Light Measurement Report

Print date: 14-1-2025
Measurement date and time: 14-1-2025 15:31:29 – Measurement no. VFR-250114-2932-MS
Measurement tracking No. and Link: VT250114-008189
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

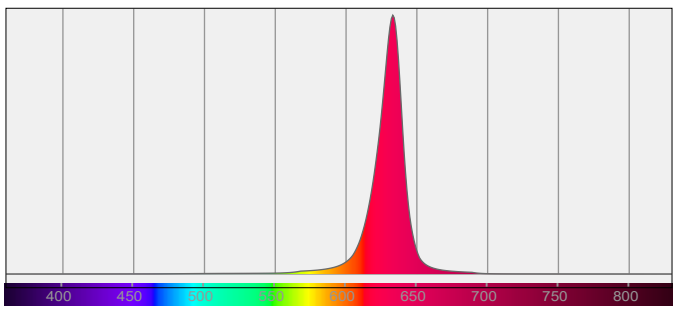
Number of C-planes and Resolution	12 planes – 30°
γ (gamma)-Resolution	5°
Test Distance	1,99 m
Input Power, Power and Displ. Factors	2,6 W – PF 0,35 – DPF 0,99
Input RMS Voltage and Current	230 V – 0,032 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Not completed – 2,0%

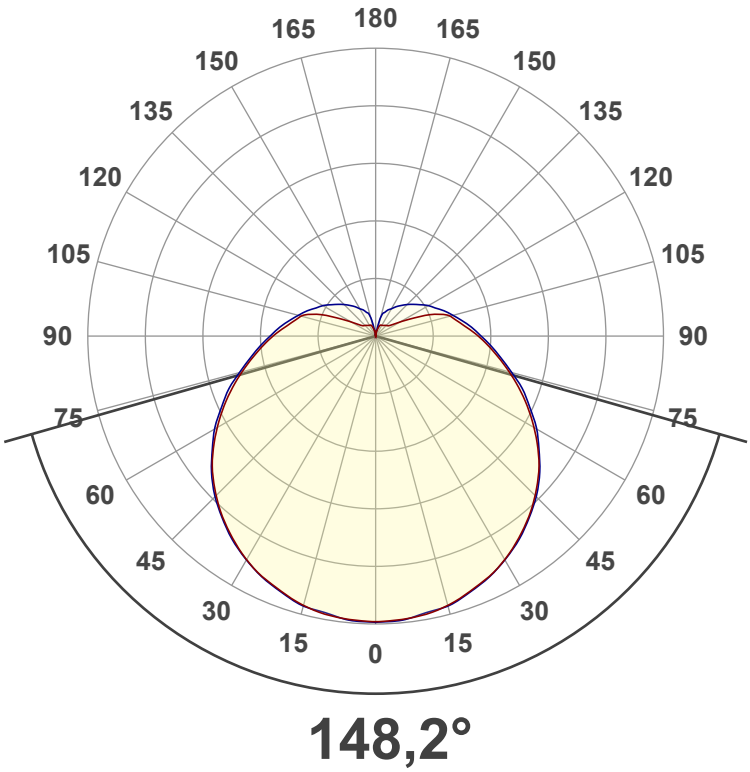
Tested Light Source

Product Name	FUT012-ROOD
Item No. and Manufacturer	FUT012-ROOD – Dutchfulfillment
Product Description (line 1)	MI-LIGHT LED LAMP E27 9W RGB+CCT

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	54,3 lm – 23,25% / 76,75%
Efficiency	21 lm/W
Peak Intensity and Beam Angle	10,1 cd – 148,2°
Correlated Color Temperature, Target/Measured	CCT = 0 K / 0 K
Color Rendering Index	CRI 0,0
Color Rendering TM30-18	R_f 0,0 – R_g 0,0
Color Shift, CIE duv and MacAdam Steps	Duv n/a – SDCM n/a
Flicker	SVM 0 – PstLM 0,02





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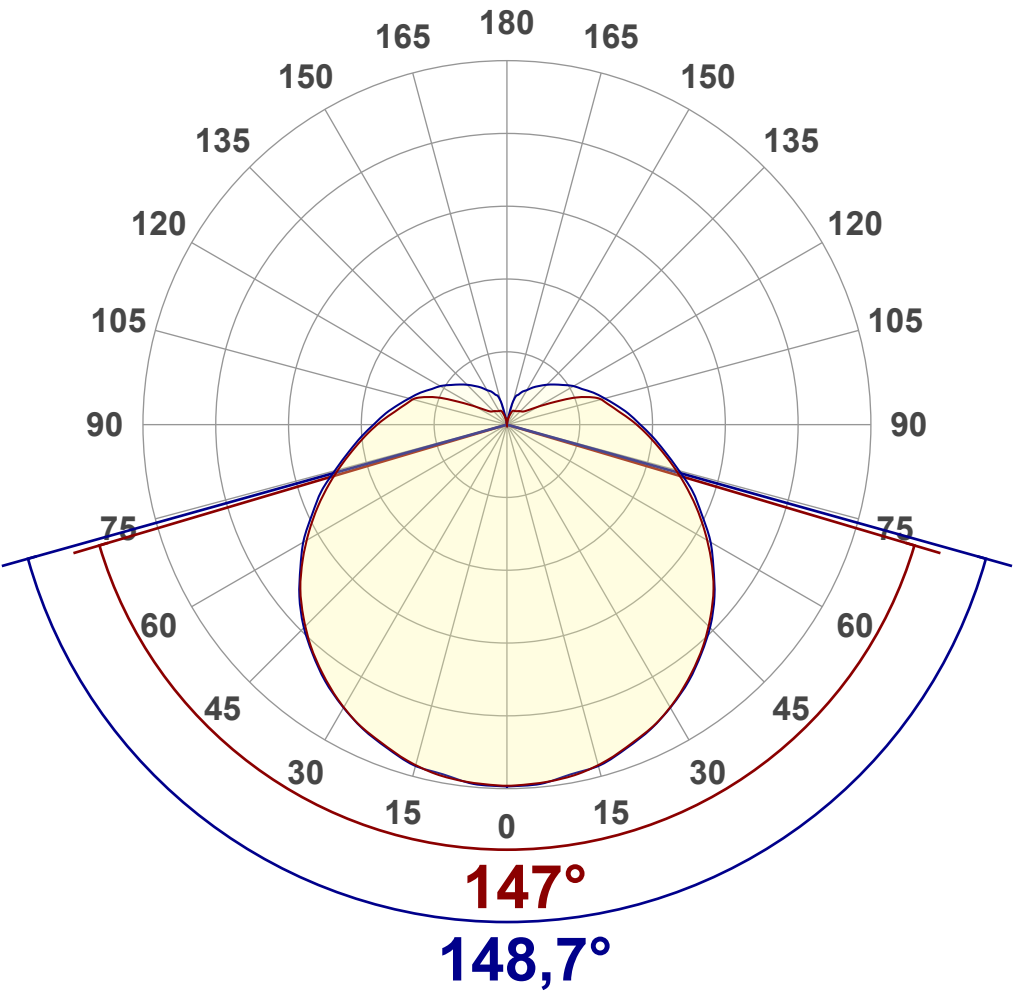
Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	54,3 lm
Lumen Up% / Down%	23,25% / 76,75%
Peak Intensity	10,1 cd
Beam Angle (50%)	148,2°
Beam Angle (90%)	148,7°
Beam Angle (10%)	147°

