

Tested Light Source - 1\_PHOT\_NINETY-NINE-1925lmChip-4000K-58Deg-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)

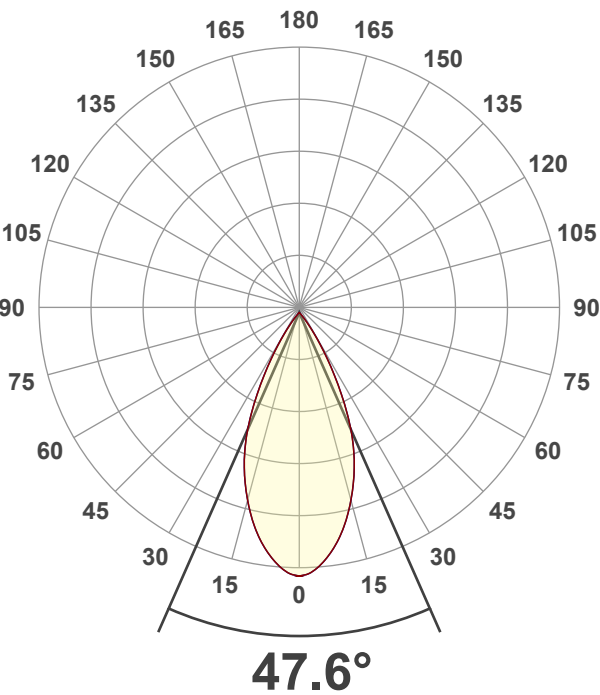
Measurement Conditions

Number of C-planes and Resolution	32 planes – 11.25°
γ (gamma)-Resolution	2°
Test Distance	1.50 m
Input Power, Power and Displ. Factors	14.6 W – PF 0.47 – DPF 0.78
Input RMS Voltage and Current	244 V – 0.128 A
Frequency of Input Power	50 Hz

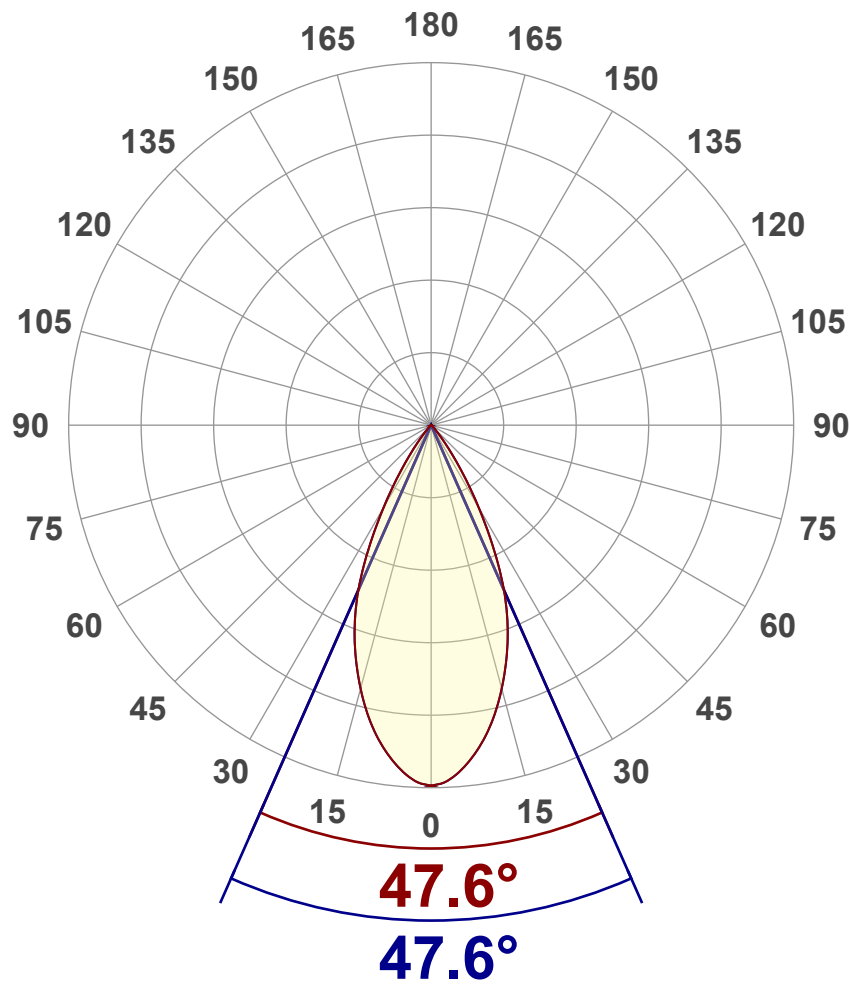
Main Light Measurement Results

Output	916 lm
Efficiency	63 lm/W
Peak Intensity and Beam Angle	1548 cd – 47.6°
Color Rendering Index	CRI 93.0

Light Intensity Distribution



Luminous Intensity diagramUnit: 0-100% of peak intensity



Main Values	
Output (total Lumen)	916 lm
Peak Intensity	1548 cd
Beam Angle (50%)	47.6°
Beam Angle (90%)	47.6°
Beam Angle (10%)	47.6°

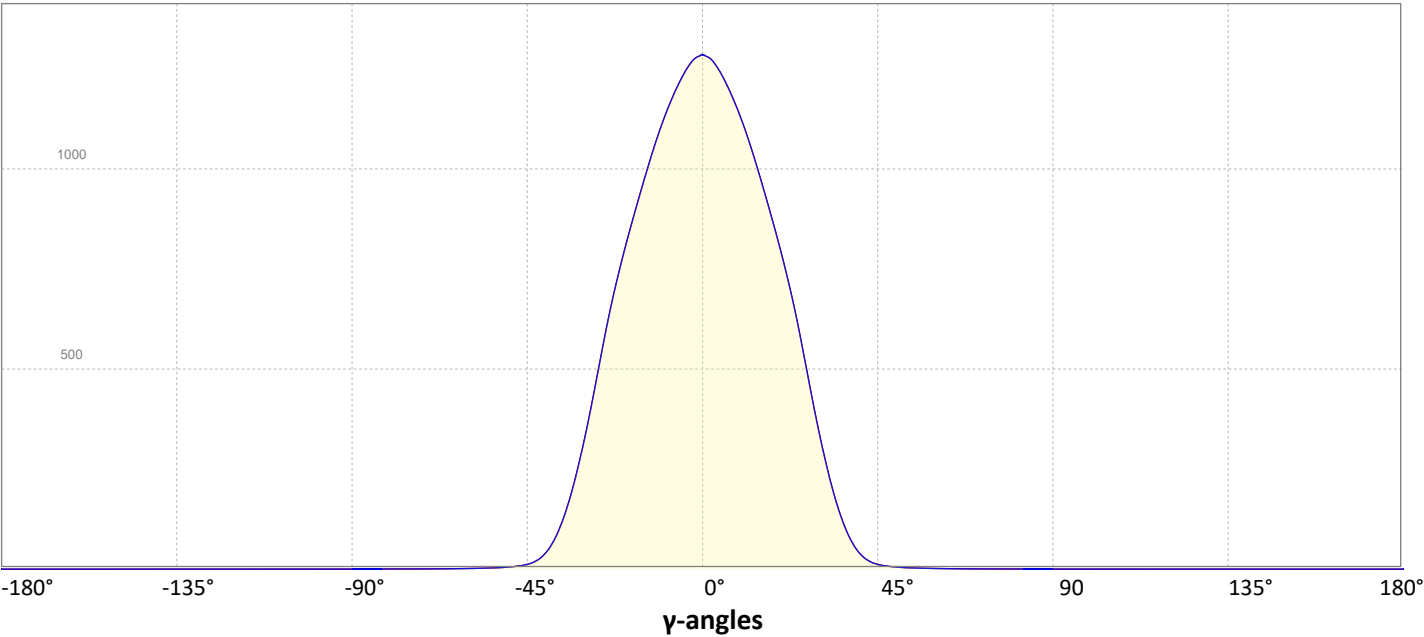
Cut-off Angle	
Average 2,5%	82.3°

Field Angle	
Average 10%	71.3°

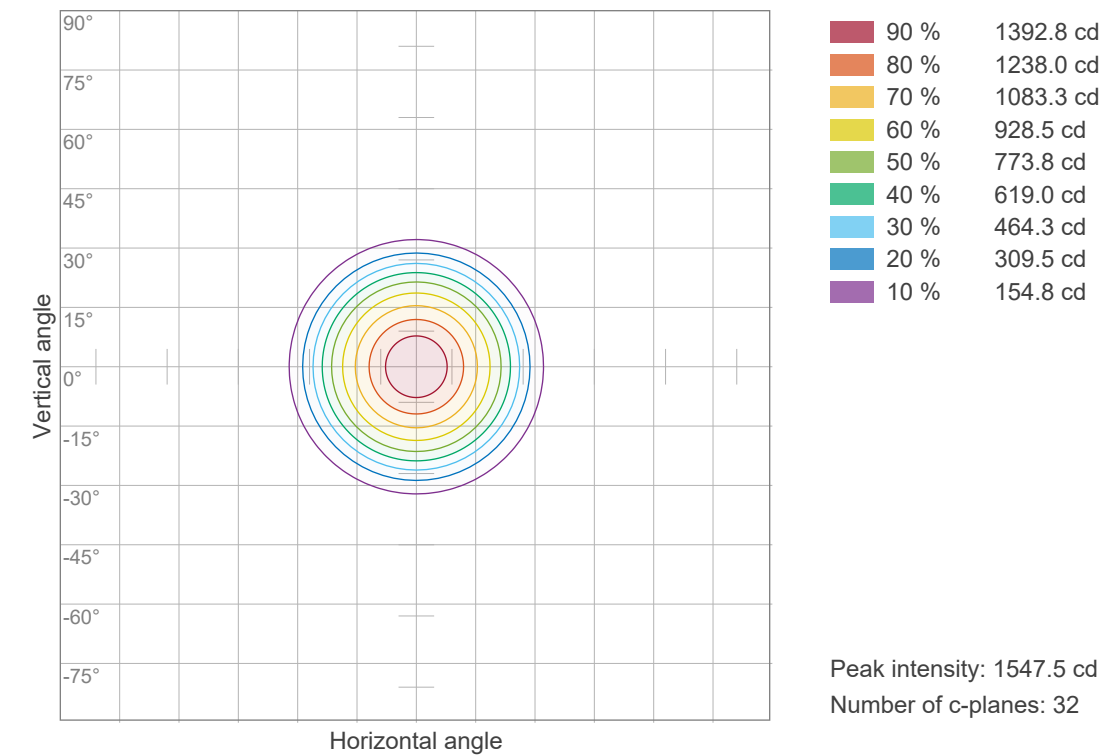
Intensity Ratio	
In 120° cone	99.6%
In 90° cone	98.9%

C000-C180  
C090-C270

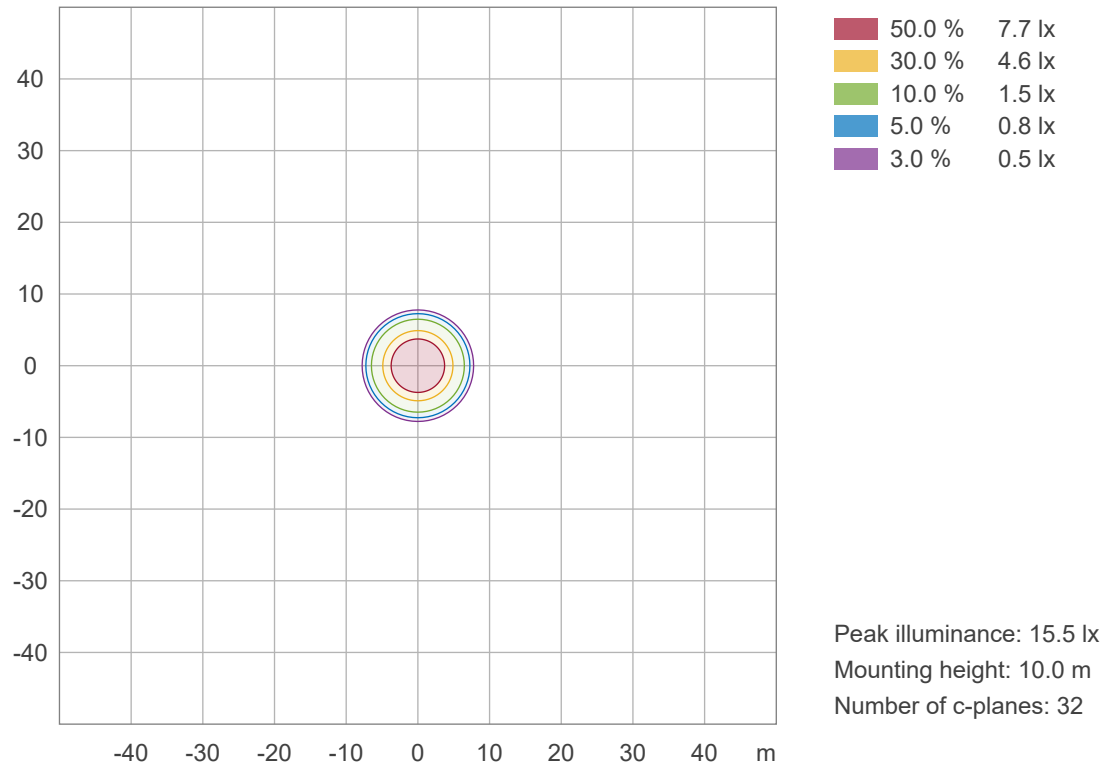
Linear distribution diagram - Intensity (candela) vs γ-angle



Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)

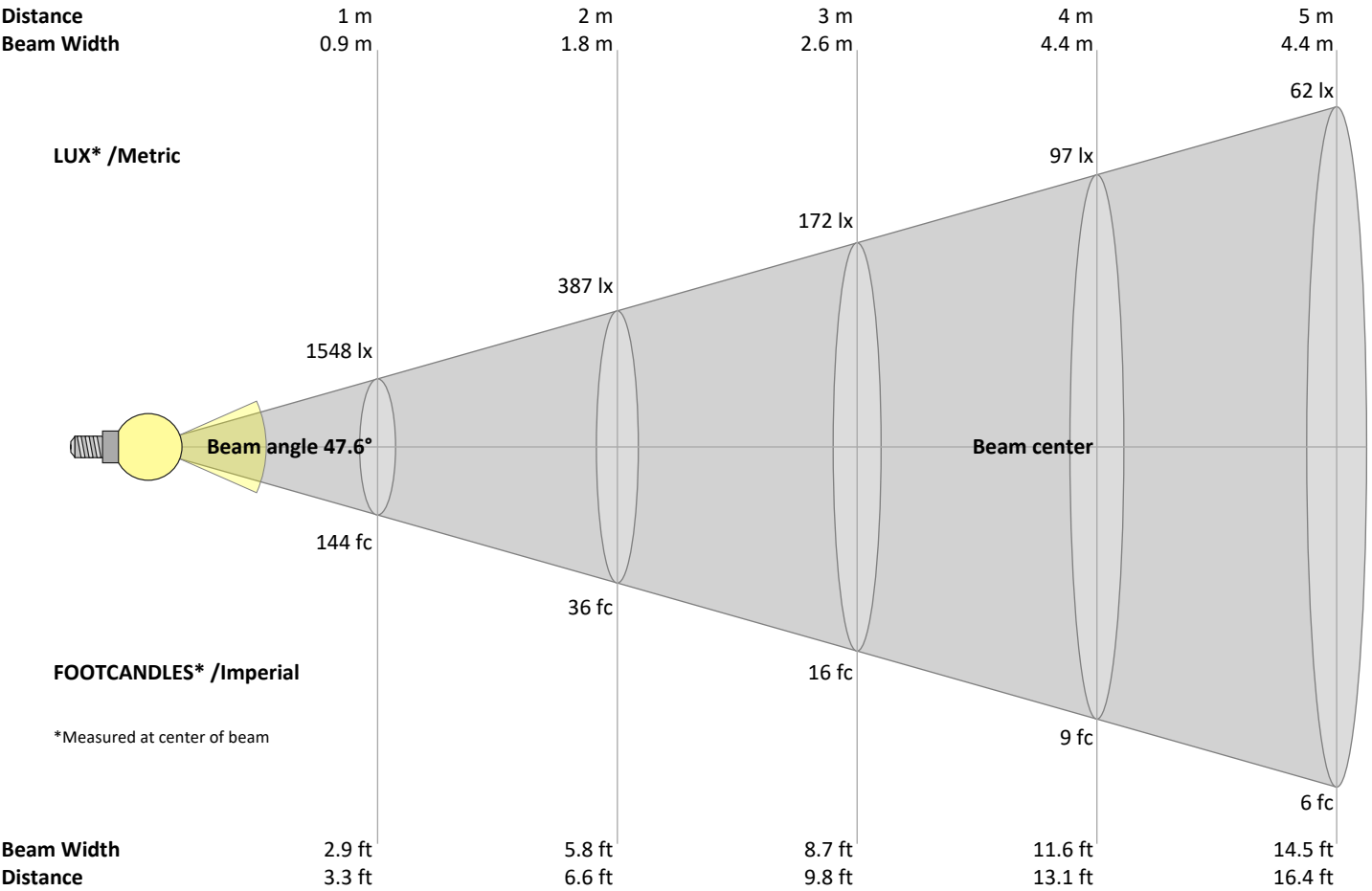


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Beam Details



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
1548	387	172	97	62	43	32	24	19	15	13	11	9	8	7	6	5	5	4	4	lux
143.8	35.9	16	9	5.8	4	2.9	2.2	1.8	1.4	1.2	1	0.9	0.7	0.6	0.6	0.5	0.4	0.4	0.4	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
1548	1536	1506	1463	1412	1353	1285	1210	1131	1048	961	867	763	646	524	409	306	217	145	91	cd
100%	99%	97%	95%	91%	87%	83%	78%	73%	68%	62%	56%	49%	42%	34%	26%	20%	14%	9%	6%	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
1548	1536	1506	1463	1412	1353	1285	1210	1131	1048	961	867	763	646	524	409	306	217	145	91	cd
100%	99%	97%	95%	91%	87%	83%	78%	73%	68%	62%	56%	49%	42%	34%	26%	20%	14%	9%	6%	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
1548	1536	1506	1463	1412	1353	1285	1210	1131	1048	961	867	763	646	524	409	306	217	145	91	cd
100%	99%	97%	95%	91%	87%	83%	78%	73%	68%	62%	56%	49%	42%	34%	26%	20%	14%	9%	6%	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
1548	1536	1506	1463	1412	1353	1285	1210	1131	1048	961	867	763	646	524	409	306	217	145	91	cd
100%	99%	97%	95%	91%	87%	83%	78%	73%	68%	62%	56%	49%	42%	34%	26%	20%	14%	9%	6%	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	15.7	16.3	15.8	16.5	16.7	15.7	16.3	15.8	16.5	16.7
	3H	15.4	16.1	15.8	16.3	16.5	15.4	16.1	15.8	16.3	16.5
	4H	15.4	16.0	15.8	16.3	16.5	15.4	16.0	15.8	16.3	16.5
	6H	15.4	15.9	15.7	16.2	16.6	15.4	15.9	15.7	16.2	16.6
	8H	15.3	15.9	15.6	16.2	16.6	15.3	15.9	15.6	16.2	16.6
	12H	15.3	15.8	15.6	16.1	16.6	15.3	15.8	15.6	16.1	16.6
4H	2H	15.4	16.0	15.8	16.3	16.5	15.4	16.0	15.8	16.3	16.5
	3H	15.3	15.8	15.6	16.1	16.6	15.3	15.8	15.6	16.1	16.6
	4H	15.1	15.6	15.5	16.0	16.5	15.1	15.6	15.5	16.0	16.5
	6H	15.1	15.6	15.6	15.9	16.3	15.1	15.6	15.6	15.9	16.3
	8H	15.0	15.5	15.5	15.8	16.2	15.0	15.5	15.5	15.8	16.2
	12H	14.9	15.3	15.5	15.7	16.2	14.9	15.3	15.5	15.7	16.2
8H	4H	15.0	15.5	15.5	15.8	16.2	15.0	15.5	15.5	15.8	16.2
	6H	14.9	15.3	15.4	15.7	16.2	14.9	15.3	15.4	15.7	16.2
	8H	14.9	15.2	15.5	15.7	16.3	14.9	15.2	15.5	15.7	16.3
	12H	14.9	15.1	15.5	15.6	16.2	14.9	15.1	15.5	15.6	16.2
12H	4H	14.9	15.3	15.4	15.7	16.2	14.9	15.3	15.4	15.7	16.2
	6H	14.9	15.2	15.4	15.7	16.3	14.9	15.2	15.4	15.7	16.3
	8H	14.9	15.1	15.5	15.6	16.2	14.9	15.1	15.5	15.6	16.2

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

S = 1.0H	6.1 / -11.7	6.1 / -11.7
S = 1.5H	8.8 / -12.2	8.8 / -12.2
S = 2.0H	10.8 / -12.7	10.8 / -12.7

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	109	107	112	109	107	105	105	104	102	102	100	99	98	97	96	95
2	109	105	101	98	107	103	100	97	100	97	95	97	95	93	94	92	91	89
3	104	99	94	91	102	97	93	90	95	91	88	92	89	87	90	88	86	84
4	100	93	88	84	98	92	87	84	90	86	83	88	85	82	86	83	81	80
5	96	88	83	79	94	87	82	79	85	81	78	84	80	77	82	79	77	75
6	91	84	78	74	90	83	78	74	81	77	74	80	76	73	79	75	73	71
7	88	79	74	70	86	79	74	70	78	73	70	76	72	69	75	72	69	68
8	84	76	70	67	83	75	70	66	74	69	66	73	69	66	72	68	66	64
9	81	72	67	63	80	71	66	63	71	66	63	70	66	63	69	65	62	61
10	77	69	63	60	76	68	63	60	67	63	60	67	63	60	66	62	59	58

Goniophotometry Report

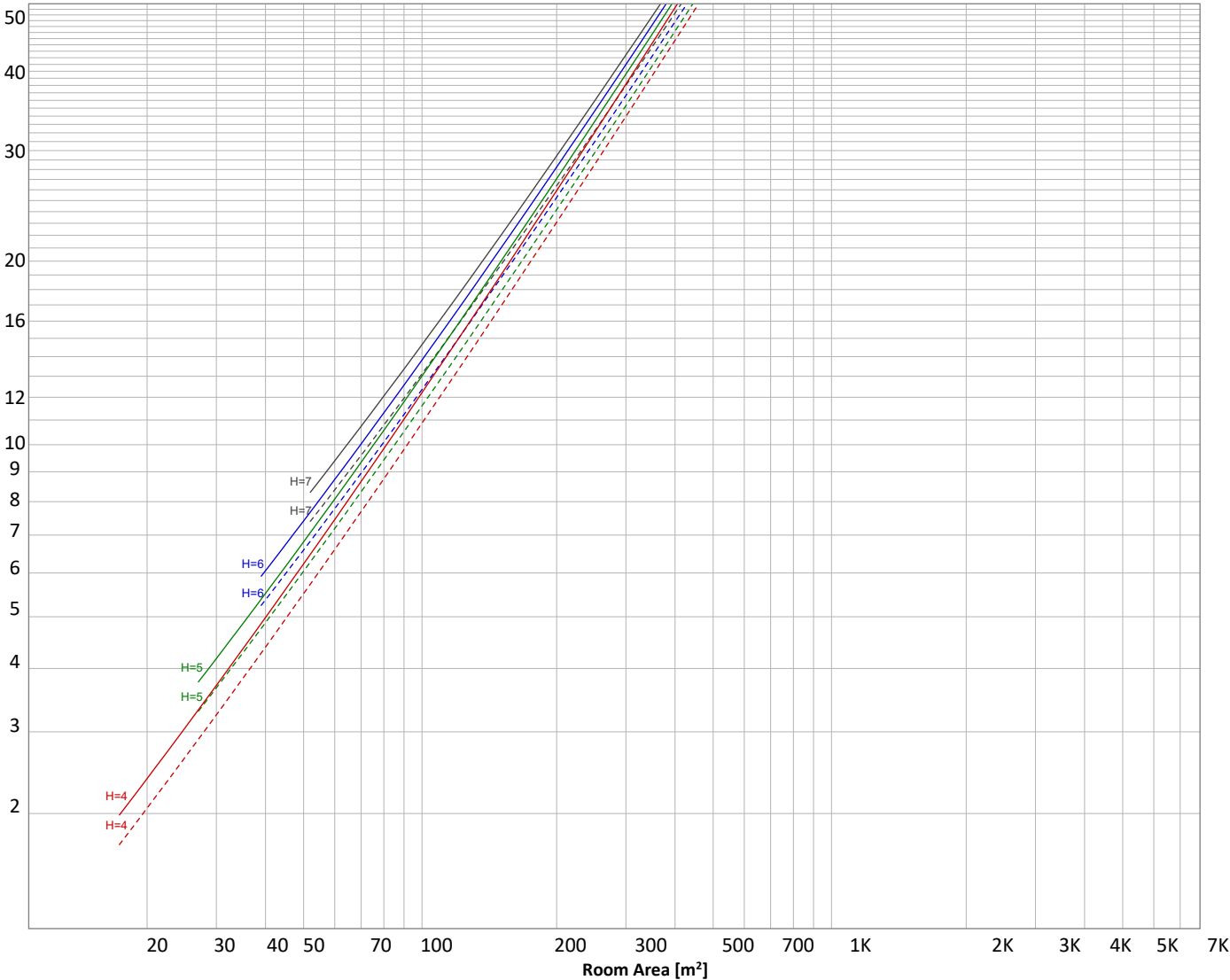
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 916 lm	ρ(%)		
H <sub>down</sub> = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	Wall reflectance
H <sub>work</sub> = Work area height from floor =	0.00 m	-----	70	50
E <sub>work</sub> = Average lux on work area =	100 lx	—————	50	30
				Floor reflectance
				30
				20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
137 lm	324 lm	315 lm	119 lm	14.5 lm	3.04 lm	1.29 lm	0.618 lm	0.446 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.215 lm	0.209 lm	0.196 lm	0.177 lm	0.074 lm	0.000 lm	0.000 lm	0.000 lm	0.000 lm

Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	137 lm	15.0%
10-20°	324 lm	35.4%
20-30°	315 lm	34.3%
30-40°	119 lm	13.0%
40-50°	15 lm	1.6%
50-60°	3 lm	0.3%
60-70°	1 lm	0.1%
70-80°	1 lm	0.1%
80-90°	0 lm	0.0%
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	916 lm	100.0%

Intensity peaks

Max intensity	1548 cd
Intensity, 90°	0 cd
Intensity, 0°	1548 cd

Zonal Lumen summary

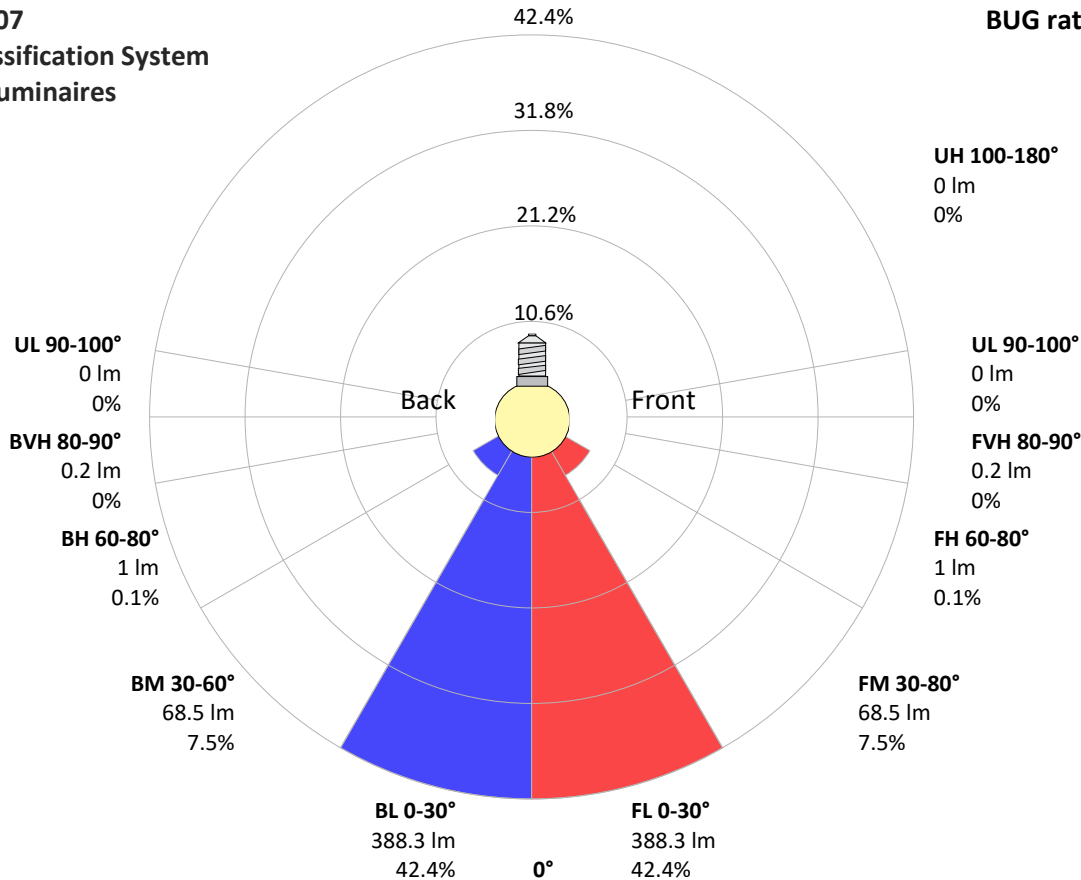
Zone (γ)	Lumen	% Total
0-30°	776 lm	84.8%
0-40°	895 lm	97.7%
0-60°	913 lm	99.6%
60-90°	2 lm	0.3%
70-100°	1 lm	0.1%
90-120°	1 lm	0.1%
0-90°	915 lm	99.9%
90-180°	1 lm	0.1%
0-180°	916 lm	100.0%

BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	388 lm	42.4%
Medium(30-60°)	69 lm	7.5%
High(60-80°)	1 lm	0.1%
Very high(80-90°)	0 lm	0.0%
<b>Back light</b>		
Low(0-30°)	388 lm	42.4%
Medium(30-60°)	69 lm	7.5%
High(60-80°)	1 lm	0.1%
Very high(80-90°)	0 lm	0.0%
<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



# Goniophotometry Report

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## Power Details

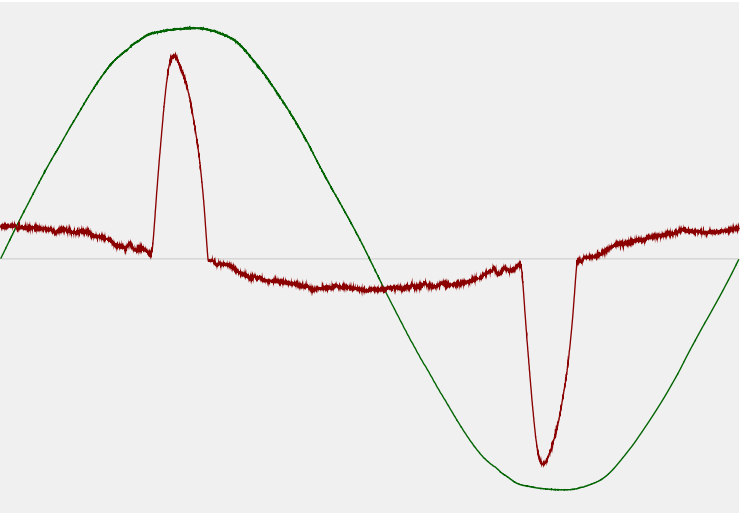
### Input Power

Power feed to light source	14.6 W
Frequency of input power	50 Hz
RMS Input voltage feed, $V_{RMS}$	244 V
RMS Input current feed, $I_{RMS}$	0.128 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	31.17 VA
Displacement factor of AC power feed	0.78
Power factor of AC current feed	0.47
Total harmonic distortion of the current	132.16%
Total harmonic distortion of the voltage	1.39%

### Efficiency

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

### Input Power Curve

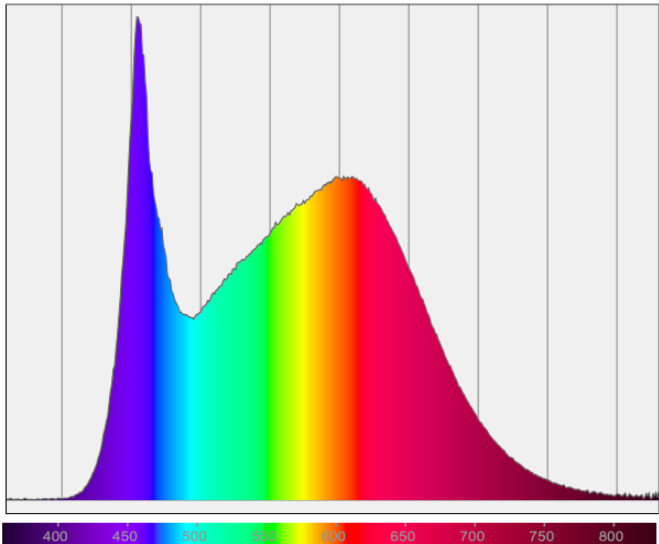




Color Measurements

Correlated Color Temperature	CCT = 4000 K
Color Rendering TM30-18	R <sub>f</sub> 88.9 – R <sub>g</sub> 98.5
Color Shift, CIE duv	Duv ±0.0003

Spectral distribution



Color details

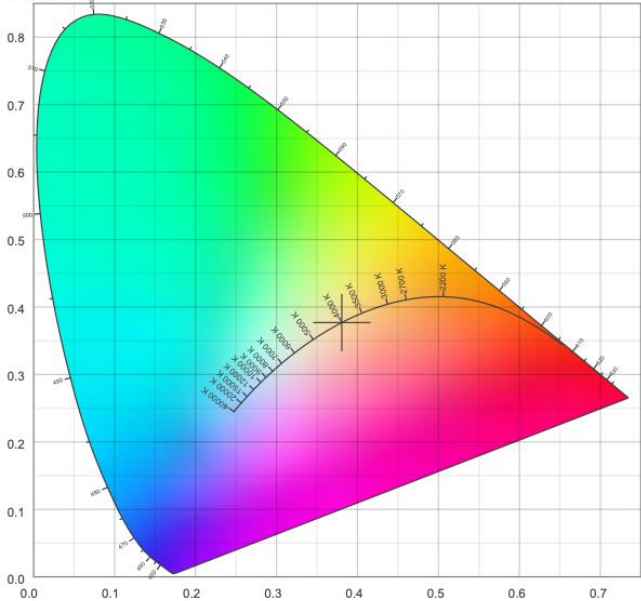
Correlated Color Temperature	CCT = 4000 K	Color coordinates CIE 1931	(x;y) = (0.381;0.377)
Color Rendering Index	CRI 92.6	Color coordinate CIEs 1960	(u;v) = (0.225;0.334)
Color Rendering Index, R9 (red component)	R9 = 72.2	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R <sub>f</sub> 88.9 – R <sub>g</sub> 98.5	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.225;0.225)
Color Quality Scale	CQS = 88.9		

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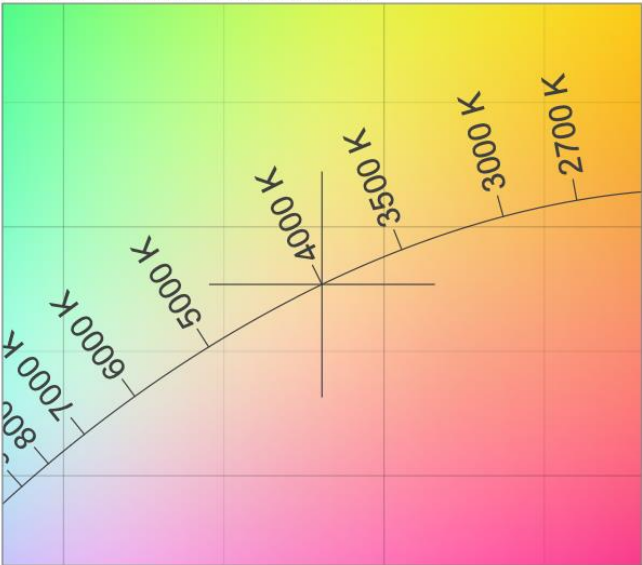
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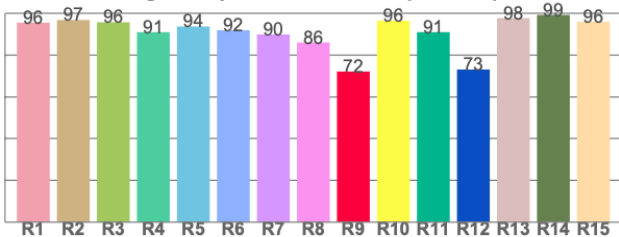
CIE 1931



CIE 1931 – zoomed on Planckian locus



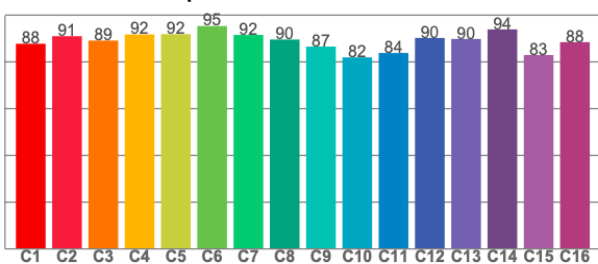
Color Rendering Index per reference color (CIE 1995)



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
95.5	96.8	95.7	91.0	93.7	91.9	89.9	86.0	72.2	96.4	91.0	73.1	97.7	99.2	96.0

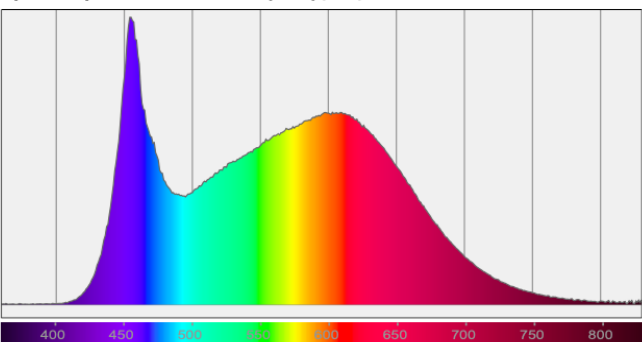
TM30-18 Rf-values per hue bin



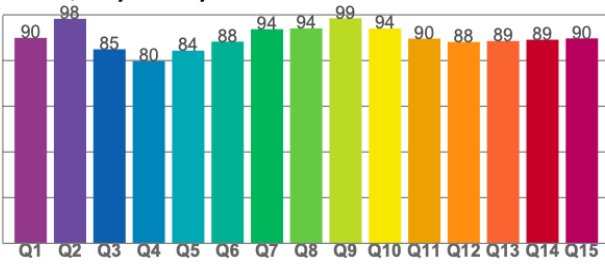
TM30 C values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
87.8	91.0	89.1	91.7	91.9	95.3	91.5	89.6	86.6	81.9	83.8	90.3	89.8	93.9	83.0	88.4

Spectral power distribution (SPD) / W/nm – 0-100%



Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
89.9	98.3	84.9	79.8	84.3	88.3	93.7	94.1	98.5	94.0	89.6	88.1	88.6	89.1	89.7