

Tested Light Source - 1_PHOT_NINETY-NINE-2350lmChip-4000K-Spreader-HoneycombLouvre_2303

Laboratory and Equipment

Laboratory Owner and Location	Factorylux, Greenhill Mills, Hebden Bridge, HX7 5QF, UK
Goniospectrometer System and Type	BaseSpion – Type C, horizontal
Spectrometer Manufacturer and Model	Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

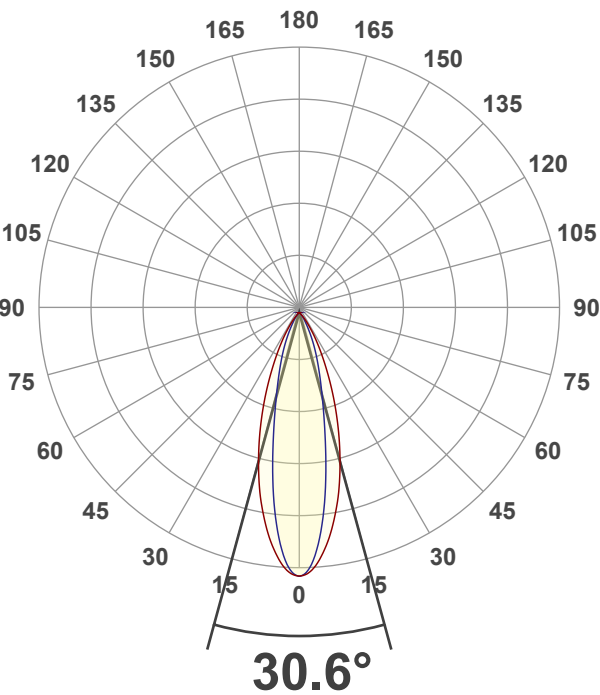
Measurement Conditions

Number of C-planes and Resolution	32 planes – 11.25°
γ (gamma)-Resolution	1°
Test Distance	1.50 m
Input Power, Power and Displ. Factors	15.8 W – PF 0.98 – DPF 0.98
Input RMS Voltage and Current	242 V – 0.067 A
Frequency of Input Power	50 Hz

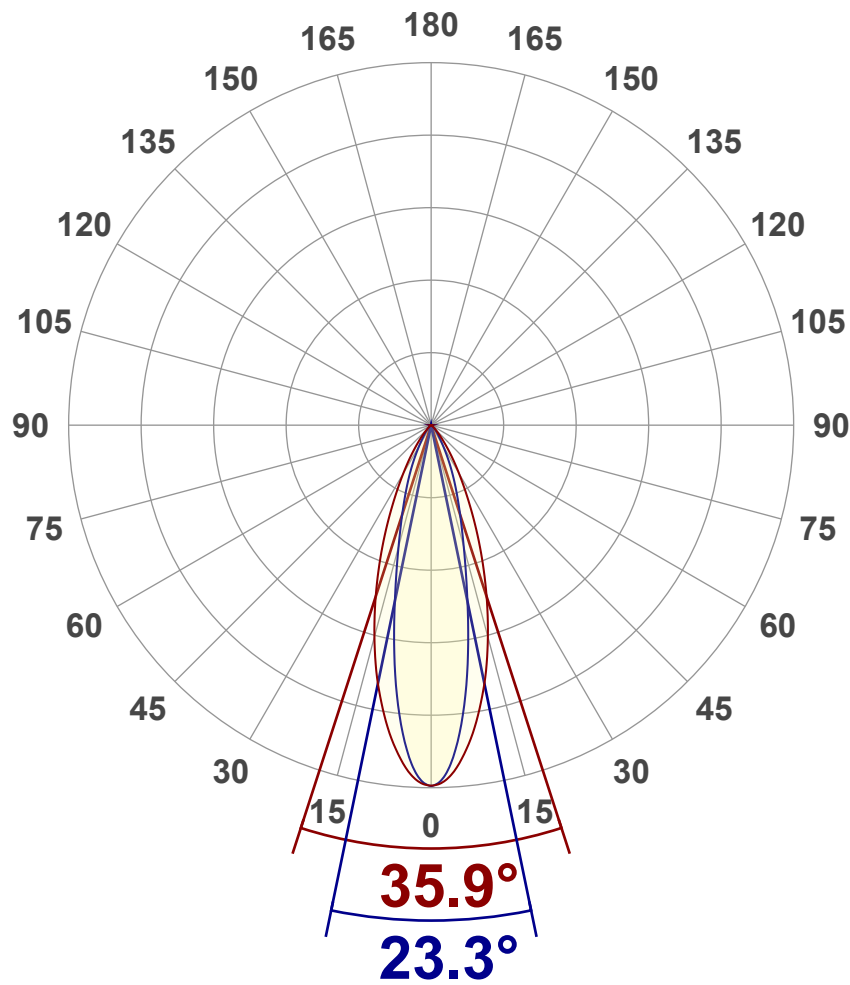
Main Light Measurement Results

Output	1013 lm
Efficiency	64 lm/W
Peak Intensity and Beam Angle	2713 cd – 30.6°
Color Rendering Index	CRI 92.8

Light Intensity Distribution



Luminous Intensity diagramUnit: 0-100% of peak intensity



Main Values	
Output (total Lumen)	1013 lm
Peak Intensity	2713 cd
Beam Angle (50%)	30.6°
Beam Angle (90%)	23.3°
Beam Angle (10%)	41.8°

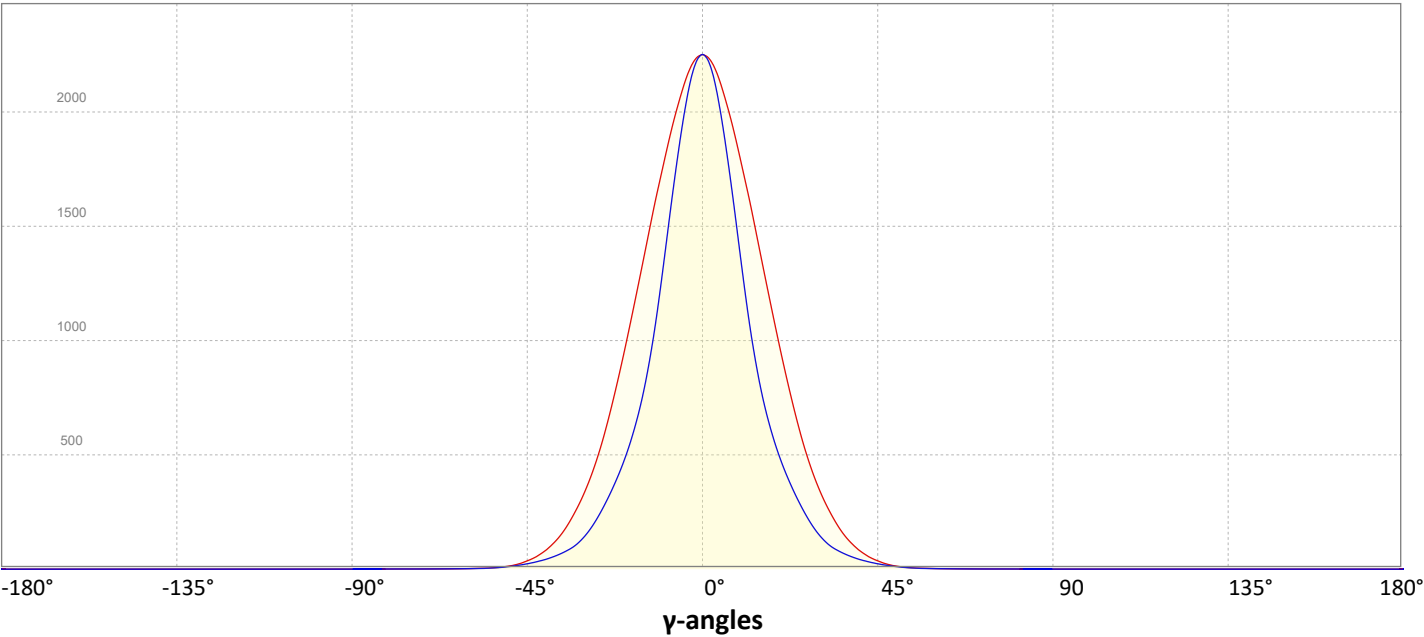
Cut-off Angle	
Average 2,5%	80.5°

Field Angle	
Average 10%	61°

Intensity Ratio	
In 120° cone	99.6%
In 90° cone	98.0%

C000-C180
C090-C270

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

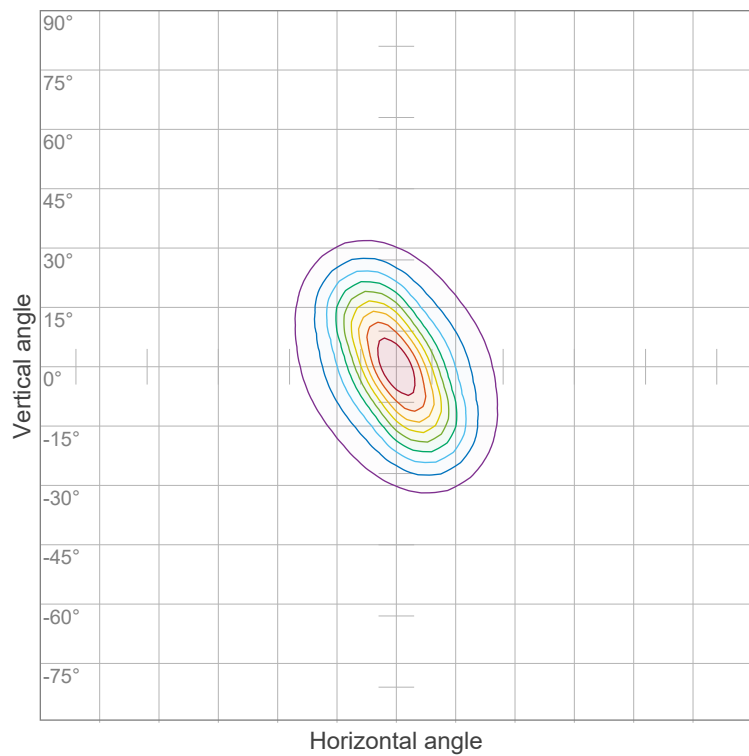


Goniophotometry Report

1_PHOT_NINETY-NINE-2350lmChip-4000K-Spreader-HoneycombLouvre_2303
www.factorylux.com



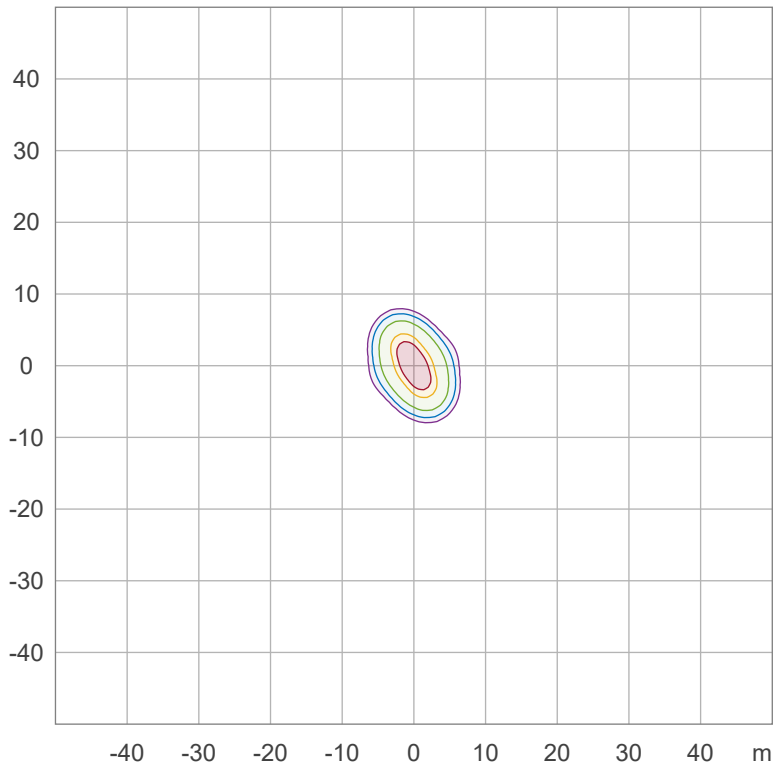
Iso-intensity Diagram (Iso-candela)



90 %	2438.7 cd
80 %	2167.7 cd
70 %	1896.8 cd
60 %	1625.8 cd
50 %	1354.8 cd
40 %	1083.9 cd
30 %	812.9 cd
20 %	541.9 cd
10 %	271.0 cd

Peak intensity: 2709.7 cd
Number of c-planes: 32

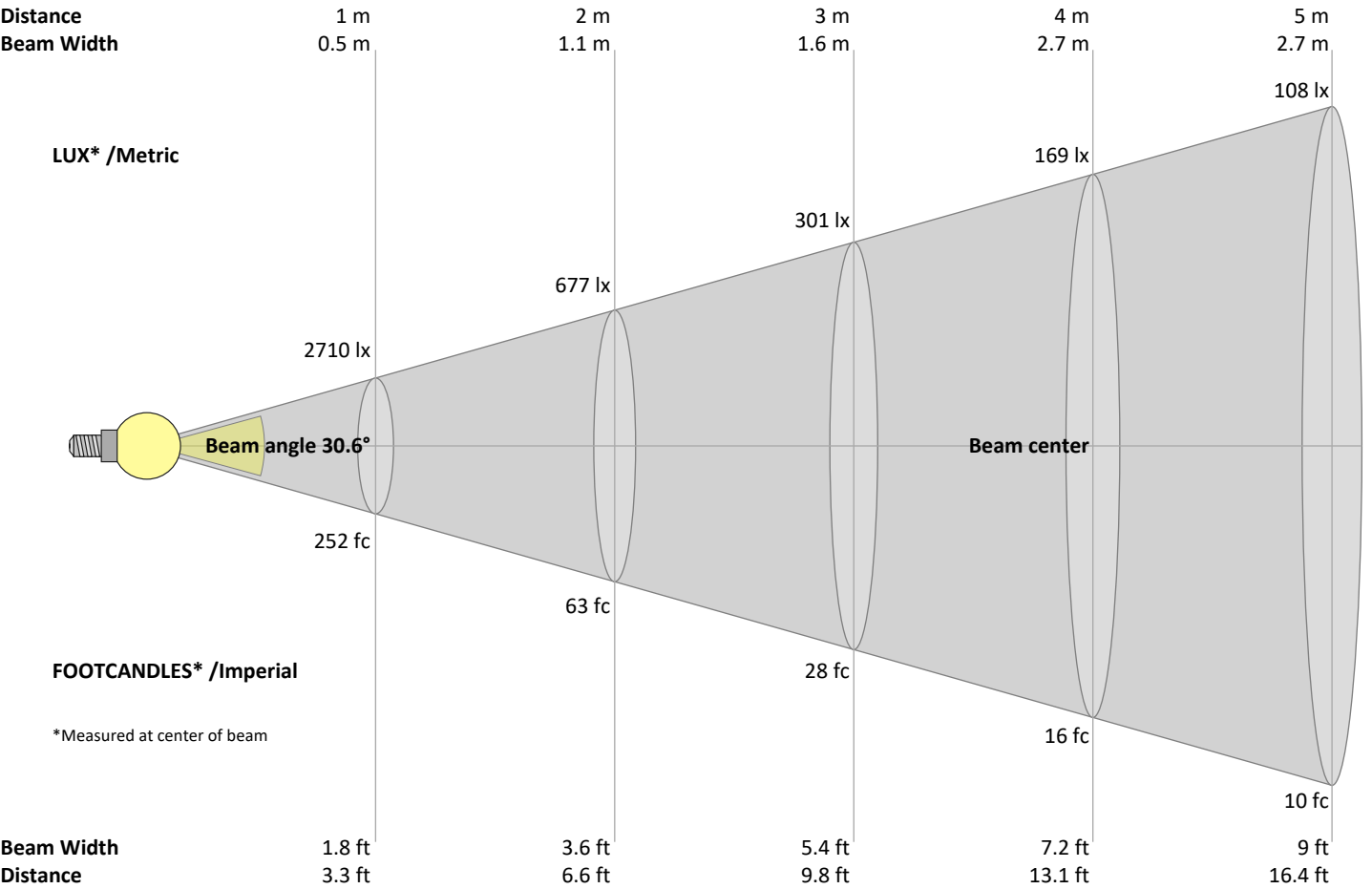
Iso-illuminance Diagram (Iso-lux)



50.0 %	13.5 lx
30.0 %	8.1 lx
10.0 %	2.7 lx
5.0 %	1.4 lx
3.0 %	0.8 lx

Peak illuminance: 27.1 lx
Mounting height: 10.0 m
Number of c-planes: 32

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
2710	677	301	169	108	75	55	42	33	27	22	19	16	14	12	11	9	8	8	7	lux
251.7	62.9	28	15.7	10.1	7	5.1	3.9	3.1	2.5	2.1	1.7	1.5	1.3	1.1	1	0.9	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
2710	2684	2599	2469	2315	2137	1953	1752	1549	1349	1156	974	805	654	527	420	331	255	191	142	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
2710	2652	2481	2228	1929	1608	1304	1054	857	705	580	477	386	306	236	180	137	107	85	68	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
2710	2684	2599	2469	2315	2137	1953	1752	1549	1349	1156	974	805	654	527	420	331	255	191	142	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
2710	2652	2481	2228	1929	1608	1304	1054	857	705	580	477	386	306	236	180	137	107	85	68	cd
100%	98%	92%	82%	71%	59%	48%	39%	32%	26%	21%	18%	14%	11%	9%	7%	5%	4%	3%	2%	of 0°val

Goniophotometry Report

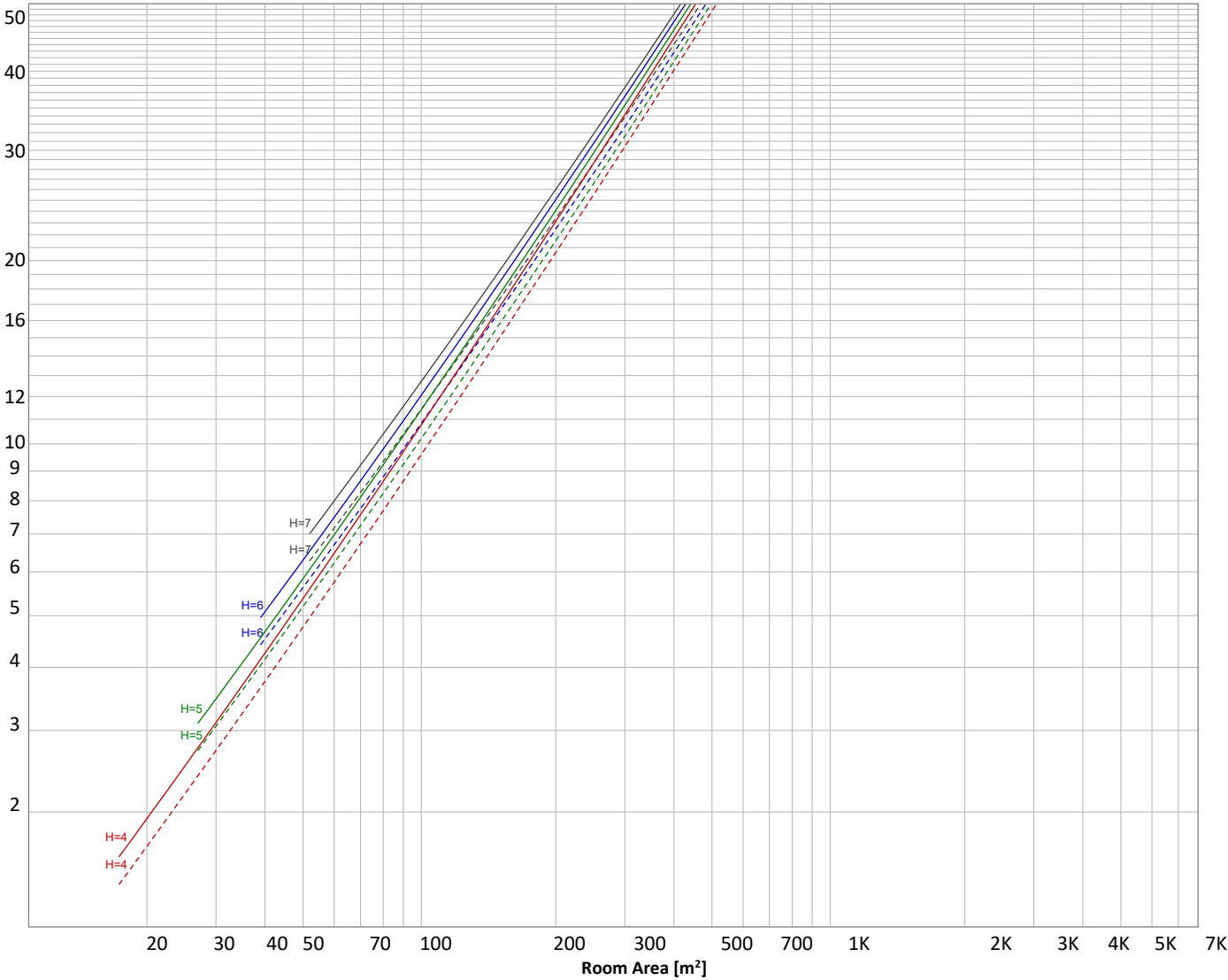
1_PHOT_NINETY-NINE-2350lmChip-4000K-Spreader-HoneycombLouvre_2303
www.factorylux.com



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 1013 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°
215 lm	369 lm	269 lm	117 lm	33.0 lm	5.45 lm	1.65 lm	0.917 lm	0.739 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.295 lm	0.284 lm	0.266 lm	0.241 lm	0.095 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°	215 lm	21.2%
10-20°	369 lm	36.5%
20-30°	269 lm	26.6%
30-40°	117 lm	11.5%
40-50°	33 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	1013 lm	100.0%

Intensity peaks

Max intensity	2713 cd
Intensity, 90°	0 cd
Intensity, 0°	2710 cd

Zonal Lumen summary

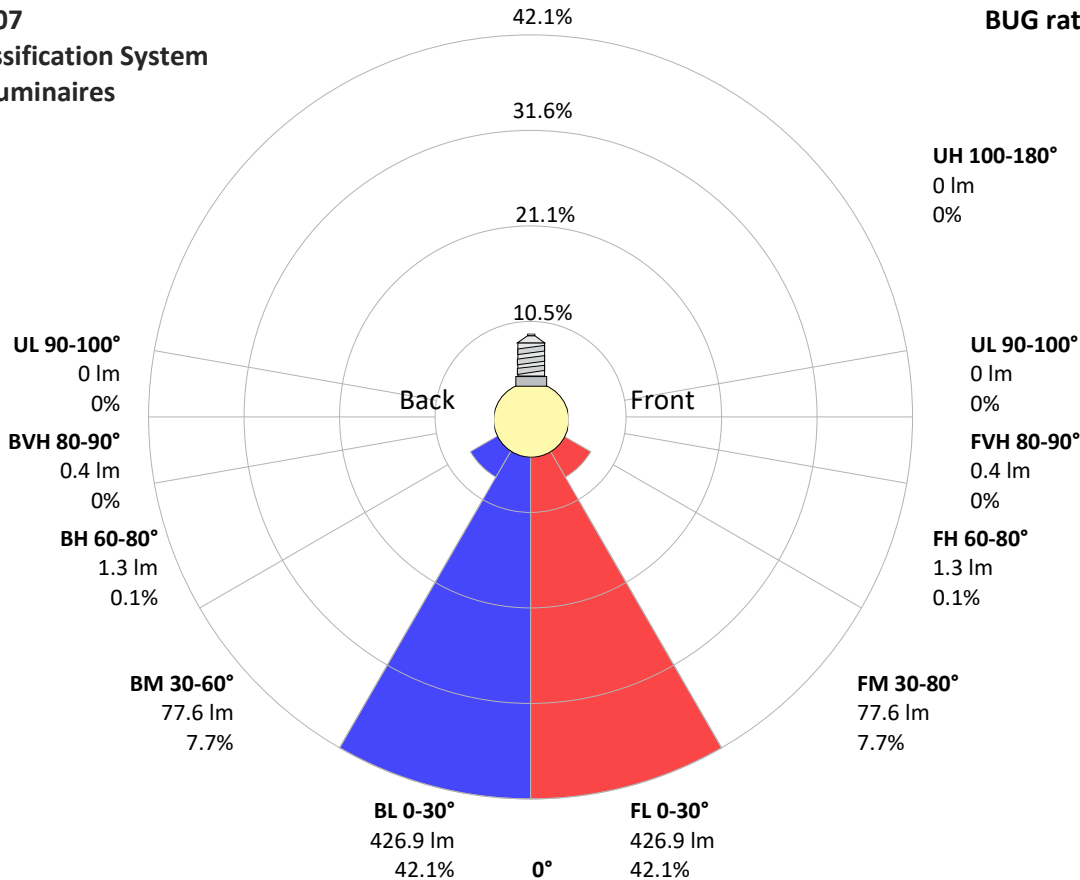
Zone (γ)	Lumen	% Total
0-30°	853 lm	84.3%
0-40°	970 lm	95.8%
0-60°	1009 lm	99.6%
60-90°	3 lm	0.3%
70-100°	2 lm	0.2%
90-120°	1 lm	0.1%
0-90°	1012 lm	99.9%
90-180°	1 lm	0.1%
0-180°	1013 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	427 lm	42.1%
Medium(30-60°)	78 lm	7.7%
High(60-80°)	1 lm	0.1%
Very high(80-90°)	0 lm	0.0%
Back light		
Low(0-30°)	427 lm	42.1%
Medium(30-60°)	78 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



Goniophotometry Report

1_PHOT_NINETY-NINE-2350lmChip-4000K-Spreader-HoneycombLouvre_2303
www.factorylux.com



Power Details

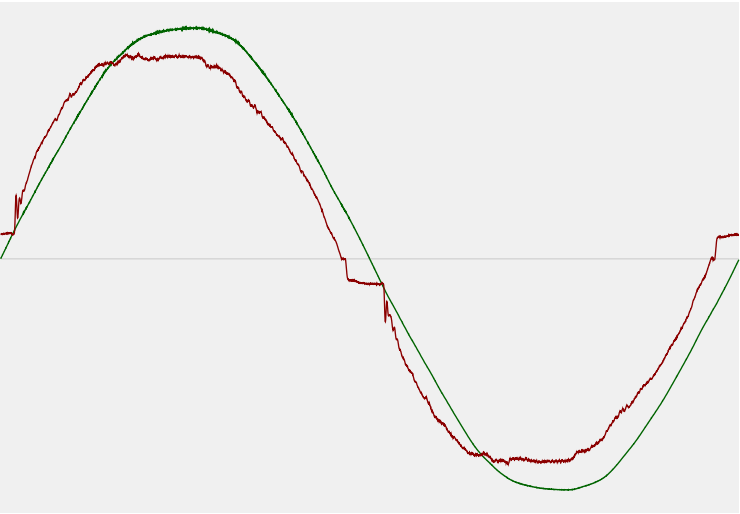
Input Power

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 = $V_{RMS} * I_{RMS}$	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%

Efficiency

Radiated power efficiency	23.5%
Lumen efficiency	64 lm/W

Input Power Curve



Goniophotometry Report

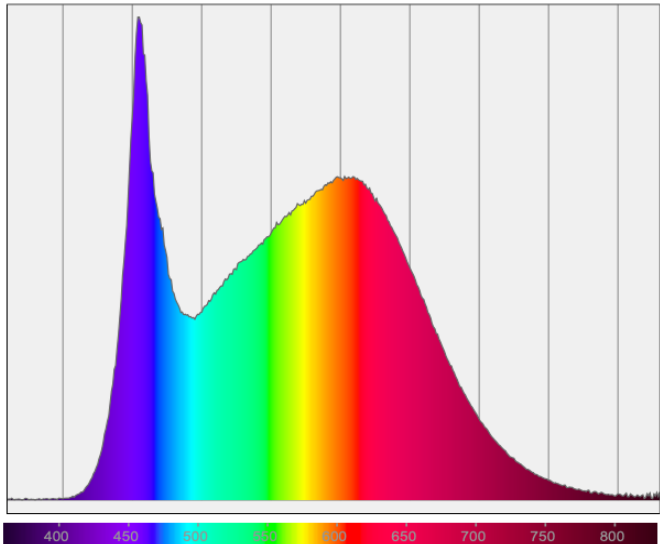
1_PHOT_NINETY-NINE-2350lmChip-4000K-Spreader-HoneycombLouvre_2303
www.factorylux.com



Color Measurements

Correlated Color Temperature	CCT = 4000 K
Color Rendering TM30-18	R _f 88.9 – R _g 98.5
Color Shift, CIE duv	Duv ±0.0003

Spectral distribution



Color details

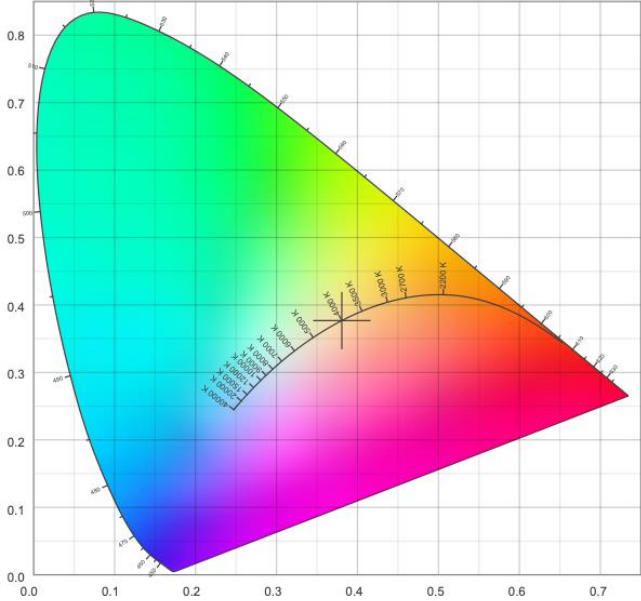
Correlated Color Temperature	CCT = 4000 K	Color coordinates CIE 1931	(x;y) = (0.381;0.377)
Color Rendering Index	CRI 92.6	Color coordinate CIEs 1960	(u;v) = (0.225;0.334)
Color Rendering Index, R9 (red component)	R9 = 72.2	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R _f 88.9 – R _g 98.5	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.225;0.225)
Color Quality Scale	CQS = 88.9		

Goniophotometry Report

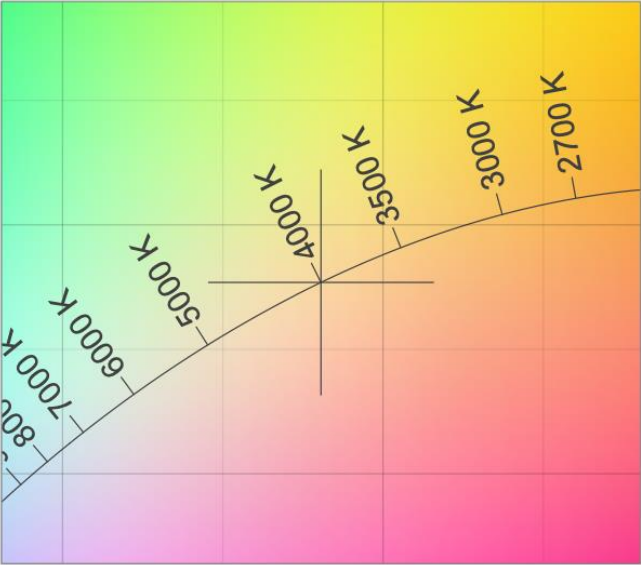
1_PHOT_NINETY-NINE-2350lmChip-4000K-Spreader-HoneycombLouvre_2303
www.factorylux.com



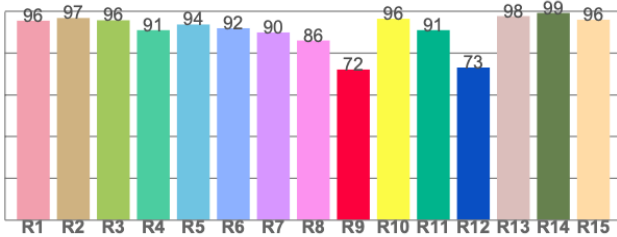
CIE 1931



CIE 1931 – zoomed on Planckian locus



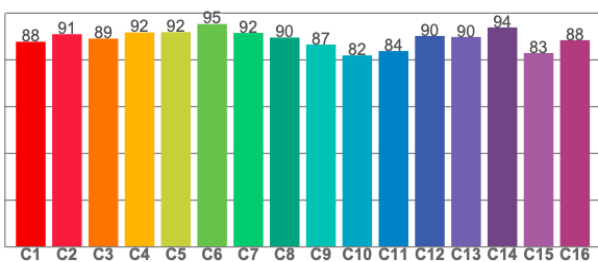
Color Rendering Index per reference color (CIE 1995)



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

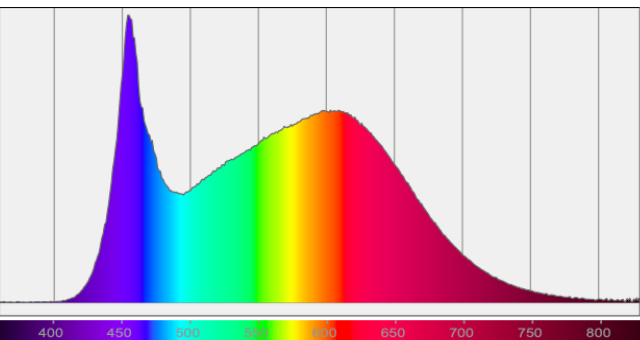
TM30-18 Rf-values per hue bin



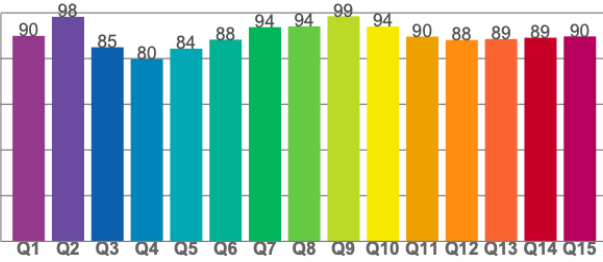
TM30 C values, 16 binned values out of total of 99 C values

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