Light Measurement Report

Print date: 25-9-2025
Measurement date and time: 25-9-2025 11:42:24 – Measurement no. VFR-250925-3356-MS
Measurement tracking No. and Link: VT250925-009332
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

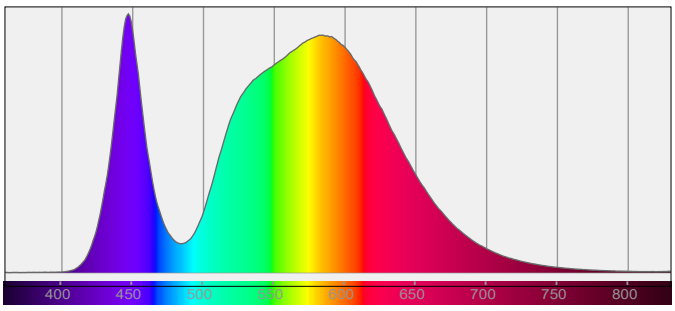
Number of C-planes and Resolution	32 planes – 11,25°
γ (gamma)-Resolution	5°
Test Distance	2,89 m
Input Power, Power and Displ. Factors	96,3 W – PF 0,96 – DPF 0,97
Input RMS Voltage and Current	230 V – 0,434 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 2 sec – 2,0%

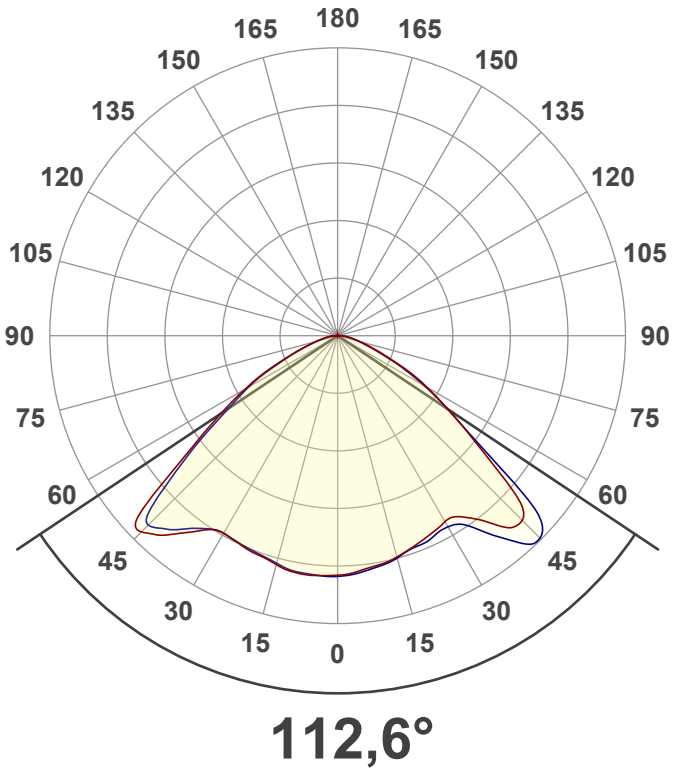
Tested Light Source

Product Name	812720-4000K-100W
Item No. and Manufacturer	812720-4000K-100W – Dutchfulfillment
Product Description (line 1)	LED HIGHBAY ARGOS | 0-10V | 150W/120W/100W | 60°/90°/120° | CCT
SWITCH	

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	13809 lm – 0,15% / 99,85%
Efficiency	143 lm/W
Peak Intensity and Beam Angle	5077 cd – 112,6°
Correlated Color Temperature, Target/Measured	CCT = 4126 K / 4126 K
Color Rendering Index	CRI 71,9
Color Rendering TM30-18	R_f 73,7 – R_g 94,8
Color Shift, CIE duv and MacAdam Steps	Duv 0,0021 – SDCM n/a
Flicker	SVM 0 – PstLM 0,13





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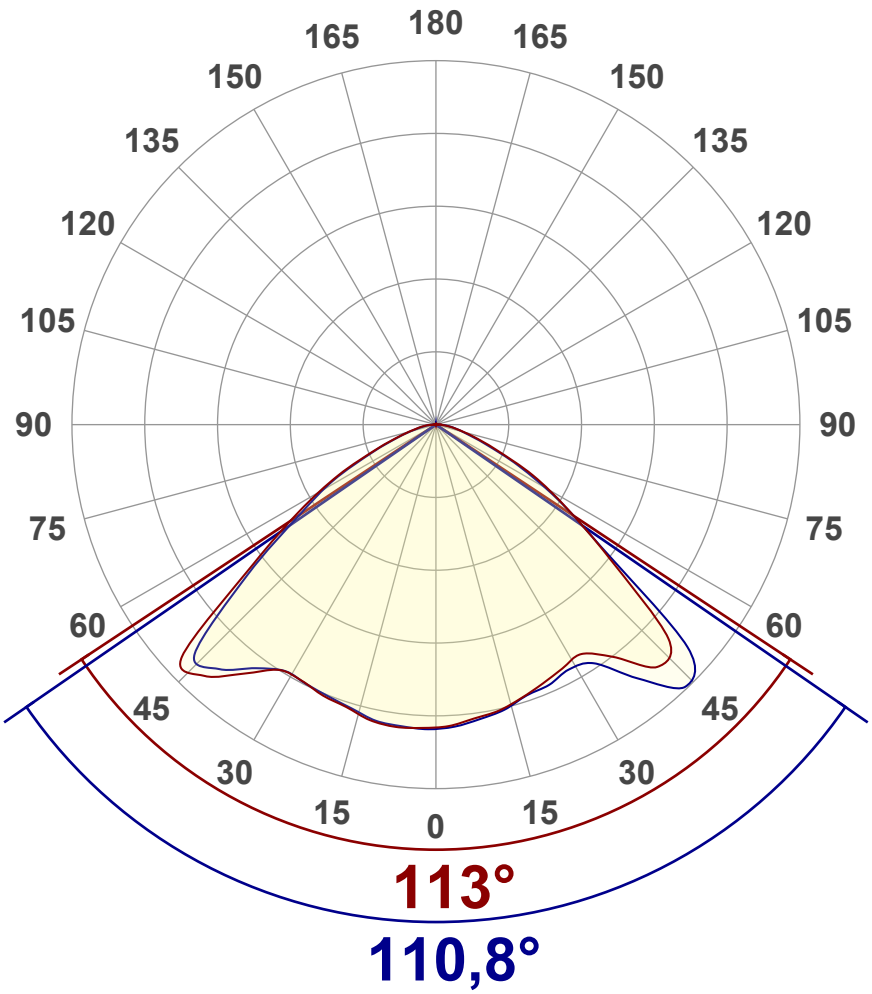
Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	13809 lm
Lumen Up% / Down%	0,15% / 99,85%
Peak Intensity	5077 cd
Beam Angle (50%)	112,6°
Beam Angle (90%)	110,8°
Beam Angle (10%)	112,6°

