

Tested Light Source - 1_PHOT_NINETY-NINE-1875lmChip-3500K-58Deg-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°

2°

1.50 m

14.6 W – PF 0.47 – DPF 0.78

244 V – 0.128 A

50 Hz

Main Light Measurement Results

Output

Efficiency

Peak Intensity and Beam Angle

Color Rendering Index

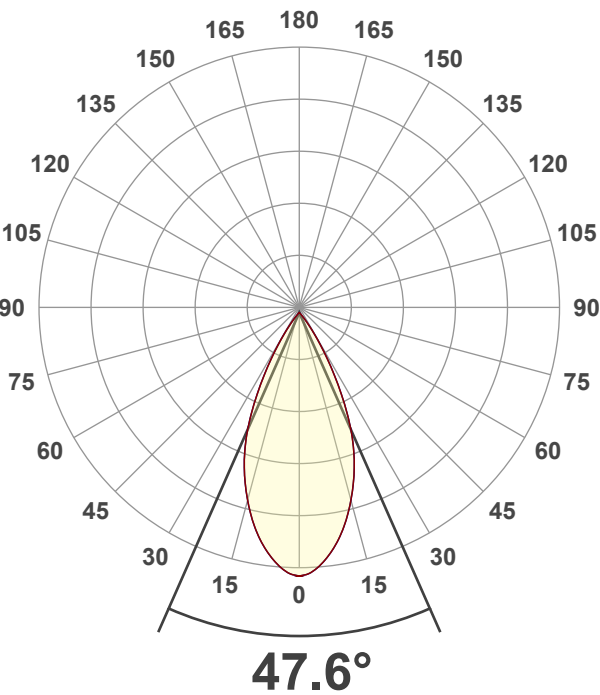
887 lm

61 lm/W

1499 cd – 47.6°

CRI 93.0

Light Intensity Distribution



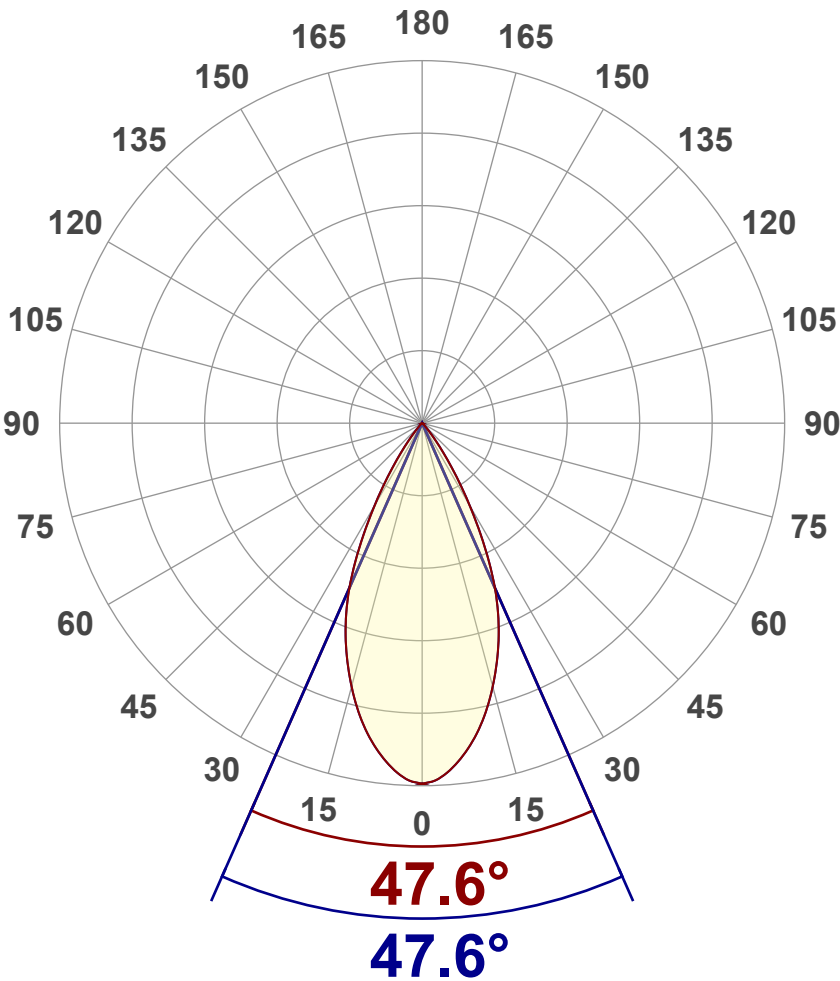
Goniophotometry Report

1_PHOT_NINETY-NINE-1875lmChip-3500K-58Deg-HoneycombLouvre_2303
www.factorylux.com



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	887 lm
Peak Intensity	1499 cd
Beam Angle (50%)	47.6°
Beam Angle (90%)	47.6°
Beam Angle (10%)	47.6°

Cut-off Angle

Average 2,5%	82.3°
--------------	-------

Field Angle

Average 10%	71.3°
-------------	-------

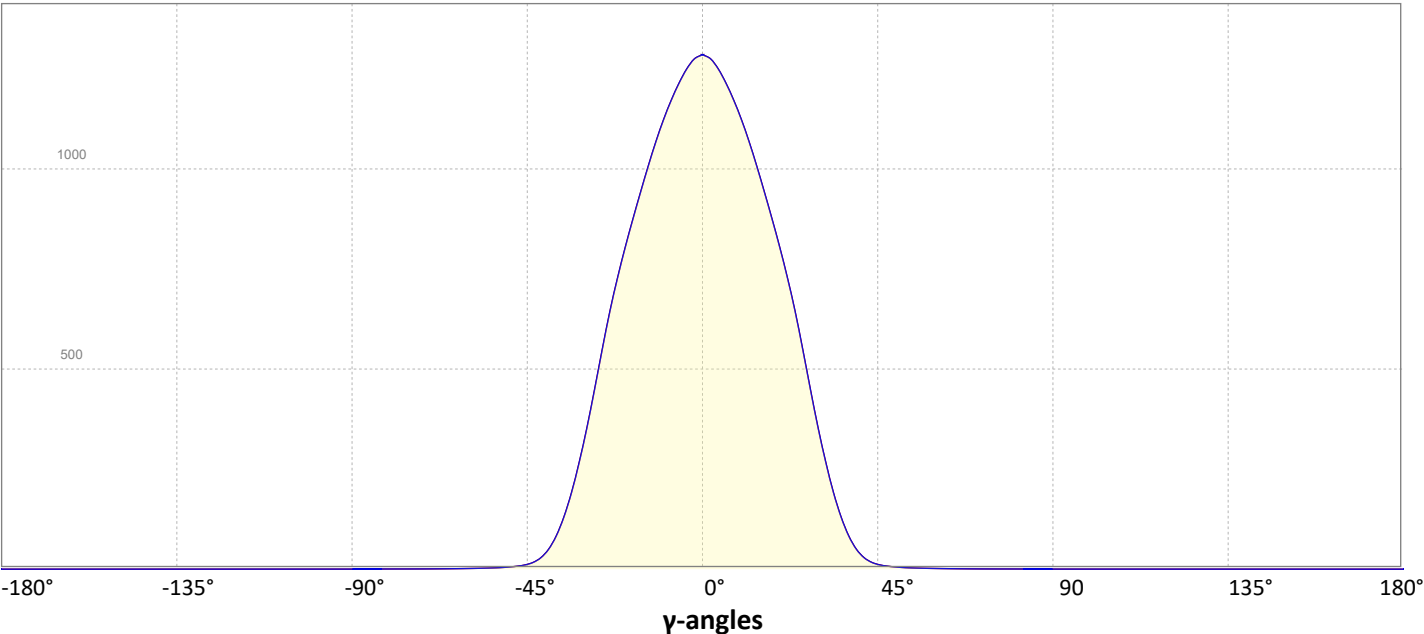
Intensity Ratio

In 120° cone	99.6%
In 90° cone	98.9%

C000-C180

C090-C270

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

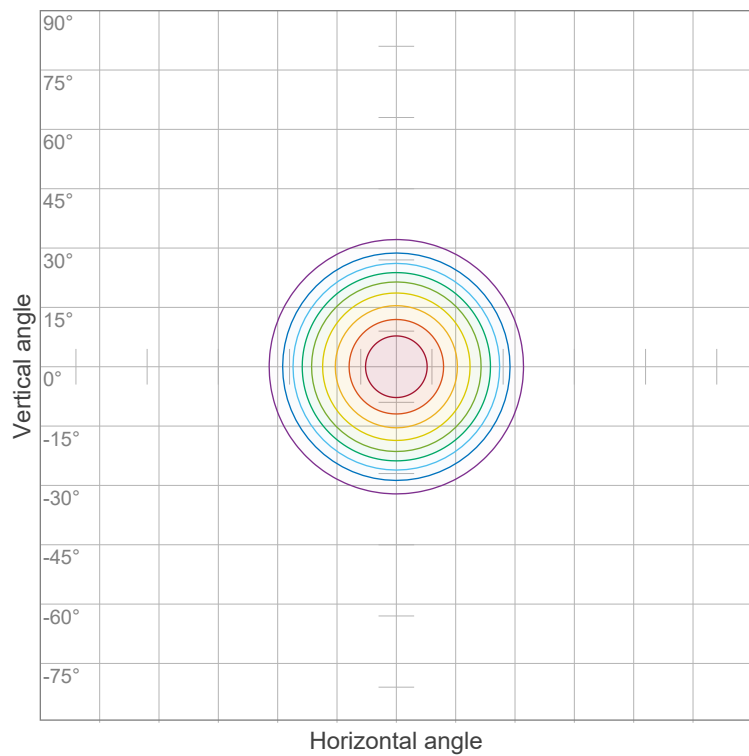


Goniophotometry Report

1_PHOT_NINETY-NINE-1875lmChip-3500K-58Deg-HoneycombLouvre_2303
www.factorylux.com



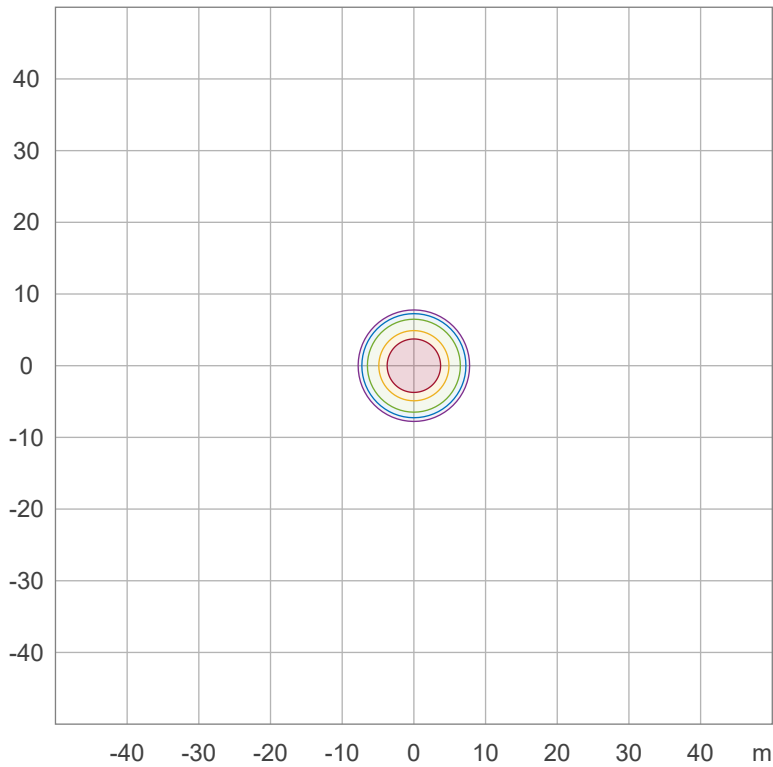
Iso-intensity Diagram (Iso-candela)



90 %	1348.7 cd
80 %	1198.8 cd
70 %	1049.0 cd
60 %	899.1 cd
50 %	749.3 cd
40 %	599.4 cd
30 %	449.6 cd
20 %	299.7 cd
10 %	149.9 cd

Peak intensity: 1498.5 cd
Number of c-planes: 32

Iso-illuminance Diagram (Iso-lux)



50.0 %	7.5 lx
30.0 %	4.5 lx
10.0 %	1.5 lx
5.0 %	0.7 lx
3.0 %	0.4 lx

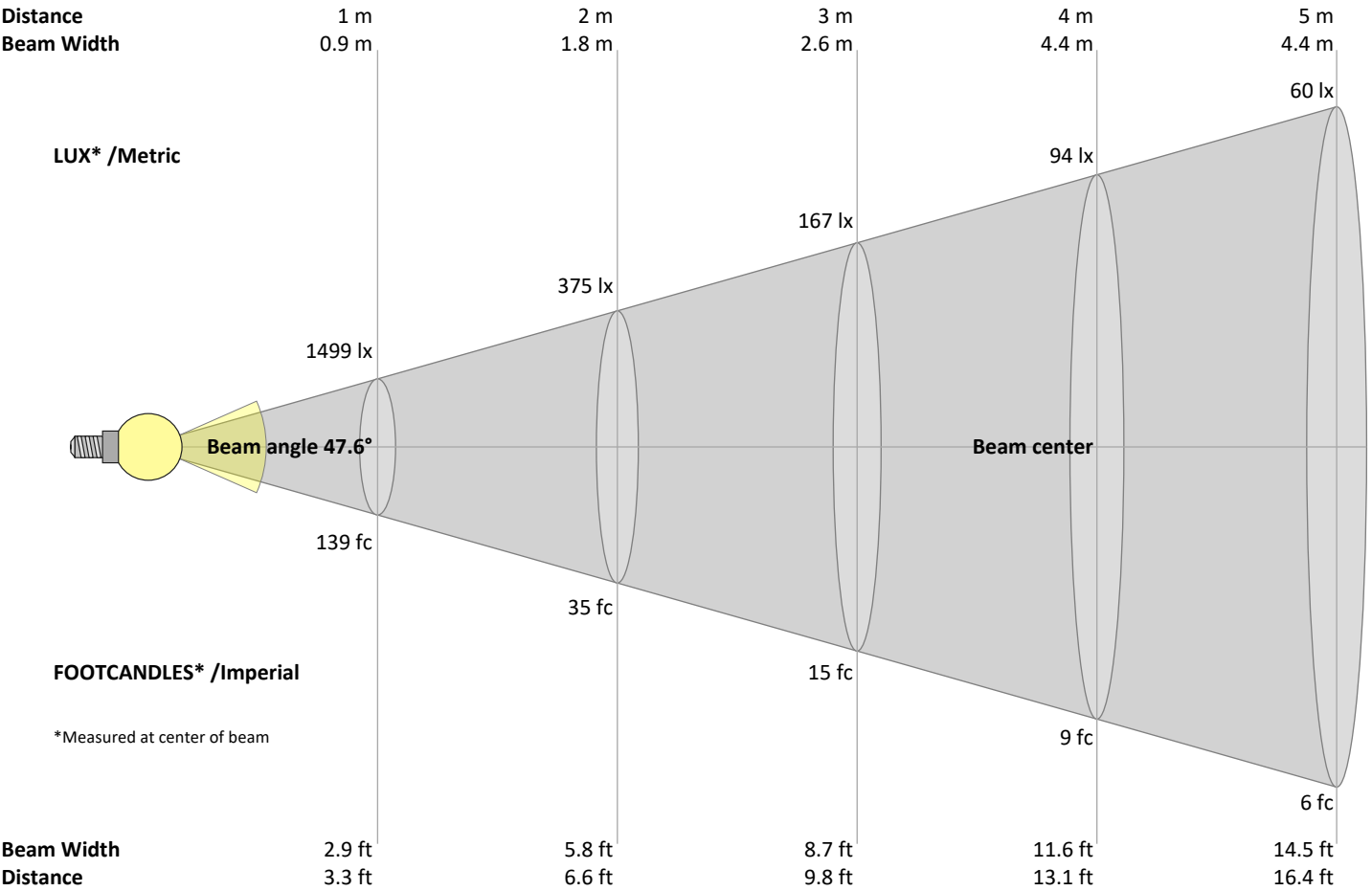
Peak illuminance: 15.0 lx
Mounting height: 10.0 m
Number of c-planes: 32

Goniophotometry Report

1_PHOT_NINETY-NINE-1875lmChip-3500K-58Deg-HoneycombLouvre_2303
www.factorylux.com



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
1499	375	167	94	60	42	31	23	19	15	12	10	9	8	7	6	5	5	4	4	lux
139.2	34.8	15.5	8.7	5.6	3.9	2.8	2.2	1.7	1.4	1.2	1	0.8	0.7	0.6	0.5	0.5	0.4	0.4	0.3	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
1499	1488	1458	1417	1367	1310	1245	1172	1095	1015	931	840	739	625	508	396	296	210	141	88	cd
100%	99%	97%	95%	91%	87%	83%	78%	73%	68%	62%	56%	49%	42%	34%	26%	20%	14%	9%	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
1499	1488	1458	1417	1367	1310	1245	1172	1095	1015	931	840	739	625	508	396	296	210	141	88	cd
100%	99%	97%	95%	91%	87%	83%	78%	73%	68%	62%	56%	49%	42%	34%	26%	20%	14%	9%	6%	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
1499	1488	1458	1417	1367	1310	1245	1172	1095	1015	931	840	739	625	508	396	296	210	141	88	cd
100%	99%	97%	95%	91%	87%	83%	78%	73%	68%	62%	56%	49%	42%	34%	26%	20%	14%	9%	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
1499	1488	1458	1417	1367	1310	1245	1172	1095	1015	931	840	739	625	508	396	296	210	141	88	cd
100%	99%	97%	95%	91%	87%	83%	78%	73%	68%	62%	56%	49%	42%	34%	26%	20%	14%	9%	6%	of 0°val

Goniophotometry Report

1_PHOT_NINETY-NINE-1875lmChip-3500K-58Deg-HoneycombLouvre_2303

www.factorylux.com



Light Planning – UGR table

Uncorrected, comprehensive UGR table according to 117-1995

Reflectances											
	p Ceiling	70	70	50	50	30	70	70	50	50	30
	p Walls	50	30	50	30	30	50	30	50	30	30
	p Floor	20	20	20	20	20	20	20	20	20	20
Room size		Viewed Crosswise					Viewed Endwise				
H = mounting height above eye level		(Viewing direction orthogonal to lamp length axis)					(Viewing direction parallel to lamp length axis)				
X	Y										
2H	2H	15.6	16.2	15.7	16.4	16.6	15.6	16.2	15.7	16.4	16.6
	3H	15.3	16.0	15.7	16.2	16.4	15.3	16.0	15.7	16.2	16.4
	4H	15.3	15.9	15.7	16.2	16.4	15.3	15.9	15.7	16.2	16.4
	6H	15.3	15.8	15.6	16.1	16.5	15.3	15.8	15.6	16.1	16.5
	8H	15.2	15.7	15.5	16.1	16.5	15.2	15.7	15.5	16.1	16.5
	12H	15.2	15.7	15.5	16.0	16.5	15.2	15.7	15.5	16.0	16.5
4H	2H	15.3	15.9	15.6	16.2	16.4	15.3	15.9	15.6	16.2	16.4
	3H	15.2	15.7	15.5	16.0	16.4	15.2	15.7	15.5	16.0	16.4
	4H	15.0	15.5	15.4	15.9	16.4	15.0	15.5	15.4	15.9	16.4
	6H	14.9	15.5	15.4	15.8	16.1	14.9	15.5	15.4	15.8	16.1
	8H	14.9	15.4	15.4	15.7	16.1	14.9	15.4	15.4	15.7	16.1
	12H	14.8	15.2	15.3	15.6	16.1	14.8	15.2	15.3	15.6	16.1
8H	4H	14.9	15.4	15.4	15.7	16.1	14.9	15.4	15.4	15.7	16.1
	6H	14.8	15.1	15.3	15.6	16.1	14.8	15.1	15.3	15.6	16.1
	8H	14.8	15.1	15.3	15.6	16.2	14.8	15.1	15.3	15.6	16.2
	12H	14.8	15.0	15.4	15.5	16.1	14.8	15.0	15.4	15.5	16.1
12H	4H	14.8	15.2	15.3	15.6	16.1	14.8	15.2	15.3	15.6	16.1
	6H	14.8	15.1	15.3	15.6	16.2	14.8	15.1	15.3	15.6	16.2
	8H	14.8	15.0	15.4	15.5	16.1	14.8	15.0	15.4	15.5	16.1
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		6.1 / -11.7					6.1 / -11.7				
S = 1.5H		8.8 / -12.2					8.8 / -12.2				
S = 2.0H		10.8 / -12.7					10.8 / -12.7				

Coefficients of Utilization

Ceiling reflectance	80			70			50			30			10			0		
Wall reflectance	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
Floor reflectance	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0
RCR		(RCR: Room Cavity Ratio)			Room Values are expressed as percentage of Lumen delivered to the task surface													
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	114	112	109	107	112	109	107	105	105	104	102	102	100	99	98	97	96	95
2	109	105	101	98	107	103	100	97	100	97	95	97	95	93	94	92	91	89
3	104	99	94	91	102	97	93	90	95	91	88	92	89	87	90	88	86	84
4	100	93	88	84	98	92	87	84	90	86	83	88	85	82	86	83	81	80
5	96	88	83	79	94	87	82	79	85	81	78	84	80	77	82	79	77	75
6	91	84	78	74	90	83	78	74	81	77	74	80	76	73	79	75	73	71
7	88	79	74	70	86	79	74	70	78	73	70	76	72	69	75	72	69	68
8	84	76	70	67	83	75	70	66	74	69	66	73	69	66	72	68	66	64
9	81	72	67	63	80	71	66	63	71	66	63	70	66	63	69	65	62	61
10	77	69	63	60	76	68	63	60	67	63	60	67	63	60	66	62	59	58

Goniophotometry Report

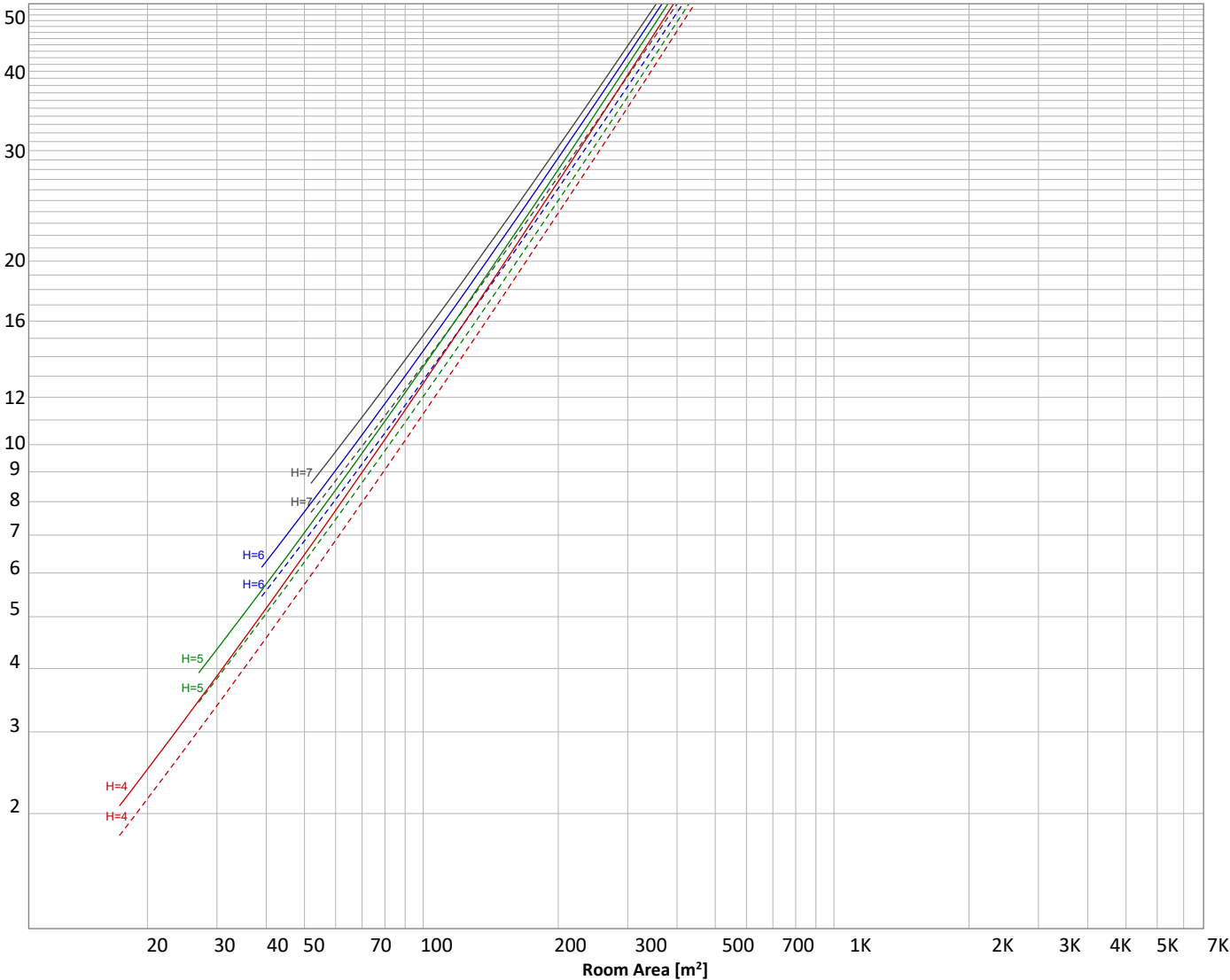
1_PHOT_NINETY-NINE-1875lmChip-3500K-58Deg-HoneycombLouvre_2303
www.factorylux.com



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 887 lm	$\rho(\%)$		
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
				30
				20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
133 lm	314 lm	305 lm	115 lm	14.0 lm	2.95 lm	1.24 lm	0.598 lm	0.432 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.208 lm	0.202 lm	0.189 lm	0.171 lm	0.072 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°	133 lm	15.0%
10-20°	314 lm	35.4%
20-30°	305 lm	34.3%
30-40°	115 lm	13.0%
40-50°	14 lm	1.6%
50-60°	3 lm	0.3%
60-70°	1 lm	0.1%
70-80°	1 lm	0.1%
80-90°	0 lm	0.0%
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	887 lm	100.0%

Intensity peaks

Max intensity	1499 cd
Intensity, 90°	0 cd
Intensity, 0°	1499 cd

Zonal Lumen summary

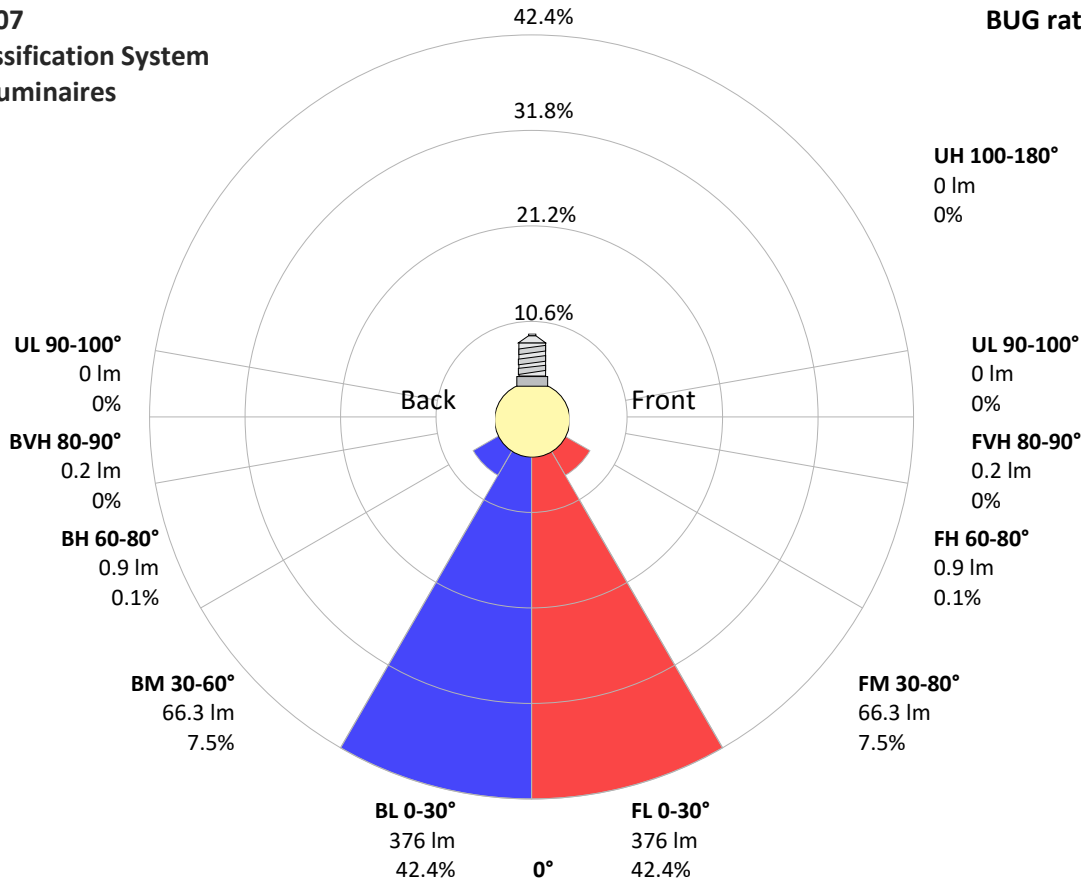
Zone (γ)	Lumen	% Total
0-30°	752 lm	84.8%
0-40°	867 lm	97.7%
0-60°	884 lm	99.6%
60-90°	2 lm	0.3%
70-100°	1 lm	0.1%
90-120°	1 lm	0.1%
0-90°	886 lm	99.9%
90-180°	1 lm	0.1%
0-180°	887 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	376 lm	42.4%
Medium(30-60°)	66 lm	7.5%
High(60-80°)	1 lm	0.1%
Very high(80-90°)	0 lm	0.0%
Back light		
Low(0-30°)	376 lm	42.4%
Medium(30-60°)	66 lm	7.5%
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-1875lmChip-3500K-58Deg-HoneycombLouvre_2303
www.factorylux.com



Power Details

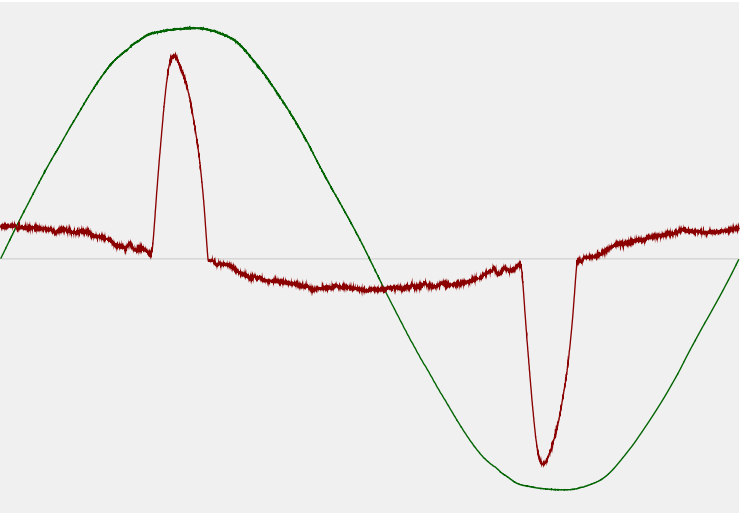
Input Power

Power feed to light source	14.6 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	244 V
RMS Input current feed, I_{RMS}	0.128 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	31.17 VA
Displacement factor of AC power feed	0.78
Power factor of AC current feed	0.47
Total harmonic distortion of the current	132.16%
Total harmonic distortion of the voltage	1.39%

Efficiency

Radiated power efficiency	22.2%
<div><div></div></div>	
Lumen efficiency	61 lm/W
<div><div></div></div>	

Input Power Curve



Goniophotometry Report

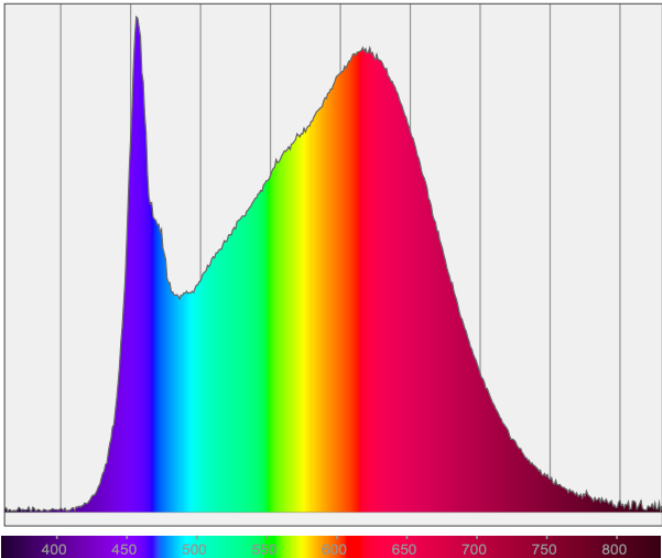
1_PHOT_NINETY-NINE-1875lmChip-3500K-58Deg-HoneycombLouvre_2303
www.factorylux.com



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		

Goniophotometry Report

1_PHOT_NINETY-NINE-1875lmChip-3500K-58Deg-HoneycombLouvre_2303
www.factorylux.com



CIE 1931



CIE 1931 – zoomed on Planckian locus



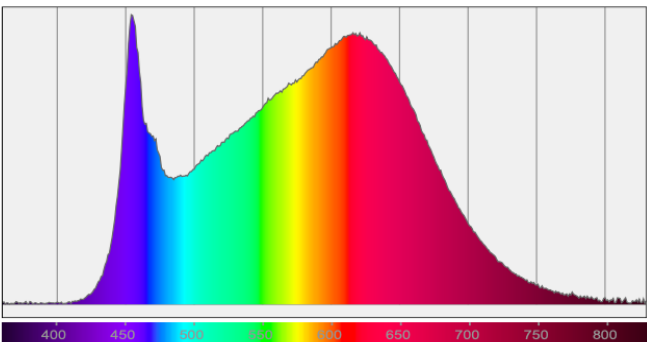
Color Rendering Index per reference color (CIE 1995)



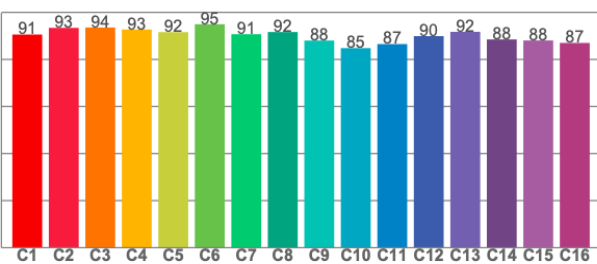
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
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

Spectral power distribution (SPD) / W/nm – 0-100%



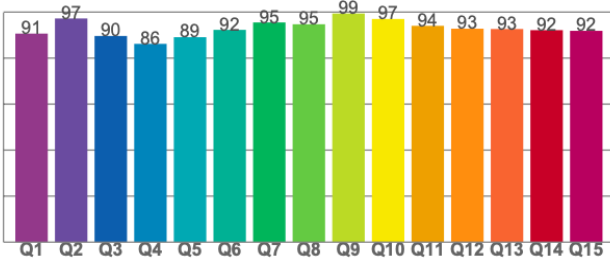
TM30-18 Rf-values per hue bin



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

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