

Tested Light Source - 1_PHOT_NINETY-NINE-2000lmChip-2700K-Spreader_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

15.9 W – PF 0.98 – DPF 0.98

241 V – 0.067 A

50 Hz

Main Light Measurement Results

Output

Efficiency

Peak Intensity and Beam Angle

Color Rendering Index

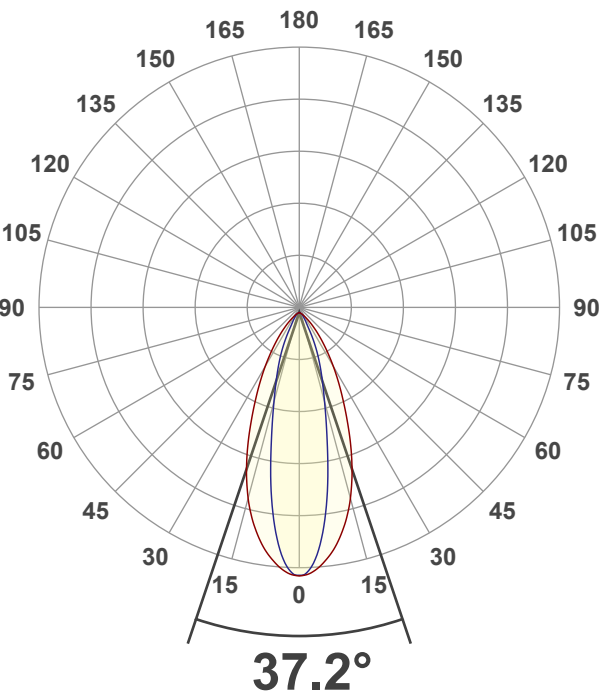
1440 lm

91 lm/W

2498 cd – 37.2°

CRI 92.7

Light Intensity Distribution



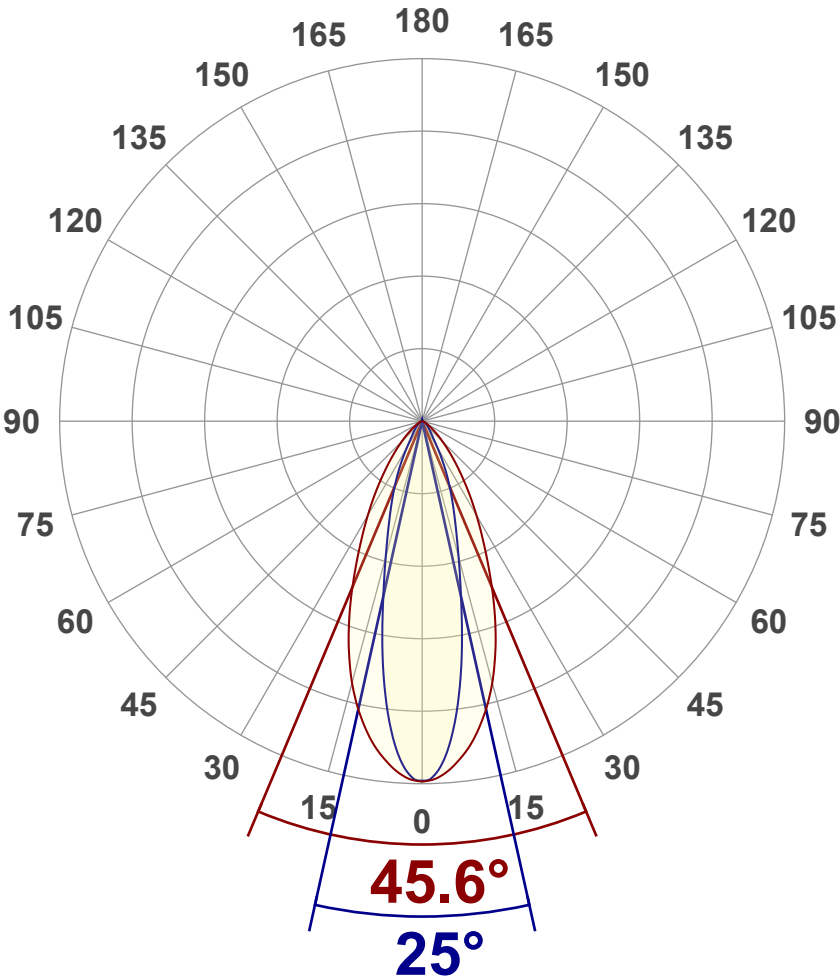
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1440 lm
Peak Intensity	2498 cd
Beam Angle (50%)	37.2°
Beam Angle (90%)	25°
Beam Angle (10%)	57.3°

Cut-off Angle

Average 2,5%	100°
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Field Angle

Average 10%	72.3°
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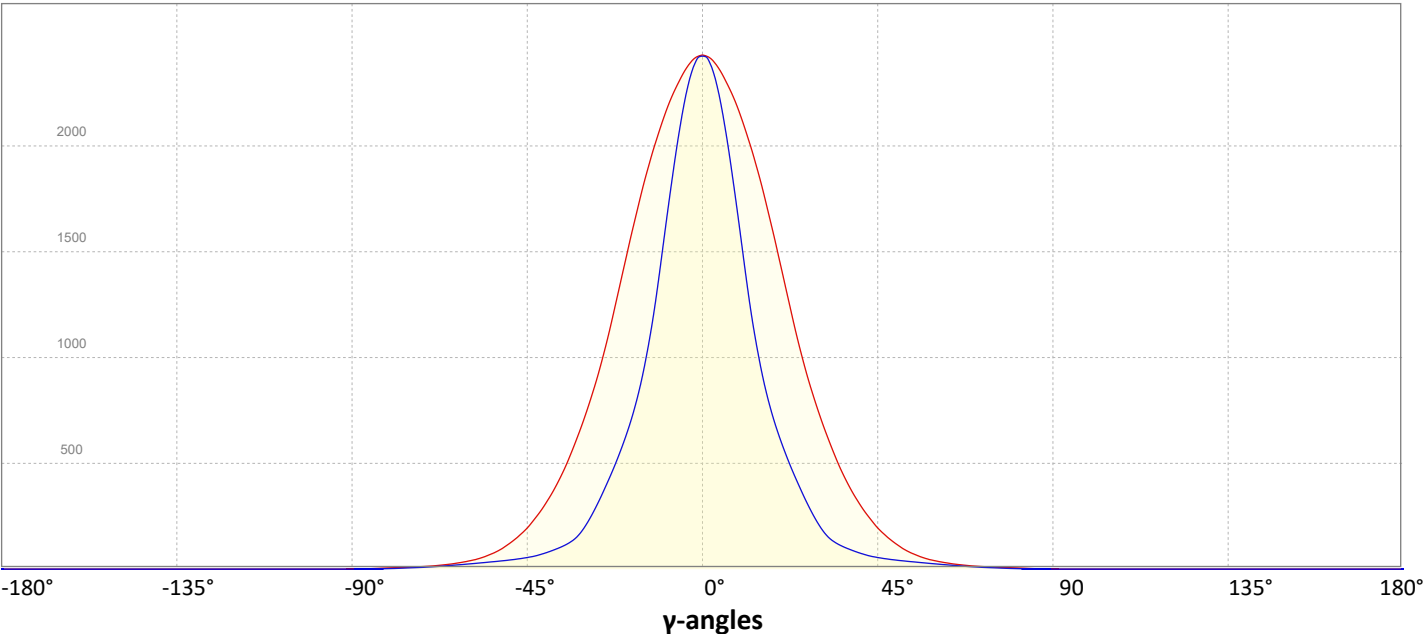
Intensity Ratio

In 120° cone	97.6%
In 90° cone	90.3%

C000-C180

C090-C270

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

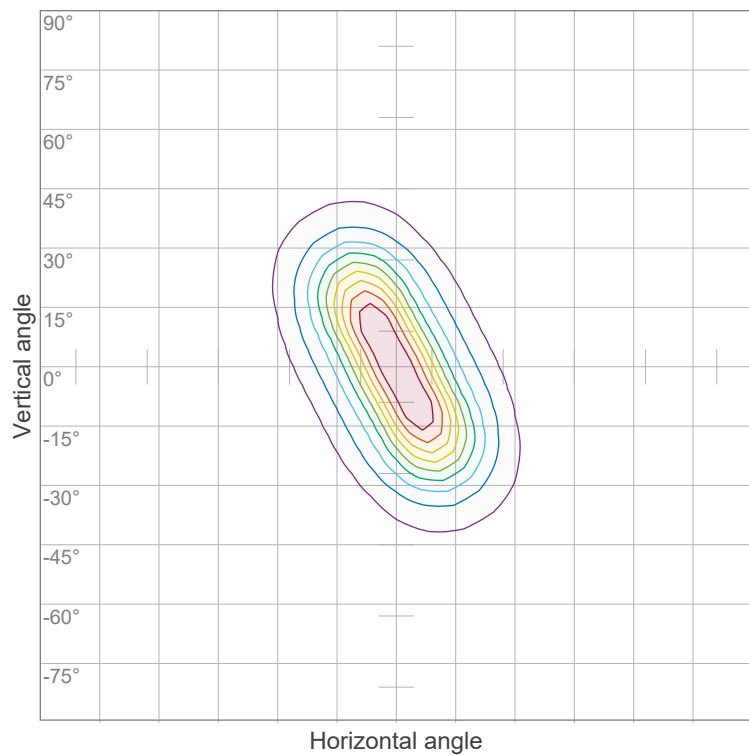


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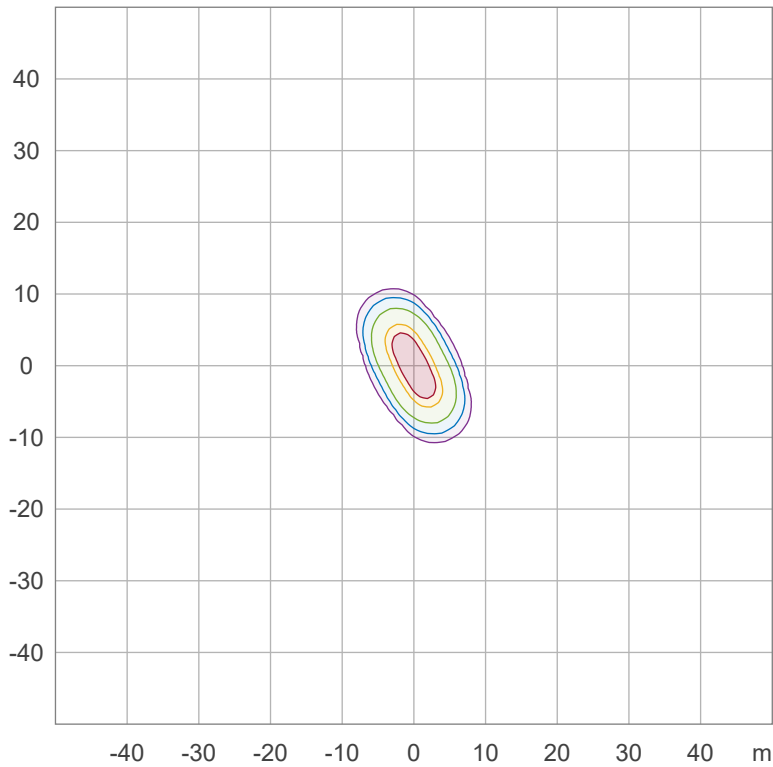
Iso-intensity Diagram (Iso-candela)



90 %	2245.6 cd
80 %	1996.1 cd
70 %	1746.6 cd
60 %	1497.1 cd
50 %	1247.6 cd
40 %	998.0 cd
30 %	748.5 cd
20 %	499.0 cd
10 %	249.5 cd

Peak intensity: 2495.1 cd
Number of c-planes: 32

Iso-illuminance Diagram (Iso-lux)



50.0 %	12.5 lx
30.0 %	7.5 lx
10.0 %	2.5 lx
5.0 %	1.2 lx
3.0 %	0.7 lx

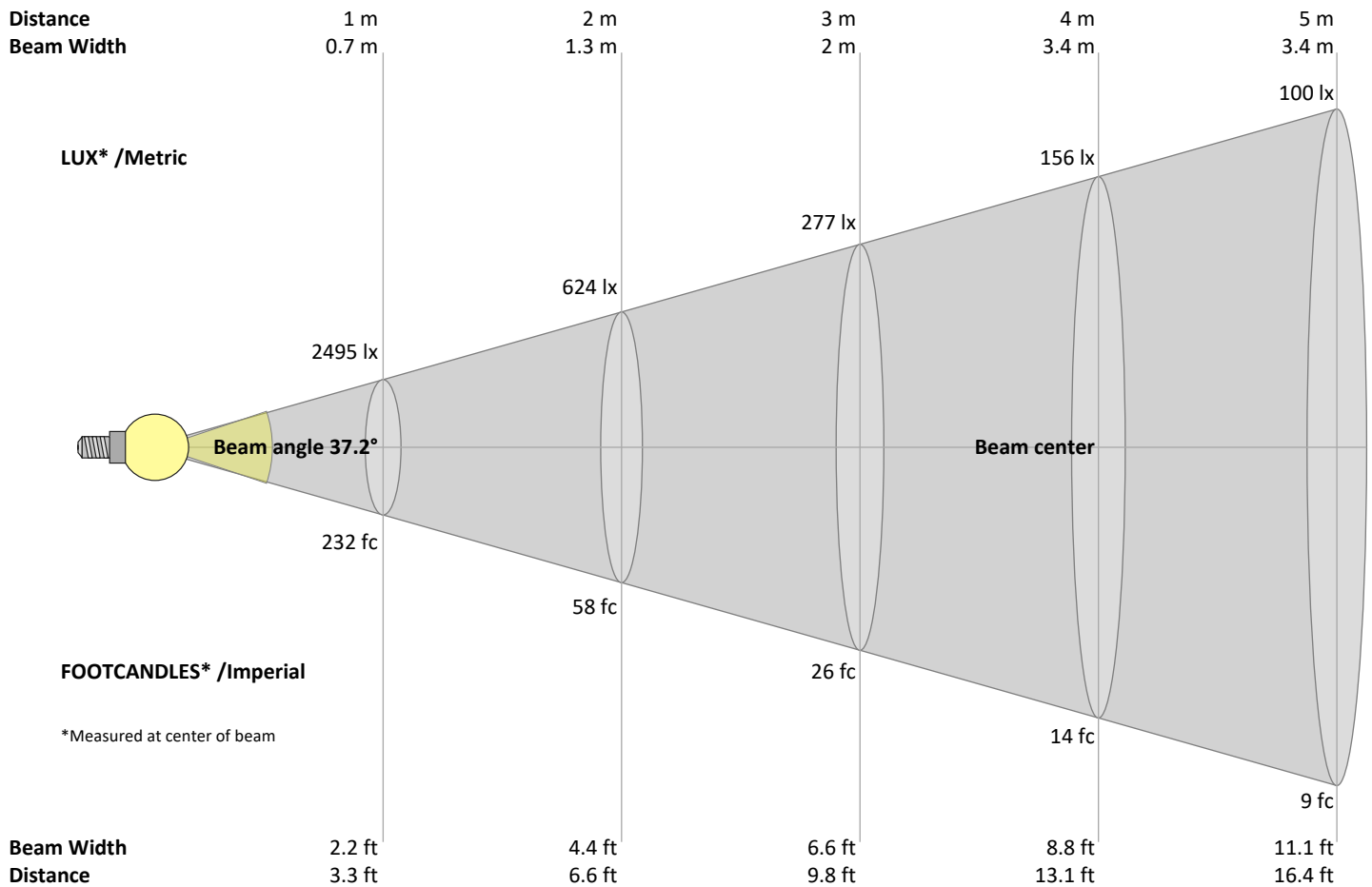
Peak illuminance: 24.9 lx
Mounting height: 10.0 m
Number of c-planes: 32

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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
2495	624	277	156	100	69	51	39	31	25	21	17	15	13	11	10	9	8	7	6	lux
231.8	57.9	25.8	14.5	9.3	6.4	4.7	3.6	2.9	2.3	1.9	1.6	1.4	1.2	1	0.9	0.8	0.7	0.6	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
2495	2482	2437	2370	2290	2190	2075	1947	1803	1646	1481	1314	1150	1001	870	753	648	551	465	391	cd
100%	99%	98%	95%	92%	88%	83%	78%	72%	66%	59%	53%	46%	40%	35%	30%	26%	22%	19%	16%	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
2495	2453	2324	2120	1867	1588	1309	1076	890	746	629	528	438	355	278	212	162	131	110	94	cd
100%	98%	93%	85%	75%	64%	52%	43%	36%	30%	25%	21%	18%	14%	11%	9%	6%	5%	4%	4%	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
2495	2482	2437	2370	2290	2190	2075	1947	1803	1646	1481	1314	1150	1001	870	753	648	551	465	391	cd
100%	99%	98%	95%	92%	88%	83%	78%	72%	66%	59%	53%	46%	40%	35%	30%	26%	22%	19%	16%	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
2495	2453	2324	2120	1867	1588	1309	1076	890	746	629	528	438	355	278	212	162	131	110	94	cd
100%	98%	93%	85%	75%	64%	52%	43%	36%	30%	25%	21%	18%	14%	11%	9%	6%	5%	4%	4%	of 0°val

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Uncorrected, comprehensive UGR table according to 117-1995

[illegible]

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

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	113	110	108	105	111	108	106	104	104	102	101	100	99	98	97	96	95	93
2	107	102	98	95	105	101	97	94	97	94	92	94	92	90	92	90	88	86
3	102	95	90	86	100	94	89	85	91	87	84	89	85	83	86	84	81	80
4	97	89	83	79	95	88	82	78	86	81	77	84	80	77	82	78	76	74
5	92	83	77	73	90	82	77	73	81	76	72	79	75	71	77	74	71	69
6	87	78	72	68	86	77	72	68	76	71	67	75	70	67	73	69	66	65
7	83	74	68	63	82	73	67	63	72	67	63	71	66	63	69	65	62	61
8	79	70	64	60	78	69	63	59	68	63	59	67	62	59	66	62	59	57
9	76	66	60	56	75	66	60	56	65	59	56	64	59	56	63	59	56	54
10	72	63	57	53	71	62	57	53	61	56	53	61	56	53	60	56	53	51

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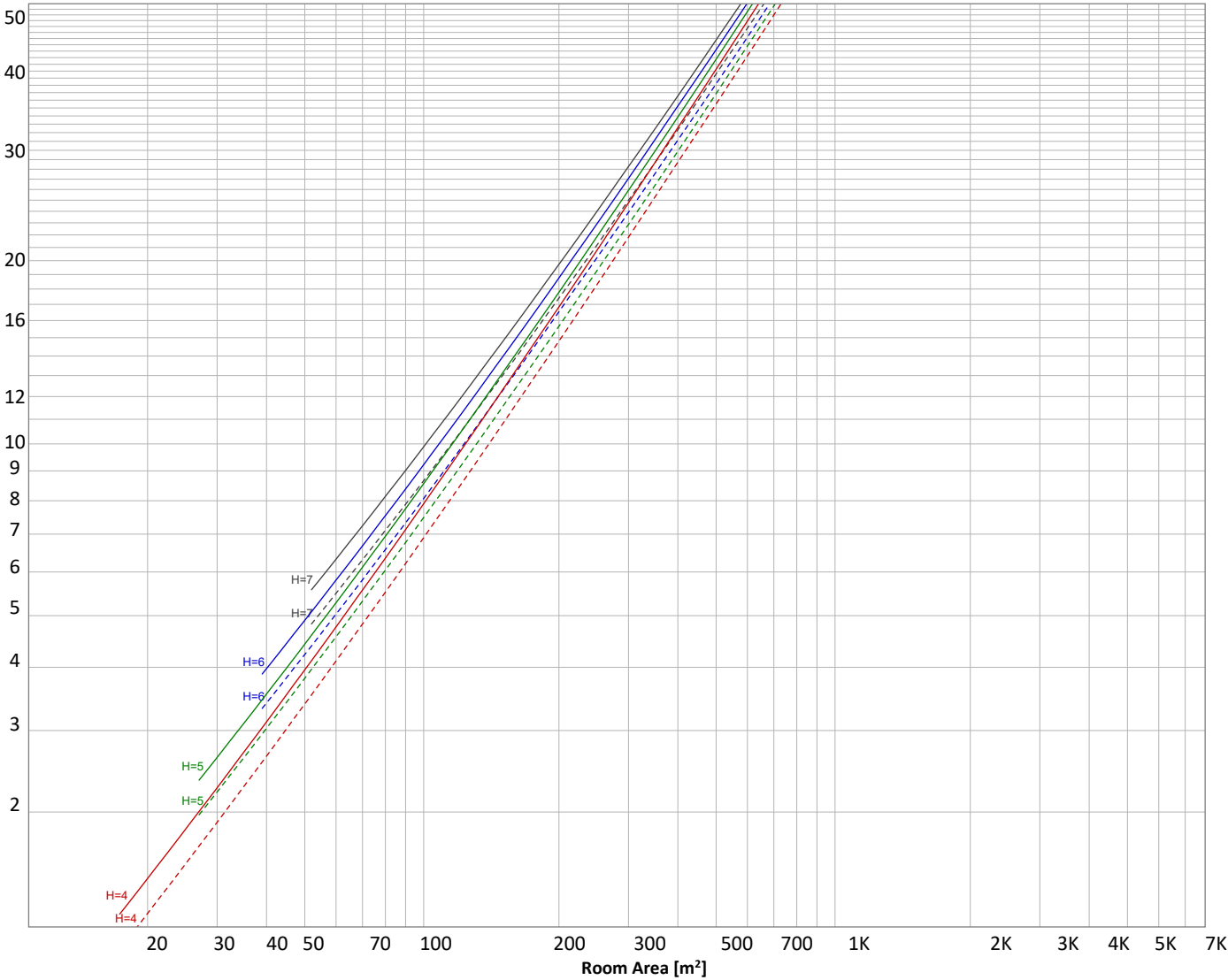
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 1440 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
				30
				20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
208 lm	411 lm	379 lm	235 lm	117 lm	55.5 lm	23.6 lm	8.73 lm	2.07 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.141 lm	0.130 lm	0.122 lm	0.110 lm	0.040 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°	208 lm	14.4%
10-20°	411 lm	28.5%
20-30°	379 lm	26.3%
30-40°	235 lm	16.3%
40-50°	117 lm	8.1%
50-60°	56 lm	3.9%
60-70°	24 lm	1.6%
70-80°	9 lm	0.6%
80-90°	2 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	1440 lm	100.0%

Intensity peaks

Max intensity	2498 cd
Intensity, 90°	0 cd
Intensity, 0°	2495 cd

Zonal Lumen summary

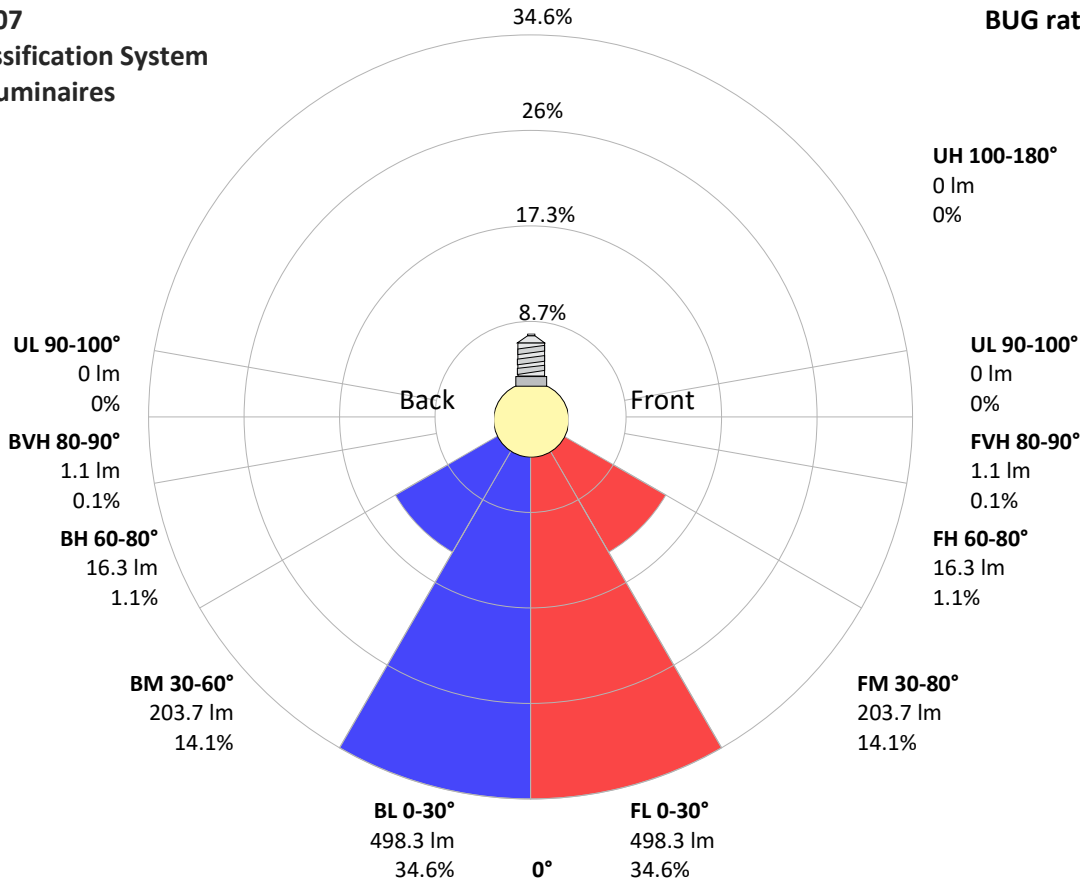
Zone (γ)	Lumen	% Total
0-30°	997 lm	69.2%
0-40°	1232 lm	85.6%
0-60°	1405 lm	97.6%
60-90°	34 lm	2.4%
70-100°	11 lm	0.8%
90-120°	0 lm	0.0%
0-90°	1439 lm	100.0%
90-180°	1 lm	0.0%
0-180°	1440 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	498 lm	34.6%
Medium(30-60°)	204 lm	14.1%
High(60-80°)	16 lm	1.1%
Very high(80-90°)	1 lm	0.1%
Back light		
Low(0-30°)	498 lm	34.6%
Medium(30-60°)	204 lm	14.1%
High(60-80°)	16 lm	1.1%
Very high(80-90°)	1 lm	0.1%
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

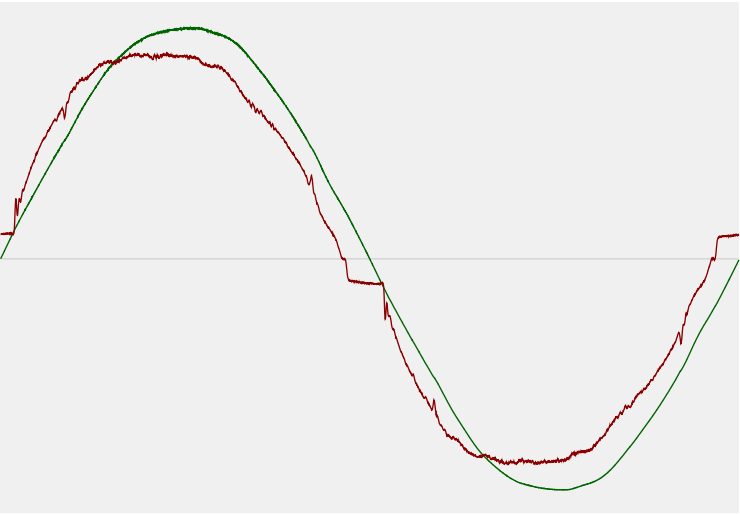
Input Power

Power feed to light source	15.9 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	241 V
RMS Input current feed, I_{RMS}	0.067 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	16.17 VA
Displacement factor of AC power feed	0.98
Power factor of AC current feed	0.98
Total harmonic distortion of the current	6.22%
Total harmonic distortion of the voltage	1.22%

Efficiency

Radiated power efficiency	33.2%
<div><div></div></div>	
Lumen efficiency	91 lm/W
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Input Power Curve



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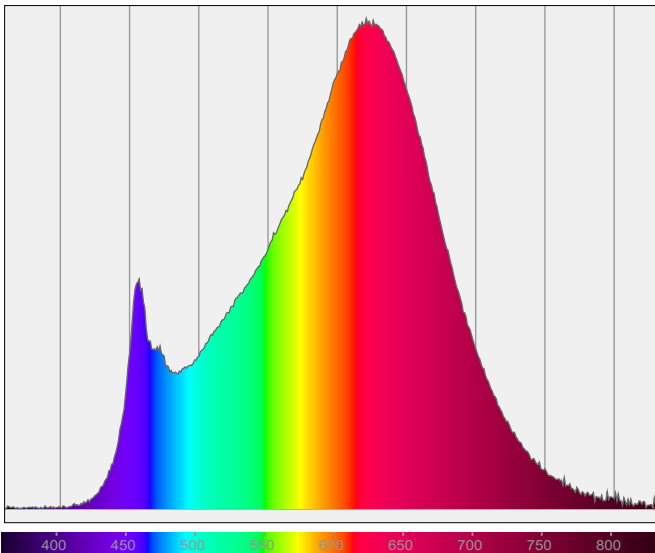
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Color Measurements

Correlated Color Temperature	CCT = 2700 K
Color Rendering TM30-18	R _f 91.3 — R _g 98.8
Color Shift, CIE duv	Duv ±0.0003

Spectral distribution



Color details

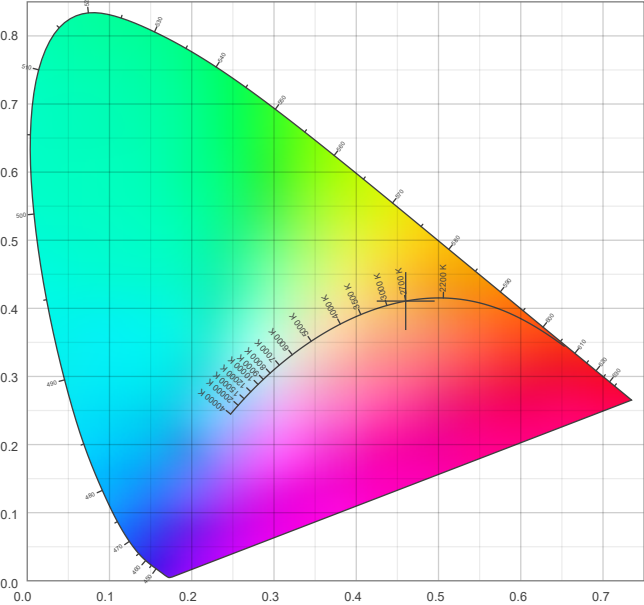
Correlated Color Temperature	CCT = 2700 K	Color coordinates CIE 1931	(x;y) = (0.460;0.411)
Color Rendering Index	CRI 92.7	Color coordinate CIEs 1960	(u;v) = (0.263;0.352)
Color Rendering Index, R9 (red component)	R9 = 66.2	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R _f 91.3 — R _g 98.8	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.263;0.263)
Color Quality Scale	CQS = 90.5		

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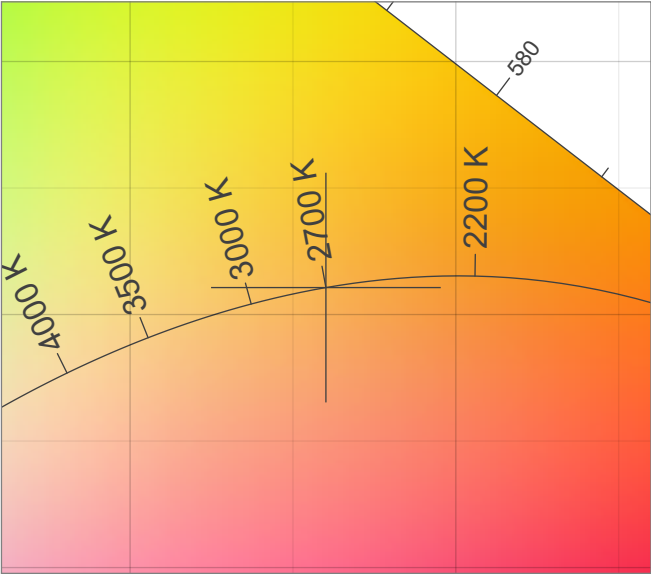
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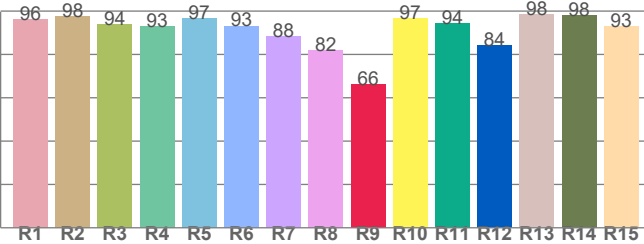
CIE 1931



CIE 1931 – zoomed on Planckian locus



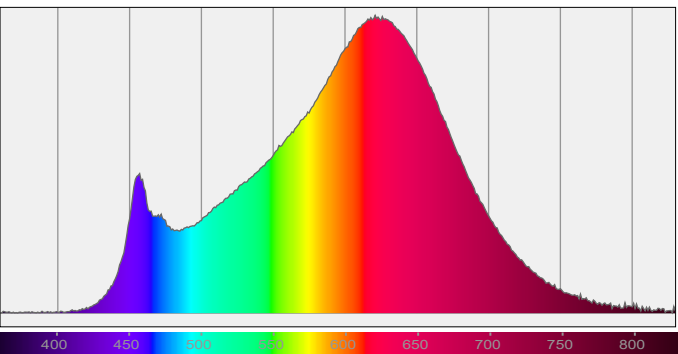
Color Rendering Index per reference color (CIE 1995)



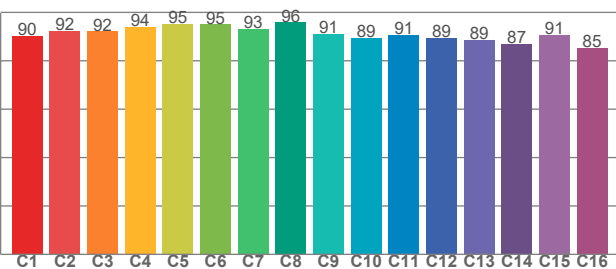
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
96.4	97.7	94.0	93.1	96.8	93.2	88.3	81.9	66.2	96.7	94.5	84.1	98.4	97.9	92.9

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



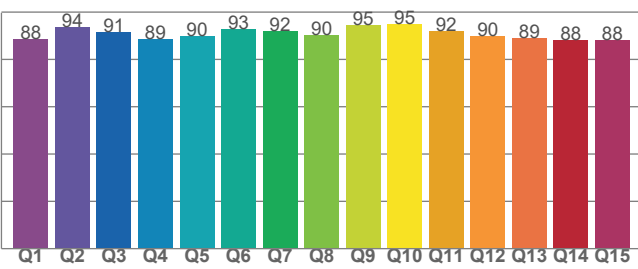
TM30-18 Rf-values per hue bin



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
90.3	92.3	92.1	93.9	95.1	95.0	93.1	95.8	91.0	89.4	90.6	89.4	88.6	86.9	90.6	85.4

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
88.4	93.8	91.4	88.6	90.0	92.9	91.9	90.1	94.7	95.0	92.1	89.8	89.1	88.0	88.1