Light Measurement Report

Print date: 15-4-2025
Measurement date and time: 14-4-2025 16:43:31 – Measurement no. VFR-250414-0768-MS
Measurement tracking No. and Link: VT250414-008189
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

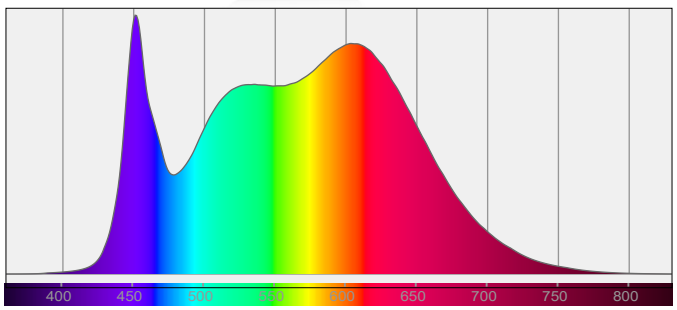
Number of C-planes and Resolution	72 planes – 5°
γ (gamma)-Resolution	5°
Test Distance	2,49 m
Input Power, Power and Displ. Factors	29,4 W – PF 0,98 – DPF 0,98
Input RMS Voltage and Current	230 V – 0,131 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 20 min 57 sec – 2,0%

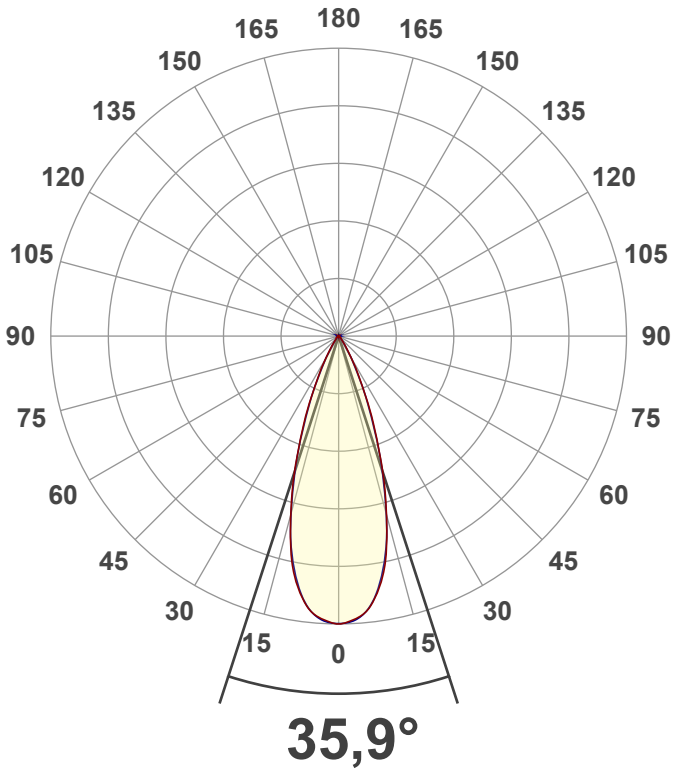
Tested Light Source

Product Name	278905-4000K BATCH 2502
Item No. and Manufacturer	278905-4000K BATCH 2502 – Dutchfulfillment
Product Description (line 1)	LED DOWNLIGHT | KANTELBAAR | Ø145 | 30W | ZWART | CCT-SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	2237 lm – 0,07% / 99,93%
Efficiency	76 lm/W
Peak Intensity and Beam Angle	5611 cd – 35,9°
Correlated Color Temperature, Target/Measured	CCT = 4220 K / 4220 K
Color Rendering Index	CRI 92,3
Color Rendering TM30-18	R_f 90,4 – R_g 97,1
Color Shift, CIE duv and MacAdam Steps	Duv 0,0025 – SDCM n/a
Flicker	SVM 0,01 – PstLM 0,02





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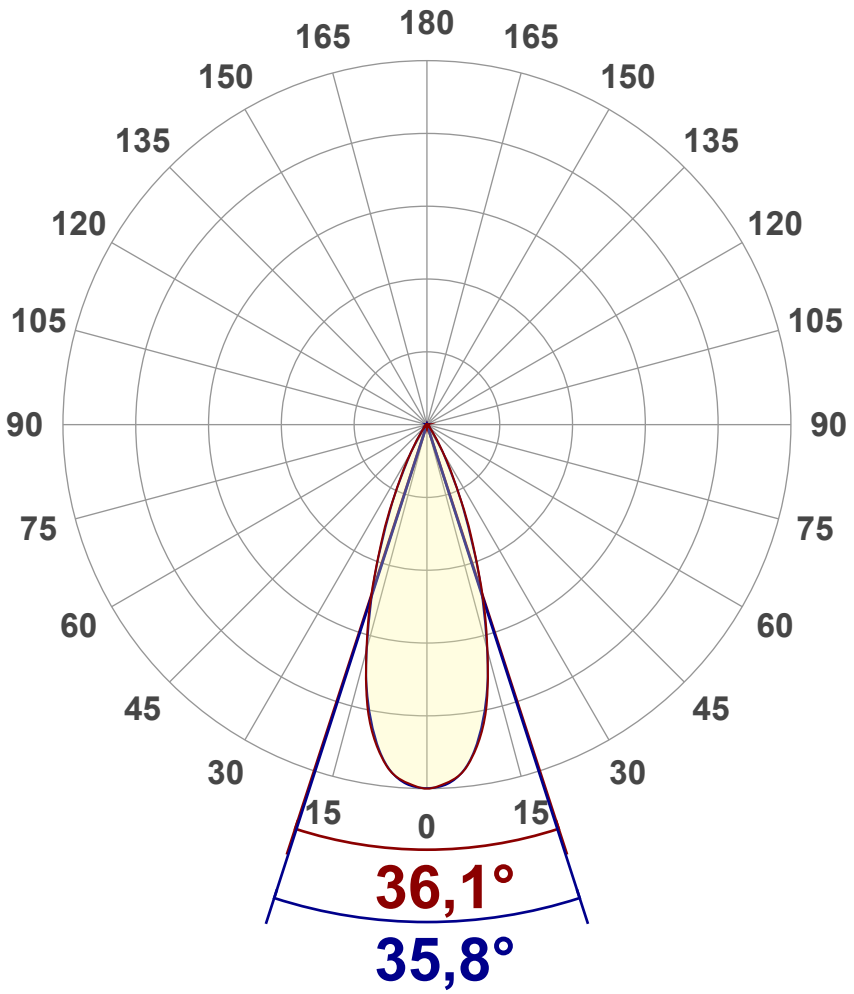
Luminous Intensity diagram Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2237 lm
Lumen Up% / Down%	0,07% / 99,93%
Peak Intensity	5611 cd
Beam Angle (50%)	35,9°
Beam Angle (90%)	35,8°
Beam Angle (10%)	36,1°

Cut-off Angle

Average 2,5%	73,6°

Field Angle

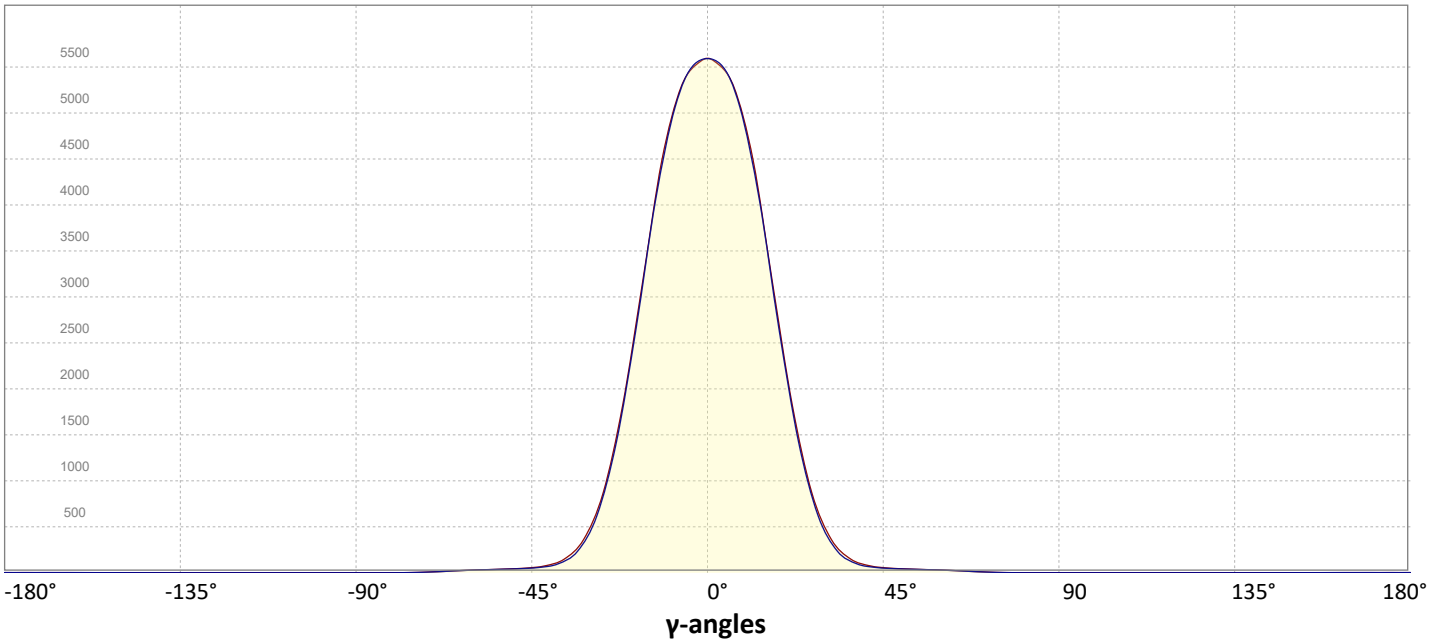
Average 10%	58,6°

Intensity Ratio

In 120° cone	98,9%
In 90° cone	96,6%

C000-C180
C090-C270

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



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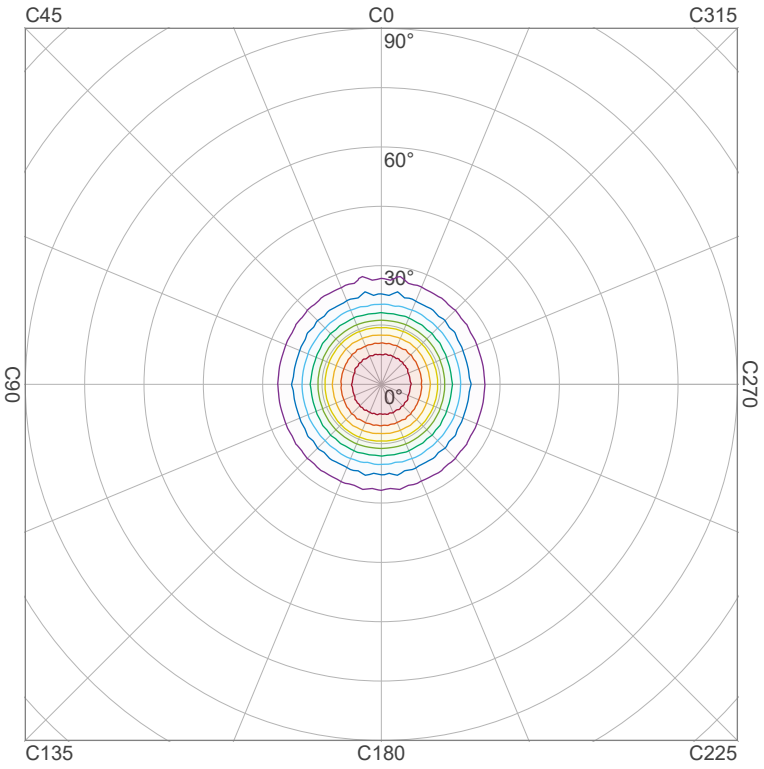
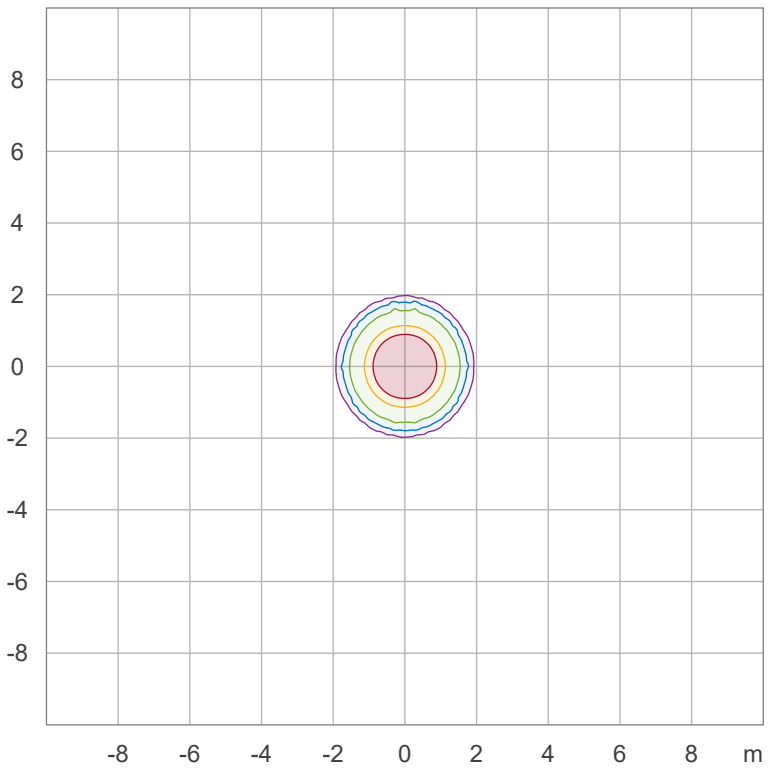
Iso-intensity Diagram (Iso-candela)



90 %	5029,0 cd
80 %	4470,2 cd
70 %	3911,4 cd
60 %	3352,7 cd
50 %	2793,9 cd
40 %	2235,1 cd
30 %	1676,3 cd
20 %	1117,6 cd
10 %	558,8 cd

Peak intensity: 5587,8 cd
Number of c-planes: 72

Iso-illuminance Diagram (Iso-lux)



50,0 %	310,4 lx
30,0 %	186,3 lx
10,0 %	62,1 lx
5,0 %	31,0 lx
3,0 %	18,6 lx

Peak illuminance: 620,9 lx
Mounting height: 3,0 m
Number of c-planes: 72

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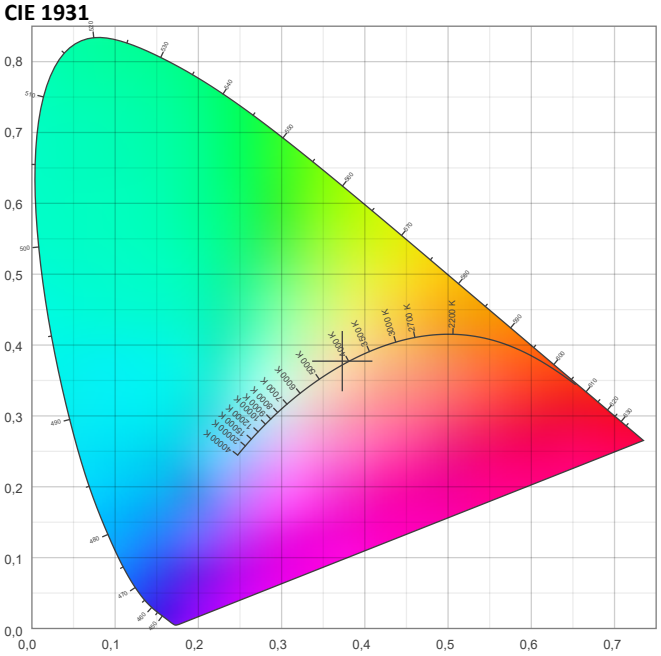
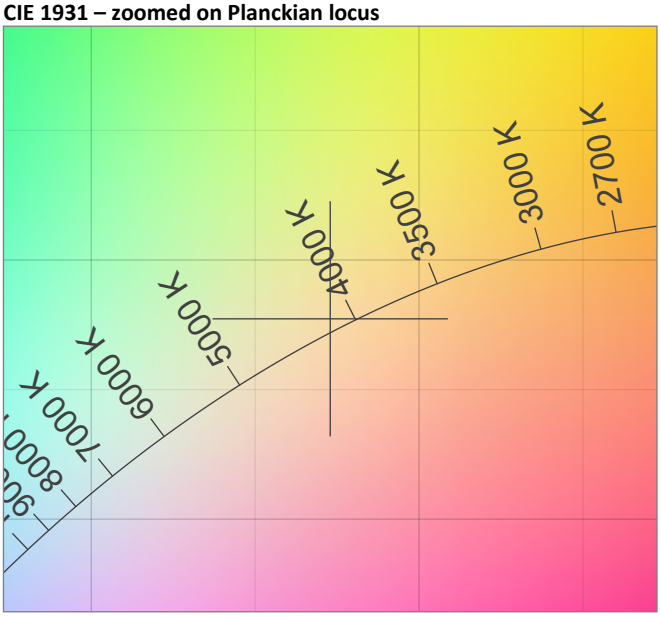
Color details

Correlated Color Temperature, Target	CCT = 4220 K
Correlated Color Temperature, Measured	CCT = 4220 K
Color Rendering Index	CRI 92,3
Color Rendering Index, R9 (red component)	R9 = 49,2
Color Rendering TM30-18	R_f 90,4 – R_g 97,1
Color Quality Scale	CQS = 91,5
MacAdam Steps	SDCM = n/a
Color coordinates CIE 1931	(x;y) = (0,373;0,377)
Color coordinate CIEs 1960	(u;v) = (0,220;0,334)
Color deviation from BBL	Duv = 0,0025
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,220;0,501)

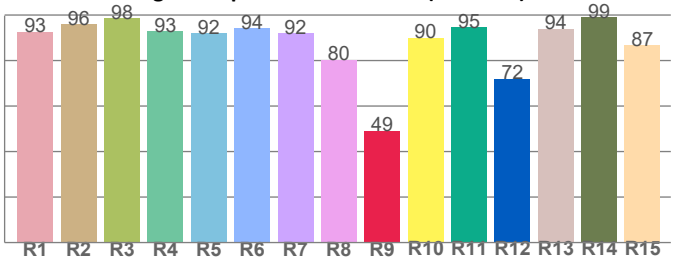
CIE 1931



CIE 1931 – zoomed on Planckian locus



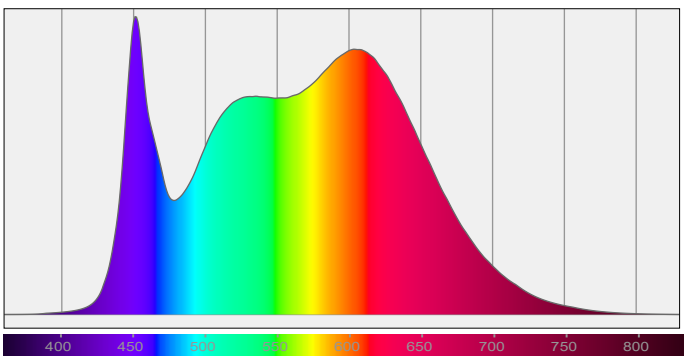
Color Rendering Index per reference color (CIE 1995)



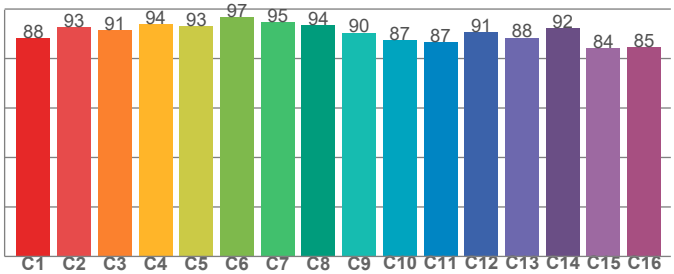
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
92,6	96,0	98,5	93,0	91,9	94,2	92,1	80,3	49,2	90,0	94,8	72,0	94,0	99,1	86,7

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



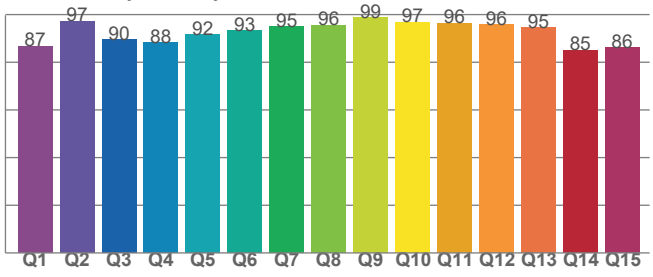
TM30-18 Rf-values per hue bin



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
88,2	92,6	91,3	93,8	93,1	96,6	94,7	93,5	90,4	87,3	86,5	90,6	88,4	92,1	84,1	84,7

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
86,8	97,3	89,5	88,3	91,6	93,3	94,9	95,6	98,7	96,9	96,4	95,7	94,6	85,1	86,1

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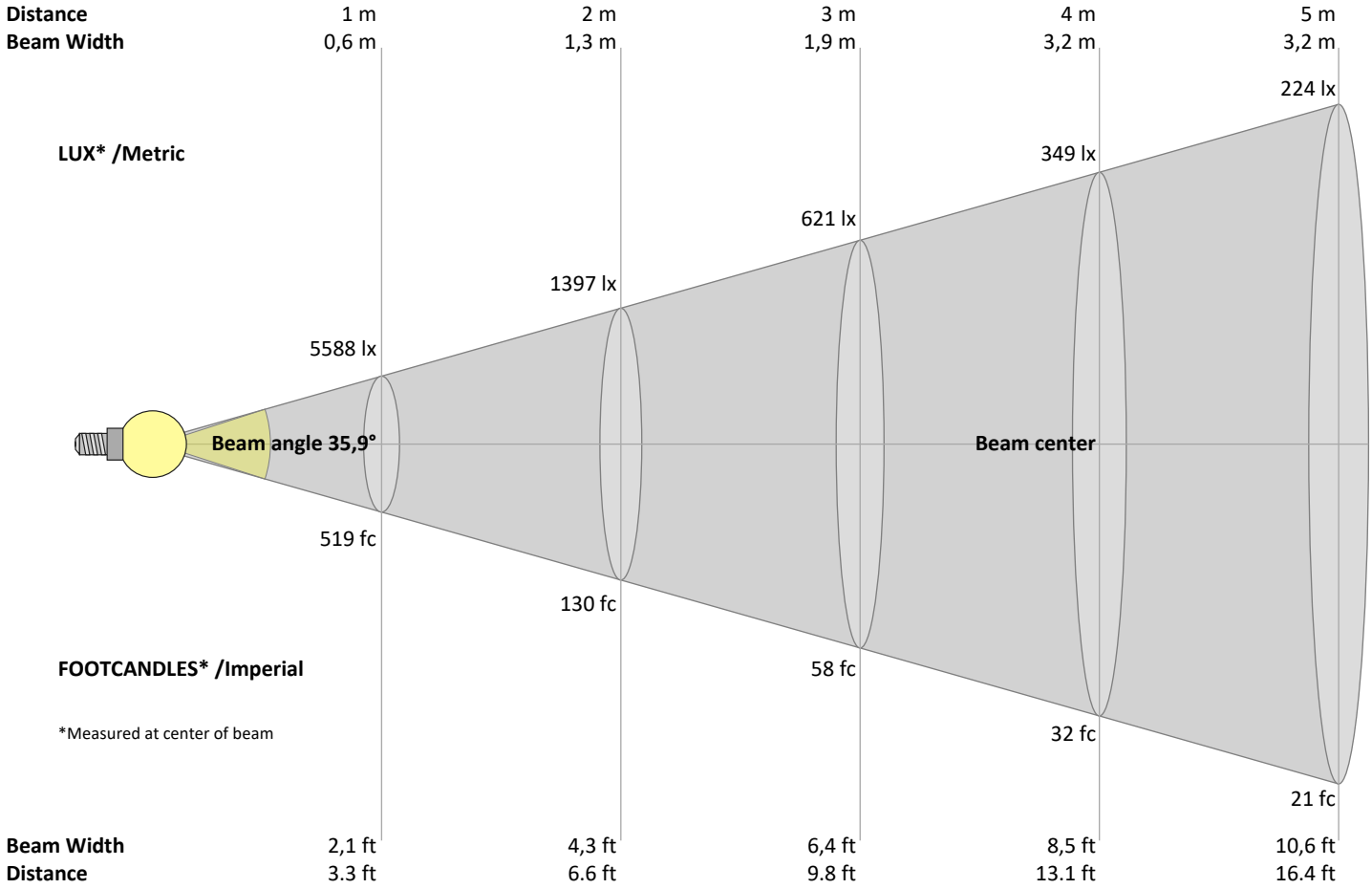
Beam Details



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
5588	1397	621	349	224	155	114	87	69	56	46	39	33	29	25	22	19	17	15	14	lux
519,1	129,8	57,7	32,4	20,8	14,4	10,6	8,1	6,4	5,2	4,3	3,6	3,1	2,6	2,3	2	1,8	1,6	1,4	1,3	fc

Intensities in 0° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
5588	5550	5439	5328	5079	4756	4400	3863	3325	2796	2271	1768	1387	1005	739	536	350	264	178	129	cd
100%	99%	97%	95%	91%	85%	79%	69%	60%	50%	41%	32%	25%	18%	13%	10%	6%	5%	3%	2%	of 0°val

Intensities in 90° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
5588	5533	5466	5278	5090	4717	4313	3853	3293	2733	2233	1743	1313	991	669	490	333	214	159	104	cd
100%	99%	98%	94%	91%	84%	77%	69%	59%	49%	40%	31%	23%	18%	12%	9%	6%	4%	3%	2%	of 0°val

Intensities in 180° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
5588	5550	5439	5328	5079	4756	4400	3863	3325	2796	2271	1768	1387	1005	739	536	350	264	178	129	cd
100%	99%	97%	95%	91%	85%	79%	69%	60%	50%	41%	32%	25%	18%	13%	10%	6%	5%	3%	2%	of 0°val

Intensities in 270° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
5588	5533	5466	5278	5090	4717	4313	3853	3293	2733	2233	1743	1313	991	669	490	333	214	159	104	cd
100%	99%	98%	94%	91%	84%	77%	69%	59%	49%	40%	31%	23%	18%	12%	9%	6%	4%	3%	2%	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		**Viewed Crosswise** (Viewing direction orthogonal to lamp length axis)					**Viewed Endwise** (Viewing direction parallel to lamp length axis)				
X	**Y**										
2H	2H	16,3	16,8	16,3	17,0	17,1	15,2	15,7	15,3	15,9	16,1
	3H	16,3	16,9	16,7	17,1	17,3	15,3	16,0	15,7	16,2	16,4
	4H	16,2	16,9	16,6	17,1	17,3	15,3	15,9	15,7	16,2	16,4
	6H	16,3	16,8	16,5	17,1	17,4	15,3	15,8	15,6	16,1	16,5
	8H	16,2	16,7	16,5	17,0	17,4	15,3	15,8	15,6	16,1	16,5
	12H	16,1	16,6	16,5	17,0	17,4	15,2	15,7	15,5	16,0	16,5
4H	2H	16,2	16,8	16,5	17,0	17,2	15,2	15,8	15,6	16,1	16,3
	3H	16,4	16,9	16,8	17,3	17,7	15,6	16,1	15,9	16,4	16,8
	4H	16,4	16,8	16,8	17,2	17,7	15,5	15,9	15,9	16,4	16,9
	6H	16,3	16,8	16,8	17,1	17,5	15,4	15,9	15,9	16,3	16,6
	8H	16,2	16,7	16,7	17,0	17,4	15,4	15,8	15,9	16,2	16,5
	12H	16,2	16,5	16,7	16,9	17,4	15,3	15,7	15,8	16,1	16,5
8H	4H	16,2	16,7	16,8	17,0	17,4	15,4	15,9	15,9	16,2	16,6
	6H	16,2	16,5	16,7	16,9	17,5	15,3	15,6	15,8	16,1	16,6
	8H	16,2	16,4	16,7	16,9	17,5	15,3	15,6	15,8	16,1	16,7
	12H	16,1	16,3	16,7	16,8	17,4	15,3	15,5	15,9	16,0	16,6
12H	4H	16,2	16,5	16,7	16,9	17,4	15,3	15,7	15,8	16,1	16,6
	6H	16,2	16,4	16,7	16,9	17,5	15,3	15,6	15,8	16,1	16,7
	8H	16,1	16,3	16,7	16,8	17,4	15,3	15,5	15,9	16,0	16,6

Variations with the observer position for the luminaire spacings, S:		
S = 1.0H	4,5 / -2,7	3,6 / -2,0
S = 1.5H	6,9 / -3,3	5,9 / -2,5
S = 2.0H	8,8 / -5,4	7,6 / -4,8

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	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	114	112	110	108	112	110	108	106	106	104	103	102	101	100	99	98	97	95
2	110	106	102	99	108	104	101	98	101	98	96	98	96	94	95	94	92	91
3	105	100	96	93	104	99	95	92	96	93	90	94	91	89	92	90	88	86
4	101	95	91	87	100	94	90	87	92	88	86	90	87	85	88	86	84	82
5	98	91	86	82	96	90	85	82	88	84	81	87	83	81	85	82	80	79
6	94	87	82	78	93	86	81	78	85	81	78	83	80	77	82	79	77	75
7	91	83	78	75	90	83	78	75	81	77	74	80	77	74	79	76	74	72
8	88	80	75	72	86	79	75	71	78	74	71	77	74	71	76	73	71	70
9	85	77	72	69	84	76	72	69	75	71	68	75	71	68	74	70	68	67
10	82	74	69	66	81	74	69	66	73	69	66	72	68	66	71	68	66	64

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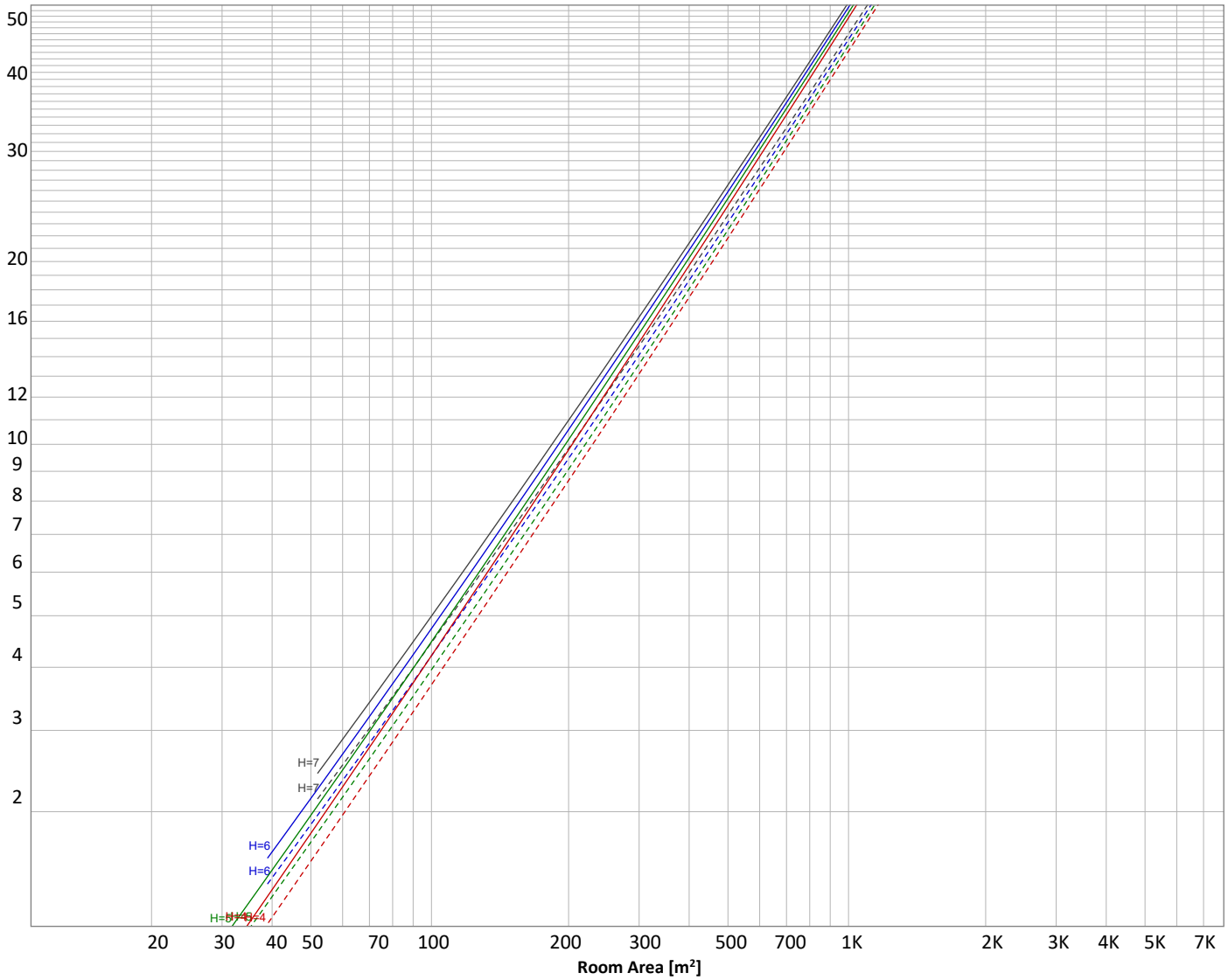
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 2237 lm		ρ(%)		
H_{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	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°
497 lm	975 lm	533 lm	131 lm	43,0 lm	31,7 lm	19,2 lm	3,98 lm	0,082 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,027 lm	0,036 lm	0,036 lm	0,033 lm	0,072 lm	0,262 lm	0,529 lm	0,483 lm	0,177 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	497 lm	22,2%
10-20°	975 lm	43,6%
20-30°	533 lm	23,8%
30-40°	131 lm	5,9%
40-50°	43 lm	1,9%
50-60°	32 lm	1,4%
60-70°	19 lm	0,9%
70-80°	4 lm	0,2%
80-90°	0 lm	0,0%
90-100°	0 lm	0,0%
100-110°	0 lm	0,0%
110-120°	0 lm	0,0%
120-130°	0 lm	0,0%
130-140°	0 lm	0,0%
140-150°	0 lm	0,0%
150-160°	1 lm	0,0%
160-170°	0 lm	0,0%
170-180°	0 lm	0,0%
Total	2237 lm	100,0%

Intensity peaks

Max intensity	5611 cd
Intensity, 90°	0 cd
Intensity, 0°	5588 cd

Zonal Lumen summary

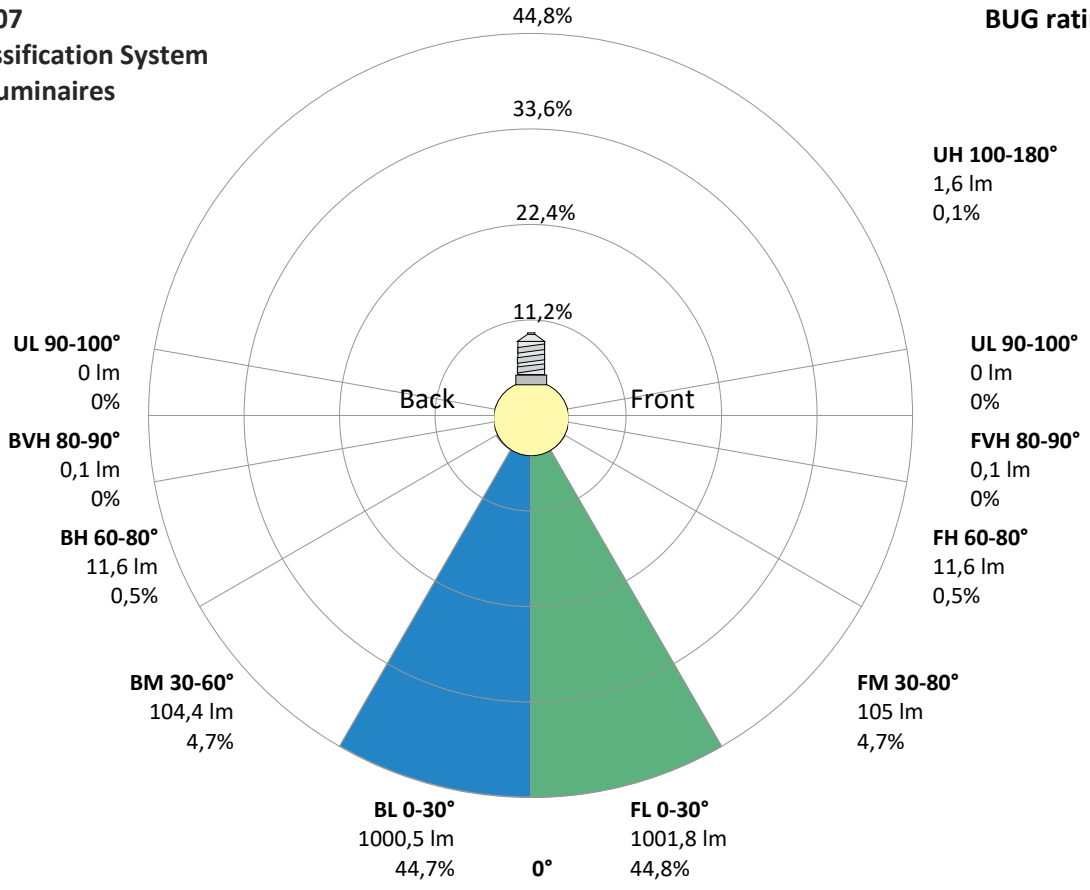
Zone (γ)	Lumen	% Total
0-30°	2006 lm	89,7%
0-40°	2137 lm	95,5%
0-60°	2212 lm	98,9%
60-90°	23 lm	1,0%
70-100°	4 lm	0,2%
90-120°	0 lm	0,0%
0-90°	2235 lm	99,9%
90-180°	2 lm	0,1%
0-180°	2237 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	1002 lm	44,8%
Medium(30-60°)	105 lm	4,7%
High(60-80°)	12 lm	0,5%
Very high(80-90°)	0 lm	0,0%
Back light		
Low(0-30°)	1000 lm	44,7%
Medium(30-60°)	104 lm	4,7%
High(60-80°)	12 lm	0,5%
Very high(80-90°)	0 lm	0,0%
Uplight		
Low(90-100°)	0 lm	0,0%
High(100-180°)	2 lm	0,1%

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

BUG rating B2 U1 G0



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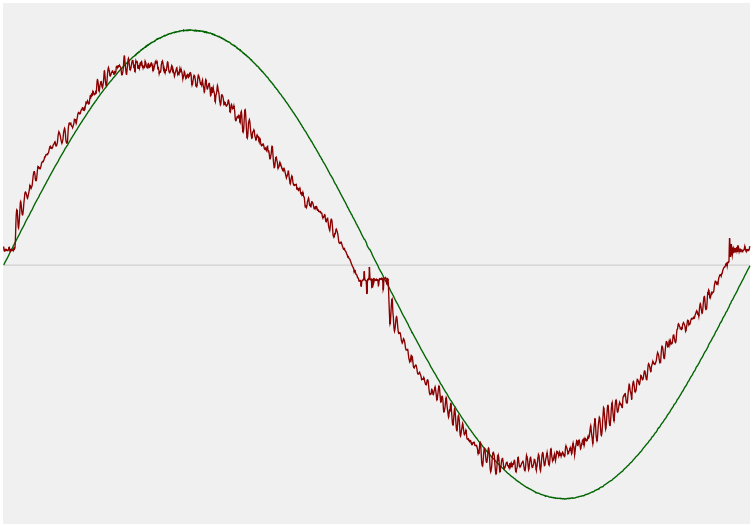
Power Details

Input Power

Power feed to light source	29,4 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,131 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	30,15 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,98
Total harmonic distortion of the current	7,7%
Total harmonic distortion of the voltage	0,08%

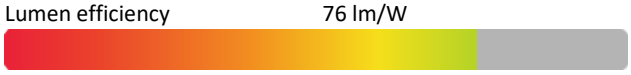
Input Power Curve



Efficiency

Radiated power efficiency 24,4%

Lumen efficiency 76 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	4204 K
CCT shift	+16 K
CCT end	4220 K

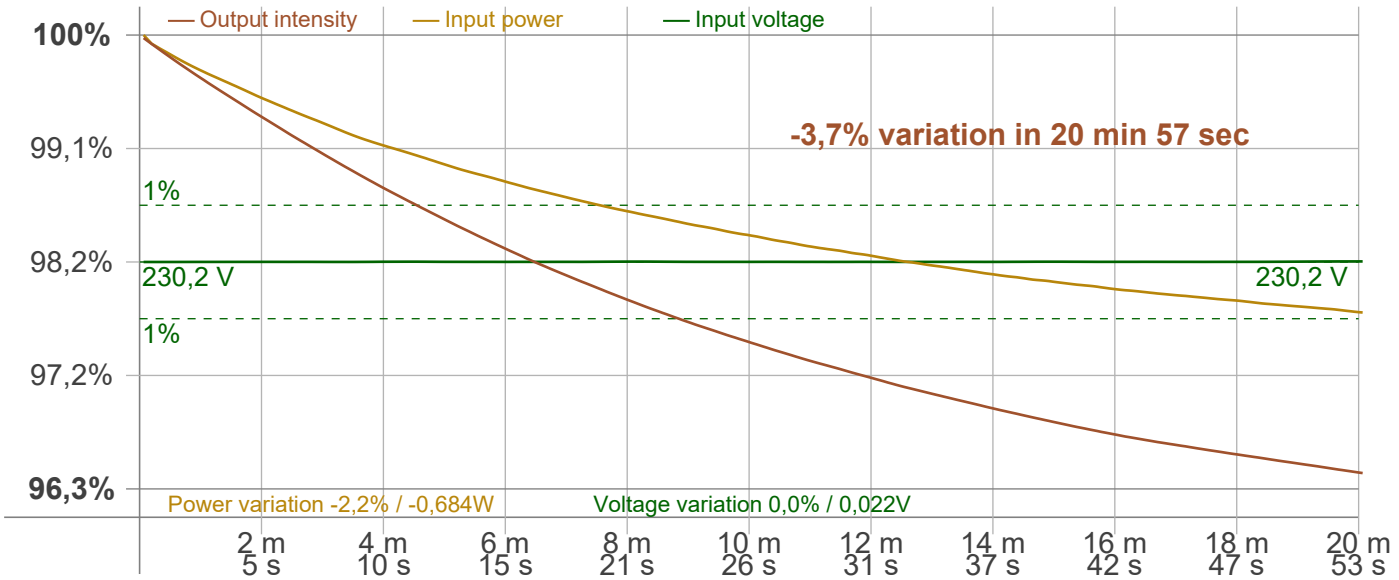
Warmup Result

Total warmup time	Lamp stabilized in 20 min 57 sec
Warmup variation	-3,7%

Output Change

Output start	2321 lm
Output change	-84 lm
Output end	2237 lm

Stabilization Curve



Light Measurement Report

Print date: 15-4-2025
Measurement date and time: 14-4-2025 16:43:31 – Measurement no. VFR-250414-0768-MS
Measurement tracking No. and Link: VT250414-008189
Operator:

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	0,38 %
Flicker index	0

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)	0,01

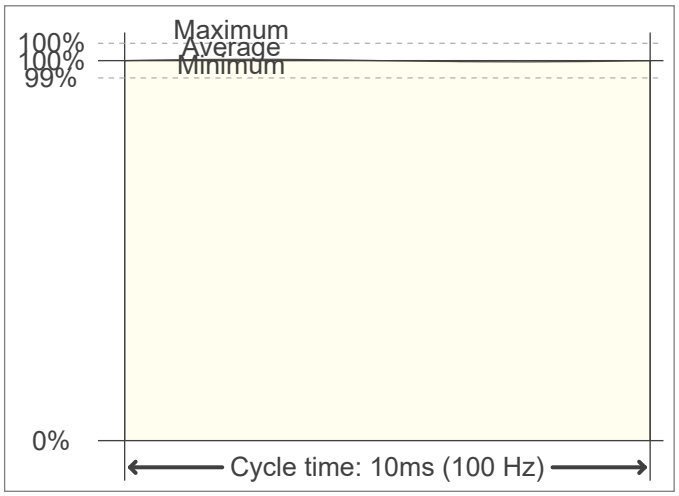
Flicker indices according to California Energy Commission (CEC) 2016b

JA8/10 40 Hz	0,03 %
JA8/10 90 Hz	0,03 %
JA8/10 200 Hz	0,37 %
JA8/10 400 Hz	0,37 %
JA8/10 1000 Hz	0,37 %

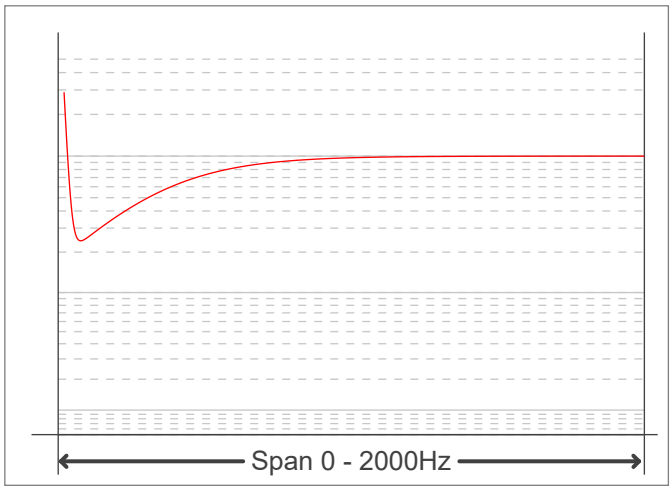
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp	0,02

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot