

Tested Light Source - 1_PHOT_NINETY-NINE-1875lmChip-3500K-38Deg-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°

1.5°

1.50 m

14.6 W – PF 0.46 – DPF 0.8

240 V – 0.132 A

50 Hz

Main Light Measurement Results

Output

Efficiency

Peak Intensity and Beam Angle

Color Rendering Index

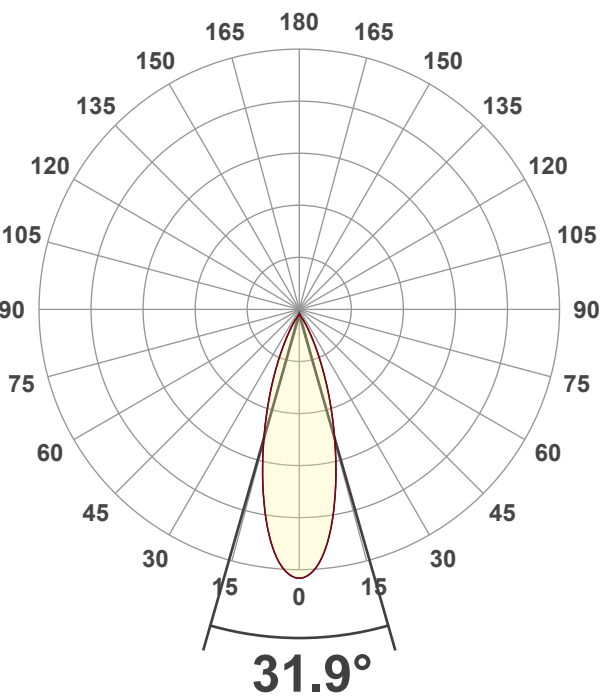
913 lm

63 lm/W

2579 cd – 31.9°

CRI 93.0

Light Intensity Distribution



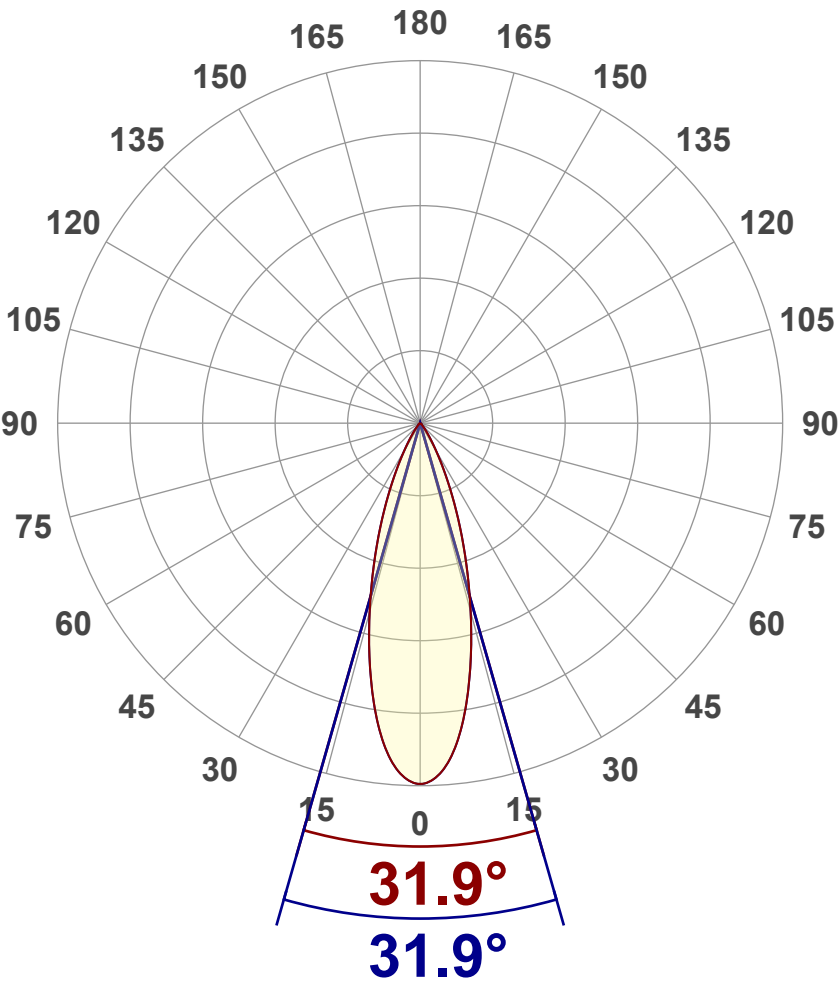
Goniophotometry Report

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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	913 lm
Peak Intensity	2579 cd
Beam Angle (50%)	31.9°
Beam Angle (90%)	31.9°
Beam Angle (10%)	31.9°

Cut-off Angle

Average 2,5%	75°
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Field Angle

Average 10%	58.5°
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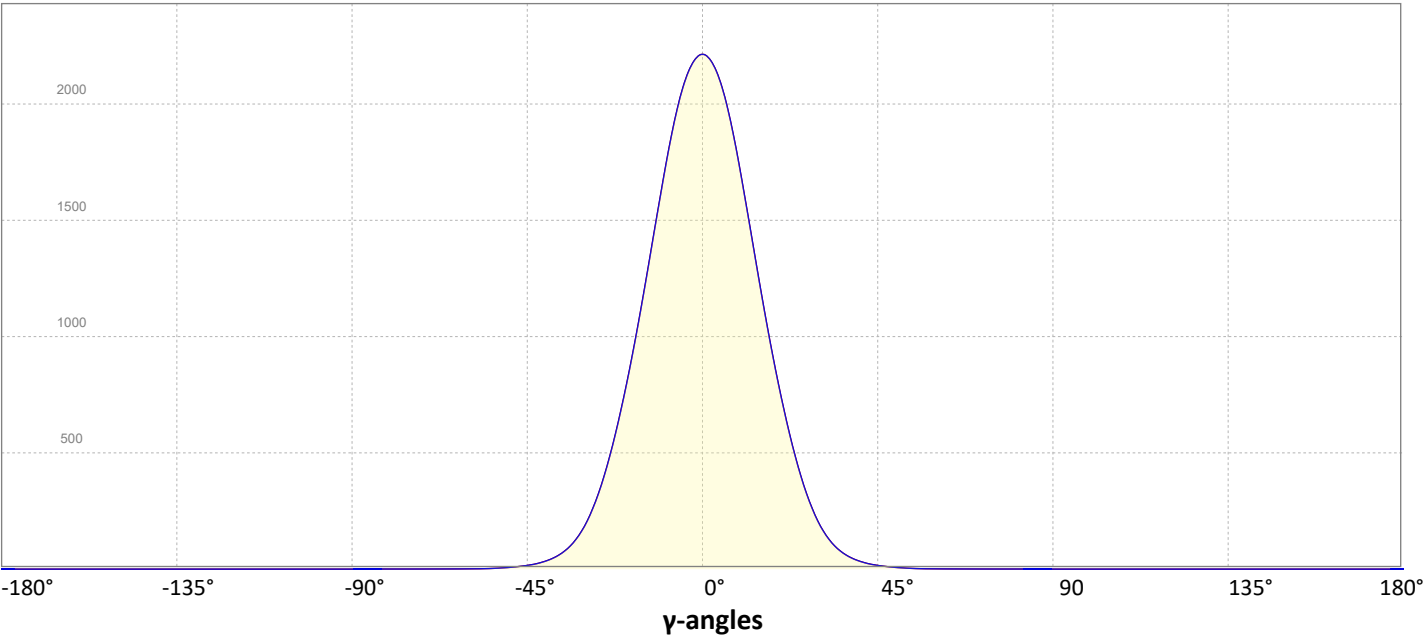
Intensity Ratio

In 120° cone	99.6%
In 90° cone	98.7%

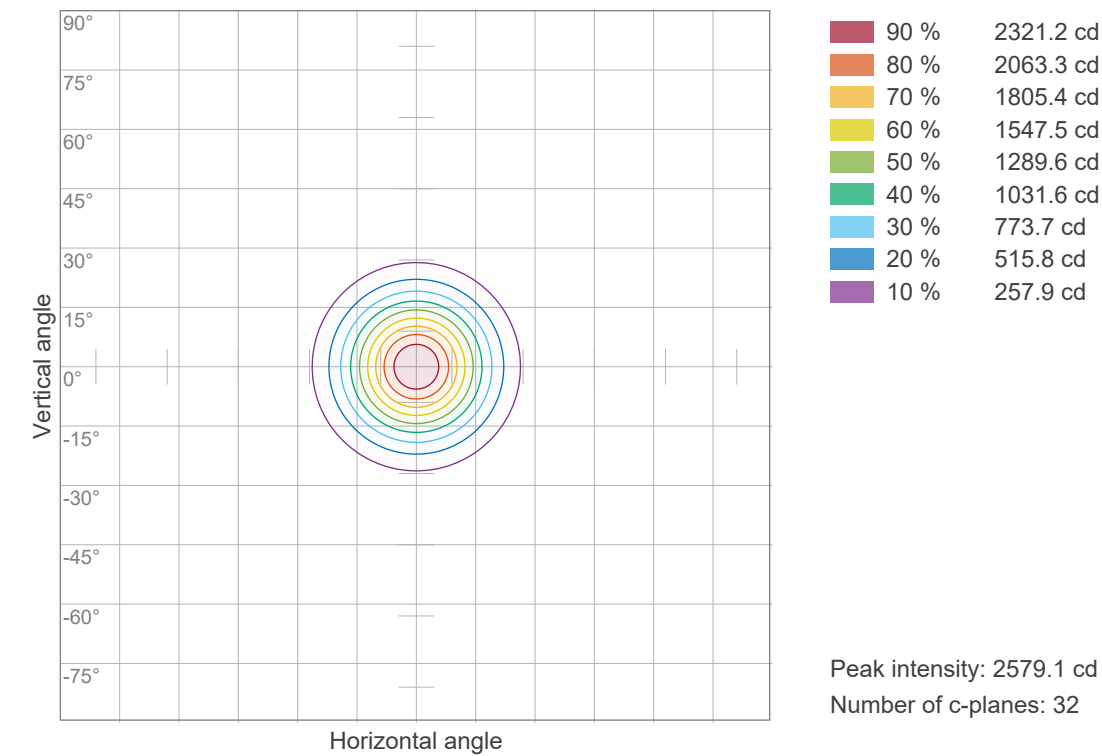
C000-C180

C090-C270

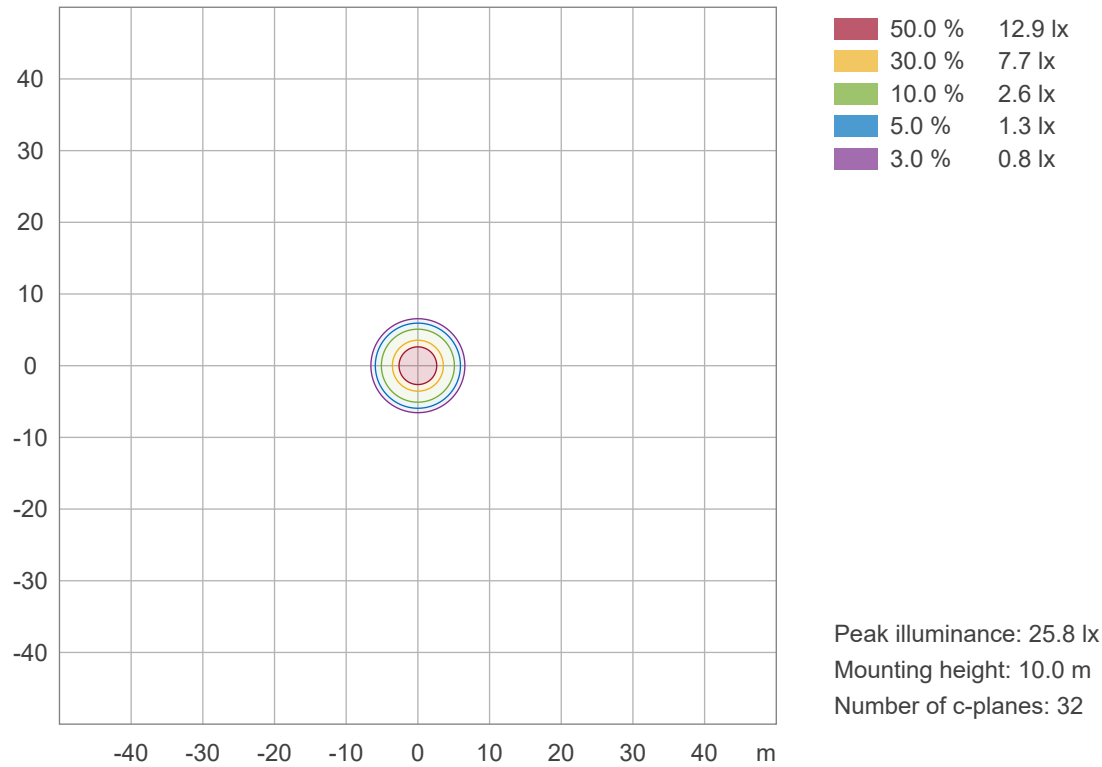
Linear distribution diagram - Intensity (candela) vs γ-angle



Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)

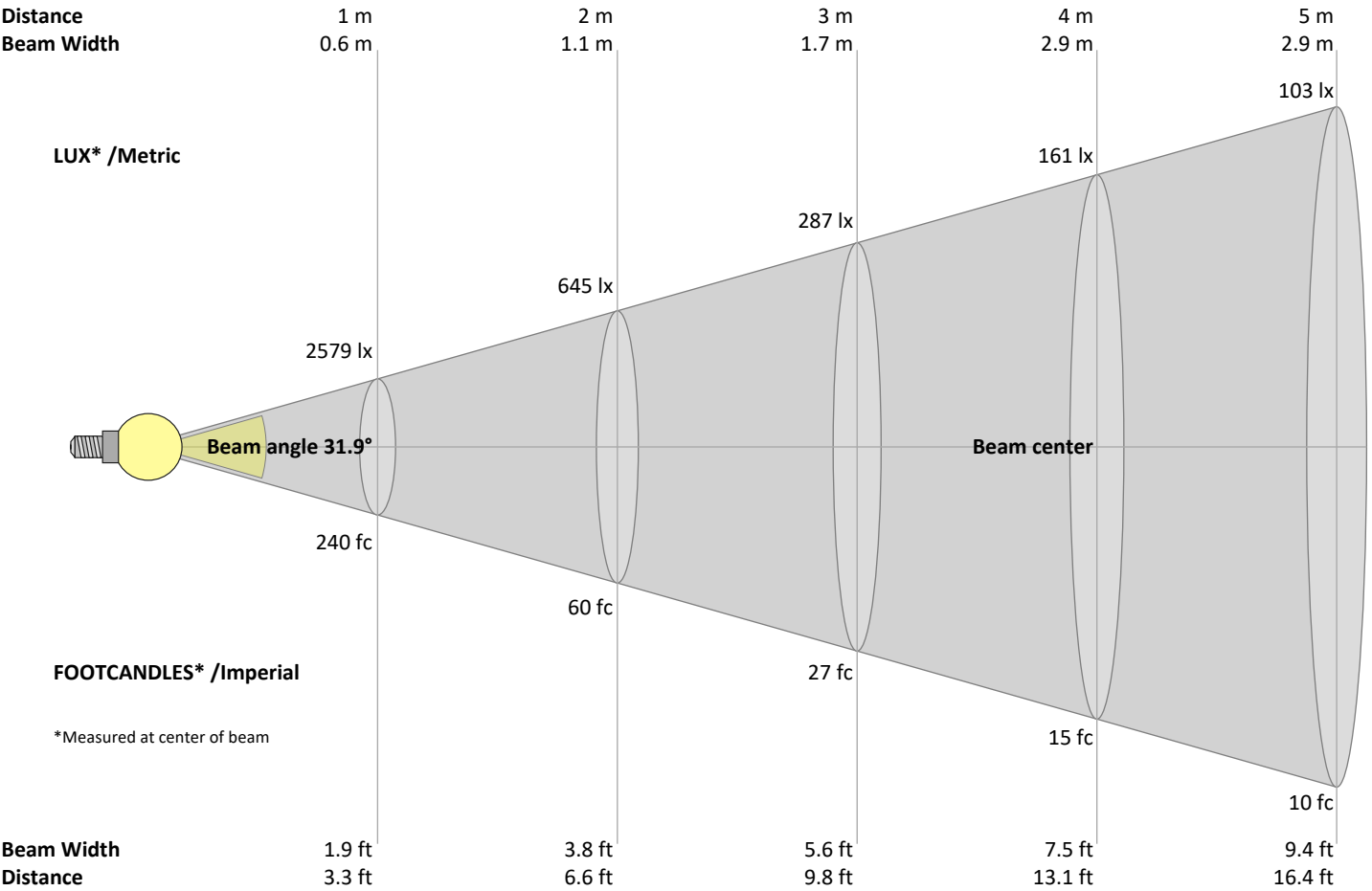


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Beam Details



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
2579	645	287	161	103	72	53	40	32	26	21	18	15	13	11	10	9	8	7	6	lux
239.6	59.9	26.6	15	9.6	6.7	4.9	3.7	3	2.4	2	1.7	1.4	1.2	1.1	0.9	0.8	0.7	0.7	0.6	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
2579	2553	2474	2344	2172	1963	1738	1509	1286	1075	883	709	554	422	313	228	163	115	83	59	cd
100%	99%	96%	91%	84%	76%	67%	59%	50%	42%	34%	27%	21%	16%	12%	9%	6%	4%	3%	2%	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
2579	2553	2474	2344	2172	1963	1738	1509	1286	1075	883	709	554	422	313	228	163	115	83	59	cd
100%	99%	96%	91%	84%	76%	67%	59%	50%	42%	34%	27%	21%	16%	12%	9%	6%	4%	3%	2%	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
2579	2553	2474	2344	2172	1963	1738	1509	1286	1075	883	709	554	422	313	228	163	115	83	59	cd
100%	99%	96%	91%	84%	76%	67%	59%	50%	42%	34%	27%	21%	16%	12%	9%	6%	4%	3%	2%	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
2579	2553	2474	2344	2172	1963	1738	1509	1286	1075	883	709	554	422	313	228	163	115	83	59	cd
100%	99%	96%	91%	84%	76%	67%	59%	50%	42%	34%	27%	21%	16%	12%	9%	6%	4%	3%	2%	of 0°val

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Light Planning – UGR table

Uncorrected, comprehensive UGR table according to 117-1995

Reflectances											
p Ceiling		70	70	50	50	30	70	70	50	50	30
p Walls		50	30	50	30	30	50	30	50	30	30
p Floor		20	20	20	20	20	20	20	20	20	20
Room size		Viewed Crosswise					Viewed Endwise				
H = mounting height above eye level		(Viewing direction orthogonal to lamp length axis)					(Viewing direction parallel to lamp length axis)				
X	Y										
2H	2H	12.1	12.6	12.2	12.8	12.9	12.1	12.6	12.2	12.8	12.9
	3H	11.8	12.4	12.2	12.6	12.8	11.8	12.4	12.2	12.6	12.8
	4H	11.7	12.3	12.1	12.6	12.8	11.7	12.3	12.1	12.6	12.8
	6H	11.7	12.2	12.0	12.5	12.9	11.7	12.2	12.0	12.5	12.9
	8H	11.7	12.2	12.0	12.5	12.9	11.7	12.2	12.0	12.5	12.9
	12H	11.7	12.2	12.0	12.5	12.9	11.7	12.2	12.0	12.5	12.9
4H	2H	11.7	12.3	12.1	12.5	12.8	11.7	12.3	12.1	12.5	12.8
	3H	11.6	12.1	12.0	12.4	12.9	11.6	12.1	12.0	12.4	12.9
	4H	11.5	11.9	11.9	12.4	12.9	11.5	11.9	11.9	12.4	12.9
	6H	11.5	11.9	12.0	12.3	12.6	11.5	11.9	12.0	12.3	12.6
	8H	11.4	11.9	11.9	12.2	12.6	11.4	11.9	11.9	12.2	12.6
	12H	11.4	11.8	11.9	12.2	12.6	11.4	11.8	11.9	12.2	12.6
8H	4H	11.4	11.8	11.9	12.2	12.5	11.4	11.8	11.9	12.2	12.5
	6H	11.4	11.7	11.9	12.1	12.6	11.4	11.7	11.9	12.1	12.6
	8H	11.4	11.6	11.9	12.2	12.8	11.4	11.6	11.9	12.2	12.8
	12H	11.5	11.6	12.0	12.2	12.7	11.5	11.6	12.0	12.2	12.7
12H	4H	11.3	11.7	11.8	12.1	12.5	11.3	11.7	11.8	12.1	12.5
	6H	11.4	11.6	11.9	12.1	12.7	11.4	11.6	11.9	12.1	12.7
	8H	11.4	11.6	12.0	12.1	12.7	11.4	11.6	12.0	12.1	12.7

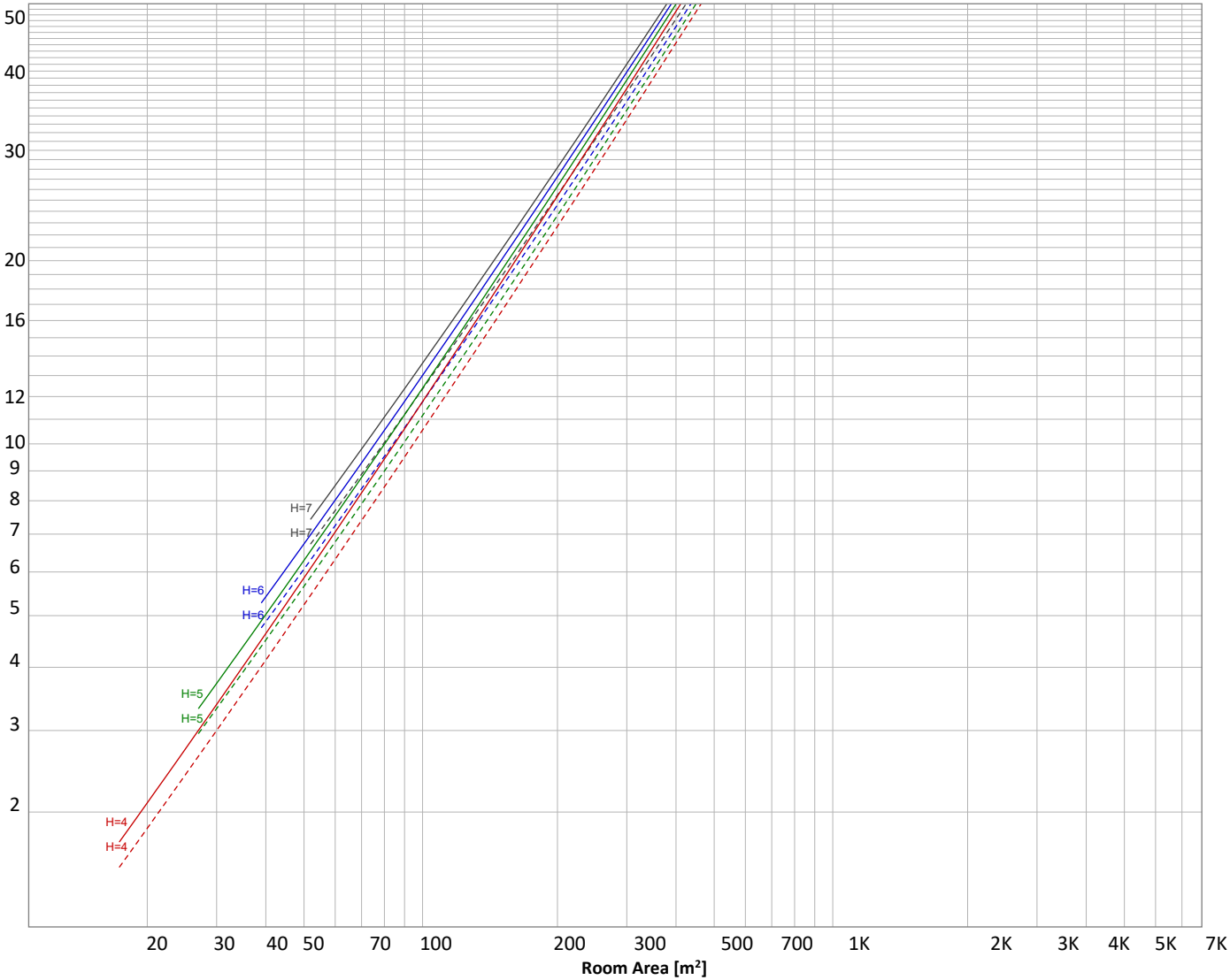
Variations with the observer position for the luminaire spacings, S:

S = 1.0H	5.3 / -6.8	5.3 / -6.8
S = 1.5H	7.9 / -7.3	7.9 / -7.3
S = 2.0H	9.9 / -7.6	9.9 / -7.6

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	114	112	110	108	112	110	108	106	106	104	103	102	101	100	99	98	97	95
2	110	106	103	100	108	104	101	99	101	99	97	98	96	95	96	94	93	91
3	106	101	97	93	104	99	96	93	97	94	91	94	92	90	92	90	88	87
4	102	96	91	88	100	95	91	87	93	89	86	91	88	85	89	87	85	83
5	98	92	87	83	97	91	86	83	89	85	82	87	84	82	86	83	81	80
6	95	88	83	79	93	87	82	79	85	82	79	84	81	78	83	80	78	76
7	91	84	79	76	90	83	79	76	82	78	75	81	78	75	80	77	74	73
8	88	81	76	73	87	80	76	72	79	75	72	78	75	72	77	74	72	70
9	85	78	73	70	84	77	73	70	76	72	69	75	72	69	75	71	69	68
10	82	75	70	67	82	74	70	67	74	70	67	73	69	67	72	69	66	65

Luminaire budgetary diagram
Uncorrected, comprehensive UGR table according to 117-1995
LAMPS (number of lamps)



Conditions		p(%)			
H = Room height	Flux = 913 lm	Line type	Ceiling reflectance	Wall reflectance	Floor reflectance
H _{down} = Lamp distance from ceiling =	0.00 m		70	50	30
H _{work} = Work area height from floor =	0.00 m				
E _{work} = Average lux on work area =	100 lx		50	30	20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
216 lm	381 lm	226 lm	66.7 lm	15.9 lm	3.32 lm	1.06 lm	0.709 lm	0.608 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.262 lm	0.254 lm	0.238 lm	0.215 lm	0.143 lm	0.098 lm	0.073 lm	0.044 lm	0.015 lm

Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	216 lm	23.7%
10-20°	381 lm	41.8%
20-30°	226 lm	24.7%
30-40°	67 lm	7.3%
40-50°	16 lm	1.7%
50-60°	3 lm	0.4%
60-70°	1 lm	0.1%
70-80°	1 lm	0.1%
80-90°	1 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	913 lm	100.0%

Intensity peaks

Max intensity	2579 cd
Intensity, 90°	0 cd
Intensity, 0°	2579 cd

Zonal Lumen summary

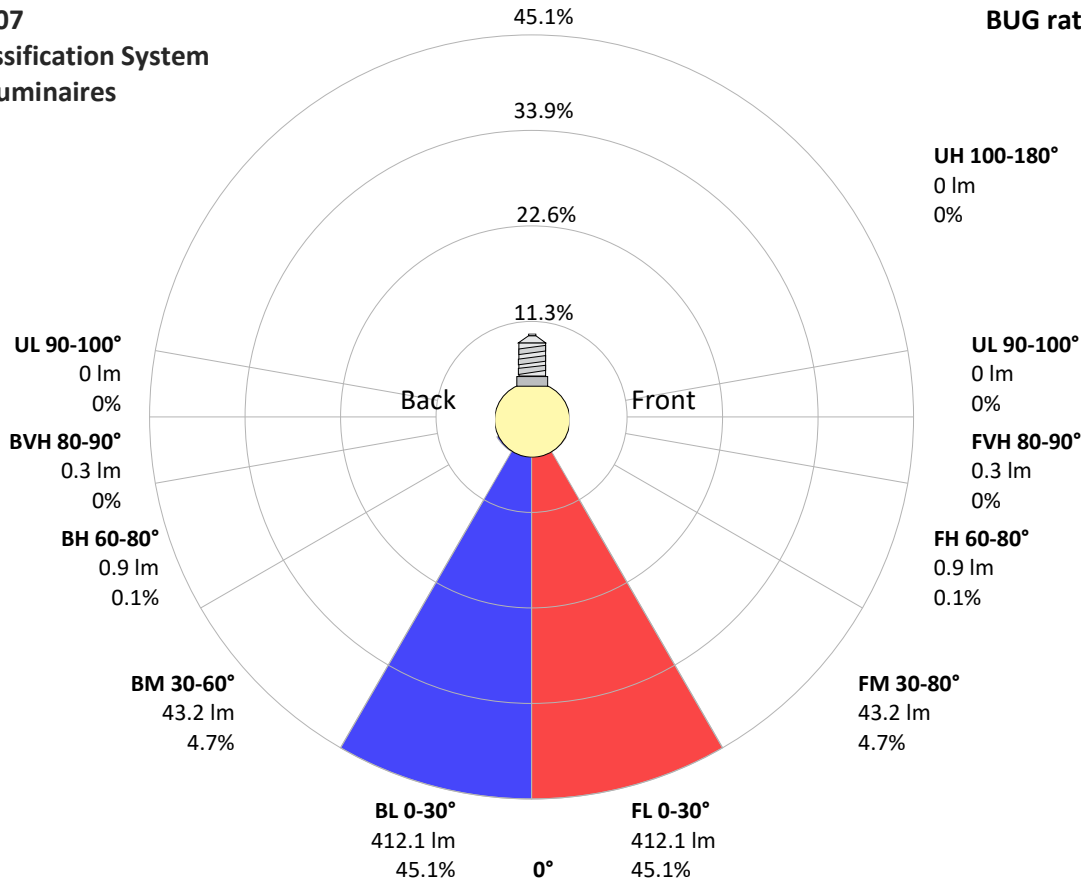
Zone (γ)	Lumen	% Total
0-30°	823 lm	90.2%
0-40°	890 lm	97.5%
0-60°	909 lm	99.6%
60-90°	2 lm	0.3%
70-100°	2 lm	0.2%
90-120°	1 lm	0.1%
0-90°	912 lm	99.9%
90-180°	1 lm	0.1%
0-180°	913 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	412 lm	45.1%
Medium(30-60°)	43 lm	4.7%
High(60-80°)	1 lm	0.1%
Very high(80-90°)	0 lm	0.0%
Back light		
Low(0-30°)	412 lm	45.1%
Medium(30-60°)	43 lm	4.7%
High(60-80°)	1 lm	0.1%
Very high(80-90°)	0 lm	0.0%
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 B1 U1 G0



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Power Details

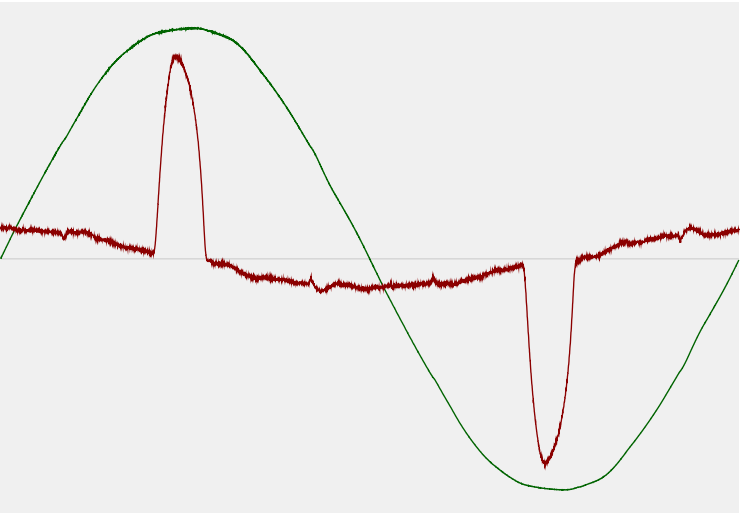
Input Power

Power feed to light source	14.6 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	240 V
RMS Input current feed, I_{RMS}	0.132 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	31.74 VA
Displacement factor of AC power feed	0.8
Power factor of AC current feed	0.46
Total harmonic distortion of the current	139.71%
Total harmonic distortion of the voltage	1.19%

Efficiency

Radiated power efficiency	23.0%
<div><div></div></div>	
Lumen efficiency	63 lm/W
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Input Power Curve



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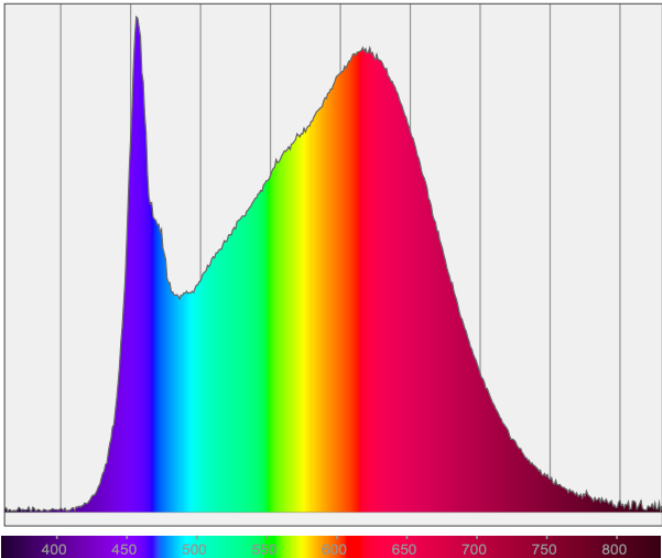
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Color Measurements

Correlated Color Temperature	CCT = 3500 K
Color Rendering TM30-18	R _f 90.2 — R _g 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 _f 90.2 — R _g 98.1	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.236;0.236)
Color Quality Scale	CQS = 92.3		

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CIE 1931



CIE 1931 – zoomed on Planckian locus



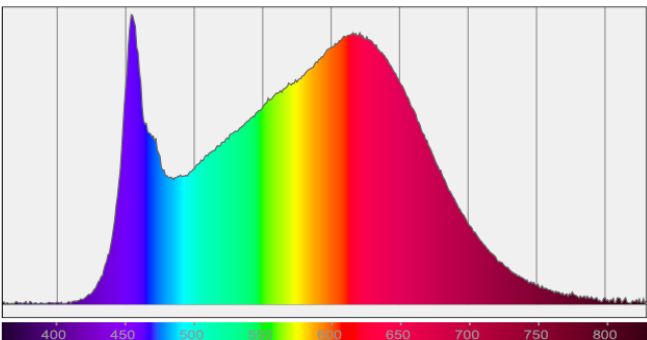
Color Rendering Index per reference color (CIE 1995)



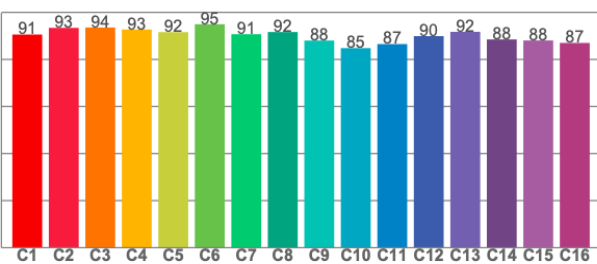
CRI R values, only R1-R8 are used to calculate final CRI value

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%



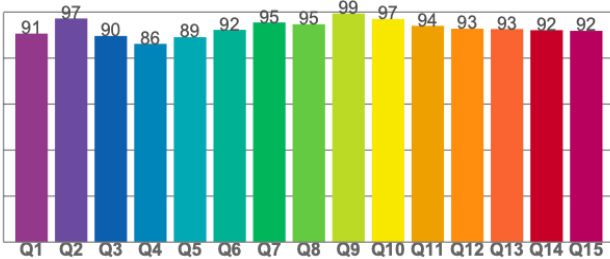
TM30-18 Rf-values per hue bin



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