Light Measurement Report

Print date: 5-9-2025
Measurement date and time: 5-9-2025 15:56:22 – Measurement no. VFR-250905-2991-MS
Measurement tracking No. and Link: VT250905-001284
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

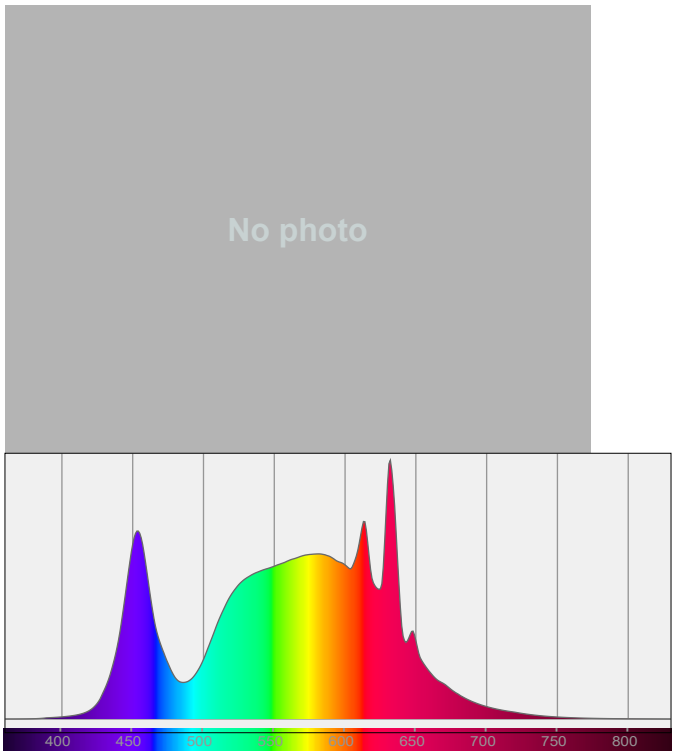
Number of C-planes and Resolution	36 planes – 10°
γ (gamma)-Resolution	5°
Test Distance	12,10 m
Input Power, Power and Displ. Factors	77,5 W – PF 0,98 – DPF 0,98
Input RMS Voltage and Current	230 V – 0,345 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 1 sec – 2,0%

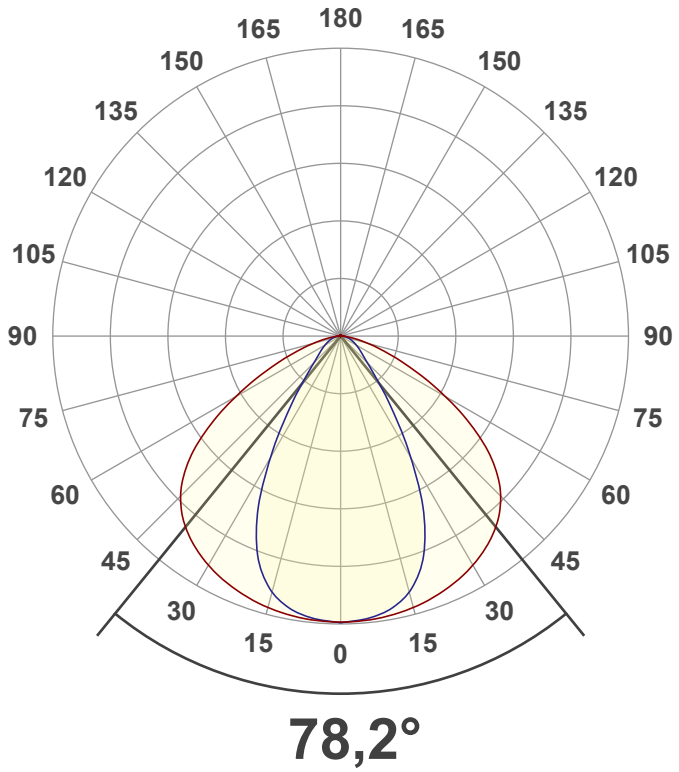
Tested Light Source

Product Name	813772-4000K
Item No. and Manufacturer	813772-4000K – Dutchfulfillment
Product Description (line 1)	LICHTLIJN MODULE | JUPITER | 65-80W | 60° | CCT-SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	12934 lm – 1,01% / 98,99%
Efficiency	167 lm/W
Peak Intensity and Beam Angle	7538 cd – 78,2°
Correlated Color Temperature, Target/Measured	CCT = 4000 K / 3999 K
Color Rendering Index	CRI 83,3
Color Rendering TM30-18	R_f 83,1 – R_g 97,1
Color Shift, CIE duv and MacAdam Steps	Duv 0,0017 – SDCM 1,4
Flicker	SVM 0 – PstLM 0,01





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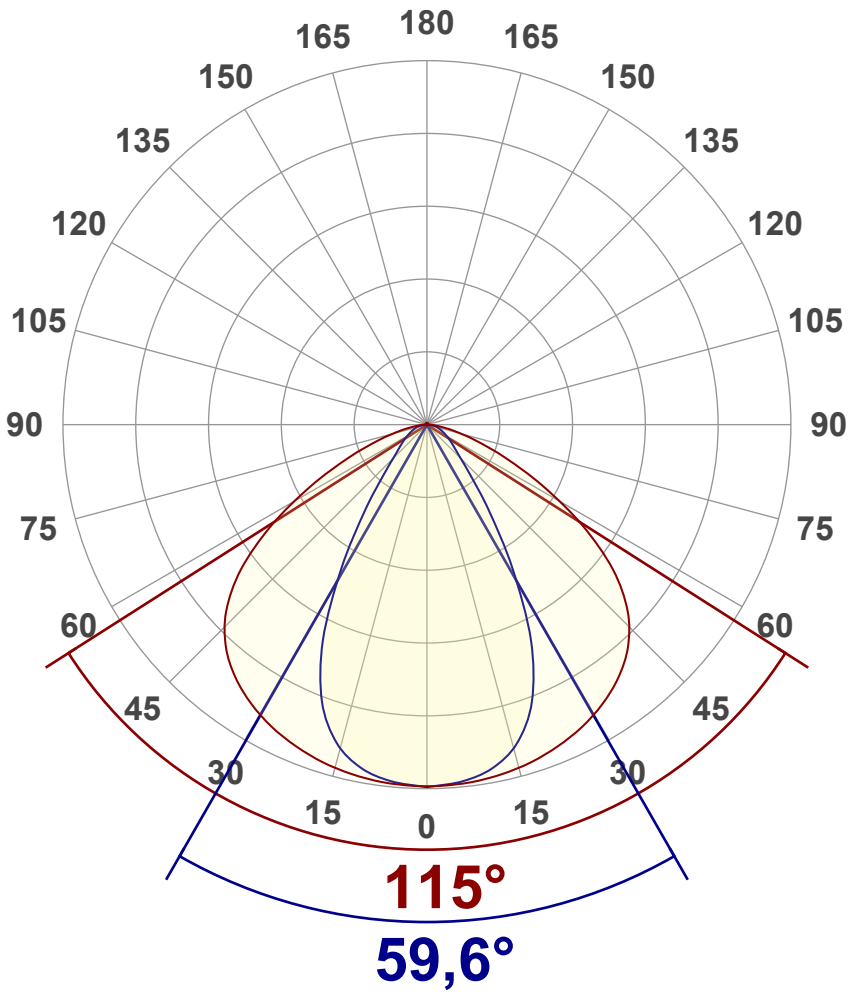
Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	12934 lm
Lumen Up% / Down%	1,01% / 98,99%
Peak Intensity	7538 cd
Beam Angle (50%)	78,2°
Beam Angle (90%)	59,6°
Beam Angle (10%)	107,3°

Cut-off Angle

Average 2,5%	158,3°

Field Angle

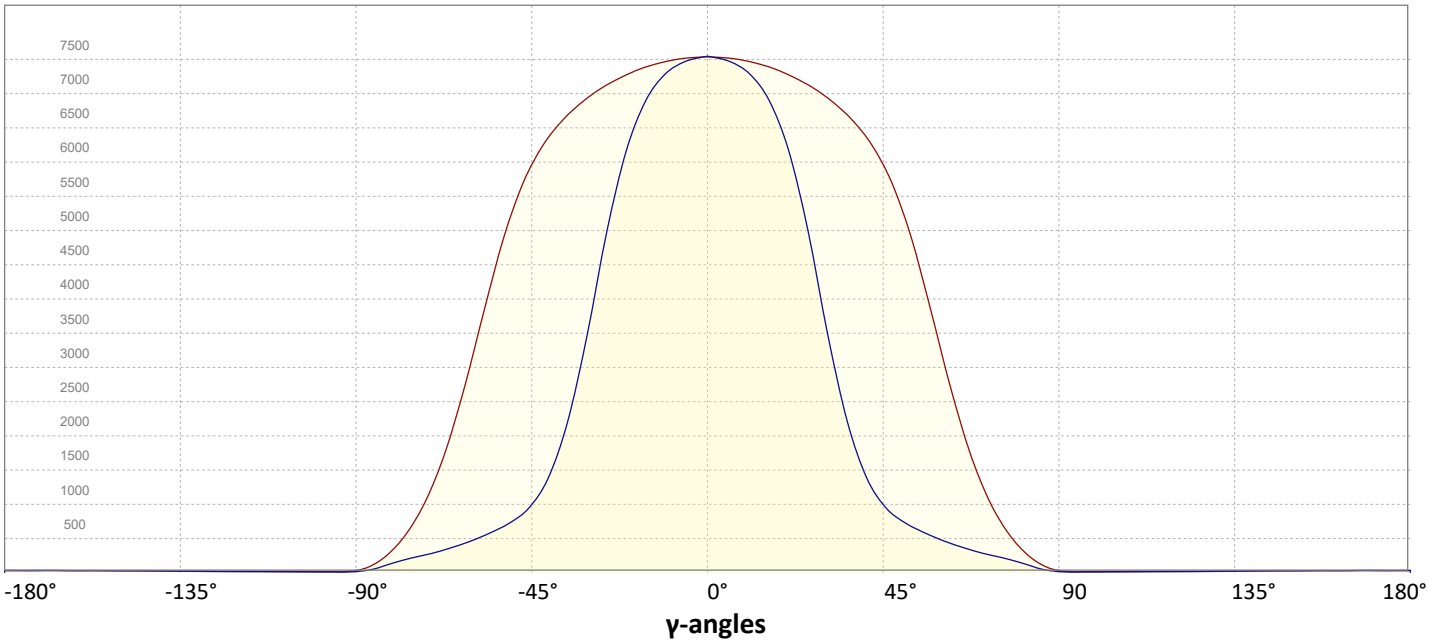
Average 10%	119,1°

Intensity Ratio

In 120° cone	89,7%
In 90° cone	72,6%

C000-C180
C090-C270

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



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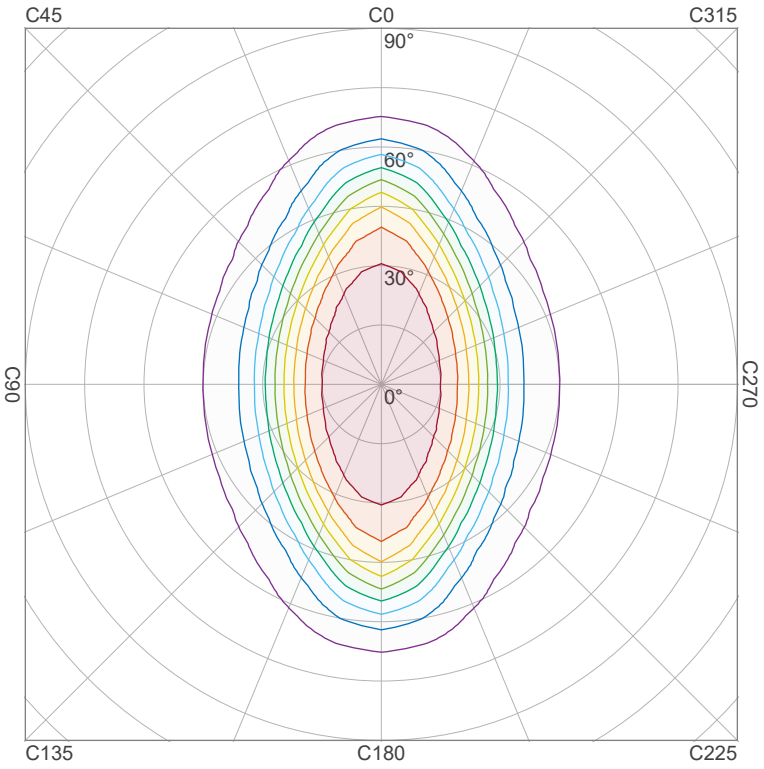
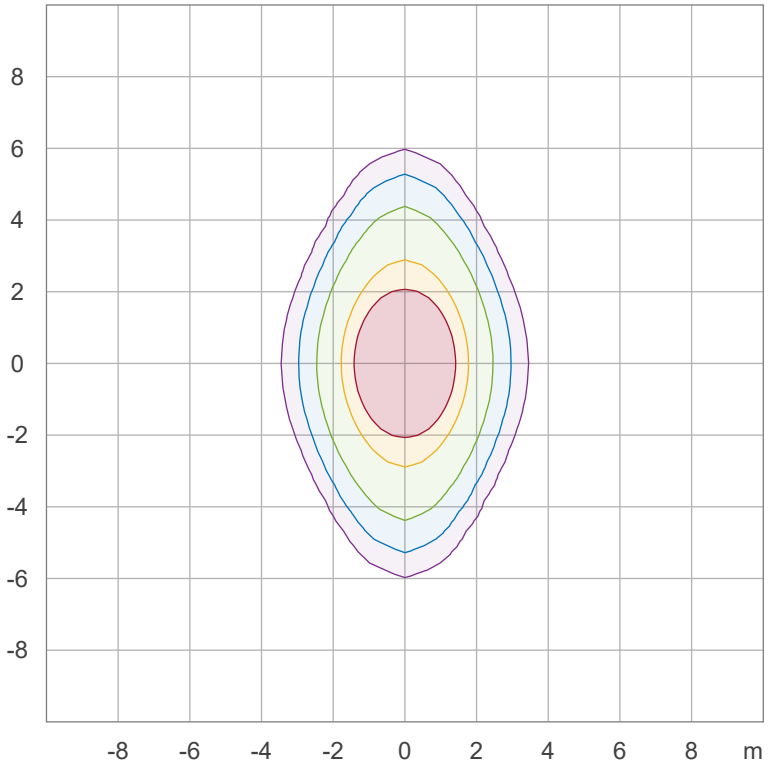
Iso-intensity Diagram (Iso-candela)



90 %	6781,6 cd
80 %	6028,1 cd
70 %	5274,6 cd
60 %	4521,1 cd
50 %	3767,6 cd
40 %	3014,0 cd
30 %	2260,5 cd
20 %	1507,0 cd
10 %	753,5 cd

Peak intensity: 7535,1 cd
Number of c-planes: 36

Iso-illuminance Diagram (Iso-lux)



50,0 %	418,5 lx
30,0 %	251,1 lx
10,0 %	83,7 lx
5,0 %	41,9 lx
3,0 %	25,1 lx

Peak illuminance: 837,1 lx
Mounting height: 3,0 m
Number of c-planes: 36

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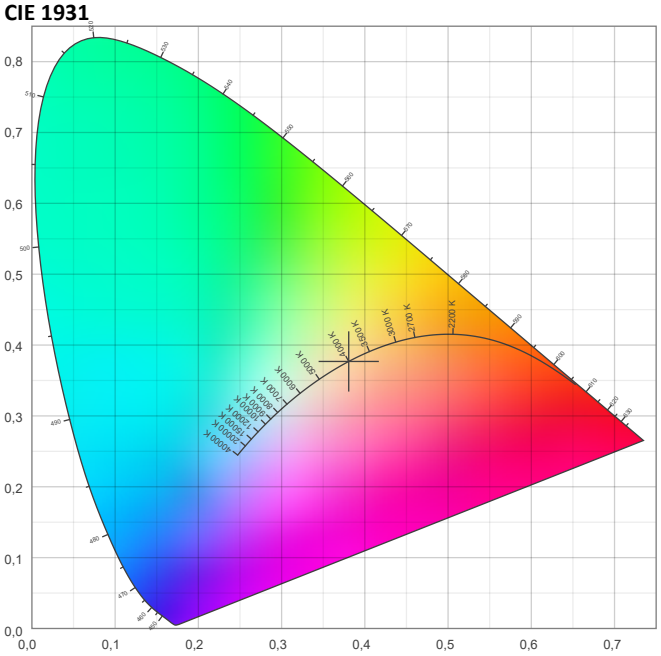
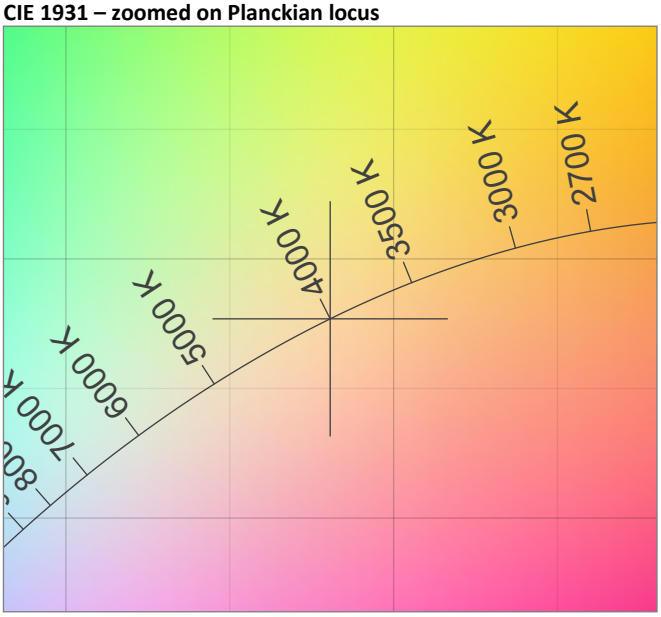
Color details

Correlated Color Temperature, Target	CCT = 4000 K
Correlated Color Temperature, Measured	CCT = 3999 K
Color Rendering Index	CRI 83,3
Color Rendering Index, R9 (red component)	R9 = 27,4
Color Rendering TM30-18	R_f 83,1 – R_g 97,1
Color Quality Scale	CQS = 82,3
MacAdam Steps	SDCM = 1,4
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 = 0,0017
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,225;0,502)

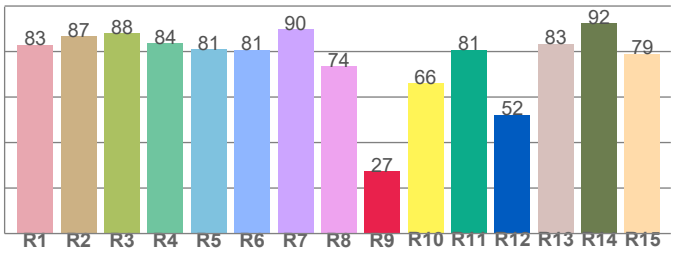
CIE 1931



CIE 1931 – zoomed on Planckian locus



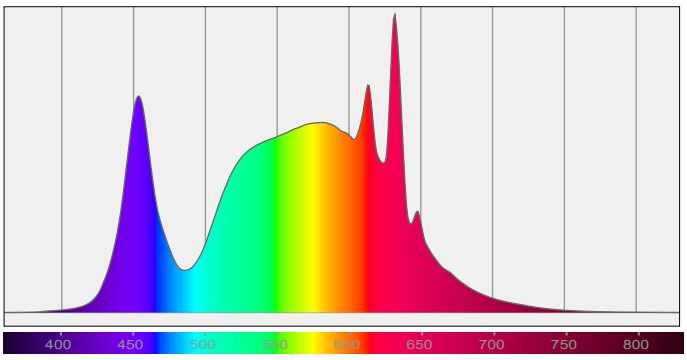
Color Rendering Index per reference color (CIE 1995)



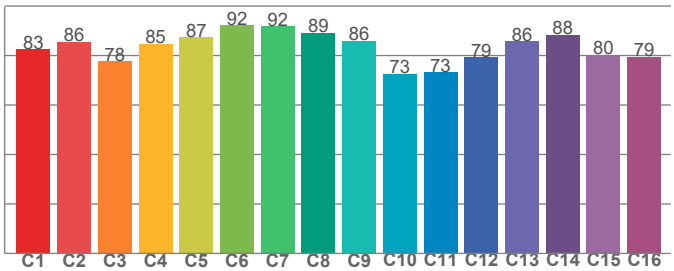
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
83,0	86,8	87,9	83,6	81,0	80,8	89,8	73,6	27,4	66,2	80,8	52,3	83,5	92,5	79,0

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



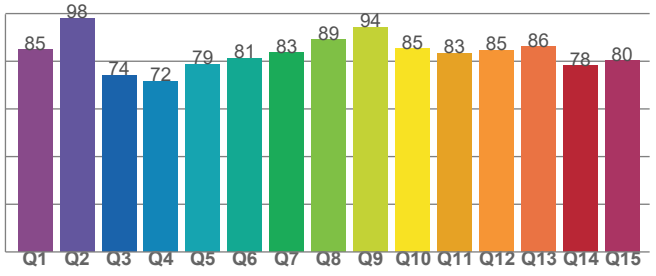
TM30-18 Rf-values per hue bin



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
82,6	85,6	77,6	84,8	87,3	92,3	91,7	89,2	86,0	72,6	73,2	79,2	85,8	88,5	80,2	79,4

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
84,9	98,0	74,1	71,6	78,8	81,3	83,5	89,1	94,3	85,2	83,4	84,7	86,2	78,2	80,2

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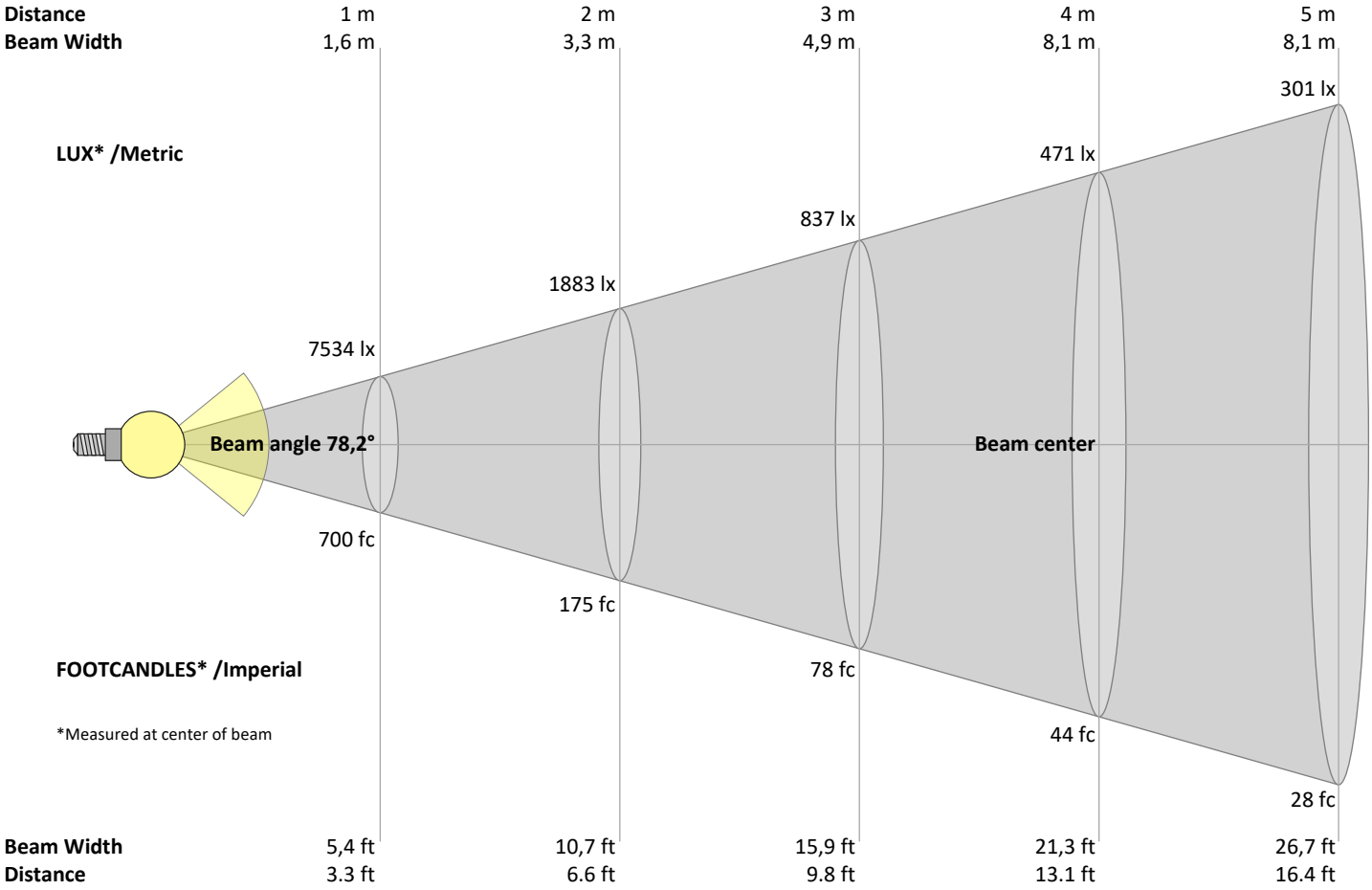
Beam Details



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
7534	1883	837	471	301	209	154	118	93	75	62	52	45	38	33	29	26	23	21	19	lux
699,9	175	77,8	43,7	28	19,4	14,3	10,9	8,6	7	5,8	4,9	4,1	3,6	3,1	2,7	2,4	2,2	1,9	1,7	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
7534	7518	7474	7399	7290	7147	6963	6723	6400	5936	5247	4298	3206	2177	1358	776	388	152	43	17	cd
100%	100%	99%	98%	97%	95%	92%	89%	85%	79%	70%	57%	43%	29%	18%	10%	5%	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
7534	7478	7316	6961	6282	5168	3715	2411	1513	1012	758	602	478	378	293	226	150	64	19	11	cd
100%	99%	97%	92%	83%	69%	49%	32%	20%	13%	10%	8%	6%	5%	4%	3%	2%	1%	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
7534	7518	7474	7399	7290	7147	6963	6723	6400	5936	5247	4298	3206	2177	1358	776	388	152	43	17	cd
100%	100%	99%	98%	97%	95%	92%	89%	85%	79%	70%	57%	43%	29%	18%	10%	5%	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
7534	7478	7316	6961	6282	5168	3715	2411	1513	1012	758	602	478	378	293	226	150	64	19	11	cd
100%	99%	97%	92%	83%	69%	49%	32%	20%	13%	10%	8%	6%	5%	4%	3%	2%	1%	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	28,3	29,3	28,5	29,6	29,8	20,2	21,2	20,4	21,5	21,7
	3H	29,1	30,1	29,5	30,4	30,6	20,8	21,9	21,2	22,1	22,3
	4H	29,4	30,4	29,8	30,6	30,9	21,2	22,2	21,7	22,5	22,8
	6H	29,6	30,4	29,9	30,7	31,1	21,7	22,5	22,0	22,8	23,2
	8H	29,6	30,4	29,9	30,7	31,2	21,8	22,6	22,2	23,0	23,4
	12H	29,6	30,4	29,9	30,7	31,2	21,9	22,7	22,3	23,1	23,5
4H	2H	28,0	29,0	28,5	29,3	29,6	20,7	21,7	21,1	22,0	22,2
	3H	29,0	29,8	29,4	30,2	30,7	21,6	22,4	22,0	22,7	23,2
	4H	29,3	30,1	29,8	30,5	31,0	22,0	22,7	22,5	23,2	23,7
	6H	29,5	30,2	30,0	30,6	31,0	22,5	23,2	23,0	23,6	23,9
	8H	29,6	30,2	30,1	30,6	31,0	22,7	23,3	23,2	23,7	24,1
	12H	29,6	30,1	30,1	30,5	31,0	22,8	23,3	23,3	23,7	24,2
8H	4H	29,2	29,9	29,7	30,3	30,6	22,2	22,9	22,8	23,3	23,7
	6H	29,5	30,0	30,0	30,4	31,0	22,8	23,3	23,3	23,8	24,3
	8H	29,6	30,0	30,1	30,5	31,2	23,1	23,5	23,6	24,0	24,7
	12H	29,6	30,0	30,2	30,5	31,1	23,3	23,6	23,9	24,1	24,8
12H	4H	29,2	29,7	29,7	30,1	30,6	22,2	22,8	22,7	23,2	23,7
	6H	29,5	29,9	30,0	30,4	31,1	22,9	23,3	23,4	23,8	24,5
	8H	29,5	29,9	30,1	30,4	31,0	23,2	23,5	23,8	24,0	24,6

Variations with the observer position for the luminaire spacings, S:		
S = 1.0H	0,6 / -0,8	0,8 / -0,7
S = 1.5H	2,0 / -2,3	1,6 / -1,0
S = 2.0H	3,3 / -3,6	2,2 / -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	111	107	104	101	108	105	102	99	100	98	96	96	94	93	93	91	90	88
2	103	96	91	86	100	94	89	85	91	87	83	87	84	81	84	82	79	77
3	95	87	80	75	93	85	79	74	82	77	73	80	75	71	77	73	70	68
4	89	79	71	66	87	77	71	65	75	69	64	73	68	63	70	66	62	61
5	83	72	64	58	81	71	63	58	69	62	57	67	61	57	65	60	56	54
6	77	66	58	52	75	65	58	52	63	57	52	61	56	51	60	55	51	49
7	72	60	53	47	71	60	52	47	58	52	47	57	51	47	55	50	46	44
8	68	56	48	43	66	55	48	43	54	47	43	53	47	43	51	46	42	41
9	64	52	45	40	62	51	44	40	50	44	39	49	43	39	48	43	39	37
10	60	48	41	36	59	48	41	36	47	41	36	46	40	36	45	40	36	34

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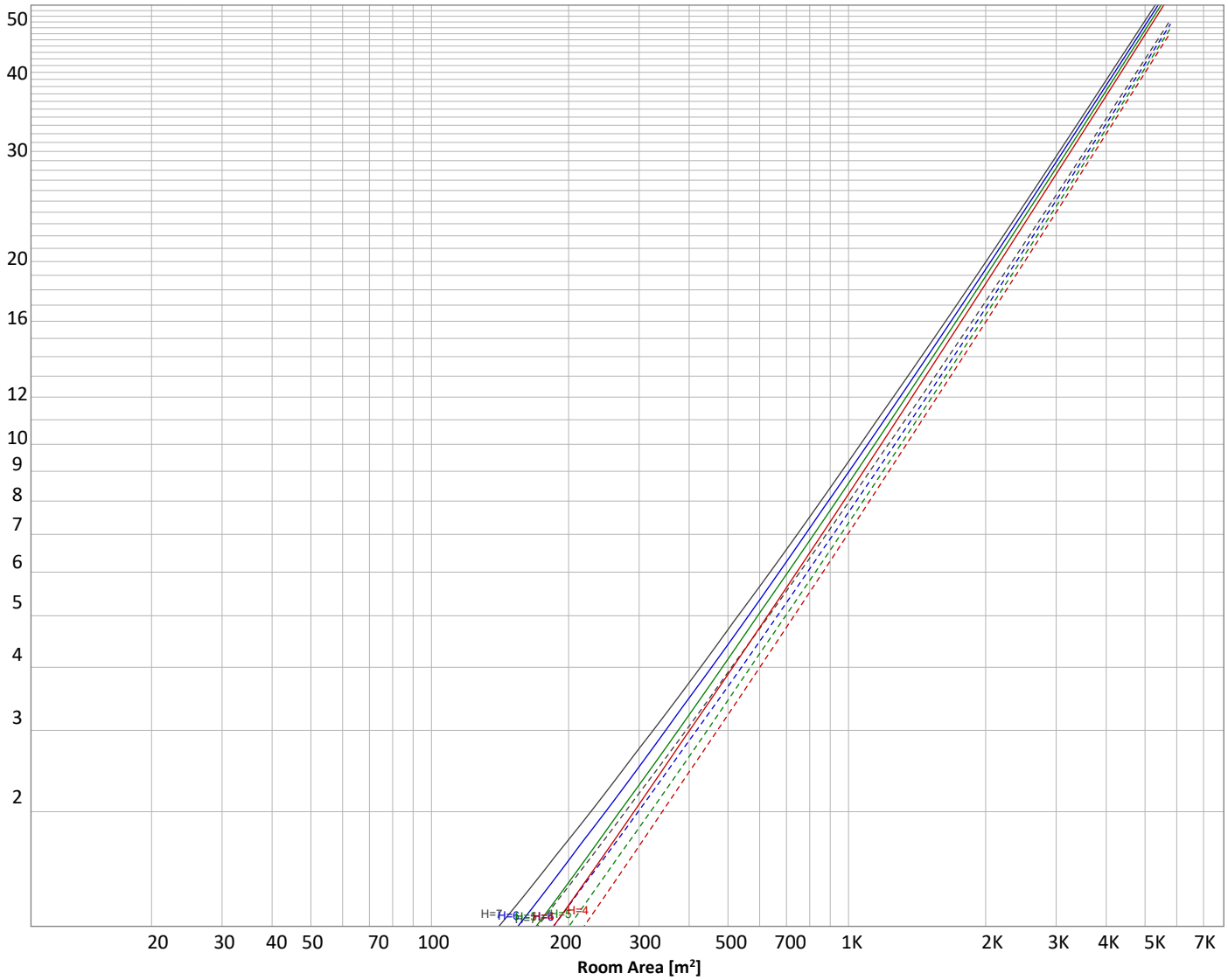
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 12934 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°
714 lm	2030 lm	2848 lm	2700 lm	2000 lm	1307 lm	747 lm	359 lm	99,9 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
16,0 lm	16,5 lm	18,1 lm	18,8 lm	18,6 lm	16,9 lm	13,5 lm	8,81 lm	3,08 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	714 lm	5,5%
10-20°	2030 lm	15,7%
20-30°	2848 lm	22,0%
30-40°	2700 lm	20,9%
40-50°	2000 lm	15,5%
50-60°	1307 lm	10,1%
60-70°	747 lm	5,8%
70-80°	359 lm	2,8%
80-90°	100 lm	0,8%
90-100°	16 lm	0,1%
100-110°	17 lm	0,1%
110-120°	18 lm	0,1%
120-130°	19 lm	0,1%
130-140°	19 lm	0,1%
140-150°	17 lm	0,1%
150-160°	13 lm	0,1%
160-170°	9 lm	0,1%
170-180°	3 lm	0,0%
Total	12934 lm	100,0%

Intensity peaks

Max intensity	7538 cd
Intensity, 90°	43 cd
Intensity, 0°	7534 cd

Zonal Lumen summary

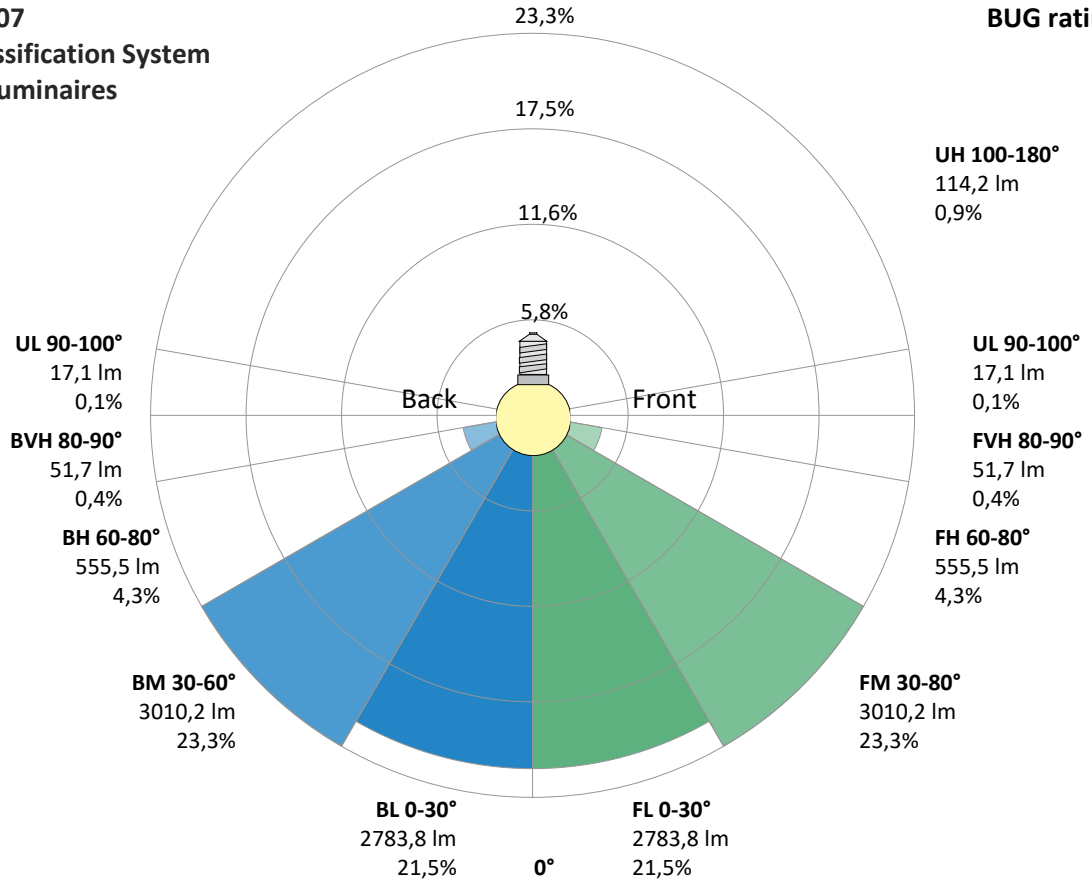
Zone (γ)	Lumen	% Total
0-30°	5592 lm	43,2%
0-40°	8291 lm	64,1%
0-60°	11598 lm	89,7%
60-90°	1205 lm	9,3%
70-100°	474 lm	3,7%
90-120°	51 lm	0,4%
0-90°	12803 lm	99,0%
90-180°	130 lm	1,0%
0-180°	12934 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	2784 lm	21,5%
Medium(30-60°)	3010 lm	23,3%
High(60-80°)	556 lm	4,3%
Very high(80-90°)	52 lm	0,4%
Back light		
Low(0-30°)	2784 lm	21,5%
Medium(30-60°)	3010 lm	23,3%
High(60-80°)	556 lm	4,3%
Very high(80-90°)	52 lm	0,4%
Uplight		
Low(90-100°)	17 lm	0,1%
High(100-180°)	114 lm	0,9%

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

BUG rating B4 U3 G1



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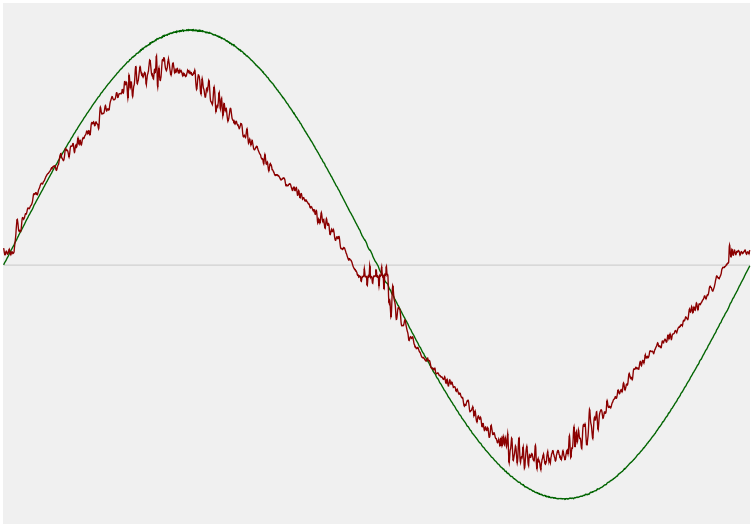
Power Details

Input Power

Power feed to light source	77,5 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,345 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	79,34 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,98
Total harmonic distortion of the current	9,57%
Total harmonic distortion of the voltage	0,07%

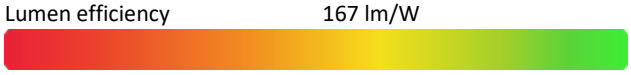
Input Power Curve



Efficiency

Radiated power efficiency 48,5%

Lumen efficiency 167 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	4000 K
CCT shift	0 K
CCT end	4000 K

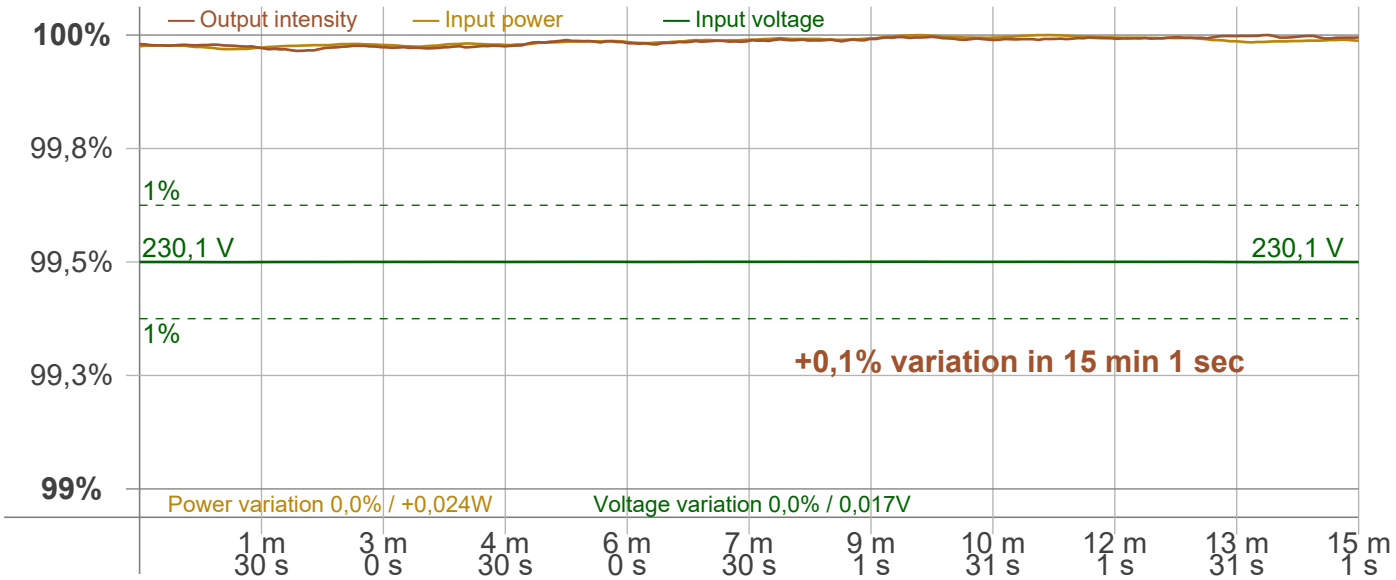
Warmup Result

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

Output Change

Output start	12932 lm
Output change	+2 lm
Output end	12934 lm

Stabilization Curve



Light Measurement Report

Print date: 5-9-2025
Measurement date and time: 5-9-2025 15:56:22 – Measurement no. VFR-250905-2991-MS
Measurement tracking No. and Link: VT250905-001284
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	103,9 Hz
Percent Flicker	0,15 %
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 %

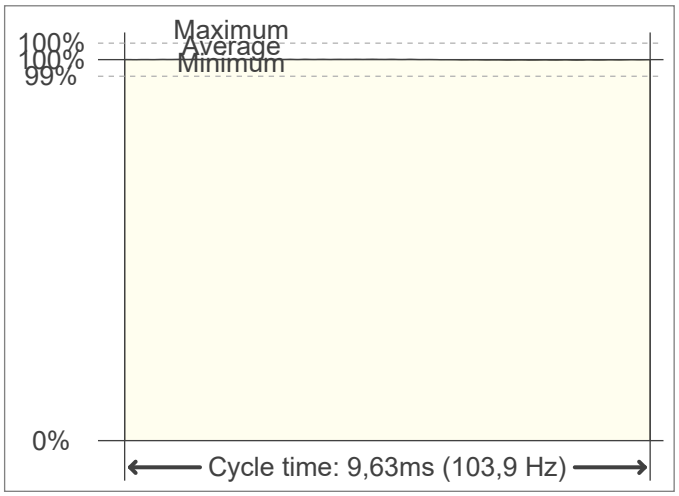
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

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

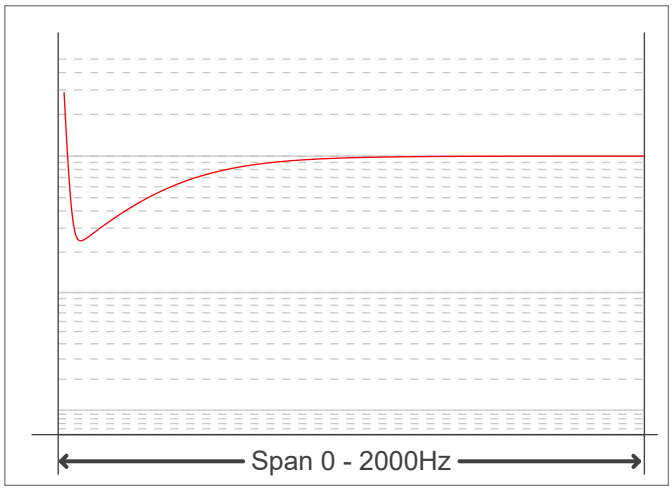
Flicker indices according to Lighting Research Center (2015)

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