

Tested Light Source - 1_PHOT_NINETY-NINE-2275lmChip-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

15.8 W – PF 0.98 – DPF 0.98

242 V – 0.067 A

50 Hz

Main Light Measurement Results

Output

Efficiency

Peak Intensity and Beam Angle

Color Rendering Index

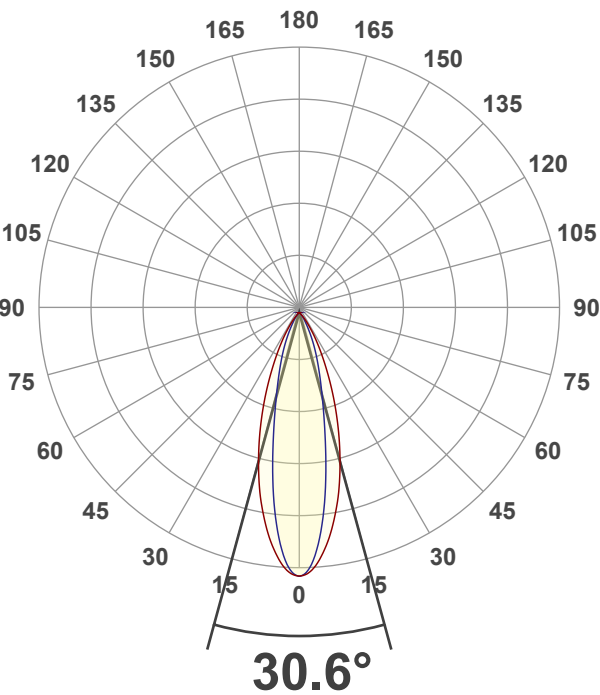
981 lm

62 lm/W

2627 cd – 30.6°

CRI 92.8

Light Intensity Distribution



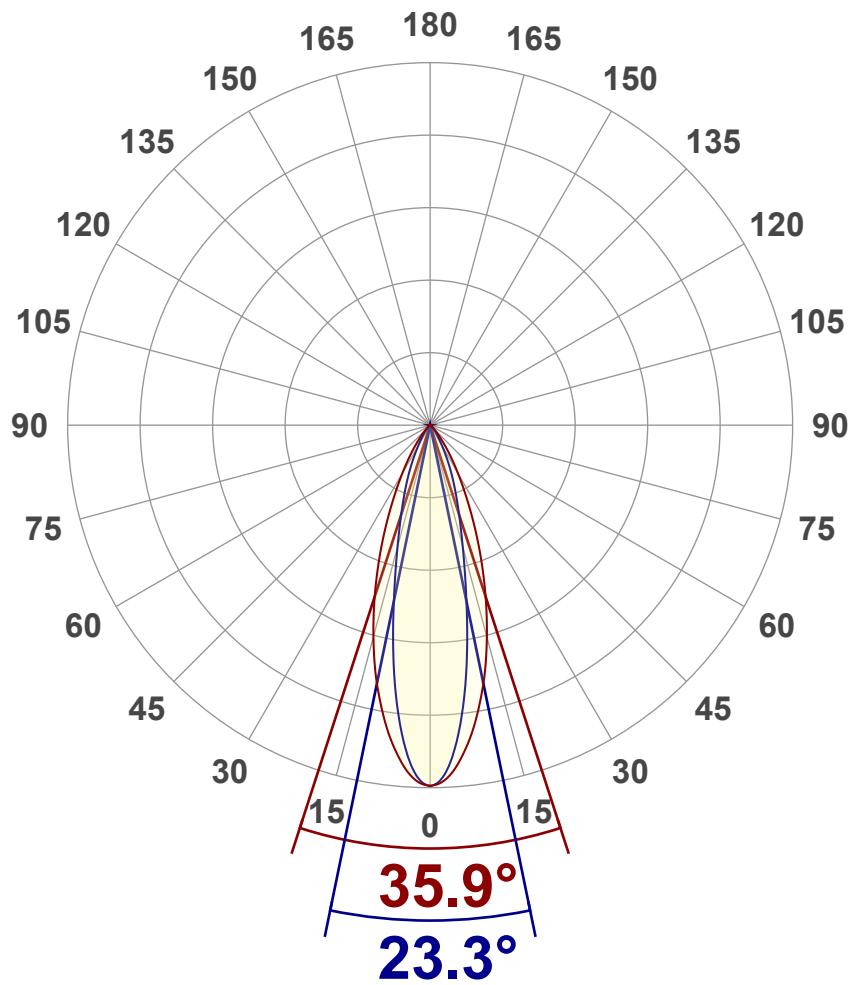
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	981 lm
Peak Intensity	2627 cd
Beam Angle (50%)	30.6°
Beam Angle (90%)	23.3°
Beam Angle (10%)	41.8°

Cut-off Angle

Average 2,5%	80.5°
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Field Angle

Average 10%	61°
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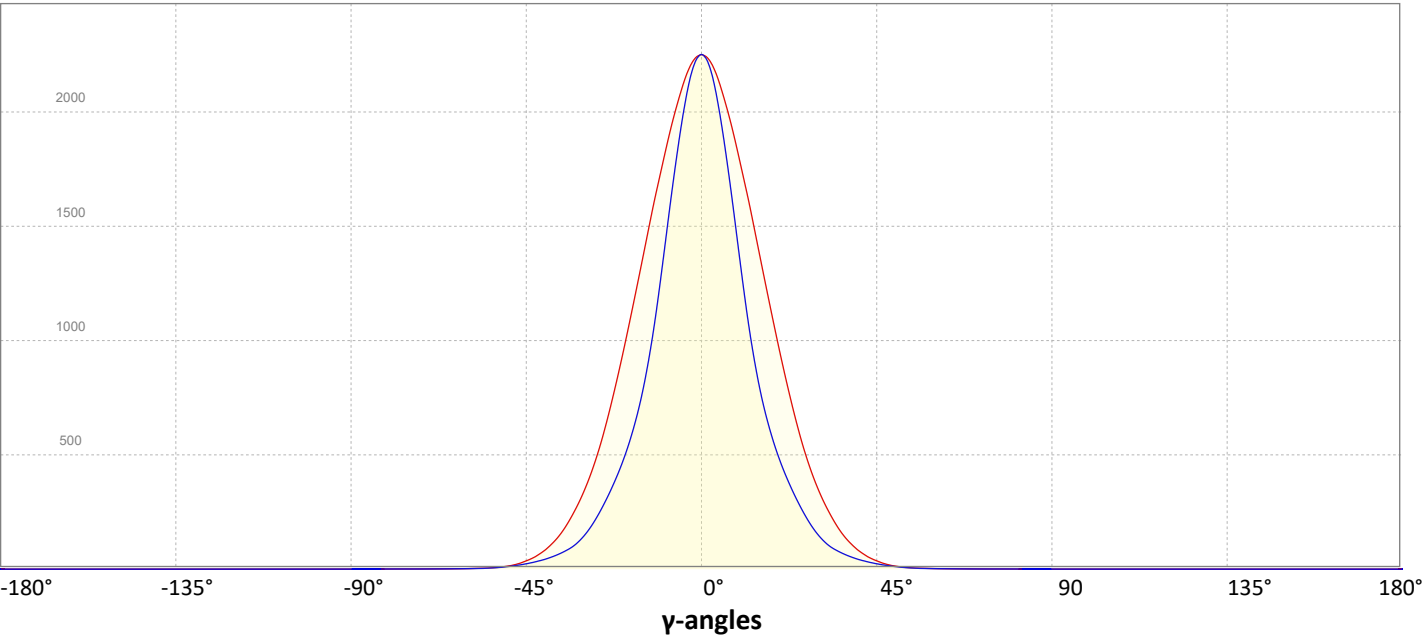
Intensity Ratio

In 120° cone	99.6%
In 90° cone	98.0%

C000-C180

C090-C270

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

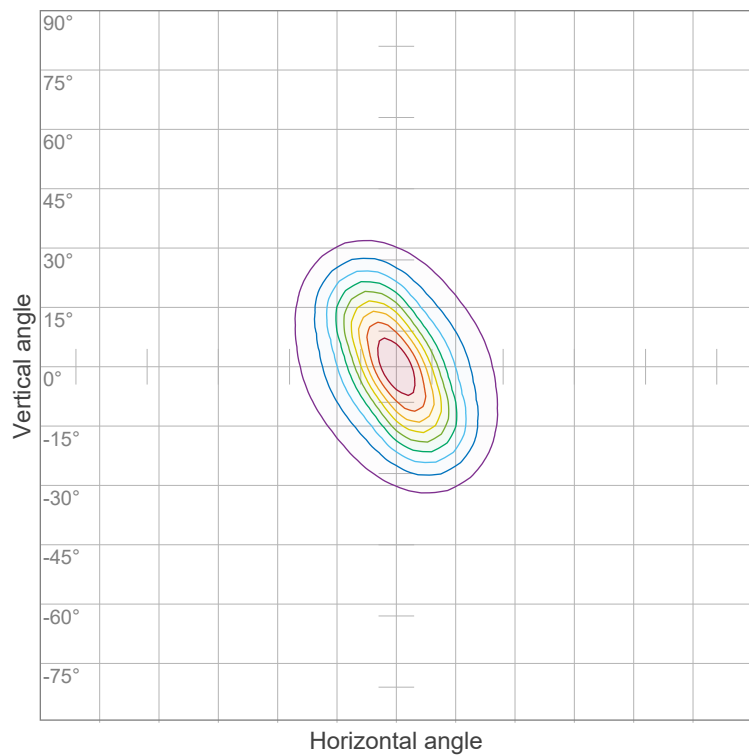


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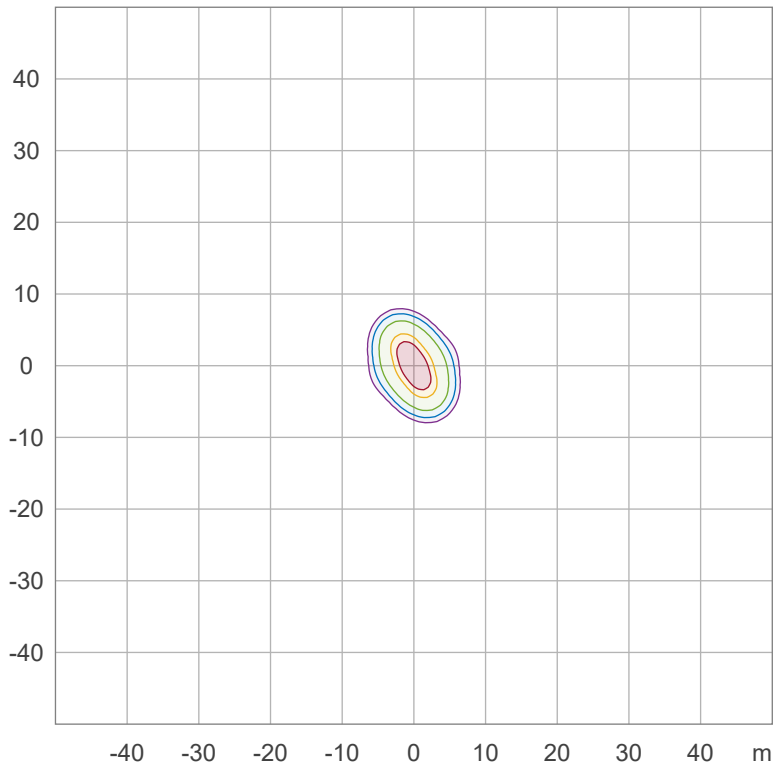
Iso-intensity Diagram (Iso-candela)



90 %	2361.7 cd
80 %	2099.2 cd
70 %	1836.8 cd
60 %	1574.4 cd
50 %	1312.0 cd
40 %	1049.6 cd
30 %	787.2 cd
20 %	524.8 cd
10 %	262.4 cd

Peak intensity: 2624.1 cd
Number of c-planes: 32

Iso-illuminance Diagram (Iso-lux)



50.0 %	13.1 lx
30.0 %	7.9 lx
10.0 %	2.6 lx
5.0 %	1.3 lx
3.0 %	0.8 lx

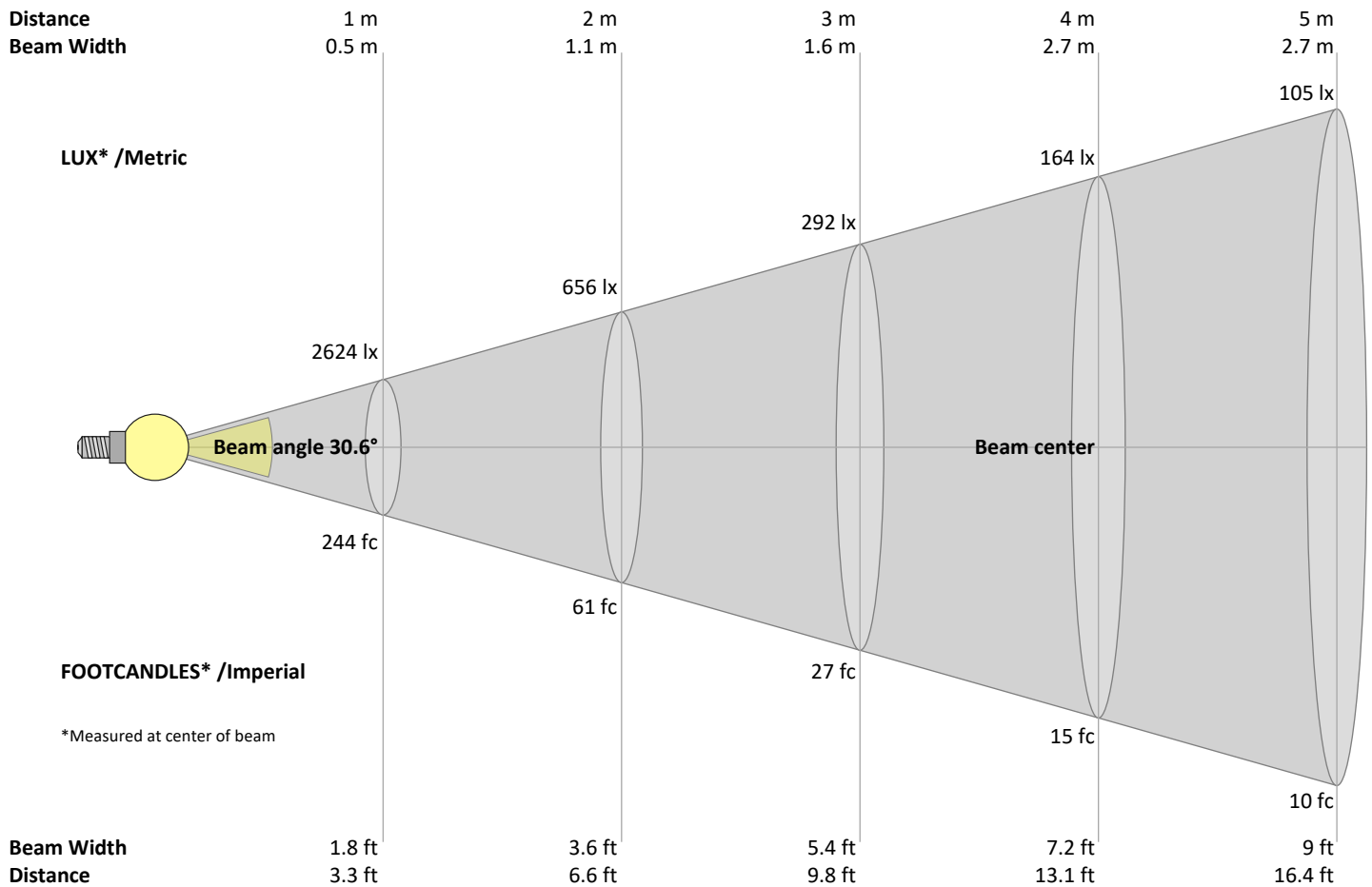
Peak illuminance: 26.2 lx
Mounting height: 10.0 m
Number of c-planes: 32

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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
2624	656	292	164	105	73	54	41	32	26	22	18	16	13	12	10	9	8	7	7	lux
243.8	60.9	27.1	15.2	9.8	6.8	5	3.8	3	2.4	2	1.7	1.4	1.2	1.1	1	0.8	0.8	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
2624	2600	2517	2391	2241	2070	1891	1697	1500	1306	1119	943	780	634	510	407	320	247	185	138	cd
100%	99%	96%	91%	85%	79%	72%	65%	57%	50%	43%	36%	30%	24%	19%	16%	12%	9%	7%	5%	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
2624	2568	2402	2158	1868	1557	1263	1021	830	682	562	462	374	296	229	174	133	104	83	66	cd
100%	98%	92%	82%	71%	59%	48%	39%	32%	26%	21%	18%	14%	11%	9%	7%	5%	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
2624	2600	2517	2391	2241	2070	1891	1697	1500	1306	1119	943	780	634	510	407	320	247	185	138	cd
100%	99%	96%	91%	85%	79%	72%	65%	57%	50%	43%	36%	30%	24%	19%	16%	12%	9%	7%	5%	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
2624	2568	2402	2158	1868	1557	1263	1021	830	682	562	462	374	296	229	174	133	104	83	66	cd
100%	98%	92%	82%	71%	59%	48%	39%	32%	26%	21%	18%	14%	11%	9%	7%	5%	4%	3%	2%	of 0°val

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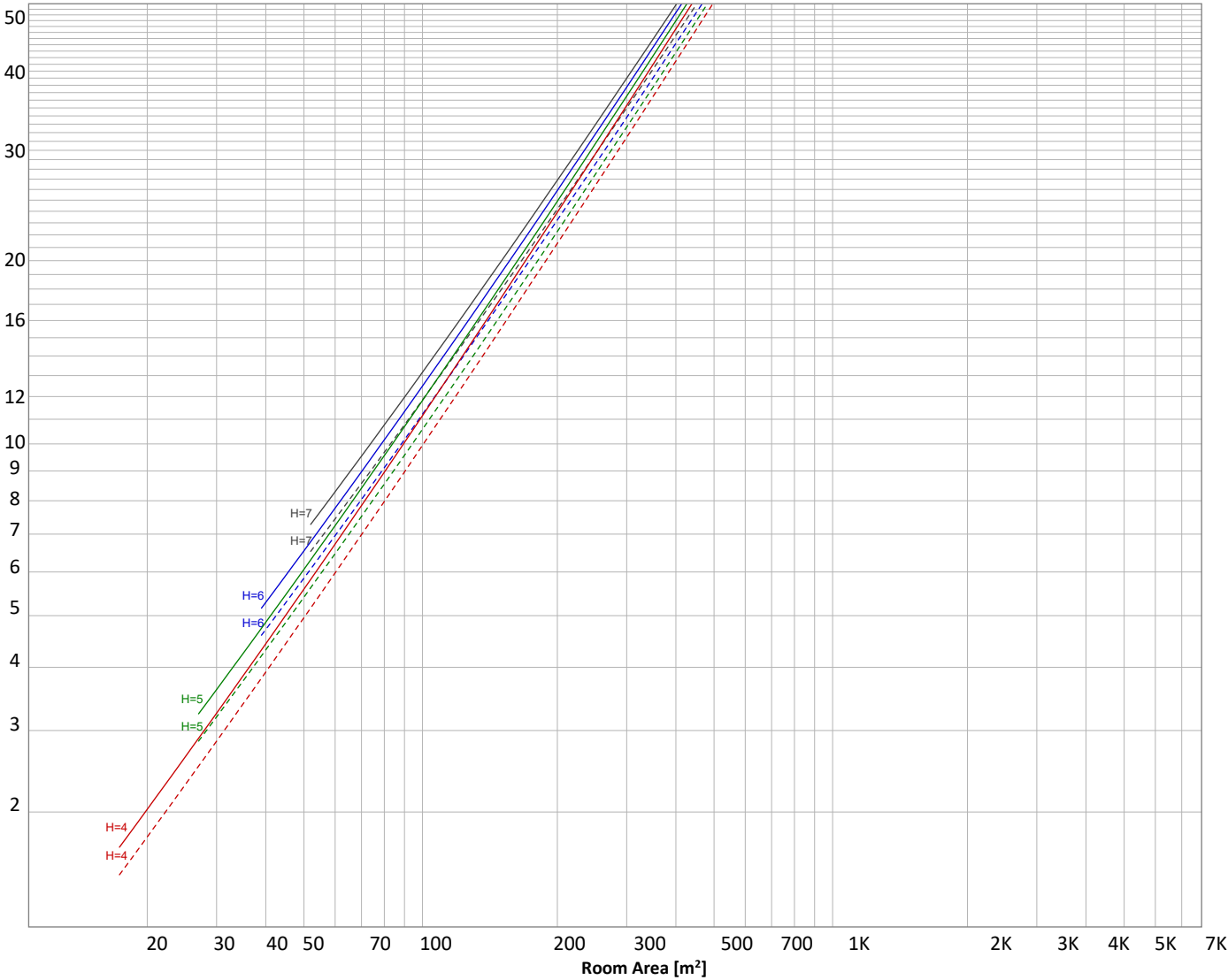
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 981 lm	ρ(%)		
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
				20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
208 lm	358 lm	261 lm	113 lm	31.9 lm	5.28 lm	1.60 lm	0.888 lm	0.716 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.286 lm	0.275 lm	0.258 lm	0.233 lm	0.092 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°	208 lm	21.2%
10-20°	358 lm	36.5%
20-30°	261 lm	26.6%
30-40°	113 lm	11.5%
40-50°	32 lm	3.3%
50-60°	5 lm	0.5%
60-70°	2 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	981 lm	100.0%

Intensity peaks

Max intensity	2627 cd
Intensity, 90°	0 cd
Intensity, 0°	2624 cd

Zonal Lumen summary

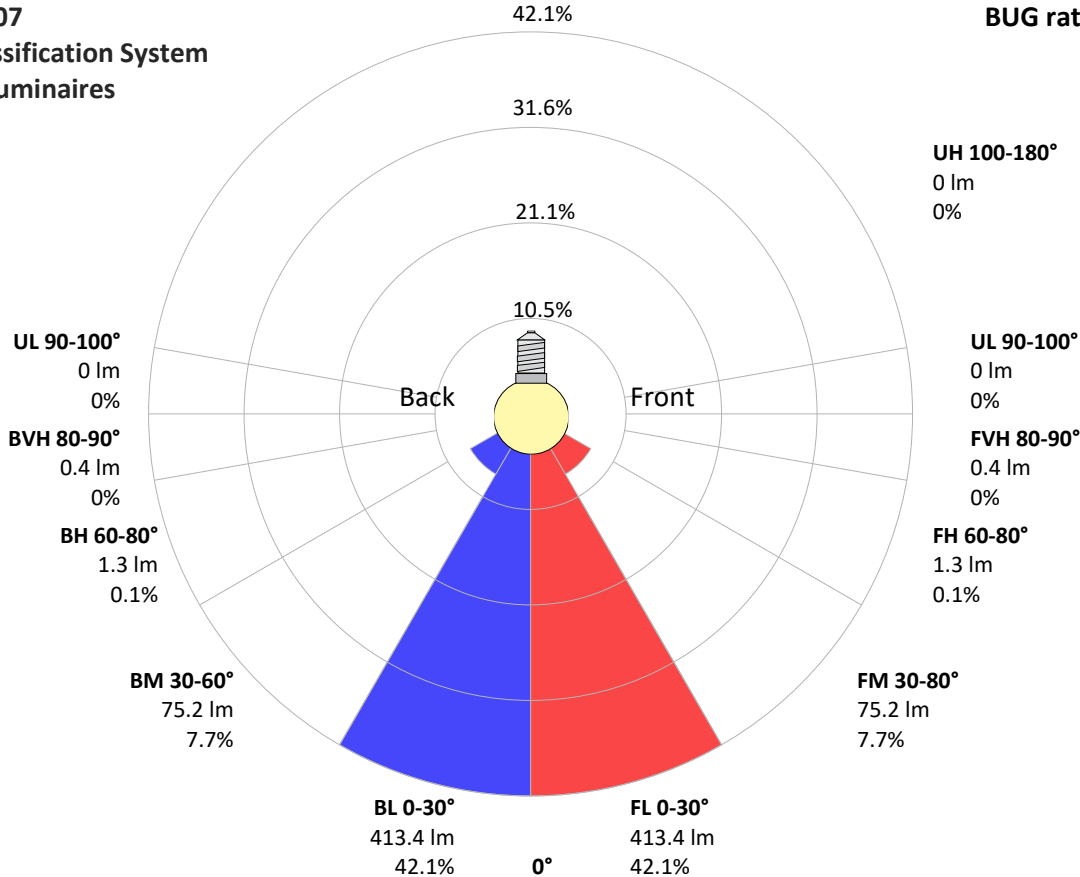
Zone (γ)	Lumen	% Total
0-30°	827 lm	84.3%
0-40°	939 lm	95.8%
0-60°	977 lm	99.6%
60-90°	3 lm	0.3%
70-100°	2 lm	0.2%
90-120°	1 lm	0.1%
0-90°	980 lm	99.9%
90-180°	1 lm	0.1%
0-180°	981 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	413 lm	42.1%
Medium(30-60°)	75 lm	7.7%
High(60-80°)	1 lm	0.1%
Very high(80-90°)	0 lm	0.0%
Back light		
Low(0-30°)	413 lm	42.1%
Medium(30-60°)	75 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	15.8 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	242 V
RMS Input current feed, I_{RMS}	0.067 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	16.12 VA
Displacement factor of AC power feed	0.98
Power factor of AC current feed	0.98
Total harmonic distortion of the current	6.23%
Total harmonic distortion of the voltage	1.42%

Input Power Curve



Efficiency

Radiated power efficiency	22.7%
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Lumen efficiency	62 lm/W
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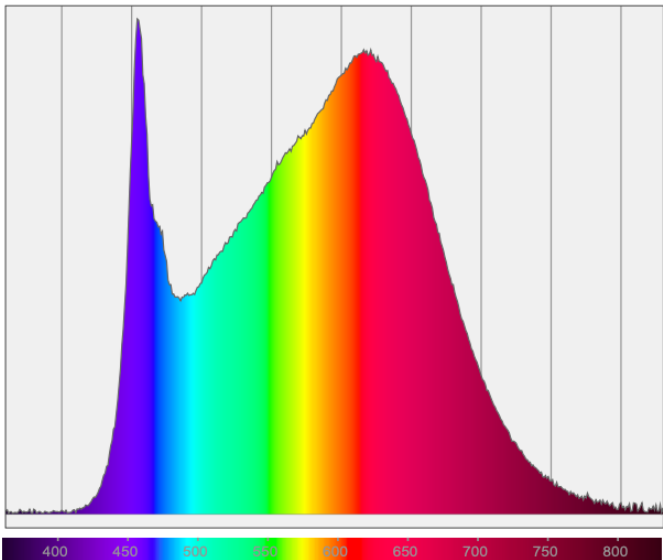
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Color Measurements

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



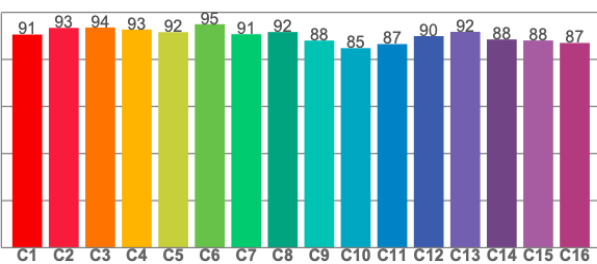
Color Rendering Index per reference color (CIE 1995)



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

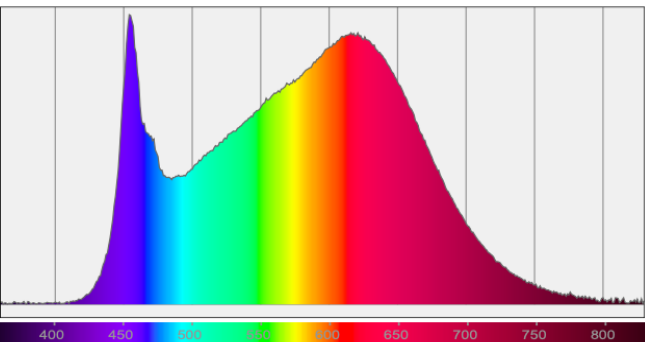
TM30-18 Rf-values per hue bin



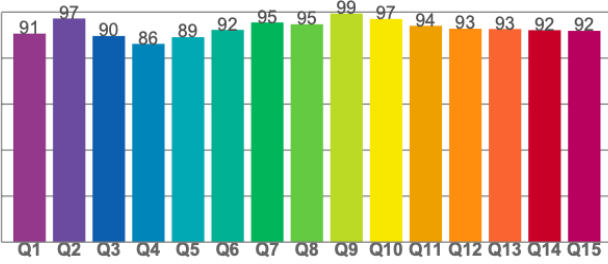
TM30 C values, 16 binned values out of total of 99 C values

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