

Light Measurement Report

Print date: 16-4-2025

Measurement date and time: 15-4-2025 15:08:24 – Measurement no. VFR-250415-0788-MS

Measurement tracking No. and Link: [VT250415-007666](#)

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°

11,89 m

47,8 W – PF 0,98 – DPF 0,98

230 V – 0,212 A

50 Hz

Lamp stabilized in 15 min 47 sec – 2,0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

271661-6000K

271661-6000K – Dutchfulfillment

LED BATTEN TELESTO 150CM 50W (OSRAM DRIVER)

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

5661 lm – 8,23% / 91,77%

118 lm/W

1557 cd – 121,7°

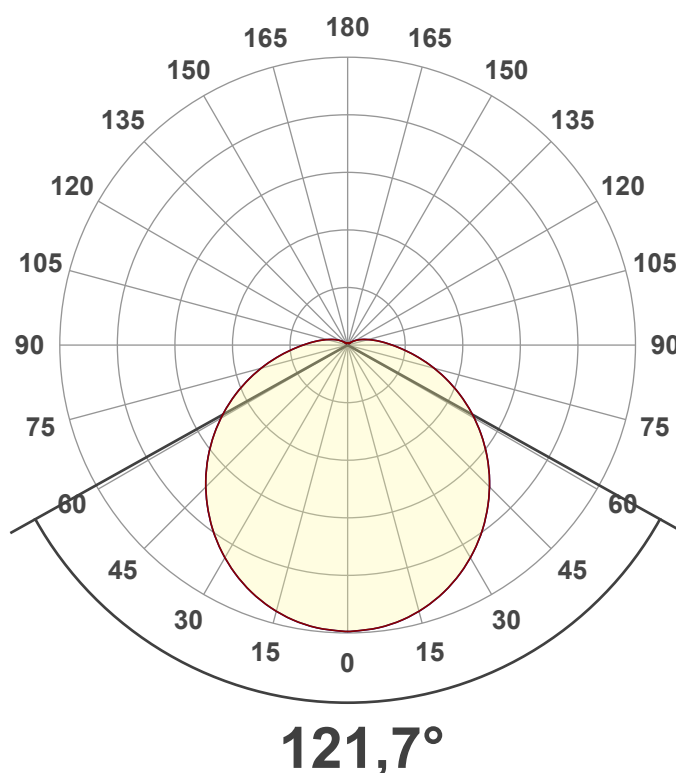
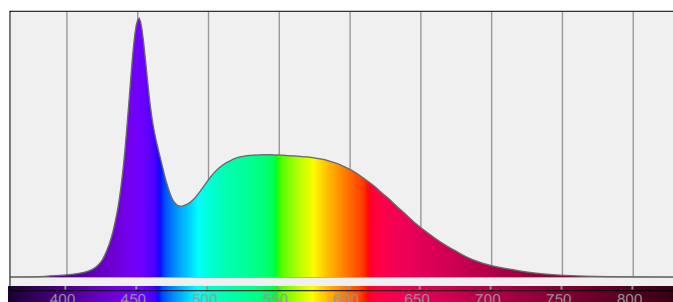
CCT = 6000 K / 6537 K

CRI 84,5

R_f 84,9 – R_g 94,1

Duv 0,0065 – SDCM 11,8

SVM 0 – PstLM 0,01



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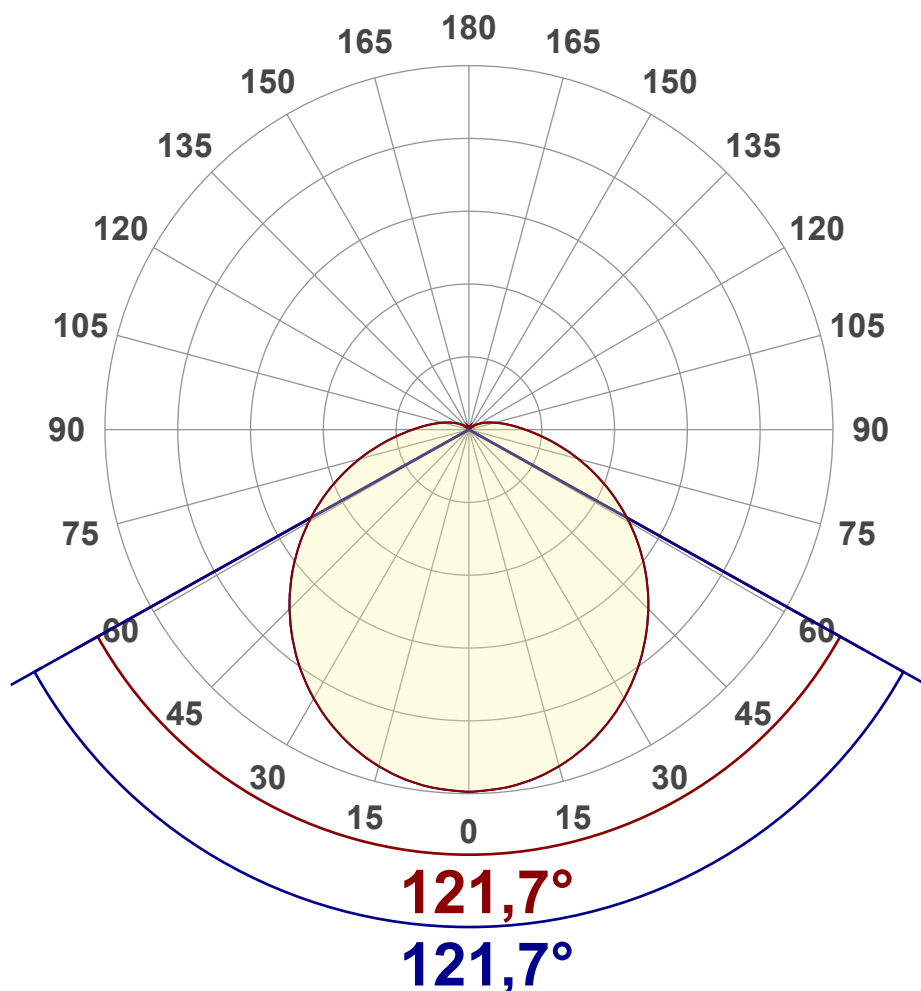
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	5661 lm
Lumen Up% / Down%	8,23% / 91,77%
Peak Intensity	1557 cd
Beam Angle (50%)	121,7°
Beam Angle (90%)	121,7°
Beam Angle (10%)	121,7°

Cut-off Angle

Average 2,5%	248,2°
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Field Angle

Average 10%	198,4°
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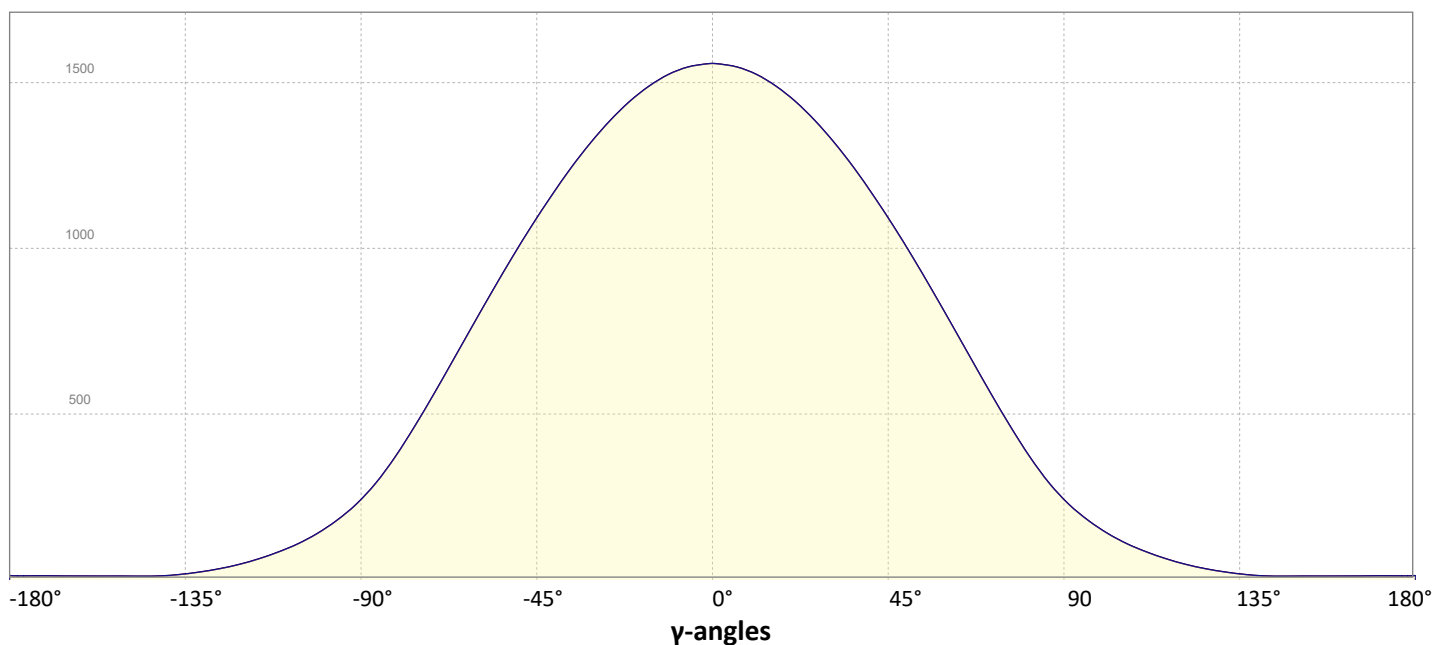
Intensity Ratio

In 120° cone	64,5%
In 90° cone	42,8%

C000-C180

C090-C270

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



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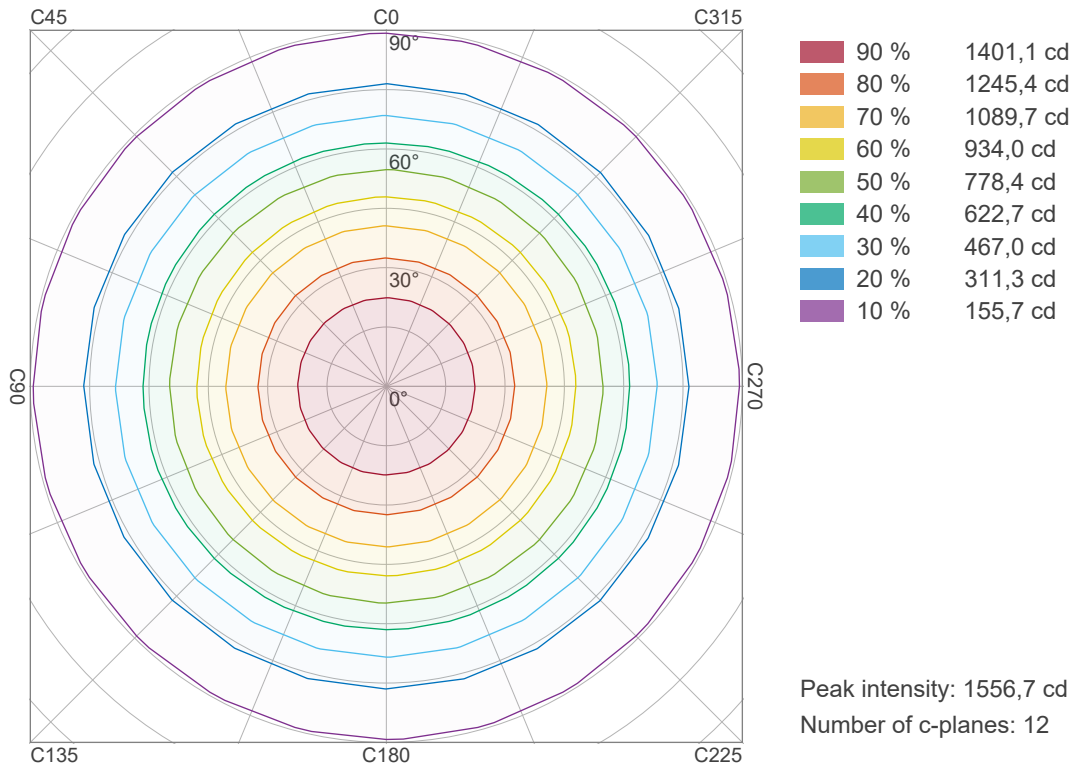
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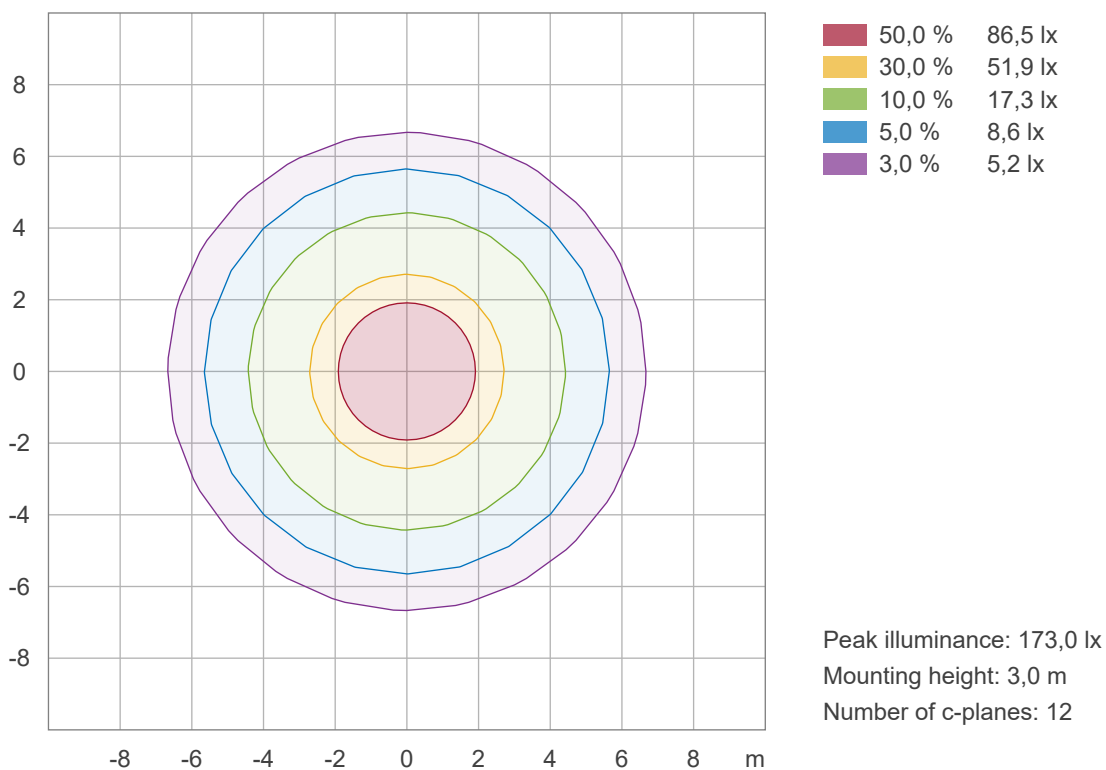
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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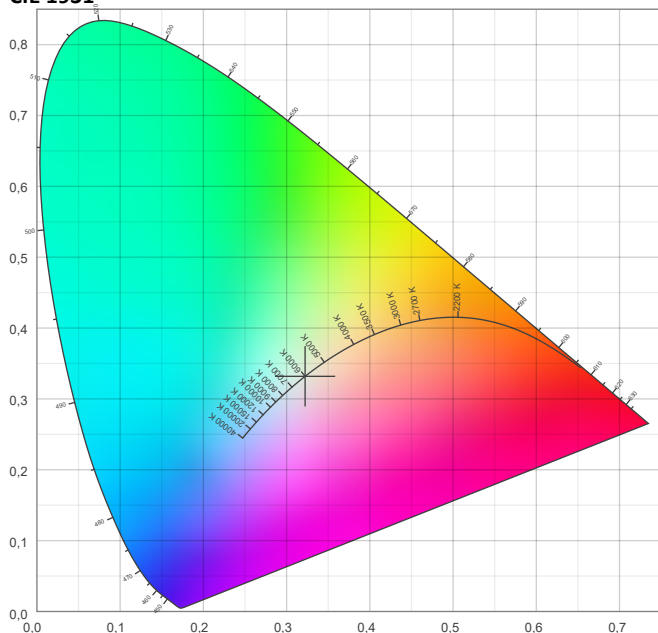


Color details

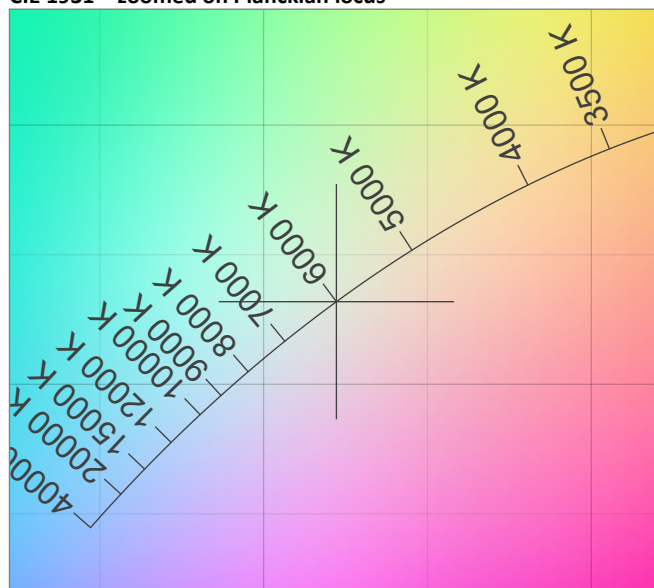
Correlated Color Temperature, Target CCT = 6000 K
Correlated Color Temperature, Measured CCT = 6537 K
Color Rendering Index CRI 84,5
Color Rendering Index, R9 (red component) R9 = 11,2
Color Rendering TM30-18 R_f 84,9 – R_g 94,1
Color Quality Scale CQS = 83,3

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0,322;0,332)
Color coordinate CIEs 1960 (u;v) = (0,203;0,314)
Color deviation from BBL Duv = 0,0065
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,203;0,471)

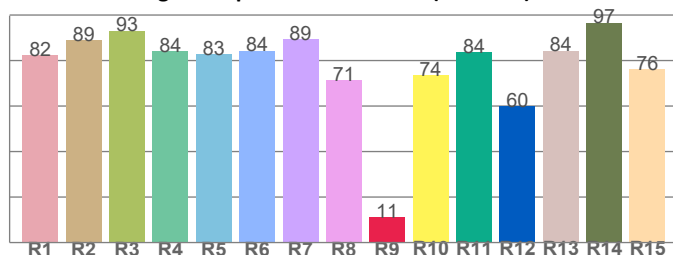
CIE 1931



CIE 1931 – zoomed on Planckian locus



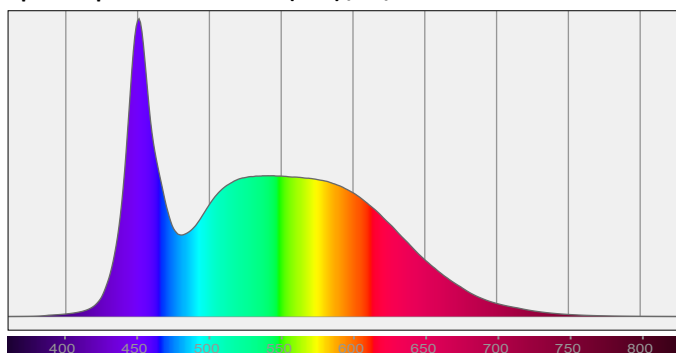
Color Rendering Index per reference color (CIE 1995)



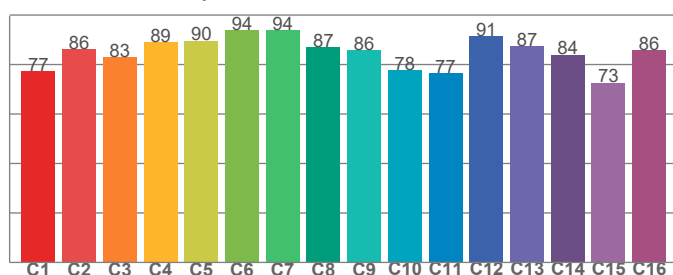
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
82,2	88,9	93,1	84,0	82,9	84,3	89,3	71,3	11,2	73,6	83,6	59,9	84,3	96,6	76,2

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



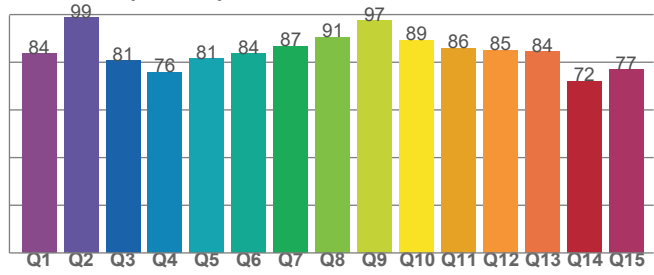
TM30-18 R_f-values per hue bin



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
77,3	86,2	83,0	89,0	89,6	93,9	93,8	86,9	85,7	77,7	76,5	91,5	87,4	84,0	72,6	85,7

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
83,7	98,7	80,6	75,9	81,4	83,7	86,8	90,6	97,5	89,2	85,9	85,0	84,4	72,1	76,8

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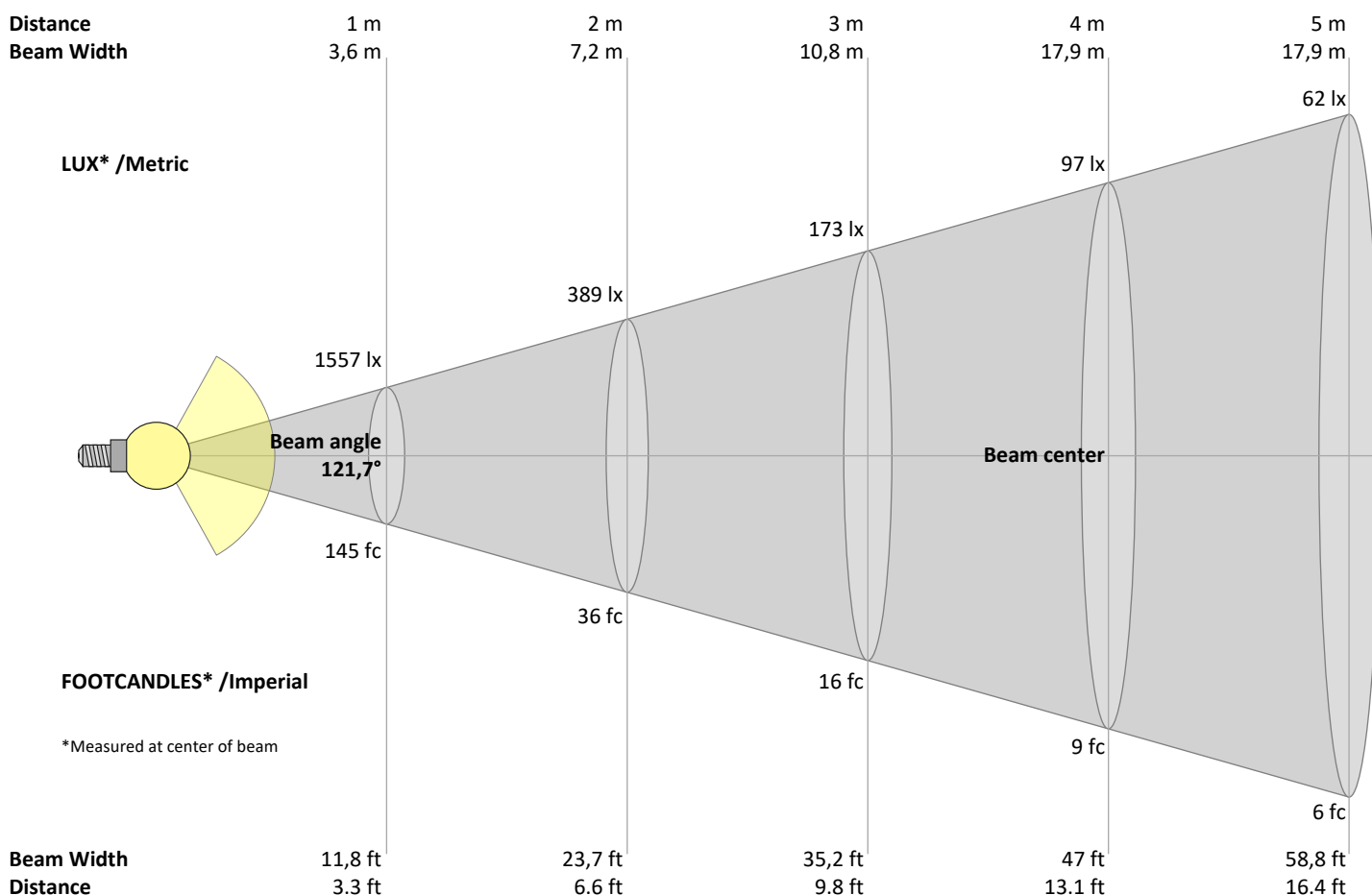
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Beam Details



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
1557	389	173	97	62	43	32	24	19	16	13	11	9	8	7	6	5	5	4	4	lux
144,6	36,2	16,1	9	5,8	4	3	2,3	1,8	1,4	1,2	1	0,9	0,7	0,6	0,6	0,5	0,4	0,4	0,4	fc

Intensities in 0° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
1557	1535	1473	1375	1246	1091	918	734	548	376	244	157	99	60	34	18	11	11	11	12	cd
100%	99%	95%	88%	80%	70%	59%	47%	35%	24%	16%	10%	6%	4%	2%	1%	1%	1%	1%	1%	of 0°val

Intensities in 90° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
1557	1535	1473	1375	1246	1091	918	734	548	376	244	157	99	60	34	18	11	11	11	12	cd
100%	99%	95%	88%	80%	70%	59%	47%	35%	24%	16%	10%	6%	4%	2%	1%	1%	1%	1%	1%	of 0°val

Intensities in 180° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
1557	1535	1473	1375	1246	1091	918	734	548	376	244	157	99	60	34	18	11	11	11	12	cd
100%	99%	95%	88%	80%	70%	59%	47%	35%	24%	16%	10%	6%	4%	2%	1%	1%	1%	1%	1%	of 0°val

Intensities in 270° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
1557	1535	1473	1375	1246	1091	918	734	548	376	244	157	99	60	34	18	11	11	11	12	cd
100%	99%	95%	88%	80%	70%	59%	47%	35%	24%	16%	10%	6%	4%	2%	1%	1%	1%	1%	1%	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											
H = mounting height above eye level											
X	Y	Viewed Crosswise (Viewing direction orthogonal to lamp length axis)					Viewed Endwise (Viewing direction parallel to lamp length axis)				
2H	2H	21,6	22,8	21,9	23,2	23,6	20,4	21,6	20,8	22,1	22,5
	3H	23,5	24,7	24,0	25,2	25,5	21,9	23,2	22,5	23,6	24,0
	4H	24,5	25,7	25,0	26,1	26,5	22,7	23,8	23,2	24,3	24,7
	6H	25,6	26,6	26,0	27,0	27,6	23,3	24,4	23,8	24,8	25,4
	8H	26,1	27,1	26,5	27,5	28,1	23,6	24,7	24,1	25,1	25,7
	12H	26,6	27,7	27,1	28,1	28,7	23,8	24,9	24,3	25,3	25,9
4H	2H	22,0	23,2	22,5	23,6	24,0	21,1	22,3	21,6	22,7	23,2
	3H	24,2	25,2	24,7	25,7	26,3	22,9	24,0	23,4	24,4	25,0
	4H	25,3	26,3	25,8	26,7	27,4	23,7	24,8	24,3	25,2	25,9
	6H	26,4	27,3	27,0	27,8	28,3	24,5	25,4	25,1	25,9	26,4
	8H	27,0	27,8	27,6	28,3	28,9	24,8	25,6	25,4	26,1	26,7
	12H	27,7	28,3	28,3	28,9	29,5	25,1	25,8	25,7	26,4	27,0
8H	4H	25,5	26,3	26,1	26,8	27,3	24,1	24,9	24,8	25,5	26,0
	6H	26,8	27,4	27,4	28,0	28,7	25,1	25,7	25,7	26,3	27,0
	8H	27,5	28,1	28,2	28,7	29,5	25,6	26,2	26,2	26,8	27,6
	12H	28,3	28,8	29,0	29,4	30,2	26,0	26,5	26,7	27,1	27,9
12H	4H	25,5	26,2	26,1	26,7	27,4	24,2	24,9	24,8	25,5	26,1
	6H	26,9	27,4	27,5	28,1	28,9	25,3	25,8	25,9	26,5	27,3
	8H	27,6	28,1	28,3	28,8	29,5	25,8	26,3	26,5	26,9	27,6
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H				0,1 / -0,1				0,1 / -0,1			
S = 1.5H				0,1 / -0,1				0,1 / -0,2			
S = 2.0H				0,4 / -0,4				0,3 / -0,4			

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	117	117	117	117	113	113	113	113	107	107	107	100	100	100	94	94	94	92
1	105	99	94	89	101	96	91	87	90	86	83	85	82	79	80	77	75	72
2	94	85	77	71	91	82	75	70	77	72	67	73	68	64	69	65	61	58
3	86	74	65	58	82	72	64	57	68	61	55	64	58	53	60	55	51	48
4	78	65	56	49	75	63	55	48	60	52	46	56	50	45	53	48	43	41
5	72	58	49	42	69	56	48	41	53	46	40	50	44	39	48	42	37	35
6	66	52	43	36	63	51	42	36	48	40	35	46	39	34	43	37	33	30
7	61	47	38	32	59	46	37	31	44	36	30	41	35	30	39	33	29	27
8	57	43	34	28	55	42	34	28	40	32	27	38	31	26	36	30	26	24
9	53	39	31	25	51	38	30	25	37	29	24	35	28	24	33	27	23	21
10	50	36	28	23	48	35	28	22	34	27	22	32	26	22	31	25	21	19

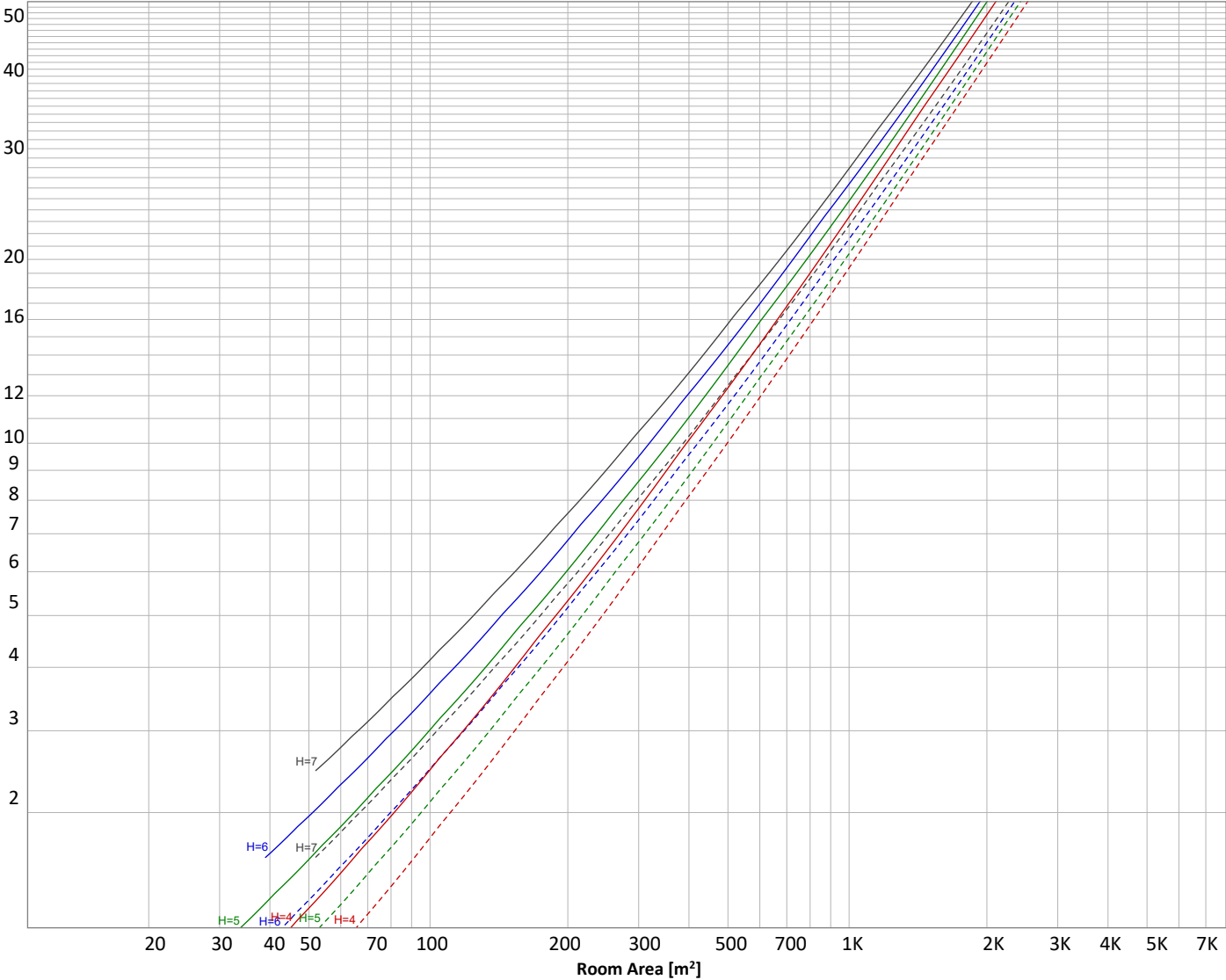
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995
LAMPS (number of lamps)



Conditions

H = Room height	Flux = 5661 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°
147 lm	423 lm	645 lm	790 lm	842 lm	804 lm	686 lm	516 lm	341 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
210 lm	124 lm	68,4 lm	33,4 lm	14,3 lm	7,04 lm	5,15 lm	3,22 lm	1,12 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	147 lm	2,6%
10-20°	423 lm	7,5%
20-30°	645 lm	11,4%
30-40°	790 lm	13,9%
40-50°	842 lm	14,9%
50-60°	804 lm	14,2%
60-70°	686 lm	12,1%
70-80°	516 lm	9,1%
80-90°	341 lm	6,0%
90-100°	210 lm	3,7%
100-110°	124 lm	2,2%
110-120°	68 lm	1,2%
120-130°	33 lm	0,6%
130-140°	14 lm	0,3%
140-150°	7 lm	0,1%
150-160°	5 lm	0,1%
160-170°	3 lm	0,1%
170-180°	1 lm	0,0%
Total	5661 lm	100,0%

Intensity peaks

Max intensity	1557 cd
Intensity, 90°	244 cd
Intensity, 0°	1557 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	1216 lm	21,5%
0-40°	2005 lm	35,4%
0-60°	3652 lm	64,5%
60-90°	1544 lm	27,3%
70-100°	1068 lm	18,9%
90-120°	402 lm	7,1%
0-90°	5195 lm	91,8%
90-180°	466 lm	8,2%
0-180°	5661 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	608 lm	10,7%
Medium(30-60°)	1217 lm	21,5%
High(60-80°)	601 lm	10,6%
Very high(80-90°)	171 lm	3,0%
Back light		
Low(0-30°)	608 lm	10,7%
Medium(30-60°)	1217 lm	21,5%
High(60-80°)	601 lm	10,6%
Very high(80-90°)	171 lm	3,0%

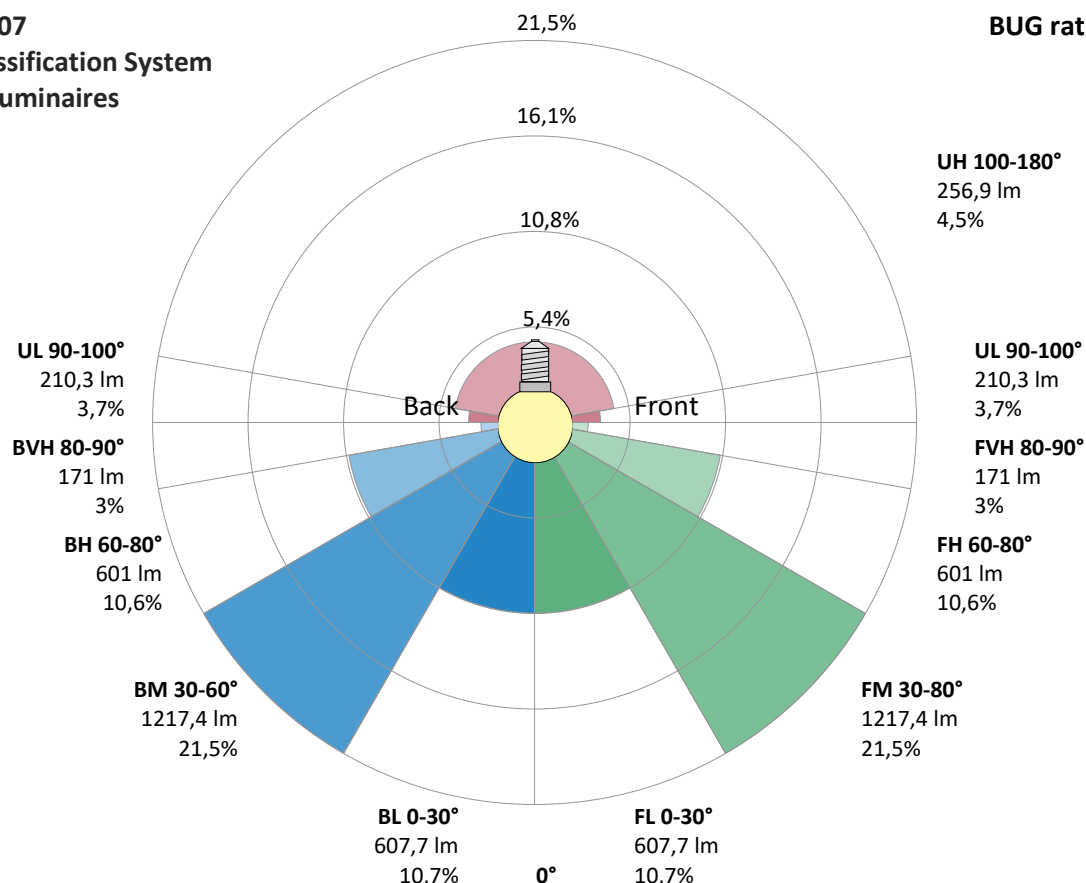
Uplight

Low(90-100°)	210 lm	3,7%
High(100-180°)	257 lm	4,5%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B2 U3 G2



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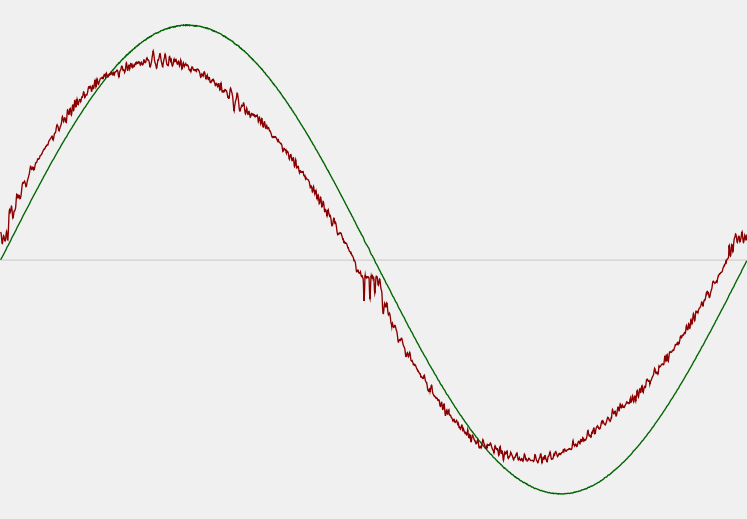


Power Details

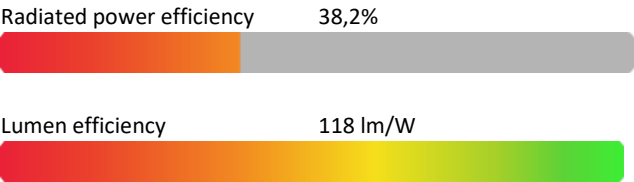
Input Power

Power feed to light source	47,8 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,212 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	48,73 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,98
Total harmonic distortion of the current	4,28%
Total harmonic distortion of the voltage	0,06%

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	5950 K
CCT shift	+50 K
CCT end	6000 K

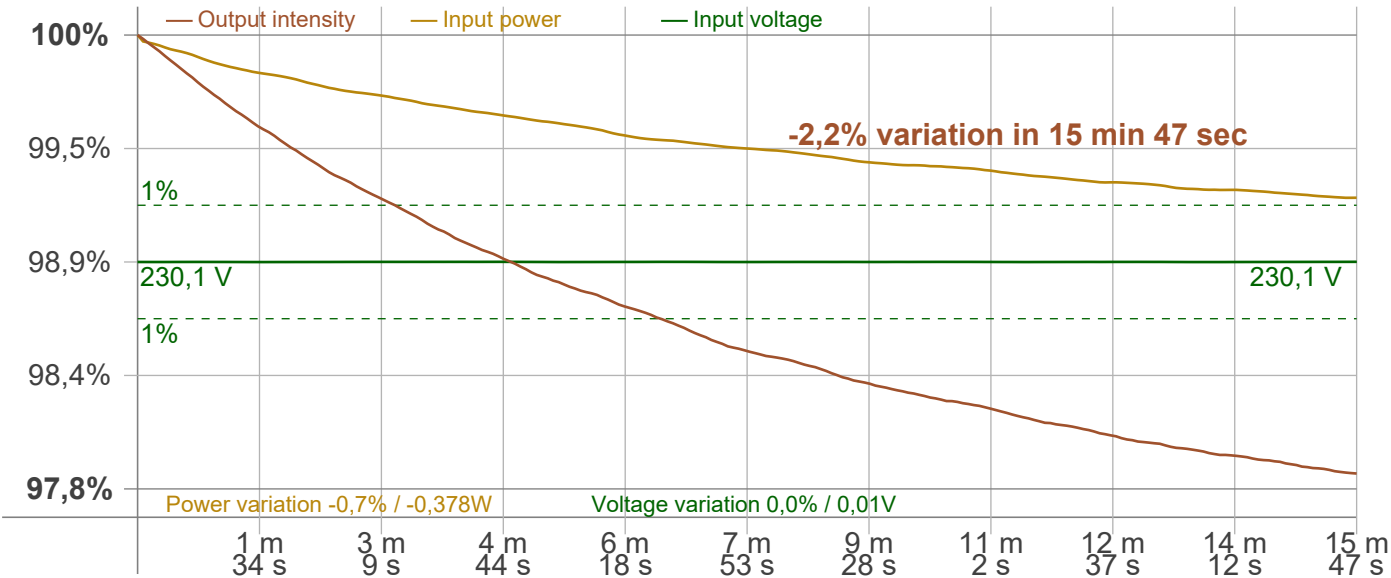
Warmup Result

Total warmup time	Lamp stabilized in 15 min 47 sec
Warmup variation	-2,2%

Output Change

Output start	5786 lm
Output change	-124 lm
Output end	5661 lm

Stabilization Curve



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Flicker /TLA details

Flicker Meter Type Viso Systems LabFlicker
Frequency of input power 50 Hz
Flicker/TLA sample rate 20000 samples/s

Measurement time
PstLM 180 sec
All other indices 1,2 sec

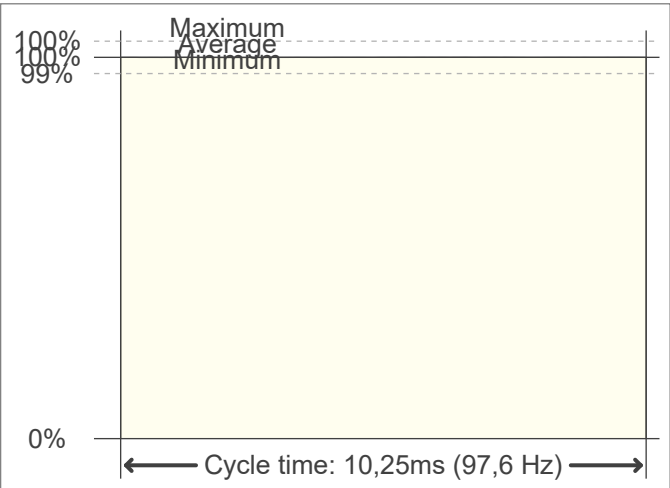
Flicker indices according to Illuminating Engineering Society (IES)
Flicker frequency 97,56 Hz
Percent Flicker 0,06 %
Flicker index 0

Flicker indices according to California Energy Commission (CEC) 2016b
JA8/10 40 Hz 0,02 %
JA8/10 90 Hz 0,02 %
JA8/10 200 Hz 0,04 %
JA8/10 400 Hz 0,04 %
JA8/10 1000 Hz 0,05 %

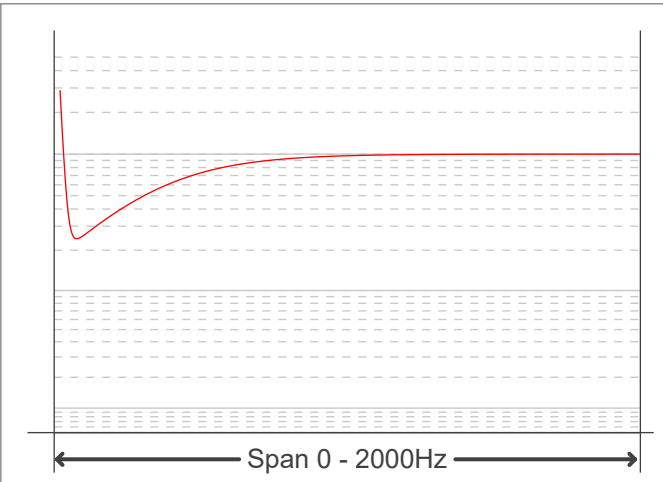
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)
PstLM value (F < 80 Hz) 0,01
SVM value (80 < F < 2000 Hz) 0

Flicker indices according to Lighting Research Center (2015)
Perception metric, Assist Mp 0,01

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

