Light Measurement Report

Print date: 15-9-2025
Measurement date and time: 15-9-2025 16:13:11 – Measurement no. VFR-250915-3210-MS
Measurement tracking No. and Link: VT250915-003462
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

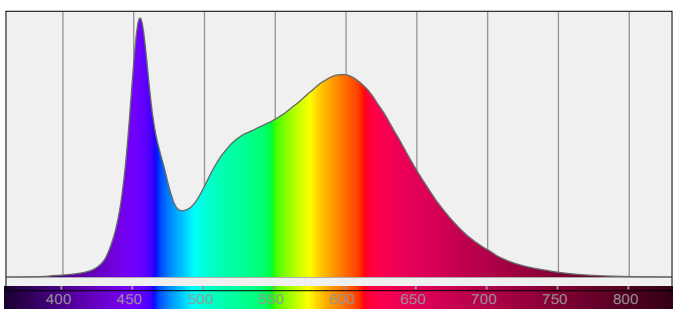
Number of C-planes and Resolution	12 planes – 30°
γ (gamma)-Resolution	5°
Test Distance	9,59 m
Input Power, Power and Displ. Factors	31,3 W – PF 0,98 – DPF 0,98
Input RMS Voltage and Current	230 V – 0,139 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 0 sec – 2,0%

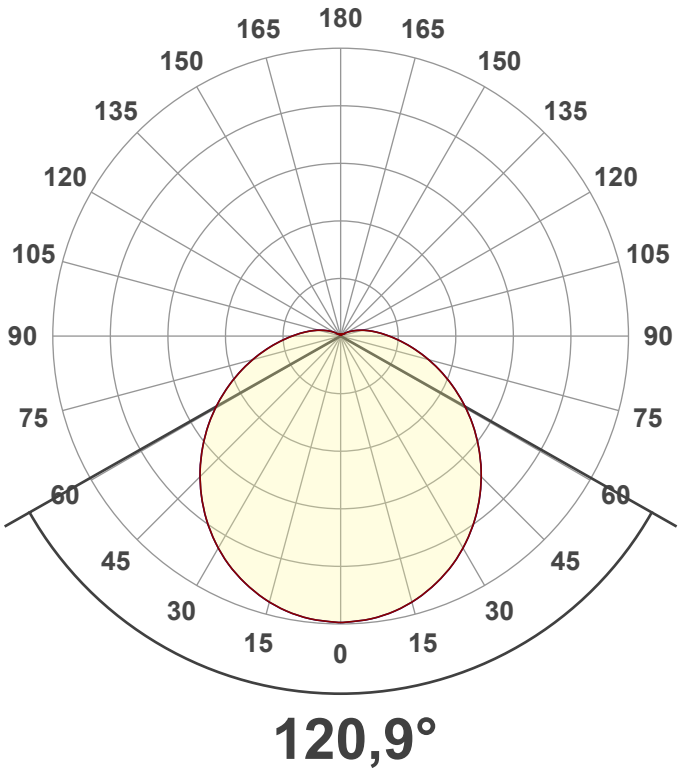
Tested Light Source

Product Name	813659-4000K-30W
Item No. and Manufacturer	813659-4000K-30W – Dutchfulfillment
Product Description (line 1)	LED BATTEN | CLIFF | 25-45W | 120CM | PHILIPS DRIVER | CCT-SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	4210 lm – 8,3% / 91,7%
Efficiency	134 lm/W
Peak Intensity and Beam Angle	1156 cd – 120,9°
Correlated Color Temperature, Target/Measured	CCT = 4000 K / 4080 K
Color Rendering Index	CRI 85,6
Color Rendering TM30-18	R_f 84,1 – R_g 95,0
Color Shift, CIE duv and MacAdam Steps	Duv -0,0025 – SDCM 2,8
Flicker	SVM 0,01 – PstLM 0,01





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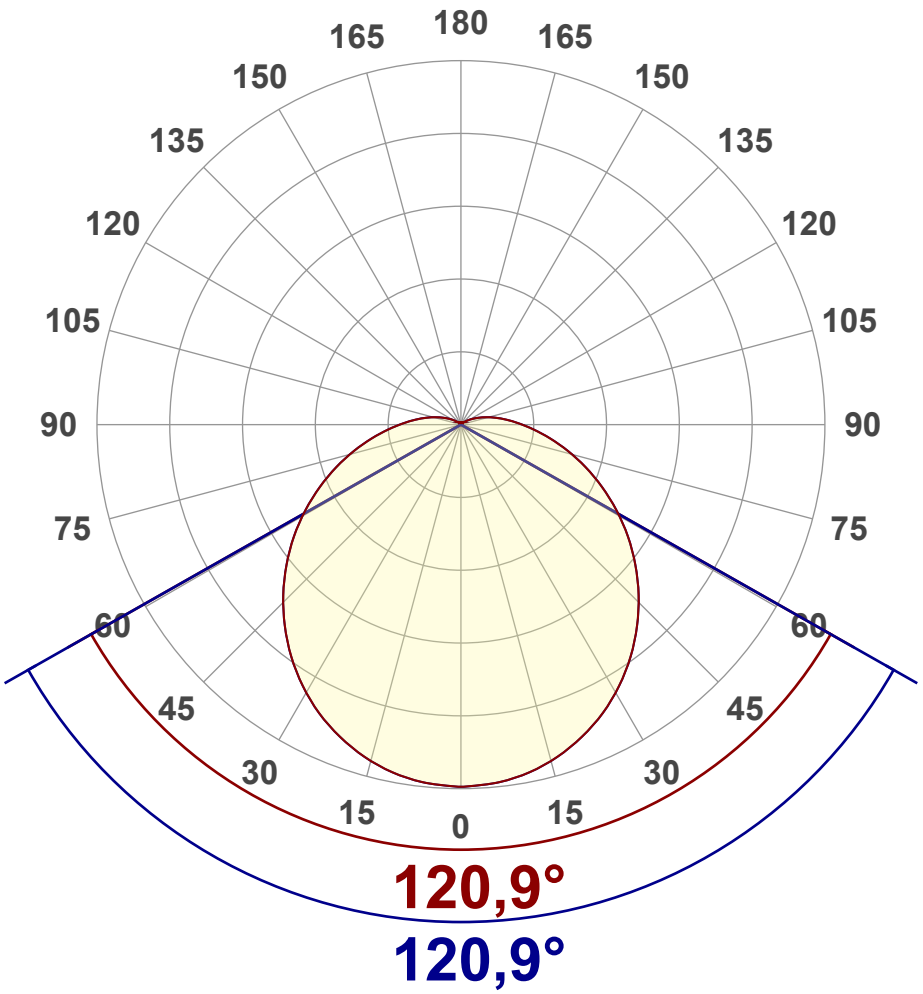
Luminous Intensity diagram Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	4210 lm
Lumen Up% / Down%	8,3% / 91,7%
Peak Intensity	1156 cd
Beam Angle (50%)	120,9°
Beam Angle (90%)	120,9°
Beam Angle (10%)	120,9°

Cut-off Angle

Average 2,5%	241,4°

Field Angle

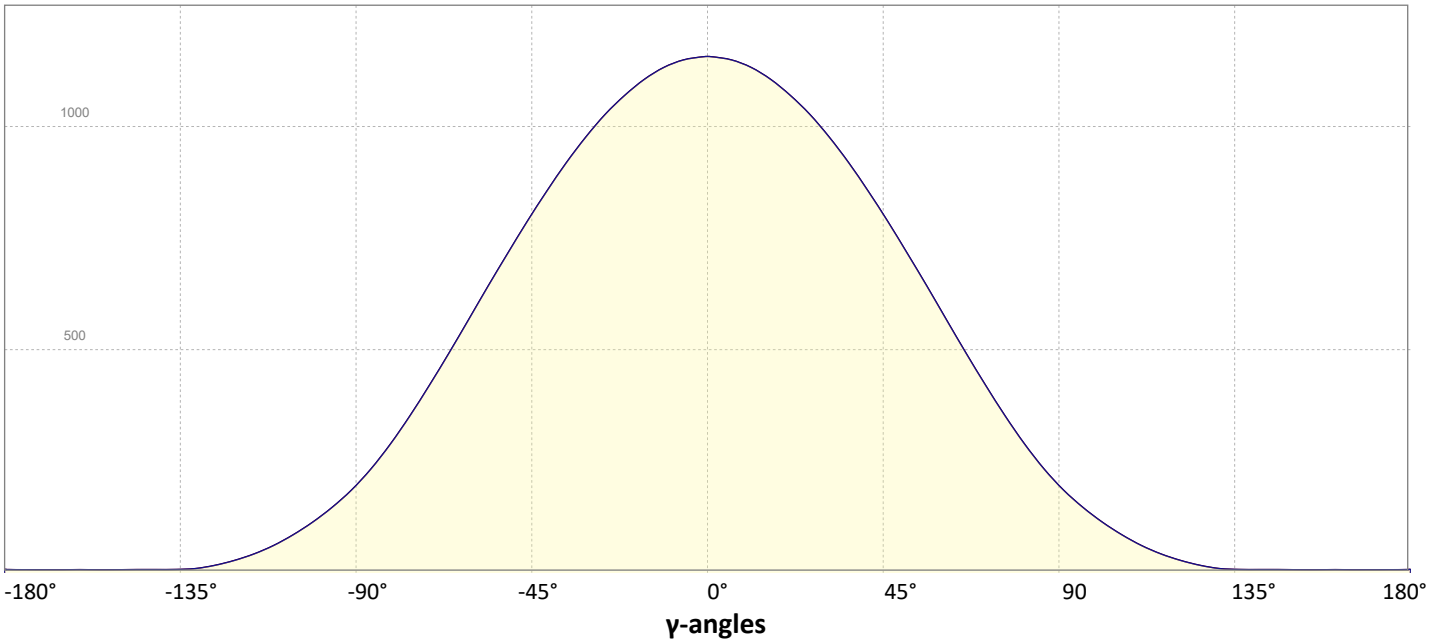
Average 10%	201,6°

Intensity Ratio

In 120° cone	64,0%
In 90° cone	42,6%

C000-C180
C090-C270

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



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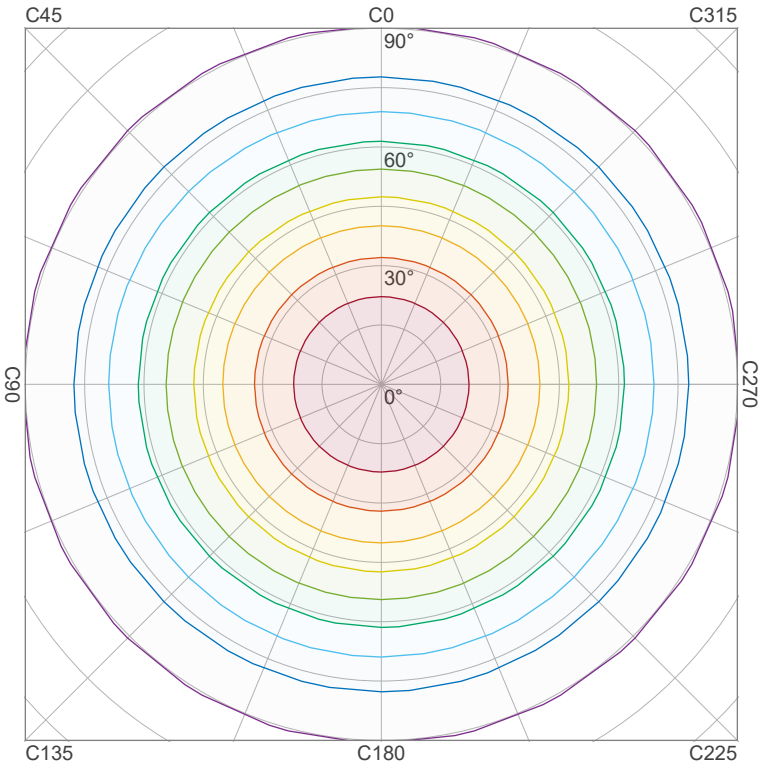
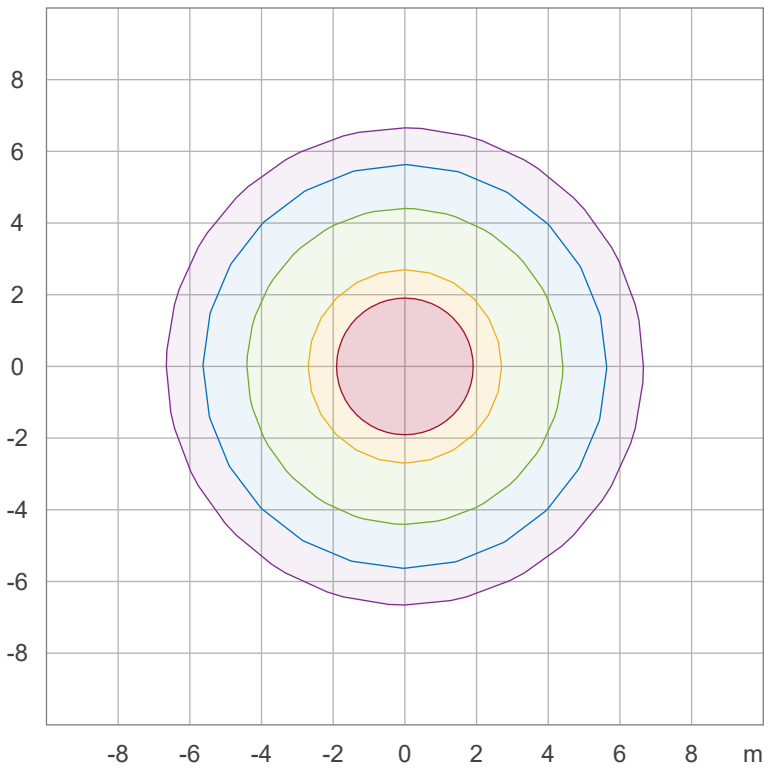
Iso-intensity Diagram (Iso-candela)



	90 %	1040,5 cd
	80 %	924,9 cd
	70 %	809,3 cd
