Light Measurement Report

Print date: 2-7-2025
Measurement date and time: 2-7-2025 10:19:55 – Measurement no. VFR-250702-1868-MS
Measurement tracking No. and Link: VT250702-005939
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

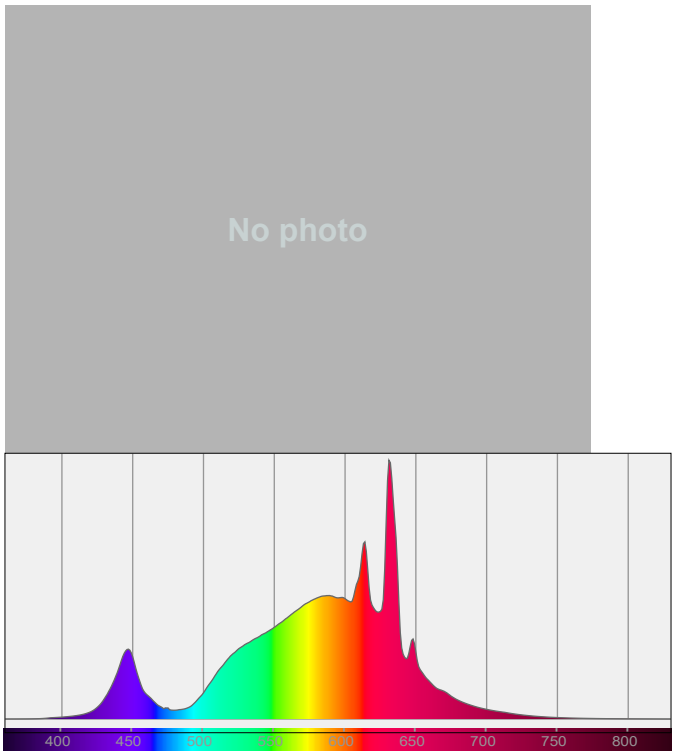
Number of C-planes and Resolution	48 planes – 7,5°
γ (gamma)-Resolution	5°
Test Distance	11,61 m
Input Power, Power and Displ. Factors	36,6 W – PF 0,98 – DPF 0,98
Input RMS Voltage and Current	230 V – 0,162 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 1 sec – 2,0%

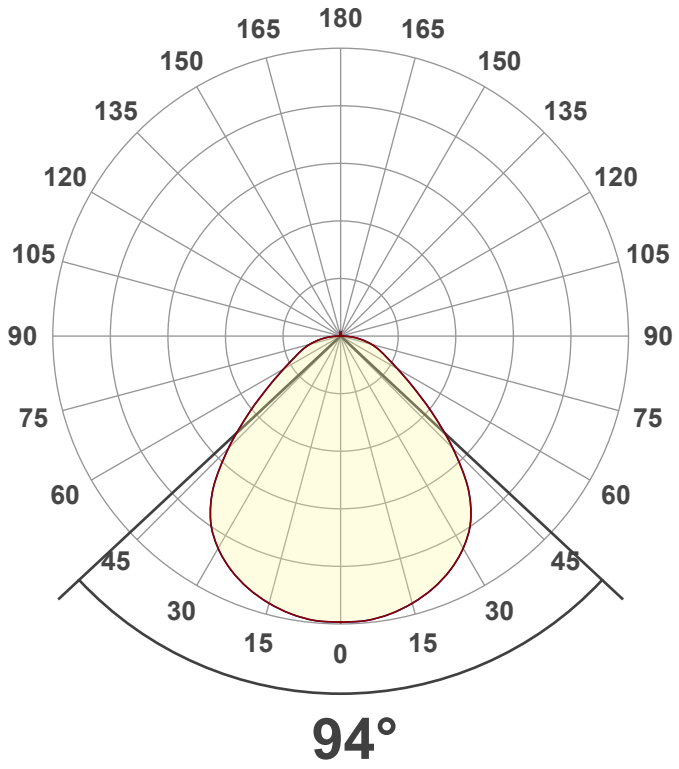
Tested Light Source

Product Name	810986-3000K
Item No. and Manufacturer	810986-3000K – Dutchfulfillment
Product Description (line 1)	BACK-LIT LED PANEEL | PONTUS | 150X11CM | 34W | CCT-SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	3915 lm – 0,87% / 99,13%
Efficiency	107 lm/W
Peak Intensity and Beam Angle	1669 cd – 94°
Correlated Color Temperature, Target/Measured	CCT = 3000 K / 2855 K
Color Rendering Index	CRI 79,9
Color Rendering TM30-18	R_f 79,1 – R_g 99,9
Color Shift, CIE duv and MacAdam Steps	Duv 0,0022 – SDCM 6,3
Flicker	SVM 0,02 – PstLM 0,01





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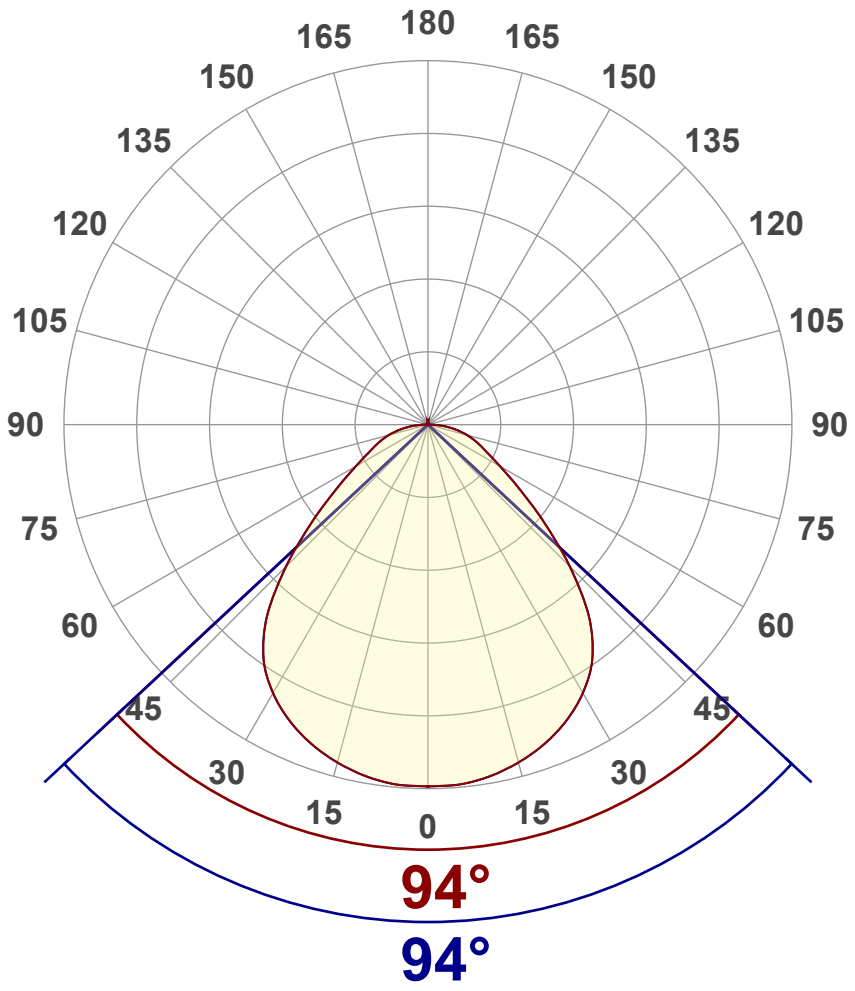
Luminous Intensity diagram Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	3915 lm
Lumen Up% / Down%	0,87% / 99,13%
Peak Intensity	1669 cd
Beam Angle (50%)	94°
Beam Angle (90%)	94°
Beam Angle (10%)	94°

Cut-off Angle

Average 2,5%	175,3°

Field Angle

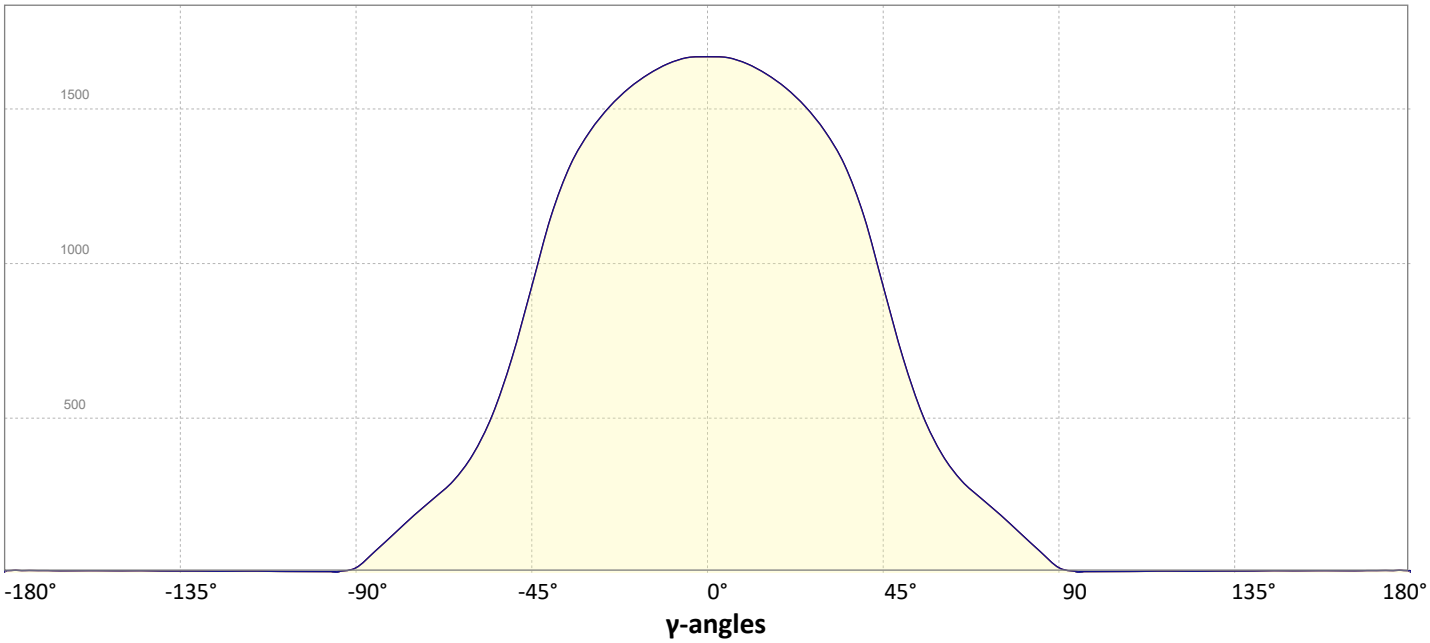
Average 10%	153,5°

Intensity Ratio

In 120° cone	84,4%
In 90° cone	64,1%

C000-C180
C090-C270

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



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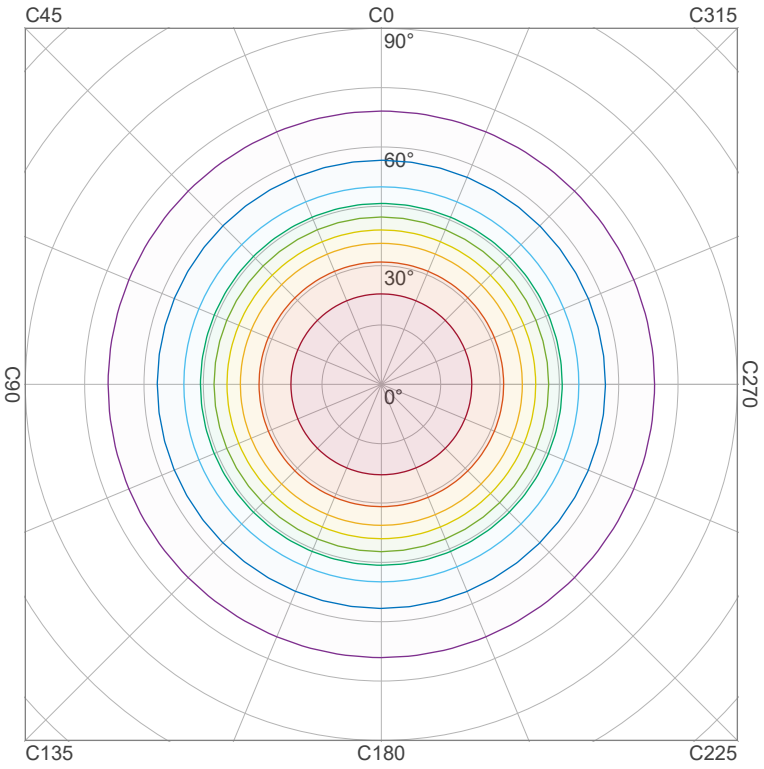
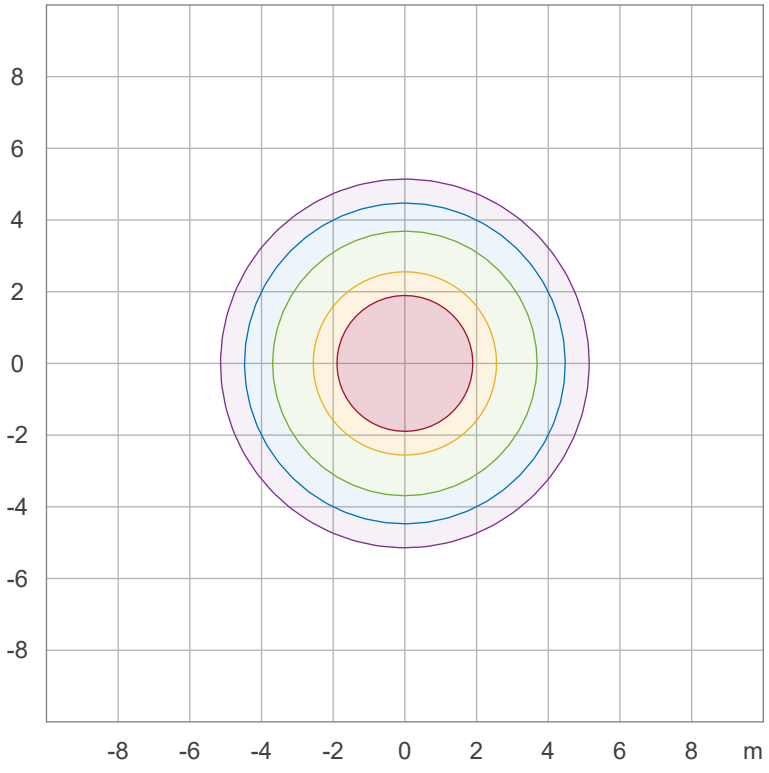
Iso-intensity Diagram (Iso-candela)



90 %	1501,8 cd
80 %	1334,9 cd
70 %	1168,0 cd
60 %	1001,2 cd
50 %	834,3 cd
40 %	667,4 cd
30 %	500,6 cd
20 %	333,7 cd
10 %	166,9 cd

Peak intensity: 1668,6 cd
Number of c-planes: 48

Iso-illuminance Diagram (Iso-lux)



50,0 %	92,7 lx
30,0 %	55,6 lx
10,0 %	18,5 lx
5,0 %	9,3 lx
3,0 %	5,6 lx

Peak illuminance: 185,4 lx
Mounting height: 3,0 m
Number of c-planes: 48

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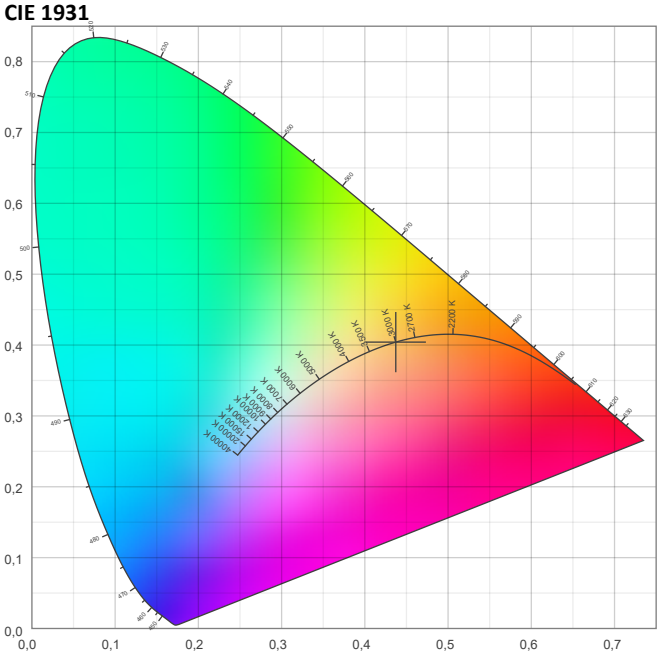
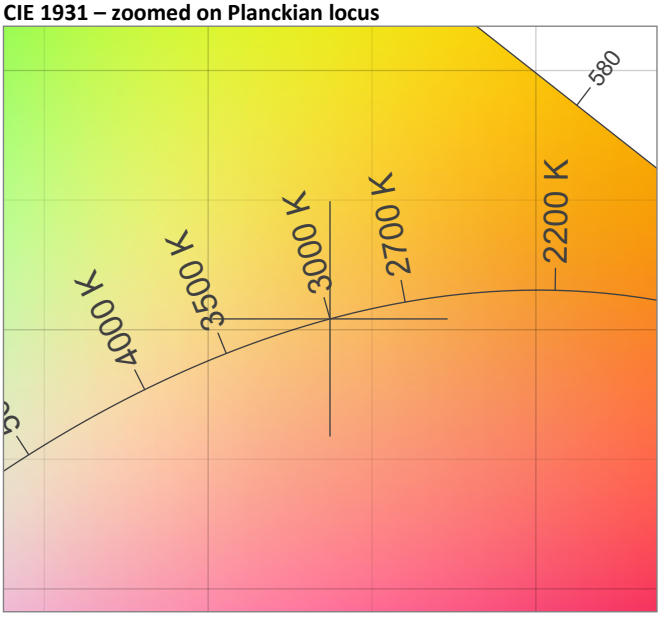
Color details

Correlated Color Temperature, Target	CCT = 3000 K
Correlated Color Temperature, Measured	CCT = 2855 K
Color Rendering Index	CRI 79,9
Color Rendering Index, R9 (red component)	R9 = 16,6
Color Rendering TM30-18	R_f 79,1 – R_g 99,9
Color Quality Scale	CQS = 78,5
MacAdam Steps	SDCM = 6,3
Color coordinates CIE 1931	(x;y) = (0,437;0,404)
Color coordinate CIEs 1960	(u;v) = (0,251;0,348)
Color deviation from BBL	Duv = 0,0022
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,251;0,521)

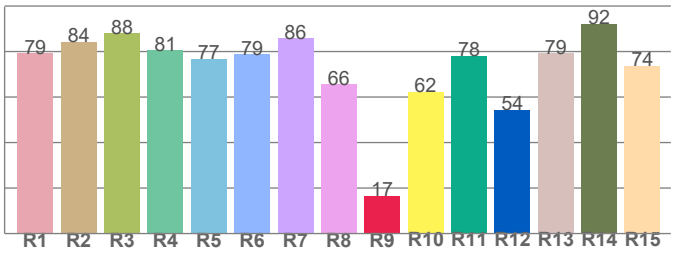
CIE 1931



CIE 1931 – zoomed on Planckian locus



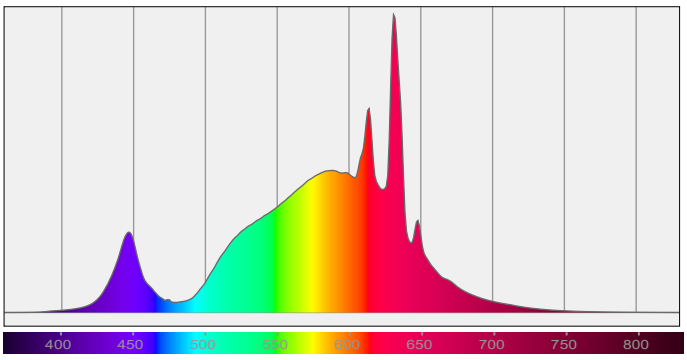
Color Rendering Index per reference color (CIE 1995)



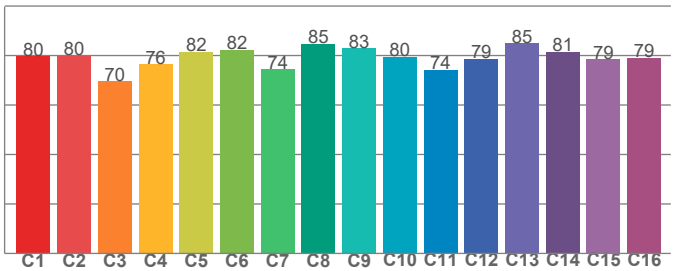
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
79,3	84,4	88,1	80,6	76,8	78,8	85,9	65,6	16,6	62,3	78,1	54,4	79,3	92,2	73,7

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



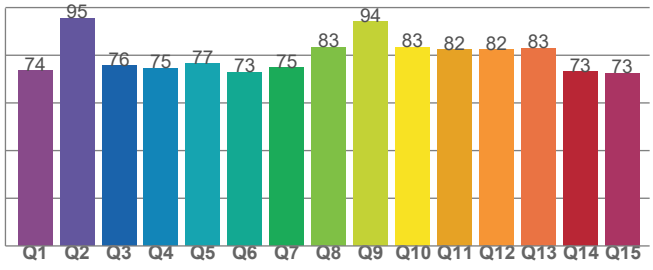
TM30-18 Rf-values per hue bin



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
79,7	80,0	69,7	76,4	81,5	82,3	74,4	84,7	82,9	79,5	74,2	78,7	85,0	81,5	78,6	79,1

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
73,5	95,5	75,6	74,5	76,5	73,0	74,8	83,4	94,2	83,3	82,3	82,3	83,1	73,0	72,5

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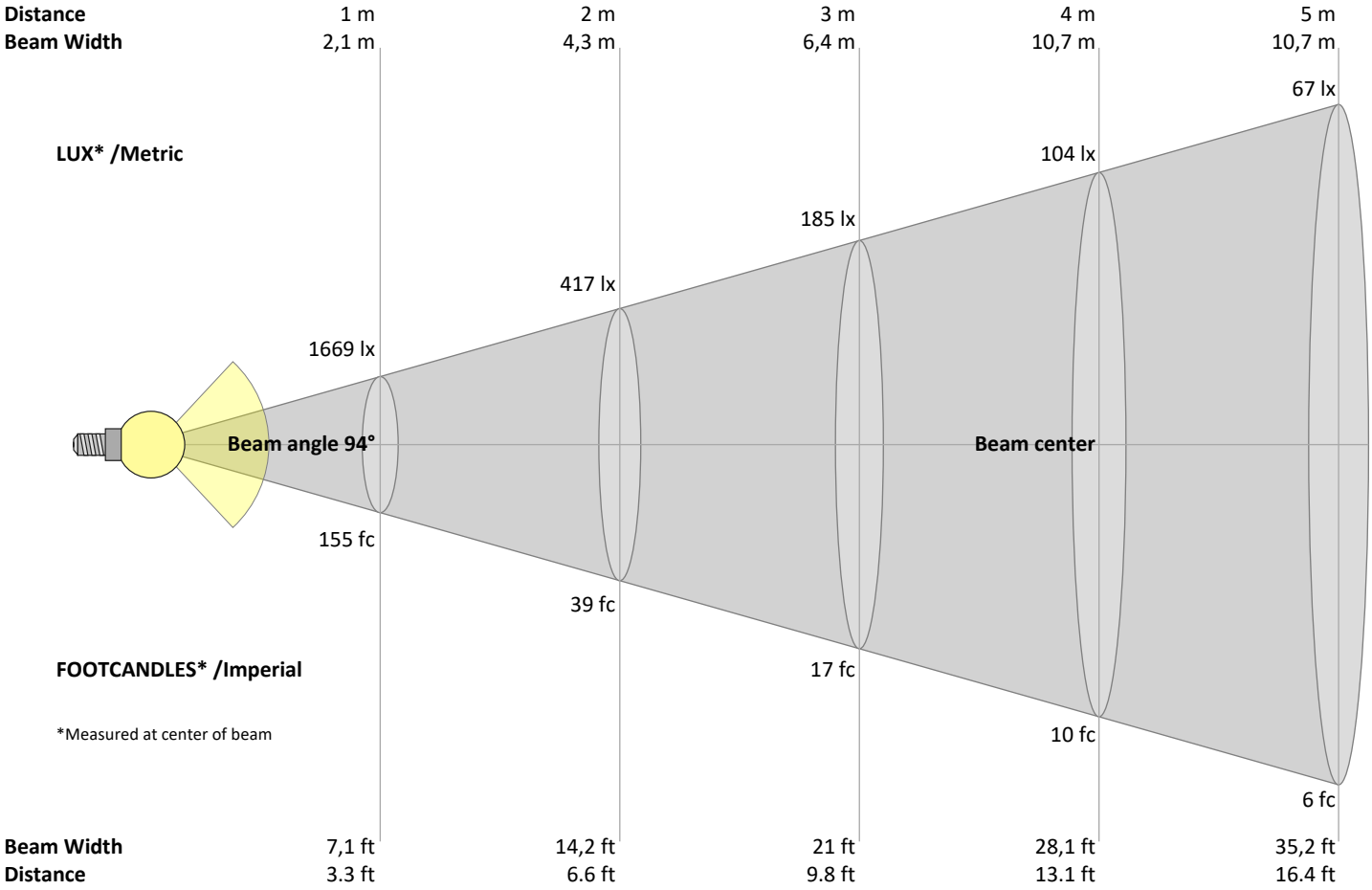
Beam Details



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
1669	417	185	104	67	46	34	26	21	17	14	12	10	9	7	7	6	5	5	4	lux
155	38,8	17,2	9,7	6,2	4,3	3,2	2,4	1,9	1,6	1,3	1,1	0,9	0,8	0,7	0,6	0,5	0,5	0,4	0,4	fc

Intensities in 0° c-plane

0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	γ
1669	1666	1647	1613	1568	1508	1429	1321	1155	926	698	513	384	299	241	187	129	71	16	4	cd
100%	100%	99%	97%	94%	90%	86%	79%	69%	55%	42%	31%	23%	18%	14%	11%	8%	4%	1%	0%	of 0°val

Intensities in 90° c-plane

0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	γ
1669	1666	1647	1613	1568	1508	1429	1321	1155	926	698	513	384	299	241	187	129	71	16	4	cd
100%	100%	99%	97%	94%	90%	86%	79%	69%	55%	42%	31%	23%	18%	14%	11%	8%	4%	1%	0%	of 0°val

Intensities in 180° c-plane

0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	γ
1669	1666	1647	1613	1568	1508	1429	1321	1155	926	698	513	384	299	241	187	129	71	16	4	cd
100%	100%	99%	97%	94%	90%	86%	79%	69%	55%	42%	31%	23%	18%	14%	11%	8%	4%	1%	0%	of 0°val

Intensities in 270° c-plane

0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	γ
1669	1666	1647	1613	1568	1508	1429	1321	1155	926	698	513	384	299	241	187	129	71	16	4	cd
100%	100%	99%	97%	94%	90%	86%	79%	69%	55%	42%	31%	23%	18%	14%	11%	8%	4%	1%	0%	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	19,6	20,7	19,8	21,0	21,2	19,8	20,9	20,0	21,2	21,4
	3H	20,5	21,6	20,9	21,9	22,1	20,7	21,9	21,1	22,2	22,4
	4H	21,0	22,1	21,4	22,3	22,6	21,3	22,4	21,7	22,7	22,9
	6H	21,5	22,4	21,8	22,7	23,1	21,9	22,9	22,2	23,1	23,5
	8H	21,6	22,6	22,0	22,9	23,3	22,1	23,0	22,5	23,4	23,8
	12H	21,7	22,6	22,1	23,0	23,5	22,3	23,2	22,7	23,5	24,0
4H	2H	19,9	21,0	20,3	21,3	21,5	20,1	21,2	20,5	21,4	21,7
	3H	21,2	22,1	21,5	22,4	22,9	21,4	22,3	21,8	22,6	23,1
	4H	21,7	22,6	22,2	23,0	23,6	22,0	22,9	22,5	23,3	23,9
	6H	22,3	23,1	22,8	23,5	23,9	22,7	23,5	23,2	23,9	24,3
	8H	22,6	23,3	23,1	23,7	24,1	23,0	23,8	23,5	24,1	24,5
	12H	22,7	23,3	23,2	23,8	24,3	23,3	23,9	23,8	24,3	24,8
8H	4H	22,0	22,8	22,5	23,1	23,5	22,3	23,0	22,8	23,4	23,8
	6H	22,8	23,3	23,3	23,8	24,4	23,2	23,7	23,7	24,2	24,7
	8H	23,2	23,6	23,7	24,2	24,8	23,6	24,1	24,1	24,6	25,2
	12H	23,4	23,8	24,0	24,3	24,9	23,9	24,3	24,5	24,9	25,5
12H	4H	22,0	22,7	22,6	23,1	23,6	22,3	22,9	22,8	23,3	23,8
	6H	22,9	23,4	23,4	23,9	24,6	23,3	23,7	23,8	24,3	24,9
	8H	23,3	23,7	23,9	24,2	24,8	23,7	24,1	24,3	24,6	25,2

