

Light Measurement Report

Print date: 13-5-2025

Measurement date and time: 12-5-2025 17:00:50 – Measurement no. VFR-250512-1201-MS

Measurement tracking No. and Link: [VT250512-009221](#)

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

16 planes – 22,5°

5°

2,00 m

30,3 W – PF 0,99 – DPF 1,0

230 V – 0,132 A

50 Hz

Lamp stabilized in 15 min 57 sec – 2,0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

848384-4000K

848384-4000K – Dutchfulfillment

3-FASE RAILSPOT ORCUS 15°-60° ZOOMABLE 30W WIT DIMBAAR

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

2330 lm – 0,05% / 99,95%

77 lm/W

3012 cd – 52°

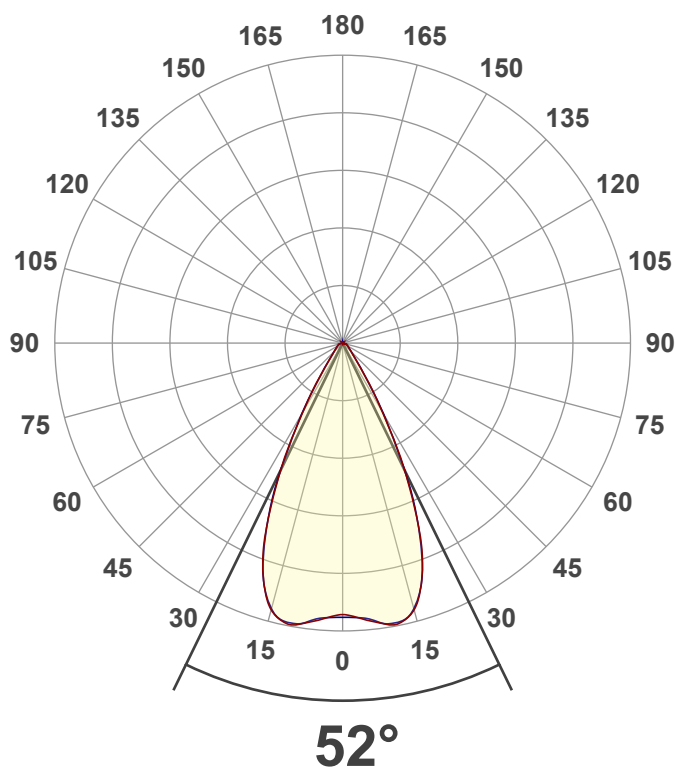
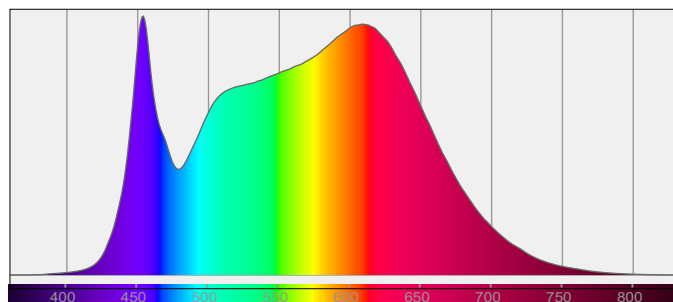
CCT = 4000 K / 4053 K

CRI 92,8

R_f 90,5 – R_g 96,5

Duv 0,0023 – SDCM 2,0

SVM 0,01 – PstLM 0,07



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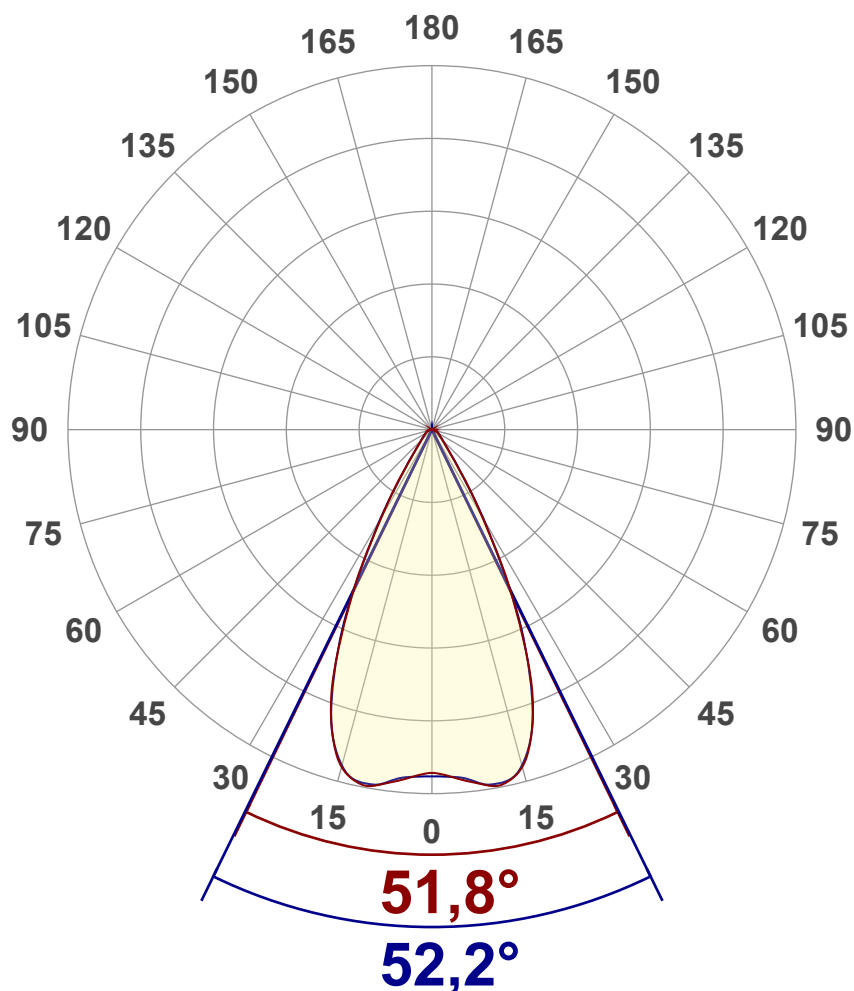
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2330 lm
Lumen Up% / Down%	0,05% / 99,95%
Peak Intensity	3012 cd
Beam Angle (50%)	52°
Beam Angle (90%)	52,2°
Beam Angle (10%)	51,8°

Cut-off Angle

Average 2,5%	110,4°
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Field Angle

Average 10%	73°
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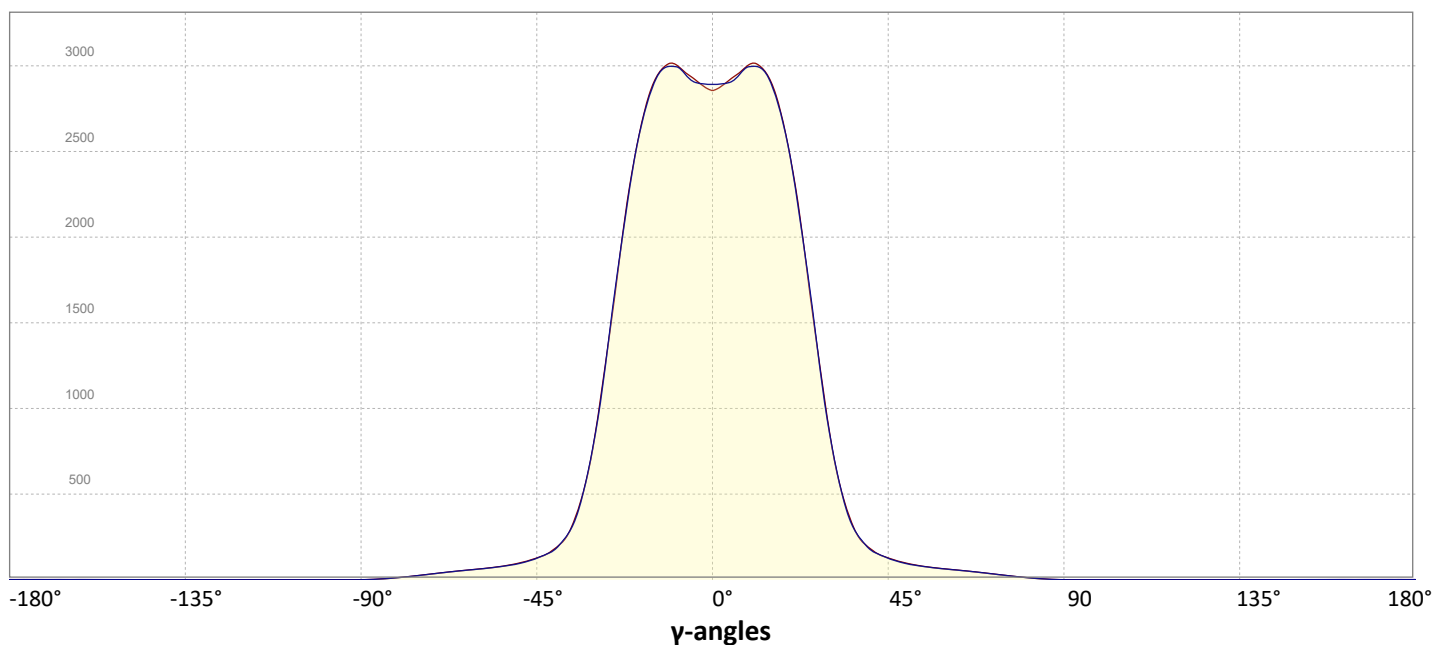
Intensity Ratio

In 120° cone	96,4%
In 90° cone	91,6%

C000-C180

C090-C270

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

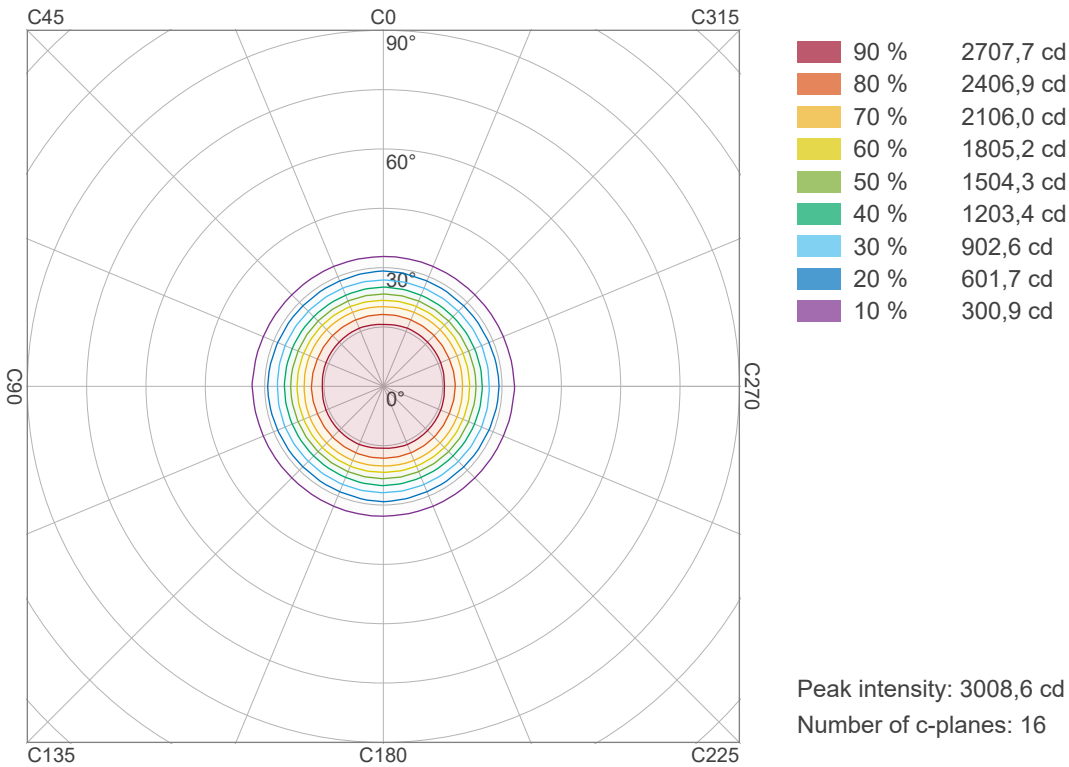


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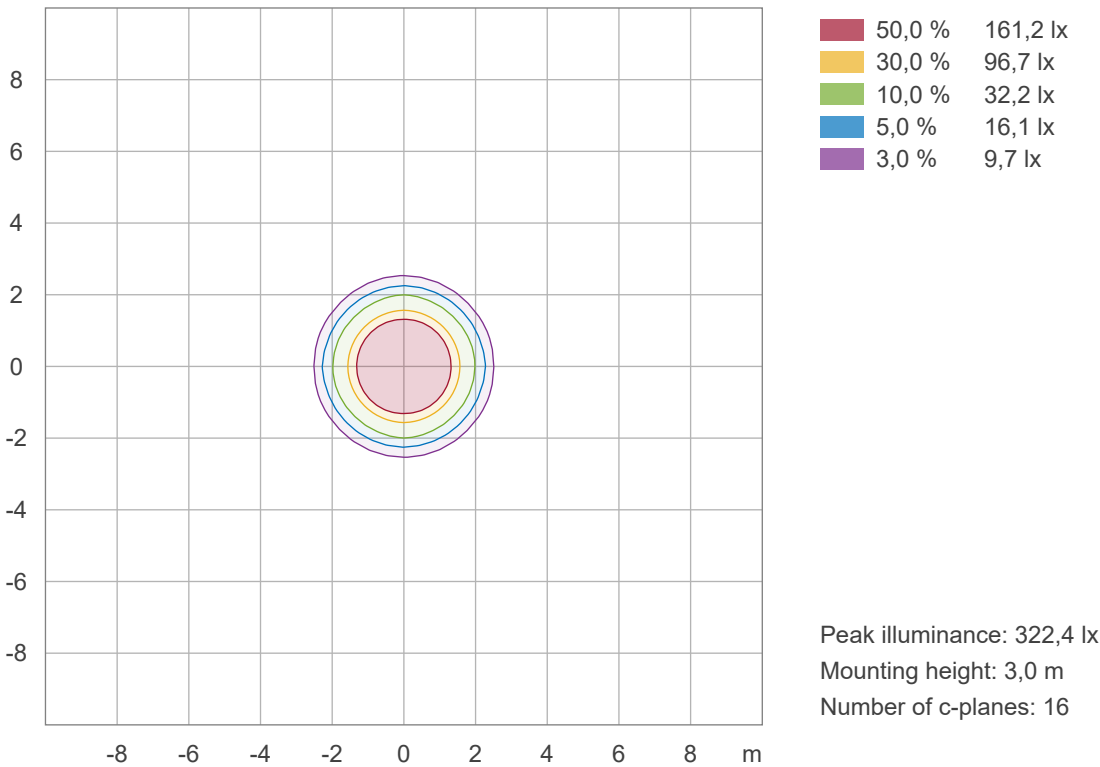
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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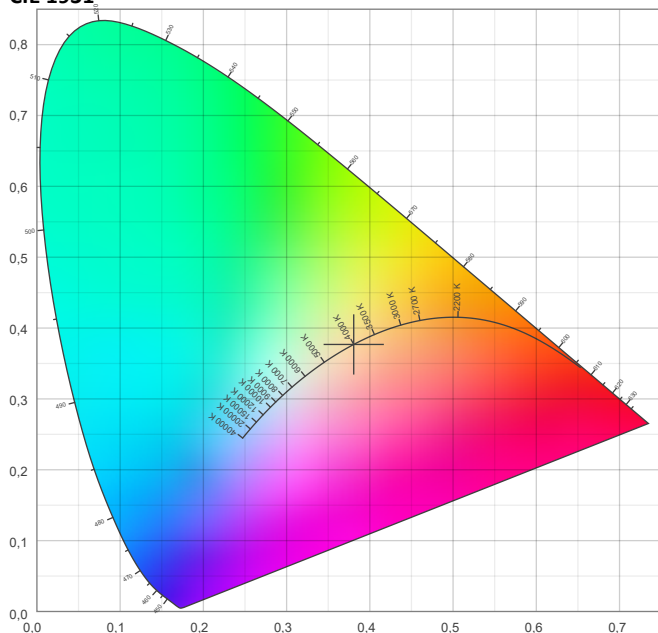


Color details

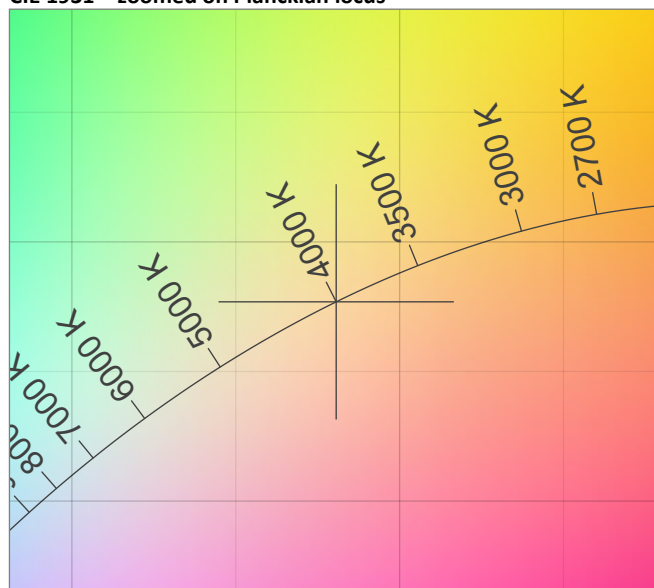
Correlated Color Temperature, Target CCT = 4000 K
Correlated Color Temperature, Measured CCT = 4053 K
Color Rendering Index CRI 92,8
Color Rendering Index, R9 (red component) R9 = 53,2
Color Rendering TM30-18 R_f 90,5 – R_g 96,5
Color Quality Scale CQS = 92,1

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 = 0,0023
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,225;0,502)

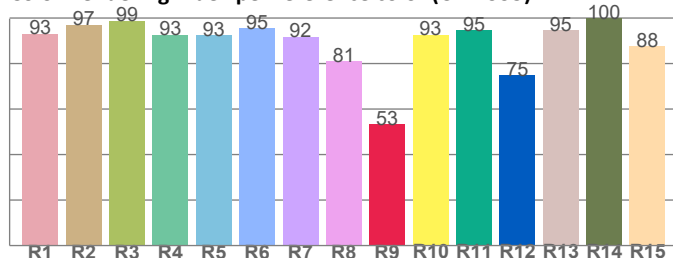
CIE 1931



CIE 1931 – zoomed on Planckian locus



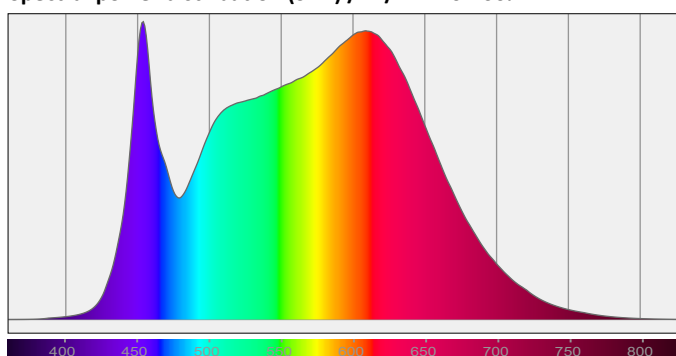
Color Rendering Index per reference color (CIE 1995)



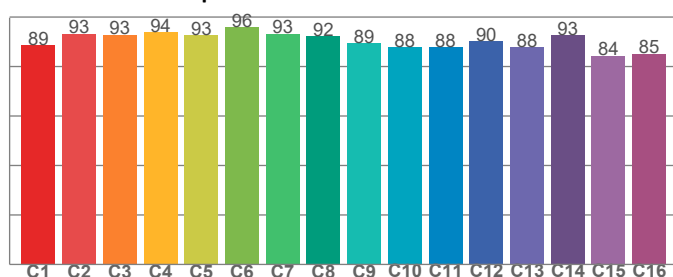
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
93,1	97,0	98,8	92,6	92,5	95,4	91,8	81,0	53,2	92,6	94,7	74,9	94,6	99,8	87,7

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



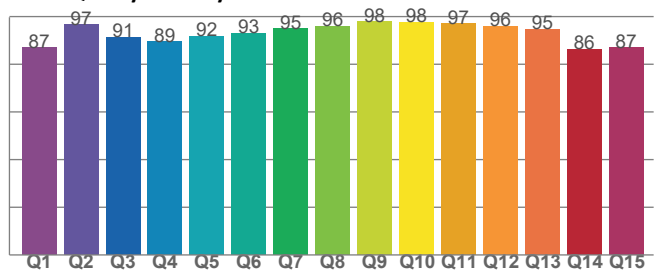
TM30-18 R_f-values per hue bin



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
88,7	93,2	92,8	93,8	92,7	95,8	93,2	92,3	89,4	87,8	87,7	90,3	87,8	92,5	84,4	85,2

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
87,0	96,6	91,4	89,5	91,8	93,1	94,9	95,9	97,8	97,6	97,1	96,0	94,8	86,4	87,0

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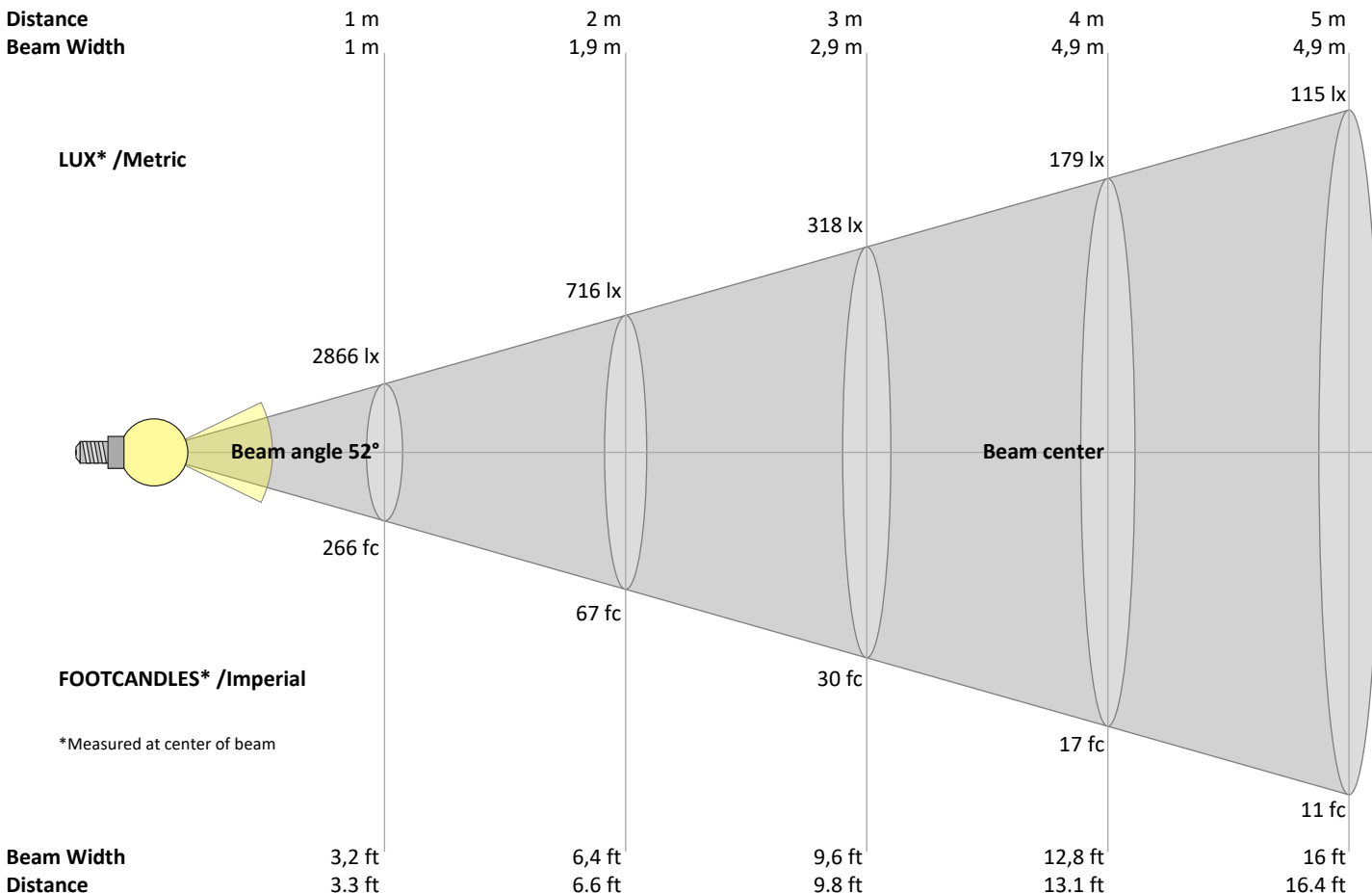
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Beam Details



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
2866	716	318	179	115	80	58	45	35	29	24	20	17	15	13	11	10	9	8	7	lux
266,3	66,6	29,6	16,6	10,7	7,4	5,4	4,2	3,3	2,7	2,2	1,8	1,6	1,4	1,2	1	0,9	0,8	0,7	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
2866	2878	2912	2945	2971	2996	2984	2911	2838	2642	2427	2167	1829	1492	1185	882	634	477	320	254	cd
100%	100%	102%	103%	104%	105%	104%	102%	99%	92%	85%	76%	64%	52%	41%	31%	22%	17%	11%	9%	of 0°va

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
2866	2903	2903	2933	2970	2986	2960	2934	2798	2640	2436	2140	1844	1510	1169	870	655	440	336	254	cd
100%	101%	101%	102%	104%	104%	103%	102%	98%	92%	85%	75%	64%	53%	41%	30%	23%	15%	12%	9%	of 0°va

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
2866	2878	2912	2945	2971	2996	2984	2911	2838	2642	2427	2167	1829	1492	1185	882	634	477	320	254	cd
100%	100%	102%	103%	104%	105%	104%	102%	99%	92%	85%	76%	64%	52%	41%	31%	22%	17%	11%	9%	of 0°va

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
2866	2903	2903	2933	2970	2986	2960	2934	2798	2640	2436	2140	1844	1510	1169	870	655	440	336	254	cd
100%	101%	101%	102%	104%	104%	103%	102%	98%	92%	85%	75%	64%	53%	41%	30%	23%	15%	12%	9%	of 0°va

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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	22,0	22,6	22,1	22,9	23,1	21,9	22,6	22,0	22,8	23,0
	3H	22,6	23,4	22,9	23,6	23,7	22,5	23,3	22,9	23,5	23,7
	4H	22,9	23,6	23,3	23,8	24,1	22,8	23,6	23,2	23,8	24,0
	6H	23,1	23,7	23,4	24,0	24,4	23,0	23,7	23,3	24,0	24,3
	8H	23,1	23,7	23,4	24,0	24,4	23,1	23,7	23,4	24,0	24,4
	12H	23,1	23,7	23,4	24,0	24,5	23,0	23,6	23,4	24,0	24,4
4H	2H	22,1	22,8	22,5	23,1	23,3	22,0	22,8	22,4	23,0	23,2
	3H	23,1	23,7	23,4	24,0	24,4	23,0	23,6	23,4	24,0	24,4
	4H	23,4	23,9	23,8	24,4	24,9	23,4	23,9	23,8	24,3	24,8
	6H	23,6	24,2	24,1	24,6	24,9	23,6	24,2	24,1	24,5	24,9
	8H	23,7	24,2	24,2	24,6	24,9	23,6	24,2	24,1	24,5	24,9
	12H	23,7	24,1	24,2	24,5	25,0	23,6	24,0	24,1	24,5	24,9
8H	4H	23,5	24,0	24,0	24,4	24,7	23,5	24,0	24,0	24,3	24,7
	6H	23,9	24,2	24,4	24,7	25,2	23,8	24,2	24,3	24,6	25,2
	8H	24,0	24,3	24,5	24,8	25,4	23,9	24,2	24,4	24,7	25,4
	12H	24,0	24,3	24,6	24,8	25,4	23,9	24,2	24,5	24,7	25,3
12H	4H	23,5	23,9	24,0	24,3	24,8	23,4	23,8	23,9	24,3	24,7
	6H	23,9	24,2	24,4	24,7	25,3	23,8	24,1	24,4	24,7	25,3
	8H	24,0	24,2	24,6	24,7	25,3	23,9	24,2	24,5	24,7	25,3
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		2,1 / -0,9					2,1 / -0,9				
S = 1.5H		3,9 / -1,2					3,9 / -1,2				
S = 2.0H		5,5 / -1,5					5,5 / -1,5				

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	113	110	108	106	111	108	106	104	104	102	101	100	99	98	97	96	95	93
2	108	103	99	95	105	101	97	94	98	95	92	95	92	90	92	90	88	86
3	102	96	91	87	100	94	90	86	92	88	85	89	86	83	87	84	82	81
4	97	90	84	80	96	89	84	80	87	82	79	85	81	78	83	80	77	75
5	93	84	79	74	91	84	78	74	82	77	73	80	76	73	79	75	72	71
6	88	80	74	70	87	79	73	69	77	73	69	76	72	68	75	71	68	67
7	84	75	70	65	83	75	69	65	73	69	65	72	68	65	71	67	64	63
8	81	71	66	62	79	71	65	62	70	65	61	69	64	61	68	64	61	59
9	77	68	62	58	76	67	62	58	66	62	58	66	61	58	65	61	58	56
10	74	65	59	55	73	64	59	55	63	58	55	63	58	55	62	58	55	54

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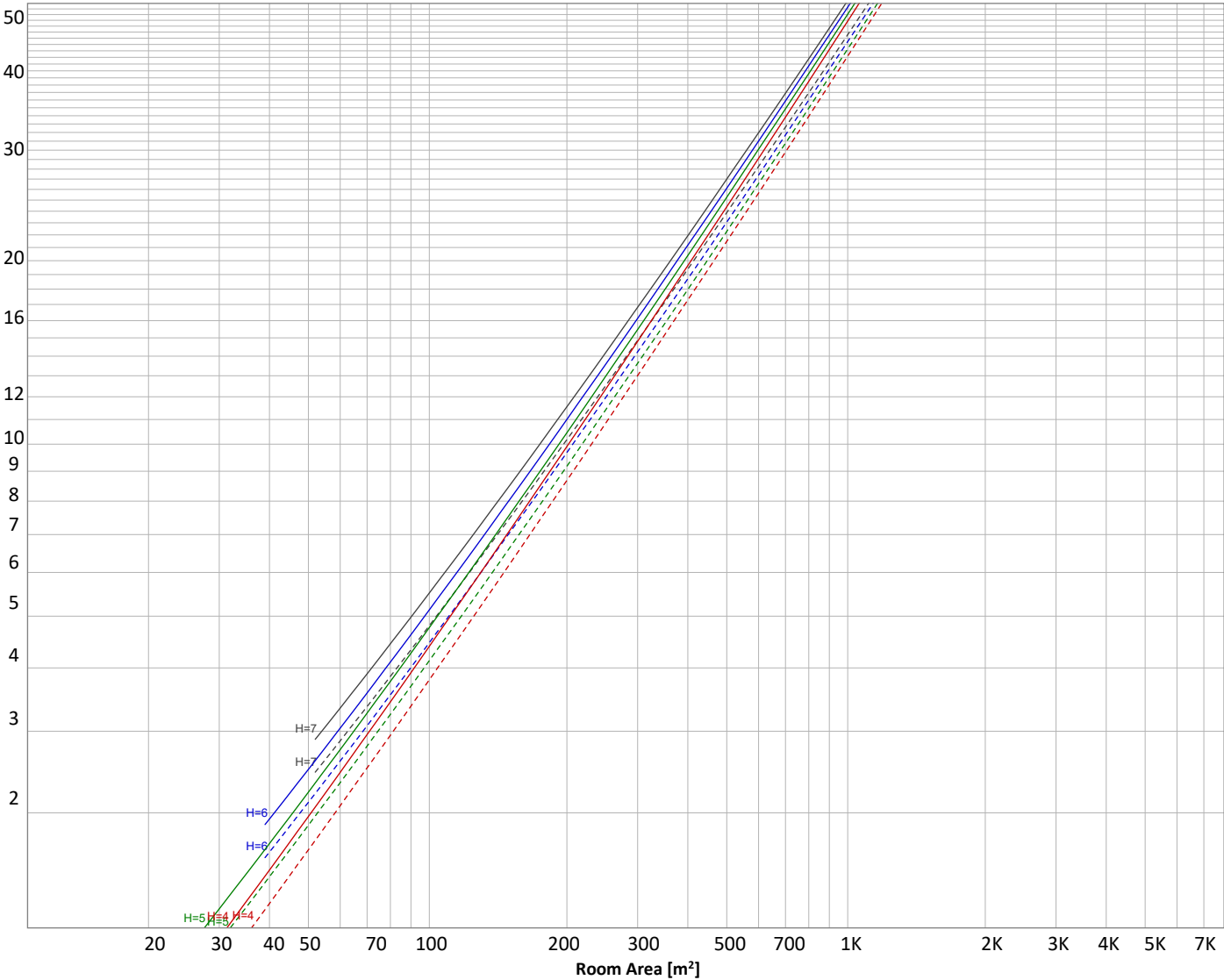
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 2330 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°
281 lm	801 lm	752 lm	244 lm	99,9 lm	67,6 lm	50,5 lm	27,2 lm	5,73 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,046 lm	0,012 lm	0,017 lm	0,014 lm	0,053 lm	0,240 lm	0,322 lm	0,258 lm	0,089 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	281 lm	12,1%
10-20°	801 lm	34,4%
20-30°	752 lm	32,3%
30-40°	244 lm	10,5%
40-50°	100 lm	4,3%
50-60°	68 lm	2,9%
60-70°	50 lm	2,2%
70-80°	27 lm	1,2%
80-90°	6 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	2330 lm	100,0%

Intensity peaks

Max intensity	3012 cd
Intensity, 90°	1 cd
Intensity, 0°	2866 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	1834 lm	78,7%
0-40°	2078 lm	89,2%
0-60°	2246 lm	96,4%
60-90°	83 lm	3,6%
70-100°	33 lm	1,4%
90-120°	0 lm	0,0%
0-90°	2329 lm	100,0%
90-180°	1 lm	0,0%
0-180°	2330 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	907 lm	38,9%
Medium(30-60°)	215 lm	9,2%
High(60-80°)	39 lm	1,7%
Very high(80-90°)	3 lm	0,1%
Back light		
Low(0-30°)	907 lm	38,9%
Medium(30-60°)	215 lm	9,2%
High(60-80°)	39 lm	1,7%
Very high(80-90°)	3 lm	0,1%

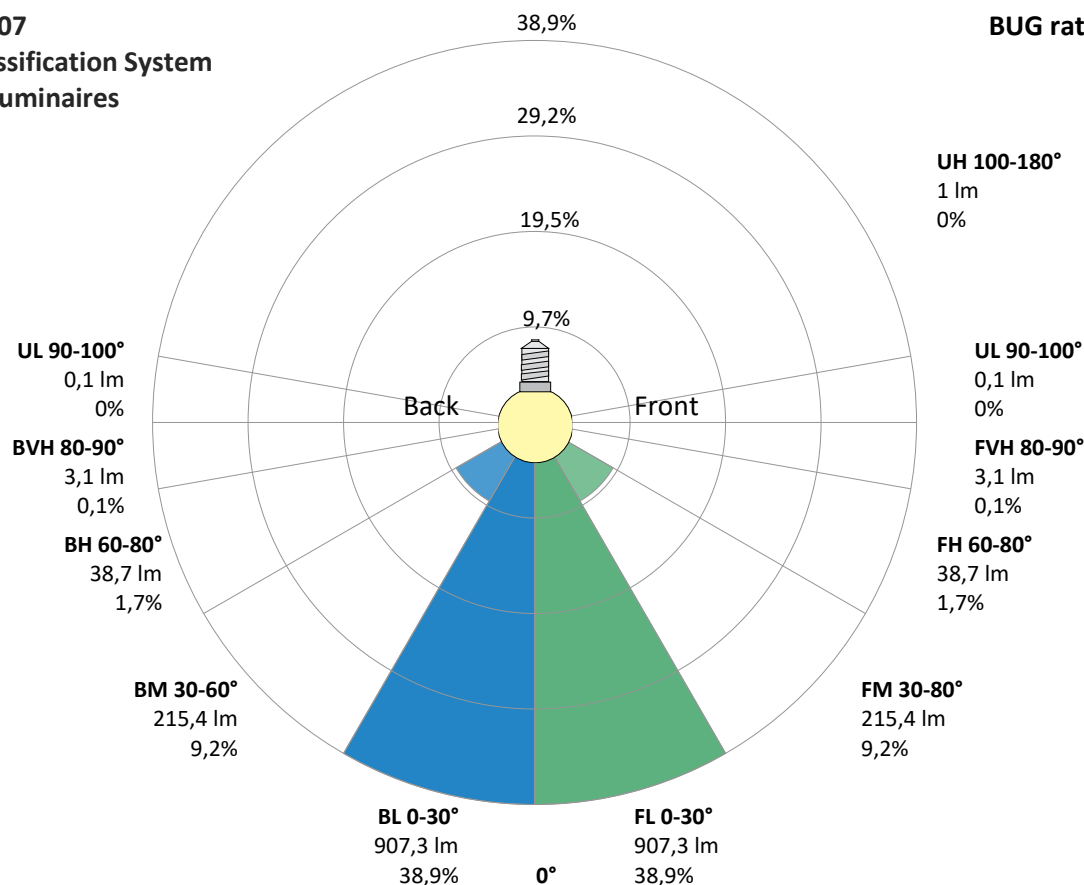
Uplight

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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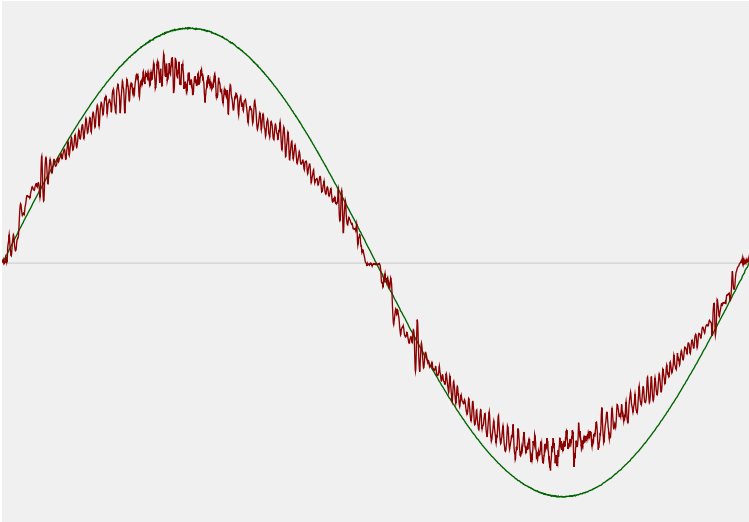


Power Details

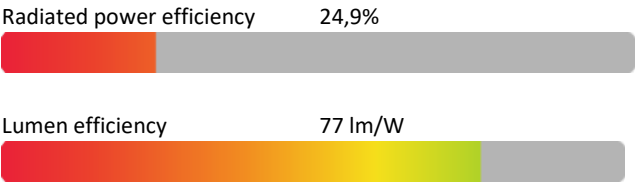
Input Power

Power feed to light source	30,3 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,132 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	30,45 VA
Displacement factor of AC power feed	1,0
Power factor of AC current feed	0,99
Total harmonic distortion of the current	5,03%
Total harmonic distortion of the voltage	0,13%

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	3969 K
CCT shift	+31 K
CCT end	4000 K

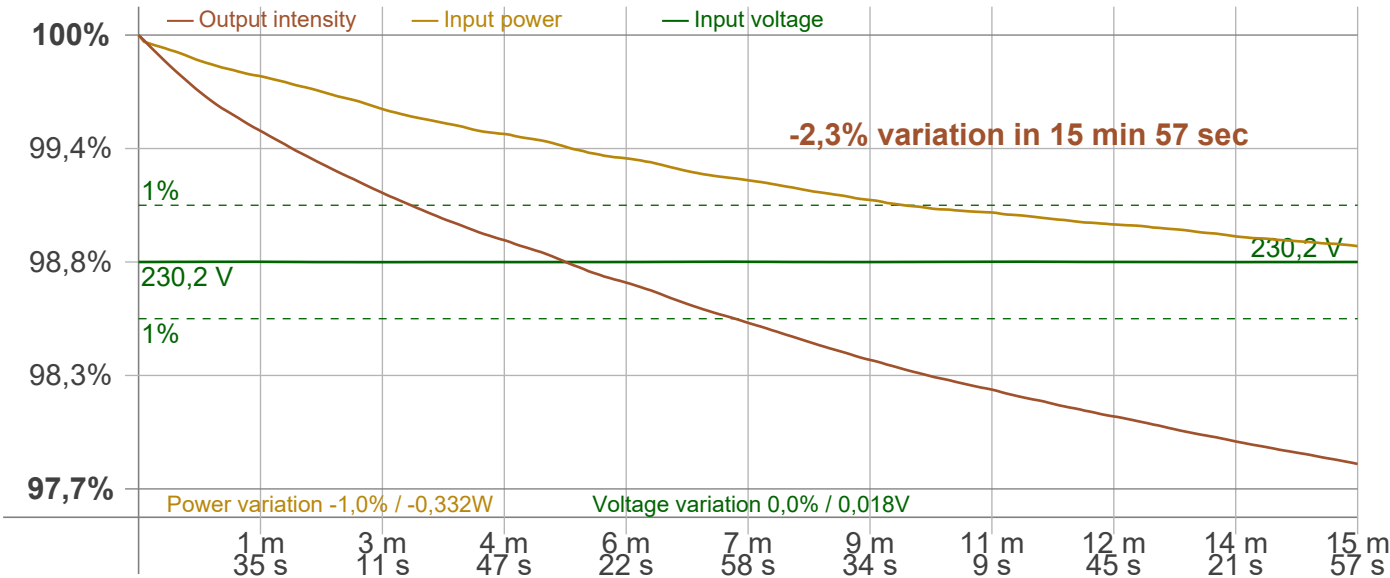
Warmup Result

Total warmup time	Lamp stabilized in 15 min 57 sec
Warmup variation	-2,3%

Output Change

Output start	2384 lm
Output change	-54 lm
Output end	2330 lm

Stabilization Curve



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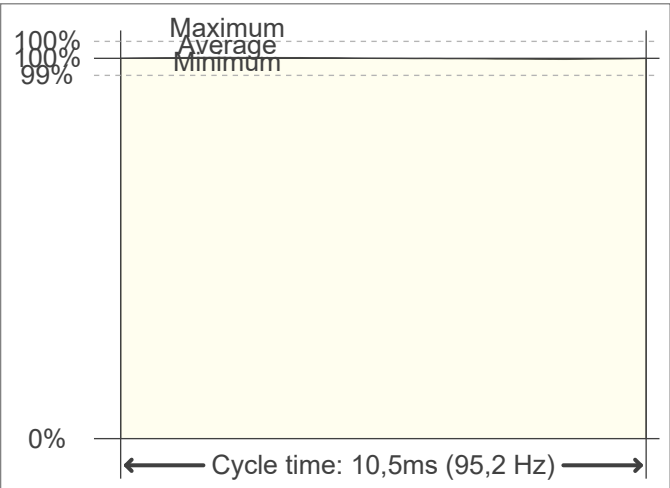
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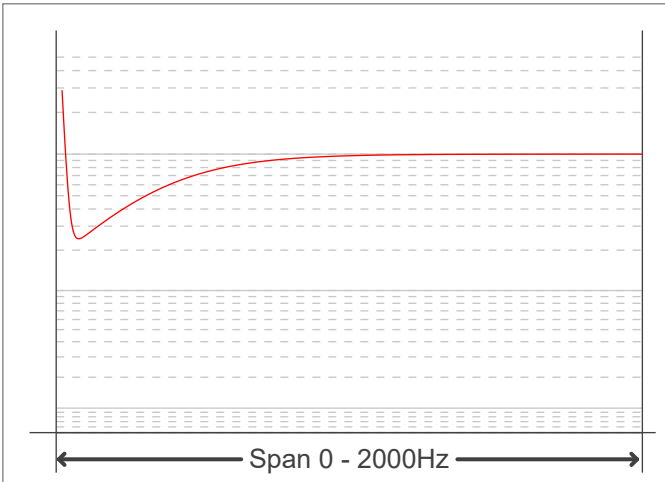
Flicker /TLA details

Flicker Meter Type	Viso Systems LabFlicker	Measurement time	
Frequency of input power	50 Hz	PstLM	180 sec
Flicker/TLA sample rate	20000 samples/s	All other indices	1,2 sec
Flicker indices according to Illuminating Engineering Society (IES)		Flicker indices according to California Energy Commission (CEC) 2016b	
Flicker frequency	95,24 Hz	JA8/10 40 Hz	0,09 %
Percent Flicker	0,36 %	JA8/10 90 Hz	0,15 %
Flicker index	0	JA8/10 200 Hz	0,32 %
		JA8/10 400 Hz	0,35 %
		JA8/10 1000 Hz	0,36 %
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)		Flicker indices according to Lighting Research Center (2015)	
PstLM value (F < 80 Hz)	0,07	Perception metric, Assist Mp	0,05
SVM value (80 < F < 2000 Hz)	0,01		

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

