

Tested Light Source - 1_PHOT_NINETY-NINE-1925lmChip-4000K-WallWash_2309

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

24 planes – 15°

1.5°

1.50 m

13.3 W – PF 0.98 – DPF 0.99

239 V – 0.056 A

49.9 Hz

Main Light Measurement Results

Output

Efficiency

Peak Intensity and Beam Angle

Color Rendering Index

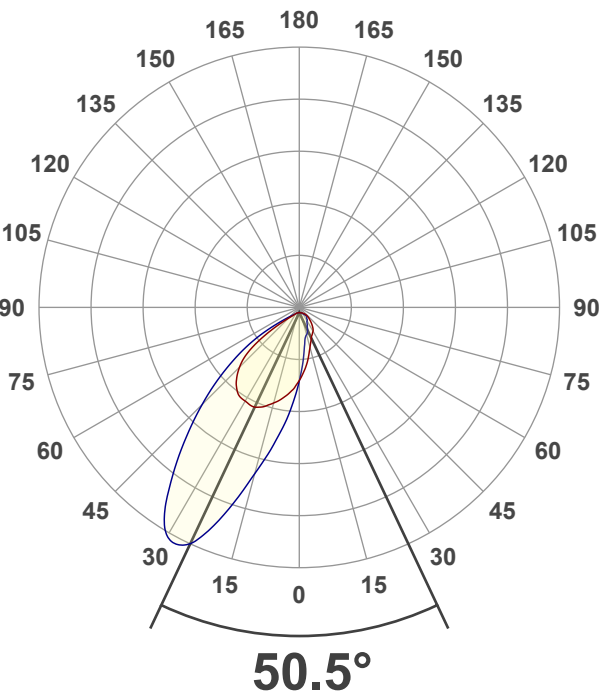
1352 lm

102 lm/W

1456 cd – 50.5°

CRI 92.1

Light Intensity Distribution



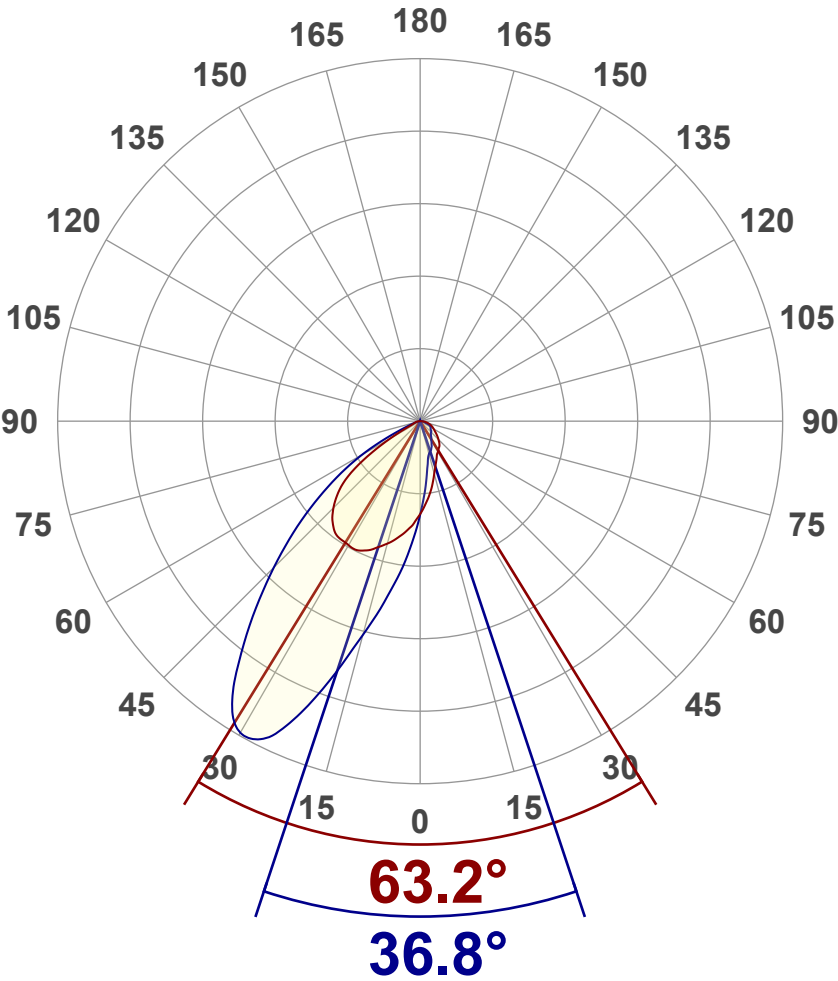
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1352 lm
Peak Intensity	1456 cd
Beam Angle (50%)	50.5°
Beam Angle (90%)	36.8°
Beam Angle (10%)	79.9°

Cut-off Angle

Average 2,5%	149.3°
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Field Angle

Average 10%	99.3°
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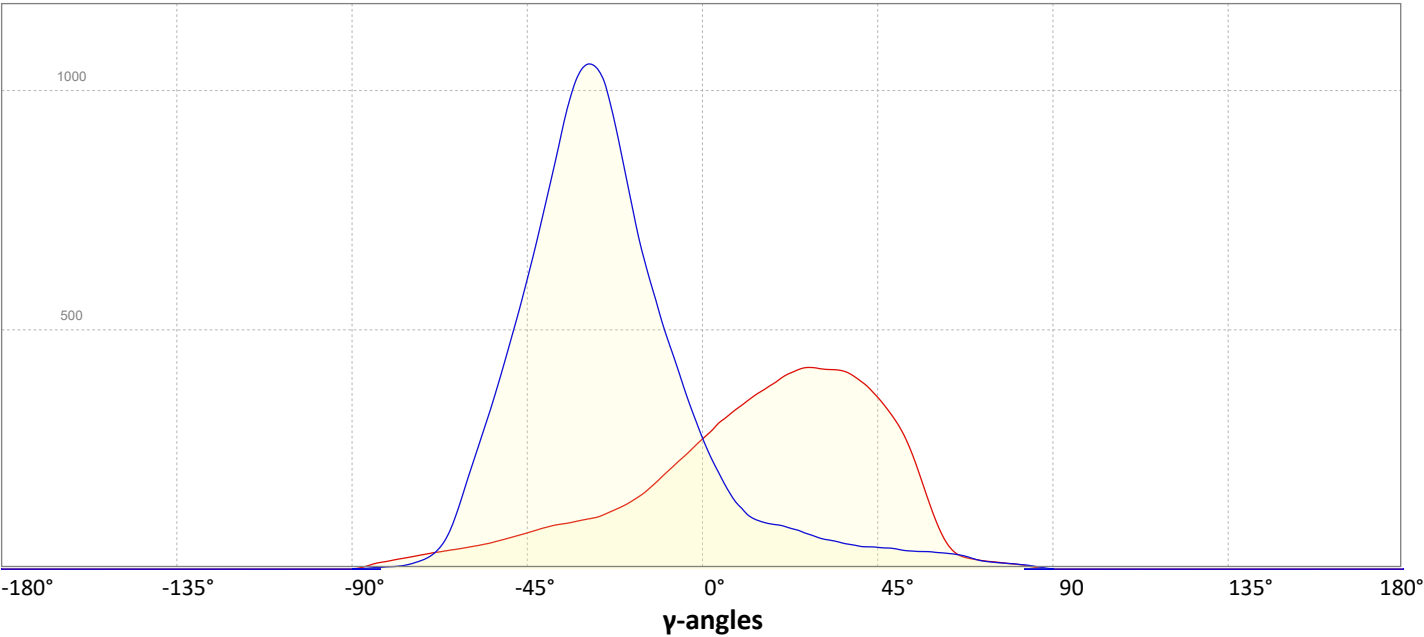
Intensity Ratio

In 120° cone	92.0%
In 90° cone	66.5%

C000-C180

C090-C270

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

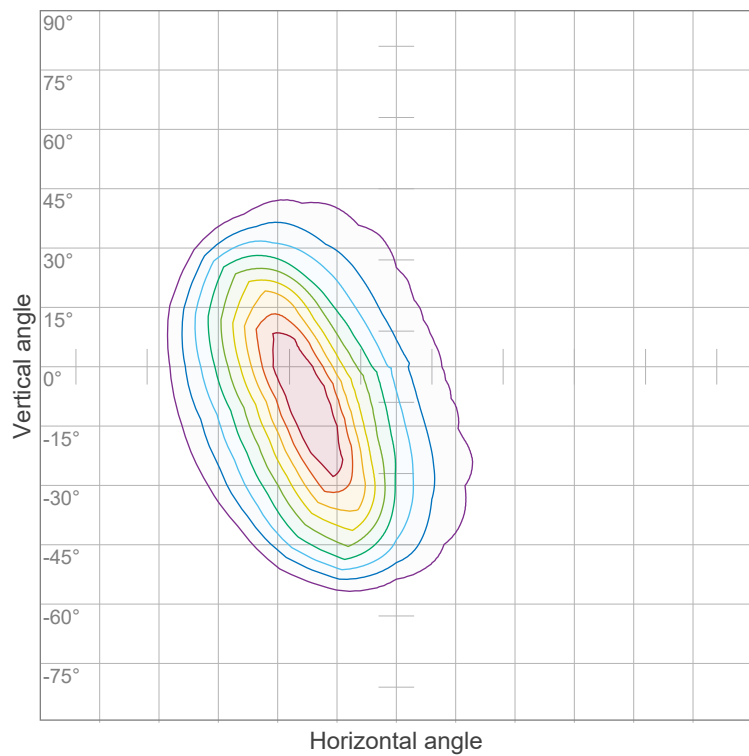


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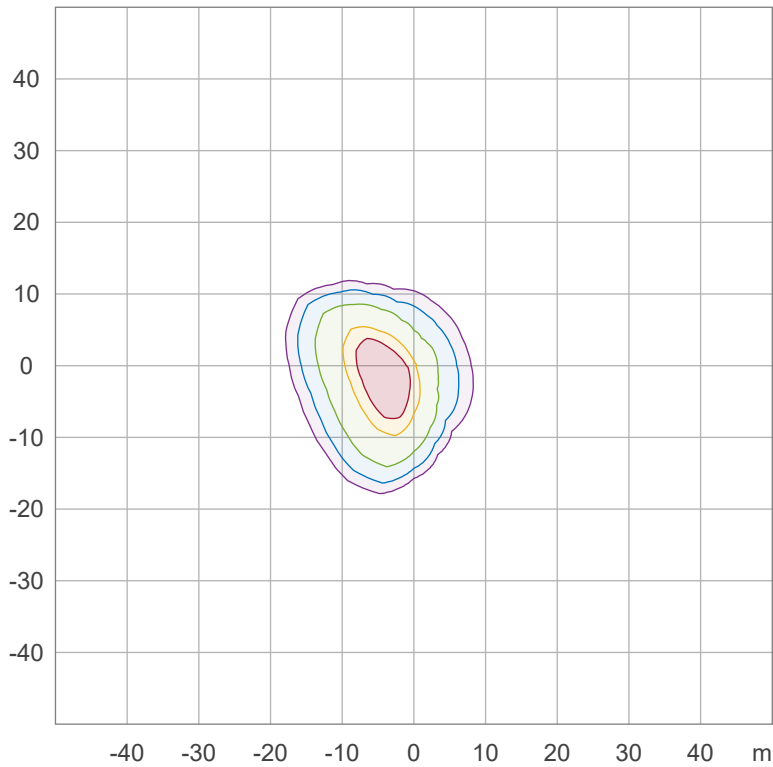
Iso-intensity Diagram (Iso-candela)



90 %	1306.8 cd
80 %	1161.6 cd
70 %	1016.4 cd
60 %	871.2 cd
50 %	726.0 cd
40 %	580.8 cd
30 %	435.6 cd
20 %	290.4 cd
10 %	145.2 cd

Peak intensity: 1452.0 cd
Number of c-planes: 24

Iso-illuminance Diagram (Iso-lux)



50.0 %	5.4 lx
30.0 %	3.3 lx
10.0 %	1.1 lx
5.0 %	0.5 lx
3.0 %	0.3 lx

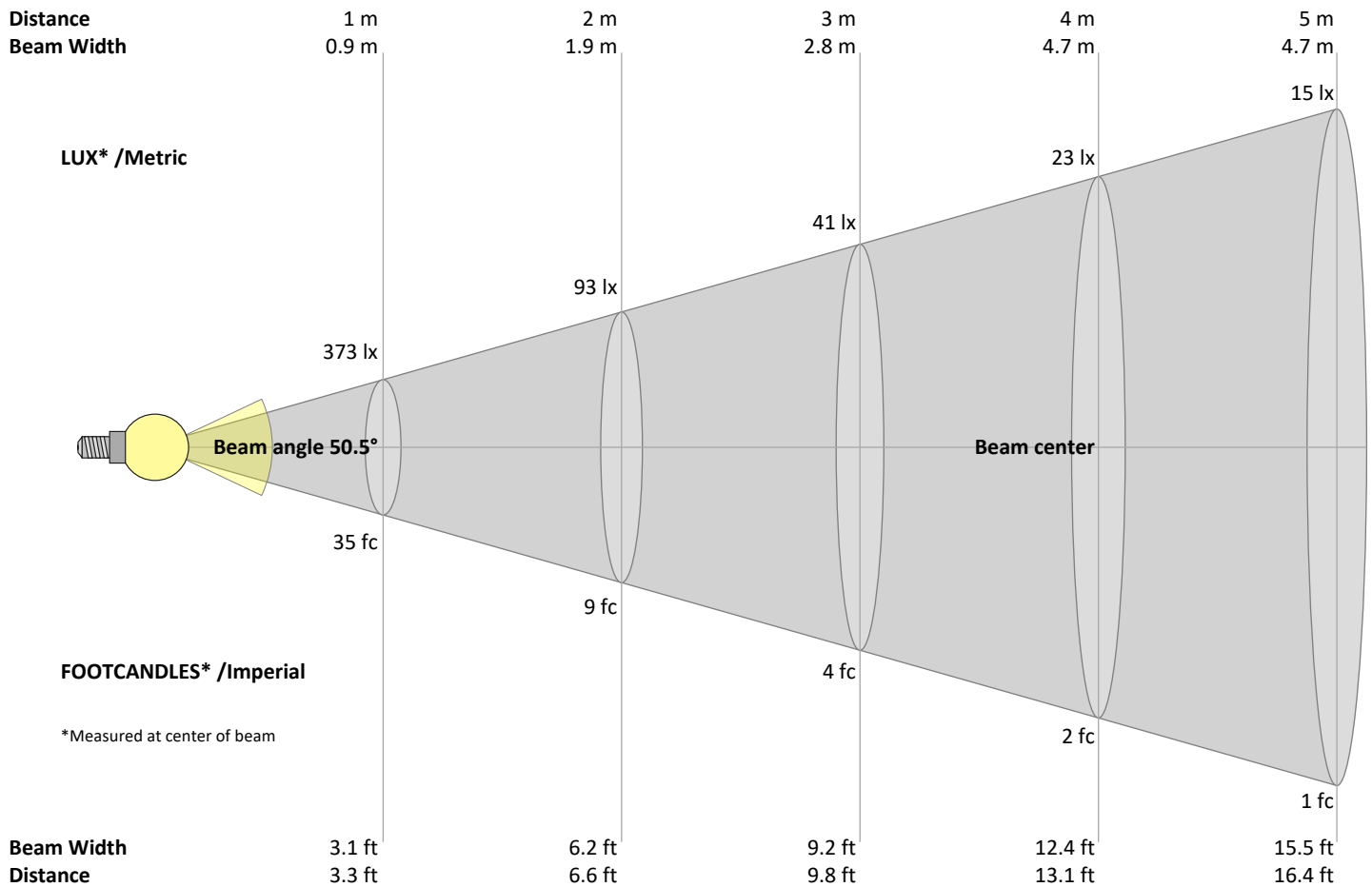
Peak illuminance: 10.9 lx
Mounting height: 10.0 m
Number of c-planes: 24

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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
373	93	41	23	15	10	8	6	5	4	3	3	2	2	2	1	1	1	1	1	lux
34.6	8.7	3.8	2.2	1.4	1	0.7	0.5	0.4	0.3	0.3	0.2	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
373	348	326	307	286	266	245	225	208	194	181	170	161	151	145	141	136	131	128	124	cd
100%	93%	88%	82%	77%	71%	66%	60%	56%	52%	49%	46%	43%	41%	39%	38%	37%	35%	34%	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
373	321	276	235	199	173	151	139	132	127	124	118	112	104	96	89	83	79	74	70	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
373	389	412	429	447	463	480	496	509	524	539	552	562	569	571	568	565	564	561	552	cd
100%	104%	110%	115%	120%	124%	129%	133%	137%	141%	145%	148%	151%	153%	153%	152%	152%	151%	151%	148%	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
373	429	489	555	621	686	762	838	921	1023	1131	1237	1331	1397	1426	1425	1394	1333	1244	1145	cd
100%	115%	131%	149%	167%	184%	204%	225%	247%	275%	303%	332%	357%	375%	383%	382%	374%	358%	334%	307%	of 0°val

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Uncorrected, comprehensive UGR table according to 117-1995

[illegible]

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	75	70	78	73	69	75	71	68	66
4	86	76	68	62	84	74	67	61	72	65	60	70	64	60	68	63	59	57
5	80	68	60	54	78	67	59	53	65	58	53	63	57	52	61	56	52	50
6	74	61	53	47	72	60	52	47	59	52	46	57	51	46	55	50	46	44
7	68	55	47	41	67	55	47	41	53	46	41	52	45	41	50	45	40	39
8	63	51	42	37	62	50	42	37	49	42	37	47	41	36	46	40	36	34
9	59	46	38	33	58	46	38	33	45	38	33	43	37	33	42	37	32	31
10	55	42	35	30	54	42	35	30	41	34	30	40	34	29	39	33	29	28

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LAMPS (number of lamps)

[illegible]

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Outdoor Light Planning

Lumen per Zone

Zone (y)	Lumen	% Total
0-10°	37 lm	2.7%
10-20°	126 lm	9.3%
20-30°	251 lm	18.6%
30-40°	328 lm	24.2%
40-50°	298 lm	22.0%
50-60°	204 lm	15.1%
60-70°	78 lm	5.7%
70-80°	23 lm	1.7%
80-90°	8 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	1352 lm	100.0%

Intensity peaks

Max intensity	1456 cd
Intensity, 90°	0 cd
Intensity, 0°	373 cd

Zonal Lumen summary

Zone (y)	Lumen	% Total
0-30°	414 lm	30.6%
0-40°	741 lm	54.8%
0-60°	1243 lm	92.0%
60-90°	109 lm	8.0%
70-100°	31 lm	2.3%
90-120°	0 lm	0.0%
0-90°	1352 lm	100.0%
90-180°	0 lm	0.0%
0-180°	1352 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	154 lm	11.4%
Medium(30-60°)	323 lm	23.9%
High(60-80°)	49 lm	3.7%
Very high(80-90°)	5 lm	0.3%

Back light

Low(0-30°)	259 lm	19.2%
Medium(30-60°)	506 lm	37.4%
High(60-80°)	52 lm	3.8%
Very high(80-90°)	3 lm	0.3%

Uplight

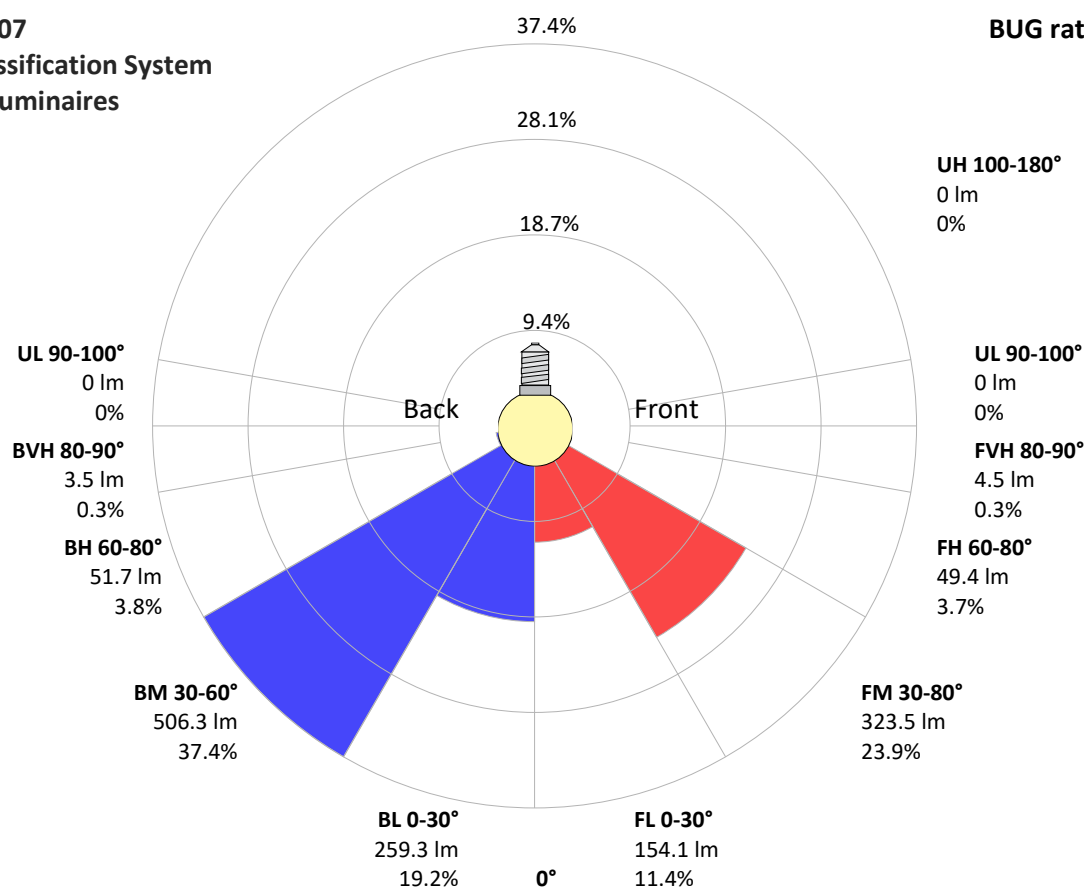
Low(90-100°)	0 lm	0.0%
High(100-180°)	0 lm	0.0%

IESNA TM-15-07

Luminaire Classification System

For Outdoor Luminaires

BUG rating B1 U1 G0



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Power Details

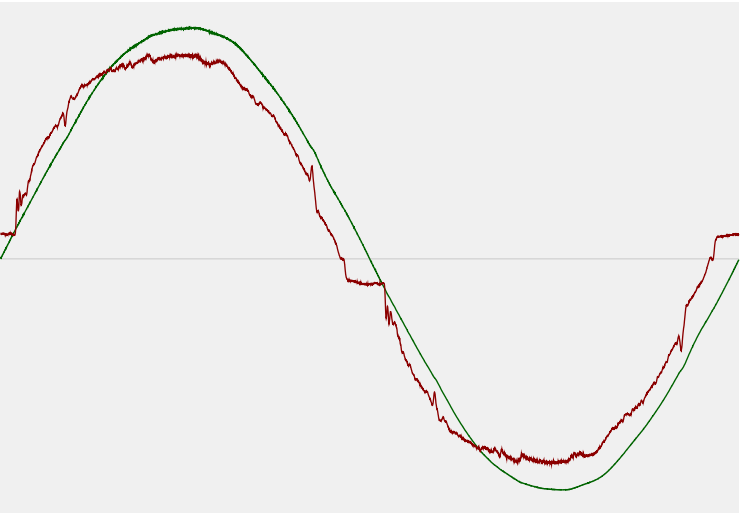
Input Power

Power feed to light source	13.3 W
Frequency of input power	49.9 Hz
RMS Input voltage feed, V_{RMS}	239 V
RMS Input current feed, I_{RMS}	0.056 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	13.49 VA
Displacement factor of AC power feed	0.99
Power factor of AC current feed	0.98
Total harmonic distortion of the current	6.73%
Total harmonic distortion of the voltage	1.07%

Efficiency

Radiated power efficiency	37.4%
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Lumen efficiency	102 lm/W
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Input Power Curve



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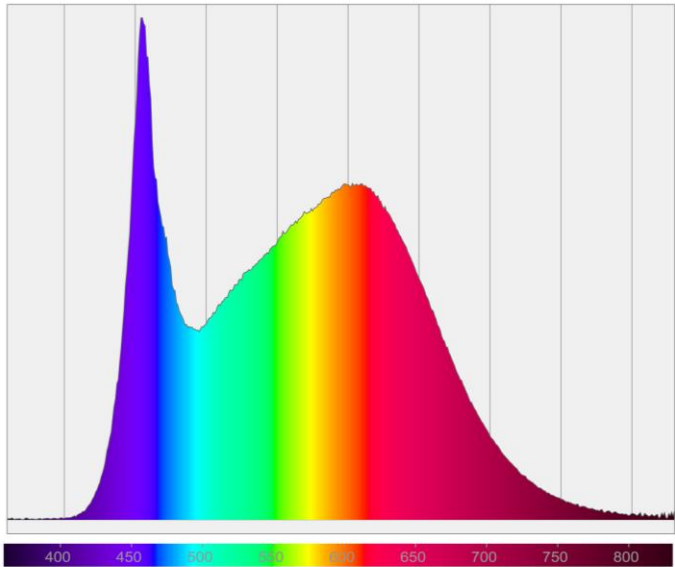
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Color Measurements

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

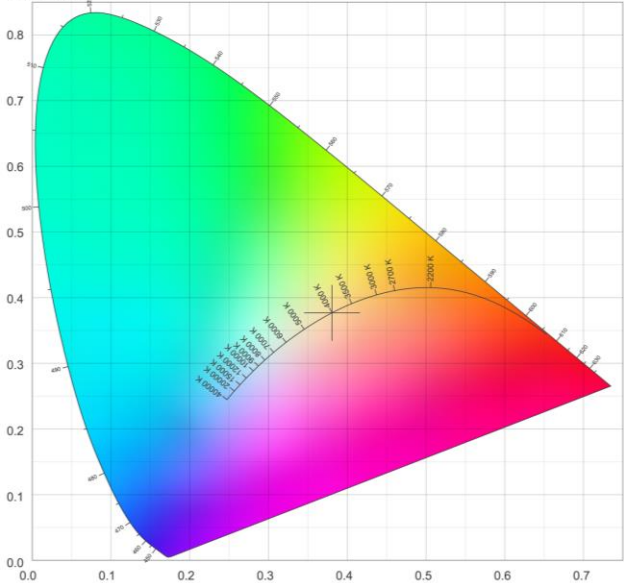
Correlated Color Temperature	CCT = 4000 K	Color coordinates CIE 1931	(x;y) = (0.381;0.377)
Color Rendering Index	CRI 92.6	Color coordinate CIEs 1960	(u;v) = (0.225;0.334)
Color Rendering Index, R9 (red component)	R9 = 72.2	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R _f 88.9 — R _g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

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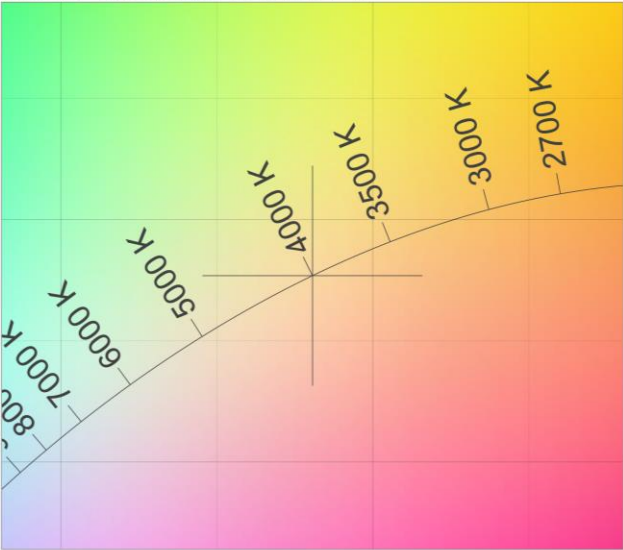
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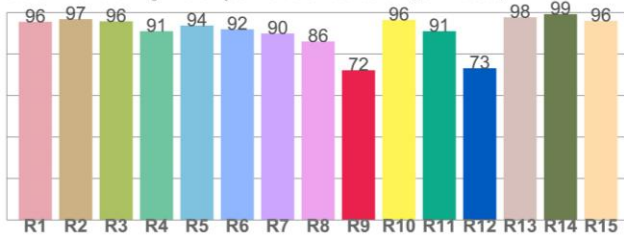
CIE 1931



CIE 1931 – zoomed on Planckian locus



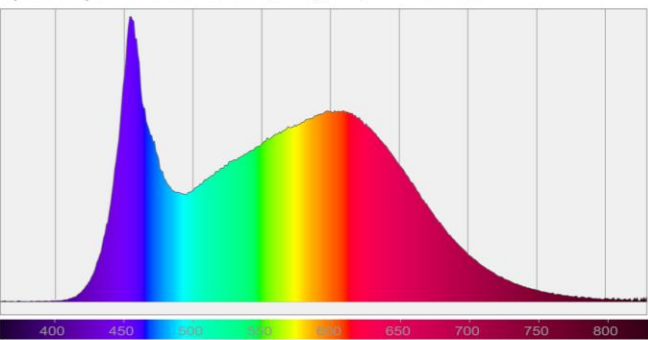
Color Rendering Index per reference color (CIE 1995)



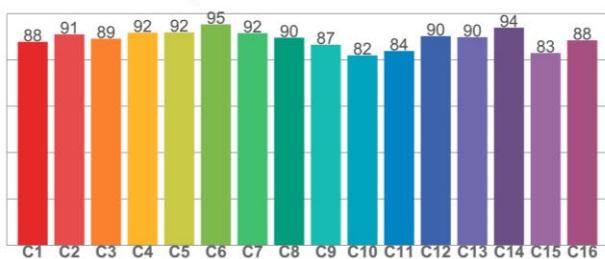
CRI R values, only R1-R8 are used to calculate final CRI value

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

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



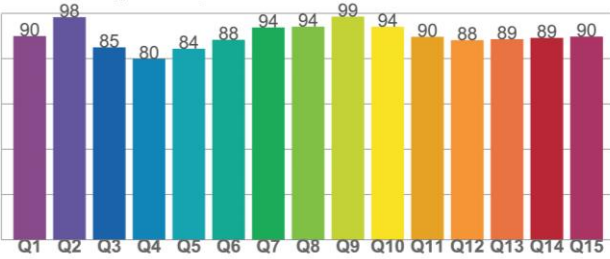
TM30-18 Rf-values per hue bin



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
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

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