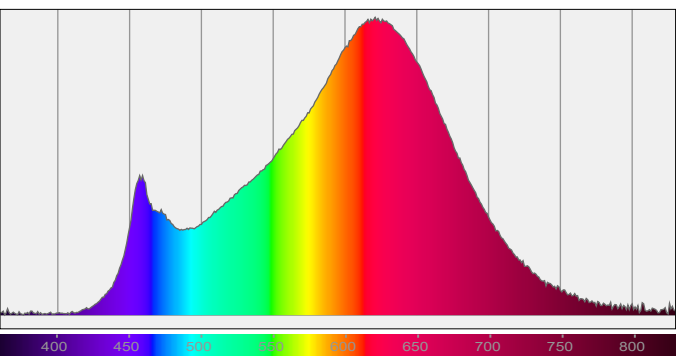
Color Rendering Index per reference color (CIE 1995)



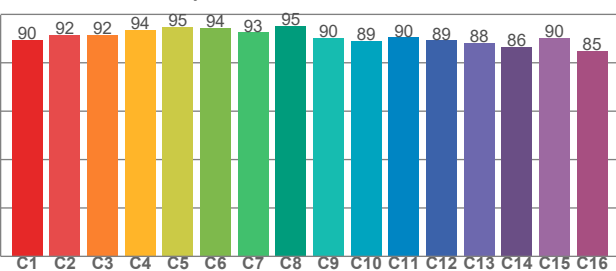
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
96.0	97.3	92.8	92.0	96.5	92.5	87.2	80.5	64.2	95.8	93.2	83.2	98.2	97.2	92.5

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



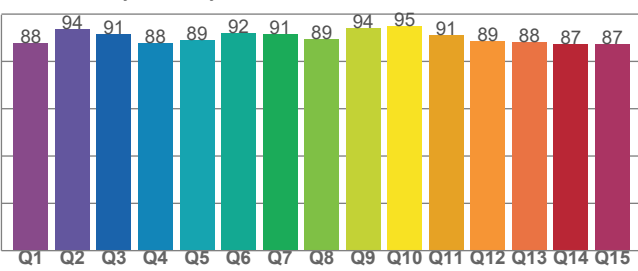
TM30-18 Rf-values per hue bin



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
89.5	91.6	91.6	93.6	94.9	94.4	92.5	95.1	90.2	88.8	90.4	89.2	88.0	86.4	90.1	85.0

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
87.9	93.6	91.4	87.9	89.0	91.9	91.4	89.2	94.2	94.8	91.3	88.7	88.0	87.3	87.4