

# Goniophotometry Report

1\_PHOT\_NINETY-NINE-1925lmChip-4000K-Spreader-HoneycombLouvre\_2303  
www.factorylux.com



Tested Light Source - 1\_PHOT\_NINETY-NINE-1925lmChip-4000K-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  
 $\gamma$  (gamma)-Resolution  
Test Distance  
Input Power, Power and Displ. Factors  
Input RMS Voltage and Current  
Frequency of Input Power

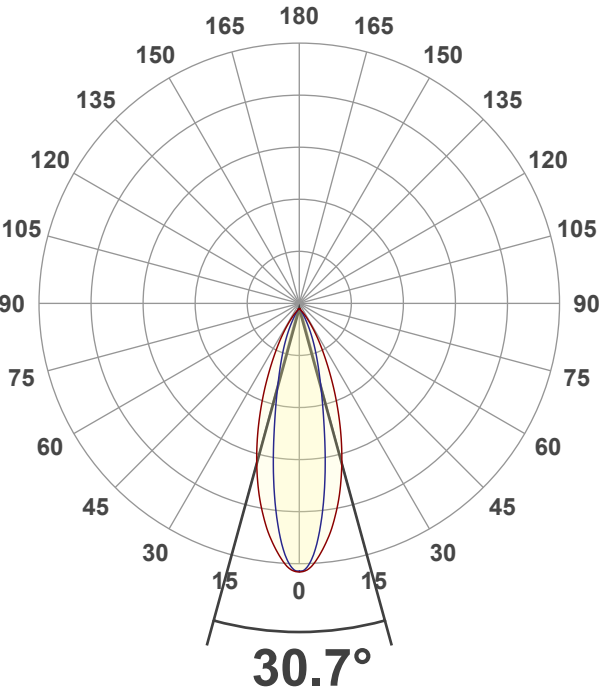
32 planes – 11.25°  
1°  
1.50 m  
14.6 W – PF 0.47 – DPF 0.78  
243 V – 0.127 A  
50 Hz

