

Light Measurement Report

Print date: 24-9-2025

Measurement date and time: 24-9-2025 15:17:45 – Measurement no. VFR-250924-3339-MS

Measurement tracking No. and Link: [VT250924-005469](https://www.viso-systems.com/VT250924-005469)

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

32 planes – 11,25°
5°
2,64 m
134,5 W – PF 0,98 – DPF 0,98
230 V – 0,600 A
50 Hz
Lamp stabilized in 15 min 2 sec – 2,0%

Tested Light Source

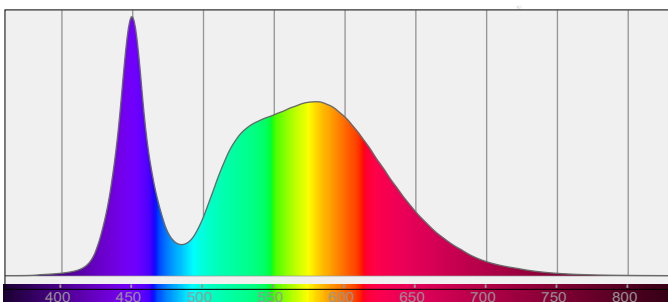
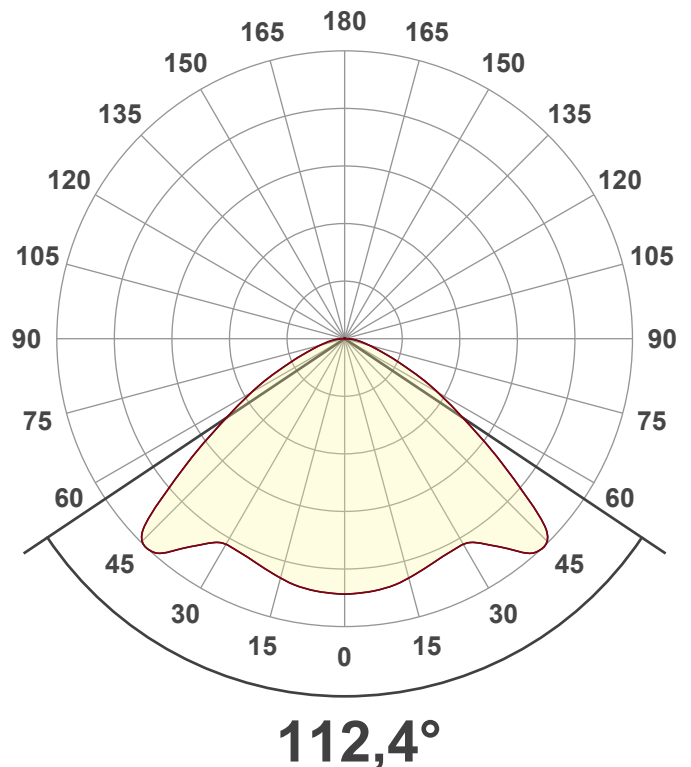
Product Name
Item No. and Manufacturer
Product Description (line 1)
SWITCH

812737-5000K-150W
812737-5000K-150W – Dutchfulfillment
LED HIGHBAY ARGOS | 0-10V | 200W/150W/120W | 60°/90°/120° | 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

21610 lm – 0,16% / 99,84%
161 lm/W
7471 cd – 112,4°
CCT = 5000 K / 4835 K
CRI 73,2
 R_f 74,3 – R_g 94,7
Duv 0,0022 – SDCM 3,5
SVM 0 – PstLM 0,11



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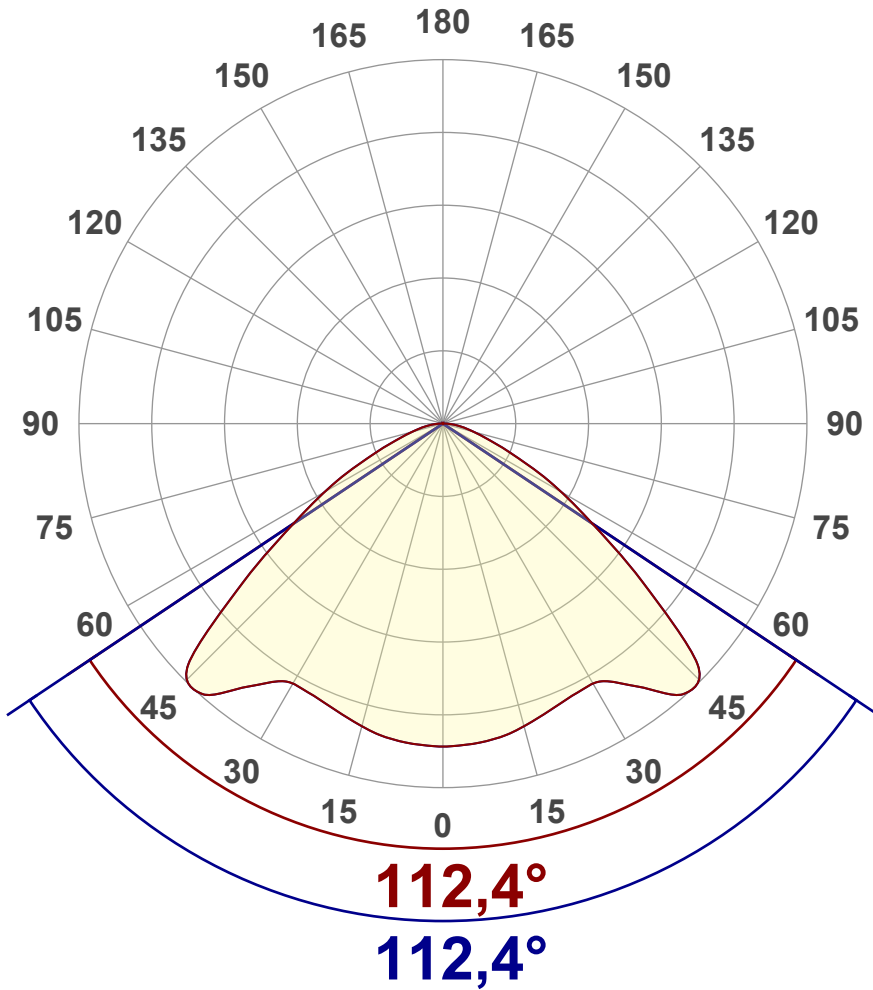
Measurement tracking No. and Link: [VT250924-005469](#)

Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	21610 lm
Lumen Up% / Down%	0,16% / 99,84%
Peak Intensity	7471 cd
Beam Angle (50%)	112,4°
Beam Angle (90%)	112,4°
Beam Angle (10%)	112,4°

Cut-off Angle

Average 2,5%	171,7°
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Field Angle

Average 10%	148°
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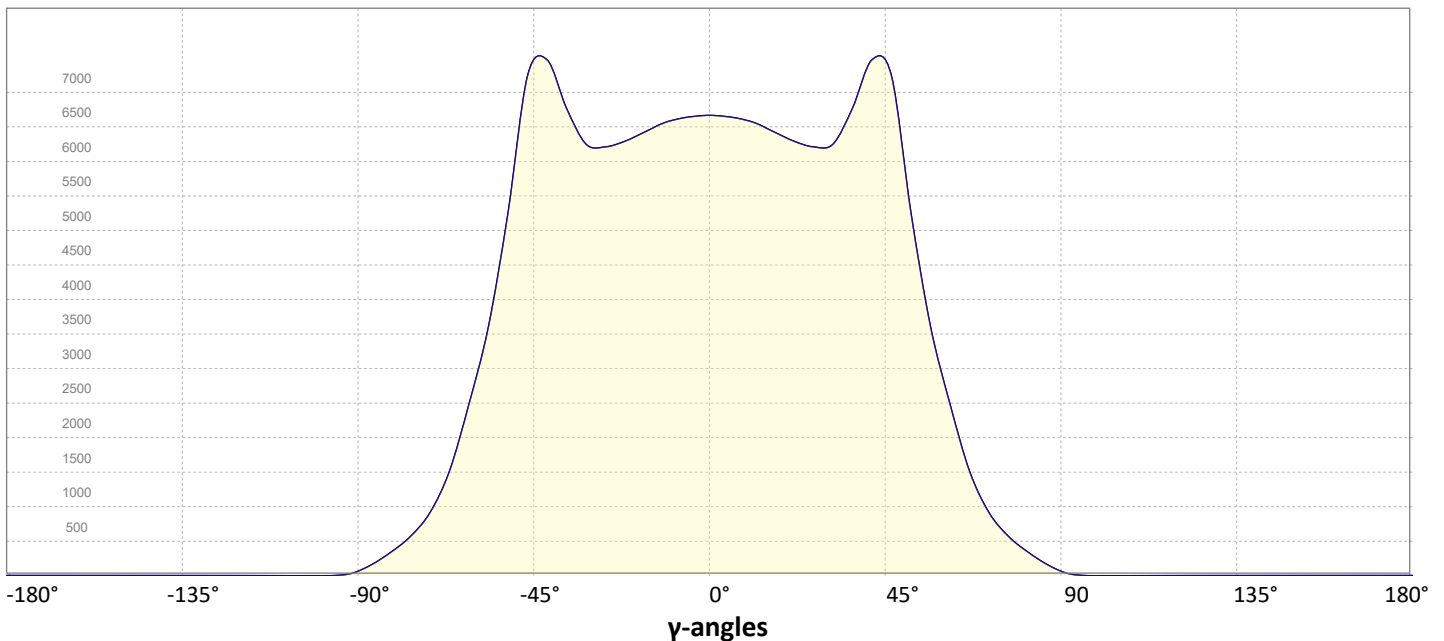
Intensity Ratio

In 120° cone	86,9%
In 90° cone	56,8%

C000-C180

C090-C270

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



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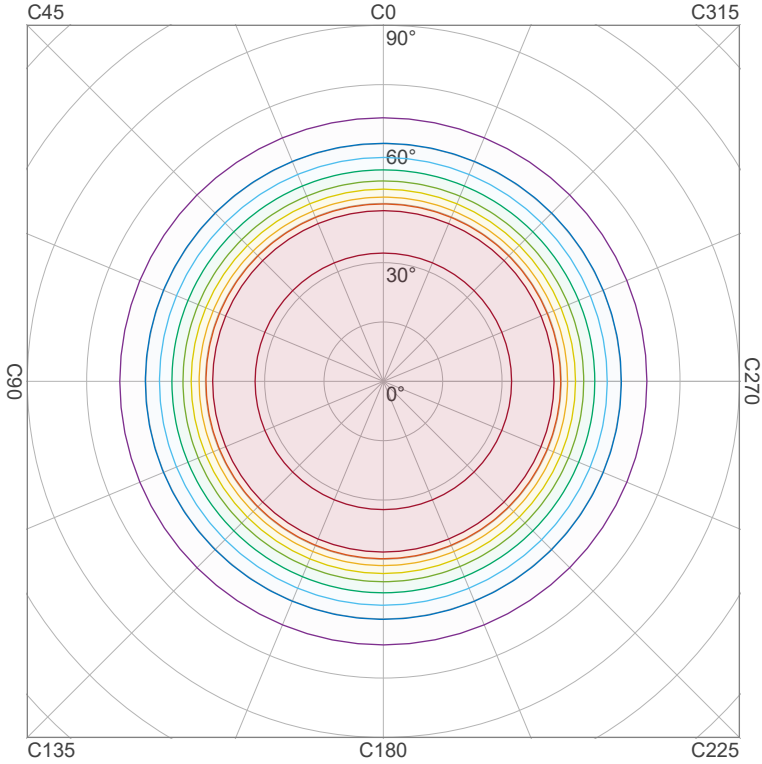
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Iso-intensity Diagram (Iso-candela)

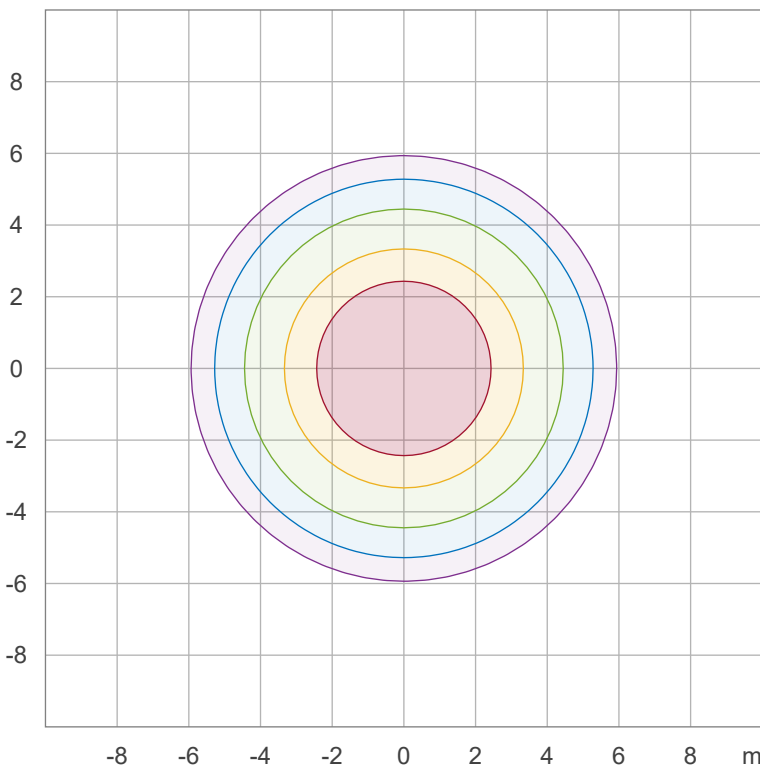


90 %	6707,1 cd
80 %	5961,9 cd
70 %	5216,6 cd
60 %	4471,4 cd
50 %	3726,2 cd
40 %	2980,9 cd
30 %	2235,7 cd
20 %	1490,5 cd
10 %	745,2 cd

Peak intensity: 7452,3 cd

Number of c-planes: 32

Iso-illuminance Diagram (Iso-lux)



50,0 %	370,2 lx
30,0 %	222,1 lx
10,0 %	74,0 lx
5,0 %	37,0 lx
3,0 %	22,2 lx

Peak illuminance: 740,4 lx

Mounting height: 3,0 m

Number of c-planes: 32

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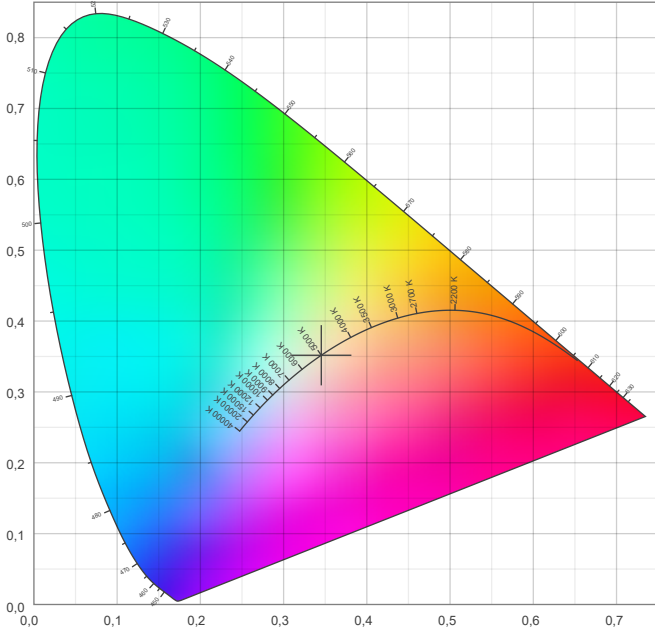


Color details

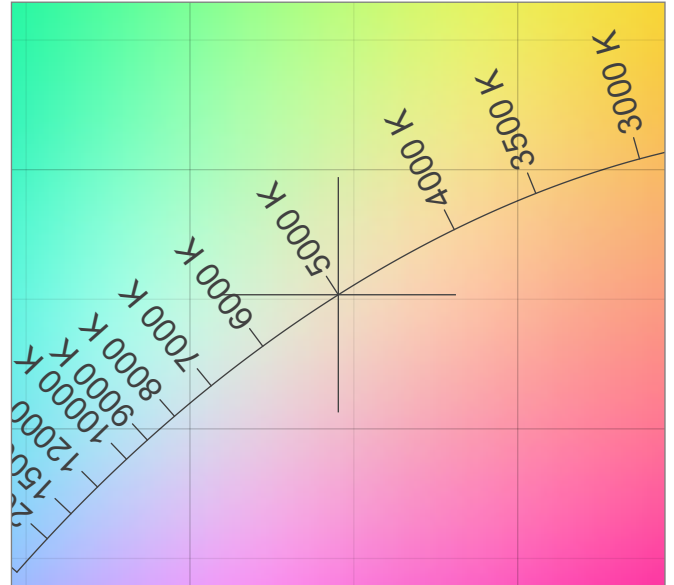
Correlated Color Temperature, Target CCT = 5000 K
 Correlated Color Temperature, Measured CCT = 4835 K
 Color Rendering Index CRI 73,2
 Color Rendering Index, R9 (red component) R9 = -27,5
 Color Rendering TM30-18 R_f 74,3 – R_g 94,7
 Color Quality Scale CQS = 72,3

MacAdam Steps SDCM = 3,5
 Color coordinates CIE 1931 (x;y) = (0,345;0,352)
 Color coordinate CIEs 1960 (u;v) = (0,211;0,323)
 Color deviation from BBL Duv = 0,0022
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,211;0,485)

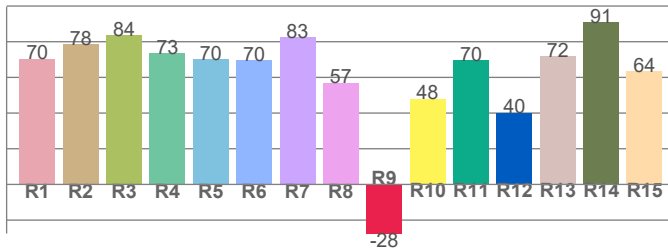
CIE 1931



CIE 1931 – zoomed on Planckian locus



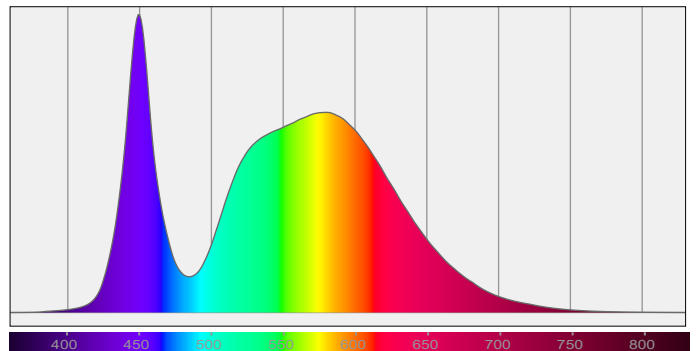
Color Rendering Index per reference color (CIE 1995)



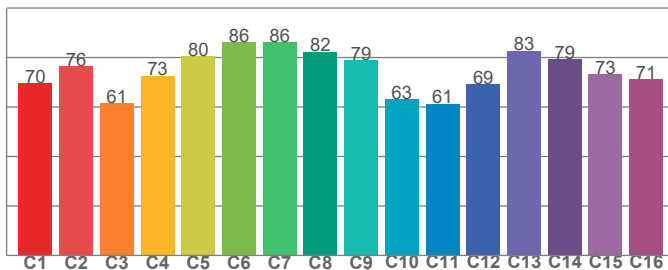
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
70,5	78,5	83,8	73,4	70,3	69,6	82,6	56,9	-27,5	48,0	69,6	40,2	71,9	90,8	63,5

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



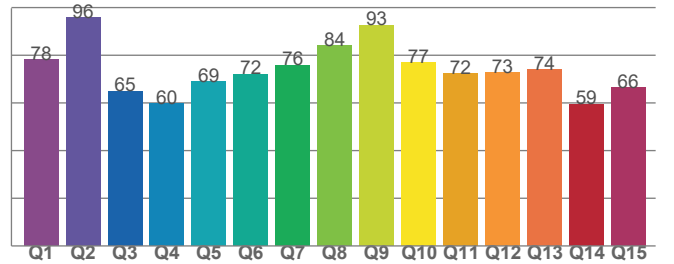
TM30-18 R_f-values per hue bin



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
69,7	76,5	61,5	72,6	80,4	86,1	86,3	82,3	78,9	63,0	61,4	69,2	82,7	79,3	73,4	71,1

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
78,0	95,8	64,9	59,7	68,9	71,9	75,9	84,0	92,6	77,0	72,2	72,7	74,0	59,4	66,5

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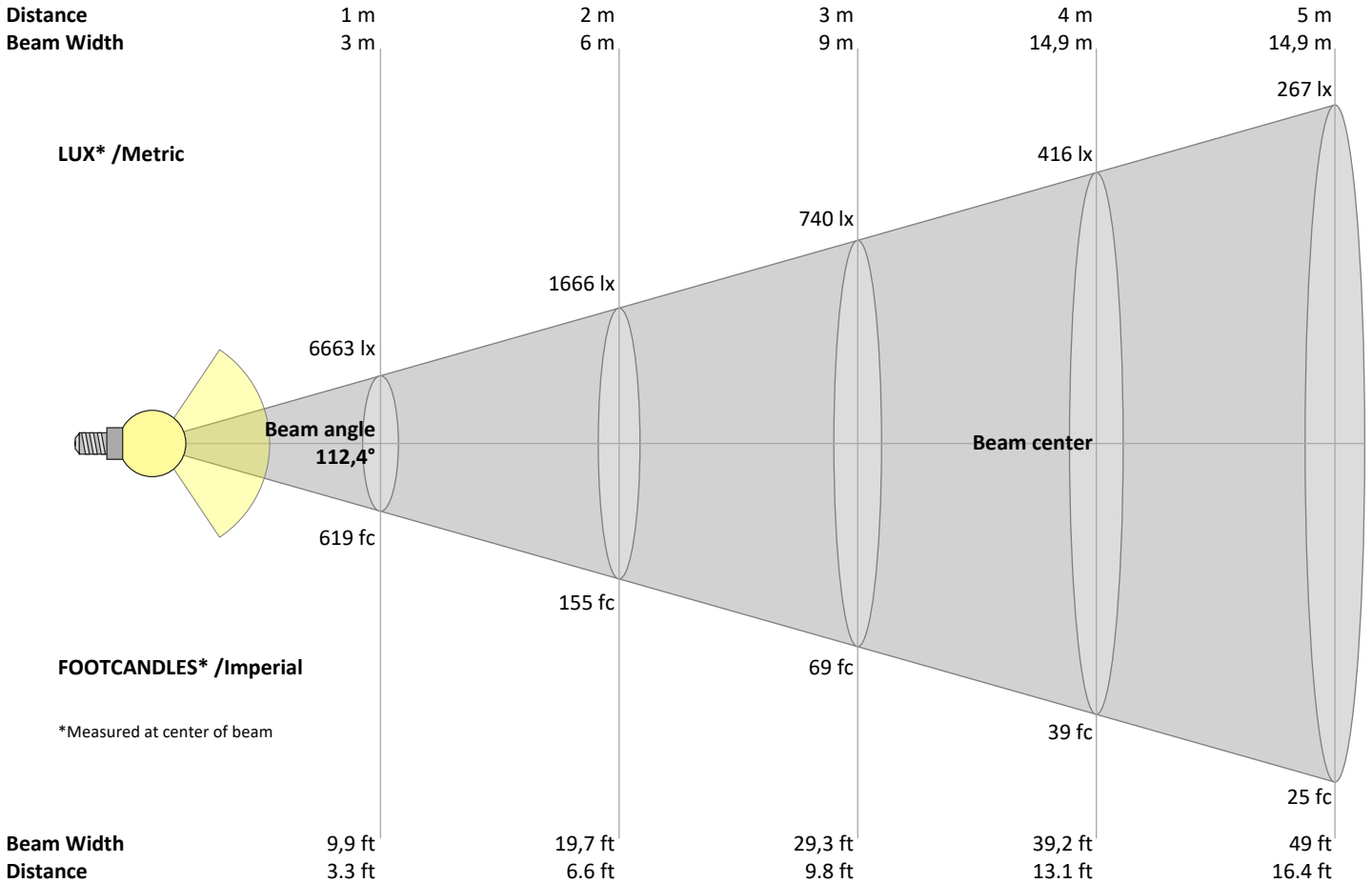
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Beam Details



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
6663	1666	740	416	267	185	136	104	82	67	55	46	39	34	30	26	23	21	18	17	lux
619	154,8	68,8	38,7	24,8	17,2	12,6	9,7	7,6	6,2	5,1	4,3	3,7	3,2	2,8	2,4	2,1	1,9	1,7	1,5	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
6663	6641	6582	6467	6335	6237	6236	6601	7245	7312	5889	4135	2844	1825	1105	678	413	217	75	13	cd
100%	100%	99%	97%	95%	94%	94%	99%	109%	110%	88%	62%	43%	27%	17%	10%	6%	3%	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
6663	6641	6582	6467	6335	6237	6236	6601	7245	7312	5889	4135	2844	1825	1105	678	413	217	75	13	cd
100%	100%	99%	97%	95%	94%	94%	99%	109%	110%	88%	62%	43%	27%	17%	10%	6%	3%	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
6663	6641	6582	6467	6335	6237	6236	6601	7245	7312	5889	4135	2844	1825	1105	678	413	217	75	13	cd
100%	100%	99%	97%	95%	94%	94%	99%	109%	110%	88%	62%	43%	27%	17%	10%	6%	3%	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
6663	6641	6582	6467	6335	6237	6236	6601	7245	7312	5889	4135	2844	1825	1105	678	413	217	75	13	cd
100%	100%	99%	97%	95%	94%	94%	99%	109%	110%	88%	62%	43%	27%	17%	10%	6%	3%	1%	0%	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	33,3	34,5	33,5	34,8	35,0	33,3	34,5	33,5	34,8	35,0
	3H	33,7	34,9	34,1	35,2	35,4	33,7	34,9	34,1	35,2	35,4
	4H	33,8	35,0	34,2	35,2	35,5	33,8	35,0	34,2	35,2	35,5
	6H	34,0	35,0	34,3	35,3	35,7	34,0	35,0	34,3	35,3	35,7
	8H	34,0	35,0	34,4	35,3	35,7	34,0	35,0	34,4	35,3	35,7
	12H	34,0	35,0	34,4	35,3	35,8	34,0	35,0	34,4	35,3	35,8
4H	2H	33,5	34,6	33,9	34,9	35,2	33,5	34,6	33,9	34,9	35,2
	3H	34,1	35,1	34,5	35,4	35,9	34,1	35,1	34,5	35,4	35,9
	4H	34,3	35,1	34,7	35,6	36,1	34,3	35,1	34,7	35,6	36,1
	6H	34,5	35,3	35,0	35,7	36,0	34,5	35,3	35,0	35,7	36,0
	8H	34,5	35,3	35,1	35,7	36,0	34,5	35,3	35,1	35,7	36,0
	12H	34,6	35,2	35,1	35,6	36,1	34,6	35,2	35,1	35,6	36,1
8H	4H	34,3	35,1	34,9	35,5	35,8	34,3	35,1	34,9	35,5	35,8
	6H	34,6	35,2	35,1	35,6	36,2	34,6	35,2	35,1	35,6	36,2
	8H	34,8	35,3	35,3	35,8	36,4	34,8	35,3	35,3	35,8	36,4
	12H	34,9	35,3	35,5	35,8	36,4	34,9	35,3	35,5	35,8	36,4
12H	4H	34,3	34,9	34,8	35,4	35,8	34,3	34,9	34,8	35,4	35,8
	6H	34,7	35,1	35,2	35,7	36,3	34,7	35,1	35,2	35,7	36,3
	8H	34,8	35,2	35,4	35,7	36,3	34,8	35,2	35,4	35,7	36,3

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

S = 1.0H	0,3 / -0,3	0,3 / -0,3
S = 1.5H	1,0 / -1,1	1,0 / -1,1
S = 2.0H	2,0 / -2,1	2,0 / -2,1

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	110	105	101	98	107	103	100	96	99	96	93	95	93	90	91	89	88	86
2	100	93	86	81	98	91	85	80	87	82	78	84	80	76	81	78	75	72
3	92	82	74	68	89	80	73	67	77	71	66	74	69	65	72	67	64	61
4	84	72	64	57	82	71	63	57	68	62	56	66	60	55	64	59	55	52
5	77	64	56	49	75	63	55	49	61	54	48	59	53	48	57	52	47	45
6	71	58	49	43	69	57	48	42	55	48	42	53	47	42	52	46	41	39
7	66	52	43	37	64	51	43	37	50	42	37	48	42	37	47	41	36	34
8	61	47	39	33	59	47	38	33	45	38	33	44	37	32	43	37	32	30
9	57	43	35	29	55	43	35	29	41	34	29	40	34	29	39	33	29	27
10	53	40	32	26	52	39	31	26	38	31	26	37	31	26	36	30	26	24

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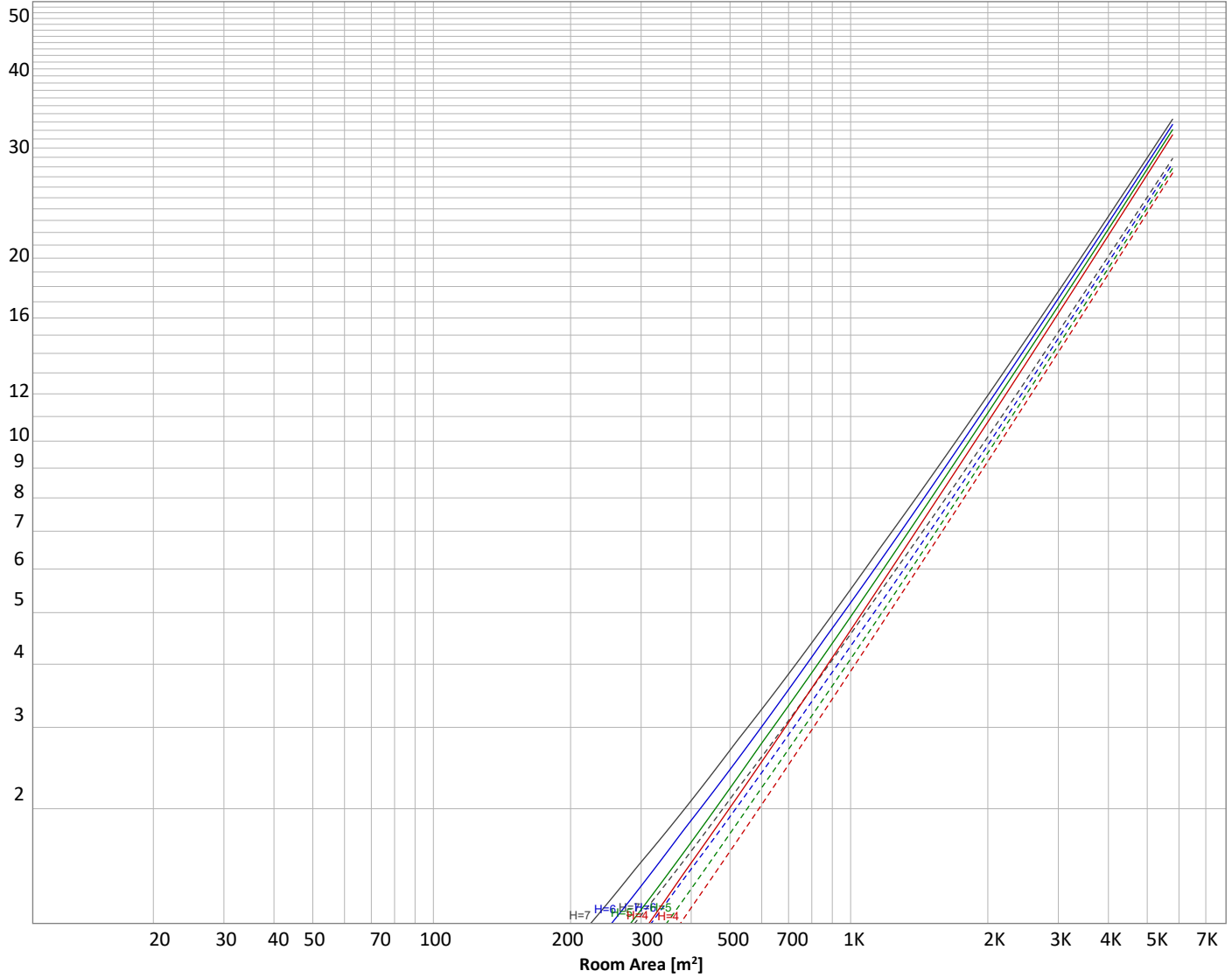
Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 21610 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°
632 lm	1829 lm	2890 lm	4171 lm	5527 lm	3725 lm	1832 lm	726 lm	242 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
17,3 lm	1,33 lm	2,55 lm	3,31 lm	3,24 lm	2,79 lm	2,14 lm	1,33 lm	0,469 lm

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Operator:



Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	632 lm	2,9%
10-20°	1829 lm	8,5%
20-30°	2890 lm	13,4%
30-40°	4171 lm	19,3%
40-50°	5527 lm	25,6%
50-60°	3725 lm	17,2%
60-70°	1832 lm	8,5%
70-80°	726 lm	3,4%
80-90°	242 lm	1,1%
90-100°	17 lm	0,1%
100-110°	1 lm	0,0%
110-120°	3 lm	0,0%
120-130°	3 lm	0,0%
130-140°	3 lm	0,0%
140-150°	3 lm	0,0%
150-160°	2 lm	0,0%
160-170°	1 lm	0,0%
170-180°	0 lm	0,0%
Total	21610 lm	100,0%

Intensity peaks

Max intensity	7471 cd
Intensity, 90°	75 cd
Intensity, 0°	6663 cd

Zonal Lumen summary

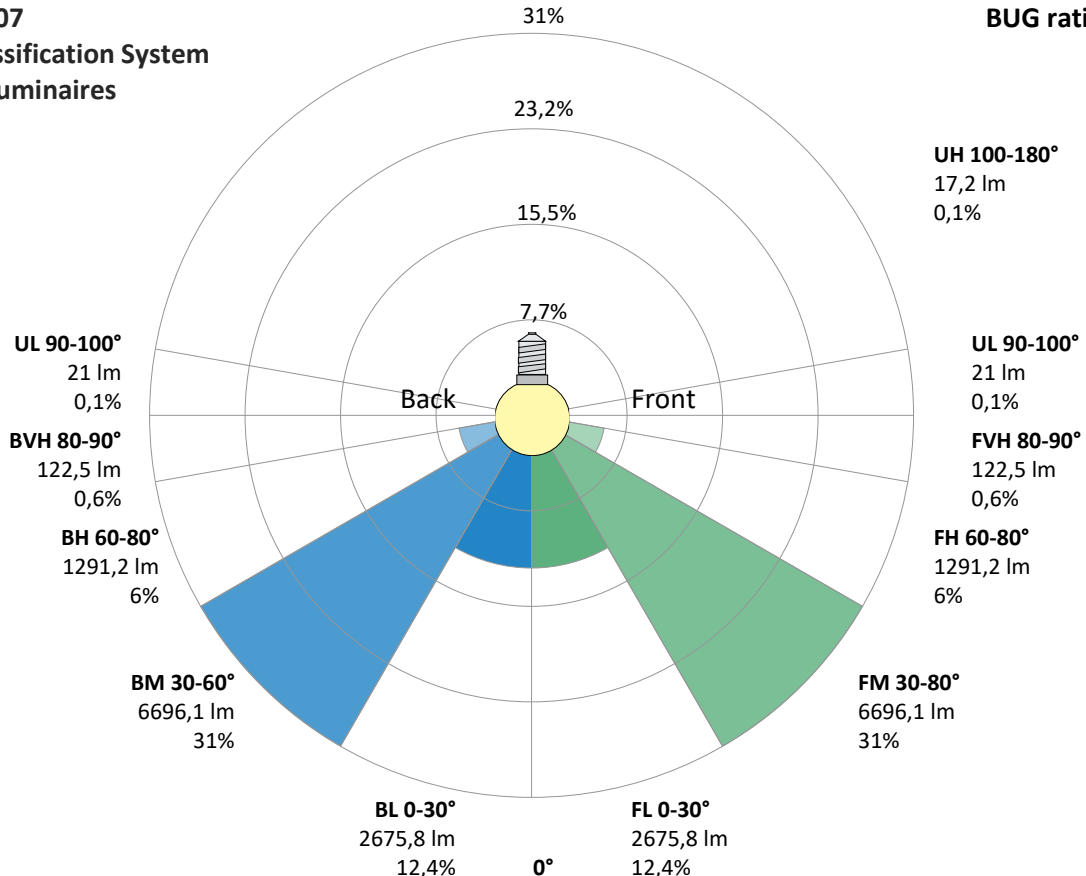
Zone (γ)	Lumen	% Total
0-30°	5352 lm	24,8%
0-40°	9523 lm	44,1%
0-60°	18775 lm	86,9%
60-90°	2800 lm	13,0%
70-100°	985 lm	4,6%
90-120°	21 lm	0,1%
0-90°	21575 lm	99,8%
90-180°	34 lm	0,2%
0-180°	21610 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	2676 lm	12,4%
Medium(30-60°)	6696 lm	31,0%
High(60-80°)	1291 lm	6,0%
Very high(80-90°)	123 lm	0,6%
Back light		
Low(0-30°)	2676 lm	12,4%
Medium(30-60°)	6696 lm	31,0%
High(60-80°)	1291 lm	6,0%
Very high(80-90°)	123 lm	0,6%
Uplight		
Low(90-100°)	21 lm	0,1%
High(100-180°)	17 lm	0,1%

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

BUG rating B4 U2 G2



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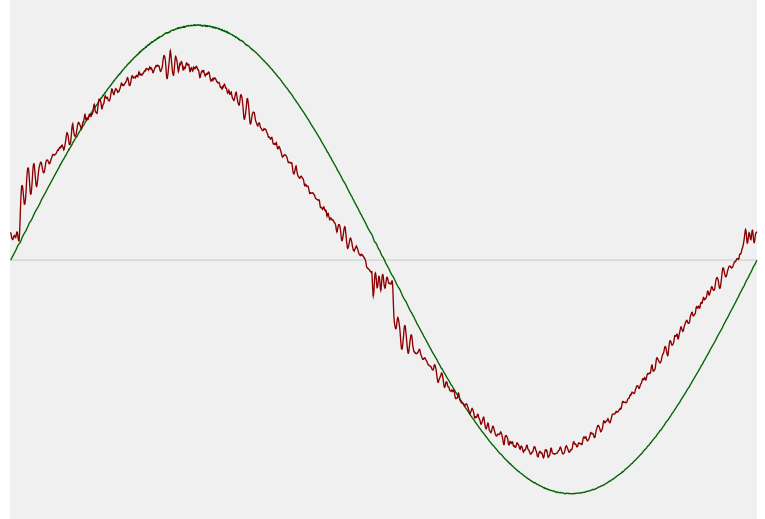


Power Details

Input Power

Power feed to light source	134,5 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,600 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	137,94 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,98
Total harmonic distortion of the current	4,34%
Total harmonic distortion of the voltage	0,07%

Input Power Curve



Efficiency

Radiated power efficiency	47,0%
Lumen efficiency	161 lm/W

Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	5001 K
CCT shift	-1 K
CCT end	5000 K

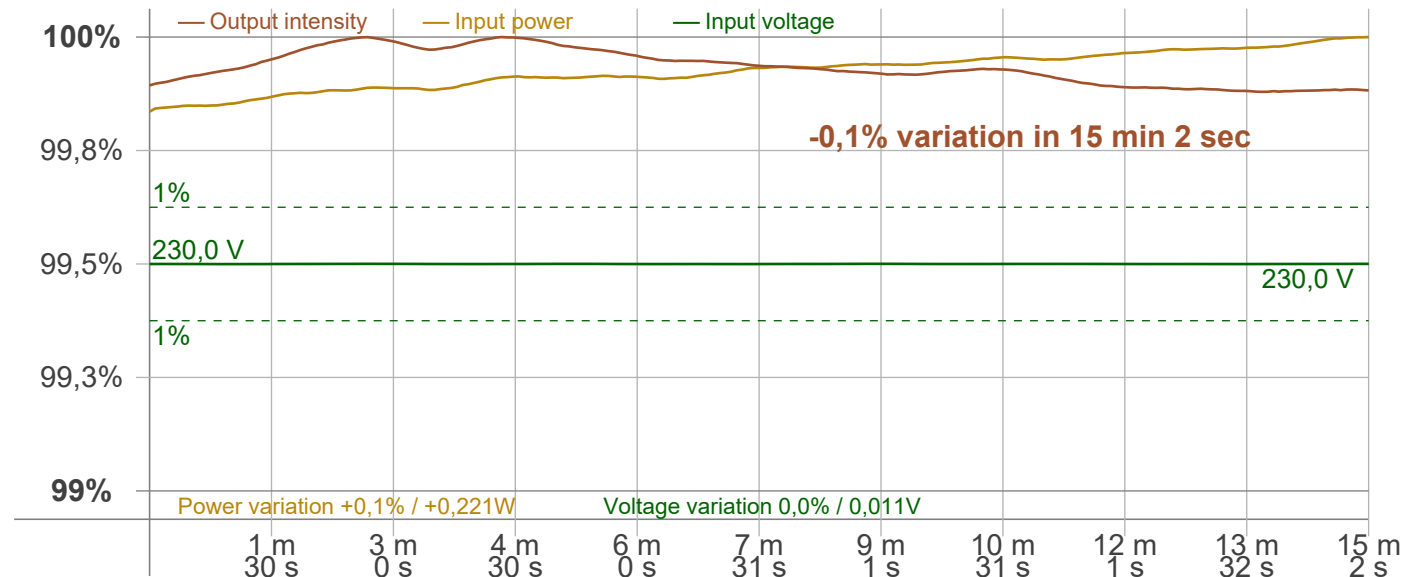
Warmup Result

Total warmup time	Lamp stabilized in 15 min 2 sec
Warmup variation	-0,1%

Output Change

Output start	21611 lm
Output change	-1 lm
Output end	21610 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 500 Hz
 Percent Flicker 0,64 %
 Flicker index 0

Flicker indices according to California Energy Commission (CEC) 2016b

JA8/10 40 Hz 0,22 %
 JA8/10 90 Hz 0,23 %
 JA8/10 200 Hz 0,32 %
 JA8/10 400 Hz 0,37 %
 JA8/10 1000 Hz 0,61 %

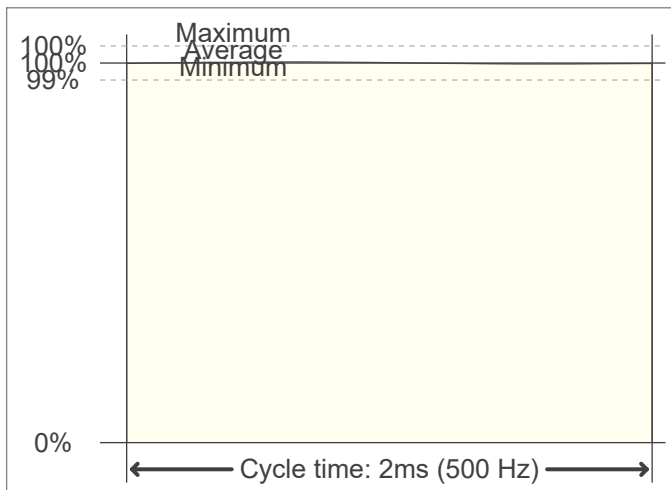
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz) 0,11
 SVM value (80 < F < 2000 Hz) 0

Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp 0,04

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