	60 %	693,7 cd
	50 %	578,1 cd
	40 %	462,5 cd
	30 %	346,8 cd
	20 %	231,2 cd
	10 %	115,6 cd

Peak intensity: 1156,2 cd
Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



	50,0 %	64,2 lx
	30,0 %	38,5 lx
	10,0 %	12,8 lx
	5,0 %	6,4 lx
	3,0 %	3,9 lx

Peak illuminance: 128,5 lx
Mounting height: 3,0 m
Number of c-planes: 12

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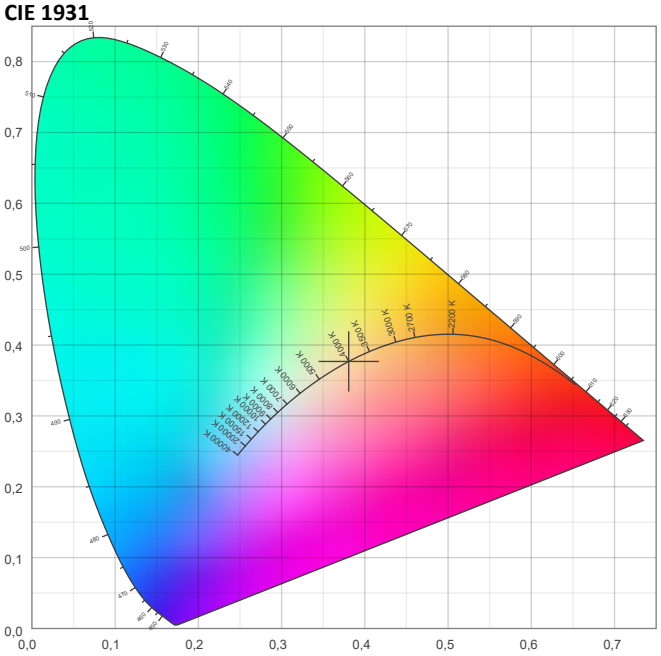
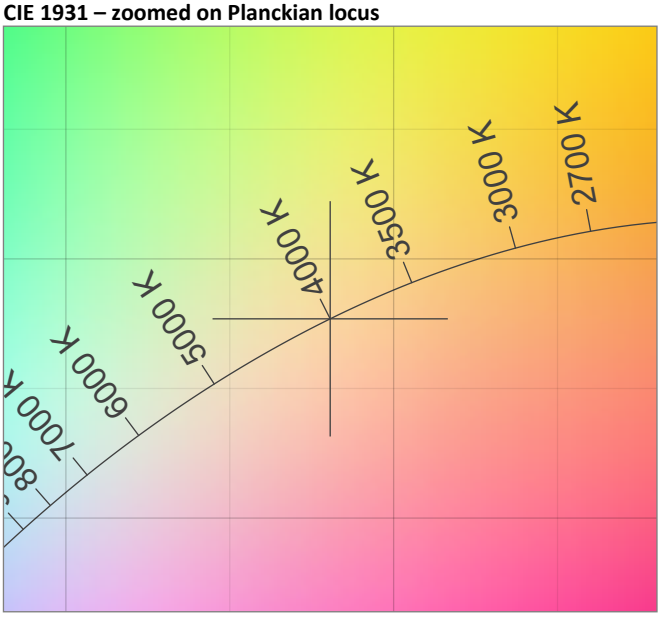
Color details

Correlated Color Temperature, Target	CCT = 4000 K
Correlated Color Temperature, Measured	CCT = 4080 K
Color Rendering Index	CRI 85,6
Color Rendering Index, R9 (red component)	R9 = 20,7
Color Rendering TM30-18	R_f 84,1 – R_g 95,0
Color Quality Scale	CQS = 83,0
MacAdam Steps	SDCM = 2,8
Color coordinates CIE 1931	(x;y) = (0,381;0,377)
Color coordinate CIEs 1960	(u;v) = (0,225;0,334)
Color deviation from BBL	Duv = -0,0025
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,225;0,502)

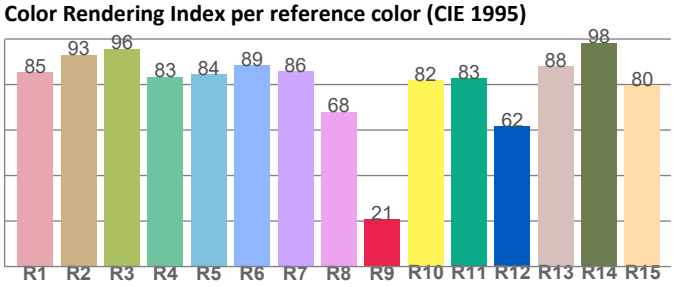
CIE 1931



CIE 1931 – zoomed on Planckian locus



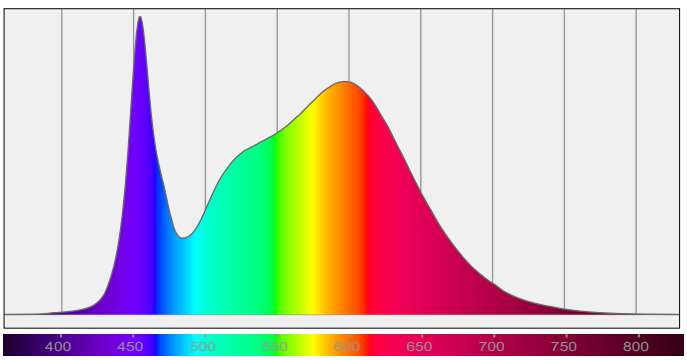
Color Rendering Index per reference color (CIE 1995)



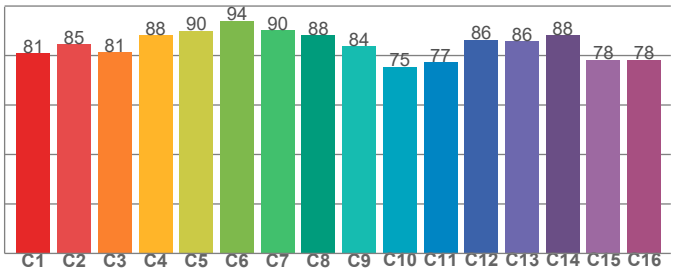
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
85,3	93,1	95,8	83,4	84,5	88,5	85,9	68,1	20,7	81,9	82,7	61,6	87,9	98,3	79,7

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



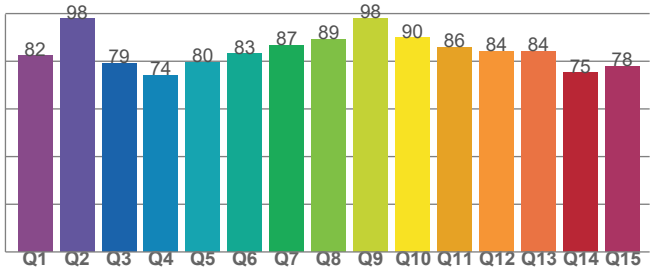
TM30-18 Rf-values per hue bin



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
80,8	84,6	81,2	88,2	90,0	94,1	90,3	88,3	83,8	75,5	77,4	86,4	85,7	88,3	78,3	78,2

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
82,3	97,8	79,1	74,1	79,7	83,1	86,7	89,2	98,0	89,9	85,9	84,3	84,1	75,2	78,0

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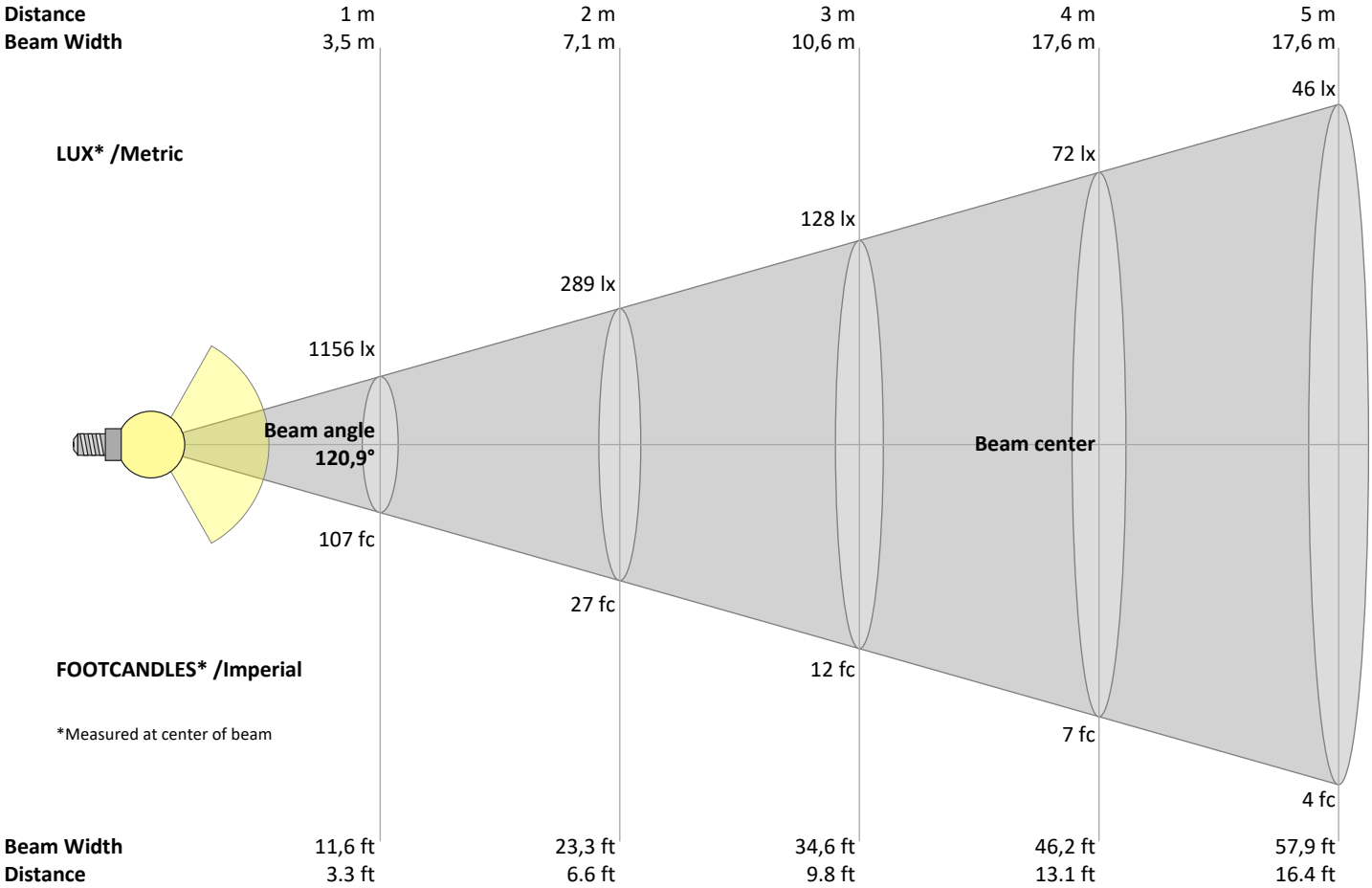
Beam Details



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
1156	289	128	72	46	32	24	18	14	12	10	8	7	6	5	5	4	4	3	3	lux
107,4	26,9	11,9	6,7	4,3	3	2,2	1,7	1,3	1,1	0,9	0,7	0,6	0,5	0,5	0,4	0,4	0,3	0,3	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
1156	1140	1093	1019	921	803	674	540	409	291	196	127	76	40	17	8	7	7	7	7	cd
100%	99%	95%	88%	80%	69%	58%	47%	35%	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
1156	1140	1093	1019	921	803	674	540	409	291	196	127	76	40	17	8	7	7	7	7	cd
100%	99%	95%	88%	80%	69%	58%	47%	35%	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
1156	1140	1093	1019	921	803	674	540	409	291	196	127	76	40	17	8	7	7	7	7	cd
100%	99%	95%	88%	80%	69%	58%	47%	35%	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
1156	1140	1093	1019	921	803	674	540	409	291	196	127	76	40	17	8	7	7	7	7	cd
100%	99%	95%	88%	80%	69%	58%	47%	35%	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	20,6	21,8	21,0	22,3	22,7	21,0	22,2	21,3	22,6	23,0
	3H	22,4	23,6	22,9	24,1	24,4	22,9	24,2	23,5	24,6	25,0
	4H	23,3	24,5	23,8	24,9	25,3	24,0	25,2	24,5	25,6	26,0
	6H	24,2	25,3	24,7	25,7	26,3	25,2	26,2	25,6	26,6	27,2
	8H	24,7	25,7	25,1	26,1	26,7	25,7	26,8	26,2	27,2	27,8
	12H	25,1	26,1	25,5	26,5	27,1	26,3	27,4	26,8	27,8	28,4
4H	2H	21,3	22,5	21,8	22,9	23,3	21,6	22,8	22,1	23,2	23,6
	3H	23,4	24,5	23,9	24,9	25,5	23,9	24,9	24,4	25,4	26,0
	4H	24,4	25,5	25,0	25,9	26,6	25,0	26,1	25,6	26,5	27,2
	6H	25,5	26,4	26,1	26,8	27,4	26,3	27,2	26,9	27,7	28,2
	8H	26,0	26,8	26,6	27,3	27,8	26,9	27,8	27,6	28,3	28,8
	12H	26,5	27,2	27,1	27,7	28,3	27,7	28,4	28,3	28,9	29,6
8H	4H	24,9	25,7	25,5	26,2	26,8	25,4	26,2	26,0	26,7	27,3
	6H	26,2	26,8	26,8	27,4	28,1	26,9	27,5	27,5	28,1	28,8
	8H	26,8	27,4	27,5	28,1	28,8	27,7	28,3	28,4	28,9	29,7
	12H	27,5	28,0	28,2	28,6	29,4	28,7	29,1	29,3	29,8	30,5
12H	4H	25,0	25,7	25,6	26,2	26,9	25,5	26,1	26,1	26,7	27,3
	6H	26,4	26,9	27,0	27,6	28,4	27,0	27,6	27,7	28,3	29,0
	8H	27,1	27,6	27,8	28,2	29,0	27,9	28,4	28,6	29,1	29,8

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	64	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	49	75	63	54	48	60	52	46	56	50	45	53	48	43	41
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	33	30
7	61	47	38	32	59	46	37	31	43	36	30	41	35	30	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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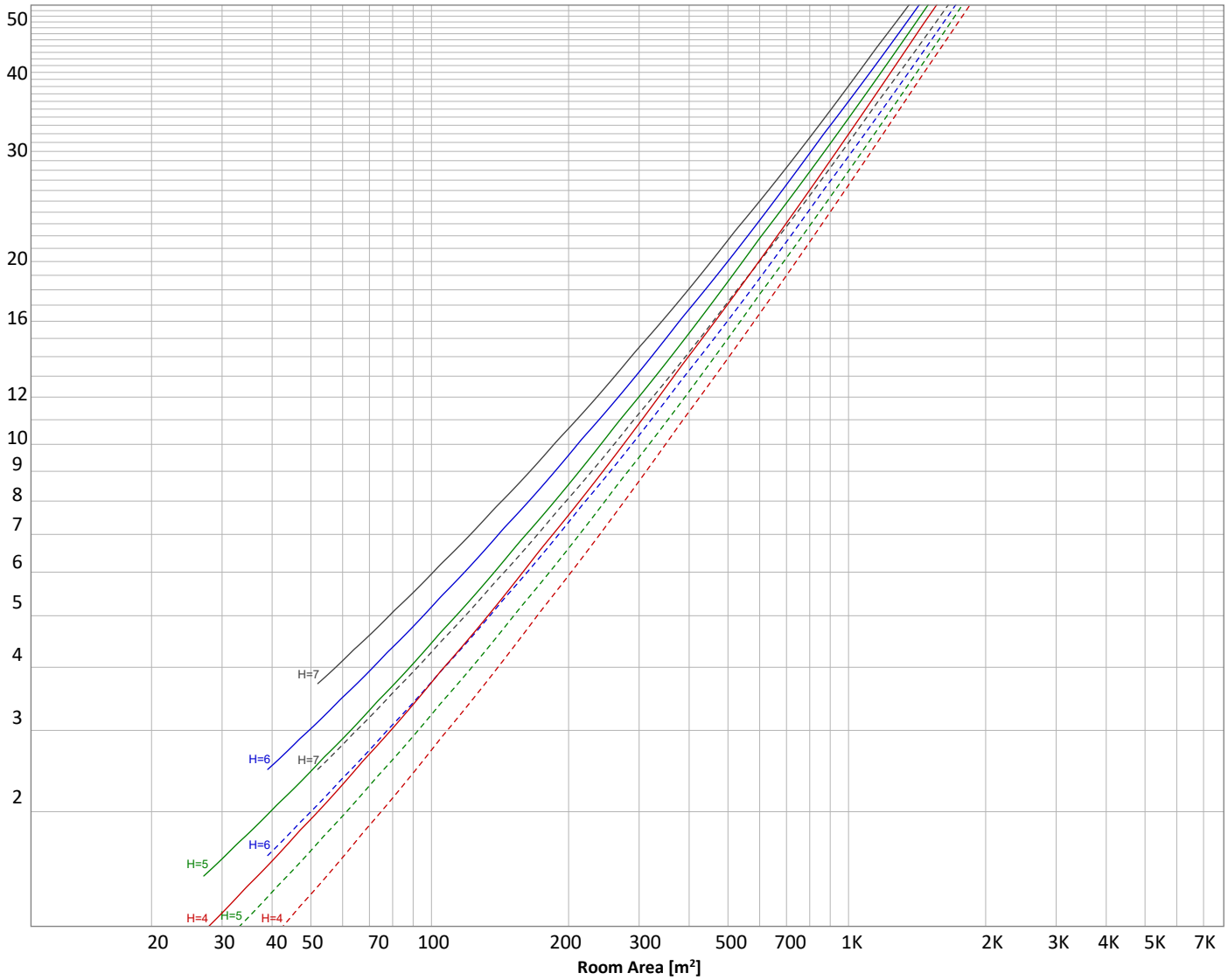
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 4210 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°
109 lm	314 lm	478 lm	583 lm	620 lm	590 lm	506 lm	390 lm	269 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
171 lm	97,6 lm	47,0 lm	17,9 lm	6,35 lm	4,53 lm	3,17 lm	1,95 lm	0,658 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	109 lm	2,6%
10-20°	314 lm	7,5%
20-30°	478 lm	11,4%
30-40°	583 lm	13,9%
40-50°	620 lm	14,7%
50-60°	590 lm	14,0%
60-70°	506 lm	12,0%
70-80°	390 lm	9,3%
80-90°	269 lm	6,4%
90-100°	171 lm	4,1%
100-110°	98 lm	2,3%
110-120°	47 lm	1,1%
120-130°	18 lm	0,4%
130-140°	6 lm	0,2%
140-150°	5 lm	0,1%
150-160°	3 lm	0,1%
160-170°	2 lm	0,0%
170-180°	1 lm	0,0%
Total	4210 lm	100,0%

Intensity peaks

Max intensity	1156 cd
Intensity, 90°	196 cd
Intensity, 0°	1156 cd

Zonal Lumen summary

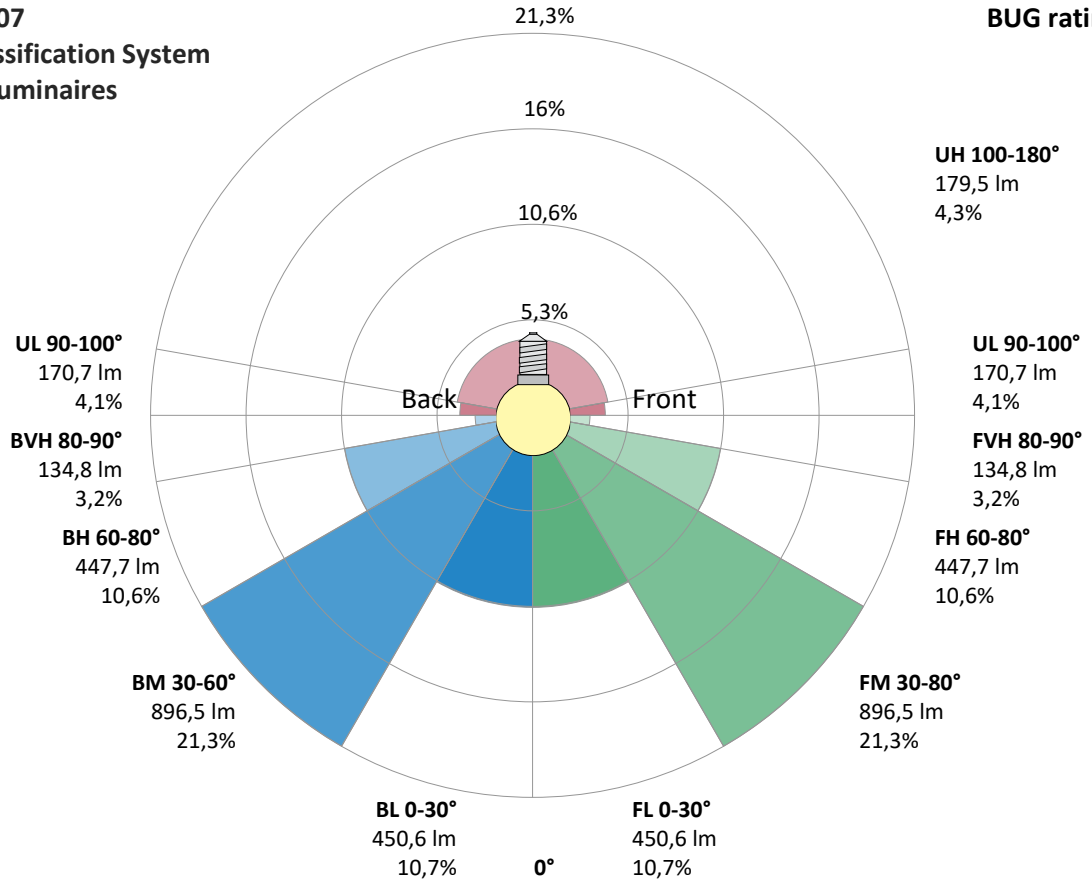
Zone (γ)	Lumen	% Total
0-30°	902 lm	21,4%
0-40°	1485 lm	35,3%
0-60°	2695 lm	64,0%
60-90°	1165 lm	27,7%
70-100°	830 lm	19,7%
90-120°	315 lm	7,5%
0-90°	3860 lm	91,7%
90-180°	350 lm	8,3%
0-180°	4210 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	451 lm	10,7%
Medium(30-60°)	897 lm	21,3%
High(60-80°)	448 lm	10,6%
Very high(80-90°)	135 lm	3,2%
Back light		
Low(0-30°)	451 lm	10,7%
Medium(30-60°)	897 lm	21,3%
High(60-80°)	448 lm	10,6%
Very high(80-90°)	135 lm	3,2%
Uplight		
Low(90-100°)	171 lm	4,1%
High(100-180°)	179 lm	4,3%

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

BUG rating B1 U3 G2



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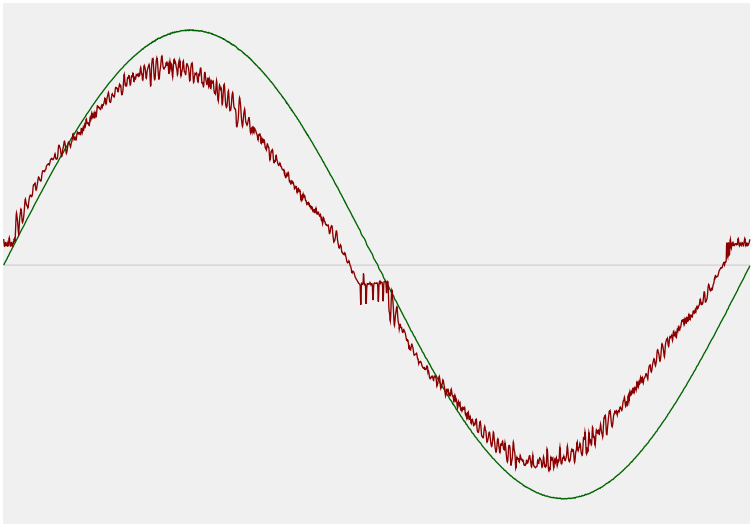
Power Details

Input Power

Power feed to light source	31,3 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,139 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	32,02 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,98
Total harmonic distortion of the current	6,31%
Total harmonic distortion of the voltage	0,07%

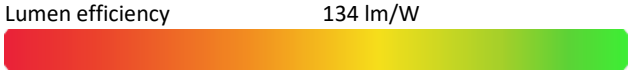
Input Power Curve



Efficiency

Radiated power efficiency 41,8%

Lumen efficiency 134 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	3999 K
CCT shift	+1 K
CCT end	4000 K

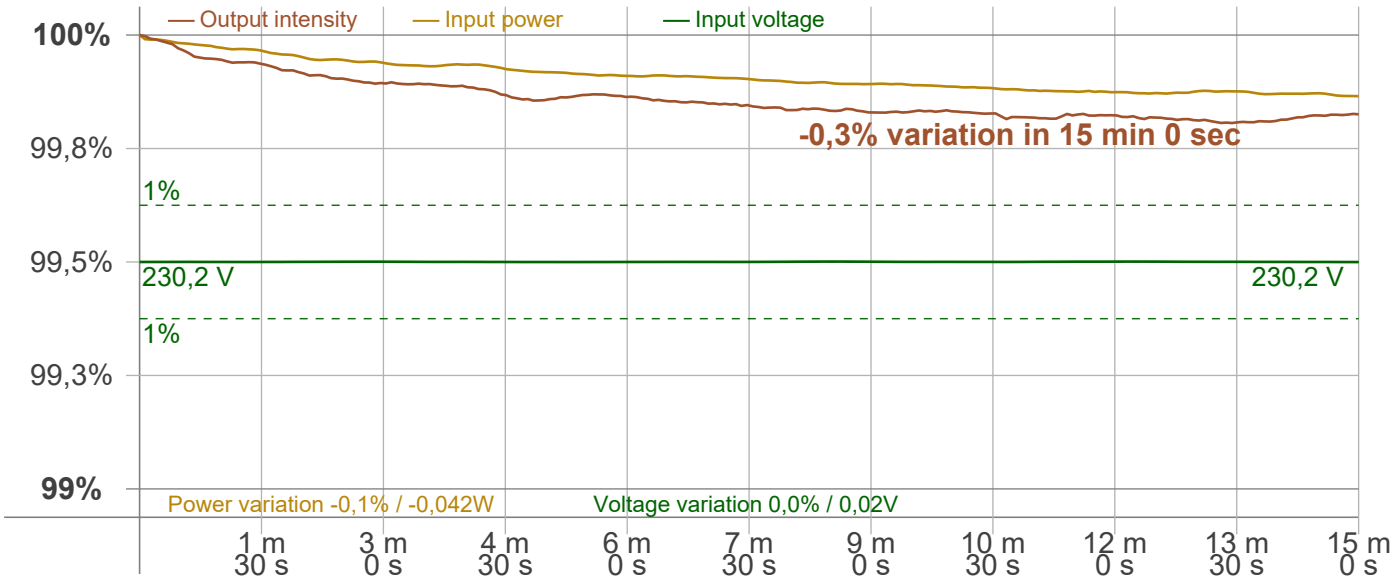
Warmup Result

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

Output Change

Output start	4218 lm
Output change	-8 lm
Output end	4210 lm

Stabilization Curve



Light Measurement Report

Print date: 15-9-2025
Measurement date and time: 15-9-2025 16:13:11 – Measurement no. VFR-250915-3210-MS
Measurement tracking No. and Link: VT250915-003462
Operator:

Flicker /TLA details

Flicker Meter Type	Viso Systems LabFlicker
Frequency of input power	50 Hz
Flicker/TLA sample rate	40000 samples/s

Measurement time

PstLM	180 sec
All other indices	1,2 sec

Flicker indices according to Illuminating Engineering Society (IES)

Flicker frequency	101,27 Hz
Percent Flicker	0,4 %
Flicker index	0

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

JA8/10 40 Hz	n/a %
JA8/10 90 Hz	n/a %
JA8/10 200 Hz	n/a %
JA8/10 400 Hz	n/a %
JA8/10 1000 Hz	n/a %

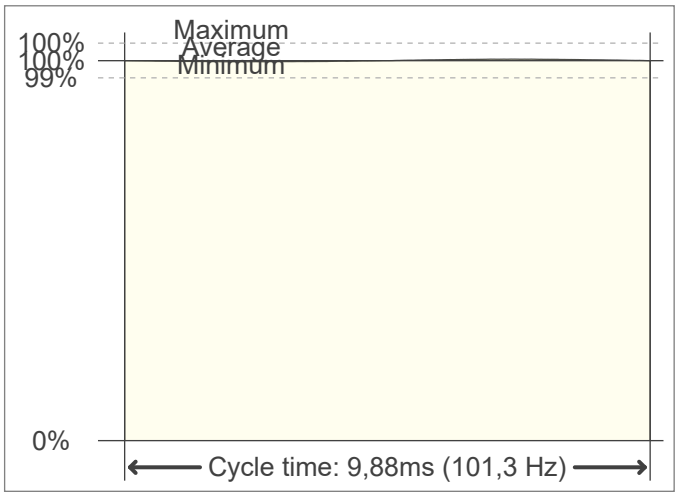
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

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

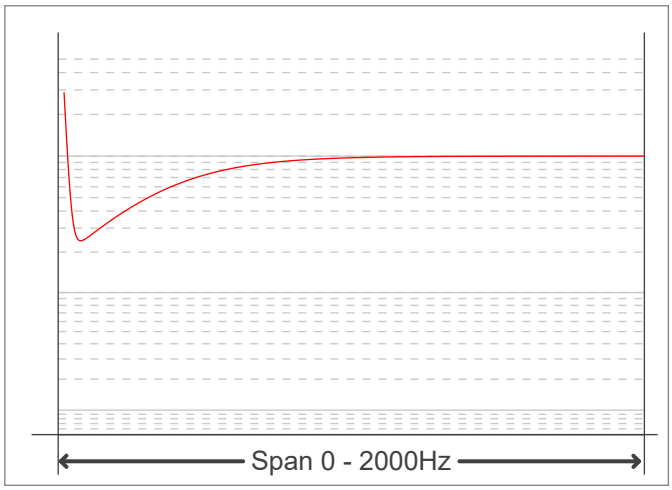
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp	n/a

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot