

Tested Light Source - 1\_PHOT\_NINETY-NINE-1925lmChip-4000K-Spreader\_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 0.46 – DPF 0.78

244 V – 0.129 A

49.9 Hz

Main Light Measurement Results

Output

Efficiency

Peak Intensity and Beam Angle

Color Rendering Index

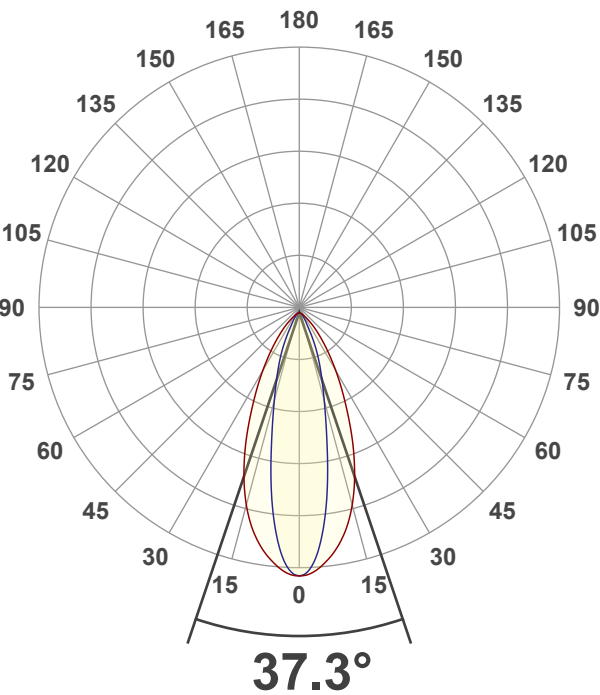
1442 lm

99 lm/W

2495 cd – 37.3°

CRI 93.0

Light Intensity Distribution



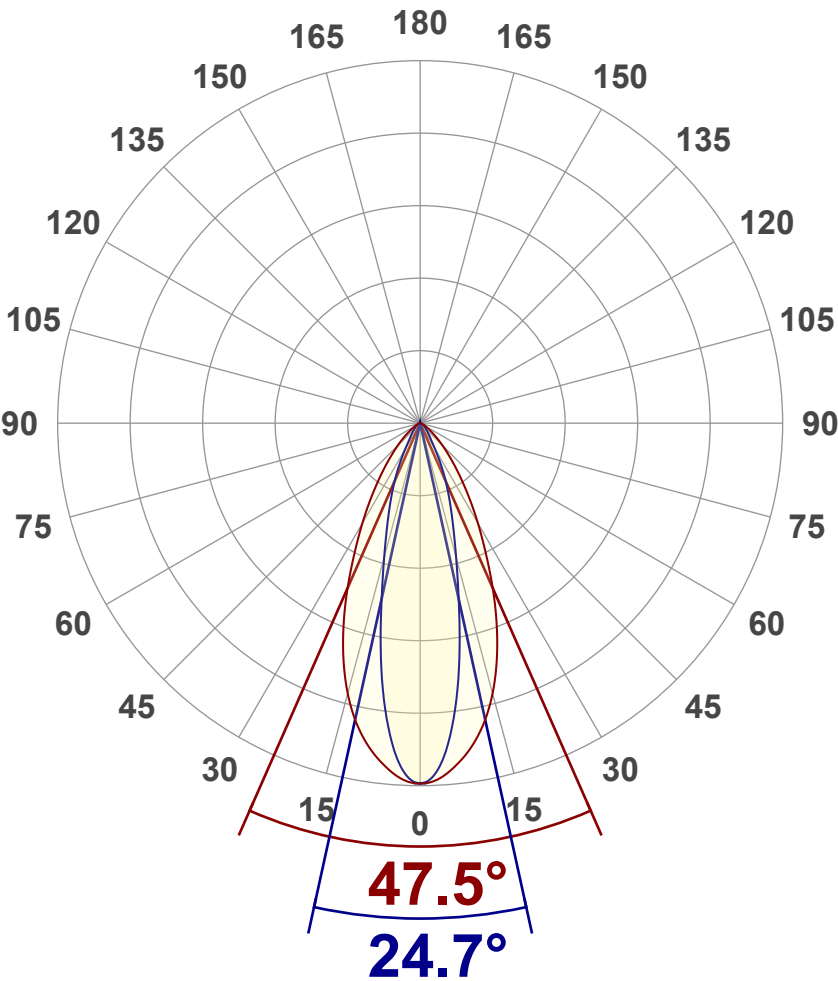
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1442 lm
Peak Intensity	2495 cd
Beam Angle (50%)	37.3°
Beam Angle (90%)	24.7°
Beam Angle (10%)	58.5°

