Goniophotometry Report

1_PHOT_NINETY-NINE-2125lmChip-3000K-WallWash_2309
www.factorylux.com

Tested Light Source - 1_PHOT_NINETY-NINE-2125lmChip-3000K-WallWash_2309

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)

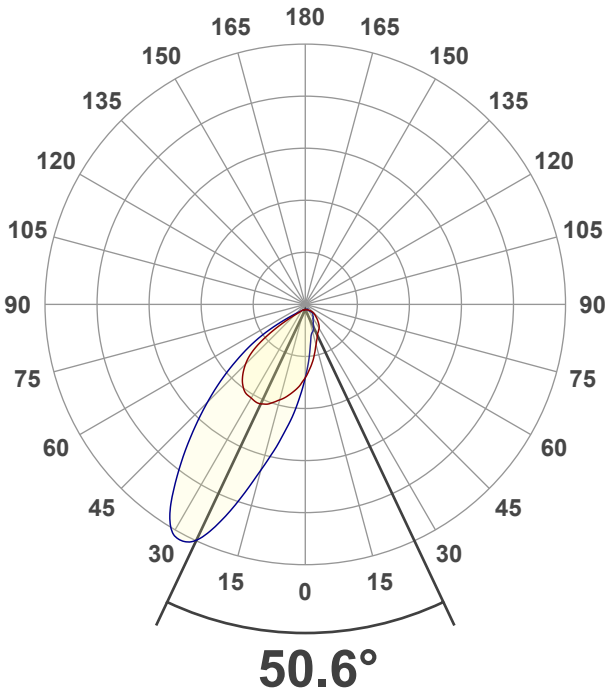
Measurement Conditions

Number of C-planes and Resolution	24 planes – 15°
γ (gamma)-Resolution	1.5°
Test Distance	1.50 m
Input Power, Power and Displ. Factors	16.1 W – PF 0.99 – DPF 0.99
Input RMS Voltage and Current	241 V – 0.068 A
Frequency of Input Power	50.1 Hz

Main Light Measurement Results

Output	1450 lm
Efficiency	90 lm/W
Peak Intensity and Beam Angle	1561 cd – 50.6°
Color Rendering Index	CRI 91.9

Light Intensity Distribution



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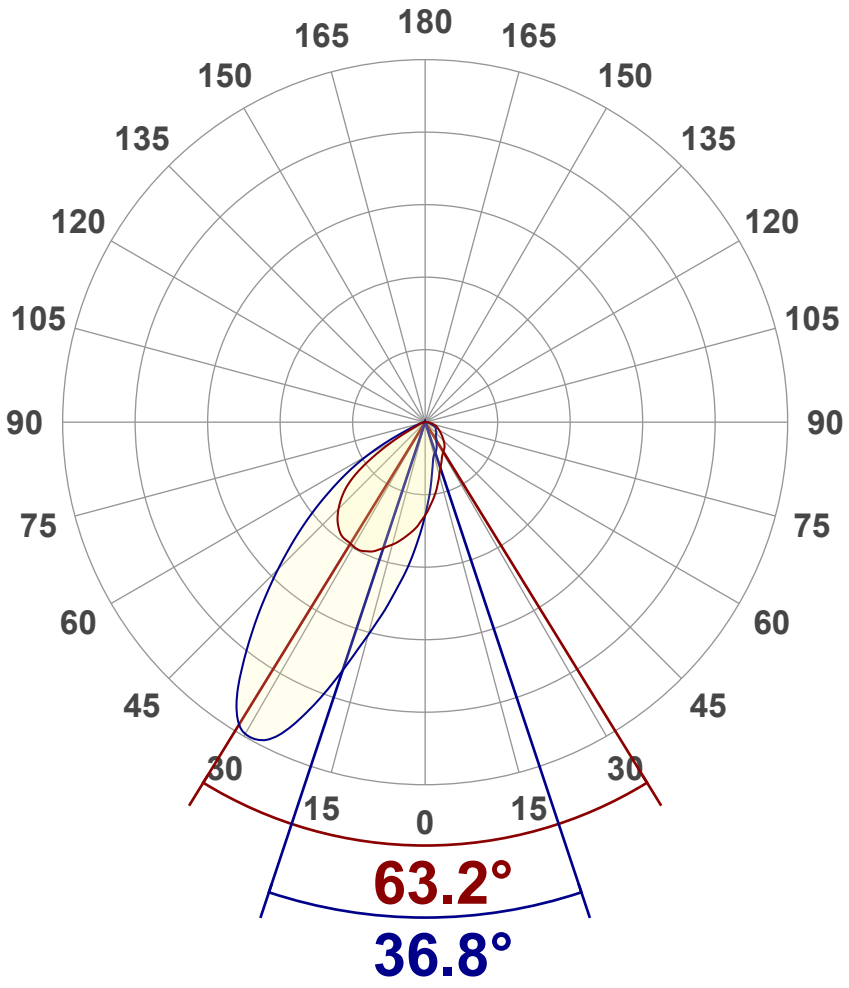
Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1450 lm
Peak Intensity	1561 cd
Beam Angle (50%)	50.6°
Beam Angle (90%)	36.8°
Beam Angle (10%)	80.3°

Cut-off Angle

Average 2,5%	149.6°

Field Angle

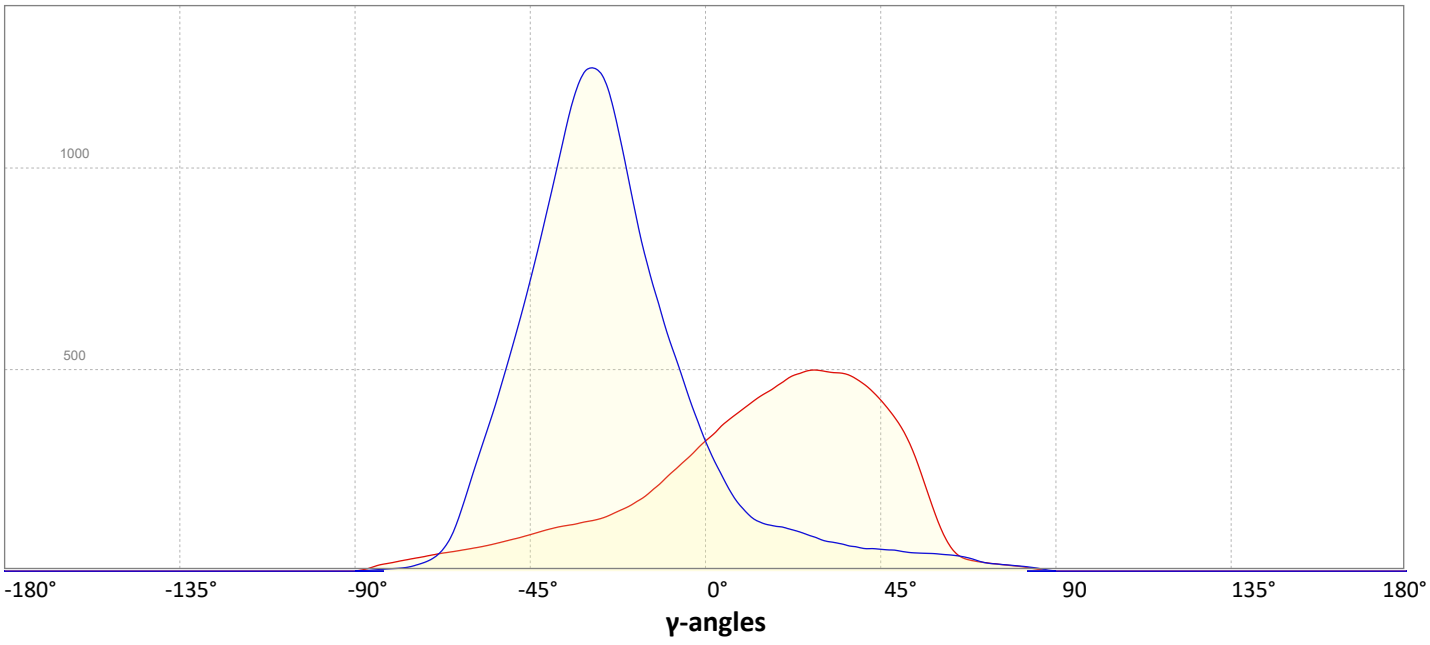
Average 10%	99.5°

Intensity Ratio

In 120° cone	91.9%
In 90° cone	66.4%

C000-C180
C090-C270

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



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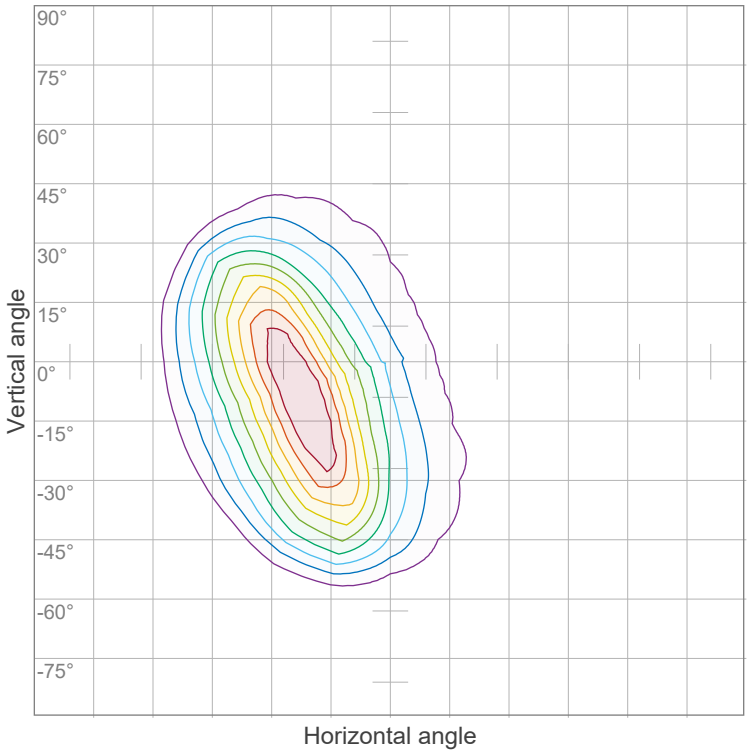
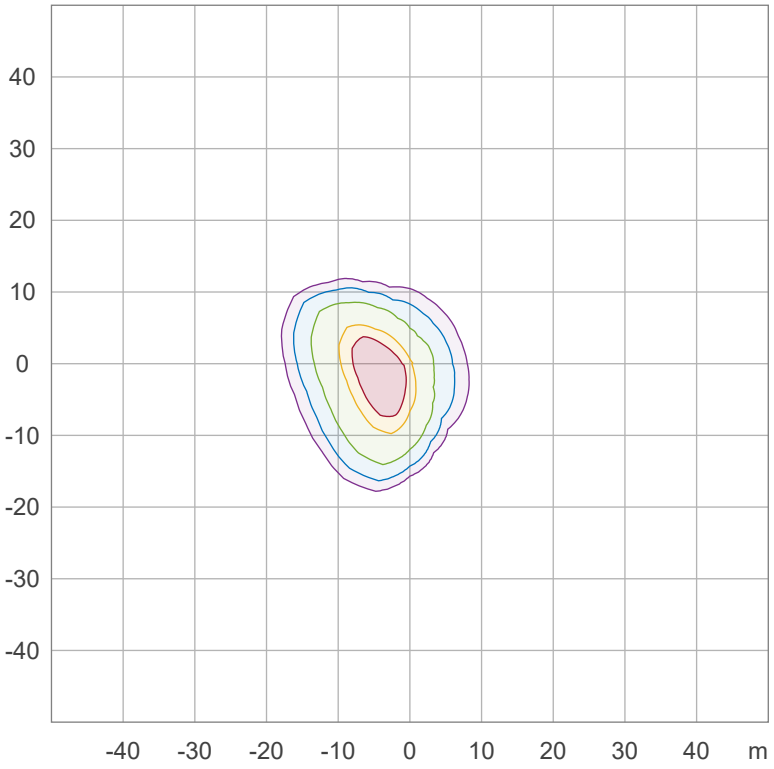
Iso-intensity Diagram (Iso-candela)



90 %	1404.1 cd
80 %	1248.1 cd
70 %	1092.1 cd
60 %	936.1 cd
50 %	780.1 cd
40 %	624.0 cd
30 %	468.0 cd
20 %	312.0 cd
10 %	156.0 cd

Peak intensity: 1560.1 cd
Number of c-planes: 24

Iso-illuminance Diagram (Iso-lux)



50.0 %	5.8 lx
30.0 %	3.5 lx
10.0 %	1.2 lx
5.0 %	0.6 lx
3.0 %	0.3 lx

Peak illuminance: 11.7 lx
Mounting height: 10.0 m
Number of c-planes: 24

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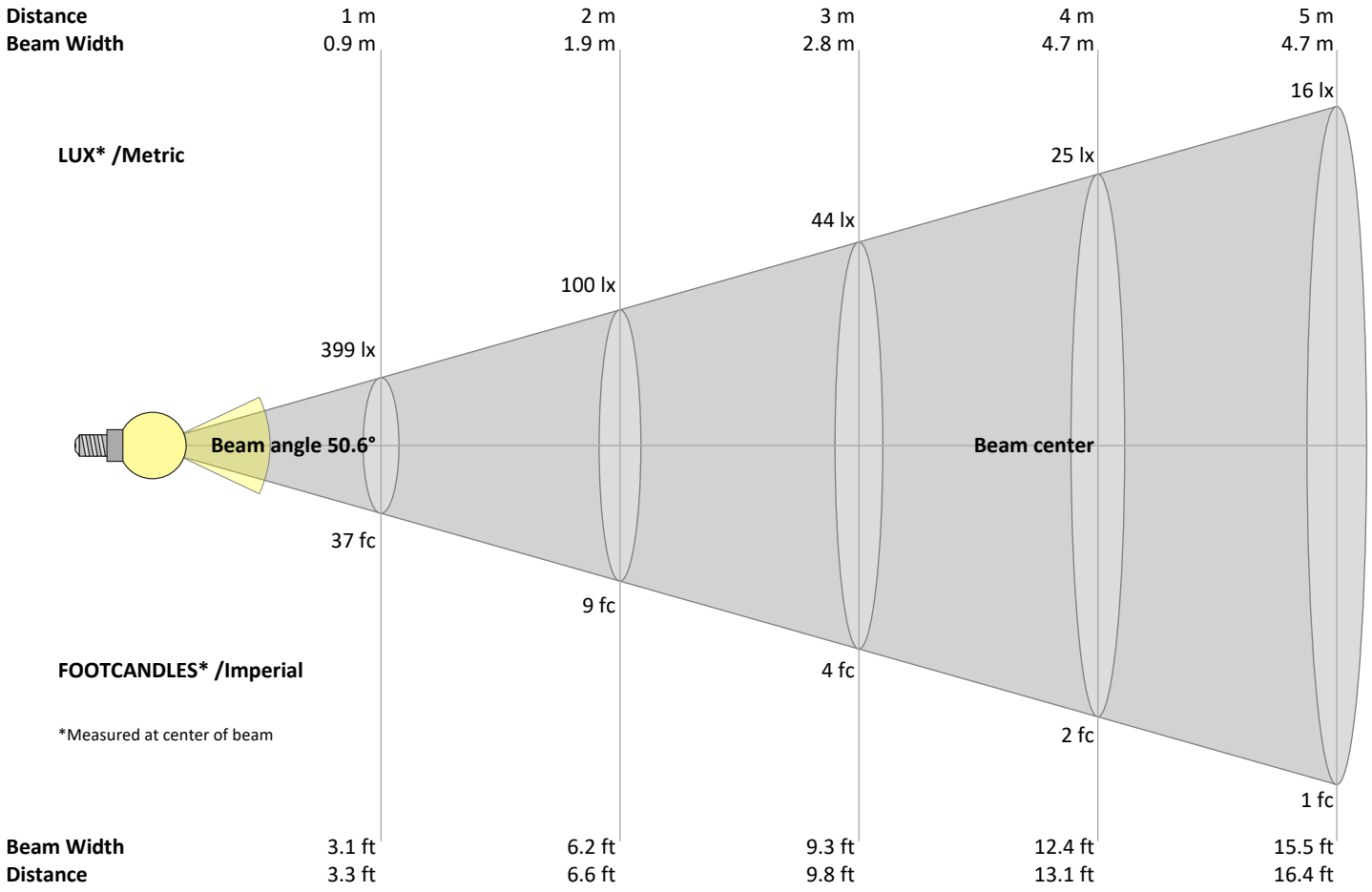
Beam Details



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
399	100	44	25	16	11	8	6	5	4	3	3	2	2	2	2	1	1	1	1	lux
37.1	9.3	4.1	2.3	1.5	1	0.8	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	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
399	373	349	328	306	285	262	242	223	209	195	184	173	163	156	151	147	142	138	133	cd
100%	93%	87%	82%	77%	71%	66%	61%	56%	52%	49%	46%	43%	41%	39%	38%	37%	35%	35%	33%	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
399	342	295	250	213	185	162	149	141	136	133	126	120	111	103	94	89	85	80	75	cd
100%	86%	74%	63%	53%	46%	41%	37%	35%	34%	33%	32%	30%	28%	26%	24%	22%	21%	20%	19%	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
399	415	439	459	477	495	513	530	544	559	575	590	599	607	610	608	604	602	598	588	cd
100%	104%	110%	115%	120%	124%	129%	133%	136%	140%	144%	148%	150%	152%	153%	152%	151%	151%	150%	147%	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
399	455	520	590	659	729	810	891	981	1087	1203	1317	1419	1491	1523	1524	1494	1429	1335	1231	cd
100%	114%	130%	148%	165%	183%	203%	223%	246%	272%	302%	330%	356%	374%	382%	382%	375%	358%	335%	309%	of 0°val

Goniophotometry Report

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Light Planning – UGR table

Uncorrected, comprehensive UGR table according to 117-1995

Reflectances											
	ρ Ceiling	70	70	50	50	30	70	70	50	50	30
	ρ Walls	50	30	50	30	30	50	30	50	30	30
	ρ Floor	20	20	20	20	20	20	20	20	20	20
Room size H = mounting height above eye level		**Viewed Crosswise** (Viewing direction orthogonal to lamp length axis)					**Viewed Endwise** (Viewing direction parallel to lamp length axis)				
X	Y										
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Variations with the observer position for the luminaire spacings, S:											
n/a				n/a					n/a		
n/a				n/a					n/a		
n/a				n/a					n/a		

UGR data could not be calculated due to missing/wrong symmetry. Goto Edit->Photometric->Corrections and select Correct asymmetry.

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	111	107	103	100	108	105	101	98	100	98	95	97	94	92	93	91	90	88
2	102	95	89	84	100	93	88	83	90	85	81	87	83	80	84	81	78	76
3	94	85	77	72	92	83	76	71	80	74	70	78	73	69	75	71	67	65
4	86	76	68	62	84	74	67	61	72	65	60	70	64	60	68	63	59	57
5	80	68	60	53	78	67	59	53	65	58	53	63	57	52	61	56	52	50
6	74	61	53	47	72	60	52	47	59	51	46	57	51	46	55	50	45	44
7	68	55	47	41	67	55	47	41	53	46	41	52	45	41	50	45	40	38
8	63	50	42	37	62	50	42	37	49	41	36	47	41	36	46	40	36	34
9	59	46	38	33	58	46	38	33	44	38	33	43	37	33	42	37	32	31
10	55	42	35	30	54	42	35	30	41	34	29	40	34	29	39	33	29	28

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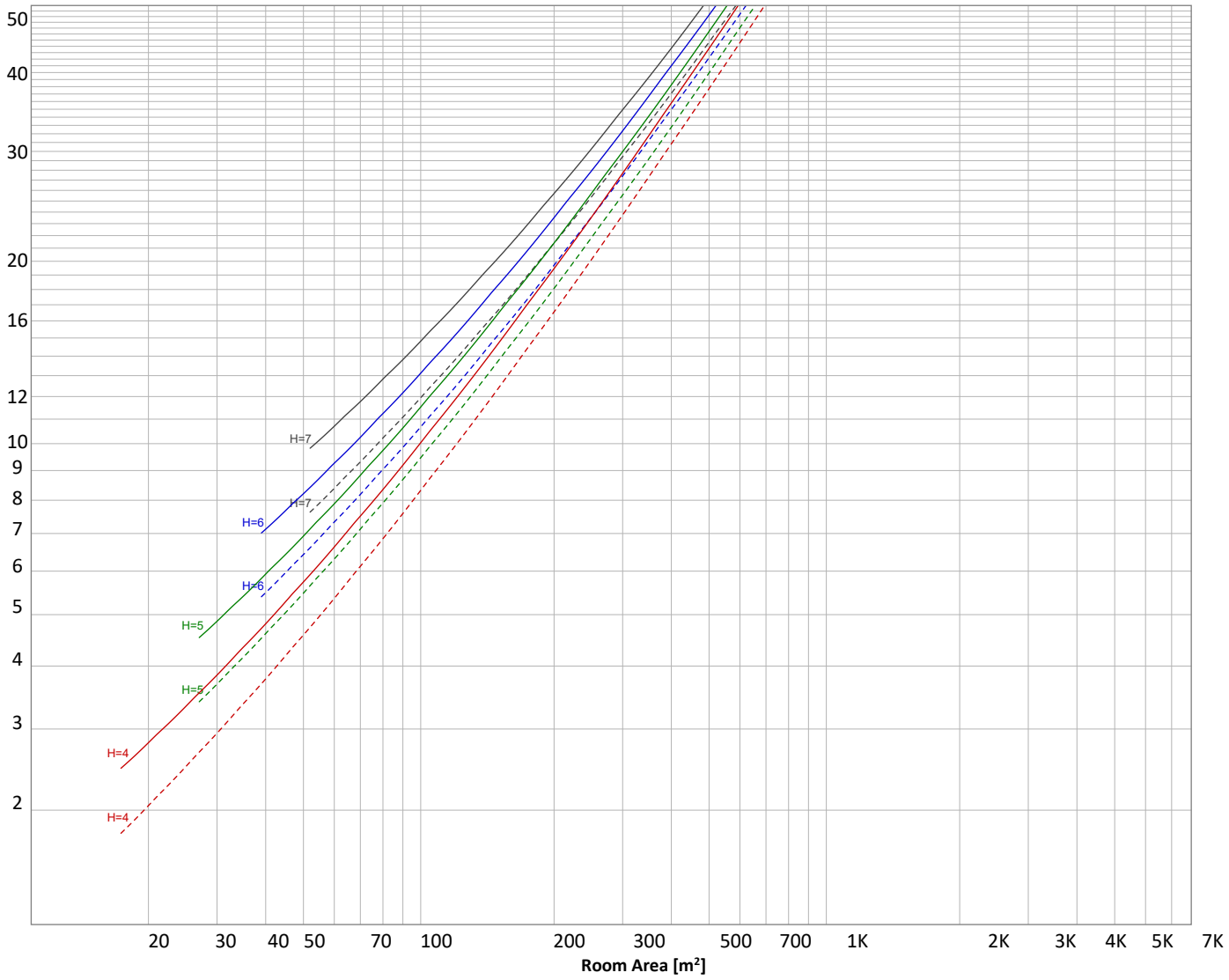
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 1450 lm
H_{down} = Lamp distance from ceiling =	0.00 m
H_{work} = Work area height from floor =	0.00 m
E_{work} = Average lux on work area =	100 lx

	ρ(%)		
Line type	Ceiling reflectance	Wall reflectance	Floor reflectance
----------	70	50	30
————	50	30	20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
39.5 lm	134 lm	268 lm	351 lm	320 lm	219 lm	83.5 lm	25.3 lm	8.65 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.003 lm	0.000 lm	0.000 lm	0.000 lm	0.000 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°	39 lm	2.7%
10-20°	134 lm	9.3%
20-30°	268 lm	18.5%
30-40°	351 lm	24.2%
40-50°	320 lm	22.1%
50-60°	219 lm	15.1%
60-70°	84 lm	5.8%
70-80°	25 lm	1.7%
80-90°	9 lm	0.6%
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	1450 lm	100.0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	442 lm	30.5%
0-40°	794 lm	54.7%
0-60°	1332 lm	91.9%
60-90°	118 lm	8.1%
70-100°	34 lm	2.3%
90-120°	0 lm	0.0%
0-90°	1450 lm	100.0%
90-180°	0 lm	0.0%
0-180°	1450 lm	100.0%

Intensity peaks

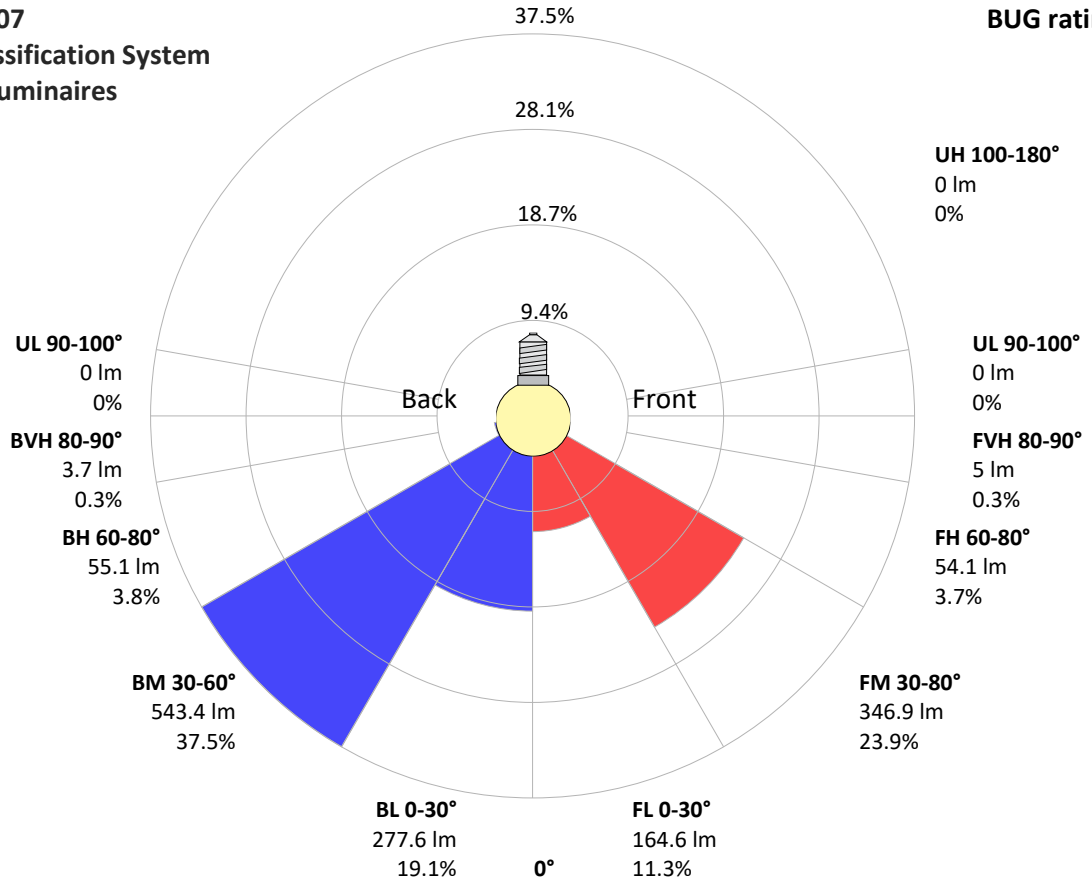
Max intensity	1561 cd
Intensity, 90°	0 cd
Intensity, 0°	399 cd

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	165 lm	11.3%
Medium(30-60°)	347 lm	23.9%
High(60-80°)	54 lm	3.7%
Very high(80-90°)	5 lm	0.3%
Back light		
Low(0-30°)	278 lm	19.1%
Medium(30-60°)	543 lm	37.5%
High(60-80°)	55 lm	3.8%
Very high(80-90°)	4 lm	0.3%
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



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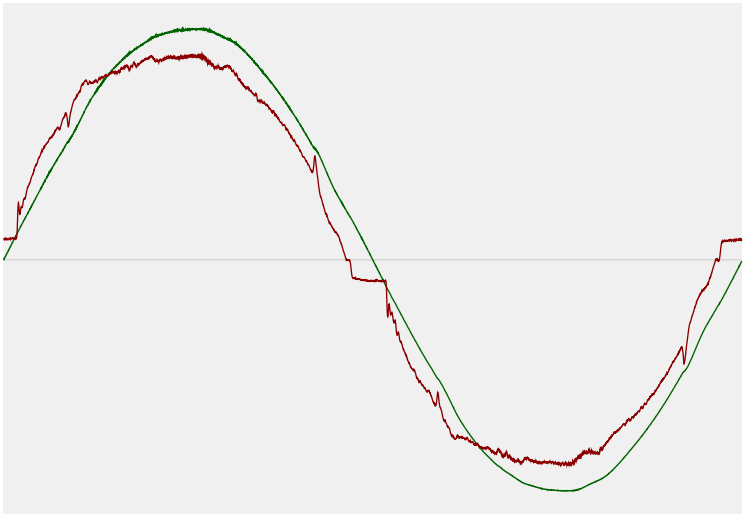
Power Details

Input Power

Power feed to light source	16.1 W
Frequency of input power	50.1 Hz
RMS Input voltage feed, V_{RMS}	241 V
RMS Input current feed, I_{RMS}	0.068 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	16.29 VA
Displacement factor of AC power feed	0.99
Power factor of AC current feed	0.99
Total harmonic distortion of the current	6.77%
Total harmonic distortion of the voltage	1.16%

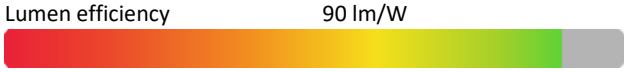
Input Power Curve



Efficiency

Radiated power efficiency 33.2%

Lumen efficiency 90 lm/W



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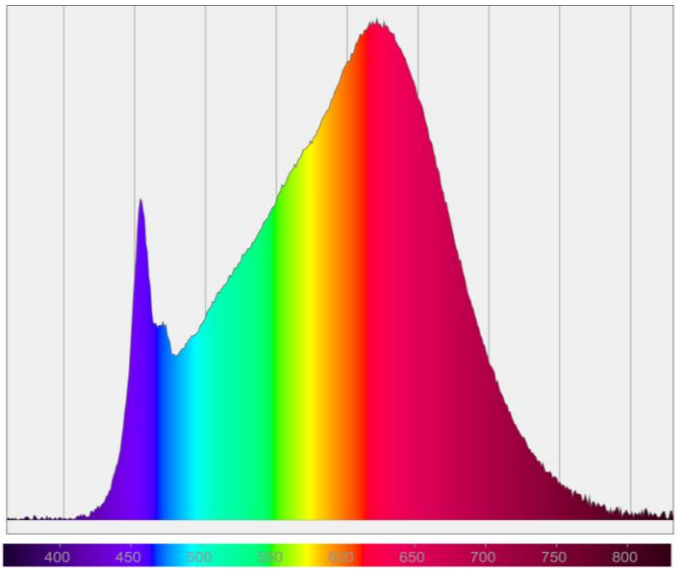
Color Measurements

Correlated Color Temperature	CCT = 3000 K
Color Rendering TM30-18	R_f 91.0 – R_g 97.7
Color Shift, CIE duv	Duv ±0.0003

Spectral distribution



Color details

Correlated Color Temperature	CCT = 3000 K	Color coordinates CIE 1931	(x;y) = (0.437;0.404)
Color Rendering Index	CRI 94.1	Color coordinate CIEs 1960	(u;v) = (0.251;0.348)
Color Rendering Index, R9 (red component)	R9 = 68.6	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R_f 91.0 – R_g 97.7	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.251;0.251)
Color Quality Scale	CQS = 91.8		

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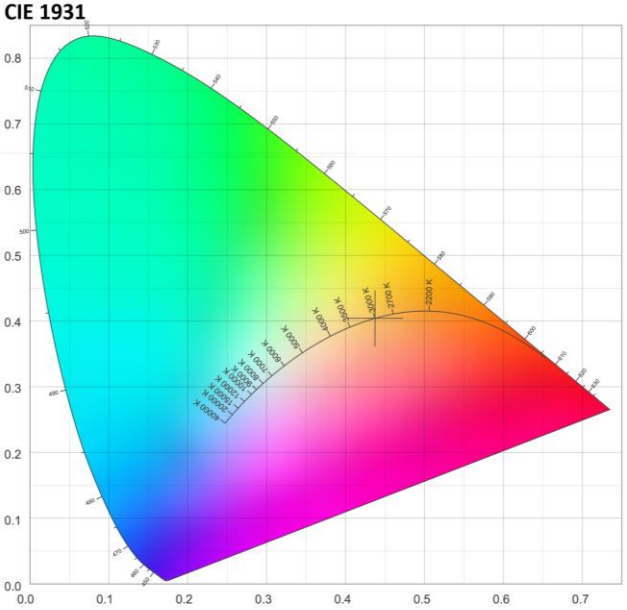
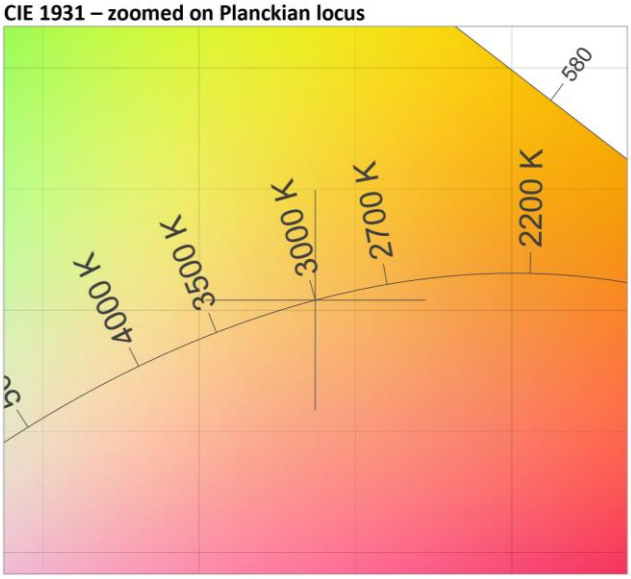
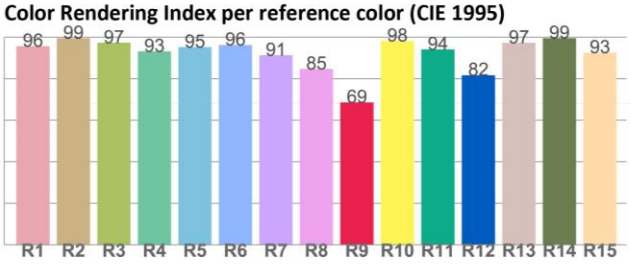
CIE 1931



CIE 1931 – zoomed on Planckian locus



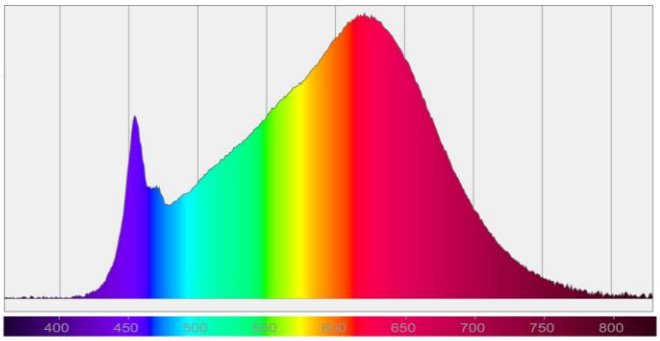
Color Rendering Index per reference color (CIE 1995)



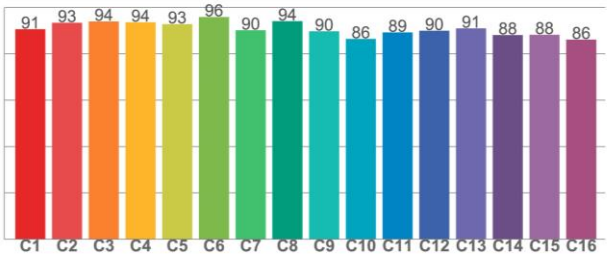
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
95.7	99.5	97.3	93.1	95.2	96.2	91.3	84.6	68.6	98.2	94.1	81.6	97.2	99.5	92.5

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



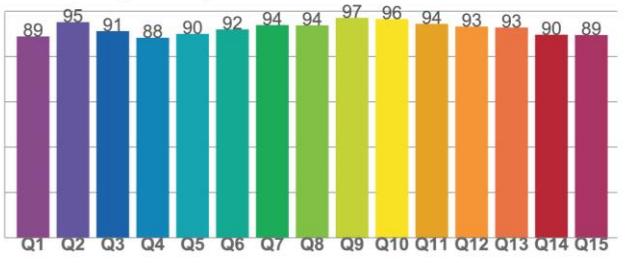
TM30-18 Rf-values per hue bin



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	93.9	93.6	92.8	95.9	90.1	94.0	89.7	86.4	89.2	89.9	90.9	88.1	88.2	86.1

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
88.8	95.1	91.2	88.2	89.9	91.9	93.8	93.7	97.0	96.5	94.4	93.2	92.8	89.6	89.5