

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

1.50 m

14.6 W – PF 0.47 – DPF 0.78

243 V – 0.127 A

50 Hz

Main Light Measurement Results

Output

Efficiency

Peak Intensity and Beam Angle

Color Rendering Index

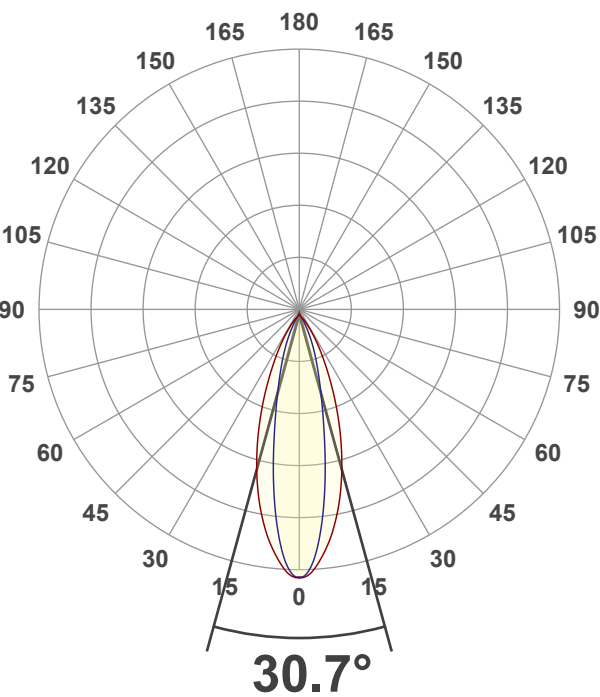
836 lm

57 lm/W

2243 cd – 30.7°

CRI 93.0

Light Intensity Distribution



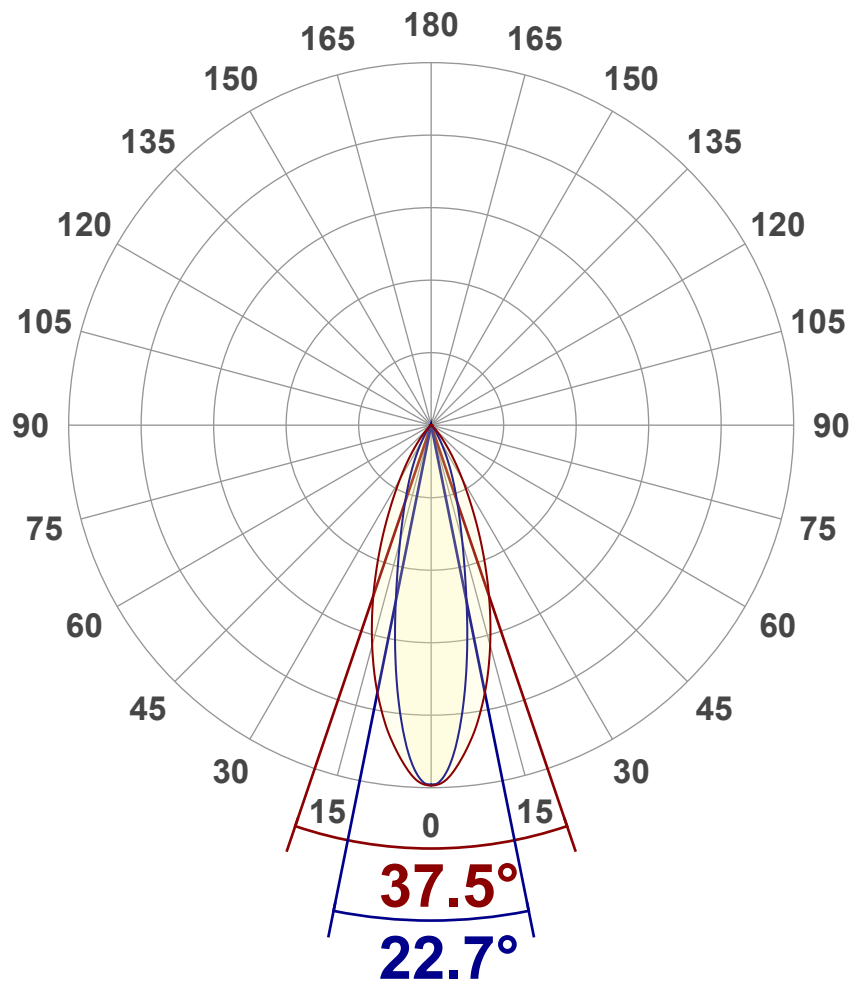
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	836 lm
Peak Intensity	2243 cd
Beam Angle (50%)	30.7°
Beam Angle (90%)	22.7°
Beam Angle (10%)	44.2°

