

Light Measurement Report

Print date: 8-5-2025

Measurement date and time: 8-5-2025 11:37:16 – Measurement no. VFR-250508-1151-MS

Measurement tracking No. and Link: [VT250508-007680](#)

Operator:



Laboratory and Equipment

Laboratory Owner and Location

Goniospectrometer System and Type

Sensor Name, Calibr. Date and Serial No.

Spectrometer Manufacturer and Model

Viso Systems, Copenhagen V, Denmark

LabSpion – Type C, horizontal

LabSensor Model2 – 11-1-2024 – 3130191315

Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

Measurement Conditions

Number of C-planes and Resolution

γ (gamma)-Resolution

Test Distance

Input Power, Power and Displ. Factors

Input RMS Voltage and Current

Frequency of Input Power

Warm-up Time and Variation

12 planes – 30°

5°

2,00 m

22,3 W – PF 0,88 – DPF 0,99

230 V – 0,110 A

50 Hz

Lamp stabilized in 15 min 3 sec – 2,0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

270565-4000K

270565-4000K – Dutchfulfillment

3-FASE RAILSPOT | ROSALIN | 20W | WIT | DIMBAAR | CCT SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)

Efficiency

Peak Intensity and Beam Angle

Correlated Color Temperature, Target/Measured

Color Rendering Index

Color Rendering TM30-18

Color Shift, CIE duv and MacAdam Steps

Flicker

1732 lm – 0,04% / 99,96%

78 lm/W

2973 cd – 39,9°

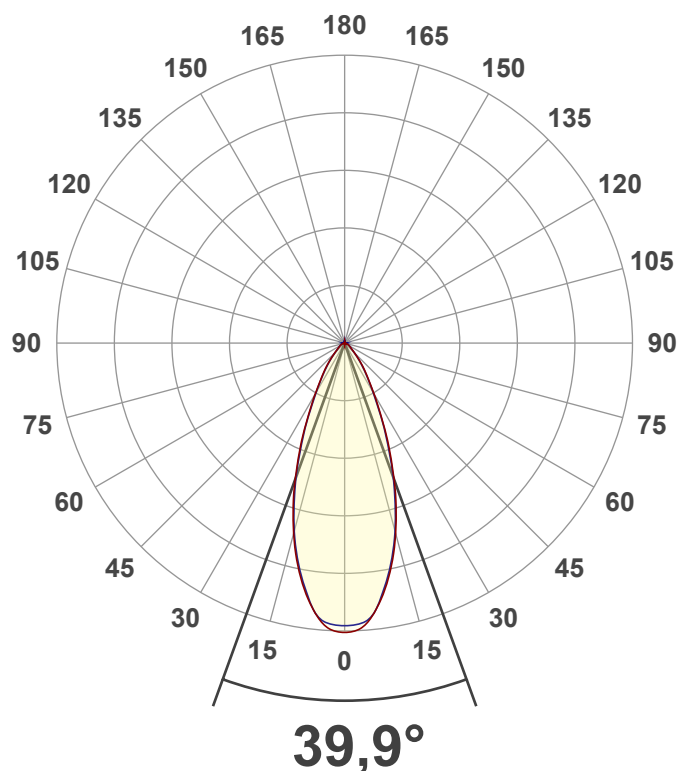
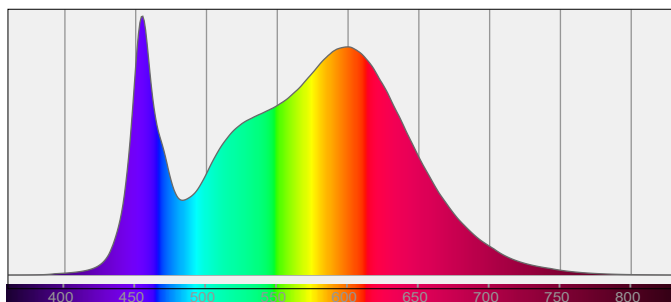
CCT = 4000 K / 3898 K

CRI 85,7

R_f 84,7 – R_g 94,7

Duv -0,0014 – SDCM 2,4

SVM 0,06 – PstLM 0,02



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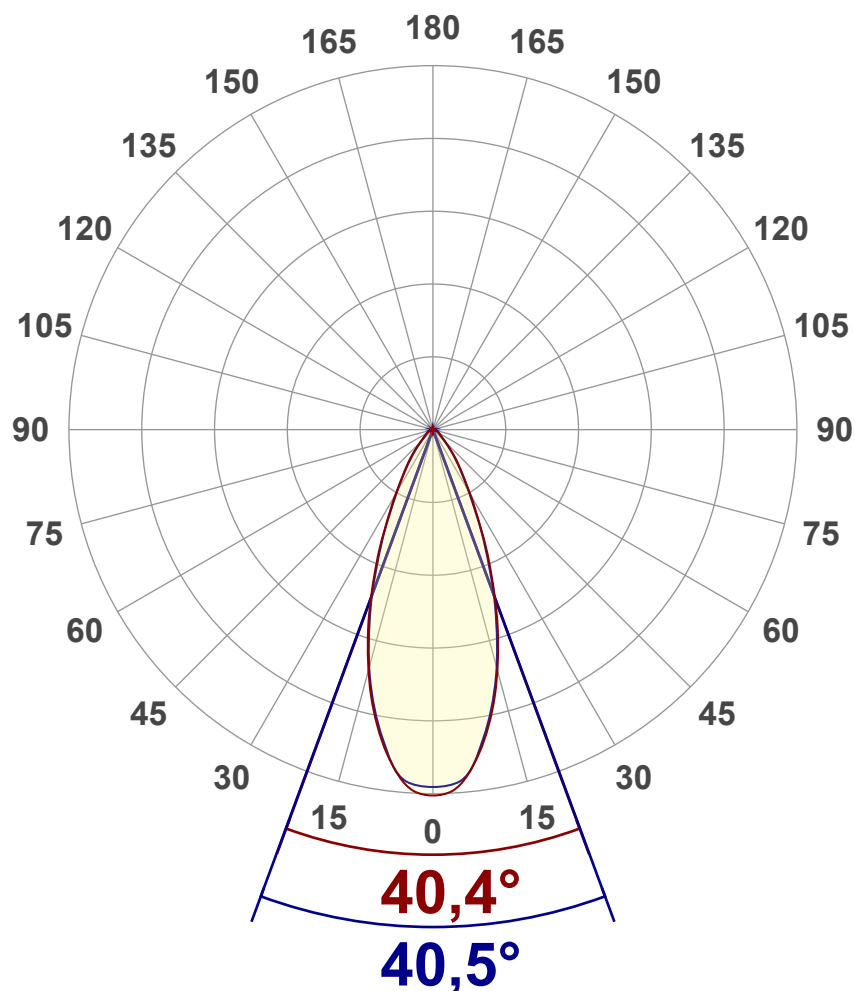
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1732 lm
Lumen Up% / Down%	0,04% / 99,96%
Peak Intensity	2973 cd
Beam Angle (50%)	39,9°
Beam Angle (90%)	40,5°
Beam Angle (10%)	40,4°

Cut-off Angle

Average 2,5%	107,7°
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Field Angle

Average 10%	75,9°
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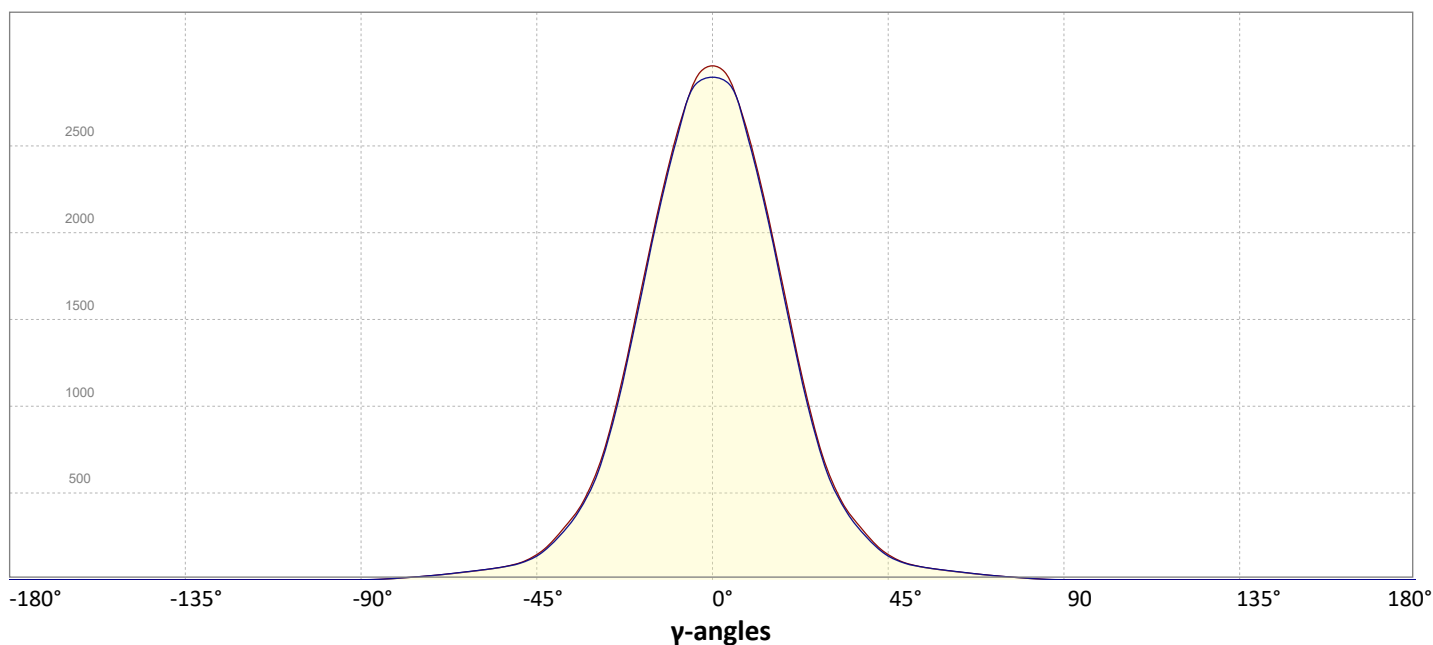
Intensity Ratio

In 120° cone	96,3%
In 90° cone	90,0%

C000-C180

C090-C270

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

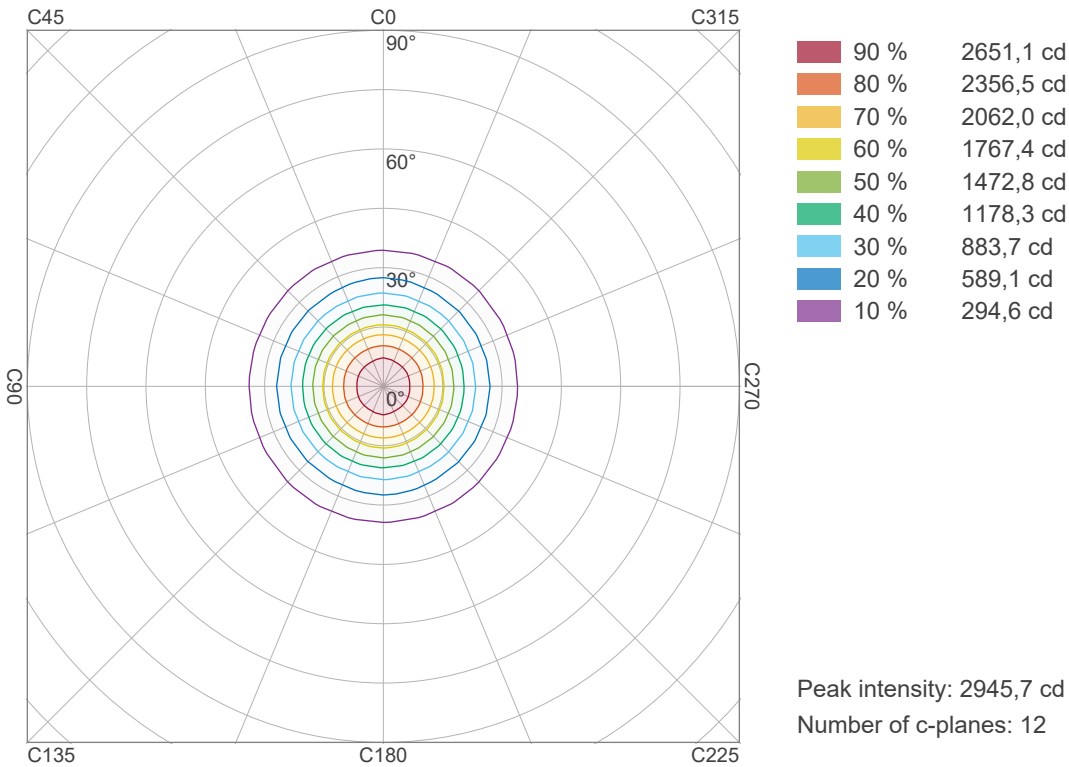


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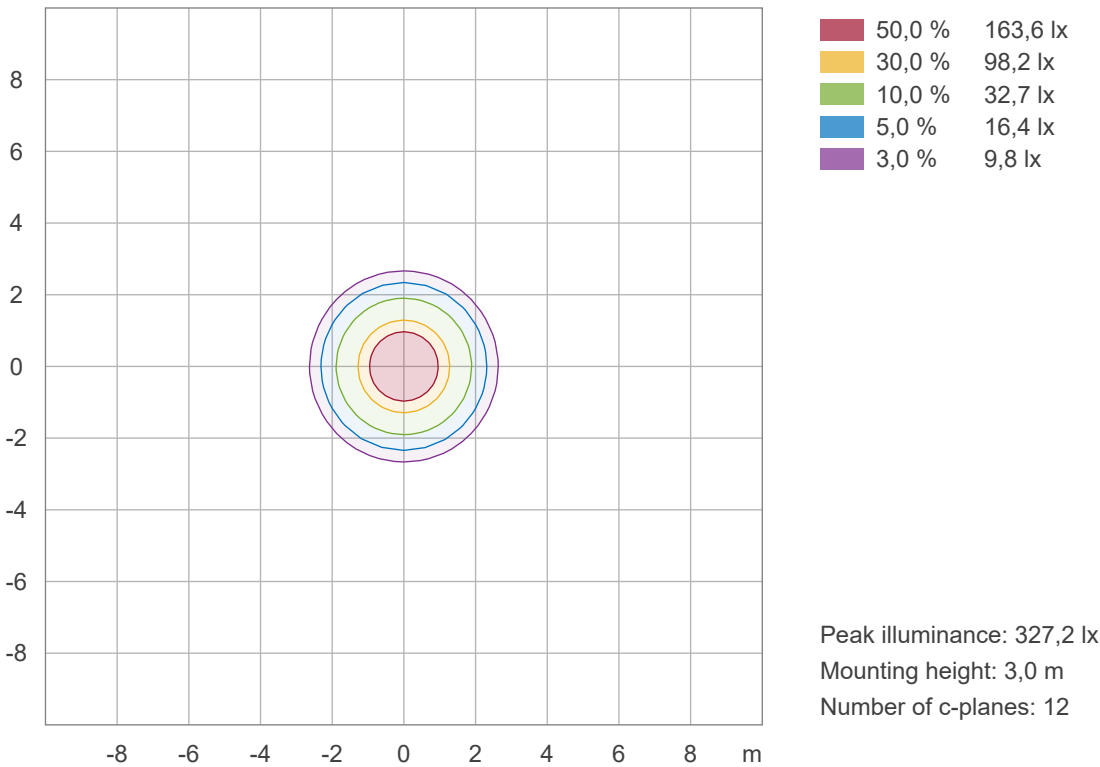
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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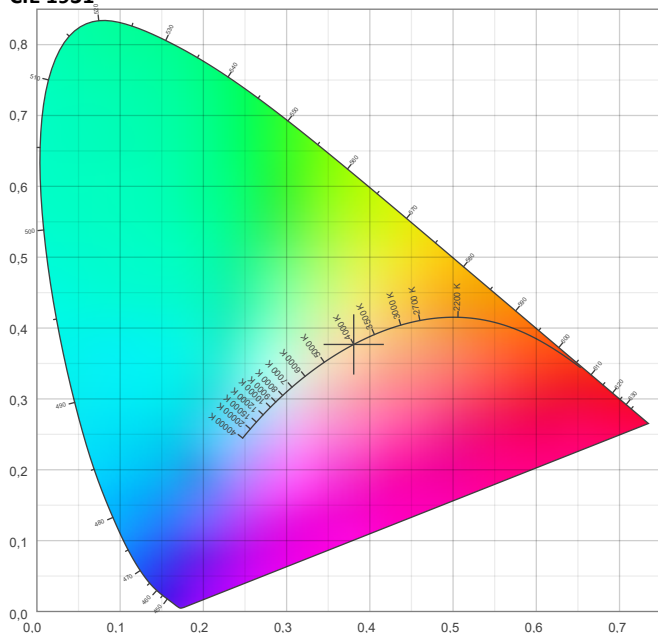


Color details

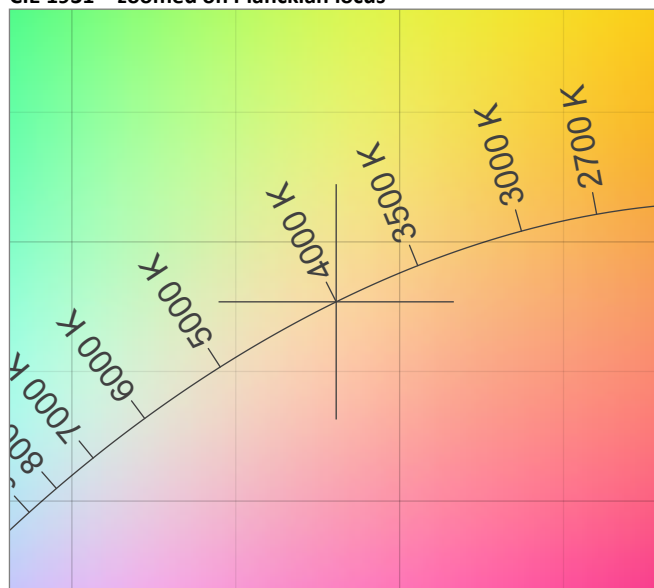
Correlated Color Temperature, Target CCT = 4000 K
Correlated Color Temperature, Measured CCT = 3898 K
Color Rendering Index CRI 85,7
Color Rendering Index, R9 (red component) R9 = 18,2
Color Rendering TM30-18 R_f 84,7 – R_g 94,7
Color Quality Scale CQS = 83,9

MacAdam Steps
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 = -0,0014
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,225;0,502)

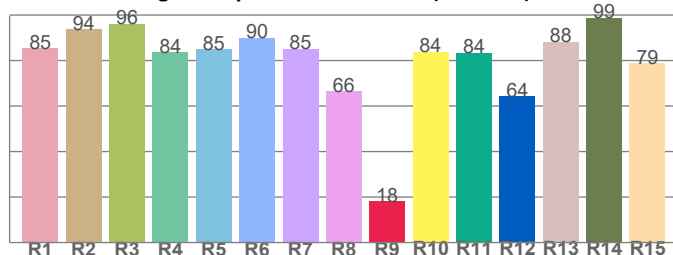
CIE 1931



CIE 1931 – zoomed on Planckian locus



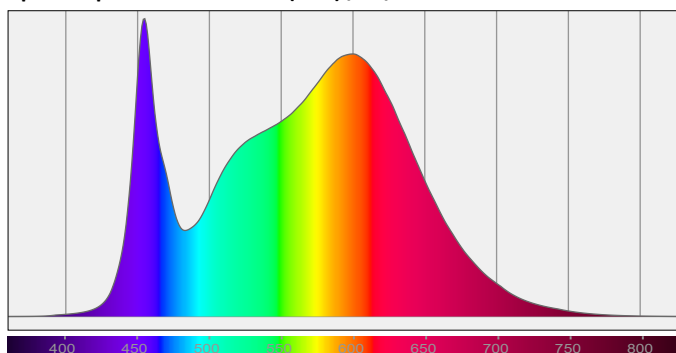
Color Rendering Index per reference color (CIE 1995)



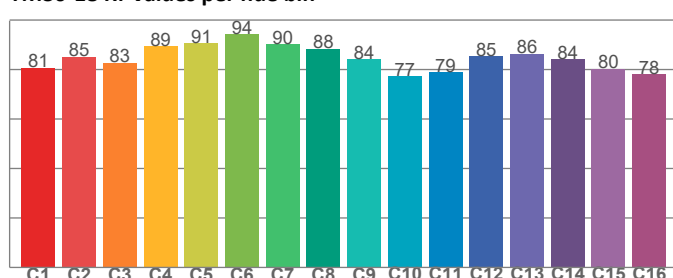
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
85,5	93,7	96,1	83,6	84,9	90,0	85,2	66,5	18,2	83,8	83,5	64,2	88,2	98,8	78,8

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



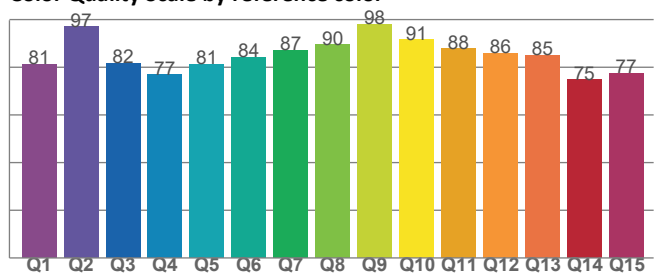
TM30-18 Rf-values per hue bin



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
80,7	85,2	82,7	89,3	90,6	94,3	90,2	88,4	84,1	77,2	79,0	85,3	86,4	84,2	80,3	78,1

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
81,3	97,0	81,7	76,9	81,4	84,2	87,2	89,5	98,0	91,5	87,8	85,8	85,0	74,8	77,4

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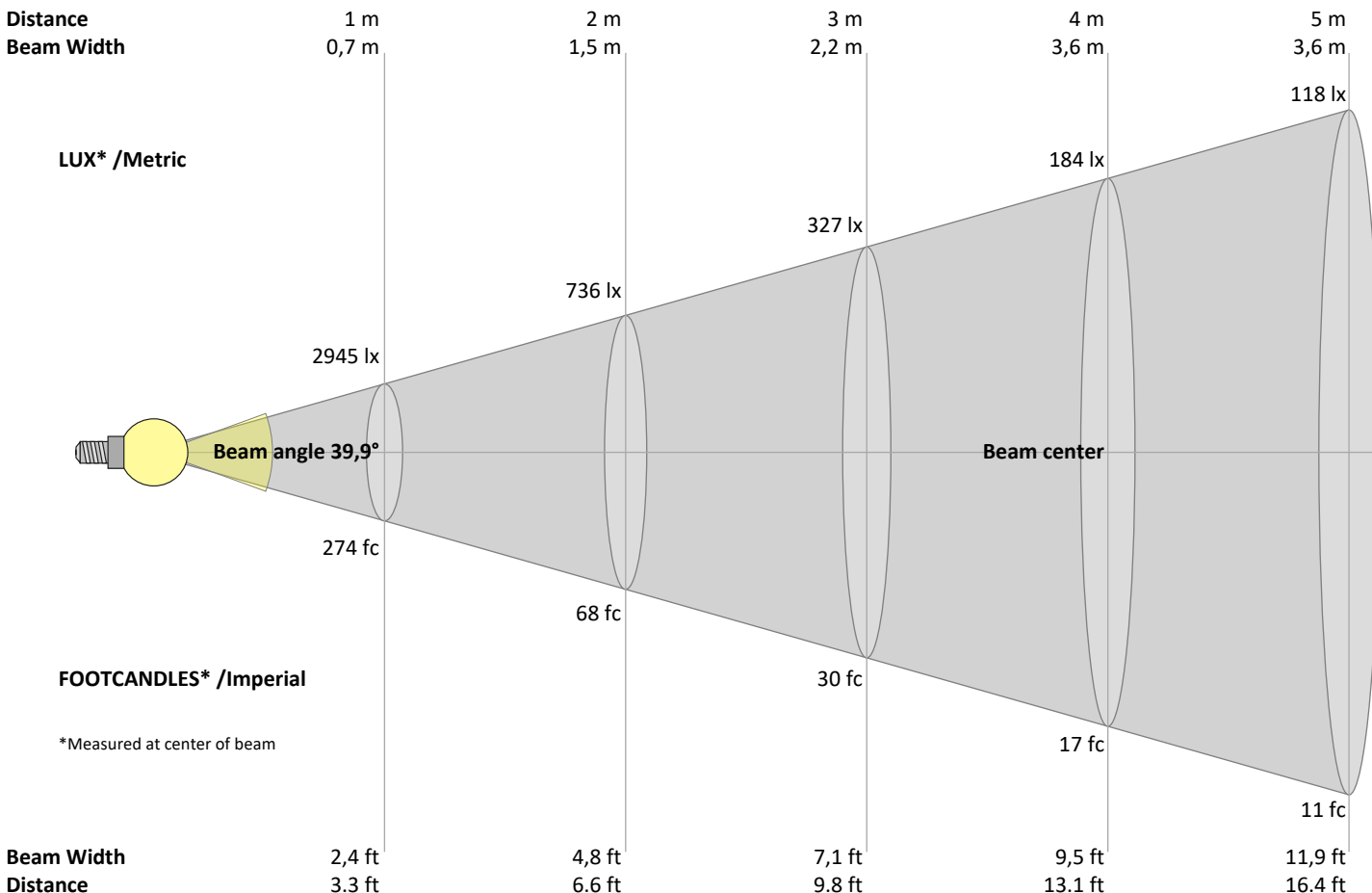
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Beam Details



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
2945	736	327	184	118	82	60	46	36	29	24	20	17	15	13	12	10	9	8	7	lux
273,6	68,4	30,4	17,1	10,9	7,6	5,6	4,3	3,4	2,7	2,3	1,9	1,6	1,4	1,2	1,1	0,9	0,8	0,8	0,7	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
2945	2926	2876	2764	2652	2480	2306	2115	1906	1697	1484	1271	1076	902	728	618	510	423	362	300	cd
100%	99%	98%	94%	90%	84%	78%	72%	65%	58%	50%	43%	37%	31%	25%	21%	17%	14%	12%	10%	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
2945	2855	2855	2744	2612	2462	2277	2092	1880	1664	1452	1247	1042	878	722	588	497	406	343	286	cd
100%	97%	97%	93%	89%	84%	77%	71%	64%	57%	49%	42%	35%	30%	25%	20%	17%	14%	12%	10%	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
2945	2926	2876	2764	2652	2480	2306	2115	1906	1697	1484	1271	1076	902	728	618	510	423	362	300	cd
100%	99%	98%	94%	90%	84%	78%	72%	65%	58%	50%	43%	37%	31%	25%	21%	17%	14%	12%	10%	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
2945	2855	2855	2744	2612	2462	2277	2092	1880	1664	1452	1247	1042	878	722	588	497	406	343	286	cd
100%	97%	97%	93%	89%	84%	77%	71%	64%	57%	49%	42%	35%	30%	25%	20%	17%	14%	12%	10%	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		Viewed Crosswise					Viewed Endwise				
H = mounting height above eye level		(Viewing direction orthogonal to lamp length axis)					(Viewing direction parallel to lamp length axis)				
X	Y										
2H	2H	23,4	24,1	23,5	24,3	24,5	23,2	23,9	23,3	24,1	24,3
	3H	23,7	24,5	24,1	24,7	24,9	23,5	24,3	23,9	24,5	24,7
	4H	23,9	24,6	24,3	24,9	25,1	23,7	24,5	24,1	24,7	24,9
	6H	24,0	24,7	24,3	25,0	25,3	23,9	24,5	24,2	24,8	25,2
	8H	24,0	24,6	24,3	25,0	25,3	23,9	24,5	24,2	24,8	25,2
	12H	24,0	24,6	24,3	24,9	25,3	23,8	24,4	24,2	24,8	25,2
4H	2H	23,4	24,2	23,8	24,4	24,6	23,2	24,0	23,6	24,2	24,5
	3H	24,1	24,7	24,4	25,0	25,4	23,9	24,5	24,3	24,9	25,3
	4H	24,2	24,8	24,7	25,2	25,7	24,1	24,6	24,5	25,1	25,6
	6H	24,4	25,0	24,9	25,3	25,6	24,2	24,8	24,7	25,1	25,5
	8H	24,4	24,9	24,9	25,3	25,6	24,2	24,8	24,8	25,1	25,5
	12H	24,3	24,8	24,8	25,2	25,6	24,2	24,6	24,7	25,0	25,5
8H	4H	24,3	24,8	24,8	25,1	25,5	24,1	24,7	24,6	25,0	25,4
	6H	24,5	24,8	25,0	25,3	25,8	24,3	24,7	24,9	25,2	25,7
	8H	24,6	24,8	25,1	25,4	26,0	24,4	24,7	24,9	25,2	25,9
	12H	24,5	24,8	25,1	25,3	25,9	24,4	24,7	25,0	25,2	25,8
12H	4H	24,2	24,6	24,7	25,0	25,5	24,1	24,5	24,6	24,9	25,4
	6H	24,5	24,8	25,0	25,3	25,9	24,4	24,7	24,9	25,2	25,8
	8H	24,5	24,8	25,1	25,3	25,9	24,4	24,7	25,0	25,2	25,8
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		1,8 / -1,3					1,8 / -1,2				
S = 1.5H		3,6 / -1,9					3,5 / -1,7				
S = 2.0H		5,1 / -2,4					5,0 / -2,4				

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	113	110	108	105	111	108	106	104	104	102	100	100	99	97	97	96	95	93
2	107	102	98	95	105	101	97	94	97	94	91	94	92	89	92	89	88	86
3	102	95	90	86	100	94	89	85	91	87	84	89	86	83	87	84	81	80
4	97	89	84	79	95	88	83	79	86	81	78	84	80	77	82	79	76	74
5	92	84	78	74	90	83	77	73	81	76	73	79	75	72	78	74	71	70
6	88	79	73	69	86	78	72	68	77	72	68	75	71	67	74	70	67	66
7	84	75	69	64	82	74	68	64	73	68	64	71	67	64	70	66	63	62
8	80	71	65	61	79	70	64	61	69	64	60	68	63	60	67	63	60	58
9	77	67	61	57	75	67	61	57	66	61	57	65	60	57	64	60	57	55
10	73	64	58	54	72	63	58	54	63	58	54	62	57	54	61	57	54	53

Light Measurement Report

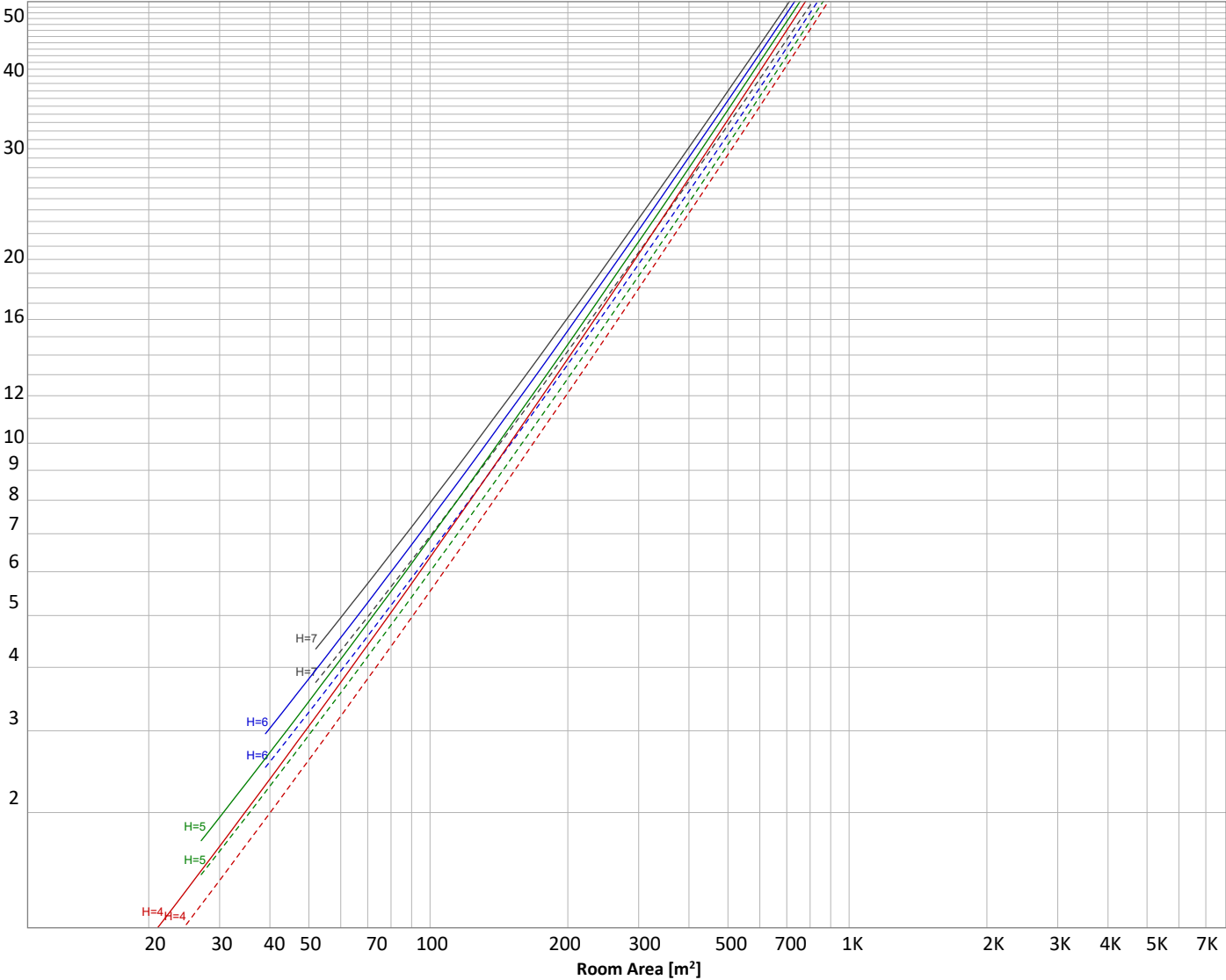
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 1732 lm	p(%)		
H _{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	Wall reflectance
H _{work} = Work area height from floor =	0.00 m	-----	70	50
E _{work} = Average lux on work area =	100 lx	_____	50	30
				Floor reflectance
				20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
257 lm	547 lm	444 lm	242 lm	116 lm	62,8 lm	39,9 lm	19,4 lm	3,96 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,021 lm	0,001 lm	0,007 lm	0,006 lm	0,027 lm	0,114 lm	0,203 lm	0,181 lm	0,062 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	257 lm	14,8%
10-20°	547 lm	31,6%
20-30°	444 lm	25,6%
30-40°	242 lm	14,0%
40-50°	116 lm	6,7%
50-60°	63 lm	3,6%
60-70°	40 lm	2,3%
70-80°	19 lm	1,1%
80-90°	4 lm	0,2%
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	1732 lm	100,0%

Intensity peaks

Max intensity	2973 cd
Intensity, 90°	0 cd
Intensity, 0°	2945 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	1247 lm	72,0%
0-40°	1489 lm	86,0%
0-60°	1668 lm	96,3%
60-90°	63 lm	3,7%
70-100°	23 lm	1,3%
90-120°	0 lm	0,0%
0-90°	1731 lm	100,0%
90-180°	1 lm	0,0%
0-180°	1732 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	624 lm	36,0%
Medium(30-60°)	210 lm	12,2%
High(60-80°)	30 lm	1,7%
Very high(80-90°)	2 lm	0,1%
Back light		
Low(0-30°)	624 lm	36,0%
Medium(30-60°)	210 lm	12,2%
High(60-80°)	30 lm	1,7%
Very high(80-90°)	2 lm	0,1%

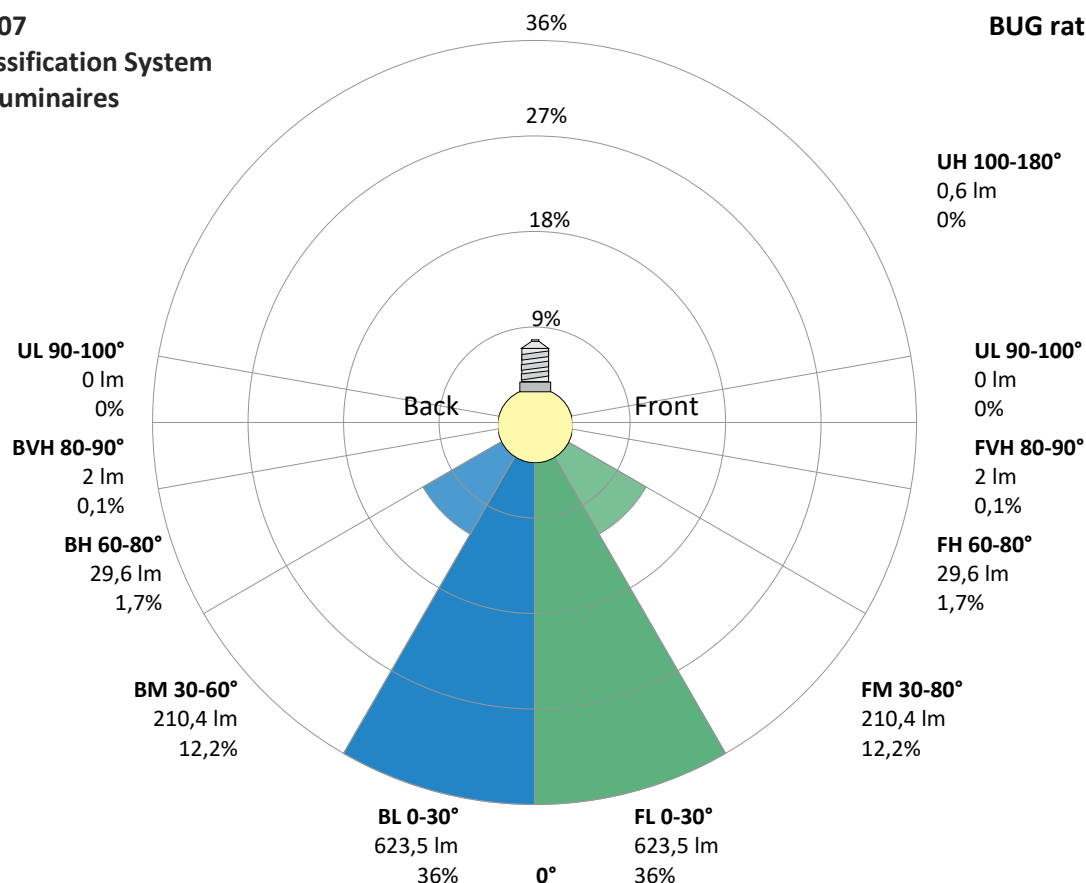
Uplight

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 B2 U1 G0



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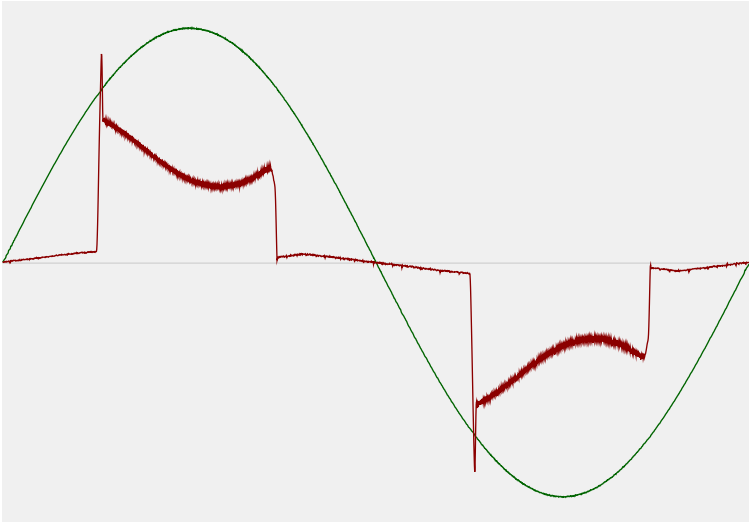


Power Details

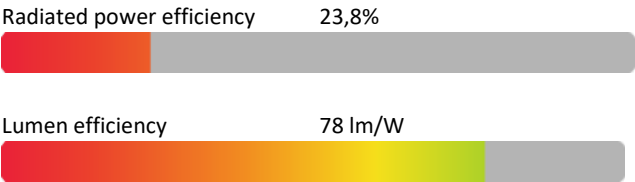
Input Power

Power feed to light source	22,3 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,110 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	25,27 VA
Displacement factor of AC power feed	0,99
Power factor of AC current feed	0,88
Total harmonic distortion of the current	50,8%
Total harmonic distortion of the voltage	0,06%

Input Power Curve



Efficiency



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	3999 K
CCT shift	+1 K
CCT end	4000 K

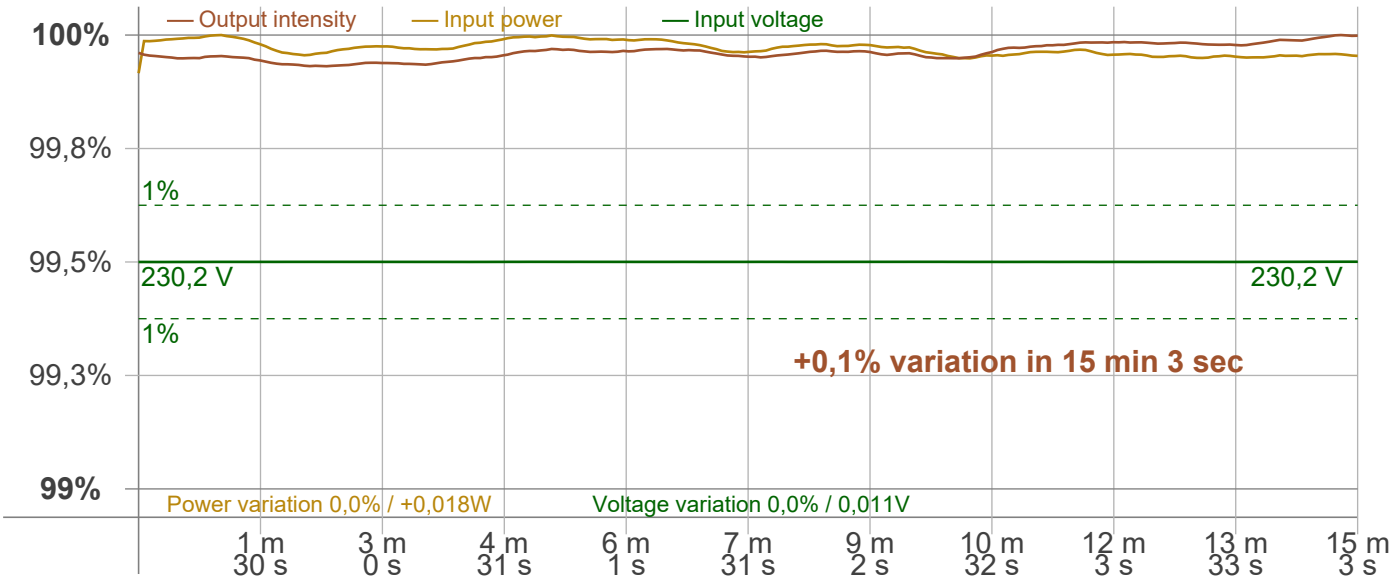
Warmup Result

Total warmup time	Lamp stabilized in 15 min 3 sec
Warmup variation	+0,1%

Output Change

Output start	1731 lm
Output change	+1m
Output end	1732 lm

Stabilization Curve



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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 99,5 Hz
Percent Flicker 2,21 %
Flicker index 0,01

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

JA8/10 40 Hz 0,02 %
JA8/10 90 Hz 0,04 %
JA8/10 200 Hz 1,68 %
JA8/10 400 Hz 1,97 %
JA8/10 1000 Hz 2,14 %

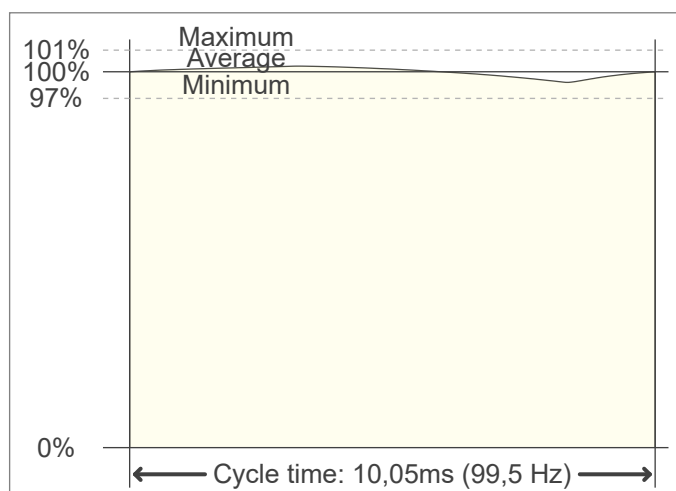
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value ($F < 80$ Hz) 0,02
SVM value ($80 < F < 2000$ Hz) 0,06

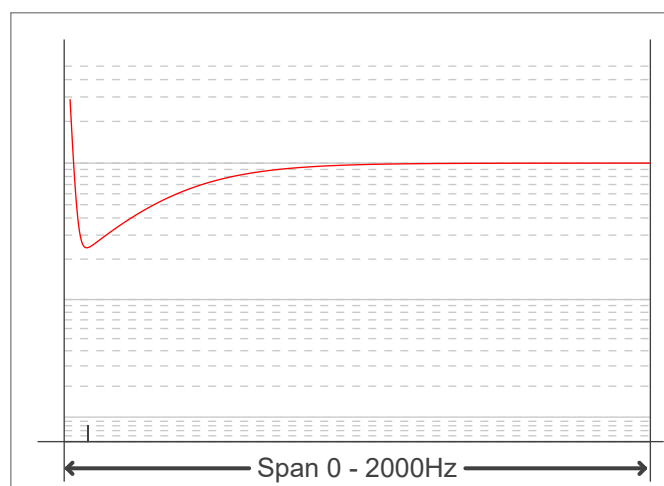
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp 0

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

