Light Measurement Report

Print date: 13-6-2025
Measurement date and time: 24-4-2025 10:02:49 – Measurement no. VFR-250424-0896-MS
Measurement tracking No. and Link: VT250424-003317
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

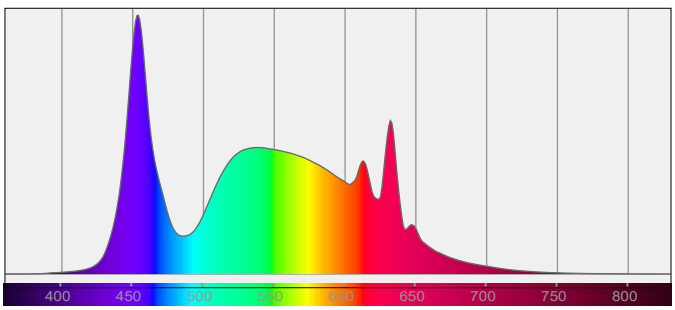
Number of C-planes and Resolution	12 planes – 30°
γ (gamma)-Resolution	5°
Test Distance	12,10 m
Input Power, Power and Displ. Factors	71,9 W – PF 0,97 – DPF 0,97
Input RMS Voltage and Current	230 V – 0,321 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 1 sec – 2,0%

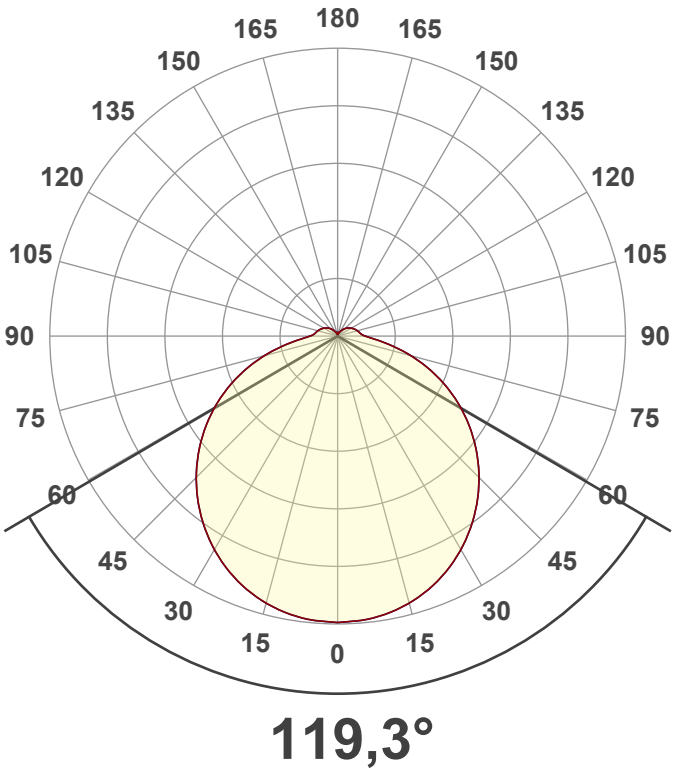
Tested Light Source

Product Name	274488-5700K BATCH 2505
Item No. and Manufacturer	274488-5700K BATCH 2505 – Dutchfulfillment
Product Description (line 1)	RETROFIT TITAN | LED MODULE | 32W/40W/48W/56W | 120°

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	10976 lm – 9,3% / 90,7%
Efficiency	153 lm/W
Peak Intensity and Beam Angle	3127 cd – 119,3°
Correlated Color Temperature, Target/Measured	CCT = 5700 K / 5810 K
Color Rendering Index	CRI 83,7
Color Rendering TM30-18	R_f 82,6 – R_g 96,6
Color Shift, CIE duv and MacAdam Steps	Duv 0,0055 – SDCM 7,8
Flicker	SVM 0,03 – PstLM 0,02





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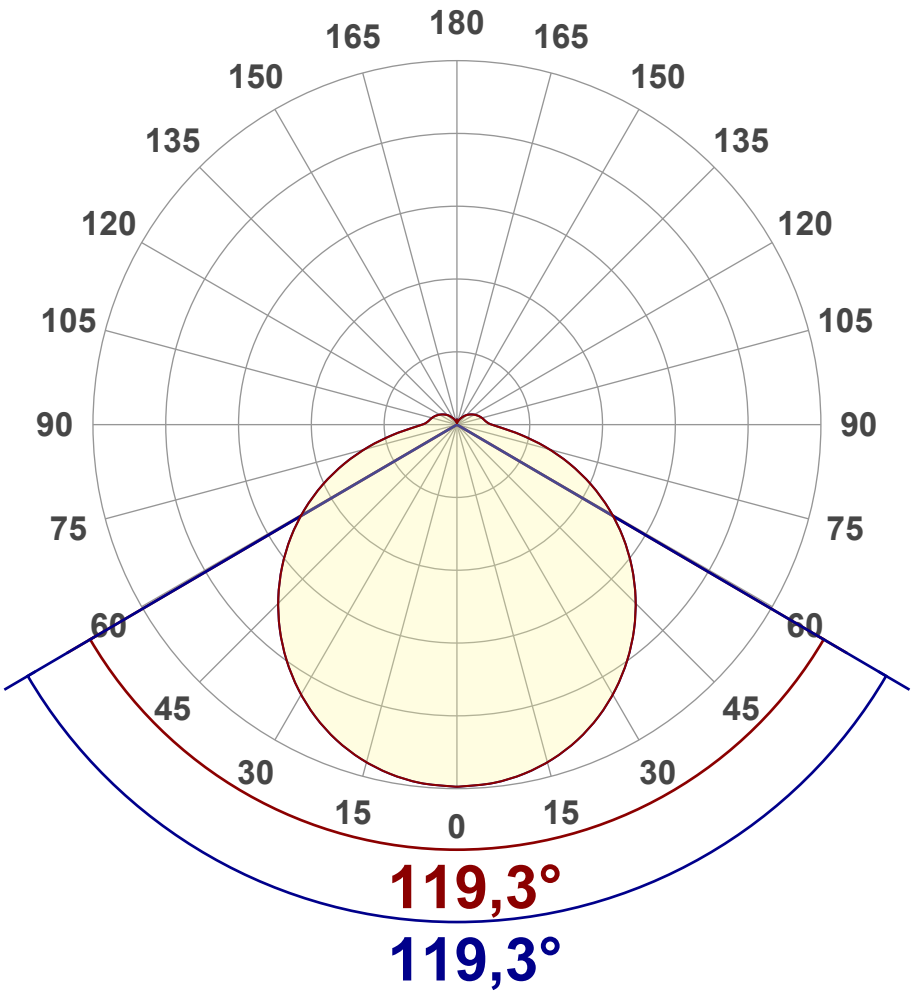
Luminous Intensity diagram Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	10976 lm
Lumen Up% / Down%	9,3% / 90,7%
Peak Intensity	3127 cd
Beam Angle (50%)	119,3°
Beam Angle (90%)	119,3°
Beam Angle (10%)	119,3°

Cut-off Angle

Average 2,5%	289,2°

Field Angle

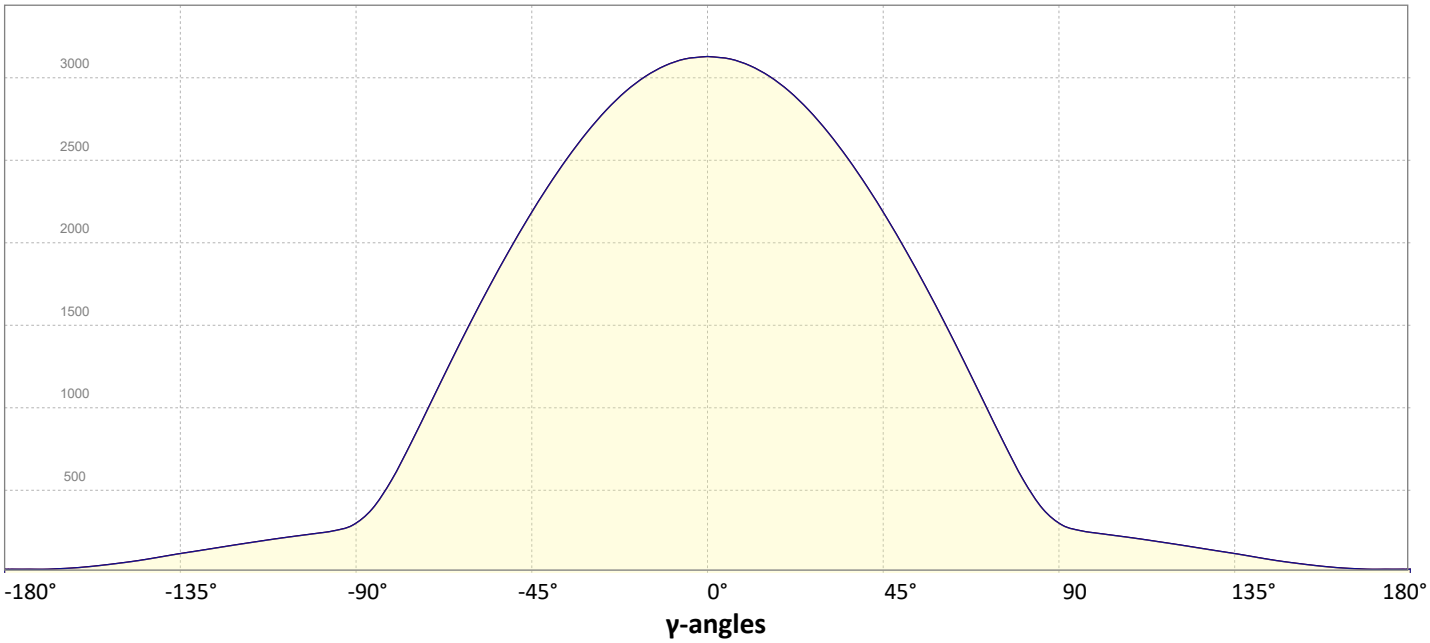
Average 10%	179,3°

Intensity Ratio

In 120° cone	66,6%
In 90° cone	44,5%

C000-C180
C090-C270

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



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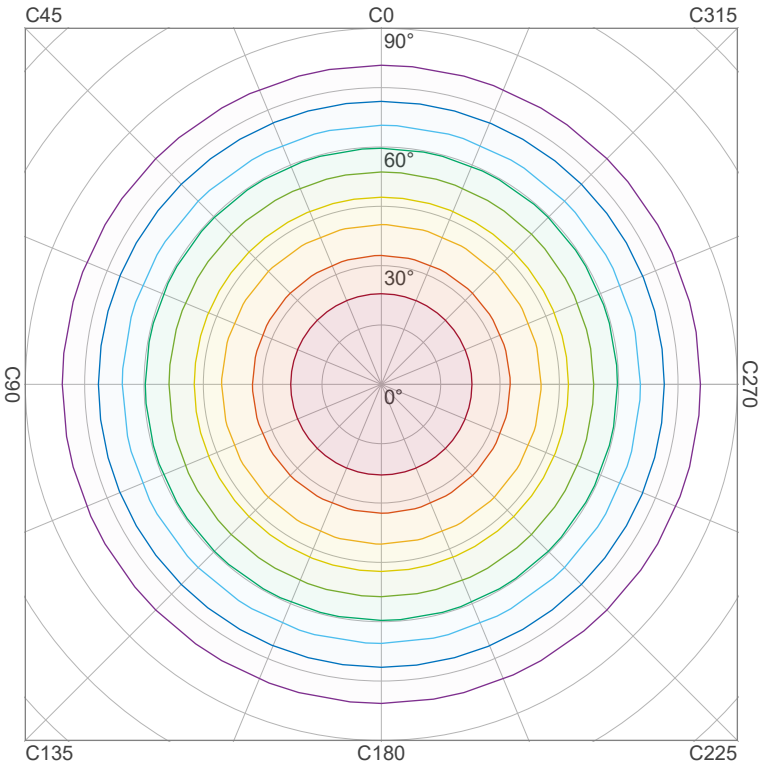
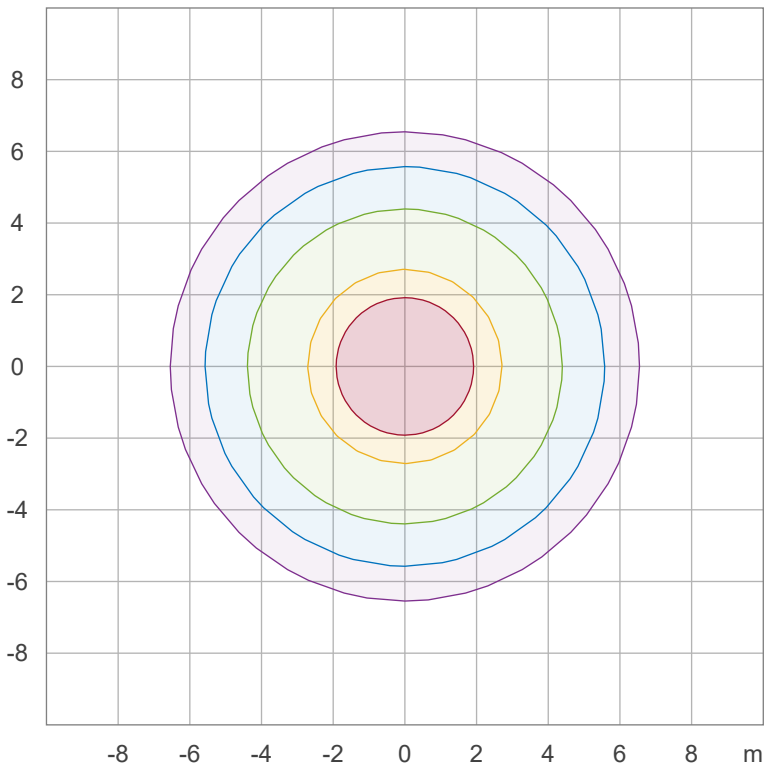
Iso-intensity Diagram (Iso-candela)



90 %	2814,3 cd
80 %	2501,6 cd
70 %	2188,9 cd
60 %	1876,2 cd
50 %	1563,5 cd
40 %	1250,8 cd
30 %	938,1 cd
20 %	625,4 cd
10 %	312,7 cd

Peak intensity: 3127,0 cd
Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



50,0 %	173,7 lx
30,0 %	104,2 lx
10,0 %	34,7 lx
5,0 %	17,4 lx
3,0 %	10,4 lx

Peak illuminance: 347,4 lx
Mounting height: 3,0 m
Number of c-planes: 12

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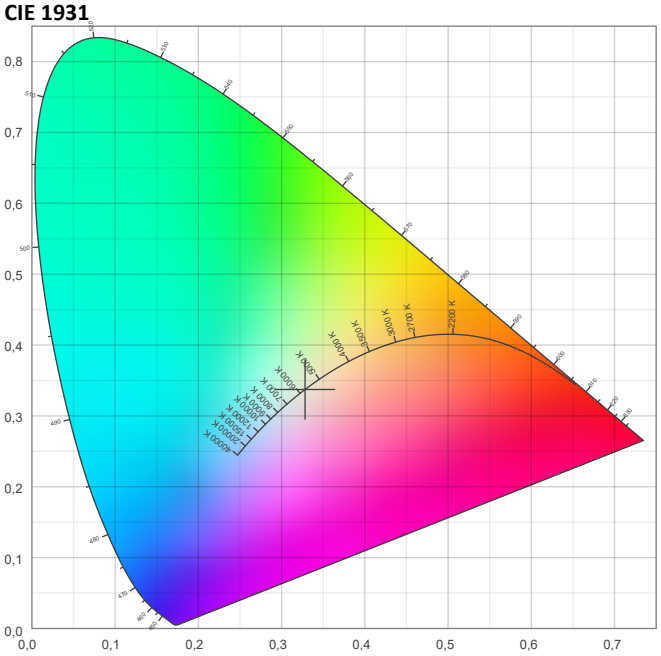
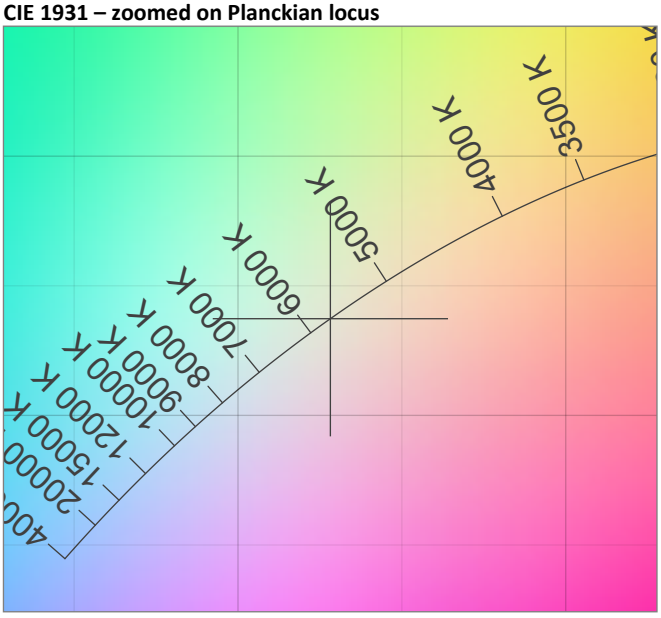
Color details

Correlated Color Temperature, Target	CCT = 5700 K
Correlated Color Temperature, Measured	CCT = 5810 K
Color Rendering Index	CRI 83,7
Color Rendering Index, R9 (red component)	R9 = 34,4
Color Rendering TM30-18	R_f 82,6 – R_g 96,6
Color Quality Scale	CQS = 81,6
MacAdam Steps	SDCM = 7,8
Color coordinates CIE 1931	(x;y) = (0,328;0,337)
Color coordinate CIEs 1960	(u;v) = (0,205;0,317)
Color deviation from BBL	Duv = 0,0055
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,205;0,475)

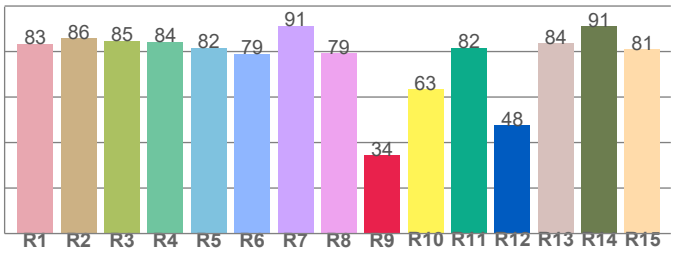
CIE 1931



CIE 1931 – zoomed on Planckian locus



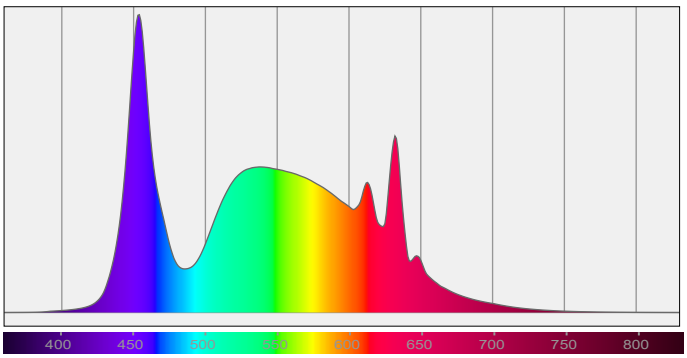
Color Rendering Index per reference color (CIE 1995)



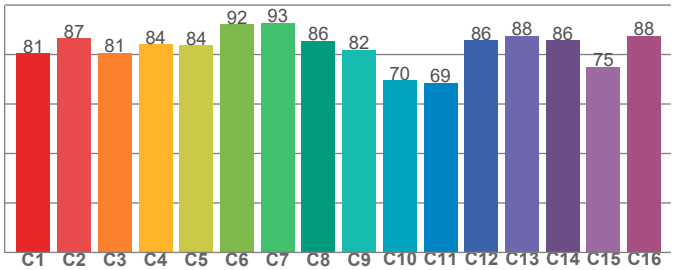
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
83,3	85,7	84,8	84,2	81,7	79,0	91,4	79,4	34,4	63,4	81,6	47,6	83,7	91,2	81,1

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



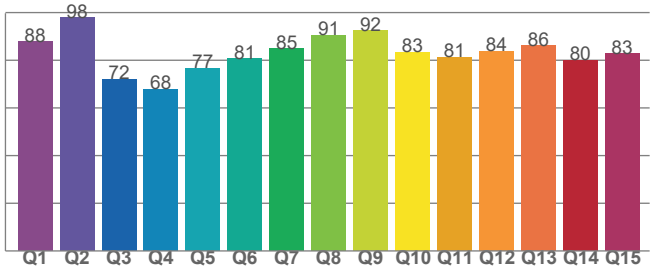
TM30-18 Rf-values per hue bin



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
80,6	86,7	80,7	84,1	83,8	92,3	92,8	85,5	82,0	69,7	68,6	85,7	87,6	85,7	75,0	87,5

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
87,8	97,8	72,0	67,8	76,6	80,6	84,8	90,6	92,4	83,3	81,4	83,8	86,1	80,0	82,8

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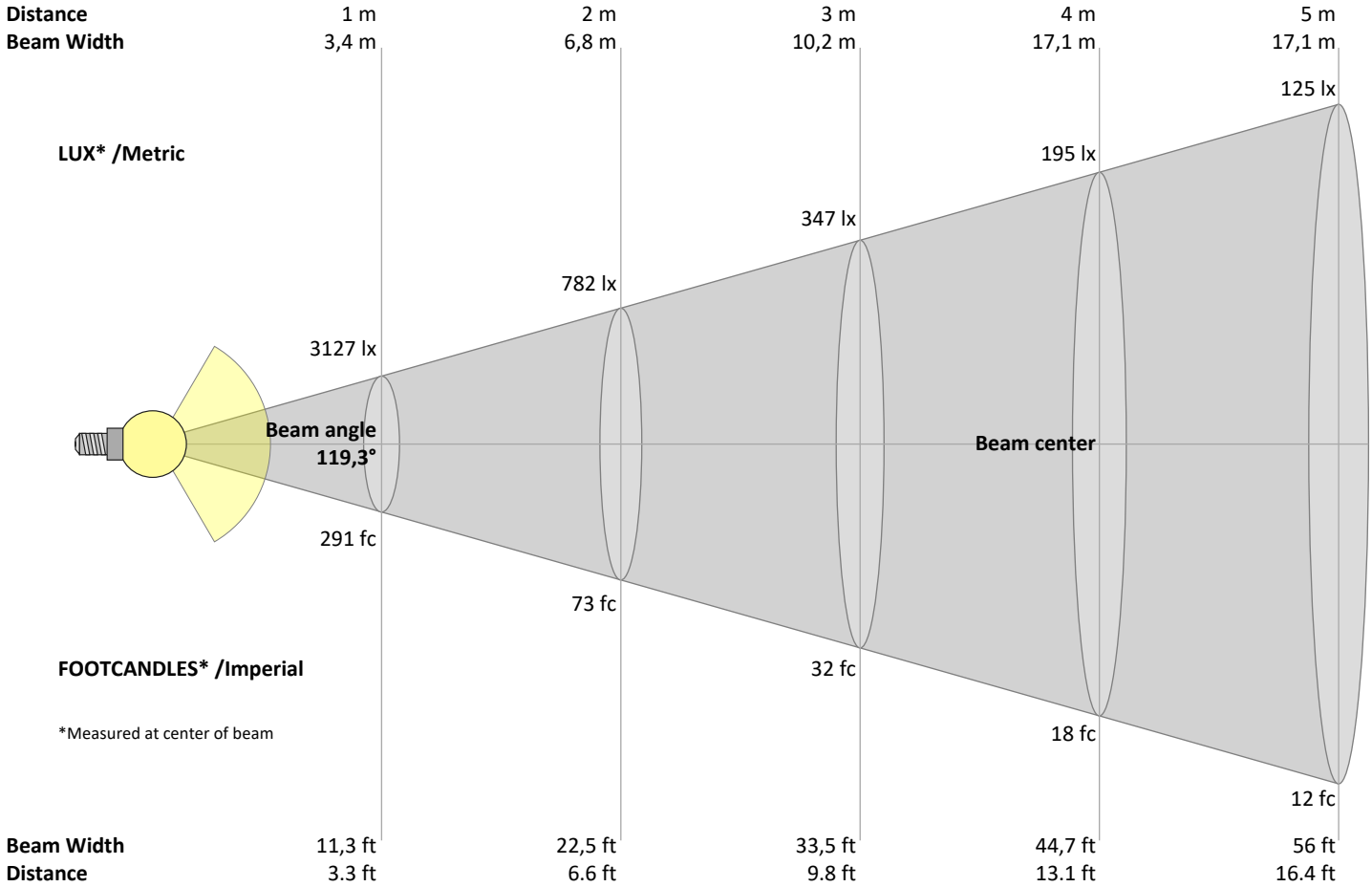
Beam Details



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
3127	782	347	195	125	87	64	49	39	31	26	22	19	16	14	12	11	10	9	8	lux
290,5	72,6	32,3	18,2	11,6	8,1	5,9	4,5	3,6	2,9	2,4	2	1,7	1,5	1,3	1,1	1	0,9	0,8	0,7	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
3127	3116	3080	3020	2935	2825	2693	2540	2370	2184	1984	1771	1547	1313	1072	830	602	417	305	260	cd
100%	100%	98%	97%	94%	90%	86%	81%	76%	70%	63%	57%	49%	42%	34%	27%	19%	13%	10%	8%	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
3127	3116	3080	3020	2935	2825	2693	2540	2370	2184	1984	1771	1547	1313	1072	830	602	417	305	260	cd
100%	100%	98%	97%	94%	90%	86%	81%	76%	70%	63%	57%	49%	42%	34%	27%	19%	13%	10%	8%	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
3127	3116	3080	3020	2935	2825	2693	2540	2370	2184	1984	1771	1547	1313	1072	830	602	417	305	260	cd
100%	100%	98%	97%	94%	90%	86%	81%	76%	70%	63%	57%	49%	42%	34%	27%	19%	13%	10%	8%	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
3127	3116	3080	3020	2935	2825	2693	2540	2370	2184	1984	1771	1547	1313	1072	830	602	417	305	260	cd
100%	100%	98%	97%	94%	90%	86%	81%	76%	70%	63%	57%	49%	42%	34%	27%	19%	13%	10%	8%	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	23,6	24,7	24,0	25,2	25,6	24,0	25,2	24,4	25,6	26,1
	3H	25,1	26,3	25,7	26,8	27,2	25,8	27,0	26,3	27,4	27,8
	4H	25,8	27,0	26,4	27,4	27,9	26,6	27,8	27,1	28,2	28,6
	6H	26,5	27,5	26,9	27,9	28,5	27,4	28,4	27,9	28,9	29,4
	8H	26,7	27,7	27,2	28,2	28,7	27,8	28,8	28,3	29,2	29,8
	12H	26,9	27,9	27,4	28,4	29,0	28,1	29,2	28,7	29,6	30,2
4H	2H	24,2	25,4	24,8	25,8	26,3	24,6	25,7	25,1	26,2	26,6
	3H	26,1	27,1	26,6	27,5	28,2	26,6	27,6	27,1	28,1	28,7
	4H	26,9	27,9	27,4	28,3	29,0	27,5	28,5	28,1	29,0	29,7
	6H	27,6	28,4	28,2	28,9	29,5	28,4	29,3	29,0	29,8	30,3
	8H	27,9	28,6	28,5	29,2	29,7	28,9	29,6	29,5	30,2	30,7
	12H	28,1	28,8	28,8	29,4	30,0	29,3	30,0	29,9	30,5	31,2
8H	4H	27,2	28,0	27,9	28,5	29,1	27,8	28,6	28,4	29,1	29,7
	6H	28,1	28,7	28,8	29,3	30,0	28,9	29,5	29,5	30,1	30,8
	8H	28,6	29,1	29,2	29,7	30,5	29,5	30,0	30,1	30,6	31,4
	12H	28,9	29,4	29,6	30,0	30,8	30,1	30,5	30,8	31,1	31,9
12H	4H	27,3	27,9	27,9	28,5	29,1	27,8	28,5	28,4	29,0	29,7
	6H	28,3	28,8	28,9	29,4	30,2	29,0	29,5	29,6	30,2	30,9
	8H	28,7	29,2	29,4	29,8	30,6	29,6	30,0	30,3	30,7	31,4

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 / -0,2	0,1 / -0,1
S = 2.0H	0,3 / -0,4	0,3 / -0,3

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	99	99	99	94	94	94	91
1	105	100	95	91	102	97	92	89	91	87	84	85	82	80	80	78	76	73
2	95	86	79	73	92	84	77	71	79	73	68	74	69	65	69	66	62	60
3	86	75	67	60	83	73	65	59	69	62	57	65	59	54	61	56	52	50
4	79	66	57	50	76	65	56	50	61	54	48	57	51	46	54	49	45	42
5	72	59	50	43	70	57	49	42	54	47	41	51	45	40	49	43	39	36
6	67	53	44	37	64	52	43	37	49	41	36	46	40	35	44	38	34	31
7	62	48	39	33	59	47	38	32	44	37	32	42	36	31	40	34	30	28
8	57	44	35	29	55	43	34	29	41	33	28	39	32	27	37	31	27	25
9	54	40	32	26	52	39	31	26	37	30	25	36	29	25	34	28	24	22
10	50	37	29	24	48	36	28	23	34	28	23	33	27	22	31	26	22	20

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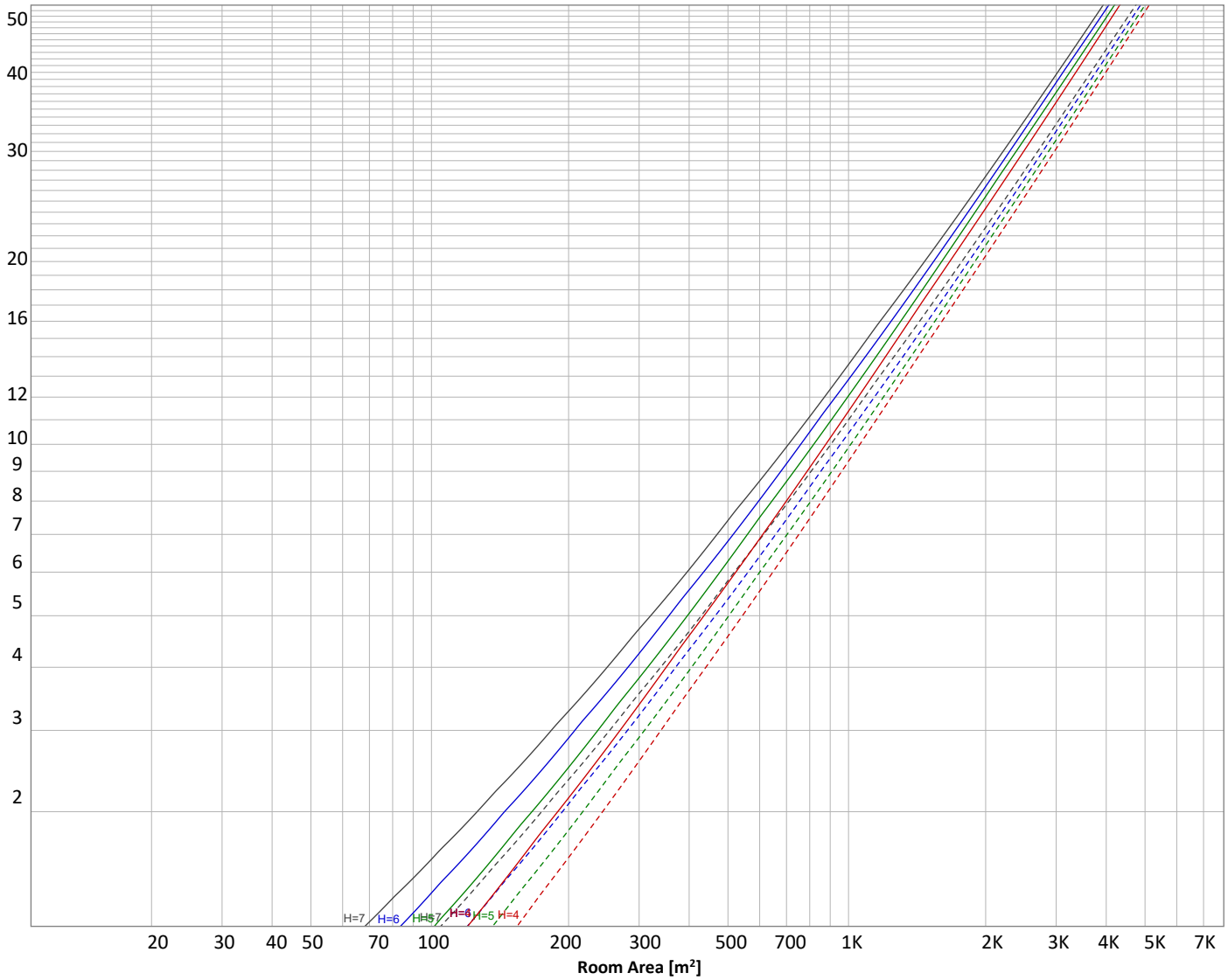
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 10976 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°
296 lm	852 lm	1302 lm	1589 lm	1685 lm	1583 lm	1299 lm	879 lm	469 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
286 lm	237 lm	189 lm	138 lm	90,3 lm	49,0 lm	21,7 lm	7,61 lm	2,03 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	296 lm	2,7%
10-20°	852 lm	7,8%
20-30°	1302 lm	11,9%
30-40°	1589 lm	14,5%
40-50°	1685 lm	15,4%
50-60°	1583 lm	14,4%
60-70°	1299 lm	11,8%
70-80°	879 lm	8,0%
80-90°	469 lm	4,3%
90-100°	286 lm	2,6%
100-110°	237 lm	2,2%
110-120°	189 lm	1,7%
120-130°	138 lm	1,3%
130-140°	90 lm	0,8%
140-150°	49 lm	0,4%
150-160°	22 lm	0,2%
160-170°	8 lm	0,1%
170-180°	2 lm	0,0%
Total	10976 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	2451 lm	22,3%
0-40°	4040 lm	36,8%
0-60°	7308 lm	66,6%
60-90°	2647 lm	24,1%
70-100°	1634 lm	14,9%
90-120°	712 lm	6,5%
0-90°	9955 lm	90,7%
90-180°	1020 lm	9,3%
0-180°	10976 lm	100,0%

Intensity peaks

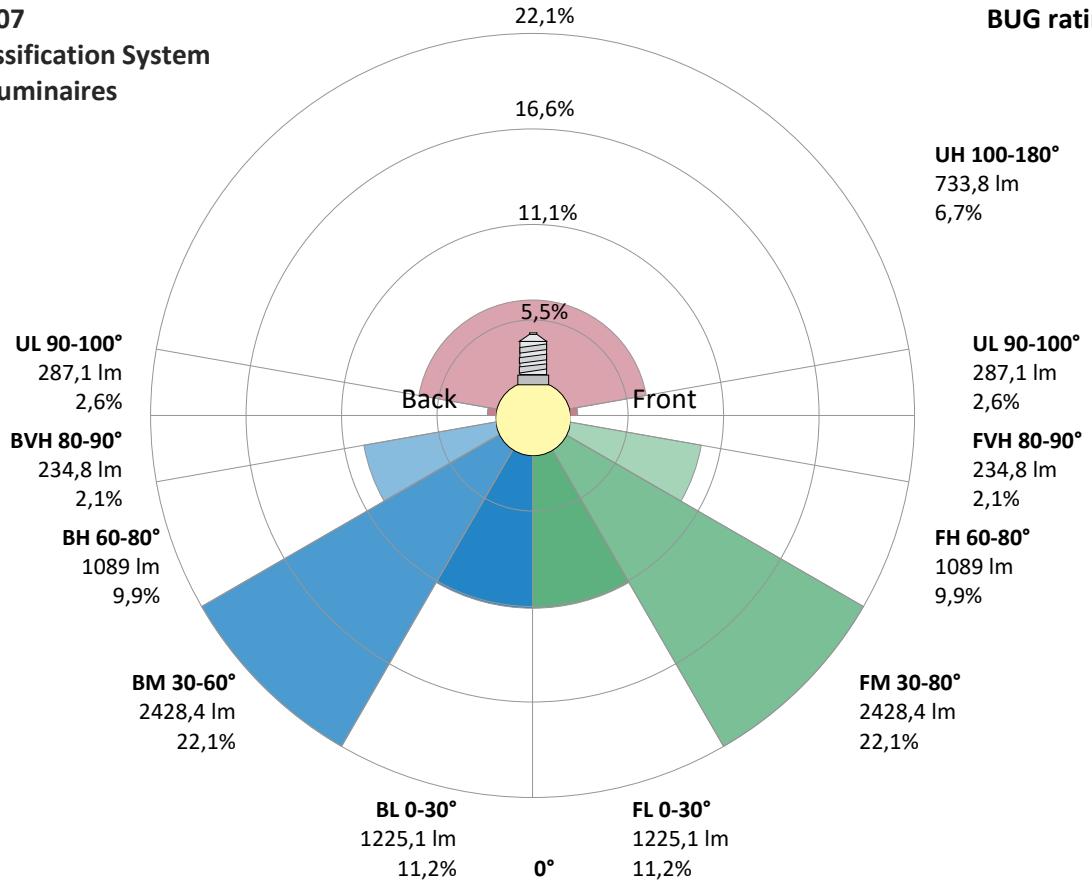
Max intensity	3127 cd
Intensity, 90°	305 cd
Intensity, 0°	3127 cd

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	1225 lm	11,2%
Medium(30-60°)	2428 lm	22,1%
High(60-80°)	1089 lm	9,9%
Very high(80-90°)	235 lm	2,1%
Back light		
Low(0-30°)	1225 lm	11,2%
Medium(30-60°)	2428 lm	22,1%
High(60-80°)	1089 lm	9,9%
Very high(80-90°)	235 lm	2,1%
Uplight		
Low(90-100°)	287 lm	2,6%
High(100-180°)	734 lm	6,7%

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

BUG rating B3 U4 G3



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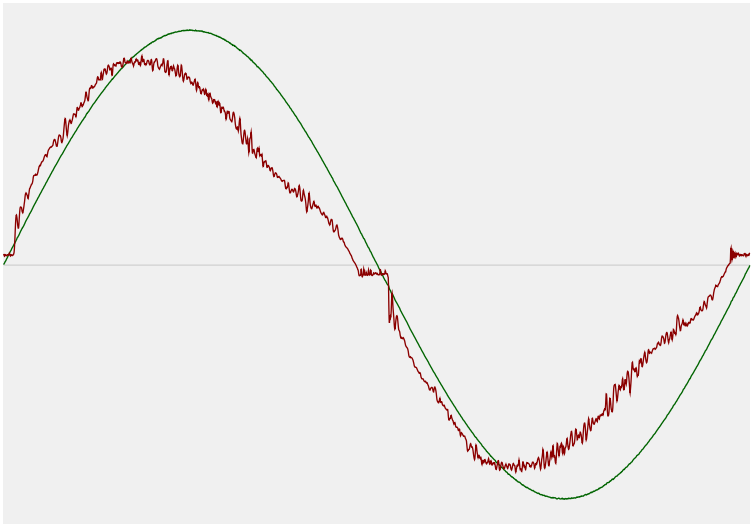
Power Details

Input Power

Power feed to light source	71,9 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,321 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	73,8 VA
Displacement factor of AC power feed	0,97
Power factor of AC current feed	0,97
Total harmonic distortion of the current	11,74%
Total harmonic distortion of the voltage	0,07%

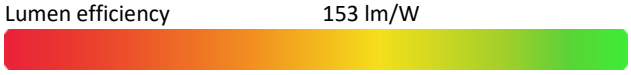
Input Power Curve



Efficiency

Radiated power efficiency 46,7%

Lumen efficiency 153 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	5696 K
CCT shift	+4 K
CCT end	5700 K

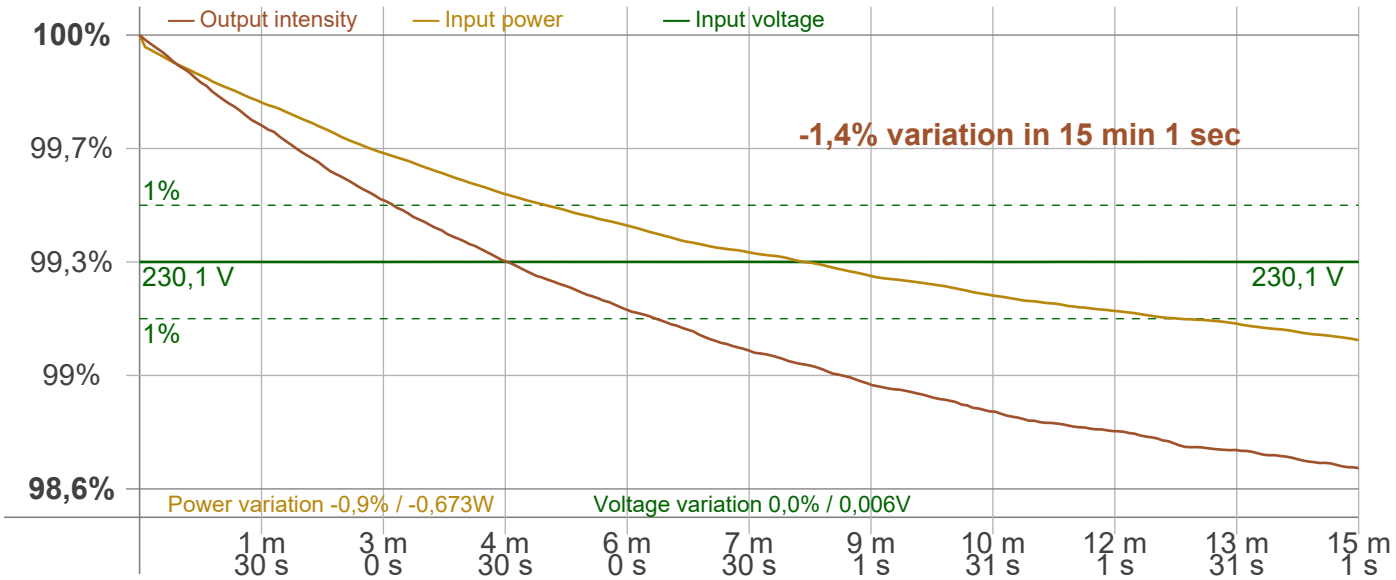
Warmup Result

Total warmup time	Lamp stabilized in 15 min 1 sec
Warmup variation	-1,4%

Output Change

Output start	11124 lm
Output change	-148 lm
Output end	10976 lm

Stabilization Curve



Light Measurement Report

Print date: 13-6-2025
Measurement date and time: 24-4-2025 10:02:49 – Measurement no. VFR-250424-0896-MS
Measurement tracking No. and Link: VT250424-003317
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	99,5 Hz
Percent Flicker	0,82 %
Flicker index	0

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

PstLM value (F < 80 Hz)	0,02
SVM value (80 < F < 2000 Hz)	0,03

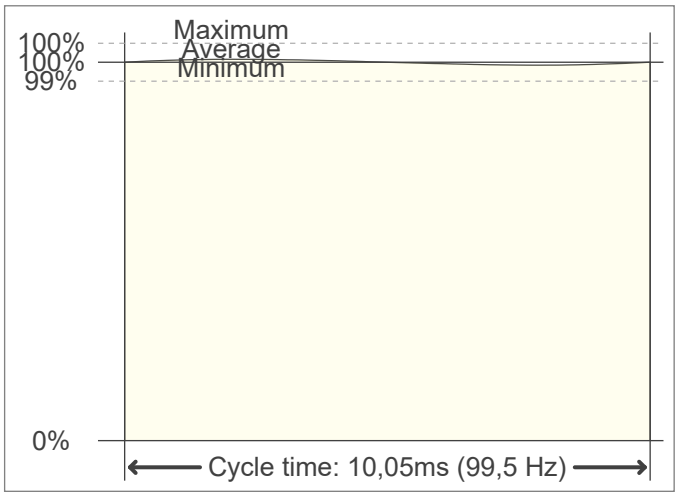
Flicker indices according to California Energy Commission (CEC) 2016b

JA8/10 40 Hz	0,03 %
JA8/10 90 Hz	0,03 %
JA8/10 200 Hz	0,8 %
JA8/10 400 Hz	0,81 %
JA8/10 1000 Hz	0,81 %

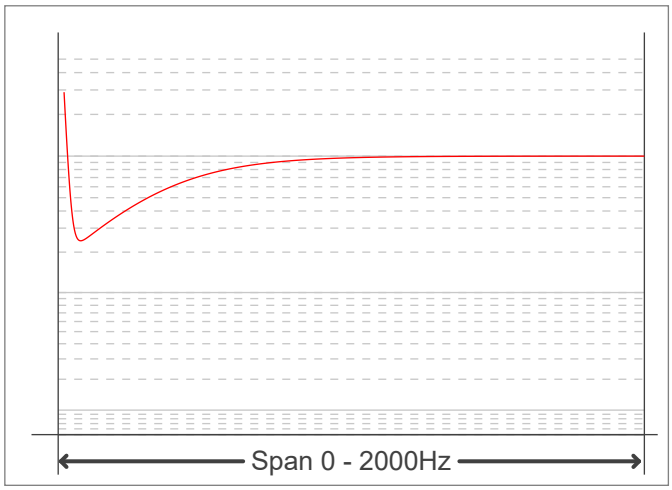
Flicker indices according to Lighting Research Center (2015)

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