Light Measurement Report

Print date: 26-5-2025
Measurement date and time: 26-5-2025 14:51:46 – Measurement no. VFR-250526-1449-MS
Measurement tracking No. and Link: VT250526-002290
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

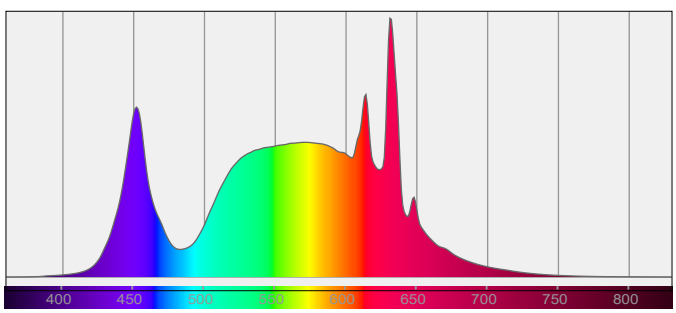
Number of C-planes and Resolution	12 planes – 30°
γ (gamma)-Resolution	5°
Test Distance	11,99 m
Input Power, Power and Displ. Factors	77,5 W – PF 0,97 – DPF 0,97
Input RMS Voltage and Current	230 V – 0,348 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 1 sec – 2,0%

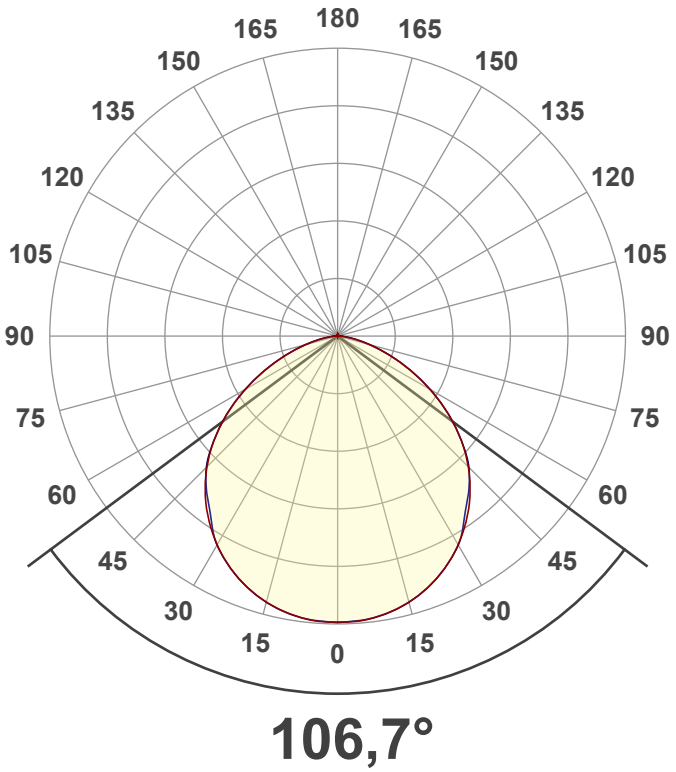
Tested Light Source

Product Name	810344-4000K BATCH 2502
Item No. and Manufacturer	810344-4000K BATCH 2502 – Dutchfulfillment
Product Description (line 1)	LICHTLIJN MODULE | JUPITER | 29-75W | 90° | CCT-SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	13558 lm – 0,94% / 99,06%
Efficiency	175 lm/W
Peak Intensity and Beam Angle	5149 cd – 106,7°
Correlated Color Temperature, Target/Measured	CCT = 4000 K / 4011 K
Color Rendering Index	CRI 84,5
Color Rendering TM30-18	R_f 84,1 – R_g 99,2
Color Shift, CIE duv and MacAdam Steps	Duv 0,0024 – SDCM 1,9
Flicker	SVM 0,03 – PstLM 0,01

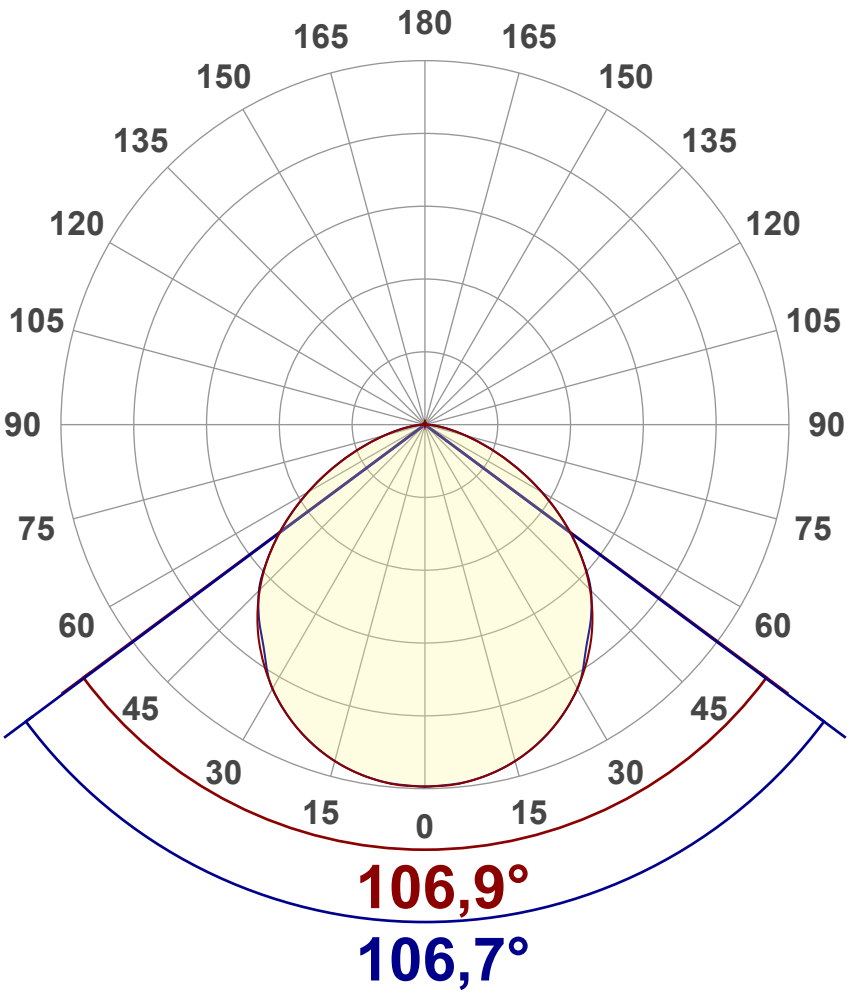




Light Measurement Report

Print date: 26-5-2025
Measurement date and time: 26-5-2025 14:51:46 – Measurement no. VFR-250526-1449-MS
Measurement tracking No. and Link: VT250526-002290
Operator:

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



Main Values

Output (total Lumen)	13558 lm
Lumen Up% / Down%	0,94% / 99,06%
Peak Intensity	5149 cd
Beam Angle (50%)	106,7°
Beam Angle (90%)	106,7°
Beam Angle (10%)	106,9°

Cut-off Angle

Average 2,5%	170°

Field Angle

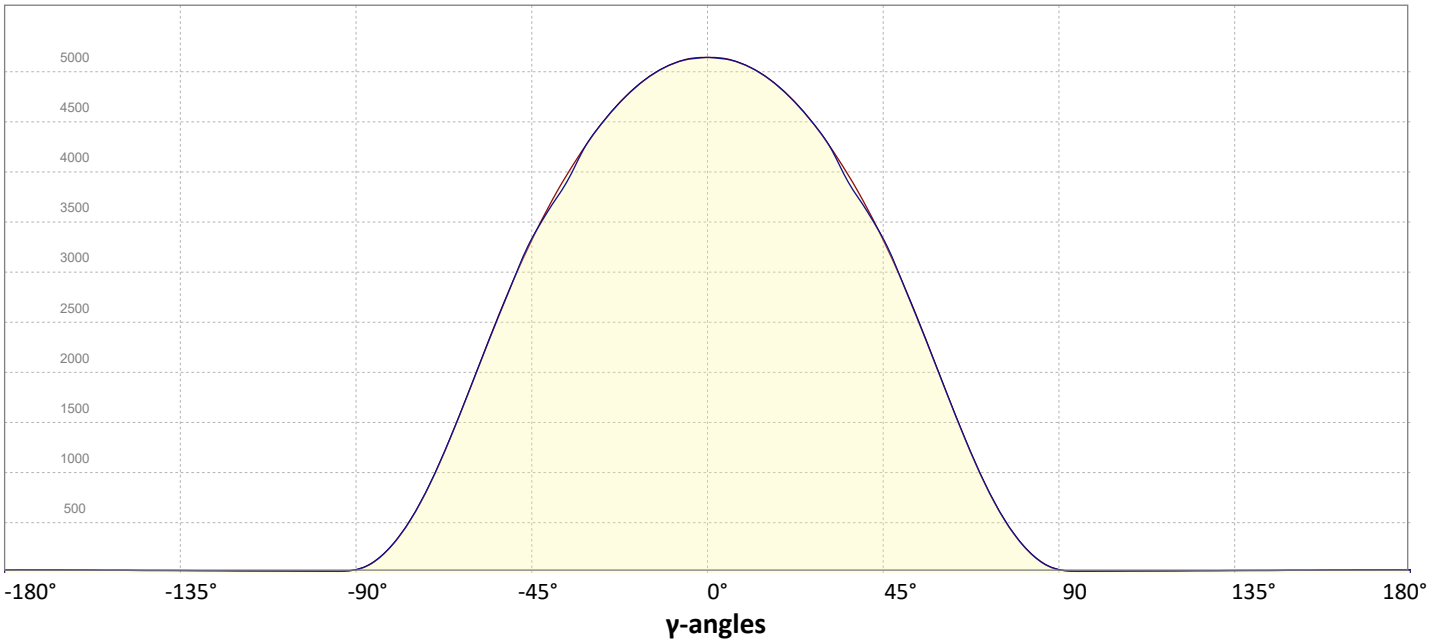
Average 10%	152,8°

Intensity Ratio

In 120° cone	82,7%
In 90° cone	57,6%

C000-C180
C090-C270

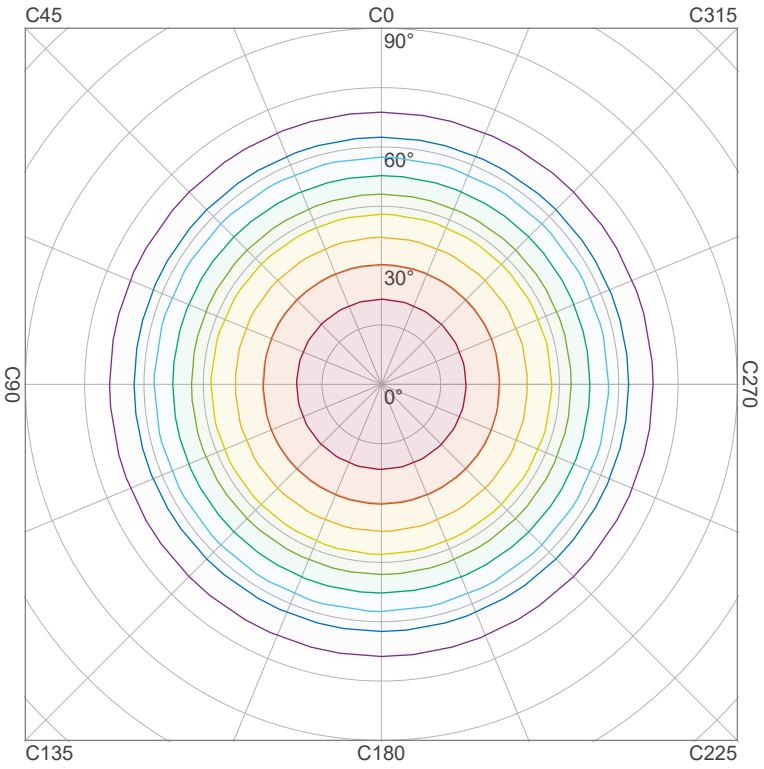
Linear distribution diagram - Intensity (candela) vs γ-angle



