

Light Measurement Report

Print date: 25-4-2025

Measurement date and time: 25-4-2025 13:25:56 – Measurement no. VFR-250425-0928-MS

Measurement tracking No. and Link: [VT250425-002129](#)

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°

1,99 m

5,2 W – PF 0,92 – DPF 1,0

230 V – 0,024 A

50 Hz

Lamp stabilized in 18 min 30 sec – 2,0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

275973-3000K

275973-3000K – Dutchfulfillment

GU10 SPOT | SPONDE | 5W | GLAS | 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

411 lm – 4,12% / 95,88%

80 lm/W

348 cd – 52,4°

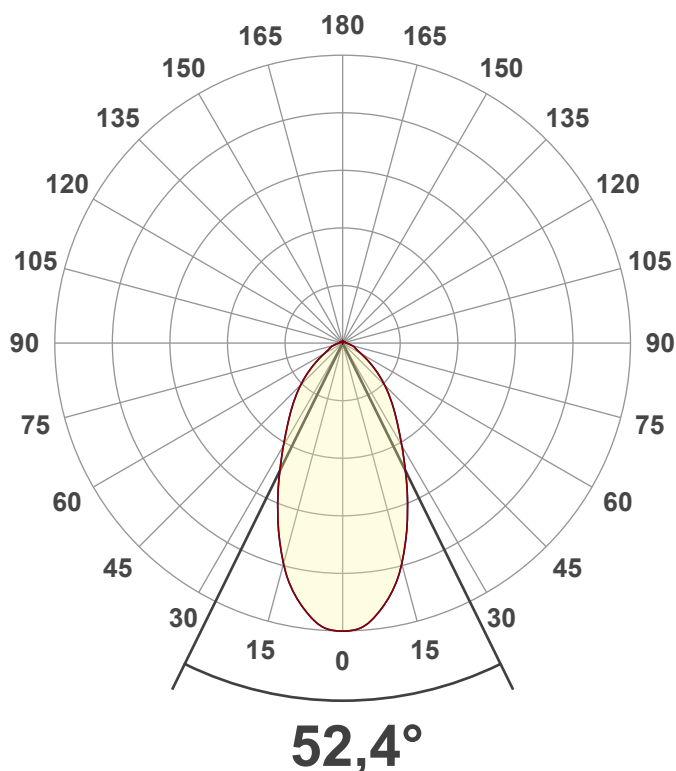
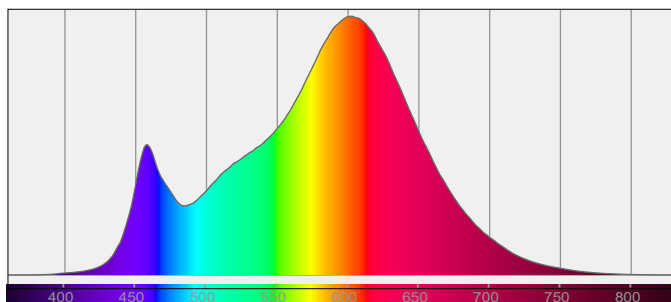
CCT = 3000 K / 2986 K

CRI 82,4

R_f 84,1 – R_g 92,6

Duv -0,0012 – SDCM 1,2

SVM 0,13 – PstLM 0,01



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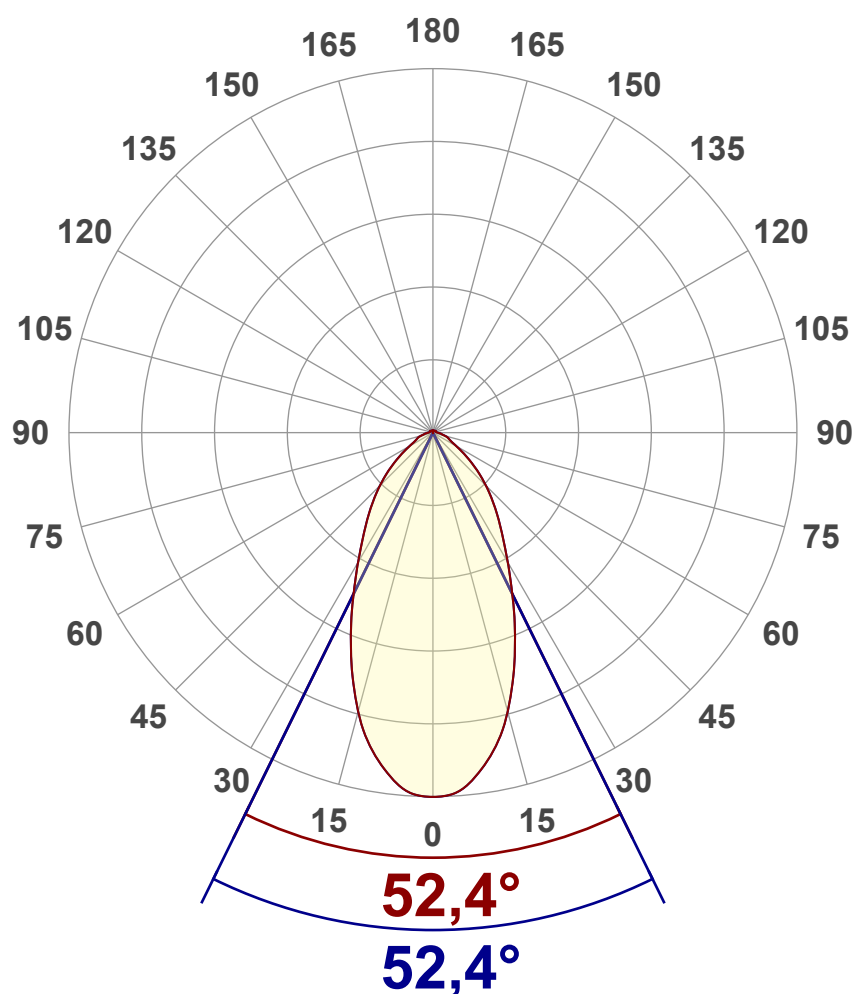
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	411 lm
Lumen Up% / Down%	4,12% / 95,88%
Peak Intensity	348 cd
Beam Angle (50%)	52,4°
Beam Angle (90%)	52,4°
Beam Angle (10%)	52,4°

Cut-off Angle

Average 2,5%	159,7°
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Field Angle

Average 10%	112,8°
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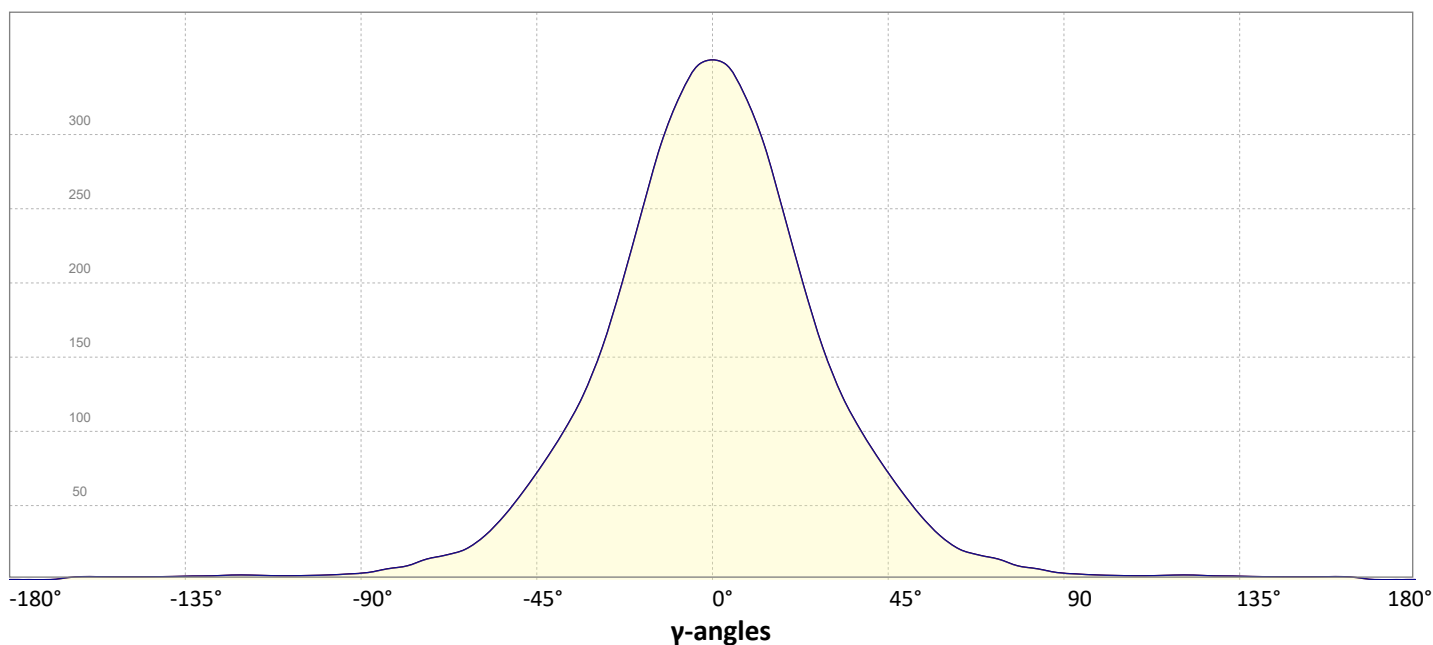
Intensity Ratio

In 120° cone	86,3%
In 90° cone	71,8%

C000-C180

C090-C270

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

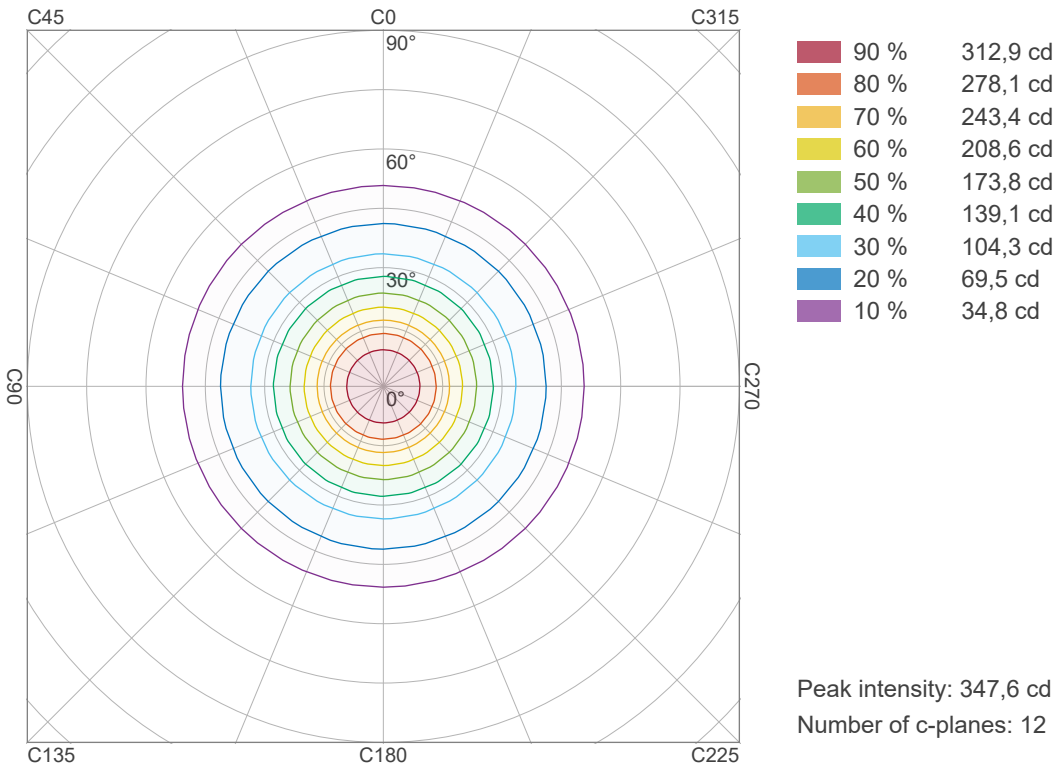


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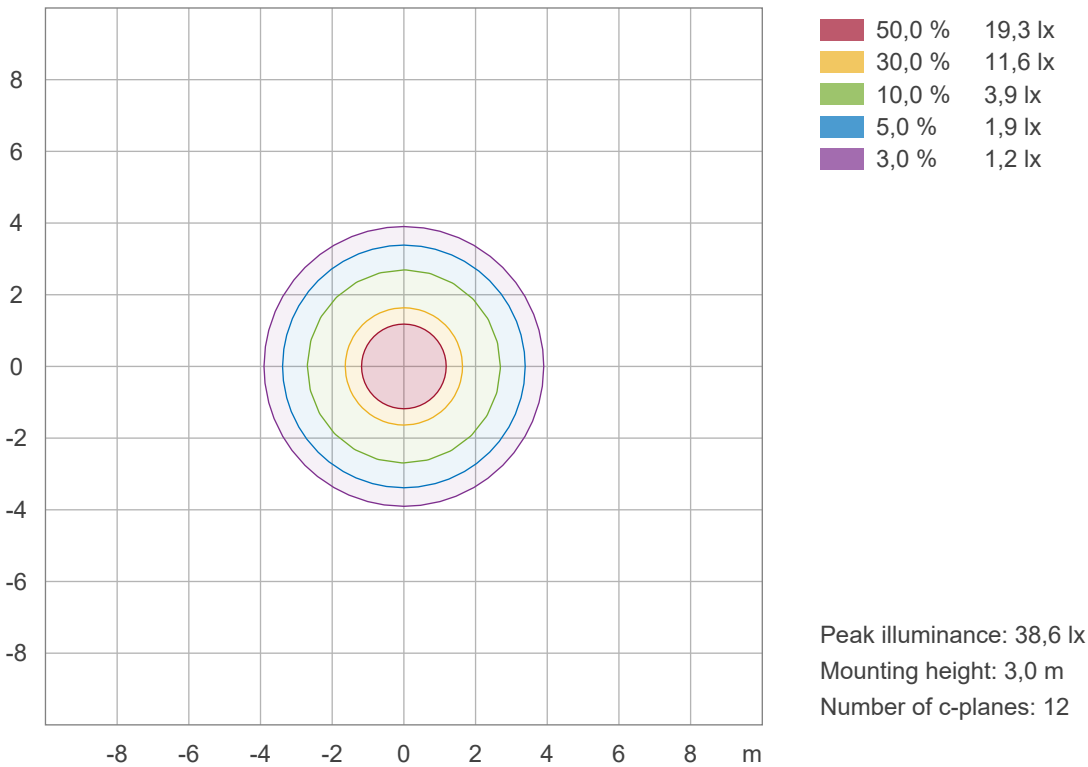
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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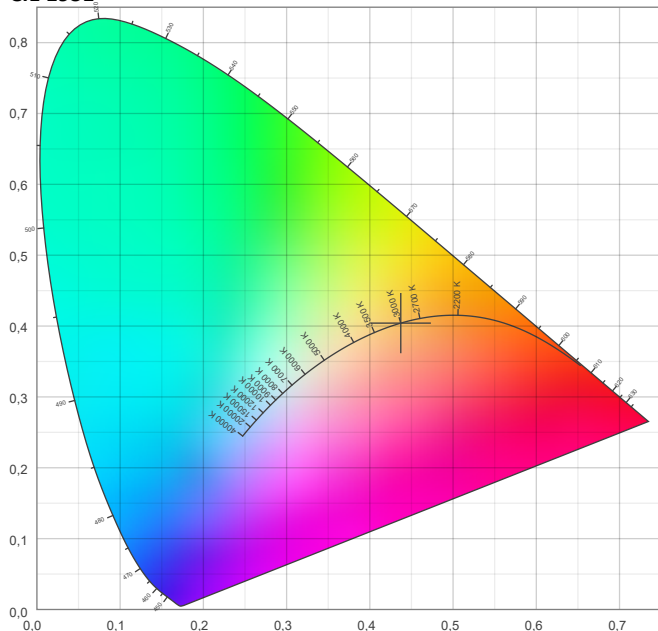


Color details

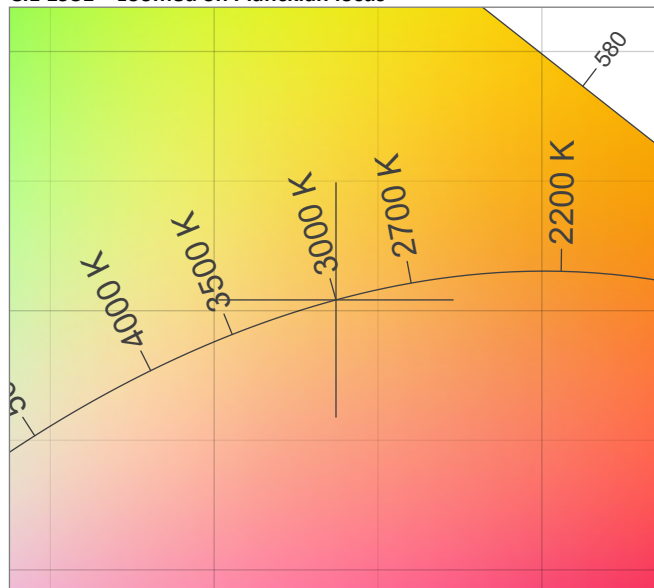
Correlated Color Temperature, Target CCT = 3000 K
Correlated Color Temperature, Measured CCT = 2986 K
Color Rendering Index CRI 82,4
Color Rendering Index, R9 (red component) R9 = 5,6
Color Rendering TM30-18 R_f 84,1 – R_g 92,6
Color Quality Scale CQS = 82,0

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0,437;0,404)
Color coordinate CIEs 1960 (u;v) = (0,251;0,348)
Color deviation from BBL Duv = -0,0012
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,251;0,521)

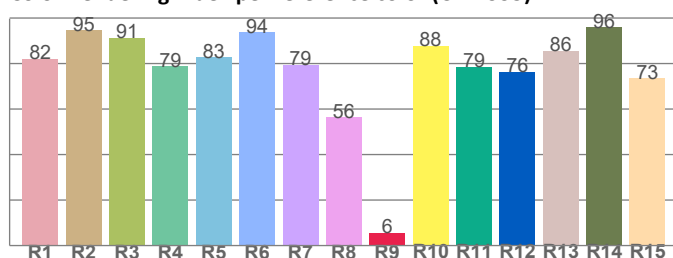
CIE 1931



CIE 1931 – zoomed on Planckian locus



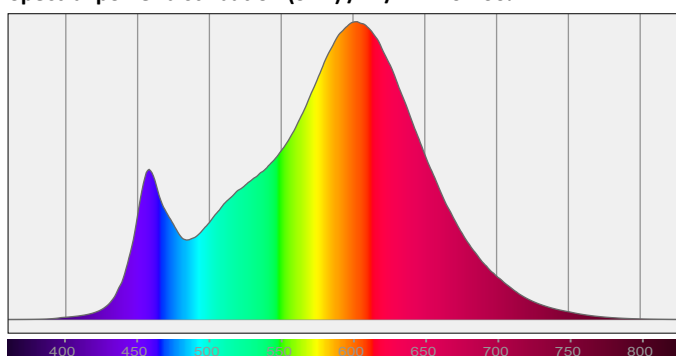
Color Rendering Index per reference color (CIE 1995)



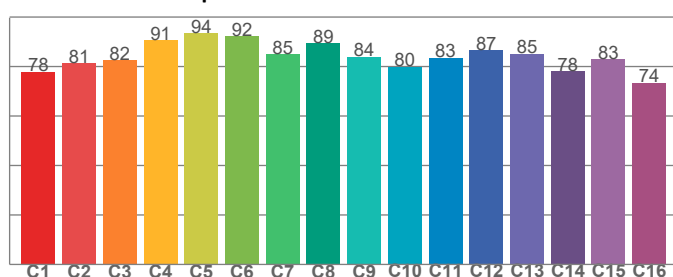
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
82,1	94,6	91,4	78,9	82,7	93,7	79,4	56,4	5,6	87,8	78,6	76,4	85,6	95,9	73,5

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



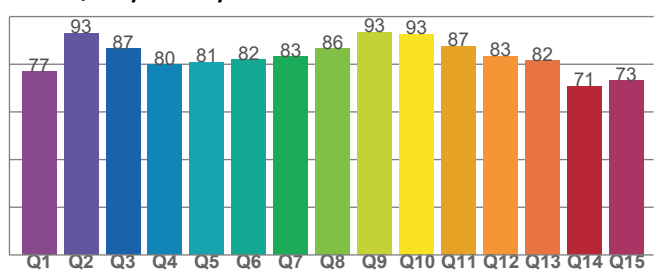
TM30-18 R_f-values per hue bin



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
77,8	81,4	82,5	90,6	93,6	92,2	85,0	89,3	83,9	79,9	83,5	86,7	85,2	78,1	82,9	73,5

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
76,9	93,0	86,6	79,7	80,9	81,9	83,1	86,4	93,5	92,5	87,5	83,4	81,5	70,9	73,1

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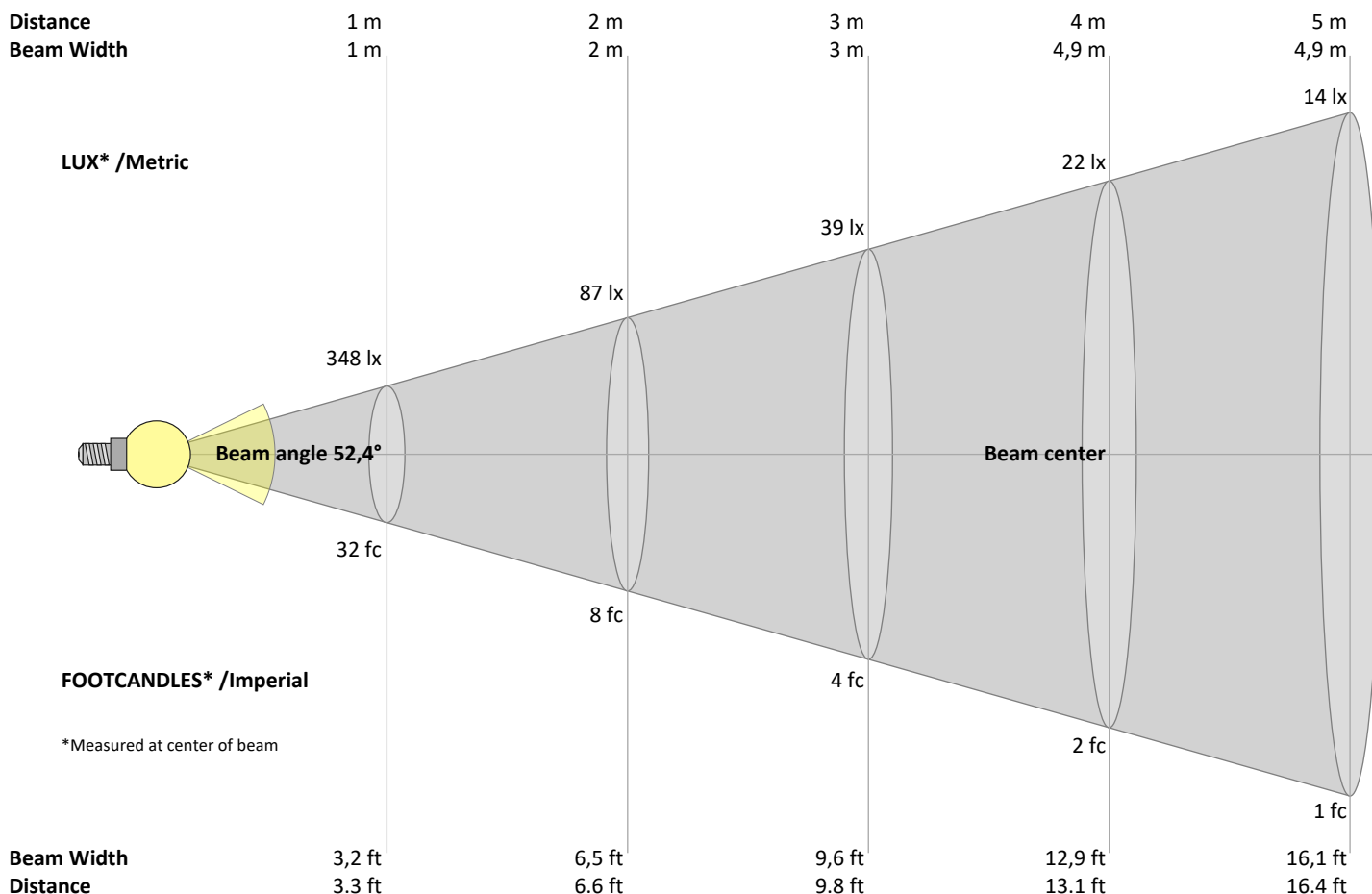
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Beam Details



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
348	87	39	22	14	10	7	5	4	3	3	2	2	2	2	1	1	1	1	1	lux
32,3	8,1	3,6	2	1,3	0,9	0,7	0,5	0,4	0,3	0,3	0,2	0,2	0,2	0,1	0,1	0,1	0,1	0,1	0,1	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
348	340	315	277	230	184	145	115	92	72	54	39	27	19	16	12	9	6	5	4	cd
100%	98%	91%	80%	66%	53%	42%	33%	27%	21%	16%	11%	8%	6%	5%	4%	2%	2%	1%	1%	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
348	340	315	277	230	184	145	115	92	72	54	39	27	19	16	12	9	6	5	4	cd
100%	98%	91%	80%	66%	53%	42%	33%	27%	21%	16%	11%	8%	6%	5%	4%	2%	2%	1%	1%	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
348	340	315	277	230	184	145	115	92	72	54	39	27	19	16	12	9	6	5	4	cd
100%	98%	91%	80%	66%	53%	42%	33%	27%	21%	16%	11%	8%	6%	5%	4%	2%	2%	1%	1%	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
348	340	315	277	230	184	145	115	92	72	54	39	27	19	16	12	9	6	5	4	cd
100%	98%	91%	80%	66%	53%	42%	33%	27%	21%	16%	11%	8%	6%	5%	4%	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	23,5	24,4	23,8	24,8	25,1	23,5	24,4	23,8	24,8	25,1
	3H	24,0	25,0	24,4	25,3	25,5	24,0	25,0	24,4	25,3	25,5
	4H	24,3	25,2	24,7	25,5	25,9	24,3	25,2	24,7	25,5	25,9
	6H	24,6	25,4	25,0	25,8	26,2	24,6	25,4	25,0	25,8	26,2
	8H	24,7	25,5	25,1	25,9	26,3	24,7	25,5	25,1	25,9	26,3
	12H	24,8	25,6	25,2	25,9	26,4	24,8	25,6	25,2	25,9	26,4
4H	2H	23,6	24,6	24,1	24,9	25,2	23,6	24,6	24,1	24,9	25,2
	3H	24,4	25,2	24,9	25,6	26,1	24,4	25,2	24,9	25,6	26,1
	4H	24,8	25,5	25,3	26,0	26,6	24,8	25,5	25,3	26,0	26,6
	6H	25,2	25,9	25,7	26,3	26,7	25,2	25,9	25,7	26,3	26,7
	8H	25,3	26,0	25,9	26,4	26,8	25,3	26,0	25,9	26,4	26,8
	12H	25,5	26,0	26,0	26,5	27,0	25,5	26,0	26,0	26,5	27,0
8H	4H	24,9	25,6	25,5	26,0	26,4	24,9	25,6	25,5	26,0	26,4
	6H	25,5	25,9	26,0	26,4	27,0	25,5	25,9	26,0	26,4	27,0
	8H	25,7	26,1	26,3	26,7	27,4	25,7	26,1	26,3	26,7	27,4
	12H	26,0	26,3	26,6	26,9	27,5	26,0	26,3	26,6	26,9	27,5
12H	4H	24,9	25,4	25,5	25,9	26,4	24,9	25,4	25,5	25,9	26,4
	6H	25,5	25,9	26,1	26,5	27,2	25,5	25,9	26,1	26,5	27,2
	8H	25,8	26,1	26,4	26,7	27,4	25,8	26,1	26,4	26,7	27,4
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H				0,3 / -0,4				0,3 / -0,4			
S = 1.5H				0,8 / -0,9				0,8 / -0,9			
S = 2.0H				1,7 / -1,4				1,7 / -1,4			

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	118	118	118	118	115	115	115	115	109	109	109	103	103	103	98	98	98	96
1	110	106	103	100	107	103	100	98	99	96	94	94	92	90	90	88	87	85
2	102	96	90	86	100	94	89	84	90	85	82	86	82	79	82	80	77	75
3	95	87	80	75	93	85	79	74	82	77	72	79	74	71	76	72	69	67
4	89	79	72	67	87	78	71	66	75	69	65	72	67	64	70	66	62	60
5	83	73	65	60	81	71	65	59	69	63	58	67	62	58	65	60	57	55
6	78	67	60	54	76	66	59	54	64	58	53	62	57	52	60	55	52	50
7	73	62	55	50	72	61	54	49	59	53	49	58	52	48	56	51	48	46
8	69	58	51	46	68	57	50	45	55	49	45	54	48	44	53	48	44	42
9	65	54	47	42	64	53	47	42	52	46	42	51	45	41	49	45	41	39
10	62	51	44	39	61	50	43	39	49	43	39	48	42	38	47	42	38	37

Light Measurement Report

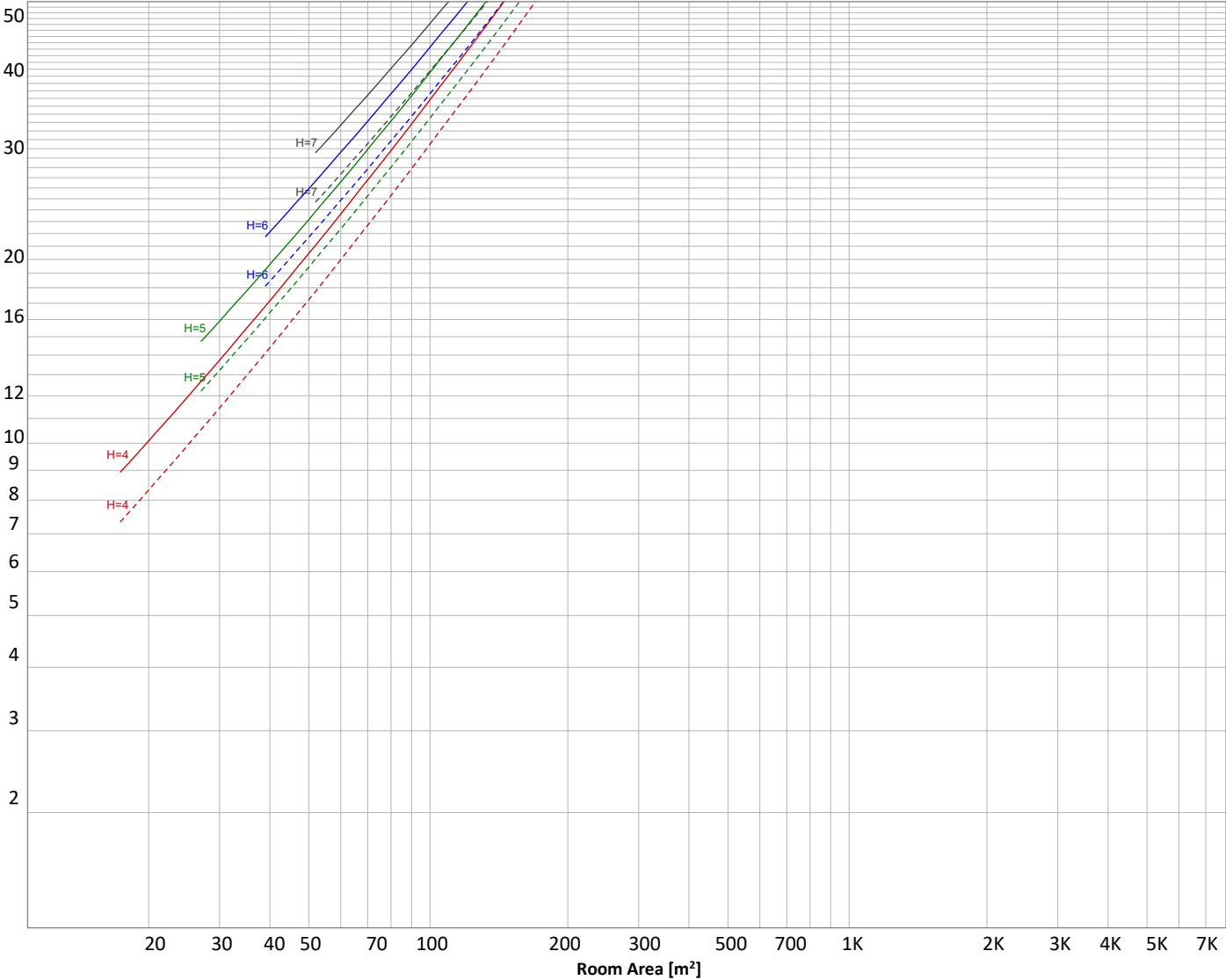
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 411 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°
31,8 lm	76,9 lm	84,2 lm	72,1 lm	55,7 lm	34,6 lm	19,4 lm	12,8 lm	7,02 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
4,01 lm	2,99 lm	2,89 lm	2,61 lm	1,85 lm	1,27 lm	0,936 lm	0,398 lm	0,008 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	32 lm	7,7%
10-20°	77 lm	18,7%
20-30°	84 lm	20,5%
30-40°	72 lm	17,5%
40-50°	56 lm	13,5%
50-60°	35 lm	8,4%
60-70°	19 lm	4,7%
70-80°	13 lm	3,1%
80-90°	7 lm	1,7%
90-100°	4 lm	1,0%
100-110°	3 lm	0,7%
110-120°	3 lm	0,7%
120-130°	3 lm	0,6%
130-140°	2 lm	0,4%
140-150°	1 lm	0,3%
150-160°	1 lm	0,2%
160-170°	0 lm	0,1%
170-180°	0 lm	0,0%
Total	411 lm	100,0%

Intensity peaks

Max intensity	348 cd
Intensity, 90°	5 cd
Intensity, 0°	348 cd

Zonal Lumen summary

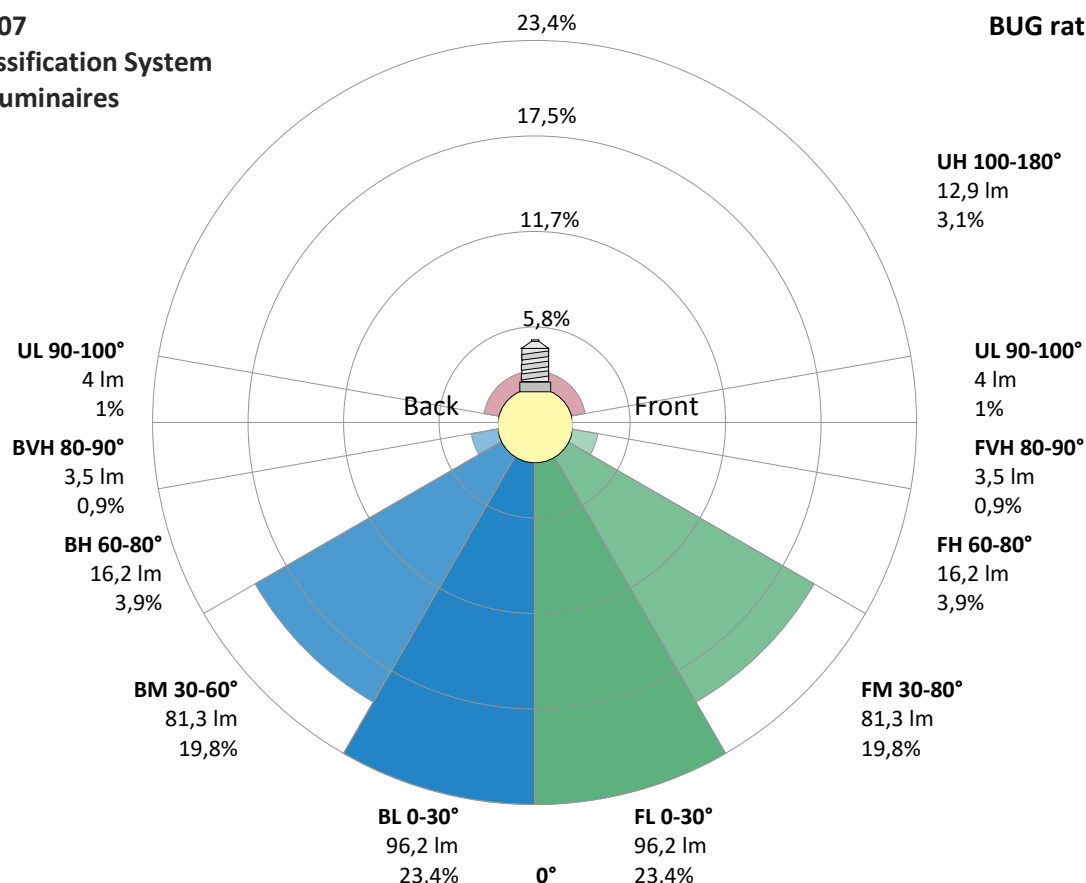
Zone (γ)	Lumen	% Total
0-30°	193 lm	46,9%
0-40°	265 lm	64,4%
0-60°	355 lm	86,3%
60-90°	39 lm	9,5%
70-100°	24 lm	5,8%
90-120°	10 lm	2,4%
0-90°	394 lm	95,9%
90-180°	17 lm	4,1%
0-180°	411 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	96 lm	23,4%
Medium(30-60°)	81 lm	19,8%
High(60-80°)	16 lm	3,9%
Very high(80-90°)	4 lm	0,9%
Back light		
Low(0-30°)	96 lm	23,4%
Medium(30-60°)	81 lm	19,8%
High(60-80°)	16 lm	3,9%
Very high(80-90°)	4 lm	0,9%
Uplight		
Low(90-100°)	4 lm	1,0%
High(100-180°)	13 lm	3,1%

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

BUG rating B0 U2 G0



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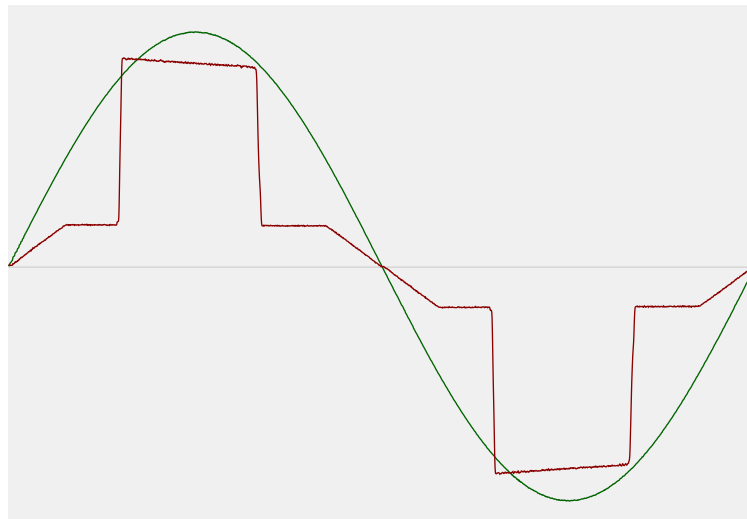


Power Details

Input Power

Power feed to light source	5,2 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,024 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	5,6 VA
Displacement factor of AC power feed	1,0
Power factor of AC current feed	0,92
Total harmonic distortion of the current	42,89%
Total harmonic distortion of the voltage	0,05%

Input Power Curve



Efficiency

Radiated power efficiency 24,3%



Lumen efficiency 80 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	2964 K
CCT shift	+36 K
CCT end	3000 K

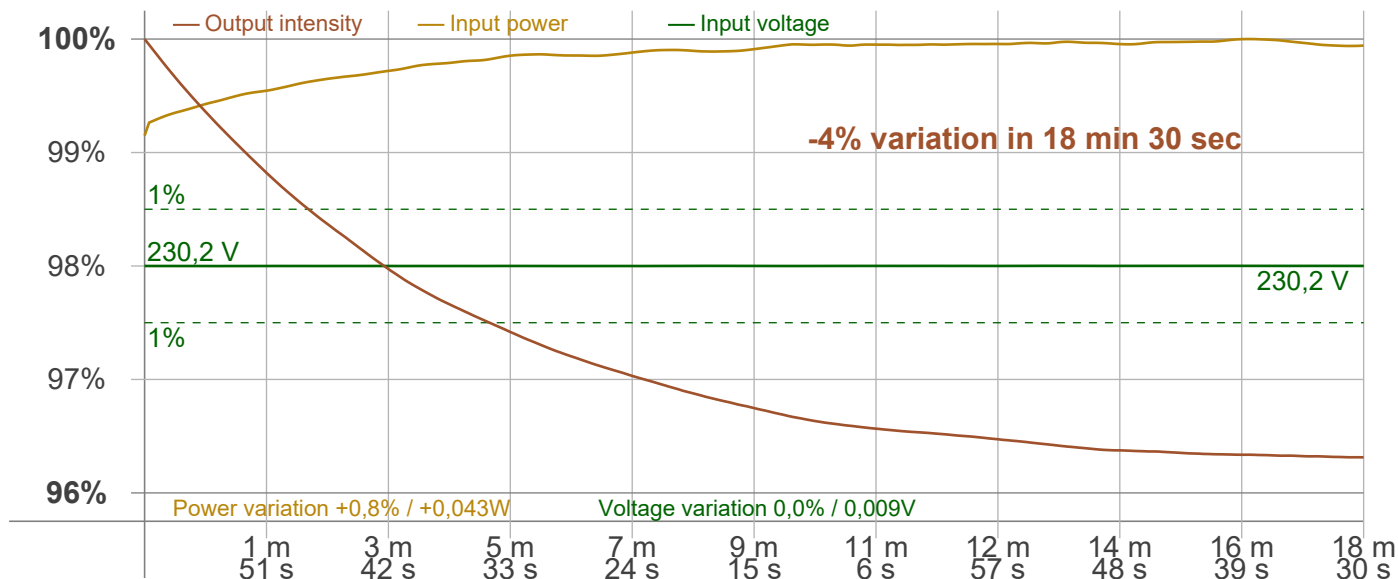
Warmup Result

Total warmup time	Lamp stabilized in 18 min 30 sec
Warmup variation	-4,0%

Output Change

Output start	428 lm
Output change	-17 lm
Output end	411 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

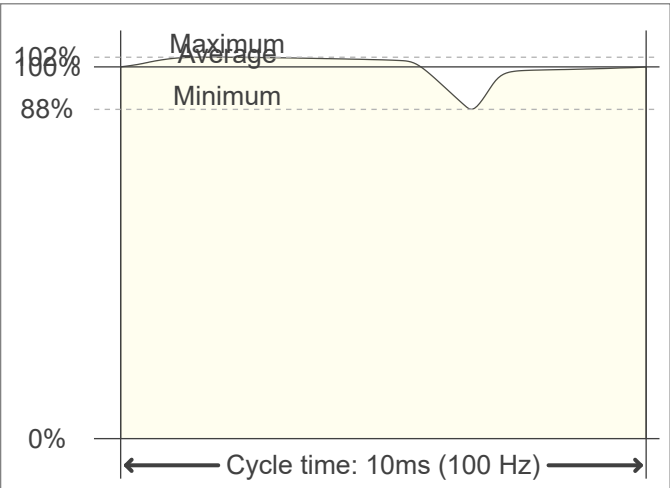
Flicker indices according to Illuminating Engineering Society (IES)
Flicker frequency 100 Hz
Percent Flicker 7,38 %
Flicker index 0,01

Flicker indices according to California Energy Commission (CEC) 2016b
JA8/10 40 Hz 0,02 %
JA8/10 90 Hz 0,03 %
JA8/10 200 Hz 3,67 %
JA8/10 400 Hz 5,31 %
JA8/10 1000 Hz 6,98 %

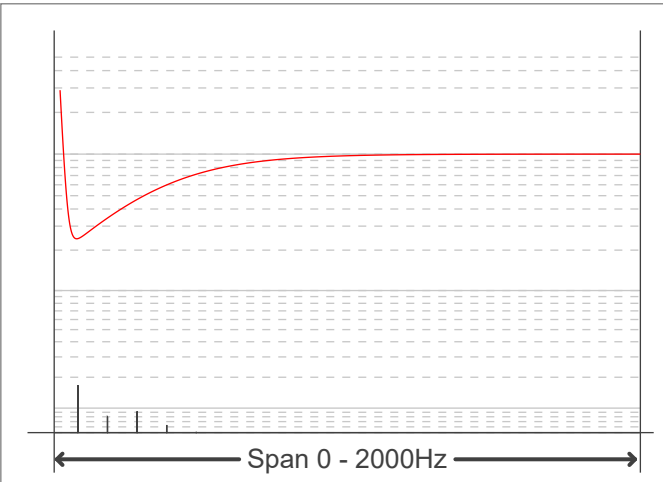
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)
PstLM value (F < 80 Hz) 0,01
SVM value (80 < F < 2000 Hz) 0,13

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