Cut-off Angle

Average 2,5%	79.3°
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Field Angle

Average 10%	60.7°
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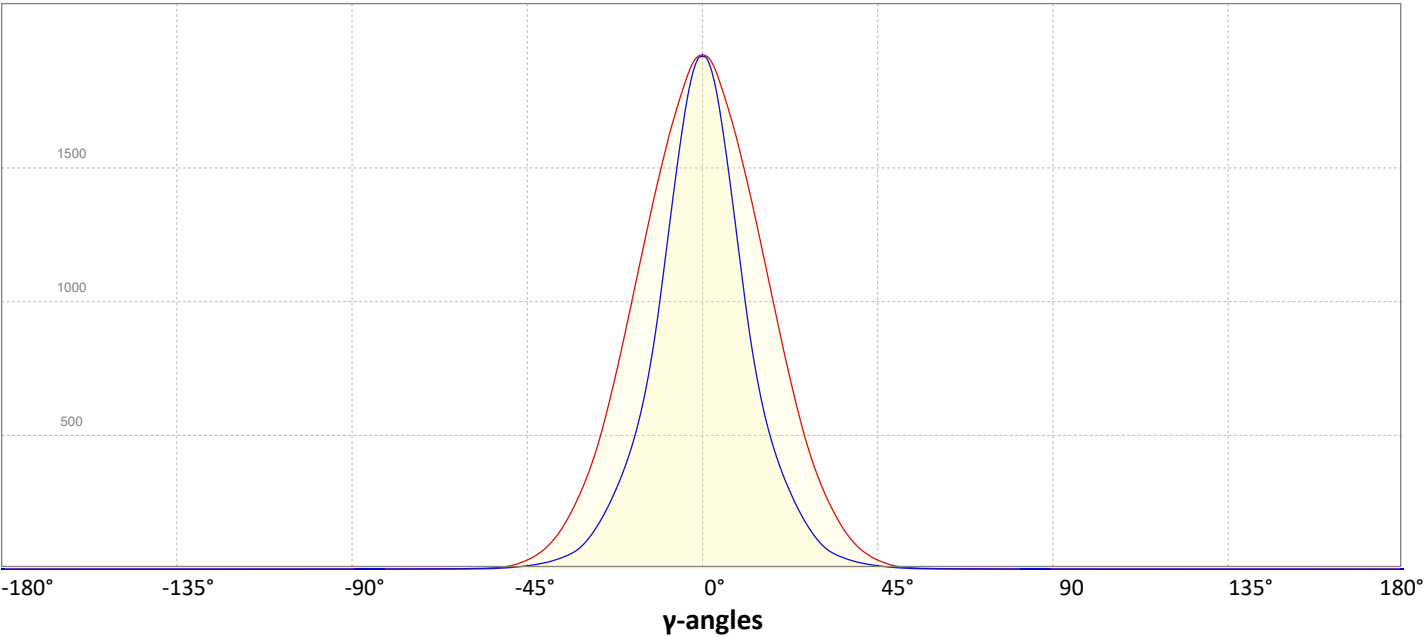
Intensity Ratio

In 120° cone	99.6%
In 90° cone	98.1%

C000-C180

C090-C270

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

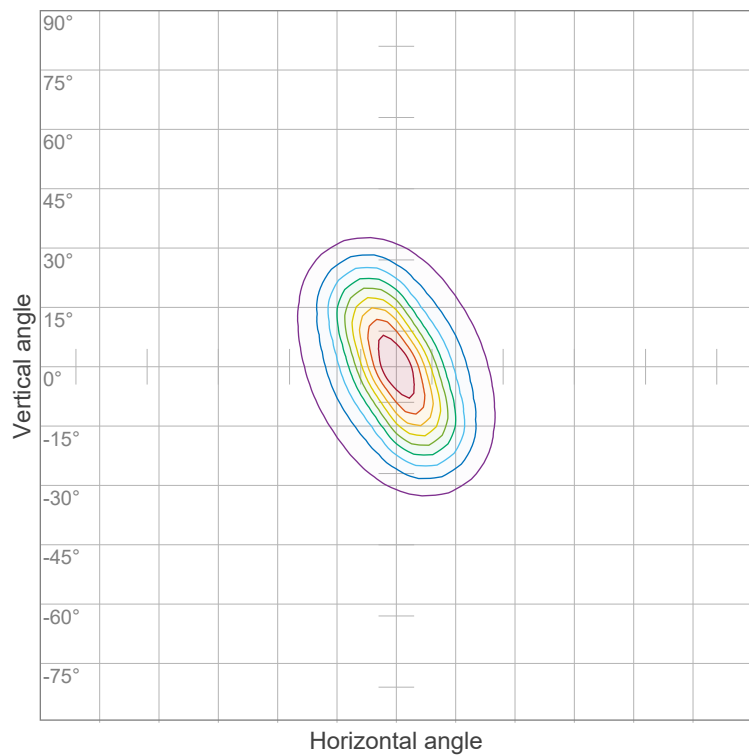


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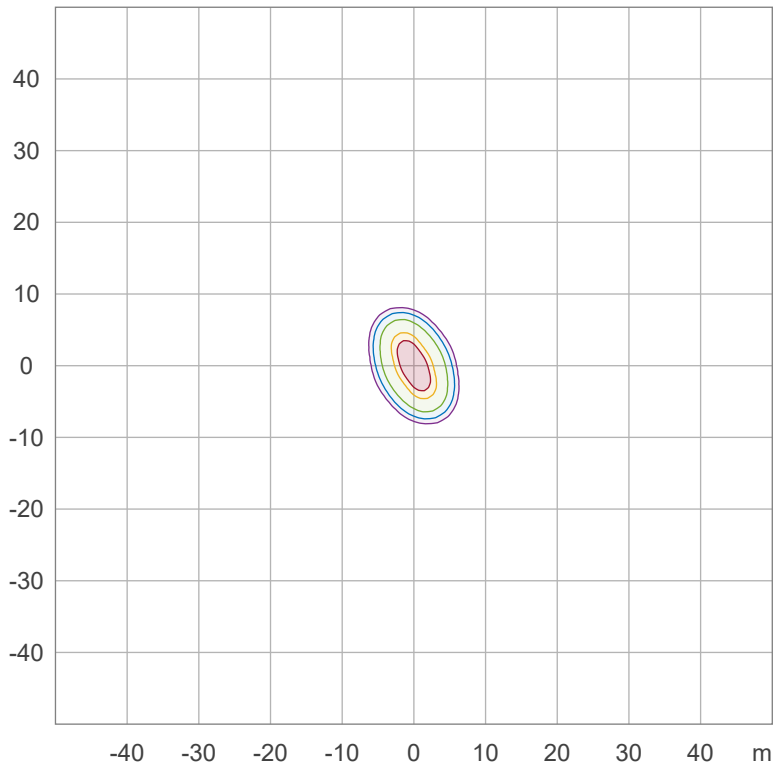
Iso-intensity Diagram (Iso-candela)



90 %	2016.2 cd
80 %	1792.2 cd
70 %	1568.2 cd
60 %	1344.2 cd
50 %	1120.1 cd
40 %	896.1 cd
30 %	672.1 cd
20 %	448.1 cd
10 %	224.0 cd

Peak intensity: 2240.3 cd
Number of c-planes: 32

Iso-illuminance Diagram (Iso-lux)



50.0 %	11.2 lx
30.0 %	6.7 lx
10.0 %	2.2 lx
5.0 %	1.1 lx
3.0 %	0.7 lx

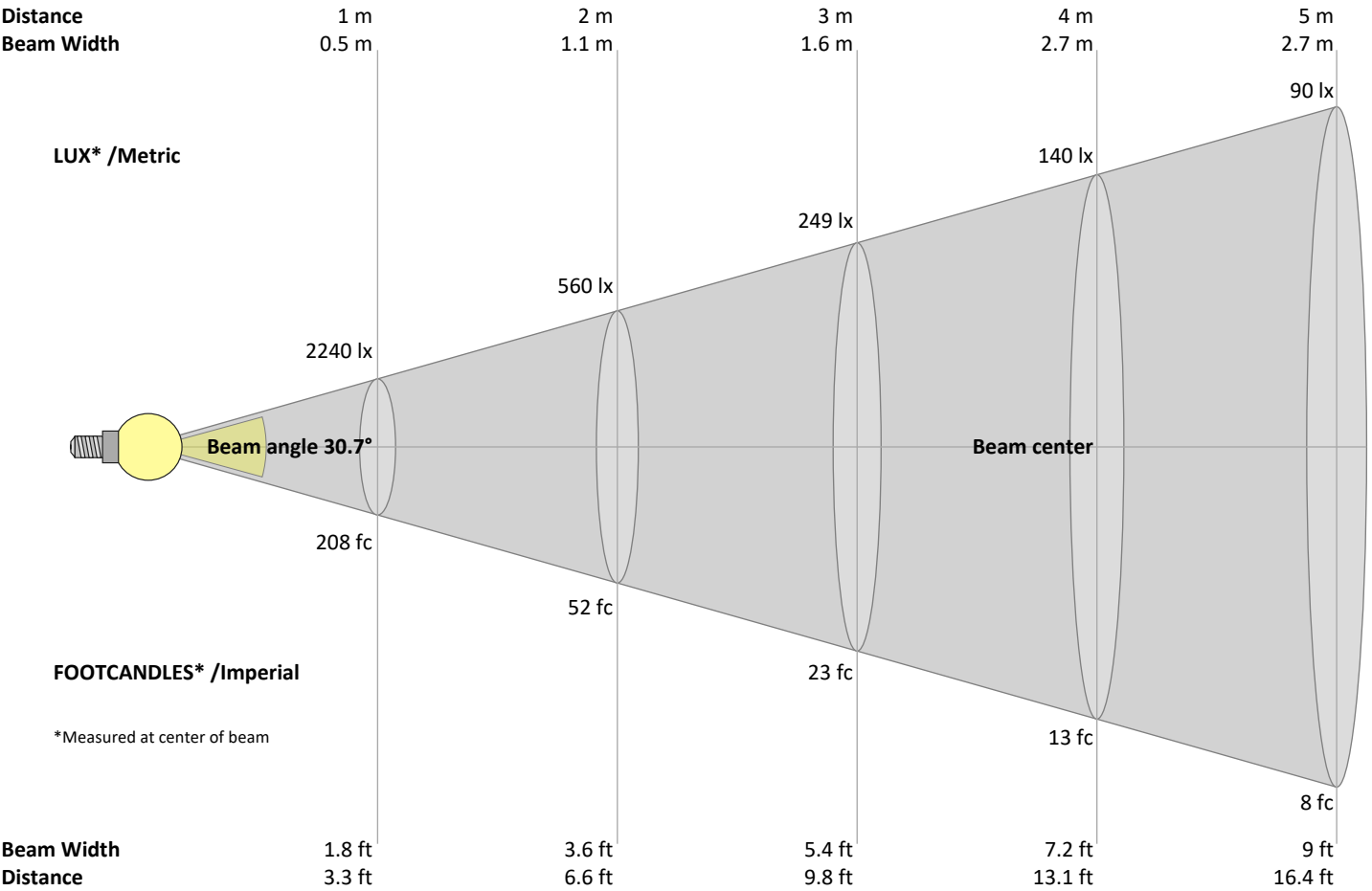
Peak illuminance: 22.4 lx
Mounting height: 10.0 m
Number of c-planes: 32

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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
2240	560	249	140	90	62	46	35	28	22	19	16	13	11	10	9	8	7	6	6	lux
208.1	52	23.1	13	8.3	5.8	4.2	3.3	2.6	2.1	1.7	1.4	1.2	1.1	0.9	0.8	0.7	0.6	0.6	0.5	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
2240	2220	2145	2042	1928	1793	1652	1498	1339	1179	1020	867	725	594	482	388	308	240	181	133	cd
100%	99%	96%	91%	86%	80%	74%	67%	60%	53%	46%	39%	32%	27%	22%	17%	14%	11%	8%	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
2240	2191	2042	1820	1563	1295	1042	835	672	544	442	356	282	217	163	119	86	66	51	39	cd
100%	98%	91%	81%	70%	58%	46%	37%	30%	24%	20%	16%	13%	10%	7%	5%	4%	3%	2%	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
2240	2220	2145	2042	1928	1793	1652	1498	1339	1179	1020	867	725	594	482	388	308	240	181	133	cd
100%	99%	96%	91%	86%	80%	74%	67%	60%	53%	46%	39%	32%	27%	22%	17%	14%	11%	8%	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
2240	2191	2042	1820	1563	1295	1042	835	672	544	442	356	282	217	163	119	86	66	51	39	cd
100%	98%	91%	81%	70%	58%	46%	37%	30%	24%	20%	16%	13%	10%	7%	5%	4%	3%	2%	2%	of 0°val

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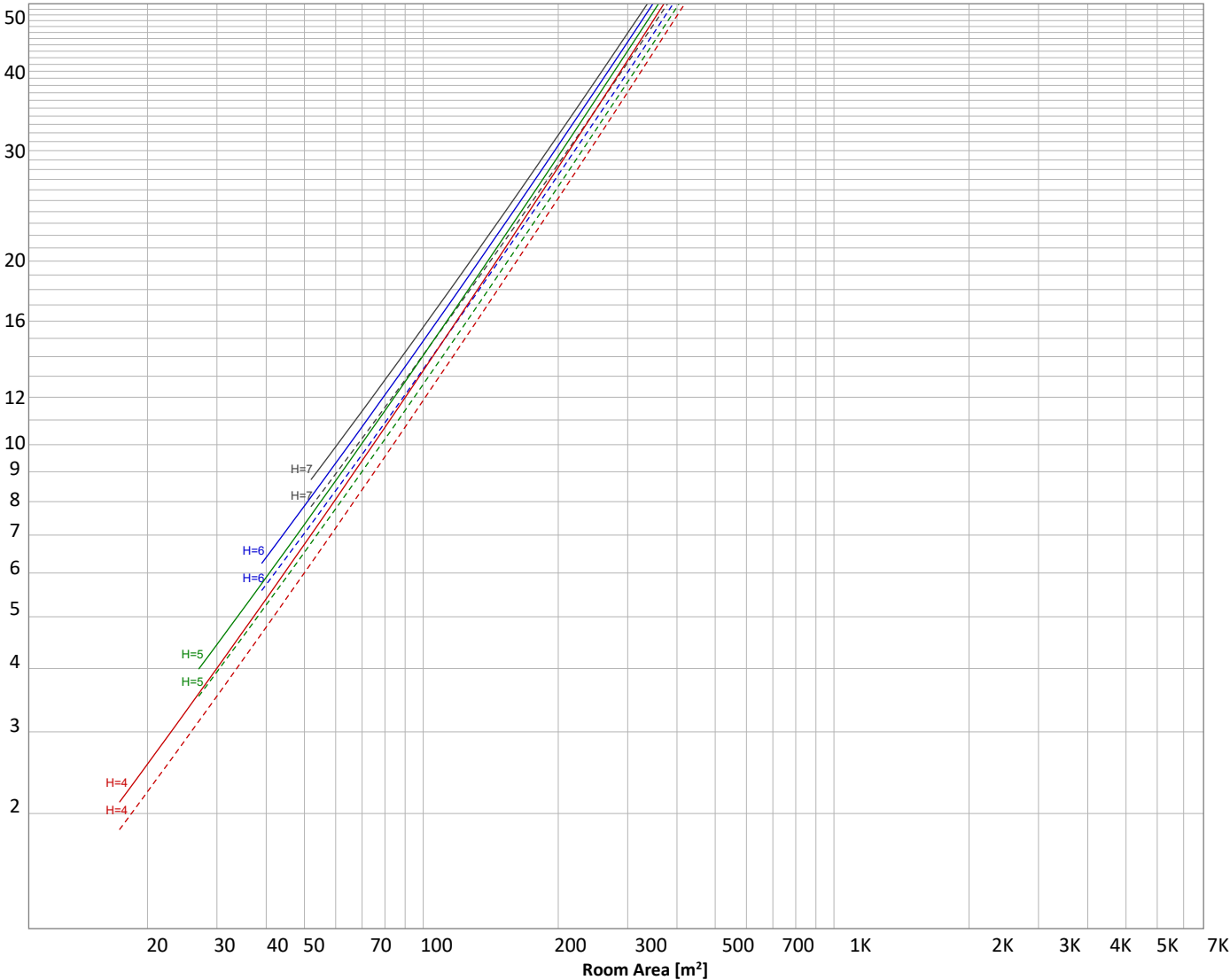
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 836 lm	$\rho(\%)$		
H _{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	Wall reflectance
H _{work} = Work area height from floor =	0.00 m	-----	70	50
E _{work} = 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°
177 lm	304 lm	223 lm	97.3 lm	26.8 lm	4.55 lm	1.35 lm	0.719 lm	0.520 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.148 lm	0.128 lm	0.120 lm	0.109 lm	0.042 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°	177 lm	21.2%
10-20°	304 lm	36.4%
20-30°	223 lm	26.7%
30-40°	97 lm	11.6%
40-50°	27 lm	3.2%
50-60°	5 lm	0.5%
60-70°	1 lm	0.2%
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	836 lm	100.0%

Intensity peaks

Max intensity	2243 cd
Intensity, 90°	0 cd
Intensity, 0°	2240 cd

Zonal Lumen summary

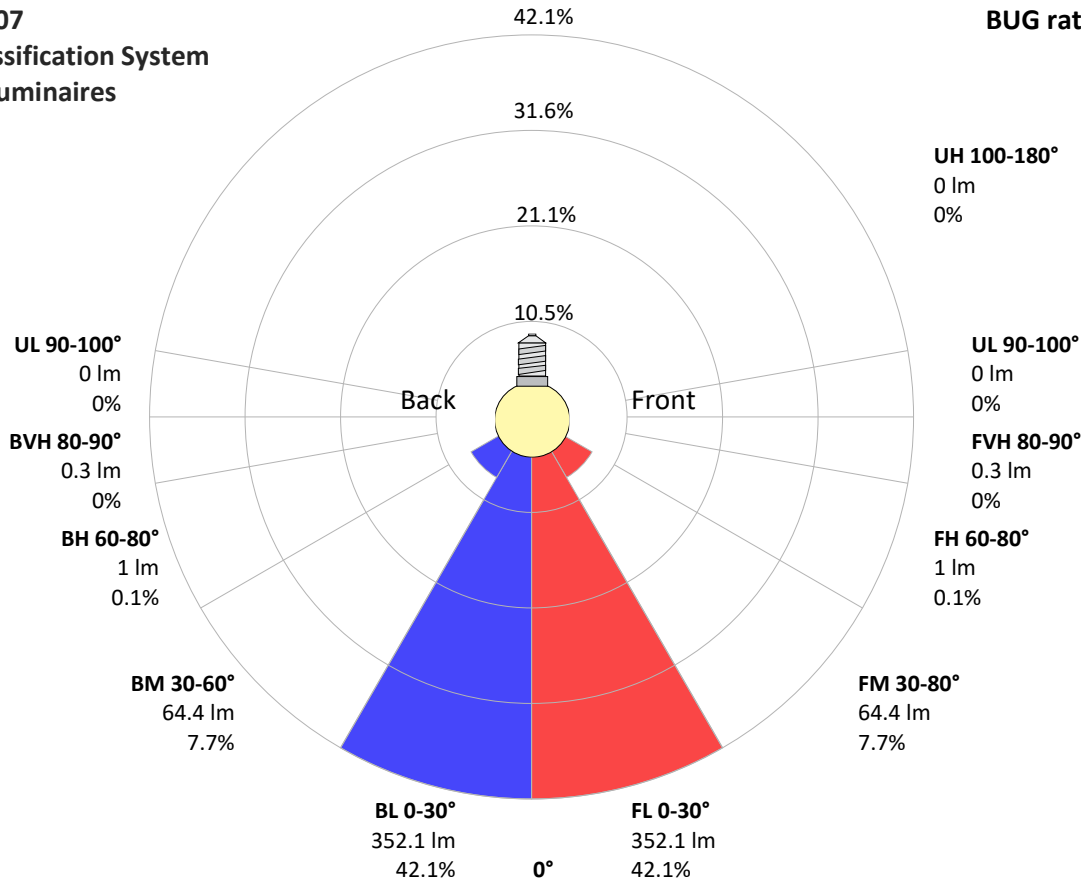
Zone (γ)	Lumen	% Total
0-30°	704 lm	84.2%
0-40°	802 lm	95.9%
0-60°	833 lm	99.6%
60-90°	3 lm	0.3%
70-100°	1 lm	0.2%
90-120°	0 lm	0.0%
0-90°	835 lm	99.9%
90-180°	1 lm	0.1%
0-180°	836 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	352 lm	42.1%
Medium(30-60°)	64 lm	7.7%
High(60-80°)	1 lm	0.1%
Very high(80-90°)	0 lm	0.0%
Back light		
Low(0-30°)	352 lm	42.1%
Medium(30-60°)	64 lm	7.7%
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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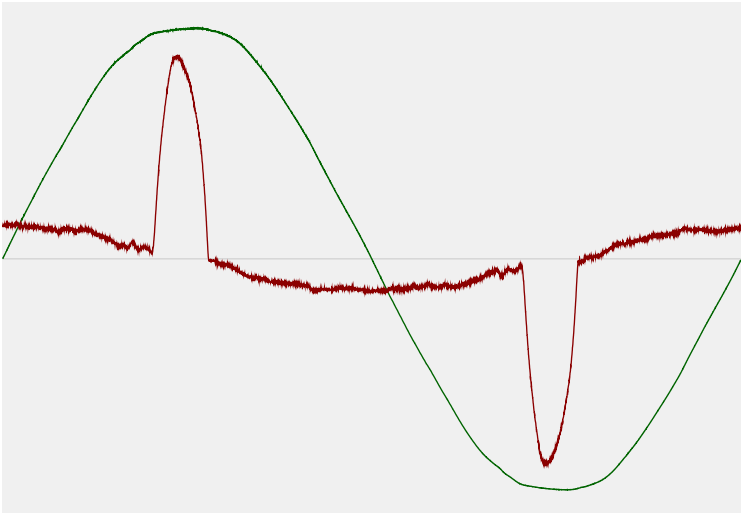


Power Details

Input Power

Power feed to light source	14.6 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	243 V
RMS Input current feed, I_{RMS}	0.127 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	30.84 VA
Displacement factor of AC power feed	0.78
Power factor of AC current feed	0.47
Total harmonic distortion of the current	130.1%
Total harmonic distortion of the voltage	1.33%

Input Power Curve



Efficiency

Radiated power efficiency	21.0%
Lumen efficiency	57 lm/W

Goniophotometry Report

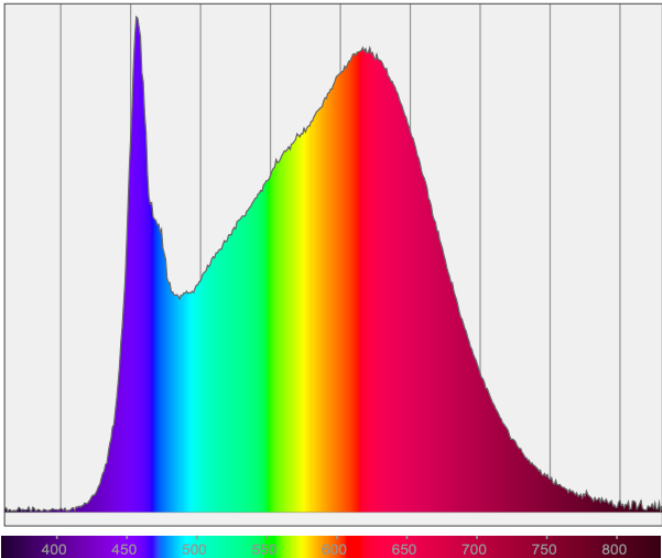
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Color Measurements

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



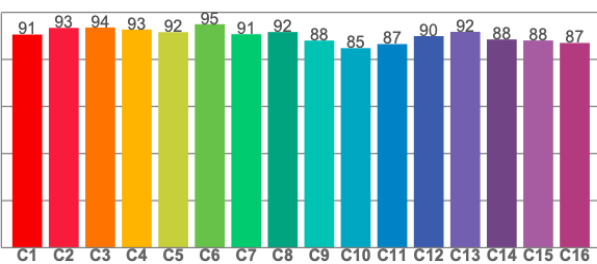
Color Rendering Index per reference color (CIE 1995)



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

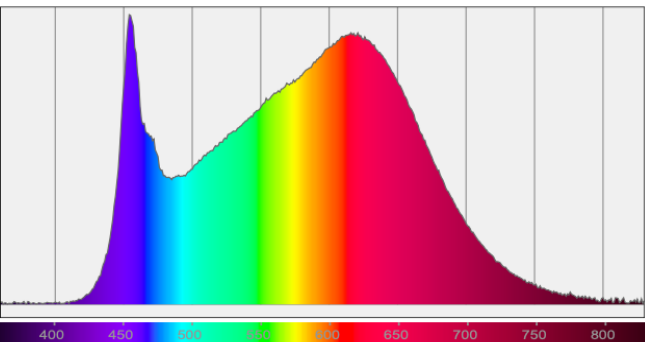
TM30-18 Rf-values per hue bin



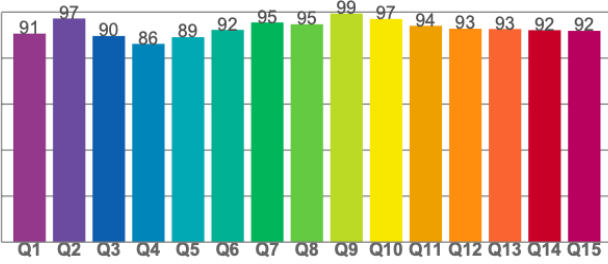
TM30 C values, 16 binned values out of total of 99 C values

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

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
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