

Tested Light Source - 1\_PHOT\_NINETY-NINE-1875lmChip-3500K-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

13.3 W – PF 0.98 – DPF 0.99

239 V – 0.056 A

49.9 Hz

Main Light Measurement Results

Output

Efficiency

Peak Intensity and Beam Angle

Color Rendering Index

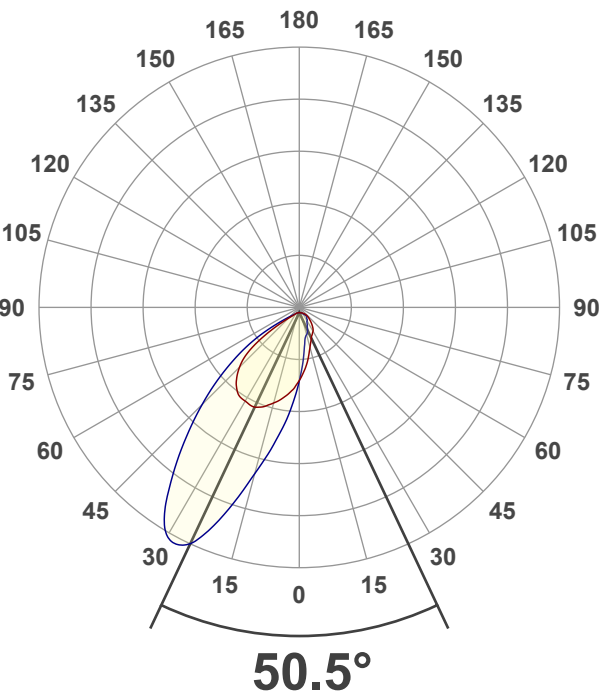
1309 lm

99 lm/W

1409 cd – 50.5°

CRI 92.1

Light Intensity Distribution



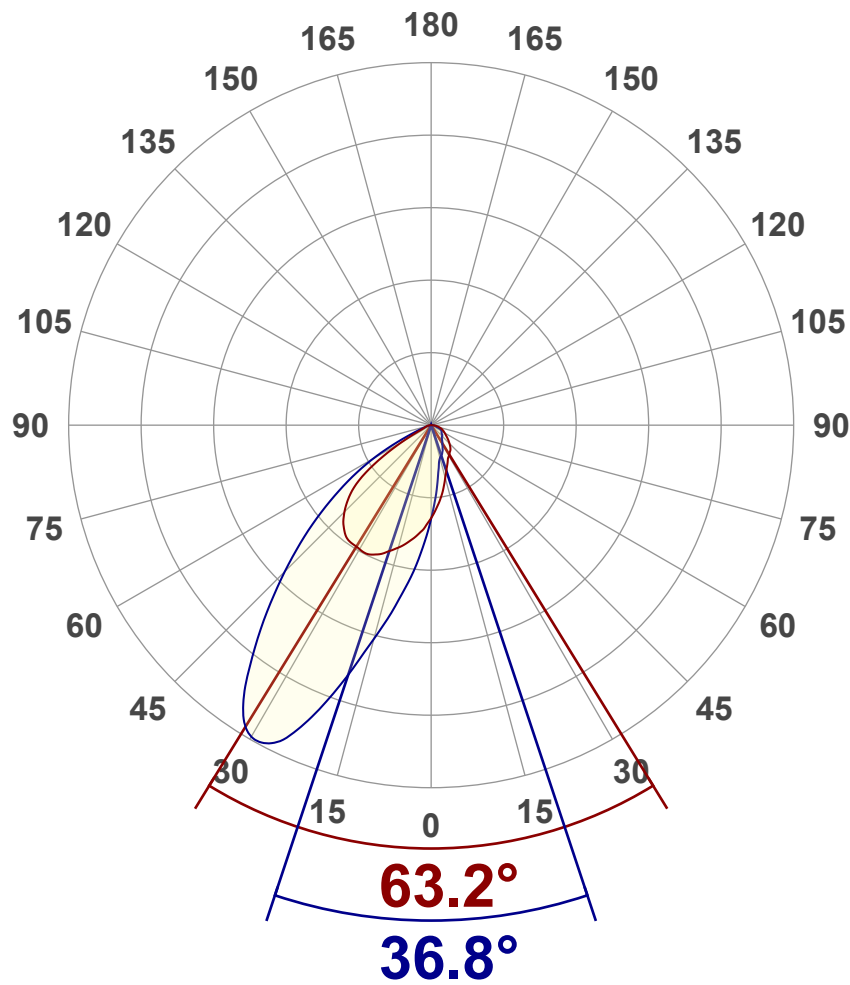
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1309 lm
Peak Intensity	1409 cd
Beam Angle (50%)	50.5°
Beam Angle (90%)	36.8°
Beam Angle (10%)	79.9°

Cut-off Angle

Average 2,5%	149.3°
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Field Angle

Average 10%	99.3°
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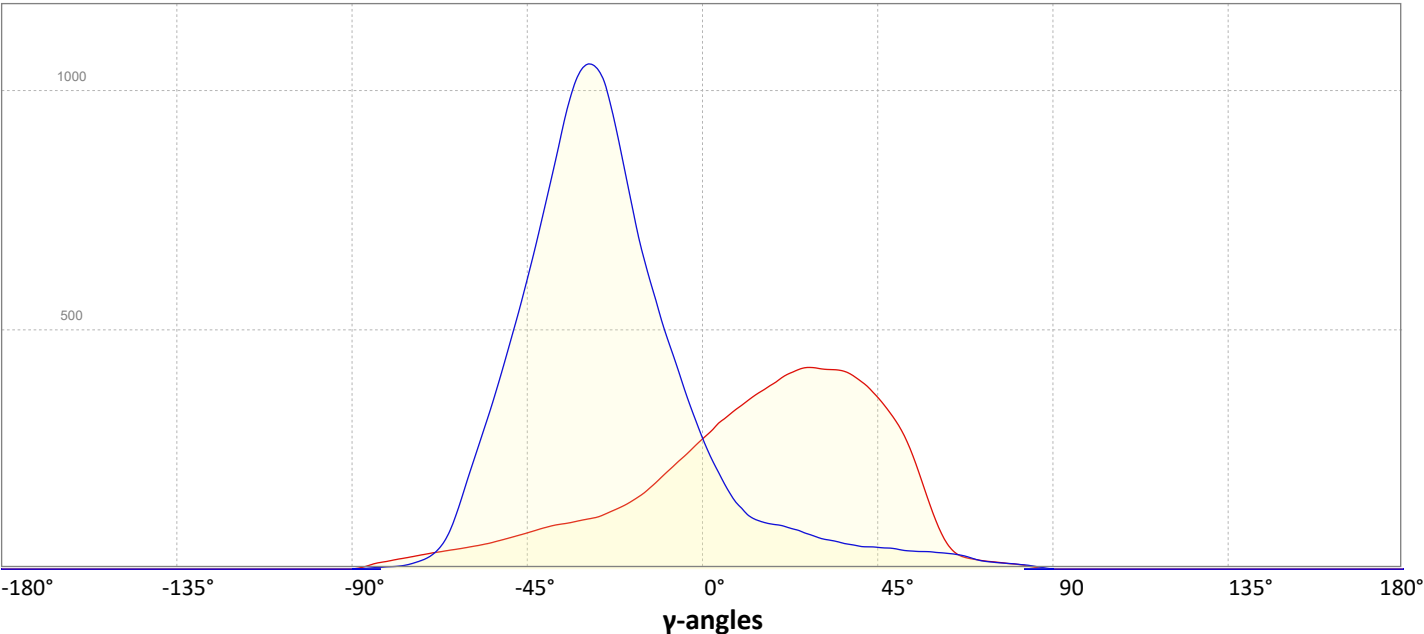
Intensity Ratio

In 120° cone	92.0%
In 90° cone	66.5%

C000-C180

C090-C270

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

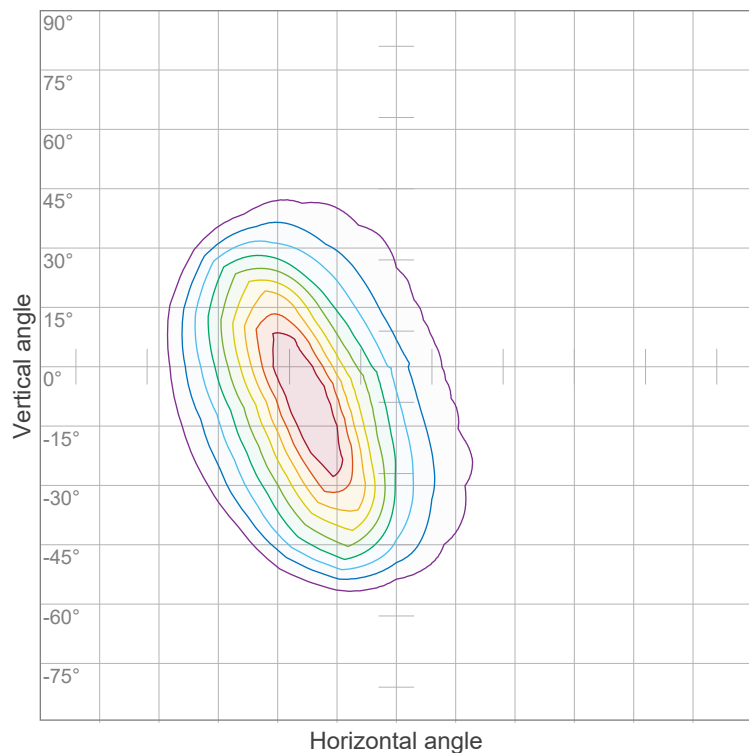


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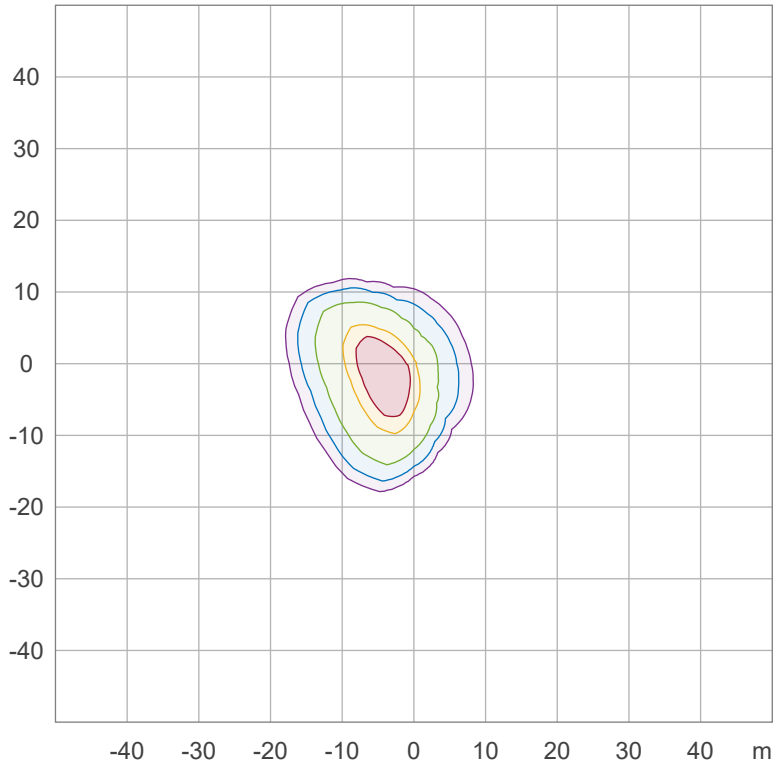
## Iso-intensity Diagram (Iso-candela)



90 %	1265.2 cd
80 %	1124.7 cd
70 %	984.1 cd
60 %	843.5 cd
50 %	702.9 cd
40 %	562.3 cd
30 %	421.7 cd
20 %	281.2 cd
10 %	140.6 cd

Peak intensity: 1405.8 cd  
Number of c-planes: 24

## Iso-illuminance Diagram (Iso-lux)



50.0 %	5.3 lx
30.0 %	3.2 lx
10.0 %	1.1 lx
5.0 %	0.5 lx
3.0 %	0.3 lx

Peak illuminance: 10.5 lx  
Mounting height: 10.0 m  
Number of c-planes: 24

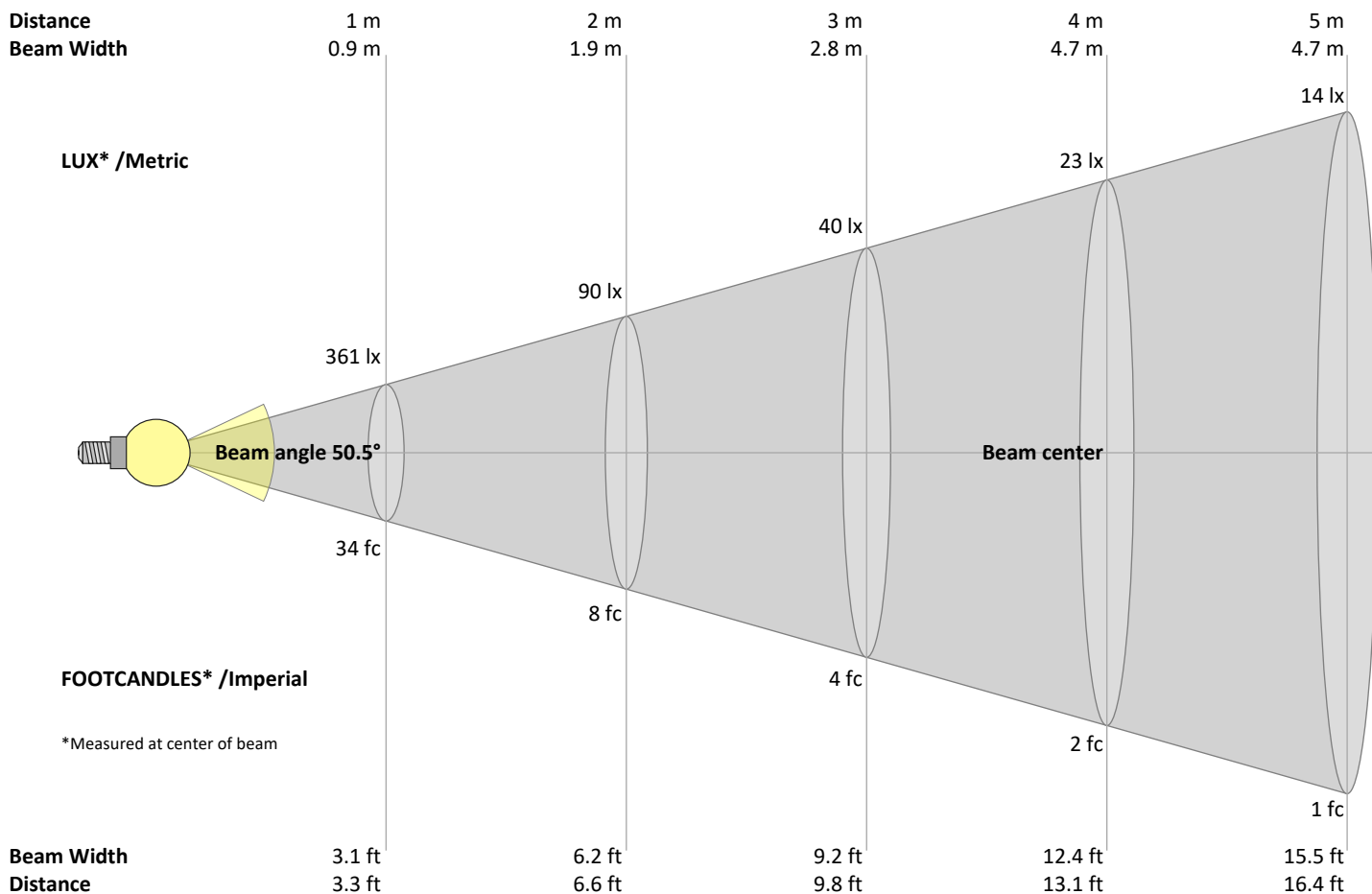
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## Beam Details



### 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
361	90	40	23	14	10	7	6	4	4	3	3	2	2	2	1	1	1	1	1	lux
33.5	8.4	3.7	2.1	1.3	0.9	0.7	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.1	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
361	337	316	297	277	257	237	218	201	187	175	165	156	146	140	136	132	127	124	120	cd
100%	93%	88%	82%	77%	71%	66%	60%	56%	52%	49%	46%	43%	41%	39%	38%	37%	35%	34%	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
361	310	268	227	192	168	146	135	128	123	120	114	108	100	93	86	81	77	71	67	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
361	376	399	415	433	449	465	480	493	507	522	535	544	551	553	550	547	546	543	535	cd
100%	104%	110%	115%	120%	124%	129%	133%	137%	141%	145%	148%	151%	153%	153%	152%	152%	151%	151%	148%	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
361	415	473	538	601	665	738	811	892	991	1095	1198	1289	1352	1381	1380	1350	1290	1204	1108	cd
100%	115%	131%	149%	167%	184%	204%	225%	247%	275%	303%	332%	357%	375%	383%	382%	374%	358%	334%	307%	of 0°val

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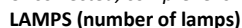
*Uncorrected, comprehensive UGR table according to 117-1995*

Reflectances		Viewed Crosswise (Viewing direction orthogonal to lamp length axis)					Viewed Endwise (Viewing direction parallel to lamp length axis)				
X	Y	Viewed Crosswise (Viewing direction orthogonal to lamp length axis)					Viewed Endwise (Viewing direction parallel to lamp length axis)				
ρ Ceiling		70	70	50	50	30	70	70	50	50	30
ρ Walls		50	30	50	30	30	50	30	50	30	30
ρ Floor		20	20	20	20	20	20	20	20	20	20
Room size H = mounting height above eye level											
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Variations with the observer position for the luminaire spacings, S:											
n/a		n/a					n/a				
n/a		n/a					n/a				
n/a		n/a					n/a				

### 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	102	102	102	100
1	111	107	103	100	108	105	101	98	100	98	95	97	94	92	93	91	90	88
2	102	95	89	84	100	93	88	83	90	85	81	87	83	80	84	81	78	76
3	94	85	77	72	92	83	76	71	80	75	70	78	73	69	75	71	68	66
4	86	76	68	62	84	74	67	61	72	65	60	70	64	60	68	63	59	57
5	80	68	60	54	78	67	59	53	65	58	53	63	57	52	61	56	52	50
6	74	61	53	47	72	60	52	47	59	52	46	57	51	46	55	50	46	44
7	68	55	47	41	67	55	47	41	53	46	41	52	45	41	50	45	40	39
8	63	51	42	37	62	50	42	37	49	42	37	47	41	36	46	40	36	34
9	59	46	38	33	58	46	38	33	45	38	33	43	37	33	42	37	32	31
10	55	42	35	30	54	42	35	30	41	34	30	40	34	29	39	33	29	28

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## Zonal Lumen Summary

[illegible]

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	36 lm	2.7%
10-20°	122 lm	9.3%
20-30°	243 lm	18.6%
30-40°	317 lm	24.2%
40-50°	289 lm	22.0%
50-60°	198 lm	15.1%
60-70°	75 lm	5.7%
70-80°	23 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	1309 lm	100.0%

Intensity peaks

Max intensity	1409 cd
Intensity, 90°	0 cd
Intensity, 0°	361 cd

Zonal Lumen summary

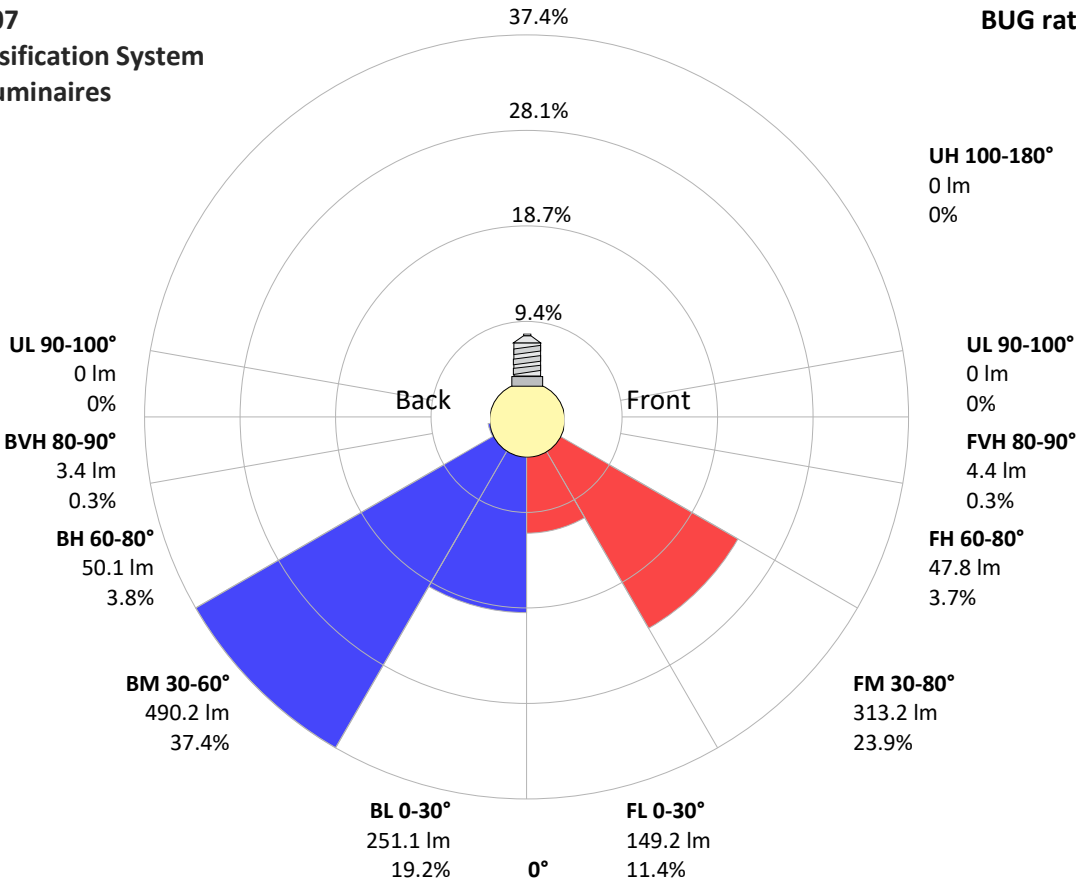
Zone (γ)	Lumen	% Total
0-30°	400 lm	30.6%
0-40°	718 lm	54.8%
0-60°	1204 lm	92.0%
60-90°	105 lm	8.0%
70-100°	30 lm	2.3%
90-120°	0 lm	0.0%
0-90°	1309 lm	100.0%
90-180°	0 lm	0.0%
0-180°	1309 lm	100.0%

BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	149 lm	11.4%
Medium(30-60°)	313 lm	23.9%
High(60-80°)	48 lm	3.7%
Very high(80-90°)	4 lm	0.3%
<b>Back light</b>		
Low(0-30°)	251 lm	19.2%
Medium(30-60°)	490 lm	37.4%
High(60-80°)	50 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

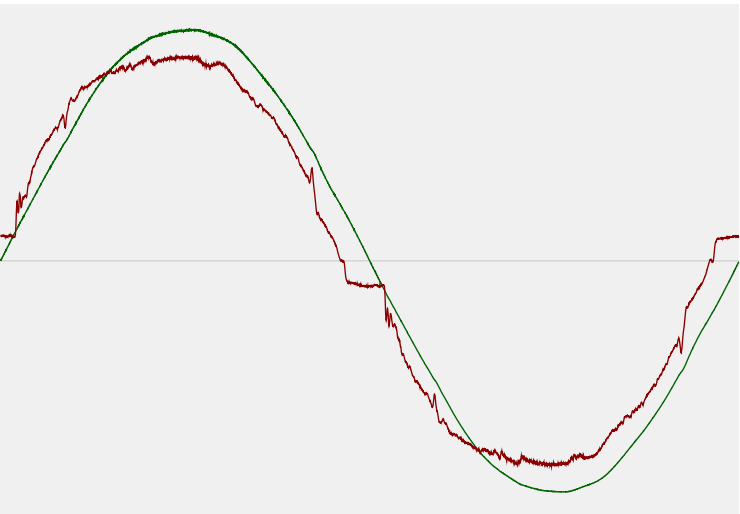
### Input Power

Power feed to light source	13.3 W
Frequency of input power	49.9 Hz
RMS Input voltage feed, $V_{RMS}$	239 V
RMS Input current feed, $I_{RMS}$	0.056 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	13.49 VA
Displacement factor of AC power feed	0.99
Power factor of AC current feed	0.98
Total harmonic distortion of the current	6.73%
Total harmonic distortion of the voltage	1.07%

### Efficiency

Radiated power efficiency	36.2%
<div><div></div></div>	
Lumen efficiency	99 lm/W
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### Input Power Curve





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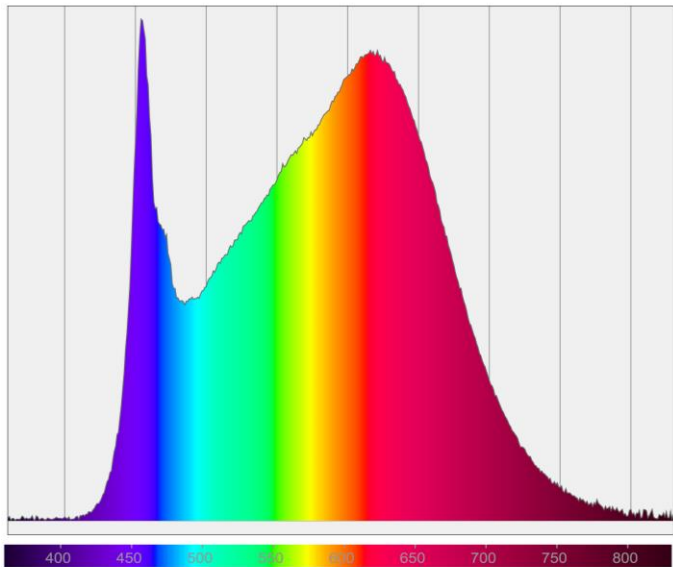
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## Color Measurements

Correlated Color Temperature	CCT = 3500 K
Color Rendering TM30-18	R <sub>f</sub> 90.2 — R <sub>g</sub> 98.1
Color Shift, CIE duv	Duv ±0.0003

## Spectral distribution



## Color details

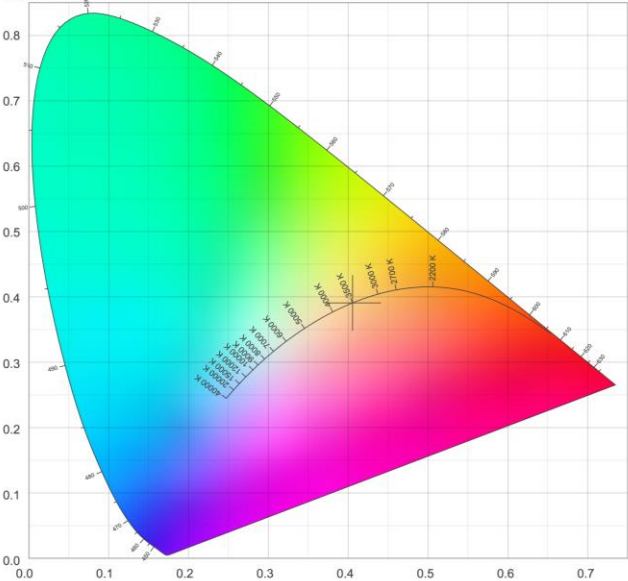
Correlated Color Temperature	CCT = 3500 K	Color coordinates CIE 1931	(x;y) = (0.406;0.391)
Color Rendering Index	CRI 94.0	Color coordinate CIEs 1960	(u;v) = (0.236;0.341)
Color Rendering Index, R9 (red component)	R9 = 77.7	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R <sub>f</sub> 90.2 — R <sub>g</sub> 98.1	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.236;0.236)
Color Quality Scale	CQS = 92.3		

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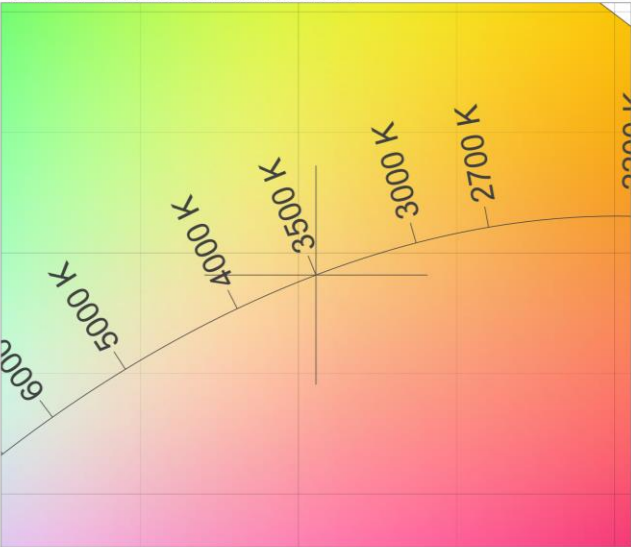
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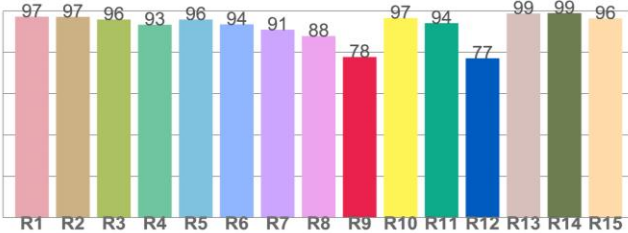
CIE 1931



CIE 1931 – zoomed on Planckian locus



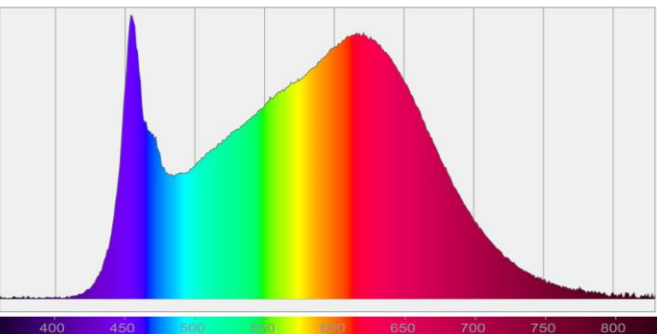
Color Rendering Index per reference color (CIE 1995)



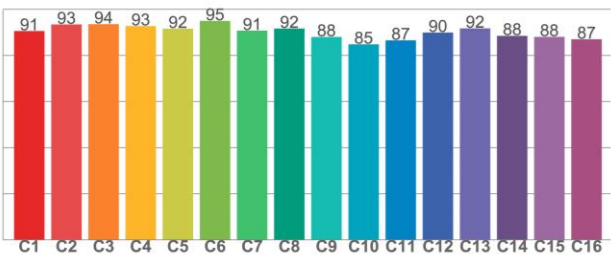
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
97.3	97.2	95.9	93.4	95.9	93.5	90.9	87.9	77.7	96.6	94.1	77.1	98.8	99.0	96.4

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



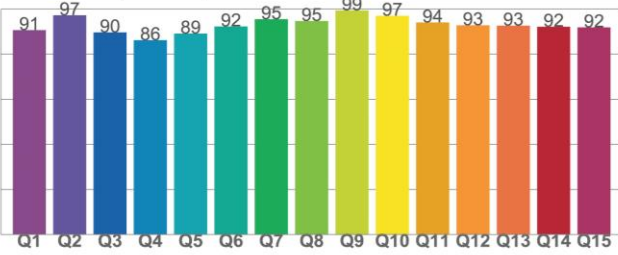
TM30-18 Rf-values per hue bin



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	93.6	92.7	91.6	95.0	90.7	91.6	88.0	84.8	86.5	89.9	91.7	88.5	88.1	87.0

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
90.6	97.2	89.6	86.2	89.1	92.3	95.5	94.7	99.4	97.0	94.0	92.8	92.6	92.1	91.8