Cut-off Angle

Average 2,5%	336,6°

Field Angle

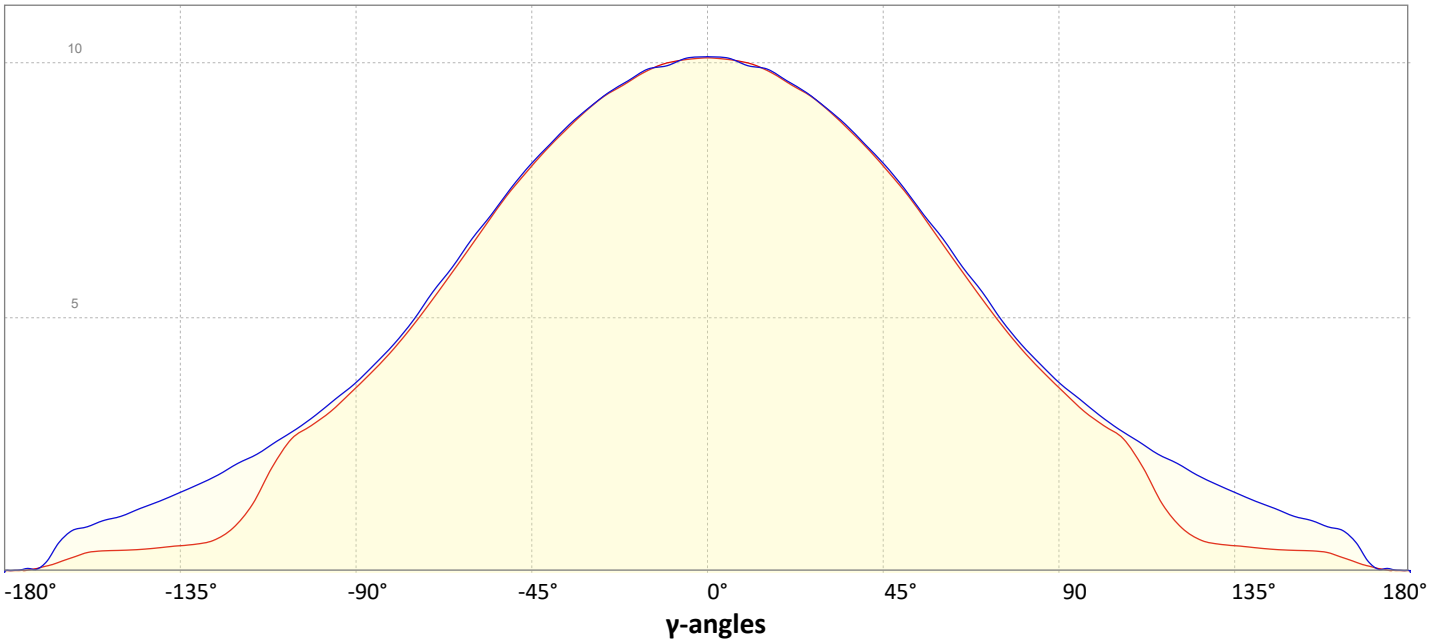
Average 10%	296,4°

Intensity Ratio

In 120° cone	48,0%
In 90° cone	30,6%

C000-C180
C090-C270

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



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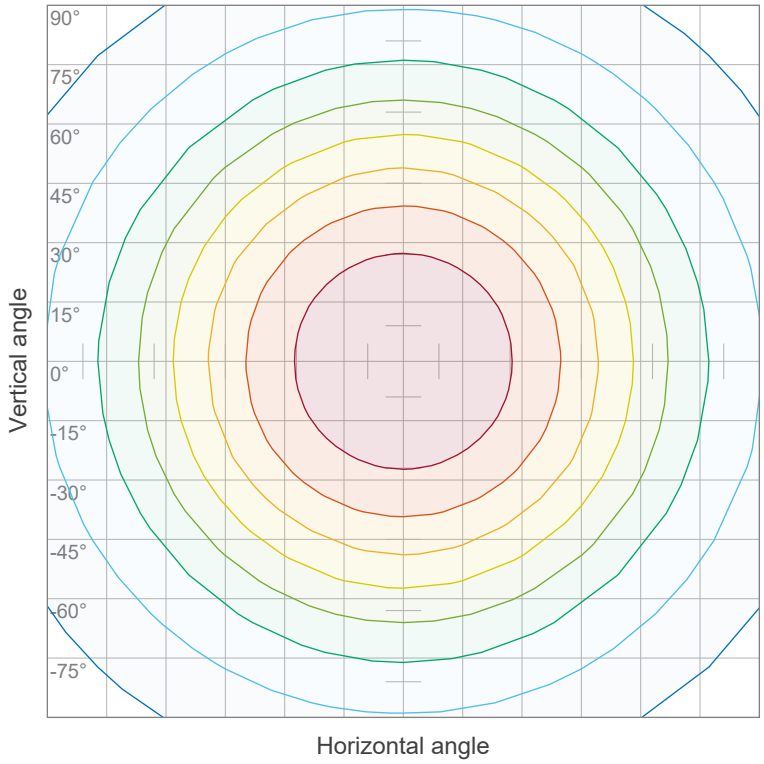
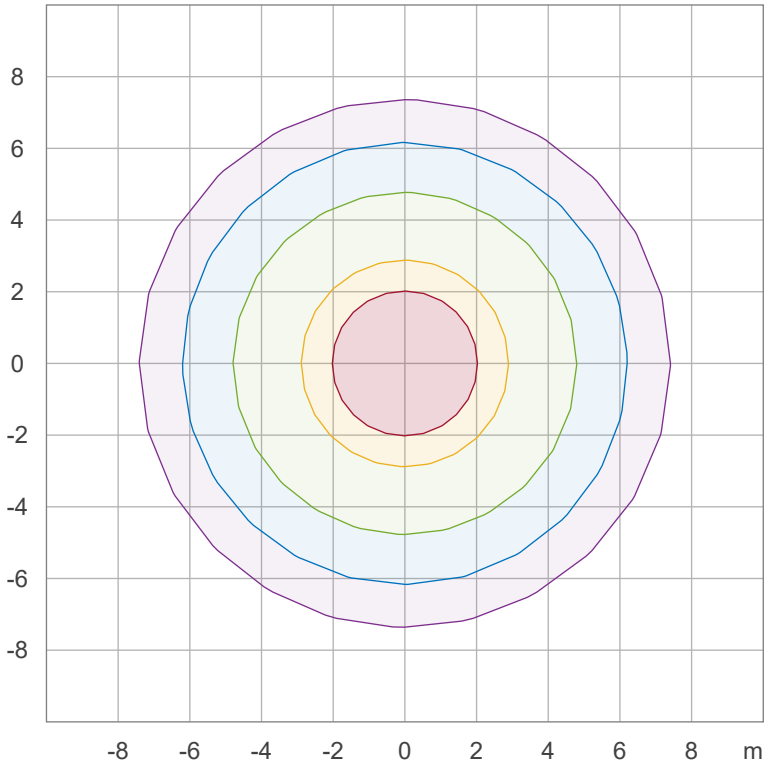
Iso-intensity Diagram (Iso-candela)



90 %	9,1 cd
80 %	8,1 cd
70 %	7,1 cd
60 %	6,1 cd
50 %	5,1 cd
40 %	4,0 cd
30 %	3,0 cd
20 %	2,0 cd
10 %	1,0 cd

Peak intensity: 10,1 cd
Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



50,0 %	0,6 lx
30,0 %	0,3 lx
10,0 %	0,1 lx
5,0 %	0,1 lx
3,0 %	0,0 lx

Peak illuminance: 1,1 lx
Mounting height: 3,0 m
Number of c-planes: 12

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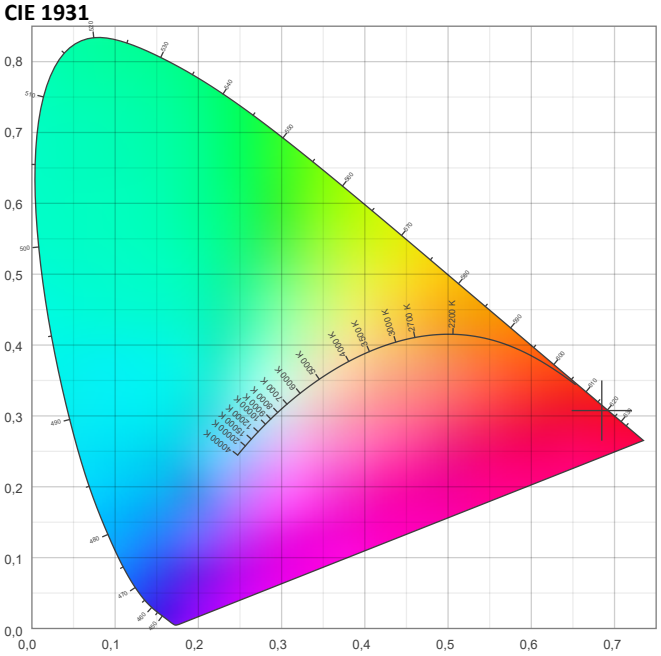
Color details

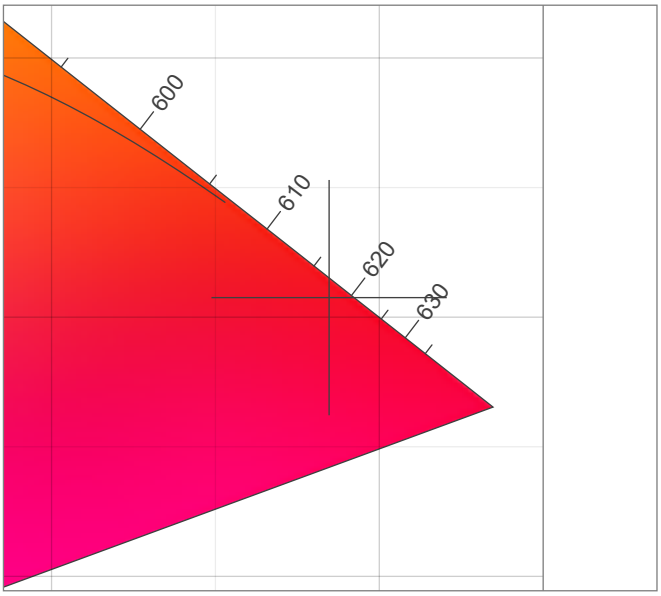
Correlated Color Temperature, Target	CCT = 0 K
Correlated Color Temperature, Measured	CCT = 0 K
Color Rendering Index	CRI 0,0
Color Rendering Index, R9 (red component)	R9 = 0,0
Color Rendering TM30-18	R_f 0,0 – R_g 0,0
Color Quality Scale	CQS = 0,0

MacAdam Steps	SDCM = n/a
Color coordinates CIE 1931	(x;y) = (0,685;0,308)
Color coordinate CIEs 1960	(u;v) = (0,515;0,347)
Color deviation from BBL	Duv = n/a
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,515;0,520)

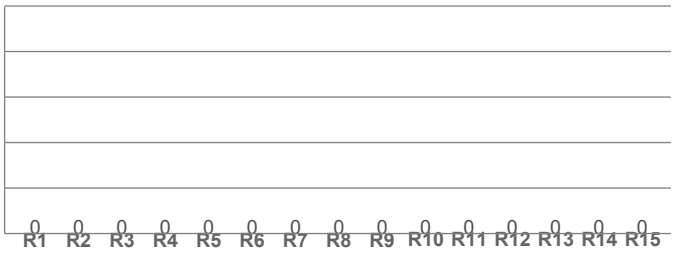
CIE 1931



CIE 1931 – zoomed on Planckian locus



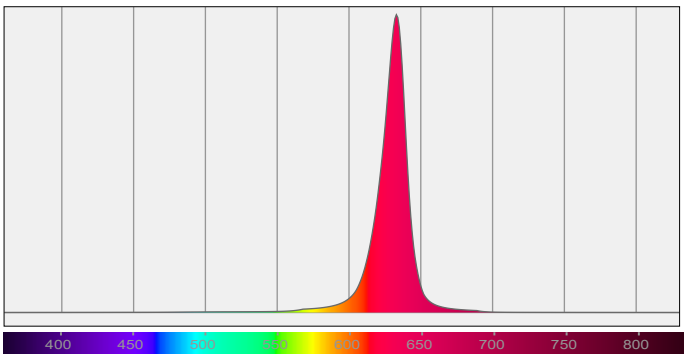
Color Rendering Index per reference color (CIE 1995)



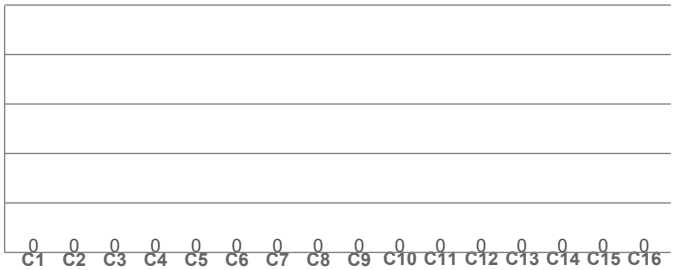
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

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
0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Color Quality Scale by reference color

CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

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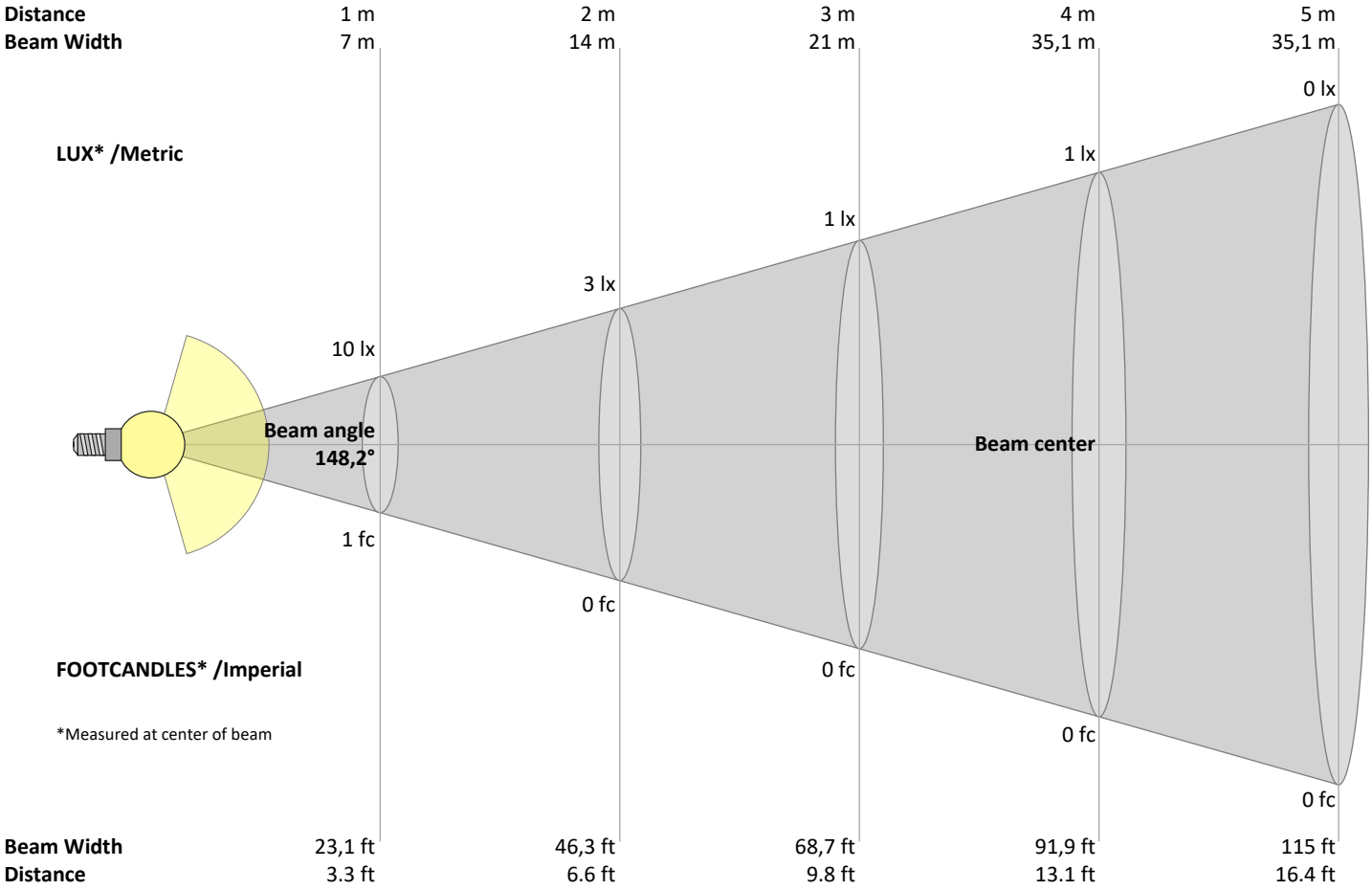
Beam Details



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
10	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	lux
0,9	0,2	0,1	0,1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	fc

Intensities in 0° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
10,1	10,0	9,7	9,3	8,7	8,0	7,1	6,1	5,2	4,3	3,6	3,0	2,5	1,3	0,7	0,5	0,5	0,4	0,3	0,1	cd
100%	99%	96%	92%	86%	79%	71%	61%	51%	43%	36%	30%	24%	13%	7%	5%	5%	4%	3%	1%	of 0°val

Intensities in 90° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
10,1	10,0	9,8	9,3	8,7	8,0	7,2	6,2	5,3	4,4	3,7	3,2	2,7	2,3	1,9	1,6	1,3	1,1	0,8	0,1	cd
100%	99%	97%	92%	87%	80%	71%	62%	53%	44%	37%	31%	27%	22%	19%	16%	13%	10%	8%	1%	of 0°val

Intensities in 180° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
10,1	10,0	9,7	9,3	8,7	8,0	7,1	6,1	5,2	4,3	3,6	3,0	2,5	1,3	0,7	0,5	0,5	0,4	0,3	0,1	cd
100%	99%	96%	92%	86%	79%	71%	61%	51%	43%	36%	30%	24%	13%	7%	5%	5%	4%	3%	1%	of 0°val

Intensities in 270° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
10,1	10,0	9,8	9,3	8,7	8,0	7,2	6,2	5,3	4,4	3,7	3,2	2,7	2,3	1,9	1,6	1,3	1,1	0,8	0,1	cd
100%	99%	97%	92%	87%	80%	71%	62%	53%	44%	37%	31%	27%	22%	19%	16%	13%	10%	8%	1%	of 0°val

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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	12,7	13,8	13,3	14,4	15,1	12,7	13,9	13,3	14,5	15,2
	3H	14,4	15,5	15,1	16,1	16,8	14,5	15,6	15,2	16,2	16,9
	4H	15,2	16,3	15,9	16,9	17,6	15,3	16,4	16,0	17,0	17,7
	6H	16,1	17,0	16,7	17,6	18,4	16,2	17,1	16,8	17,8	18,5
	8H	16,4	17,4	17,1	18,0	18,8	16,5	17,5	17,2	18,1	18,9
	12H	16,8	17,8	17,4	18,4	19,2	16,9	17,9	17,5	18,5	19,3
4H	2H	13,3	14,3	14,0	15,0	15,7	13,3	14,4	14,0	15,0	15,7
	3H	15,3	16,3	16,0	16,9	17,7	15,4	16,4	16,0	17,0	17,8
	4H	16,2	17,3	16,9	17,8	18,7	16,3	17,4	17,0	17,9	18,8
	6H	17,2	18,0	17,9	18,7	19,4	17,3	18,1	18,0	18,8	19,5
	8H	17,6	18,3	18,4	19,0	19,8	17,7	18,4	18,5	19,1	19,9
	12H	18,1	18,6	18,8	19,4	20,2	18,2	18,8	18,9	19,5	20,4
8H	4H	16,6	17,3	17,4	18,0	18,8	16,7	17,4	17,4	18,1	18,9
	6H	17,8	18,3	18,5	19,1	20,0	17,9	18,4	18,6	19,2	20,1
	8H	18,4	18,9	19,2	19,7	20,6	18,5	18,9	19,2	19,8	20,7
	12H	18,9	19,4	19,8	20,2	21,1	19,0	19,5	19,9	20,3	21,2
12H	4H	16,7	17,2	17,4	18,0	18,8	16,7	17,3	17,5	18,1	18,9
	6H	17,9	18,4	18,7	19,2	20,2	18,0	18,5	18,8	19,3	20,3
	8H	18,6	19,0	19,4	19,8	20,7	18,6	19,1	19,5	19,9	20,8

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

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	114	114	114	114	108	108	108	108	98	98	98	89	89	89	81	81	81	77
1	100	94	88	83	95	89	84	80	81	77	73	73	70	67	65	63	61	57
2	90	80	72	65	85	76	69	63	69	63	58	62	57	53	56	52	48	45
3	81	69	60	53	76	66	58	51	59	53	47	54	48	43	48	44	40	36
4	74	61	51	44	69	58	49	42	52	45	39	47	41	36	42	37	33	30
5	67	54	44	37	64	51	42	36	46	39	33	42	36	31	38	33	28	26
6	62	48	39	32	59	46	37	31	42	34	29	38	31	27	34	29	25	22
7	57	43	34	28	54	41	33	27	38	30	25	34	28	23	31	26	22	19
8	53	39	31	25	50	38	29	24	34	27	22	31	25	21	28	23	19	17
9	50	36	27	22	47	34	27	21	31	25	20	29	23	19	26	21	17	15
10	46	33	25	20	44	32	24	19	29	22	18	27	21	17	24	19	16	14

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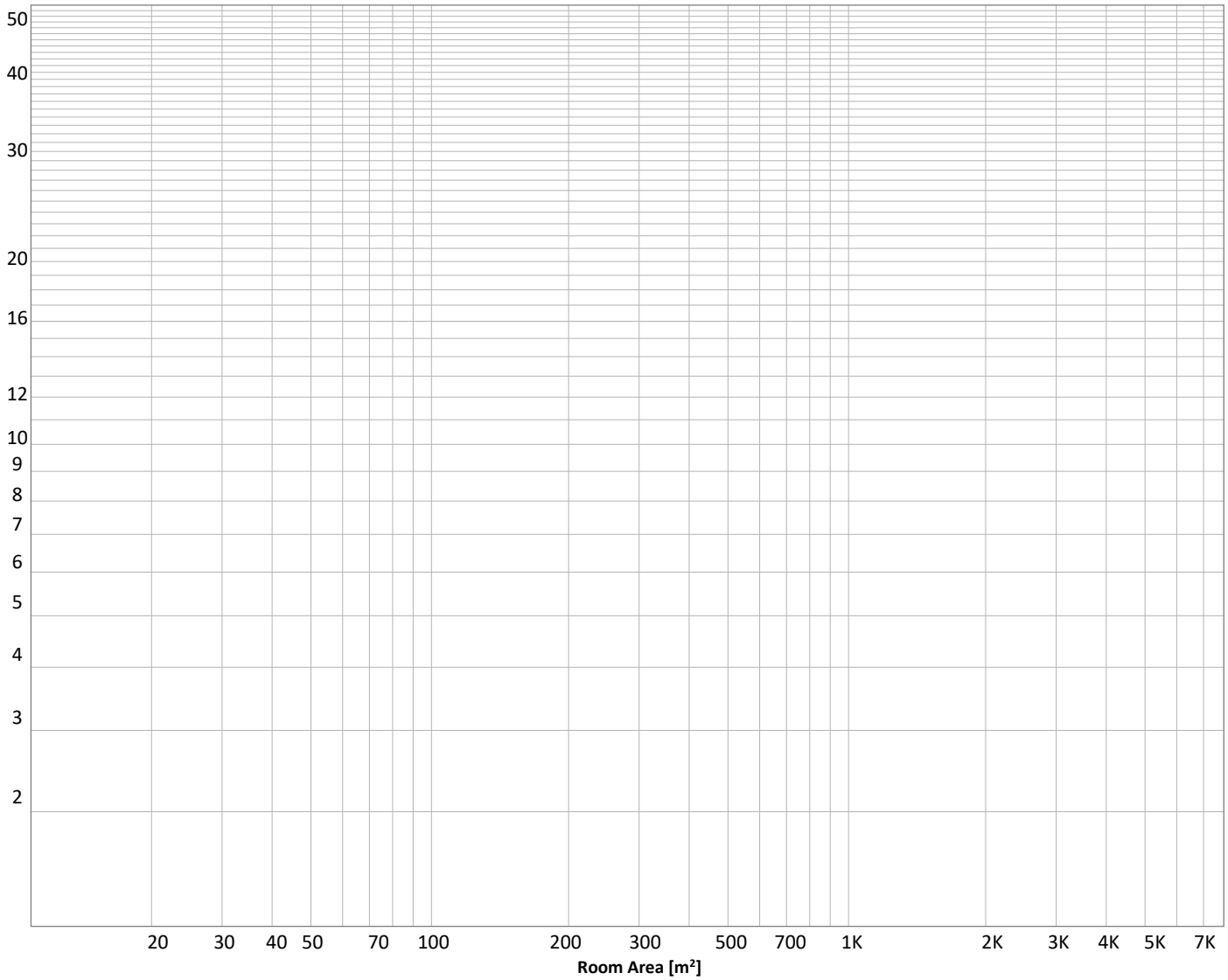
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 54,3 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°
0,958 lm	2,78 lm	4,34 lm	5,52 lm	6,18 lm	6,30 lm	5,93 lm	5,24 lm	4,43 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
3,66 lm	2,93 lm	2,17 lm	1,53 lm	1,07 lm	0,703 lm	0,413 lm	0,156 lm	0,008 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	1 lm	1,8%
10-20°	3 lm	5,1%
20-30°	4 lm	8,0%
30-40°	6 lm	10,2%
40-50°	6 lm	11,4%
50-60°	6 lm	11,6%
60-70°	6 lm	10,9%
70-80°	5 lm	9,7%
80-90°	4 lm	8,2%
90-100°	4 lm	6,7%
100-110°	3 lm	5,4%
110-120°	2 lm	4,0%
120-130°	2 lm	2,8%
130-140°	1 lm	2,0%
140-150°	1 lm	1,3%
150-160°	0 lm	0,8%
160-170°	0 lm	0,3%
170-180°	0 lm	0,0%
Total	54 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	8 lm	14,9%
0-40°	14 lm	25,0%
0-60°	26 lm	48,0%
60-90°	16 lm	28,7%
70-100°	13 lm	24,5%
90-120°	9 lm	16,1%
0-90°	42 lm	76,7%
90-180°	13 lm	23,3%
0-180°	54 lm	100,0%

Intensity peaks

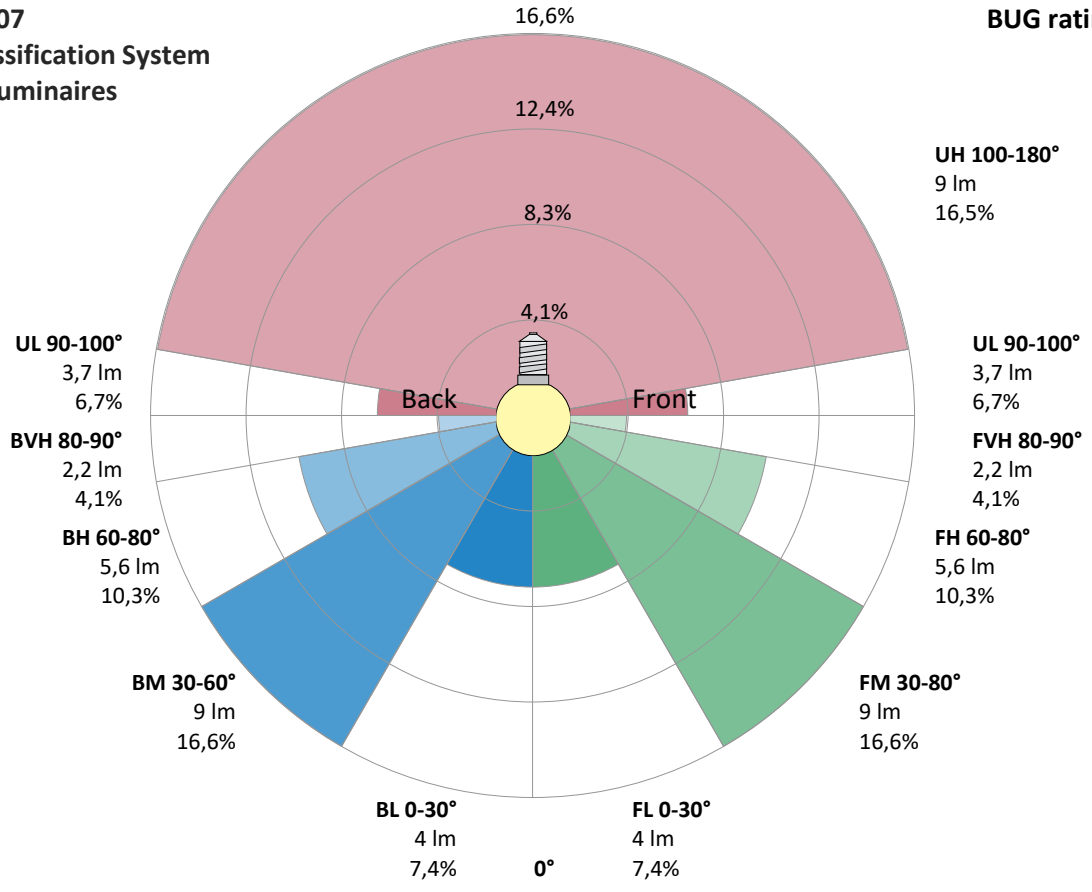
Max intensity	10 cd
Intensity, 90°	4 cd
Intensity, 0°	10 cd

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	4 lm	7,4%
Medium(30-60°)	9 lm	16,6%
High(60-80°)	6 lm	10,3%
Very high(80-90°)	2 lm	4,1%
Back light		
Low(0-30°)	4 lm	7,4%
Medium(30-60°)	9 lm	16,6%
High(60-80°)	6 lm	10,3%
Very high(80-90°)	2 lm	4,1%
Uplight		
Low(90-100°)	4 lm	6,7%
High(100-180°)	9 lm	16,5%

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

BUG rating B0 U1 G0



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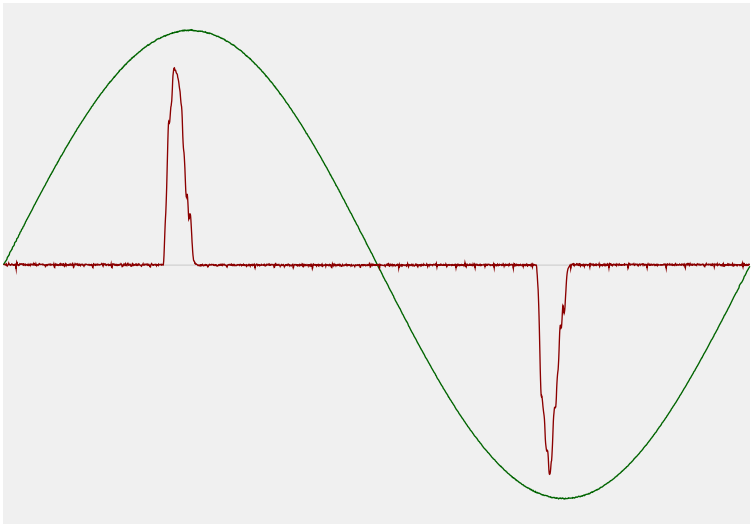
Power Details

Input Power

Power feed to light source	2,6 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,032 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	7,44 VA
Displacement factor of AC power feed	0,99
Power factor of AC current feed	0,35
Total harmonic distortion of the current	261,16%
Total harmonic distortion of the voltage	0,08%

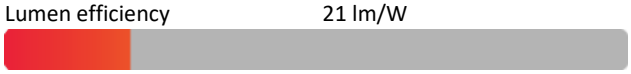
Input Power Curve



Efficiency

Radiated power efficiency 10,7%

Lumen efficiency 21 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	0 K
CCT shift	0 K
CCT end	0 K

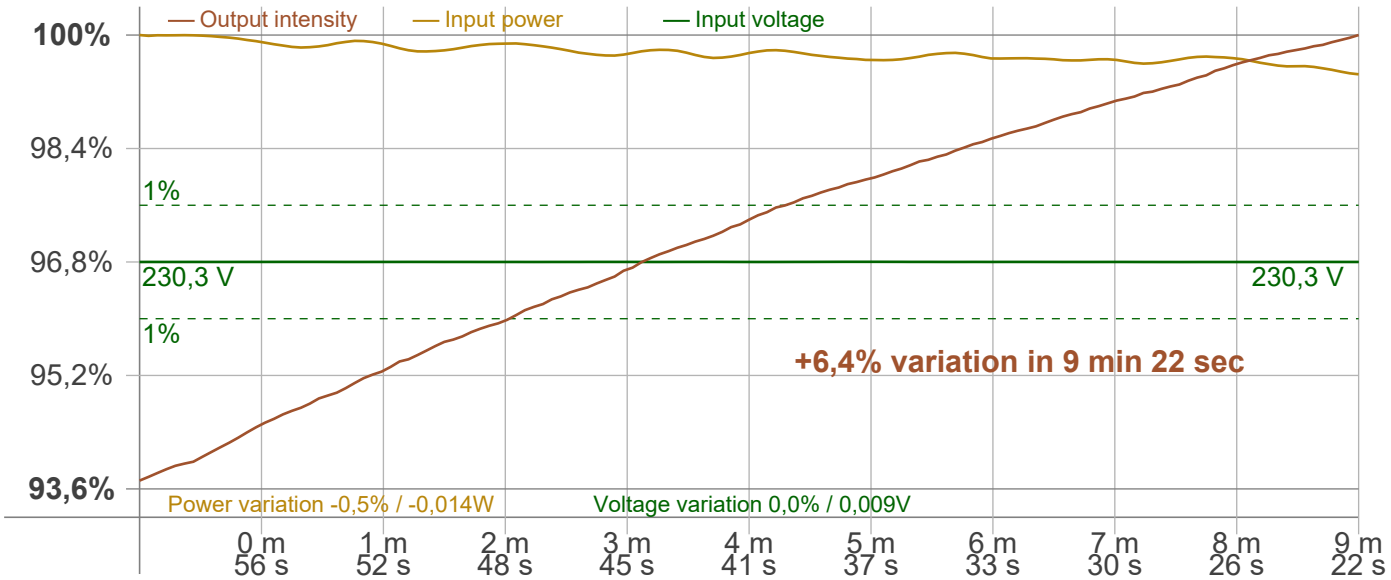
Warmup Result

Total warmup time	Not completed
Warmup variation	+6,4%

Output Change

Output start	51,0 lm
Output change	+3,4 lm
Output end	54,3 lm

Stabilization Curve



Light Measurement Report

Print date: 14-1-2025
Measurement date and time: 14-1-2025 15:31:29 – Measurement no. VFR-250114-2932-MS
Measurement tracking No. and Link: VT250114-008189
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	10000 Hz
Percent Flicker	0,31 %
Flicker index	0

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

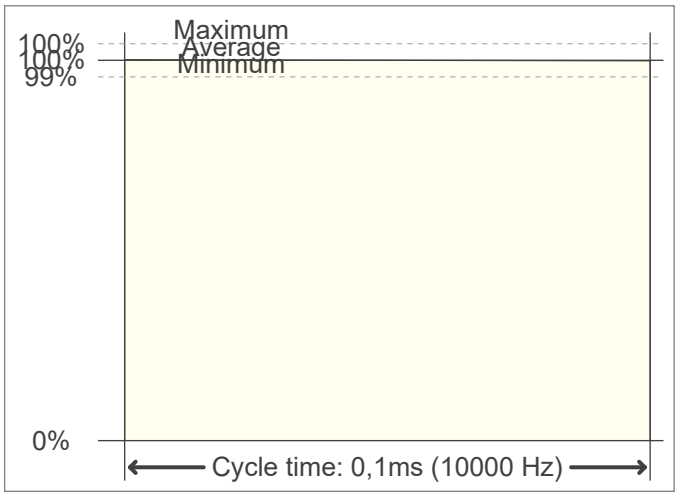
Flicker indices according to California Energy Commission (CEC) 2016b

JA8/10 40 Hz	0,03 %
JA8/10 90 Hz	0,03 %
JA8/10 200 Hz	0,05 %
JA8/10 400 Hz	0,06 %
JA8/10 1000 Hz	0,07 %

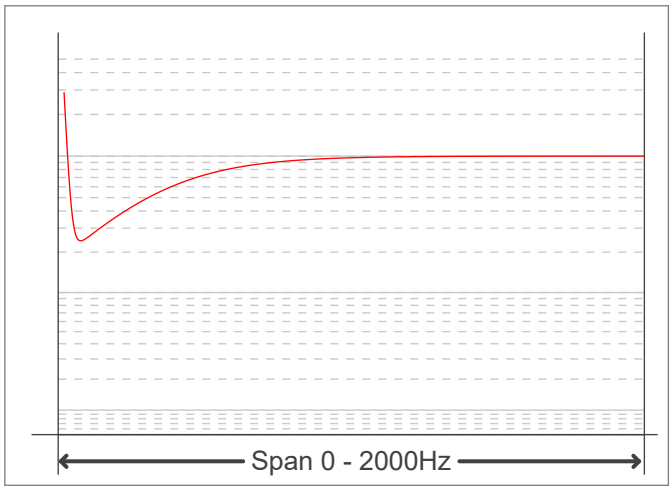
Flicker indices according to Lighting Research Center (2015)

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