Light Measurement Report

Print date: 18-12-2024
Measurement date and time: 18-12-2024 14:05:18 – Measurement no. VFR-241218-2575-MS
Measurement tracking No. and Link: VT241218-000428
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

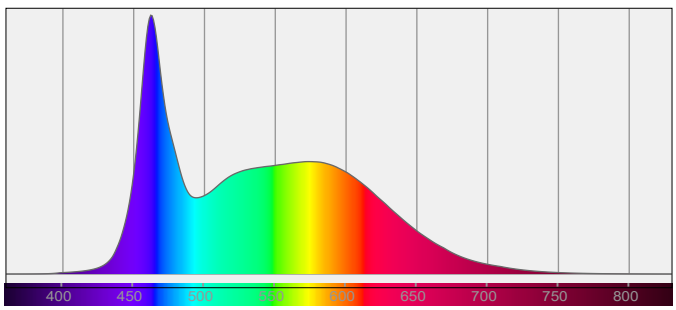
Number of C-planes and Resolution	56 planes – 6,43°
γ (gamma)-Resolution	5°
Test Distance	4,79 m
Input Power, Power and Displ. Factors	49,7 W – PF 0,99 – DPF 1,0
Input RMS Voltage and Current	230 V – 0,218 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 22 min 3 sec – 2,0%

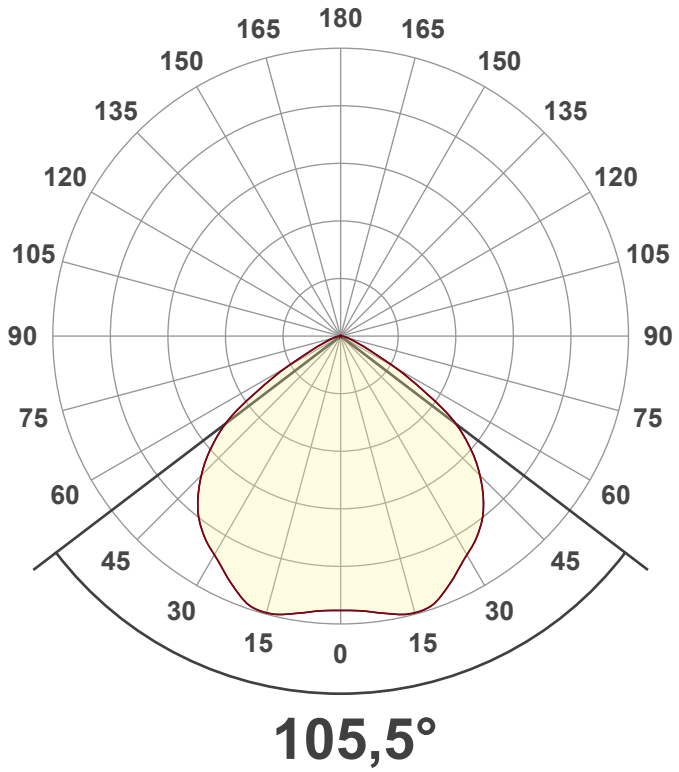
Tested Light Source

Product Name	808266-6000K
Item No. and Manufacturer	808266-6000K – Dutchfulfillment
Product Description (line 1)	LED STRAATLAMP | HERO | 50W

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	7550 lm – 0,29% / 99,71%
Efficiency	152 lm/W
Peak Intensity and Beam Angle	3177 cd – 105,5°
Correlated Color Temperature, Target/Measured	CCT = 6000 K / 6345 K
Color Rendering Index	CRI 81,6
Color Rendering TM30-18	R_f 78,0 – R_g 85,7
Color Shift, CIE duv and MacAdam Steps	Duv 0,0053 – SDCM 13,0
Flicker	SVM n/a – PstLM n/a

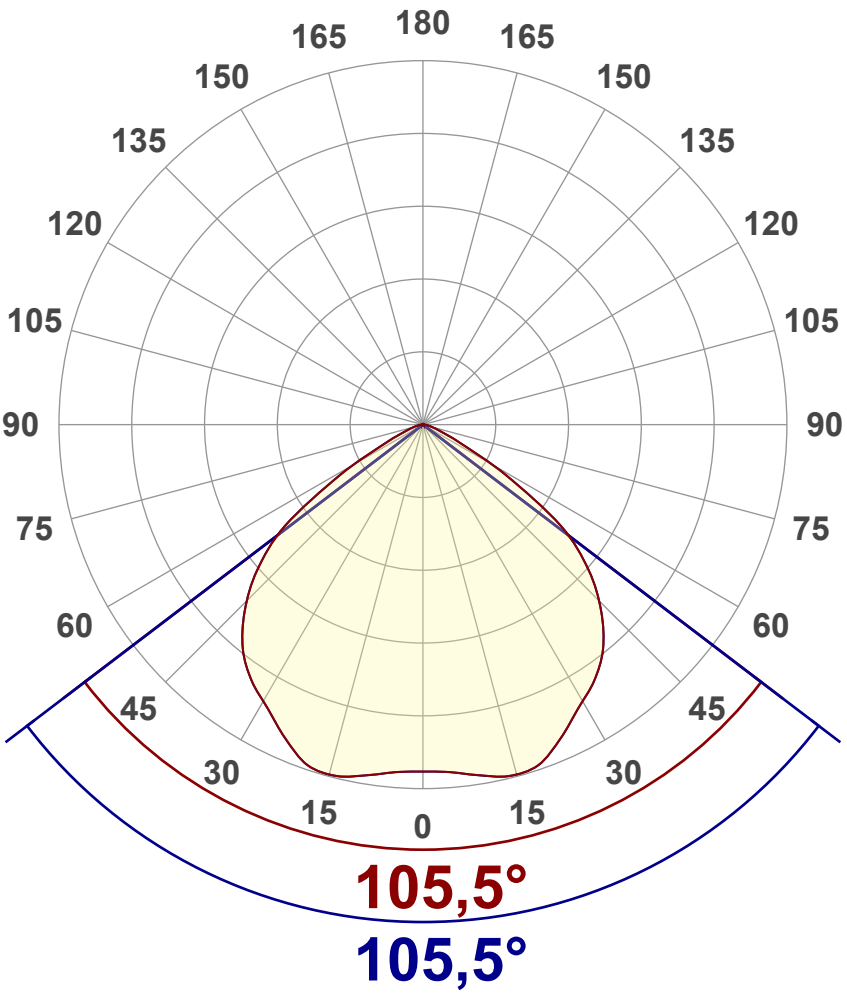




Light Measurement Report

Print date: 18-12-2024
Measurement date and time: 18-12-2024 14:05:18 – Measurement no. VFR-241218-2575-MS
Measurement tracking No. and Link: VT241218-000428
Operator:

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



Main Values

Output (total Lumen)	7550 lm
Lumen Up% / Down%	0,29% / 99,71%
Peak Intensity	3177 cd
Beam Angle (50%)	105,5°
Beam Angle (90%)	105,5°
Beam Angle (10%)	105,5°

Cut-off Angle

Average 2,5%	151,6°

Field Angle

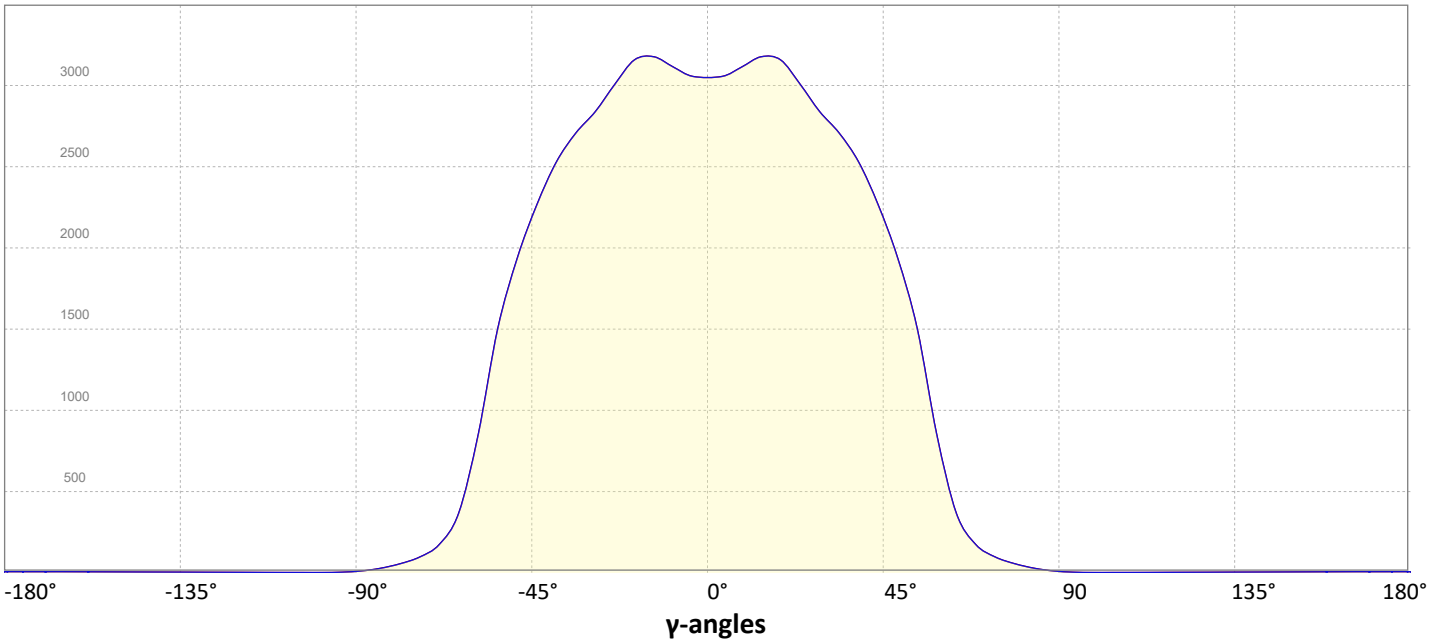
Average 10%	130°

Intensity Ratio

In 120° cone	93,5%
In 90° cone	67,3%

C000-C180
C090-C270

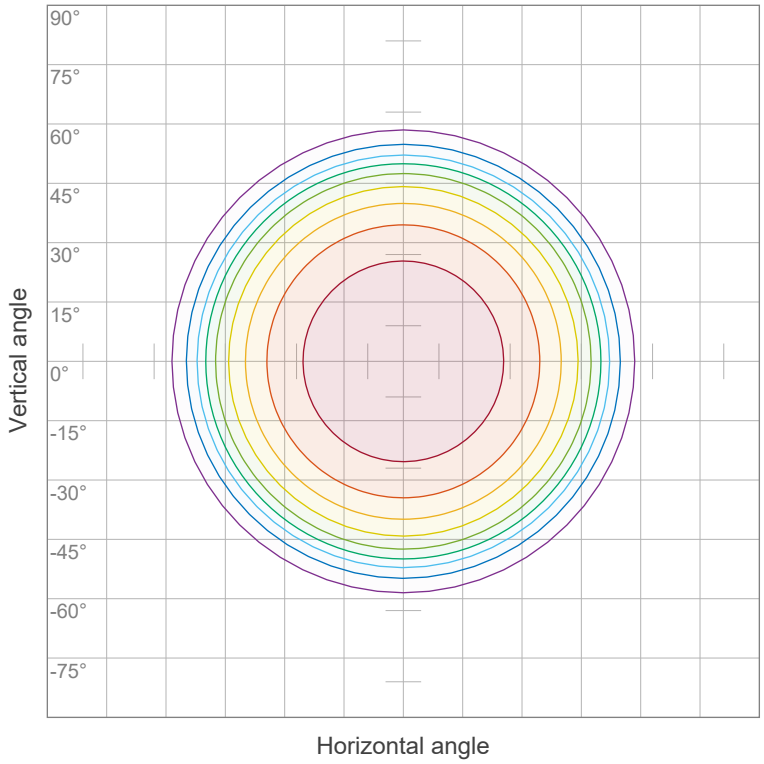
Linear distribution diagram - Intensity (candela) vs γ-angle



Light Measurement Report

Print date: 18-12-2024
Measurement date and time: 18-12-2024 14:05:18 – Measurement no. VFR-241218-2575-MS
Measurement tracking No. and Link: VT241218-000428
Operator:

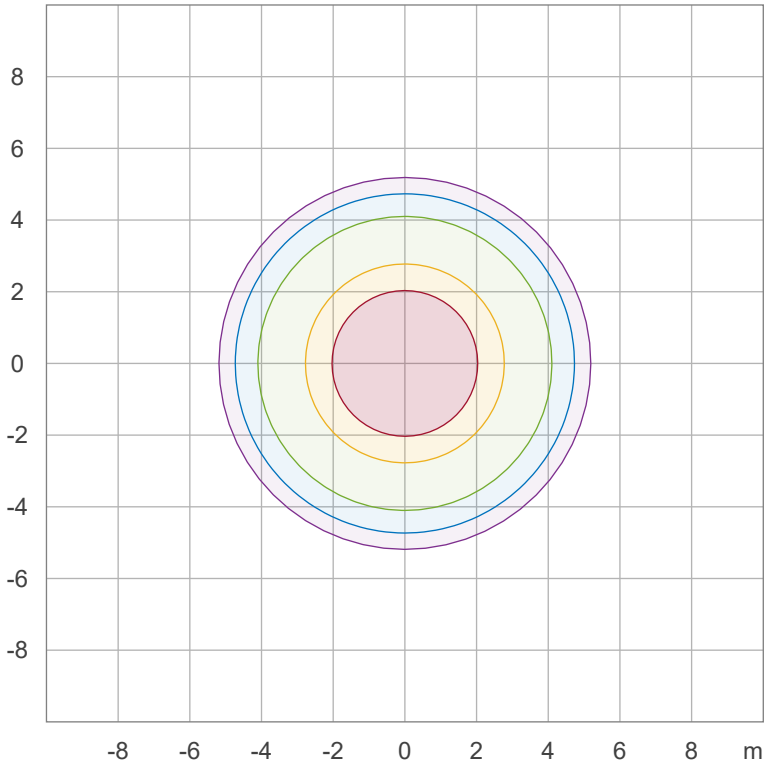
Iso-intensity Diagram (Iso-candela)



90 %	2857,9 cd
80 %	2540,4 cd
70 %	2222,8 cd
60 %	1905,3 cd
50 %	1587,7 cd
40 %	1270,2 cd
30 %	952,6 cd
20 %	635,1 cd
10 %	317,5 cd

Peak intensity: 3175,5 cd
Number of c-planes: 56

Iso-illuminance Diagram (Iso-lux)



50,0 %	169,8 lx
30,0 %	101,9 lx
10,0 %	34,0 lx
5,0 %	17,0 lx
3,0 %	10,2 lx

Peak illuminance: 339,5 lx
Mounting height: 3,0 m
Number of c-planes: 56

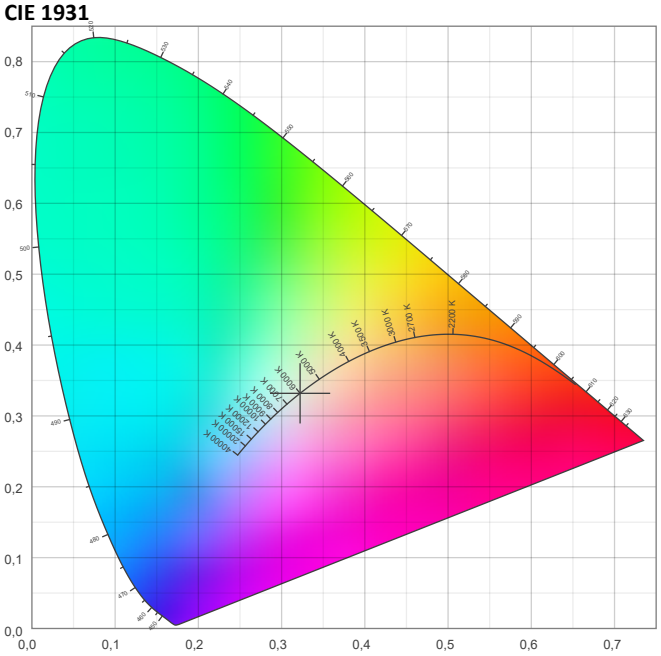
Light Measurement Report

Print date: 18-12-2024
Measurement date and time: 18-12-2024 14:05:18 – Measurement no. VFR-241218-2575-MS
Measurement tracking No. and Link: VT241218-000428
Operator:

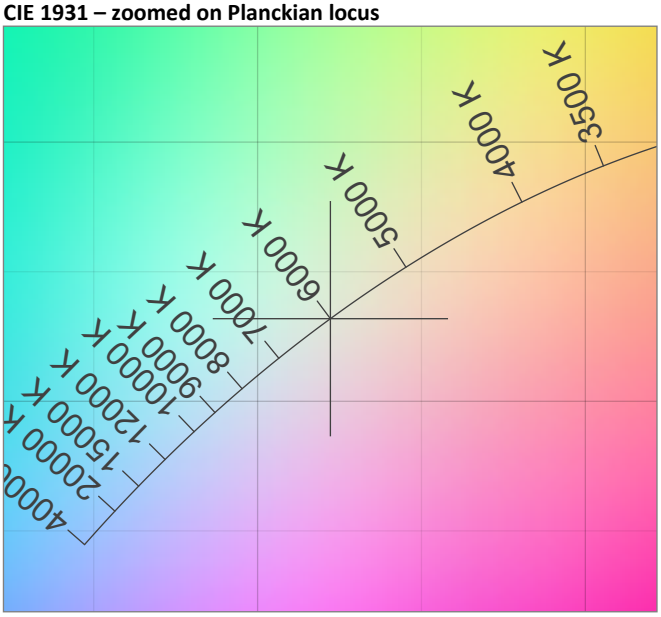
Color details

Correlated Color Temperature, Target	CCT = 6000 K
Correlated Color Temperature, Measured	CCT = 6345 K
Color Rendering Index	CRI 81,6
Color Rendering Index, R9 (red component)	R9 = 7,5
Color Rendering TM30-18	R_f 78,0 – R_g 85,7
Color Quality Scale	CQS = 78,8
MacAdam Steps	SDCM = 13,0
Color coordinates CIE 1931	(x;y) = (0,322;0,332)
Color coordinate CIEs 1960	(u;v) = (0,203;0,314)
Color deviation from BBL	Duv = 0,0053
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,203;0,471)