Cut-off Angle

Average 2,5%	100.2°
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Field Angle

Average 10%	72.5°
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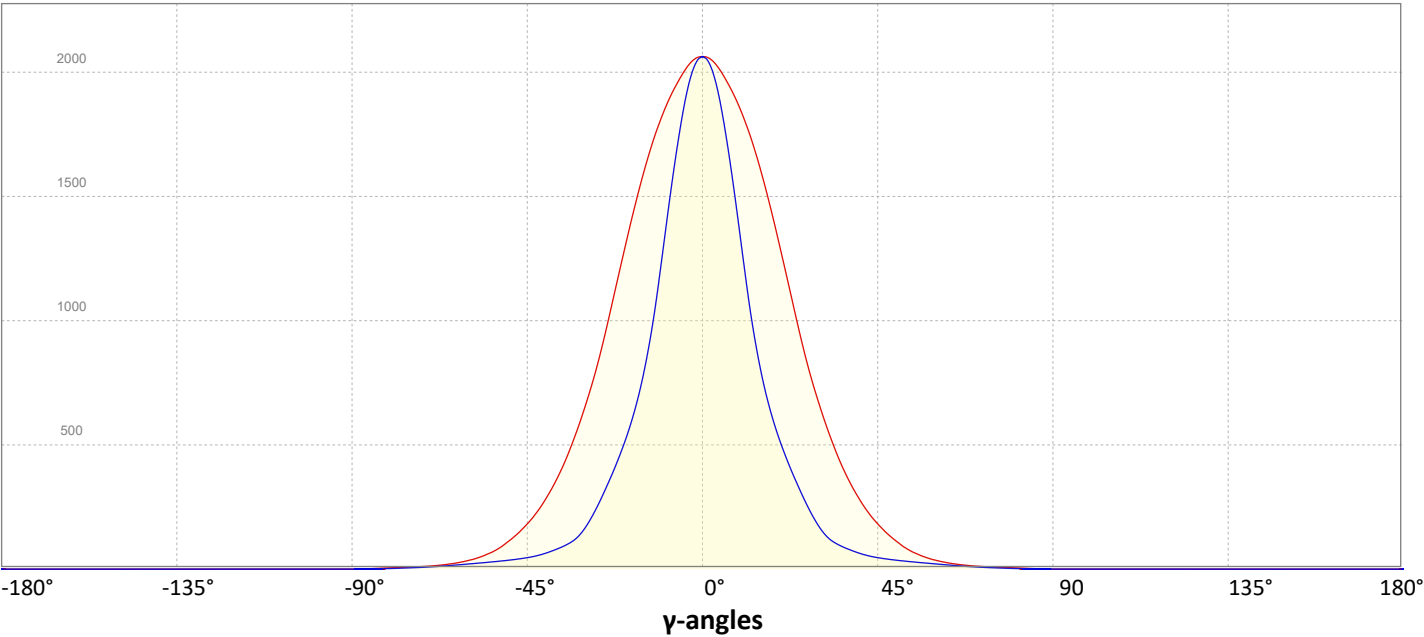
Intensity Ratio

