

Light Measurement Report

Print date: 30-10-2025

Measurement date and time: 30-10-2025 11:31:50 – Measurement no. VFR-251030-3829-MS

Measurement tracking No. and Link: [VT251030-002510](#)

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°
12,09 m
45,1 W – PF 0,96 – DPF 0,96
230 V – 0,204 A
50 Hz
Lamp stabilized in 15 min 1 sec – 2,0%

Tested Light Source

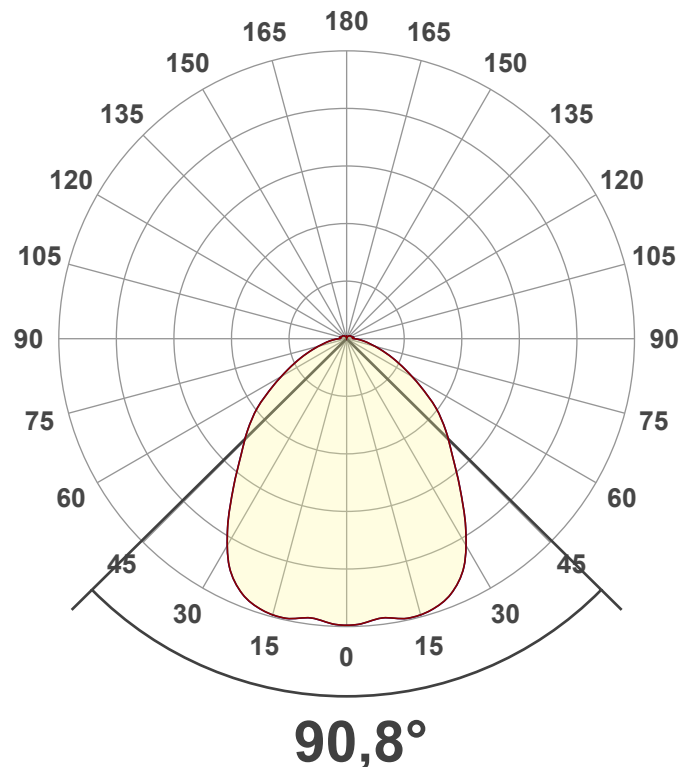
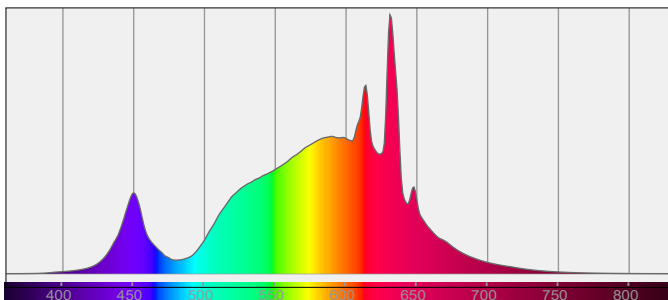
Product Name
Item No. and Manufacturer
Product Description (line 1)
35W/40W/45W/55W | ZWART | CCT SWITCH

812973-3000K-45W
812973-3000K-45W – Dutchfulfillment
3-FASE RAILARMATUUR | TARVOS | KANTELBAAR | 150CM |

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

6100 lm – 4,4% / 95,6%
135 lm/W
2528 cd – 90,8°
CCT = 3000 K / 2992 K
CRI 81,2
 R_f 82,1 – R_g 98,4
Duv 0,0036 – SDCM 3,8
SVM 0 – PstLM 0,02



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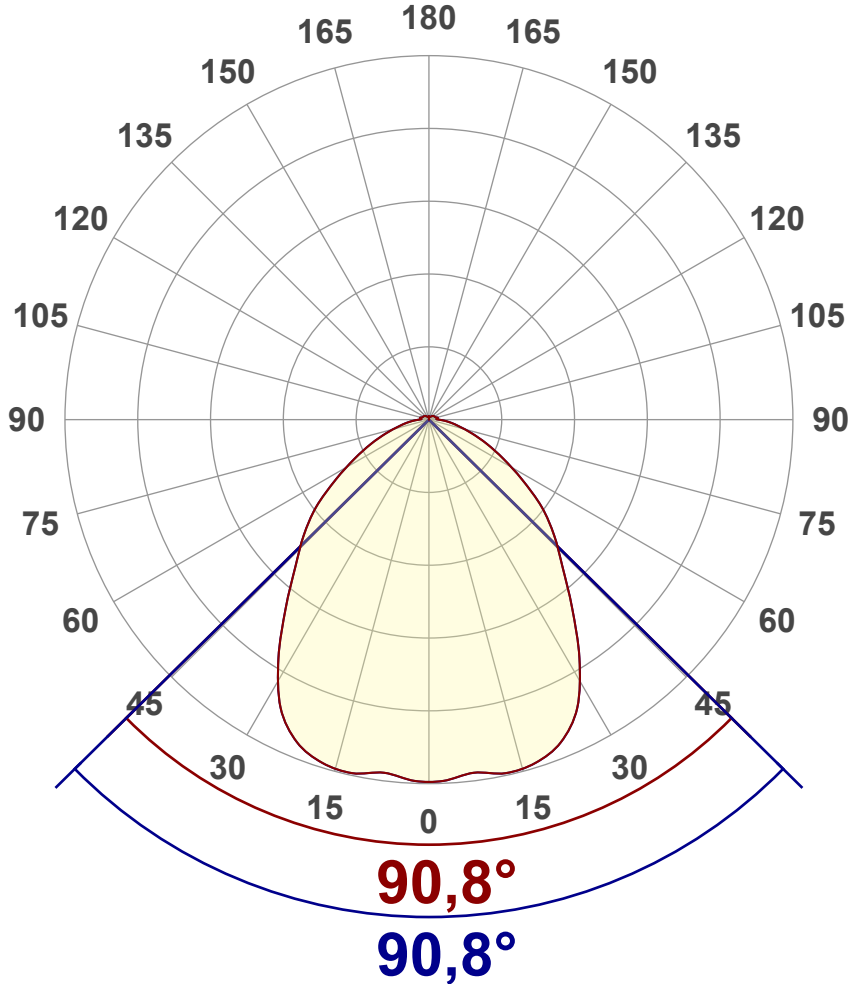
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	6100 lm
Lumen Up% / Down%	4,4% / 95,6%
Peak Intensity	2528 cd
Beam Angle (50%)	90,8°
Beam Angle (90%)	90,8°
Beam Angle (10%)	90,8°

Cut-off Angle

Average 2,5%	182,4°
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Field Angle

Average 10%	150,9°
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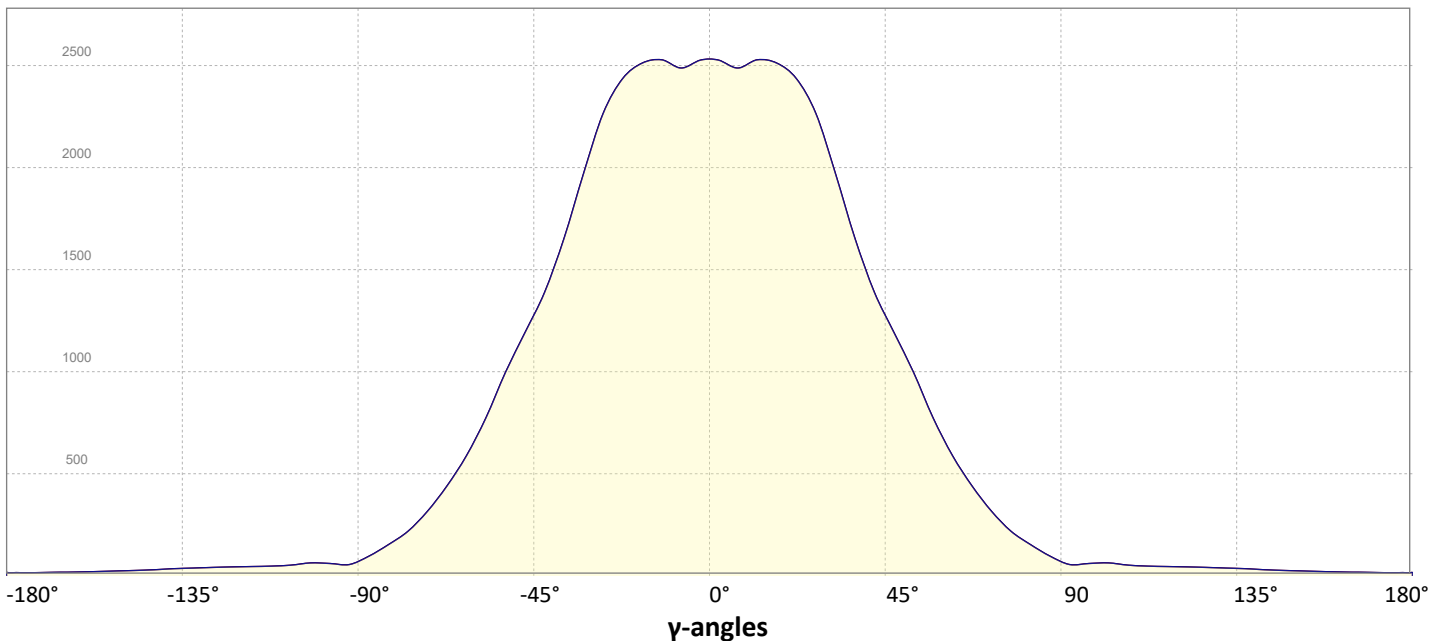
Intensity Ratio

In 120° cone	80,7%
In 90° cone	60,0%

C000-C180

C090-C270

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



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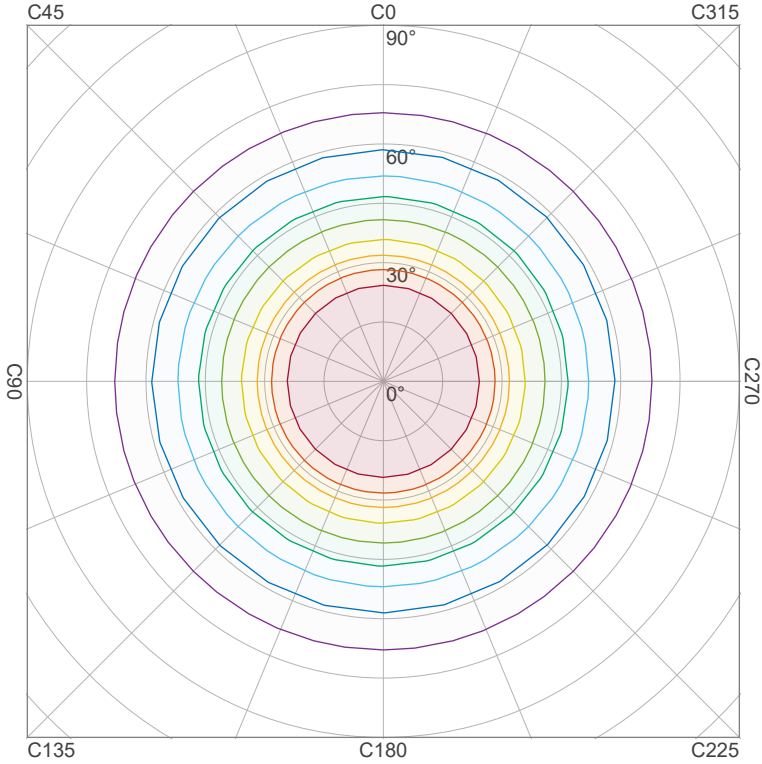
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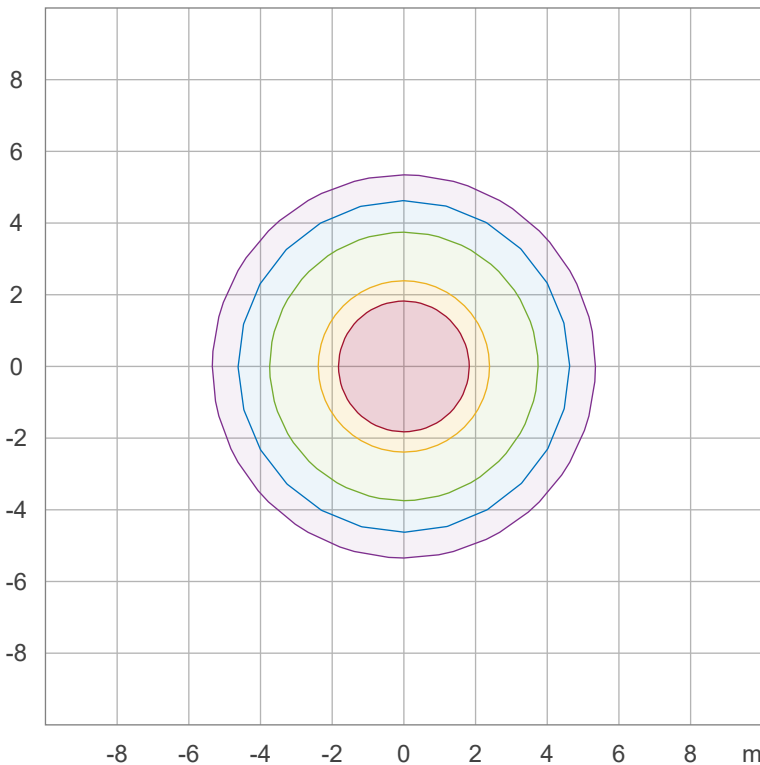
Iso-intensity Diagram (Iso-candela)



90 %	2274,2 cd
80 %	2021,5 cd
70 %	1768,8 cd
60 %	1516,1 cd
50 %	1263,4 cd
40 %	1010,7 cd
30 %	758,1 cd
20 %	505,4 cd
10 %	252,7 cd

Peak intensity: 2526,9 cd
Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



50,0 %	140,4 lx
30,0 %	84,2 lx
10,0 %	28,1 lx
5,0 %	14,0 lx
3,0 %	8,4 lx

Peak illuminance: 280,8 lx
Mounting height: 3,0 m
Number of c-planes: 12

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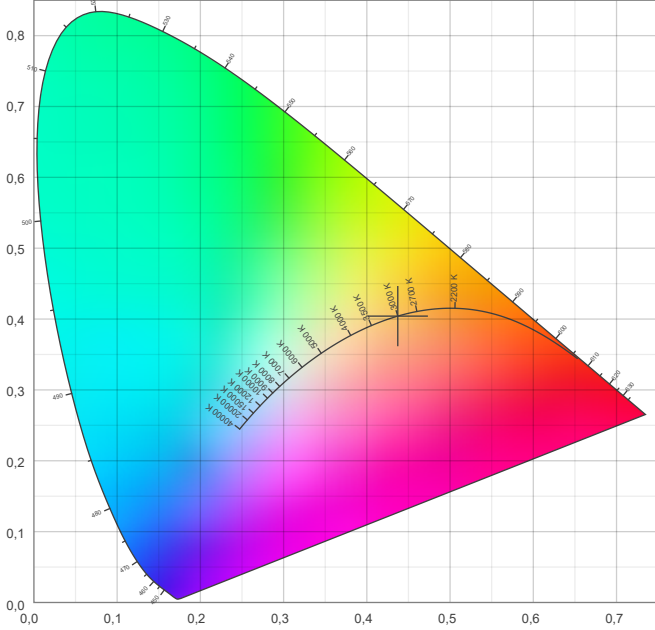


Color details

Correlated Color Temperature, Target CCT = 3000 K
 Correlated Color Temperature, Measured CCT = 2992 K
 Color Rendering Index CRI 81,2
 Color Rendering Index, R9 (red component) R9 = 16,8
 Color Rendering TM30-18 R_f 82,1 – R_g 98,4
 Color Quality Scale CQS = 80,7

MacAdam Steps SDCM = 3,8
 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 = 0,0036
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,251;0,521)

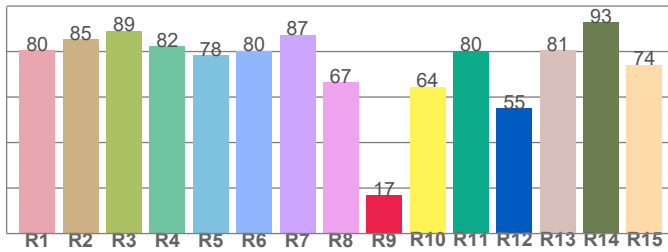
CIE 1931



CIE 1931 – zoomed on Planckian locus



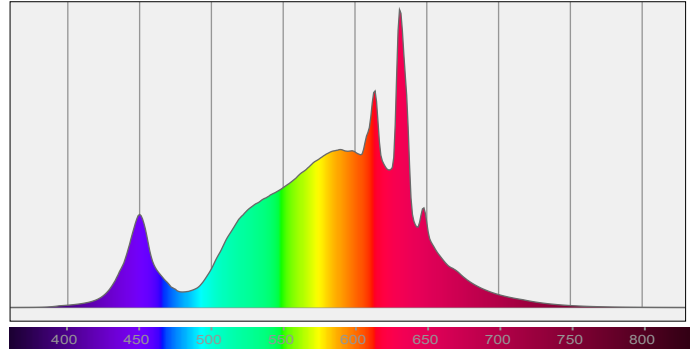
Color Rendering Index per reference color (CIE 1995)



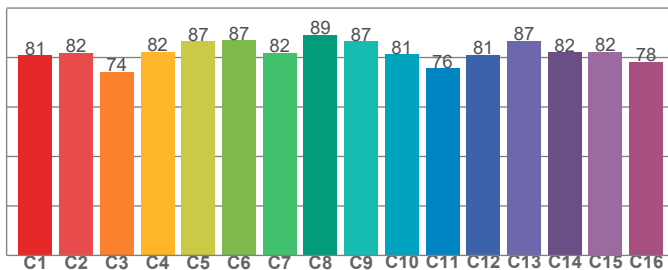
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
80,5	85,3	89,2	82,3	78,3	80,4	87,3	66,5	16,8	64,5	80,3	55,1	80,7	92,9	74,1

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



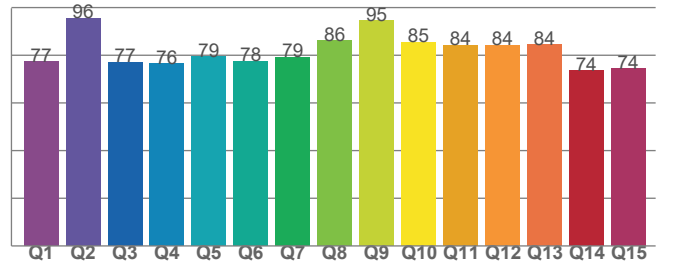
TM30-18 R_f-values per hue bin



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
81,0	82,0	74,2	82,3	86,6	87,1	81,9	89,3	86,6	81,3	75,7	81,1	86,8	82,0	82,4	78,2

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
77,3	95,6	77,2	76,4	79,4	77,6	79,2	86,1	94,5	85,4	84,2	84,2	84,5	73,6	74,4

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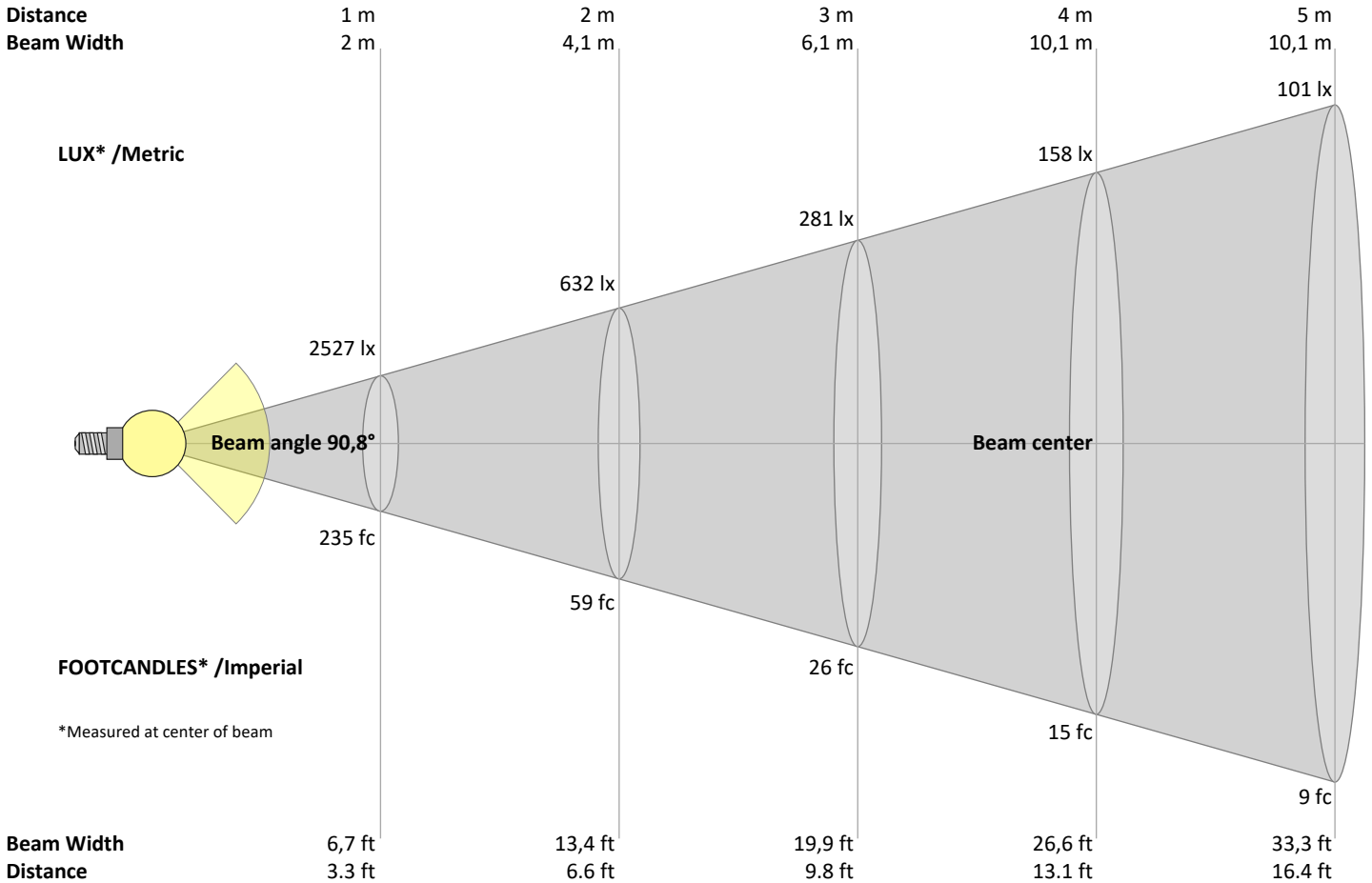
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Operator:



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
2527	632	281	158	101	70	52	39	31	25	21	18	15	13	11	10	9	8	7	6	lux
234,8	58,7	26,1	14,7	9,4	6,5	4,8	3,7	2,9	2,3	1,9	1,6	1,4	1,2	1	0,9	0,8	0,7	0,7	0,6	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
2527	2505	2510	2519	2470	2342	2103	1796	1507	1280	1084	874	672	506	371	262	182	121	73	58	cd
100%	99%	99%	100%	98%	93%	83%	71%	60%	51%	43%	35%	27%	20%	15%	10%	7%	5%	3%	2%	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
2527	2505	2510	2519	2470	2342	2103	1796	1507	1280	1084	874	672	506	371	262	182	121	73	58	cd
100%	99%	99%	100%	98%	93%	83%	71%	60%	51%	43%	35%	27%	20%	15%	10%	7%	5%	3%	2%	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
2527	2505	2510	2519	2470	2342	2103	1796	1507	1280	1084	874	672	506	371	262	182	121	73	58	cd
100%	99%	99%	100%	98%	93%	83%	71%	60%	51%	43%	35%	27%	20%	15%	10%	7%	5%	3%	2%	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
2527	2505	2510	2519	2470	2342	2103	1796	1507	1280	1084	874	672	506	371	262	182	121	73	58	cd
100%	99%	99%	100%	98%	93%	83%	71%	60%	51%	43%	35%	27%	20%	15%	10%	7%	5%	3%	2%	of 0°val

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Operator:



Light Planning – UGR table

Uncorrected, comprehensive UGR table according to 117-1995

Reflectances		70	70	50	50	30	70	70	50	50	30
	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	22,3	23,4	22,6	23,7	24,0	22,6	23,7	22,9	24,0	24,3
	3H	23,1	24,3	23,6	24,6	24,9	23,5	24,7	24,0	25,0	25,3
	4H	23,5	24,6	24,0	24,9	25,3	24,0	25,1	24,5	25,4	25,7
	6H	23,9	24,8	24,3	25,2	25,6	24,5	25,4	24,9	25,8	26,2
	8H	24,0	24,9	24,4	25,3	25,8	24,7	25,6	25,1	26,0	26,4
	12H	24,1	25,0	24,6	25,4	25,9	24,9	25,8	25,3	26,1	26,7
4H	2H	22,7	23,7	23,1	24,1	24,4	22,9	24,0	23,4	24,3	24,6
	3H	23,8	24,7	24,3	25,1	25,6	24,2	25,1	24,6	25,5	26,0
	4H	24,3	25,1	24,8	25,6	26,2	24,7	25,5	25,2	26,0	26,6
	6H	24,7	25,5	25,3	25,9	26,4	25,2	26,0	25,8	26,4	26,9
	8H	24,9	25,6	25,5	26,0	26,5	25,5	26,2	26,1	26,6	27,1
	12H	25,1	25,6	25,6	26,1	26,7	25,8	26,4	26,3	26,9	27,4
8H	4H	24,5	25,2	25,0	25,6	26,1	24,9	25,6	25,4	26,0	26,5
	6H	25,1	25,6	25,6	26,1	26,7	25,6	26,1	26,1	26,6	27,2
	8H	25,4	25,8	26,0	26,4	27,1	26,0	26,4	26,5	27,0	27,7
	12H	25,6	26,0	26,3	26,6	27,3	26,4	26,7	27,0	27,3	28,0
12H	4H	24,5	25,1	25,0	25,6	26,1	24,9	25,4	25,4	25,9	26,5
	6H	25,2	25,6	25,7	26,2	26,9	25,6	26,1	26,2	26,7	27,4
	8H	25,5	25,9	26,1	26,4	27,1	26,0	26,4	26,7	27,0	27,7

Variations with the observer position for the luminaire spacings, S:

S = 1.0H	0,1 / -0,2	0,1 / -0,1
S = 1.5H	0,3 / -0,5	0,2 / -0,3
S = 2.0H	0,7 / -0,8	0,6 / -0,8

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	109	104	100	97	105	101	98	95	96	94	91	92	89	87	88	86	84	82
2	100	92	86	81	97	90	84	79	86	81	77	82	78	74	78	75	72	70
3	92	82	74	68	89	80	73	67	76	71	66	73	68	64	70	66	62	60
4	84	73	65	59	82	72	64	58	69	62	57	66	60	56	63	59	55	53
5	78	66	58	52	76	65	57	51	62	55	50	60	54	49	58	52	48	46
6	72	60	52	46	70	59	51	45	57	50	45	55	48	44	53	47	43	41
7	67	55	47	41	66	54	46	40	52	45	40	50	44	39	48	43	39	37
8	63	50	42	37	61	49	42	36	48	41	36	46	40	36	45	39	35	33
9	59	46	39	33	57	46	38	33	44	37	33	43	37	32	41	36	32	30
10	55	43	35	30	54	42	35	30	41	34	30	40	34	30	39	33	29	28

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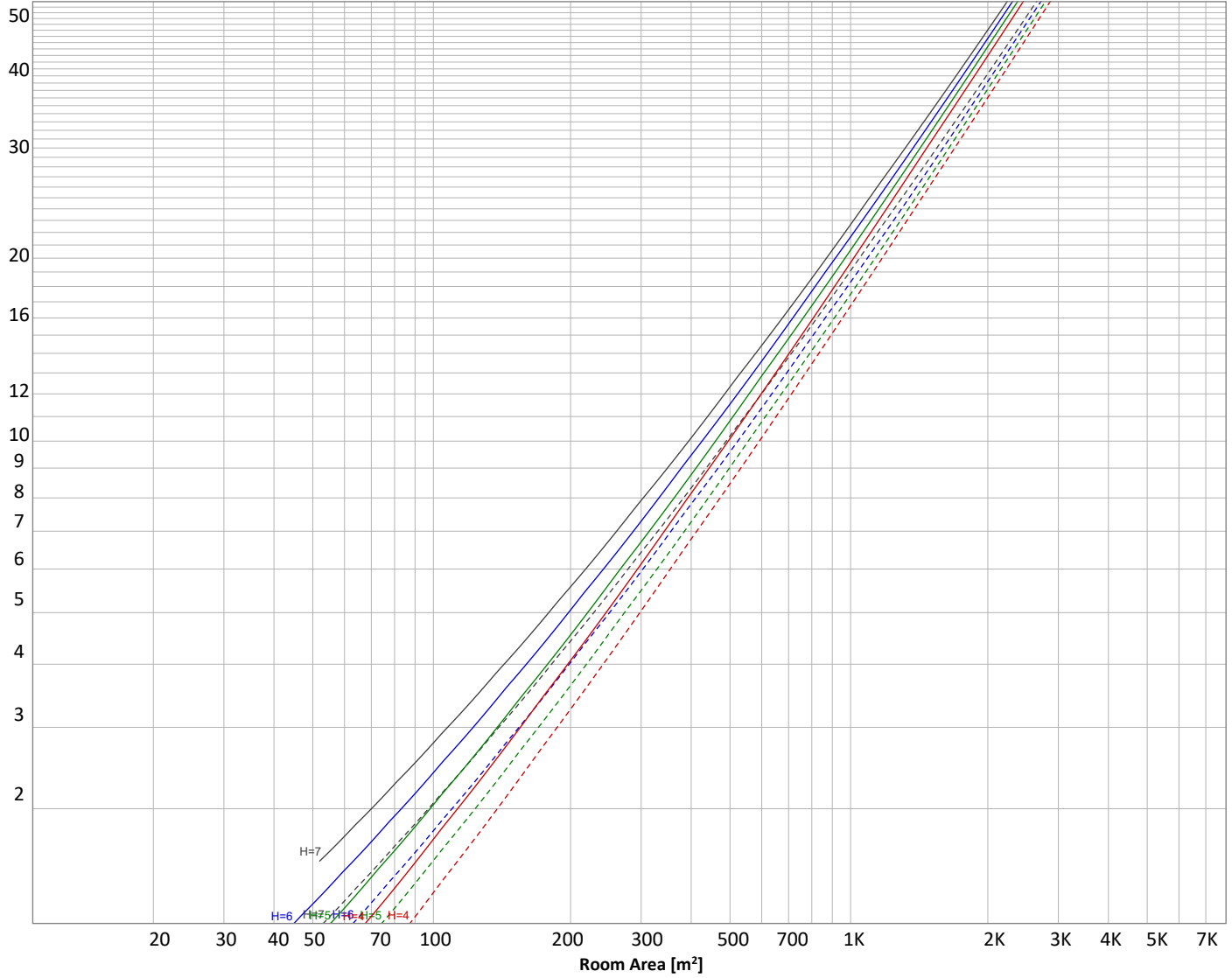
Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 6100 lm				
H _{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	ρ(%) Wall reflectance	Floor reflectance
H _{work} = Work area height from floor =	0.00 m	-----	70	50	30
E _{work} = Average lux on work area =	100 lx	—————	50	30	20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
238 lm	713 lm	1078 lm	1122 lm	987 lm	782 lm	502 lm	277 lm	132 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
63,1 lm	60,2 lm	45,7 lm	37,6 lm	27,8 lm	17,3 lm	10,1 lm	5,03 lm	1,47 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	238 lm	3,9%
10-20°	713 lm	11,7%
20-30°	1078 lm	17,7%
30-40°	1122 lm	18,4%
40-50°	987 lm	16,2%
50-60°	782 lm	12,8%
60-70°	502 lm	8,2%
70-80°	277 lm	4,5%
80-90°	132 lm	2,2%
90-100°	63 lm	1,0%
100-110°	60 lm	1,0%
110-120°	46 lm	0,7%
120-130°	38 lm	0,6%
130-140°	28 lm	0,5%
140-150°	17 lm	0,3%
150-160°	10 lm	0,2%
160-170°	5 lm	0,1%
170-180°	1 lm	0,0%
Total	6100 lm	100,0%

Intensity peaks

Max intensity	2528 cd
Intensity, 90°	73 cd
Intensity, 0°	2527 cd

Zonal Lumen summary

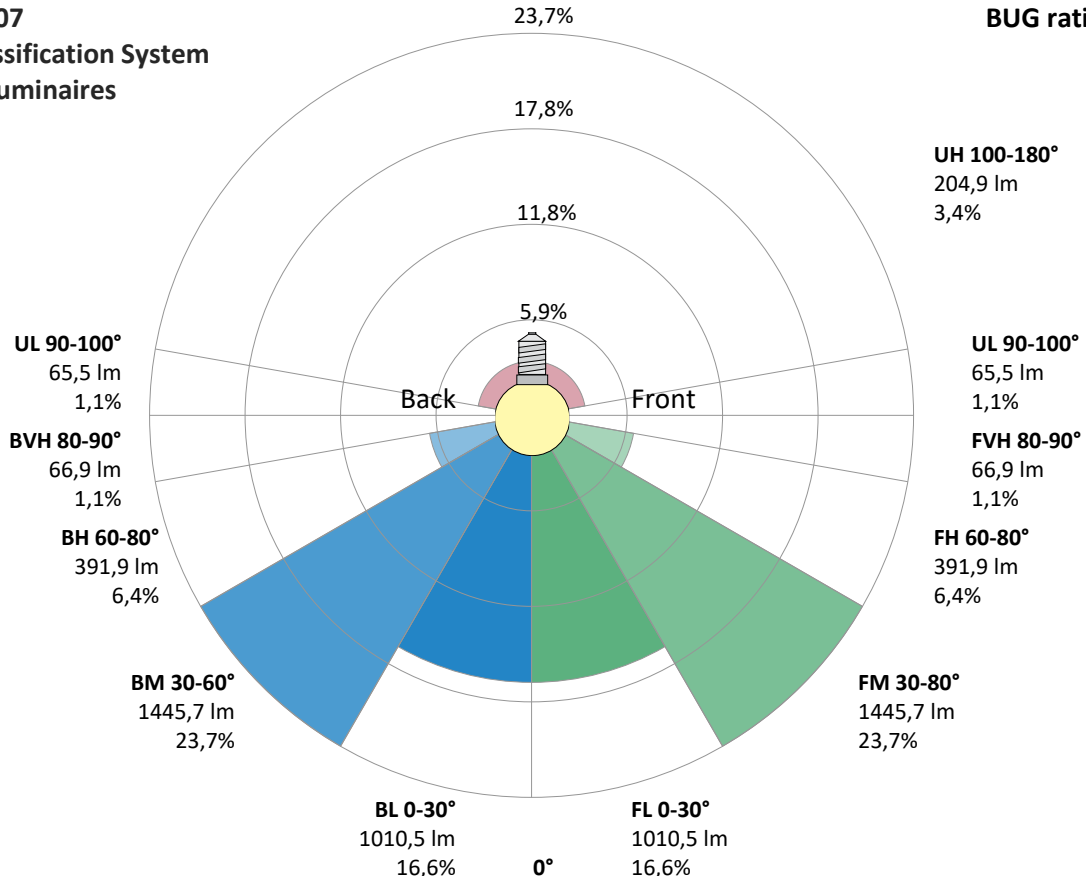
Zone (γ)	Lumen	% Total
0-30°	2030 lm	33,3%
0-40°	3152 lm	51,7%
0-60°	4921 lm	80,7%
60-90°	911 lm	14,9%
70-100°	472 lm	7,7%
90-120°	169 lm	2,8%
0-90°	5832 lm	95,6%
90-180°	268 lm	4,4%
0-180°	6100 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	1010 lm	16,6%
Medium(30-60°)	1446 lm	23,7%
High(60-80°)	392 lm	6,4%
Very high(80-90°)	67 lm	1,1%
Back light		
Low(0-30°)	1010 lm	16,6%
Medium(30-60°)	1446 lm	23,7%
High(60-80°)	392 lm	6,4%
Very high(80-90°)	67 lm	1,1%
Uplight		
Low(90-100°)	65 lm	1,1%
High(100-180°)	205 lm	3,4%

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

BUG rating B3 U3 G1



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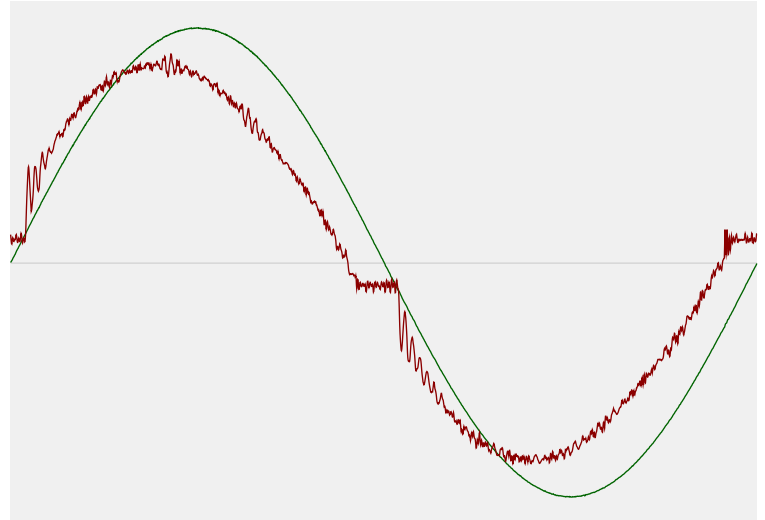


Power Details

Input Power

Power feed to light source	45,1 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,204 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	46,93 VA
Displacement factor of AC power feed	0,96
Power factor of AC current feed	0,96
Total harmonic distortion of the current	7,37%
Total harmonic distortion of the voltage	0,07%

Input Power Curve



Efficiency

Radiated power efficiency 37,9%



Lumen efficiency 135 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	3002 K
CCT shift	-2 K
CCT end	3000 K

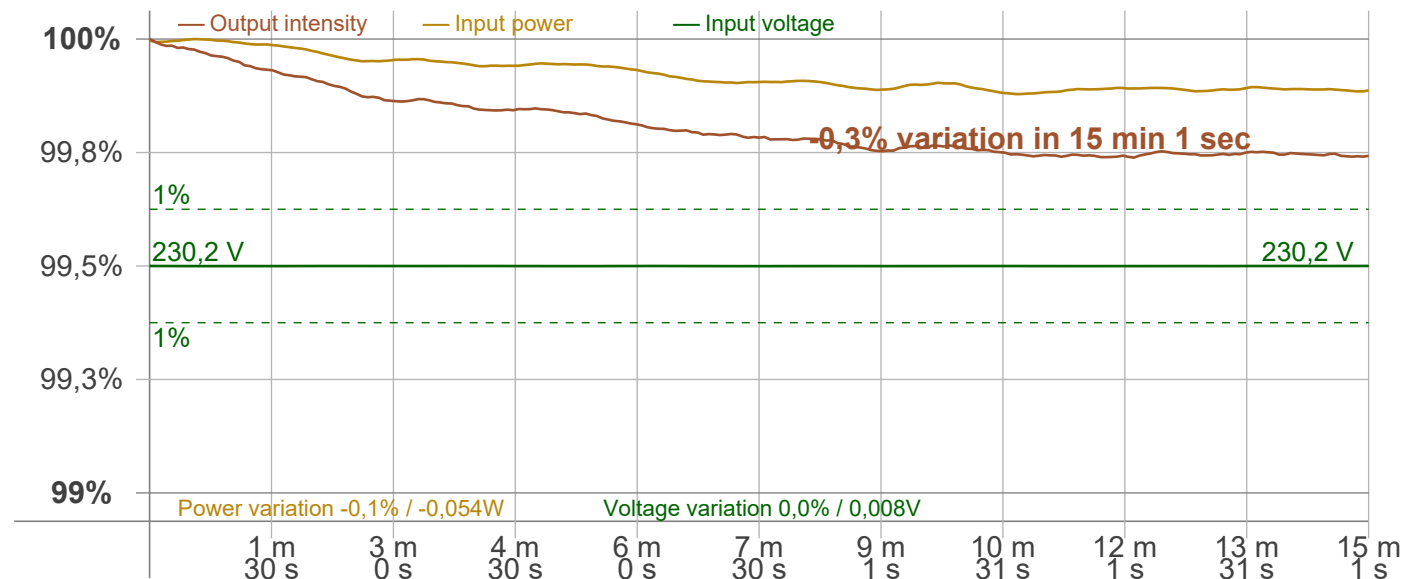
Warmup Result

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

Output Change

Output start	6116 lm
Output change	-16 lm
Output end	6100 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: 0,2 %
 Flicker index: 0

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: 0,16 %
 JA8/10 400 Hz: 0,16 %
 JA8/10 1000 Hz: 0,18 %

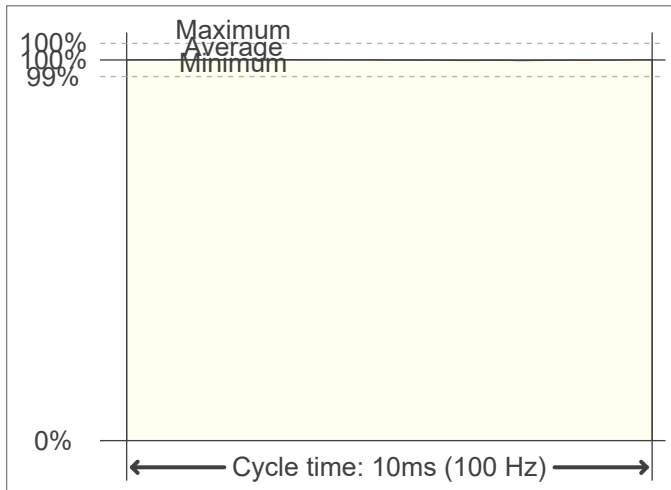
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

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

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

