

Light Measurement Report

Print date: 29-9-2025

Measurement date and time: 26-9-2025 13:01:45 – Measurement no. VFR-250926-3407-MS

Measurement tracking No. and Link: [VT250926-008416](#)

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

36 planes – 10°
5°
2,89 m
97,8 W – PF 0,98 – DPF 0,99
230 V – 0,432 A
50 Hz
Lamp stabilized in 15 min 2 sec – 2,0%

Tested Light Source

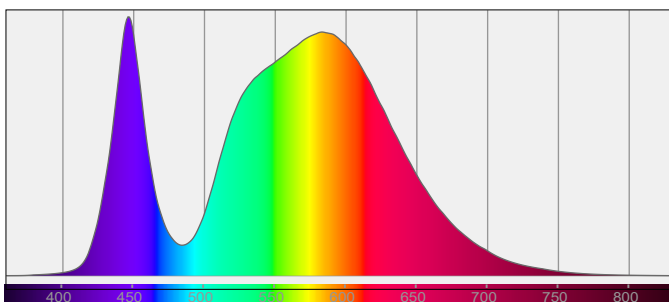
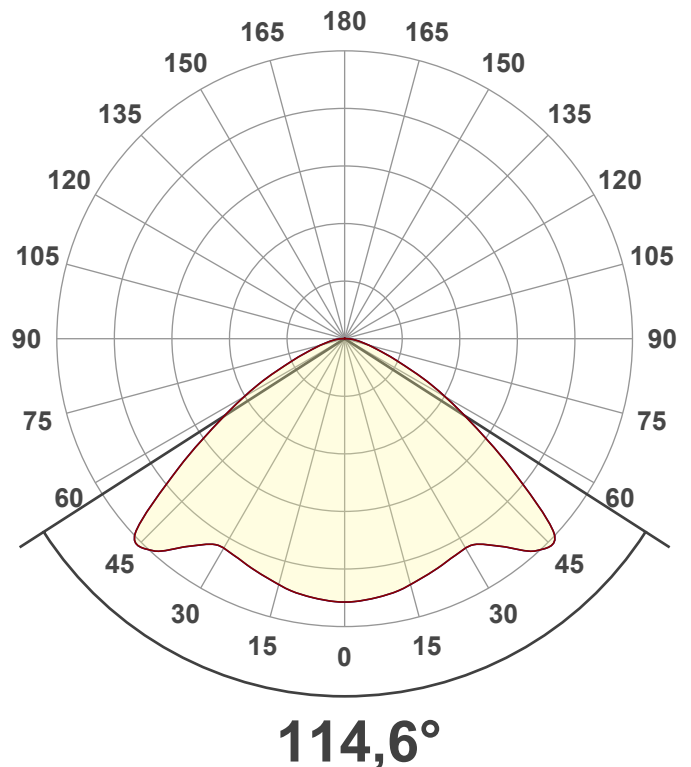
Product Name
Item No. and Manufacturer
Product Description (line 1)
SWITCH

812713-4000K-100W
812713-4000K-100W – Dutchfulfillment
LED HIGHBAY ARGOS | 0-10V | 100W/80W/60W | 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

12757 lm – 0,16% / 99,84%
130 lm/W
4274 cd – 114,6°
CCT = 4000 K / 4139 K
CRI 71,8
 R_f 73,4 – R_g 95,0
Duv 0,0016 – SDCM 3,1
SVM 0 – PstLM 0,08



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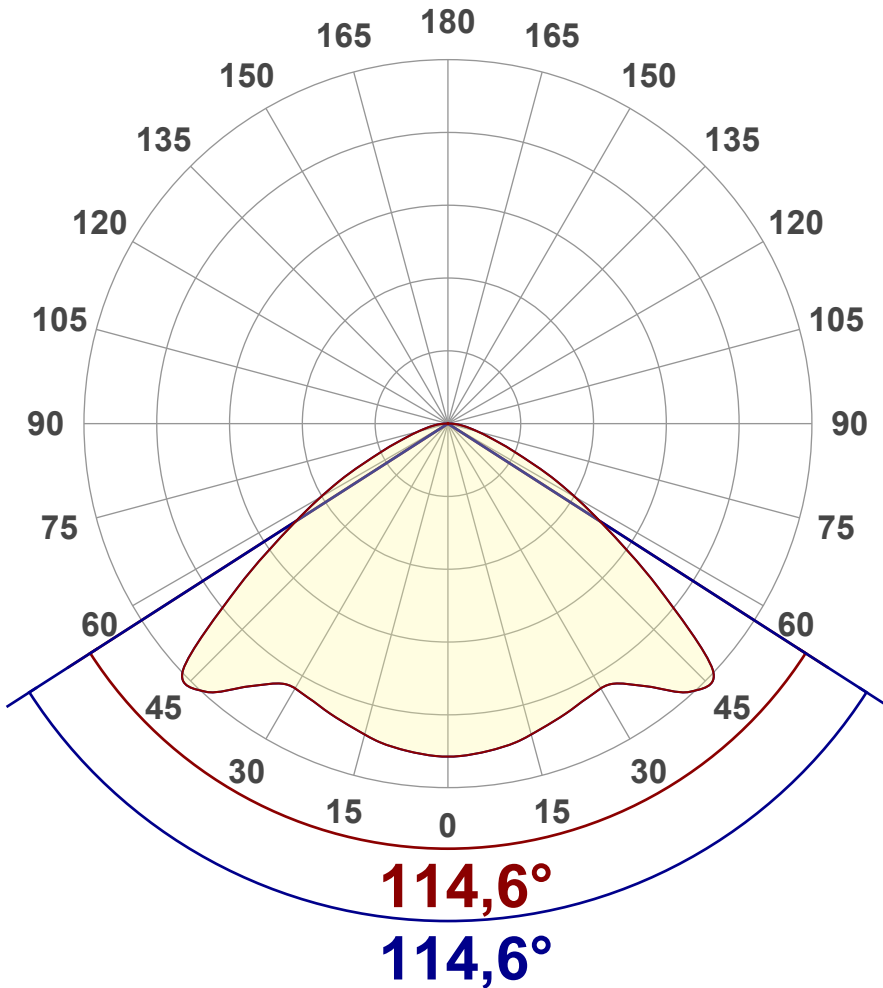
Measurement tracking No. and Link: [VT250926-008416](#)

Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	12757 lm
Lumen Up% / Down%	0,16% / 99,84%
Peak Intensity	4274 cd
Beam Angle (50%)	114,6°
Beam Angle (90%)	114,6°
Beam Angle (10%)	114,6°

Cut-off Angle

Average 2,5%	171,4°
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Field Angle

Average 10%	147,6°
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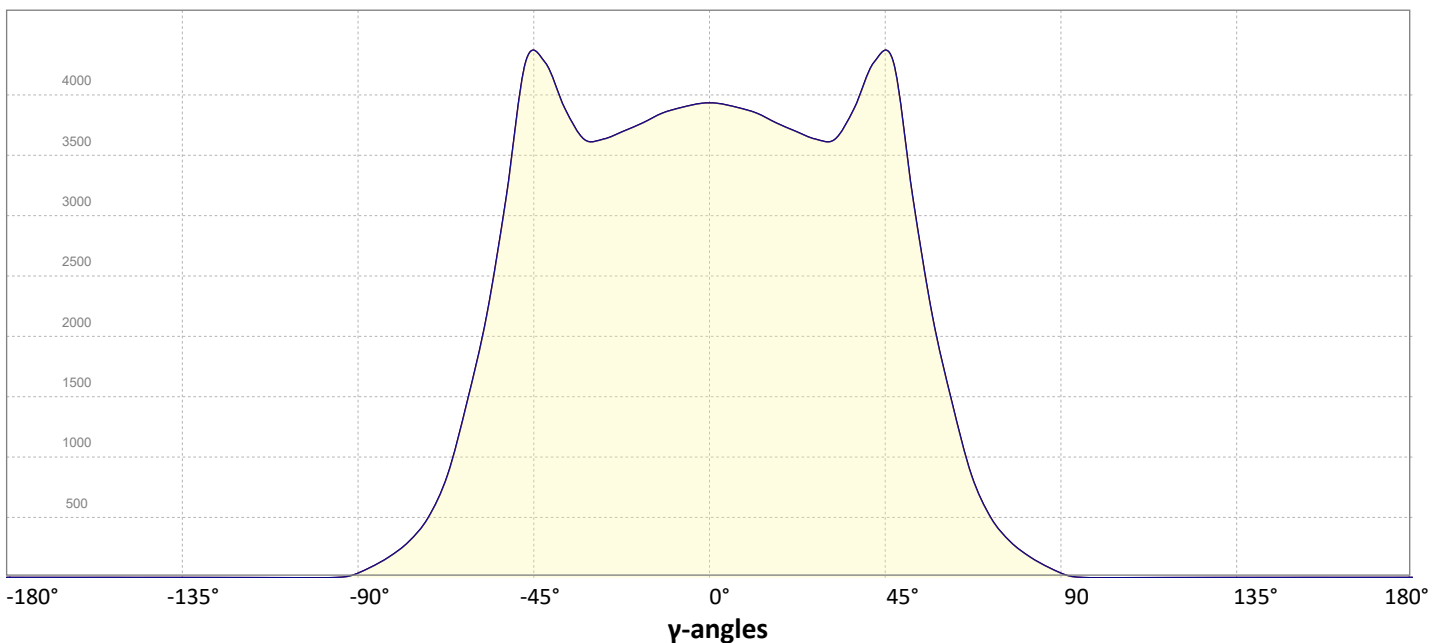
Intensity Ratio

In 120° cone	87,0%
In 90° cone	55,7%

C000-C180

C090-C270

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



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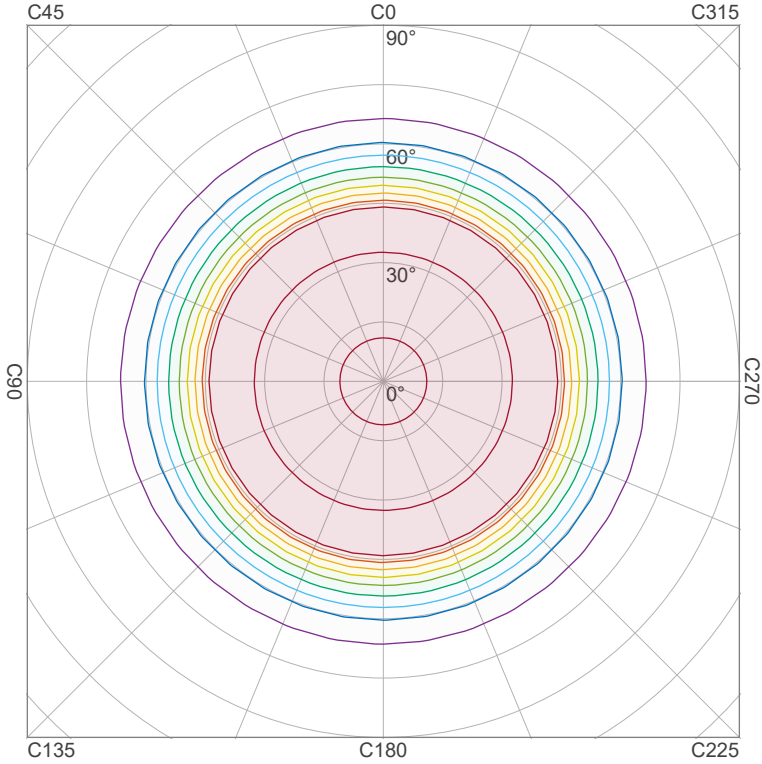
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Operator:



Iso-intensity Diagram (Iso-candela)

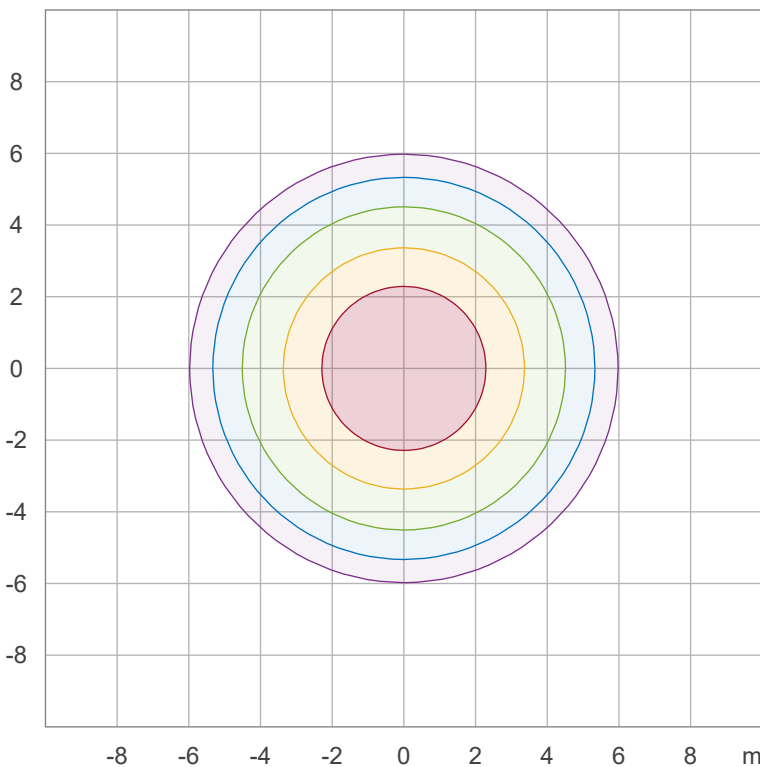


90 %	3846,8 cd
80 %	3419,4 cd
70 %	2992,0 cd
60 %	2564,5 cd
50 %	2137,1 cd
40 %	1709,7 cd
30 %	1282,3 cd
20 %	854,8 cd
10 %	427,4 cd

Peak intensity: 4274,2 cd

Number of c-planes: 36

Iso-illuminance Diagram (Iso-lux)



50,0 %	218,3 lx
30,0 %	131,0 lx
10,0 %	43,7 lx
5,0 %	21,8 lx
3,0 %	13,1 lx

Peak illuminance: 436,7 lx

Mounting height: 3,0 m

Number of c-planes: 36

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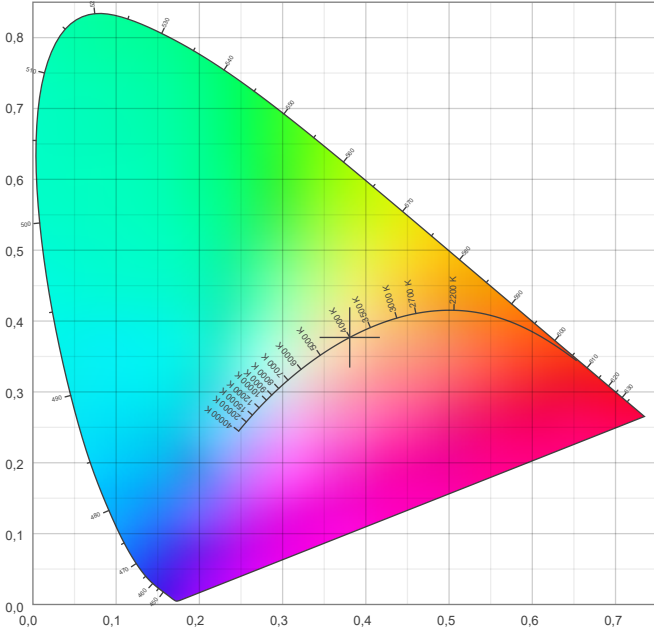


Color details

Correlated Color Temperature, Target CCT = 4000 K
 Correlated Color Temperature, Measured CCT = 4139 K
 Color Rendering Index CRI 71,8
 Color Rendering Index, R9 (red component) R9 = -26,9
 Color Rendering TM30-18 R_f 73,4 – R_g 95,0
 Color Quality Scale CQS = 71,7

MacAdam Steps SDCM = 3,1
 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 = 0,0016
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,225;0,502)

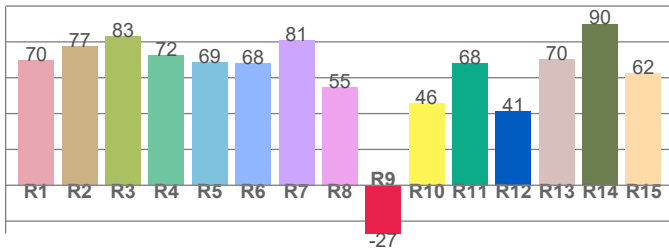
CIE 1931



CIE 1931 – zoomed on Planckian locus



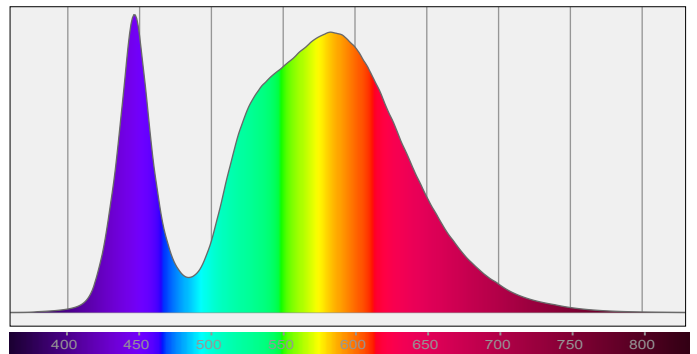
Color Rendering Index per reference color (CIE 1995)



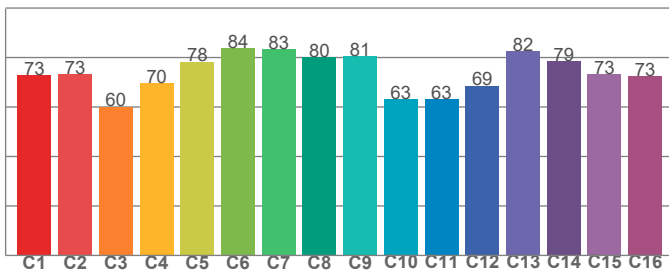
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
69,5	77,3	82,9	72,4	68,8	68,1	81,0	54,8	-26,9	45,5	68,2	41,4	70,5	90,1	62,3

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



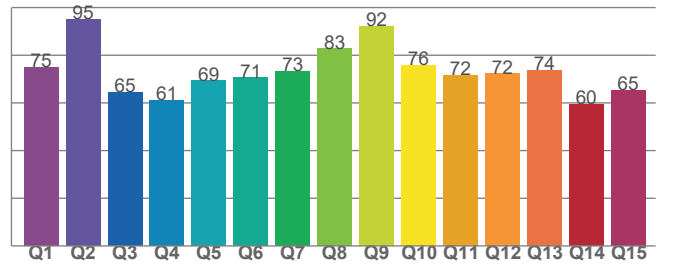
TM30-18 Rf-values per hue bin



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
72,8	73,1	60,1	69,7	78,3	83,7	83,4	80,2	80,6	63,2	63,0	68,6	82,5	78,5	73,2	72,5

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
74,9	95,1	64,6	61,2	69,3	70,5	73,4	82,8	92,2	75,8	71,6	72,2	73,8	59,5	65,3

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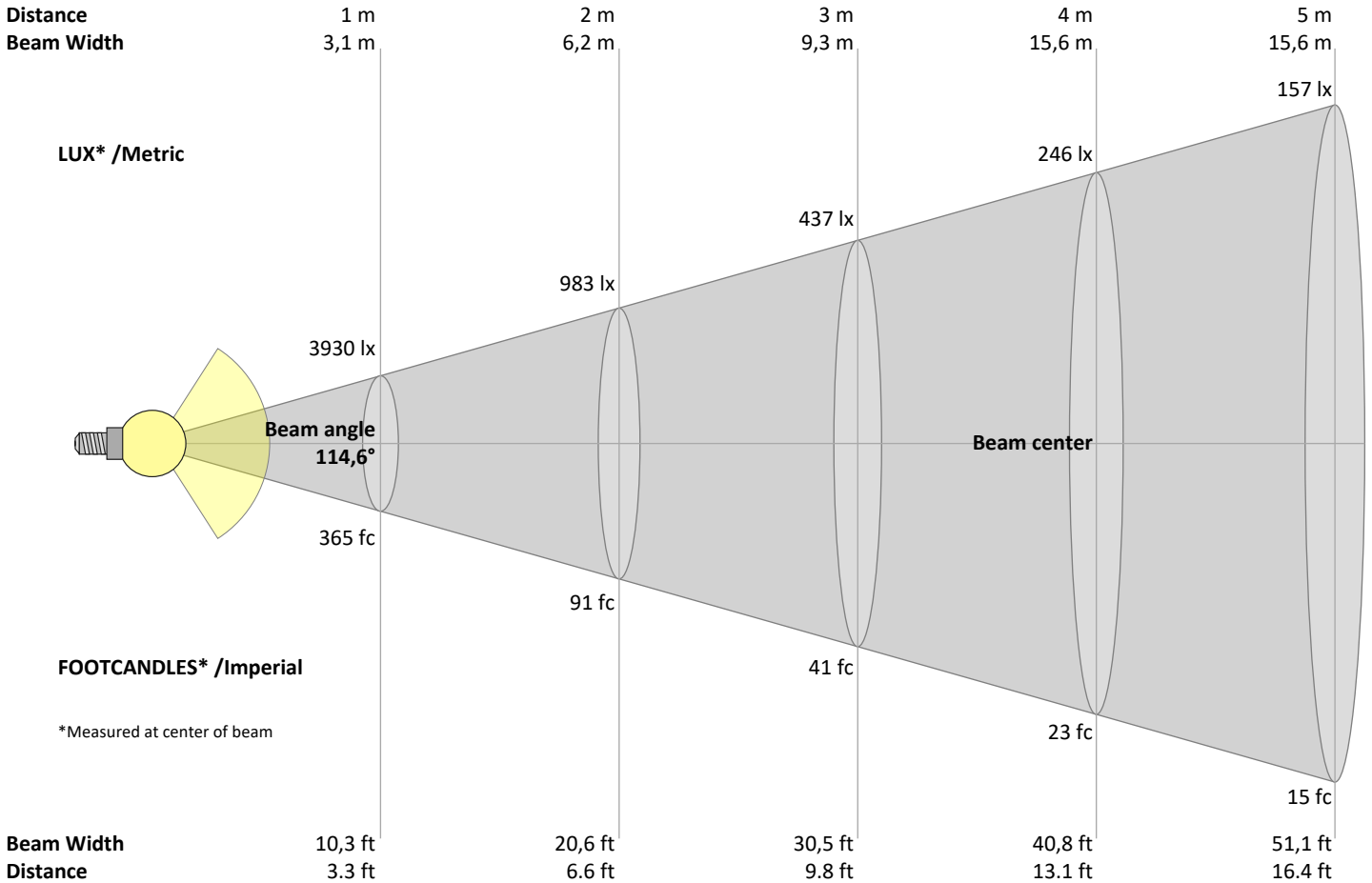
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Operator:



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
3930	983	437	246	157	109	80	61	49	39	32	27	23	20	17	15	14	12	11	10	lux
365,1	91,3	40,6	22,8	14,6	10,1	7,5	5,7	4,5	3,7	3	2,5	2,2	1,9	1,6	1,4	1,3	1,1	1	0,9	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
3930	3911	3869	3802	3728	3661	3633	3782	4111	4272	3615	2576	1753	1103	644	380	225	120	43	7	cd
100%	100%	98%	97%	95%	93%	92%	96%	105%	109%	92%	66%	45%	28%	16%	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
3930	3911	3869	3802	3728	3661	3633	3782	4111	4272	3615	2576	1753	1103	644	380	225	120	43	7	cd
100%	100%	98%	97%	95%	93%	92%	96%	105%	109%	92%	66%	45%	28%	16%	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
3930	3911	3869	3802	3728	3661	3633	3782	4111	4272	3615	2576	1753	1103	644	380	225	120	43	7	cd
100%	100%	98%	97%	95%	93%	92%	96%	105%	109%	92%	66%	45%	28%	16%	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
3930	3911	3869	3802	3728	3661	3633	3782	4111	4272	3615	2576	1753	1103	644	380	225	120	43	7	cd
100%	100%	98%	97%	95%	93%	92%	96%	105%	109%	92%	66%	45%	28%	16%	10%	6%	3%	1%	0%	of 0°val

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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	31,6	32,8	31,9	33,1	33,4	31,6	32,8	31,9	33,1	33,4
	3H	32,0	33,2	32,4	33,5	33,7	32,0	33,2	32,4	33,5	33,7
	4H	32,1	33,3	32,5	33,6	33,8	32,1	33,3	32,5	33,6	33,8
	6H	32,3	33,3	32,6	33,6	33,9	32,3	33,3	32,6	33,6	33,9
	8H	32,3	33,3	32,6	33,6	34,0	32,3	33,3	32,6	33,6	34,0
	12H	32,3	33,2	32,7	33,6	34,0	32,3	33,2	32,7	33,6	34,0
4H	2H	31,8	33,0	32,3	33,3	33,5	31,8	33,0	32,3	33,3	33,5
	3H	32,5	33,4	32,8	33,8	34,2	32,5	33,4	32,8	33,8	34,2
	4H	32,6	33,4	33,0	33,9	34,4	32,6	33,4	33,0	33,9	34,4
	6H	32,7	33,6	33,2	33,9	34,3	32,7	33,6	33,2	33,9	34,3
	8H	32,8	33,5	33,3	33,9	34,3	32,8	33,5	33,3	33,9	34,3
	12H	32,8	33,4	33,3	33,9	34,3	32,8	33,4	33,3	33,9	34,3
8H	4H	32,6	33,4	33,1	33,7	34,1	32,6	33,4	33,1	33,7	34,1
	6H	32,8	33,4	33,4	33,9	34,4	32,8	33,4	33,4	33,9	34,4
	8H	33,0	33,5	33,5	34,0	34,6	33,0	33,5	33,5	34,0	34,6
	12H	33,1	33,5	33,7	34,0	34,6	33,1	33,5	33,7	34,0	34,6
12H	4H	32,6	33,2	33,1	33,6	34,1	32,6	33,2	33,1	33,6	34,1
	6H	32,9	33,4	33,4	33,9	34,5	32,9	33,4	33,4	33,9	34,5
	8H	33,0	33,4	33,6	33,9	34,5	33,0	33,4	33,6	33,9	34,5

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

S = 1.0H	0,4 / -0,3	0,4 / -0,3
S = 1.5H	1,1 / -1,2	1,1 / -1,2
S = 2.0H	2,1 / -2,3	2,1 / -2,3

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	111	111	106	106	106	102	102	102	100	100
1	110	105	101	98	107	103	100	96	99	96	93	95	93	90	91	90	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	63	61
4	84	72	64	57	82	71	63	57	68	61	56	66	60	55	64	59	54	52
5	77	64	55	49	75	63	55	49	61	54	48	59	53	48	57	52	47	45
6	71	58	49	42	69	57	48	42	55	47	42	53	46	41	52	46	41	39
7	65	52	43	37	64	51	43	37	50	42	37	48	41	36	47	41	36	34
8	61	47	39	33	59	46	38	33	45	38	32	44	37	32	43	37	32	30
9	56	43	35	29	55	42	34	29	41	34	29	40	33	29	39	33	29	27
10	53	39	31	26	51	39	31	26	38	31	26	37	30	26	36	30	26	24

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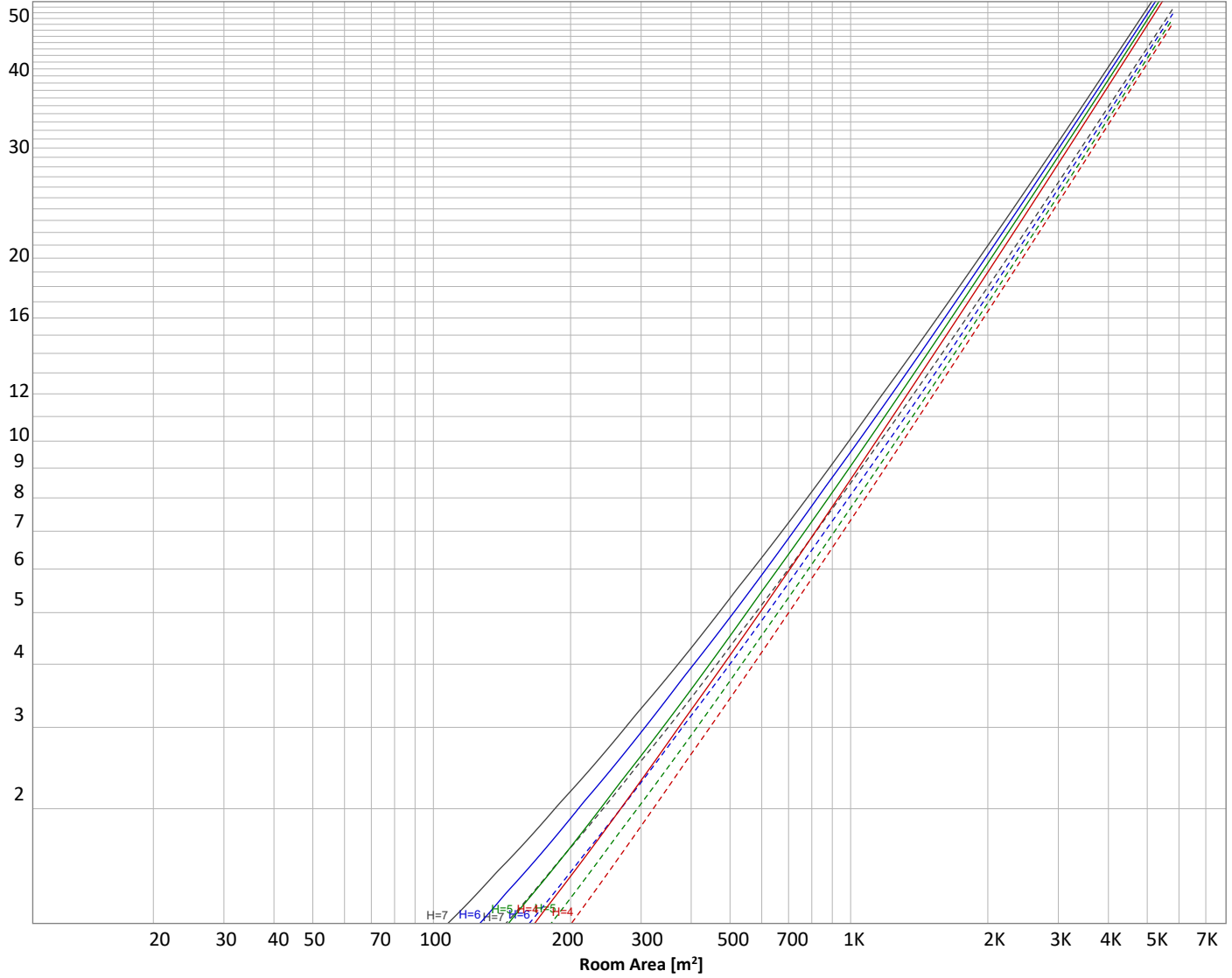
Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 12757 lm			
H _{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	ρ(%) 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°
372 lm	1076 lm	1695 lm	2386 lm	3268 lm	2307 lm	1099 lm	404 lm	132 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
8,46 lm	0,902 lm	1,70 lm	2,18 lm	2,23 lm	1,88 lm	1,51 lm	0,913 lm	0,318 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	372 lm	2,9%
10-20°	1076 lm	8,4%
20-30°	1695 lm	13,3%
30-40°	2386 lm	18,7%
40-50°	3268 lm	25,6%
50-60°	2307 lm	18,1%
60-70°	1099 lm	8,6%
70-80°	404 lm	3,2%
80-90°	132 lm	1,0%
90-100°	8 lm	0,1%
100-110°	1 lm	0,0%
110-120°	2 lm	0,0%
120-130°	2 lm	0,0%
130-140°	2 lm	0,0%
140-150°	2 lm	0,0%
150-160°	2 lm	0,0%
160-170°	1 lm	0,0%
170-180°	0 lm	0,0%
Total	12757 lm	100,0%

Intensity peaks

Max intensity	4274 cd
Intensity, 90°	43 cd
Intensity, 0°	3930 cd

Zonal Lumen summary

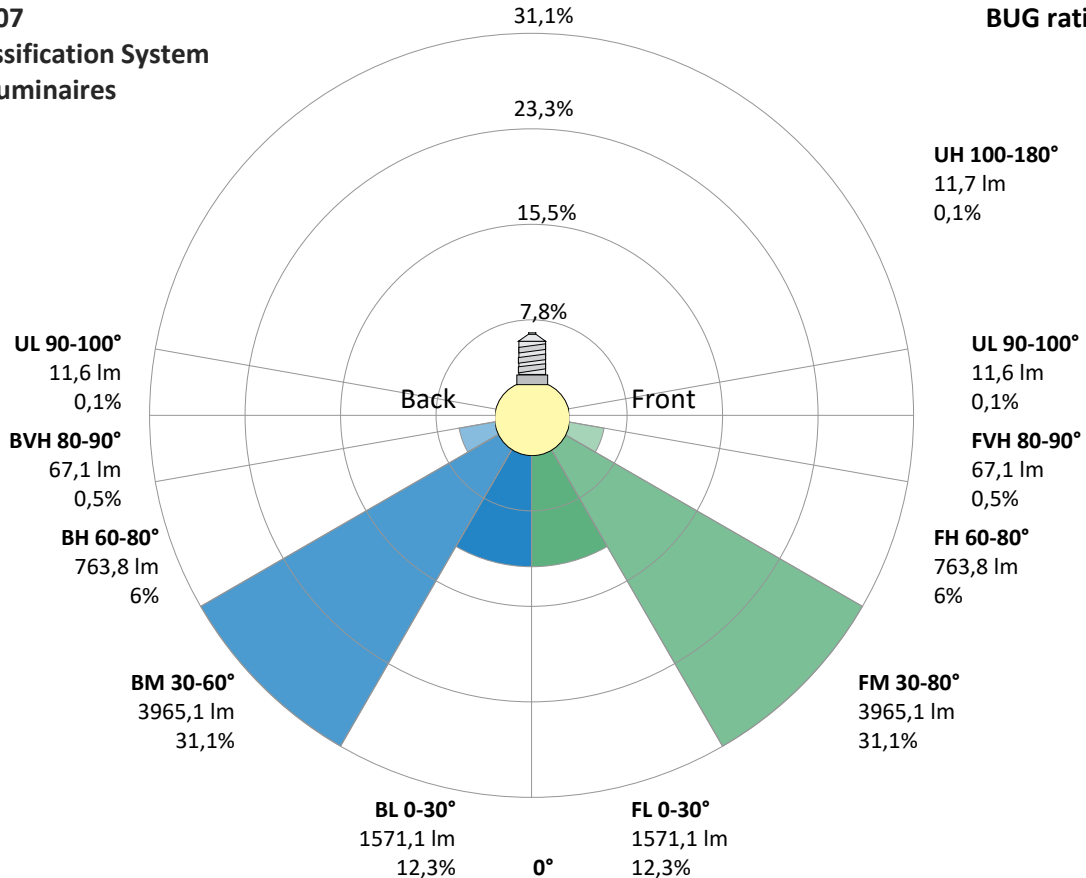
Zone (γ)	Lumen	% Total
0-30°	3143 lm	24,6%
0-40°	5528 lm	43,3%
0-60°	11102 lm	87,0%
60-90°	1635 lm	12,8%
70-100°	544 lm	4,3%
90-120°	11 lm	0,1%
0-90°	12737 lm	99,8%
90-180°	20 lm	0,2%
0-180°	12757 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	1571 lm	12,3%
Medium(30-60°)	3965 lm	31,1%
High(60-80°)	764 lm	6,0%
Very high(80-90°)	67 lm	0,5%
Back light		
Low(0-30°)	1571 lm	12,3%
Medium(30-60°)	3965 lm	31,1%
High(60-80°)	764 lm	6,0%
Very high(80-90°)	67 lm	0,5%
Uplight		
Low(90-100°)	12 lm	0,1%
High(100-180°)	12 lm	0,1%

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

BUG rating B3 U2 G1



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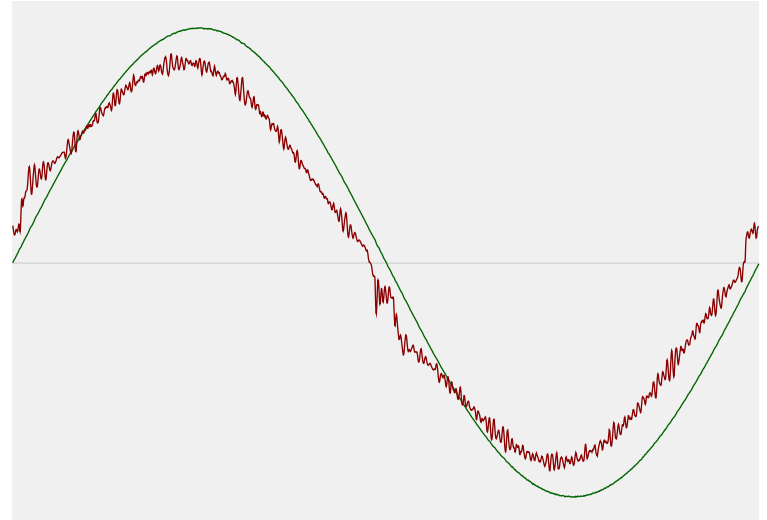


Power Details

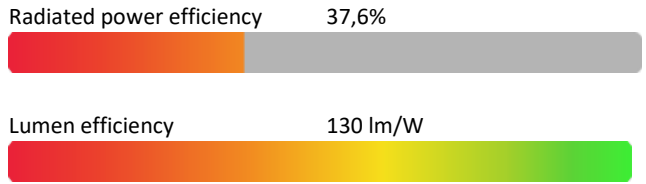
Input Power

Power feed to light source	97,8 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,432 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	99,37 VA
Displacement factor of AC power feed	0,99
Power factor of AC current feed	0,98
Total harmonic distortion of the current	4,25%
Total harmonic distortion of the voltage	0,05%

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	4018 K
CCT shift	-18 K
CCT end	4000 K

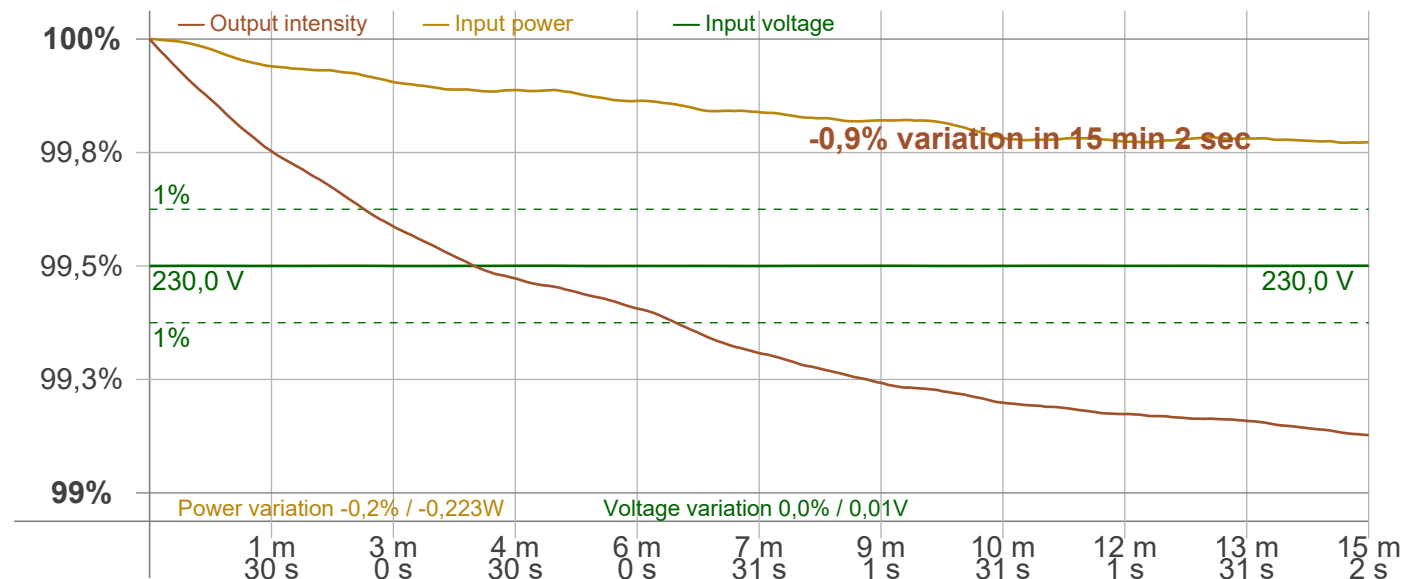
Warmup Result

Total warmup time	Lamp stabilized in 15 min 2 sec
Warmup variation	-0,9%

Output Change

Output start	12874 lm
Output change	-116 lm
Output end	12757 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 0,31 %
 Flicker index 0

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

JA8/10 40 Hz 0,16 %
 JA8/10 90 Hz 0,16 %
 JA8/10 200 Hz 0,24 %
 JA8/10 400 Hz 0,24 %
 JA8/10 1000 Hz 0,3 %

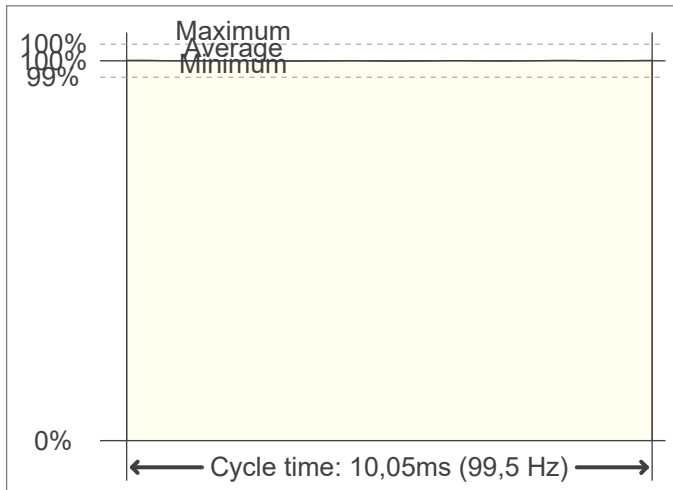
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz) 0,08
 SVM value (80 < F < 2000 Hz) 0

Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp 0,03

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

