Light Measurement Report

Print date: 5-5-2025
Measurement date and time: 5-5-2025 10:53:48 – Measurement no. VFR-250505-1060-MS
Measurement tracking No. and Link: VT250505-009631
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

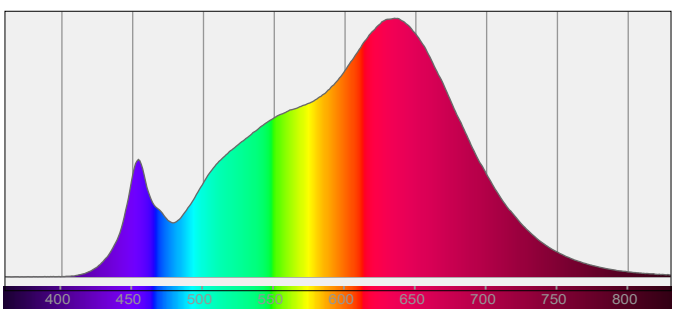
Number of C-planes and Resolution	12 planes – 30°
γ (gamma)-Resolution	5°
Test Distance	1,99 m
Input Power, Power and Displ. Factors	40,9 W – PF 0,97 – DPF 0,98
Input RMS Voltage and Current	230 V – 0,183 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 19 min 40 sec – 2,0%

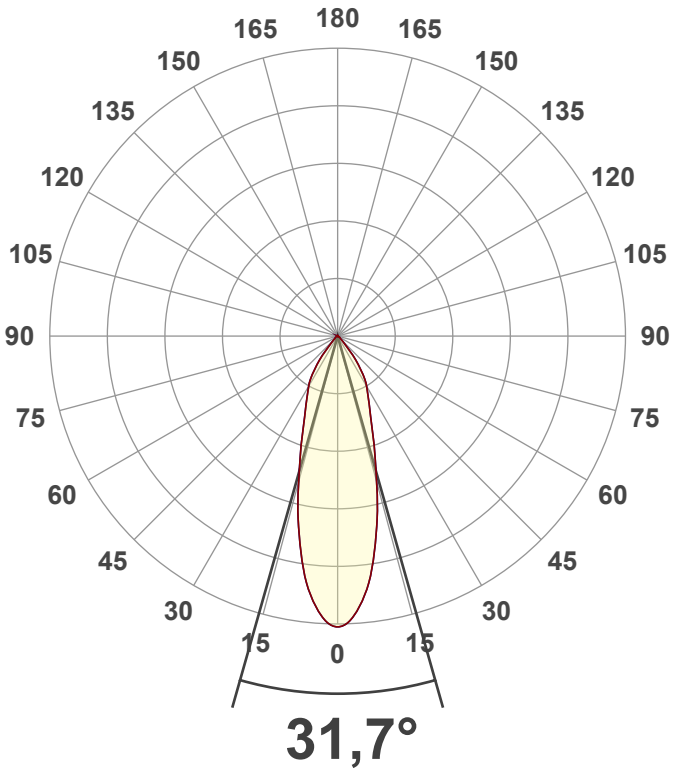
Tested Light Source

Product Name	805272-4000K
Item No. and Manufacturer	805272-4000K – Dutchfulfillment
Product Description (line 1)	3-FASE RAILSPOT | DURHAM | 38W | WIT

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	3184 lm – 0,03% / 99,97%
Efficiency	78 lm/W
Peak Intensity and Beam Angle	6742 cd – 31,7°
Correlated Color Temperature, Target/Measured	CCT = 3000 K / 2982 K
Color Rendering Index	CRI 98,1
Color Rendering TM30-18	R_f 95,0 – R_g 100,5
Color Shift, CIE duv and MacAdam Steps	Duv 0,0010 – SDCM 1,3
Flicker	SVM 0 – PstLM 0,05

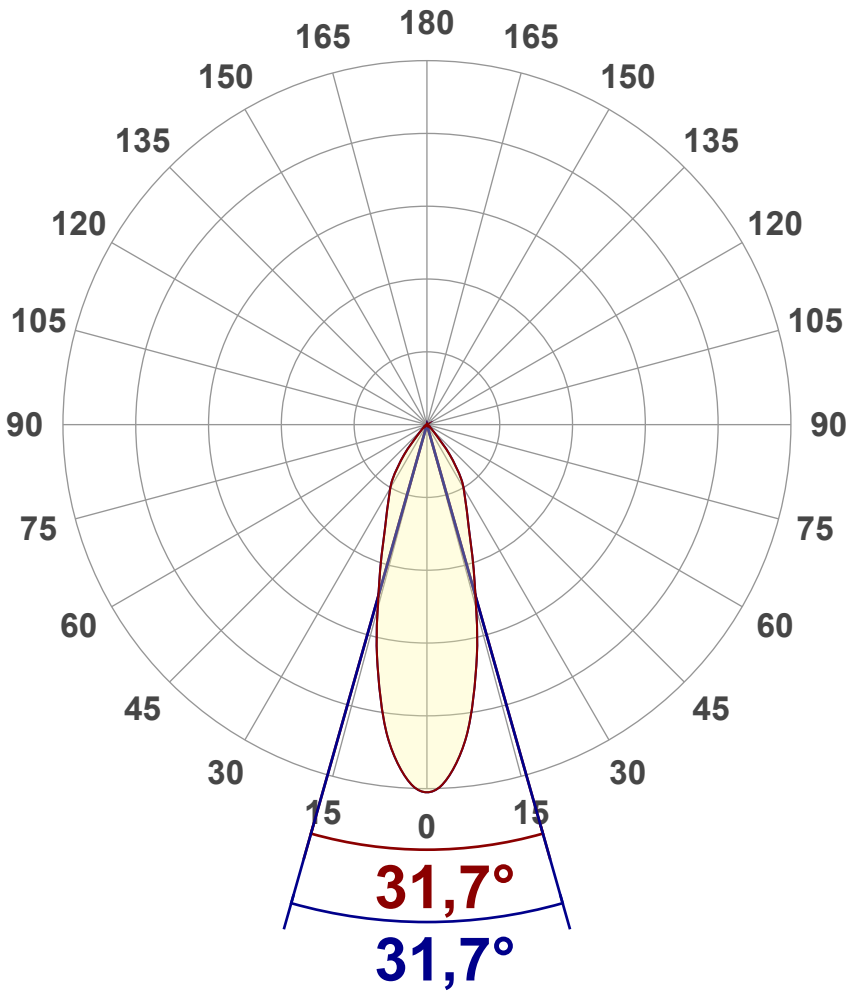




Light Measurement Report

Print date: 5-5-2025
Measurement date and time: 5-5-2025 10:53:48 – Measurement no. VFR-250505-1060-MS
Measurement tracking No. and Link: VT250505-009631
Operator:

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



Main Values

Output (total Lumen)	3184 lm
Lumen Up% / Down%	0,03% / 99,97%
Peak Intensity	6742 cd
Beam Angle (50%)	31,7°
Beam Angle (90%)	31,7°
Beam Angle (10%)	31,7°

Cut-off Angle

Average 2,5%	89,2°

Field Angle

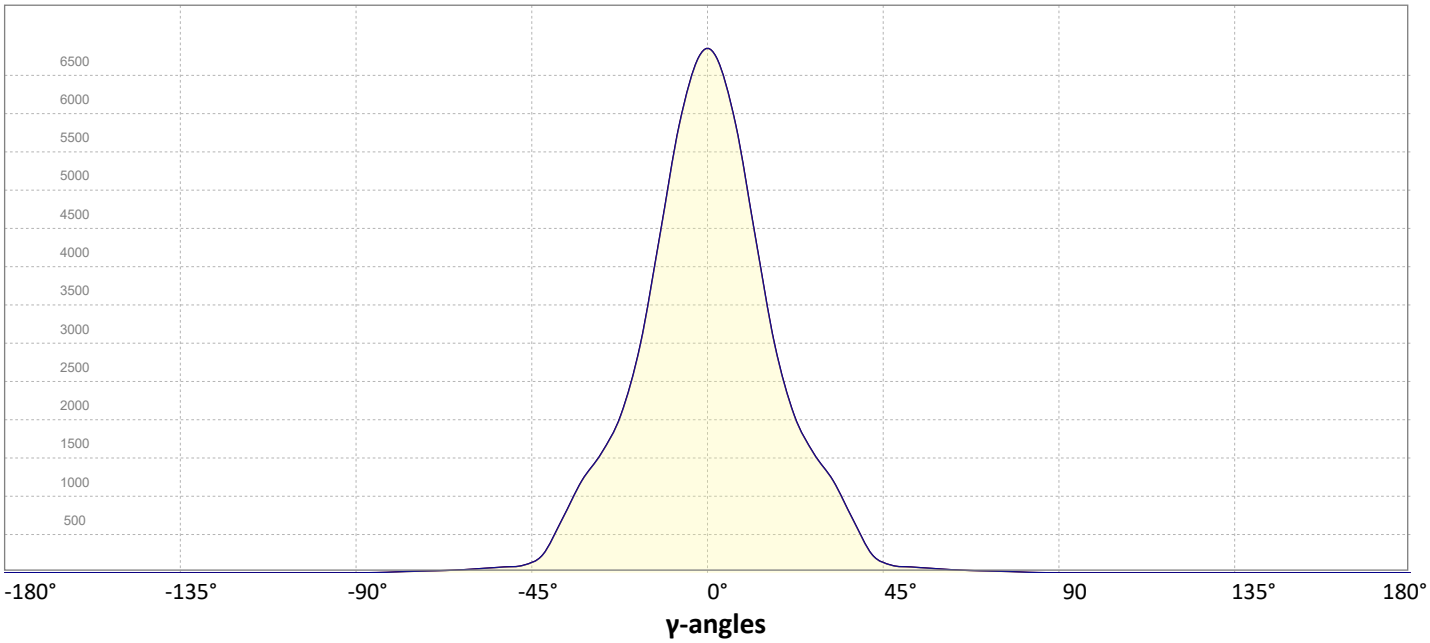
Average 10%	75°

Intensity Ratio

In 120° cone	98,2%
In 90° cone	95,1%

C000-C180
C090-C270

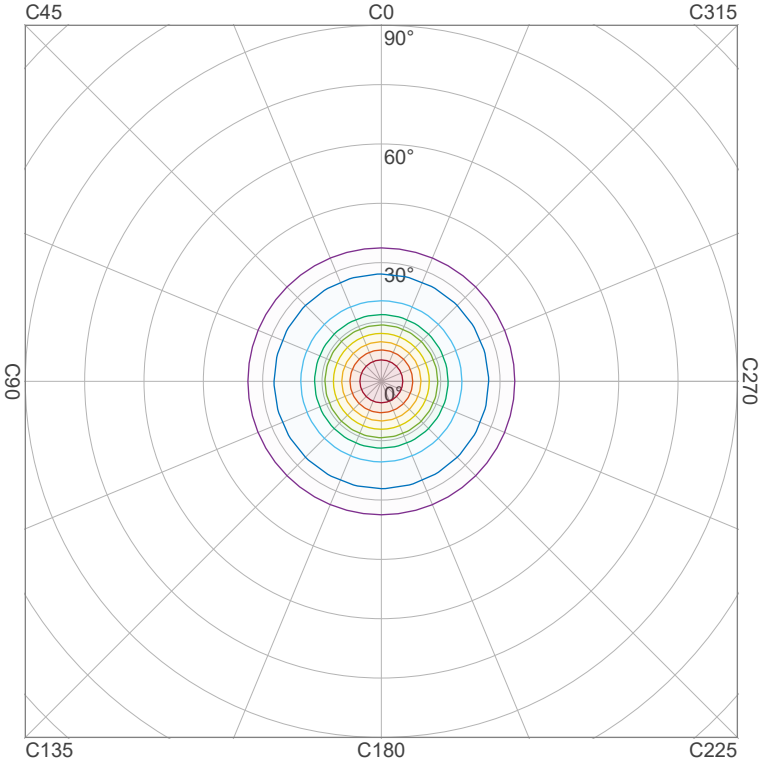
Linear distribution diagram - Intensity (candela) vs γ-angle



Light Measurement Report

Print date: 5-5-2025
Measurement date and time: 5-5-2025 10:53:48 – Measurement no. VFR-250505-1060-MS
Measurement tracking No. and Link: VT250505-009631
Operator:

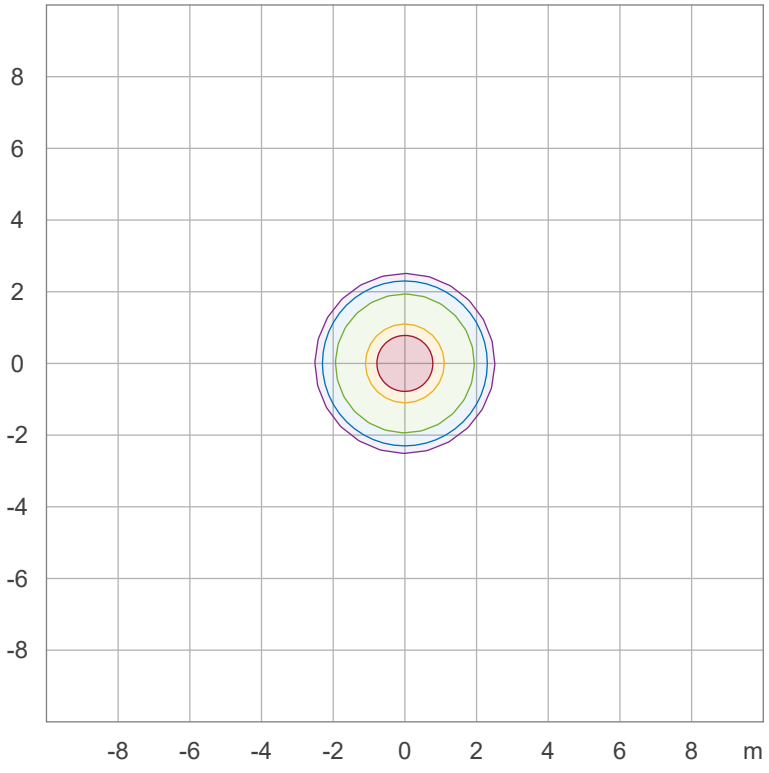
Iso-intensity Diagram (Iso-candela)



90 %	6068,2 cd
80 %	5393,9 cd
70 %	4719,7 cd
60 %	4045,4 cd
50 %	3371,2 cd
40 %	2697,0 cd
30 %	2022,7 cd
20 %	1348,5 cd
10 %	674,2 cd

Peak intensity: 6742,4 cd
Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



50,0 %	374,6 lx
30,0 %	224,7 lx
10,0 %	74,9 lx
5,0 %	37,5 lx
3,0 %	22,5 lx

Peak illuminance: 749,2 lx
Mounting height: 3,0 m
Number of c-planes: 12

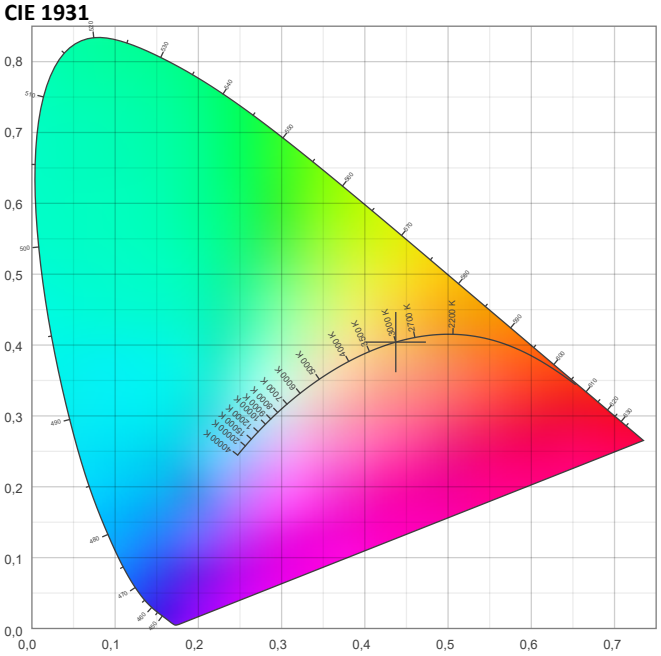
Light Measurement Report

Print date: 5-5-2025
Measurement date and time: 5-5-2025 10:53:48 – Measurement no. VFR-250505-1060-MS
Measurement tracking No. and Link: VT250505-009631
Operator:

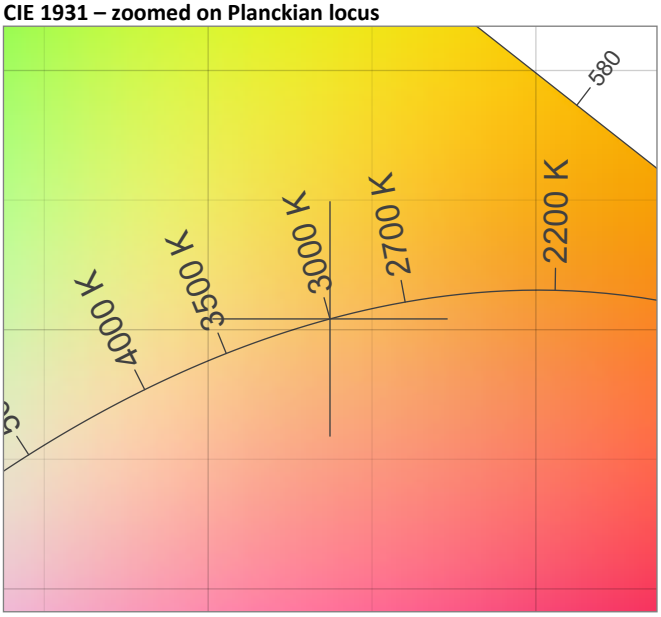
Color details

Correlated Color Temperature, Target	CCT = 3000 K
Correlated Color Temperature, Measured	CCT = 2982 K
Color Rendering Index	CRI 98,1
Color Rendering Index, R9 (red component)	R9 = 91,2
Color Rendering TM30-18	R_f 95,0 – R_g 100,5
Color Quality Scale	CQS = 95,4
MacAdam Steps	SDCM = 1,3
Color coordinates CIE 1931	(x;y) = (0,437;0,404)
Color coordinate CIEs 1960	(u;v) = (0,251;0,348)
Color deviation from BBL	Duv = 0,0010
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,251;0,521)

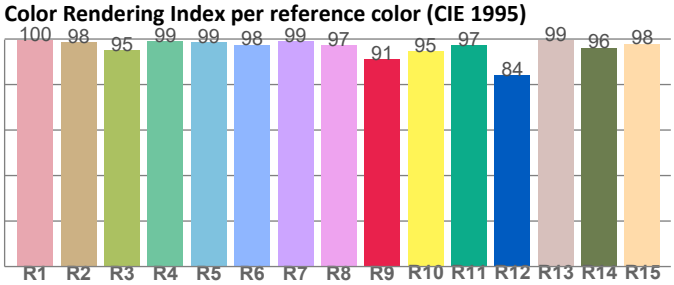
CIE 1931



CIE 1931 – zoomed on Planckian locus



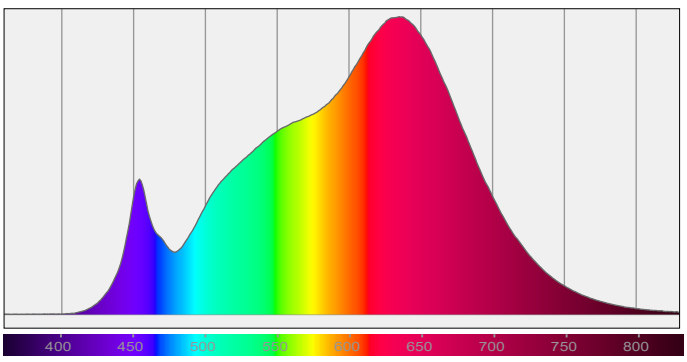
Color Rendering Index per reference color (CIE 1995)



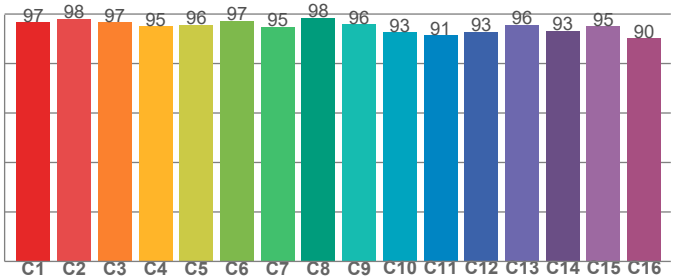
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
99,5	98,5	95,0	99,0	98,6	97,6	99,2	97,2	91,2	94,6	97,2	84,2	99,4	96,2	97,9

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



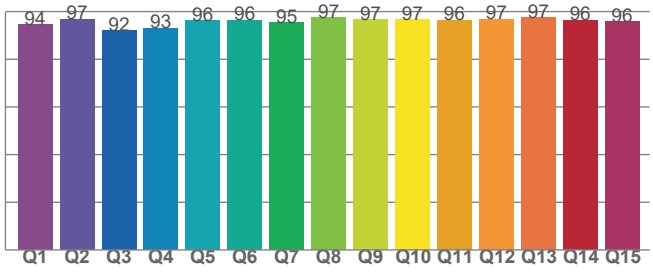
TM30-18 Rf-values per hue bin



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
96,6	98,1	96,6	95,0	95,7	97,3	94,9	98,5	96,0	92,6	91,4	92,8	95,7	93,3	95,2	90,3

Color Quality Scale by reference color



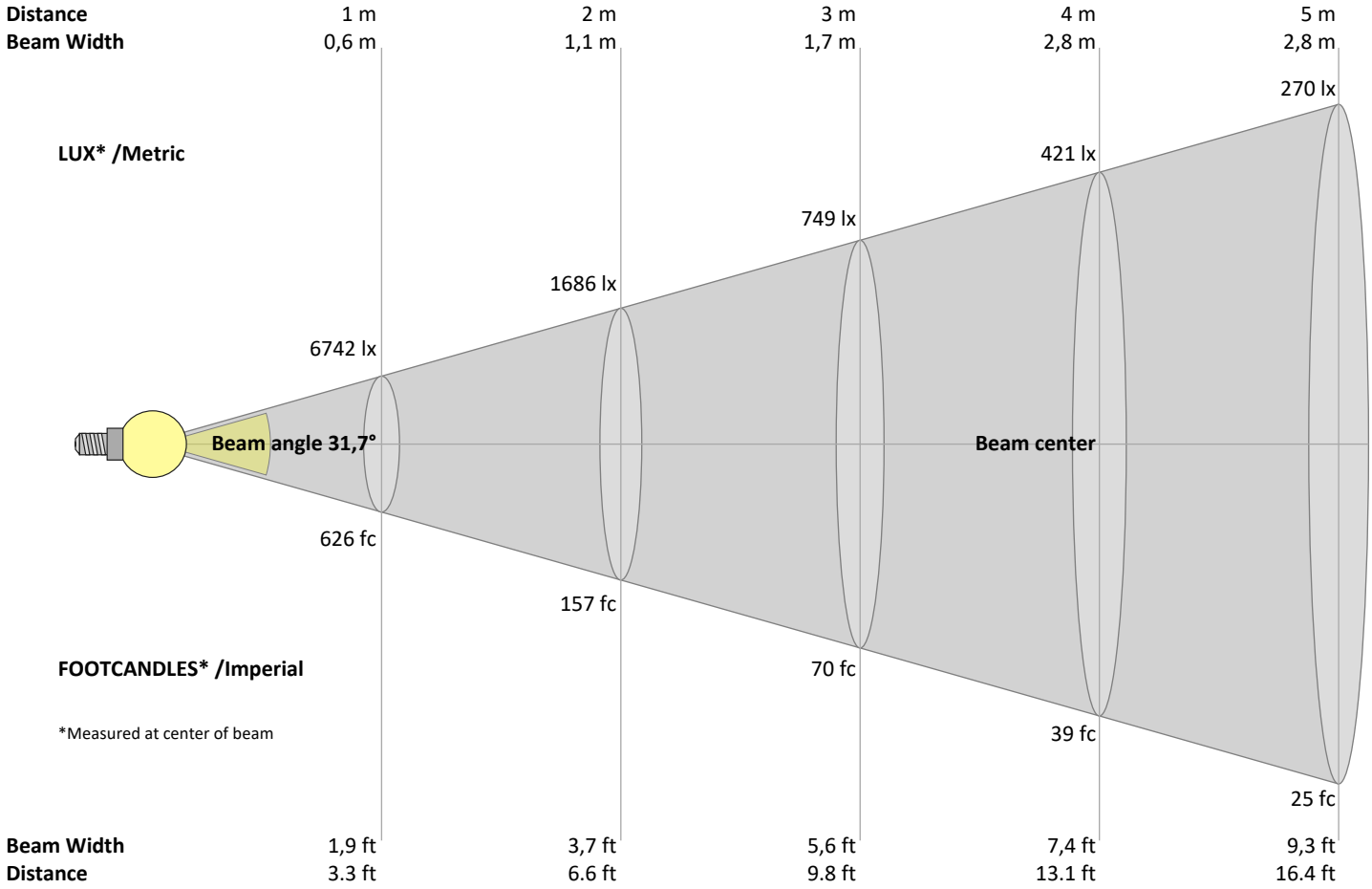
CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
94,5	96,9	92,0	93,0	96,1	96,5	95,3	97,4	96,7	96,5	96,4	96,8	97,4	96,3	95,7

Light Measurement Report

Print date: 5-5-2025
Measurement date and time: 5-5-2025 10:53:48 – Measurement no. VFR-250505-1060-MS
Measurement tracking No. and Link: VT250505-009631
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
6742	1686	749	421	270	187	138	105	83	67	56	47	40	34	30	26	23	21	19	17	lux
626,4	156,6	69,6	39,1	25,1	17,4	12,8	9,8	7,7	6,3	5,2	4,3	3,7	3,2	2,8	2,4	2,2	1,9	1,7	1,6	fc

Intensities in 0° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
6742	6742	6424	6072	5627	5045	4463	3893	3324	2836	2466	2096	1880	1680	1502	1359	1215	1020	820	626	cd
100%	100%	95%	90%	83%	75%	66%	58%	49%	42%	37%	31%	28%	25%	22%	20%	18%	15%	12%	9%	of 0°val

Intensities in 90° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
6742	6742	6424	6072	5627	5045	4463	3893	3324	2836	2466	2096	1880	1680	1502	1359	1215	1020	820	626	cd
100%	100%	95%	90%	83%	75%	66%	58%	49%	42%	37%	31%	28%	25%	22%	20%	18%	15%	12%	9%	of 0°val

Intensities in 180° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
6742	6742	6424	6072	5627	5045	4463	3893	3324	2836	2466	2096	1880	1680	1502	1359	1215	1020	820	626	cd
100%	100%	95%	90%	83%	75%	66%	58%	49%	42%	37%	31%	28%	25%	22%	20%	18%	15%	12%	9%	of 0°val

Intensities in 270° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
6742	6742	6424	6072	5627	5045	4463	3893	3324	2836	2466	2096	1880	1680	1502	1359	1215	1020	820	626	cd
100%	100%	95%	90%	83%	75%	66%	58%	49%	42%	37%	31%	28%	25%	22%	20%	18%	15%	12%	9%	of 0°val

Light Measurement Report

Print date: 5-5-2025
Measurement date and time: 5-5-2025 10:53:48 – Measurement no. VFR-250505-1060-MS
Measurement tracking No. and Link: VT250505-009631
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	21,6	22,2	21,7	22,4	22,6	21,6	22,2	21,7	22,4	22,6
	3H	21,4	22,1	21,8	22,3	22,5	21,4	22,1	21,8	22,3	22,5
	4H	21,4	22,1	21,8	22,3	22,5	21,4	22,1	21,8	22,3	22,5
	6H	21,4	22,0	21,7	22,3	22,6	21,4	22,0	21,7	22,3	22,6
	8H	21,4	21,9	21,7	22,3	22,6	21,4	21,9	21,7	22,3	22,6
	12H	21,3	21,9	21,7	22,2	22,6	21,3	21,9	21,7	22,2	22,6
4H	2H	21,3	22,0	21,7	22,2	22,4	21,3	22,0	21,7	22,2	22,4
	3H	21,3	21,9	21,7	22,2	22,7	21,3	21,9	21,7	22,2	22,7
	4H	21,3	21,8	21,7	22,2	22,7	21,3	21,8	21,7	22,2	22,7
	6H	21,3	21,8	21,8	22,2	22,5	21,3	21,8	21,8	22,2	22,5
	8H	21,2	21,7	21,7	22,1	22,4	21,2	21,7	21,7	22,1	22,4
	12H	21,2	21,6	21,7	22,0	22,4	21,2	21,6	21,7	22,0	22,4
8H	4H	21,2	21,7	21,7	22,0	22,4	21,2	21,7	21,7	22,0	22,4
	6H	21,2	21,6	21,7	22,0	22,6	21,2	21,6	21,7	22,0	22,6
	8H	21,3	21,5	21,8	22,0	22,7	21,3	21,5	21,8	22,0	22,7
	12H	21,2	21,4	21,8	21,9	22,5	21,2	21,4	21,8	21,9	22,5
12H	4H	21,1	21,5	21,6	21,9	22,4	21,1	21,5	21,6	21,9	22,4
	6H	21,2	21,5	21,7	22,0	22,6	21,2	21,5	21,7	22,0	22,6
	8H	21,2	21,4	21,8	21,9	22,5	21,2	21,4	21,8	21,9	22,5

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

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	102	102	102	100
1	114	111	109	106	111	109	107	105	105	103	101	101	100	98	98	97	96	94
2	108	104	100	96	106	102	98	95	99	96	93	96	93	91	93	91	89	88
3	103	97	92	89	101	96	91	88	93	89	86	91	88	85	88	86	84	82
4	98	91	86	82	97	90	85	82	88	84	81	86	83	80	84	81	79	77
5	94	86	81	77	92	85	80	76	83	79	76	82	78	75	80	77	74	73
6	90	81	76	72	88	81	75	72	79	75	71	78	74	71	77	73	70	69
7	86	77	72	68	85	77	71	67	75	71	67	74	70	67	73	69	66	65
8	82	73	68	64	81	73	68	64	72	67	64	71	66	63	70	66	63	62
9	79	70	64	61	78	69	64	61	68	64	60	68	63	60	67	63	60	59
10	76	67	61	58	75	66	61	58	66	61	58	65	60	57	64	60	57	56

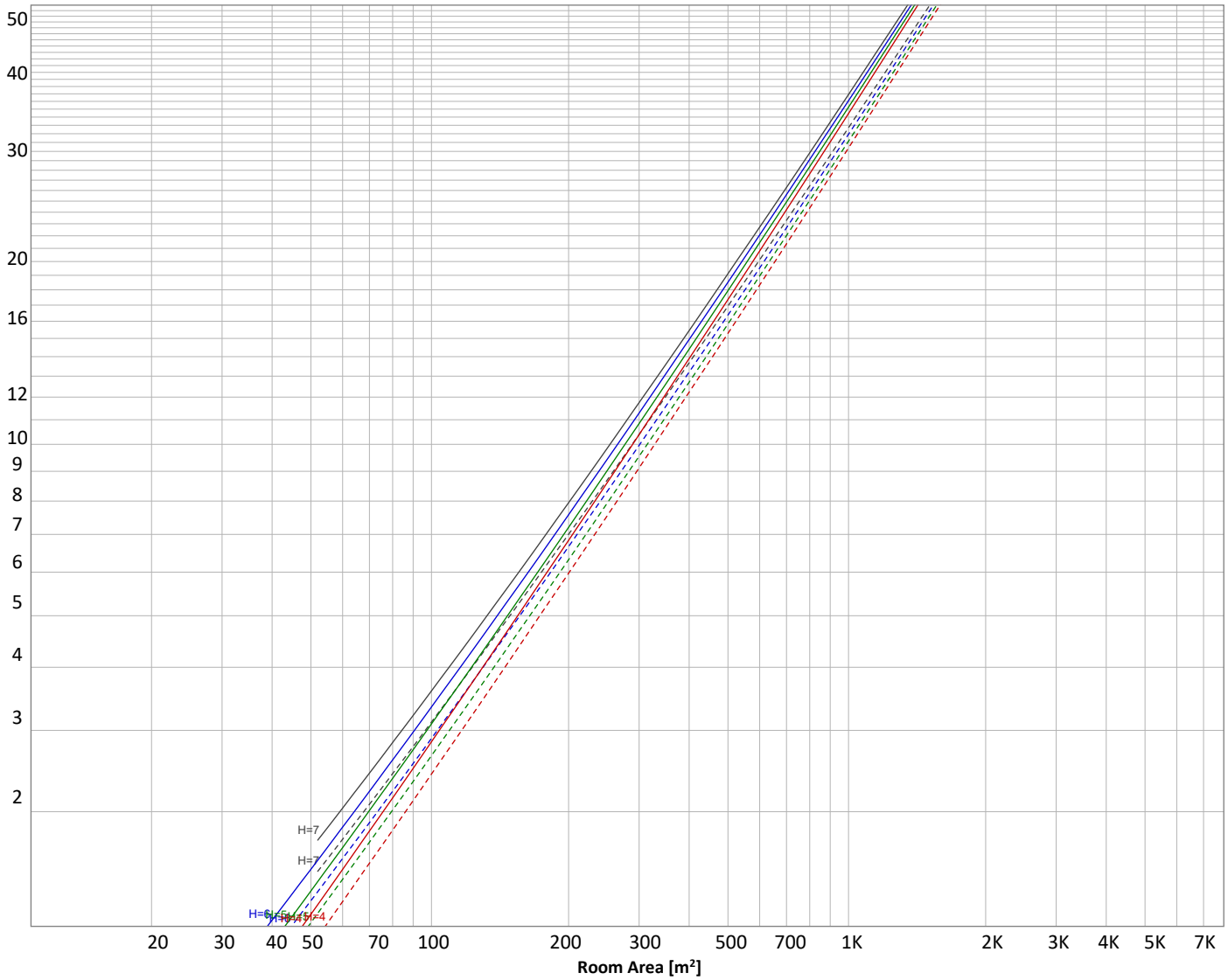
Light Measurement Report

Print date: 5-5-2025
Measurement date and time: 5-5-2025 10:53:48 – Measurement no. VFR-250505-1060-MS
Measurement tracking No. and Link: VT250505-009631
Operator:

Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 3184 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°
570 lm	992 lm	814 lm	568 lm	123 lm	58,8 lm	34,4 lm	19,9 lm	3,72 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,018 lm	0,000 lm	0,000 lm	0,008 lm	0,007 lm	0,111 lm	0,326 lm	0,326 lm	0,104 lm

Light Measurement Report

Print date: 5-5-2025
Measurement date and time: 5-5-2025 10:53:48 – Measurement no. VFR-250505-1060-MS
Measurement tracking No. and Link: VT250505-009631
Operator:

Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	570 lm	17,9%
10-20°	992 lm	31,2%
20-30°	814 lm	25,6%
30-40°	568 lm	17,8%
40-50°	123 lm	3,9%
50-60°	59 lm	1,8%
60-70°	34 lm	1,1%
70-80°	20 lm	0,6%
80-90°	4 lm	0,1%
90-100°	0 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	3184 lm	100,0%

Intensity peaks

Max intensity	6742 cd
Intensity, 90°	0 cd
Intensity, 0°	6742 cd

Zonal Lumen summary

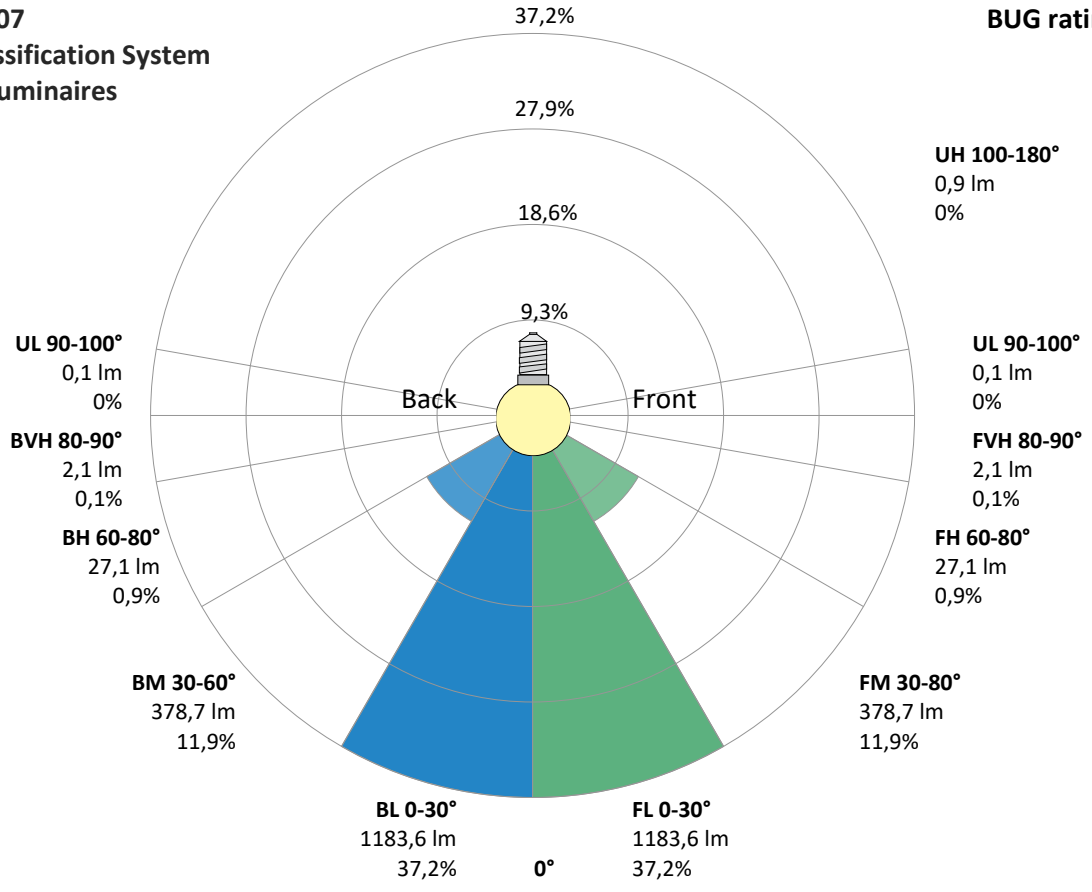
Zone (γ)	Lumen	% Total
0-30°	2376 lm	74,6%
0-40°	2944 lm	92,5%
0-60°	3125 lm	98,2%
60-90°	58 lm	1,8%
70-100°	24 lm	0,7%
90-120°	0 lm	0,0%
0-90°	3183 lm	100,0%
90-180°	1 lm	0,0%
0-180°	3184 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	1184 lm	37,2%
Medium(30-60°)	379 lm	11,9%
High(60-80°)	27 lm	0,9%
Very high(80-90°)	2 lm	0,1%
Back light		
Low(0-30°)	1184 lm	37,2%
Medium(30-60°)	379 lm	11,9%
High(60-80°)	27 lm	0,9%
Very high(80-90°)	2 lm	0,1%
Uplight		
Low(90-100°)	0 lm	0,0%
High(100-180°)	1 lm	0,0%

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

BUG rating B3 U1 G0



Light Measurement Report

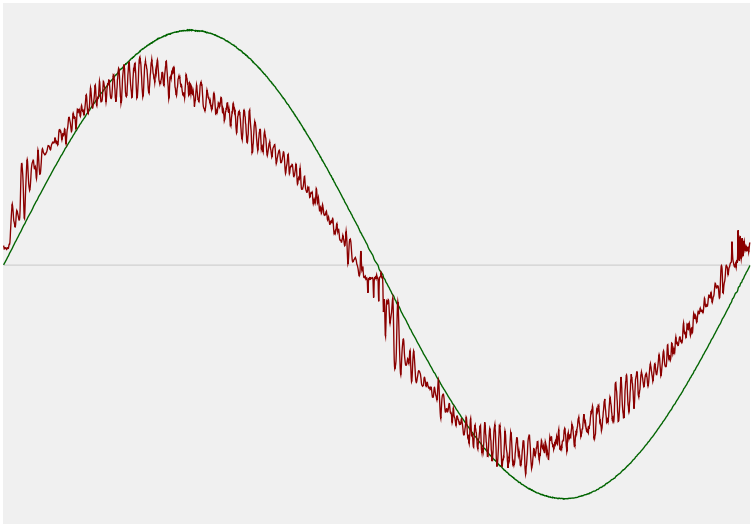
Print date: 5-5-2025
Measurement date and time: 5-5-2025 10:53:48 – Measurement no. VFR-250505-1060-MS
Measurement tracking No. and Link: VT250505-009631
Operator:

Power Details

Input Power

Power feed to light source	40,9 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,183 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	42,17 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,97
Total harmonic distortion of the current	6,84%
Total harmonic distortion of the voltage	0,07%

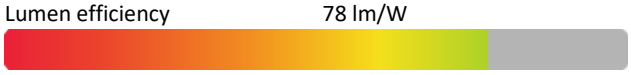
Input Power Curve



Efficiency

Radiated power efficiency 28,9%

Lumen efficiency 78 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	3018 K
CCT shift	-18 K
CCT end	3000 K

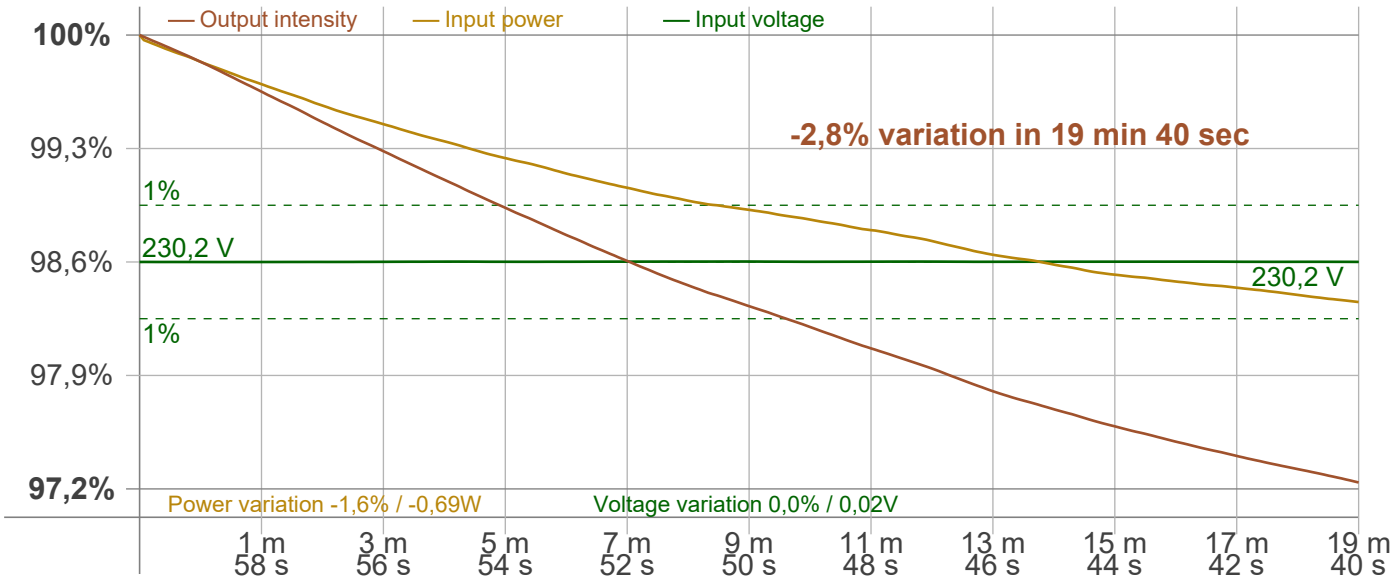
Warmup Result

Total warmup time	Lamp stabilized in 19 min 40 sec
Warmup variation	-2,8%

Output Change

Output start	3275 lm
Output change	-91 lm
Output end	3184 lm

Stabilization Curve



Light Measurement Report

Print date: 5-5-2025
Measurement date and time: 5-5-2025 10:53:48 – Measurement no. VFR-250505-1060-MS
Measurement tracking No. and Link: VT250505-009631
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	200 Hz
Percent Flicker	0,35 %
Flicker index	0

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

JA8/10 40 Hz	0,07 %
JA8/10 90 Hz	0,12 %
JA8/10 200 Hz	0,25 %
JA8/10 400 Hz	0,32 %
JA8/10 1000 Hz	0,33 %

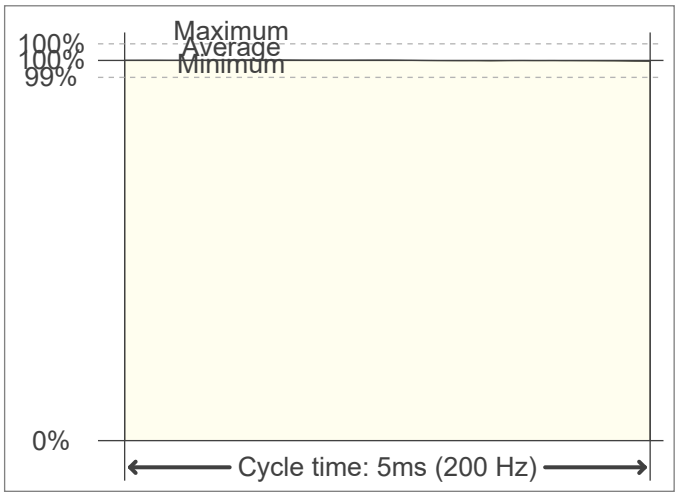
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz)	0,05
SVM value (80 < F < 2000 Hz)	0

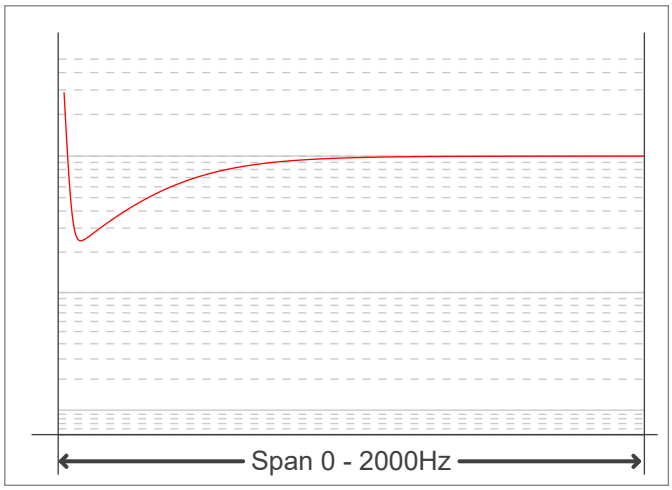
Flicker indices according to Lighting Research Center (2015)

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