

Tested Light Source - 1_PHOT_REFLEKTER-L-4300lmChip-3000K-21Deg-HoneycombLouvre_2303

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

32 planes – 11.25°

1°

3.00 m

41.3 W – PF 0.97 – DPF 0.97

243 V – 0.176 A

50.1 Hz

Main Light Measurement Results

Output

Efficiency

Peak Intensity and Beam Angle

Color Rendering Index

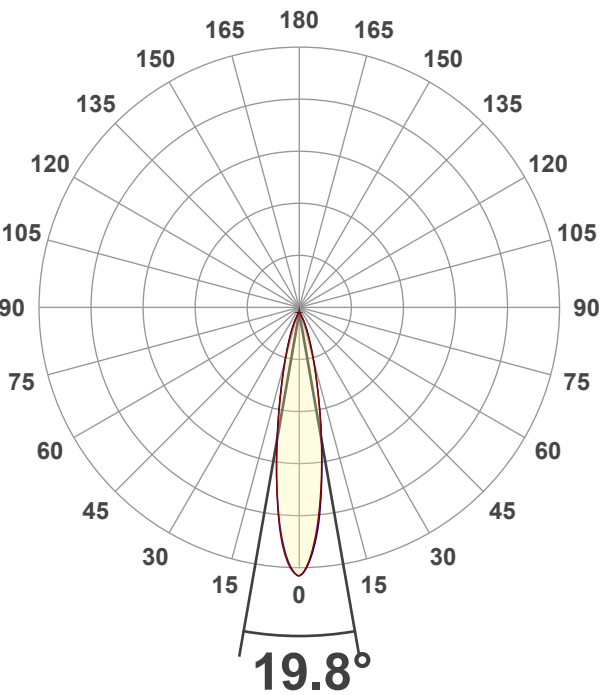
2614 lm

63 lm/W

14509 cd – 19.8°

CRI 92.7

Light Intensity Distribution



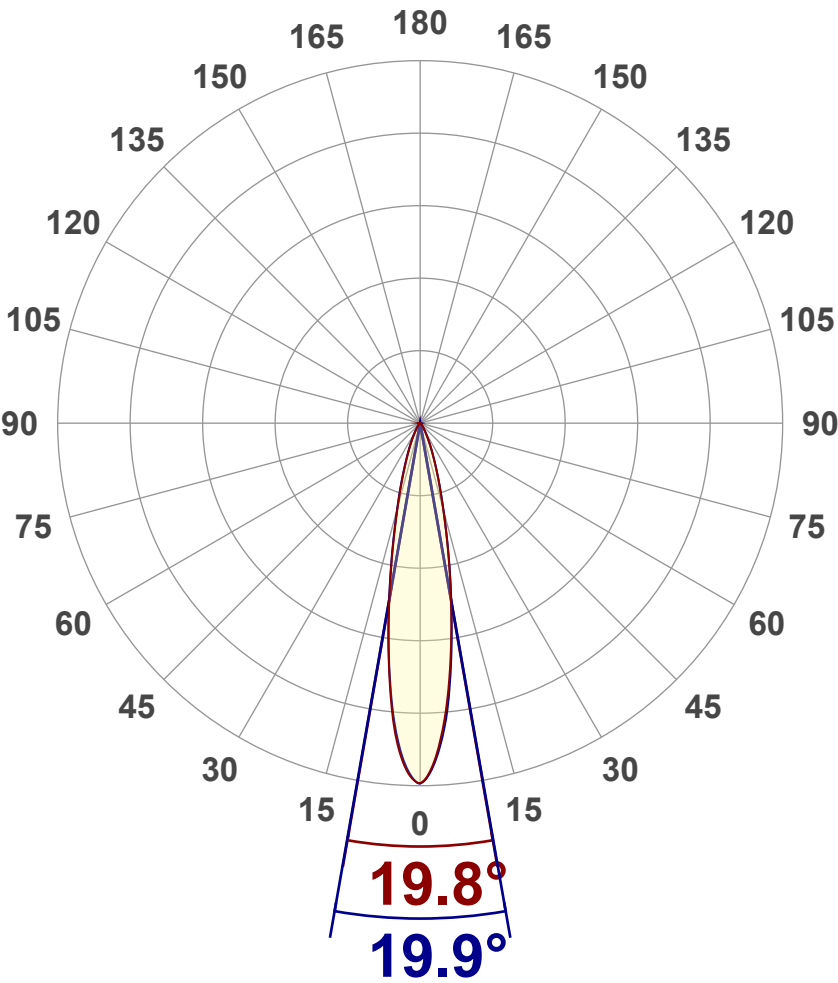
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2614 lm
Peak Intensity	14509 cd
Beam Angle (50%)	19.8°
Beam Angle (90%)	19.9°
Beam Angle (10%)	19.8°

Cut-off Angle

Average 2,5%	61.9°
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Field Angle

Average 10%	42.6°
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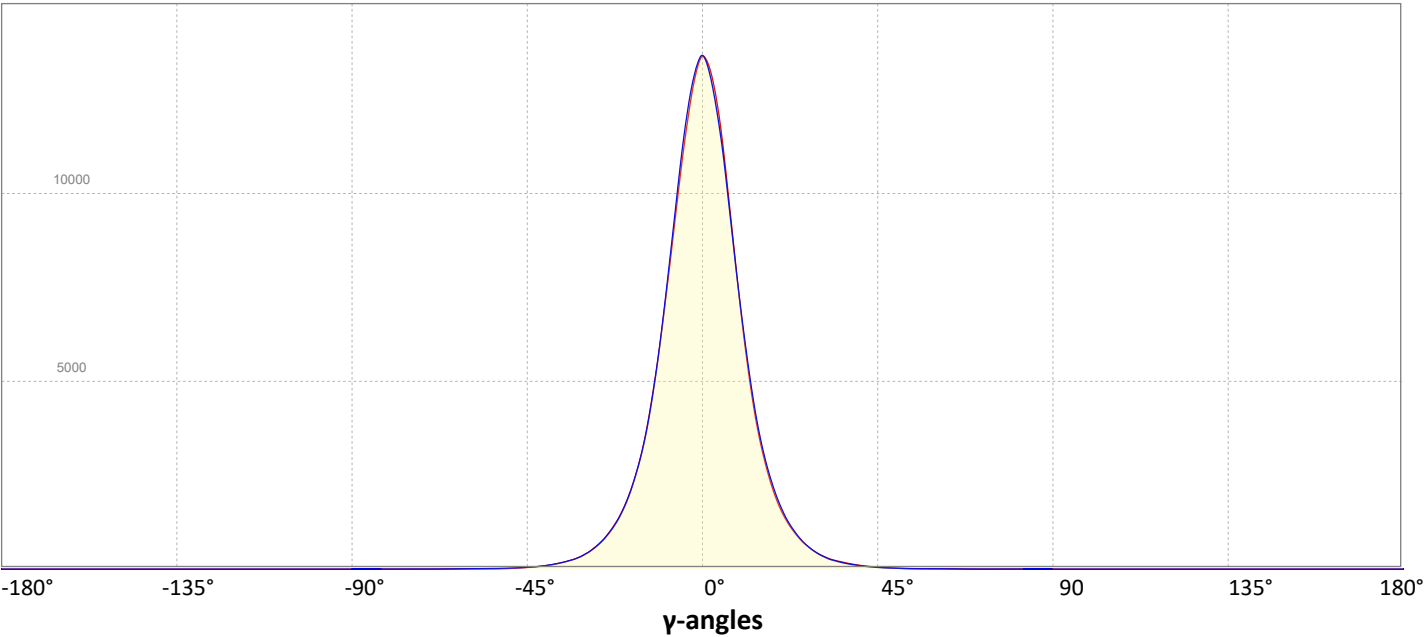
Intensity Ratio

In 120° cone	99.6%
In 90° cone	98.5%

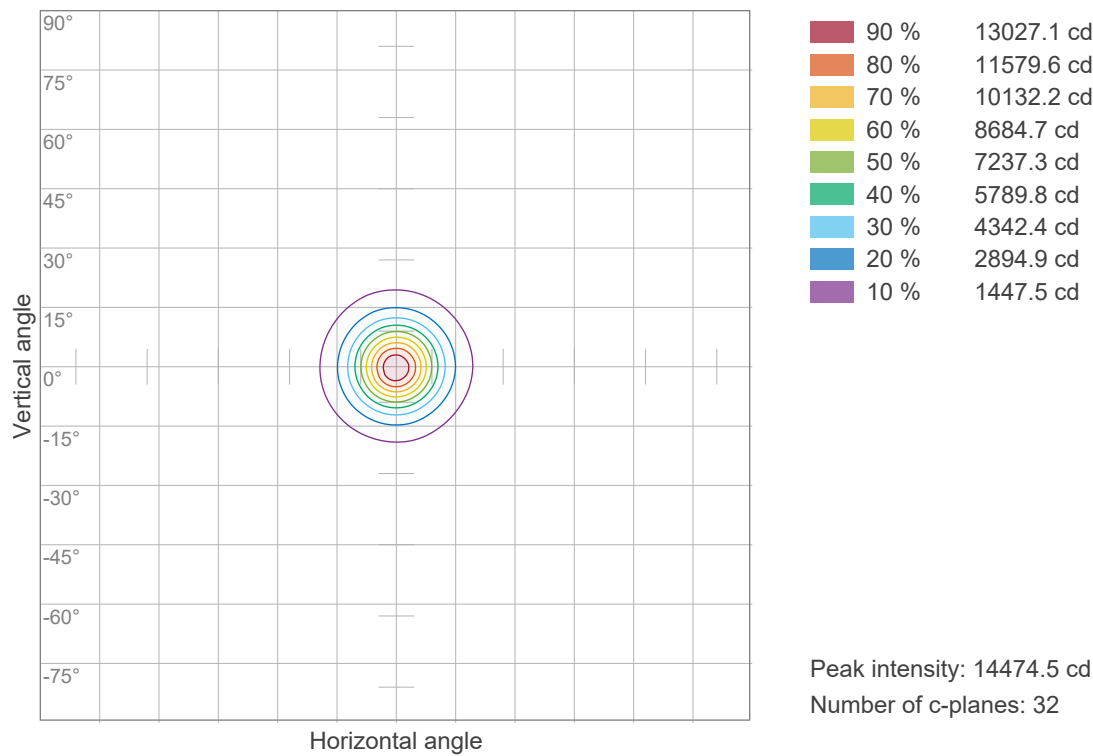
C000-C180

C090-C270

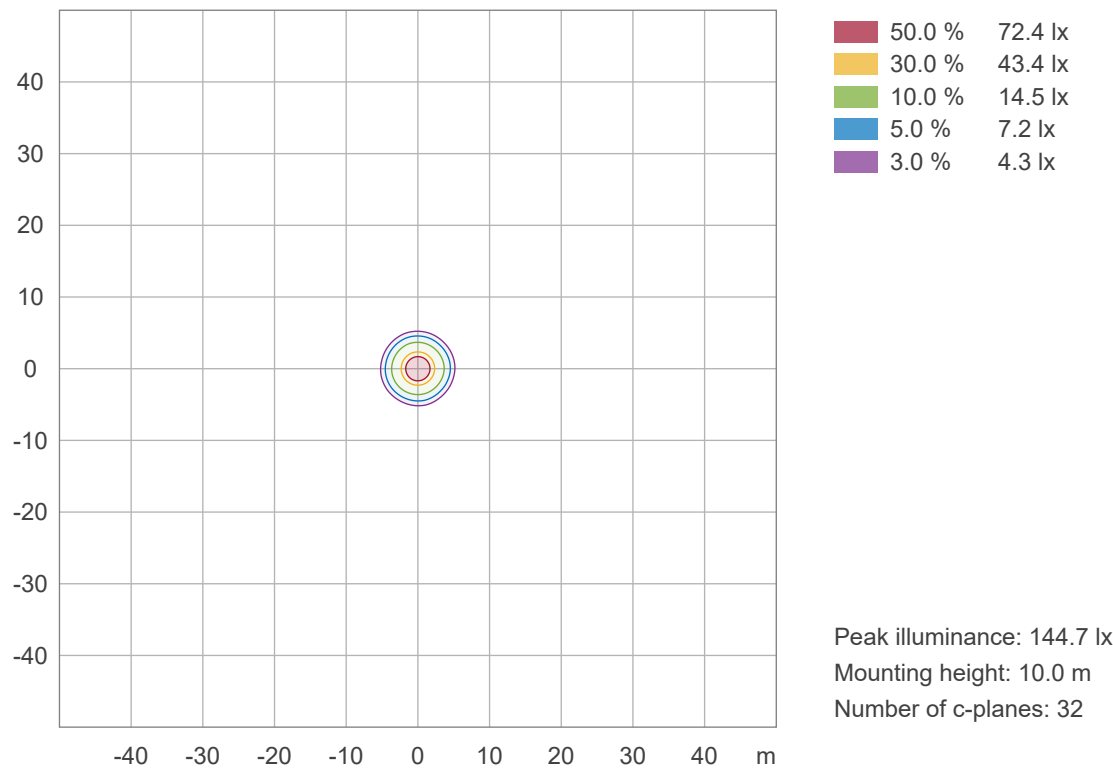
Linear distribution diagram - Intensity (candela) vs γ-angle



Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)

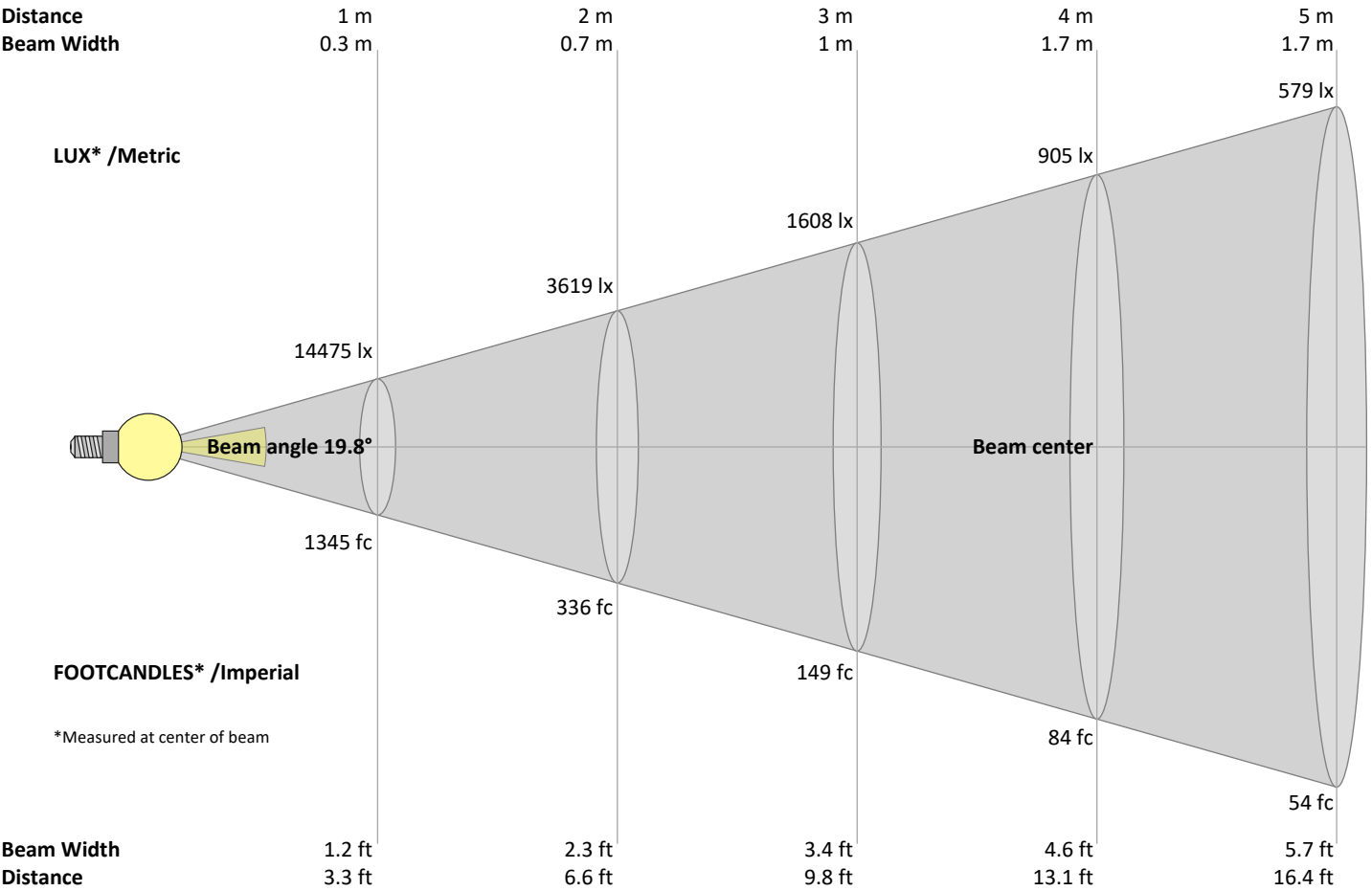


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Beam Details



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
14475	3619	1608	905	579	402	295	226	179	145	120	101	86	74	64	57	50	45	40	36	lux
1344.7	336.2	149.4	84	53.8	37.4	27.4	21	16.6	13.4	11.1	9.3	8	6.9	6	5.3	4.7	4.2	3.7	3.4	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
14.5K	13.8K	12.5K	10.8K	9.0K	7.1K	5.5K	4.2K	3.1K	2.4K	1.8K	1.4K	1.0K	0.8K	0.6K	0.4K	0.3K	0.2K	0.2K	0.1K	cd
100%	95%	86%	75%	62%	49%	38%	29%	22%	16%	12%	9%	7%	5%	4%	3%	2%	2%	1%	1%	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
14.5K	13.9K	12.7K	11.0K	9.1K	7.2K	5.5K	4.2K	3.2K	2.4K	1.8K	1.3K	1.0K	0.7K	0.6K	0.4K	0.3K	0.2K	0.2K	0.1K	cd
100%	96%	88%	76%	63%	50%	38%	29%	22%	16%	12%	9%	7%	5%	4%	3%	2%	2%	1%	1%	of 0°val

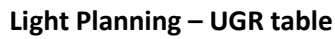
Intensities in 180° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
14.5K	14.1K	13.0K	11.2K	9.1K	7.1K	5.4K	4.0K	3.0K	2.3K	1.7K	1.3K	1.0K	0.7K	0.6K	0.4K	0.3K	0.2K	0.2K	0.2K	cd
100%	97%	90%	77%	63%	49%	37%	28%	21%	16%	12%	9%	7%	5%	4%	3%	2%	2%	1%	1%	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
14.5K	14.0K	12.8K	11.1K	9.1K	7.2K	5.5K	4.1K	3.1K	2.4K	1.8K	1.3K	1.0K	0.8K	0.6K	0.4K	0.3K	0.2K	0.2K	0.1K	cd
100%	97%	88%	77%	63%	50%	38%	28%	21%	16%	12%	9%	7%	5%	4%	3%	2%	2%	1%	1%	of 0°val

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Uncorrected, comprehensive UGR table according to 117-1995

[illegible]

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	115	113	111	109	113	111	109	107	107	105	104	103	102	101	100	99	98	96
2	111	107	104	102	109	106	103	101	103	100	98	100	98	96	97	96	94	93
3	107	103	99	96	106	101	98	95	99	96	94	97	94	92	94	93	91	90
4	104	98	94	91	102	97	94	91	95	92	90	94	91	89	92	90	88	87
5	101	95	91	88	99	94	90	87	92	89	86	91	88	86	89	87	85	84
6	98	91	87	84	97	91	87	84	89	86	83	88	85	83	87	84	82	81
7	95	88	84	81	94	88	84	81	87	83	81	86	83	80	85	82	80	79
8	92	86	82	79	91	85	81	78	84	81	78	83	80	78	83	80	78	77
9	90	83	79	76	89	83	79	76	82	78	76	81	78	76	81	78	75	75
10	88	81	77	74	87	81	77	74	80	76	74	79	76	74	79	76	74	73

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LAMPS (number of lamps)

[illegible]

Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	979 lm	37.5%
10-20°	1016 lm	38.9%
20-30°	414 lm	15.8%
30-40°	138 lm	5.3%
40-50°	42 lm	1.6%
50-60°	14 lm	0.5%
60-70°	6 lm	0.2%
70-80°	2 lm	0.1%
80-90°	3 lm	0.1%
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	2614 lm	100.0%

Intensity peaks

Max intensity	14509 cd
Intensity, 90°	0 cd
Intensity, 0°	14475 cd

Zonal Lumen summary

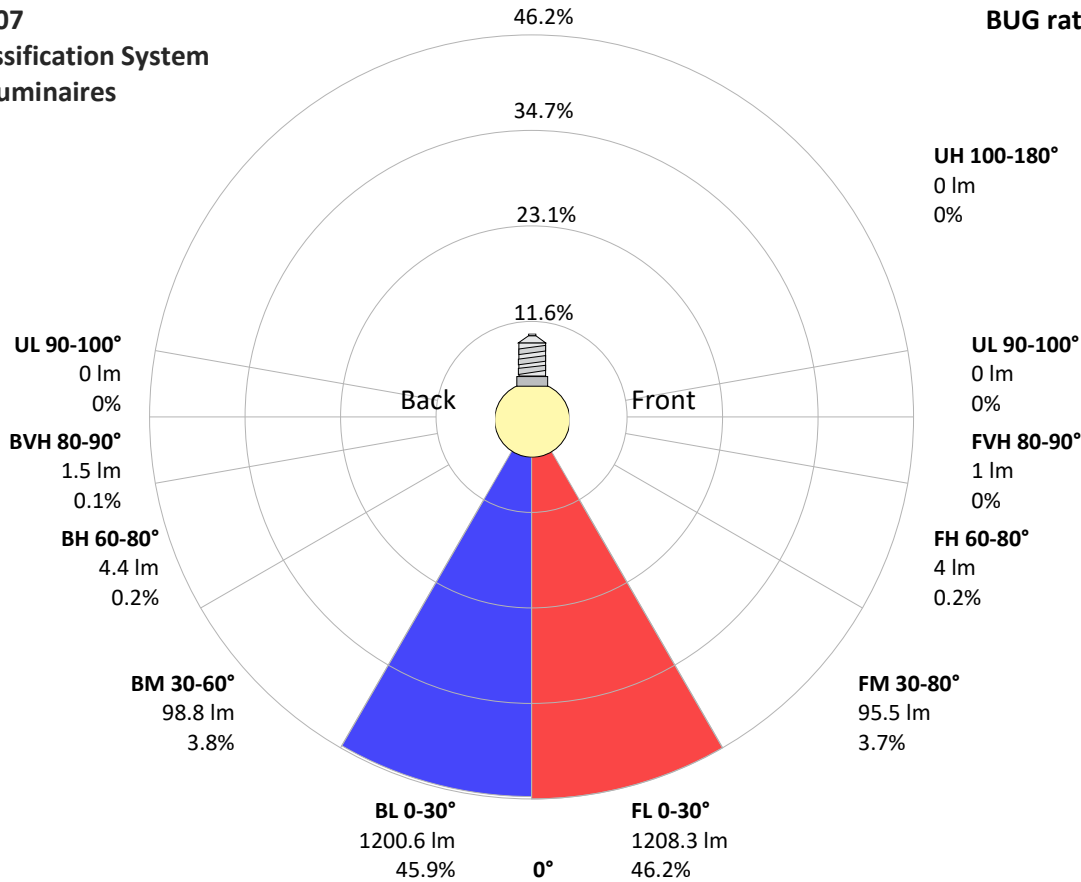
Zone (γ)	Lumen	% Total
0-30°	2409 lm	92.2%
0-40°	2548 lm	97.5%
0-60°	2603 lm	99.6%
60-90°	11 lm	0.4%
70-100°	5 lm	0.2%
90-120°	0 lm	0.0%
0-90°	2614 lm	100.0%
90-180°	0 lm	0.0%
0-180°	2614 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	1208 lm	46.2%
Medium(30-60°)	96 lm	3.7%
High(60-80°)	4 lm	0.2%
Very high(80-90°)	1 lm	0.0%
Back light		
Low(0-30°)	1201 lm	45.9%
Medium(30-60°)	99 lm	3.8%
High(60-80°)	4 lm	0.2%
Very high(80-90°)	2 lm	0.1%
Uplight		
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 B3 U1 G0



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Power Details

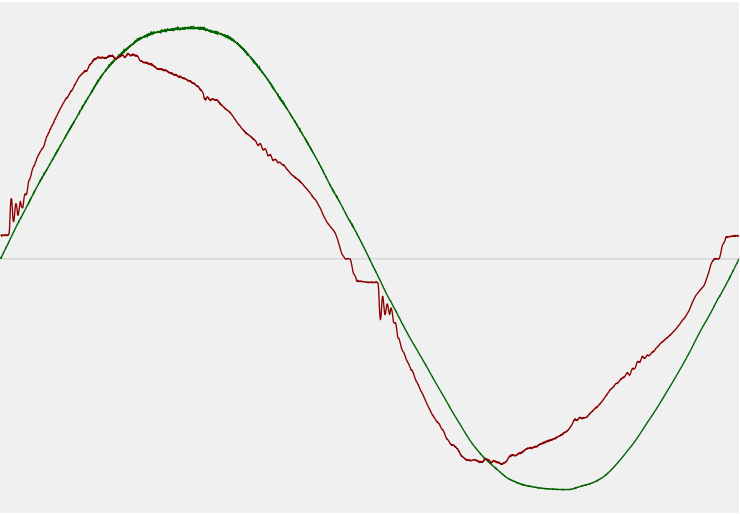
Input Power

Power feed to light source	41.3 W
Frequency of input power	50.1 Hz
RMS Input voltage feed, V_{RMS}	243 V
RMS Input current feed, I_{RMS}	0.176 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	42.77 VA
Displacement factor of AC power feed	0.97
Power factor of AC current feed	0.97
Total harmonic distortion of the current	11.09%
Total harmonic distortion of the voltage	1.38%

Efficiency

Radiated power efficiency	22.9%
Lumen efficiency	63 lm/W

Input Power Curve



Goniophotometry Report

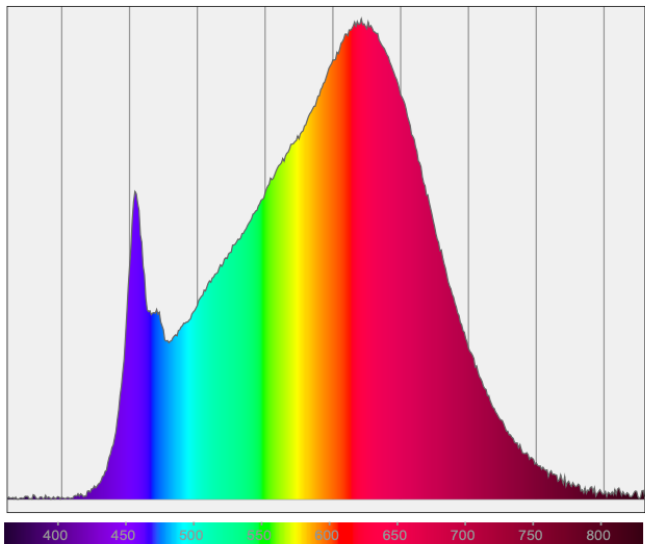
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Color Measurements

Correlated Color Temperature	CCT = 3000 K
Color Rendering TM30-18	R _f 91.0 — R _g 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 _f 91.0 — R _g 97.7	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.251;0.251)
Color Quality Scale	CQS = 91.8		

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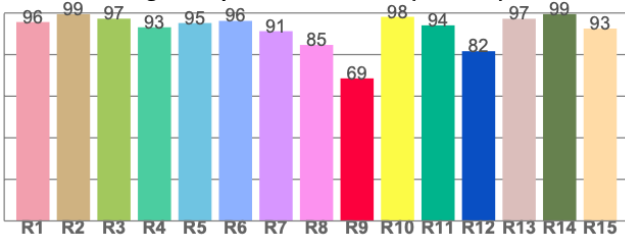
CIE 1931



CIE 1931 – zoomed on Planckian locus



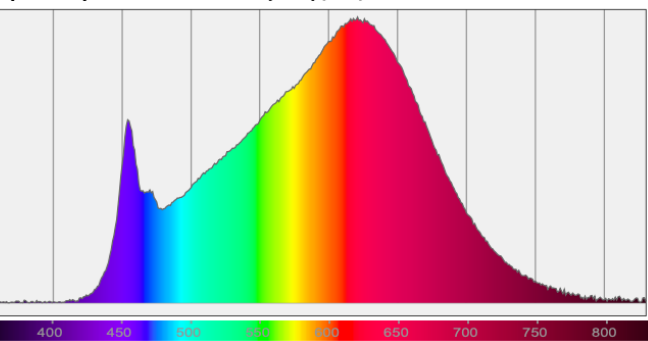
Color Rendering Index per reference color (CIE 1995)



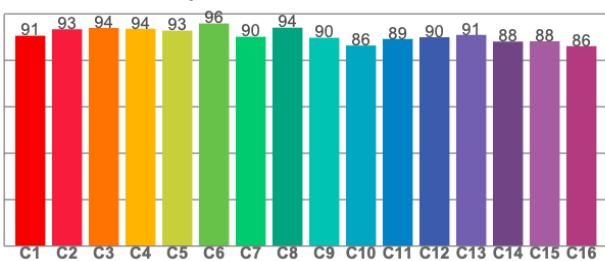
CRI R values, only R1-R8 are used to calculate final CRI value

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%



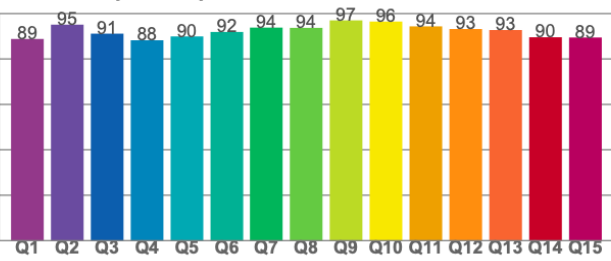
TM30-18 Rf-values per hue bin



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