In 120° cone	97.6%
In 90° cone	90.3%

C000-C180

C090-C270

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

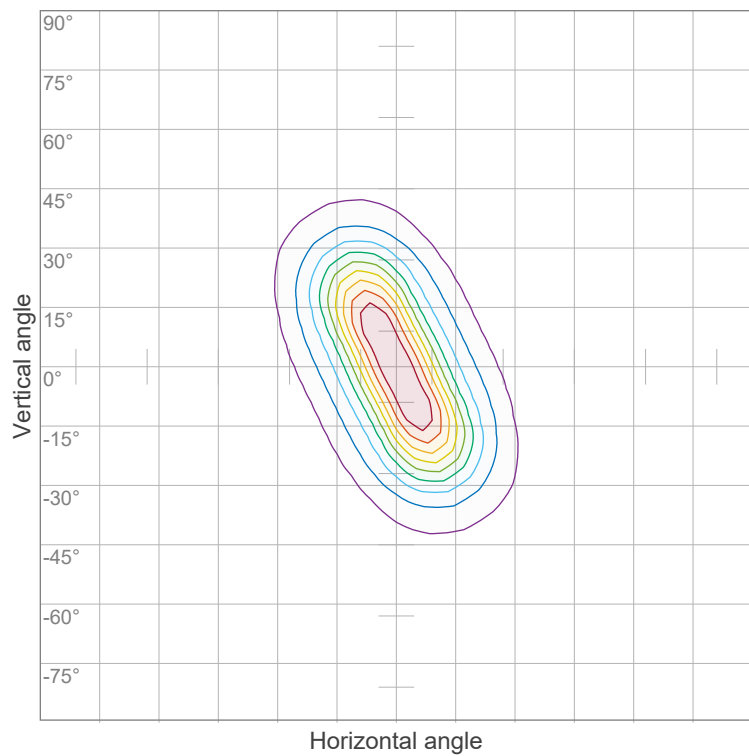


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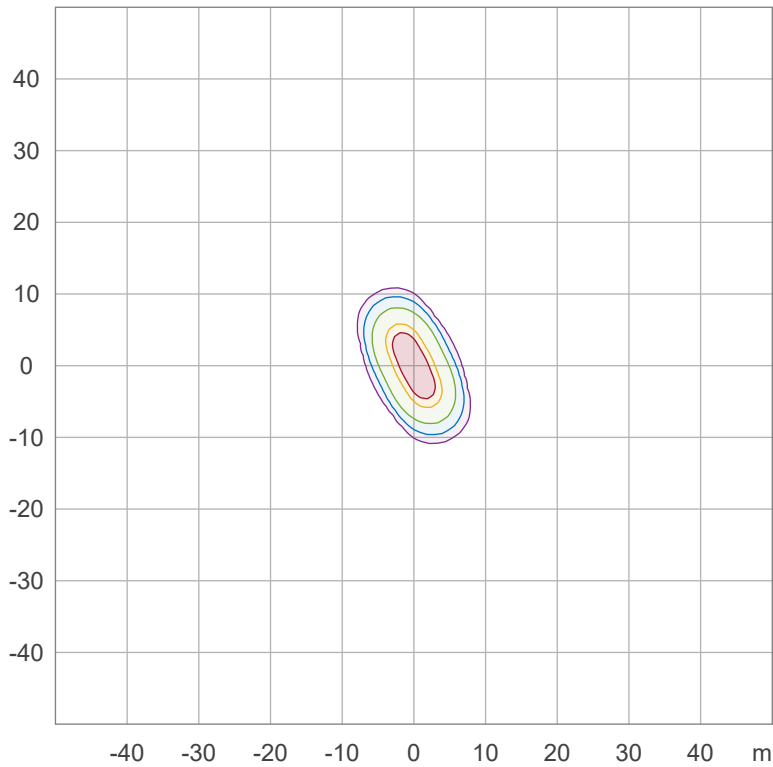
## Iso-intensity Diagram (Iso-candela)



90 %	2244.9 cd
80 %	1995.5 cd
70 %	1746.0 cd
60 %	1496.6 cd
50 %	1247.2 cd
40 %	997.7 cd
30 %	748.3 cd
20 %	498.9 cd
10 %	249.4 cd

Peak intensity: 2494.3 cd  
Number of c-planes: 32

## Iso-illuminance Diagram (Iso-lux)



50.0 %	12.4 lx
30.0 %	7.5 lx
10.0 %	2.5 lx
5.0 %	1.2 lx
3.0 %	0.7 lx

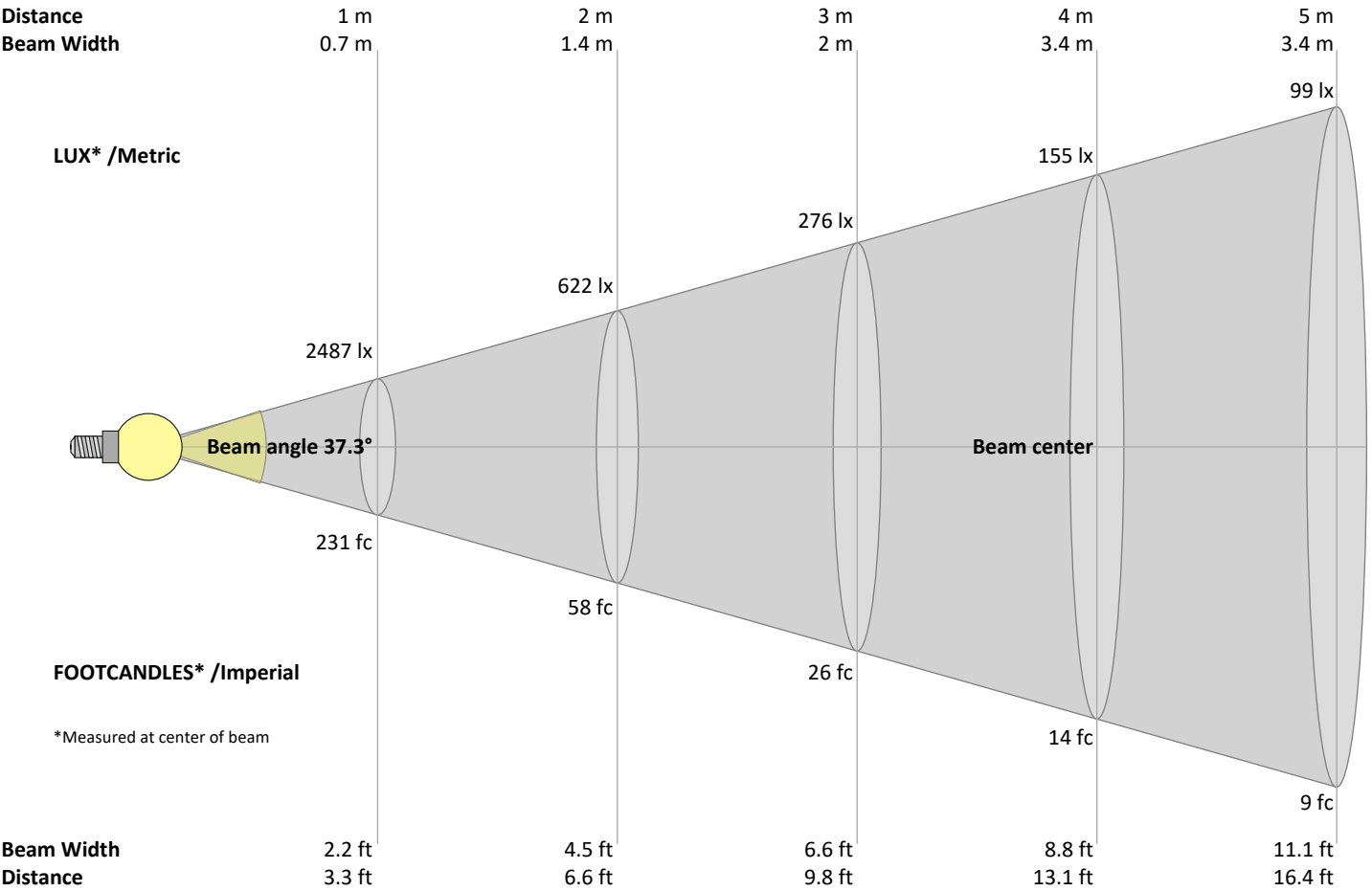
Peak illuminance: 24.9 lx  
Mounting height: 10.0 m  
Number of c-planes: 32

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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
2487	622	276	155	99	69	51	39	31	25	21	17	15	13	11	10	9	8	7	6	lux
231	57.8	25.7	14.4	9.2	6.4	4.7	3.6	2.9	2.3	1.9	1.6	1.4	1.2	1	0.9	0.8	0.7	0.6	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
2487	2474	2434	2374	2303	2217	2116	1997	1862	1713	1553	1389	1223	1064	922	798	685	583	493	416	cd
100%	100%	98%	95%	93%	89%	85%	80%	75%	69%	62%	56%	49%	43%	37%	32%	28%	23%	20%	17%	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
2487	2443	2314	2107	1852	1568	1288	1057	874	732	616	516	427	344	268	205	157	128	109	93	cd
100%	98%	93%	85%	74%	63%	52%	43%	35%	29%	25%	21%	17%	14%	11%	8%	6%	5%	4%	4%	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
2487	2474	2434	2374	2303	2217	2116	1997	1862	1713	1553	1389	1223	1064	922	798	685	583	493	416	cd
100%	100%	98%	95%	93%	89%	85%	80%	75%	69%	62%	56%	49%	43%	37%	32%	28%	23%	20%	17%	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
2487	2443	2314	2107	1852	1568	1288	1057	874	732	616	516	427	344	268	205	157	128	109	93	cd
100%	98%	93%	85%	74%	63%	52%	43%	35%	29%	25%	21%	17%	14%	11%	8%	6%	5%	4%	4%	of 0°val



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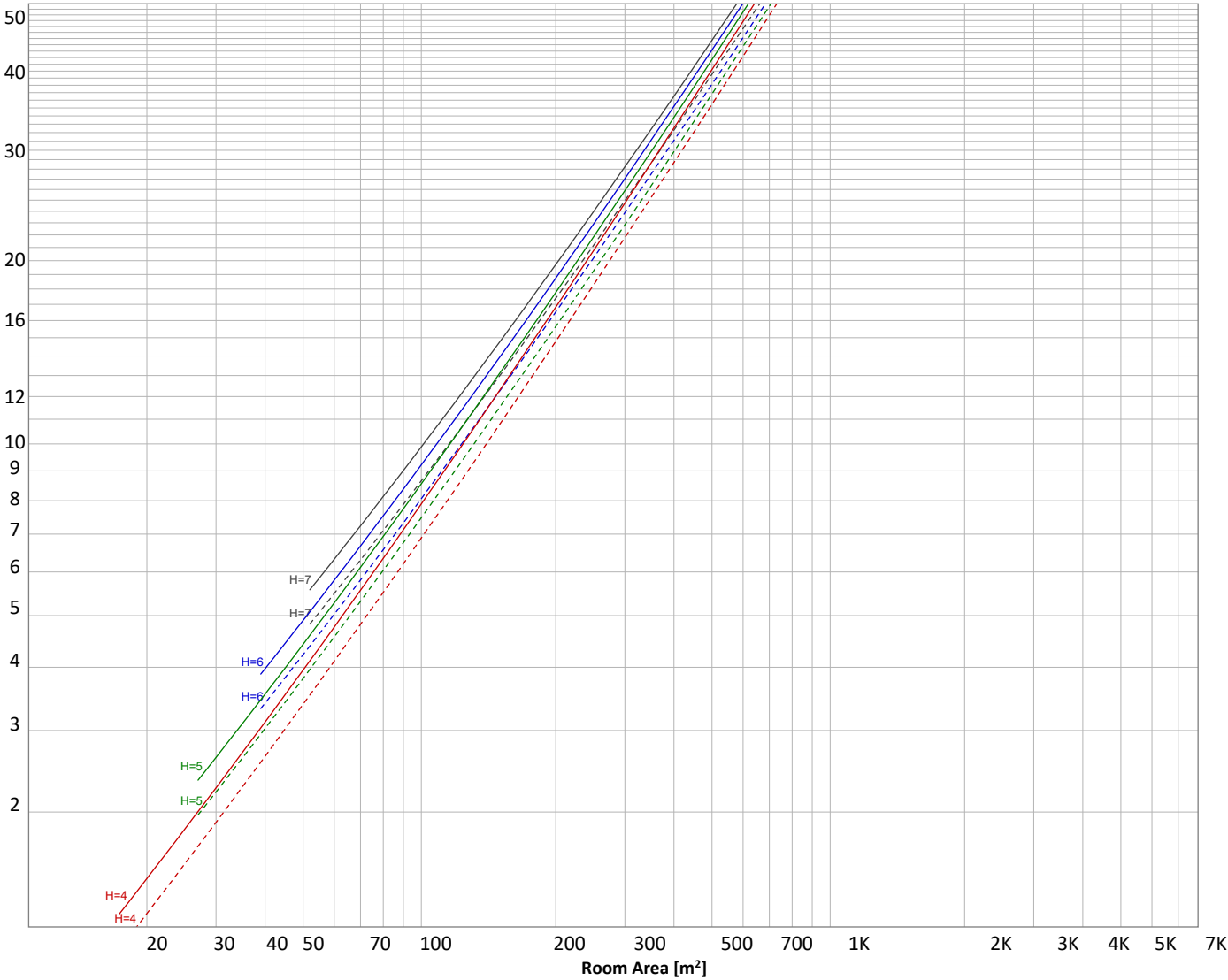
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 1442 lm	p(%)		
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
				20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
207 lm	410 lm	379 lm	236 lm	119 lm	55.6 lm	23.4 lm	8.80 lm	2.12 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.190 lm	0.183 lm	0.172 lm	0.156 lm	0.058 lm	0.000 lm	0.000 lm	0.000 lm	0.000 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	207 lm	14.4%
10-20°	410 lm	28.4%
20-30°	379 lm	26.3%
30-40°	236 lm	16.4%
40-50°	119 lm	8.2%
50-60°	56 lm	3.9%
60-70°	23 lm	1.6%
70-80°	9 lm	0.6%
80-90°	2 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	1442 lm	100.0%

Intensity peaks

Max intensity	2495 cd
Intensity, 90°	0 cd
Intensity, 0°	2487 cd

Zonal Lumen summary

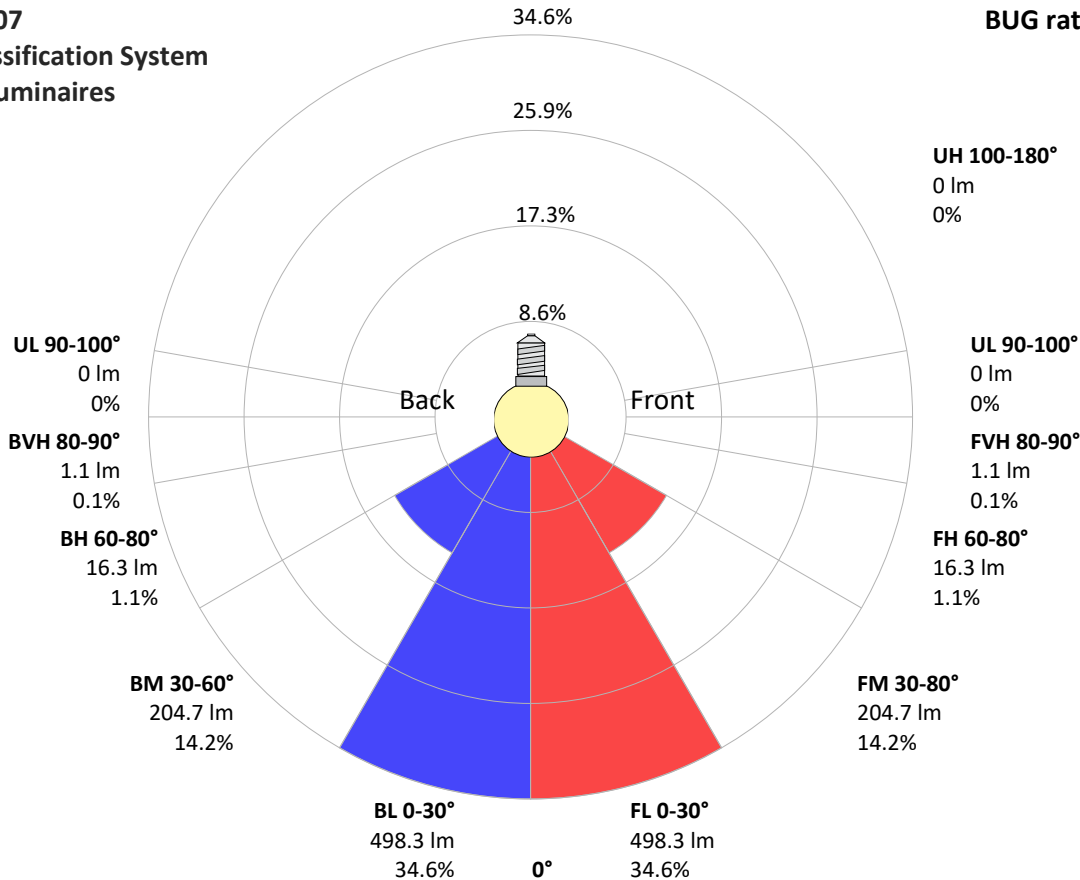
Zone (γ)	Lumen	% Total
0-30°	997 lm	69.1%
0-40°	1233 lm	85.5%
0-60°	1407 lm	97.6%
60-90°	34 lm	2.4%
70-100°	11 lm	0.8%
90-120°	1 lm	0.0%
0-90°	1441 lm	99.9%
90-180°	1 lm	0.1%
0-180°	1442 lm	100.0%

BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	498 lm	34.6%
Medium(30-60°)	205 lm	14.2%
High(60-80°)	16 lm	1.1%
Very high(80-90°)	1 lm	0.1%
<b>Back light</b>		
Low(0-30°)	498 lm	34.6%
Medium(30-60°)	205 lm	14.2%
High(60-80°)	16 lm	1.1%
Very high(80-90°)	1 lm	0.1%
<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



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## Power Details

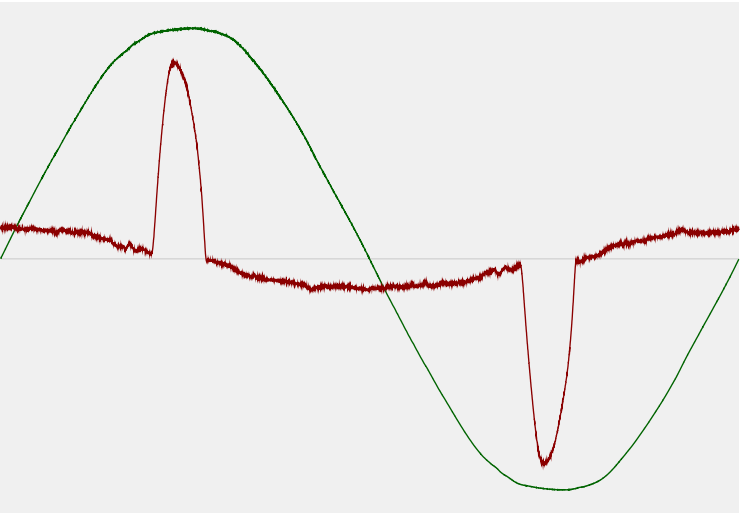
### Input Power

Power feed to light source	14.6 W
Frequency of input power	49.9 Hz
RMS Input voltage feed, $V_{RMS}$	244 V
RMS Input current feed, $I_{RMS}$	0.129 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	31.5 VA
Displacement factor of AC power feed	0.78
Power factor of AC current feed	0.46
Total harmonic distortion of the current	134.39%
Total harmonic distortion of the voltage	1.36%

### Efficiency

Radiated power efficiency	36.1%
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Lumen efficiency	99 lm/W
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### Input Power Curve





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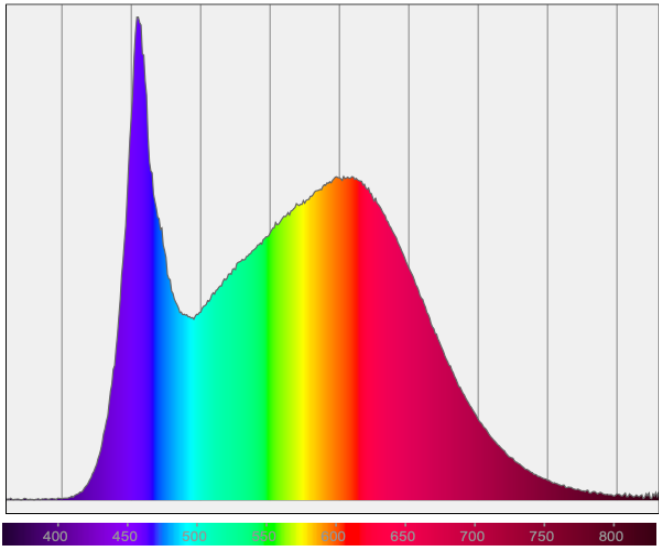
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## Color Measurements

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

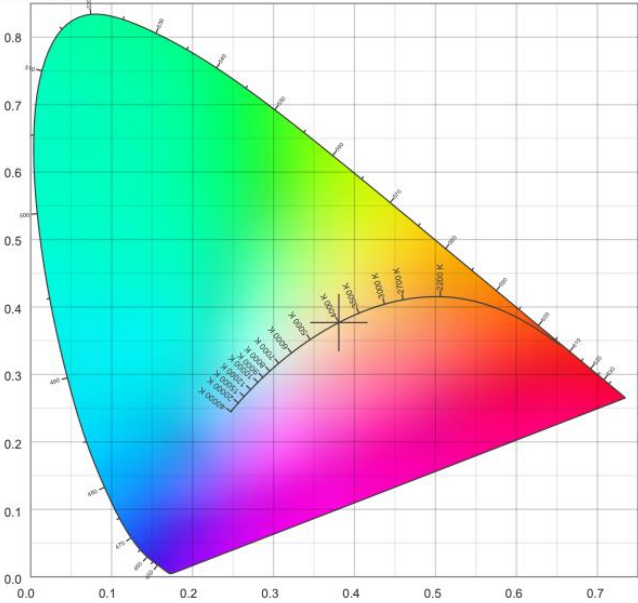
Correlated Color Temperature	CCT = 4000 K	Color coordinates CIE 1931	(x;y) = (0.381;0.377)
Color Rendering Index	CRI 92.6	Color coordinate CIEs 1960	(u;v) = (0.225;0.334)
Color Rendering Index, R9 (red component)	R9 = 72.2	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R <sub>f</sub>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

