

Light Measurement Report

Print date: 12-5-2025

Measurement date and time: 12-5-2025 14:54:59 – Measurement no. VFR-250512-1195-MS

Measurement tracking No. and Link: [VT250512-004583](#)

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

16 planes – 22,5°

5°

2,00 m

28,5 W – PF 0,9 – DPF 0,93

230 V – 0,137 A

50 Hz

Lamp stabilized in 15 min 3 sec – 2,0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

272033-3500K

272033-3500K – Dutchfulfillment

3-FASE RAILSPOT | RHEA | 10°-60° | 30W | WIT | CCT SWITCH

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

2296 lm – 0,05% / 99,95%

81 lm/W

2389 cd – 57,6°

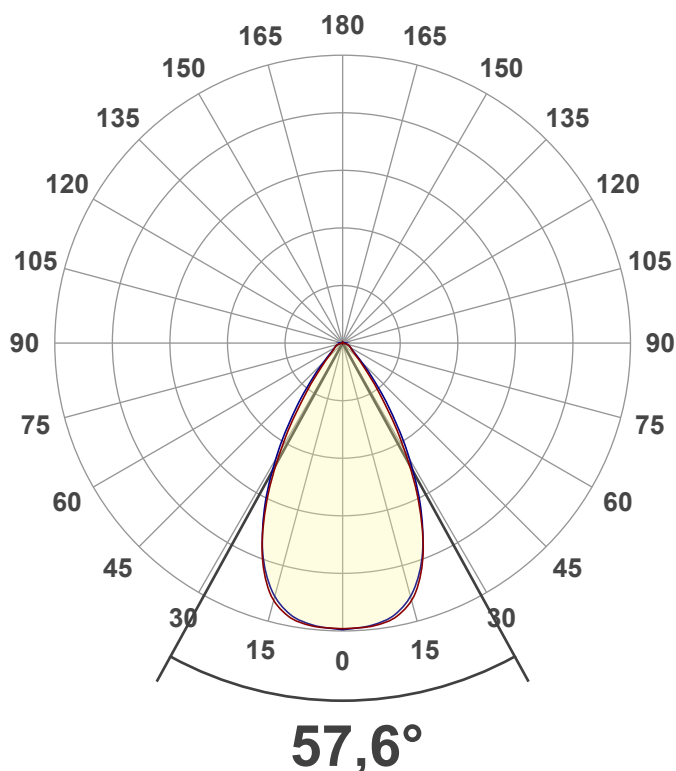
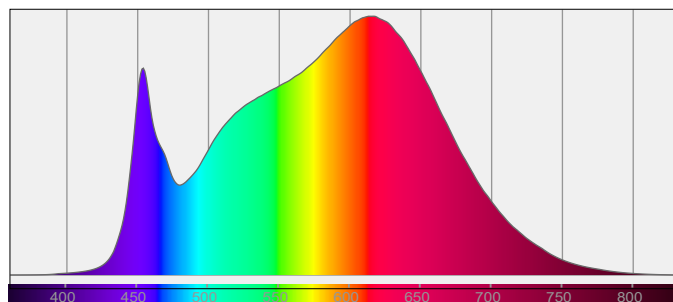
CCT = 3500 K / 3478 K

CRI 93,5

R_f 90,6 – R_g 97,2

Duv 0,0005 – SDCM 0,8

SVM 1,53 – PstLM 0,47



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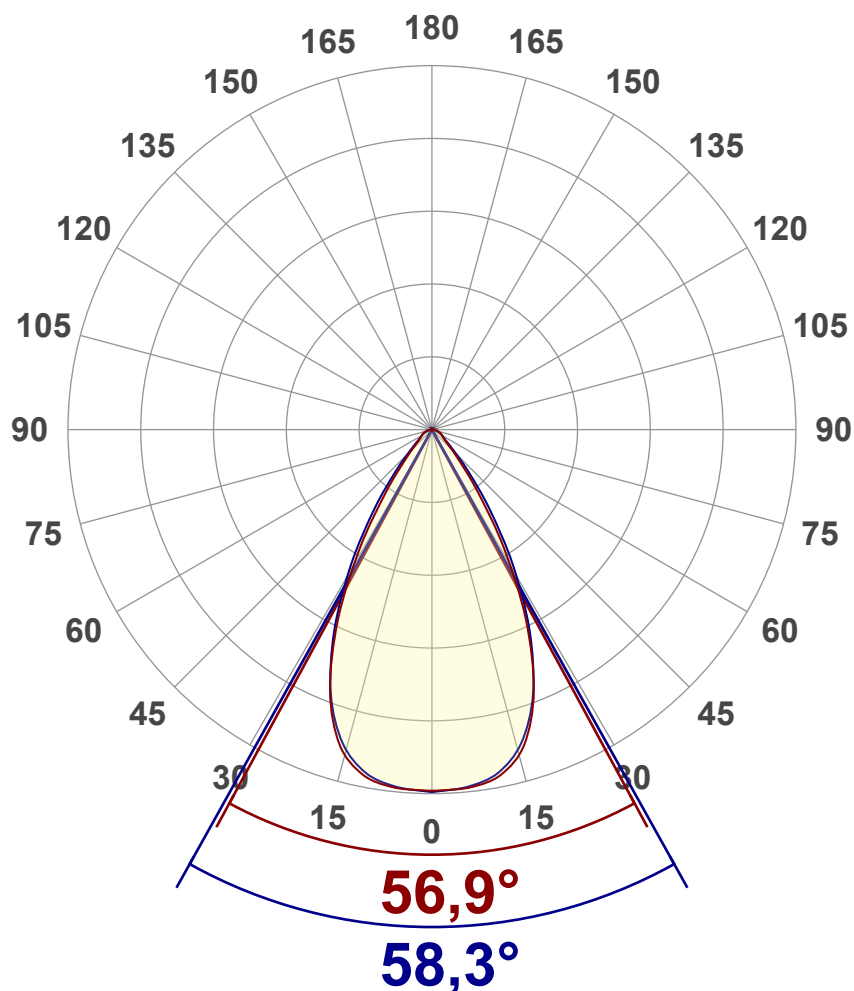
Measurement tracking No. and Link: [VT250512-004583](#)

Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2296 lm
Lumen Up% / Down%	0,05% / 99,95%
Peak Intensity	2389 cd
Beam Angle (50%)	57,6°
Beam Angle (90%)	58,3°
Beam Angle (10%)	56,9°

Cut-off Angle

Average 2,5%	133,3°
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Field Angle

Average 10%	85,9°
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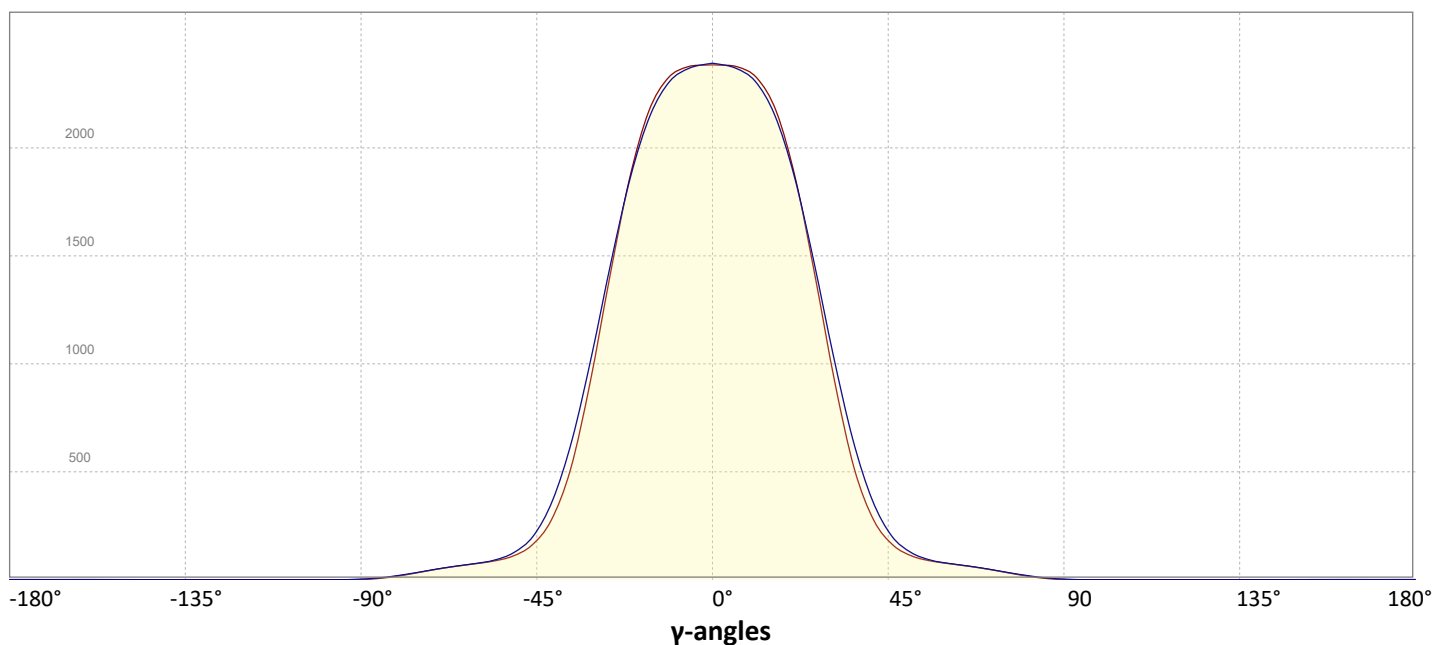
Intensity Ratio

In 120° cone	95,3%
In 90° cone	89,1%

C000-C180

C090-C270

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

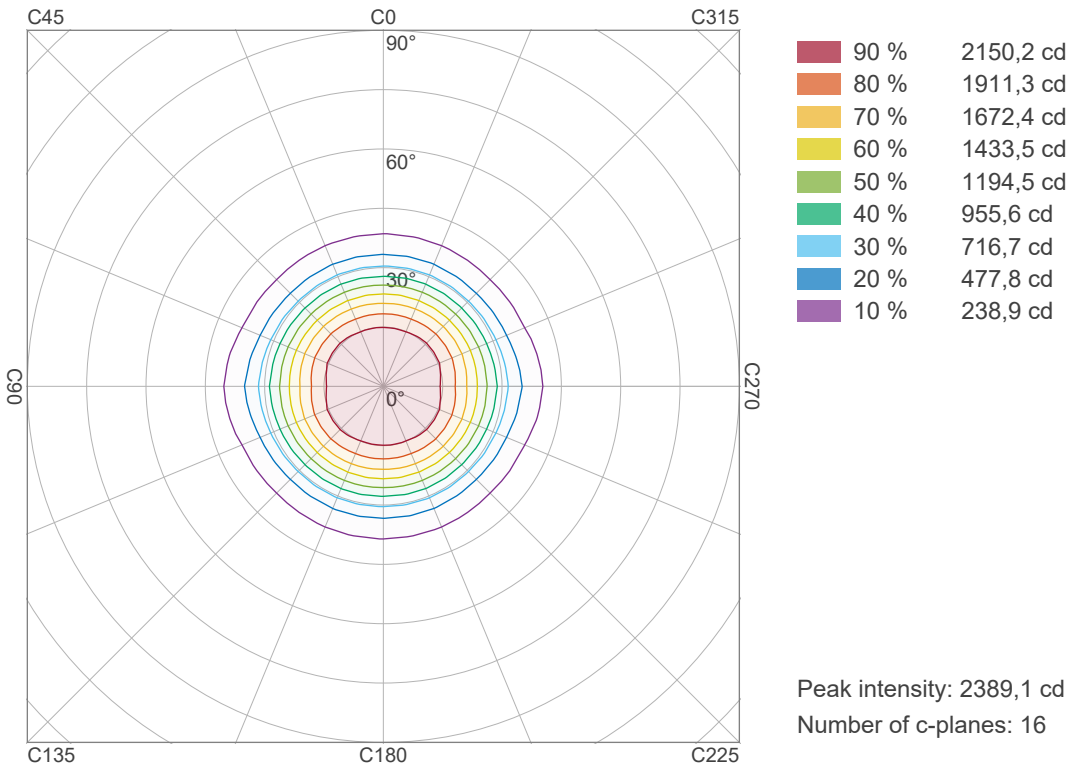


Light Measurement Report

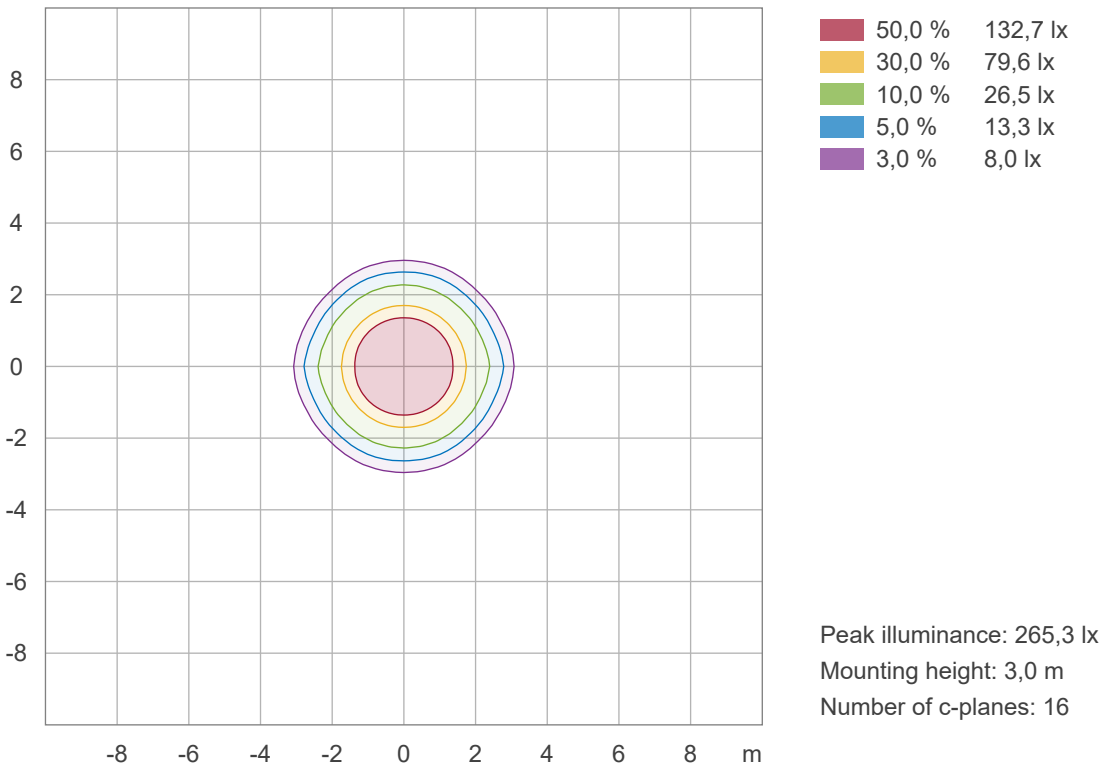
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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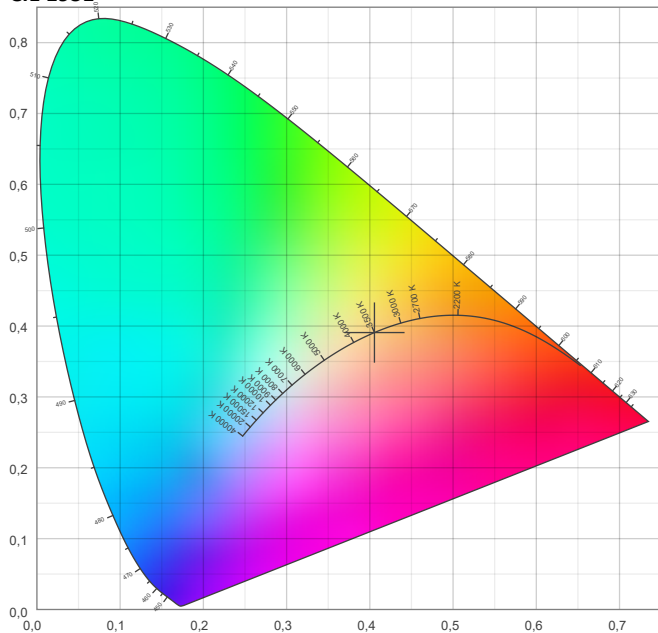


Color details

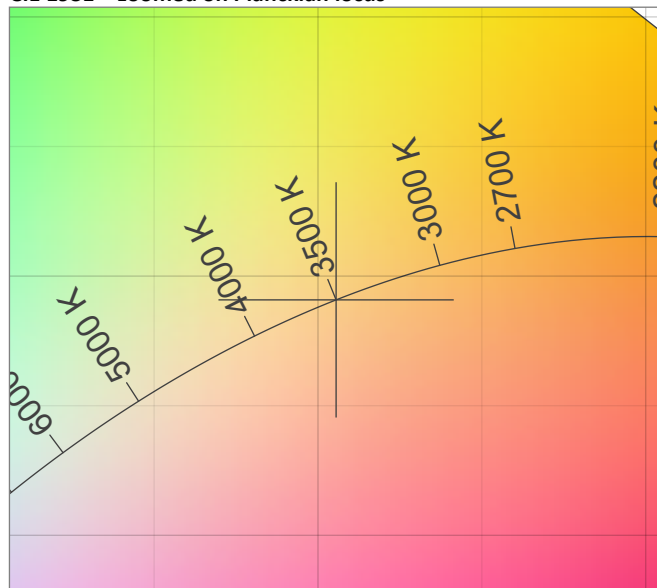
Correlated Color Temperature, Target CCT = 3500 K
Correlated Color Temperature, Measured CCT = 3478 K
Color Rendering Index CRI 93,5
Color Rendering Index, R9 (red component) R9 = 61,4
Color Rendering TM30-18 R_f 90,6 – R_g 97,2
Color Quality Scale CQS = 92,5

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0,406;0,391)
Color coordinate CIEs 1960 (u;v) = (0,236;0,341)
Color deviation from BBL Duv = 0,0005
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,236;0,511)

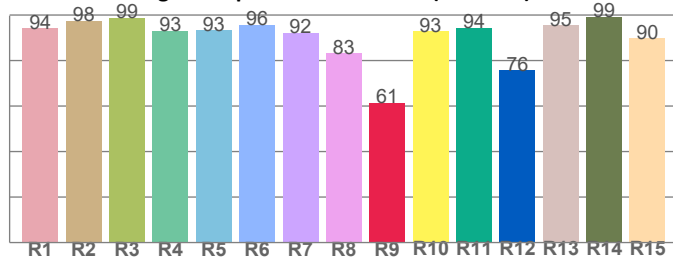
CIE 1931



CIE 1931 – zoomed on Planckian locus



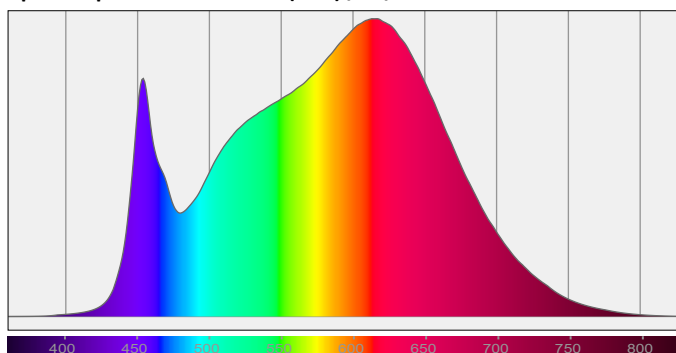
Color Rendering Index per reference color (CIE 1995)



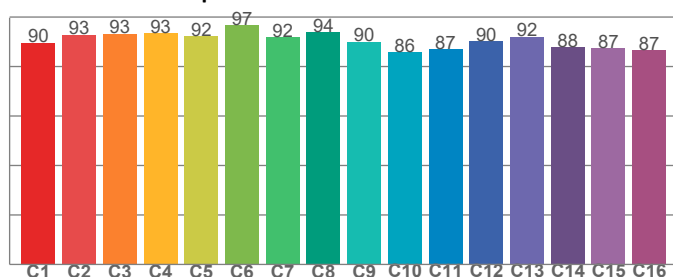
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
94,1	97,6	98,8	93,1	93,2	95,7	92,3	83,3	61,4	93,0	94,4	75,8	95,4	99,2	89,9

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



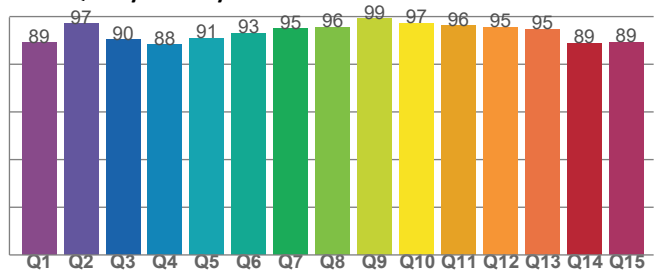
TM30-18 R_f-values per hue bin



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
89,6	92,9	93,2	93,3	92,3	96,6	91,8	93,7	90,1	85,8	86,9	90,1	92,1	87,7	87,5	86,5

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
89,0	97,0	90,4	88,3	91,0	93,0	95,0	95,6	99,1	97,1	96,1	95,5	94,7	88,8	89,2

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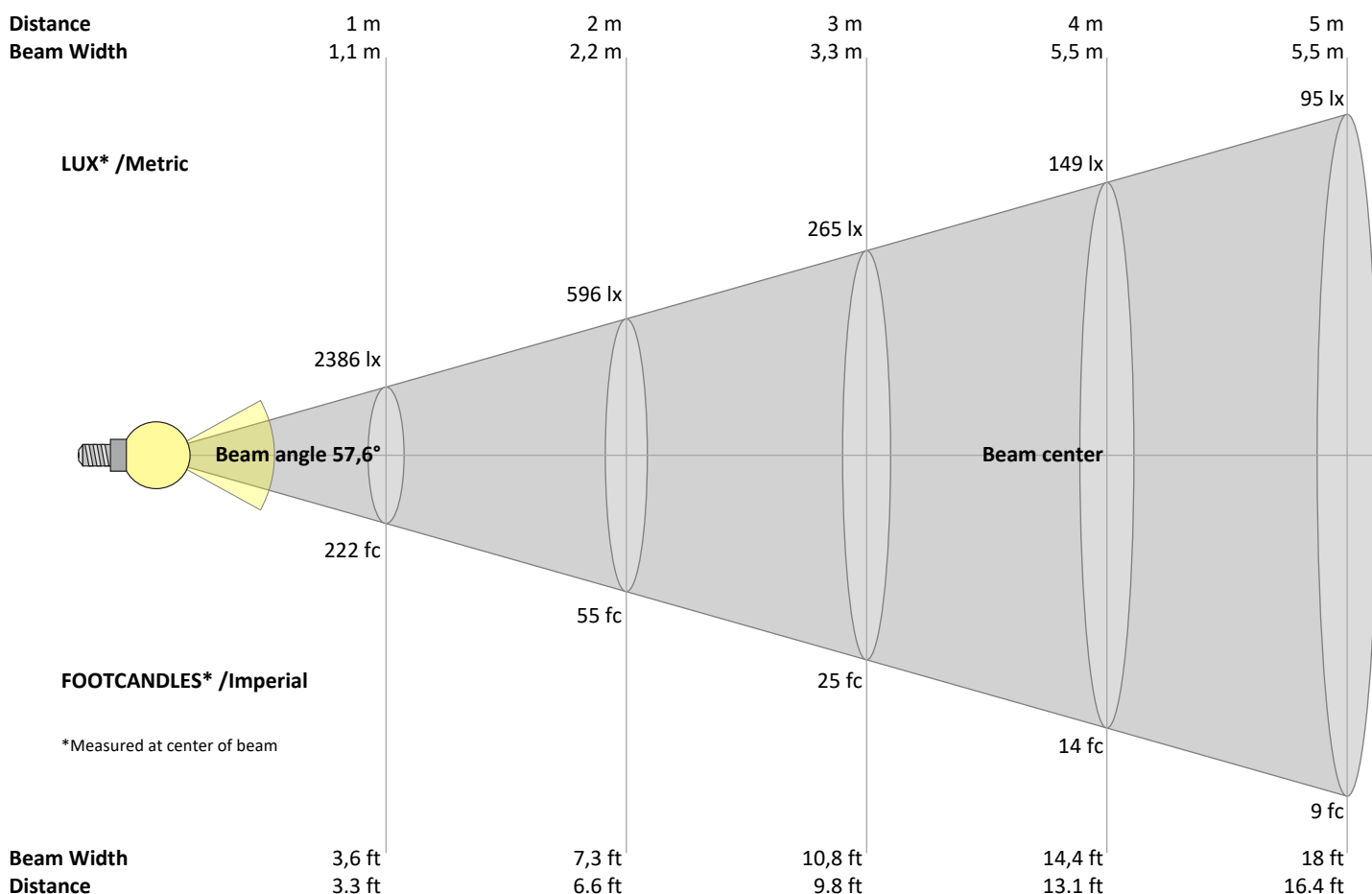
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Beam Details



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
2386	596	265	149	95	66	49	37	29	24	20	17	14	12	11	9	8	7	7	6	lux
221,6	55,4	24,6	13,9	8,9	6,2	4,5	3,5	2,7	2,2	1,8	1,5	1,3	1,1	1	0,9	0,8	0,7	0,6	0,6	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
2386	2382	2379	2376	2358	2338	2303	2241	2179	2062	1935	1790	1609	1429	1237	1043	860	699	539	433	cd
100%	100%	100%	100%	99%	98%	97%	94%	91%	86%	81%	75%	67%	60%	52%	44%	36%	29%	23%	18%	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
2386	2385	2377	2368	2344	2320	2275	2212	2148	2035	1922	1785	1627	1469	1295	1120	956	800	646	533	cd
100%	100%	100%	99%	98%	97%	95%	93%	90%	85%	81%	75%	68%	62%	54%	47%	40%	34%	27%	22%	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
2386	2382	2379	2376	2358	2338	2303	2241	2179	2062	1935	1790	1609	1429	1237	1043	860	699	539	433	cd
100%	100%	100%	100%	99%	98%	97%	94%	91%	86%	81%	75%	67%	60%	52%	44%	36%	29%	23%	18%	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
2386	2385	2377	2368	2344	2320	2275	2212	2148	2035	1922	1785	1627	1469	1295	1120	956	800	646	533	cd
100%	100%	100%	99%	98%	97%	95%	93%	90%	85%	81%	75%	68%	62%	54%	47%	40%	34%	27%	22%	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		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	25,0	25,7	25,1	25,9	26,1	25,3	26,0	25,4	26,3	26,5
	3H	25,4	26,3	25,8	26,5	26,7	25,7	26,6	26,1	26,8	27,0
	4H	25,7	26,5	26,1	26,8	27,0	26,0	26,8	26,4	27,0	27,3
	6H	26,0	26,6	26,3	26,9	27,3	26,2	26,9	26,5	27,2	27,6
	8H	26,0	26,6	26,3	27,0	27,4	26,2	26,9	26,6	27,2	27,6
	12H	26,0	26,6	26,3	27,0	27,4	26,2	26,9	26,6	27,2	27,7
4H	2H	25,0	25,8	25,4	26,0	26,3	25,3	26,1	25,7	26,3	26,6
	3H	25,9	26,5	26,2	26,9	27,3	26,1	26,7	26,5	27,1	27,5
	4H	26,2	26,8	26,6	27,2	27,7	26,4	27,0	26,8	27,4	27,9
	6H	26,5	27,1	27,0	27,4	27,8	26,7	27,3	27,2	27,6	28,0
	8H	26,5	27,1	27,0	27,4	27,8	26,7	27,3	27,2	27,6	28,0
	12H	26,5	27,0	27,0	27,4	27,8	26,7	27,2	27,2	27,6	28,1
8H	4H	26,3	26,9	26,8	27,2	27,6	26,5	27,1	27,0	27,4	27,8
	6H	26,7	27,0	27,2	27,5	28,0	26,8	27,2	27,3	27,7	28,2
	8H	26,8	27,1	27,3	27,6	28,3	27,0	27,3	27,5	27,8	28,4
	12H	26,8	27,1	27,4	27,6	28,2	27,0	27,3	27,6	27,8	28,4
12H	4H	26,3	26,7	26,8	27,1	27,6	26,5	26,9	27,0	27,3	27,8
	6H	26,7	27,0	27,2	27,5	28,2	26,9	27,2	27,4	27,7	28,3
	8H	26,8	27,1	27,4	27,6	28,2	27,0	27,2	27,6	27,7	28,3
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		2,0 / -1,2					2,1 / -1,2				
S = 1.5H		3,8 / -1,4					4,0 / -1,6				
S = 2.0H		5,4 / -1,7					5,6 / -1,8				

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	113	110	107	104	110	107	105	103	103	101	99	100	98	97	96	95	94	92
2	106	101	97	93	104	99	95	92	96	93	90	93	90	88	90	88	86	84
3	101	94	88	84	99	92	87	83	89	85	82	87	83	80	85	82	79	78
4	95	87	81	76	93	86	80	76	84	79	75	82	77	74	80	76	73	72
5	90	81	75	70	88	80	74	70	78	73	69	77	72	69	75	71	68	66
6	85	76	70	65	84	75	69	65	74	68	64	72	67	64	71	67	63	62
7	81	71	65	60	80	71	65	60	69	64	60	68	63	60	67	63	59	58
8	77	67	61	56	76	66	60	56	65	60	56	64	59	56	63	59	56	54
9	73	63	57	53	72	63	57	53	62	56	53	61	56	52	60	56	52	51
10	70	60	54	50	69	59	54	50	59	53	50	58	53	49	57	52	49	48

Light Measurement Report

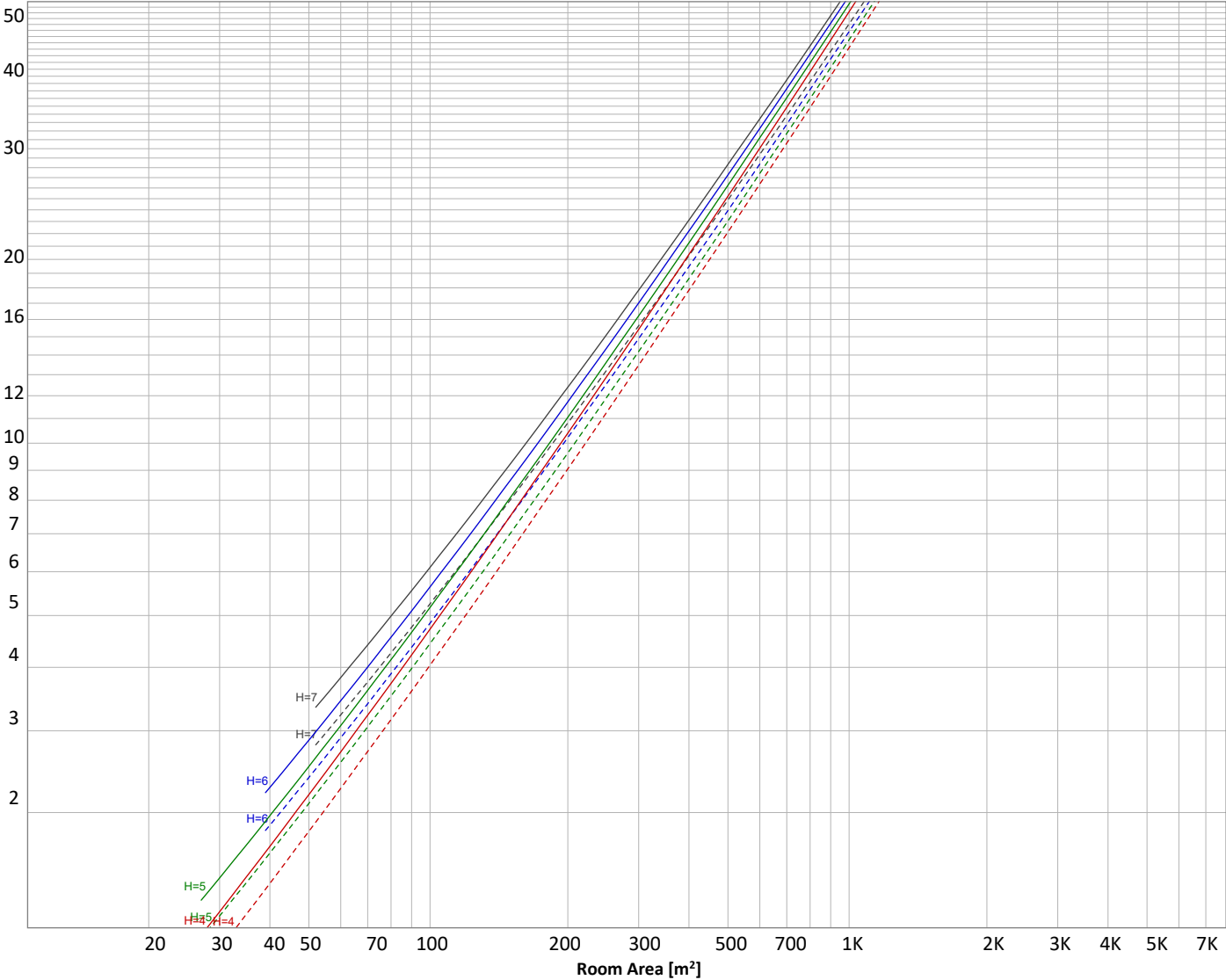
Print date: 12-5-2025
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Measurement tracking No. and Link: [VT250512-004583](#)
Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 2296 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
				20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
226 lm	621 lm	705 lm	402 lm	152 lm	81,5 lm	62,9 lm	36,5 lm	8,30 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,169 lm	0,009 lm	0,005 lm	0,015 lm	0,076 lm	0,209 lm	0,292 lm	0,214 lm	0,071 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	226 lm	9,9%
10-20°	621 lm	27,1%
20-30°	705 lm	30,7%
30-40°	402 lm	17,5%
40-50°	152 lm	6,6%
50-60°	81 lm	3,5%
60-70°	63 lm	2,7%
70-80°	37 lm	1,6%
80-90°	8 lm	0,4%
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°	0 lm	0,0%
160-170°	0 lm	0,0%
170-180°	0 lm	0,0%
Total	2296 lm	100,0%

Intensity peaks

Max intensity	2389 cd
Intensity, 90°	2 cd
Intensity, 0°	2386 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	1553 lm	67,6%
0-40°	1954 lm	85,1%
0-60°	2188 lm	95,3%
60-90°	108 lm	4,7%
70-100°	45 lm	2,0%
90-120°	0 lm	0,0%
0-90°	2295 lm	100,0%
90-180°	1 lm	0,0%
0-180°	2296 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	769 lm	33,5%
Medium(30-60°)	325 lm	14,1%
High(60-80°)	50 lm	2,2%
Very high(80-90°)	4 lm	0,2%

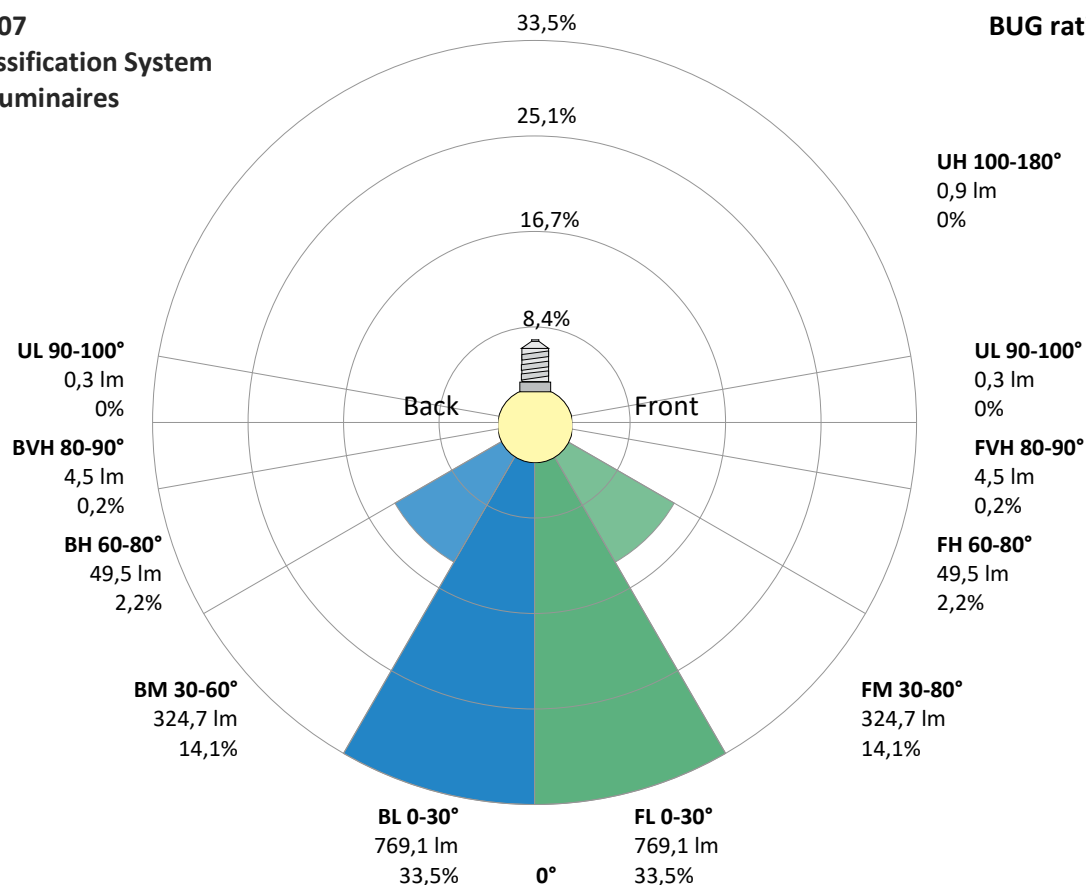
Back light		
Low(0-30°)	769 lm	33,5%
Medium(30-60°)	325 lm	14,1%
High(60-80°)	50 lm	2,2%
Very high(80-90°)	4 lm	0,2%

Uplight		
Low(90-100°)	0 lm	0,0%
High(100-180°)	1 lm	0,0%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B2 U1 G0



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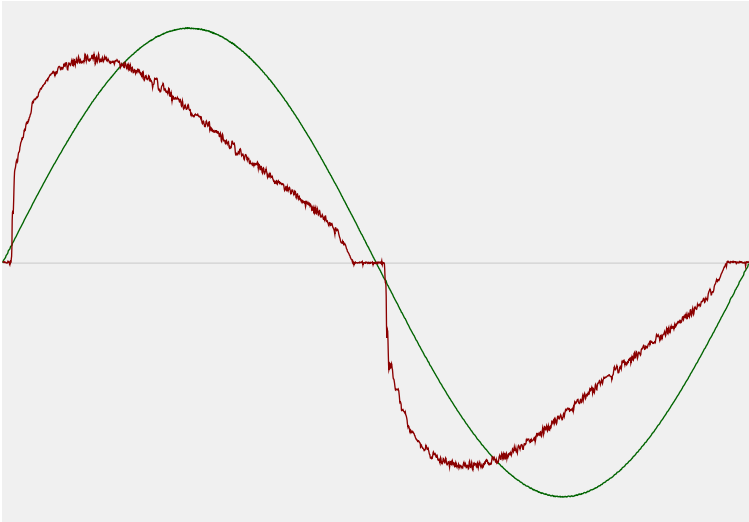


Power Details

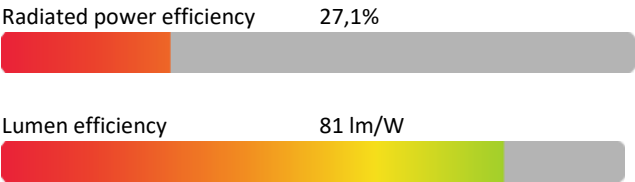
Input Power

Power feed to light source	28,5 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,137 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	31,5 VA
Displacement factor of AC power feed	0,93
Power factor of AC current feed	0,9
Total harmonic distortion of the current	23,62%
Total harmonic distortion of the voltage	0,12%

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	3499 K
CCT shift	+1 K
CCT end	3500 K

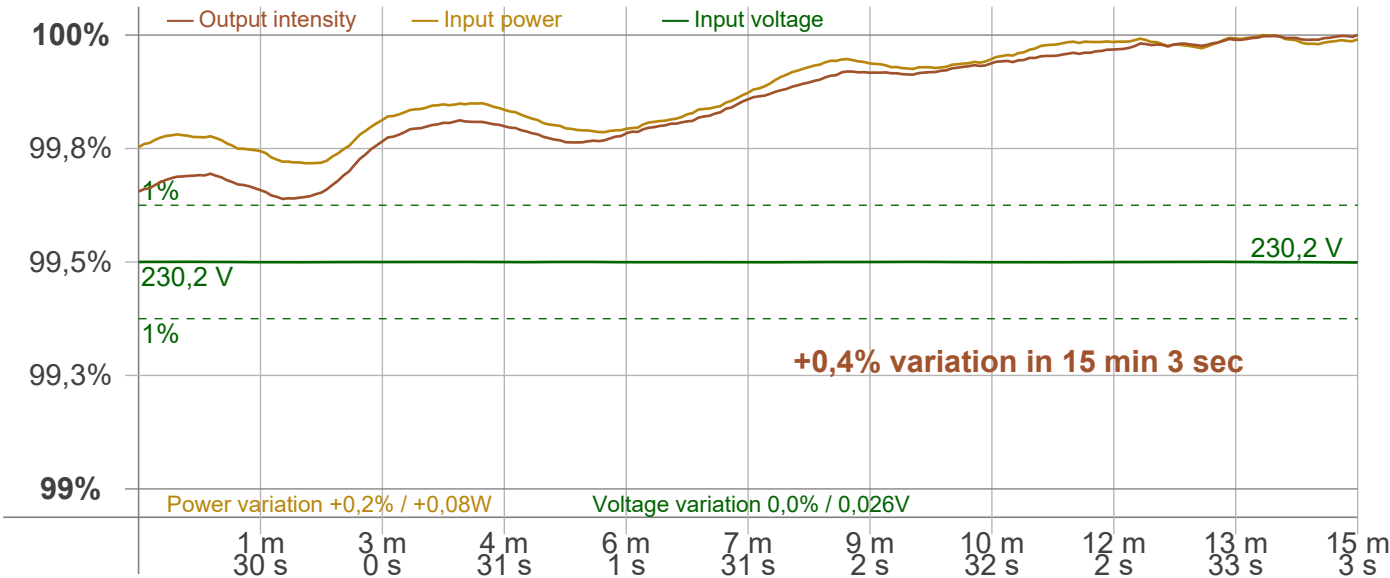
Warmup Result

Total warmup time	Lamp stabilized in 15 min 3 sec
Warmup variation	+0,4%

Output Change

Output start	2289 lm
Output change	+8 lm
Output end	2296 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 100 Hz
Percent Flicker 41,24 %
Flicker index 0,13

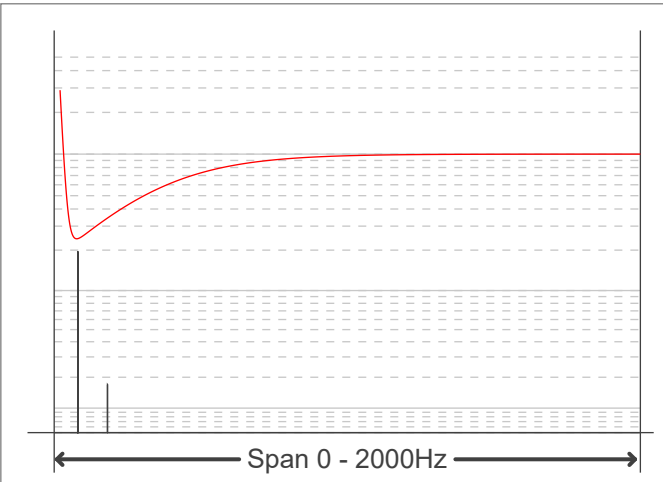
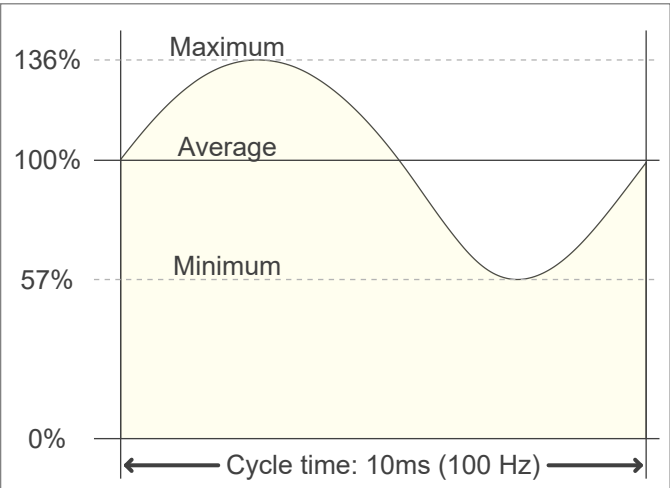
Flicker indices according to California Energy Commission (CEC) 2016b
JA8/10 40 Hz 0,49 %
JA8/10 90 Hz 0,64 %
JA8/10 200 Hz 40,39 %
JA8/10 400 Hz 41,33 %
JA8/10 1000 Hz 41,23 %

TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)
PstLM value (F < 80 Hz) 0,47
SVM value (80 < F < 2000 Hz) 1,53

Flicker indices according to Lighting Research Center (2015)
Perception metric, Assist Mp 0,32

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

Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

