Light Measurement Report

Print date: 18-4-2025
Measurement date and time: 3-4-2025 10:00:06 – Measurement no. VFR-250403-0551-MS
Measurement tracking No. and Link: VT250403-009389
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

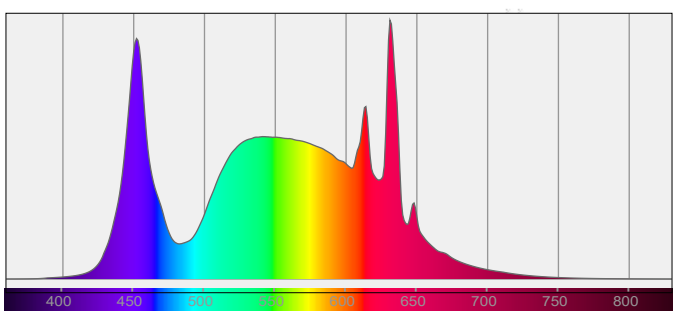
Number of C-planes and Resolution	72 planes – 5°
γ (gamma)-Resolution	5°
Test Distance	12,10 m
Input Power, Power and Displ. Factors	74,1 W – PF 0,97 – DPF 0,97
Input RMS Voltage and Current	230 V – 0,332 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 0 sec – 2,0%

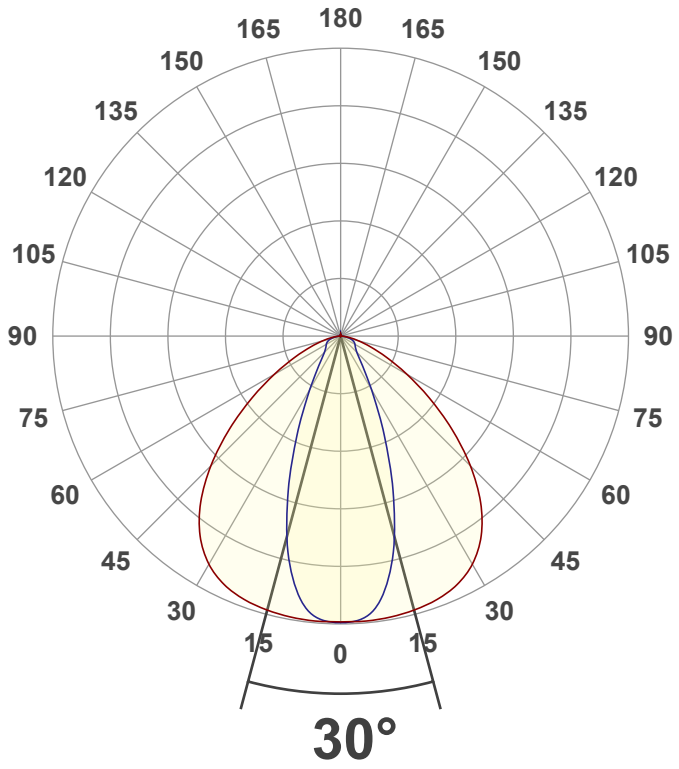
Tested Light Source

Product Name	810764-5000K
Item No. and Manufacturer	810764-5000K – Dutchfulfillment
Product Description (line 1)	LICHTLIJN MODULE | JUPITER | 43-80W | 30° | CCT-SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	12549 lm – 1,06% / 98,94%
Efficiency	169 lm/W
Peak Intensity and Beam Angle	9780 cd – 30°
Correlated Color Temperature, Target/Measured	CCT = 5000 K / 4714 K
Color Rendering Index	CRI 85,0
Color Rendering TM30-18	R_f 84,1 – R_g 99,5
Color Shift, CIE duv and MacAdam Steps	Duv 0,0040 – SDCM 6,3
Flicker	SVM 0,03 – PstLM 0,02

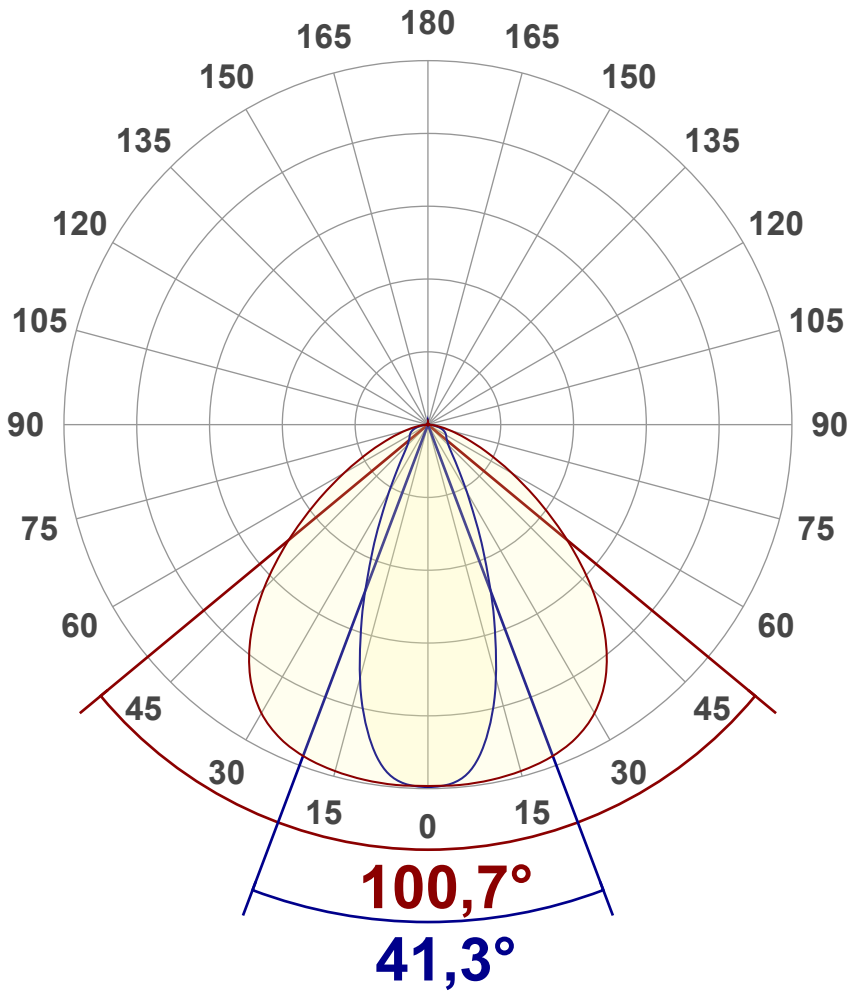




Light Measurement Report

Print date: 18-4-2025
Measurement date and time: 3-4-2025 10:00:06 – Measurement no. VFR-250403-0551-MS
Measurement tracking No. and Link: VT250403-009389
Operator:

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



Main Values

Output (total Lumen)	12549 lm
Lumen Up% / Down%	1,06% / 98,94%
Peak Intensity	9780 cd
Beam Angle (50%)	30°
Beam Angle (90%)	41,3°
Beam Angle (10%)	94,5°

Cut-off Angle

Average 2,5%	157,7°

Field Angle

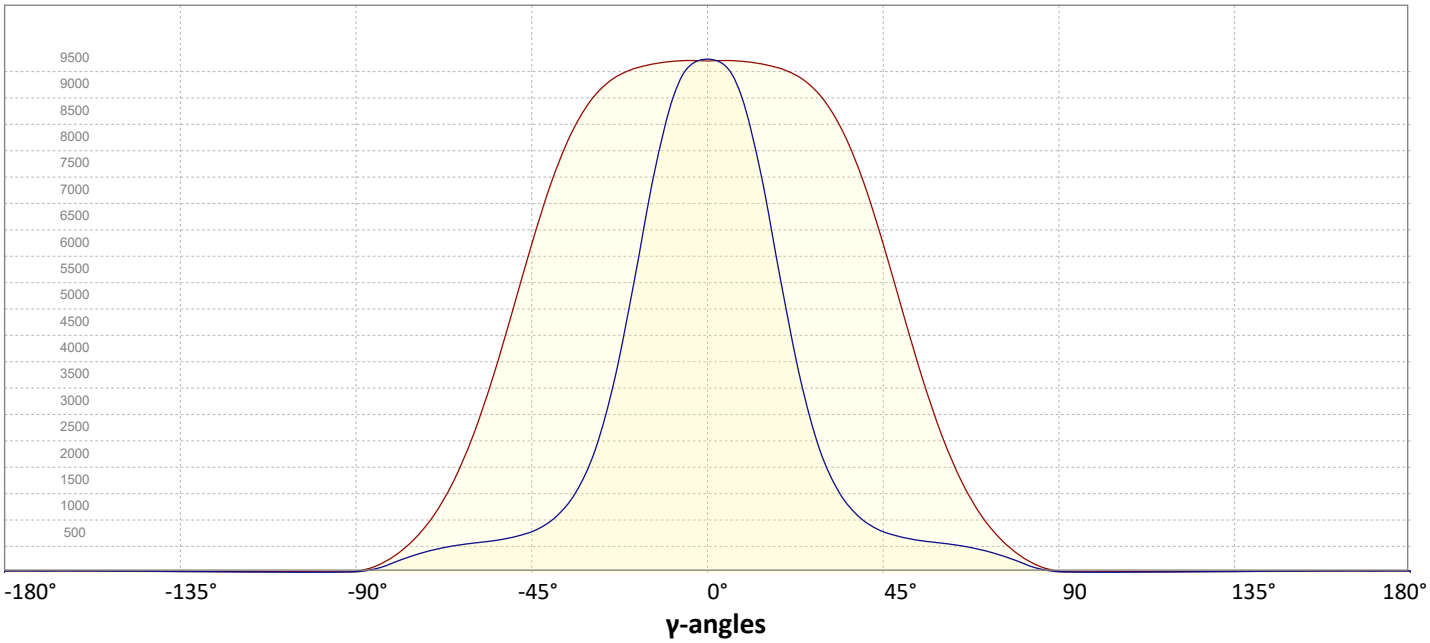
Average 10%	107,2°

Intensity Ratio

In 120° cone	88,5%
In 90° cone	72,5%

C000-C180
C090-C270

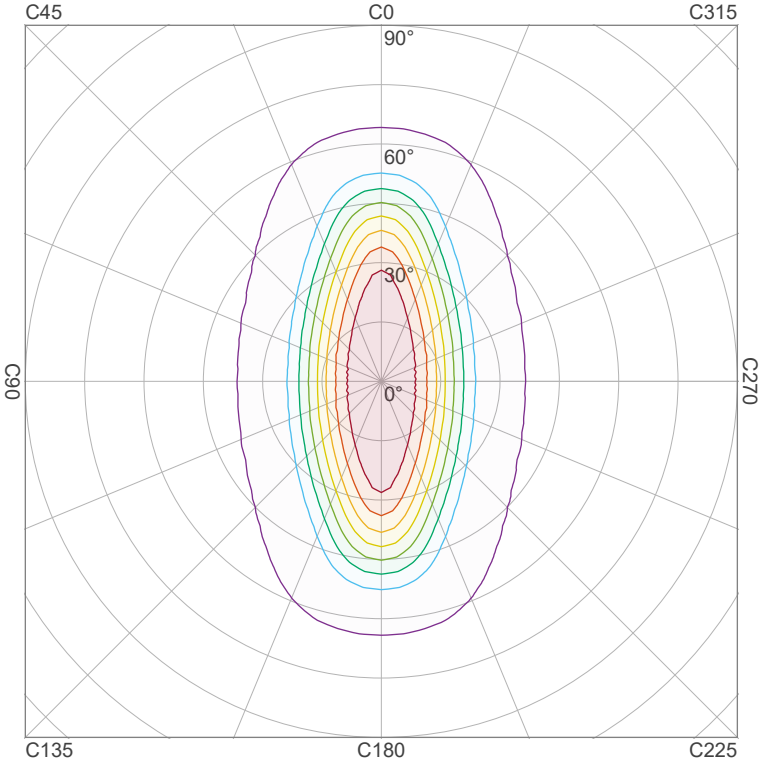
Linear distribution diagram - Intensity (candela) vs γ-angle



Light Measurement Report

Print date: 18-4-2025
Measurement date and time: 3-4-2025 10:00:06 – Measurement no. VFR-250403-0551-MS
Measurement tracking No. and Link: VT250403-009389
Operator:

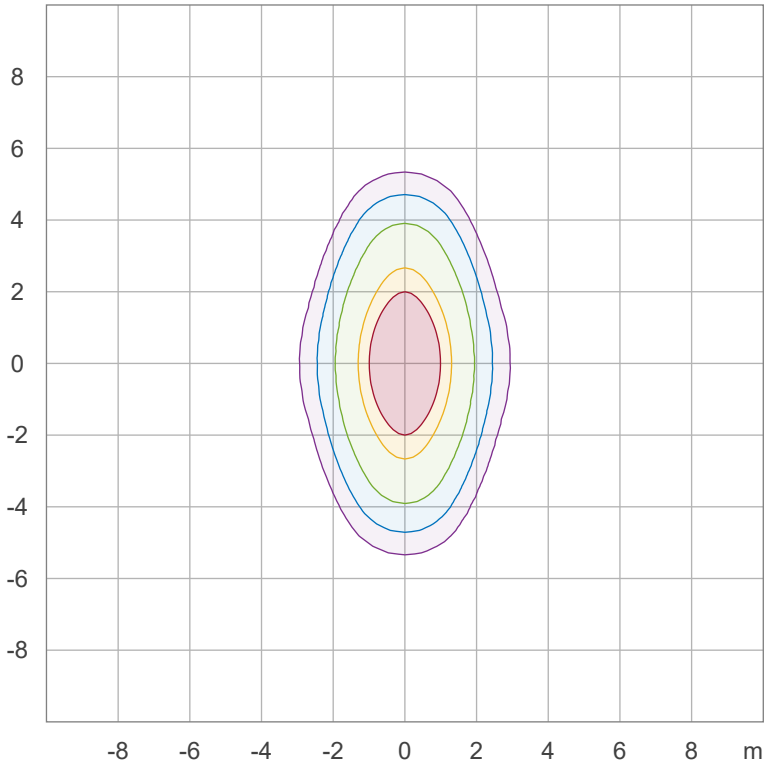
Iso-intensity Diagram (Iso-candela)



90 %	8788,4 cd
80 %	7811,9 cd
70 %	6835,4 cd
60 %	5858,9 cd
50 %	4882,4 cd
40 %	3905,9 cd
30 %	2929,5 cd
20 %	1953,0 cd
10 %	976,5 cd

Peak intensity: 9764,8 cd
Number of c-planes: 72

Iso-illuminance Diagram (Iso-lux)



50,0 %	542,2 lx
30,0 %	325,3 lx
10,0 %	108,4 lx
5,0 %	54,2 lx
3,0 %	32,5 lx

Peak illuminance: 1084,5 lx
Mounting height: 3,0 m
Number of c-planes: 72

Light Measurement Report

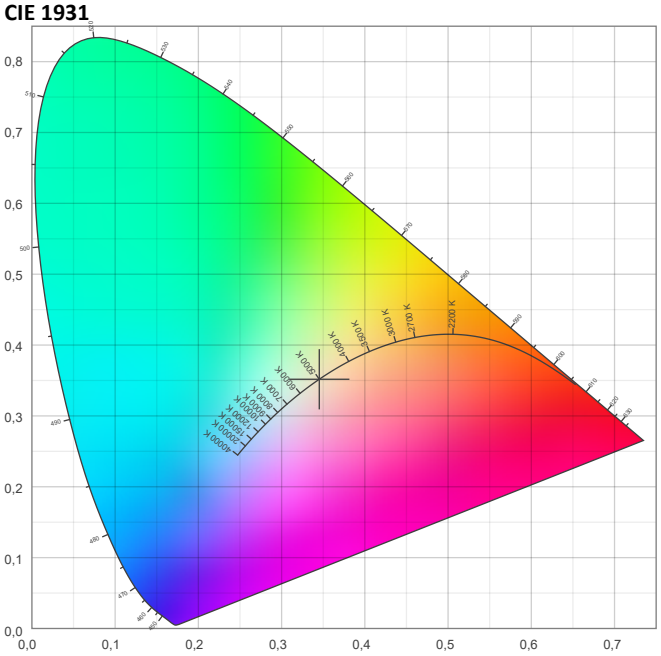
Print date: 18-4-2025
Measurement date and time: 3-4-2025 10:00:06 – Measurement no. VFR-250403-0551-MS
Measurement tracking No. and Link: VT250403-009389
Operator:

Color details

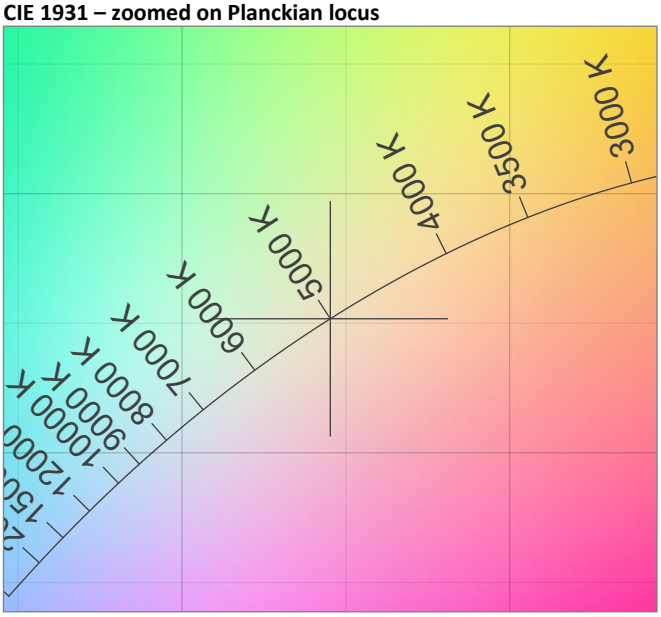
Correlated Color Temperature, Target	CCT = 5000 K
Correlated Color Temperature, Measured	CCT = 4714 K
Color Rendering Index	CRI 85,0
Color Rendering Index, R9 (red component)	R9 = 45,5
Color Rendering TM30-18	R_f 84,1 – R_g 99,5
Color Quality Scale	CQS = 84,5

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 = 0,0040
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,211;0,485)

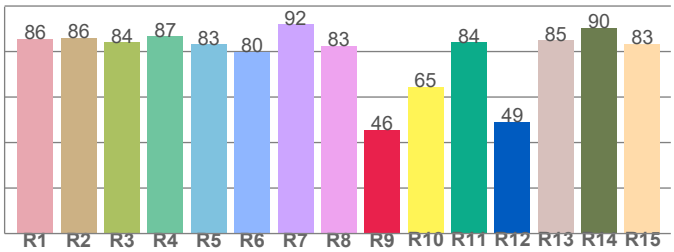
CIE 1931



CIE 1931 – zoomed on Planckian locus



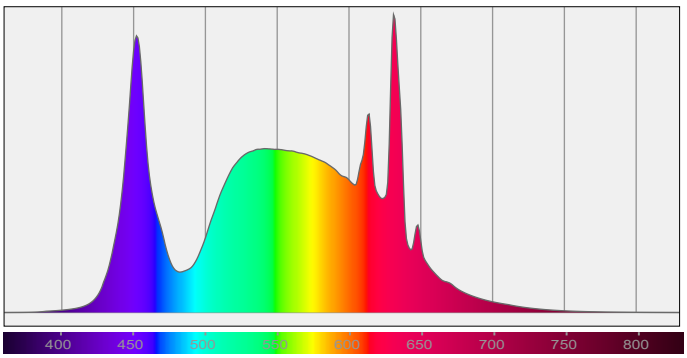
Color Rendering Index per reference color (CIE 1995)



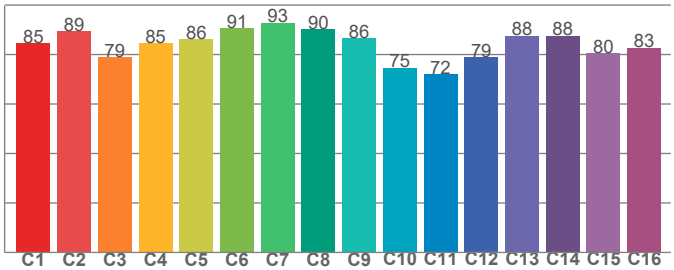
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
85,6	86,1	84,1	86,6	83,3	79,9	92,0	82,6	45,5	64,5	84,1	49,2	85,0	90,5	83,4

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



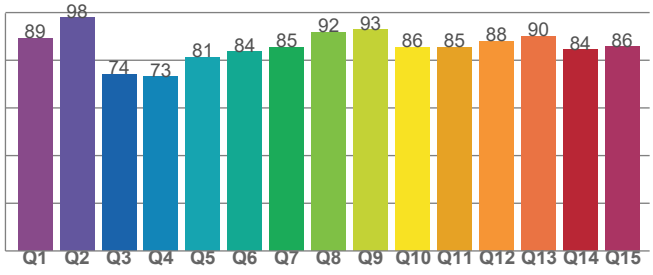
TM30-18 Rf-values per hue bin



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
84,7	89,3	79,0	84,5	86,1	90,5	92,9	90,2	86,5	74,7	72,1	79,0	87,6	87,6	80,4	82,7

Color Quality Scale by reference color



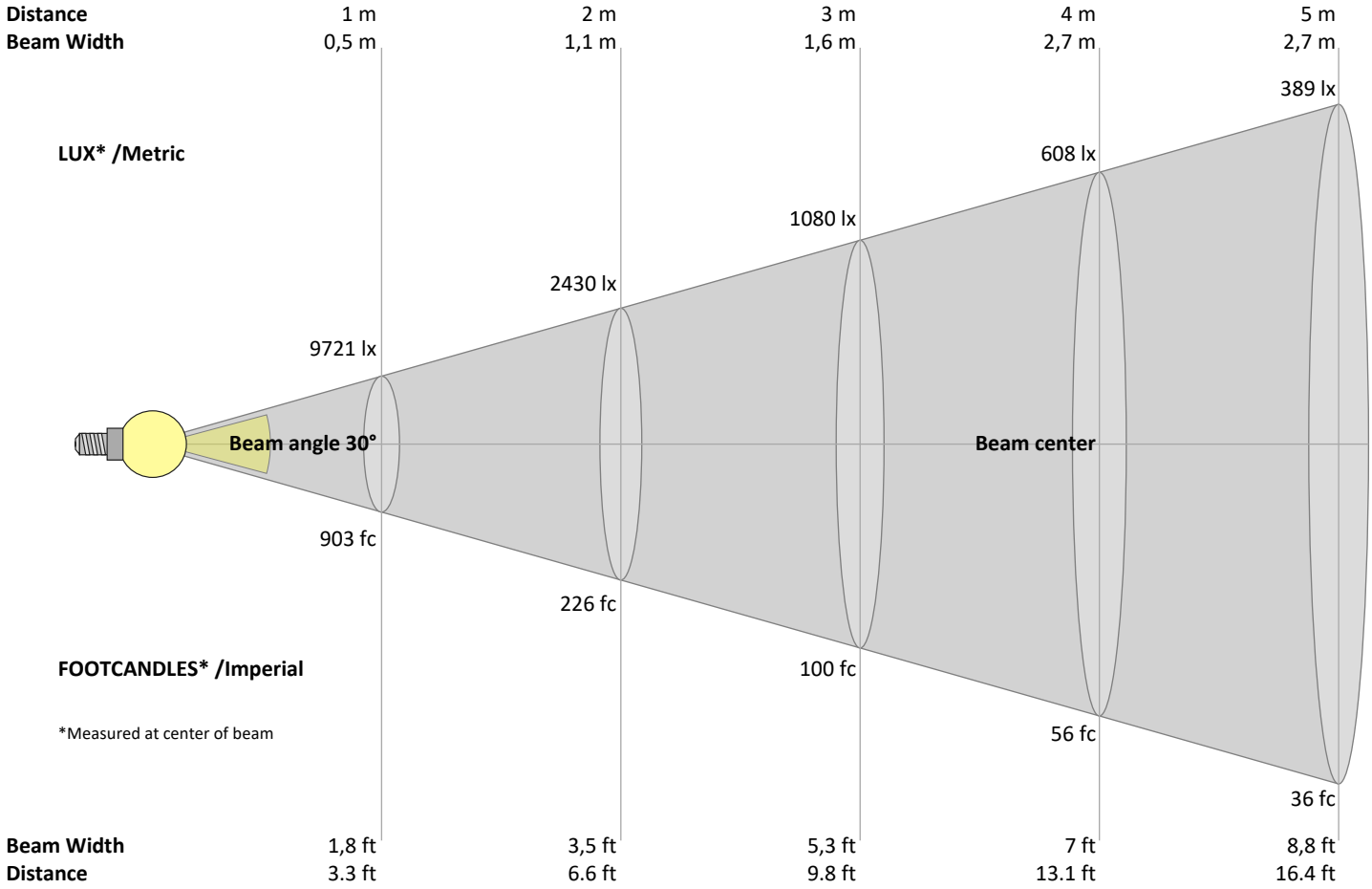
CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
89,3	97,9	74,1	73,1	81,2	83,6	85,4	91,8	92,8	85,5	85,4	88,0	90,1	84,4	85,7

Light Measurement Report

Print date: 18-4-2025
Measurement date and time: 3-4-2025 10:00:06 – Measurement no. VFR-250403-0551-MS
Measurement tracking No. and Link: VT250403-009389
Operator:

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
9721	2430	1080	608	389	270	198	152	120	97	80	68	58	50	43	38	34	30	27	24	lux
903,1	225,8	100,3	56,4	36,1	25,1	18,4	14,1	11,1	9	7,5	6,3	5,3	4,6	4	3,5	3,1	2,8	2,5	2,3	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
9721	9710	9685	9627	9522	9318	8938	8306	7393	6229	4942	3692	2606	1742	1098	645	328	125	28	19	cd
100%	100%	100%	99%	98%	96%	92%	85%	76%	64%	51%	38%	27%	18%	11%	7%	3%	1%	0%	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
9721	9496	8647	7032	5068	3341	2127	1406	1003	787	675	606	560	508	433	331	203	81	23	12	cd
100%	98%	89%	72%	52%	34%	22%	14%	10%	8%	7%	6%	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
9721	9710	9685	9627	9522	9318	8938	8306	7393	6229	4942	3692	2606	1742	1098	645	328	125	28	19	cd
100%	100%	100%	99%	98%	96%	92%	85%	76%	64%	51%	38%	27%	18%	11%	7%	3%	1%	0%	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
9721	9496	8647	7032	5068	3341	2127	1406	1003	787	675	606	560	508	433	331	203	81	23	12	cd
100%	98%	89%	72%	52%	34%	22%	14%	10%	8%	7%	6%	6%	5%	4%	3%	2%	1%	0%	0%	of 0°val

Light Measurement Report

Print date: 18-4-2025
Measurement date and time: 3-4-2025 10:00:06 – Measurement no. VFR-250403-0551-MS
Measurement tracking No. and Link: VT250403-009389
Operator:

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	29,2	28,5	29,5	29,7	19,1	20,1	19,3	20,4	20,6
	3H	29,1	30,2	29,5	30,4	30,6	20,9	21,9	21,3	22,2	22,4
	4H	29,5	30,4	29,9	30,7	31,0	21,8	22,8	22,2	23,0	23,3
	6H	29,7	30,6	30,0	30,9	31,2	22,5	23,4	22,9	23,7	24,1
	8H	29,8	30,6	30,1	30,9	31,3	22,7	23,6	23,1	23,9	24,3
	12H	29,8	30,5	30,1	30,9	31,4	22,8	23,6	23,2	24,0	24,4
4H	2H	28,0	29,0	28,4	29,3	29,5	20,1	21,1	20,5	21,3	21,6
	3H	29,1	29,9	29,5	30,3	30,7	22,0	22,8	22,3	23,1	23,6
	4H	29,5	30,2	29,9	30,7	31,2	22,9	23,6	23,3	24,0	24,6
	6H	29,8	30,5	30,3	30,9	31,3	23,6	24,4	24,2	24,7	25,1
	8H	29,9	30,6	30,4	30,9	31,3	23,9	24,6	24,4	24,9	25,3
	12H	29,9	30,5	30,5	30,9	31,4	24,1	24,6	24,6	25,0	25,5
8H	4H	29,4	30,1	30,0	30,5	30,9	23,2	23,9	23,8	24,3	24,7
	6H	29,8	30,3	30,3	30,8	31,3	24,1	24,6	24,6	25,1	25,6
	8H	30,0	30,4	30,5	30,9	31,6	24,5	24,9	25,0	25,4	26,1
	12H	30,1	30,5	30,7	31,0	31,6	24,7	25,1	25,3	25,6	26,2
12H	4H	29,4	29,9	29,9	30,4	30,8	23,3	23,8	23,8	24,2	24,7
	6H	29,8	30,2	30,4	30,8	31,4	24,2	24,6	24,8	25,2	25,8
	8H	30,0	30,3	30,6	30,8	31,5	24,6	24,9	25,2	25,5	26,1

Variations with the observer position for the luminaire spacings, S:		
S = 1.0H	0,6 / -0,6	0,3 / -0,2
S = 1.5H	1,8 / -1,5	0,5 / -0,4
S = 2.0H	3,1 / -2,3	0,6 / -0,5

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	92	93	91	90	88
2	103	96	91	86	100	94	89	85	91	87	83	88	84	81	85	82	79	77
3	96	87	81	75	93	86	79	75	83	77	73	80	76	72	77	74	71	69
4	89	79	72	67	87	78	71	66	76	70	65	73	68	64	71	67	63	61
5	83	73	65	60	81	72	65	59	70	63	59	68	62	58	66	61	57	55
6	78	67	59	54	76	66	59	54	64	58	53	63	57	53	61	56	52	50
7	73	62	54	49	72	61	54	49	60	53	49	58	52	48	57	52	48	46
8	69	57	50	45	68	57	50	45	56	49	45	54	49	44	53	48	44	42
9	65	54	47	42	64	53	46	42	52	46	41	51	45	41	50	45	41	39
10	62	50	43	39	61	50	43	39	49	43	38	48	42	38	47	42	38	37

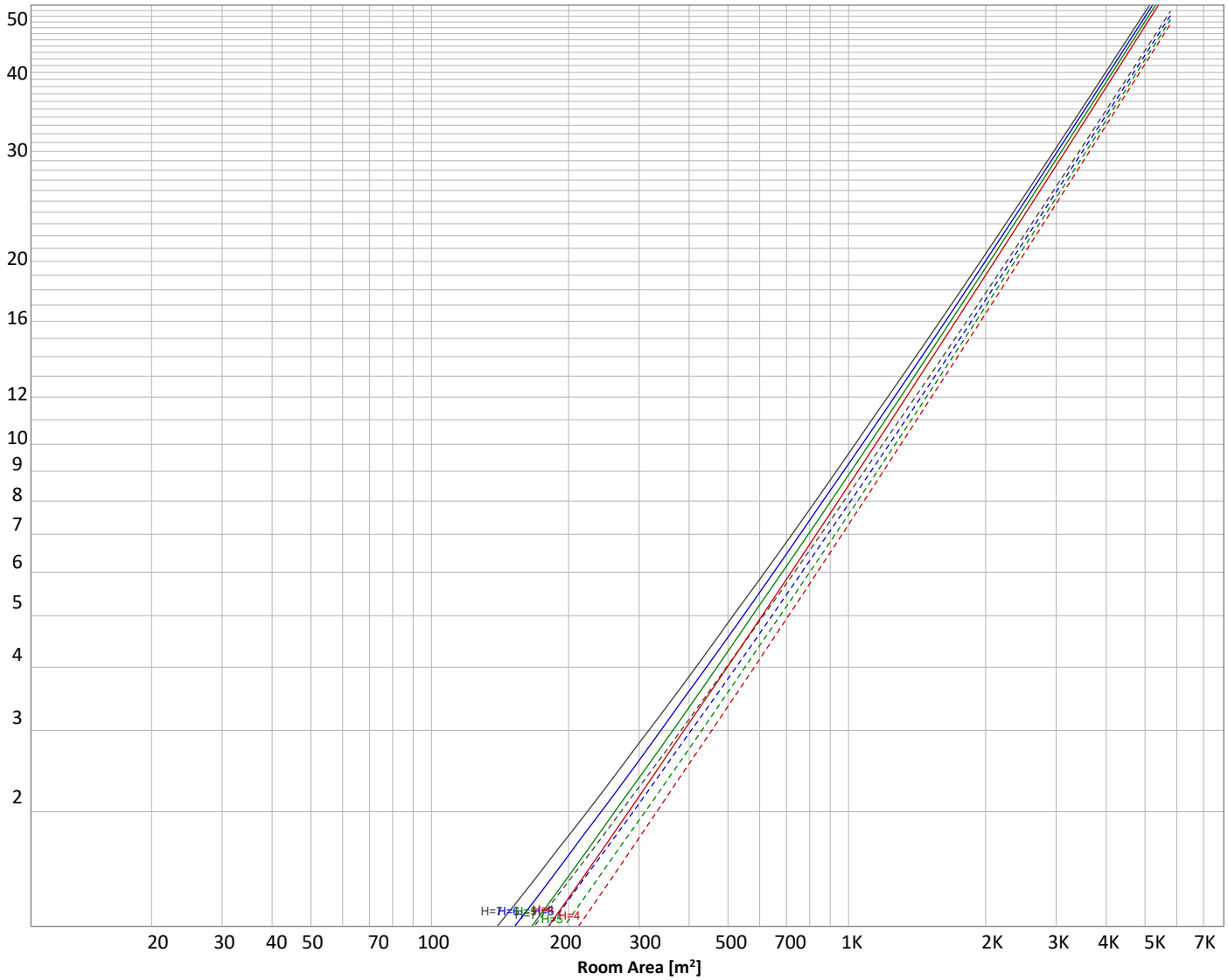
Light Measurement Report

Print date: 18-4-2025
Measurement date and time: 3-4-2025 10:00:06 – Measurement no. VFR-250403-0551-MS
Measurement tracking No. and Link: VT250403-009389
Operator:

Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 12549 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°
908 lm	2320 lm	2657 lm	2276 lm	1732 lm	1218 lm	780 lm	411 lm	113 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
17,2 lm	16,5 lm	17,7 lm	18,8 lm	18,8 lm	17,4 lm	14,0 lm	9,04 lm	3,12 lm

Light Measurement Report

Print date: 18-4-2025
Measurement date and time: 3-4-2025 10:00:06 – Measurement no. VFR-250403-0551-MS
Measurement tracking No. and Link: VT250403-009389
Operator:

Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	908 lm	7,2%
10-20°	2320 lm	18,5%
20-30°	2657 lm	21,2%
30-40°	2276 lm	18,1%
40-50°	1732 lm	13,8%
50-60°	1218 lm	9,7%
60-70°	780 lm	6,2%
70-80°	411 lm	3,3%
80-90°	113 lm	0,9%
90-100°	17 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	0,2%
140-150°	17 lm	0,1%
150-160°	14 lm	0,1%
160-170°	9 lm	0,1%
170-180°	3 lm	0,0%
Total	12549 lm	100,0%

Intensity peaks

Max intensity	9780 cd
Intensity, 90°	28 cd
Intensity, 0°	9721 cd

Zonal Lumen summary

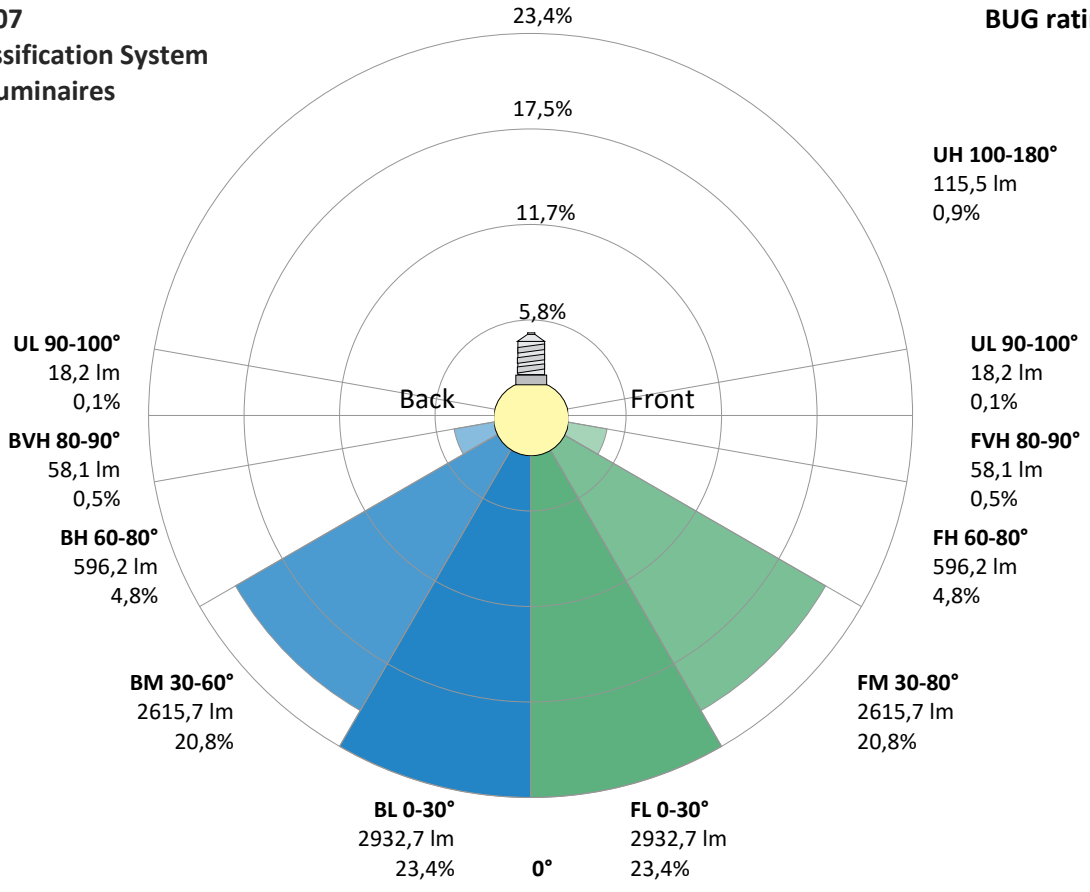
Zone (γ)	Lumen	% Total
0-30°	5885 lm	46,9%
0-40°	8161 lm	65,0%
0-60°	11112 lm	88,5%
60-90°	1305 lm	10,4%
70-100°	542 lm	4,3%
90-120°	51 lm	0,4%
0-90°	12417 lm	98,9%
90-180°	133 lm	1,1%
0-180°	12549 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	2933 lm	23,4%
Medium(30-60°)	2616 lm	20,8%
High(60-80°)	596 lm	4,8%
Very high(80-90°)	58 lm	0,5%
Back light		
Low(0-30°)	2933 lm	23,4%
Medium(30-60°)	2616 lm	20,8%
High(60-80°)	596 lm	4,8%
Very high(80-90°)	58 lm	0,5%
Uplight		
Low(90-100°)	18 lm	0,1%
High(100-180°)	116 lm	0,9%

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

BUG rating B4 U3 G1



Light Measurement Report

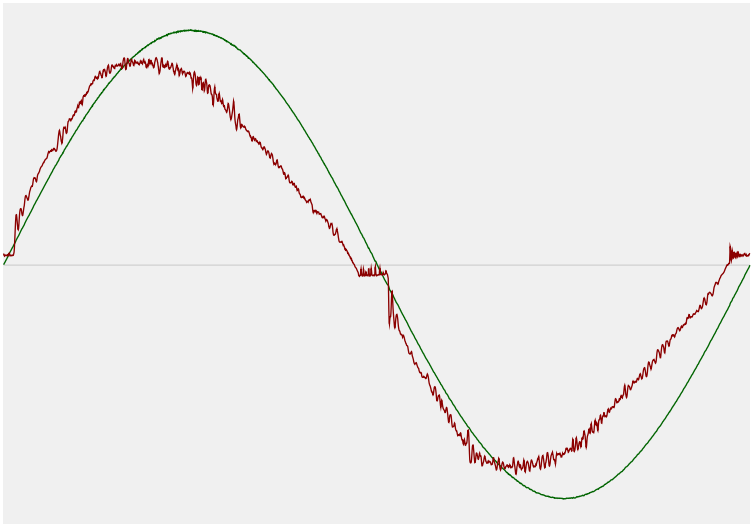
Print date: 18-4-2025
Measurement date and time: 3-4-2025 10:00:06 – Measurement no. VFR-250403-0551-MS
Measurement tracking No. and Link: VT250403-009389
Operator:

Power Details

Input Power

Power feed to light source	74,1 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,332 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	76,37 VA
Displacement factor of AC power feed	0,97
Power factor of AC current feed	0,97
Total harmonic distortion of the current	9,94%
Total harmonic distortion of the voltage	0,06%

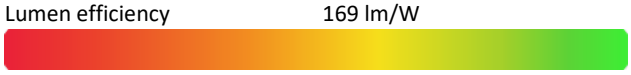
Input Power Curve



Efficiency

Radiated power efficiency 50,3%

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

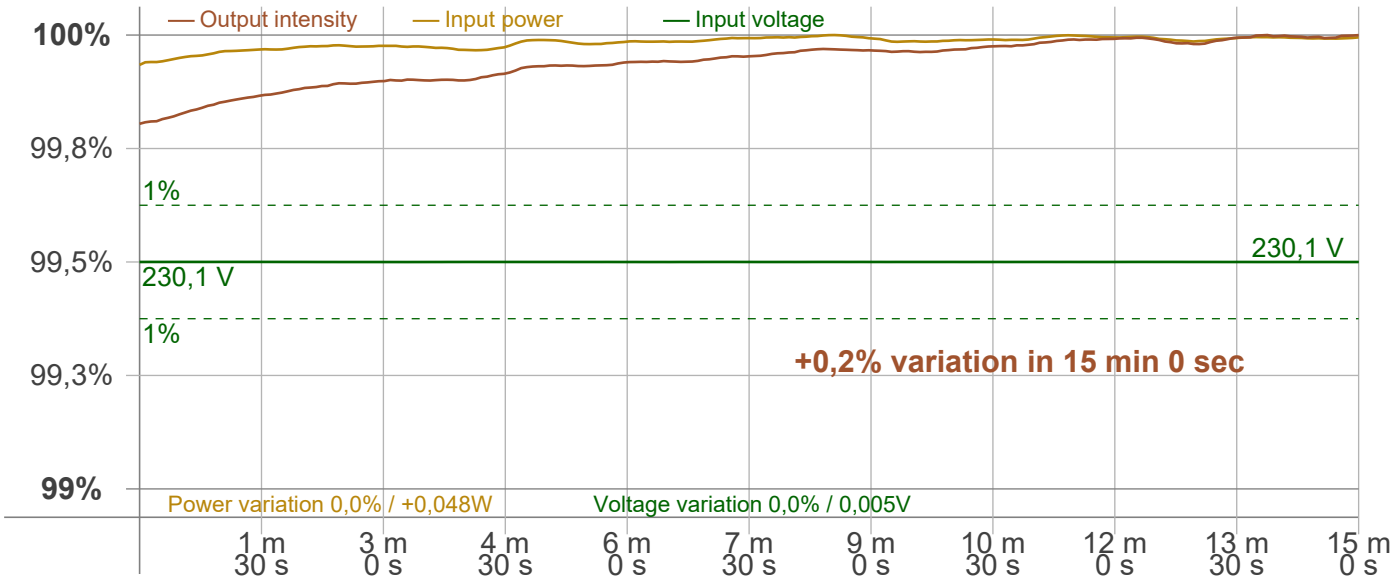
Warmup Result

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

Output Change

Output start	12525 lm
Output change	+25 lm
Output end	12549 lm

Stabilization Curve



Light Measurement Report

Print date: 18-4-2025
Measurement date and time: 3-4-2025 10:00:06 – Measurement no. VFR-250403-0551-MS
Measurement tracking No. and Link: VT250403-009389
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	100 Hz
Percent Flicker	0,85 %
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 %

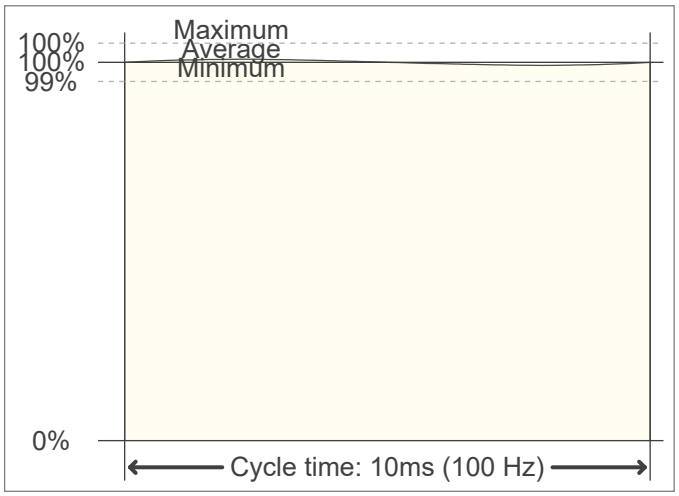
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

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

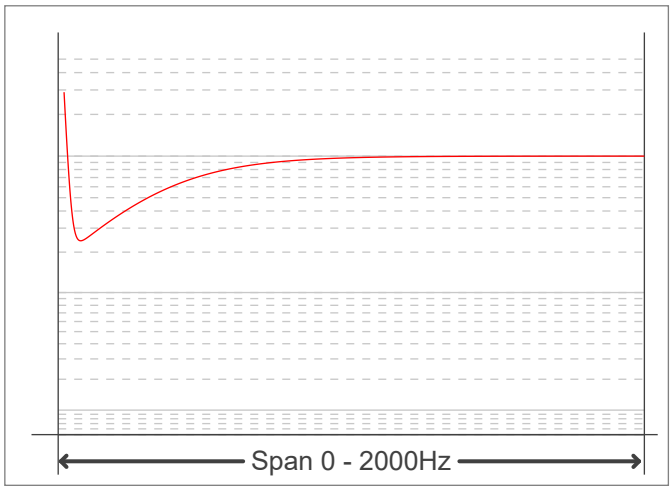
Flicker indices according to Lighting Research Center (2015)

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