Light Measurement Report

Print date: 26-5-2025
Measurement date and time: 26-5-2025 14:51:46 – Measurement no. VFR-250526-1449-MS
Measurement tracking No. and Link: VT250526-002290
Operator:

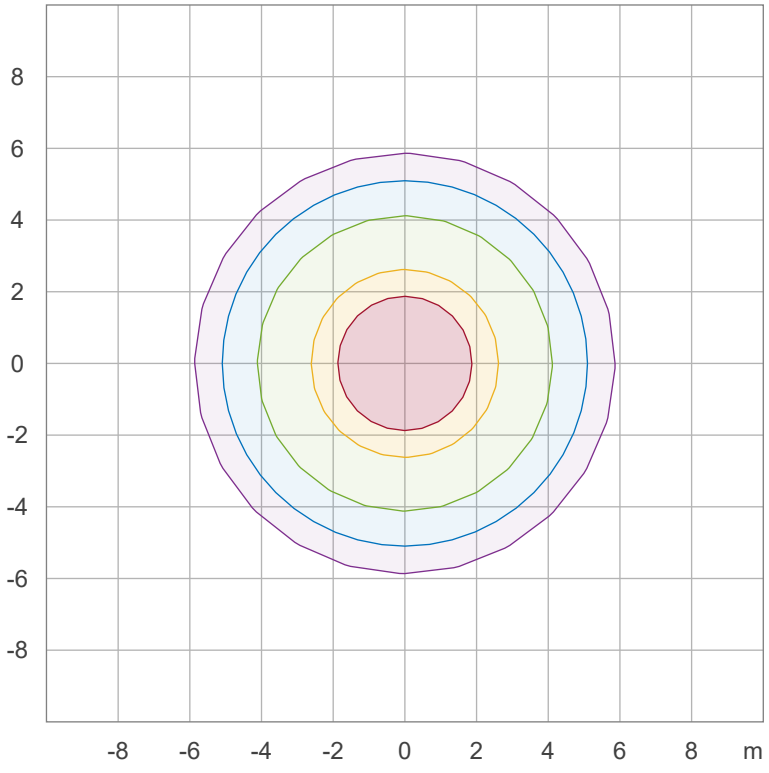
Iso-intensity Diagram (Iso-candela)



90 %	4630,7 cd
80 %	4116,1 cd
70 %	3601,6 cd
60 %	3087,1 cd
50 %	2572,6 cd
40 %	2058,1 cd
30 %	1543,6 cd
20 %	1029,0 cd
10 %	514,5 cd

Peak intensity: 5145,2 cd
Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



50,0 %	285,8 lx
30,0 %	171,5 lx
10,0 %	57,2 lx
5,0 %	28,6 lx
3,0 %	17,1 lx

Peak illuminance: 571,6 lx
Mounting height: 3,0 m
Number of c-planes: 12

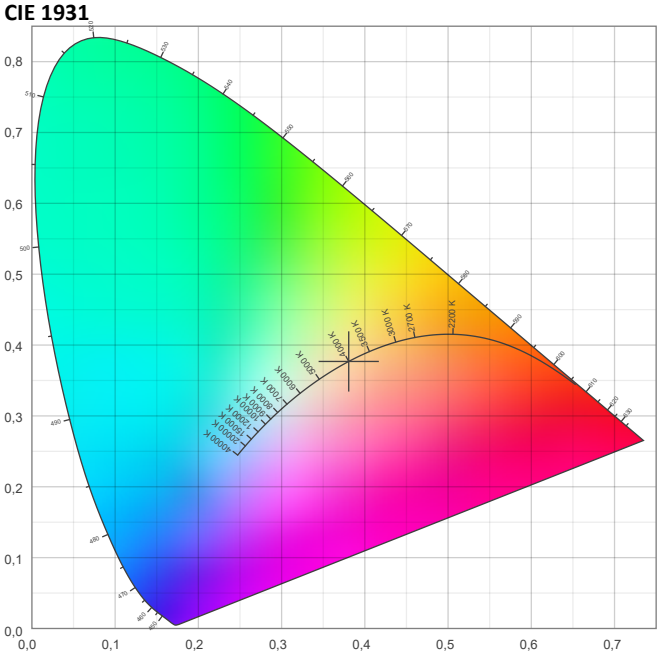
Light Measurement Report

Print date: 26-5-2025
Measurement date and time: 26-5-2025 14:51:46 – Measurement no. VFR-250526-1449-MS
Measurement tracking No. and Link: VT250526-002290
Operator:

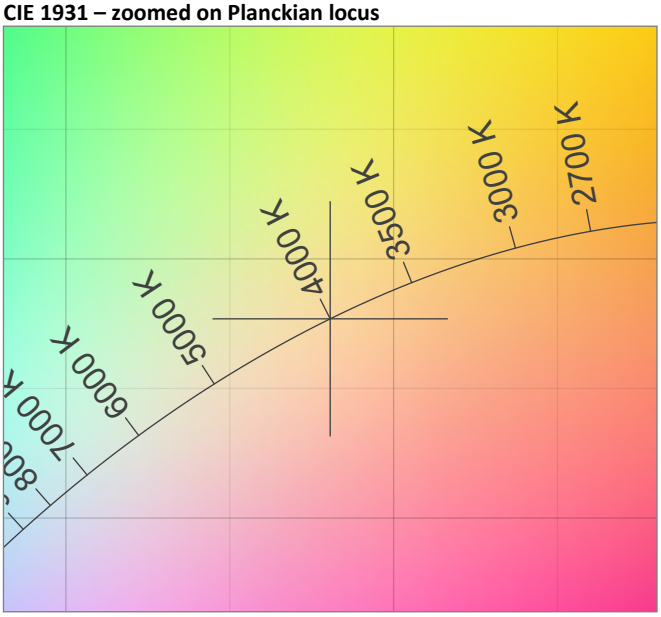
Color details

Correlated Color Temperature, Target	CCT = 4000 K
Correlated Color Temperature, Measured	CCT = 4011 K
Color Rendering Index	CRI 84,5
Color Rendering Index, R9 (red component)	R9 = 39,7
Color Rendering TM30-18	R_f 84,1 – R_g 99,2
Color Quality Scale	CQS = 84,0
MacAdam Steps	SDCM = 1,9
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 = 0,0024
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,225;0,502)

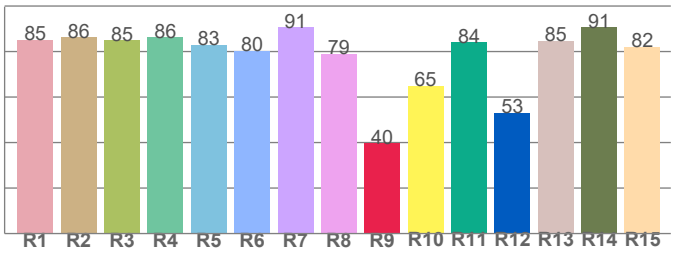
CIE 1931



CIE 1931 – zoomed on Planckian locus



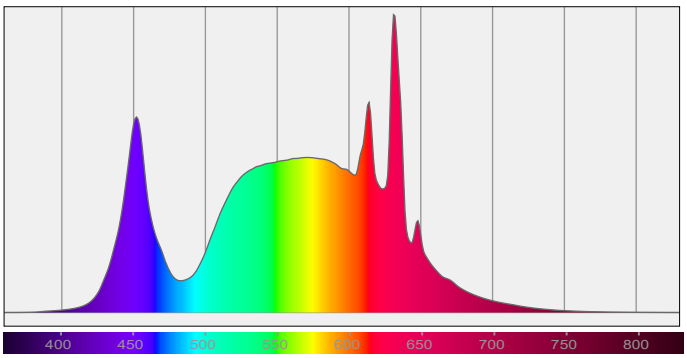
Color Rendering Index per reference color (CIE 1995)



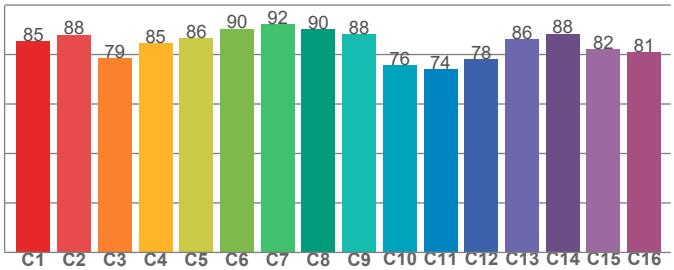
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
85,3	86,3	84,9	86,2	83,0	80,4	90,7	79,1	39,7	64,9	84,0	53,1	84,7	90,6	82,1

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



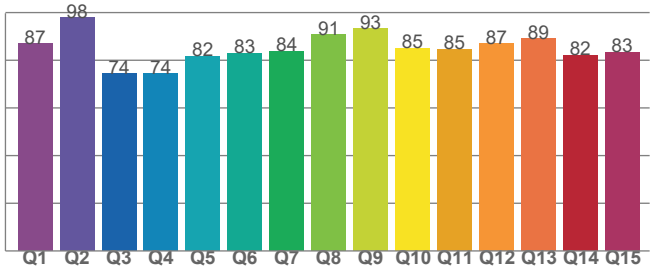
TM30-18 Rf-values per hue bin



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
85,3	88,0	78,6	84,5	86,5	90,4	92,3	90,2	88,3	75,7	74,0	78,1	86,2	88,4	82,2	81,0

Color Quality Scale by reference color



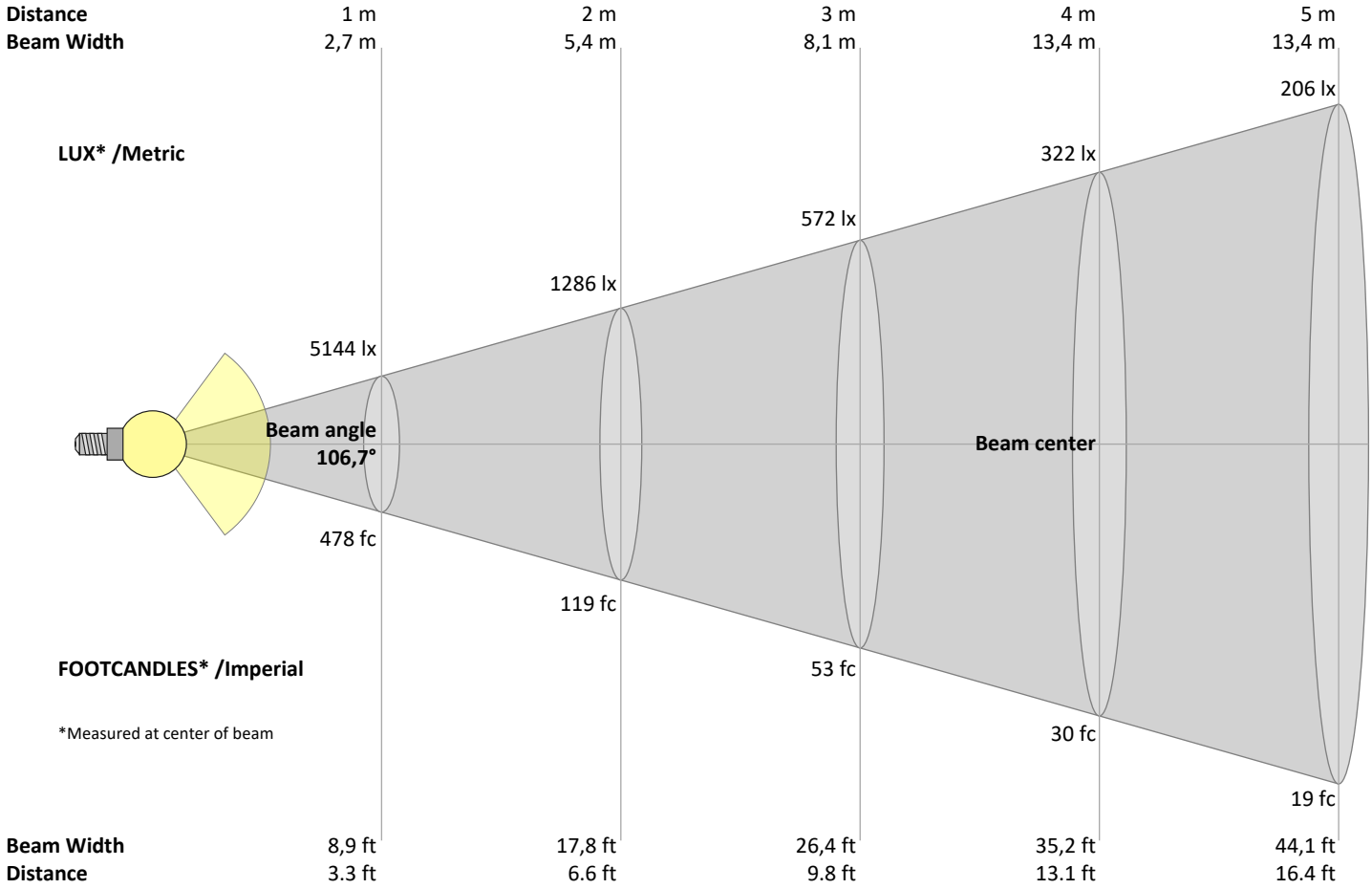
CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
87,0	97,8	74,4	74,3	81,7	82,9	83,7	90,7	93,2	85,0	84,7	87,0	89,0	82,2	83,3

Light Measurement Report

Print date: 26-5-2025
Measurement date and time: 26-5-2025 14:51:46 – Measurement no. VFR-250526-1449-MS
Measurement tracking No. and Link: VT250526-002290
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
5144	1286	572	322	206	143	105	80	64	51	43	36	30	26	23	20	18	16	14	13	lux
477,9	119,5	53,1	29,9	19,1	13,3	9,8	7,5	5,9	4,8	3,9	3,3	2,8	2,4	2,1	1,9	1,7	1,5	1,3	1,2	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
5144	5121	5056	4945	4785	4578	4326	4031	3696	3315	2888	2417	1921	1431	982	605	321	132	37	16	cd
100%	100%	98%	96%	93%	89%	84%	78%	72%	64%	56%	47%	37%	28%	19%	12%	6%	3%	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
5144	5120	5057	4944	4784	4578	4325	3976	3659	3325	2888	2412	1917	1430	982	605	319	128	38	18	cd
100%	100%	98%	96%	93%	89%	84%	77%	71%	65%	56%	47%	37%	28%	19%	12%	6%	2%	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
5144	5121	5056	4945	4785	4578	4326	4031	3696	3315	2888	2417	1921	1431	982	605	321	132	37	16	cd
100%	100%	98%	96%	93%	89%	84%	78%	72%	64%	56%	47%	37%	28%	19%	12%	6%	3%	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
5144	5120	5057	4944	4784	4578	4325	3976	3659	3325	2888	2412	1917	1430	982	605	319	128	38	18	cd
100%	100%	98%	96%	93%	89%	84%	77%	71%	65%	56%	47%	37%	28%	19%	12%	6%	2%	1%	0%	of 0°val

Light Measurement Report

Print date: 26-5-2025
Measurement date and time: 26-5-2025 14:51:46 – Measurement no. VFR-250526-1449-MS
Measurement tracking No. and Link: VT250526-002290
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	27,0	28,1	27,2	28,5	28,7	27,3	28,5	27,6	28,8	29,1
	3H	27,8	29,0	28,3	29,3	29,5	28,3	29,5	28,8	29,8	30,0
	4H	28,1	29,3	28,6	29,6	29,8	28,7	29,8	29,1	30,1	30,4
	6H	28,3	29,3	28,7	29,6	30,0	29,0	30,0	29,3	30,2	30,6
	8H	28,3	29,3	28,7	29,6	30,1	29,0	30,0	29,4	30,3	30,7
	12H	28,3	29,3	28,7	29,6	30,1	29,0	29,9	29,4	30,3	30,8
4H	2H	27,4	28,6	27,8	28,8	29,1	27,7	28,9	28,1	29,1	29,4
	3H	28,6	29,5	28,9	29,9	30,3	29,0	29,9	29,4	30,3	30,7
	4H	28,9	29,7	29,3	30,1	30,7	29,3	30,2	29,8	30,6	31,2
	6H	29,1	29,9	29,6	30,3	30,6	29,6	30,5	30,1	30,8	31,2
	8H	29,1	29,8	29,6	30,2	30,6	29,7	30,5	30,2	30,8	31,2
	12H	29,1	29,7	29,6	30,2	30,7	29,7	30,4	30,3	30,8	31,3
8H	4H	29,0	29,7	29,5	30,1	30,5	29,4	30,2	30,0	30,6	31,0
	6H	29,3	29,8	29,8	30,3	30,9	29,8	30,4	30,3	30,9	31,4
	8H	29,4	29,9	29,9	30,4	31,1	30,0	30,5	30,5	31,0	31,6
	12H	29,4	29,8	30,0	30,3	31,0	30,0	30,5	30,6	31,0	31,6
12H	4H	29,0	29,6	29,5	30,0	30,5	29,4	30,0	29,9	30,5	31,0
	6H	29,3	29,8	29,8	30,3	31,0	29,8	30,3	30,4	30,9	31,5
	8H	29,4	29,8	30,0	30,3	30,9	30,0	30,4	30,6	30,9	31,5

Variations with the observer position for the luminaire spacings, S:		
S = 1.0H	0,1 / -0,2	0,1 / -0,2
S = 1.5H	0,4 / -0,6	0,3 / -0,5
S = 2.0H	0,9 / -1,3	0,8 / -1,2

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	97	107	103	99	96	98	95	93	94	92	90	90	89	87	85
2	100	92	86	80	97	90	84	79	87	82	77	83	79	75	80	77	74	72
3	91	81	74	67	89	80	73	67	77	71	65	74	69	64	71	67	63	61
4	84	72	64	57	82	71	63	57	68	62	56	66	60	55	64	59	54	52
5	77	65	56	50	75	64	56	49	61	54	49	59	53	48	58	52	48	45
6	71	58	50	44	69	57	49	43	56	48	43	54	47	42	52	46	42	40
7	66	53	45	39	65	52	44	38	51	43	38	49	43	38	48	42	37	35
8	62	48	40	34	60	48	40	34	46	39	34	45	39	34	44	38	34	32
9	58	45	36	31	56	44	36	31	43	36	31	42	35	31	40	35	30	28
10	54	41	33	28	53	41	33	28	40	33	28	39	32	28	38	32	28	26

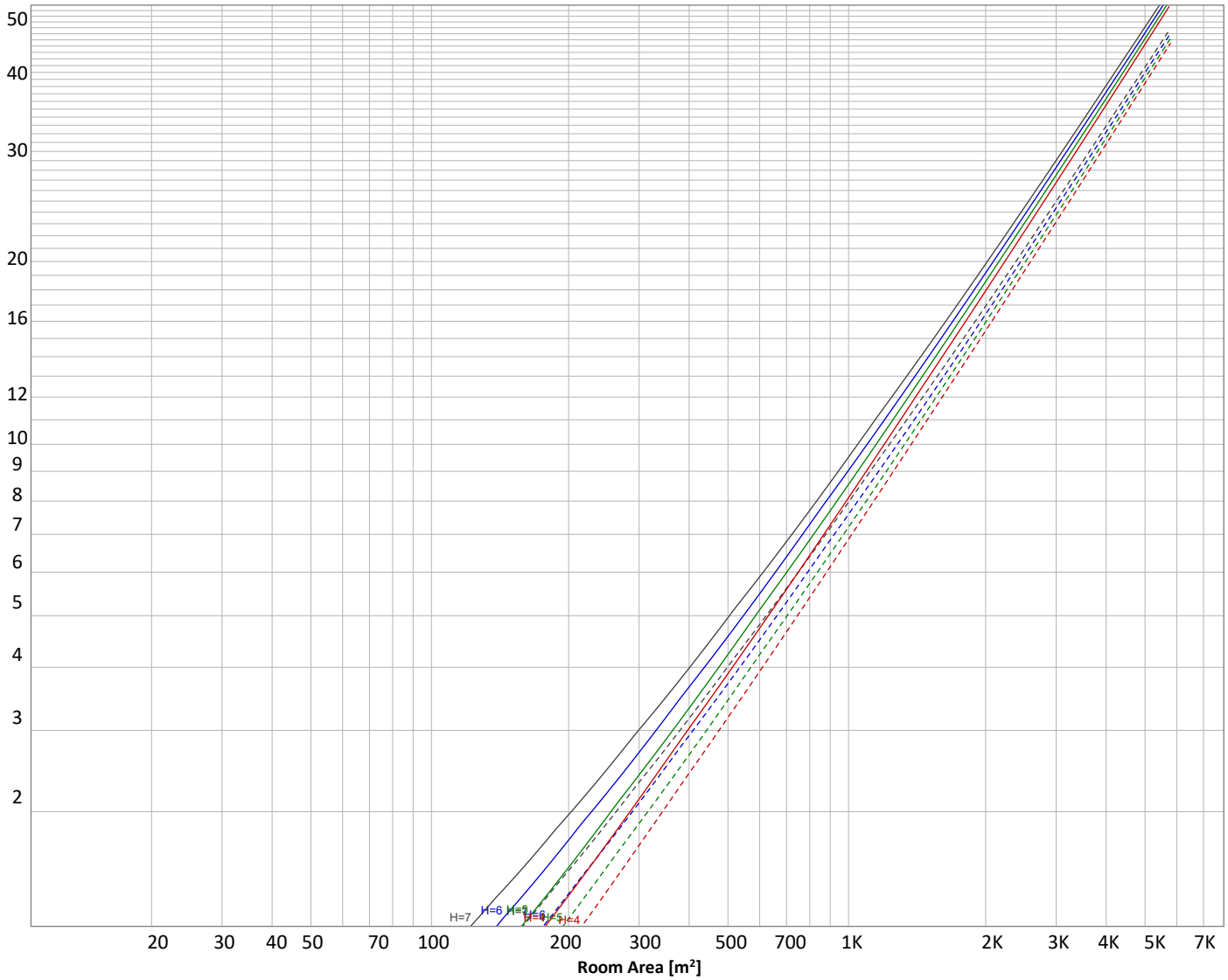
Light Measurement Report

Print date: 26-5-2025
Measurement date and time: 26-5-2025 14:51:46 – Measurement no. VFR-250526-1449-MS
Measurement tracking No. and Link: VT250526-002290
Operator:

Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 13558 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°
487 lm	1396 lm	2111 lm	2517 lm	2553 lm	2154 lm	1415 lm	645 lm	152 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
19,7 lm	17,8 lm	18,2 lm	18,1 lm	16,9 lm	14,9 lm	11,8 lm	7,72 lm	2,71 lm

Light Measurement Report

Print date: 26-5-2025
Measurement date and time: 26-5-2025 14:51:46 – Measurement no. VFR-250526-1449-MS
Measurement tracking No. and Link: VT250526-002290
Operator:

Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	487 lm	3,6%
10-20°	1396 lm	10,3%
20-30°	2111 lm	15,6%
30-40°	2517 lm	18,6%
40-50°	2553 lm	18,8%
50-60°	2154 lm	15,9%
60-70°	1415 lm	10,4%
70-80°	645 lm	4,8%
80-90°	152 lm	1,1%
90-100°	20 lm	0,1%
100-110°	18 lm	0,1%
110-120°	18 lm	0,1%
120-130°	18 lm	0,1%
130-140°	17 lm	0,1%
140-150°	15 lm	0,1%
150-160°	12 lm	0,1%
160-170°	8 lm	0,1%
170-180°	3 lm	0,0%
Total	13558 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	3994 lm	29,5%
0-40°	6511 lm	48,0%
0-60°	11218 lm	82,7%
60-90°	2212 lm	16,3%
70-100°	817 lm	6,0%
90-120°	56 lm	0,4%
0-90°	13431 lm	99,1%
90-180°	128 lm	0,9%
0-180°	13558 lm	100,0%

Intensity peaks

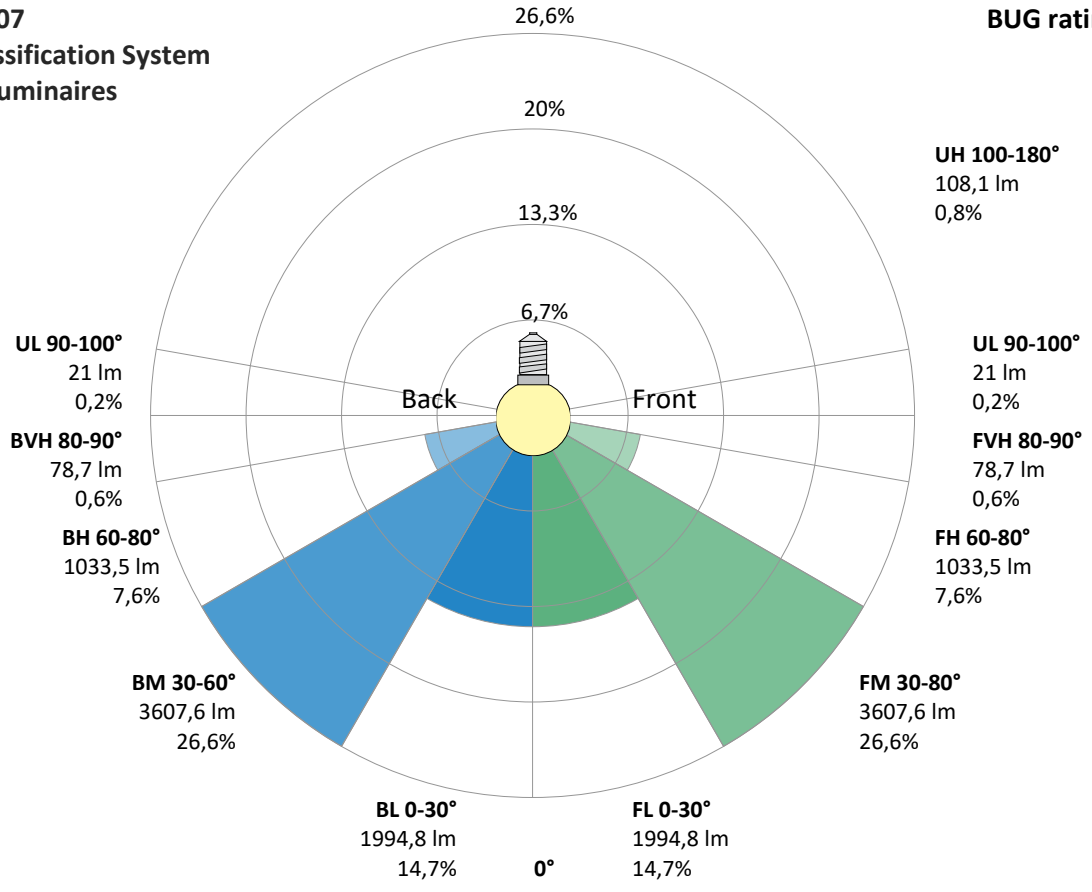
Max intensity	5149 cd
Intensity, 90°	37 cd
Intensity, 0°	5144 cd

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	1995 lm	14,7%
Medium(30-60°)	3608 lm	26,6%
High(60-80°)	1033 lm	7,6%
Very high(80-90°)	79 lm	0,6%
Back light		
Low(0-30°)	1995 lm	14,7%
Medium(30-60°)	3608 lm	26,6%
High(60-80°)	1033 lm	7,6%
Very high(80-90°)	79 lm	0,6%
Uplight		
Low(90-100°)	21 lm	0,2%
High(100-180°)	108 lm	0,8%

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

BUG rating B3 U3 G1



Light Measurement Report

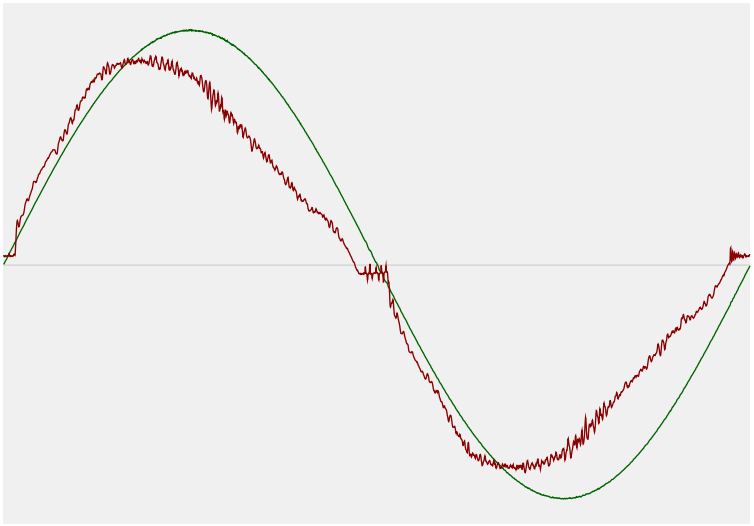
Print date: 26-5-2025
Measurement date and time: 26-5-2025 14:51:46 – Measurement no. VFR-250526-1449-MS
Measurement tracking No. and Link: VT250526-002290
Operator:

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}	0,348 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	80,07 VA
Displacement factor of AC power feed	0,97
Power factor of AC current feed	0,97
Total harmonic distortion of the current	11,63%
Total harmonic distortion of the voltage	0,13%

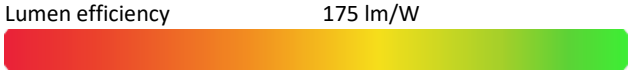
Input Power Curve



Efficiency

Radiated power efficiency 50,9%

Lumen efficiency 175 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	4005 K
CCT shift	-5 K
CCT end	4000 K

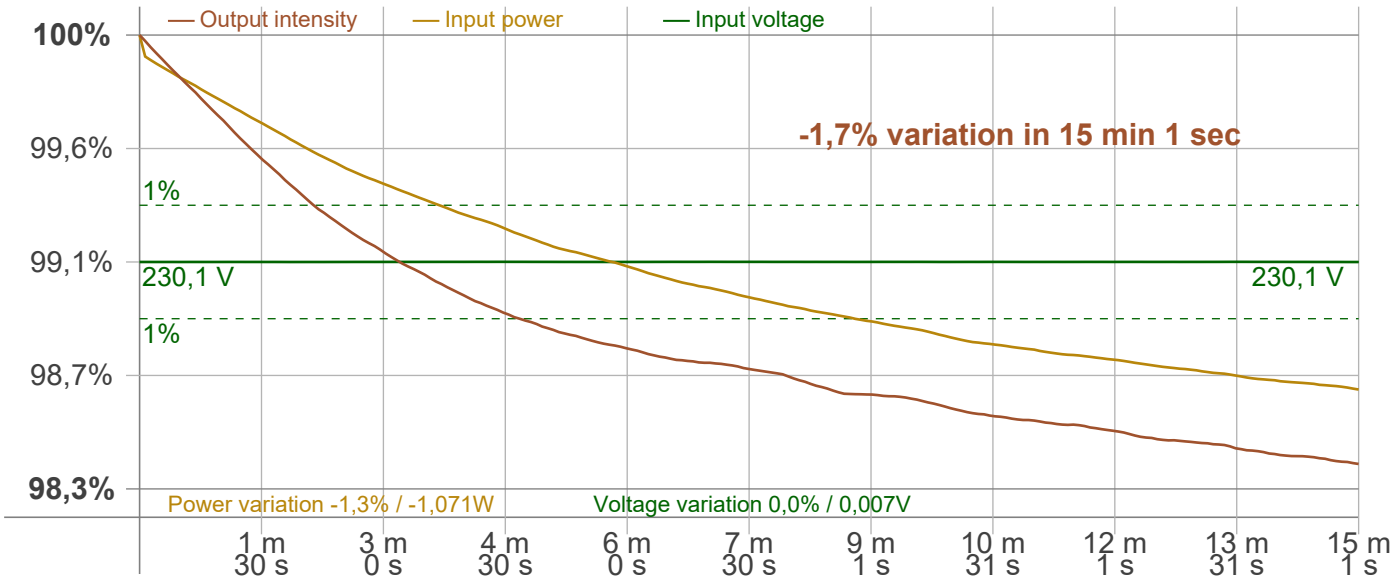
Warmup Result

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

Output Change

Output start	13791 lm
Output change	-233 lm
Output end	13558 lm

Stabilization Curve



Light Measurement Report

Print date: 26-5-2025
Measurement date and time: 26-5-2025 14:51:46 – Measurement no. VFR-250526-1449-MS
Measurement tracking No. and Link: VT250526-002290
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	100,5 Hz
Percent Flicker	0,88 %
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	0,86 %
JA8/10 400 Hz	0,87 %
JA8/10 1000 Hz	0,87 %

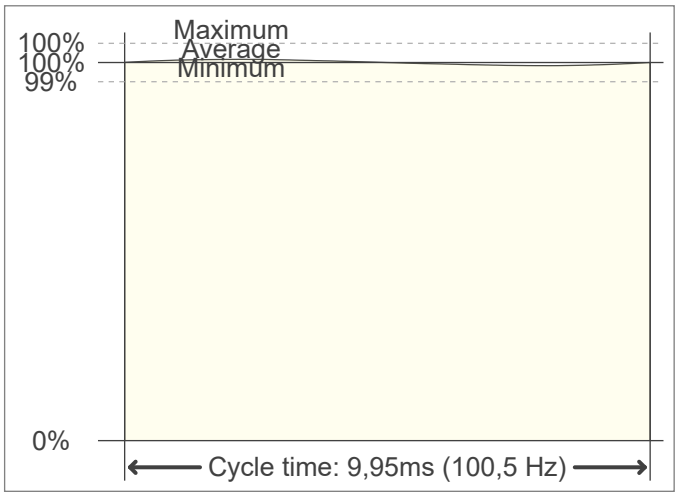
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz)	0,01
SVM value (80 < F < 2000 Hz)	0,03

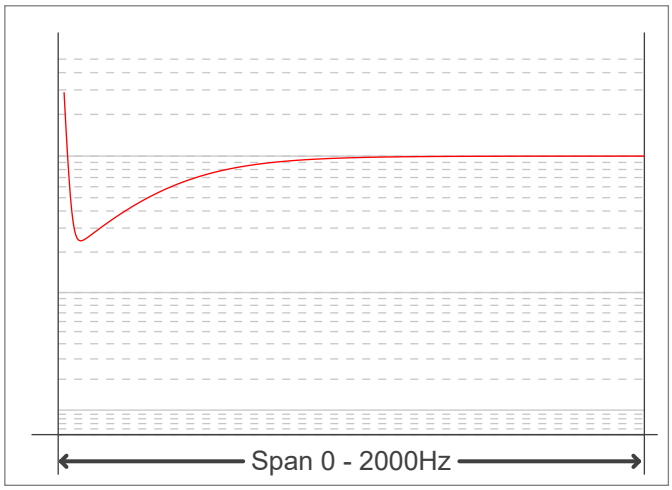
Flicker indices according to Lighting Research Center (2015)

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