

Light Measurement Report

Print date: 26-6-2025

Measurement date and time: 26-6-2025 08:44:41 – Measurement no. VFR-250626-1751-MS

Measurement tracking No. and Link: [VT250626-003173](#)

Operator:



Laboratory and Equipment

Laboratory Owner and Location

Goniospectrometer System and Type

Sensor Name, Calibr. Date and Serial No.

Spectrometer Manufacturer and Model

Viso Systems, Copenhagen V, Denmark

LabSpion – Type C, horizontal

LabSensor Model2 – 11-1-2024 – 3130191315

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

Warm-up Time and Variation

12 planes – 30°

5°

1,99 m

4,8 W – PF 0,4 – DPF 0,98

230 V – 0,052 A

50 Hz

Lamp stabilized in 15 min 3 sec – 2,0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

FUT070-5500K

FUT070-5500K – Dutchfulfillment

MI-LIGHT REFLECTOR DOWNLIGHT RGB+CCT 6W

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)

Efficiency

Peak Intensity and Beam Angle

Correlated Color Temperature, Target/Measured

Color Rendering Index

Color Rendering TM30-18

Color Shift, CIE duv and MacAdam Steps

Flicker

414 lm – 0,05% / 99,95%

86 lm/W

367 cd – 60,4°

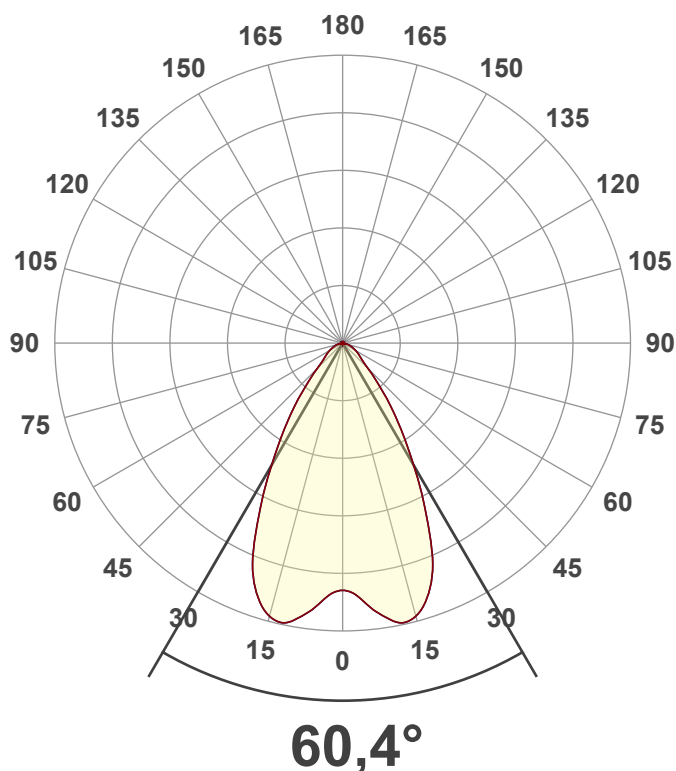
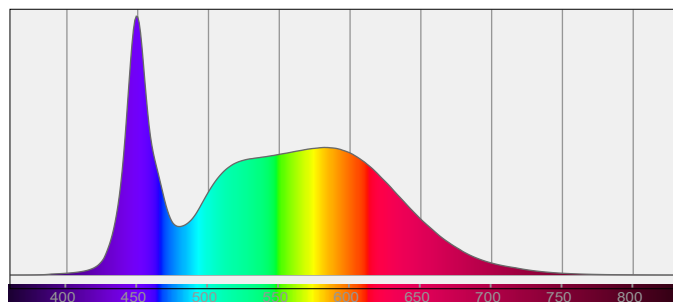
CCT = 5500 K / 5507 K

CRI 83,6

R_f 83,3 – R_g 97,3

Duv 0,0006 – SDCM 0,8

SVM 0 – PstLM 0,07



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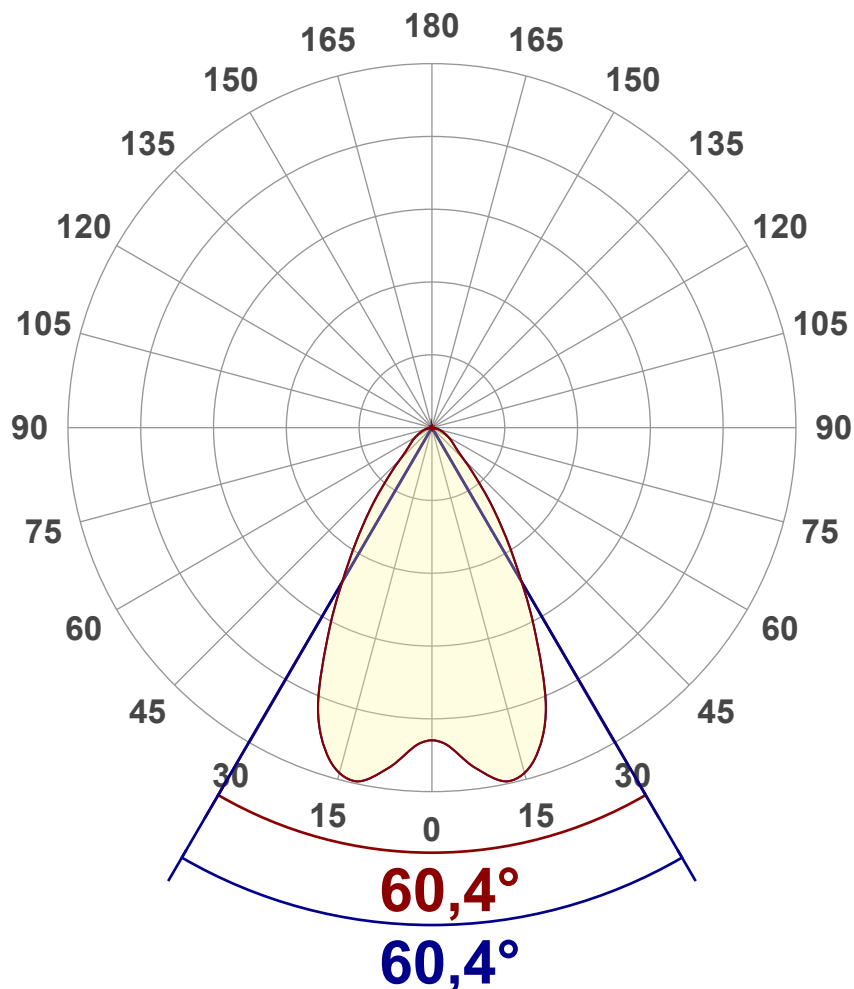
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	414 lm
Lumen Up% / Down%	0,05% / 99,95%
Peak Intensity	367 cd
Beam Angle (50%)	60,4°
Beam Angle (90%)	60,4°
Beam Angle (10%)	60,4°

Cut-off Angle

Average 2,5%	143,8°
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Field Angle

Average 10%	95,1°
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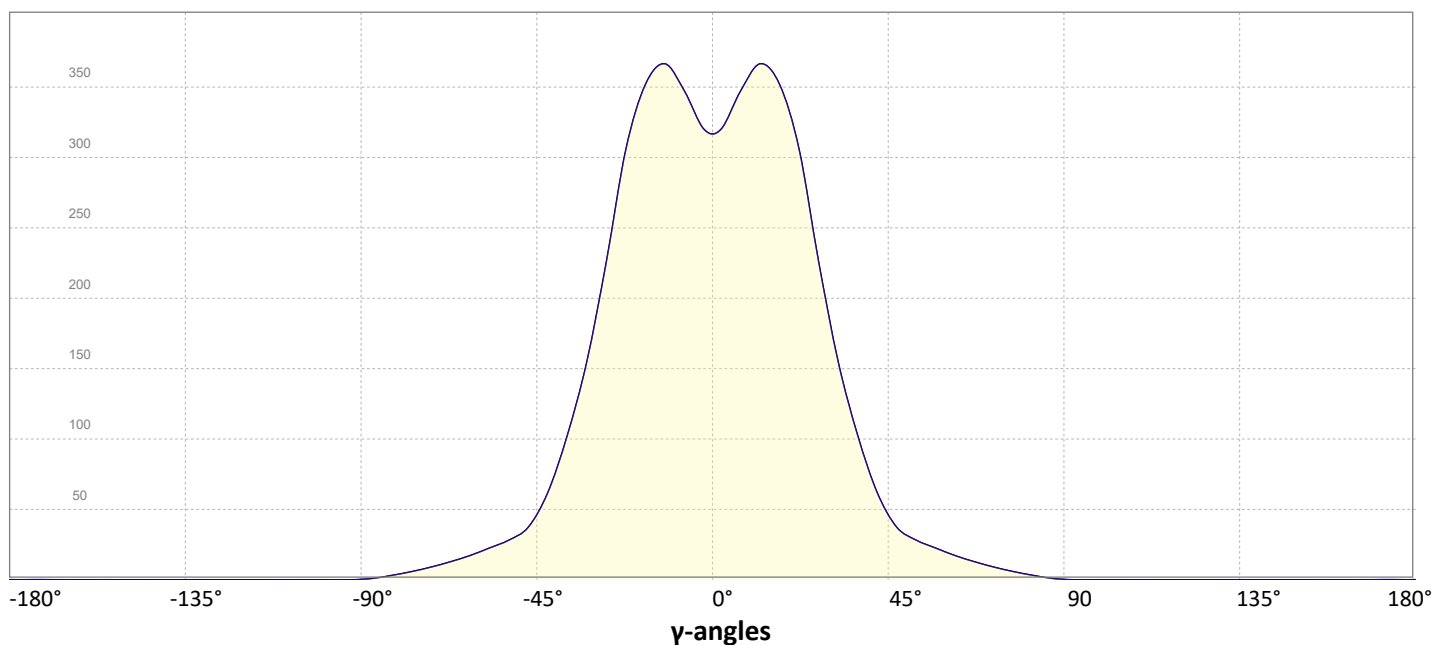
Intensity Ratio

In 120° cone	94,1%
In 90° cone	85,1%

C000-C180

C090-C270

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

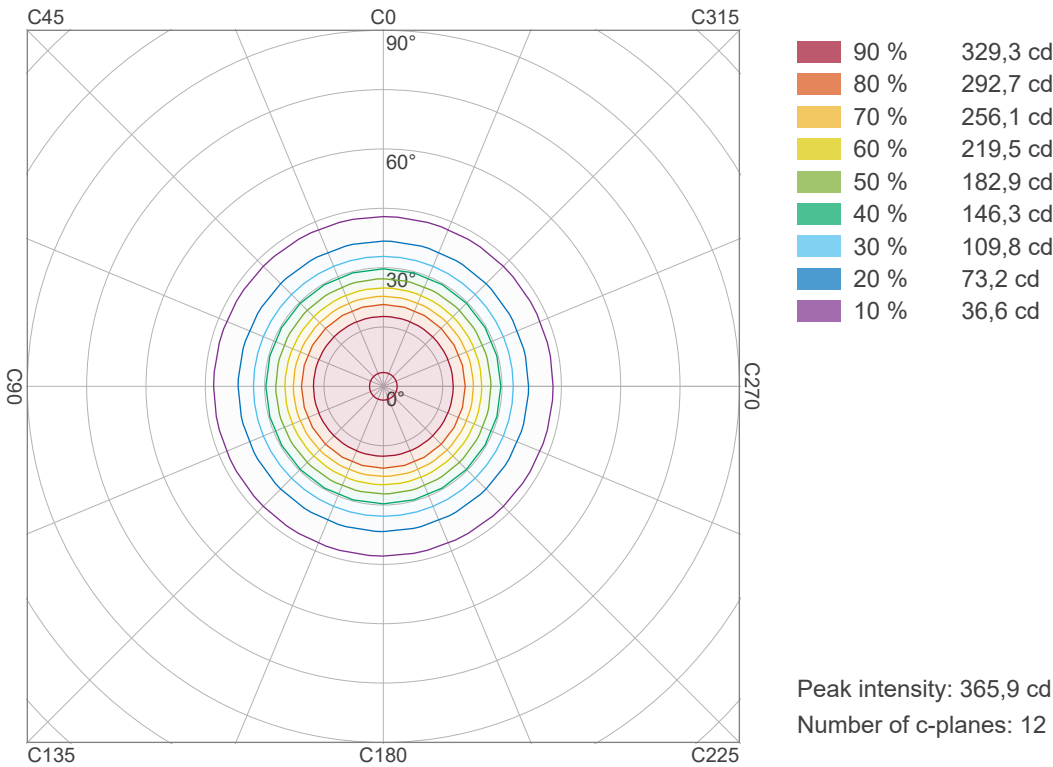


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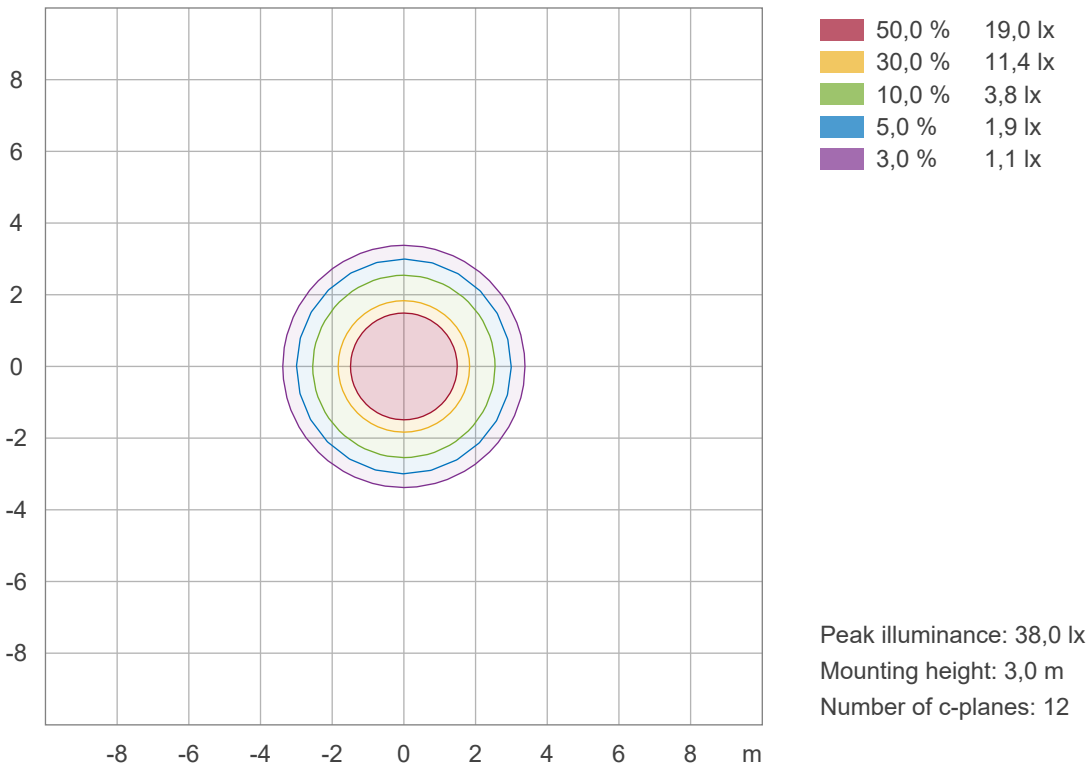
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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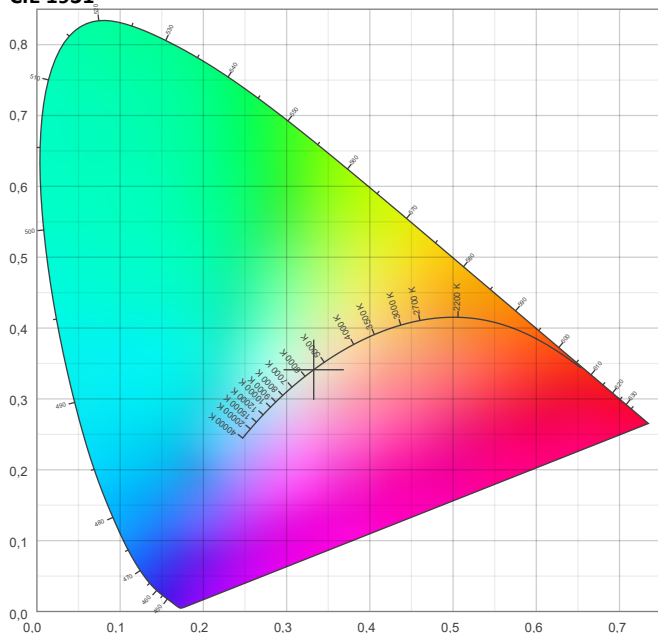


Color details

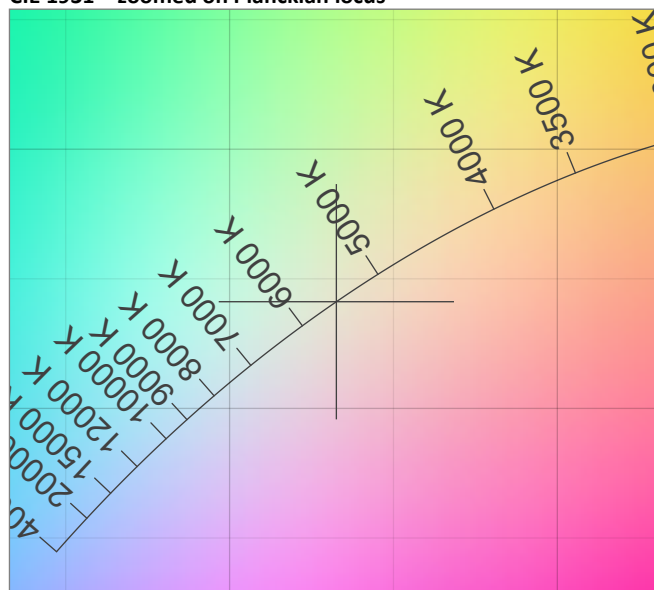
Correlated Color Temperature, Target CCT = 5500 K
Correlated Color Temperature, Measured CCT = 5507 K
Color Rendering Index CRI 83,6
Color Rendering Index, R9 (red component) R9 = 11,4
Color Rendering TM30-18 R_f 83,3 – R_g 97,3
Color Quality Scale CQS = 80,9

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0,333;0,341)
Color coordinate CIEs 1960 (u;v) = (0,207;0,318)
Color deviation from BBL Duv = 0,0006
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,207;0,478)

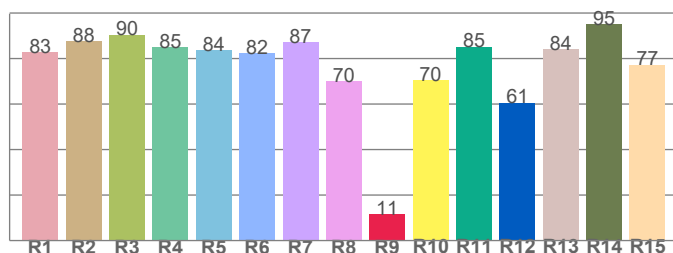
CIE 1931



CIE 1931 – zoomed on Planckian locus



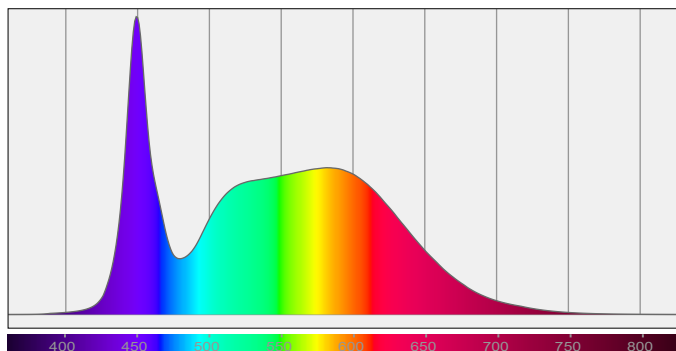
Color Rendering Index per reference color (CIE 1995)



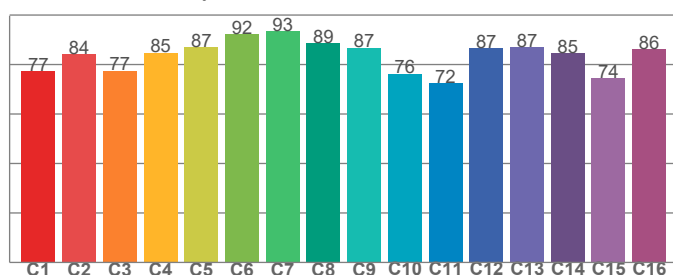
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
82,9	87,6	90,5	85,0	83,5	82,4	87,1	70,0	11,4	70,4	85,2	60,5	84,1	94,9	77,3

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



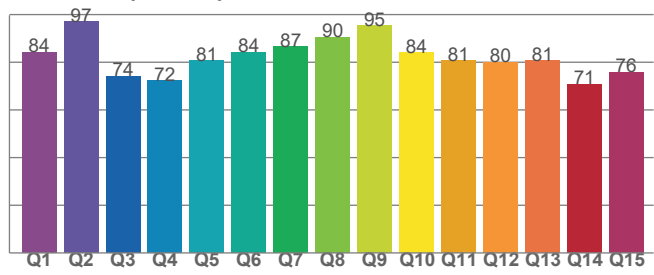
TM30-18 R_f-values per hue bin



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
77,4	84,2	77,5	84,8	86,9	92,3	93,4	88,7	86,7	76,3	72,5	86,6	87,0	84,6	74,4	86,2

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
84,2	96,9	74,1	72,3	80,6	84,2	86,6	90,4	95,4	84,1	80,6	79,9	80,7	70,8	75,9

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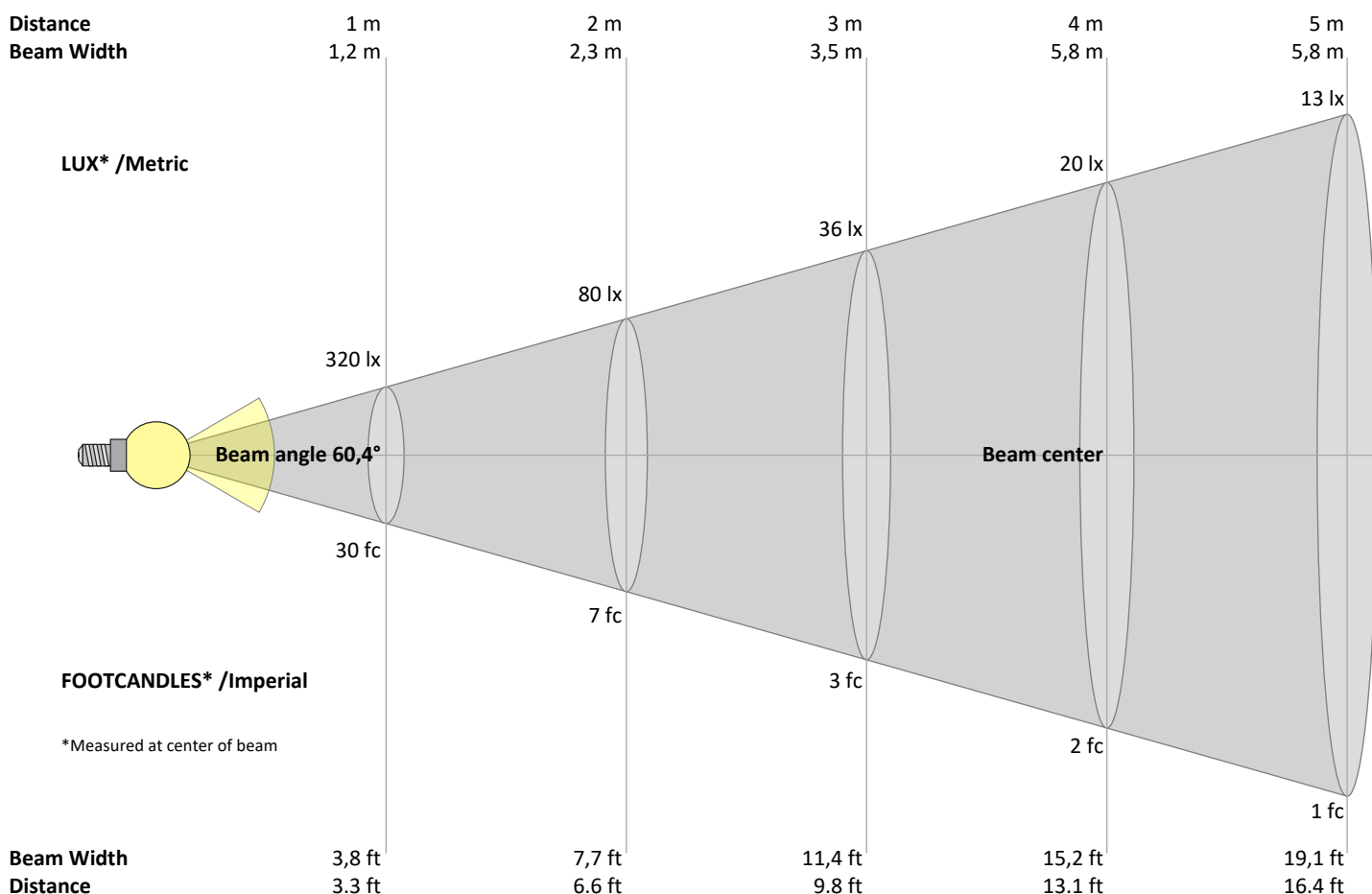
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Beam Details



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
320	80	36	20	13	9	7	5	4	3	3	2	2	2	1	1	1	1	1	1	lux
29,7	7,4	3,3	1,9	1,2	0,8	0,6	0,5	0,4	0,3	0,2	0,2	0,2	0,2	0,1	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
320	320	330	341	350	358	366	361	355	344	326	307	277	245	214	186	158	136	115	96	cd
100%	100%	103%	106%	109%	112%	114%	113%	111%	108%	102%	96%	86%	76%	67%	58%	49%	42%	36%	30%	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
320	320	330	341	350	358	366	361	355	344	326	307	277	245	214	186	158	136	115	96	cd
100%	100%	103%	106%	109%	112%	114%	113%	111%	108%	102%	96%	86%	76%	67%	58%	49%	42%	36%	30%	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
320	320	330	341	350	358	366	361	355	344	326	307	277	245	214	186	158	136	115	96	cd
100%	100%	103%	106%	109%	112%	114%	113%	111%	108%	102%	96%	86%	76%	67%	58%	49%	42%	36%	30%	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
320	320	330	341	350	358	366	361	355	344	326	307	277	245	214	186	158	136	115	96	cd
100%	100%	103%	106%	109%	112%	114%	113%	111%	108%	102%	96%	86%	76%	67%	58%	49%	42%	36%	30%	of 0°val

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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		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	21,9	22,7	22,0	22,9	23,1	21,9	22,7	22,0	22,9	23,1
	3H	22,3	23,2	22,7	23,4	23,6	22,3	23,2	22,7	23,4	23,6
	4H	22,5	23,4	22,9	23,6	23,9	22,5	23,4	22,9	23,6	23,9
	6H	22,7	23,4	23,0	23,7	24,1	22,7	23,4	23,0	23,7	24,1
	8H	22,7	23,4	23,1	23,8	24,2	22,7	23,4	23,1	23,8	24,2
	12H	22,7	23,4	23,1	23,8	24,2	22,7	23,4	23,1	23,8	24,2
4H	2H	21,9	22,8	22,4	23,1	23,3	21,9	22,8	22,4	23,1	23,3
	3H	22,7	23,4	23,1	23,8	24,2	22,7	23,4	23,1	23,8	24,2
	4H	23,0	23,6	23,4	24,0	24,5	23,0	23,6	23,4	24,0	24,5
	6H	23,2	23,8	23,7	24,2	24,5	23,2	23,8	23,7	24,2	24,5
	8H	23,2	23,8	23,7	24,2	24,5	23,2	23,8	23,7	24,2	24,5
	12H	23,2	23,7	23,7	24,1	24,6	23,2	23,7	23,7	24,1	24,6
8H	4H	23,0	23,6	23,5	24,0	24,3	23,0	23,6	23,5	24,0	24,3
	6H	23,3	23,8	23,9	24,2	24,8	23,3	23,8	23,9	24,2	24,8
	8H	23,5	23,8	24,0	24,3	25,0	23,5	23,8	24,0	24,3	25,0
	12H	23,5	23,8	24,1	24,3	24,9	23,5	23,8	24,1	24,3	24,9
12H	4H	23,0	23,5	23,5	23,9	24,4	23,0	23,5	23,5	23,9	24,4
	6H	23,4	23,7	23,9	24,2	24,9	23,4	23,7	23,9	24,2	24,9
	8H	23,5	23,8	24,1	24,3	24,9	23,5	23,8	24,1	24,3	24,9
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		1,4 / -1,0					1,4 / -1,0				
S = 1.5H		2,9 / -1,4					2,9 / -1,4				
S = 2.0H		4,3 / -1,9					4,3 / -1,9				

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	112	109	106	103	110	107	104	102	103	101	99	99	97	96	95	94	93	91
2	106	100	95	91	103	98	94	90	95	91	88	92	89	86	89	86	84	82
3	99	92	86	81	97	90	85	81	88	83	79	85	81	78	83	80	77	75
4	93	85	78	73	91	84	78	73	81	76	72	79	75	71	77	73	70	69
5	88	79	72	67	86	78	71	67	76	70	66	74	69	65	72	68	65	63
6	83	73	66	61	82	72	66	61	71	65	61	69	64	60	68	63	60	58
7	79	68	61	57	77	67	61	57	66	60	56	65	60	56	64	59	56	54
8	74	64	57	53	73	63	57	53	62	56	52	61	56	52	60	55	52	50
9	71	60	53	49	69	59	53	49	58	53	49	57	52	49	57	52	48	47
10	67	56	50	46	66	56	50	46	55	49	46	54	49	45	53	49	45	44

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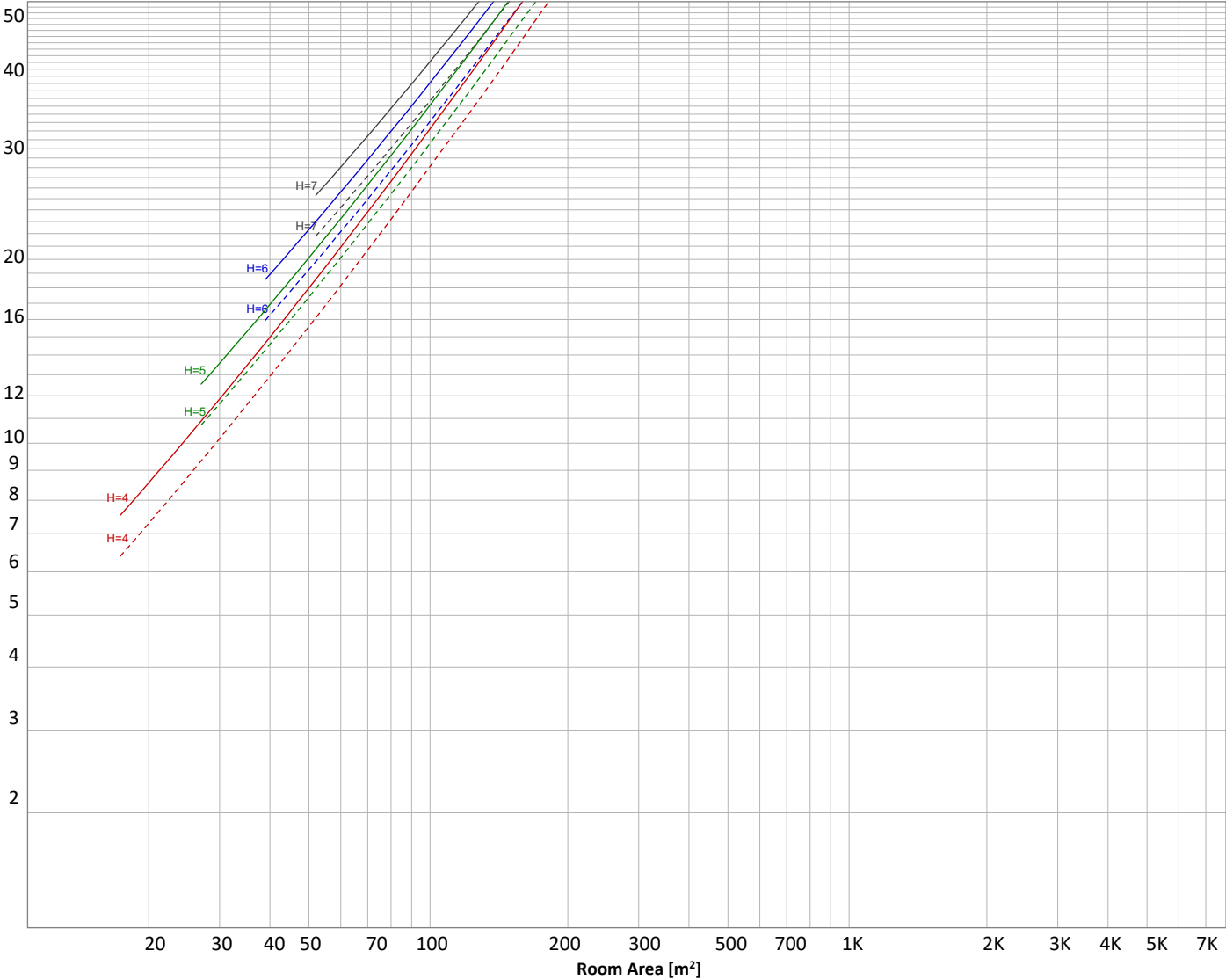
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 414 lm	p(%)		
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
				20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
32,7 lm	101 lm	119 lm	77,9 lm	37,2 lm	22,3 lm	14,5 lm	7,54 lm	2,07 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,028 lm	0,025 lm	0,020 lm	0,019 lm	0,032 lm	0,033 lm	0,035 lm	0,023 lm	0,011 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	33 lm	7,9%
10-20°	101 lm	24,3%
20-30°	119 lm	28,7%
30-40°	78 lm	18,8%
40-50°	37 lm	9,0%
50-60°	22 lm	5,4%
60-70°	15 lm	3,5%
70-80°	8 lm	1,8%
80-90°	2 lm	0,5%
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	414 lm	100,0%

Intensity peaks

Max intensity	367 cd
Intensity, 90°	0 cd
Intensity, 0°	320 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	252 lm	60,9%
0-40°	330 lm	79,8%
0-60°	390 lm	94,1%
60-90°	24 lm	5,8%
70-100°	10 lm	2,3%
90-120°	0 lm	0,0%
0-90°	414 lm	99,9%
90-180°	0 lm	0,1%
0-180°	414 lm	100,0%

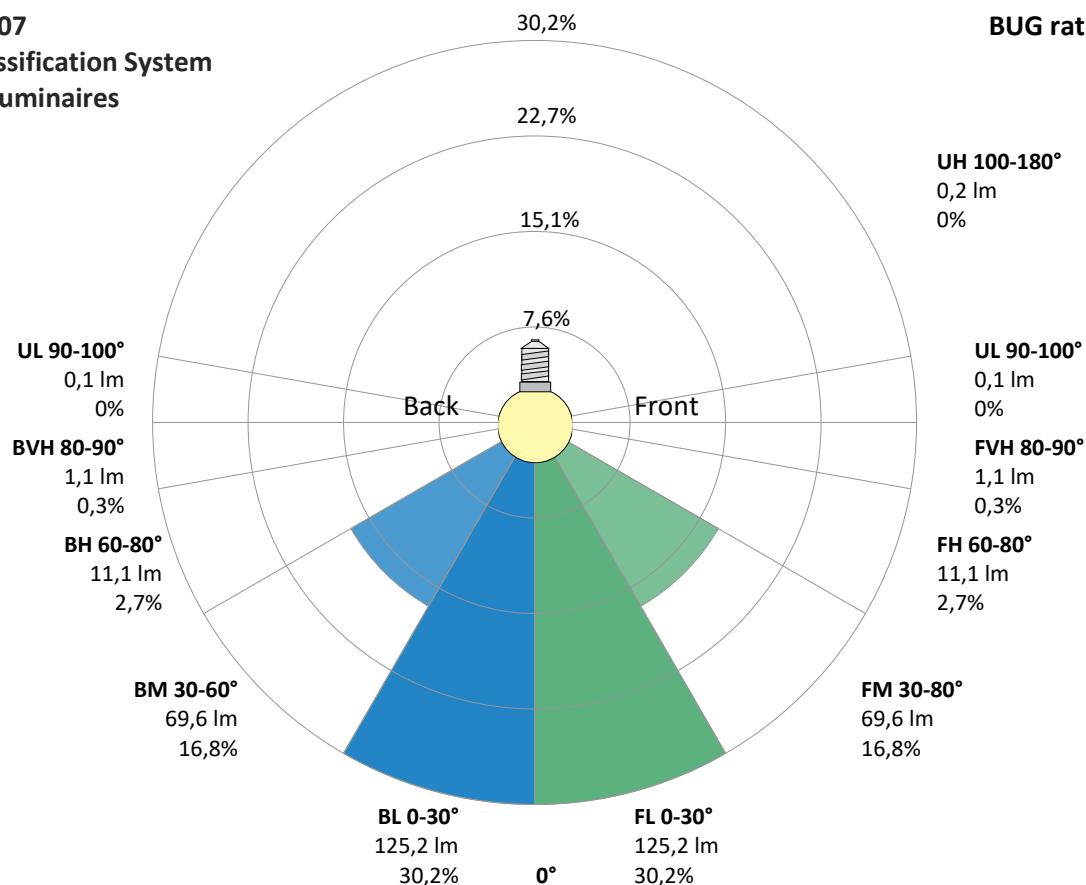
BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	125 lm	30,2%
Medium(30-60°)	70 lm	16,8%
High(60-80°)	11 lm	2,7%
Very high(80-90°)	1 lm	0,3%
Back light		
Low(0-30°)	125 lm	30,2%
Medium(30-60°)	70 lm	16,8%
High(60-80°)	11 lm	2,7%
Very high(80-90°)	1 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 U0 G0



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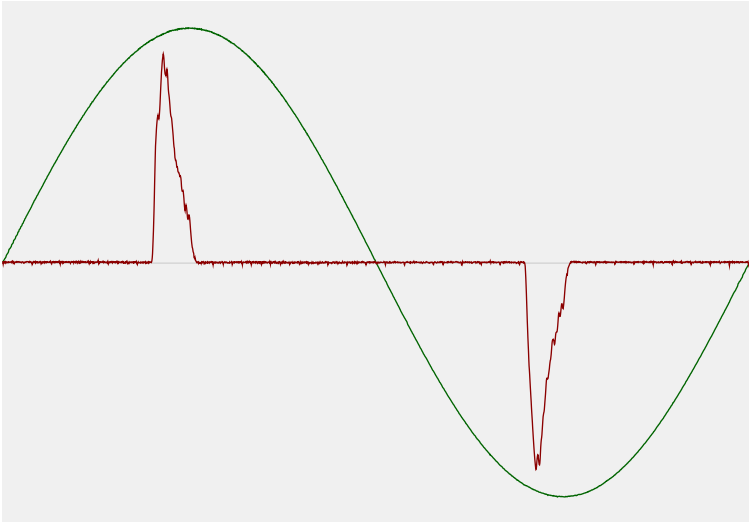


Power Details

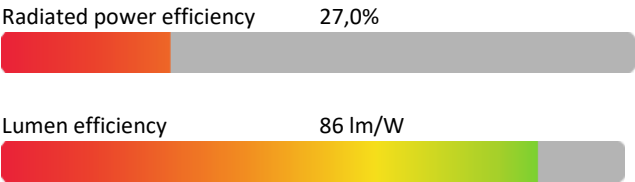
Input Power

Power feed to light source	4,8 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,052 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	11,88 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,4
Total harmonic distortion of the current	217,34%
Total harmonic distortion of the voltage	0,09%

Input Power Curve



Efficiency



Stabilization Details

Warmup Conditions

Stable period	15 min
Stable change max	2,0%
Minimum time	15 min

Color Temperature Change

CCT start	5487 K
CCT shift	+13 K
CCT end	5500 K

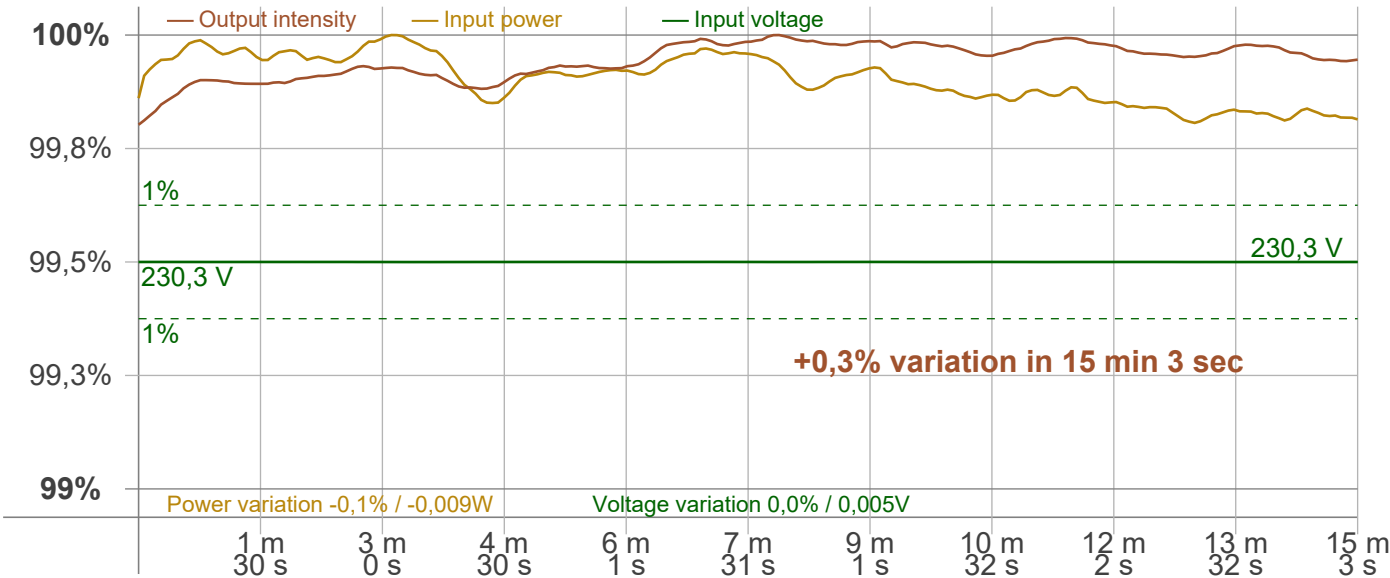
Warmup Result

Total warmup time	Lamp stabilized in 15 min 3 sec
Warmup variation	+0,3%

Output Change

Output start	413 lm
Output change	+1 lm
Output end	414 lm

Stabilization Curve



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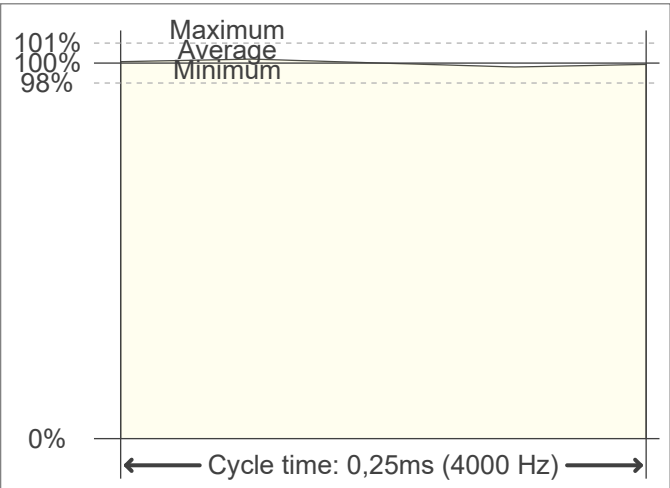
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Flicker /TLA details

Flicker Meter Type	Viso Systems LabFlicker	Measurement time	
Frequency of input power	50 Hz	PstLM	180 sec
Flicker/TLA sample rate	20000 samples/s	All other indices	1,2 sec
Flicker indices according to Illuminating Engineering Society (IES)		Flicker indices according to California Energy Commission (CEC) 2016b	
Flicker frequency	4000 Hz	JA8/10 40 Hz	0,1 %
Percent Flicker	2,09 %	JA8/10 90 Hz	0,14 %
Flicker index	0	JA8/10 200 Hz	0,18 %
		JA8/10 400 Hz	0,27 %
		JA8/10 1000 Hz	0,52 %
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)		Flicker indices according to Lighting Research Center (2015)	
PstLM value (F < 80 Hz)	0,07	Perception metric, Assist Mp	0,05
SVM value (80 < F < 2000 Hz)	0		

Flicker frame (frame of one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

