

Light Measurement Report

Print date: 9-7-2025
Measurement date and time: 9-7-2025 09:48:20 – Measurement no. VFR-250709-2023-MS
Measurement tracking No. and Link: [VT250709-009748](#)
Operator:



Laboratory and Equipment

Laboratory Owner and Location	Viso Systems, Copenhagen V, Denmark
Goniospectrometer System and Type	LabSpion – Type C, horizontal
Sensor Name, Calibr. Date and Serial No.	LabSensor Model2 – 11-1-2024 – 3130191315
Spectrometer Manufacturer and Model	Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

Measurement Conditions

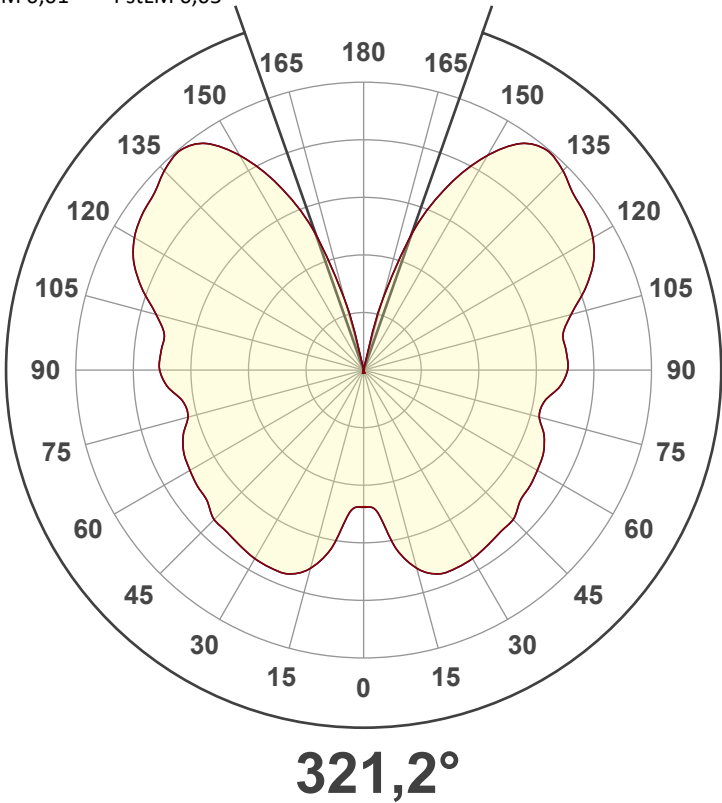
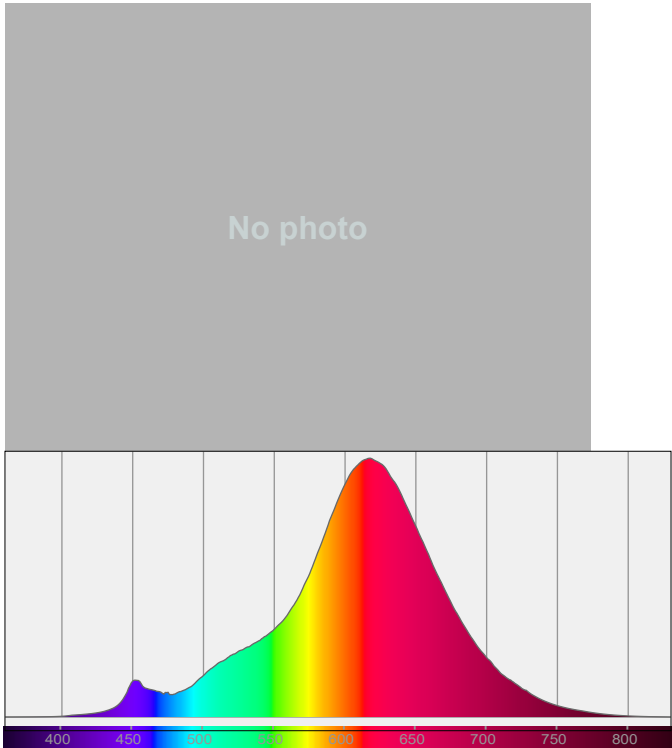
Number of C-planes and Resolution	72 planes – 5°
γ (gamma)-Resolution	5°
Test Distance	1,99 m
Input Power, Power and Displ. Factors	4,2 W – PF 0,92 – DPF 1,0
Input RMS Voltage and Current	230 V – 0,020 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 2 sec – 2,0%

Tested Light Source

Product Name	813062-2000K
Item No. and Manufacturer	813062-2000K – Dutchfulfillment
Product Description (line 1)	LED FILAMENT E27 PEER DIMBAAR SMOKY 4W

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	179 lm – 53,59% / 46,41%
Efficiency	42 lm/W
Peak Intensity and Beam Angle	18,9 cd – 321,2°
Correlated Color Temperature, Target/Measured	CCT = 2000 K / 2063 K
Color Rendering Index	CRI 83,9
Color Rendering TM30-18	R _f 86,6 – R _g 96,8
Color Shift, CIE duv and MacAdam Steps	Duv -0,0010 – SDCM 4,0
Flicker	SVM 0,01 – PstLM 0,05



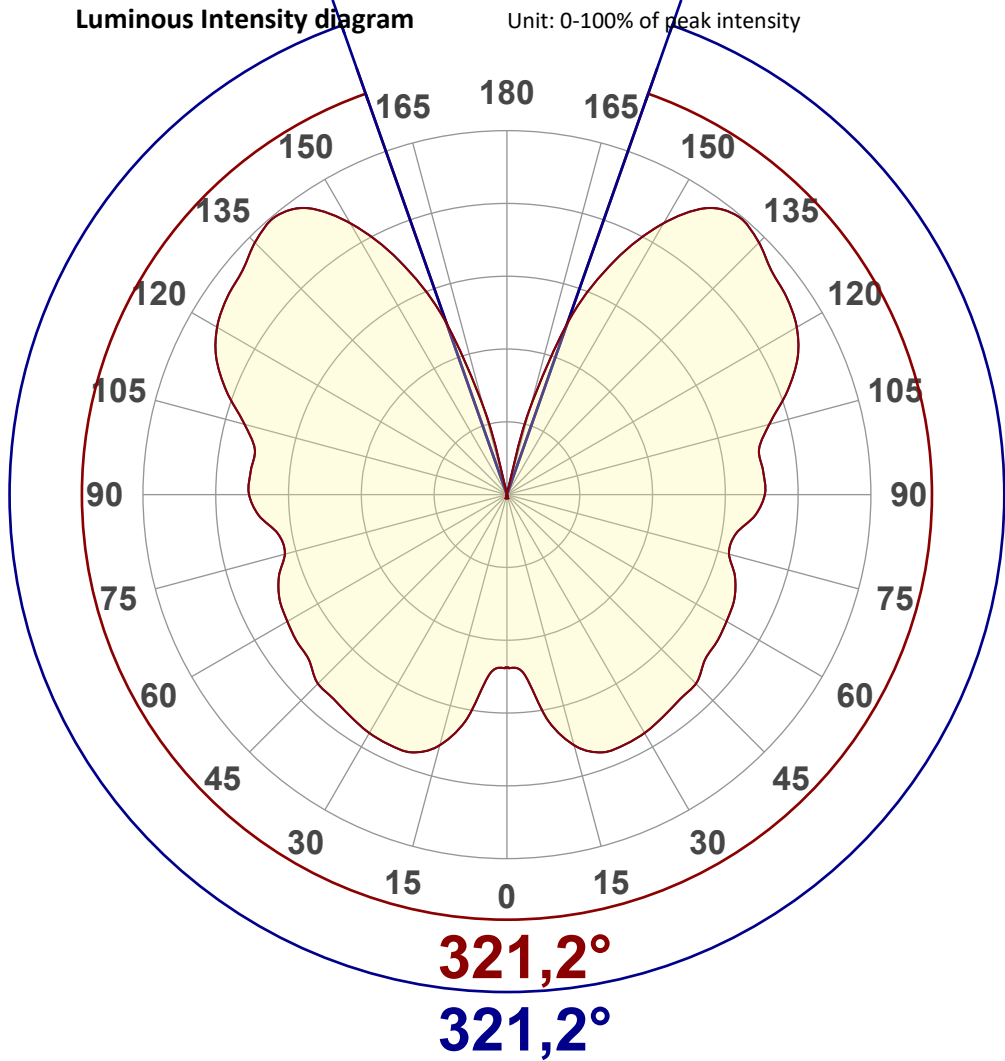
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	179 lm
Lumen Up% / Down%	53,59% / 46,41%
Peak Intensity	18,9 cd
Beam Angle (50%)	321,2°
Beam Angle (90%)	321,2°
Beam Angle (10%)	321,2°

Cut-off Angle

Average 2,5%	339,6°
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Field Angle

Average 10%	336,4°
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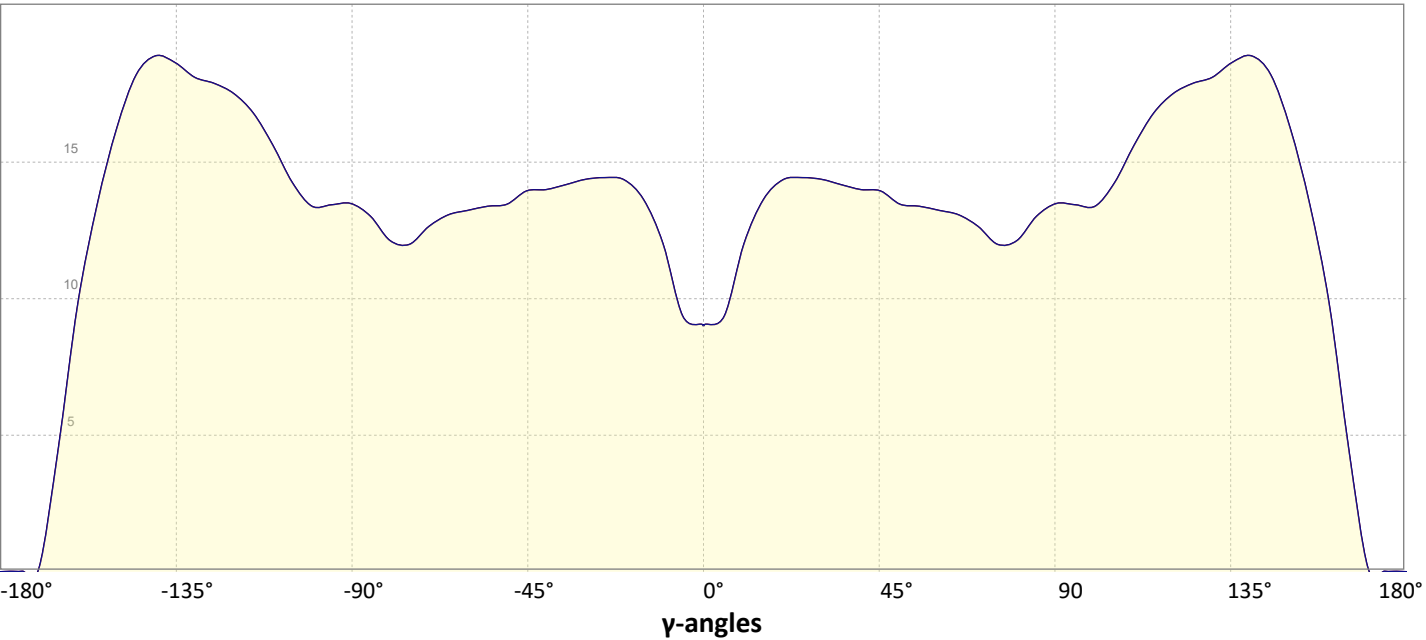
Intensity Ratio

In 120° cone	24,1%
In 90° cone	14,3%

C000-C180

C090-C270

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



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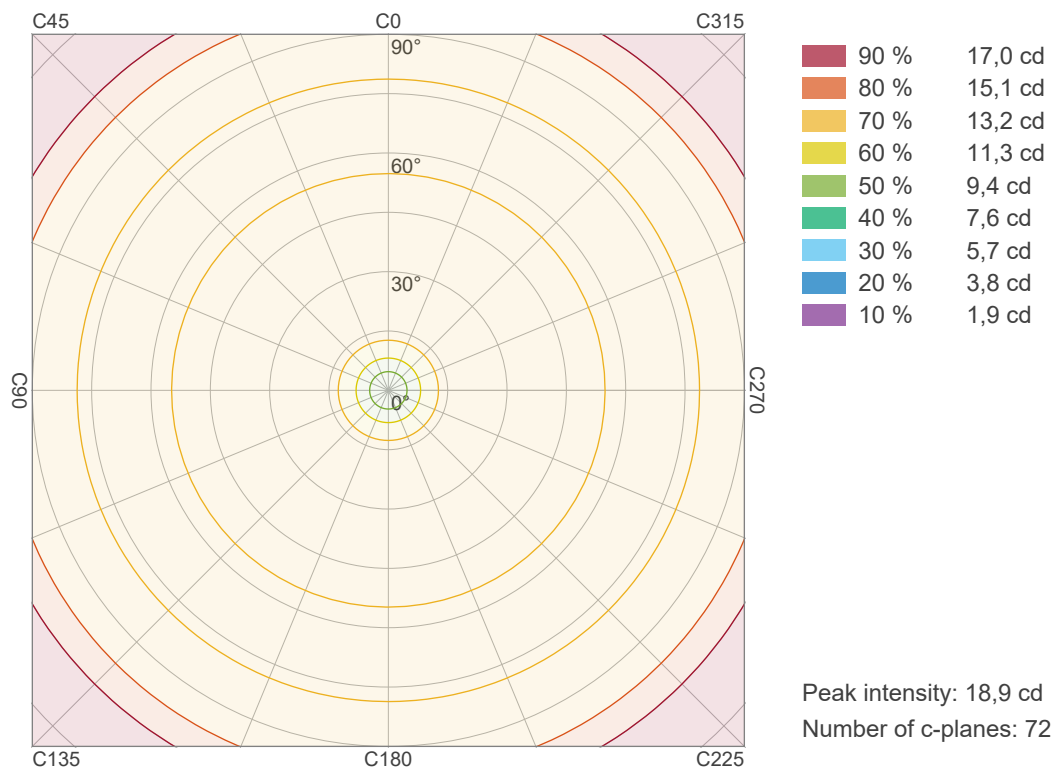
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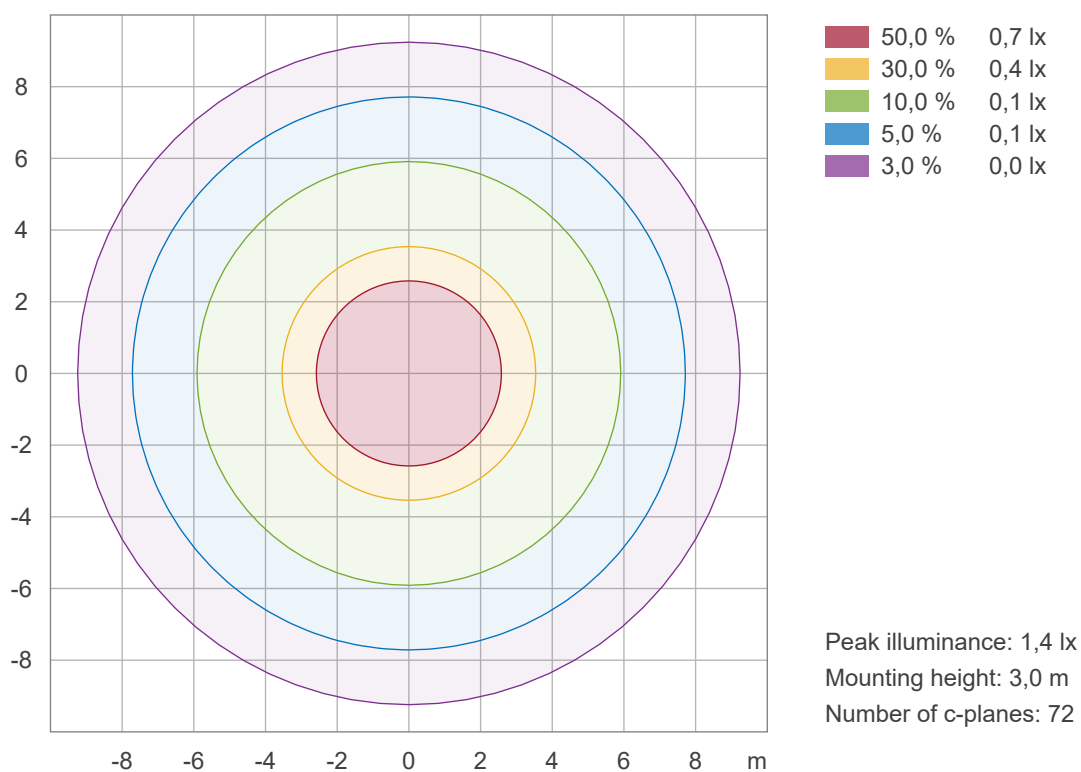
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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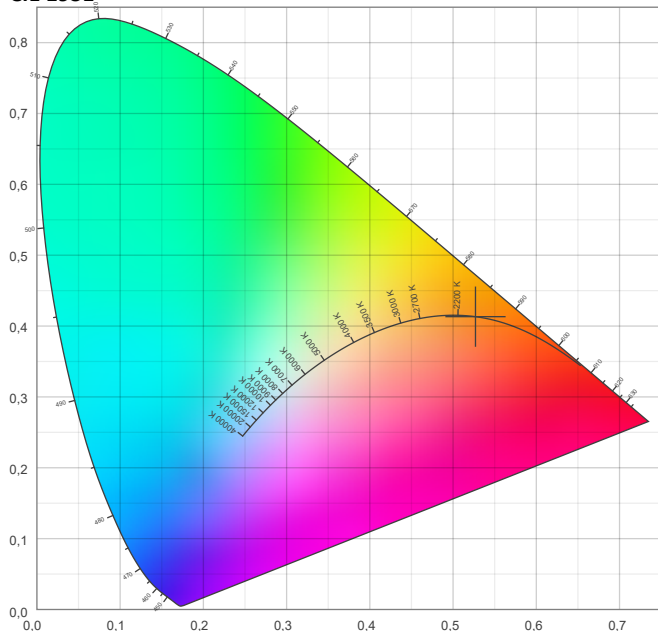


Color details

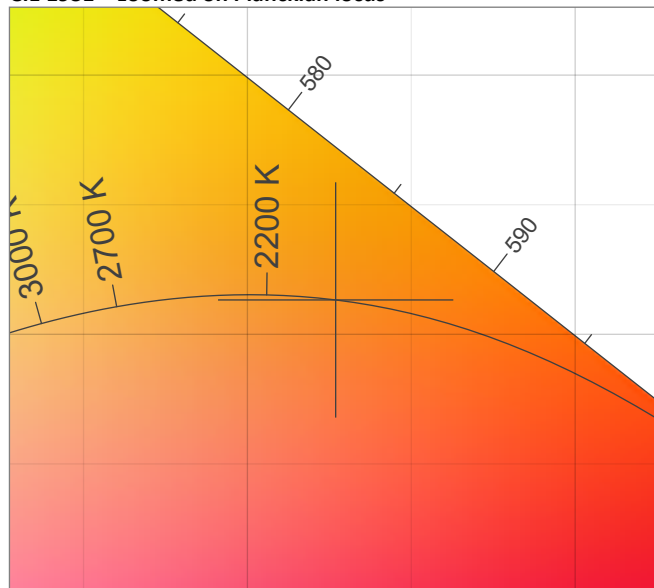
Correlated Color Temperature, Target CCT = 2000 K
Correlated Color Temperature, Measured CCT = 2063 K
Color Rendering Index CRI 83,9
Color Rendering Index, R9 (red component) R9 = 17,3
Color Rendering TM30-18 R_f 86,6 – R_g 96,8
Color Quality Scale CQS = 77,4

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0,527;0,413)
Color coordinate CIEs 1960 (u;v) = (0,305;0,359)
Color deviation from BBL Duv = -0,0010
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,305;0,539)

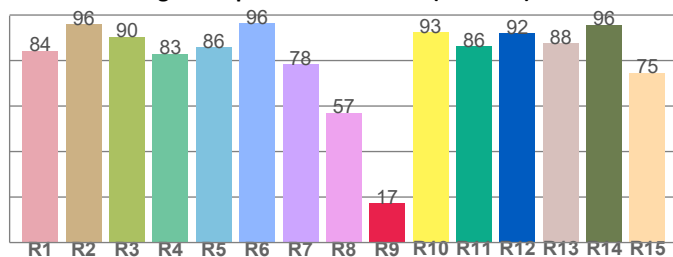
CIE 1931



CIE 1931 – zoomed on Planckian locus



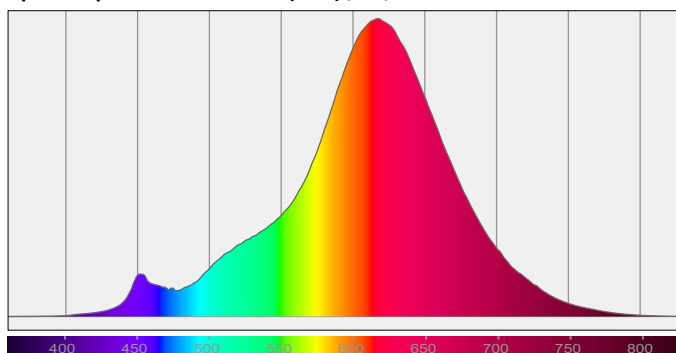
Color Rendering Index per reference color (CIE 1995)



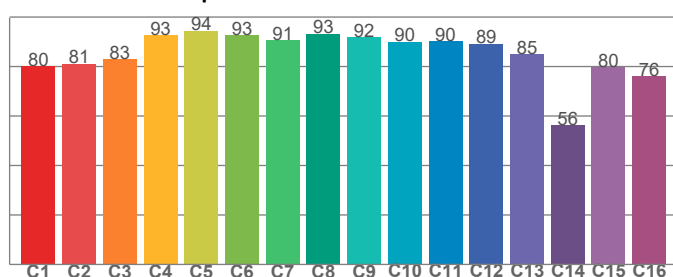
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
84,4	96,0	90,4	82,9	85,8	96,5	78,4	57,0	17,3	92,6	86,4	91,9	87,5	95,7	74,6

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



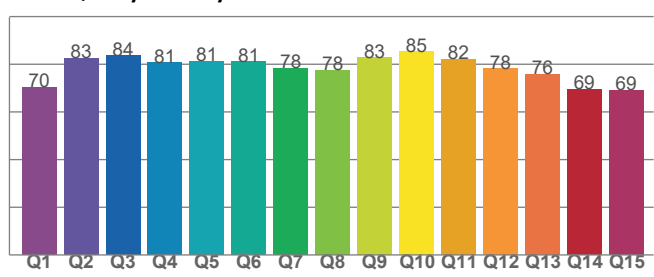
TM30-18 R_f-values per hue bin



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
80,2	81,1	82,9	92,6	94,4	92,7	90,6	93,3	91,8	90,1	90,2	89,3	84,9	56,3	79,8	76,1

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
70,3	82,6	83,6	80,6	81,3	81,1	78,4	77,6	82,8	85,2	82,1	78,1	75,9	69,5	69,2

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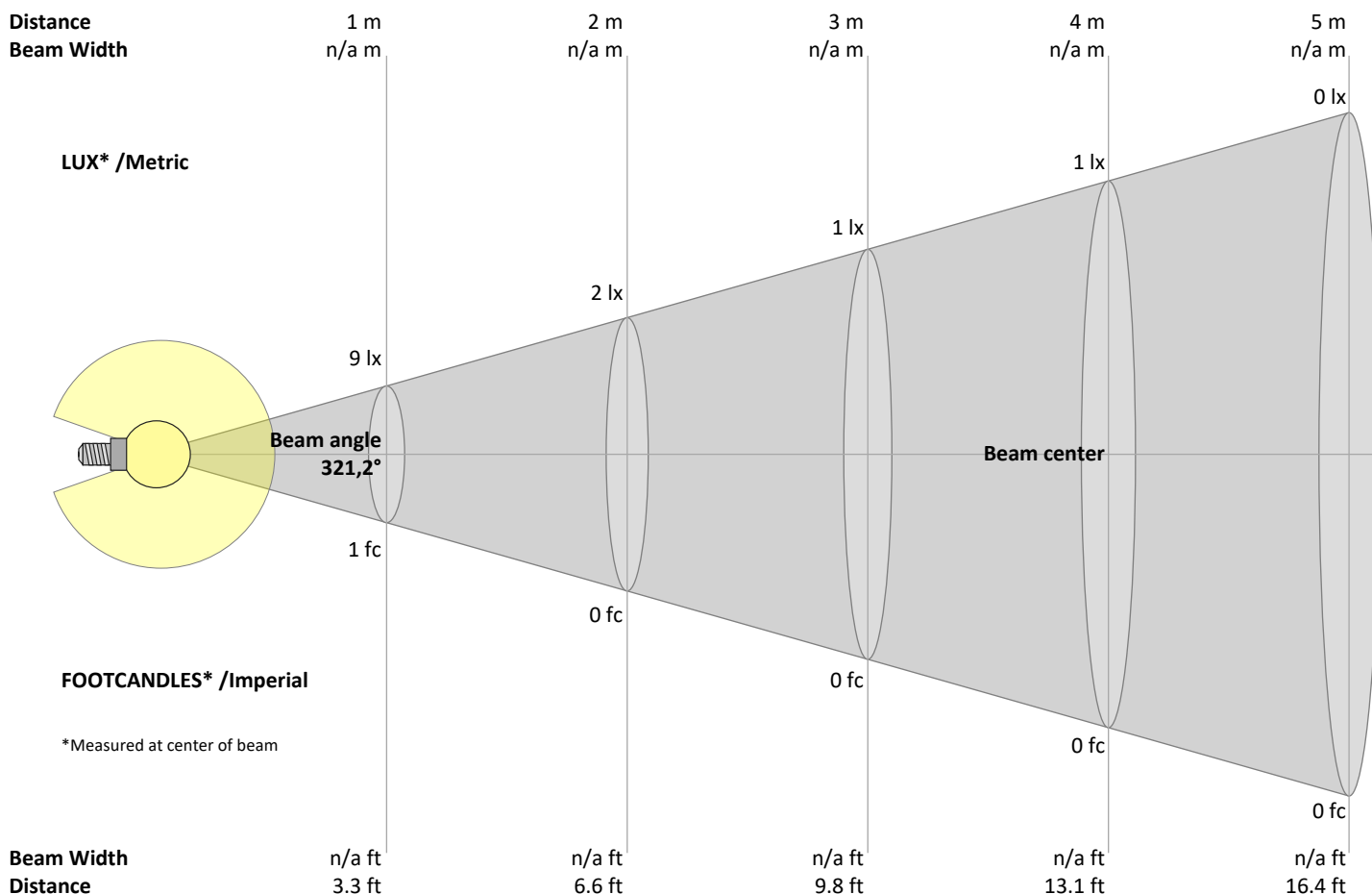
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Beam Details



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
9	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	lux
0,8	0,2	0,1	0,1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	fc

Intensities in 0° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
9,1	11,3	14,0	14,4	14,1	13,9	13,4	13,1	12,4	12,3	13,5	13,4	15,0	17,0	17,9	18,6	18,4	14,7	7,9	0,1	cd
100%	125%	155%	159%	156%	154%	148%	145%	137%	135%	149%	148%	166%	188%	198%	205%	203%	162%	88%	1%	of 0°val

Intensities in 90° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
9,1	11,3	14,0	14,4	14,1	13,9	13,4	13,1	12,4	12,3	13,5	13,4	15,0	17,0	17,9	18,6	18,4	14,7	7,9	0,1	cd
100%	125%	155%	159%	156%	154%	148%	145%	137%	135%	149%	148%	166%	188%	198%	205%	203%	162%	88%	1%	of 0°val

Intensities in 180° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
9,1	11,3	14,0	14,4	14,1	13,9	13,4	13,1	12,4	12,3	13,5	13,4	15,0	17,0	17,9	18,6	18,4	14,7	7,9	0,1	cd
100%	125%	155%	159%	156%	154%	148%	145%	137%	135%	149%	148%	166%	188%	198%	205%	203%	162%	88%	1%	of 0°val

Intensities in 270° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
9,1	11,3	14,0	14,4	14,1	13,9	13,4	13,1	12,4	12,3	13,5	13,4	15,0	17,0	17,9	18,6	18,4	14,7	7,9	0,1	cd
100%	125%	155%	159%	156%	154%	148%	145%	137%	135%	149%	148%	166%	188%	198%	205%	203%	162%	88%	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											
H = mounting height above eye level											
X	Y	Viewed Crosswise (Viewing direction orthogonal to lamp length axis)					Viewed Endwise (Viewing direction parallel to lamp length axis)				
2H	2H	14,0	15,0	15,0	15,9	17,1	14,0	15,0	15,0	15,9	17,1
	3H	16,3	17,1	17,3	18,0	19,2	16,3	17,1	17,3	18,0	19,2
	4H	17,4	18,1	18,3	19,1	20,3	17,4	18,1	18,3	19,1	20,3
	6H	18,5	19,2	19,4	20,2	21,4	18,5	19,2	19,4	20,2	21,4
	8H	19,1	19,9	20,0	20,8	22,0	19,1	19,9	20,0	20,8	22,0
	12H	19,7	20,6	20,7	21,4	22,6	19,7	20,6	20,7	21,4	22,6
4H	2H	14,8	15,6	15,8	16,5	17,7	14,8	15,6	15,8	16,5	17,7
	3H	17,2	18,1	18,2	18,9	20,1	17,2	18,1	18,2	18,9	20,1
	4H	18,4	19,5	19,4	20,1	21,3	18,4	19,5	19,4	20,1	21,3
	6H	19,7	20,3	20,7	21,3	22,4	19,7	20,3	20,7	21,3	22,4
	8H	20,4	20,9	21,4	21,9	23,1	20,4	20,9	21,4	21,9	23,1
	12H	21,1	21,5	22,1	22,6	23,7	21,1	21,5	22,1	22,6	23,7
8H	4H	18,9	19,4	19,9	20,4	21,6	18,9	19,4	19,9	20,4	21,6
	6H	20,4	20,8	21,4	21,9	23,1	20,4	20,8	21,4	21,9	23,1
	8H	21,2	21,6	22,3	22,7	23,9	21,2	21,6	22,3	22,7	23,9
	12H	22,1	22,4	23,2	23,5	24,7	22,1	22,4	23,2	23,5	24,7
12H	4H	19,0	19,4	19,9	20,4	21,6	19,0	19,4	19,9	20,4	21,6
	6H	20,6	20,9	21,6	22,0	23,2	20,6	20,9	21,6	22,0	23,2
	8H	21,5	21,8	22,6	22,9	24,1	21,5	21,8	22,6	22,9	24,1
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		0,1 / -0,1					0,1 / -0,1				
S = 1.5H		0,1 / -0,1					0,1 / -0,1				
S = 2.0H		0,2 / -0,2					0,2 / -0,2				

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	106	106	106	106	98	98	98	98	81	81	81	66	66	66	53	53	53	46
1	93	87	82	77	85	80	75	71	66	62	59	53	50	48	41	39	37	31
2	84	74	67	60	76	68	61	56	56	51	46	44	41	37	34	31	29	24
3	75	64	56	49	68	59	51	45	48	42	37	38	34	30	29	26	23	19
4	68	56	47	40	62	51	43	37	42	36	31	33	29	25	25	22	19	15
5	63	50	40	34	57	45	37	31	37	31	26	30	25	21	22	19	16	12
6	57	44	35	29	52	40	32	27	33	27	22	26	22	18	20	16	14	11
7	53	40	31	25	48	36	28	23	30	24	19	24	19	15	18	15	12	9
8	49	36	27	22	44	33	25	20	27	21	17	22	17	14	17	13	10	8
9	45	32	24	19	41	30	23	18	25	19	15	20	15	12	15	12	9	7
10	42	30	22	17	38	27	20	16	23	17	13	18	14	11	14	11	8	6

Light Measurement Report

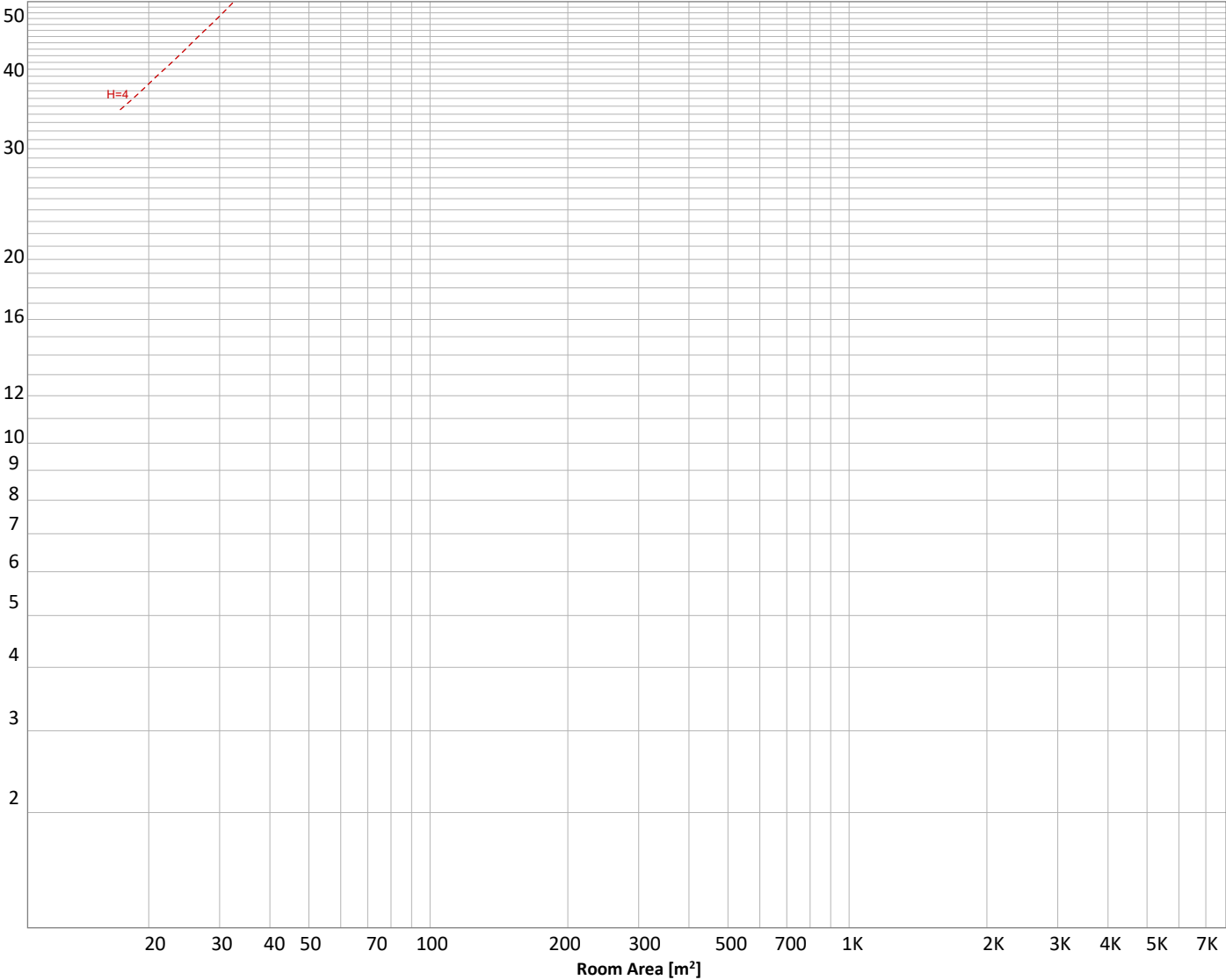
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 179 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
				30
				20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
0,989 lm	3,82 lm	6,66 lm	8,91 lm	10,7 lm	12,0 lm	12,9 lm	12,9 lm	14,0 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
14,7 lm	15,1 lm	16,5 lm	16,0 lm	14,4 lm	11,3 lm	6,31 lm	1,57 lm	0,006 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	1 lm	0,6%
10-20°	4 lm	2,1%
20-30°	7 lm	3,7%
30-40°	9 lm	5,0%
40-50°	11 lm	6,0%
50-60°	12 lm	6,7%
60-70°	13 lm	7,2%
70-80°	13 lm	7,2%
80-90°	14 lm	7,9%
90-100°	15 lm	8,2%
100-110°	15 lm	8,5%
110-120°	16 lm	9,2%
120-130°	16 lm	8,9%
130-140°	14 lm	8,0%
140-150°	11 lm	6,3%
150-160°	6 lm	3,5%
160-170°	2 lm	0,9%
170-180°	0 lm	0,0%
Total	179 lm	100,0%

Intensity peaks

Max intensity	19 cd
Intensity, 90°	13 cd
Intensity, 0°	9 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	11 lm	6,4%
0-40°	20 lm	11,4%
0-60°	43 lm	24,1%
60-90°	40 lm	22,3%
70-100°	42 lm	23,3%
90-120°	46 lm	25,9%
0-90°	83 lm	46,4%
90-180°	96 lm	53,6%
0-180°	179 lm	100,0%

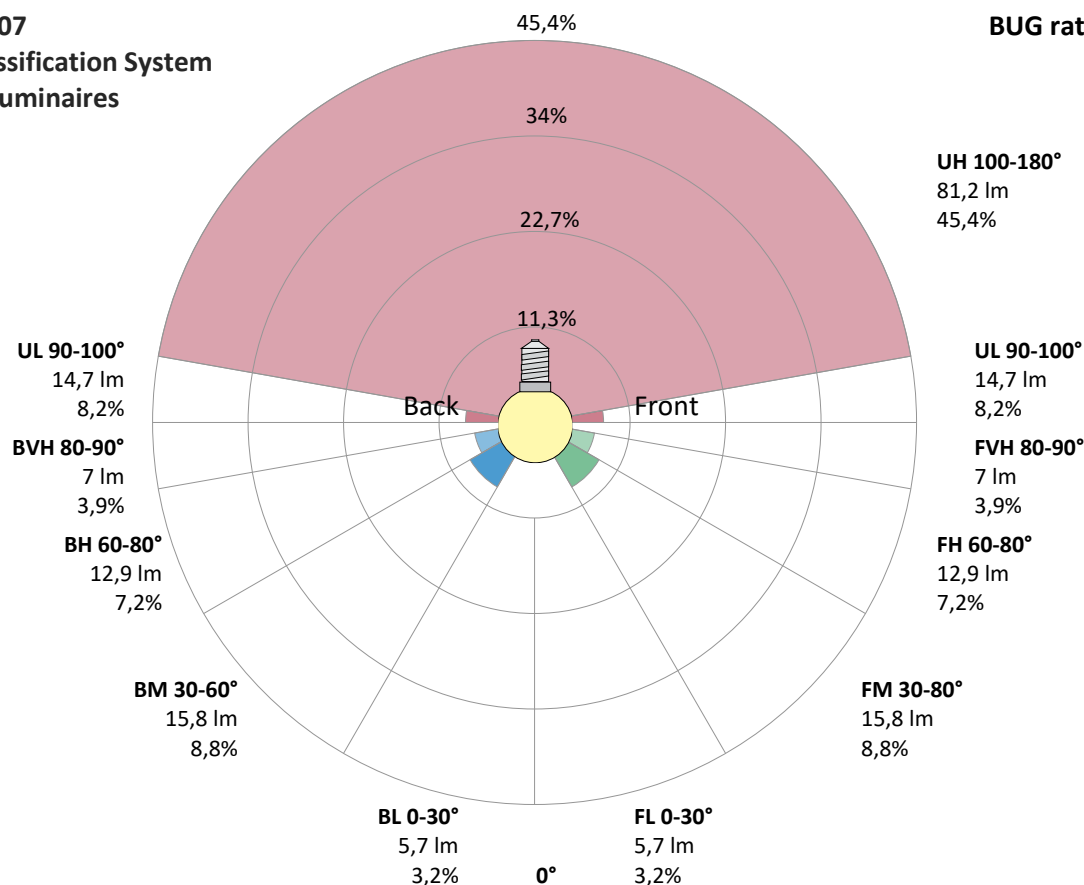
BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	6 lm	3,2%
Medium(30-60°)	16 lm	8,8%
High(60-80°)	13 lm	7,2%
Very high(80-90°)	7 lm	3,9%
Back light		
Low(0-30°)	6 lm	3,2%
Medium(30-60°)	16 lm	8,8%
High(60-80°)	13 lm	7,2%
Very high(80-90°)	7 lm	3,9%
Uplight		
Low(90-100°)	15 lm	8,2%
High(100-180°)	81 lm	45,4%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B0 U3 G0



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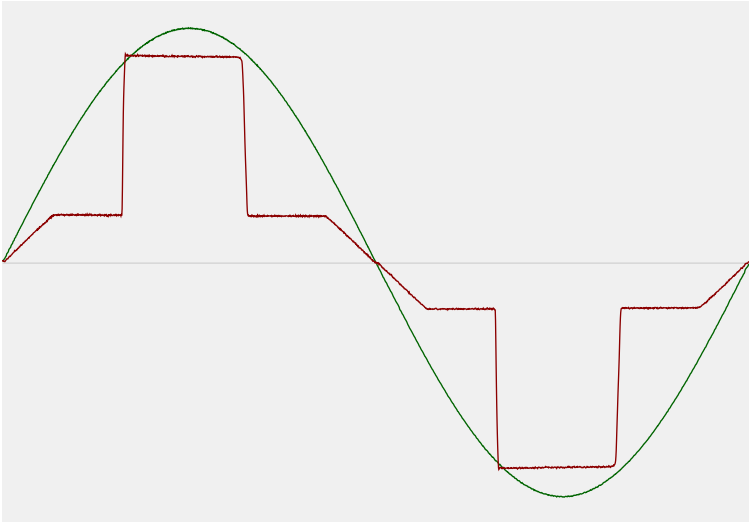


Power Details

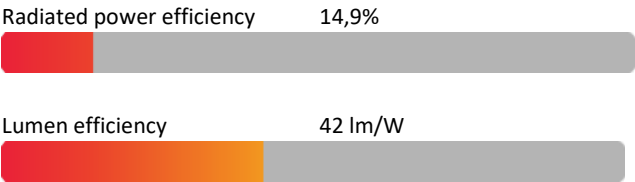
Input Power

Power feed to light source	4,2 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,020 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	4,6 VA
Displacement factor of AC power feed	1,0
Power factor of AC current feed	0,92
Total harmonic distortion of the current	44,5%
Total harmonic distortion of the voltage	0,13%

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	1999 K
CCT shift	+1 K
CCT end	2000 K

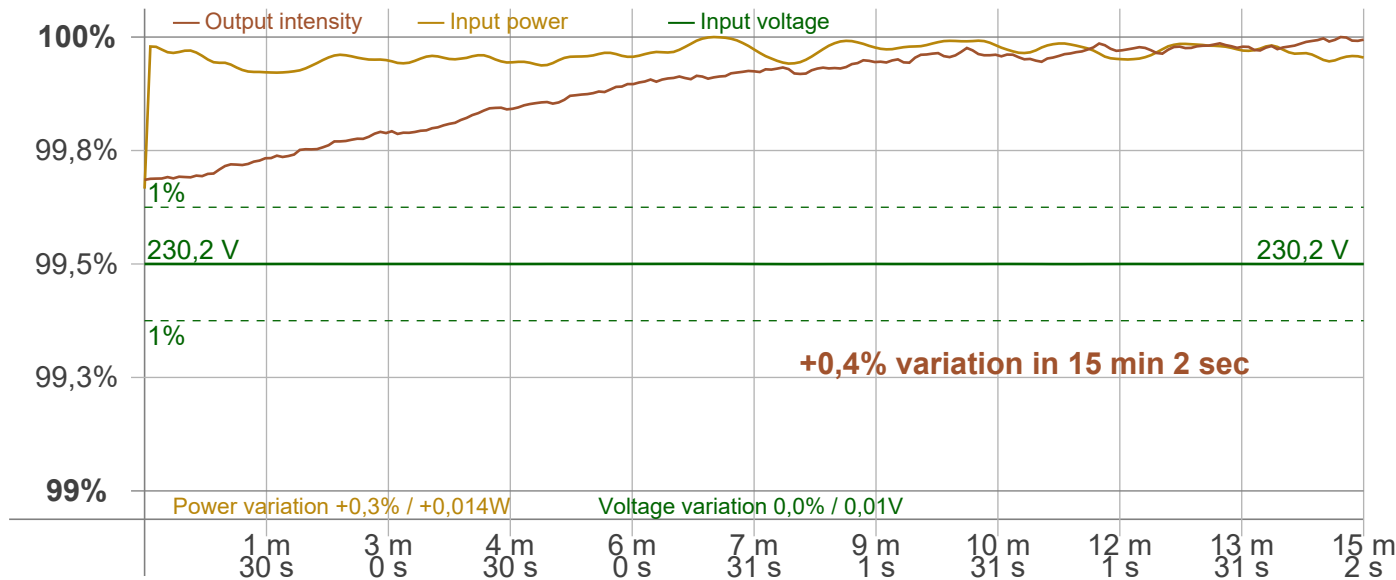
Warmup Result

Total warmup time	Lamp stabilized in 15 min 2 sec
Warmup variation	+0,4%

Output Change

Output start	178 lm
Output change	+1 lm
Output end	179 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

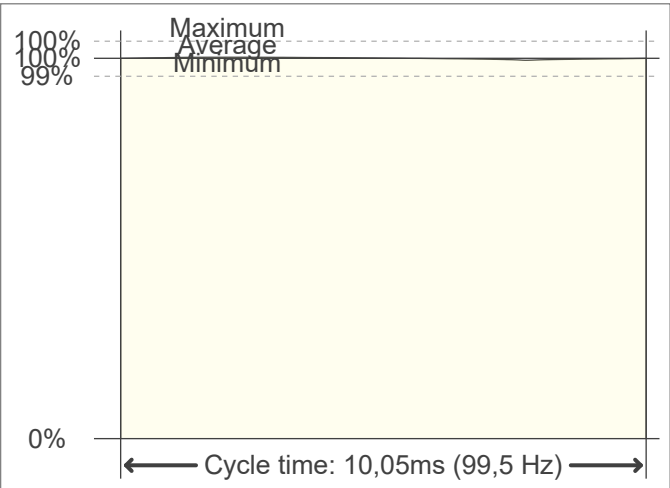
Flicker indices according to Illuminating Engineering Society (IES)
Flicker frequency 99,5 Hz
Percent Flicker 0,45 %
Flicker index 0

Flicker indices according to California Energy Commission (CEC) 2016b
JA8/10 40 Hz 0,04 %
JA8/10 90 Hz 0,04 %
JA8/10 200 Hz 0,35 %
JA8/10 400 Hz 0,39 %
JA8/10 1000 Hz 0,42 %

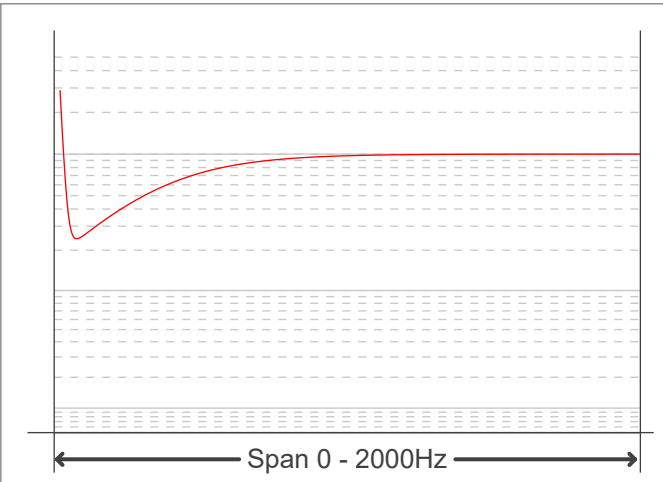
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)
PstLM value (F < 80 Hz) 0,05
SVM value (80 < F < 2000 Hz) 0,01

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