## Main Light Measurement Results

Output  
Efficiency  
Peak Intensity and Beam Angle  
Color Rendering Index

863 lm  
59 lm/W  
2315 cd – 30.7°  
CRI 93.0

## Light Intensity Distribution



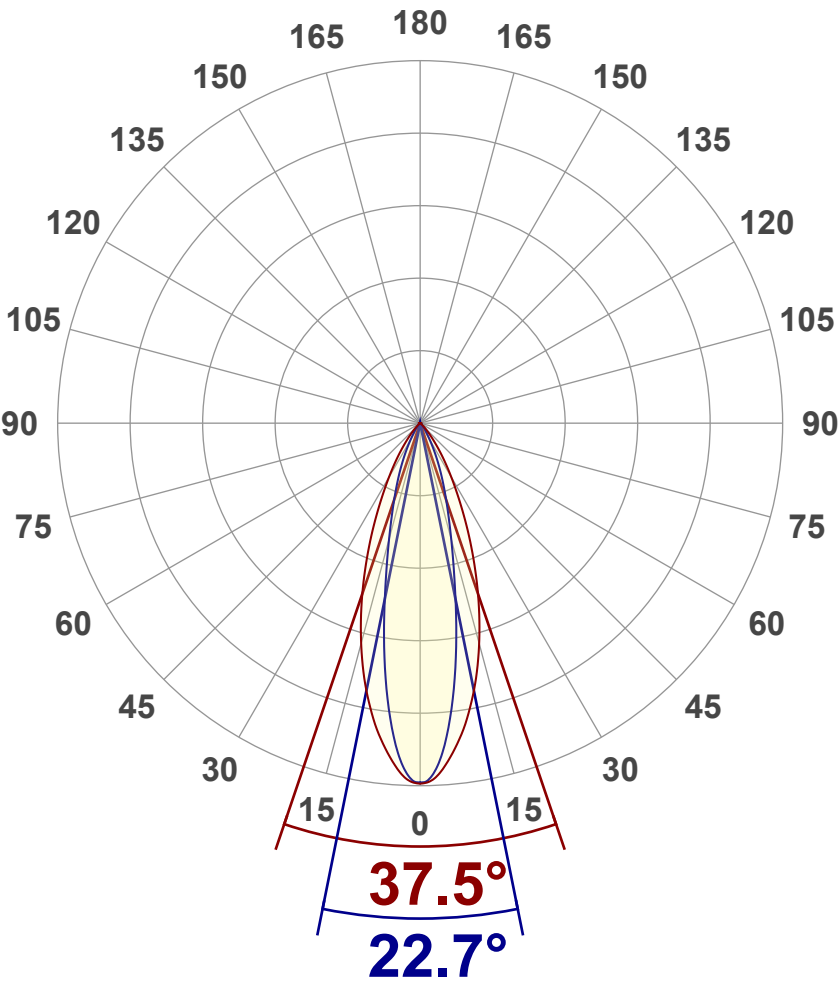
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	863 lm
Peak Intensity	2315 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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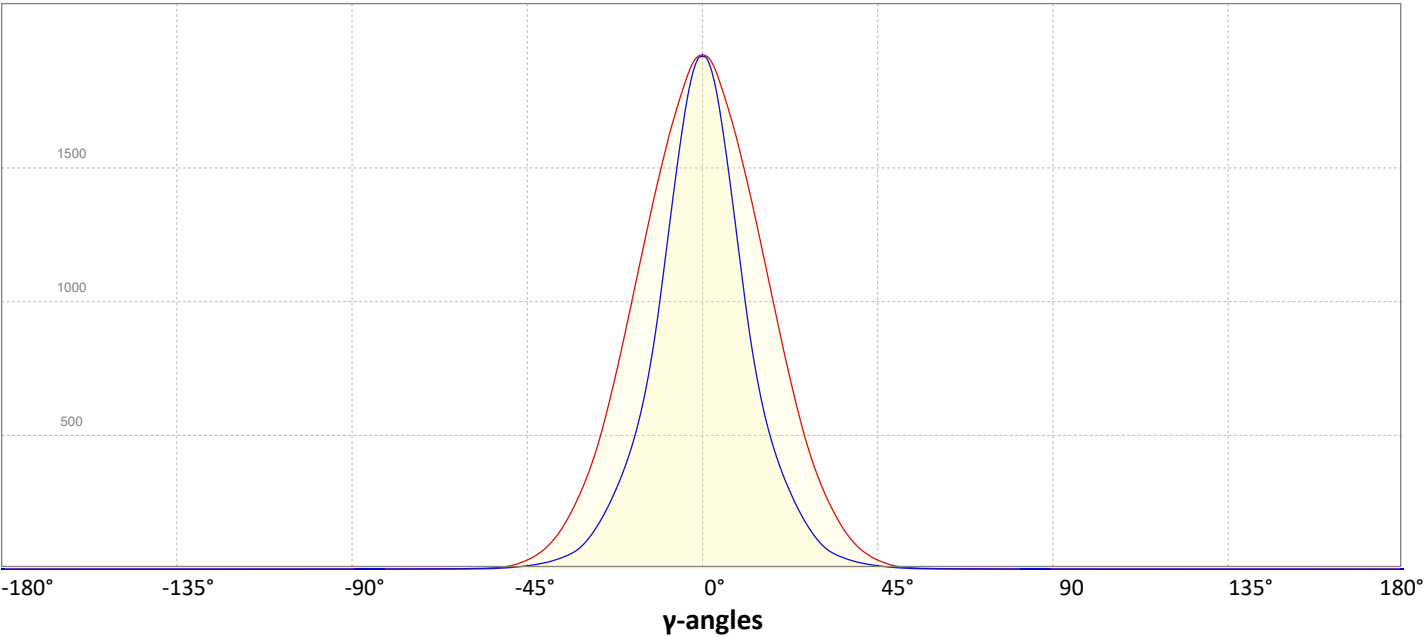
Intensity Ratio

In 120° cone	99.6%
In 90° cone	98.1%

C000-C180

C090-C270

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

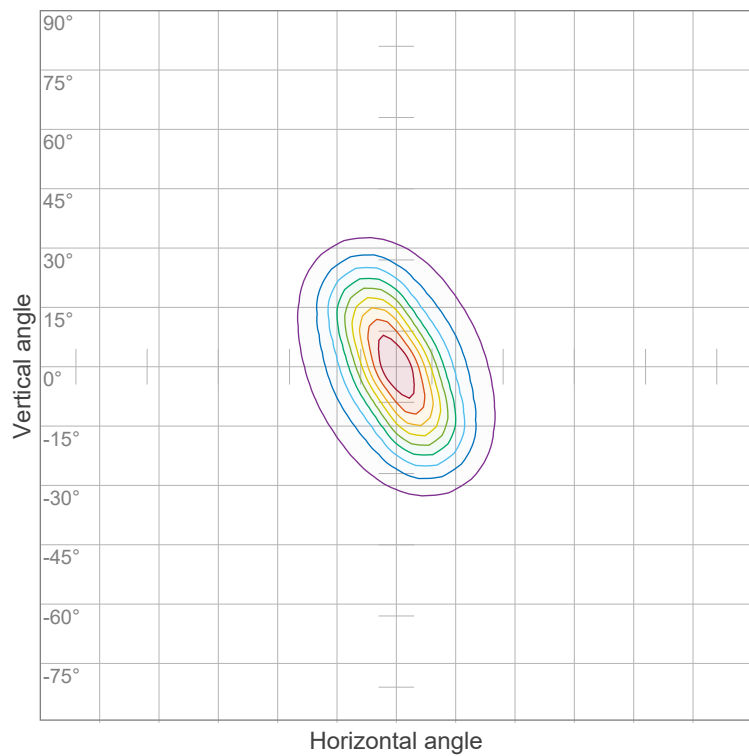


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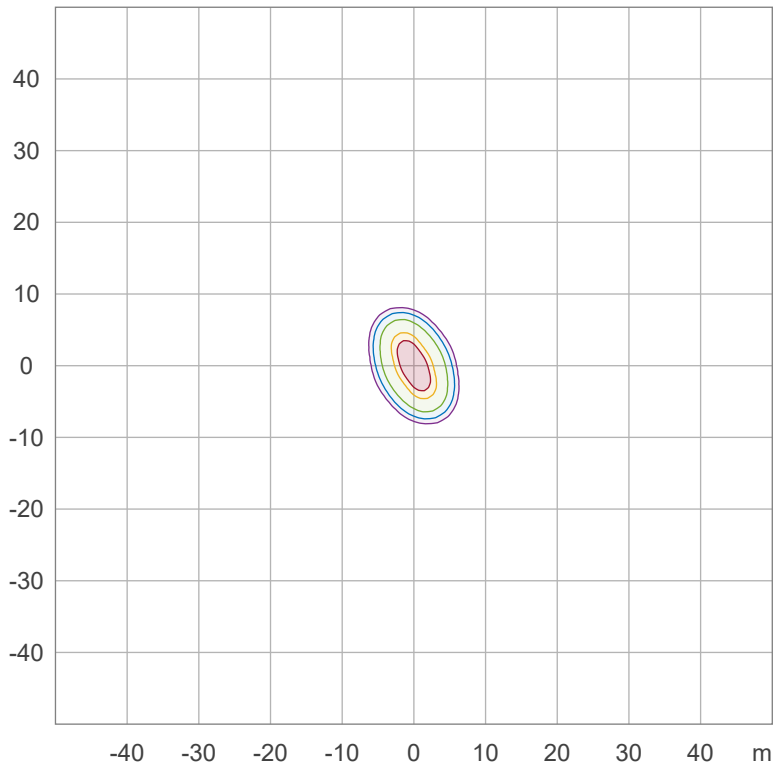
## Iso-intensity Diagram (Iso-candela)



90 %	2081.4 cd
80 %	1850.1 cd
70 %	1618.8 cd
60 %	1387.6 cd
50 %	1156.3 cd
40 %	925.0 cd
30 %	693.8 cd
20 %	462.5 cd
10 %	231.3 cd

Peak intensity: 2312.6 cd  
Number of c-planes: 32

## Iso-illuminance Diagram (Iso-lux)



50.0 %	11.6 lx
30.0 %	6.9 lx
10.0 %	2.3 lx
5.0 %	1.2 lx
3.0 %	0.7 lx

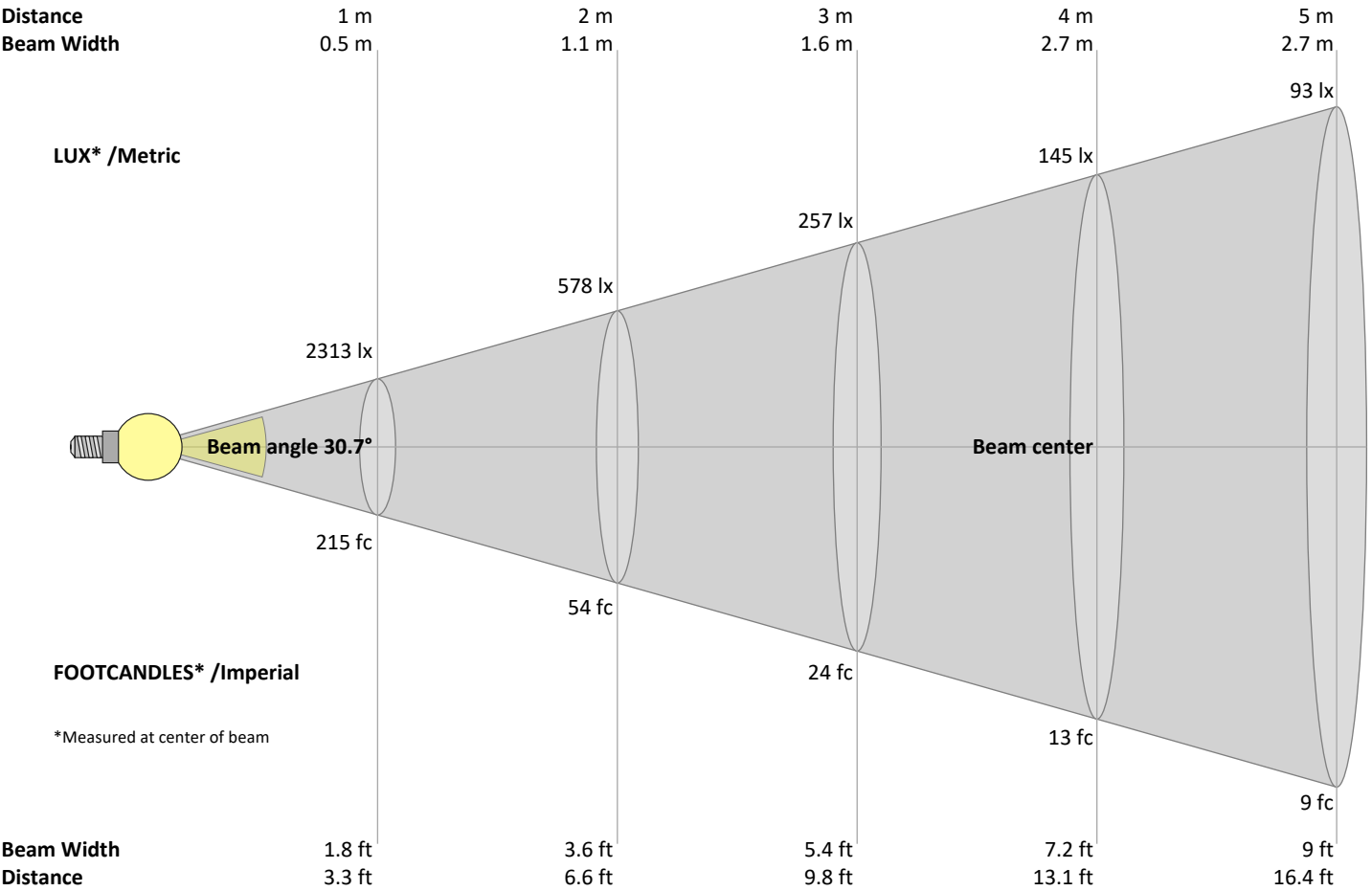
Peak illuminance: 23.1 lx  
Mounting height: 10.0 m  
Number of c-planes: 32

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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
2313	578	257	145	93	64	47	36	29	23	19	16	14	12	10	9	8	7	6	6	lux
214.8	53.7	23.9	13.4	8.6	6	4.4	3.4	2.7	2.1	1.8	1.5	1.3	1.1	1	0.8	0.7	0.7	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
2313	2292	2214	2108	1990	1851	1705	1546	1382	1217	1053	895	748	613	498	401	318	247	186	138	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
2313	2262	2108	1879	1614	1337	1075	862	694	562	456	368	291	224	168	122	89	68	53	40	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

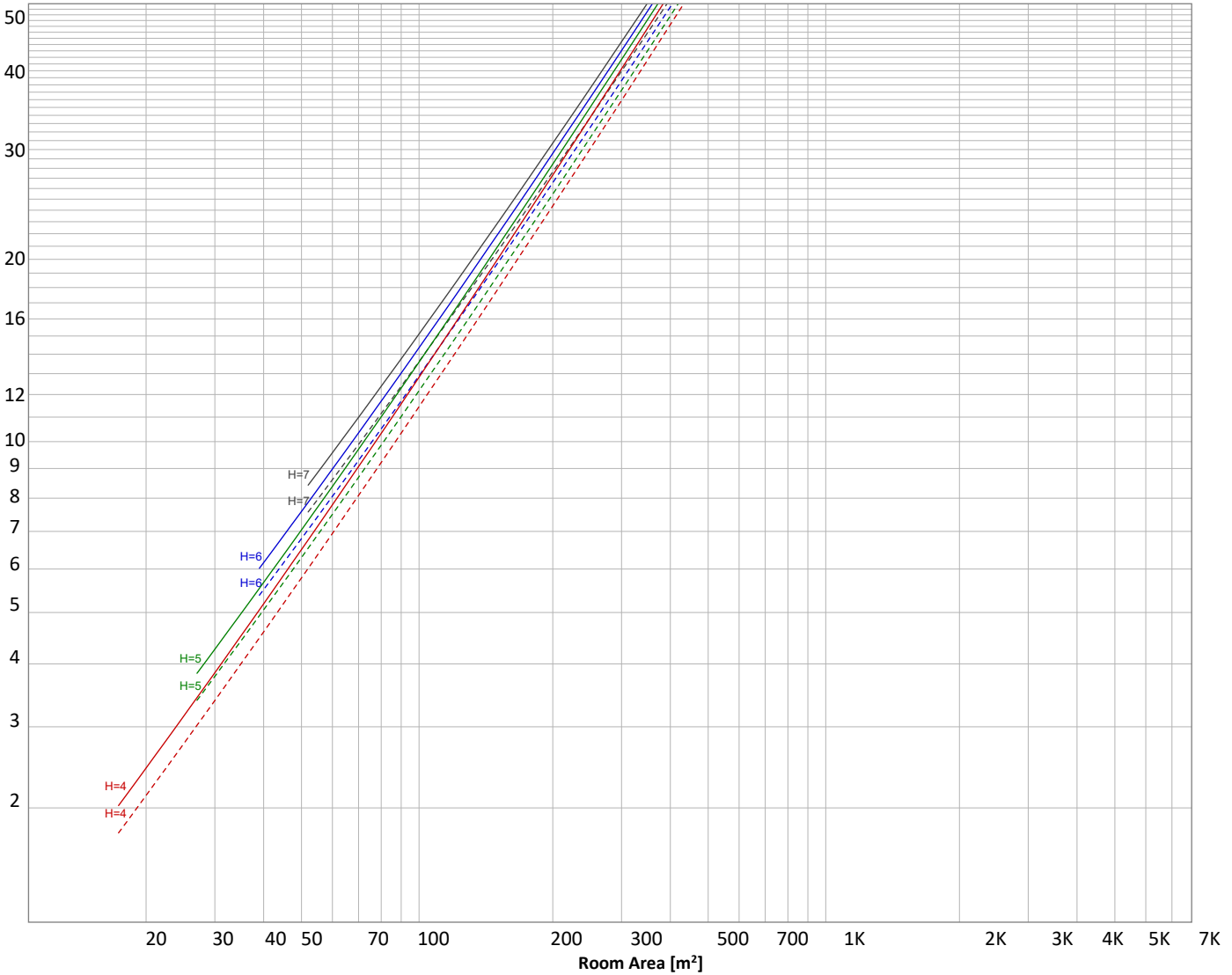
0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
2313	2292	2214	2108	1990	1851	1705	1546	1382	1217	1053	895	748	613	498	401	318	247	186	138	cd
100%	99%	96%	91%	86%	80%	74%	67%	60%	53%	46%	39%	32%	27%	22%	17%	14%	11%	8%	6%	of 0°val

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
2313	2262	2108	1879	1614	1337	1075	862	694	562	456	368	291	224	168	122	89	68	53	40	cd
100%	98%	91%	81%	70%	58%	46%	37%	30%	24%	20%	16%	13%	10%	7%	5%	4%	3%	2%	2%	of 0°val



**Luminaire budgetary diagram**  
*Uncorrected, comprehensive UGR table according to 117-1995*  
**LAMPS (number of lamps)**



Conditions		ρ(%)			
H = Room height	Flux = 863 lm	Line type	Ceiling reflectance	Wall reflectance	Floor reflectance
H <sub>down</sub> = Lamp distance from ceiling =	0.00 m		70	50	30
H <sub>work</sub> = Work area height from floor =	0.00 m				
E <sub>work</sub> = Average lux on work area =	100 lx		50	30	20

**Zonal Lumen Summary**

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
183 lm	314 lm	230 lm	100 lm	27.6 lm	4.69 lm	1.39 lm	0.742 lm	0.537 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.152 lm	0.132 lm	0.124 lm	0.112 lm	0.043 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°	183 lm	21.2%
10-20°	314 lm	36.4%
20-30°	230 lm	26.7%
30-40°	100 lm	11.6%
40-50°	28 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	863 lm	100.0%

Intensity peaks

Max intensity	2315 cd
Intensity, 90°	0 cd
Intensity, 0°	2313 cd

Zonal Lumen summary

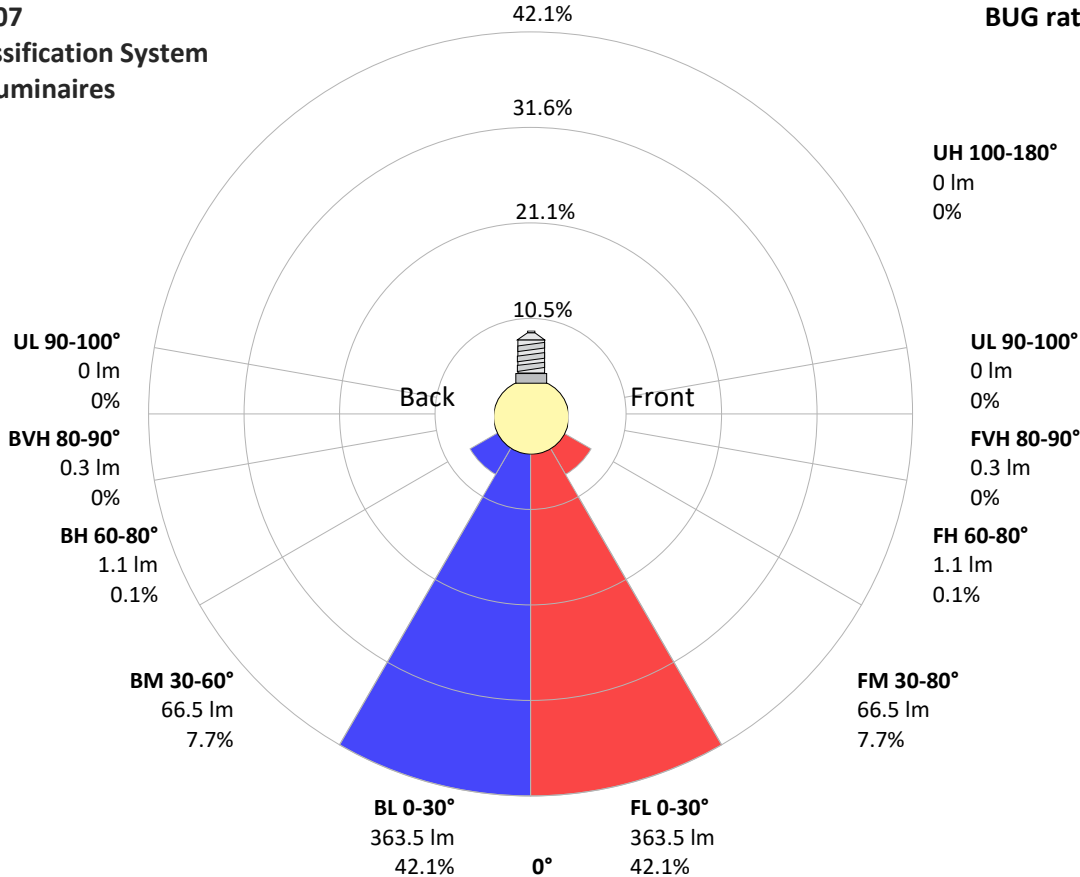
Zone (γ)	Lumen	% Total
0-30°	727 lm	84.2%
0-40°	827 lm	95.9%
0-60°	860 lm	99.6%
60-90°	3 lm	0.3%
70-100°	1 lm	0.2%
90-120°	0 lm	0.0%
0-90°	862 lm	99.9%
90-180°	1 lm	0.1%
0-180°	863 lm	100.0%

BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	363 lm	42.1%
Medium(30-60°)	66 lm	7.7%
High(60-80°)	1 lm	0.1%
Very high(80-90°)	0 lm	0.0%
<b>Back light</b>		
Low(0-30°)	363 lm	42.1%
Medium(30-60°)	66 lm	7.7%
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



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## Power Details

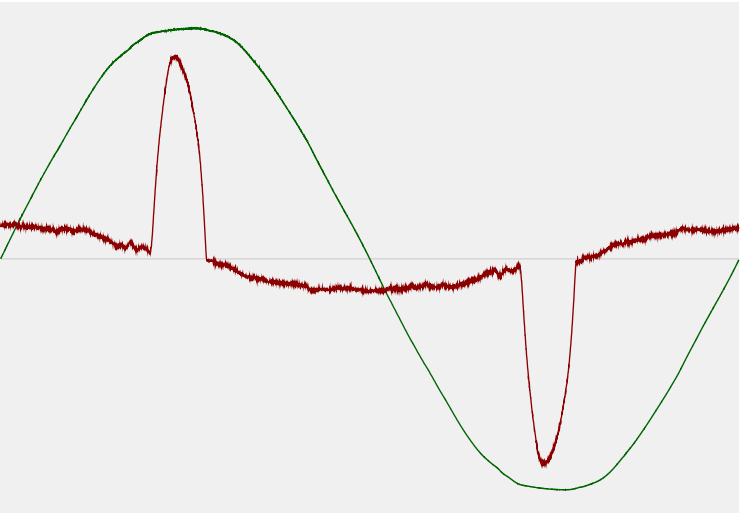
### Input Power

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%

### Efficiency

Radiated power efficiency	21.7%
<div><div></div></div>	
Lumen efficiency	59 lm/W
<div><div></div></div>	

### Input Power Curve





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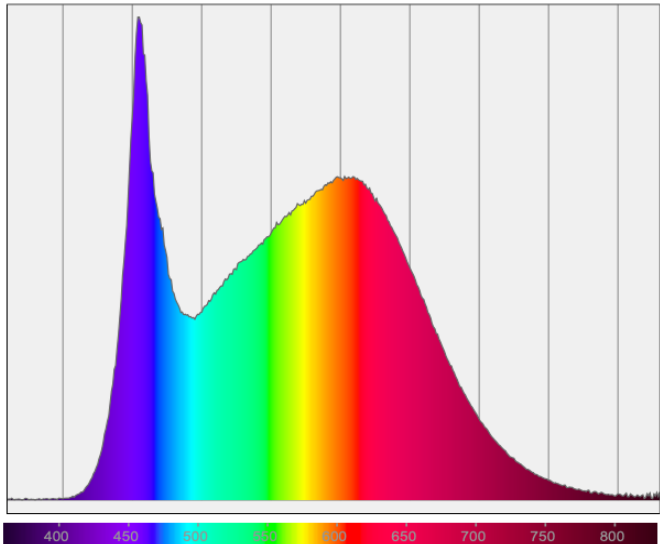
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## Color Measurements

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

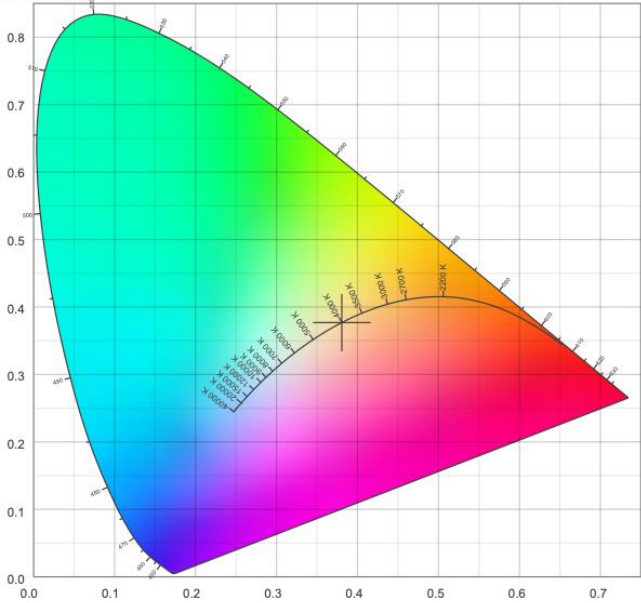
Correlated Color Temperature	CCT = 4000 K	Color coordinates CIE 1931	(x;y) = (0.381;0.377)
Color Rendering Index	CRI 92.6	Color coordinate CIEs 1960	(u;v) = (0.225;0.334)
Color Rendering Index, R9 (red component)	R9 = 72.2	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R <sub>f</sub>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

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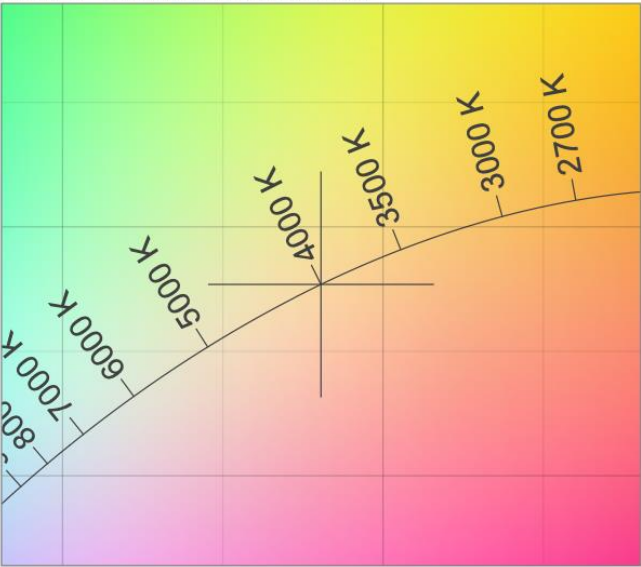
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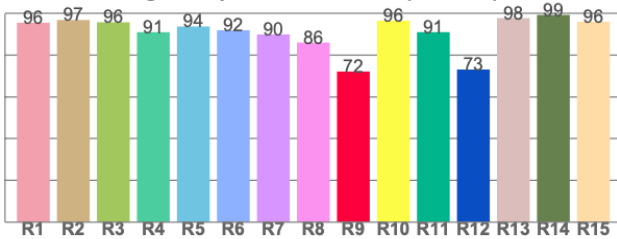
CIE 1931



CIE 1931 – zoomed on Planckian locus



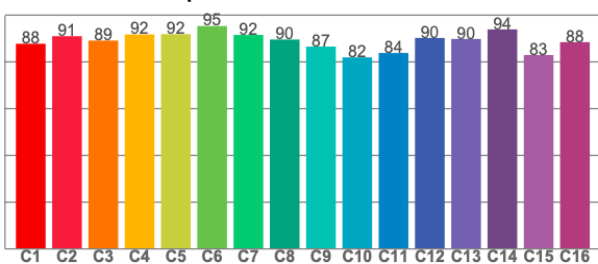
Color Rendering Index per reference color (CIE 1995)



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

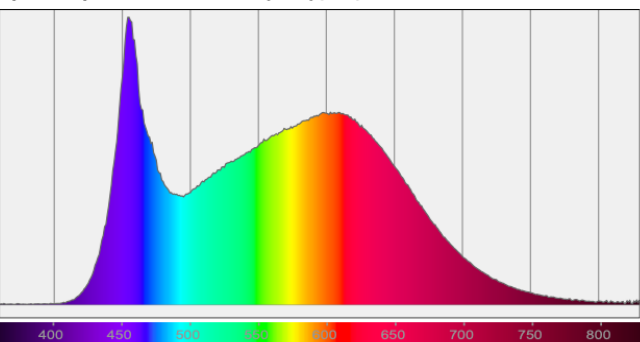
TM30-18 Rf-values per hue bin



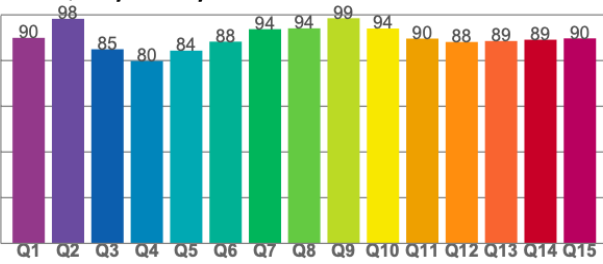
TM30 C values, 16 binned values out of total of 99 C values

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