Light Measurement Report

Print date: 1-7-2025
Measurement date and time: 1-7-2025 10:59:22 – Measurement no. VFR-250701-1830-MS
Measurement tracking No. and Link: VT250701-008120
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

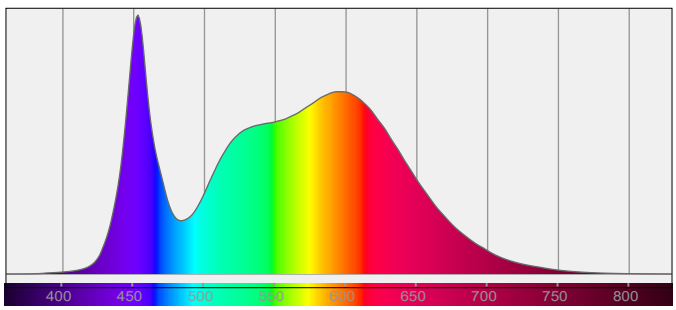
Number of C-planes and Resolution	16 planes – 22,5°
γ (gamma)-Resolution	5°
Test Distance	1,99 m
Input Power, Power and Displ. Factors	51,3 W – PF 0,99 – DPF 1,0
Input RMS Voltage and Current	230 V – 0,225 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 1 sec – 2,0%

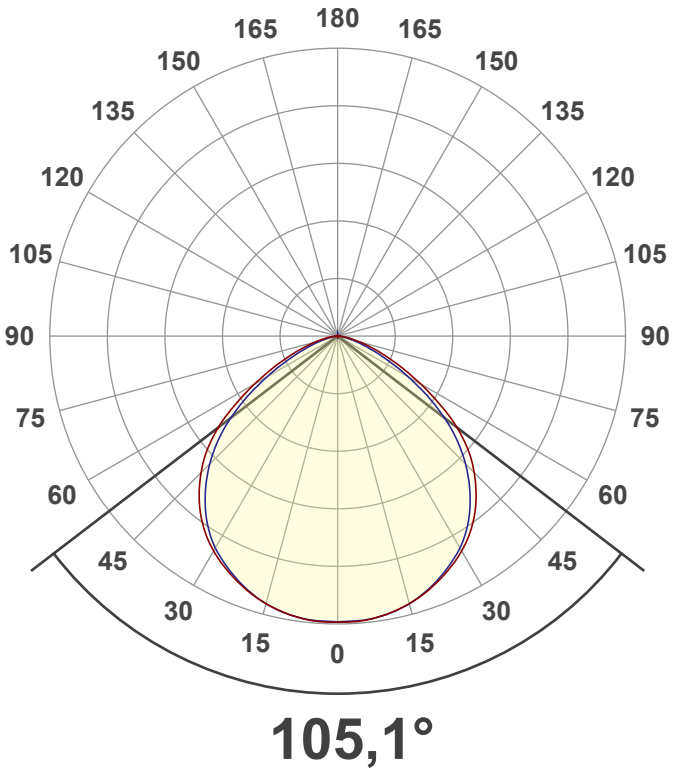
Tested Light Source

Product Name	811518-4000K
Item No. and Manufacturer	811518-4000K – Dutchfulfillment
Product Description (line 1)	LED FLOODLIGHT ISTOS | 50W | CCT-SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	5172 lm – 0,04% / 99,96%
Efficiency	101 lm/W
Peak Intensity and Beam Angle	2080 cd – 105,1°
Correlated Color Temperature, Target/Measured	CCT = 4000 K / 4358 K
Color Rendering Index	CRI 85,0
Color Rendering TM30-18	R_f 83,7 – R_g 97,4
Color Shift, CIE duv and MacAdam Steps	Duv -0,0027 – SDCM 7,8
Flicker	SVM 3,58 – PstLM 0,07

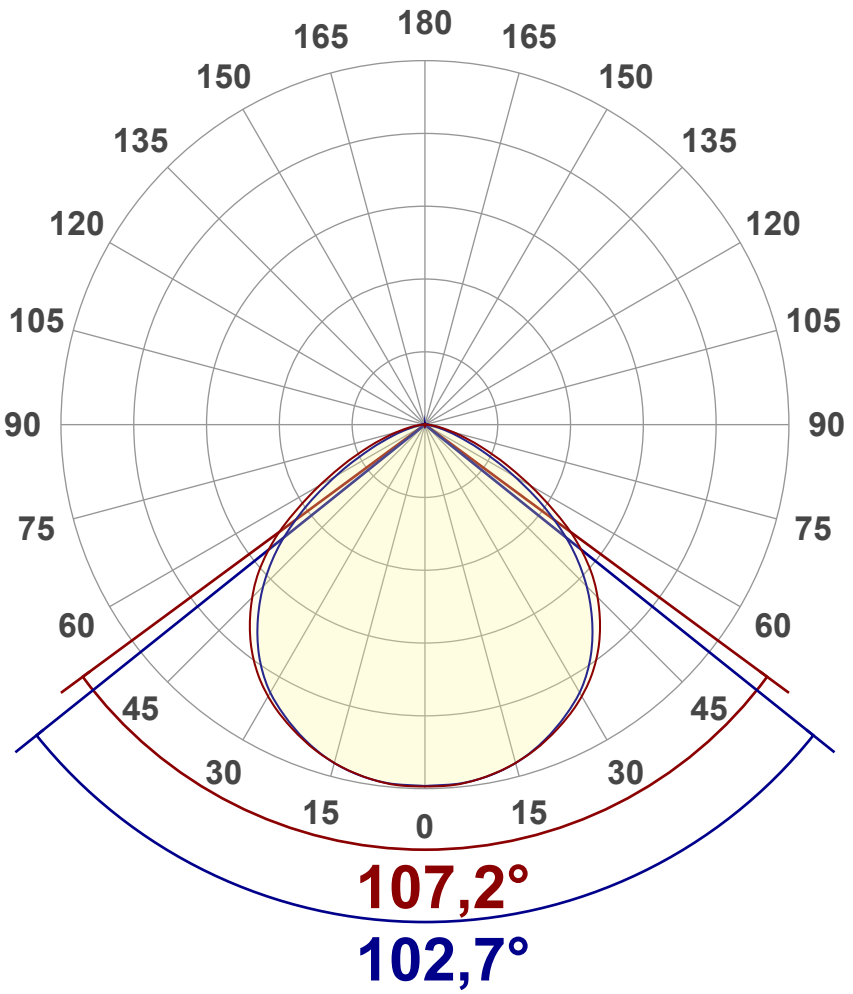




Light Measurement Report

Print date: 1-7-2025
Measurement date and time: 1-7-2025 10:59:22 – Measurement no. VFR-250701-1830-MS
Measurement tracking No. and Link: VT250701-008120
Operator:

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



Main Values

Output (total Lumen)	5172 lm
Lumen Up% / Down%	0,04% / 99,96%
Peak Intensity	2080 cd
Beam Angle (50%)	105,1°
Beam Angle (90%)	102,7°
Beam Angle (10%)	107,2°

Cut-off Angle

Average 2,5%	163°

Field Angle

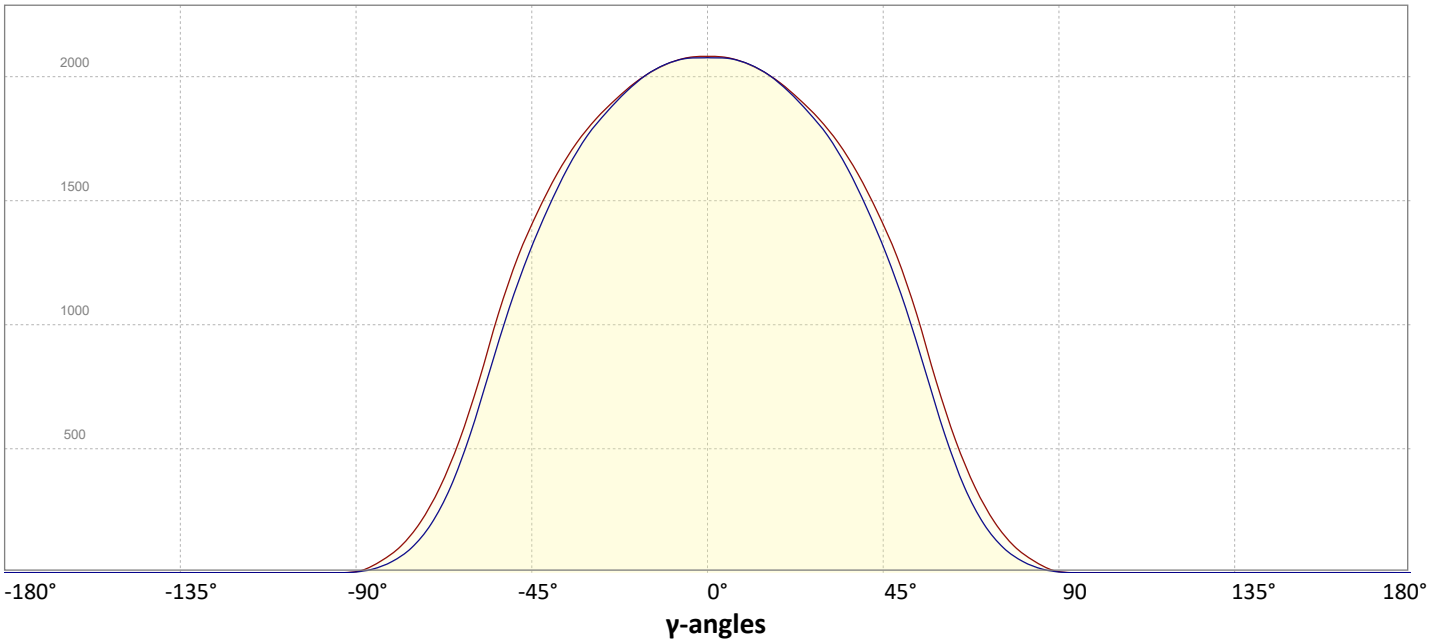
Average 10%	143,4°

Intensity Ratio

In 120° cone	88,2%
In 90° cone	62,6%

C000-C180
C090-C270

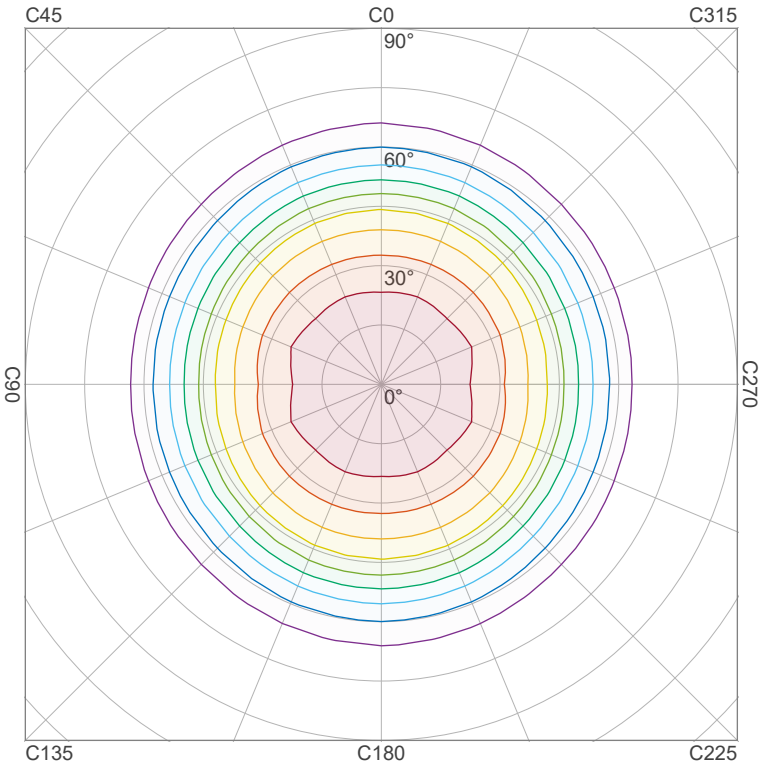
Linear distribution diagram - Intensity (candela) vs γ-angle



Light Measurement Report

Print date: 1-7-2025
Measurement date and time: 1-7-2025 10:59:22 – Measurement no. VFR-250701-1830-MS
Measurement tracking No. and Link: VT250701-008120
Operator:

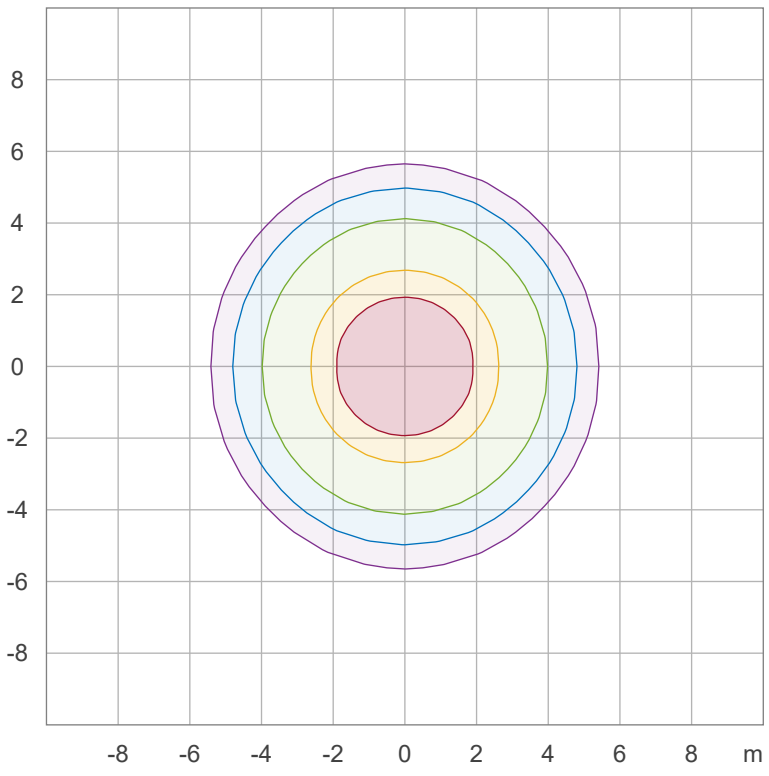
Iso-intensity Diagram (Iso-candela)



	90 %	1871,9 cd
	80 %	1663,9 cd
	70 %	1455,9 cd
	60 %	1247,9 cd
	50 %	1039,9 cd
	40 %	831,9 cd
	30 %	624,0 cd
	20 %	416,0 cd
	10 %	208,0 cd

Peak intensity: 2079,9 cd
Number of c-planes: 16

Iso-illuminance Diagram (Iso-lux)



	50,0 %	115,5 lx
	30,0 %	69,3 lx
	10,0 %	23,1 lx
	5,0 %	11,5 lx
	3,0 %	6,9 lx

Peak illuminance: 231,0 lx
Mounting height: 3,0 m
Number of c-planes: 16

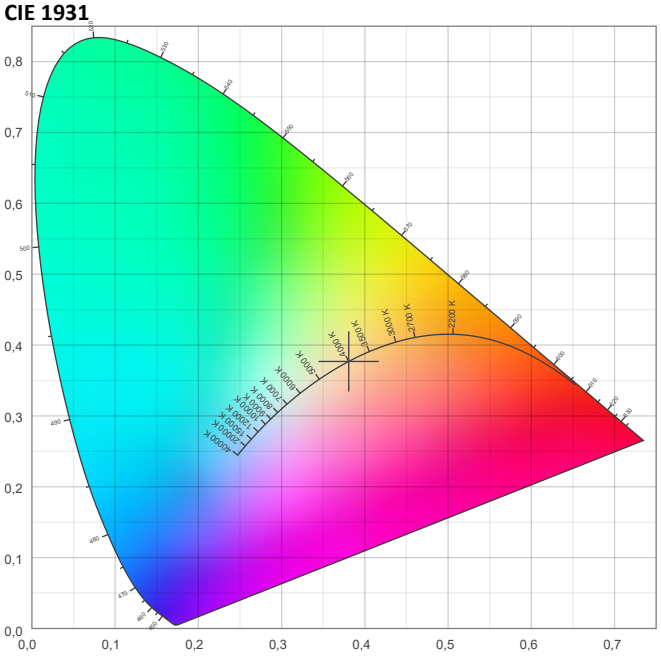
Light Measurement Report

Print date: 1-7-2025
Measurement date and time: 1-7-2025 10:59:22 – Measurement no. VFR-250701-1830-MS
Measurement tracking No. and Link: VT250701-008120
Operator:

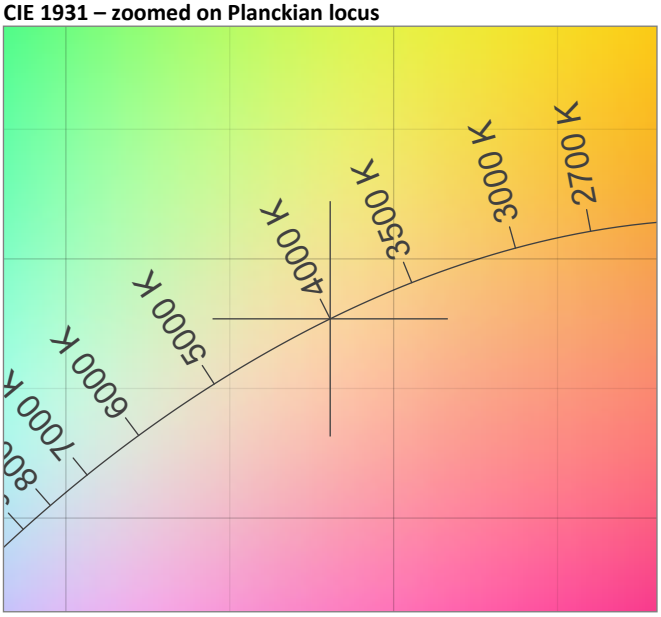
Color details

Correlated Color Temperature, Target	CCT = 4000 K
Correlated Color Temperature, Measured	CCT = 4358 K
Color Rendering Index	CRI 85,0
Color Rendering Index, R9 (red component)	R9 = 21,3
Color Rendering TM30-18	R_f 83,7 – R_g 97,4
Color Quality Scale	CQS = 82,3
MacAdam Steps	SDCM = 7,8
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 = -0,0027
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,225;0,502)

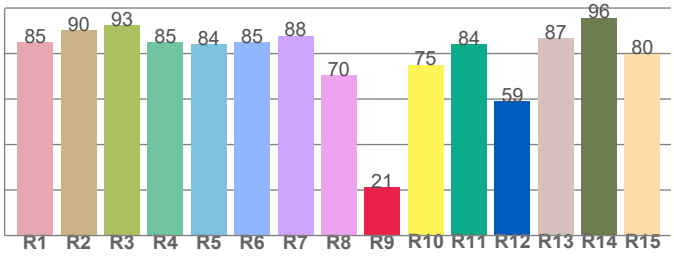
CIE 1931



CIE 1931 – zoomed on Planckian locus



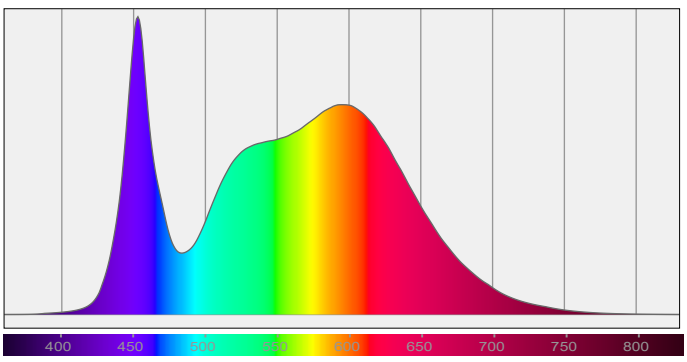
Color Rendering Index per reference color (CIE 1995)



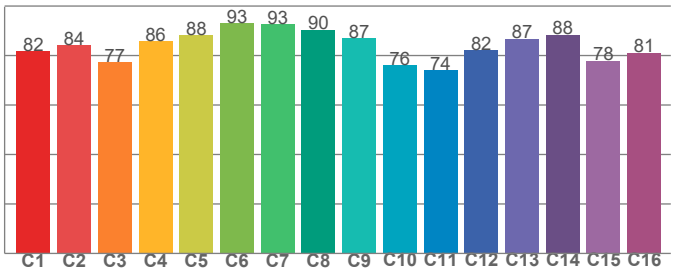
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
85,0	90,4	92,5	85,0	84,1	85,1	87,8	70,5	21,3	75,1	84,0	59,0	86,7	95,7	80,0

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



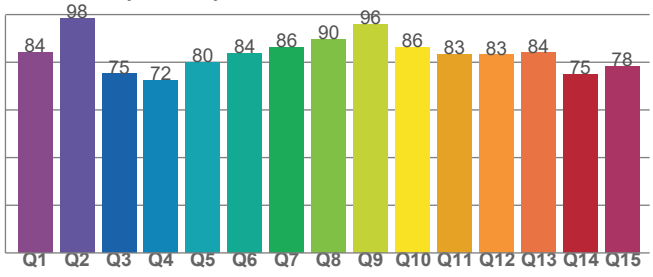
TM30-18 Rf-values per hue bin



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
81,8	84,0	77,3	85,8	88,2	93,0	92,6	90,4	86,9	76,1	74,1	82,2	86,8	88,4	77,9	81,1

Color Quality Scale by reference color



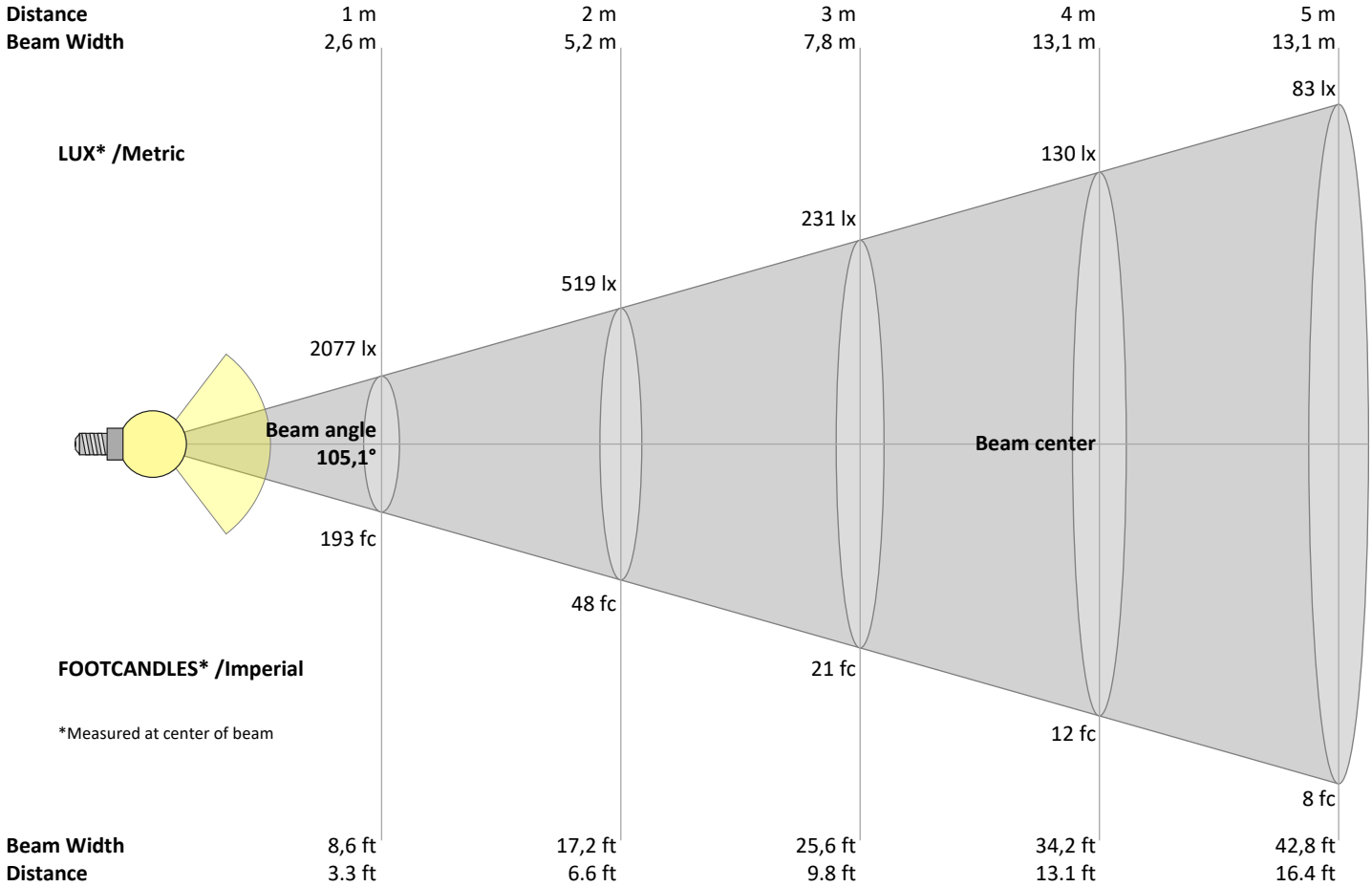
CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
84,2	98,5	75,2	72,4	79,9	83,7	86,2	89,6	96,0	86,3	83,4	83,2	84,0	75,0	78,4

Light Measurement Report

Print date: 1-7-2025
Measurement date and time: 1-7-2025 10:59:22 – Measurement no. VFR-250701-1830-MS
Measurement tracking No. and Link: VT250701-008120
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
2077	519	231	130	83	58	42	32	26	21	17	14	12	11	9	8	7	6	6	5	lux
192,9	48,2	21,4	12,1	7,7	5,4	3,9	3	2,4	1,9	1,6	1,3	1,1	1	0,9	0,8	0,7	0,6	0,5	0,5	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
2077	2075	2052	2012	1956	1885	1801	1696	1562	1401	1207	965	703	478	303	175	90	37	7	0	cd
100%	100%	99%	97%	94%	91%	87%	82%	75%	67%	58%	46%	34%	23%	15%	8%	4%	2%	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
2077	2073	2053	2013	1950	1870	1777	1652	1495	1313	1100	852	597	379	220	116	54	19	4	0	cd
100%	100%	99%	97%	94%	90%	86%	80%	72%	63%	53%	41%	29%	18%	11%	6%	3%	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
2077	2075	2052	2012	1956	1885	1801	1696	1562	1401	1207	965	703	478	303	175	90	37	7	0	cd
100%	100%	99%	97%	94%	91%	87%	82%	75%	67%	58%	46%	34%	23%	15%	8%	4%	2%	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
2077	2073	2053	2013	1950	1870	1777	1652	1495	1313	1100	852	597	379	220	116	54	19	4	0	cd
100%	100%	99%	97%	94%	90%	86%	80%	72%	63%	53%	41%	29%	18%	11%	6%	3%	1%	0%	0%	of 0°val

Light Measurement Report

Print date: 1-7-2025
Measurement date and time: 1-7-2025 10:59:22 – Measurement no. VFR-250701-1830-MS
Measurement tracking No. and Link: VT250701-008120
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	29,4	30,5	29,6	30,8	31,0	28,8	29,9	29,0	30,2	30,4
	3H	30,0	31,1	30,4	31,4	31,6	29,1	30,3	29,5	30,5	30,7
	4H	30,2	31,3	30,6	31,5	31,8	29,2	30,3	29,6	30,5	30,8
	6H	30,3	31,3	30,6	31,6	31,9	29,3	30,2	29,6	30,5	30,9
	8H	30,3	31,2	30,7	31,6	32,0	29,2	30,1	29,6	30,5	30,9
	12H	30,3	31,2	30,7	31,5	32,0	29,2	30,1	29,6	30,4	30,9
4H	2H	29,6	30,7	30,0	30,9	31,2	29,0	30,1	29,4	30,4	30,7
	3H	30,4	31,3	30,8	31,7	32,1	29,6	30,5	30,0	30,9	31,3
	4H	30,6	31,4	31,0	31,8	32,4	29,7	30,5	30,1	30,9	31,5
	6H	30,7	31,5	31,2	31,9	32,2	29,7	30,5	30,2	30,9	31,2
	8H	30,8	31,5	31,3	31,8	32,2	29,7	30,4	30,2	30,8	31,2
	12H	30,8	31,4	31,3	31,8	32,3	29,7	30,3	30,2	30,7	31,2
8H	4H	30,6	31,3	31,1	31,7	32,1	29,7	30,4	30,2	30,8	31,2
	6H	30,8	31,3	31,3	31,8	32,3	29,8	30,3	30,3	30,8	31,3
	8H	30,9	31,3	31,4	31,9	32,5	29,8	30,3	30,4	30,8	31,5
	12H	30,9	31,3	31,5	31,8	32,4	29,8	30,2	30,4	30,7	31,3
12H	4H	30,6	31,1	31,1	31,6	32,0	29,7	30,3	30,2	30,7	31,2
	6H	30,8	31,3	31,3	31,8	32,4	29,8	30,3	30,3	30,8	31,4
	8H	30,9	31,2	31,4	31,7	32,4	29,8	30,2	30,4	30,7	31,3

Variations with the observer position for the luminaire spacings, S:		
S = 1.0H	0,2 / -0,3	0,3 / -0,4
S = 1.5H	0,7 / -1,0	0,8 / -1,4
S = 2.0H	1,6 / -2,1	1,8 / -2,9

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	110	106	103	99	108	104	101	98	100	97	95	96	94	92	92	91	89	87
2	101	94	88	83	99	92	87	82	89	84	80	86	82	78	83	79	77	75
3	93	84	76	70	91	82	75	70	79	73	69	76	72	67	74	70	66	64
4	86	75	67	60	84	73	66	60	71	64	59	69	63	58	67	62	58	56
5	79	67	59	53	77	66	58	52	64	57	52	62	56	51	60	55	51	49
6	73	61	52	46	71	60	52	46	58	51	46	56	50	45	55	49	45	43
7	68	55	47	41	66	54	46	41	53	46	41	51	45	40	50	44	40	38
8	63	50	42	37	62	50	42	37	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	43	37	32	31
10	55	43	35	30	54	42	35	30	41	34	30	40	34	30	39	34	30	28

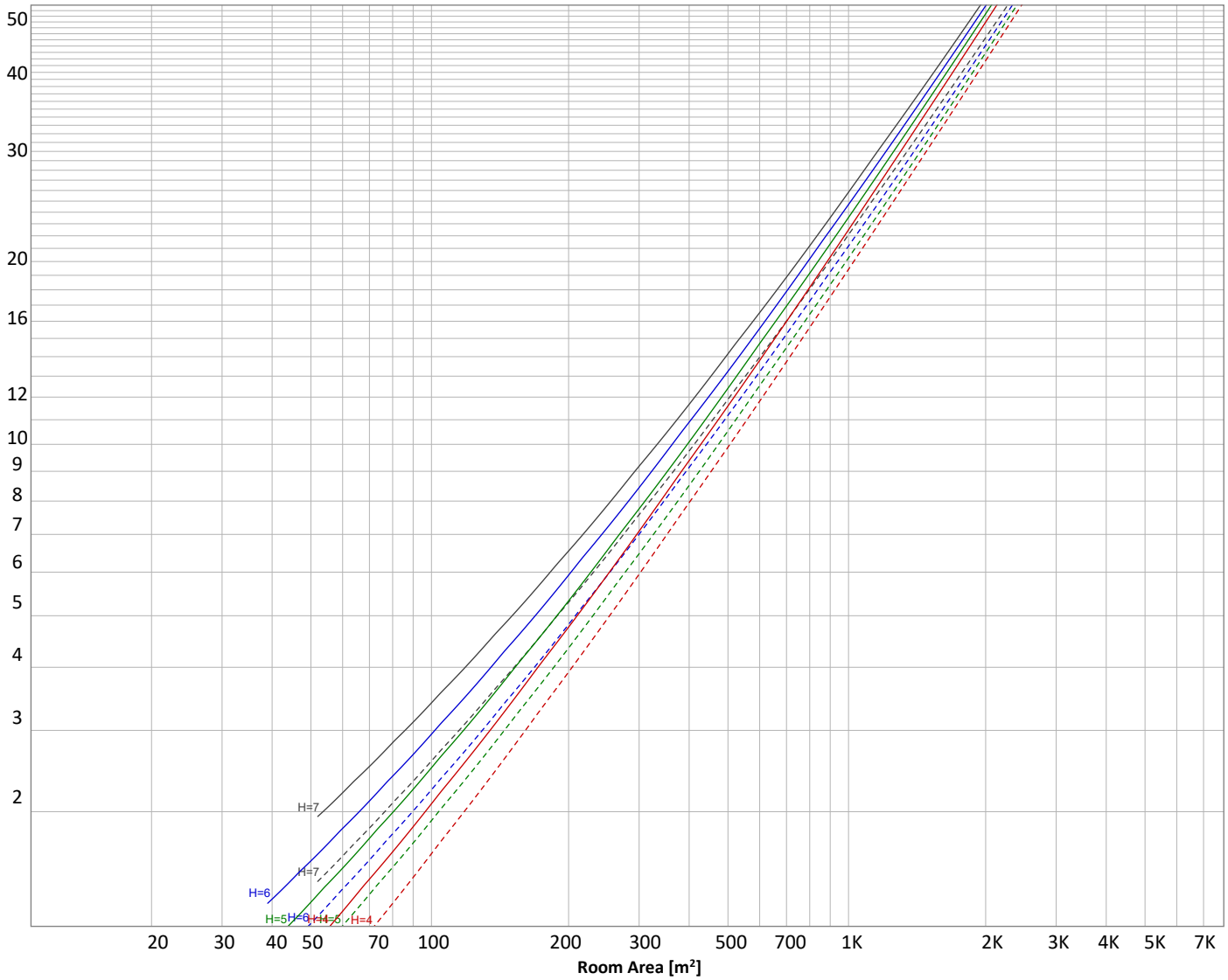
Light Measurement Report

Print date: 1-7-2025
Measurement date and time: 1-7-2025 10:59:22 – Measurement no. VFR-250701-1830-MS
Measurement tracking No. and Link: VT250701-008120
Operator:

Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 5172 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°
197 lm	569 lm	873 lm	1058 lm	1056 lm	811 lm	424 lm	151 lm	31,5 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,583 lm	0,083 lm	0,207 lm	0,307 lm	0,333 lm	0,324 lm	0,235 lm	0,154 lm	0,052 lm

Light Measurement Report

Print date: 1-7-2025
Measurement date and time: 1-7-2025 10:59:22 – Measurement no. VFR-250701-1830-MS
Measurement tracking No. and Link: VT250701-008120
Operator:

Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	197 lm	3,8%
10-20°	569 lm	11,0%
20-30°	873 lm	16,9%
30-40°	1058 lm	20,5%
40-50°	1056 lm	20,4%
50-60°	811 lm	15,7%
60-70°	424 lm	8,2%
70-80°	151 lm	2,9%
80-90°	32 lm	0,6%
90-100°	1 lm	0,0%
100-110°	0 lm	0,0%
110-120°	0 lm	0,0%
120-130°	0 lm	0,0%
130-140°	0 lm	0,0%
140-150°	0 lm	0,0%
150-160°	0 lm	0,0%
160-170°	0 lm	0,0%
170-180°	0 lm	0,0%
Total	5172 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	1639 lm	31,7%
0-40°	2697 lm	52,1%
0-60°	4563 lm	88,2%
60-90°	606 lm	11,7%
70-100°	183 lm	3,5%
90-120°	1 lm	0,0%
0-90°	5169 lm	100,0%
90-180°	2 lm	0,0%
0-180°	5172 lm	100,0%

Intensity peaks

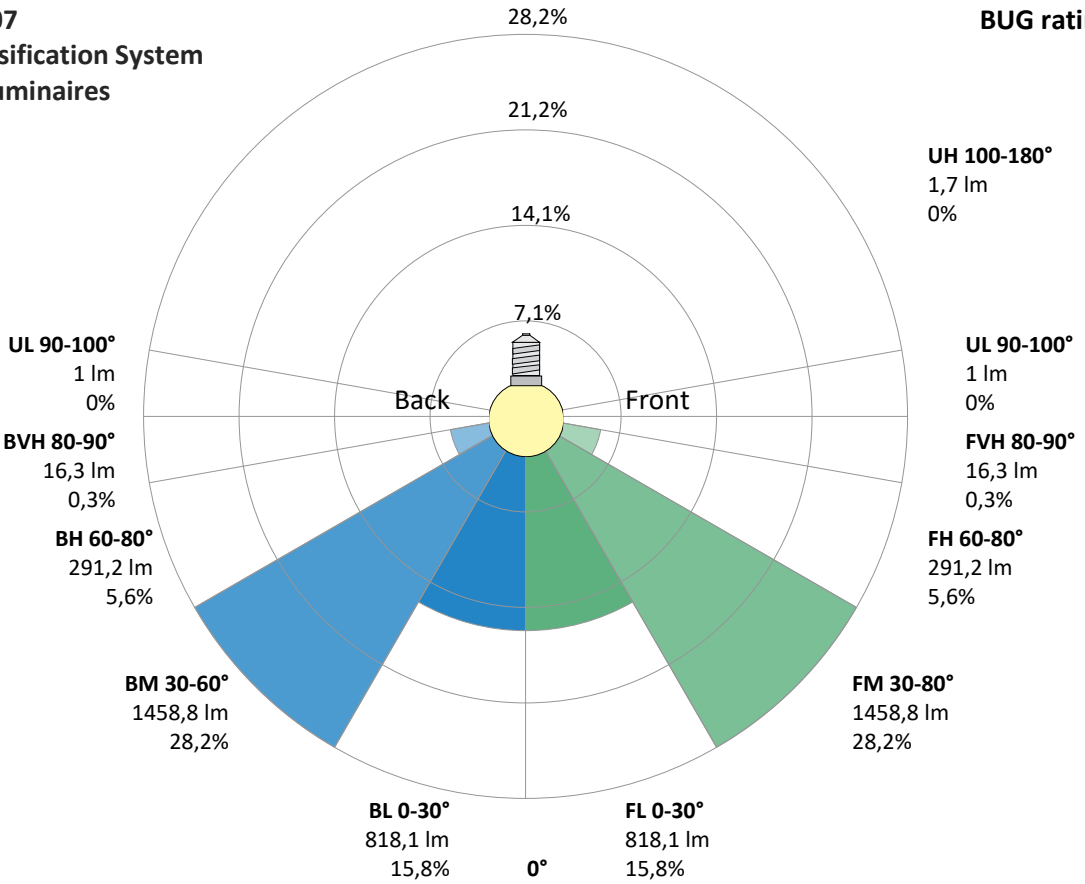
Max intensity	2080 cd
Intensity, 90°	7 cd
Intensity, 0°	2077 cd

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	818 lm	15,8%
Medium(30-60°)	1459 lm	28,2%
High(60-80°)	291 lm	5,6%
Very high(80-90°)	16 lm	0,3%
Back light		
Low(0-30°)	818 lm	15,8%
Medium(30-60°)	1459 lm	28,2%
High(60-80°)	291 lm	5,6%
Very high(80-90°)	16 lm	0,3%
Uplight		
Low(90-100°)	1 lm	0,0%
High(100-180°)	2 lm	0,0%

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

BUG rating B2 U1 G1



Light Measurement Report

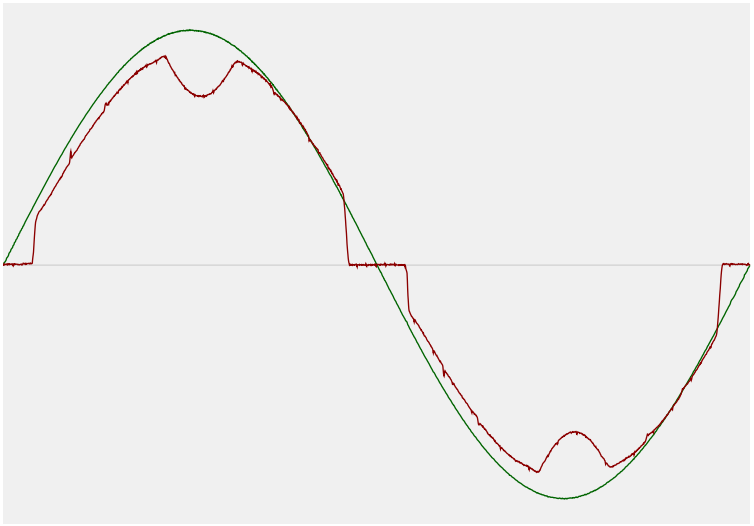
Print date: 1-7-2025
Measurement date and time: 1-7-2025 10:59:22 – Measurement no. VFR-250701-1830-MS
Measurement tracking No. and Link: VT250701-008120
Operator:

Power Details

Input Power

Power feed to light source	51,3 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,225 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	51,71 VA
Displacement factor of AC power feed	1,0
Power factor of AC current feed	0,99
Total harmonic distortion of the current	12,3%
Total harmonic distortion of the voltage	0,07%

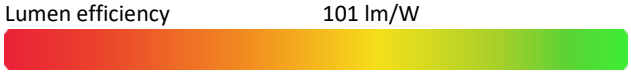
Input Power Curve



Efficiency

Radiated power efficiency 31,4%

Lumen efficiency 101 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	3998 K
CCT shift	+2 K
CCT end	4000 K

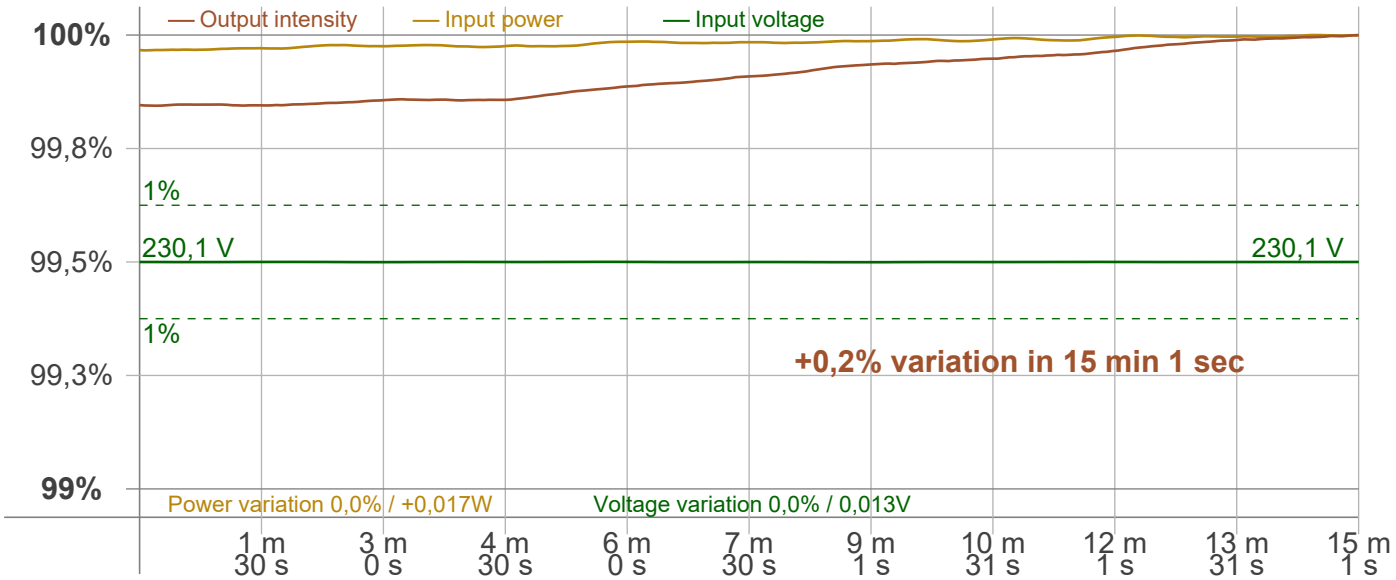
Warmup Result

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

Output Change

Output start	5164 lm
Output change	+8 lm
Output end	5172 lm

Stabilization Curve



Light Measurement Report

Print date: 1-7-2025
Measurement date and time: 1-7-2025 10:59:22 – Measurement no. VFR-250701-1830-MS
Measurement tracking No. and Link: VT250701-008120
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	99,94 %
Flicker index	0,31

Flicker indices according to California Energy Commission (CEC) 2016b

JA8/10 40 Hz	0,21 %
JA8/10 90 Hz	0,85 %
JA8/10 200 Hz	103,91 %
JA8/10 400 Hz	101,24 %
JA8/10 1000 Hz	101,36 %

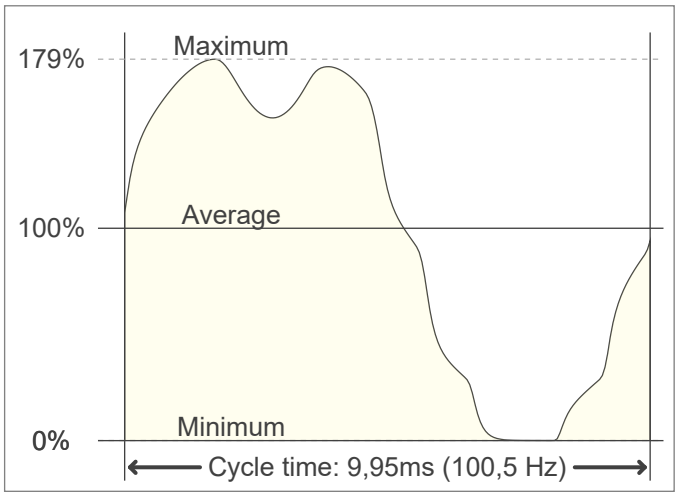
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz)	0,07
SVM value (80 < F < 2000 Hz)	3,58

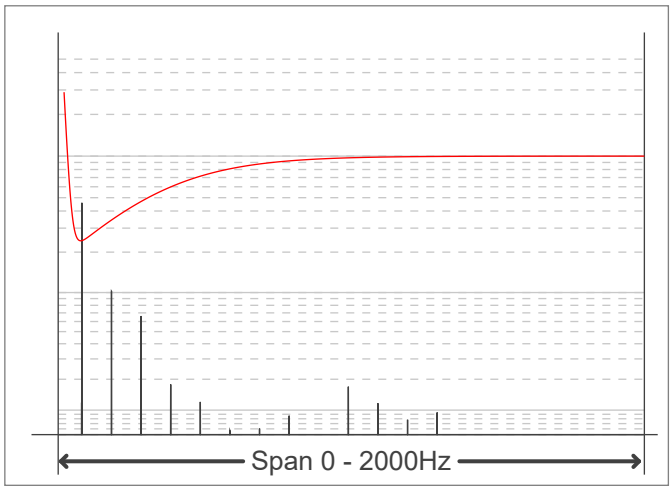
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp	0,04

Flicker frame (frame of one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot