

Tested Light Source - 1\_PHOT\_NINETY-NINE-1875lmChip-3500K-21Deg-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°

1°

1.50 m

14.6 W – PF 0.46 – DPF 0.8

242 V – 0.131 A

50 Hz

Main Light Measurement Results

Output

Efficiency

Peak Intensity and Beam Angle

Color Rendering Index

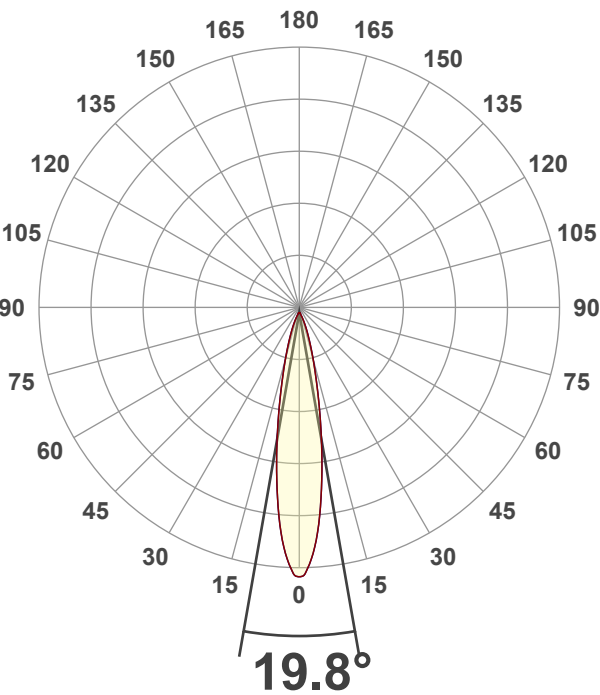
1018 lm

70 lm/W

5762 cd – 19.8°

CRI 93.0

Light Intensity Distribution



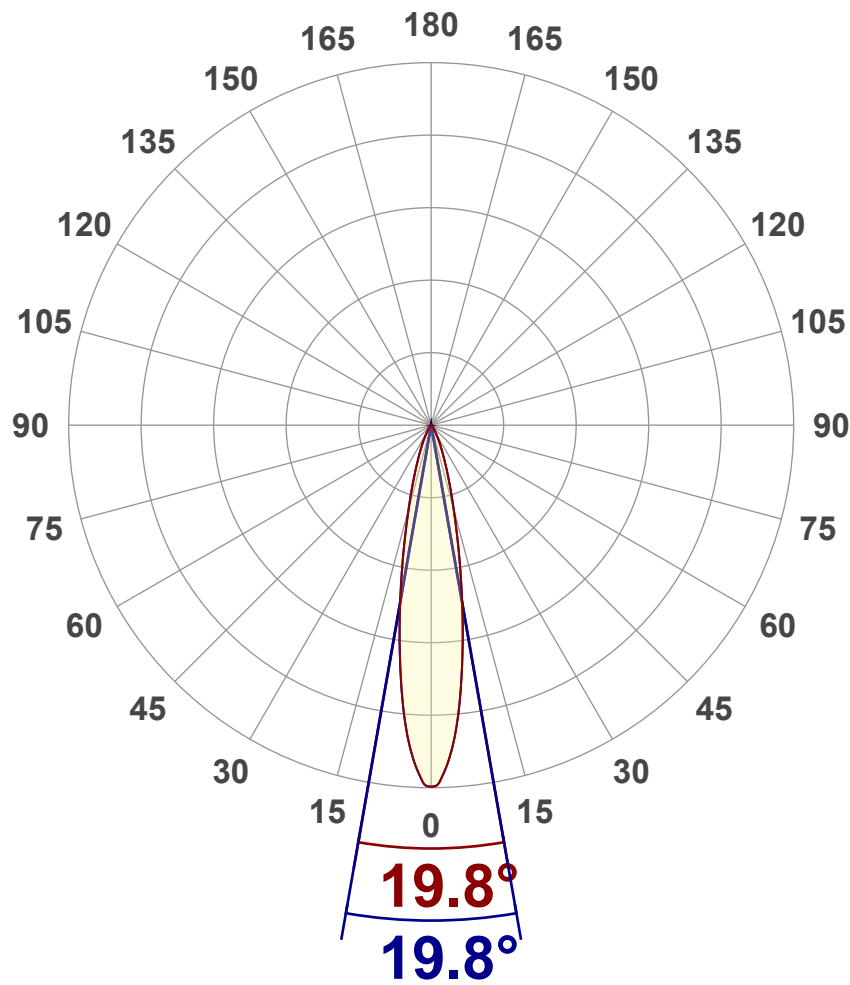
Goniophotometry Report

1\_PHOT\_NINETY-NINE-1875lmChip-3500K-21Deg-HoneycombLouvre\_2303  
www.factorylux.com



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1018 lm
Peak Intensity	5762 cd
Beam Angle (50%)	19.8°
Beam Angle (90%)	19.8°
Beam Angle (10%)	19.8°

Cut-off Angle

Average 2,5%	61°
--------------	-----

Field Angle

Average 10%	42.1°
-------------	-------

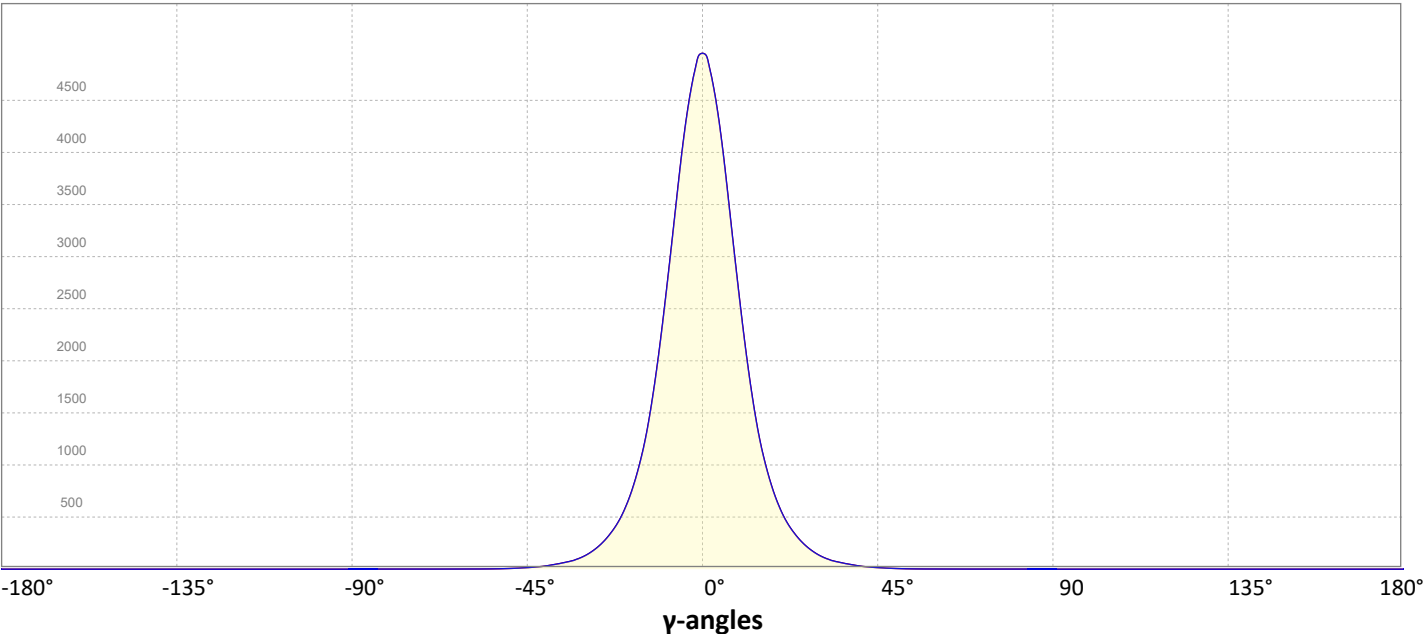
Intensity Ratio

In 120° cone	99.7%
In 90° cone	98.9%

C000-C180

C090-C270

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

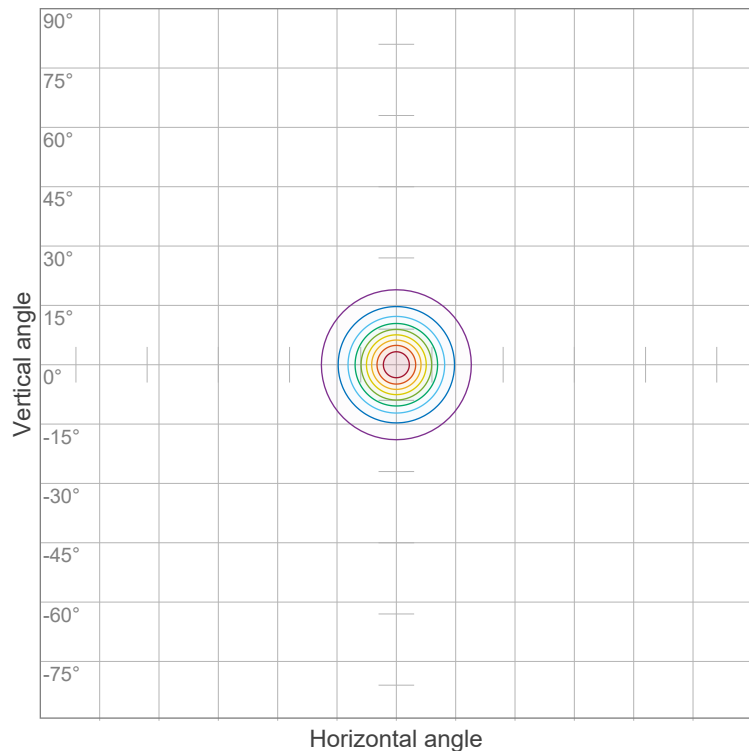


Goniophotometry Report

1\_PHOT\_NINETY-NINE-1875lmChip-3500K-21Deg-HoneycombLouvre\_2303  
www.factorylux.com



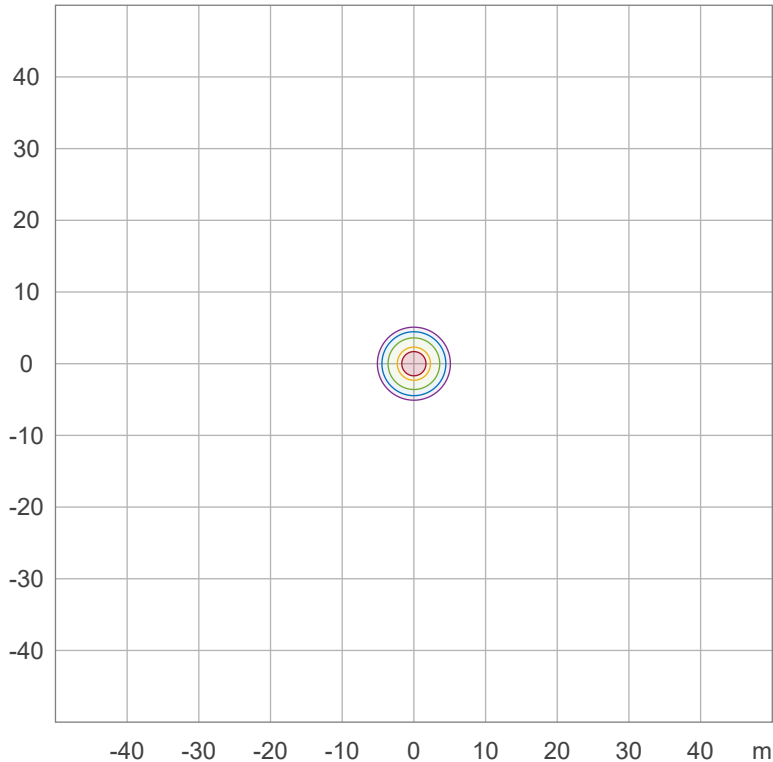
Iso-intensity Diagram (Iso-candela)



90 %	5185.6 cd
80 %	4609.4 cd
70 %	4033.2 cd
60 %	3457.1 cd
50 %	2880.9 cd
40 %	2304.7 cd
30 %	1728.5 cd
20 %	1152.4 cd
10 %	576.2 cd

Peak intensity: 5761.8 cd  
Number of c-planes: 32

Iso-illuminance Diagram (Iso-lux)



50.0 %	28.8 lx
30.0 %	17.3 lx
10.0 %	5.8 lx
5.0 %	2.9 lx
3.0 %	1.7 lx

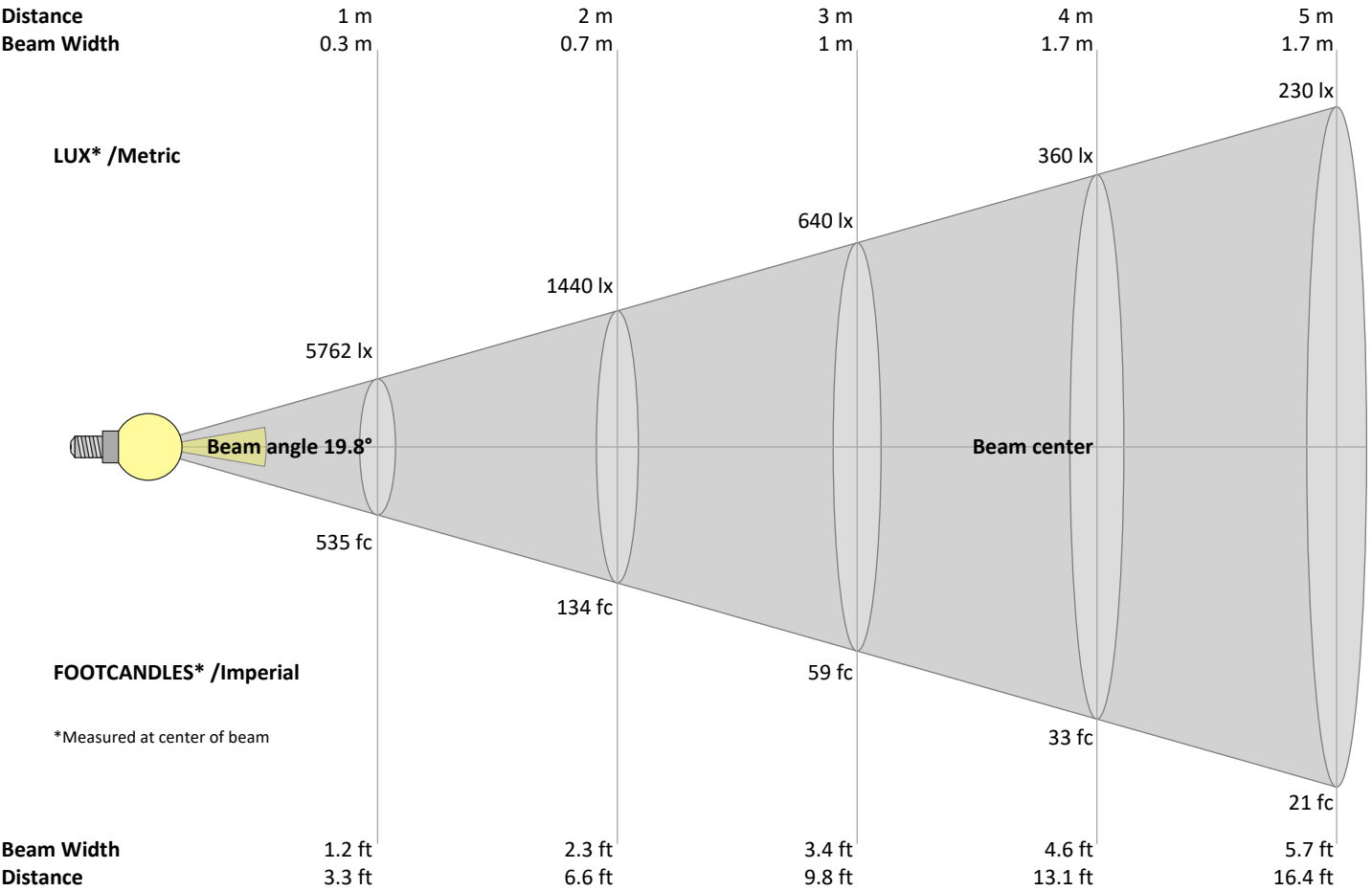
Peak illuminance: 57.6 lx  
Mounting height: 10.0 m  
Number of c-planes: 32

Goniophotometry Report

1\_PHOT\_NINETY-NINE-1875lmChip-3500K-21Deg-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
5762	1440	640	360	230	160	118	90	71	58	48	40	34	29	26	23	20	18	16	14	lux
535.3	133.8	59.5	33.5	21.4	14.9	10.9	8.4	6.6	5.4	4.4	3.7	3.2	2.7	2.4	2.1	1.9	1.7	1.5	1.3	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
5762	5578	5090	4401	3610	2849	2170	1616	1207	902	672	504	380	284	211	155	116	88	71	54	cd
100%	97%	88%	76%	63%	49%	38%	28%	21%	16%	12%	9%	7%	5%	4%	3%	2%	2%	1%	1%	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
5762	5578	5090	4401	3610	2849	2170	1616	1207	902	672	504	380	284	211	155	116	88	71	54	cd
100%	97%	88%	76%	63%	49%	38%	28%	21%	16%	12%	9%	7%	5%	4%	3%	2%	2%	1%	1%	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
5762	5578	5090	4401	3610	2849	2170	1616	1207	902	672	504	380	284	211	155	116	88	71	54	cd
100%	97%	88%	76%	63%	49%	38%	28%	21%	16%	12%	9%	7%	5%	4%	3%	2%	2%	1%	1%	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
5762	5578	5090	4401	3610	2849	2170	1616	1207	902	672	504	380	284	211	155	116	88	71	54	cd
100%	97%	88%	76%	63%	49%	38%	28%	21%	16%	12%	9%	7%	5%	4%	3%	2%	2%	1%	1%	of 0°val

# Goniophotometry Report

1\_PHOT\_NINETY-NINE-1875lmChip-3500K-21Deg-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	10.1	10.5	10.2	10.7	10.9	10.1	10.5	10.2	10.7	10.9
	3H	9.9	10.4	10.2	10.6	10.8	9.9	10.4	10.2	10.6	10.8
	4H	9.8	10.4	10.2	10.6	10.8	9.8	10.4	10.2	10.6	10.8
	6H	9.9	10.4	10.2	10.7	11.0	9.9	10.4	10.2	10.7	11.0
	8H	9.9	10.4	10.2	10.7	11.1	9.9	10.4	10.2	10.7	11.1
	12H	10.0	10.4	10.3	10.8	11.2	10.0	10.4	10.3	10.8	11.2
4H	2H	9.8	10.3	10.1	10.5	10.8	9.8	10.3	10.1	10.5	10.8
	3H	9.7	10.1	10.1	10.5	10.9	9.7	10.1	10.1	10.5	10.9
	4H	9.6	10.0	10.1	10.5	11.0	9.6	10.0	10.1	10.5	11.0
	6H	9.7	10.2	10.2	10.5	10.8	9.7	10.2	10.2	10.5	10.8
	8H	9.8	10.2	10.3	10.5	10.9	9.8	10.2	10.3	10.5	10.9
	12H	9.9	10.2	10.4	10.6	11.1	9.9	10.2	10.4	10.6	11.1
8H	4H	9.5	10.0	10.1	10.3	10.7	9.5	10.0	10.1	10.3	10.7
	6H	9.7	10.0	10.2	10.4	11.0	9.7	10.0	10.2	10.4	11.0
	8H	9.9	10.1	10.4	10.6	11.3	9.9	10.1	10.4	10.6	11.3
	12H	10.2	10.3	10.8	10.8	11.4	10.2	10.3	10.8	10.8	11.4
12H	4H	9.5	9.8	10.0	10.2	10.7	9.5	9.8	10.0	10.2	10.7
	6H	9.8	10.0	10.3	10.5	11.1	9.8	10.0	10.3	10.5	11.1
	8H	9.9	10.1	10.5	10.6	11.2	9.9	10.1	10.5	10.6	11.2
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		4.0 / -3.6					4.0 / -3.6				
S = 1.5H		6.4 / -3.9					6.4 / -3.9				
S = 2.0H		8.4 / -4.1					8.4 / -4.1				

## 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	115	113	111	109	113	111	109	107	107	105	104	103	102	101	100	99	98	97
2	111	108	104	102	109	106	103	101	103	101	99	100	98	97	97	96	95	93
3	108	103	99	96	106	102	98	96	99	96	94	97	95	93	95	93	91	90
4	104	99	95	92	103	98	94	91	96	93	90	94	91	89	92	90	88	87
5	101	95	91	88	100	94	91	88	93	89	87	91	88	86	90	87	86	84
6	98	92	88	85	97	91	87	85	90	87	84	89	86	83	88	85	83	82
7	95	89	85	82	94	88	84	82	87	84	81	86	83	81	85	83	81	80
8	93	86	82	79	92	86	82	79	85	81	79	84	81	79	83	80	78	77
9	90	84	80	77	90	83	80	77	83	79	77	82	79	76	81	78	76	75
10	88	82	78	75	87	81	77	75	80	77	75	80	77	74	79	76	74	73

1\_PHOT\_NINETY-NINE-1875lmChip-3500K-21Deg-HoneycombLouvre\_2303  
www.factorylux.com

[illegible]

Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	390 lm	38.3%
10-20°	398 lm	39.1%
20-30°	157 lm	15.5%
30-40°	51 lm	5.1%
40-50°	15 lm	1.4%
50-60°	3 lm	0.3%
60-70°	1 lm	0.1%
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	1018 lm	100.0%

Intensity peaks

Max intensity	5762 cd
Intensity, 90°	0 cd
Intensity, 0°	5762 cd

Zonal Lumen summary

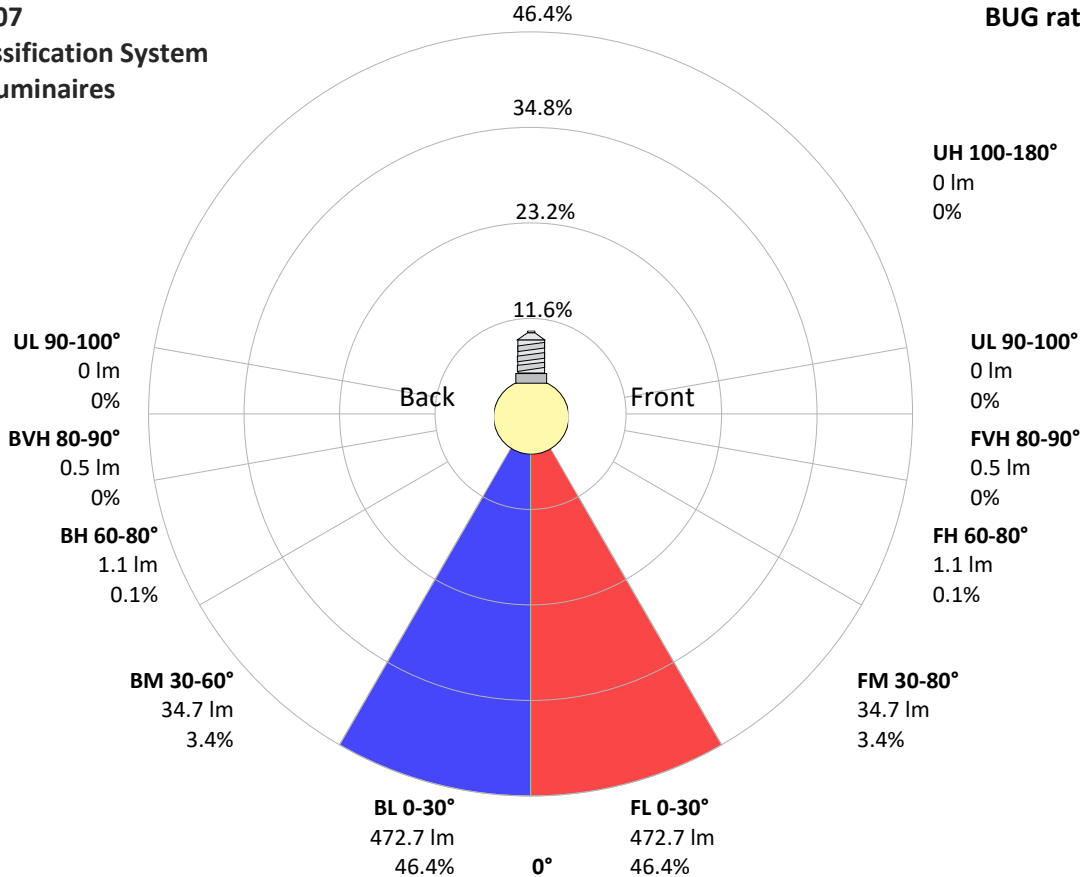
Zone (γ)	Lumen	% Total
0-30°	946 lm	92.9%
0-40°	997 lm	98.0%
0-60°	1015 lm	99.7%
60-90°	3 lm	0.3%
70-100°	2 lm	0.2%
90-120°	0 lm	0.0%
0-90°	1018 lm	100.0%
90-180°	0 lm	0.0%
0-180°	1018 lm	100.0%

BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	473 lm	46.4%
Medium(30-60°)	35 lm	3.4%
High(60-80°)	1 lm	0.1%
Very high(80-90°)	0 lm	0.0%
<b>Back light</b>		
Low(0-30°)	473 lm	46.4%
Medium(30-60°)	35 lm	3.4%
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



# Goniophotometry Report

1\_PHOT\_NINETY-NINE-1875lmChip-3500K-21Deg-HoneycombLouvre\_2303  
www.factorylux.com



## Power Details

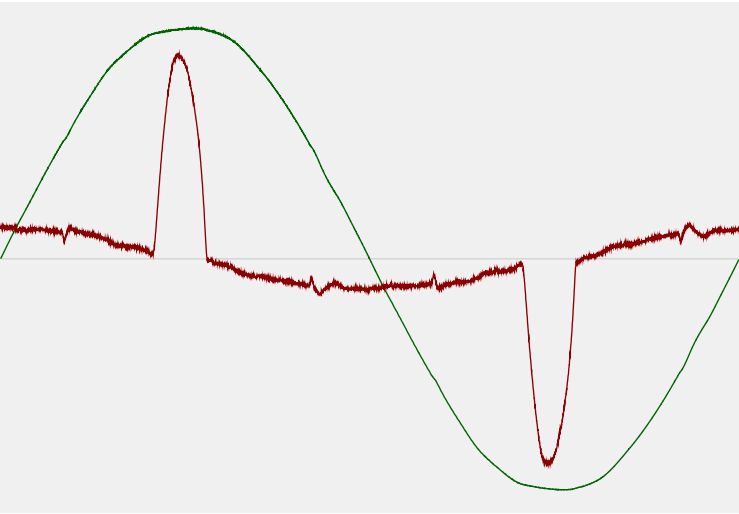
### Input Power

Power feed to light source	14.6 W
Frequency of input power	50 Hz
RMS Input voltage feed, $V_{RMS}$	242 V
RMS Input current feed, $I_{RMS}$	0.131 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	31.58 VA
Displacement factor of AC power feed	0.8
Power factor of AC current feed	0.46
Total harmonic distortion of the current	137.46%
Total harmonic distortion of the voltage	1.12%

### Efficiency

Radiated power efficiency	25.6%
<div><div></div></div>	
Lumen efficiency	70 lm/W
<div><div></div></div>	

### Input Power Curve

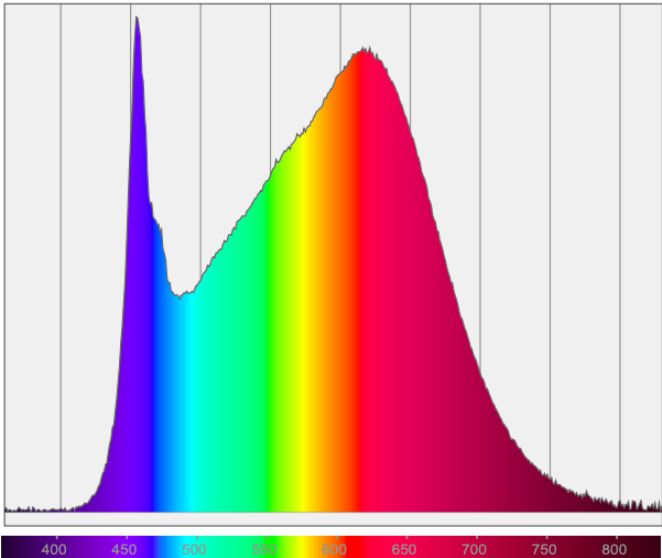




Color Measurements

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		

Goniophotometry Report

1\_PHOT\_NINETY-NINE-1875lmChip-3500K-21Deg-HoneycombLouvre\_2303  
www.factorylux.com



CIE 1931



CIE 1931 – zoomed on Planckian locus



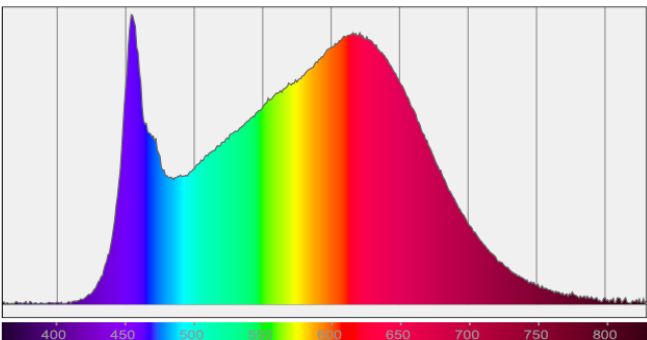
Color Rendering Index per reference color (CIE 1995)



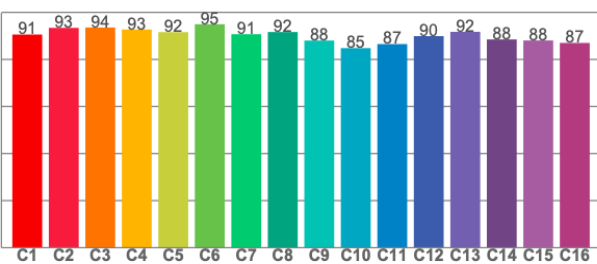
CRI R values, only R1-R8 are used to calculate final CRI value

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%



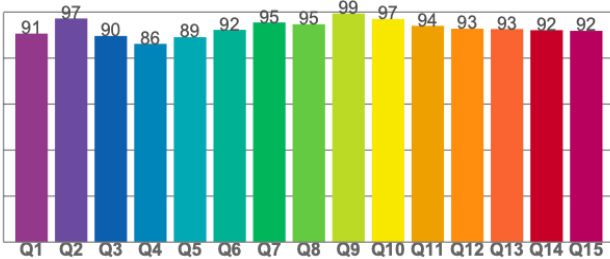
TM30-18 Rf-values per hue bin



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