Goniophotometry Report

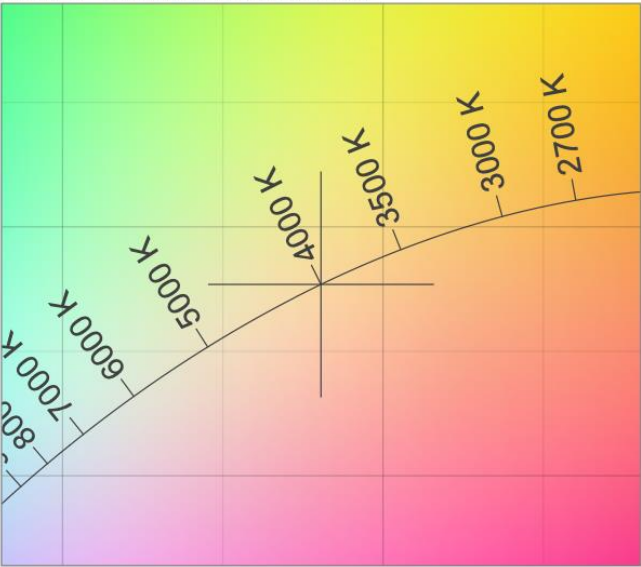
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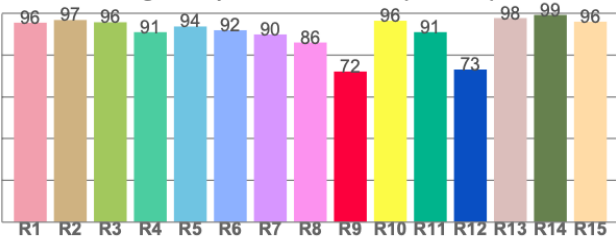
CIE 1931



CIE 1931 – zoomed on Planckian locus



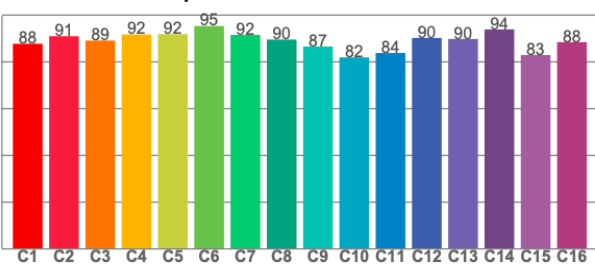
Color Rendering Index per reference color (CIE 1995)



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

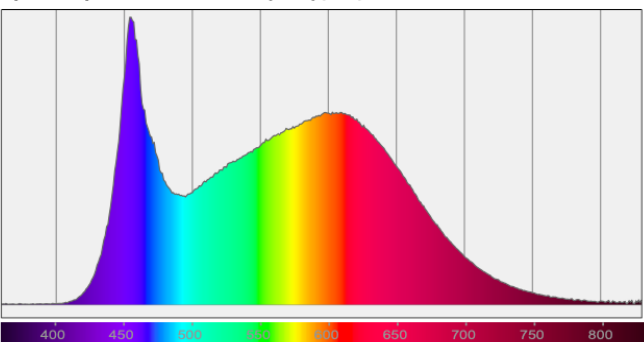
TM30-18 Rf-values per hue bin



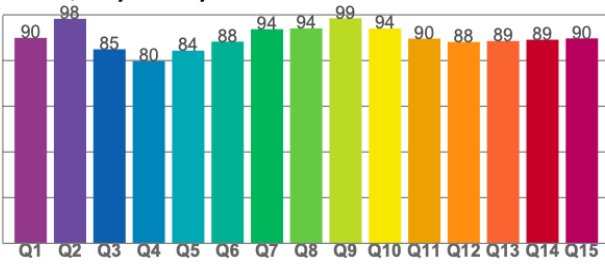
TM30 C values, 16 binned values out of total of 99 C values

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