

Light Measurement Report

Print date: 11-6-2025

Measurement date and time: 11-6-2025 09:29:57 – Measurement no. VFR-250611-1515-MS

Measurement tracking No. and Link: [VT250611-001797](#)

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

68 planes – 5,29°

5°

10,10 m

24,7 W – PF 0,91 – DPF 0,92

230 V – 0,118 A

50 Hz

Lamp stabilized in 15 min 1 sec – 2,0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

RL1-24-6500K

RL1-24-6500K – Dutchfulfillment

MI-LIGHT WALL WASHER 24W RGB+CCT

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

2144 lm – 1,14% / 98,86%

87 lm/W

1648 cd – 60,2°

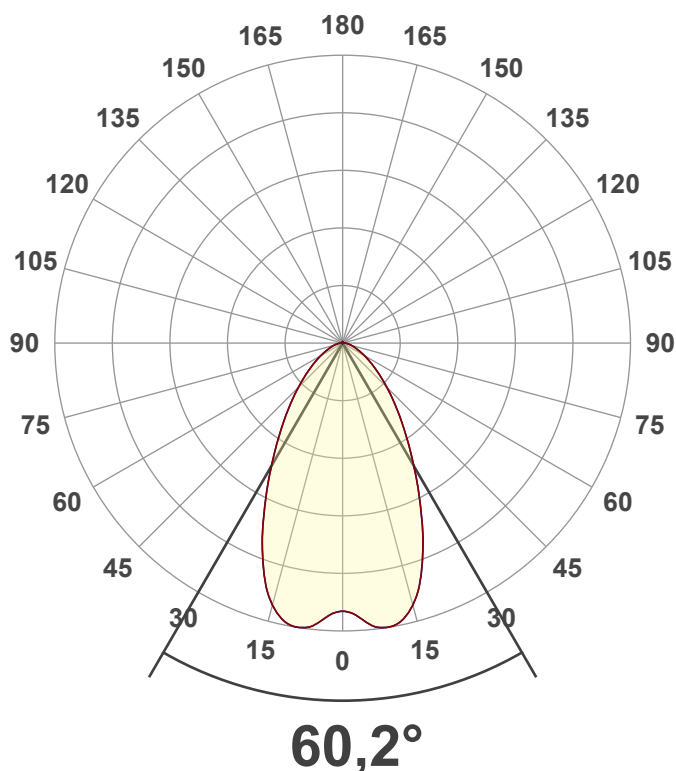
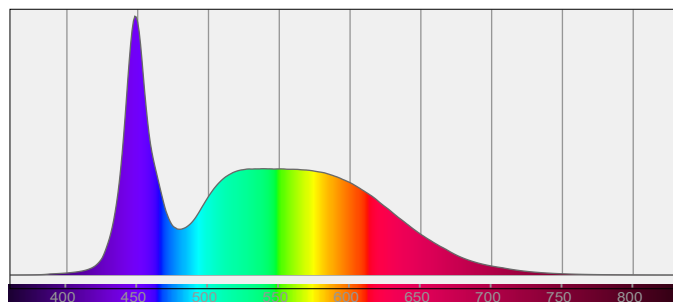
CCT = 6500 K / 6799 K

CRI 82,5

R_f 82,6 – R_g 97,0

Duv 0,0033 – SDCM 5,7

SVM 0,01 – PstLM 0,01



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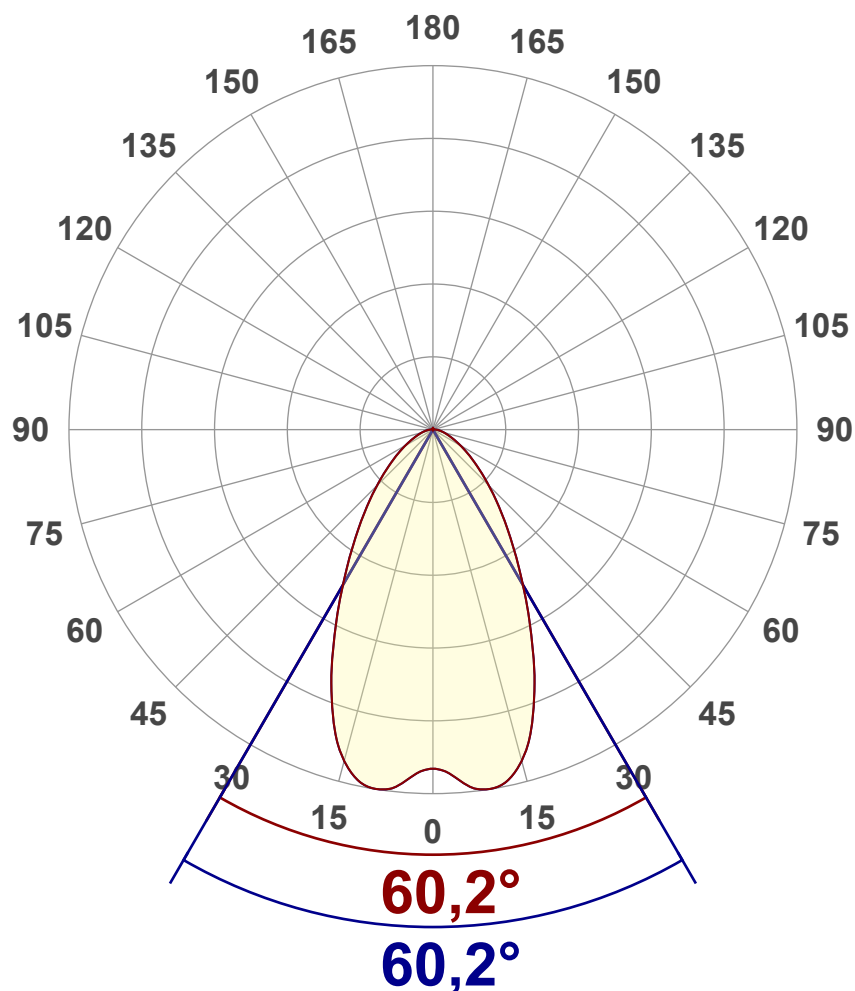
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2144 lm
Lumen Up% / Down%	1,14% / 98,86%
Peak Intensity	1648 cd
Beam Angle (50%)	60,2°
Beam Angle (90%)	60,2°
Beam Angle (10%)	60,2°

Cut-off Angle

Average 2,5%	157,1°
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Field Angle

Average 10%	116,3°
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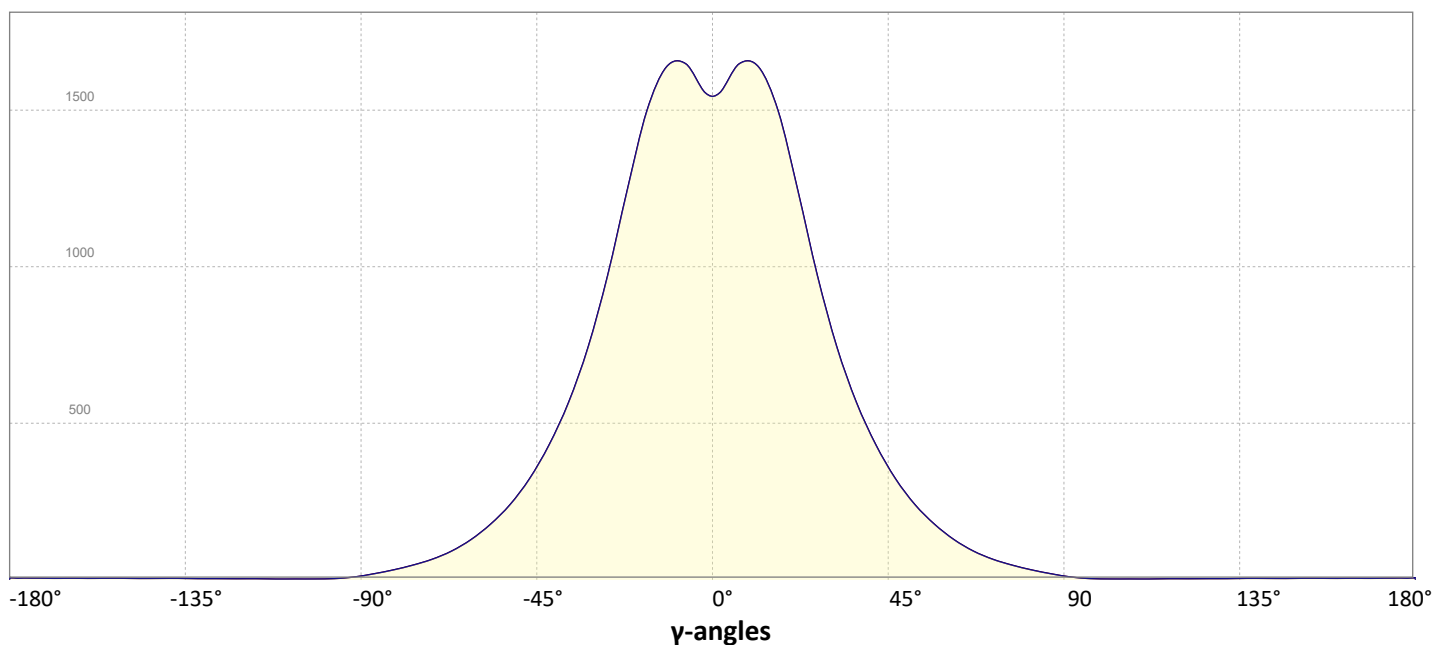
Intensity Ratio

In 120° cone	90,2%
In 90° cone	75,9%

C000-C180

C090-C270

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



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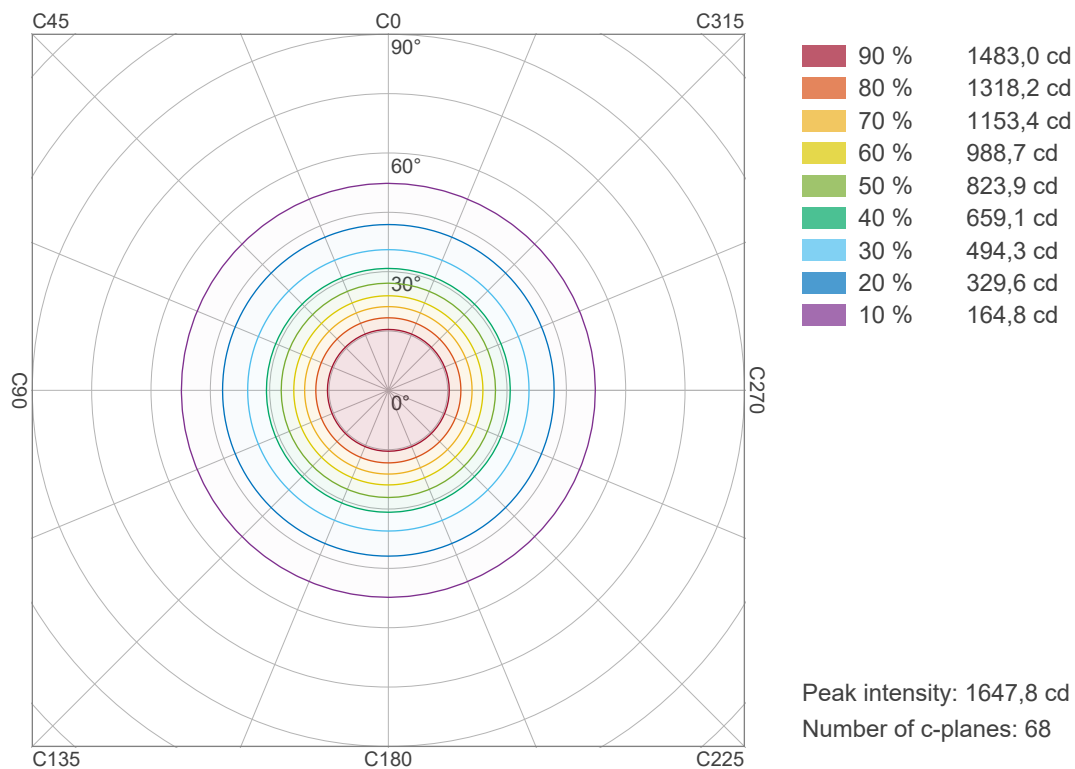
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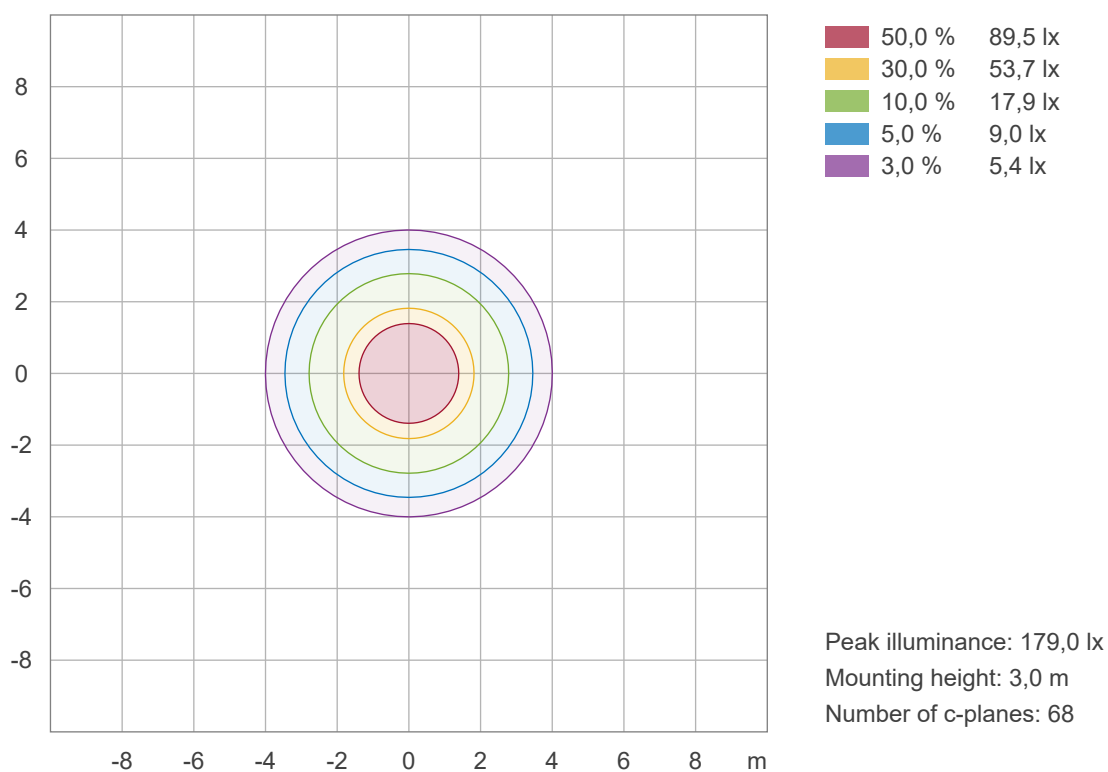
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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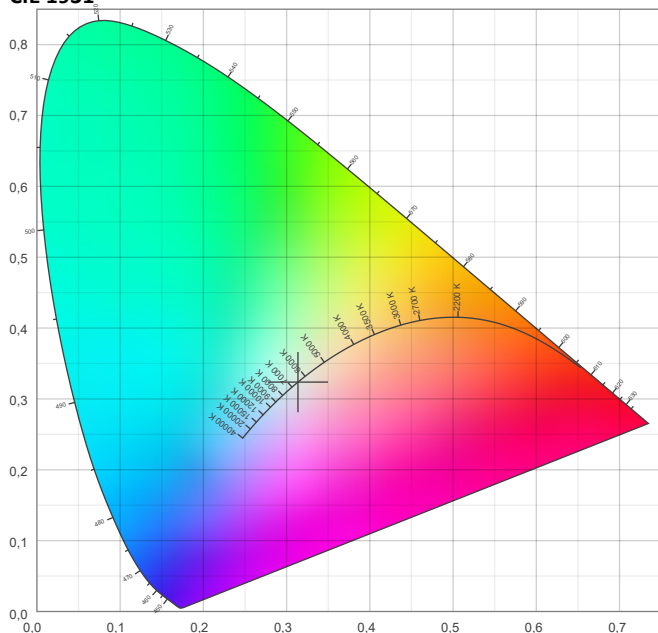


Color details

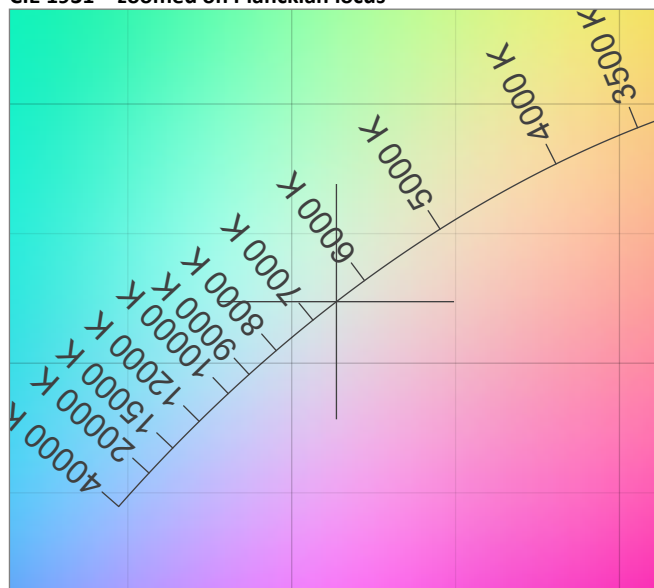
Correlated Color Temperature, Target CCT = 6500 K
Correlated Color Temperature, Measured CCT = 6799 K
Color Rendering Index CRI 82,5
Color Rendering Index, R9 (red component) R9 = 8,5
Color Rendering TM30-18 R_f 82,6 – R_g 97,0
Color Quality Scale CQS = 80,8

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0,314;0,324)
Color coordinate CIEs 1960 (u;v) = (0,200;0,310)
Color deviation from BBL Duv = 0,0033
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,200;0,466)

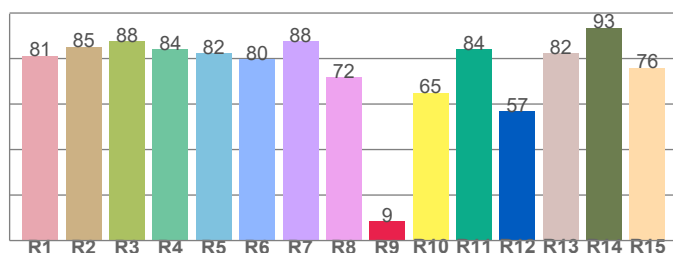
CIE 1931



CIE 1931 – zoomed on Planckian locus



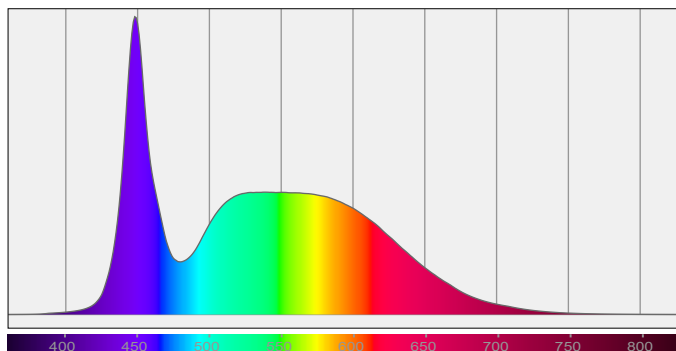
Color Rendering Index per reference color (CIE 1995)



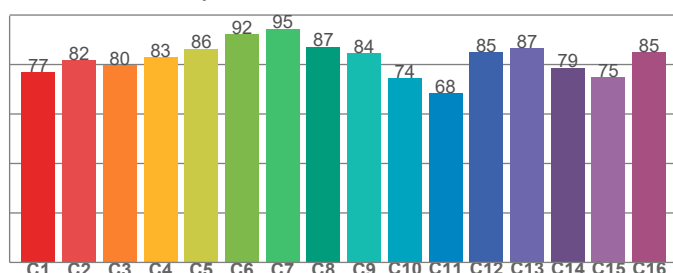
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
81,3	85,3	87,6	84,1	82,2	79,8	87,6	71,8	8,5	64,9	84,2	56,9	82,3	93,5	75,9

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



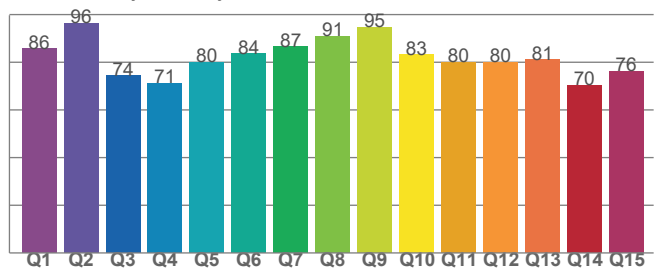
TM30-18 Rf-values per hue bin



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
76,8	81,7	79,6	82,8	86,3	92,1	94,5	87,2	84,5	74,5	68,4	85,1	86,5	78,7	74,8	84,9

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
85,6	96,4	74,3	71,3	80,0	83,6	86,5	91,0	94,6	83,2	80,1	80,1	81,0	70,3	76,3

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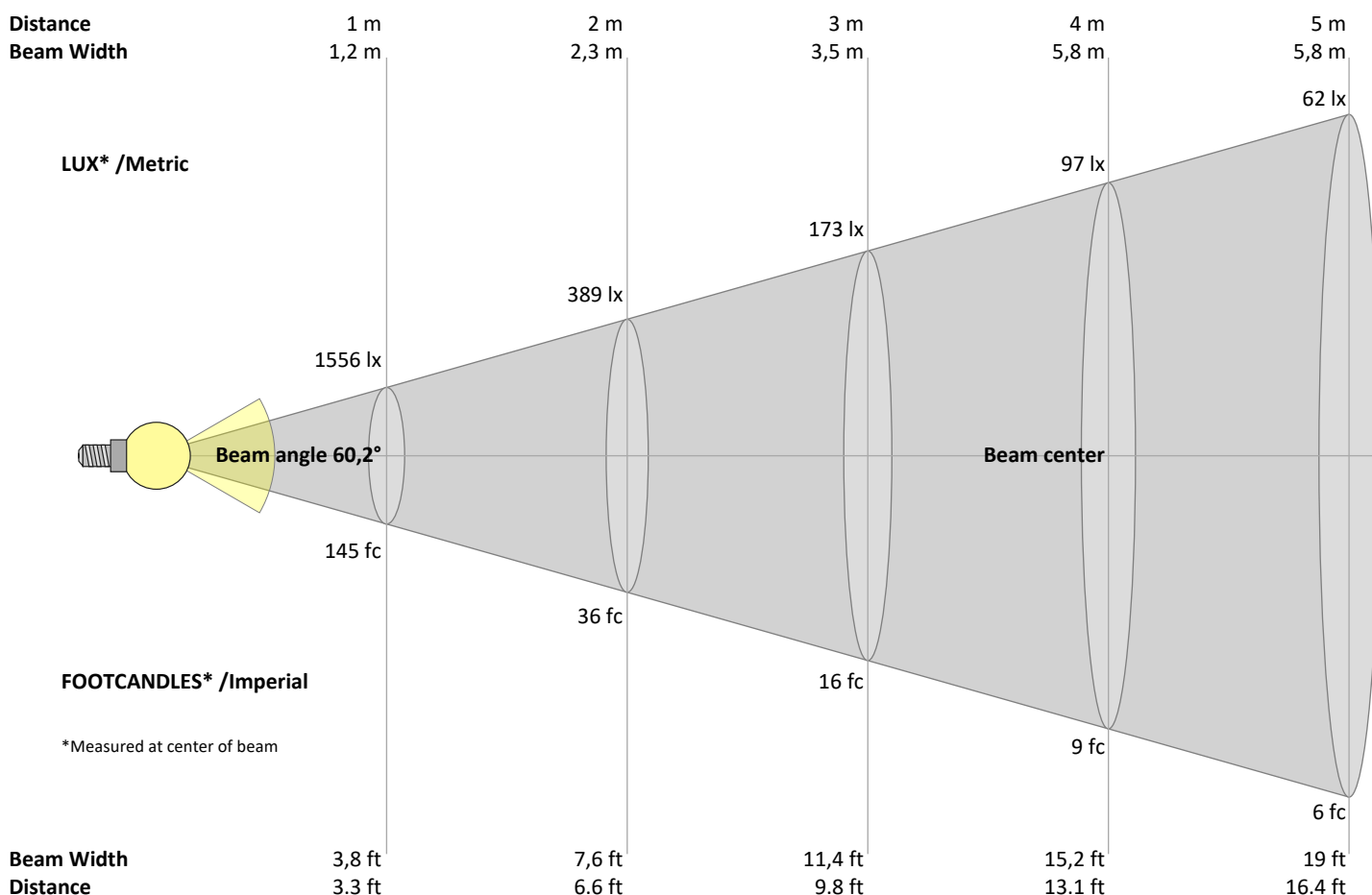
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Beam Details



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
1556	389	173	97	62	43	32	24	19	16	13	11	9	8	7	6	5	5	4	4	lux
144,5	36,1	16,1	9	5,8	4	2,9	2,3	1,8	1,4	1,2	1	0,9	0,7	0,6	0,6	0,5	0,4	0,4	0,4	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
1556	1614	1641	1548	1337	1073	828	632	481	363	271	201	146	105	75	53	37	23	12	6	cd
100%	104%	106%	100%	86%	69%	53%	41%	31%	23%	17%	13%	9%	7%	5%	3%	2%	2%	1%	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
1556	1614	1641	1548	1337	1073	828	632	481	363	271	201	146	105	75	53	37	23	12	6	cd
100%	104%	106%	100%	86%	69%	53%	41%	31%	23%	17%	13%	9%	7%	5%	3%	2%	2%	1%	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
1556	1614	1641	1548	1337	1073	828	632	481	363	271	201	146	105	75	53	37	23	12	6	cd
100%	104%	106%	100%	86%	69%	53%	41%	31%	23%	17%	13%	9%	7%	5%	3%	2%	2%	1%	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
1556	1614	1641	1548	1337	1073	828	632	481	363	271	201	146	105	75	53	37	23	12	6	cd
100%	104%	106%	100%	86%	69%	53%	41%	31%	23%	17%	13%	9%	7%	5%	3%	2%	2%	1%	0%	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	19,1	20,0	19,3	20,3	20,5	19,4	20,4	19,6	20,6	20,9
	3H	19,5	20,5	19,9	20,8	21,0	20,0	21,0	20,4	21,3	21,5
	4H	19,8	20,7	20,2	21,0	21,3	20,3	21,3	20,7	21,5	21,8
	6H	20,0	20,8	20,4	21,2	21,5	20,7	21,5	21,0	21,8	22,2
	8H	20,1	20,9	20,5	21,2	21,6	20,8	21,6	21,2	21,9	22,4
	12H	20,1	20,9	20,5	21,3	21,7	21,0	21,7	21,3	22,1	22,5
4H	2H	19,2	20,2	19,7	20,5	20,7	19,6	20,5	20,0	20,8	21,0
	3H	20,0	20,8	20,4	21,2	21,6	20,5	21,2	20,8	21,6	22,0
	4H	20,3	21,0	20,8	21,5	22,0	20,8	21,5	21,3	22,0	22,5
	6H	20,6	21,3	21,1	21,7	22,1	21,2	21,9	21,8	22,3	22,7
	8H	20,7	21,4	21,3	21,7	22,1	21,4	22,1	22,0	22,5	22,8
	12H	20,8	21,3	21,3	21,8	22,3	21,6	22,2	22,2	22,6	23,1
8H	4H	20,4	21,1	21,0	21,5	21,8	20,9	21,6	21,4	21,9	22,3
	6H	20,9	21,3	21,4	21,8	22,4	21,5	21,9	22,0	22,4	23,0
	8H	21,1	21,5	21,6	22,0	22,7	21,8	22,2	22,3	22,7	23,4
	12H	21,3	21,6	21,9	22,1	22,7	22,1	22,4	22,7	22,9	23,6
12H	4H	20,4	20,9	20,9	21,4	21,9	20,9	21,4	21,4	21,8	22,3
	6H	21,0	21,3	21,5	21,9	22,5	21,5	21,9	22,1	22,5	23,1
	8H	21,2	21,5	21,8	22,0	22,6	21,8	22,2	22,4	22,7	23,3
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		0,4 / -0,5					0,3 / -0,4				
S = 1.5H		1,1 / -1,0					0,9 / -0,8				
S = 2.0H		1,9 / -1,5					1,7 / -1,3				

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	119	119	119	119	116	116	116	116	110	110	110	106	106	106	101	101	101	99
1	111	107	104	101	108	105	102	99	101	98	96	97	95	93	93	91	90	88
2	104	97	92	87	101	95	90	86	92	88	84	88	85	82	85	83	80	78
3	97	88	82	77	94	87	81	76	84	79	75	81	77	73	79	75	72	70
4	90	81	74	68	88	79	73	68	77	71	67	75	70	66	73	69	65	63
5	85	74	67	62	83	73	66	61	71	65	61	69	64	60	67	63	59	57
6	79	69	61	56	78	68	61	56	66	60	55	64	59	55	63	58	54	52
7	75	64	56	51	73	63	56	51	61	55	51	60	54	50	59	54	50	48
8	70	59	52	47	69	58	52	47	57	51	47	56	50	46	55	50	46	44
9	67	55	48	44	65	55	48	43	54	47	43	52	47	43	51	46	43	41
10	63	52	45	41	62	51	45	40	50	44	40	49	44	40	49	44	40	38

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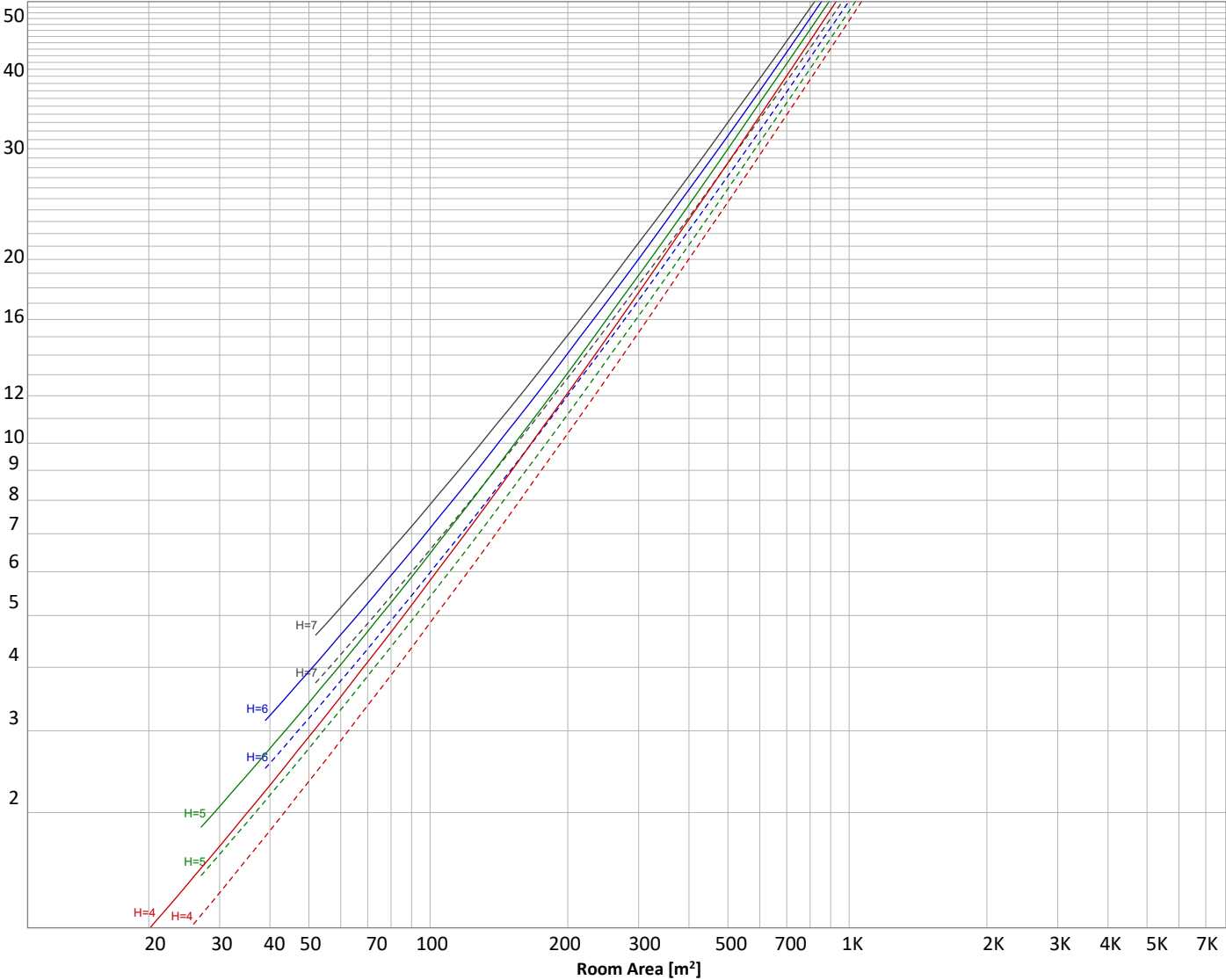
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 2144 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°
156 lm	432 lm	491 lm	395 lm	280 lm	180 lm	104 lm	56,5 lm	25,6 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
6,30 lm	2,54 lm	2,77 lm	2,98 lm	3,15 lm	2,69 lm	2,15 lm	1,31 lm	0,472 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	156 lm	7,3%
10-20°	432 lm	20,2%
20-30°	491 lm	22,9%
30-40°	395 lm	18,4%
40-50°	280 lm	13,1%
50-60°	180 lm	8,4%
60-70°	104 lm	4,9%
70-80°	57 lm	2,6%
80-90°	26 lm	1,2%
90-100°	6 lm	0,3%
100-110°	3 lm	0,1%
110-120°	3 lm	0,1%
120-130°	3 lm	0,1%
130-140°	3 lm	0,1%
140-150°	3 lm	0,1%
150-160°	2 lm	0,1%
160-170°	1 lm	0,1%
170-180°	0 lm	0,0%
Total	2144 lm	100,0%

Intensity peaks

Max intensity	1648 cd
Intensity, 90°	12 cd
Intensity, 0°	1556 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	1079 lm	50,3%
0-40°	1473 lm	68,7%
0-60°	1933 lm	90,2%
60-90°	187 lm	8,7%
70-100°	88 lm	4,1%
90-120°	12 lm	0,5%
0-90°	2120 lm	98,9%
90-180°	24 lm	1,1%
0-180°	2144 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	537 lm	25,1%
Medium(30-60°)	429 lm	20,0%
High(60-80°)	81 lm	3,8%
Very high(80-90°)	13 lm	0,6%
Back light		
Low(0-30°)	537 lm	25,1%
Medium(30-60°)	429 lm	20,0%
High(60-80°)	81 lm	3,8%
Very high(80-90°)	13 lm	0,6%

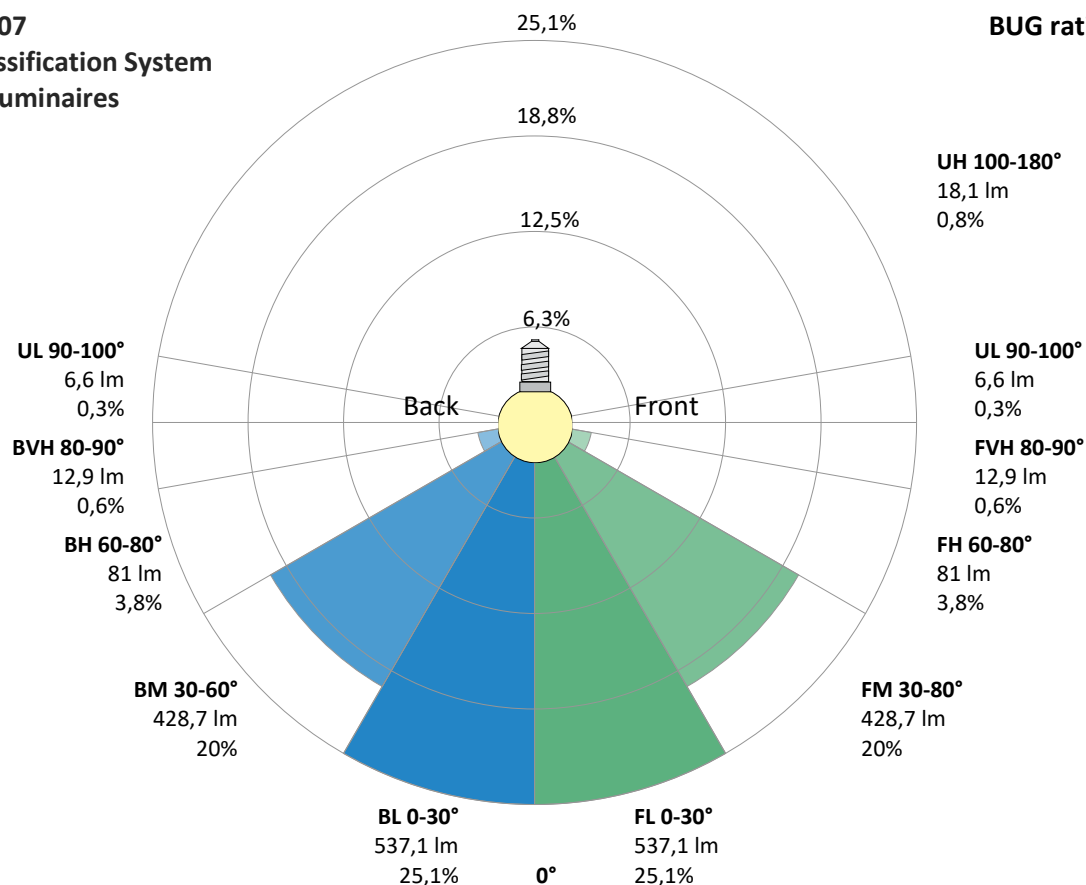
Uplight

Low(90-100°)	7 lm	0,3%
High(100-180°)	18 lm	0,8%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B2 U2 G1



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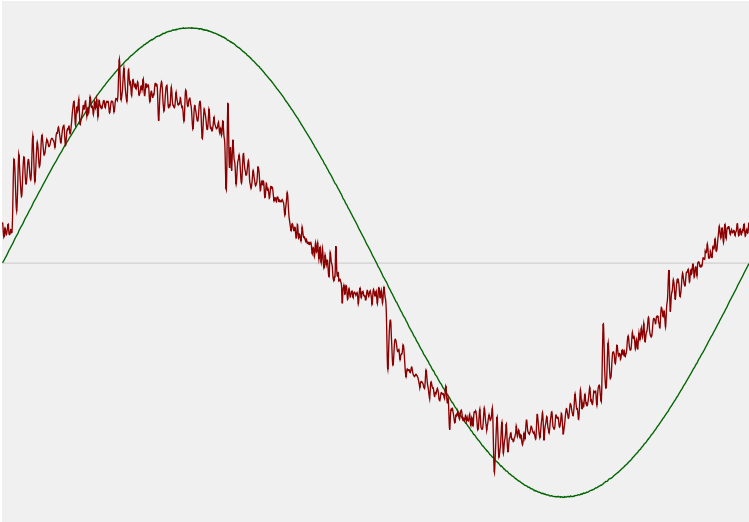


Power Details

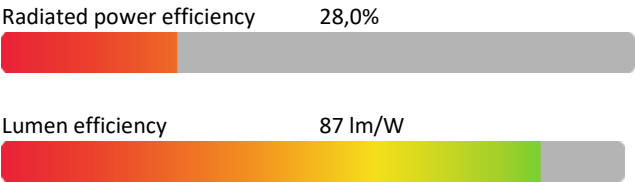
Input Power

Power feed to light source	24,7 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,118 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	27,08 VA
Displacement factor of AC power feed	0,92
Power factor of AC current feed	0,91
Total harmonic distortion of the current	8,72%
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	6492 K
CCT shift	+8 K
CCT end	6500 K

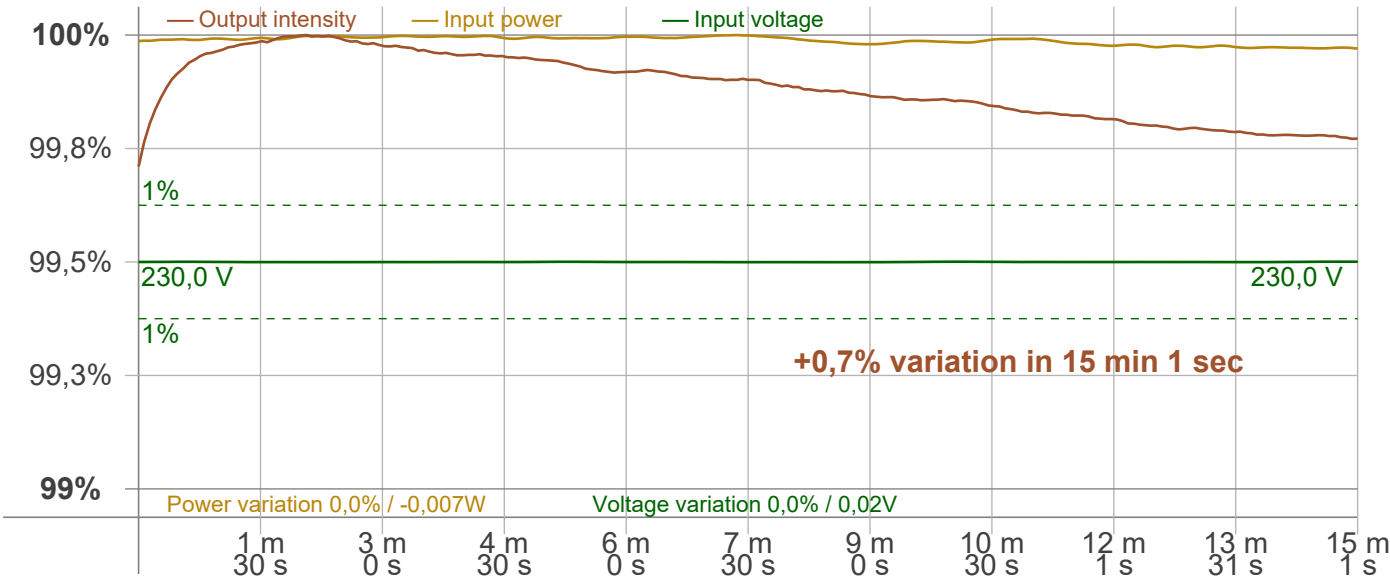
Warmup Result

Total warmup time	Lamp stabilized in 15 min 1 sec
Warmup variation	+0,7%

Output Change

Output start	2139 lm
Output change	+5 lm
Output end	2144 lm

Stabilization Curve



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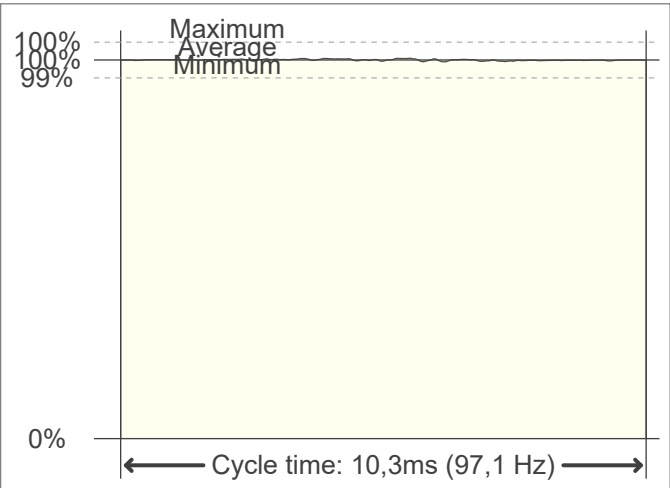
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Flicker /TLA details

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	97,09 Hz	JA8/10 40 Hz	0,01 %
Percent Flicker	0,72 %	JA8/10 90 Hz	0,02 %
Flicker index	0	JA8/10 200 Hz	0,2 %
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)		JA8/10 400 Hz	0,3 %
PstLM value (F < 80 Hz)	0,01	JA8/10 1000 Hz	0,48 %
SVM value (80 < F < 2000 Hz)	0,01	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