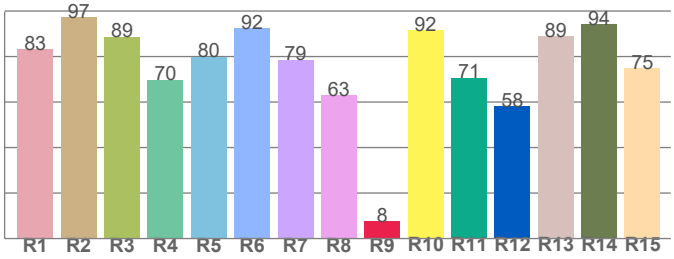
CIE 1931



CIE 1931 – zoomed on Planckian locus



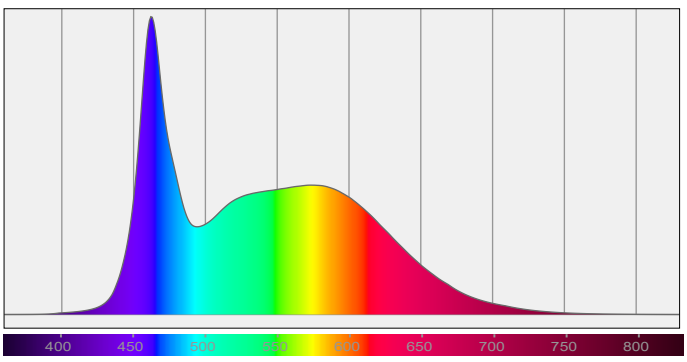
Color Rendering Index per reference color (CIE 1995)



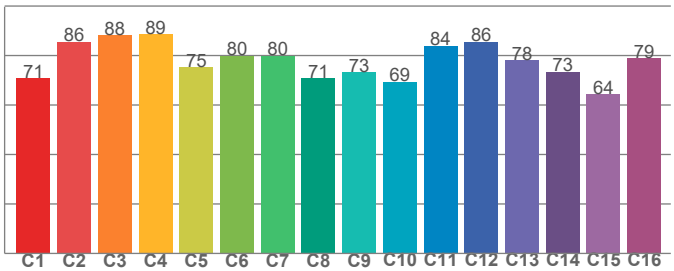
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
83,1	97,3	88,7	69,8	79,9	92,5	78,5	63,0	7,5	91,5	70,6	58,0	88,9	94,1	75,0

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



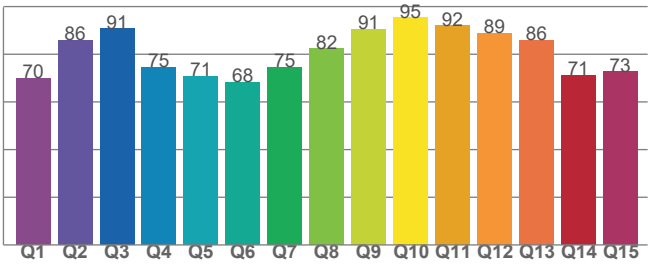
TM30-18 Rf-values per hue bin



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
70,8	85,6	88,1	88,7	75,3	79,9	79,9	70,7	73,3	69,5	83,9	85,5	78,1	73,4	64,3	78,9

Color Quality Scale by reference color



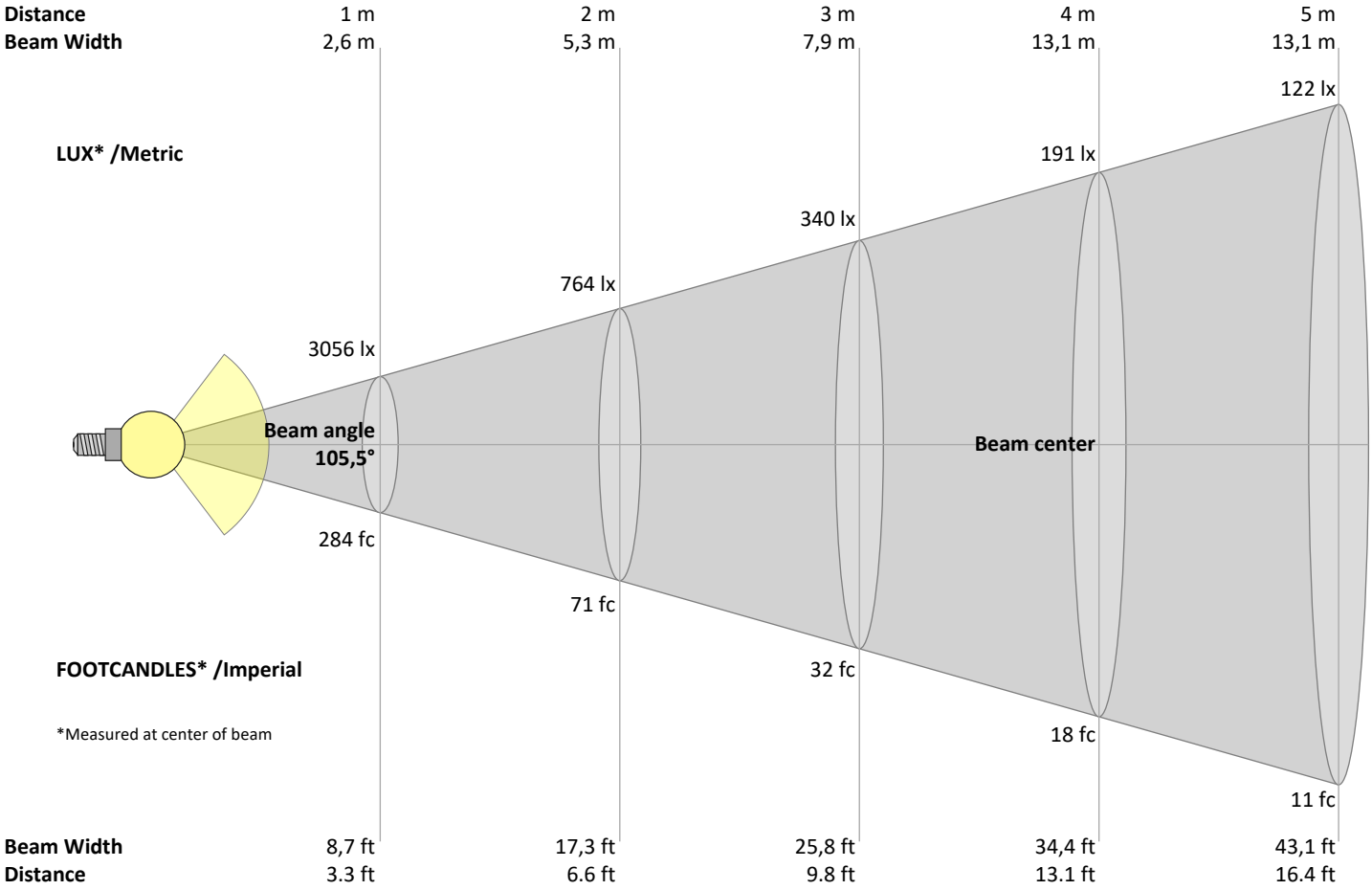
CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
69,9	85,9	90,8	74,7	70,7	68,2	74,7	82,4	90,5	95,4	92,1	88,9	85,8	71,3	72,8

Light Measurement Report

Print date: 18-12-2024
Measurement date and time: 18-12-2024 14:05:18 – Measurement no. VFR-241218-2575-MS
Measurement tracking No. and Link: VT241218-000428
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
3056	764	340	191	122	85	62	48	38	31	25	21	18	16	14	12	11	9	8	8	lux
283,9	71	31,5	17,7	11,4	7,9	5,8	4,4	3,5	2,8	2,3	2	1,7	1,4	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
3056	3070	3129	3172	3119	2964	2805	2661	2460	2180	1825	1335	726	317	154	86	48	23	9	3	cd
100%	100%	102%	104%	102%	97%	92%	87%	81%	71%	60%	44%	24%	10%	5%	3%	2%	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
3056	3070	3129	3172	3119	2964	2805	2661	2460	2180	1825	1335	726	317	154	86	48	23	9	3	cd
100%	100%	102%	104%	102%	97%	92%	87%	81%	71%	60%	44%	24%	10%	5%	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
3056	3070	3129	3172	3119	2964	2805	2661	2460	2180	1825	1335	726	317	154	86	48	23	9	3	cd
100%	100%	102%	104%	102%	97%	92%	87%	81%	71%	60%	44%	24%	10%	5%	3%	2%	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
3056	3070	3129	3172	3119	2964	2805	2661	2460	2180	1825	1335	726	317	154	86	48	23	9	3	cd
100%	100%	102%	104%	102%	97%	92%	87%	81%	71%	60%	44%	24%	10%	5%	3%	2%	1%	0%	0%	of 0°val

Light Measurement Report

Print date: 18-12-2024
Measurement date and time: 18-12-2024 14:05:18 – Measurement no. VFR-241218-2575-MS
Measurement tracking No. and Link: VT241218-000428
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	29,0	30,1	29,2	30,4	30,6	28,9	30,0	29,1	30,3	30,5
	3H	29,0	30,0	29,4	30,3	30,5	28,8	29,9	29,2	30,2	30,4
	4H	28,9	30,0	29,3	30,2	30,5	28,8	29,8	29,2	30,1	30,4
	6H	29,0	29,8	29,3	30,1	30,5	28,8	29,7	29,1	30,0	30,4
	8H	28,9	29,8	29,2	30,1	30,5	28,8	29,6	29,1	30,0	30,4
	12H	28,9	29,7	29,2	30,0	30,5	28,7	29,6	29,1	29,9	30,4
4H	2H	29,0	30,1	29,4	30,3	30,6	28,9	30,0	29,3	30,2	30,5
	3H	29,1	30,0	29,5	30,3	30,7	29,0	29,8	29,4	30,2	30,6
	4H	29,0	29,8	29,5	30,2	30,8	28,9	29,7	29,4	30,1	30,7
	6H	29,0	29,8	29,5	30,1	30,5	28,9	29,6	29,4	30,0	30,4
	8H	29,0	29,7	29,5	30,0	30,4	28,9	29,5	29,4	29,9	30,3
	12H	28,9	29,5	29,4	29,9	30,4	28,8	29,4	29,3	29,8	30,3
8H	4H	29,0	29,6	29,5	30,0	30,4	28,9	29,5	29,4	29,9	30,3
	6H	29,0	29,4	29,5	29,9	30,5	28,9	29,3	29,4	29,8	30,3
	8H	29,0	29,4	29,5	29,9	30,5	28,9	29,3	29,4	29,8	30,4
	12H	28,9	29,3	29,5	29,8	30,4	28,8	29,2	29,4	29,7	30,3
12H	4H	28,9	29,5	29,4	29,9	30,4	28,8	29,4	29,3	29,8	30,2
	6H	29,0	29,4	29,5	29,9	30,5	28,9	29,3	29,4	29,8	30,4
	8H	28,9	29,3	29,5	29,8	30,4	28,8	29,2	29,4	29,7	30,3

Variations with the observer position for the luminaire spacings, S:		
S = 1.0H	0,4 / -0,6	0,5 / -0,6
S = 1.5H	1,7 / -3,8	1,6 / -3,8
S = 2.0H	3,2 / -6,6	3,2 / -6,7

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	102	102	102	100
1	111	107	104	101	108	105	102	99	101	98	96	97	95	93	93	92	90	88
2	103	96	90	85	100	94	89	84	91	86	82	87	84	81	84	81	79	77
3	95	86	79	73	92	84	78	73	81	76	71	79	74	70	76	72	69	67
4	87	77	69	63	85	76	68	63	73	67	62	71	66	61	69	64	60	58
5	81	69	61	55	79	68	61	55	66	60	55	64	58	54	63	57	53	51
6	75	63	55	49	73	62	54	49	60	53	48	58	52	48	57	52	47	45
7	70	57	49	43	68	56	49	43	55	48	43	53	47	43	52	47	42	41
8	65	52	44	39	63	52	44	39	50	43	39	49	43	38	48	42	38	36
9	61	48	40	35	59	47	40	35	46	40	35	45	39	35	44	39	34	33
10	57	44	37	32	56	44	37	32	43	36	32	42	36	32	41	35	31	30

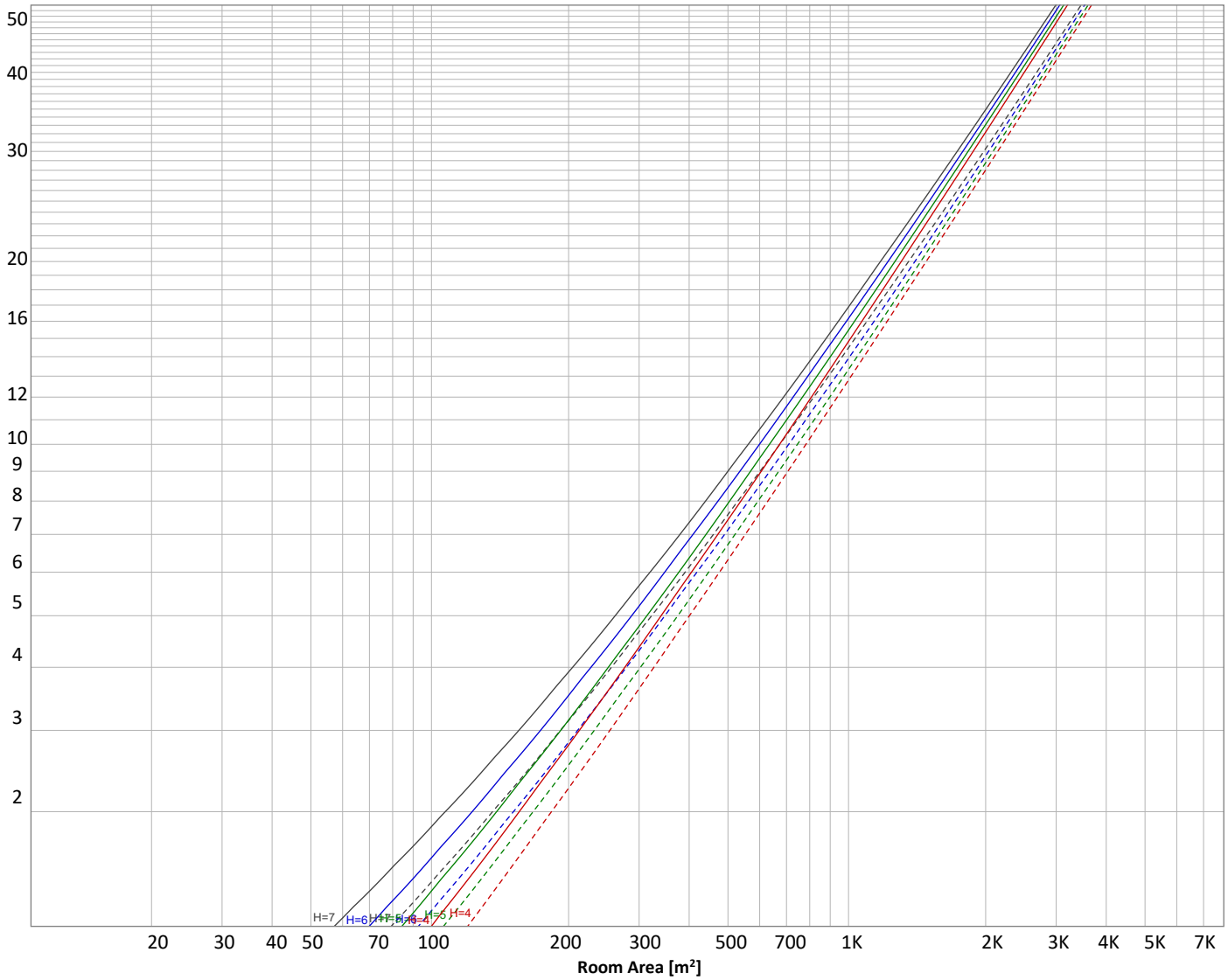
Light Measurement Report

Print date: 18-12-2024
Measurement date and time: 18-12-2024 14:05:18 – Measurement no. VFR-241218-2575-MS
Measurement tracking No. and Link: VT241218-000428
Operator:

Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 7550 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°
295 lm	896 lm	1366 lm	1664 lm	1675 lm	1163 lm	346 lm	95,2 lm	26,8 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
4,05 lm	1,91 lm	2,37 lm	2,88 lm	3,07 lm	2,88 lm	2,49 lm	1,76 lm	0,603 lm

Light Measurement Report

Print date: 18-12-2024
Measurement date and time: 18-12-2024 14:05:18 – Measurement no. VFR-241218-2575-MS
Measurement tracking No. and Link: VT241218-000428
Operator:

Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	295 lm	3,9%
10-20°	896 lm	11,9%
20-30°	1366 lm	18,1%
30-40°	1664 lm	22,0%
40-50°	1675 lm	22,2%
50-60°	1163 lm	15,4%
60-70°	346 lm	4,6%
70-80°	95 lm	1,3%
80-90°	27 lm	0,4%
90-100°	4 lm	0,1%
100-110°	2 lm	0,0%
110-120°	2 lm	0,0%
120-130°	3 lm	0,0%
130-140°	3 lm	0,0%
140-150°	3 lm	0,0%
150-160°	2 lm	0,0%
160-170°	2 lm	0,0%
170-180°	1 lm	0,0%
Total	7550 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	2558 lm	33,9%
0-40°	4221 lm	55,9%
0-60°	7060 lm	93,5%
60-90°	468 lm	6,2%
70-100°	126 lm	1,7%
90-120°	8 lm	0,1%
0-90°	7528 lm	99,7%
90-180°	22 lm	0,3%
0-180°	7550 lm	100,0%

Intensity peaks

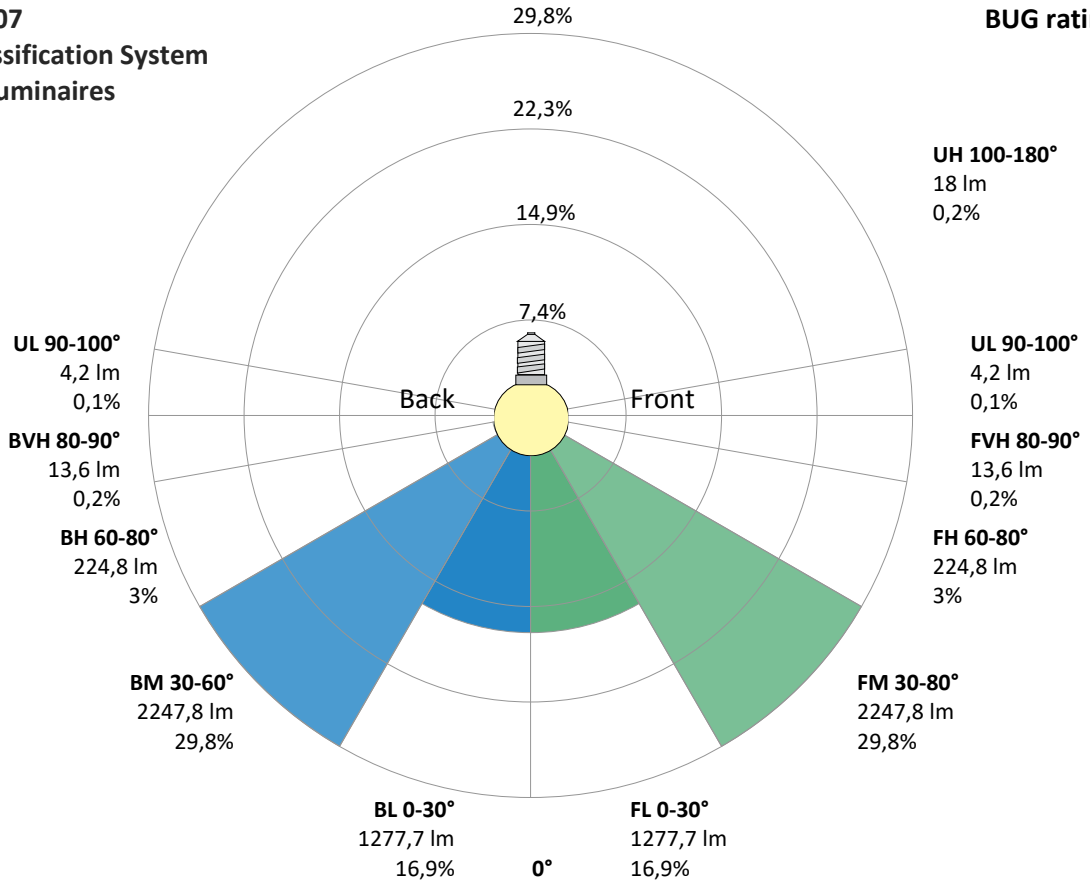
Max intensity	3177 cd
Intensity, 90°	9 cd
Intensity, 0°	3056 cd

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	1278 lm	16,9%
Medium(30-60°)	2248 lm	29,8%
High(60-80°)	225 lm	3,0%
Very high(80-90°)	14 lm	0,2%
Back light		
Low(0-30°)	1278 lm	16,9%
Medium(30-60°)	2248 lm	29,8%
High(60-80°)	225 lm	3,0%
Very high(80-90°)	14 lm	0,2%
Uplight		
Low(90-100°)	4 lm	0,1%
High(100-180°)	18 lm	0,2%

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

BUG rating B3 U2 G1



Light Measurement Report

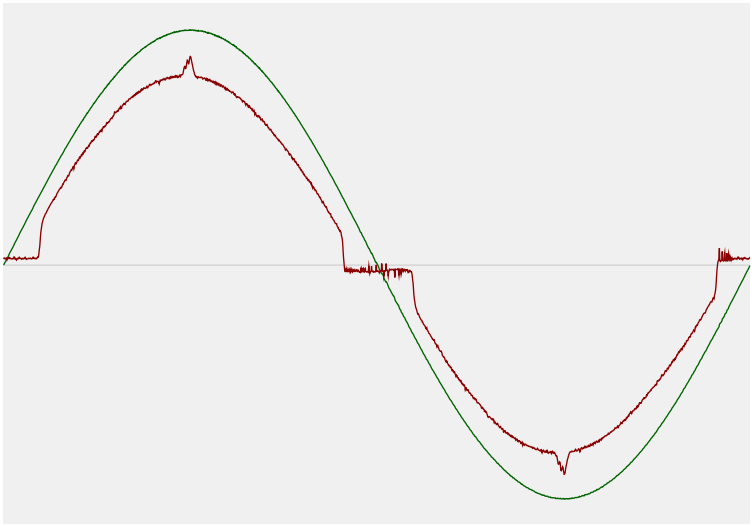
Print date: 18-12-2024
Measurement date and time: 18-12-2024 14:05:18 – Measurement no. VFR-241218-2575-MS
Measurement tracking No. and Link: VT241218-000428
Operator:

Power Details

Input Power

Power feed to light source	49,7 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,218 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	50,11 VA
Displacement factor of AC power feed	1,0
Power factor of AC current feed	0,99
Total harmonic distortion of the current	11,93%
Total harmonic distortion of the voltage	0,08%

Input Power Curve



Efficiency

Radiated power efficiency 48,8%

Lumen efficiency 152 lm/W

Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	5880 K
CCT shift	+120 K
CCT end	6000 K

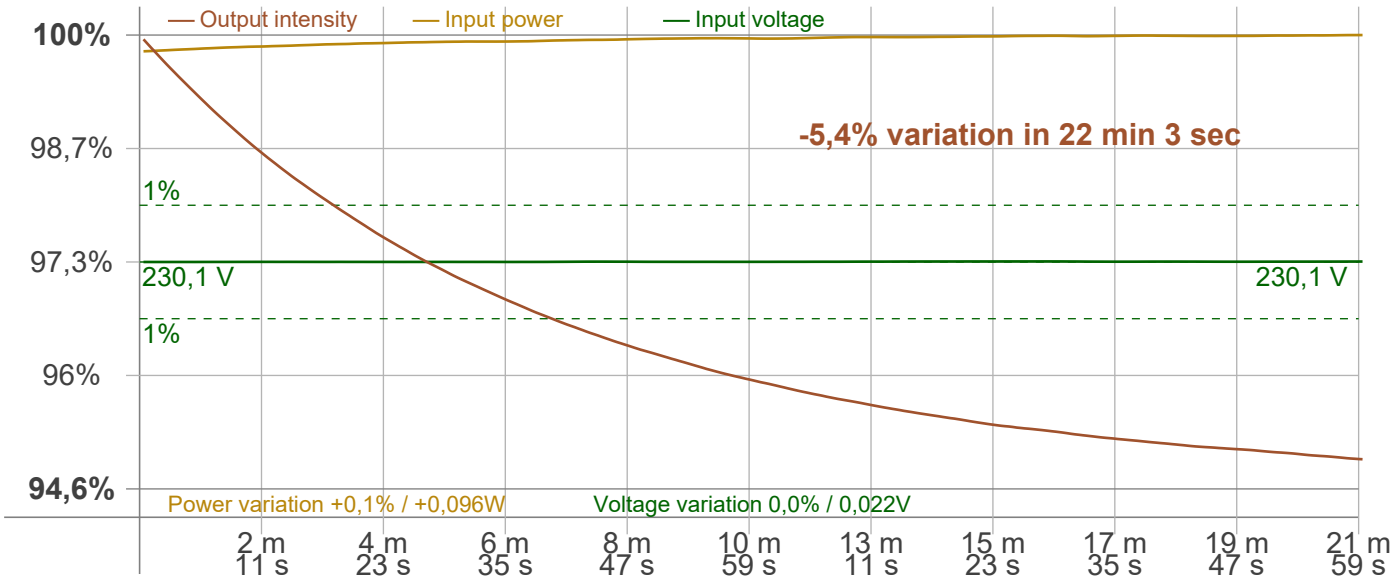
Warmup Result

Total warmup time	Lamp stabilized in 22 min 3 sec
Warmup variation	-5,4%

Output Change

Output start	7971 lm
Output change	-421 lm
Output end	7550 lm

Stabilization Curve



Light Measurement Report

Print date: 18-12-2024
Measurement date and time: 18-12-2024 14:05:18 – Measurement no. VFR-241218-2575-MS
Measurement tracking No. and Link: VT241218-000428
Operator:

Flicker /TLA details

Flicker Meter Type	Viso Systems LabFlicker
Frequency of input power	50 Hz
Flicker/TLA sample rate	n/a samples/s

Measurement time

PstLM	180 sec
All other indices	1,2 sec

Flicker indices according to Illuminating Engineering Society (IES)

Flicker frequency	n/a Hz
Percent Flicker	n/a %
Flicker index	n/a

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 %

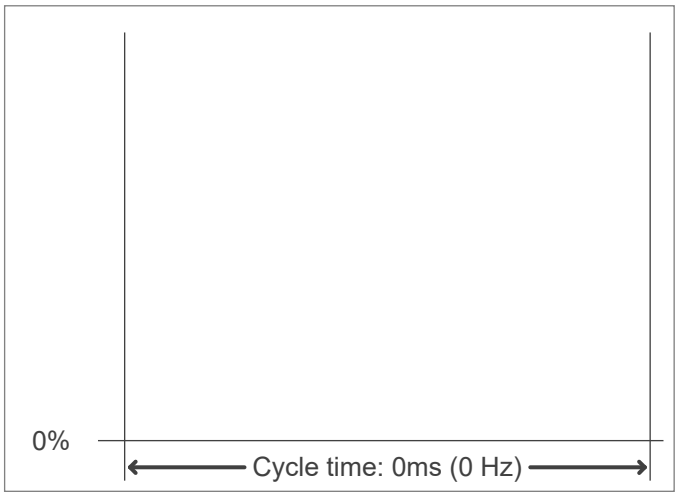
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz)	n/a
SVM value (80 < F < 2000 Hz)	n/a

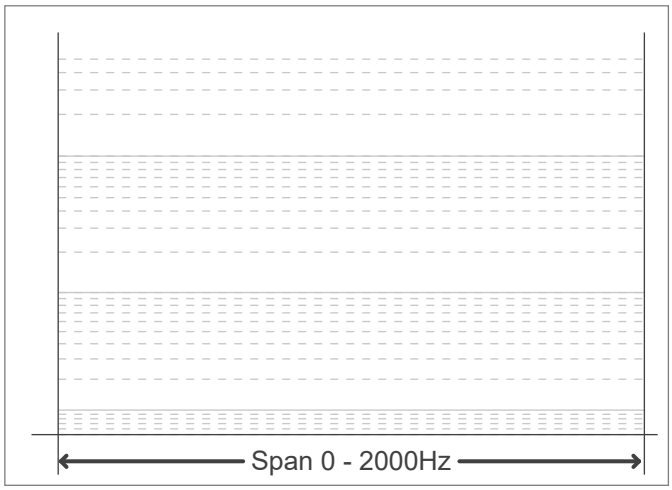
Flicker indices according to Lighting Research Center (2015)

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