Light Measurement Report

Print date: 18-4-2025
Measurement date and time: 3-4-2025 13:02:15 – Measurement no. VFR-250403-0560-MS
Measurement tracking No. and Link: VT250403-003678
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

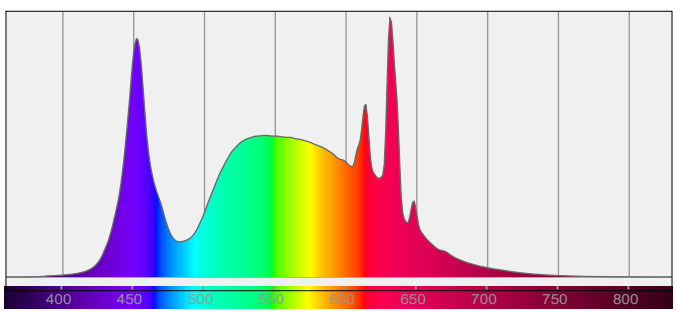
Number of C-planes and Resolution	12 planes – 30°
γ (gamma)-Resolution	5°
Test Distance	12,10 m
Input Power, Power and Displ. Factors	75,2 W – PF 0,97 – DPF 0,97
Input RMS Voltage and Current	230 V – 0,337 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 1 sec – 2,0%

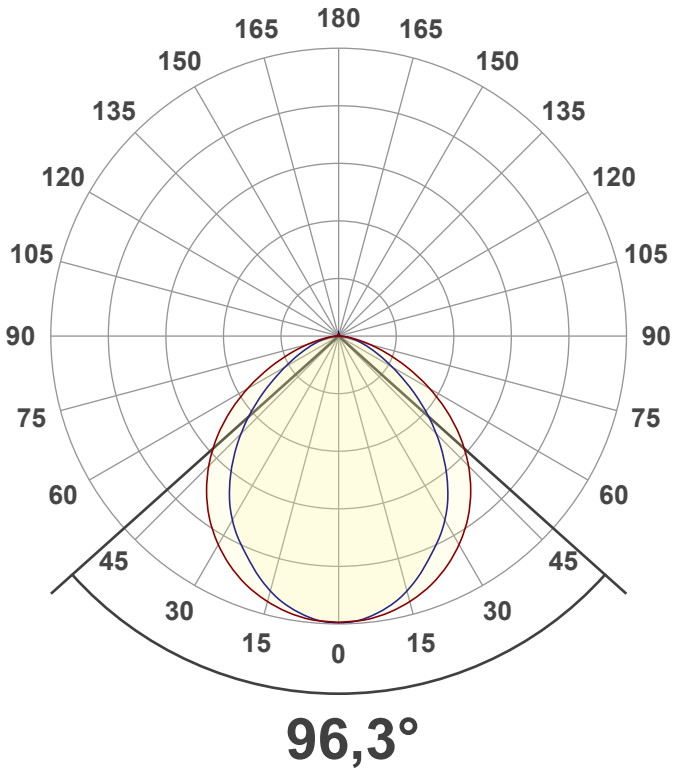
Tested Light Source

Product Name	810344-5000K
Item No. and Manufacturer	810344-5000K – Dutchfulfillment
Product Description (line 1)	LICHTLIJN MODULE | JUPITER | 20-30-40W | 90° | CCT-SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	12684 lm – 0,98% / 99,02%
Efficiency	169 lm/W
Peak Intensity and Beam Angle	5510 cd – 96,3°
Correlated Color Temperature, Target/Measured	CCT = 5000 K / 4705 K
Color Rendering Index	CRI 85,2
Color Rendering TM30-18	R_f 84,1 – R_g 99,5
Color Shift, CIE duv and MacAdam Steps	Duv 0,0039 – SDCM 6,3
Flicker	SVM 0,02 – PstLM 0,02





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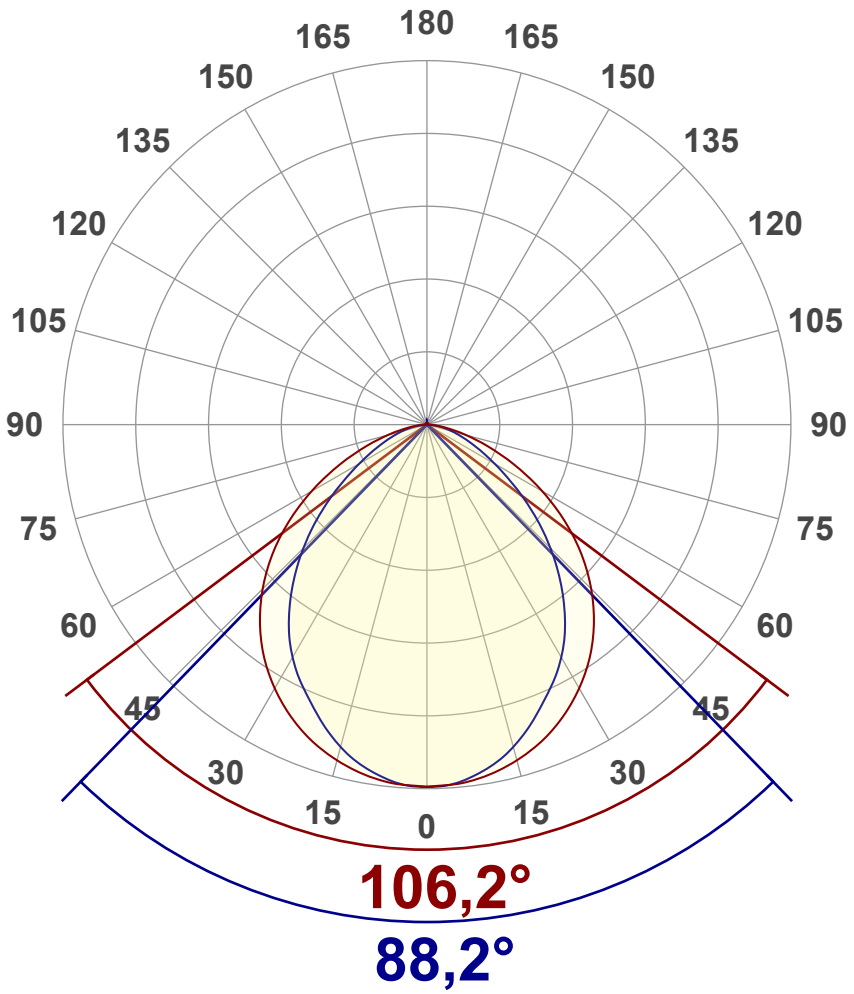
Luminous Intensity diagram Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	12684 lm
Lumen Up% / Down%	0,98% / 99,02%
Peak Intensity	5510 cd
Beam Angle (50%)	96,3°
Beam Angle (90%)	88,2°
Beam Angle (10%)	106,2°

Cut-off Angle

Average 2,5%	167,9°

Field Angle

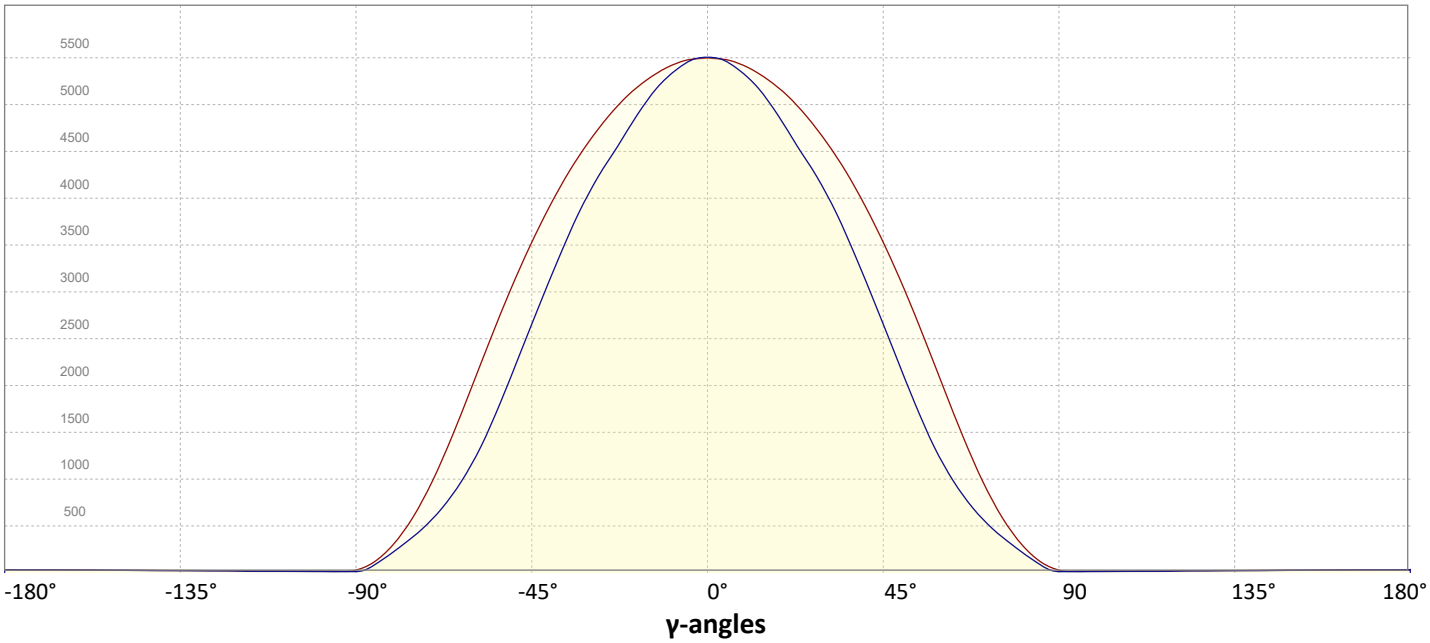
Average 10%	147,1°

Intensity Ratio

In 120° cone	85,0%
In 90° cone	61,5%

C000-C180
C090-C270

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



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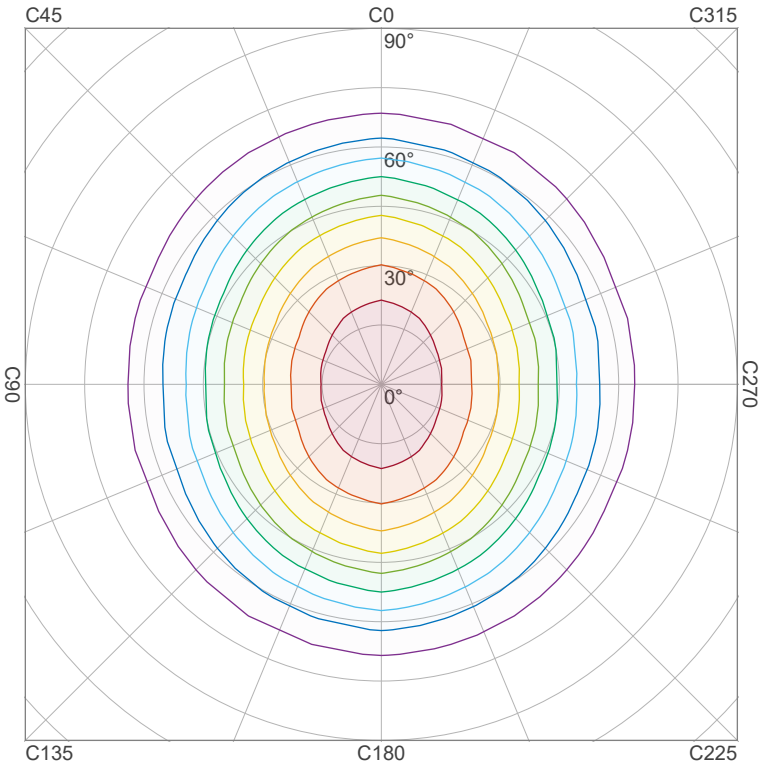
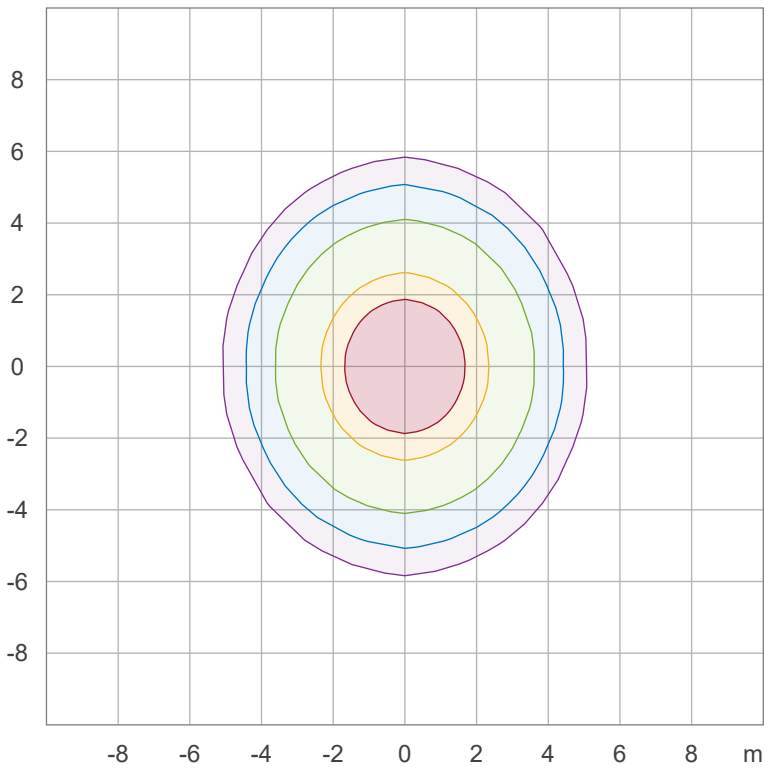
Iso-intensity Diagram (Iso-candela)



	90 %	4951,2 cd
	80 %	4401,1 cd
	70 %	3851,0 cd
	60 %	3300,8 cd
	50 %	2750,7 cd
	40 %	2200,6 cd
	30 %	1650,4 cd
	20 %	1100,3 cd
	10 %	550,1 cd

Peak intensity: 5501,4 cd
Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



	50,0 %	305,6 lx
	30,0 %	183,4 lx
	10,0 %	61,1 lx
	5,0 %	30,6 lx
	3,0 %	18,3 lx

Peak illuminance: 611,3 lx
Mounting height: 3,0 m
Number of c-planes: 12

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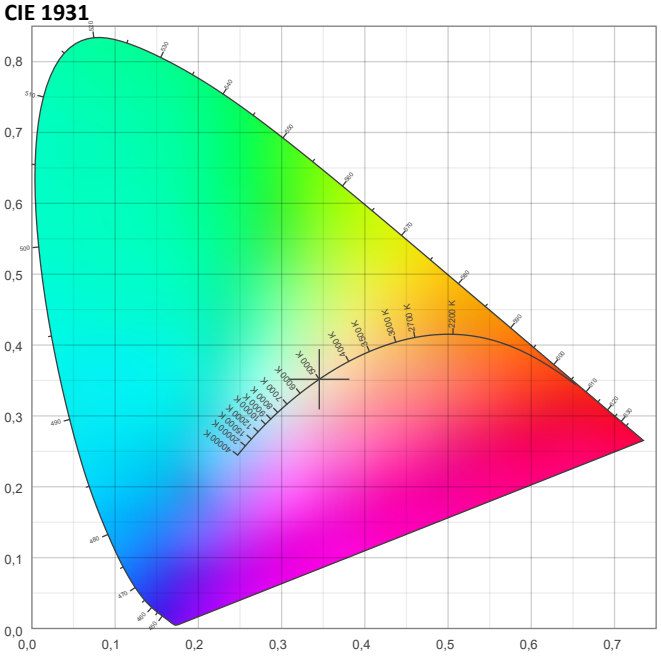
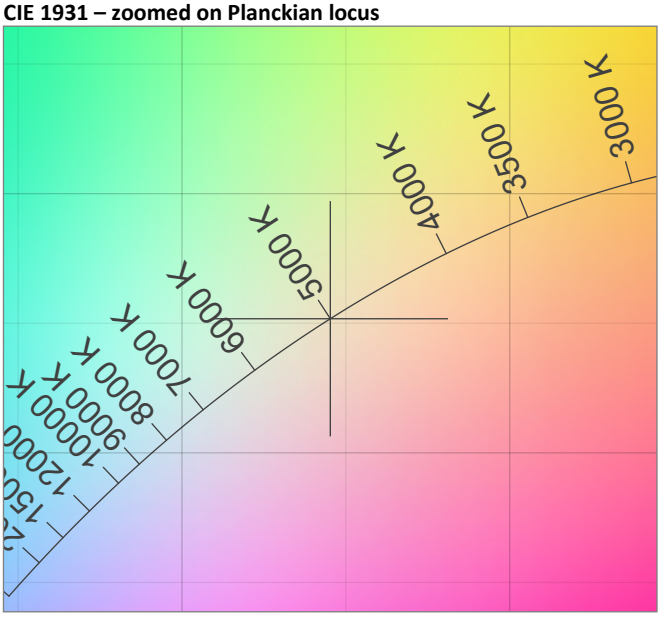
Color details

Correlated Color Temperature, Target	CCT = 5000 K
Correlated Color Temperature, Measured	CCT = 4705 K
Color Rendering Index	CRI 85,2
Color Rendering Index, R9 (red component)	R9 = 46,2
Color Rendering TM30-18	R_f 84,1 – R_g 99,5
Color Quality Scale	CQS = 84,6
MacAdam Steps	SDCM = 6,3
Color coordinates CIE 1931	(x;y) = (0,345;0,352)
Color coordinate CIEs 1960	(u;v) = (0,211;0,323)
Color deviation from BBL	Duv = 0,0039
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,211;0,485)

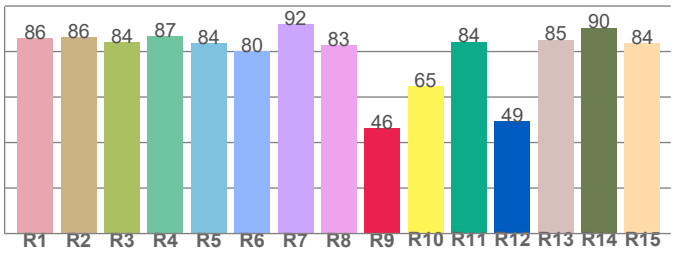
CIE 1931



CIE 1931 – zoomed on Planckian locus



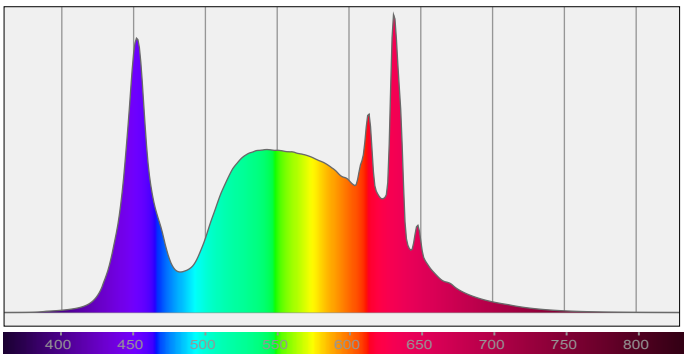
Color Rendering Index per reference color (CIE 1995)



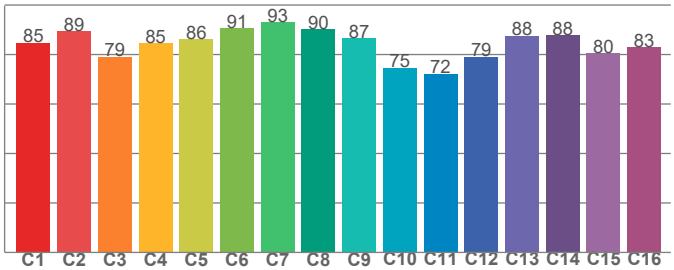
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
85,8	86,3	84,2	86,7	83,5	80,1	92,1	82,8	46,2	64,8	84,2	49,4	85,3	90,5	83,6

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



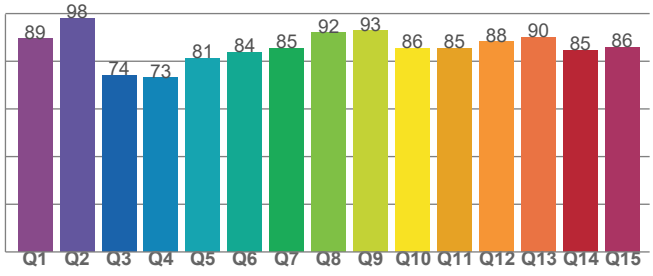
TM30-18 Rf-values per hue bin



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
84,8	89,4	79,1	84,6	86,1	90,6	93,0	90,3	86,5	74,7	72,2	79,1	87,6	87,7	80,5	82,9

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
89,4	97,9	74,1	73,1	81,3	83,7	85,4	91,9	92,8	85,6	85,4	88,1	90,2	84,6	85,8

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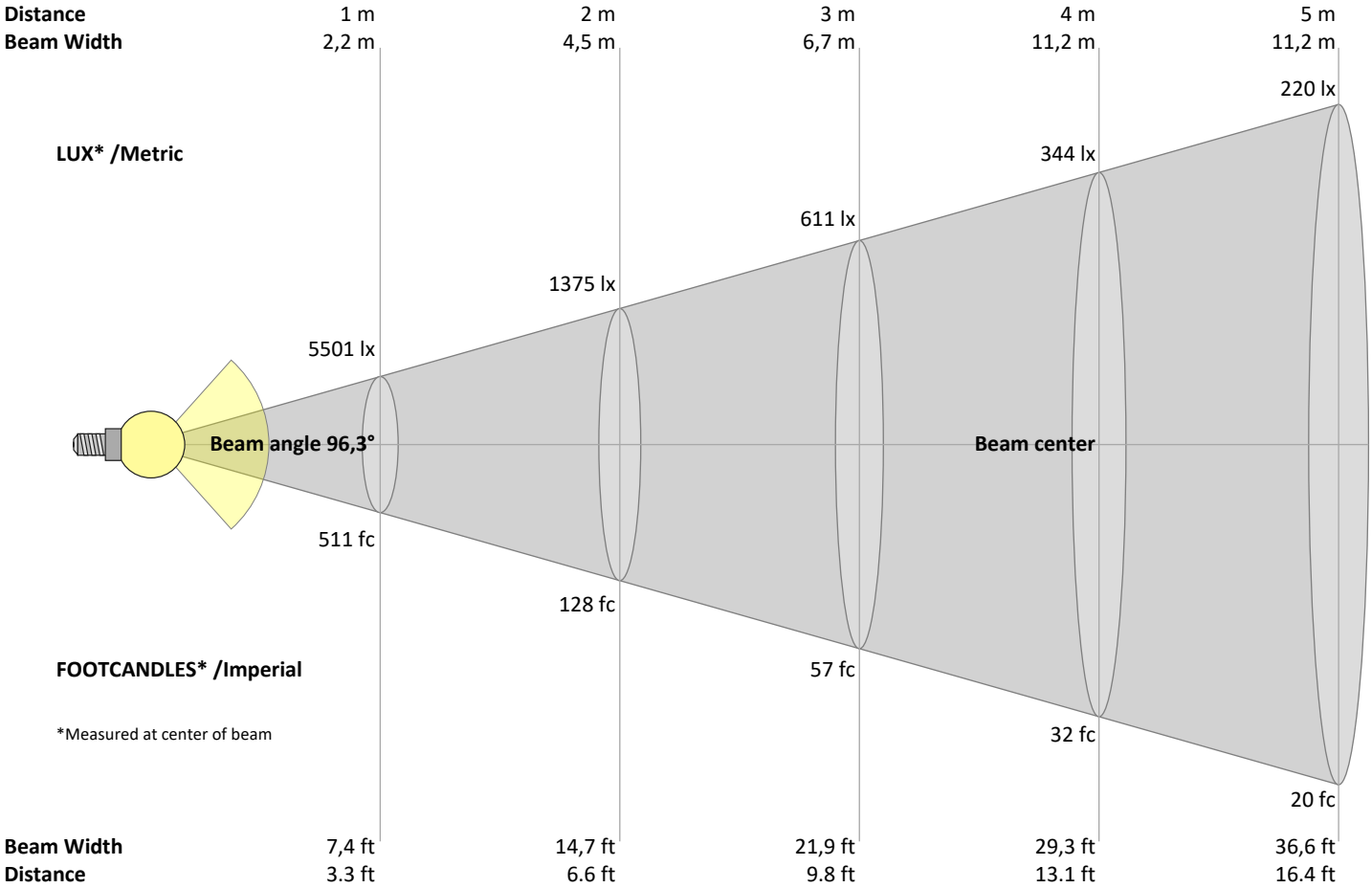
Beam Details



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
5501	1375	611	344	220	153	112	86	68	55	45	38	33	28	24	21	19	17	15	14	lux
511,1	127,8	56,8	31,9	20,4	14,2	10,4	8	6,3	5,1	4,2	3,5	3	2,6	2,3	2	1,8	1,6	1,4	1,3	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
5501	5475	5401	5278	5111	4891	4623	4311	3944	3527	3063	2555	2024	1498	1021	626	329	130	32	17	cd
100%	100%	98%	96%	93%	89%	84%	78%	72%	64%	56%	46%	37%	27%	19%	11%	6%	2%	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
5501	5443	5293	5061	4755	4424	4073	3651	3166	2654	2132	1631	1200	862	601	402	238	98	20	12	cd
100%	99%	96%	92%	86%	80%	74%	66%	58%	48%	39%	30%	22%	16%	11%	7%	4%	2%	0%	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
5501	5475	5401	5278	5111	4891	4623	4311	3944	3527	3063	2555	2024	1498	1021	626	329	130	32	17	cd
100%	100%	98%	96%	93%	89%	84%	78%	72%	64%	56%	46%	37%	27%	19%	11%	6%	2%	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
5501	5443	5293	5061	4755	4424	4073	3651	3166	2654	2132	1631	1200	862	601	402	238	98	20	12	cd
100%	99%	96%	92%	86%	80%	74%	66%	58%	48%	39%	30%	22%	16%	11%	7%	4%	2%	0%	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	27,4	28,5	27,6	28,8	29,1	25,5	26,6	25,8	27,0	27,2
	3H	28,4	29,6	28,8	29,9	30,1	26,2	27,3	26,6	27,6	27,8
	4H	28,8	29,9	29,2	30,2	30,4	26,5	27,6	26,9	27,9	28,1
	6H	29,1	30,0	29,4	30,3	30,7	26,8	27,7	27,1	28,0	28,4
	8H	29,1	30,1	29,5	30,4	30,8	26,8	27,7	27,2	28,1	28,5
	12H	29,1	30,0	29,5	30,4	30,9	26,8	27,7	27,2	28,1	28,5
4H	2H	27,6	28,7	28,0	29,0	29,3	26,1	27,2	26,5	27,5	27,7
	3H	28,9	29,8	29,3	30,2	30,6	27,0	27,9	27,4	28,3	28,7
	4H	29,3	30,2	29,8	30,6	31,1	27,3	28,1	27,8	28,6	29,1
	6H	29,7	30,5	30,2	30,8	31,2	27,6	28,4	28,1	28,8	29,1
	8H	29,8	30,5	30,3	30,9	31,3	27,7	28,4	28,2	28,8	29,2
	12H	29,8	30,4	30,3	30,8	31,3	27,7	28,3	28,2	28,8	29,3
8H	4H	29,4	30,1	29,9	30,5	30,9	27,5	28,3	28,1	28,6	29,0
	6H	29,8	30,4	30,4	30,9	31,4	27,9	28,5	28,4	28,9	29,5
	8H	30,0	30,5	30,5	31,0	31,7	28,1	28,6	28,6	29,1	29,7
	12H	30,1	30,5	30,7	31,0	31,7	28,2	28,6	28,8	29,1	29,7
12H	4H	29,4	30,0	29,9	30,4	30,9	27,5	28,1	28,0	28,6	29,1
	6H	29,9	30,3	30,4	30,9	31,5	28,0	28,5	28,5	29,0	29,6
	8H	30,0	30,4	30,6	30,9	31,6	28,2	28,5	28,8	29,1	29,7

Variations with the observer position for the luminaire spacings, S:		
S = 1.0H	0,1 / -0,1	0,2 / -0,3
S = 1.5H	0,4 / -0,5	0,5 / -0,8
S = 2.0H	1,0 / -1,1	1,0 / -1,4

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	119	119	119	119	116	116	116	116	111	111	111	106	106	106	101	101	101	99
1	110	106	102	98	107	103	100	97	99	96	93	95	92	90	91	89	88	85
2	101	93	87	82	98	91	86	81	88	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	68	65	63
4	85	74	66	60	83	73	65	59	70	64	58	68	62	57	65	61	57	54
5	79	67	58	52	77	65	58	52	63	56	51	61	55	50	59	54	50	48
6	73	60	52	46	71	59	51	46	57	50	45	56	49	45	54	49	44	42
7	68	55	47	41	66	54	46	41	53	45	40	51	45	40	50	44	40	38
8	63	50	42	37	62	50	42	36	48	41	36	47	41	36	46	40	36	34
9	59	46	38	33	58	46	38	33	45	38	33	43	37	33	42	37	32	31
10	56	43	35	30	54	42	35	30	41	35	30	40	34	30	39	34	30	28

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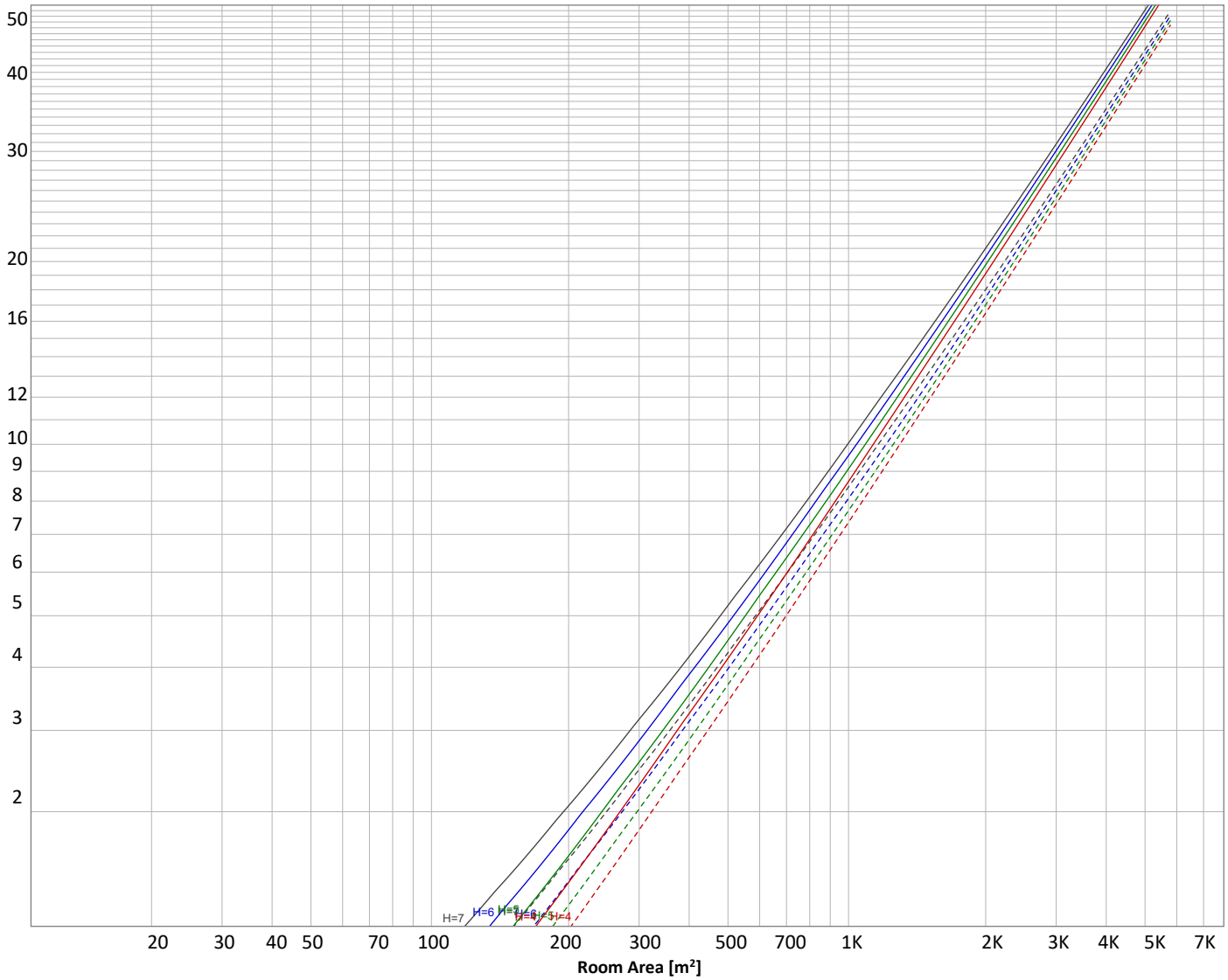
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 12684 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°
518 lm	1456 lm	2141 lm	2471 lm	2355 lm	1835 lm	1129 lm	527 lm	128 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
16,2 lm	16,7 lm	17,3 lm	18,2 lm	17,2 lm	15,5 lm	12,5 lm	8,24 lm	2,86 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	518 lm	4,1%
10-20°	1456 lm	11,5%
20-30°	2141 lm	16,9%
30-40°	2471 lm	19,5%
40-50°	2355 lm	18,6%
50-60°	1835 lm	14,5%
60-70°	1129 lm	8,9%
70-80°	527 lm	4,2%
80-90°	128 lm	1,0%
90-100°	16 lm	0,1%
100-110°	17 lm	0,1%
110-120°	17 lm	0,1%
120-130°	18 lm	0,1%
130-140°	17 lm	0,1%
140-150°	15 lm	0,1%
150-160°	13 lm	0,1%
160-170°	8 lm	0,1%
170-180°	3 lm	0,0%
Total	12684 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	4115 lm	32,4%
0-40°	6586 lm	51,9%
0-60°	10775 lm	85,0%
60-90°	1784 lm	14,1%
70-100°	671 lm	5,3%
90-120°	50 lm	0,4%
0-90°	12559 lm	99,0%
90-180°	125 lm	1,0%
0-180°	12684 lm	100,0%

Intensity peaks

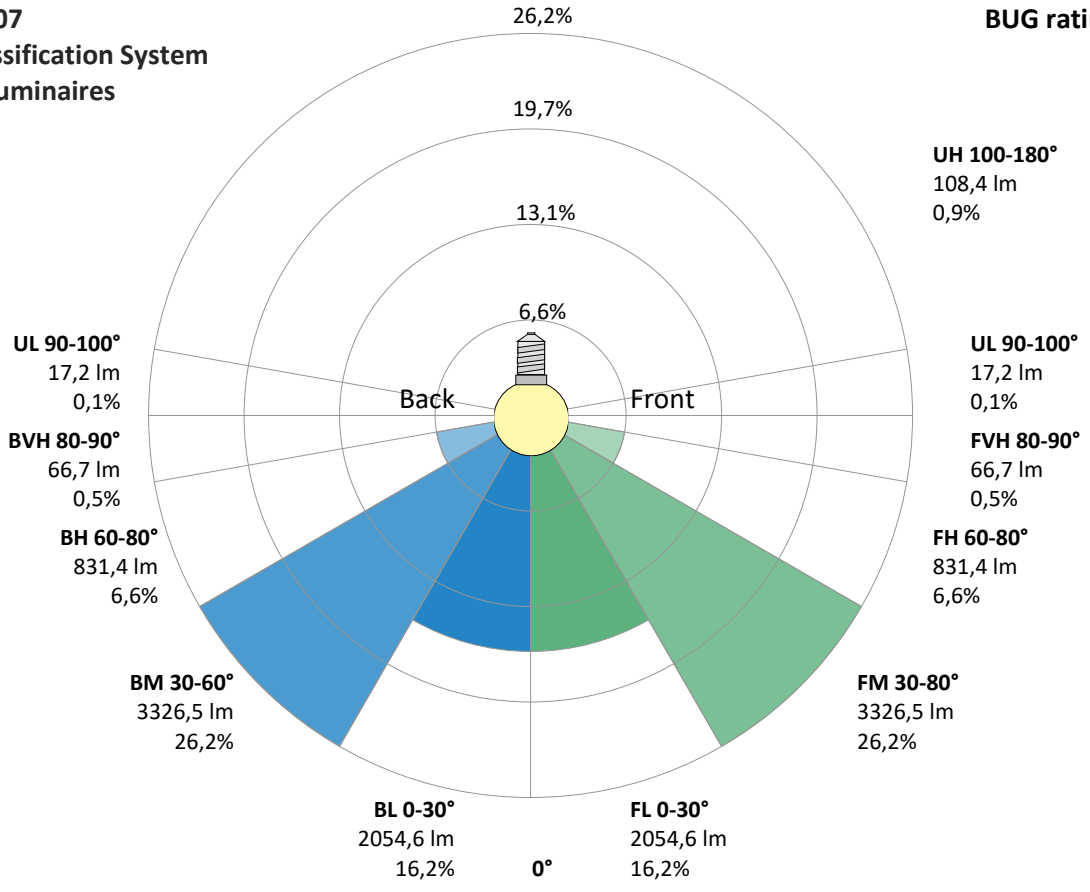
Max intensity	5510 cd
Intensity, 90°	32 cd
Intensity, 0°	5501 cd

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	2055 lm	16,2%
Medium(30-60°)	3326 lm	26,2%
High(60-80°)	831 lm	6,6%
Very high(80-90°)	67 lm	0,5%
Back light		
Low(0-30°)	2055 lm	16,2%
Medium(30-60°)	3326 lm	26,2%
High(60-80°)	831 lm	6,6%
Very high(80-90°)	67 lm	0,5%
Uplight		
Low(90-100°)	17 lm	0,1%
High(100-180°)	108 lm	0,9%

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

BUG rating B3 U3 G1



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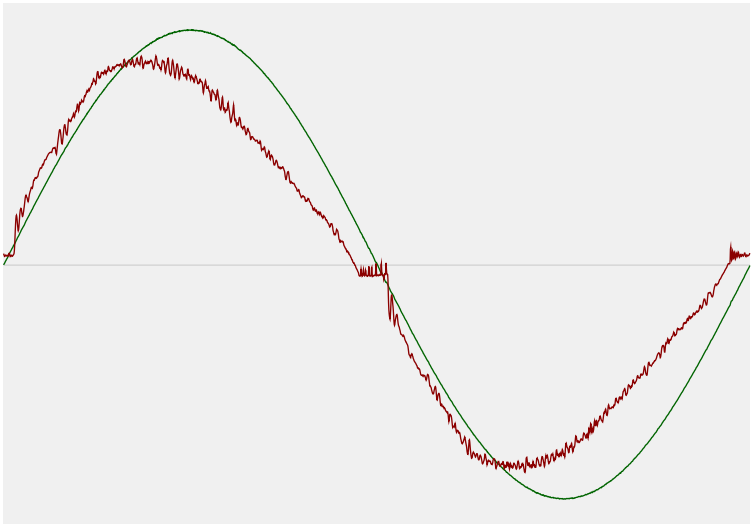
Power Details

Input Power

Power feed to light source	75,2 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,337 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	77,63 VA
Displacement factor of AC power feed	0,97
Power factor of AC current feed	0,97
Total harmonic distortion of the current	10,1%
Total harmonic distortion of the voltage	0,07%

Input Power Curve



Efficiency

Radiated power efficiency 50,0%

Lumen efficiency 169 lm/W

Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	4999 K
CCT shift	+1 K
CCT end	5000 K

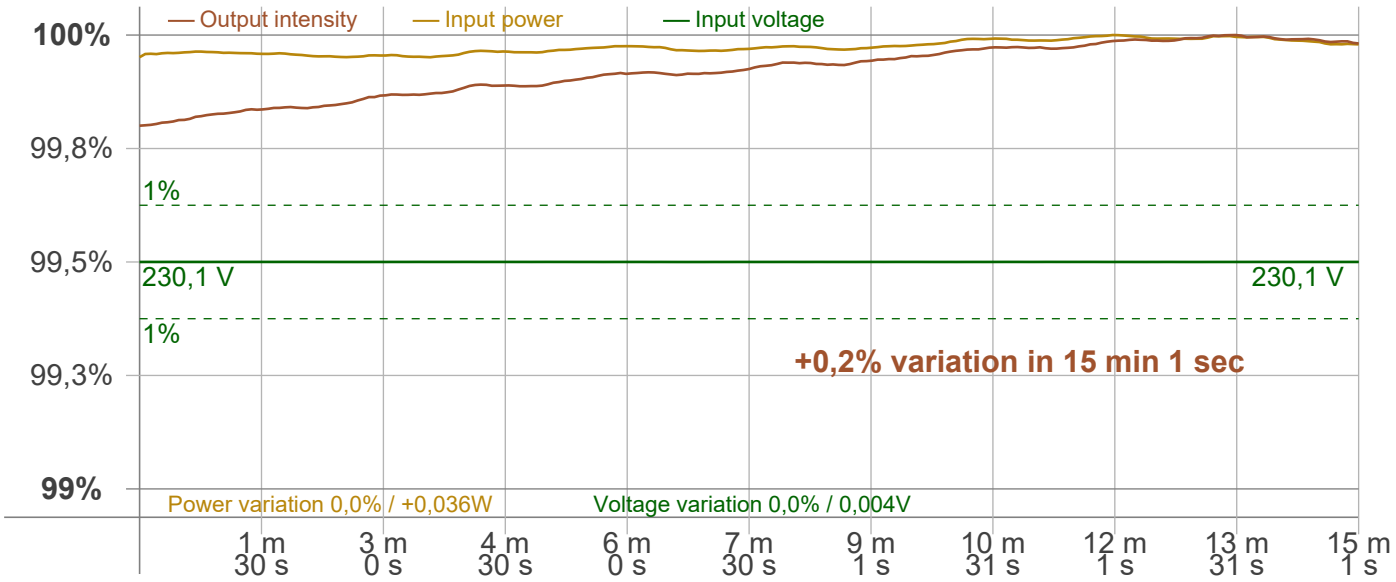
Warmup Result

Total warmup time	Lamp stabilized in 15 min 1 sec
Warmup variation	+0,2%

Output Change

Output start	12659 lm
Output change	+25 lm
Output end	12684 lm

Stabilization Curve



Light Measurement Report

Print date: 18-4-2025
Measurement date and time: 3-4-2025 13:02:15 – Measurement no. VFR-250403-0560-MS
Measurement tracking No. and Link: VT250403-003678
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	66,45 Hz
Percent Flicker	0,81 %
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 %

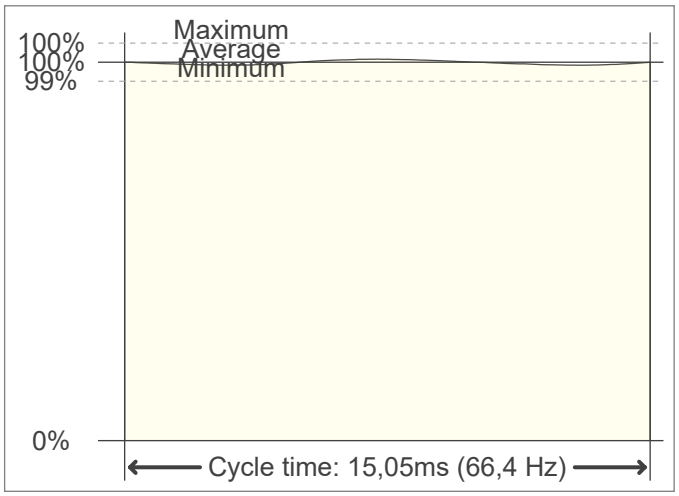
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

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

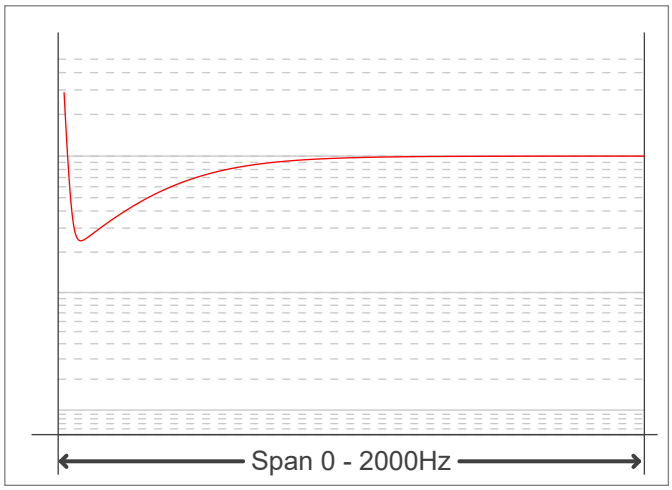
Flicker indices according to Lighting Research Center (2015)

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