

Goniophotometry Report

1_PHOT_REFLEKTER-L-4300lmChip-3000K-38Deg_2303
www.factorylux.com



Tested Light Source - 1_PHOT_REFLEKTER-L-4300lmChip-3000K-38Deg_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

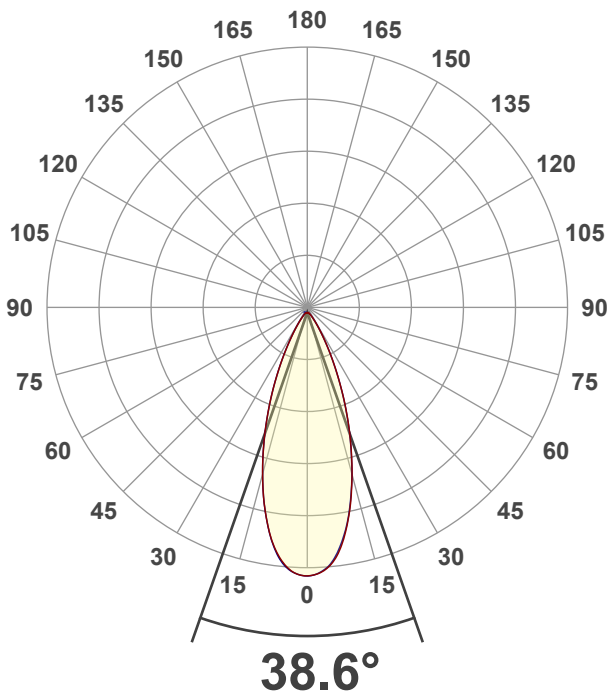
32 planes – 11.25°
1.5°
3.00 m
41.3 W – PF 0.97 – DPF 0.97
242 V – 0.177 A
50 Hz

Main Light Measurement Results

Output
Efficiency
Peak Intensity and Beam Angle
Color Rendering Index

3614 lm
87 lm/W
6918 cd – 38.6°
CRI 92.6

Light Intensity Distribution



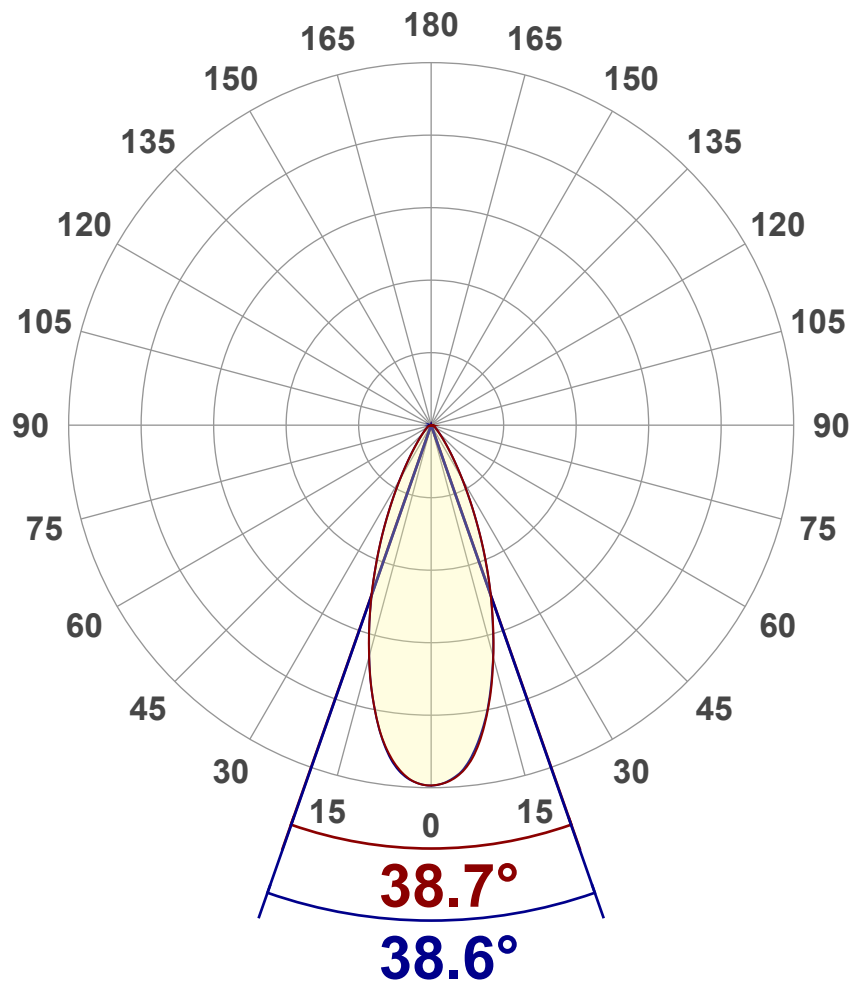
Goniophotometry Report

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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	3614 lm
Peak Intensity	6918 cd
Beam Angle (50%)	38.6°
Beam Angle (90%)	38.6°
Beam Angle (10%)	38.6°

Cut-off Angle

Average 2,5%	97.1°
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Field Angle

Average 10%	68.9°
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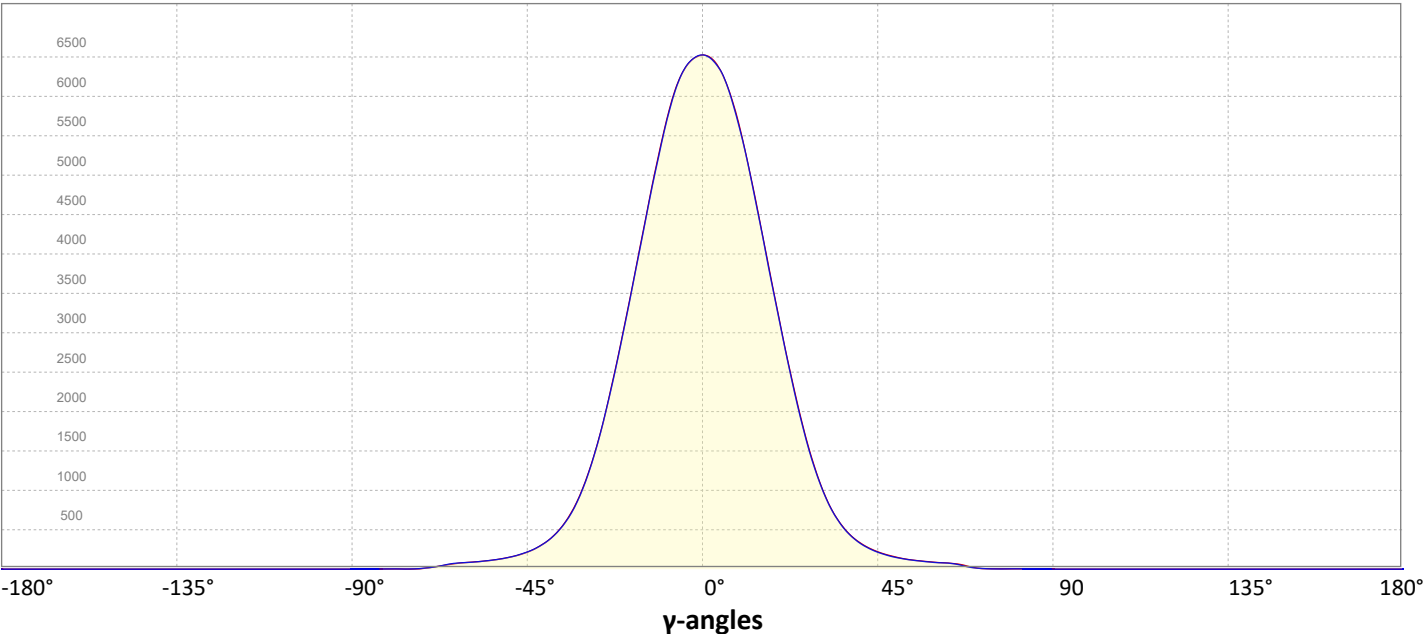
Intensity Ratio

In 120° cone	98.1%
In 90° cone	93.1%

C000-C180

C090-C270

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

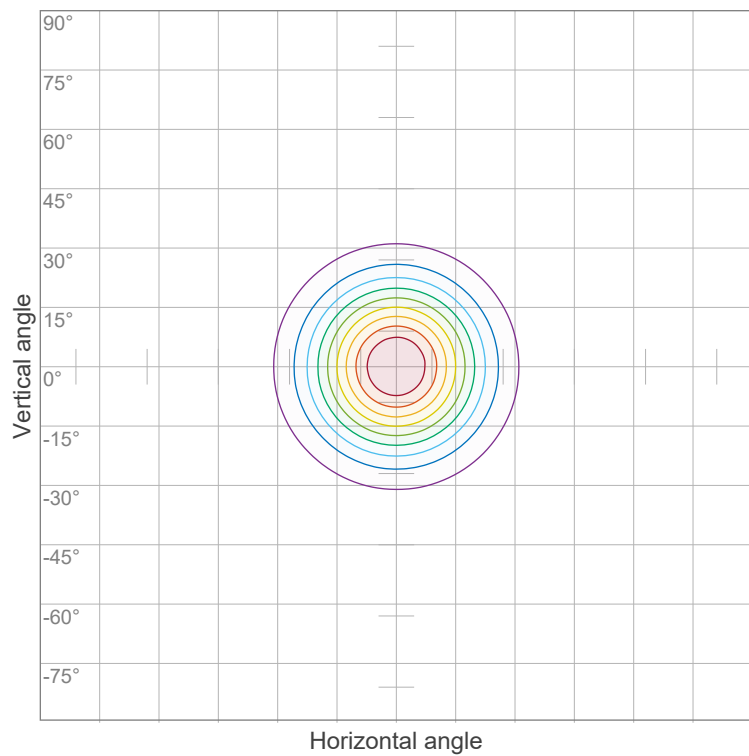


Goniophotometry Report

1_PHOT_REFLEKTER-L-4300lmChip-3000K-38Deg_2303
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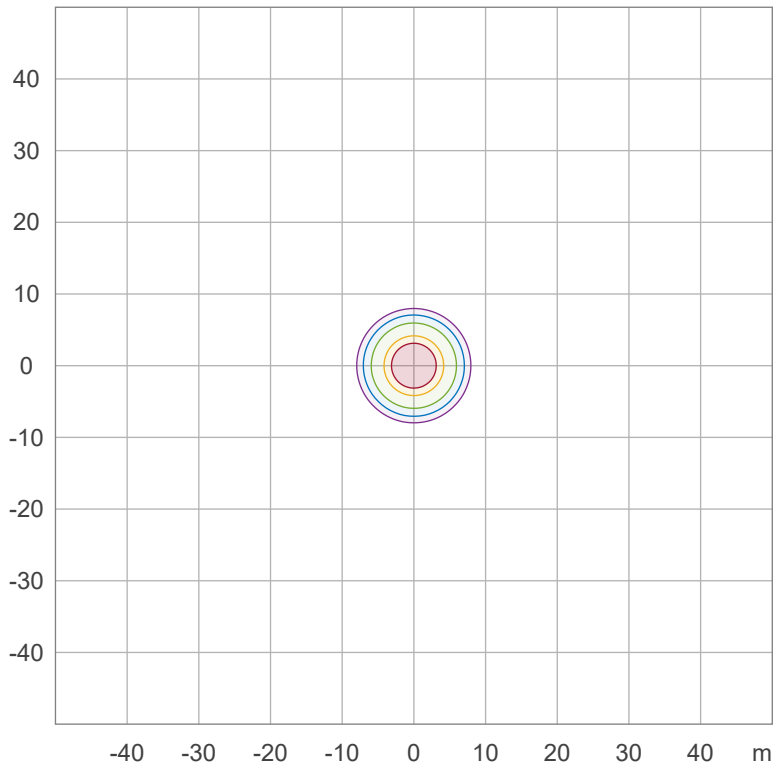
Iso-intensity Diagram (Iso-candela)



90 %	6223.5 cd
80 %	5532.0 cd
70 %	4840.5 cd
60 %	4149.0 cd
50 %	3457.5 cd
40 %	2766.0 cd
30 %	2074.5 cd
20 %	1383.0 cd
10 %	691.5 cd

Peak intensity: 6915.0 cd
Number of c-planes: 32

Iso-illuminance Diagram (Iso-lux)



50.0 %	34.6 lx
30.0 %	20.7 lx
10.0 %	6.9 lx
5.0 %	3.5 lx
3.0 %	2.1 lx

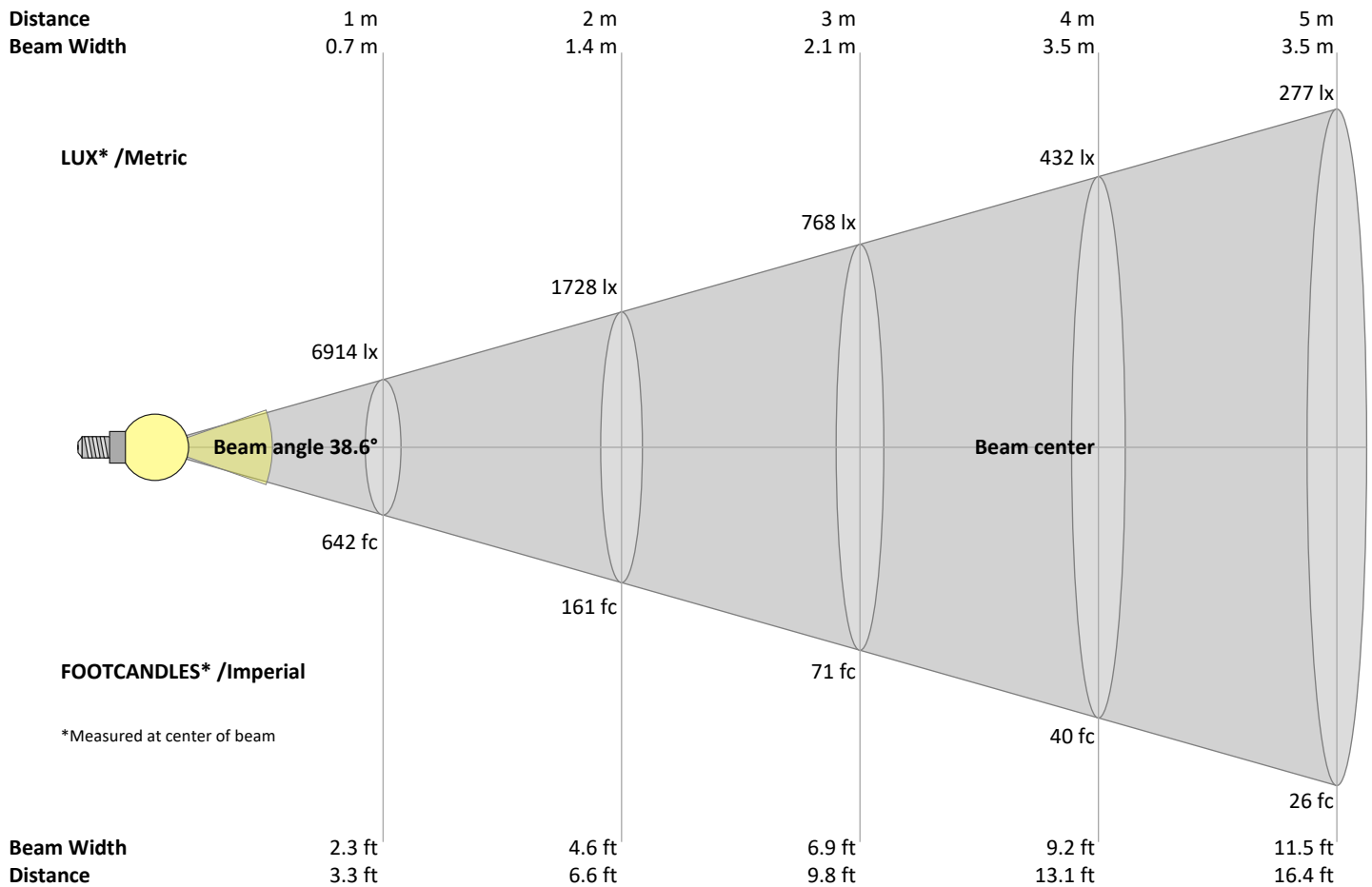
Peak illuminance: 69.1 lx
Mounting height: 10.0 m
Number of c-planes: 32

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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
6914	1728	768	432	277	192	141	108	85	69	57	48	41	35	31	27	24	21	19	17	lux
642.3	160.6	71.4	40.1	25.7	17.8	13.1	10	7.9	6.4	5.3	4.5	3.8	3.3	2.9	2.5	2.2	2	1.8	1.6	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
6914	6876	6776	6581	6275	5869	5392	4875	4346	3808	3289	2781	2313	1879	1506	1196	937	736	582	463	cd
100%	99%	98%	95%	91%	85%	78%	71%	63%	55%	48%	40%	33%	27%	22%	17%	14%	11%	8%	7%	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
6914	6875	6753	6544	6226	5828	5367	4853	4325	3791	3275	2770	2295	1866	1493	1181	923	726	570	454	cd
100%	99%	98%	95%	90%	84%	78%	70%	63%	55%	47%	40%	33%	27%	22%	17%	13%	10%	8%	7%	of 0°val

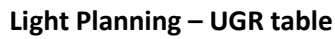
Intensities in 180° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
6914	6883	6760	6548	6242	5842	5374	4871	4337	3805	3286	2783	2314	1883	1509	1187	930	729	574	459	cd
100%	100%	98%	95%	90%	84%	78%	70%	63%	55%	48%	40%	33%	27%	22%	17%	13%	11%	8%	7%	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
6914	6880	6779	6575	6261	5851	5372	4862	4327	3798	3275	2772	2306	1874	1503	1187	927	728	578	459	cd
100%	100%	98%	95%	91%	85%	78%	70%	63%	55%	47%	40%	33%	27%	22%	17%	13%	11%	8%	7%	of 0°val

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[illegible]

n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a

UGR data could not be calculated due to missing/wrong symmetry. Goto Edit->Photometric->Corrections and select Correct asymmetry.

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	114	111	109	106	111	109	107	105	105	103	102	101	100	99	98	97	96	94
2	108	104	100	97	106	102	98	96	99	96	93	96	93	91	93	91	90	88
3	103	97	92	89	101	96	92	88	93	90	87	91	88	85	89	86	84	82
4	99	91	86	82	97	90	85	82	88	84	81	86	83	80	84	81	79	77
5	94	86	81	77	93	85	80	76	84	79	76	82	78	75	80	77	74	73
6	90	82	76	72	89	81	76	72	79	75	71	78	74	71	77	73	70	69
7	86	78	72	68	85	77	72	68	76	71	67	74	70	67	73	70	67	65
8	83	74	68	64	81	73	68	64	72	67	64	71	67	64	70	66	63	62
9	79	70	65	61	78	70	65	61	69	64	61	68	64	61	67	63	60	59
10	76	67	62	58	75	67	62	58	66	61	58	65	61	58	65	61	58	57

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LAMPS (number of lamps)

[illegible]

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	611 lm	16.9%
10-20°	1261 lm	34.9%
20-30°	959 lm	26.5%
30-40°	424 lm	11.7%
40-50°	184 lm	5.1%
50-60°	104 lm	2.9%
60-70°	61 lm	1.7%
70-80°	7 lm	0.2%
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	3614 lm	100.0%

Intensity peaks

Max intensity	6918 cd
Intensity, 90°	0 cd
Intensity, 0°	6914 cd

Zonal Lumen summary

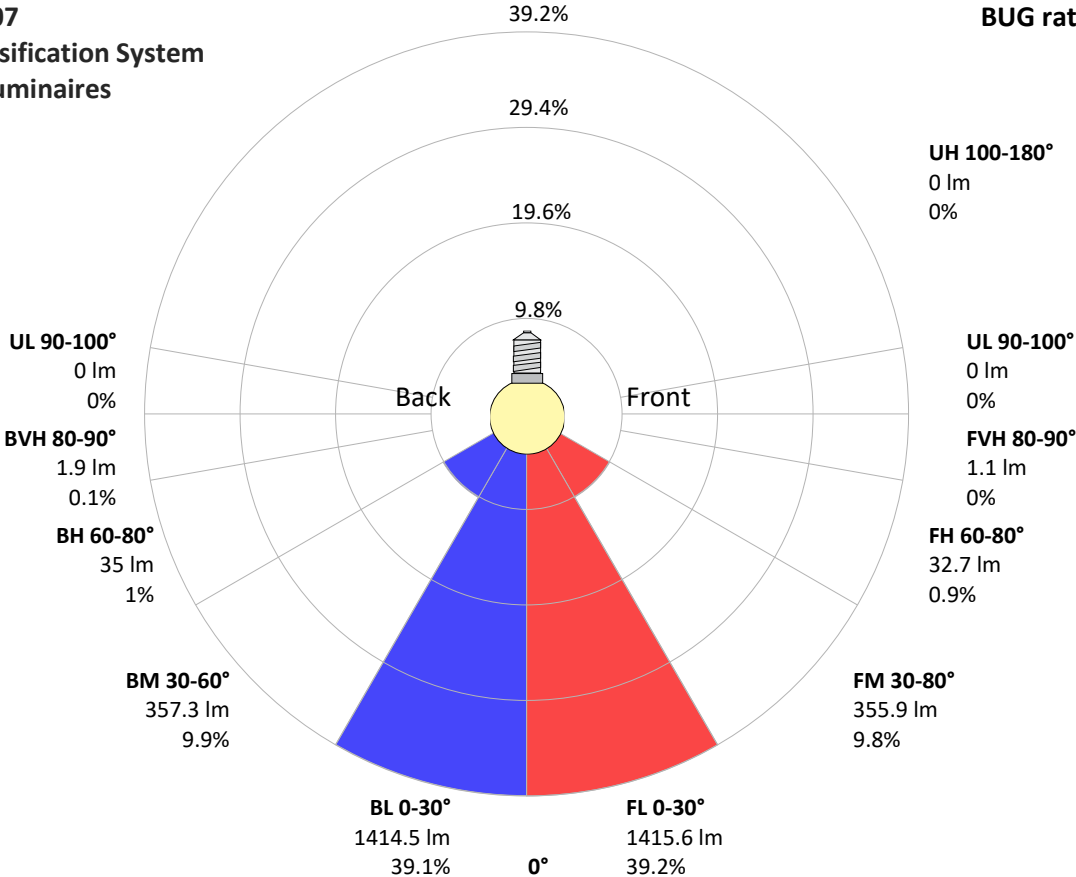
Zone (γ)	Lumen	% Total
0-30°	2831 lm	78.3%
0-40°	3255 lm	90.1%
0-60°	3544 lm	98.1%
60-90°	70 lm	1.9%
70-100°	10 lm	0.3%
90-120°	0 lm	0.0%
0-90°	3614 lm	100.0%
90-180°	0 lm	0.0%
0-180°	3614 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	1416 lm	39.2%
Medium(30-60°)	356 lm	9.8%
High(60-80°)	33 lm	0.9%
Very high(80-90°)	1 lm	0.0%
Back light		
Low(0-30°)	1415 lm	39.1%
Medium(30-60°)	357 lm	9.9%
High(60-80°)	35 lm	1.0%
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

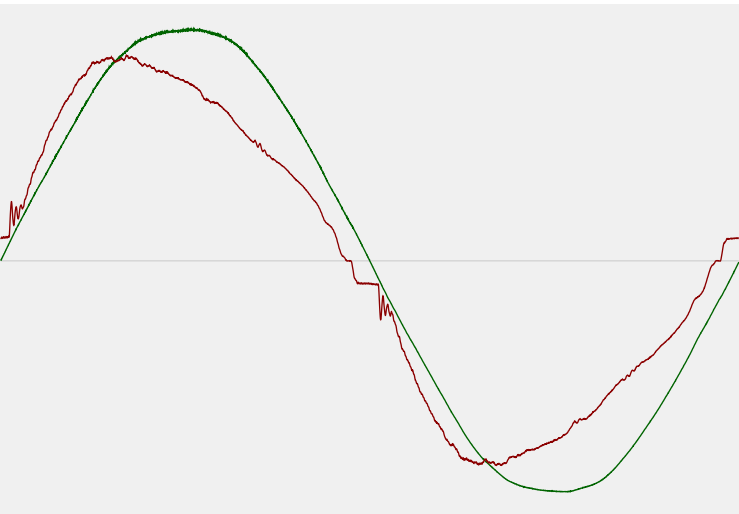
Input Power

Power feed to light source	41.3 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	242 V
RMS Input current feed, I_{RMS}	0.177 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	42.78 VA
Displacement factor of AC power feed	0.97
Power factor of AC current feed	0.97
Total harmonic distortion of the current	11.22%
Total harmonic distortion of the voltage	1.42%

Efficiency

Radiated power efficiency	31.7%
<div><div></div></div>	
Lumen efficiency	87 lm/W
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Input Power Curve



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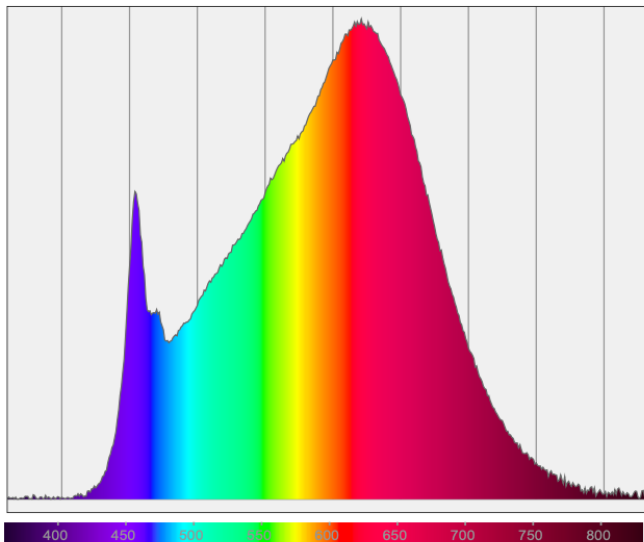
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Color Measurements

Correlated Color Temperature	CCT = 3000 K
Color Rendering TM30-18	R _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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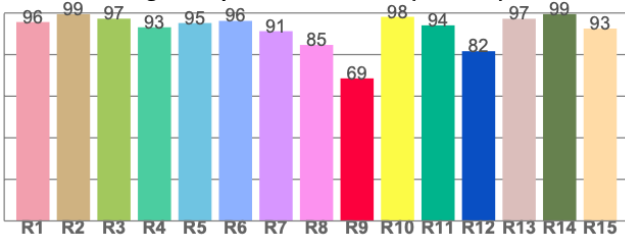
CIE 1931



CIE 1931 – zoomed on Planckian locus



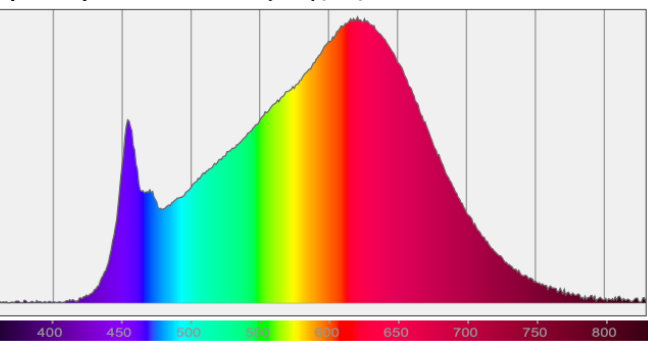
Color Rendering Index per reference color (CIE 1995)



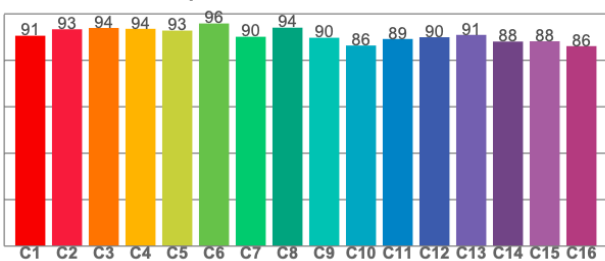
CRI R values, only R1-R8 are used to calculate final CRI value

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%



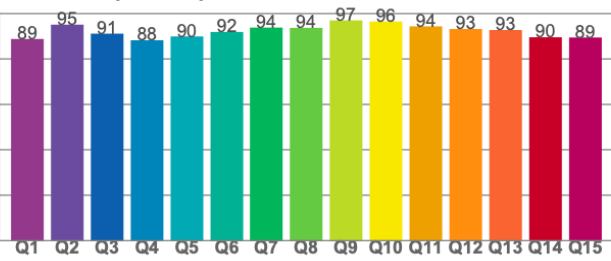
TM30-18 Rf-values per hue bin



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