

Tested Light Source - 1_PHOT_REFLEKTER-XL-4300lmChip-3000K-38Deg-HoneycombLouvre_2303

Laboratory and Equipment

Laboratory Owner and Location	Factorylux, Greenhill Mills, Hebden Bridge, HX7 5QF, UK
Goniospectrometer System and Type	BaseSpion – Type C, horizontal
Spectrometer Manufacturer and Model	Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

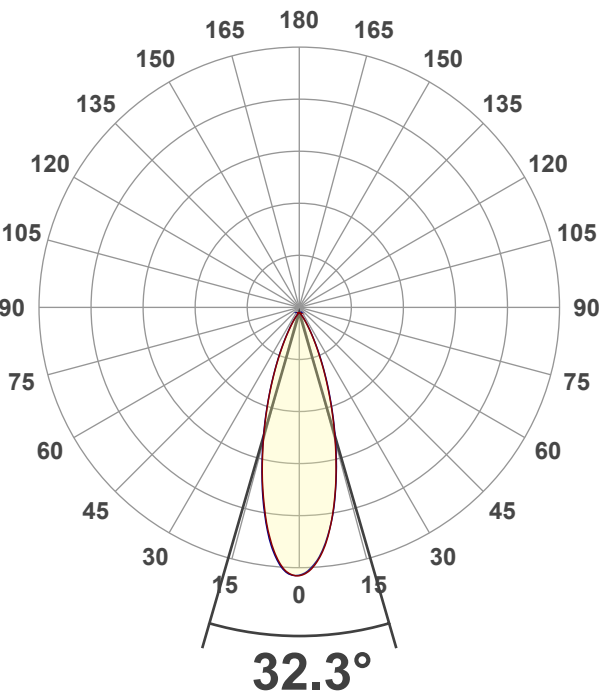
Measurement Conditions

Number of C-planes and Resolution	32 planes – 11.25°
γ (gamma)-Resolution	1.5°
Test Distance	4.50 m
Input Power, Power and Displ. Factors	41.5 W – PF 0.97 – DPF 0.97
Input RMS Voltage and Current	241 V – 0.178 A
Frequency of Input Power	50 Hz

Main Light Measurement Results

Output	2316 lm
Efficiency	56 lm/W
Peak Intensity and Beam Angle	6328 cd – 32.3°
Color Rendering Index	CRI 92.7

Light Intensity Distribution



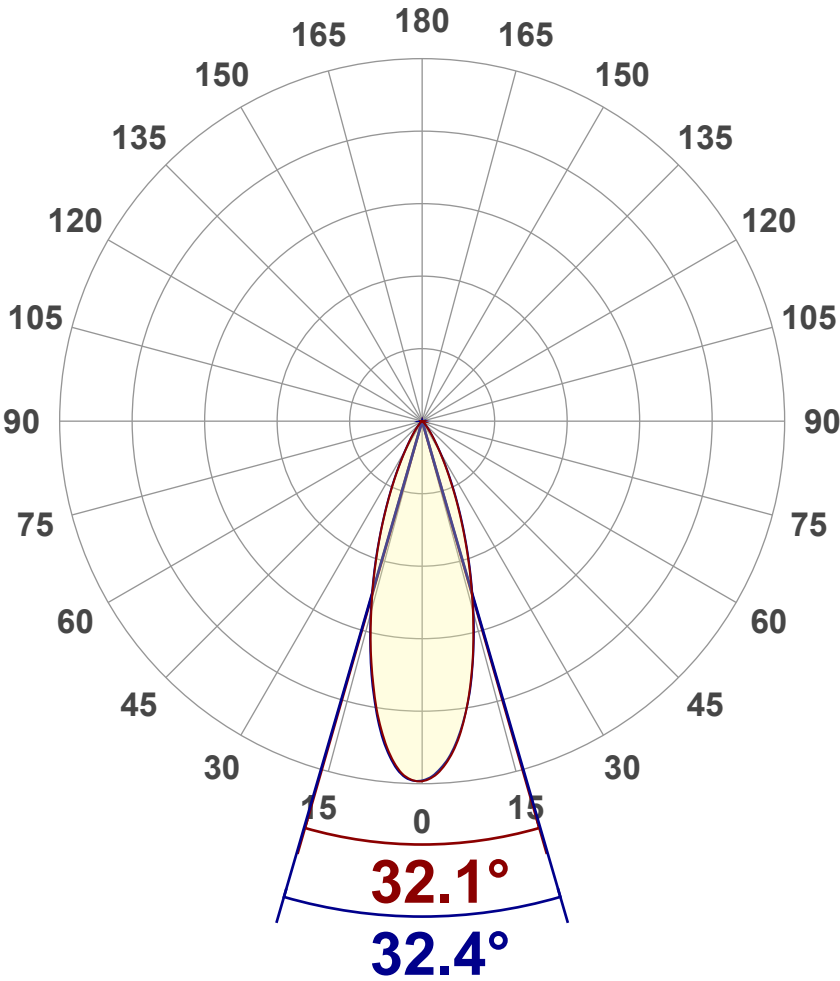
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2316 lm
Peak Intensity	6328 cd
Beam Angle (50%)	32.3°
Beam Angle (90%)	32.4°
Beam Angle (10%)	32°

Cut-off Angle

Average 2,5%	77.5°
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Field Angle

Average 10%	59.6°
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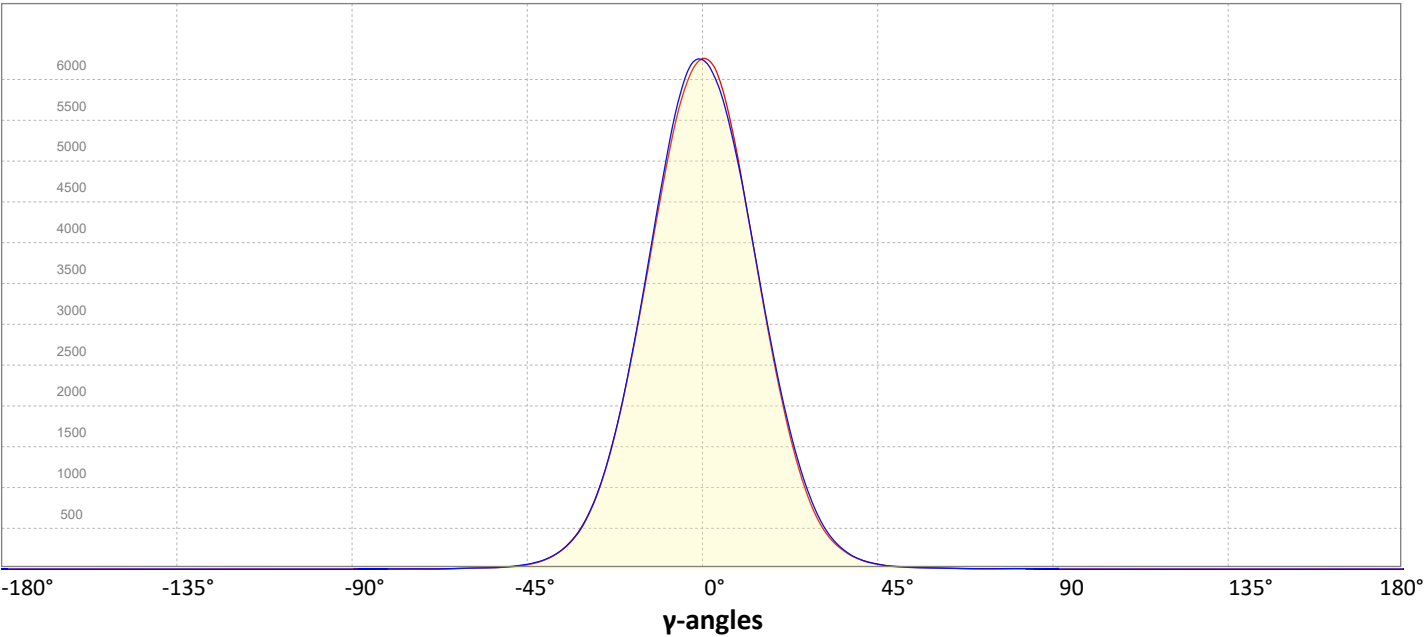
Intensity Ratio

In 120° cone	99.3%
In 90° cone	97.8%

C000-C180

C090-C270

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

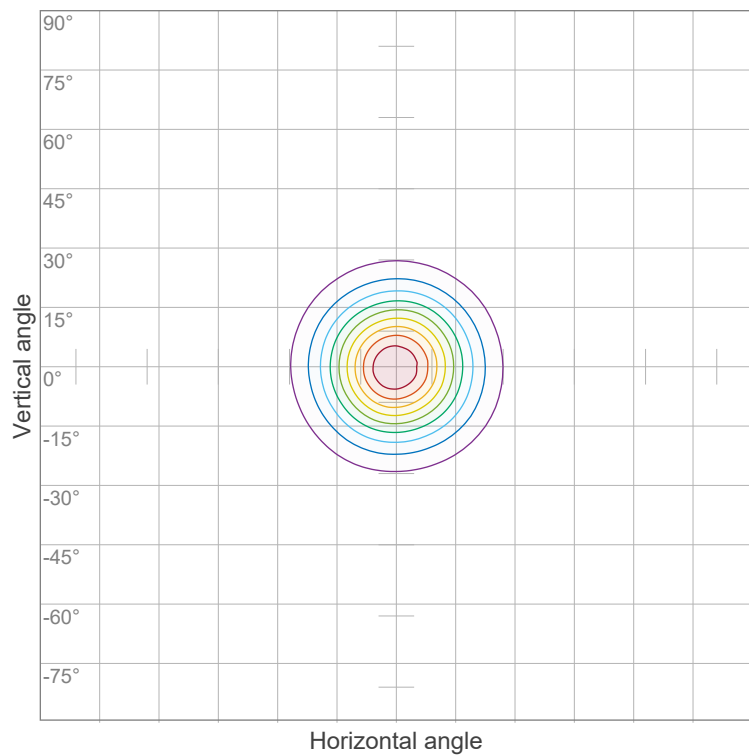


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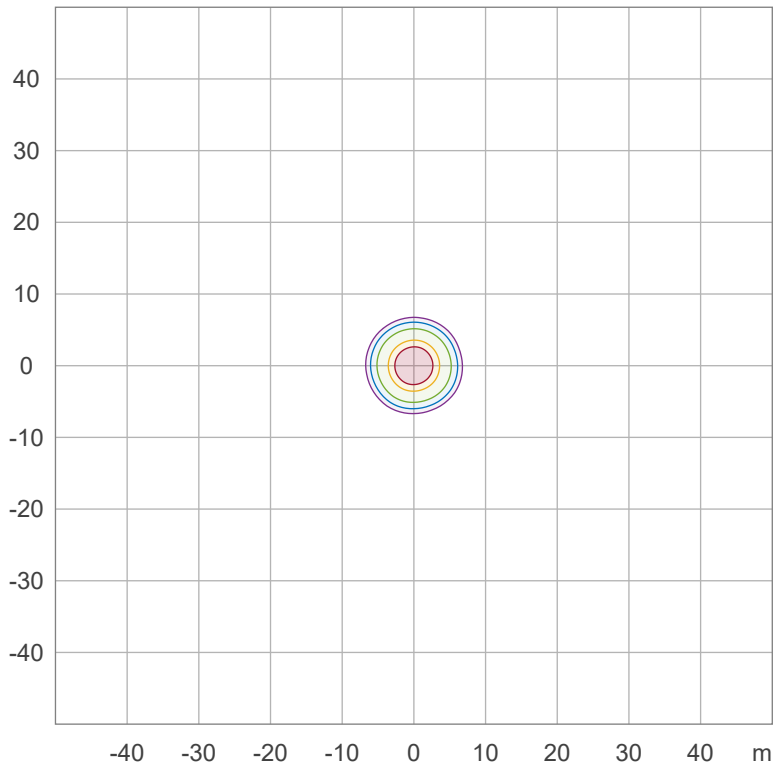
Iso-intensity Diagram (Iso-candela)



90 %	5692.4 cd
80 %	5059.9 cd
70 %	4427.4 cd
60 %	3795.0 cd
50 %	3162.5 cd
40 %	2530.0 cd
30 %	1897.5 cd
20 %	1265.0 cd
10 %	632.5 cd

Peak intensity: 6324.9 cd
Number of c-planes: 32

Iso-illuminance Diagram (Iso-lux)



50.0 %	31.6 lx
30.0 %	19.0 lx
10.0 %	6.3 lx
5.0 %	3.2 lx
3.0 %	1.9 lx

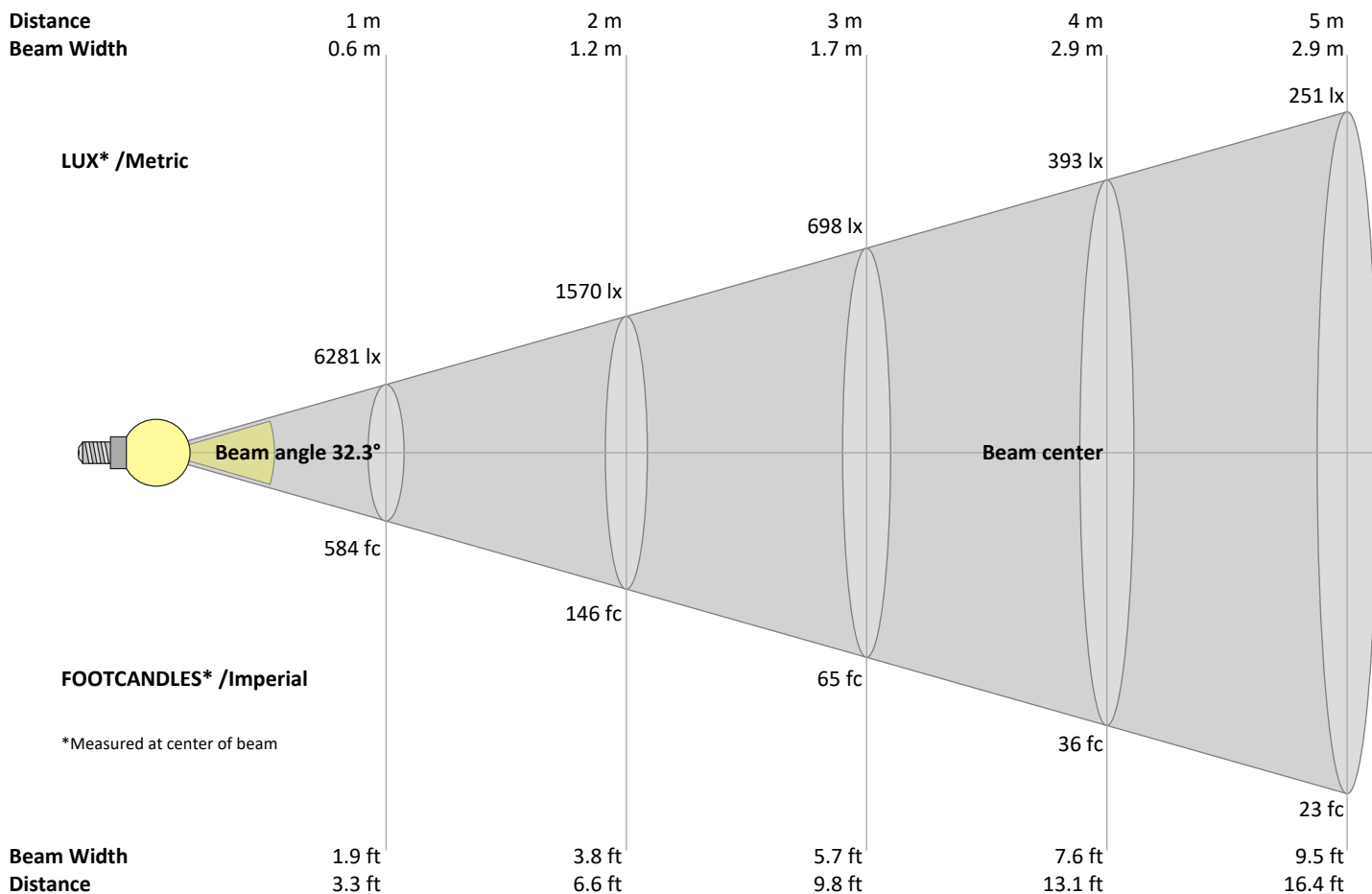
Peak illuminance: 63.2 lx
Mounting height: 10.0 m
Number of c-planes: 32

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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
6281	1570	698	393	251	174	128	98	78	63	52	44	37	32	28	25	22	19	17	16	lux
583.5	145.9	64.8	36.5	23.3	16.2	11.9	9.1	7.2	5.8	4.8	4.1	3.5	3	2.6	2.3	2	1.8	1.6	1.5	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
6281	6186	5983	5669	5258	4767	4241	3688	3161	2652	2180	1758	1385	1069	814	611	453	333	243	173	cd
100%	98%	95%	90%	84%	76%	68%	59%	50%	42%	35%	28%	22%	17%	13%	10%	7%	5%	4%	3%	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
6281	6159	5950	5643	5242	4788	4261	3729	3188	2687	2215	1799	1428	1106	846	628	463	340	248	180	cd
100%	98%	95%	90%	83%	76%	68%	59%	51%	43%	35%	29%	23%	18%	13%	10%	7%	5%	4%	3%	of 0°val

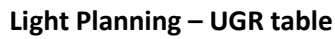
Intensities in 180° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
6281	6242	6064	5750	5319	4809	4267	3712	3162	2644	2169	1733	1363	1043	782	579	426	317	236	172	cd
100%	99%	97%	92%	85%	77%	68%	59%	50%	42%	35%	28%	22%	17%	12%	9%	7%	5%	4%	3%	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
6281	6250	6101	5790	5369	4858	4311	3745	3191	2673	2186	1758	1382	1070	809	601	444	327	240	177	cd
100%	100%	97%	92%	85%	77%	69%	60%	51%	43%	35%	28%	22%	17%	13%	10%	7%	5%	4%	3%	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	112	110	108	112	110	108	106	106	104	103	102	101	100	99	98	97	95
2	110	106	102	99	108	104	101	98	101	98	96	98	96	94	95	94	92	91
3	105	100	96	93	104	99	95	92	96	93	90	94	91	89	92	90	88	86
4	101	95	91	87	100	94	90	87	92	88	86	90	87	85	88	86	84	82
5	98	91	86	82	96	90	85	82	88	84	81	87	83	81	85	82	80	79
6	94	87	82	78	93	86	81	78	84	80	77	83	80	77	82	79	76	75
7	91	83	78	75	89	82	78	74	81	77	74	80	76	74	79	76	73	72
8	87	80	75	71	86	79	74	71	78	74	71	77	73	71	76	73	70	69
9	84	76	72	68	83	76	71	68	75	71	68	74	71	68	74	70	68	67
10	81	74	69	66	81	73	69	66	72	68	65	72	68	65	71	68	65	64

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	527 lm	22.8%
10-20°	942 lm	40.7%
20-30°	573 lm	24.7%
30-40°	190 lm	8.2%
40-50°	50 lm	2.2%
50-60°	17 lm	0.7%
60-70°	8 lm	0.3%
70-80°	4 lm	0.2%
80-90°	5 lm	0.2%
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	2316 lm	100.0%

Intensity peaks

Max intensity	6328 cd
Intensity, 90°	0 cd
Intensity, 0°	6281 cd

Zonal Lumen summary

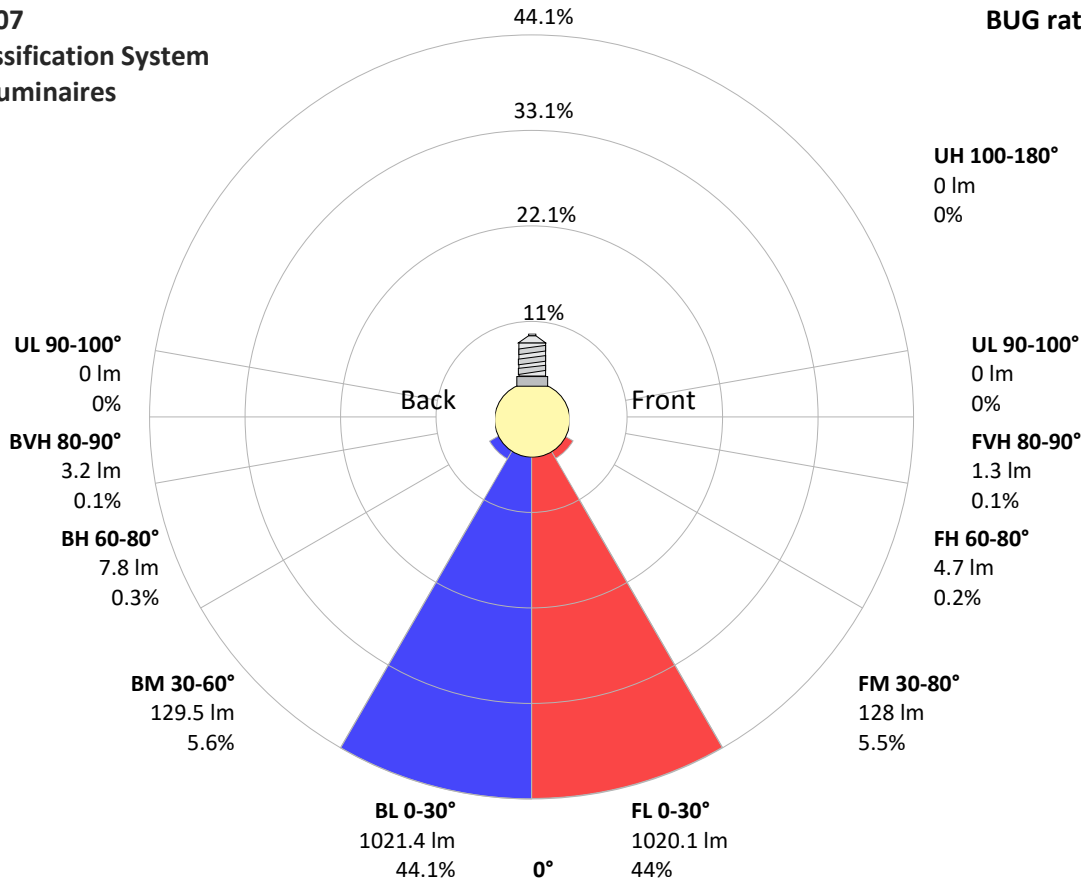
Zone (γ)	Lumen	% Total
0-30°	2042 lm	88.2%
0-40°	2232 lm	96.4%
0-60°	2299 lm	99.3%
60-90°	17 lm	0.7%
70-100°	9 lm	0.4%
90-120°	0 lm	0.0%
0-90°	2316 lm	100.0%
90-180°	0 lm	0.0%
0-180°	2316 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	1020 lm	44.0%
Medium(30-60°)	128 lm	5.5%
High(60-80°)	5 lm	0.2%
Very high(80-90°)	1 lm	0.1%
Back light		
Low(0-30°)	1021 lm	44.1%
Medium(30-60°)	130 lm	5.6%
High(60-80°)	8 lm	0.3%
Very high(80-90°)	3 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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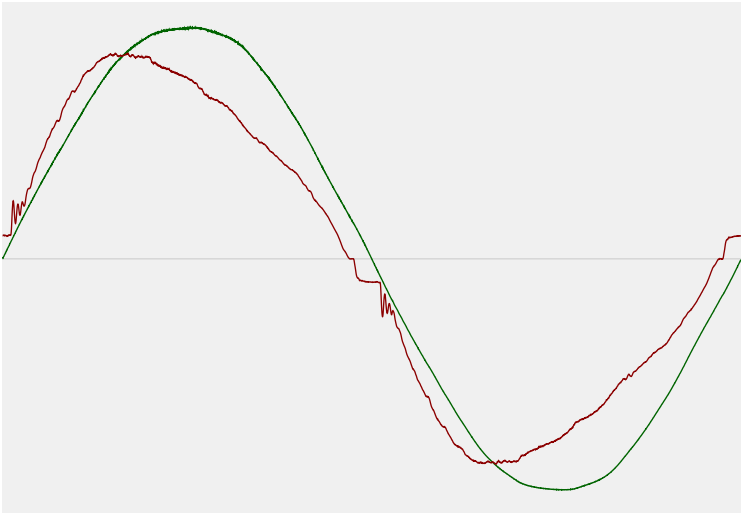


Power Details

Input Power

Power feed to light source	41.5 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	241 V
RMS Input current feed, I_{RMS}	0.178 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	42.91 VA
Displacement factor of AC power feed	0.97
Power factor of AC current feed	0.97
Total harmonic distortion of the current	10.7%
Total harmonic distortion of the voltage	1.17%

Input Power Curve



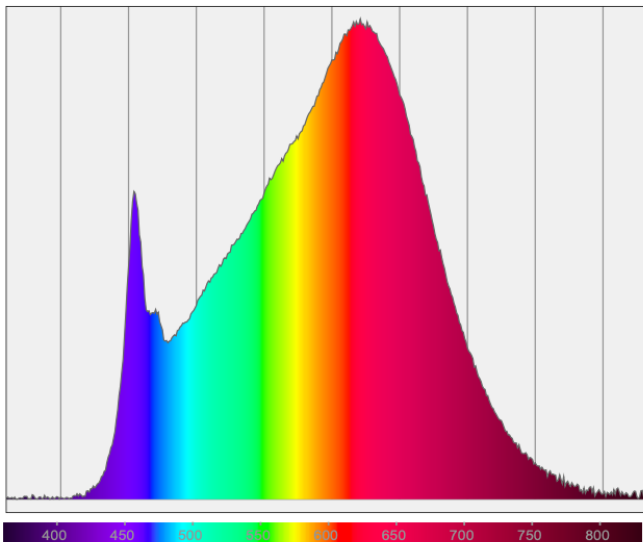
Efficiency

Radiated power efficiency	20.3%
Lumen efficiency	56 lm/W

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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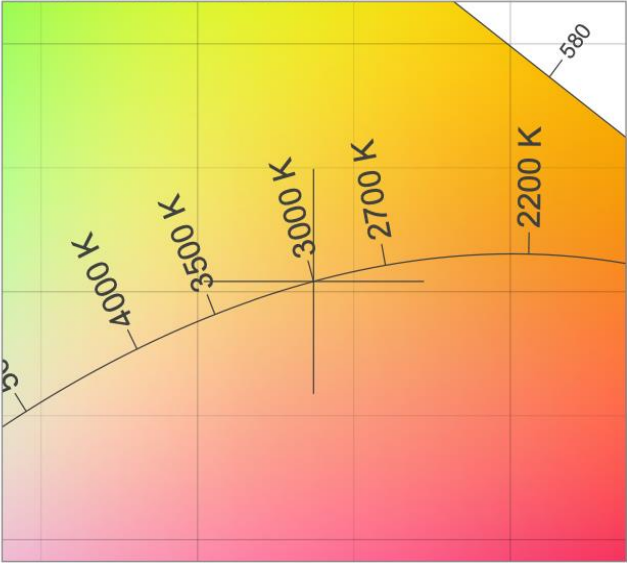
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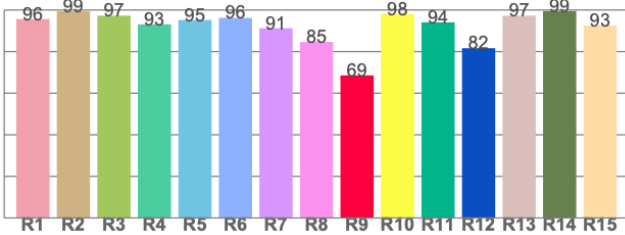
CIE 1931



CIE 1931 – zoomed on Planckian locus



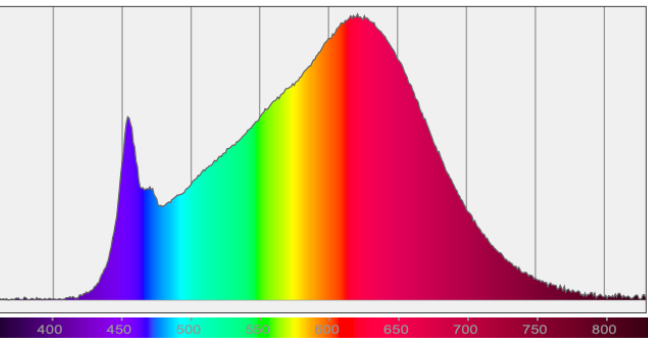
Color Rendering Index per reference color (CIE 1995)



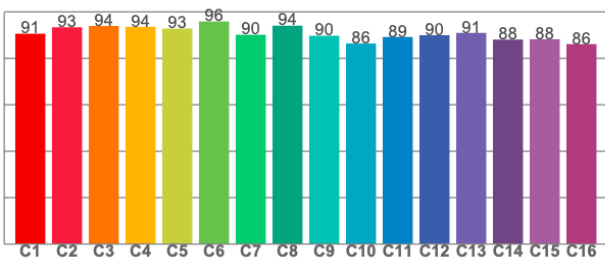
CRI R values, only R1-R8 are used to calculate final CRI value

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%



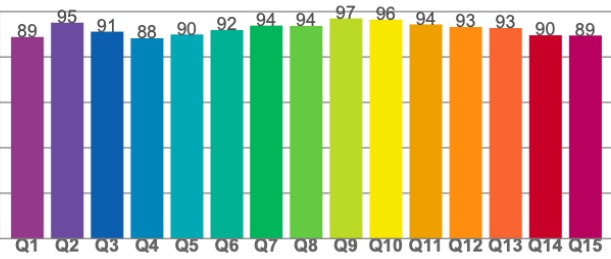
TM30-18 Rf-values per hue bin



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