

Light Measurement Report

Print date: 14-10-2024

Measurement date and time: 14-10-2024 16:43:08 – Measurement no. VFR-241014-1259-MS

Measurement tracking No. and Link: [VT241014-007542](#)

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

44 planes – 8,18°
5°
12,13 m
64,6 W – PF 0,97 – DPF 0,98
230 V – 0,290 A
50 Hz
Lamp stabilized in 16 min 32 sec – 2,0%

Tested Light Source

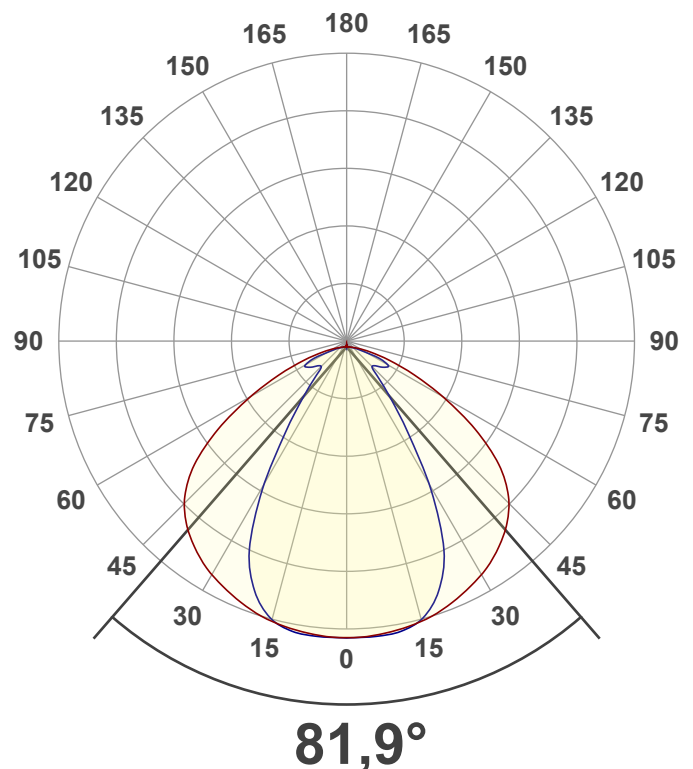
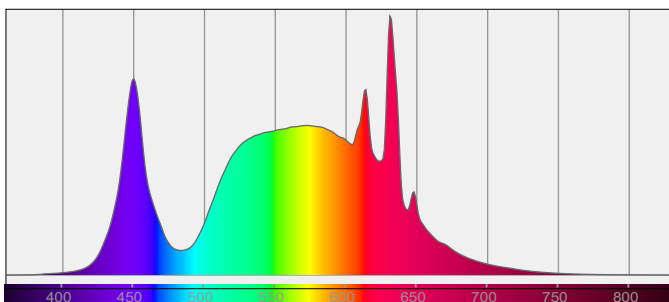
Product Name
Item No. and Manufacturer
Product Description (line 1)

276253-4000K
276253-4000K – Dutchfulfillment
LICHTLIJN JUPITER | LED MODULE | 33W/42W/58W/66W | 60°

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

11125 lm – 1,05% / 98,95%
172 lm/W
5762 cd – 81,9°
CCT = 4000 K / 4067 K
CRI 81,2
 R_f 81,3 – R_g 98,8
Duv 0,0031 – SDCM 2,7
SVM 0 – PstLM 0,01



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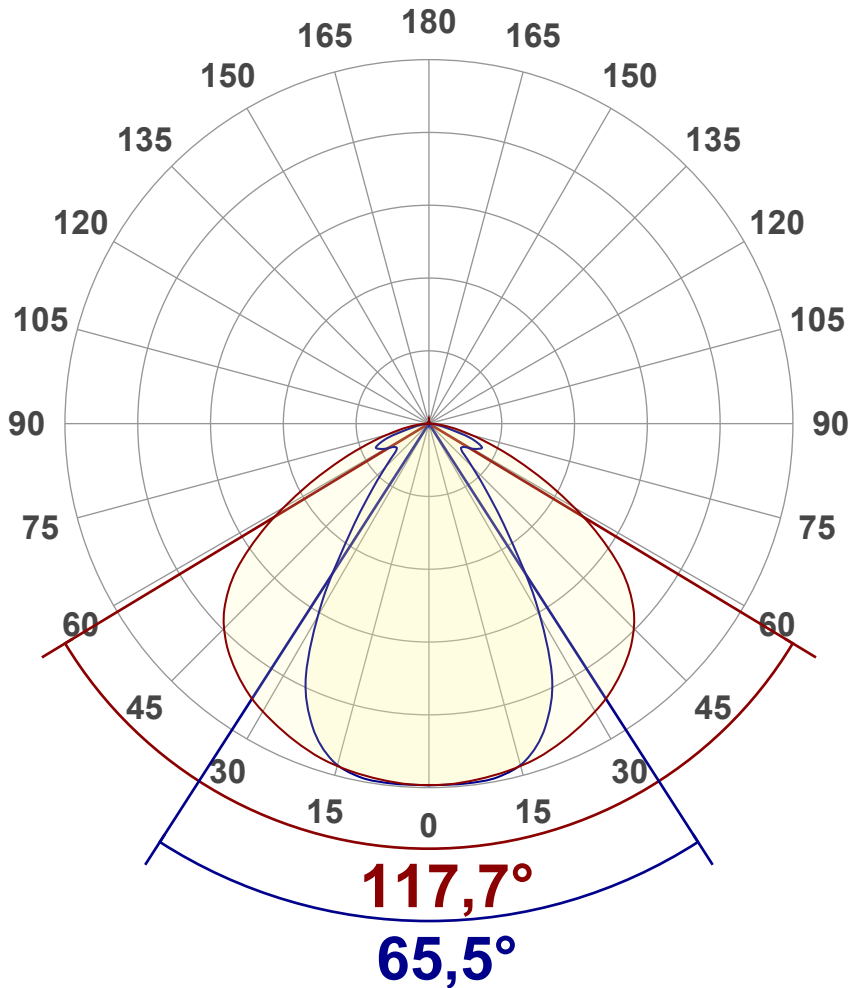
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	11125 lm
Lumen Up% / Down%	1,05% / 98,95%
Peak Intensity	5762 cd
Beam Angle (50%)	81,9°
Beam Angle (90%)	65,5°
Beam Angle (10%)	110,8°

Cut-off Angle

Average 2,5%	166,3°
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Field Angle

Average 10%	142,6°
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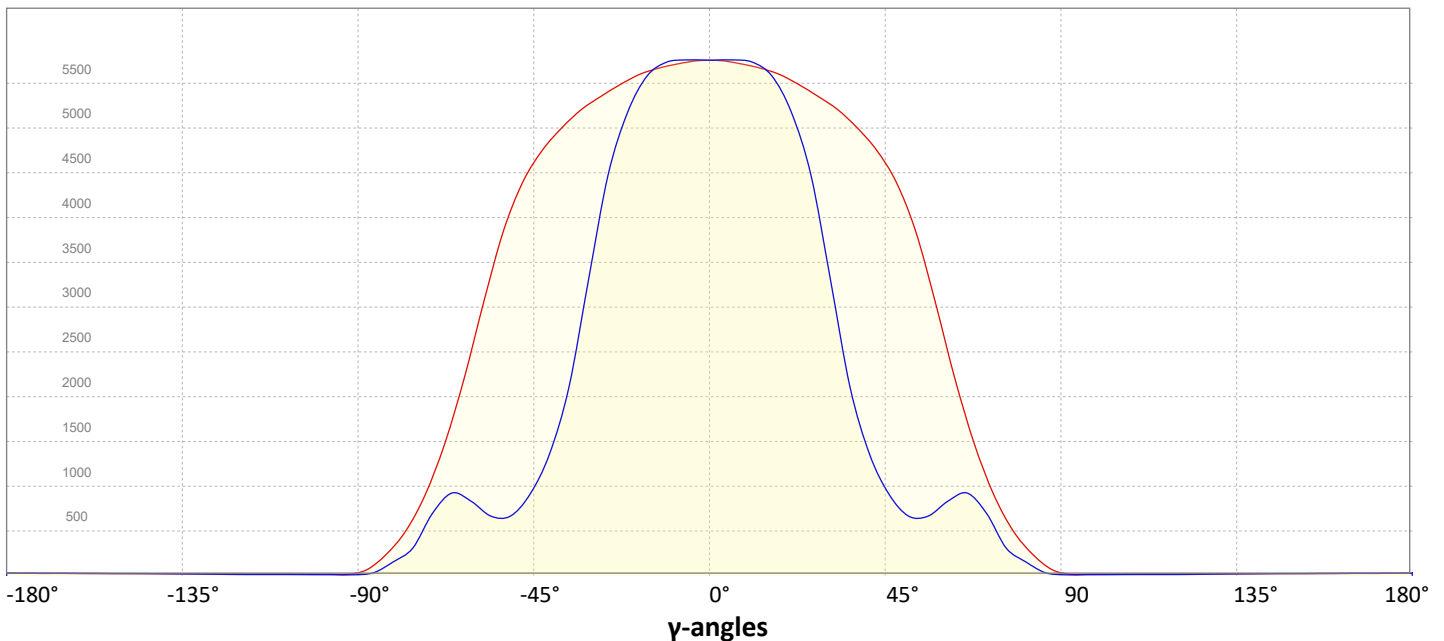
Intensity Ratio

In 120° cone	86,1%
In 90° cone	69,2%

C000-C180

C090-C270

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



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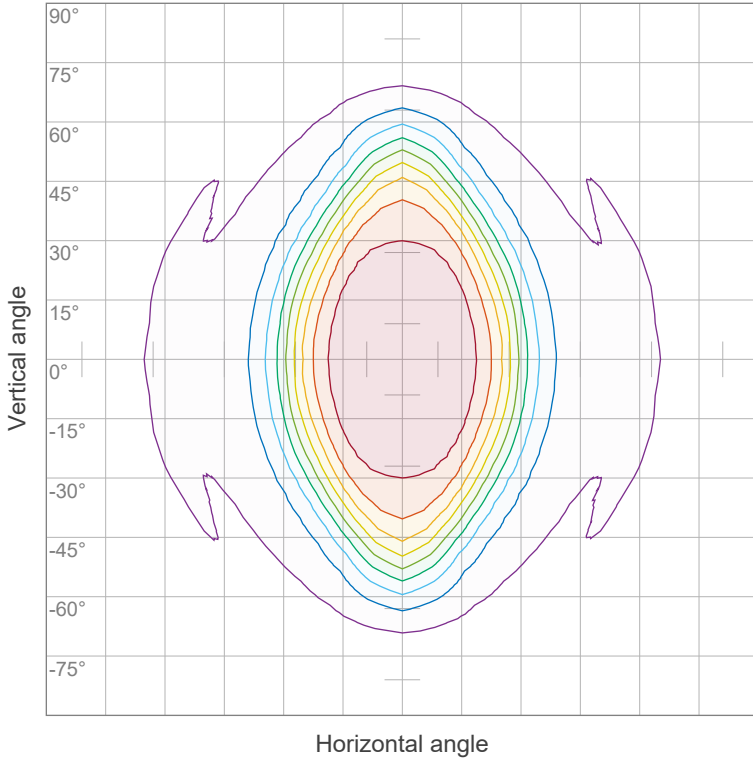
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Operator:



Iso-intensity Diagram (Iso-candela)

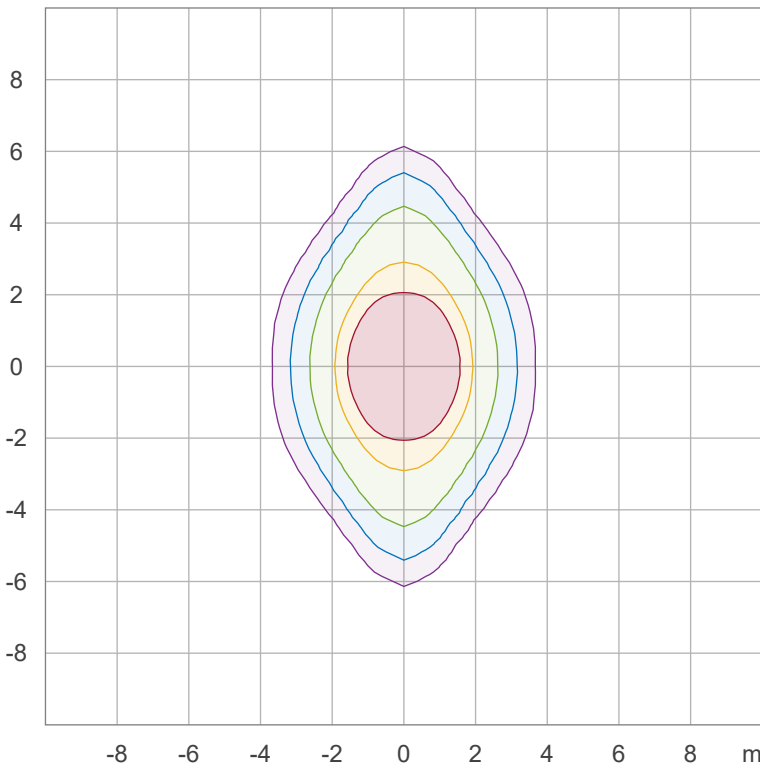


90 %	5185,5 cd
80 %	4609,3 cd
70 %	4033,2 cd
60 %	3457,0 cd
50 %	2880,8 cd
40 %	2304,7 cd
30 %	1728,5 cd
20 %	1152,3 cd
10 %	576,2 cd

Peak intensity: 5761,7 cd

Number of c-planes: 44

Iso-illuminance Diagram (Iso-lux)



50,0 %	319,7 lx
30,0 %	191,8 lx
10,0 %	63,9 lx
5,0 %	32,0 lx
3,0 %	19,2 lx

Peak illuminance: 639,4 lx

Mounting height: 3,0 m

Number of c-planes: 44

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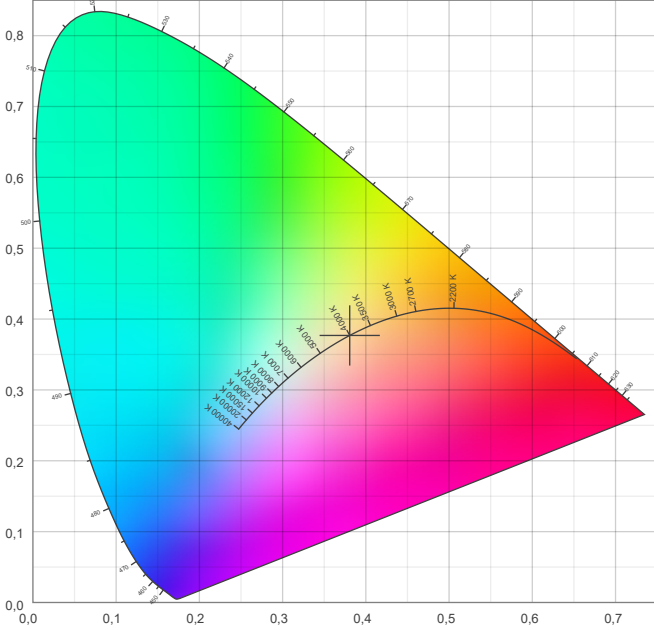


Color details

Correlated Color Temperature, Target CCT = 4000 K
 Correlated Color Temperature, Measured CCT = 4067 K
 Color Rendering Index CRI 81,2
 Color Rendering Index, R9 (red component) R9 = 27,2
 Color Rendering TM30-18 R_f 81,3 – R_g 98,8
 Color Quality Scale CQS = 81,2

MacAdam Steps SDCM = 2,7
 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 = 0,0031
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,225;0,502)

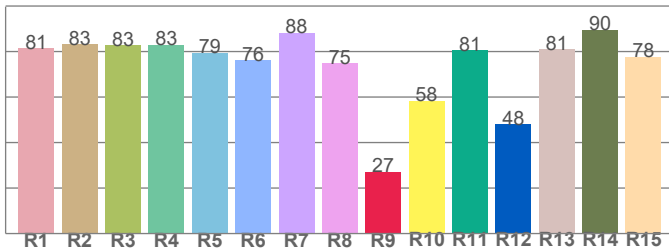
CIE 1931



CIE 1931 – zoomed on Planckian locus



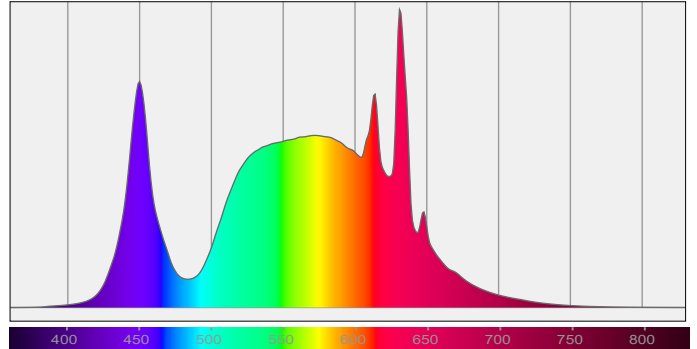
Color Rendering Index per reference color (CIE 1995)



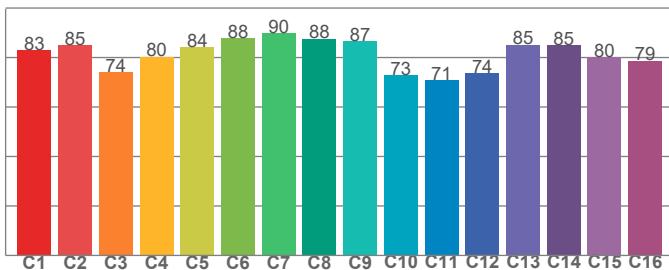
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
81,5	83,3	82,9	83,0	79,4	76,3	88,2	74,8	27,2	58,3	80,6	48,1	81,0	89,6	77,7

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



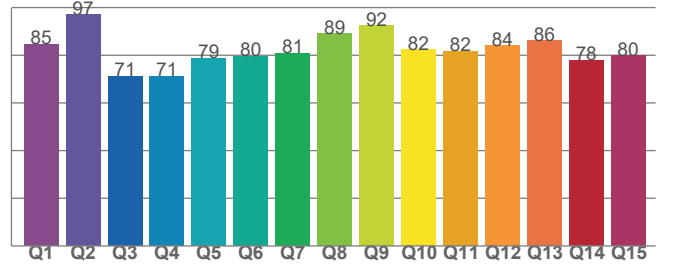
TM30-18 R_f-values per hue bin



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
82,9	85,0	73,9	80,3	84,1	87,7	89,7	87,6	86,6	72,8	70,7	73,7	85,2	85,0	80,1	78,7

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
84,6	97,1	71,2	71,1	78,8	79,6	80,8	89,0	92,4	82,4	81,7	84,0	86,1	78,0	79,9

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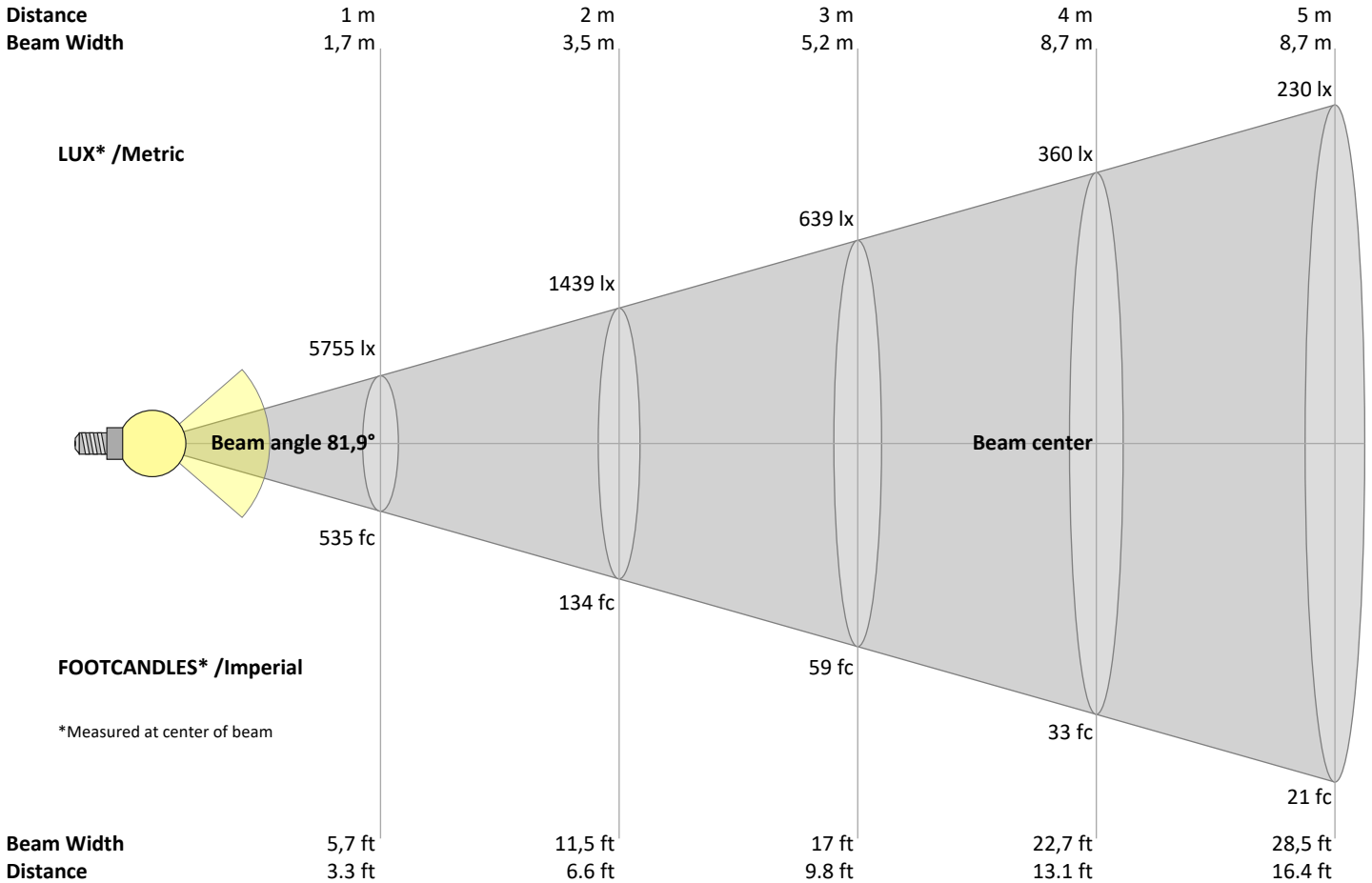
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Operator:



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
5755	1439	639	360	230	160	117	90	71	58	48	40	34	29	26	22	20	18	16	14	lux
534,7	133,7	59,4	33,4	21,4	14,9	10,9	8,4	6,6	5,3	4,4	3,7	3,2	2,7	2,4	2,1	1,9	1,7	1,5	1,3	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
5755	5737	5697	5640	5550	5428	5289	5117	4892	4596	4154	3499	2684	1884	1224	726	384	162	44	16	cd
100%	100%	99%	98%	96%	94%	92%	89%	85%	80%	72%	61%	47%	33%	21%	13%	7%	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
5755	5759	5740	5611	5253	4610	3533	2342	1504	997	714	666	798	905	739	384	185	58	15	11	cd
100%	100%	100%	97%	91%	80%	61%	41%	26%	17%	12%	12%	14%	16%	13%	7%	3%	1%	0%	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
5755	5737	5697	5640	5550	5428	5289	5117	4892	4596	4154	3499	2684	1884	1224	726	384	162	44	16	cd
100%	100%	99%	98%	96%	94%	92%	89%	85%	80%	72%	61%	47%	33%	21%	13%	7%	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
5755	5759	5740	5611	5253	4610	3533	2342	1504	997	714	666	798	905	739	384	185	58	15	11	cd
100%	100%	100%	97%	91%	80%	61%	41%	26%	17%	12%	12%	14%	16%	13%	7%	3%	1%	0%	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	28,0	29,1	28,2	29,4	29,6	21,1	22,1	21,3	22,4	22,7
	3H	29,0	30,1	29,4	30,3	30,6	23,4	24,5	23,8	24,8	25,0
	4H	29,4	30,4	29,8	30,7	31,0	23,9	24,9	24,3	25,2	25,5
	6H	29,8	30,6	30,1	30,9	31,3	24,1	25,0	24,5	25,3	25,7
	8H	29,8	30,7	30,2	31,0	31,5	24,2	25,0	24,5	25,4	25,8
	12H	29,9	30,7	30,2	31,1	31,5	24,1	25,0	24,5	25,3	25,8
4H	2H	27,8	28,8	28,2	29,1	29,4	21,6	22,7	22,0	22,9	23,2
	3H	29,0	29,8	29,4	30,2	30,6	24,3	25,1	24,6	25,5	25,9
	4H	29,4	30,2	29,8	30,6	31,2	24,8	25,6	25,3	26,0	26,6
	6H	29,8	30,5	30,3	30,9	31,3	25,0	25,8	25,6	26,2	26,6
	8H	29,9	30,6	30,4	31,0	31,4	25,1	25,8	25,6	26,1	26,5
	12H	30,0	30,6	30,5	31,0	31,5	25,1	25,6	25,6	26,1	26,5
8H	4H	29,4	30,1	29,9	30,5	30,9	25,1	25,8	25,6	26,1	26,5
	6H	29,8	30,4	30,4	30,8	31,4	25,4	25,9	25,9	26,4	27,0
	8H	30,1	30,5	30,6	31,0	31,7	25,5	25,9	26,0	26,5	27,1
	12H	30,2	30,6	30,8	31,1	31,7	25,5	25,9	26,1	26,4	27,0
12H	4H	29,4	29,9	29,9	30,4	30,8	25,1	25,7	25,6	26,1	26,6
	6H	29,9	30,3	30,4	30,8	31,5	25,5	25,9	26,0	26,4	27,1
	8H	30,0	30,4	30,6	30,9	31,5	25,5	25,9	26,1	26,4	27,1

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

S = 1.0H	0,7 / -0,8	0,5 / -0,4
S = 1.5H	1,8 / -2,0	1,1 / -0,8
S = 2.0H	3,0 / -2,9	1,7 / -1,2

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	101	101	101	99	
1	110	106	103	99	107	104	101	98	99	97	94	95	93	91	92	90	88	86
2	102	95	89	84	99	93	87	83	89	85	81	86	82	79	83	80	77	75
3	94	85	78	72	92	83	77	72	80	75	70	78	73	69	75	71	68	66
4	87	77	69	63	85	75	68	63	73	67	62	71	65	61	68	64	60	58
5	81	70	62	56	79	69	61	56	67	60	55	65	59	54	63	58	54	52
6	76	64	56	50	74	63	55	50	61	54	49	59	53	49	58	52	48	46
7	71	59	51	45	69	58	50	45	56	49	45	55	49	44	53	48	44	42
8	66	54	46	41	65	53	46	41	52	45	41	51	45	40	50	44	40	38
9	62	50	43	37	61	49	42	37	48	42	37	47	41	37	46	41	37	35
10	59	47	39	34	57	46	39	34	45	39	34	44	38	34	43	38	34	32

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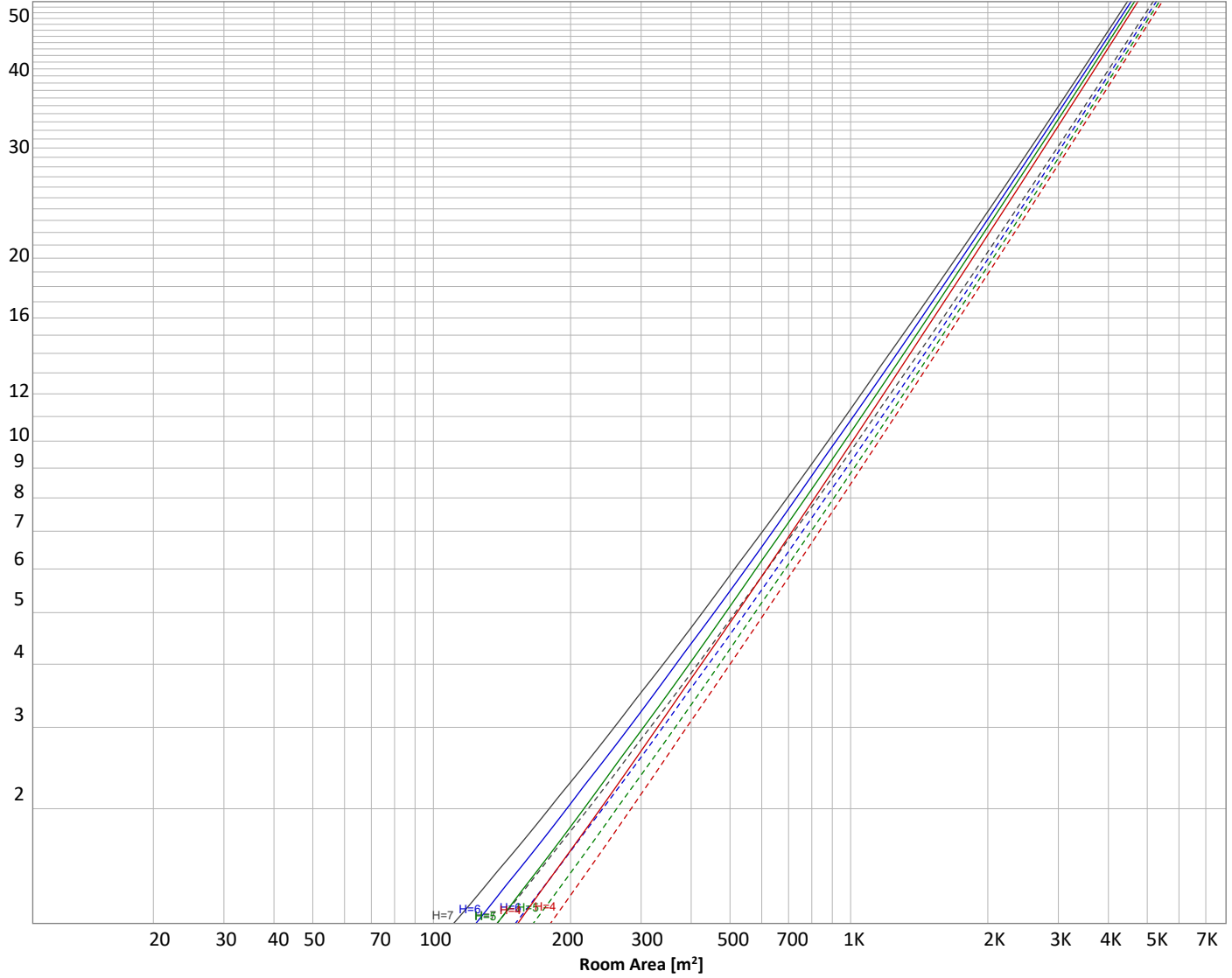
Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 11125 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°
548 lm	1594 lm	2336 lm	2295 lm	1679 lm	1125 lm	828 lm	487 lm	115 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
15,3 lm	15,8 lm	16,7 lm	16,9 lm	16,2 lm	14,5 lm	11,6 lm	7,54 lm	2,62 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	548 lm	4,9%
10-20°	1594 lm	14,3%
20-30°	2336 lm	21,0%
30-40°	2295 lm	20,6%
40-50°	1679 lm	15,1%
50-60°	1125 lm	10,1%
60-70°	828 lm	7,4%
70-80°	487 lm	4,4%
80-90°	115 lm	1,0%
90-100°	15 lm	0,1%
100-110°	16 lm	0,1%
110-120°	17 lm	0,2%
120-130°	17 lm	0,2%
130-140°	16 lm	0,1%
140-150°	15 lm	0,1%
150-160°	12 lm	0,1%
160-170°	8 lm	0,1%
170-180°	3 lm	0,0%
Total	11125 lm	100,0%

Intensity peaks

Max intensity	5762 cd
Intensity, 90°	44 cd
Intensity, 0°	5755 cd

Zonal Lumen summary

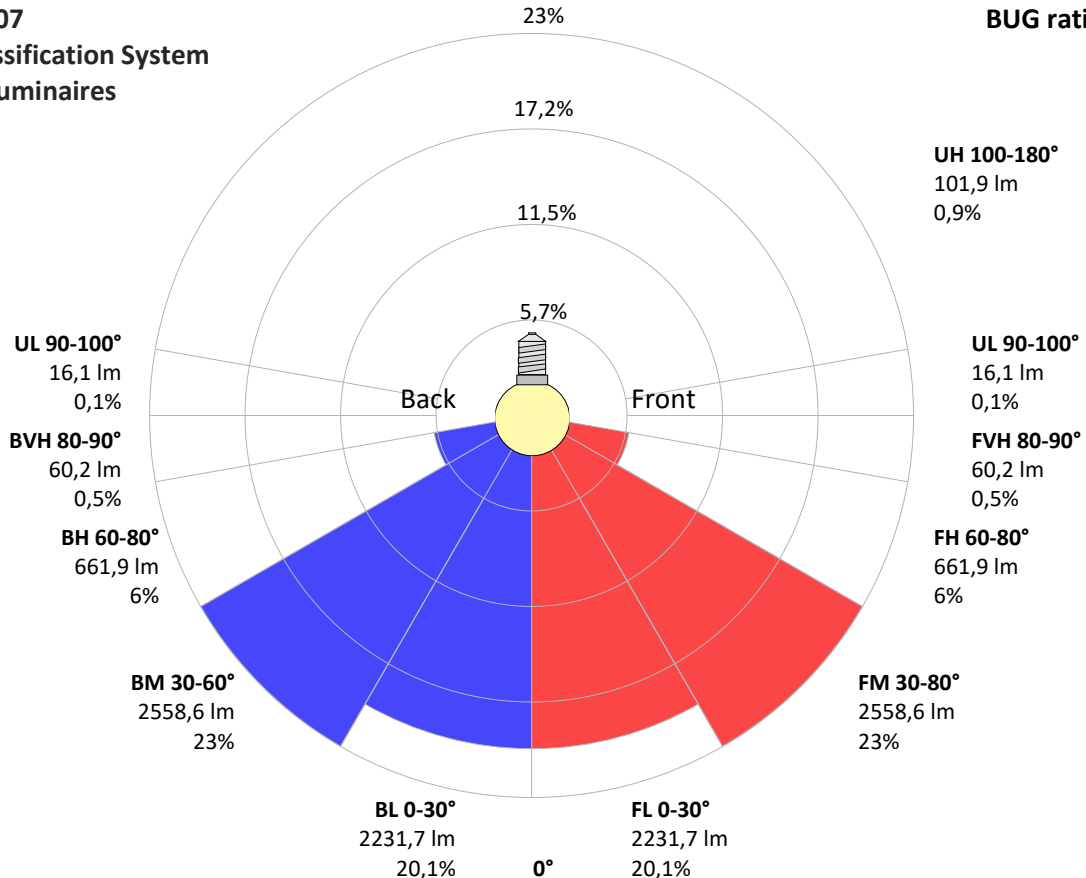
Zone (γ)	Lumen	% Total
0-30°	4478 lm	40,3%
0-40°	6773 lm	60,9%
0-60°	9577 lm	86,1%
60-90°	1431 lm	12,9%
70-100°	618 lm	5,6%
90-120°	48 lm	0,4%
0-90°	11008 lm	98,9%
90-180°	117 lm	1,1%
0-180°	11125 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	2232 lm	20,1%
Medium(30-60°)	2559 lm	23,0%
High(60-80°)	662 lm	6,0%
Very high(80-90°)	60 lm	0,5%
Back light		
Low(0-30°)	2232 lm	20,1%
Medium(30-60°)	2559 lm	23,0%
High(60-80°)	662 lm	6,0%
Very high(80-90°)	60 lm	0,5%
Uplight		
Low(90-100°)	16 lm	0,1%
High(100-180°)	102 lm	0,9%

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

BUG rating B3 U3 G1



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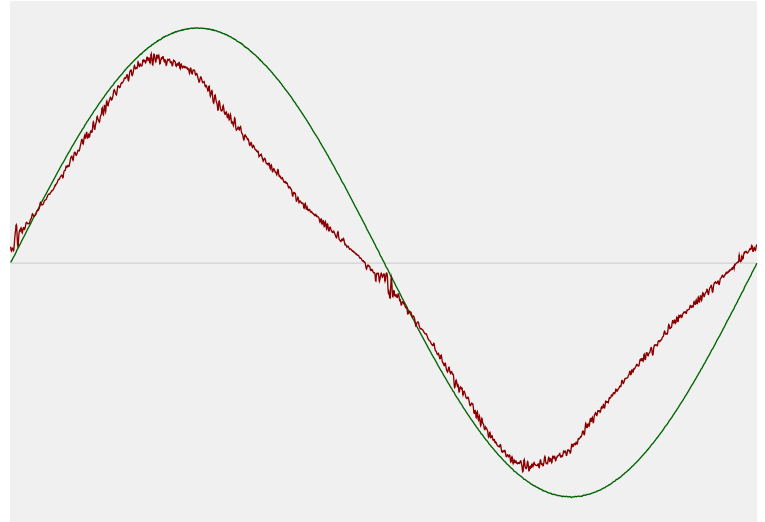


Power Details

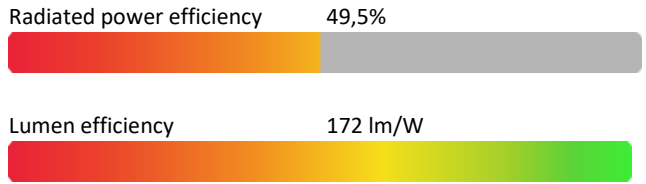
Input Power

Power feed to light source	64,6 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,290 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	66,66 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,97
Total harmonic distortion of the current	14,52%
Total harmonic distortion of the voltage	0,08%

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	4007 K
CCT shift	-7 K
CCT end	4000 K

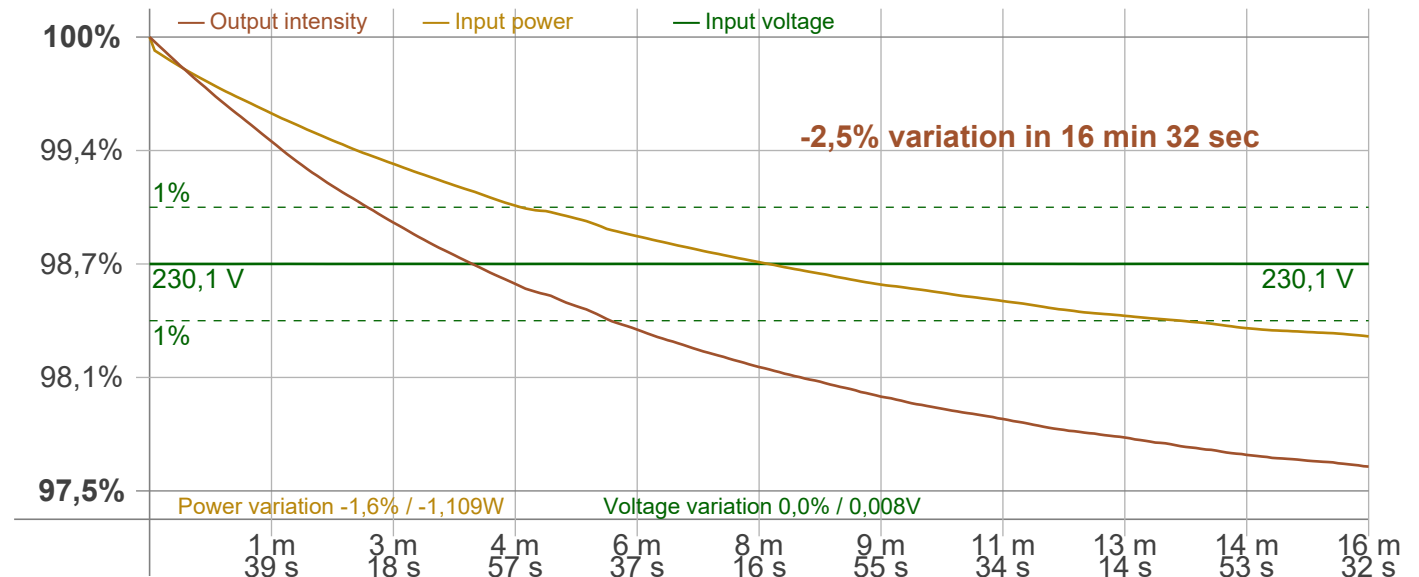
Warmup Result

Total warmup time	Lamp stabilized in 16 min 32 sec
Warmup variation	-2,5%

Output Change

Output start	11407 lm
Output change	-282 lm
Output end	11125 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 95,69 Hz
 Percent Flicker 0,08 %
 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 0,05 %
 JA8/10 400 Hz 0,05 %
 JA8/10 1000 Hz 0,06 %

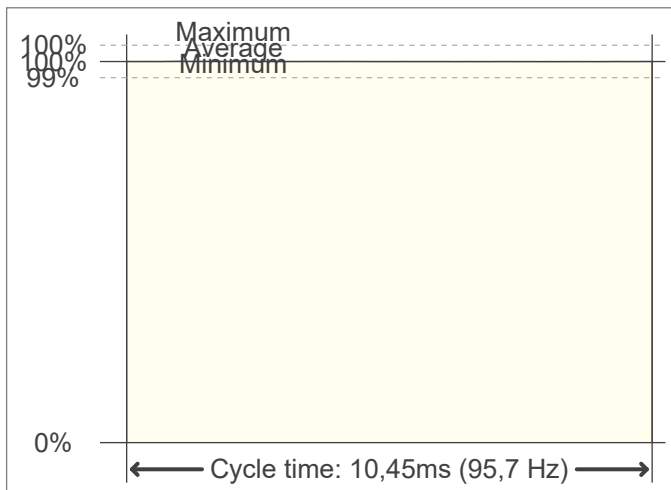
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz) 0,01
 SVM value (80 < F < 2000 Hz) 0

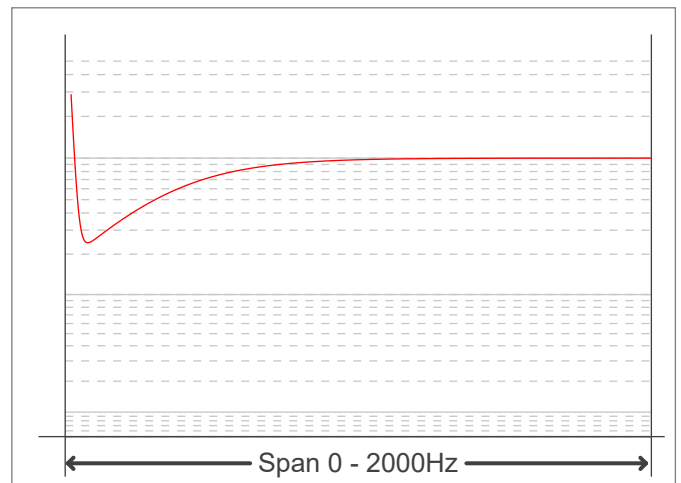
Flicker indices according to Lighting Research Center (2015)

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