Variations with the observer position for the luminaire spacings, S:		
S = 1.0H	0,2 / -0,2	0,2 / -0,2
S = 1.5H	0,5 / -0,5	0,4 / -0,4
S = 2.0H	1,0 / -0,8	0,9 / -0,7

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	101	101	101	99
1	109	105	101	98	107	103	99	96	98	95	93	94	92	90	91	89	87	85
2	101	93	87	82	98	91	85	80	87	83	79	84	80	77	81	78	75	73
3	93	83	75	69	90	81	74	69	78	72	67	75	70	66	73	69	65	63
4	85	74	66	60	83	73	65	59	70	64	59	68	62	58	66	61	57	55
5	79	67	59	52	77	66	58	52	64	57	52	62	56	51	60	55	50	48
6	73	61	52	46	71	60	52	46	58	51	46	56	50	45	55	49	45	43
7	68	55	47	41	67	55	47	41	53	46	41	52	45	41	50	45	40	38
8	64	51	43	37	62	50	42	37	49	42	37	48	41	37	46	41	36	35
9	60	47	39	34	58	46	39	34	45	38	33	44	38	33	43	37	33	31
10	56	43	36	31	55	43	36	31	42	35	31	41	35	30	40	34	30	29

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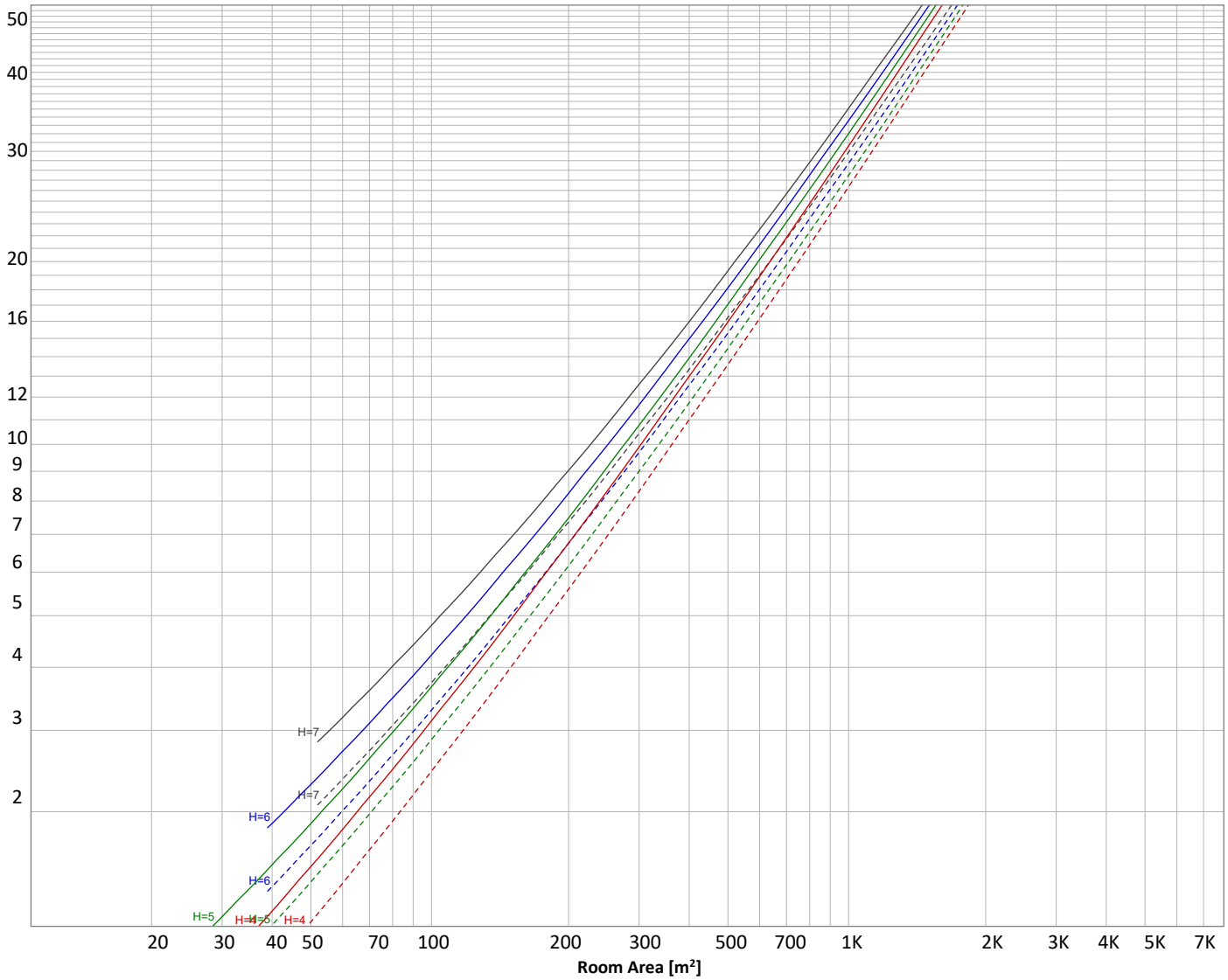
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 3915 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°
158 lm	455 lm	694 lm	817 lm	711 lm	469 lm	302 lm	196 lm	78,1 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
7,16 lm	4,22 lm	4,84 lm	4,39 lm	4,14 lm	3,87 lm	2,98 lm	1,83 lm	0,682 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	158 lm	4,0%
10-20°	455 lm	11,6%
20-30°	694 lm	17,7%
30-40°	817 lm	20,9%
40-50°	711 lm	18,2%
50-60°	469 lm	12,0%
60-70°	302 lm	7,7%
70-80°	196 lm	5,0%
80-90°	78 lm	2,0%
90-100°	7 lm	0,2%
100-110°	4 lm	0,1%
110-120°	5 lm	0,1%
120-130°	4 lm	0,1%
130-140°	4 lm	0,1%
140-150°	4 lm	0,1%
150-160°	3 lm	0,1%
160-170°	2 lm	0,0%
170-180°	1 lm	0,0%
Total	3915 lm	100,0%

Intensity peaks

Max intensity	1669 cd
Intensity, 90°	16 cd
Intensity, 0°	1669 cd

Zonal Lumen summary

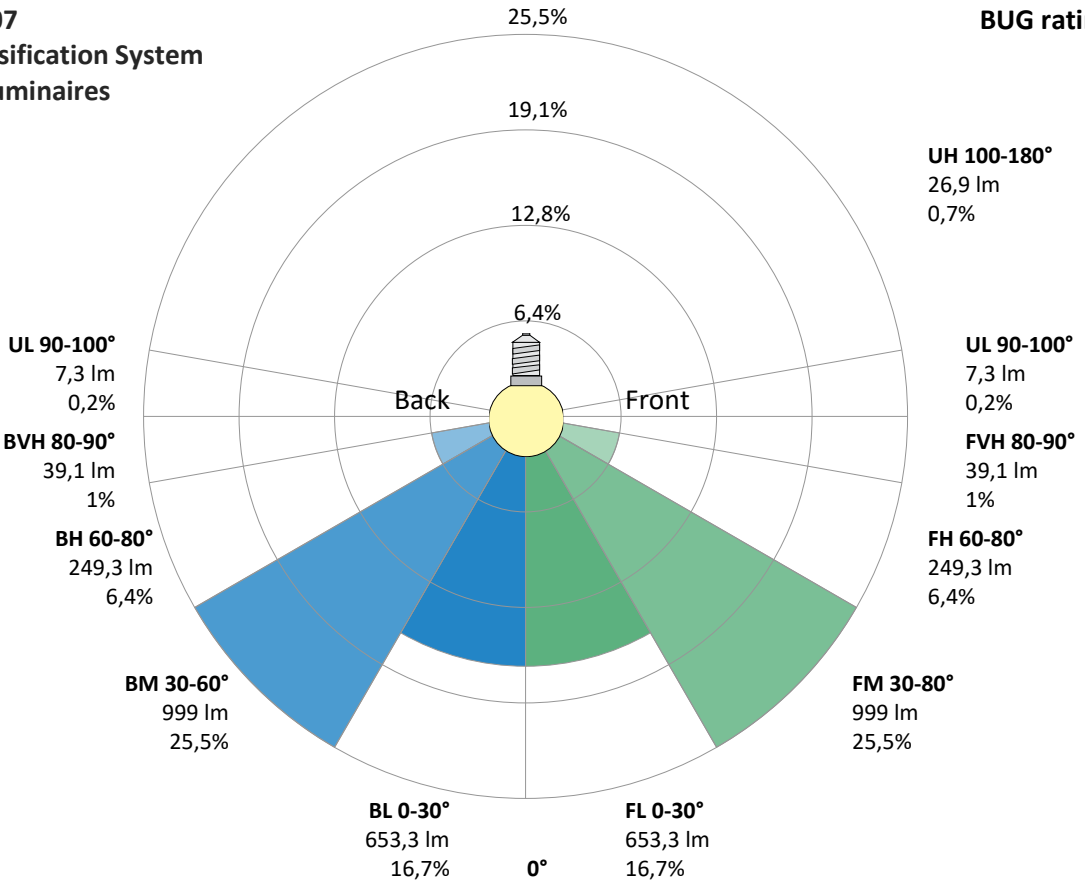
Zone (γ)	Lumen	% Total
0-30°	1307 lm	33,4%
0-40°	2124 lm	54,2%
0-60°	3305 lm	84,4%
60-90°	577 lm	14,7%
70-100°	282 lm	7,2%
90-120°	16 lm	0,4%
0-90°	3881 lm	99,1%
90-180°	34 lm	0,9%
0-180°	3915 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	653 lm	16,7%
Medium(30-60°)	999 lm	25,5%
High(60-80°)	249 lm	6,4%
Very high(80-90°)	39 lm	1,0%
Back light		
Low(0-30°)	653 lm	16,7%
Medium(30-60°)	999 lm	25,5%
High(60-80°)	249 lm	6,4%
Very high(80-90°)	39 lm	1,0%
Uplight		
Low(90-100°)	7 lm	0,2%
High(100-180°)	27 lm	0,7%

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

BUG rating B2 U2 G1



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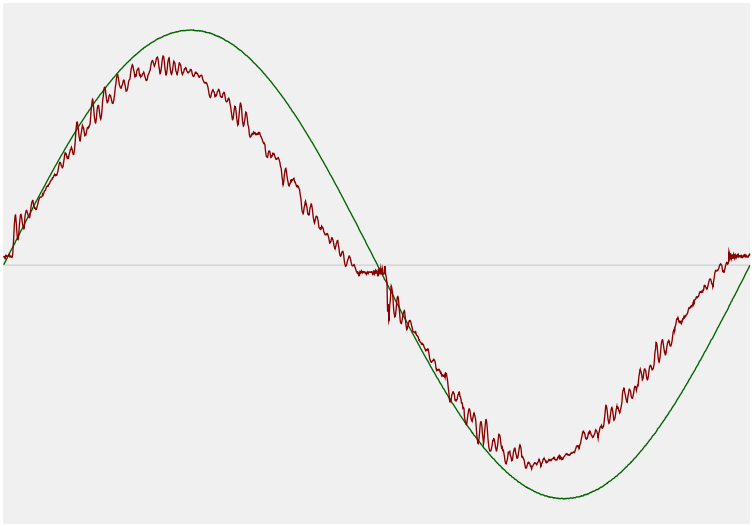
Power Details

Input Power

Power feed to light source	36,6 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,162 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	37,35 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,98
Total harmonic distortion of the current	9,88%
Total harmonic distortion of the voltage	0,06%

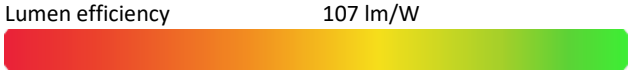
Input Power Curve



Efficiency

Radiated power efficiency 30,0%

Lumen efficiency 107 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	2997 K
CCT shift	+3 K
CCT end	3000 K

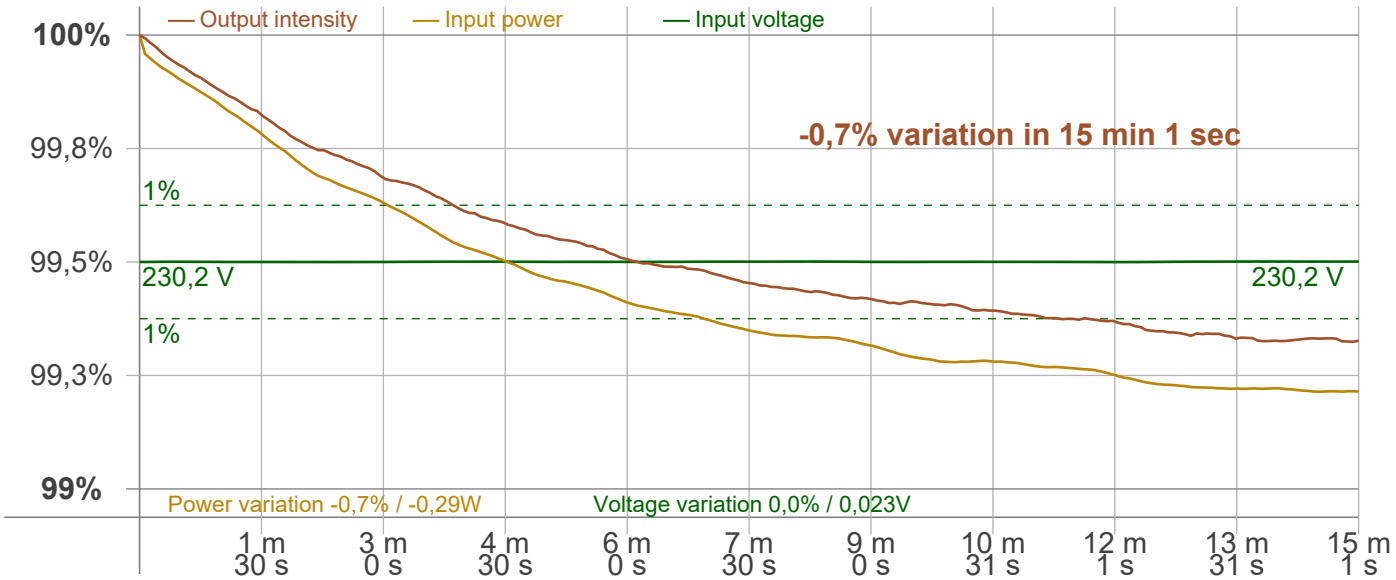
Warmup Result

Total warmup time	Lamp stabilized in 15 min 1 sec
Warmup variation	-0,7%

Output Change

Output start	3944 lm
Output change	-28 lm
Output end	3915 lm

Stabilization Curve



Light Measurement Report

Print date: 2-7-2025
Measurement date and time: 2-7-2025 10:19:55 – Measurement no. VFR-250702-1868-MS
Measurement tracking No. and Link: VT250702-005939
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	100 Hz
Percent Flicker	0,67 %
Flicker index	0

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

JA8/10 40 Hz	0,02 %
JA8/10 90 Hz	0,03 %
JA8/10 200 Hz	0,63 %
JA8/10 400 Hz	0,64 %
JA8/10 1000 Hz	0,65 %

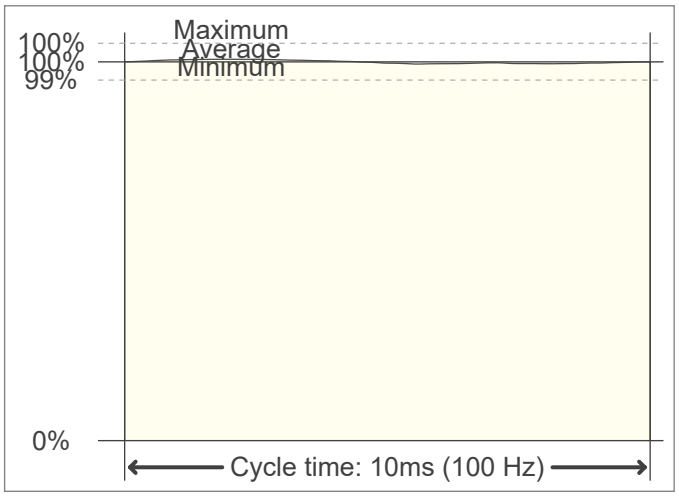
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

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

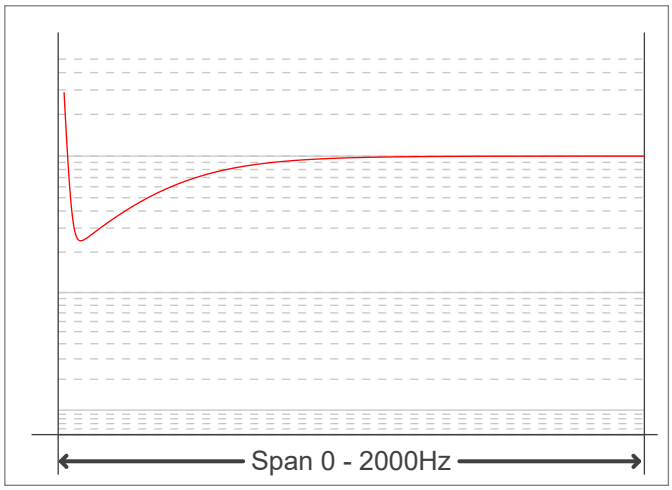
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp	0,01

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot