Light Measurement Report

Print date: 15-9-2025
Measurement date and time: 15-9-2025 10:50:06 – Measurement no. VFR-250915-3180-MS
Measurement tracking No. and Link: VT250915-007746
Operator:

Laboratory and Equipment

Laboratory Owner and Location	Viso Systems, Copenhagen V, Denmark
Goniospectrometer System and Type	LabSpion – Type C, horizontal
Sensor Name, Calibr. Date and Serial No.	LabSensor Model2 – 11-1-2024 – 3130191315
Spectrometer Manufacturer and Model	Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

Measurement Conditions

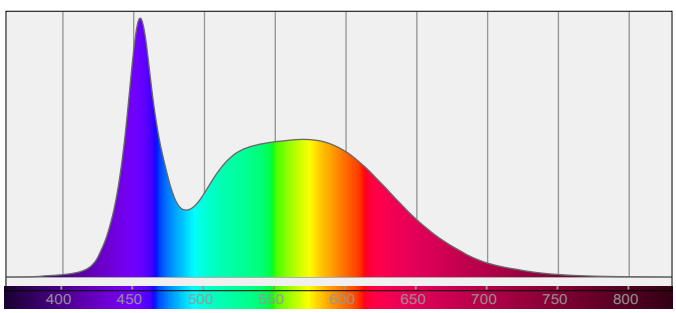
Number of C-planes and Resolution	12 planes – 30°
γ (gamma)-Resolution	5°
Test Distance	9,59 m
Input Power, Power and Displ. Factors	46,4 W – PF 0,99 – DPF 0,99
Input RMS Voltage and Current	230 V – 0,204 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 18 min 15 sec – 2,0%

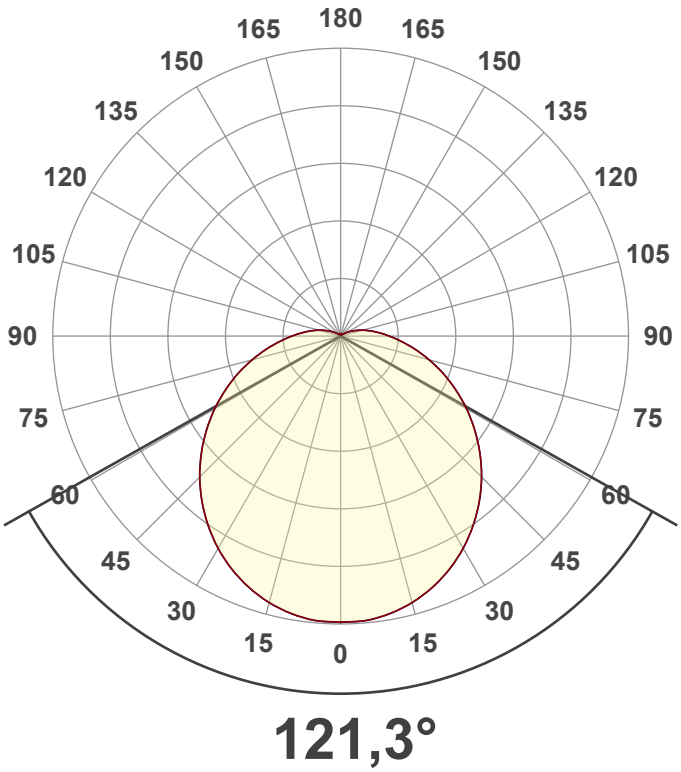
Tested Light Source

Product Name	813659-6000K-45W
Item No. and Manufacturer	813659-6000K-45W – Dutchfulfillment
Product Description (line 1)	LED BATTEN | CLIFF | 25-45W | 120CM | PHILIPS DRIVER | CCT-SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	5051 lm – 8,34% / 91,66%
Efficiency	109 lm/W
Peak Intensity and Beam Angle	1383 cd – 121,3°
Correlated Color Temperature, Target/Measured	CCT = 6000 K / 6004 K
Color Rendering Index	CRI 83,2
Color Rendering TM30-18	R_f 82,7 – R_g 93,6
Color Shift, CIE duv and MacAdam Steps	Duv 0,0031 – SDCM 4,1
Flicker	SVM 0,02 – PstLM 0,01





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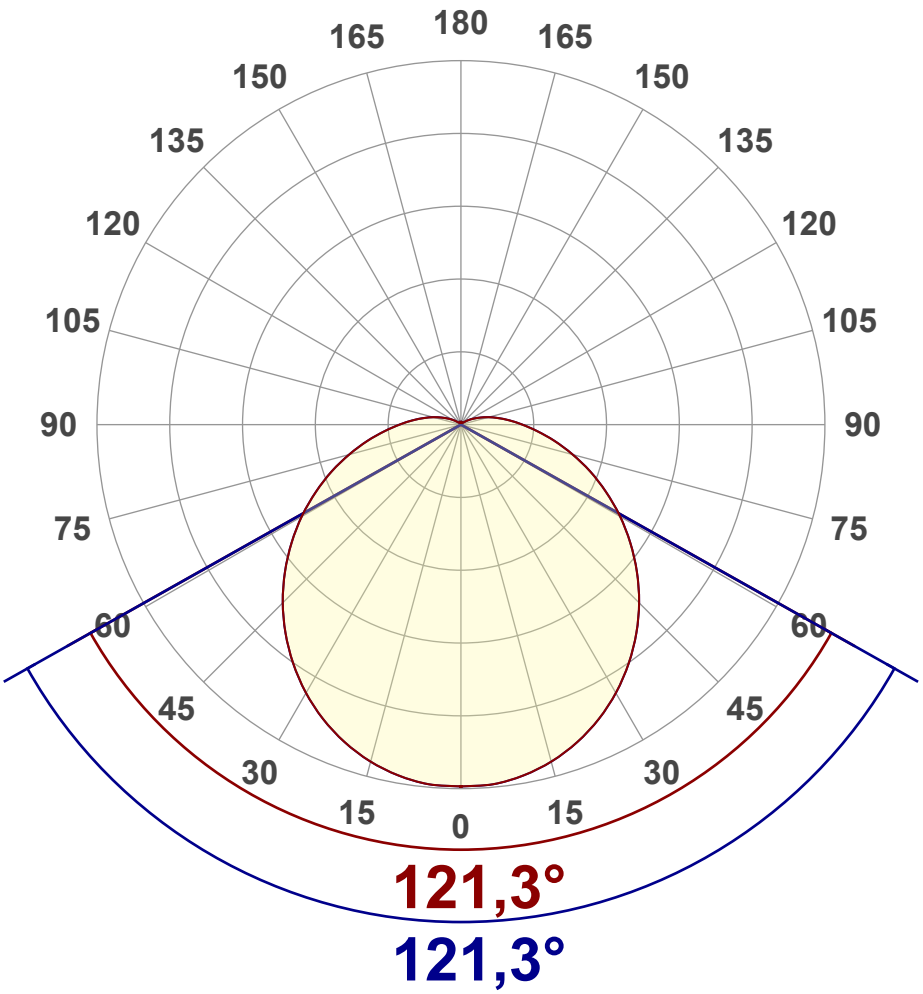
Luminous Intensity diagram Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	5051 lm
Lumen Up% / Down%	8,34% / 91,66%
Peak Intensity	1383 cd
Beam Angle (50%)	121,3°
Beam Angle (90%)	121,3°
Beam Angle (10%)	121,3°

Cut-off Angle

Average 2,5%	241,4°

Field Angle

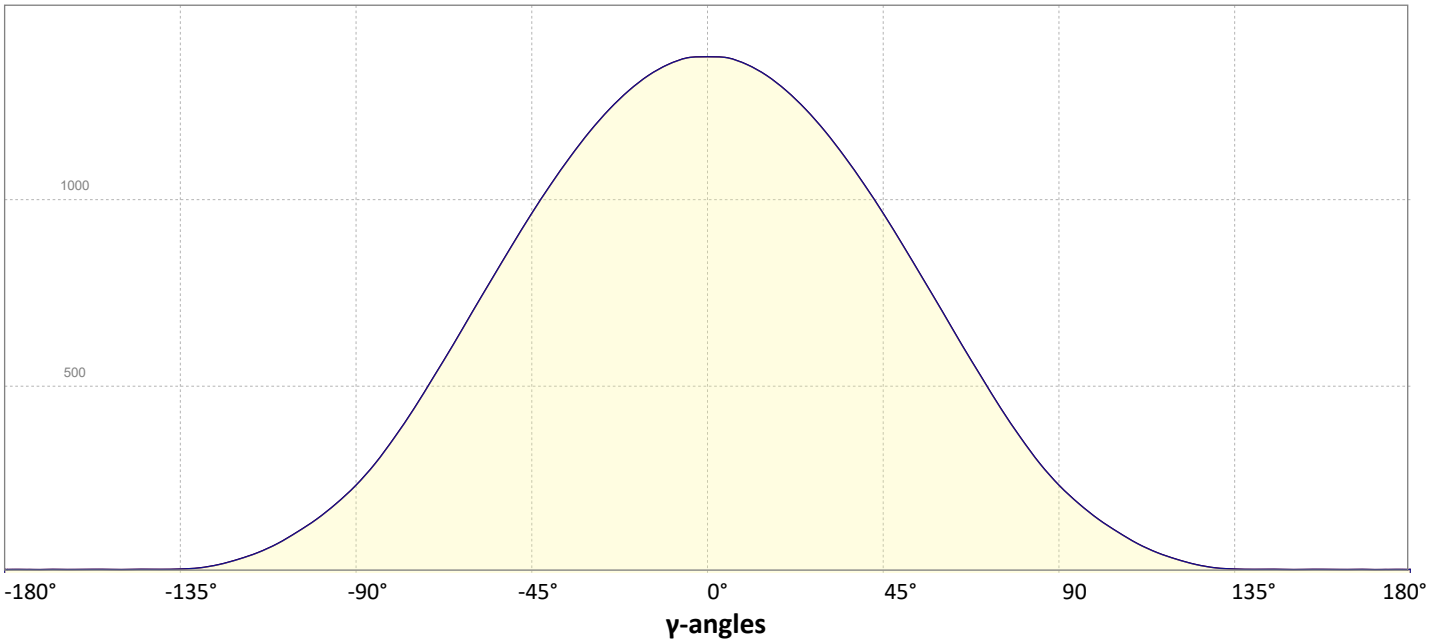
Average 10%	201,7°

Intensity Ratio

In 120° cone	63,9%
In 90° cone	42,5%

C000-C180
C090-C270

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



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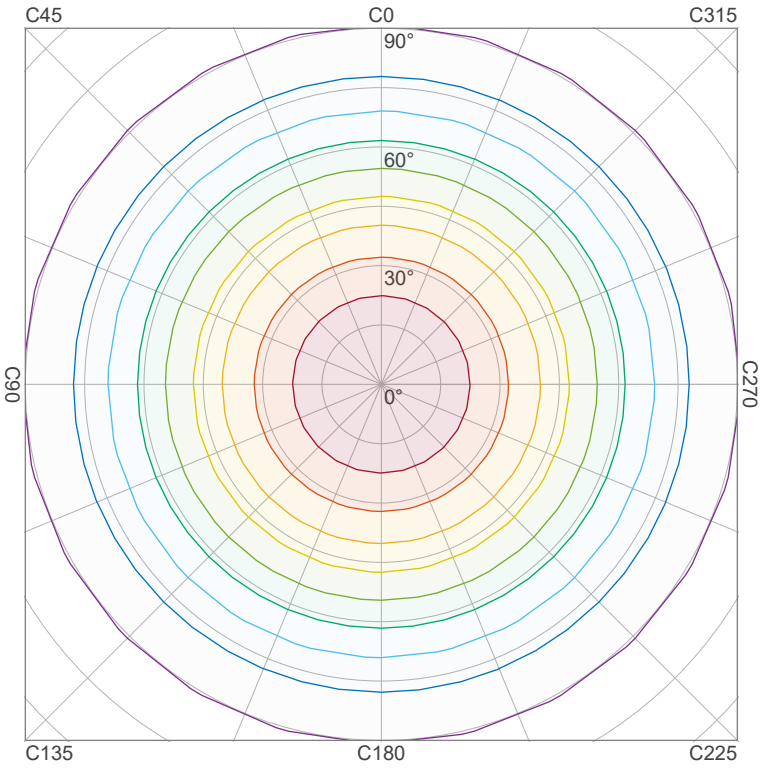
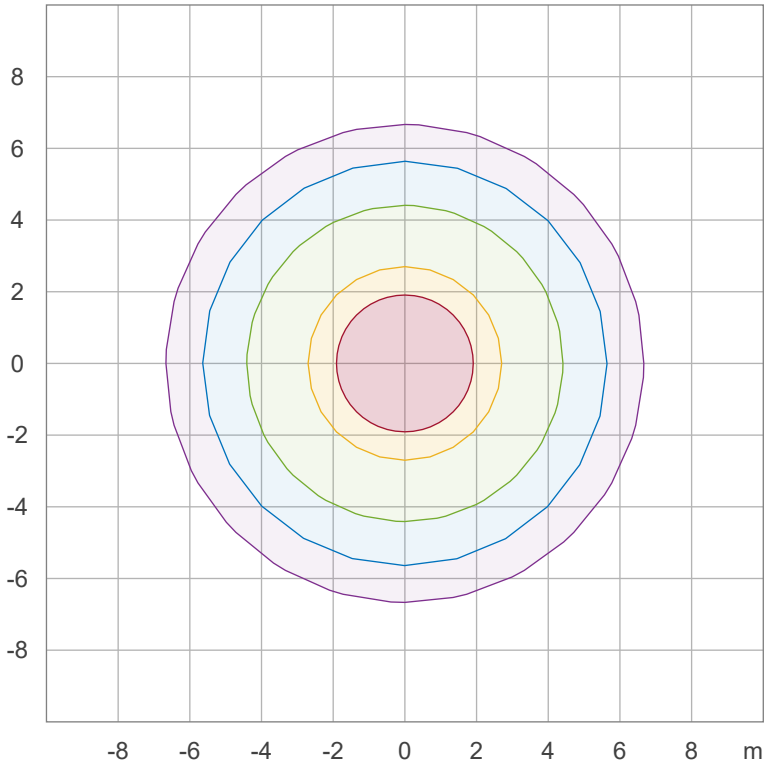
Iso-intensity Diagram (Iso-candela)



	90 %	1244,5 cd
	80 %	1106,2 cd
	70 %	967,9 cd
	60 %	829,7 cd
	50 %	691,4 cd
	40 %	553,1 cd
	30 %	414,8 cd
	20 %	276,6 cd
	10 %	138,3 cd

Peak intensity: 1382,8 cd
Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



	50,0 %	76,8 lx
	30,0 %	46,1 lx
	10,0 %	15,4 lx
	5,0 %	7,7 lx
	3,0 %	4,6 lx

Peak illuminance: 153,6 lx
Mounting height: 3,0 m
Number of c-planes: 12

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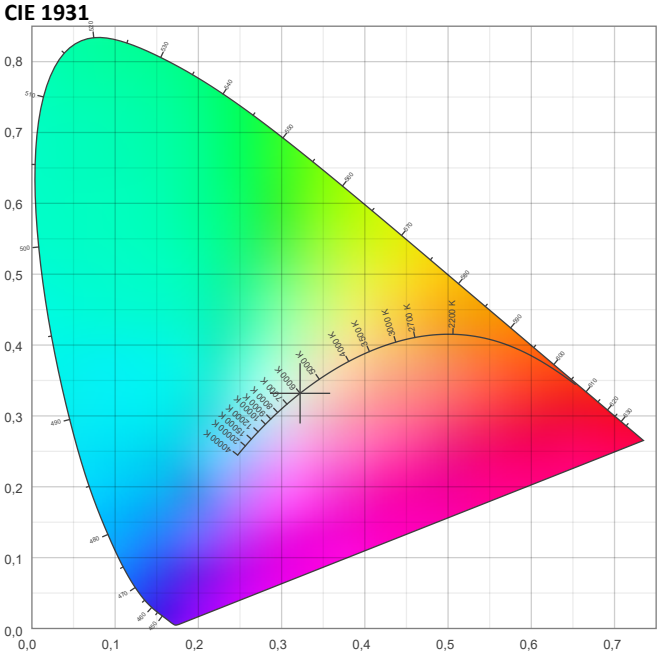
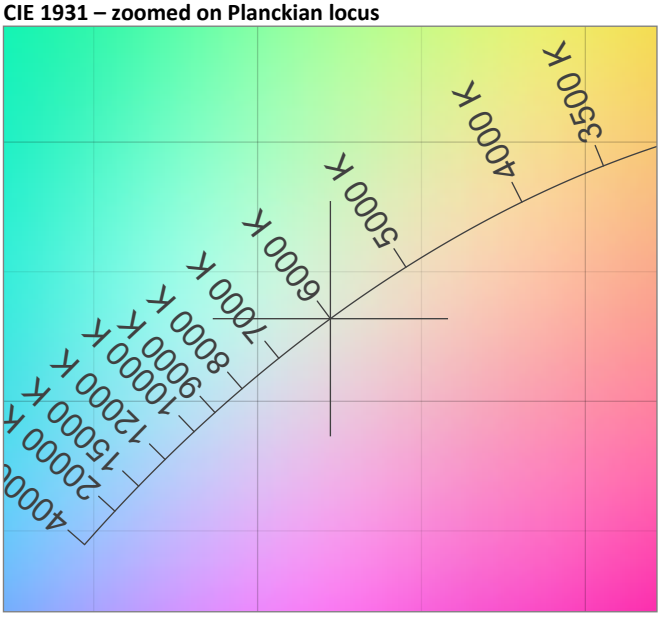
Color details

Correlated Color Temperature, Target	CCT = 6000 K
Correlated Color Temperature, Measured	CCT = 6004 K
Color Rendering Index	CRI 83,2
Color Rendering Index, R9 (red component)	R9 = 9,1
Color Rendering TM30-18	R_f 82,7 – R_g 93,6
Color Quality Scale	CQS = 80,0
MacAdam Steps	SDCM = 4,1
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 = 0,0031
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,203;0,471)

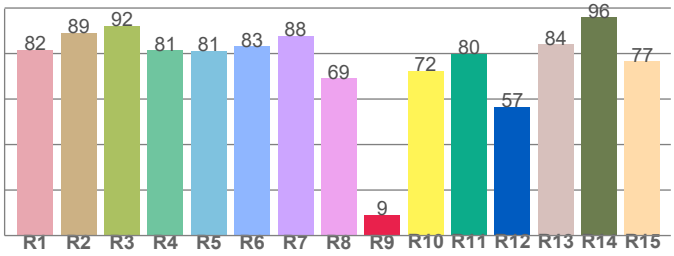
CIE 1931



CIE 1931 – zoomed on Planckian locus



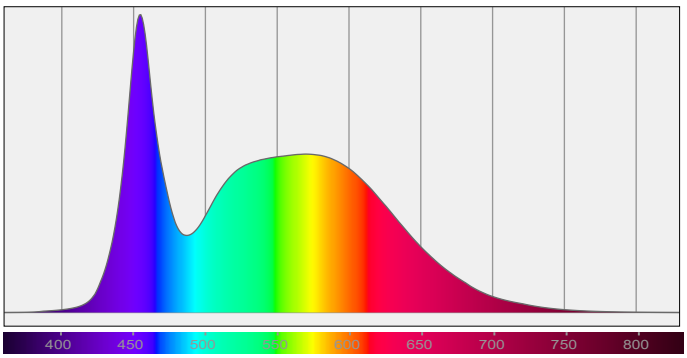
Color Rendering Index per reference color (CIE 1995)



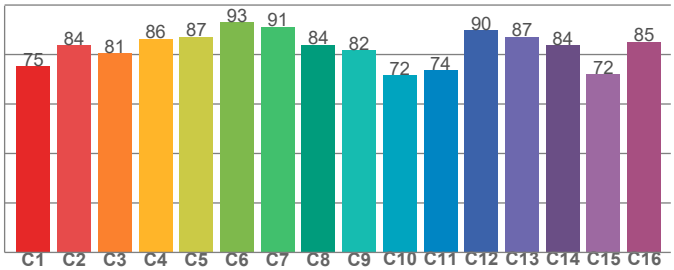
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
81,6	89,1	92,2	81,4	81,2	83,1	87,8	69,1	9,1	72,4	79,9	56,7	84,2	96,0	76,5

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



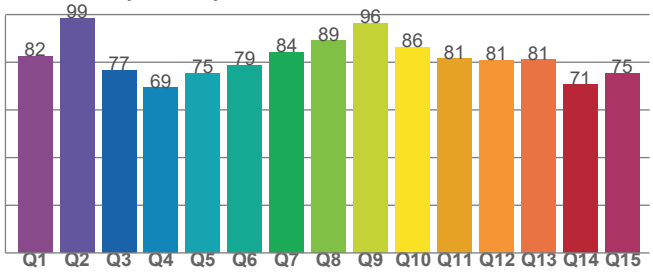
TM30-18 Rf-values per hue bin



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
75,3	83,7	80,5	86,4	87,2	92,9	91,3	84,0	81,6	71,7	73,7	89,8	87,2	83,9	72,0	85,1

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
82,5	98,5	76,7	69,3	75,3	78,7	84,3	89,0	96,3	86,4	81,5	80,8	81,0	70,5	75,4

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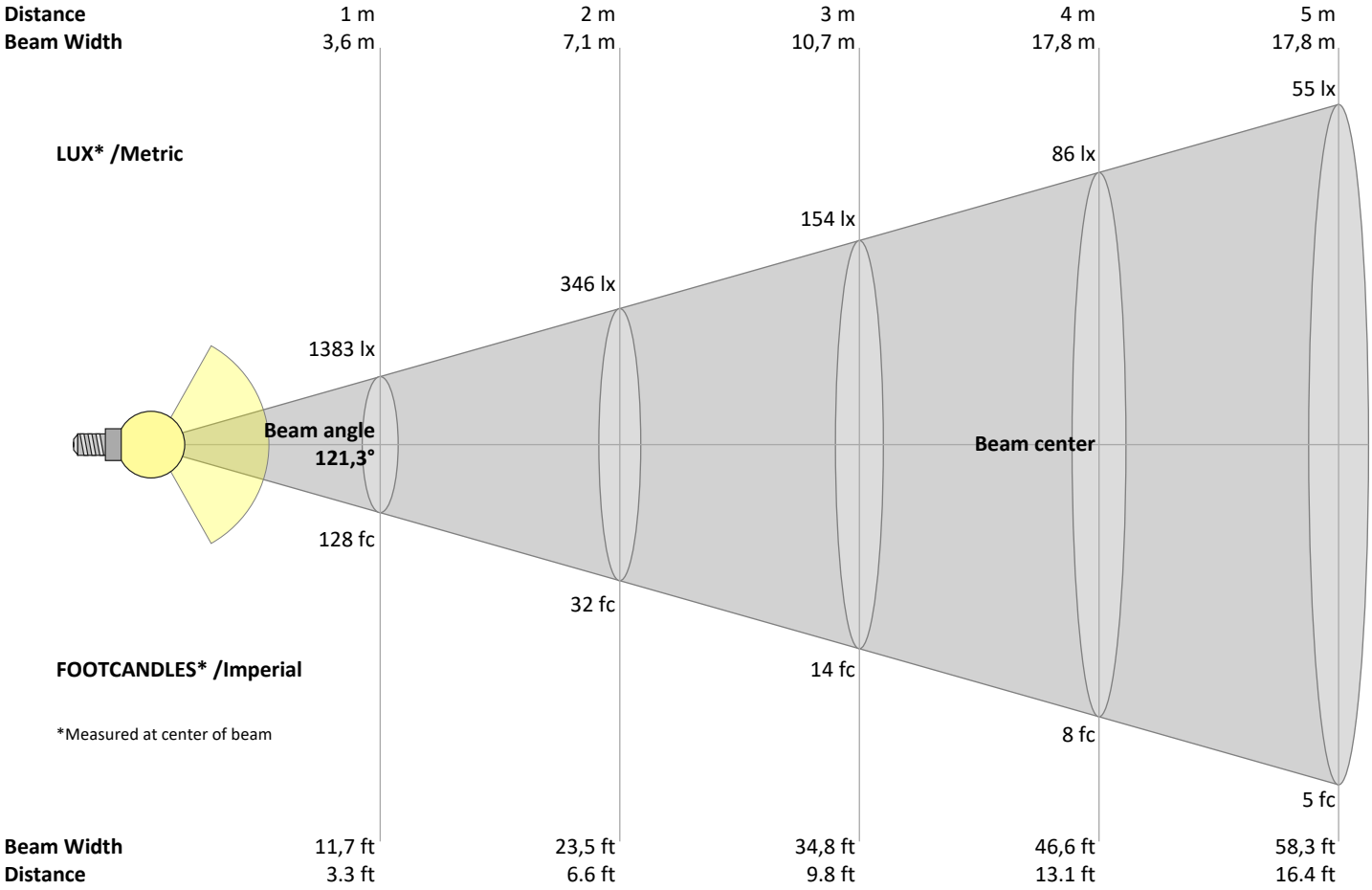
Beam Details



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
1383	346	154	86	55	38	28	22	17	14	11	10	8	7	6	5	5	4	4	3	lux
128,5	32,1	14,3	8	5,1	3,6	2,6	2	1,6	1,3	1,1	0,9	0,8	0,7	0,6	0,5	0,4	0,4	0,4	0,3	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
1383	1366	1310	1220	1102	963	808	649	493	351	235	153	91	47	20	10	9	9	9	9	cd
100%	99%	95%	88%	80%	70%	58%	47%	36%	25%	17%	11%	7%	3%	1%	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
1383	1366	1310	1220	1102	963	808	649	493	351	235	153	91	47	20	10	9	9	9	9	cd
100%	99%	95%	88%	80%	70%	58%	47%	36%	25%	17%	11%	7%	3%	1%	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
1383	1366	1310	1220	1102	963	808	649	493	351	235	153	91	47	20	10	9	9	9	9	cd
100%	99%	95%	88%	80%	70%	58%	47%	36%	25%	17%	11%	7%	3%	1%	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
1383	1366	1310	1220	1102	963	808	649	493	351	235	153	91	47	20	10	9	9	9	9	cd
100%	99%	95%	88%	80%	70%	58%	47%	36%	25%	17%	11%	7%	3%	1%	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		**Viewed Crosswise** (Viewing direction orthogonal to lamp length axis)					**Viewed Endwise** (Viewing direction parallel to lamp length axis)				
X	**Y**										
2H	2H	21,2	22,4	21,6	22,9	23,3	21,6	22,8	22,0	23,3	23,7
	3H	23,0	24,3	23,5	24,7	25,1	23,6	24,8	24,1	25,3	25,6
	4H	23,9	25,1	24,5	25,6	26,0	24,6	25,8	25,2	26,3	26,7
	6H	24,9	25,9	25,3	26,4	26,9	25,8	26,8	26,2	27,3	27,8
	8H	25,3	26,3	25,8	26,8	27,3	26,4	27,4	26,8	27,8	28,4
	12H	25,7	26,7	26,2	27,2	27,8	27,0	28,0	27,5	28,5	29,1
4H	2H	21,9	23,1	22,5	23,6	24,0	22,2	23,4	22,8	23,9	24,3
	3H	24,1	25,1	24,6	25,6	26,1	24,5	25,6	25,0	26,0	26,6
	4H	25,1	26,1	25,6	26,5	27,2	25,7	26,7	26,2	27,1	27,8
	6H	26,1	27,0	26,7	27,5	28,0	26,9	27,8	27,5	28,3	28,8
	8H	26,6	27,4	27,2	27,9	28,5	27,6	28,4	28,2	28,9	29,5
	12H	27,1	27,8	27,7	28,4	29,0	28,3	29,0	28,9	29,6	30,2
8H	4H	25,5	26,3	26,1	26,9	27,4	26,1	26,9	26,7	27,4	27,9
	6H	26,8	27,5	27,4	28,1	28,7	27,5	28,2	28,2	28,8	29,5
	8H	27,5	28,1	28,1	28,7	29,5	28,4	28,9	29,0	29,6	30,4
	12H	28,2	28,6	28,8	29,3	30,0	29,3	29,8	30,0	30,4	31,1
12H	4H	25,6	26,3	26,2	26,9	27,5	26,1	26,8	26,7	27,4	28,0
	6H	27,0	27,6	27,6	28,2	29,0	27,7	28,3	28,3	28,9	29,7
	8H	27,8	28,2	28,4	28,9	29,6	28,6	29,1	29,3	29,7	30,4

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 / -0,1
S = 2.0H	0,2 / -0,2	0,2 / -0,2

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	106	106	106	100	100	100	94	94	94	92
1	104	99	94	89	101	96	91	87	90	86	82	84	81	78	79	77	75	72
2	94	85	77	71	91	82	75	69	77	71	66	73	68	63	68	64	61	58
3	85	74	65	58	82	72	63	57	67	60	55	63	58	53	60	55	51	48
4	78	65	56	48	75	63	54	48	59	52	46	56	50	45	53	48	43	40
5	71	58	48	41	69	56	47	41	53	45	40	50	44	38	48	42	37	35
6	66	52	43	36	63	51	42	35	48	40	34	45	39	33	43	37	32	30
7	61	47	38	32	59	46	37	31	43	36	30	41	35	29	39	33	29	27
8	57	43	34	28	55	42	33	28	40	32	27	38	31	26	36	30	26	24
9	53	39	31	25	51	38	30	25	36	29	24	35	28	24	33	27	23	21
10	50	36	28	23	48	35	28	22	34	27	22	32	26	21	31	25	21	19

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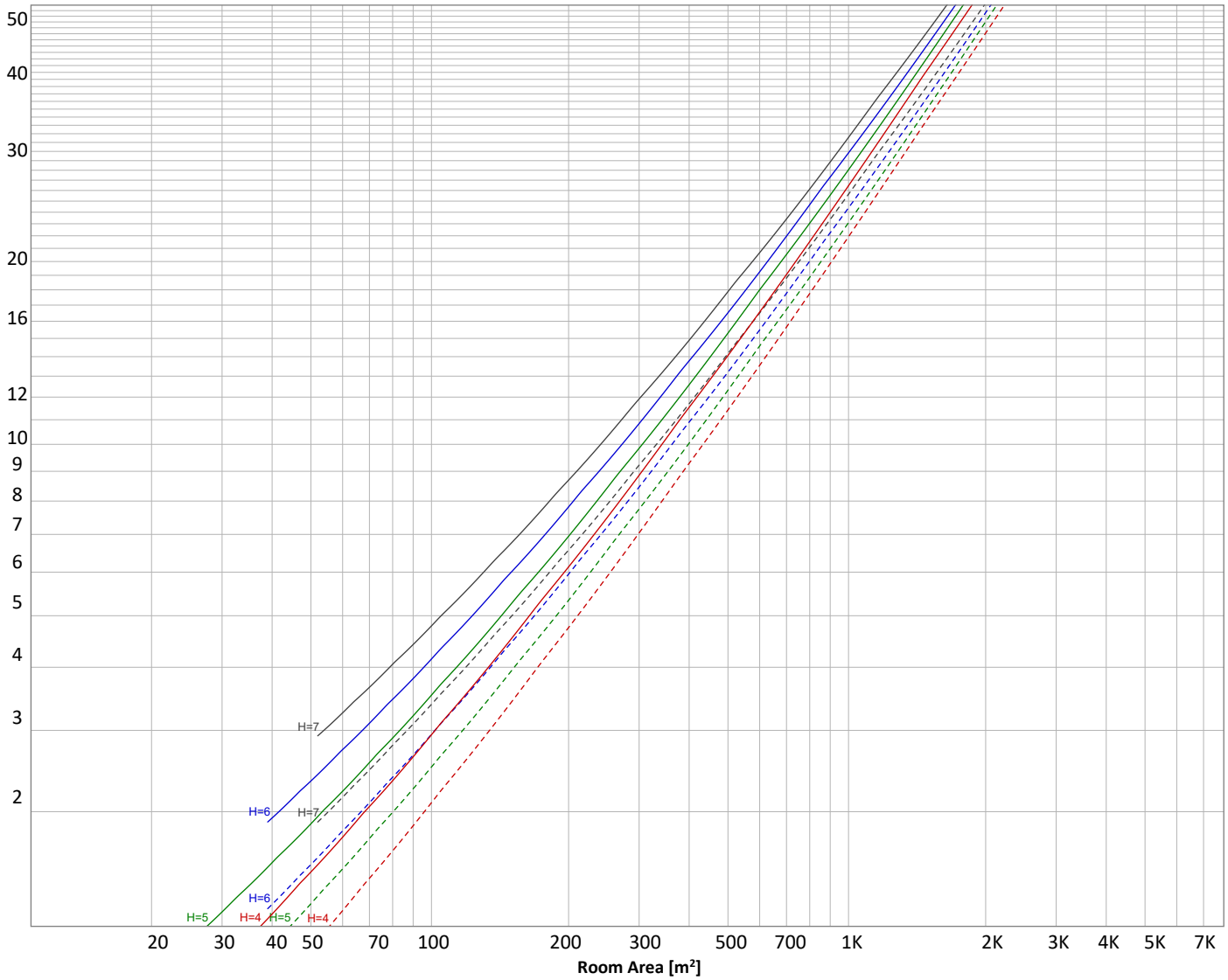
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 5051 lm		ρ(%)		
H_{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	Wall reflectance	Floor reflectance
H_{work} = Work area height from floor =	0.00 m	----------	70	50	30
E_{work} = Average lux on work area =	100 lx	————	50	30	20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
131 lm	376 lm	573 lm	698 lm	743 lm	708 lm	608 lm	469 lm	324 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
205 lm	117 lm	56,1 lm	21,4 lm	8,23 lm	5,74 lm	4,17 lm	2,53 lm	0,838 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	131 lm	2,6%
10-20°	376 lm	7,4%
20-30°	573 lm	11,3%
30-40°	698 lm	13,8%
40-50°	743 lm	14,7%
50-60°	708 lm	14,0%
60-70°	608 lm	12,0%
70-80°	469 lm	9,3%
80-90°	324 lm	6,4%
90-100°	205 lm	4,1%
100-110°	117 lm	2,3%
110-120°	56 lm	1,1%
120-130°	21 lm	0,4%
130-140°	8 lm	0,2%
140-150°	6 lm	0,1%
150-160°	4 lm	0,1%
160-170°	3 lm	0,1%
170-180°	1 lm	0,0%
Total	5051 lm	100,0%

Intensity peaks

Max intensity	1383 cd
Intensity, 90°	235 cd
Intensity, 0°	1383 cd

Zonal Lumen summary

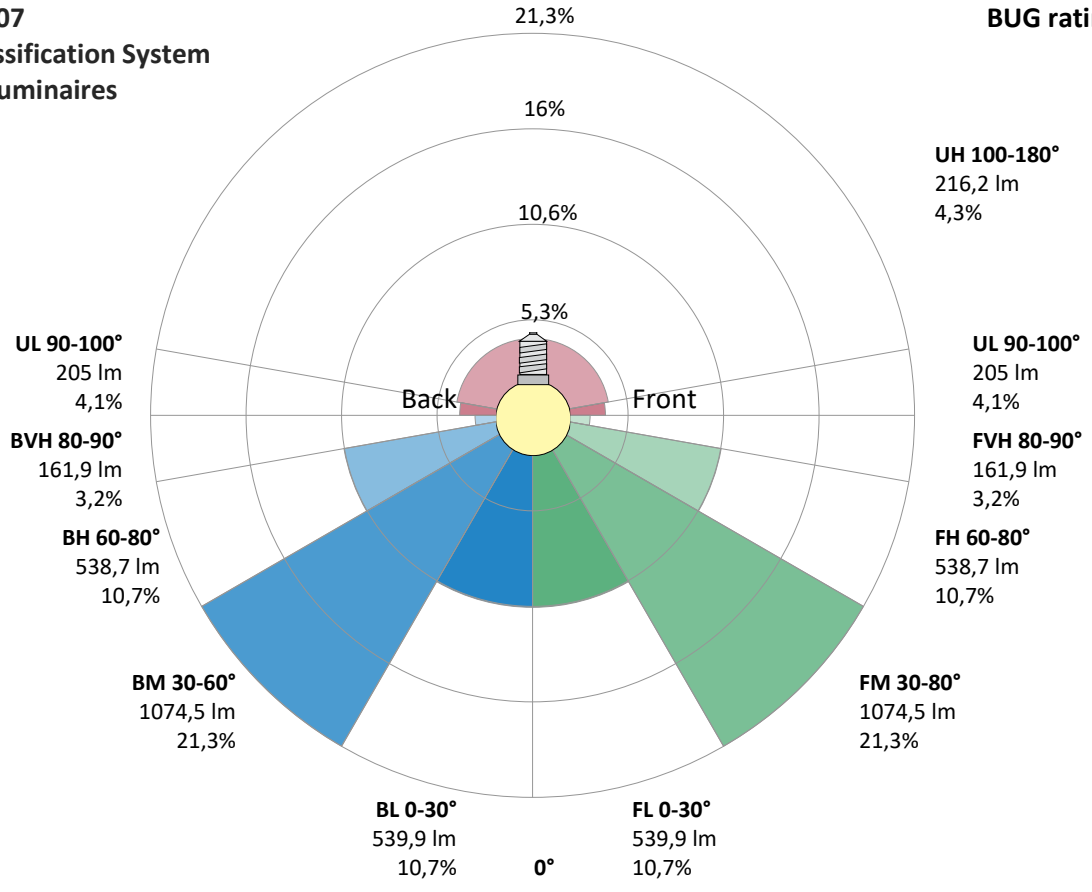
Zone (γ)	Lumen	% Total
0-30°	1080 lm	21,4%
0-40°	1778 lm	35,2%
0-60°	3229 lm	63,9%
60-90°	1401 lm	27,7%
70-100°	998 lm	19,8%
90-120°	378 lm	7,5%
0-90°	4630 lm	91,7%
90-180°	421 lm	8,3%
0-180°	5051 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	540 lm	10,7%
Medium(30-60°)	1075 lm	21,3%
High(60-80°)	539 lm	10,7%
Very high(80-90°)	162 lm	3,2%
Back light		
Low(0-30°)	540 lm	10,7%
Medium(30-60°)	1075 lm	21,3%
High(60-80°)	539 lm	10,7%
Very high(80-90°)	162 lm	3,2%
Uplight		
Low(90-100°)	205 lm	4,1%
High(100-180°)	216 lm	4,3%

IESNA TM-15-07
Luminaire Classification System
For Outdoor Luminaires

BUG rating B2 U3 G2



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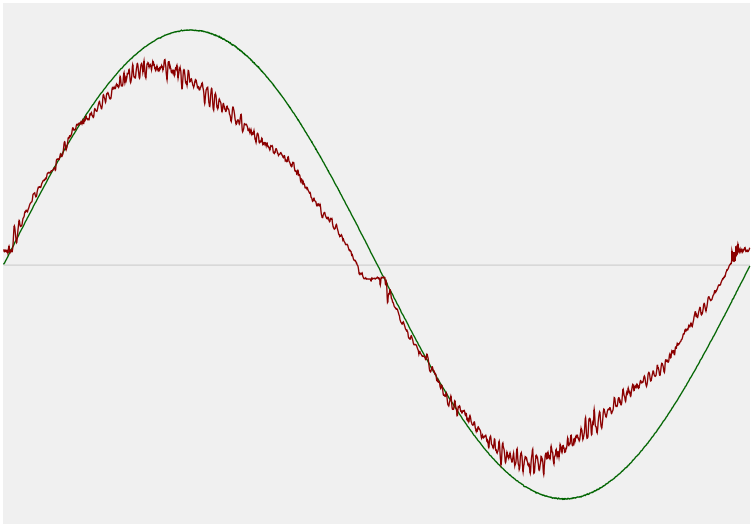
Power Details

Input Power

Power feed to light source	46,4 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,204 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	47,01 VA
Displacement factor of AC power feed	0,99
Power factor of AC current feed	0,99
Total harmonic distortion of the current	7,04%
Total harmonic distortion of the voltage	0,13%

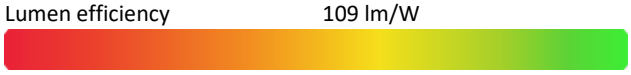
Input Power Curve



Efficiency

Radiated power efficiency 34,8%

Lumen efficiency 109 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	5944 K
CCT shift	+56 K
CCT end	6000 K

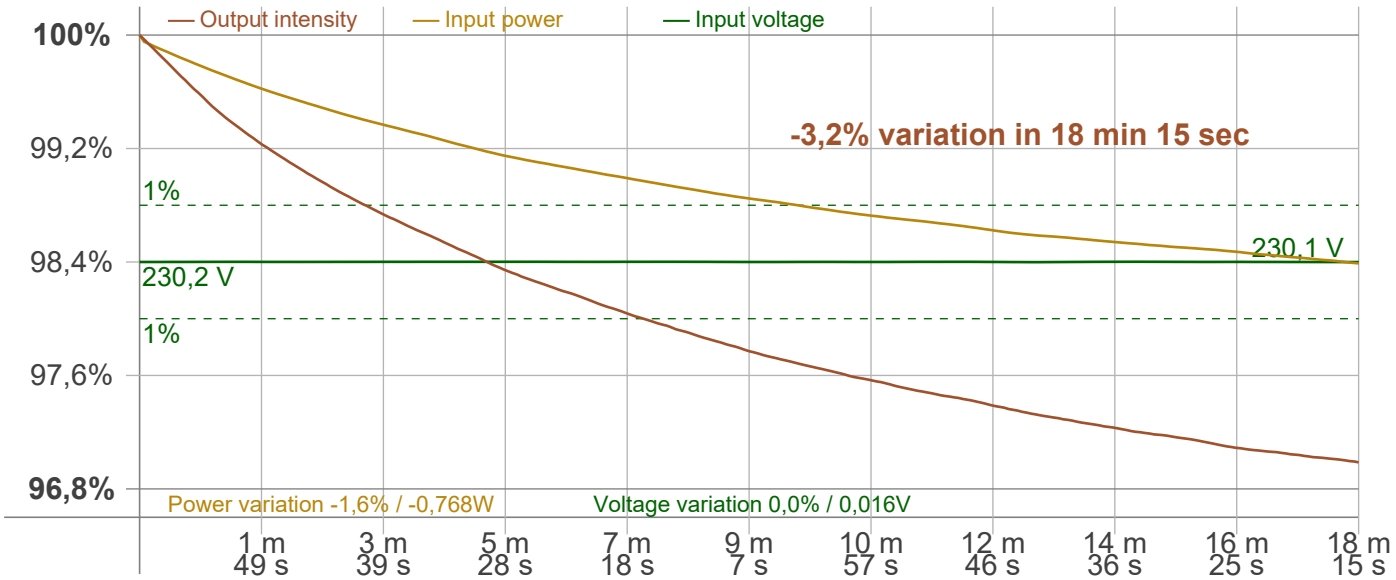
Warmup Result

Total warmup time	Lamp stabilized in 18 min 15 sec
Warmup variation	-3,2%

Output Change

Output start	5215 lm
Output change	-164 lm
Output end	5051 lm

Stabilization Curve



Light Measurement Report

Print date: 15-9-2025
Measurement date and time: 15-9-2025 10:50:06 – Measurement no. VFR-250915-3180-MS
Measurement tracking No. and Link: VT250915-007746
Operator:

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	102,04 Hz
Percent Flicker	0,65 %
Flicker index	0

Flicker indices according to California Energy Commission (CEC) 2016b

JA8/10 40 Hz	0,01 %
JA8/10 90 Hz	0,05 %
JA8/10 200 Hz	0,64 %
JA8/10 400 Hz	0,64 %
JA8/10 1000 Hz	0,65 %

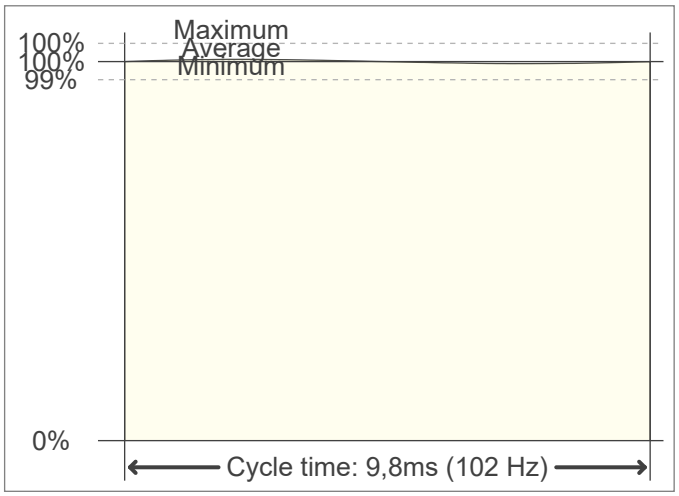
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz)	0,01
SVM value (80 < F < 2000 Hz)	0,02

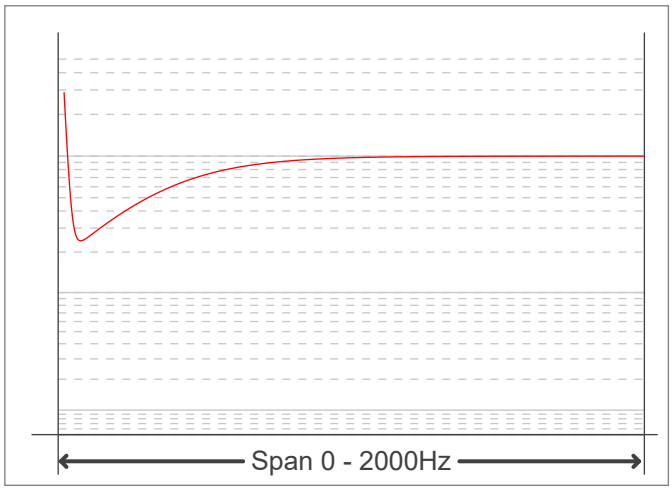
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp	0

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot