

Tested Light Source - 1\_PHOT\_NINETY-NINE-1875lmChip-3500K-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

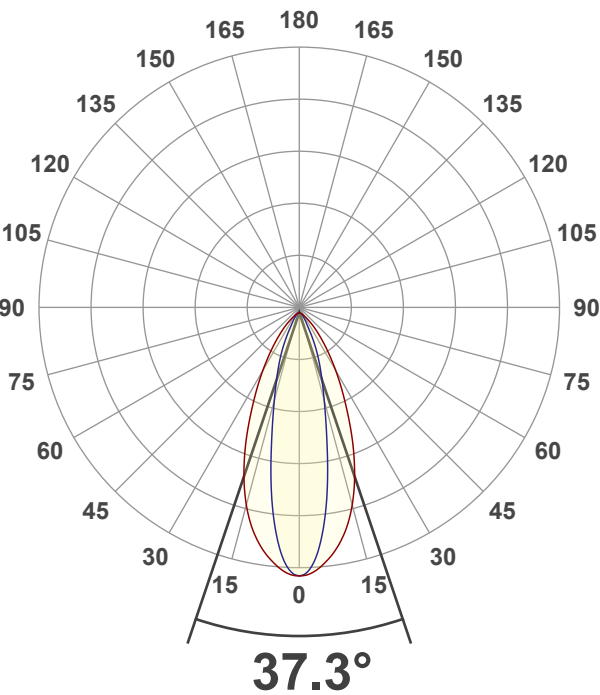
1397 lm

96 lm/W

2417 cd – 37.3°

CRI 93.0

Light Intensity Distribution



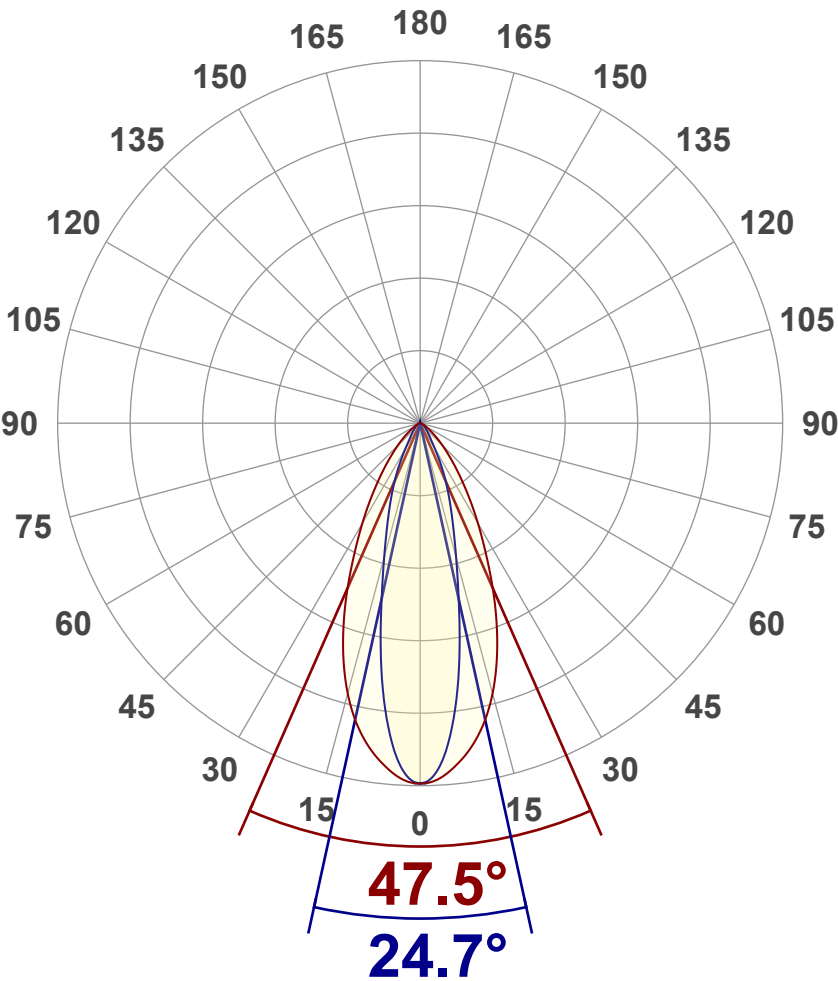
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1397 lm
Peak Intensity	2417 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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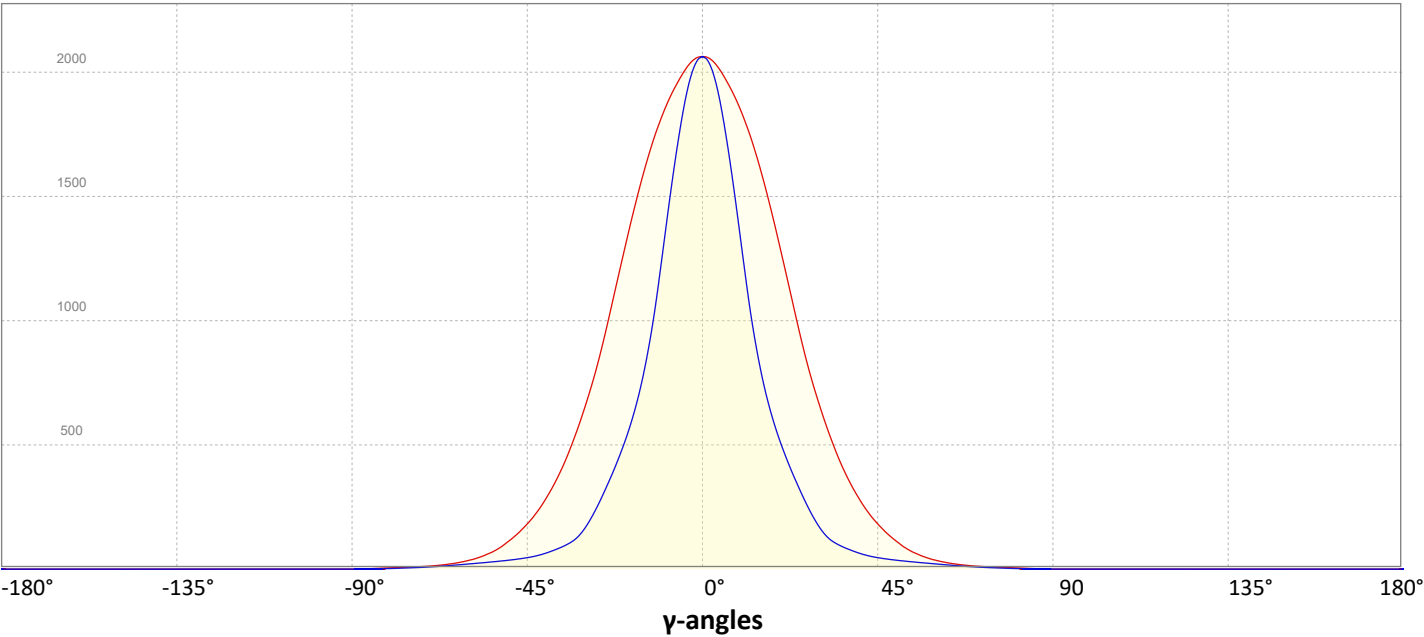
Intensity Ratio

In 120° cone	97.6%
In 90° cone	90.3%

C000-C180

C090-C270

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

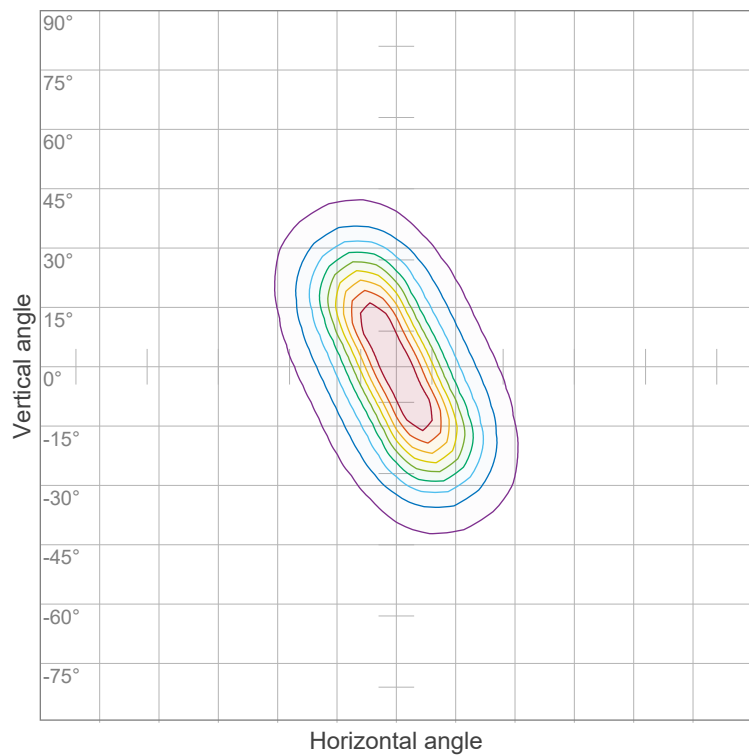


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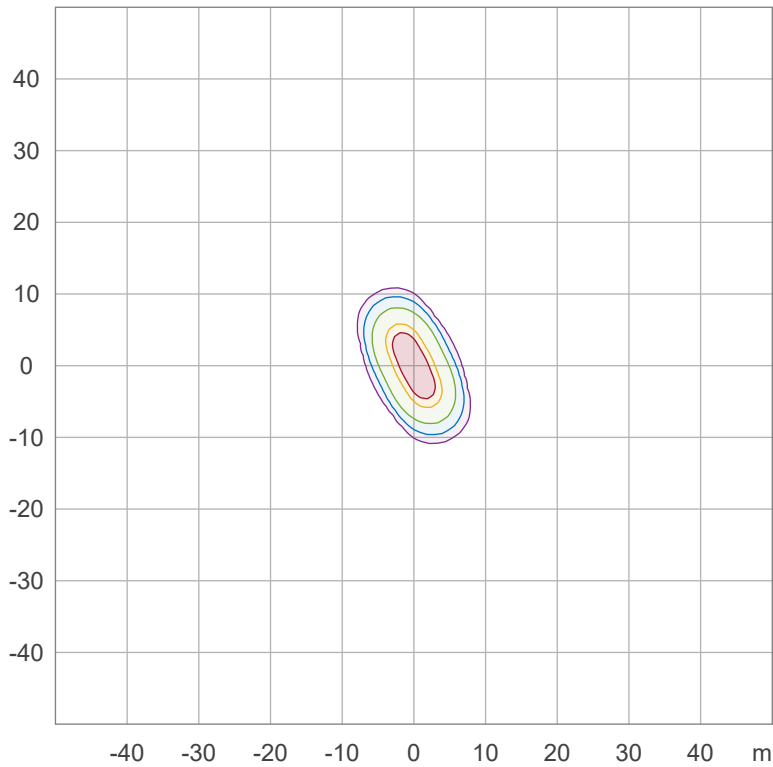
## Iso-intensity Diagram (Iso-candela)



90 %	2174.8 cd
80 %	1933.2 cd
70 %	1691.5 cd
60 %	1449.9 cd
50 %	1208.2 cd
40 %	966.6 cd
30 %	724.9 cd
20 %	483.3 cd
10 %	241.6 cd

Peak intensity: 2416.5 cd  
Number of c-planes: 32

## Iso-illuminance Diagram (Iso-lux)



50.0 %	12.0 lx
30.0 %	7.2 lx
10.0 %	2.4 lx
5.0 %	1.2 lx
3.0 %	0.7 lx

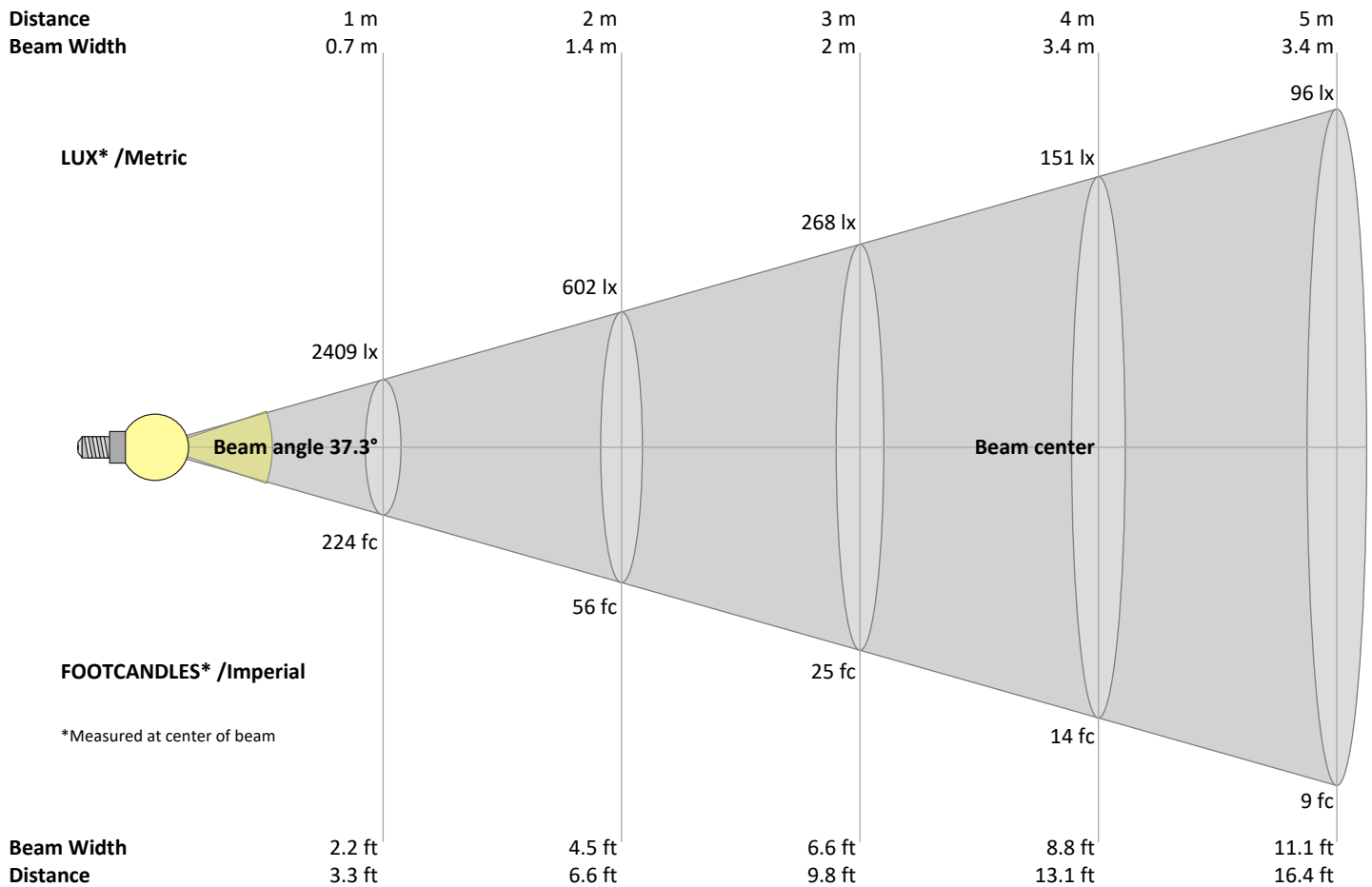
Peak illuminance: 24.1 lx  
Mounting height: 10.0 m  
Number of c-planes: 32

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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
2409	602	268	151	96	67	49	38	30	24	20	17	14	12	11	9	8	7	7	6	lux
223.8	56	24.9	14	9	6.2	4.6	3.5	2.8	2.2	1.8	1.6	1.3	1.1	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
2409	2397	2358	2300	2231	2148	2050	1934	1804	1659	1505	1346	1185	1031	893	773	663	565	478	403	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
2409	2367	2242	2041	1794	1519	1248	1024	847	709	597	500	413	333	260	198	153	124	105	90	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
2409	2397	2358	2300	2231	2148	2050	1934	1804	1659	1505	1346	1185	1031	893	773	663	565	478	403	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
2409	2367	2242	2041	1794	1519	1248	1024	847	709	597	500	413	333	260	198	153	124	105	90	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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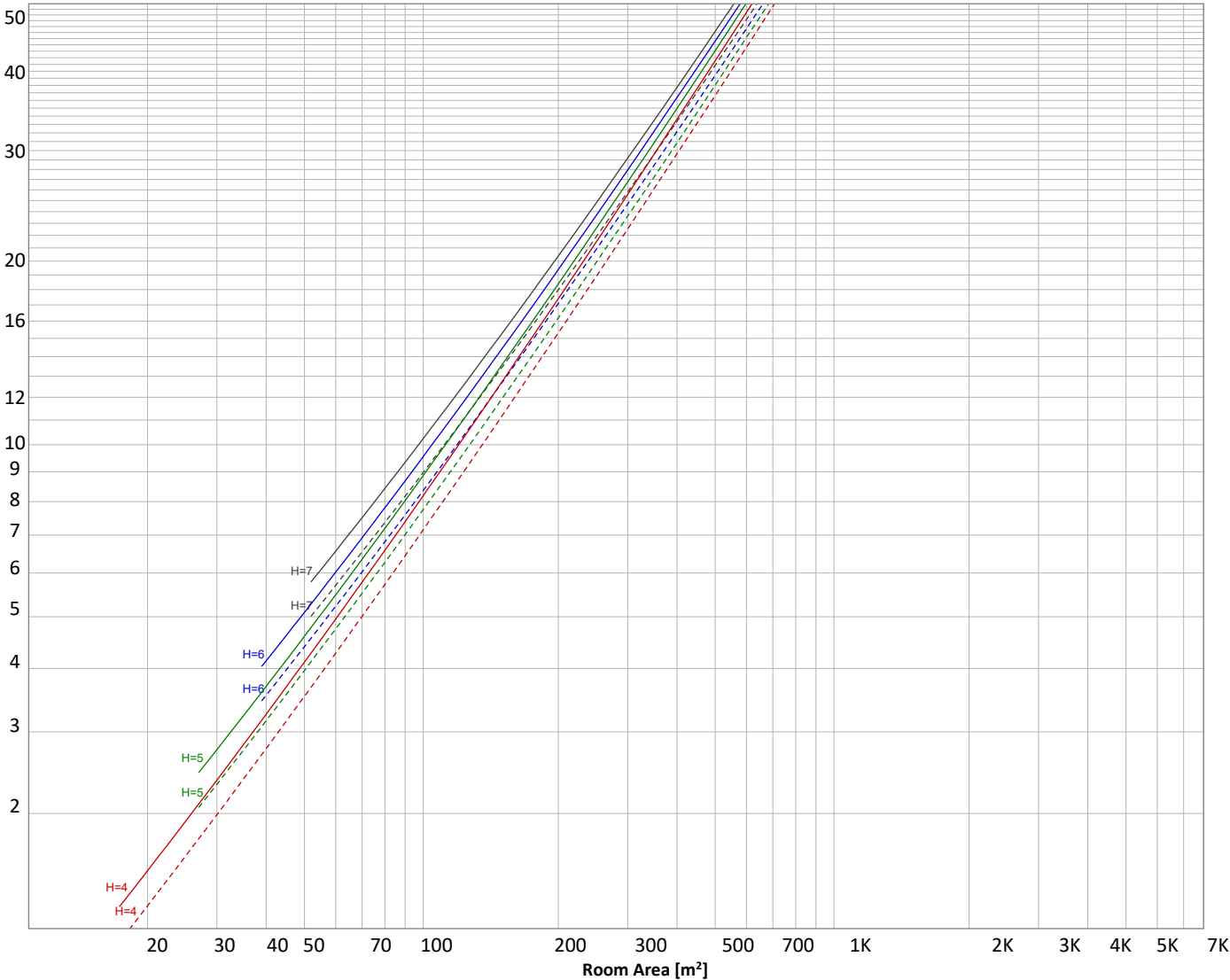
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## Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



### Conditions

H = Room height	Flux = 1397 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
				30
				20

## Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
201 lm	397 lm	368 lm	229 lm	115 lm	53.9 lm	22.7 lm	8.52 lm	2.05 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.184 lm	0.178 lm	0.167 lm	0.151 lm	0.057 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°	201 lm	14.4%
10-20°	397 lm	28.4%
20-30°	368 lm	26.3%
30-40°	229 lm	16.4%
40-50°	115 lm	8.2%
50-60°	54 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	1397 lm	100.0%

Intensity peaks

Max intensity	2417 cd
Intensity, 90°	0 cd
Intensity, 0°	2409 cd

Zonal Lumen summary

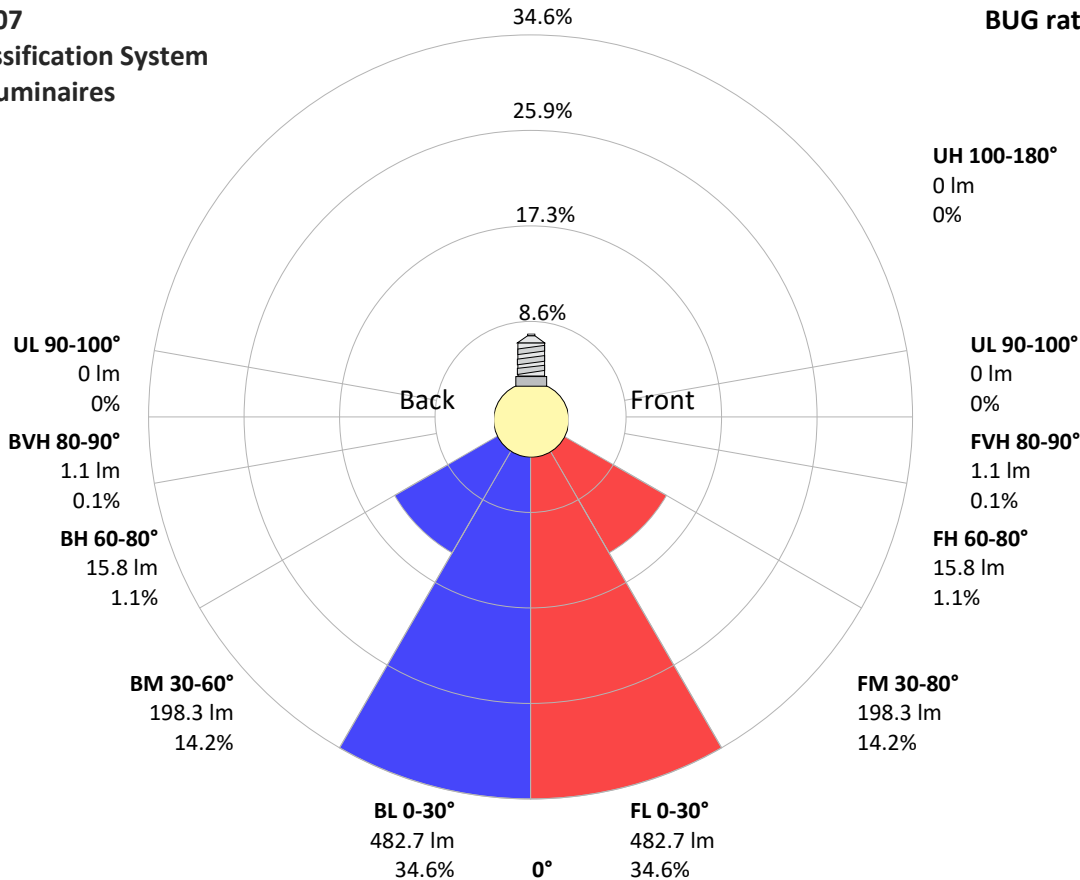
Zone (γ)	Lumen	% Total
0-30°	966 lm	69.1%
0-40°	1194 lm	85.5%
0-60°	1363 lm	97.6%
60-90°	33 lm	2.4%
70-100°	11 lm	0.8%
90-120°	1 lm	0.0%
0-90°	1396 lm	99.9%
90-180°	1 lm	0.1%
0-180°	1397 lm	100.0%

BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	483 lm	34.6%
Medium(30-60°)	198 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°)	483 lm	34.6%
Medium(30-60°)	198 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

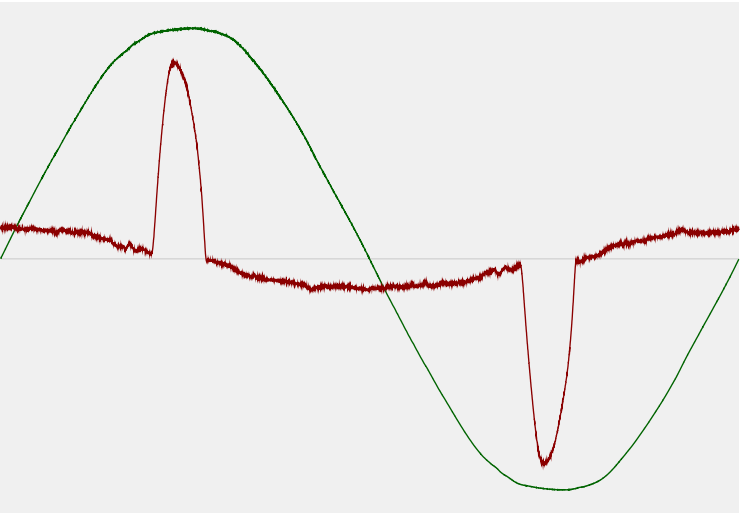
### Input Power

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 = $V_{RMS} * I_{RMS}$	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	35.0%
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Lumen efficiency	96 lm/W
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### Input Power Curve





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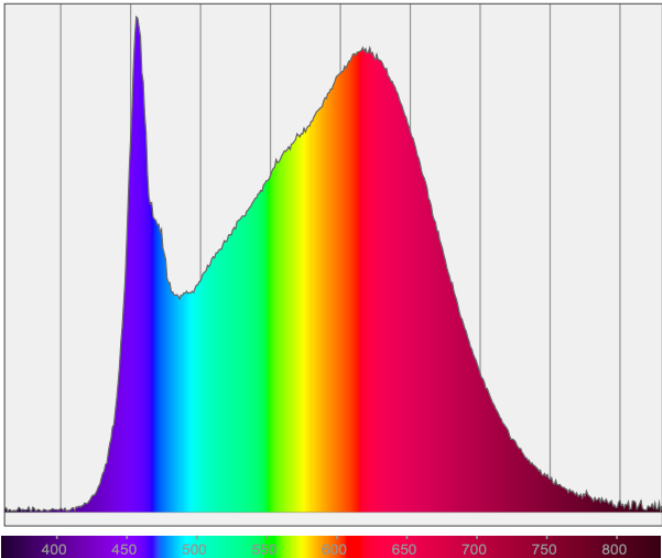
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## Color Measurements

Correlated Color Temperature      CCT = 3500 K  
Color Rendering TM30-18      R<sub>f</sub> 90.2 — R<sub>g</sub> 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 <sub>f</sub> 90.2 — R <sub>g</sub> 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



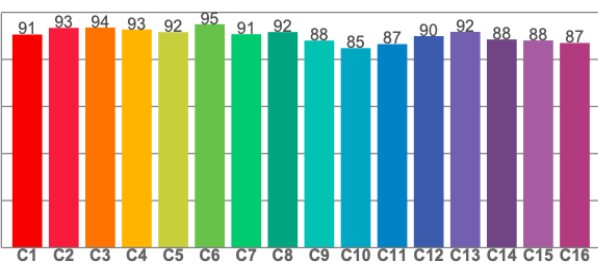
Color Rendering Index per reference color (CIE 1995)



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

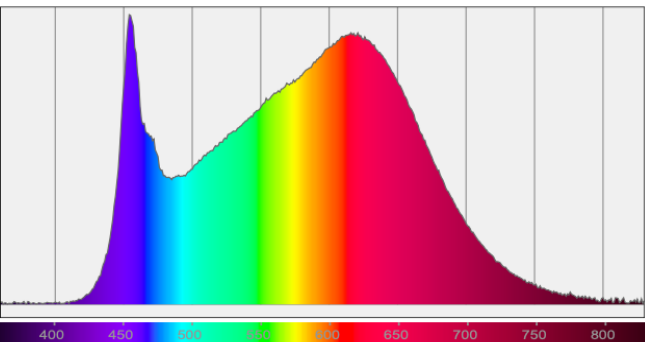
TM30-18 Rf-values per hue bin



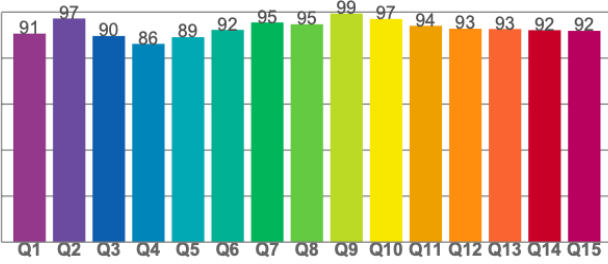
TM30 C values, 16 binned values out of total of 99 C values

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