

Tested Light Source - 1\_PHOT\_NINETY-NINE-1750lmChip-3000K-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

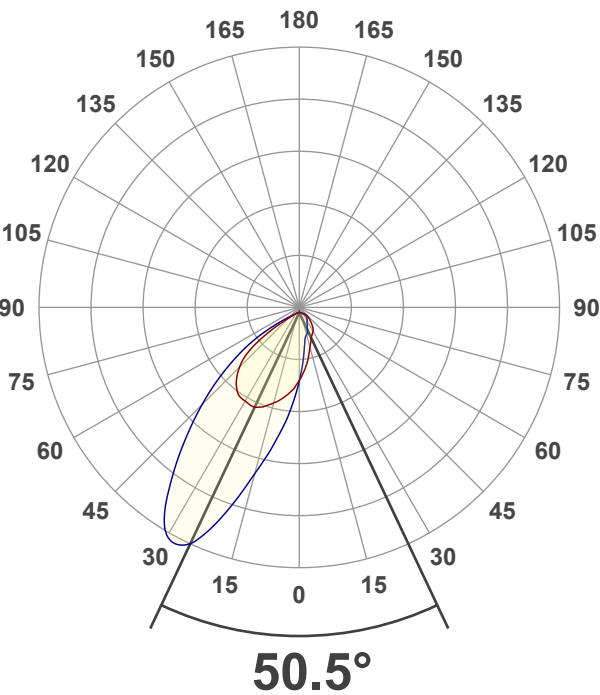
1221 lm

92 lm/W

1315 cd – 50.5°

CRI 92.1

Light Intensity Distribution



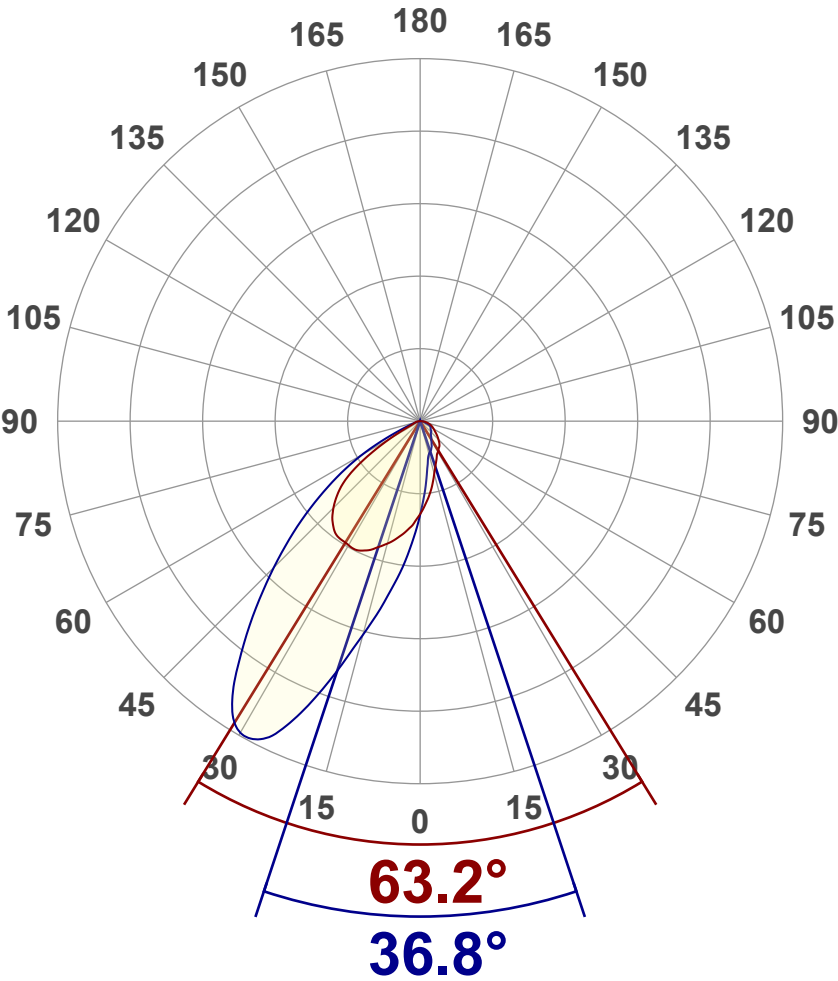
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1221 lm
Peak Intensity	1315 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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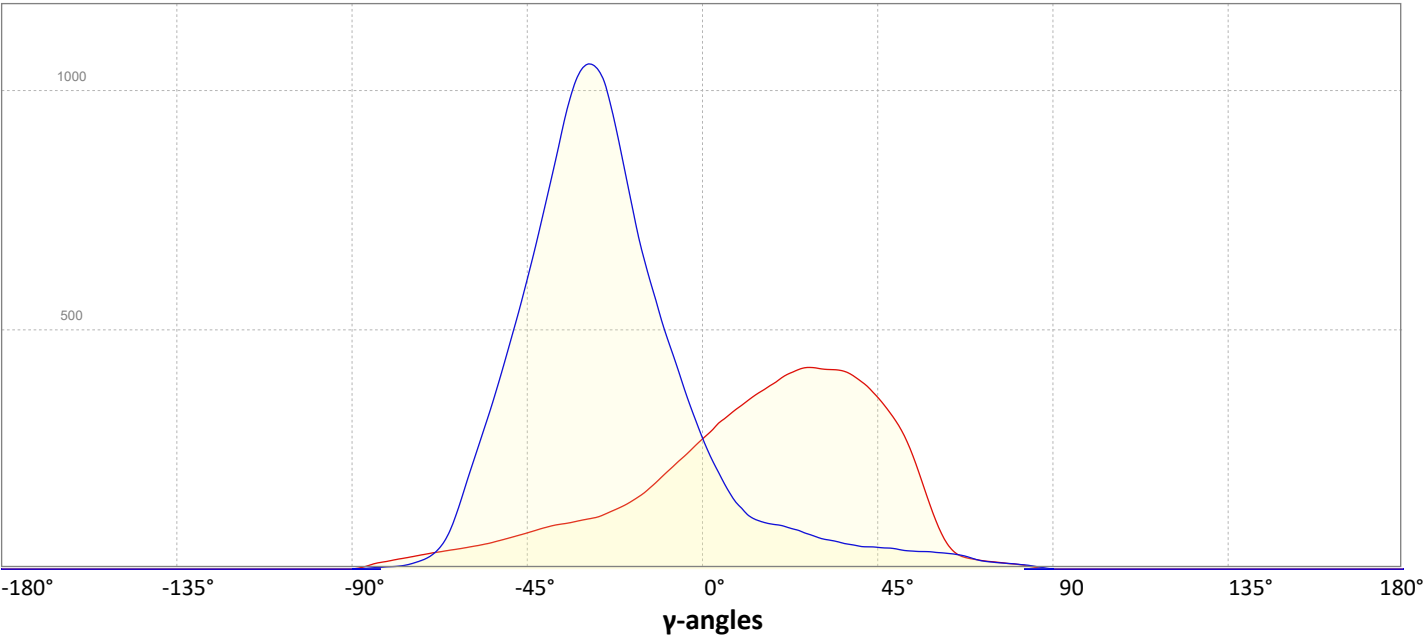
Intensity Ratio

In 120° cone	92.0%
In 90° cone	66.5%

C000-C180

C090-C270

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

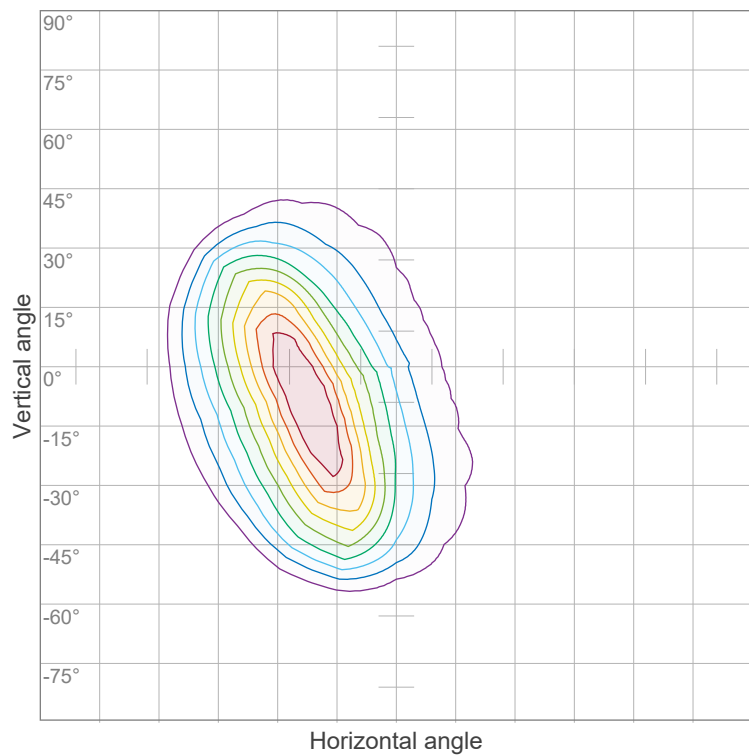


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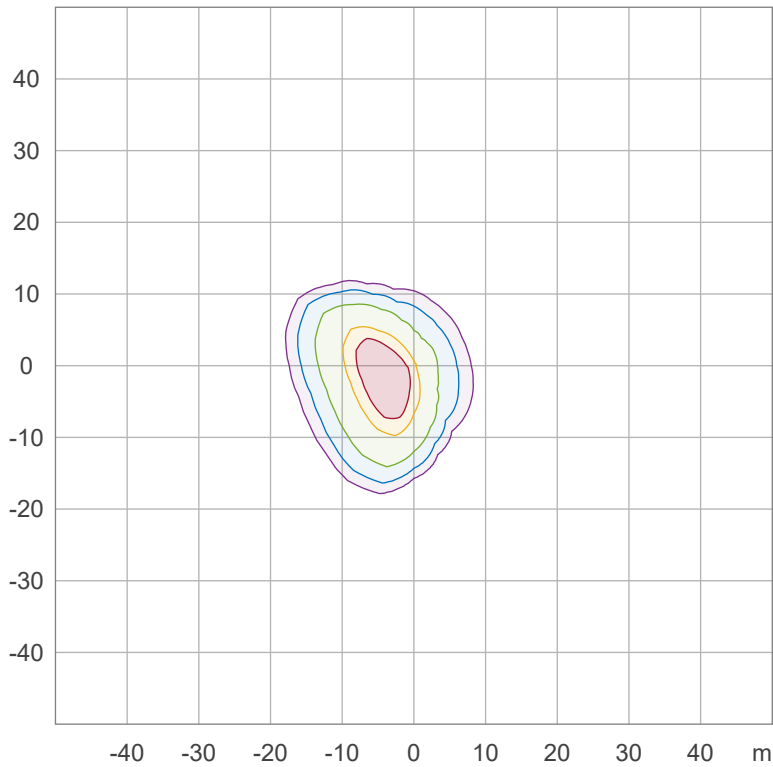
## Iso-intensity Diagram (Iso-candela)



90 %	1180.2 cd
80 %	1049.1 cd
70 %	917.9 cd
60 %	786.8 cd
50 %	655.7 cd
40 %	524.5 cd
30 %	393.4 cd
20 %	262.3 cd
10 %	131.1 cd

Peak intensity: 1311.3 cd  
Number of c-planes: 24

## Iso-illuminance Diagram (Iso-lux)



50.0 %	4.9 lx
30.0 %	2.9 lx
10.0 %	1.0 lx
5.0 %	0.5 lx
3.0 %	0.3 lx

Peak illuminance: 9.8 lx  
Mounting height: 10.0 m  
Number of c-planes: 24

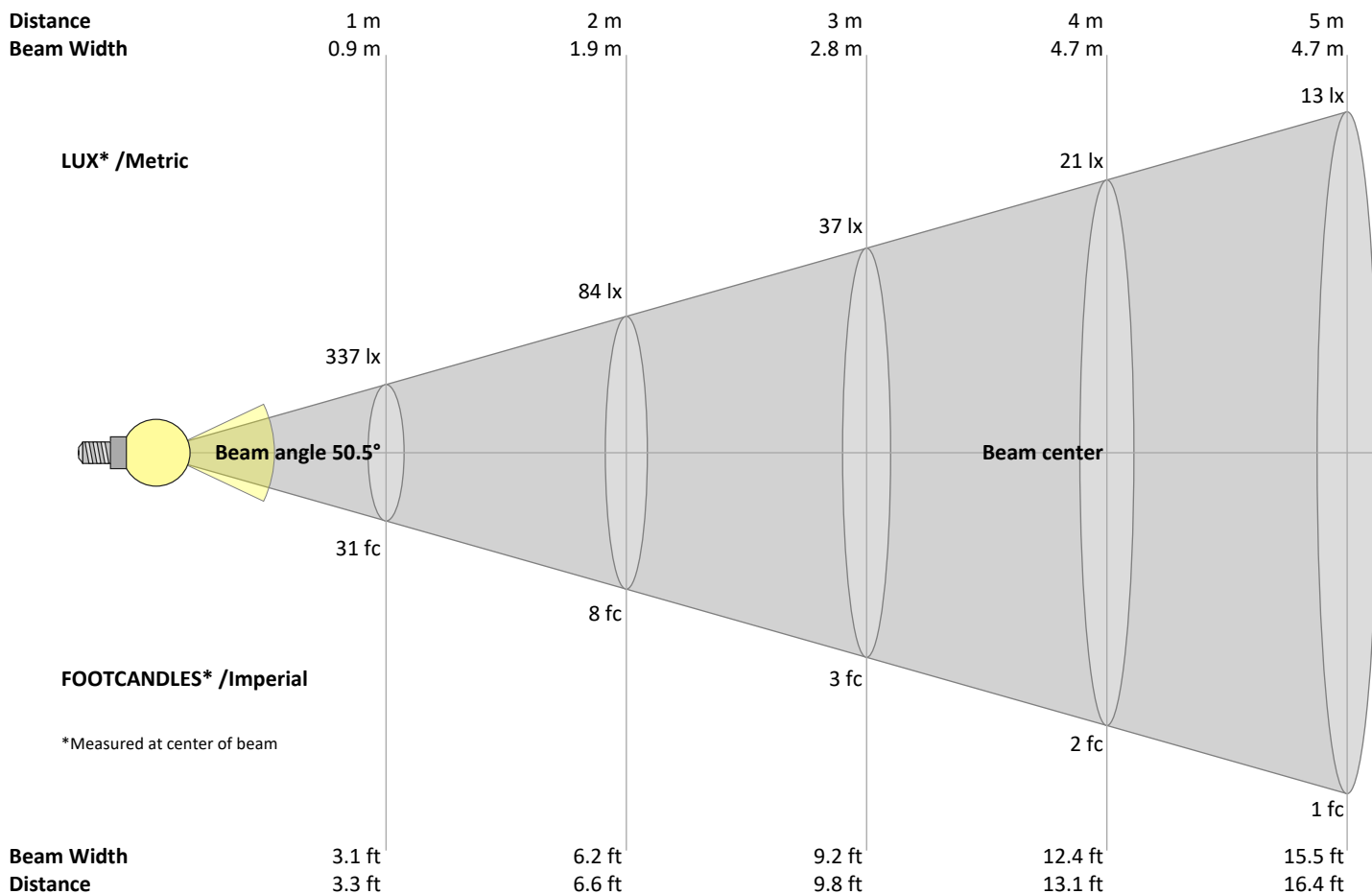
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## Beam Details



### 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
337	84	37	21	13	9	7	5	4	3	3	2	2	2	1	1	1	1	1	1	lux
31.3	7.8	3.5	2	1.3	0.9	0.6	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
337	314	295	277	258	240	221	203	188	175	163	154	145	137	131	127	123	119	115	112	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
337	290	250	212	180	156	136	126	119	115	112	106	101	94	87	80	75	72	67	63	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

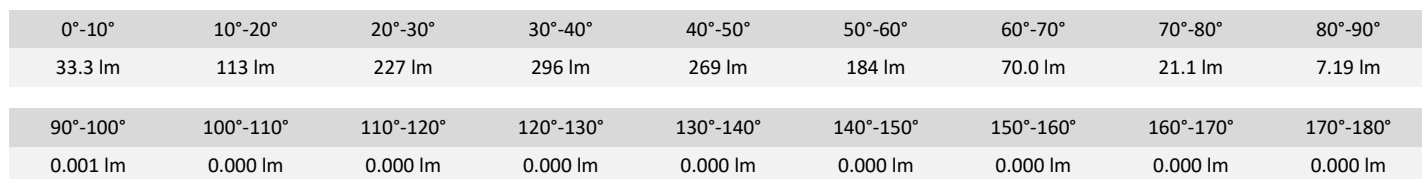
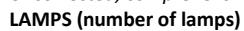
0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
337	351	372	387	404	418	434	448	460	473	487	499	507	514	515	513	511	510	507	499	cd
100%	104%	110%	115%	120%	124%	129%	133%	137%	141%	145%	148%	151%	153%	153%	152%	152%	151%	151%	148%	of 0°val

### 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
337	387	442	502	560	620	688	757	832	924	1021	1117	1202	1261	1288	1287	1259	1204	1123	1034	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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## Outdoor Light Planning

### Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	33 lm	2.7%
10-20°	113 lm	9.3%
20-30°	227 lm	18.6%
30-40°	296 lm	24.2%
40-50°	269 lm	22.0%
50-60°	184 lm	15.1%
60-70°	70 lm	5.7%
70-80°	21 lm	1.7%
80-90°	7 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	1221 lm	100.0%

### Intensity peaks

Max intensity	1315 cd
Intensity, 90°	0 cd
Intensity, 0°	337 cd

### Zonal Lumen summary

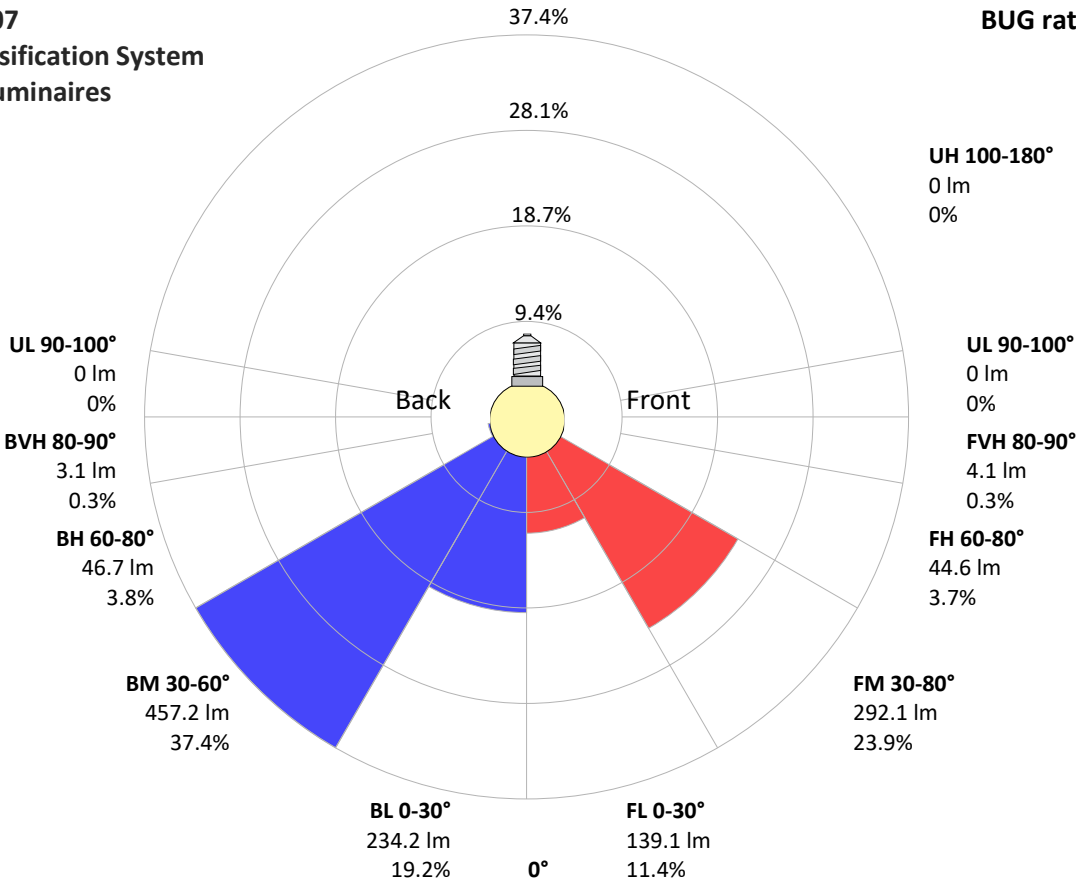
Zone (γ)	Lumen	% Total
0-30°	373 lm	30.6%
0-40°	669 lm	54.8%
0-60°	1123 lm	92.0%
60-90°	98 lm	8.0%
70-100°	28 lm	2.3%
90-120°	0 lm	0.0%
0-90°	1221 lm	100.0%
90-180°	0 lm	0.0%
0-180°	1221 lm	100.0%

### BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	139 lm	11.4%
Medium(30-60°)	292 lm	23.9%
High(60-80°)	45 lm	3.7%
Very high(80-90°)	4 lm	0.3%
<b>Back light</b>		
Low(0-30°)	234 lm	19.2%
Medium(30-60°)	457 lm	37.4%
High(60-80°)	47 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

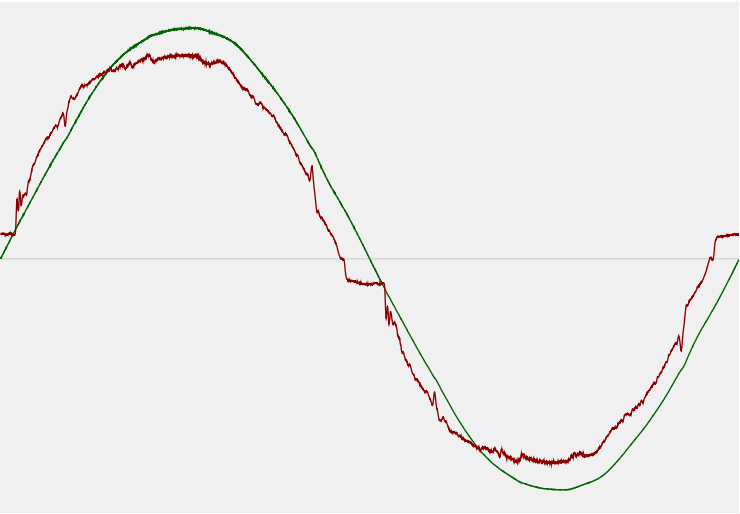
### Input Power

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 = $V_{RMS} * I_{RMS}$	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	33.8%
<div><div></div></div>	
Lumen efficiency	92 lm/W
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### Input Power Curve



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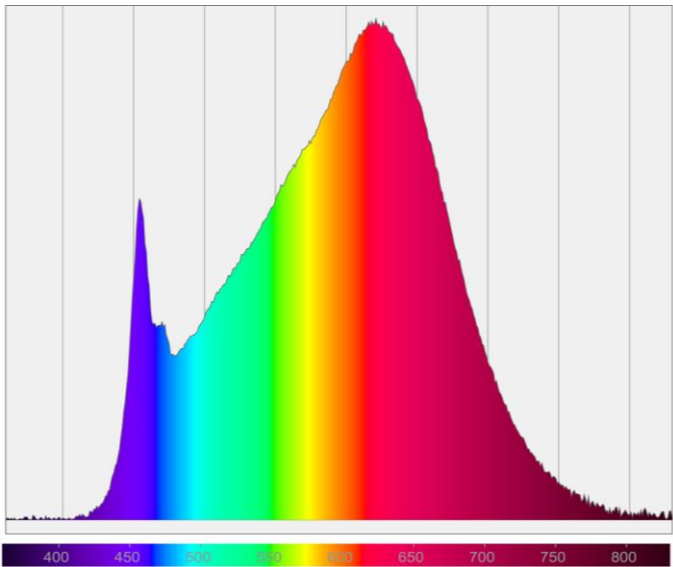
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## Color Measurements

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

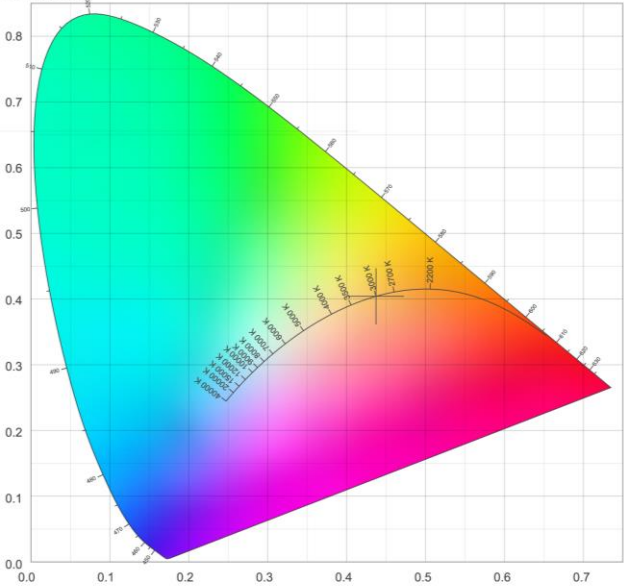
Correlated Color Temperature	CCT = 3000 K	Color coordinates CIE 1931	(x;y) = (0.437;0.404)
Color Rendering Index	CRI 94.1	Color coordinate CIEs 1960	(u;v) = (0.251;0.348)
Color Rendering Index, R9 (red component)	R9 = 68.6	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R <sub>f</sub>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

Goniophotometry Report

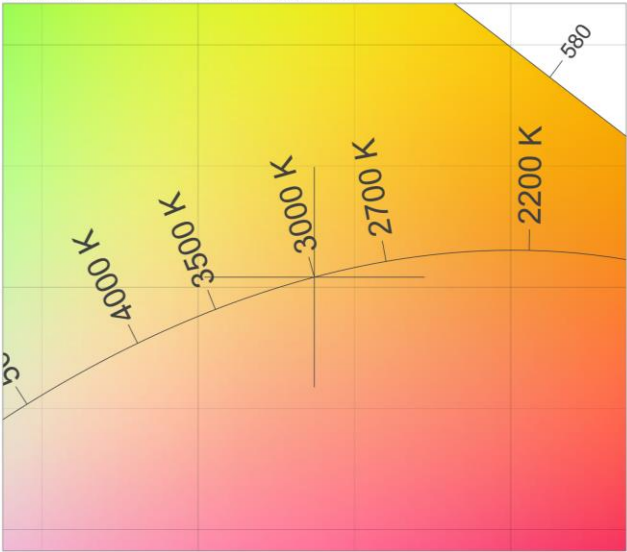
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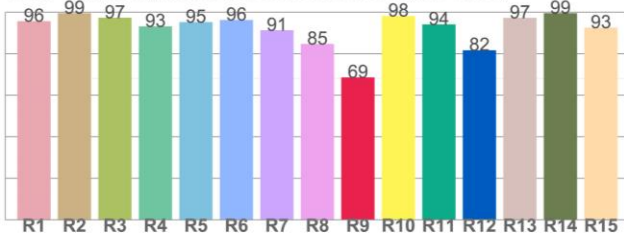
CIE 1931



CIE 1931 – zoomed on Planckian locus



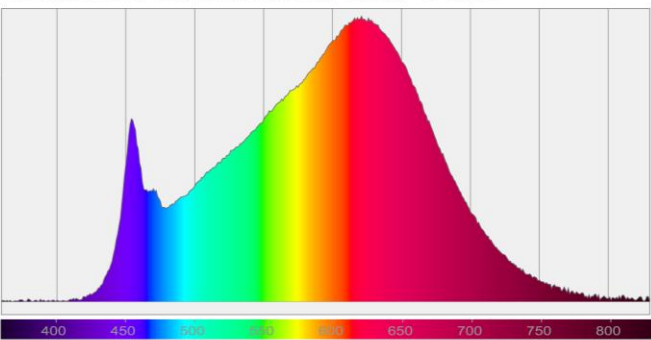
Color Rendering Index per reference color (CIE 1995)



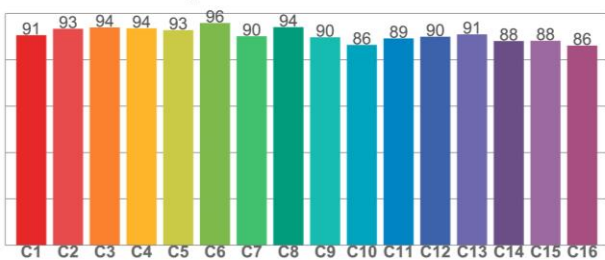
CRI R values, only R1-R8 are used to calculate final CRI value

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%



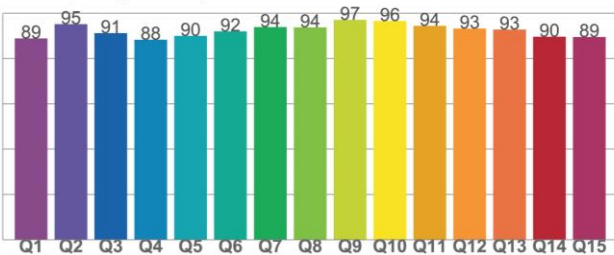
TM30-18 Rf-values per hue bin



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