Light Measurement Report

Print date: 15-4-2025
Measurement date and time: 15-4-2025 08:29:08 – Measurement no. VFR-250415-0772-MS
Measurement tracking No. and Link: VT250415-003978
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

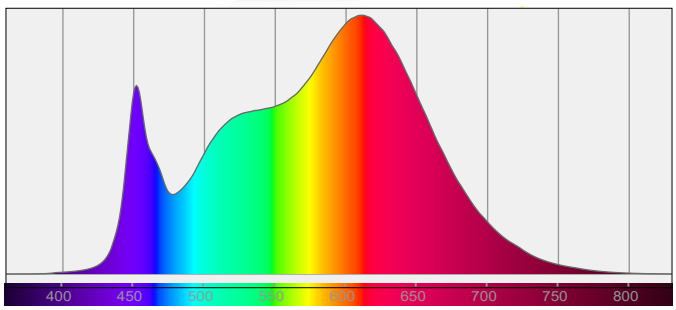
Number of C-planes and Resolution	12 planes – 30°
γ (gamma)-Resolution	5°
Test Distance	2,49 m
Input Power, Power and Displ. Factors	28,2 W – PF 0,97 – DPF 0,97
Input RMS Voltage and Current	230 V – 0,126 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 20 min 41 sec – 2,0%

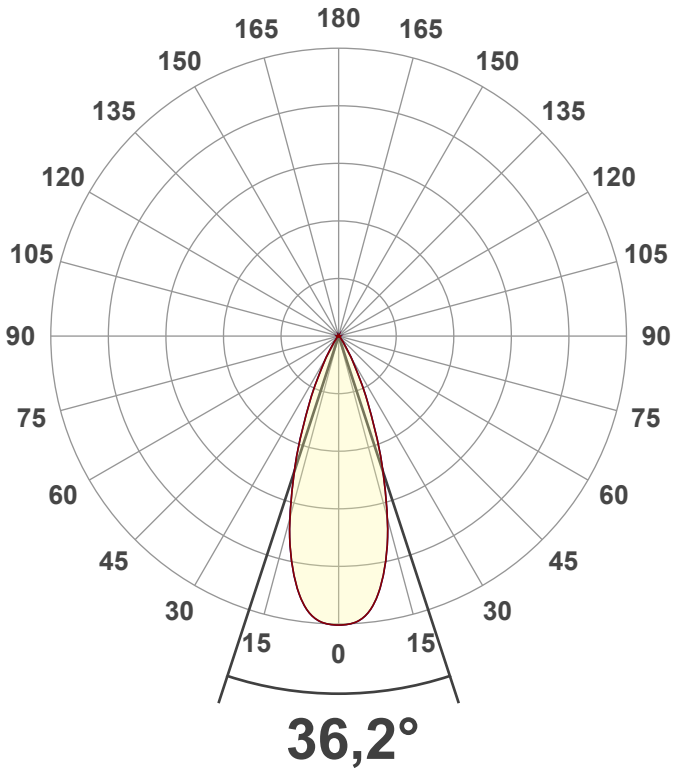
Tested Light Source

Product Name	278905-3000K BATCH 2502
Item No. and Manufacturer	278905-3000K BATCH 2502 – Dutchfulfillment
Product Description (line 1)	LED DOWNLIGHT | KANTELBAAR | Ø145 | 30W | ZWART | CCT-SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	2375 lm – 0,06% / 99,94%
Efficiency	84 lm/W
Peak Intensity and Beam Angle	5811 cd – 36,2°
Correlated Color Temperature, Target/Measured	CCT = 3000 K / 3373 K
Color Rendering Index	CRI 93,2
Color Rendering TM30-18	R_f 91,1 – R_g 98,0
Color Shift, CIE duv and MacAdam Steps	Duv -0,0007 – SDCM 11,9
Flicker	SVM 0,02 – PstLM 0,03





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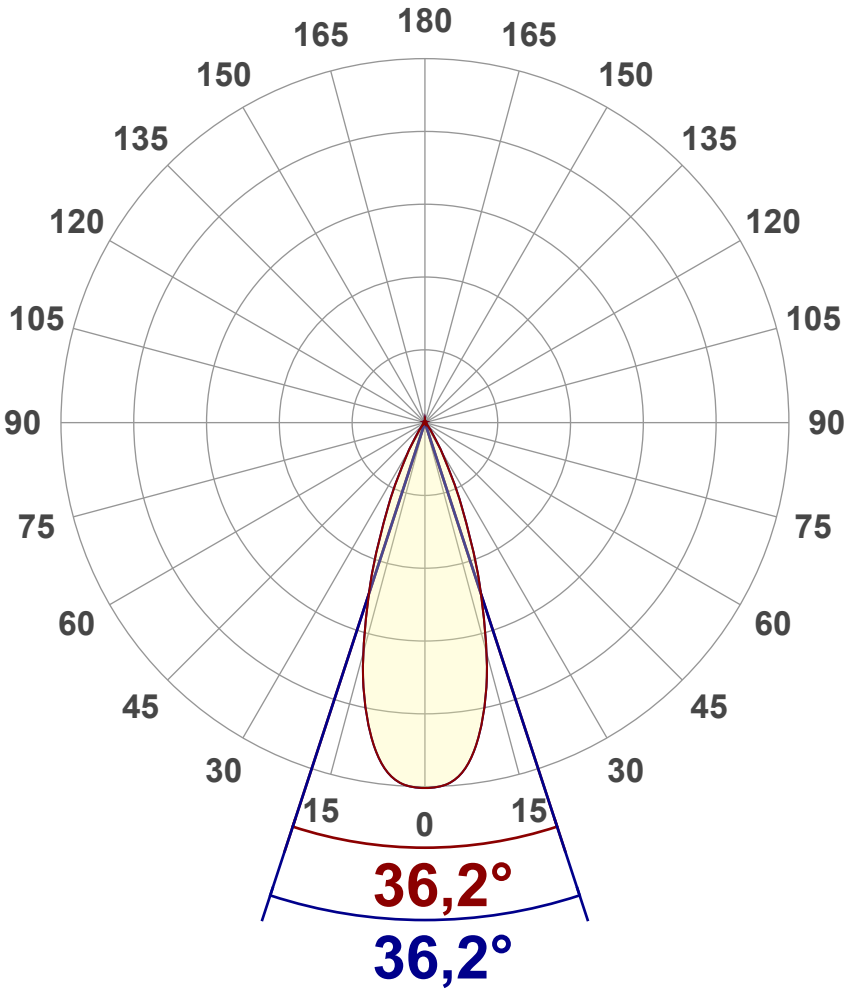
Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2375 lm
Lumen Up% / Down%	0,06% / 99,94%
Peak Intensity	5811 cd
Beam Angle (50%)	36,2°
Beam Angle (90%)	36,2°
Beam Angle (10%)	36,2°

Cut-off Angle

Average 2,5%	74,5°

Field Angle

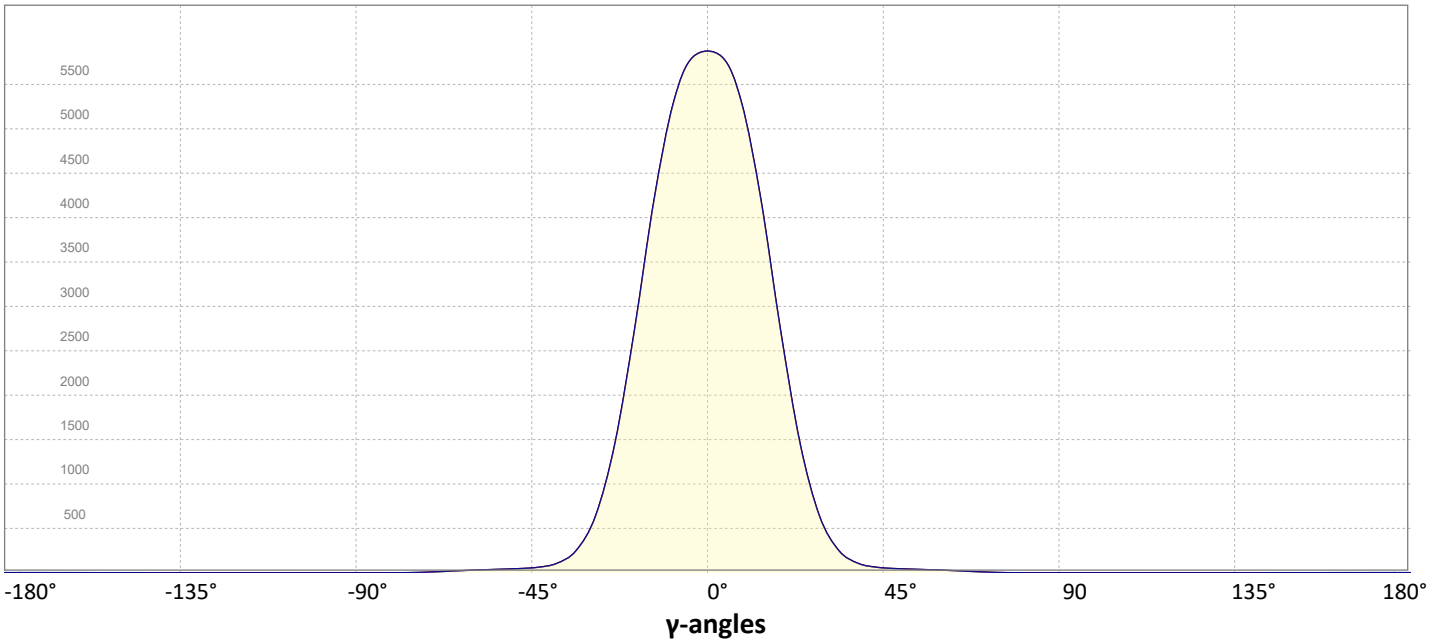
Average 10%	58,9°

Intensity Ratio

In 120° cone	98,9%
In 90° cone	96,7%

C000-C180
C090-C270

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



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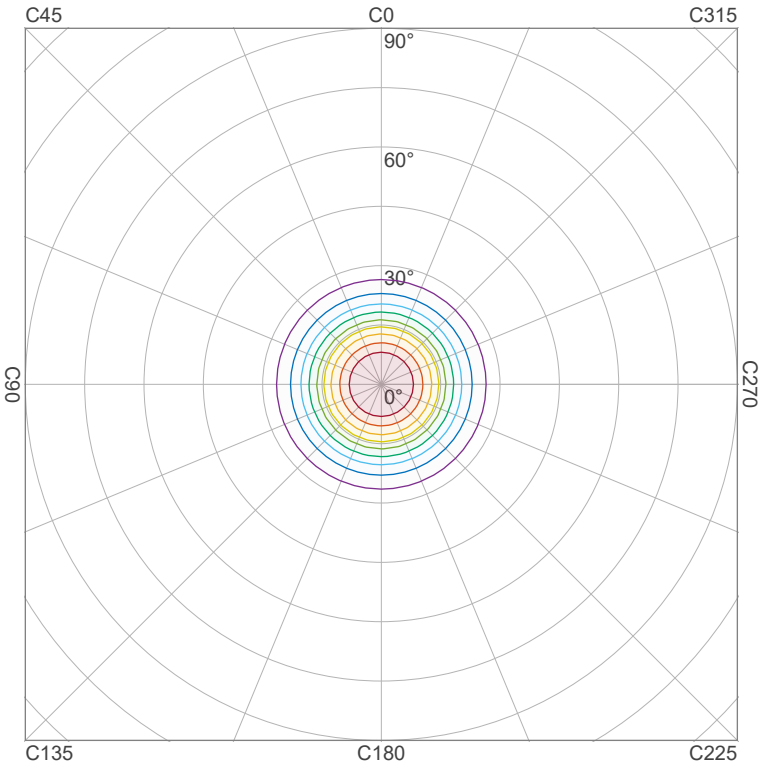
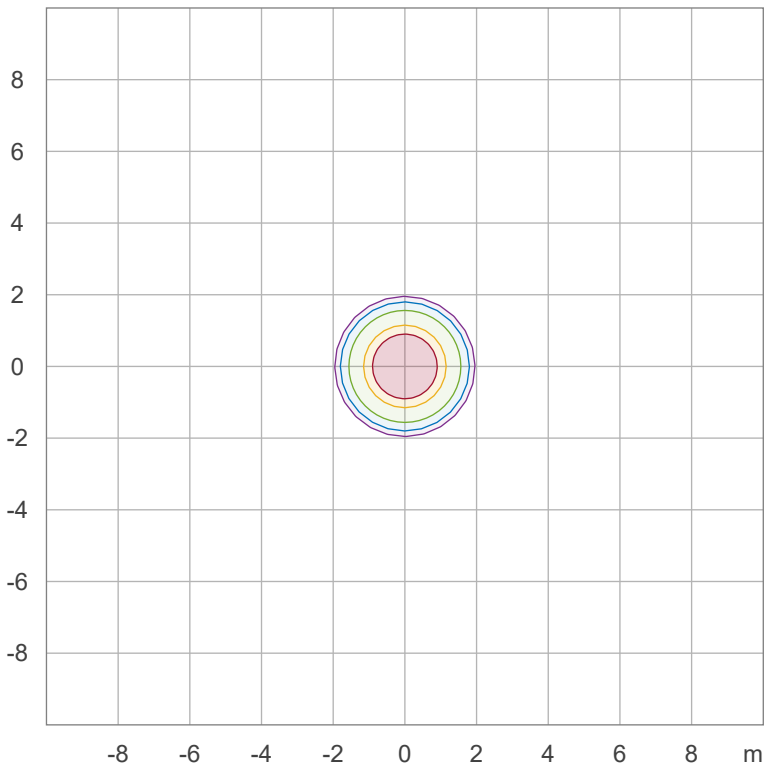
Iso-intensity Diagram (Iso-candela)



90 %	5230,0 cd
80 %	4648,9 cd
70 %	4067,7 cd
60 %	3486,6 cd
50 %	2905,5 cd
40 %	2324,4 cd
30 %	1743,3 cd
20 %	1162,2 cd
10 %	581,1 cd

Peak intensity: 5811,1 cd
Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



50,0 %	322,8 lx
30,0 %	193,7 lx
10,0 %	64,6 lx
5,0 %	32,3 lx
3,0 %	19,4 lx

Peak illuminance: 645,7 lx
Mounting height: 3,0 m
Number of c-planes: 12

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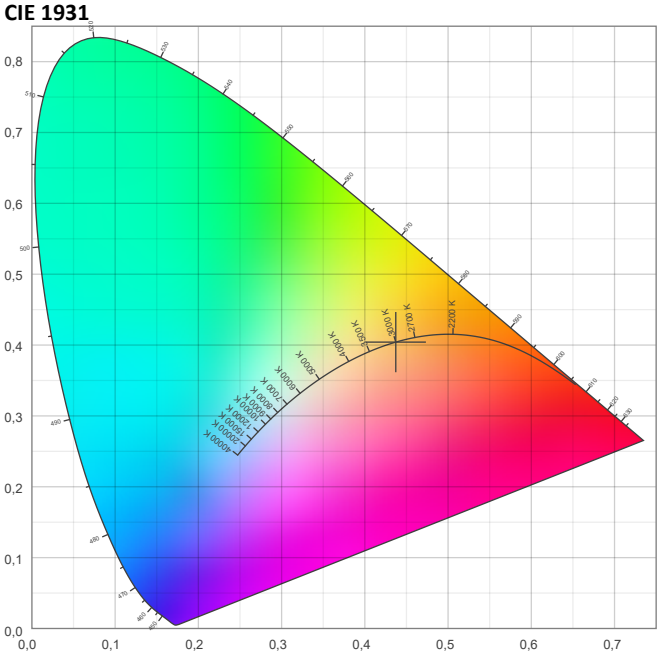
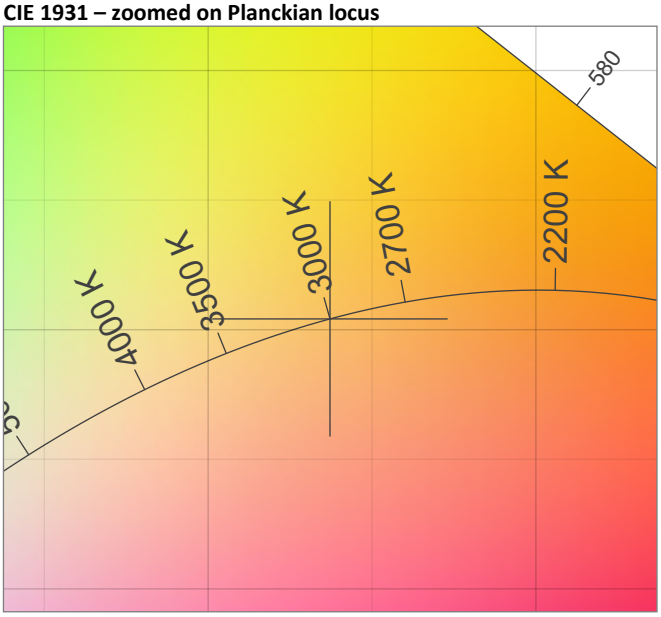
Color details

Correlated Color Temperature, Target	CCT = 3000 K
Correlated Color Temperature, Measured	CCT = 3373 K
Color Rendering Index	CRI 93,2
Color Rendering Index, R9 (red component)	R9 = 52,4
Color Rendering TM30-18	R_f 91,1 – R_g 98,0
Color Quality Scale	CQS = 91,9
MacAdam Steps	SDCM = 11,9
Color coordinates CIE 1931	(x;y) = (0,437;0,404)
Color coordinate CIEs 1960	(u;v) = (0,251;0,348)
Color deviation from BBL	Duv = -0,0007
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,251;0,521)

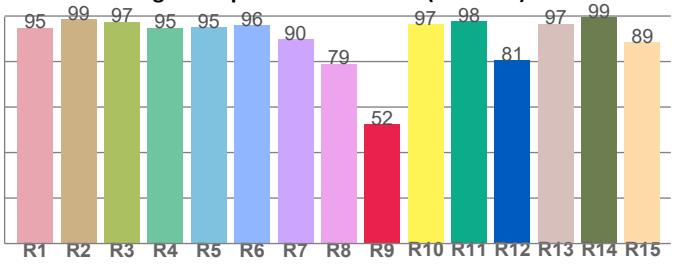
CIE 1931



CIE 1931 – zoomed on Planckian locus



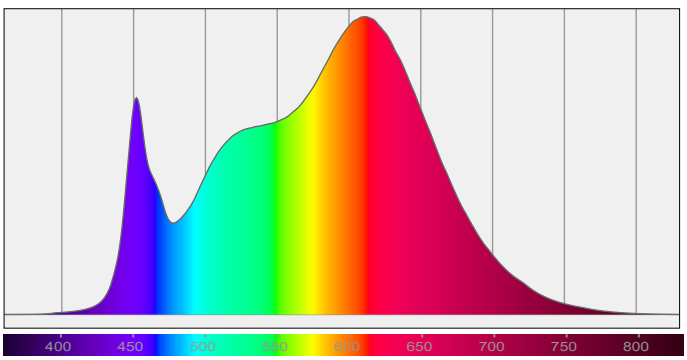
Color Rendering Index per reference color (CIE 1995)



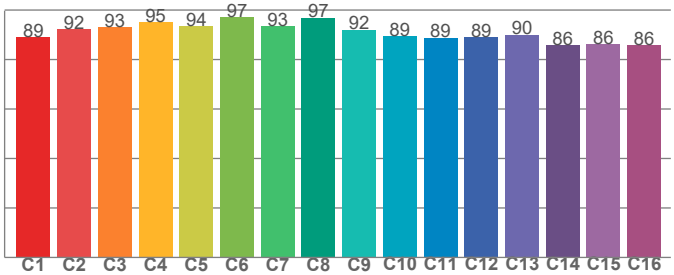
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
94,8	98,7	97,5	94,8	94,9	96,0	89,9	79,1	52,4	96,5	97,6	80,6	96,6	99,4	88,6

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



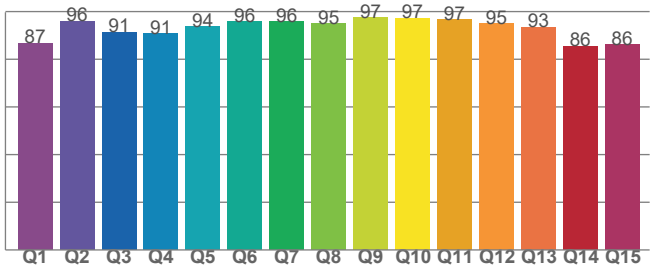
TM30-18 Rf-values per hue bin



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
88,9	92,4	93,1	95,0	93,5	97,0	93,5	96,9	92,1	89,3	88,9	89,0	90,1	85,8	86,3	85,7

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
86,7	96,0	91,4	90,8	93,6	95,7	95,7	94,9	97,4	97,2	96,6	95,0	93,5	85,5	86,0

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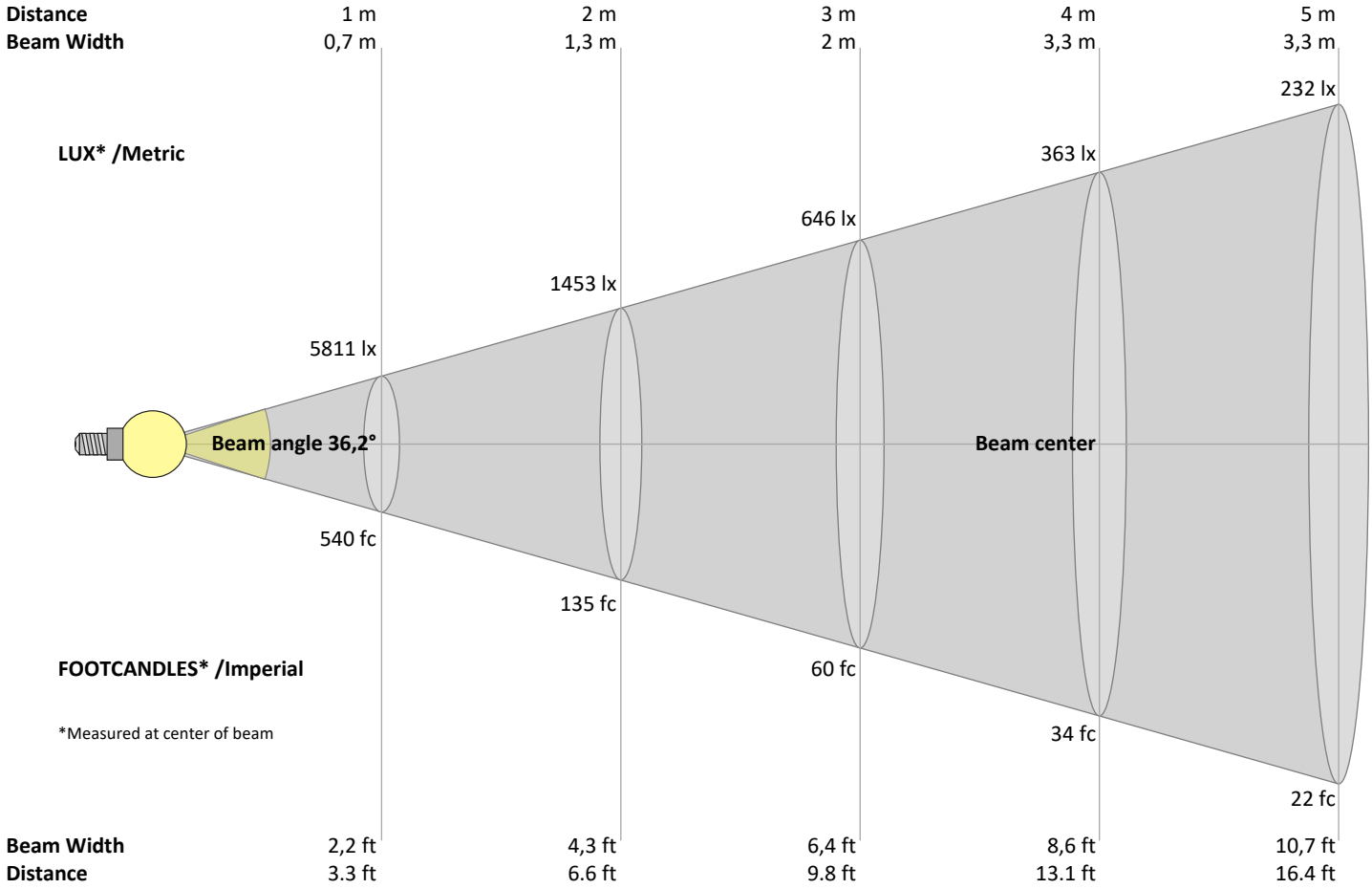
Beam Details



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
5811	1453	646	363	232	161	119	91	72	58	48	40	34	30	26	23	20	18	16	15	lux
539,9	135	60	33,7	21,6	15	11	8,4	6,7	5,4	4,5	3,7	3,2	2,8	2,4	2,1	1,9	1,7	1,5	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
5811	5811	5779	5574	5369	5015	4575	4111	3526	2941	2404	1893	1411	1081	751	537	380	239	181	124	cd
100%	100%	99%	96%	92%	86%	79%	71%	61%	51%	41%	33%	24%	19%	13%	9%	7%	4%	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
5811	5811	5779	5574	5369	5015	4575	4111	3526	2941	2404	1893	1411	1081	751	537	380	239	181	124	cd
100%	100%	99%	96%	92%	86%	79%	71%	61%	51%	41%	33%	24%	19%	13%	9%	7%	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
5811	5811	5779	5574	5369	5015	4575	4111	3526	2941	2404	1893	1411	1081	751	537	380	239	181	124	cd
100%	100%	99%	96%	92%	86%	79%	71%	61%	51%	41%	33%	24%	19%	13%	9%	7%	4%	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
5811	5811	5779	5574	5369	5015	4575	4111	3526	2941	2404	1893	1411	1081	751	537	380	239	181	124	cd
100%	100%	99%	96%	92%	86%	79%	71%	61%	51%	41%	33%	24%	19%	13%	9%	7%	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	16,0	16,5	16,0	16,7	16,9	16,0	16,5	16,0	16,7	16,9
	3H	16,0	16,7	16,4	16,9	17,0	16,0	16,7	16,4	16,9	17,0
	4H	16,0	16,6	16,4	16,8	17,1	16,0	16,6	16,4	16,8	17,1
	6H	16,0	16,5	16,3	16,8	17,1	16,0	16,5	16,3	16,8	17,1
	8H	15,9	16,4	16,3	16,8	17,1	15,9	16,4	16,3	16,8	17,1
	12H	15,9	16,4	16,2	16,7	17,1	15,9	16,4	16,2	16,7	17,1
4H	2H	15,9	16,5	16,3	16,7	17,0	15,9	16,5	16,3	16,7	17,0
	3H	16,2	16,7	16,5	17,0	17,5	16,2	16,7	16,5	17,0	17,5
	4H	16,1	16,6	16,5	17,0	17,5	16,1	16,6	16,5	17,0	17,5
	6H	16,0	16,5	16,5	16,9	17,2	16,0	16,5	16,5	16,9	17,2
	8H	16,0	16,4	16,5	16,8	17,1	16,0	16,4	16,5	16,8	17,1
	12H	15,9	16,3	16,4	16,7	17,1	15,9	16,3	16,4	16,7	17,1
8H	4H	16,0	16,5	16,5	16,8	17,2	16,0	16,5	16,5	16,8	17,2
	6H	16,0	16,3	16,5	16,7	17,2	16,0	16,3	16,5	16,7	17,2
	8H	16,0	16,2	16,5	16,7	17,3	16,0	16,2	16,5	16,7	17,3
	12H	15,9	16,1	16,5	16,6	17,2	15,9	16,1	16,5	16,6	17,2
12H	4H	15,9	16,3	16,4	16,7	17,2	15,9	16,3	16,4	16,7	17,2
	6H	16,0	16,2	16,5	16,7	17,3	16,0	16,2	16,5	16,7	17,3
	8H	15,9	16,1	16,5	16,6	17,2	15,9	16,1	16,5	16,6	17,2

Variations with the observer position for the luminaire spacings, S:		
S = 1.0H	4,1 / -2,4	4,1 / -2,4
S = 1.5H	6,5 / -3,1	6,5 / -3,1
S = 2.0H	8,3 / -5,0	8,3 / -5,0

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	89	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	89	82	78	75	81	77	74	80	76	74	79	76	73	72
8	87	80	75	71	86	79	75	71	78	74	71	77	74	71	76	73	71	69
9	84	77	72	69	84	76	72	68	75	71	68	75	71	68	74	70	68	67
10	82	74	69	66	81	73	69	66	73	69	66	72	68	66	71	68	65	64

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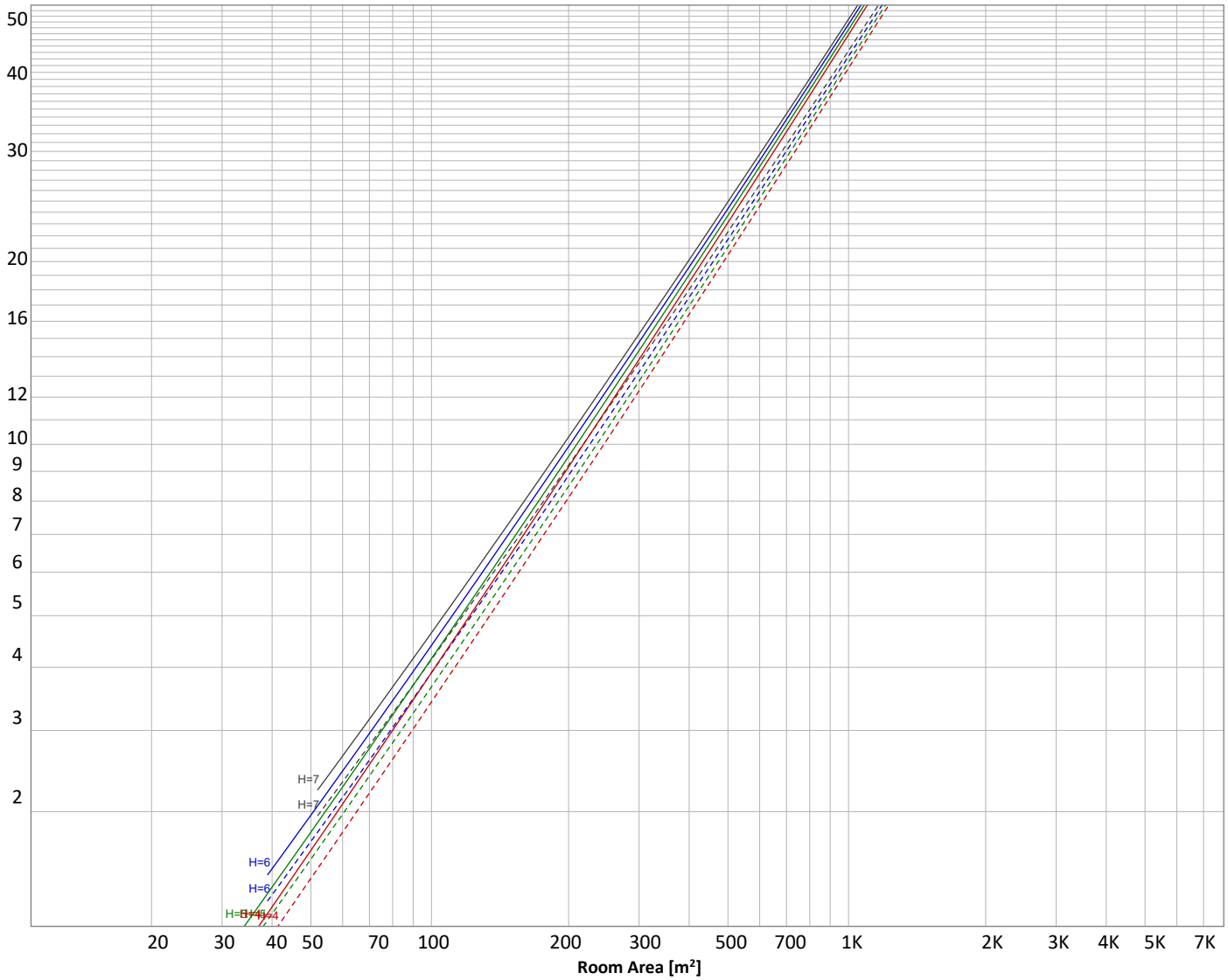
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 2375 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°
524 lm	1028 lm	573 lm	145 lm	46,1 lm	33,1 lm	19,6 lm	4,24 lm	0,145 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,032 lm	0,006 lm	0,002 lm	0,005 lm	0,030 lm	0,241 lm	0,524 lm	0,488 lm	0,177 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	524 lm	22,1%
10-20°	1028 lm	43,3%
20-30°	573 lm	24,1%
30-40°	145 lm	6,1%
40-50°	46 lm	1,9%
50-60°	33 lm	1,4%
60-70°	20 lm	0,8%
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	2375 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	2126 lm	89,5%
0-40°	2270 lm	95,6%
0-60°	2350 lm	98,9%
60-90°	24 lm	1,0%
70-100°	4 lm	0,2%
90-120°	0 lm	0,0%
0-90°	2374 lm	99,9%
90-180°	2 lm	0,1%
0-180°	2375 lm	100,0%

Intensity peaks

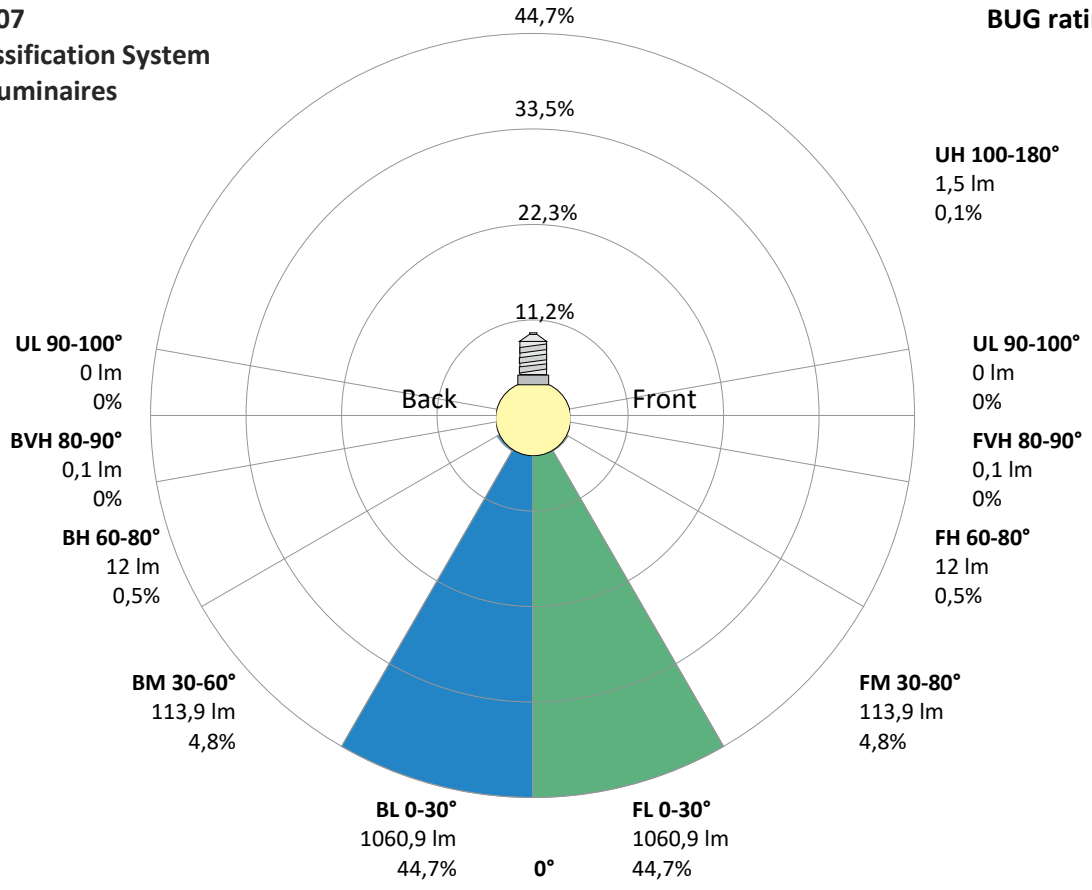
Max intensity	5811 cd
Intensity, 90°	0 cd
Intensity, 0°	5811 cd

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	1061 lm	44,7%
Medium(30-60°)	114 lm	4,8%
High(60-80°)	12 lm	0,5%
Very high(80-90°)	0 lm	0,0%
Back light		
Low(0-30°)	1061 lm	44,7%
Medium(30-60°)	114 lm	4,8%
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°)	1 lm	0,1%

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

BUG rating B3 U1 G0



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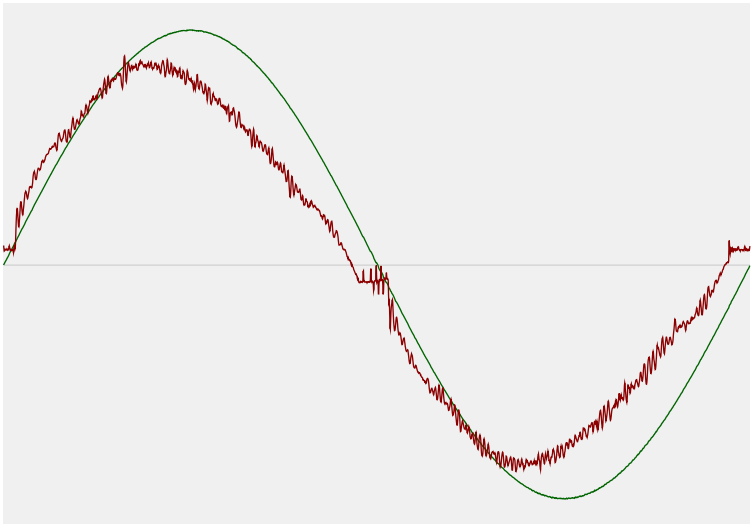
Power Details

Input Power

Power feed to light source	28,2 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,126 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	28,97 VA
Displacement factor of AC power feed	0,97
Power factor of AC current feed	0,97
Total harmonic distortion of the current	7,78%
Total harmonic distortion of the voltage	0,07%

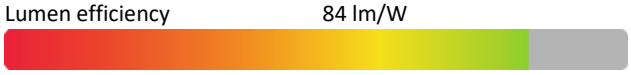
Input Power Curve



Efficiency

Radiated power efficiency 27,4%

Lumen efficiency 84 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	3005 K
CCT shift	-5 K
CCT end	3000 K

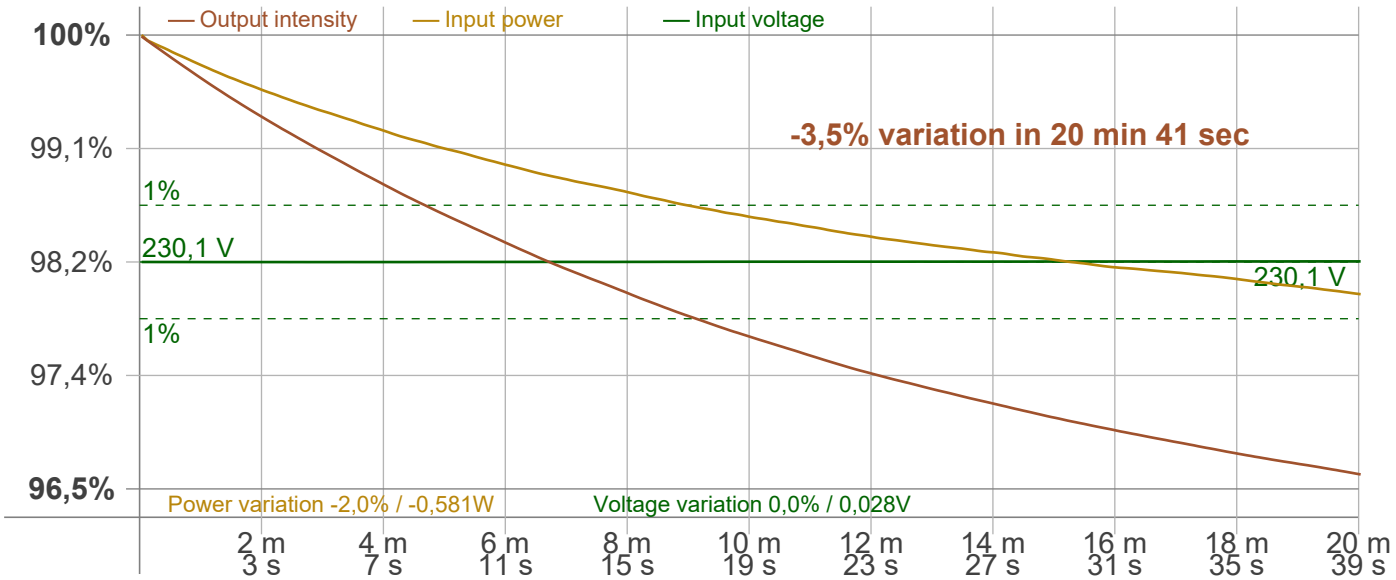
Warmup Result

Total warmup time	Lamp stabilized in 20 min 41 sec
Warmup variation	-3,5%

Output Change

Output start	2460 lm
Output change	-85 lm
Output end	2375 lm

Stabilization Curve



Light Measurement Report

Print date: 15-4-2025
Measurement date and time: 15-4-2025 08:29:08 – Measurement no. VFR-250415-0772-MS
Measurement tracking No. and Link: VT250415-003978
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	99,01 Hz
Percent Flicker	0,44 %
Flicker index	0

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

PstLM value (F < 80 Hz)	0,03
SVM value (80 < F < 2000 Hz)	0,02

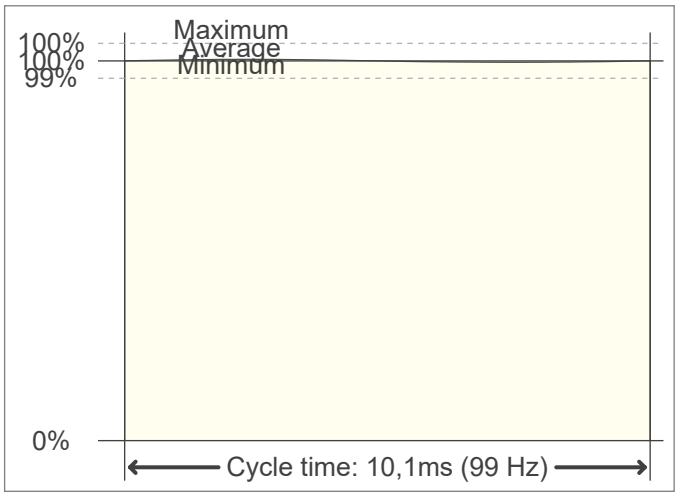
Flicker indices according to California Energy Commission (CEC) 2016b

JA8/10 40 Hz	0,03 %
JA8/10 90 Hz	0,03 %
JA8/10 200 Hz	0,42 %
JA8/10 400 Hz	0,43 %
JA8/10 1000 Hz	0,43 %

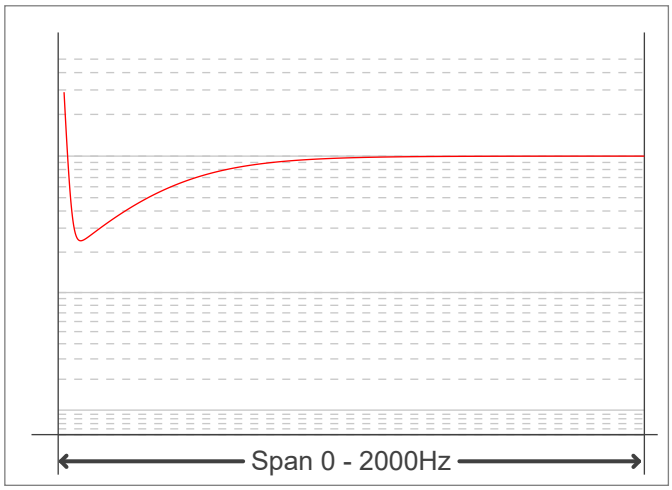
Flicker indices according to Lighting Research Center (2015)

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