

Light Measurement Report

Print date: 8-5-2025

Measurement date and time: 8-5-2025 15:54:25 – Measurement no. VFR-250508-1166-MS

Measurement tracking No. and Link: [VT250508-005320](#)

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

72 planes – 5°

5°

2,00 m

23,4 W – PF 0,91 – DPF 0,93

230 V – 0,111 A

50 Hz

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

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

806767-4000K-20W

806767-4000K-20W – Dutchfulfillment

3-FASE RAILSPOT | ZOOMABLE | WATT SWITCH | CCT-SWITCH | WIT

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

1375 lm – 0,04% / 99,96%

59 lm/W

5384 cd – 27,7°

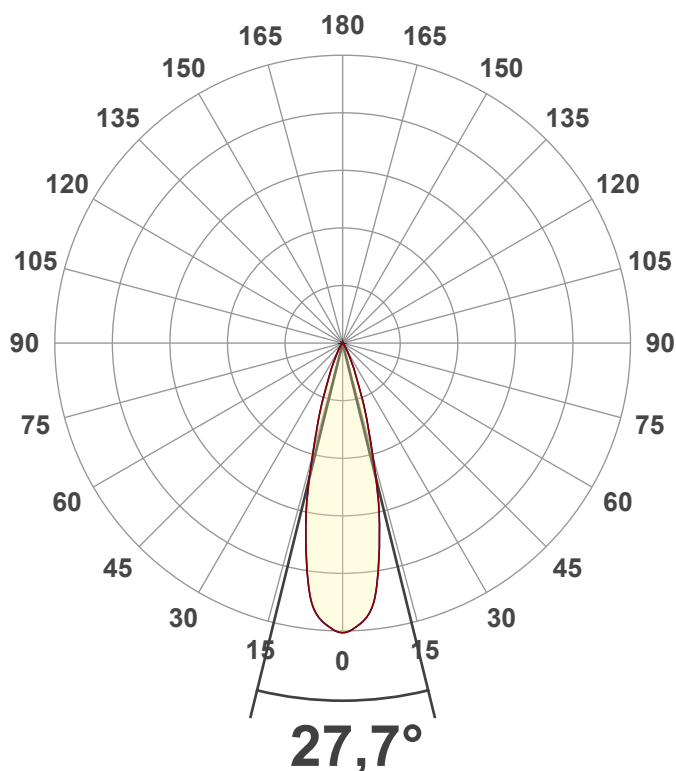
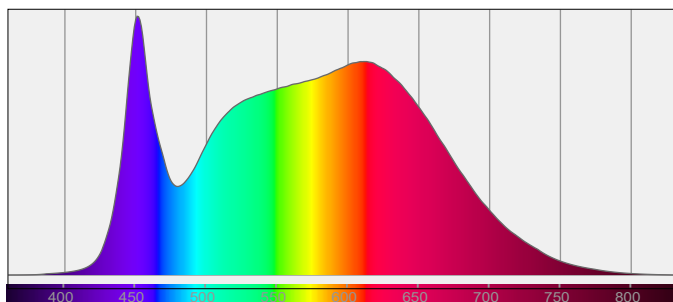
CCT = 4000 K / 4206 K

CRI 93,4

R_f 91,0 – R_g 99,7

Duv -0,0012 – SDCM 4,6

SVM 0 – PstLM 0,03



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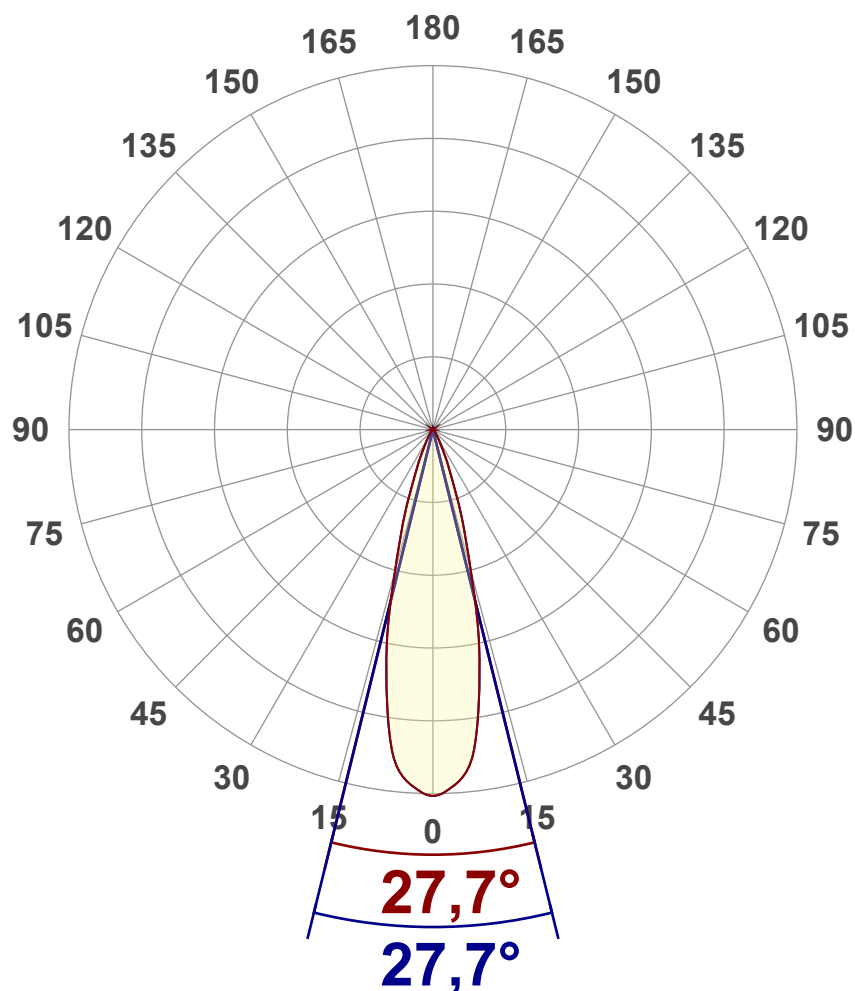
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1375 lm
Lumen Up% / Down%	0,04% / 99,96%
Peak Intensity	5384 cd
Beam Angle (50%)	27,7°
Beam Angle (90%)	27,7°
Beam Angle (10%)	27,7°

Cut-off Angle

Average 2,5%	63,2°
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Field Angle

Average 10%	47,4°
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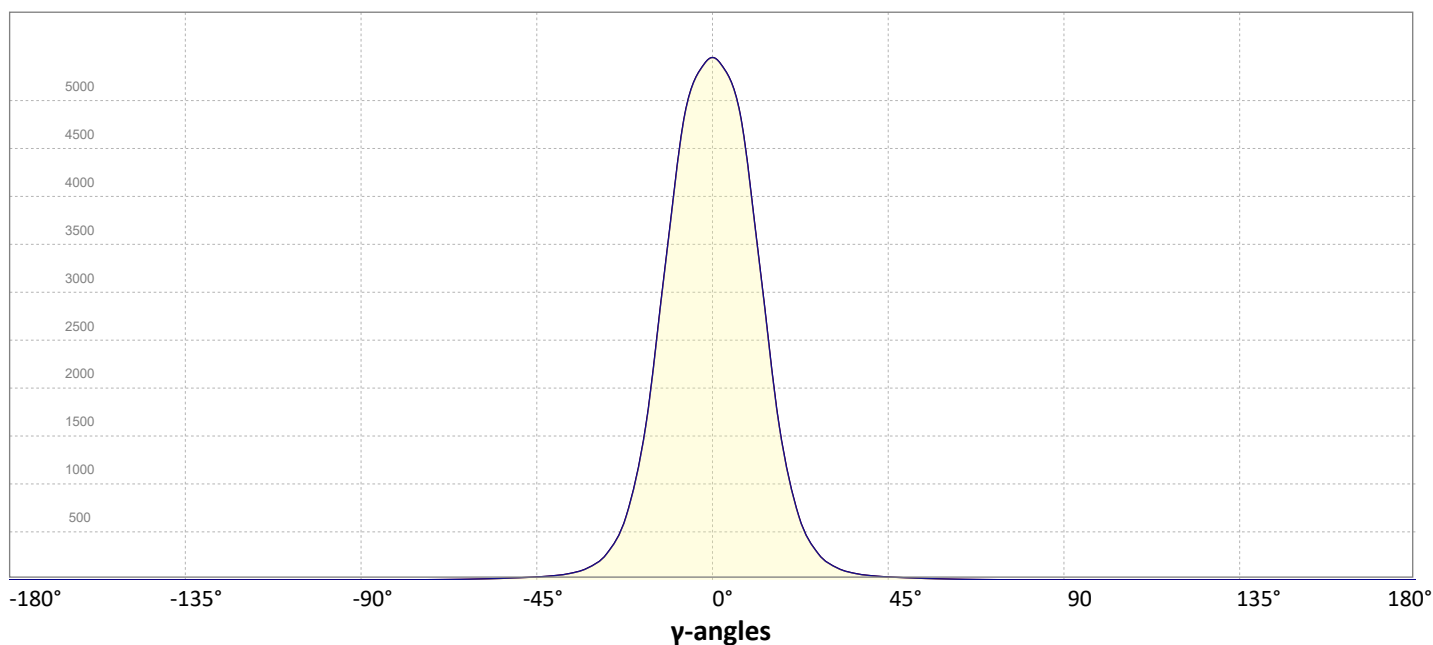
Intensity Ratio

In 120° cone	99,6%
In 90° cone	98,0%

C000-C180

C090-C270

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

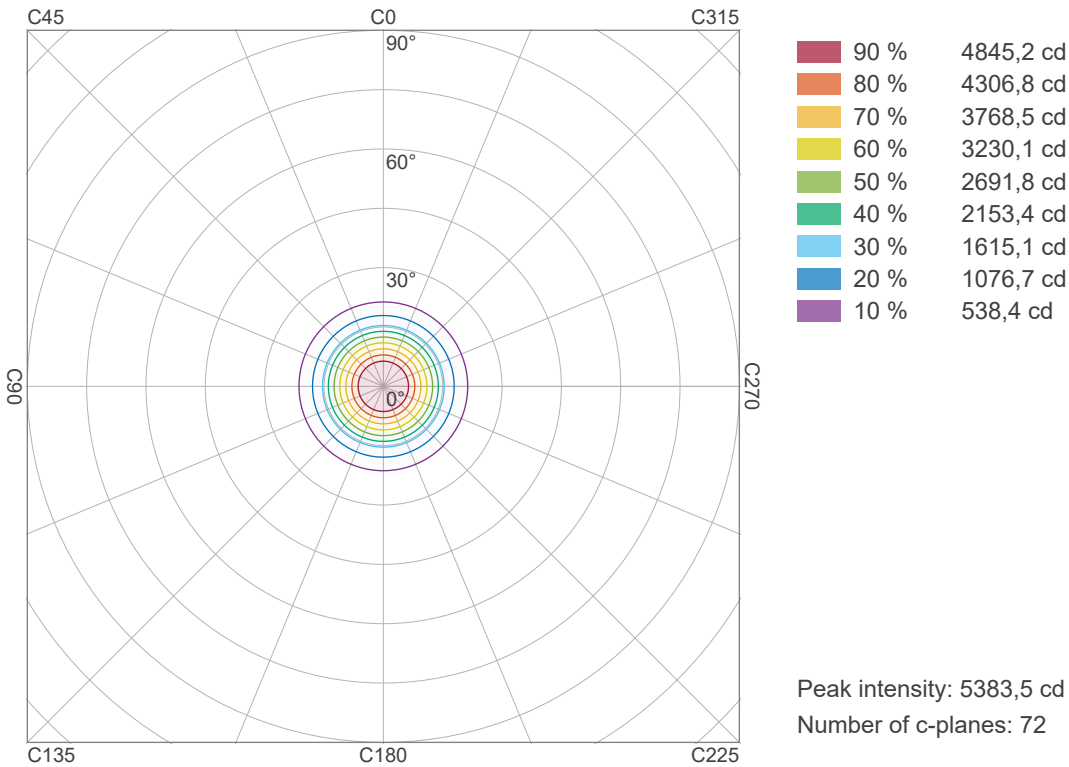


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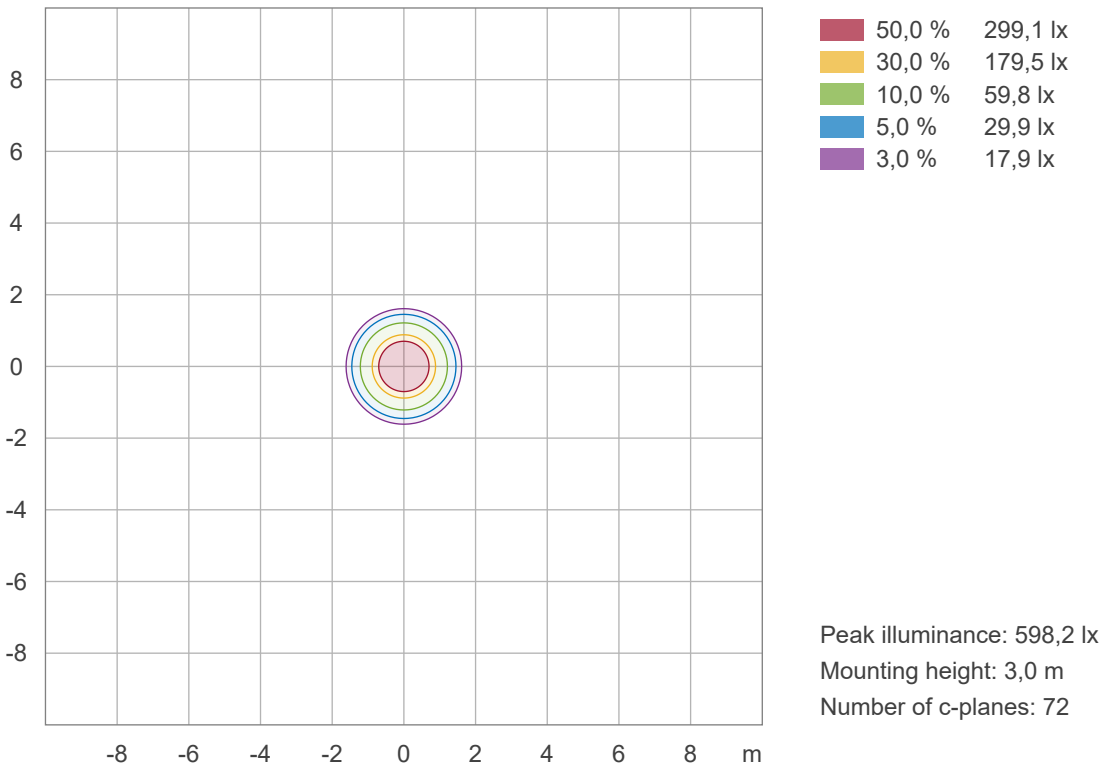
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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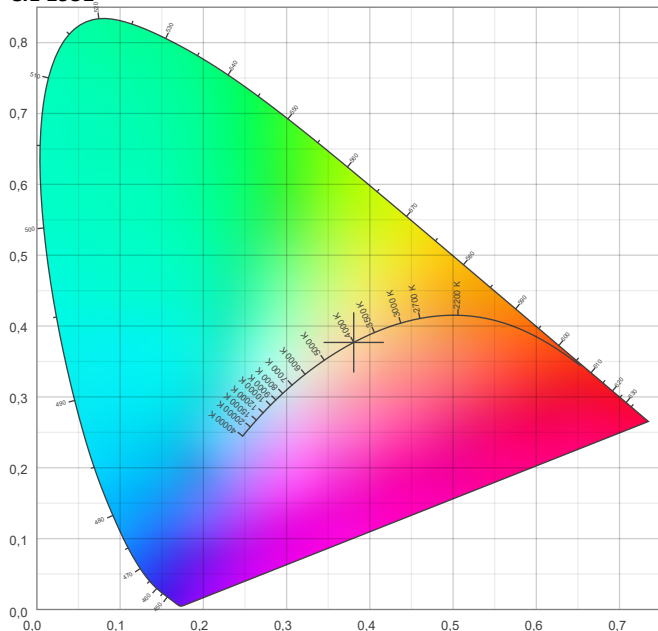


Color details

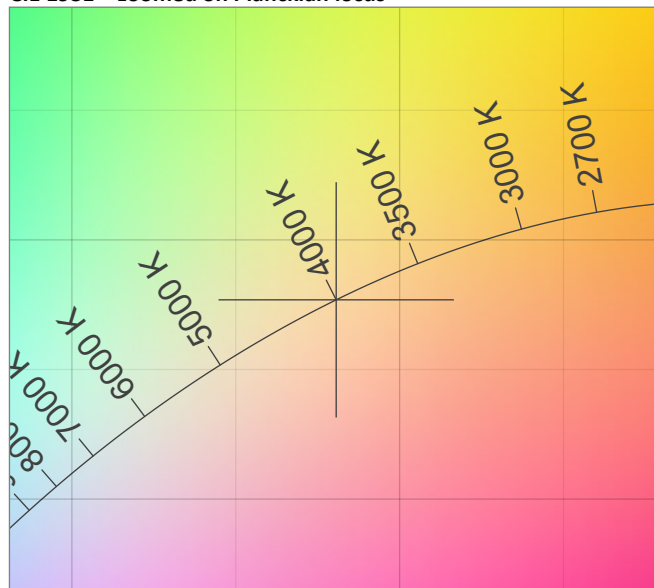
Correlated Color Temperature, Target CCT = 4000 K
Correlated Color Temperature, Measured CCT = 4206 K
Color Rendering Index CRI 93,4
Color Rendering Index, R9 (red component) R9 = 67,7
Color Rendering TM30-18 R_f 91,0 – R_g 99,7
Color Quality Scale CQS = 91,6

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 = -0,0012
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,225;0,502)

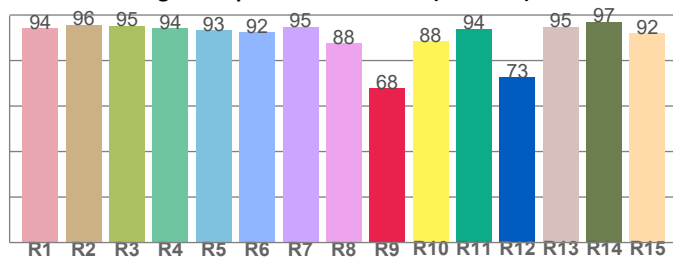
CIE 1931



CIE 1931 – zoomed on Planckian locus



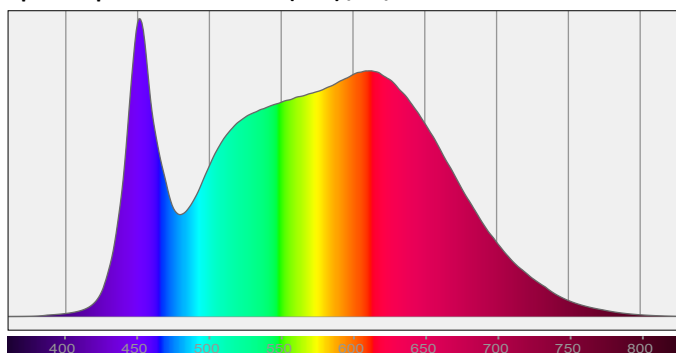
Color Rendering Index per reference color (CIE 1995)



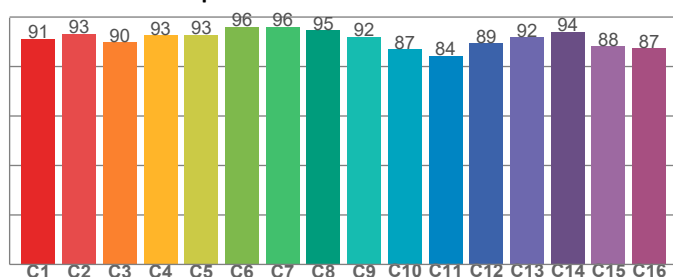
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
94,2	95,7	95,2	94,1	93,2	92,4	94,8	87,7	67,7	88,4	94,0	72,8	94,9	97,0	92,0

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



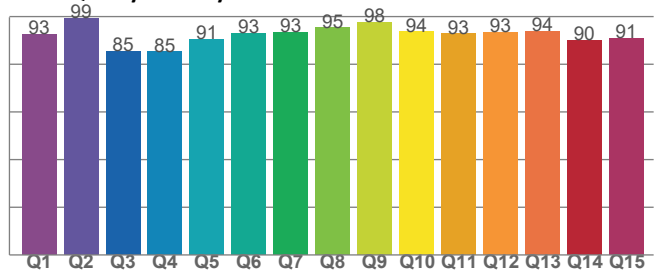
TM30-18 R_f-values per hue bin



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
91,3	93,3	89,8	92,7	92,9	96,1	96,1	94,7	92,0	86,9	84,3	89,4	91,8	94,0	88,2	87,3

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
92,5	99,2	85,4	85,2	90,6	93,1	93,4	95,4	97,7	93,6	92,9	93,3	93,9	90,1	91,0

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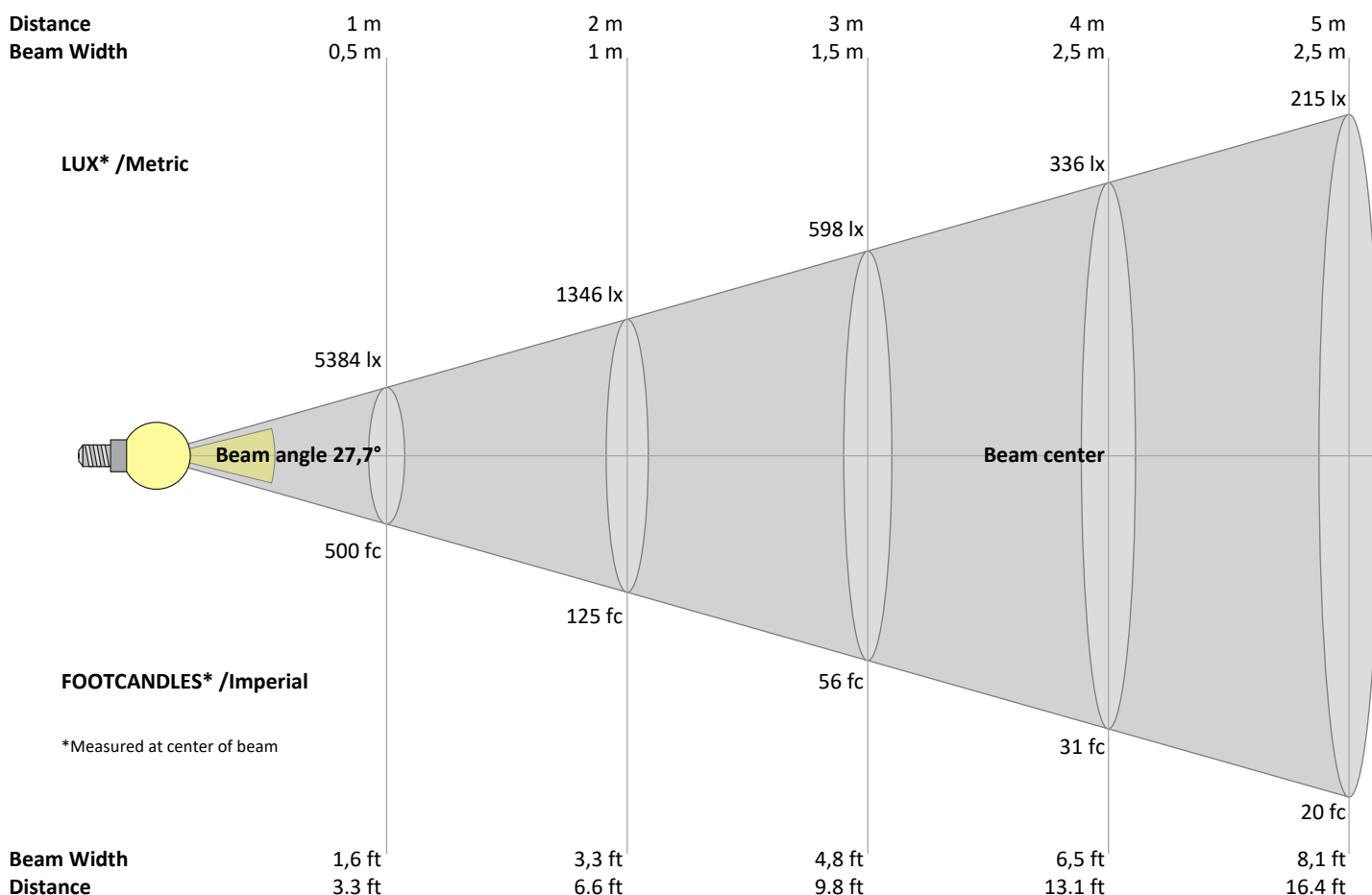
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Beam Details



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
5384	1346	598	336	215	150	110	84	66	54	44	37	32	27	24	21	19	17	15	13	lux
500,1	125	55,6	31,3	20	13,9	10,2	7,8	6,2	5	4,1	3,5	3	2,6	2,2	2	1,7	1,5	1,4	1,3	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
5384	5384	5182	4972	4570	3939	3308	2639	1969	1434	1057	681	515	357	244	183	123	98	74	57	cd
100%	100%	96%	92%	85%	73%	61%	49%	37%	27%	20%	13%	10%	7%	5%	3%	2%	2%	1%	1%	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
5384	5384	5182	4972	4570	3939	3308	2639	1969	1434	1057	681	515	357	244	183	123	98	74	57	cd
100%	100%	96%	92%	85%	73%	61%	49%	37%	27%	20%	13%	10%	7%	5%	3%	2%	2%	1%	1%	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
5384	5384	5182	4972	4570	3939	3308	2639	1969	1434	1057	681	515	357	244	183	123	98	74	57	cd
100%	100%	96%	92%	85%	73%	61%	49%	37%	27%	20%	13%	10%	7%	5%	3%	2%	2%	1%	1%	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
5384	5384	5182	4972	4570	3939	3308	2639	1969	1434	1057	681	515	357	244	183	123	98	74	57	cd
100%	100%	96%	92%	85%	73%	61%	49%	37%	27%	20%	13%	10%	7%	5%	3%	2%	2%	1%	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		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	14,5	14,9	14,5	15,1	15,3	14,5	14,9	14,5	15,1	15,3
	3H	14,3	14,9	14,6	15,1	15,2	14,3	14,9	14,6	15,1	15,2
	4H	14,2	14,8	14,6	15,0	15,2	14,2	14,8	14,6	15,0	15,2
	6H	14,2	14,7	14,5	15,0	15,3	14,2	14,7	14,5	15,0	15,3
	8H	14,2	14,6	14,5	14,9	15,3	14,2	14,6	14,5	14,9	15,3
	12H	14,1	14,6	14,5	14,9	15,3	14,1	14,6	14,5	14,9	15,3
4H	2H	14,2	14,8	14,6	15,0	15,3	14,2	14,8	14,6	15,0	15,3
	3H	14,3	14,7	14,6	15,1	15,5	14,3	14,7	14,6	15,1	15,5
	4H	14,2	14,6	14,6	15,0	15,5	14,2	14,6	14,6	15,0	15,5
	6H	14,1	14,6	14,6	14,9	15,2	14,1	14,6	14,6	14,9	15,2
	8H	14,0	14,5	14,5	14,8	15,2	14,0	14,5	14,5	14,8	15,2
	12H	14,0	14,3	14,5	14,7	15,1	14,0	14,3	14,5	14,7	15,1
8H	4H	14,0	14,5	14,5	14,8	15,2	14,0	14,5	14,5	14,8	15,2
	6H	14,0	14,2	14,5	14,7	15,2	14,0	14,2	14,5	14,7	15,2
	8H	14,0	14,2	14,5	14,7	15,3	14,0	14,2	14,5	14,7	15,3
	12H	13,9	14,1	14,5	14,6	15,2	13,9	14,1	14,5	14,6	15,2
12H	4H	14,0	14,3	14,5	14,7	15,2	14,0	14,3	14,5	14,7	15,2
	6H	14,0	14,2	14,5	14,7	15,3	14,0	14,2	14,5	14,7	15,3
	8H	13,9	14,1	14,5	14,6	15,2	13,9	14,1	14,5	14,6	15,2
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		3,9 / -3,5					3,9 / -3,5				
S = 1.5H		6,3 / -5,9					6,3 / -5,9				
S = 2.0H		8,1 / -8,4					8,1 / -8,4				

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	115	113	111	109	112	111	109	107	107	105	104	103	102	101	100	99	98	96
2	111	107	104	102	109	106	103	100	102	100	98	100	98	96	97	95	94	93
3	107	102	99	96	105	101	98	95	99	96	94	96	94	92	94	92	91	89
4	104	98	94	91	102	97	93	91	95	92	90	93	91	89	92	89	88	86
5	101	95	90	87	99	94	90	87	92	89	86	91	88	85	89	87	85	84
6	98	91	87	84	96	90	86	84	89	86	83	88	85	82	87	84	82	81
7	95	88	84	81	94	88	83	81	86	83	80	85	82	80	84	82	79	78
8	92	85	81	78	91	85	81	78	84	80	78	83	80	77	82	79	77	76
9	90	83	79	76	89	82	78	76	81	78	75	81	77	75	80	77	75	74
10	87	80	76	73	86	80	76	73	79	76	73	79	75	73	78	75	73	72

Light Measurement Report

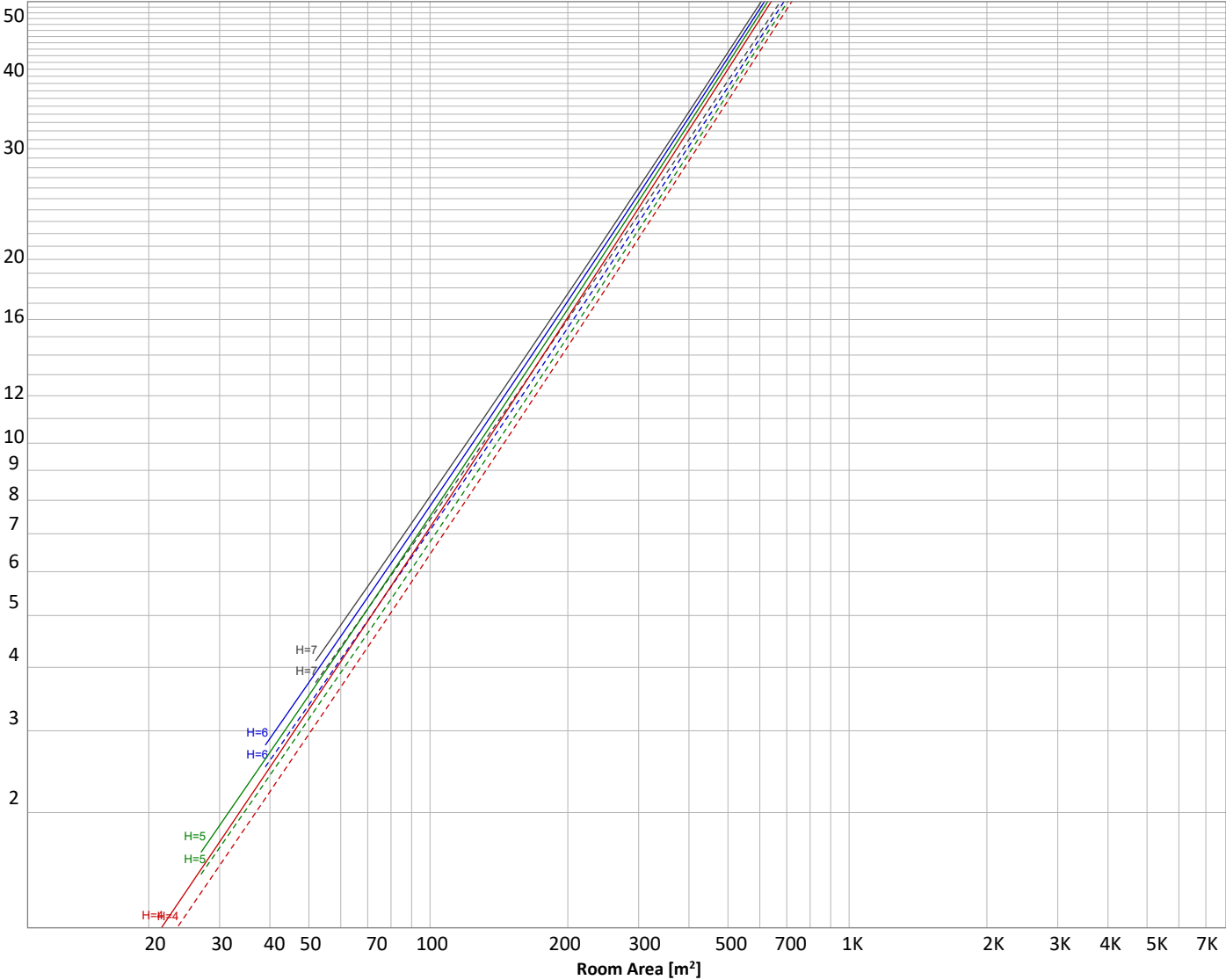
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 1375 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°
462 lm	620 lm	197 lm	53,8 lm	23,4 lm	11,9 lm	4,48 lm	0,896 lm	0,021 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,001 lm	0,001 lm	0,003 lm	0,010 lm	0,003 lm	0,028 lm	0,209 lm	0,261 lm	0,078 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	462 lm	33,6%
10-20°	620 lm	45,1%
20-30°	197 lm	14,4%
30-40°	54 lm	3,9%
40-50°	23 lm	1,7%
50-60°	12 lm	0,9%
60-70°	4 lm	0,3%
70-80°	1 lm	0,1%
80-90°	0 lm	0,0%
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	1375 lm	100,0%

Intensity peaks

Max intensity	5384 cd
Intensity, 90°	0 cd
Intensity, 0°	5384 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	1279 lm	93,1%
0-40°	1333 lm	97,0%
0-60°	1369 lm	99,6%
60-90°	5 lm	0,4%
70-100°	1 lm	0,1%
90-120°	0 lm	0,0%
0-90°	1374 lm	100,0%
90-180°	1 lm	0,0%
0-180°	1375 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	638 lm	46,4%
Medium(30-60°)	46 lm	3,4%
High(60-80°)	3 lm	0,2%
Very high(80-90°)	0 lm	0,0%
Back light		
Low(0-30°)	638 lm	46,4%
Medium(30-60°)	46 lm	3,4%
High(60-80°)	3 lm	0,2%
Very high(80-90°)	0 lm	0,0%

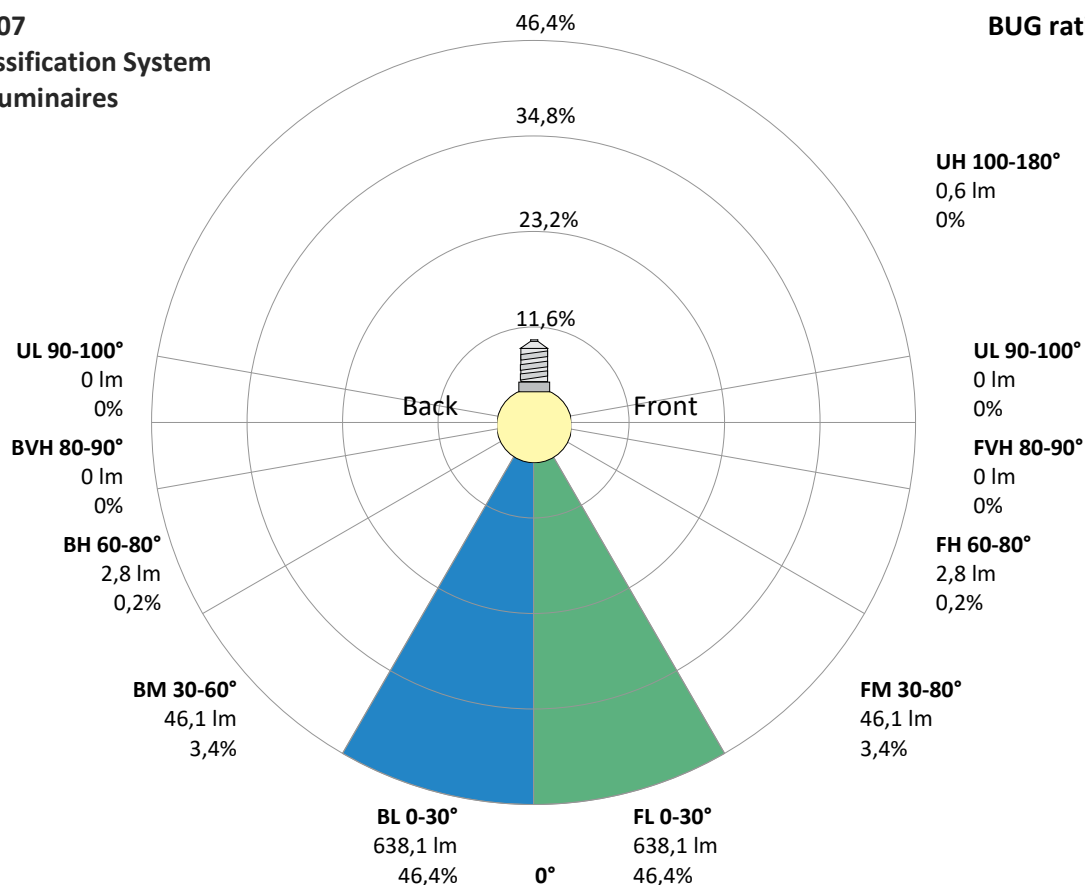
Uplight

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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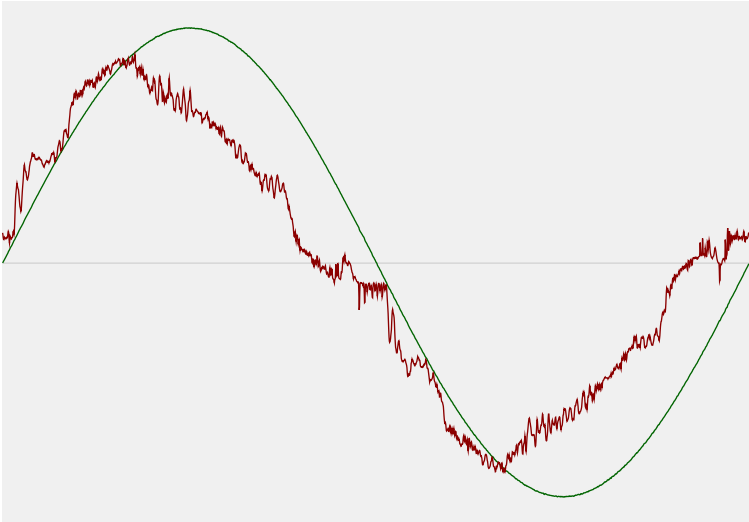


Power Details

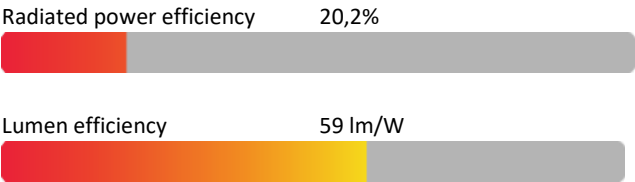
Input Power

Power feed to light source	23,4 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,111 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	25,59 VA
Displacement factor of AC power feed	0,93
Power factor of AC current feed	0,91
Total harmonic distortion of the current	15,17%
Total harmonic distortion of the voltage	0,07%

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	4000 K
CCT shift	+0 K
CCT end	4000 K

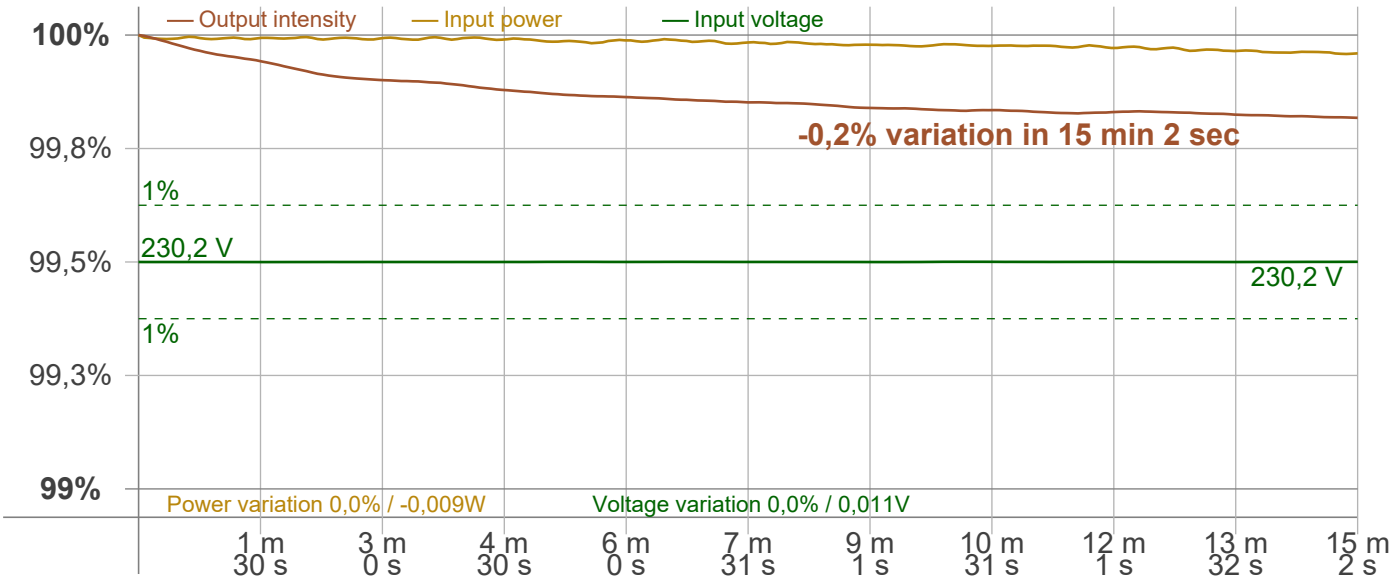
Warmup Result

Total warmup time	Lamp stabilized in 15 min 2 sec
Warmup variation	-0,2%

Output Change

Output start	1377 lm
Output change	-3 lm
Output end	1375 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

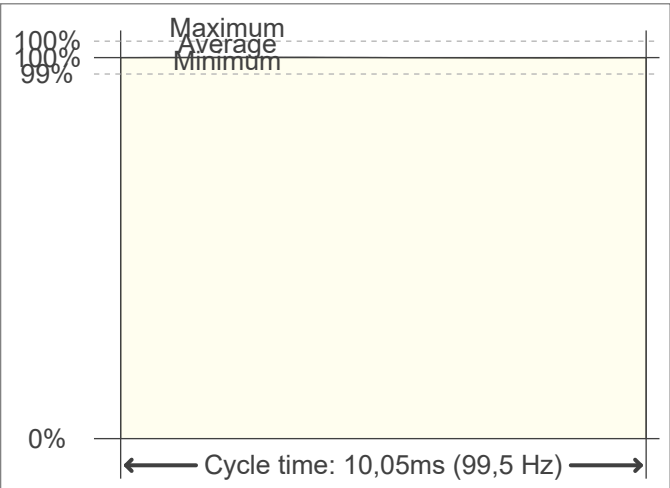
Flicker indices according to Illuminating Engineering Society (IES)
Flicker frequency 99,5 Hz
Percent Flicker 0,13 %
Flicker index 0

Flicker indices according to California Energy Commission (CEC) 2016b
JA8/10 40 Hz 0,02 %
JA8/10 90 Hz 0,02 %
JA8/10 200 Hz 0,12 %
JA8/10 400 Hz 0,12 %
JA8/10 1000 Hz 0,12 %

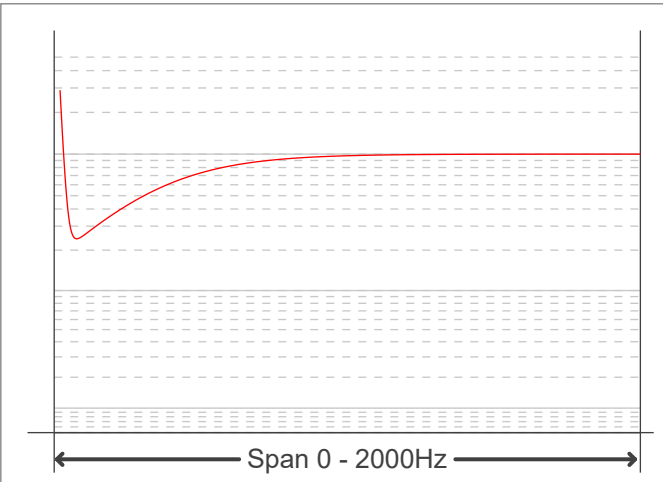
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)
PstLM value (F < 80 Hz) 0,03
SVM value (80 < F < 2000 Hz) 0

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