Cut-off Angle

Average 2,5%	170,4°

Field Angle

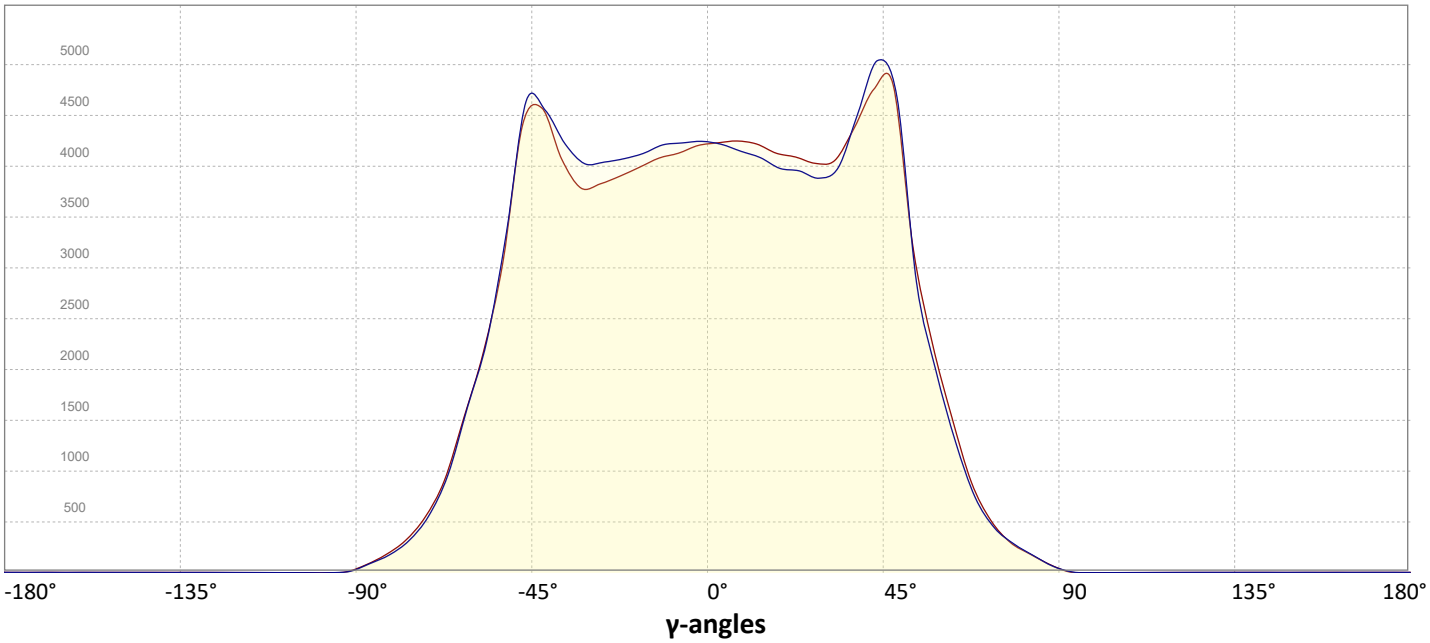
Average 10%	146,1°

Intensity Ratio

In 120° cone	87,1%
In 90° cone	55,8%

C000-C180
C090-C270

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



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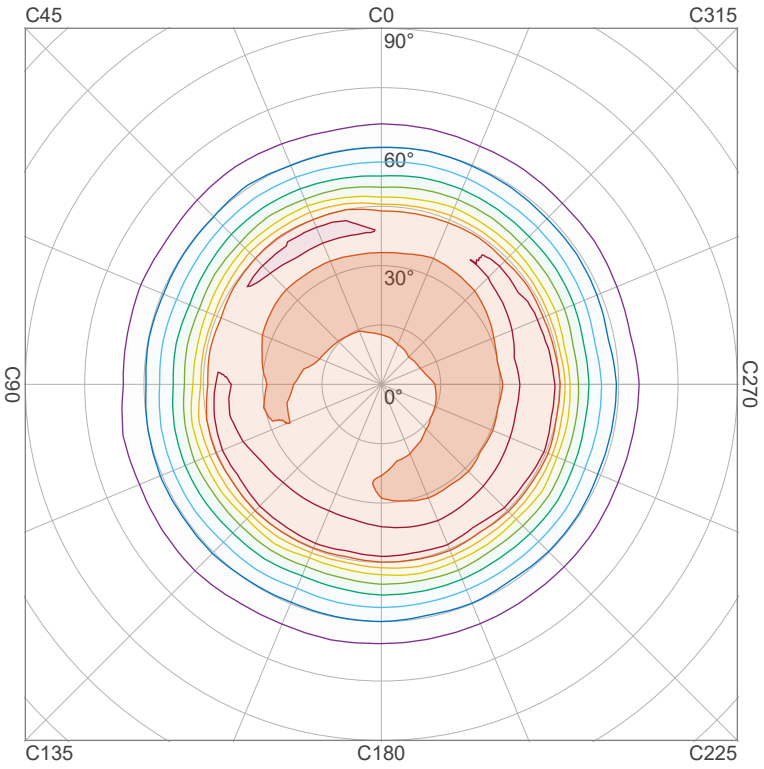
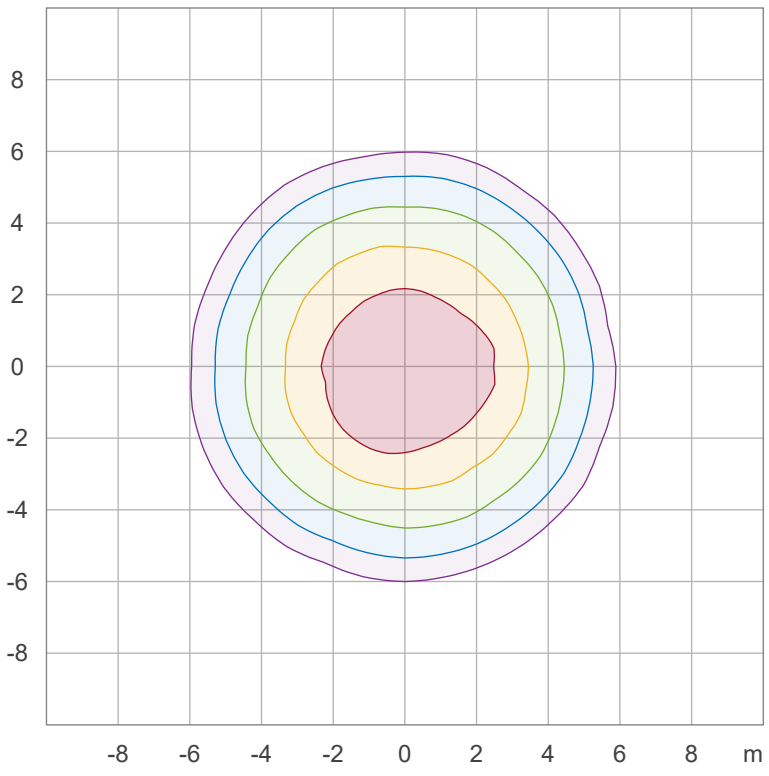
Iso-intensity Diagram (Iso-candela)



90 %	4559,1 cd
80 %	4052,6 cd
70 %	3546,0 cd
60 %	3039,4 cd
50 %	2532,9 cd
40 %	2026,3 cd
30 %	1519,7 cd
20 %	1013,1 cd
10 %	506,6 cd

Peak intensity: 5065,7 cd
Number of c-planes: 32

Iso-illuminance Diagram (Iso-lux)



50,0 %	235,6 lx
30,0 %	141,3 lx
10,0 %	47,1 lx
5,0 %	23,6 lx
3,0 %	14,1 lx

Peak illuminance: 471,1 lx
Mounting height: 3,0 m
Number of c-planes: 32

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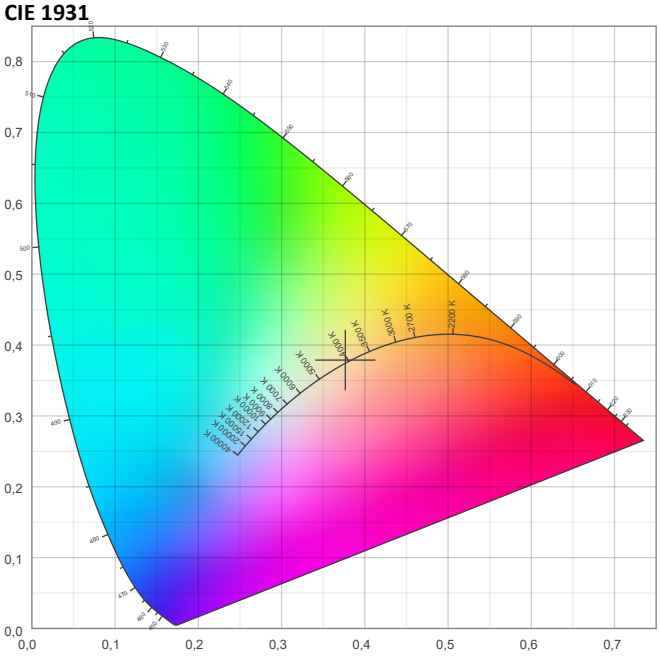
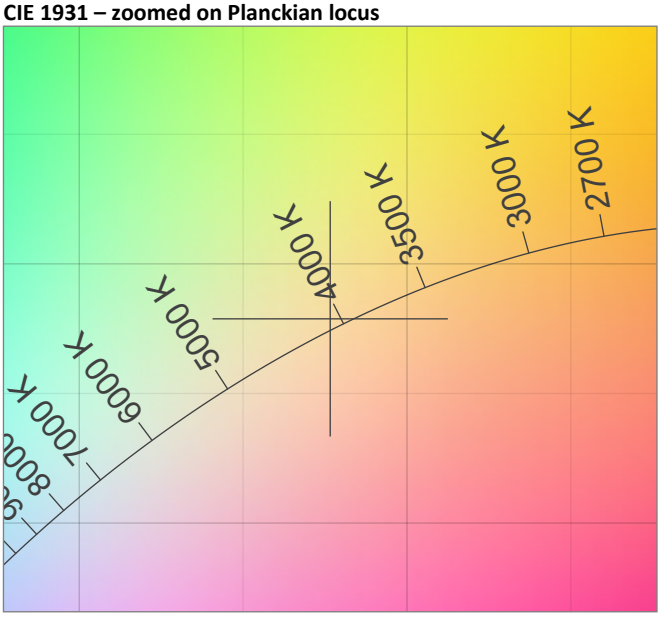
Color details

Correlated Color Temperature, Target	CCT = 4126 K
Correlated Color Temperature, Measured	CCT = 4126 K
Color Rendering Index	CRI 71,9
Color Rendering Index, R9 (red component)	R9 = -27,4
Color Rendering TM30-18	R_f 73,7 – R_g 94,8
Color Quality Scale	CQS = 71,9
MacAdam Steps	SDCM = n/a
Color coordinates CIE 1931	(x;y) = (0,377;0,379)
Color coordinate CIEs 1960	(u;v) = (0,222;0,335)
Color deviation from BBL	Duv = 0,0021
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,222;0,502)

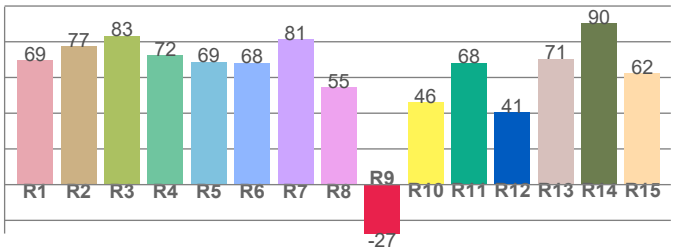
CIE 1931



CIE 1931 – zoomed on Planckian locus



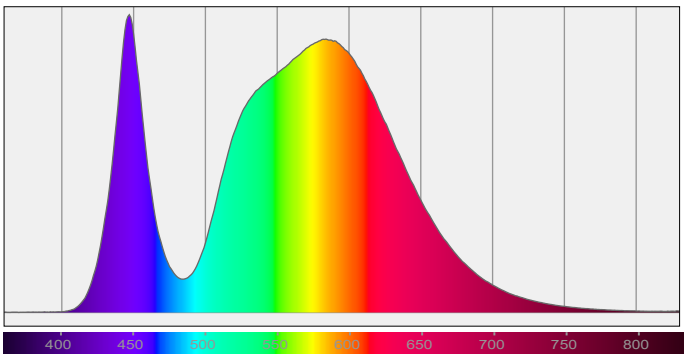
Color Rendering Index per reference color (CIE 1995)



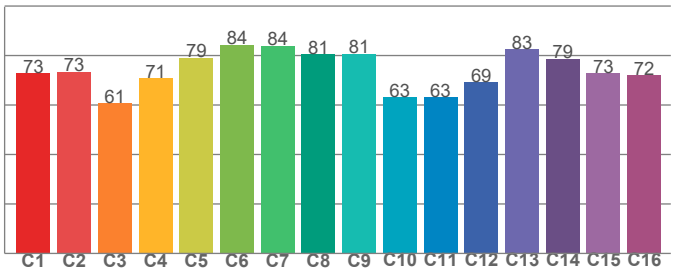
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
69,5	77,4	83,3	72,4	68,7	68,2	81,2	54,6	-27,4	45,9	68,2	40,5	70,5	90,3	62,2

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



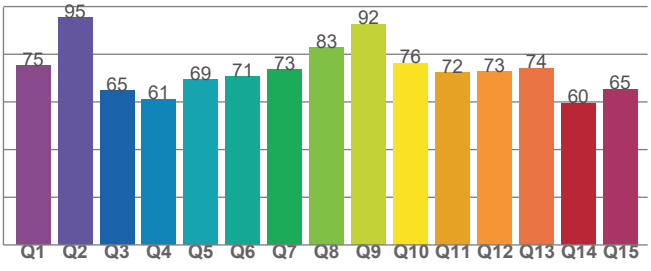
TM30-18 Rf-values per hue bin



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
72,7	73,4	60,8	70,8	79,1	84,4	83,9	80,5	80,7	63,0	63,1	69,2	82,5	78,7	72,9	72,1

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
75,1	95,4	64,8	61,2	69,4	70,7	73,5	82,7	92,5	76,2	72,2	72,7	74,1	59,5	65,3

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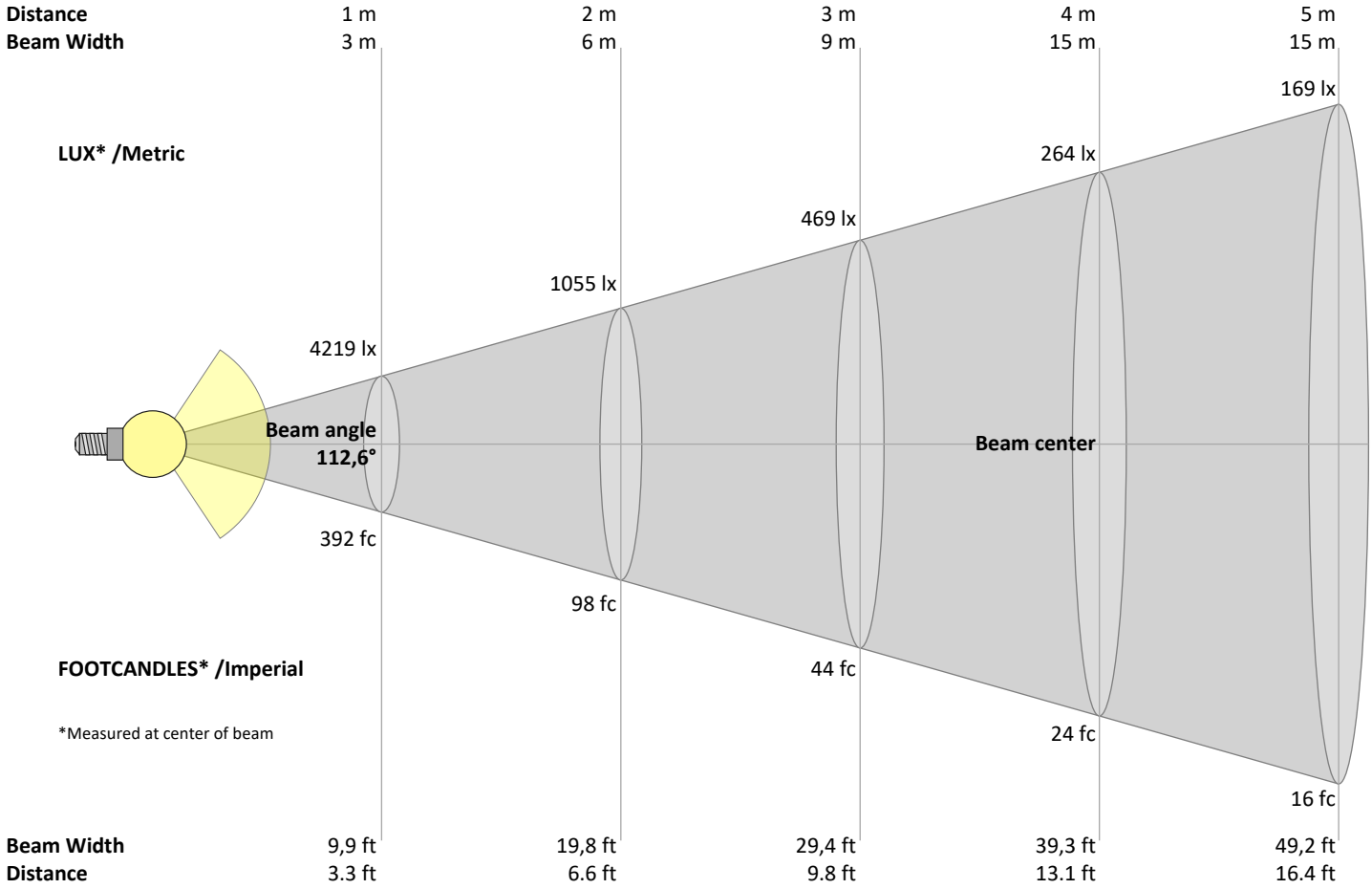
Beam Details



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
4219	1055	469	264	169	117	86	66	52	42	35	29	25	22	19	16	15	13	12	11	lux
391,9	98	43,5	24,5	15,7	10,9	8	6,1	4,8	3,9	3,2	2,7	2,3	2	1,7	1,5	1,4	1,2	1,1	1	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
4219	4165	4103	4033	3945	3863	3805	3936	4333	4482	3697	2593	1833	1202	716	424	244	126	43	5	cd
100%	99%	97%	96%	94%	92%	90%	93%	103%	106%	88%	61%	43%	28%	17%	10%	6%	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
4219	4196	4129	4053	3971	3933	3913	4146	4673	4934	4139	2599	1777	1126	653	393	248	137	46	5	cd
100%	99%	98%	96%	94%	93%	93%	98%	111%	117%	98%	62%	42%	27%	15%	9%	6%	3%	1%	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
4219	4239	4234	4175	4110	4060	4042	4211	4560	4775	4029	2751	1905	1220	708	409	243	135	47	5	cd
100%	100%	100%	99%	97%	96%	96%	100%	108%	113%	96%	65%	45%	29%	17%	10%	6%	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
4219	4234	4215	4150	4089	4050	4030	4162	4451	4611	3727	2599	1821	1157	673	385	216	115	36	5	cd
100%	100%	100%	98%	97%	96%	96%	99%	106%	109%	88%	62%	43%	27%	16%	9%	5%	3%	1%	0%	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**										
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Variations with the observer position for the luminaire spacings, S:											
n/a		n/a					n/a				
n/a		n/a					n/a				
n/a		n/a					n/a				

UGR data could not be calculated due to missing/wrong symmetry. Go to Edit -> Photometric -> Corrections and select Correct asymmetry (UGR not defined for asymmetrical distributions)..

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	110	105	102	98	107	103	100	96	99	96	93	95	93	90	91	90	88	86
2	100	93	86	81	98	91	85	80	87	82	78	84	80	76	81	78	75	72
3	92	82	74	68	89	80	73	67	77	71	66	74	69	65	72	67	64	61
4	84	72	64	57	82	71	63	57	68	61	56	66	60	55	64	59	54	52
5	77	64	55	49	75	63	55	49	61	54	48	59	53	48	57	52	47	45
6	71	58	49	42	69	57	48	42	55	47	42	53	46	41	52	46	41	39
7	65	52	43	37	64	51	43	37	50	42	37	48	41	36	47	41	36	34
8	61	47	39	33	59	46	38	33	45	38	32	44	37	32	43	37	32	30
9	56	43	35	29	55	42	34	29	41	34	29	40	33	29	39	33	29	27
10	53	39	31	26	51	39	31	26	38	31	26	37	30	26	36	30	26	24

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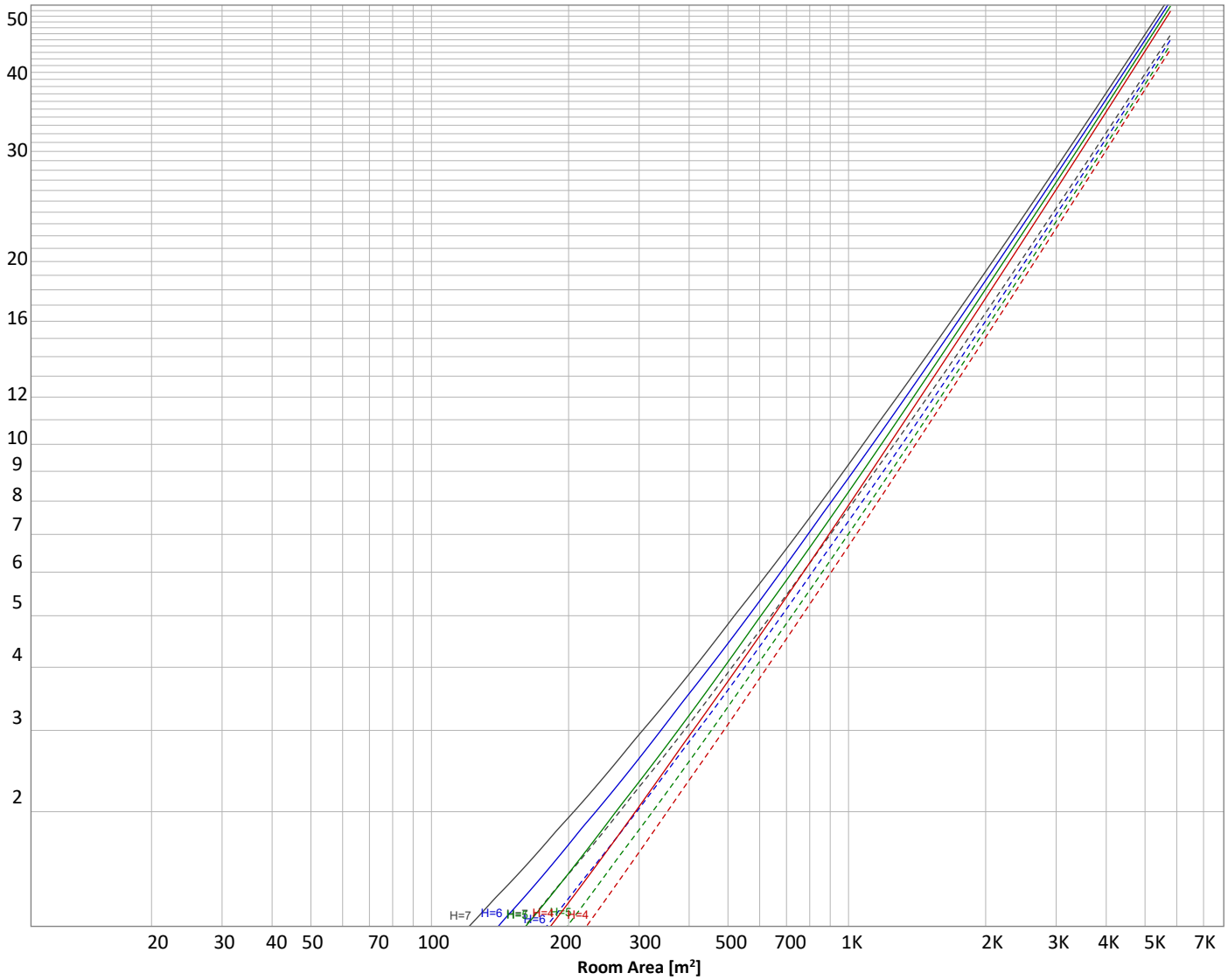
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 13809 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°
400 lm	1159 lm	1834 lm	2583 lm	3588 lm	2462 lm	1184 lm	436 lm	141 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
8,05 lm	0,974 lm	1,86 lm	2,51 lm	2,50 lm	2,15 lm	1,63 lm	1,00 lm	0,350 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	{LUM00-10} lm	#VALUE!
10-20°	{LUM10-20} lm	#VALUE!
20-30°	{LUM20-30} lm	#VALUE!
30-40°	{LUM30-40} lm	#VALUE!
40-50°	{LUM40-50} lm	#VALUE!
50-60°	{LUM50-60} lm	#VALUE!
60-70°	{LUM60-70} lm	#VALUE!
70-80°	{LUM70-80} lm	#VALUE!
80-90°	{LUM80-90} lm	#VALUE!
90-100°	{LUM90-100} lm	#VALUE!
100-110°	{LUM100-110} lm	#VALUE!
110-120°	{LUM110-120} lm	#VALUE!
120-130°	{LUM120-130} lm	#VALUE!
130-140°	{LUM130-140} lm	#VALUE!
140-150°	{LUM140-150} lm	#VALUE!
150-160°	{LUM150-160} lm	#VALUE!
160-170°	{LUM160-170} lm	#VALUE!
170-180°	{LUM170-180} lm	#VALUE!
Total	0 lm	#VALUE!

Intensity peaks

Max intensity	{PEAK}	cd
Intensity, 90°	{INT90}	cd
Intensity, 0°	{INT0}	cd

Zonal Lumen summary

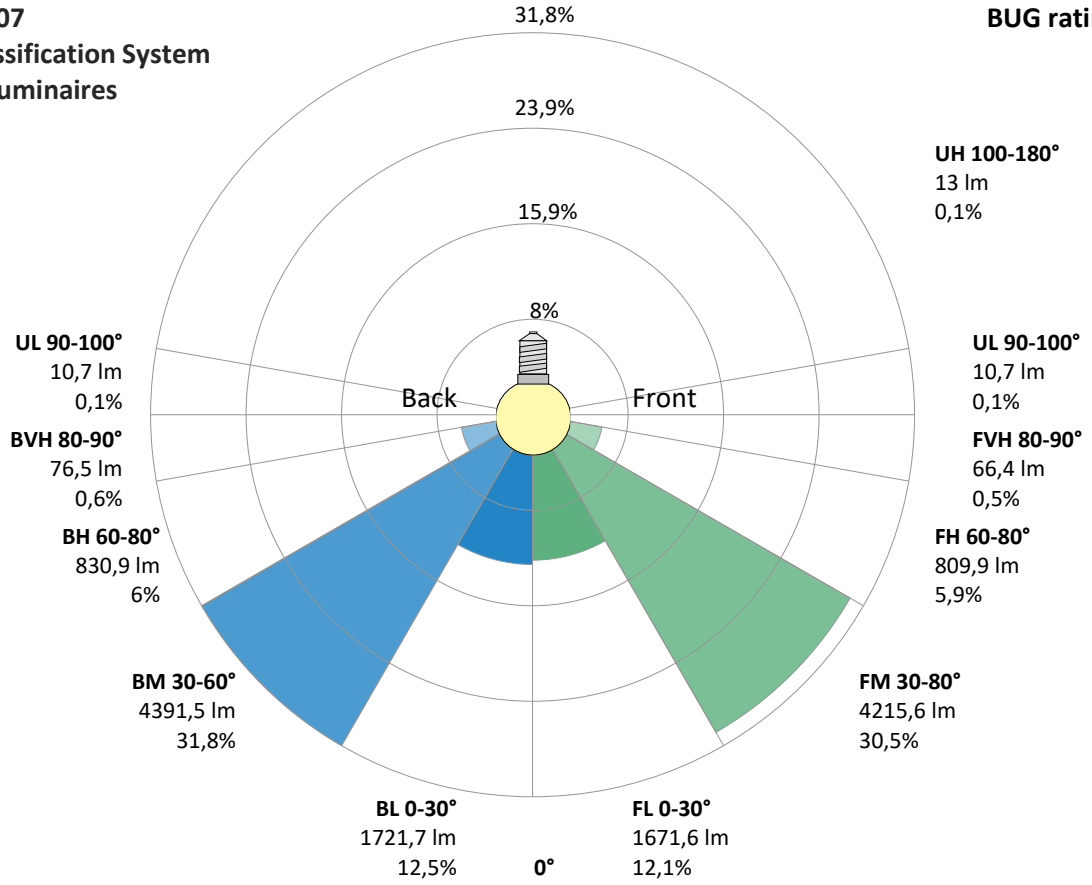
Zone (γ)	Lumen	% Total
0-30°	{LUM00-30} lm	#VALUE!
0-40°	{LUM00-40} lm	#VALUE!
0-60°	{LUM00-60} lm	#VALUE!
60-90°	{LUM60-90} lm	#VALUE!
70-100°	{LUM70-100} lm	#VALUE!
90-120°	{LUM90-120} lm	#VALUE!
0-90°	{LUM00-90} lm	#VALUE!
90-180°	{LUM90-180} lm	#VALUE!
0-180°	{LUM00-180} lm	#VALUE!

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	{BUG0} lm	#VALUE!
Medium(30-60°)	{BUG1} lm	#VALUE!
High(60-80°)	{BUG2} lm	#VALUE!
Very high(80-90°)	{BUG3} lm	#VALUE!
Back light		
Low(0-30°)	{BUG4} lm	#VALUE!
Medium(30-60°)	{BUG5} lm	#VALUE!
High(60-80°)	{BUG6} lm	#VALUE!
Very high(80-90°)	{BUG7} lm	#VALUE!
Uplight		
Low(90-100°)	{BUG8} lm	#VALUE!
High(100-180°)	{BUG9} lm	#VALUE!

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

BUG rating B3 U2 G2



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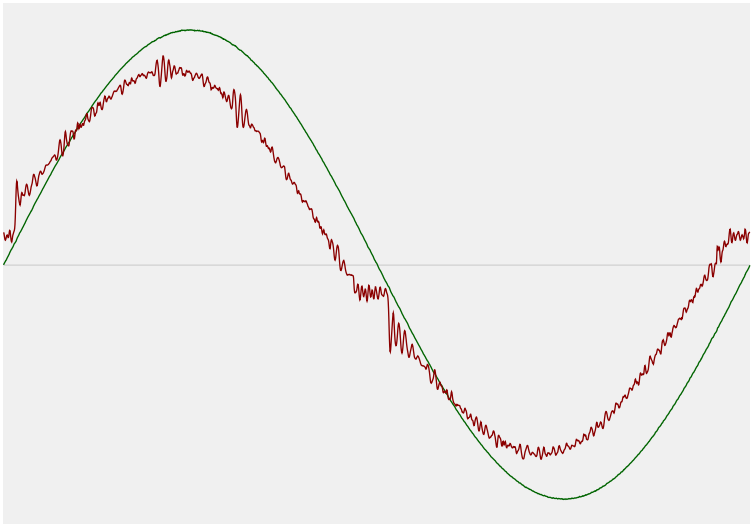
Power Details

Input Power

Power feed to light source	96,3 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,434 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	99,83 VA
Displacement factor of AC power feed	0,97
Power factor of AC current feed	0,96
Total harmonic distortion of the current	5,54%
Total harmonic distortion of the voltage	0,07%

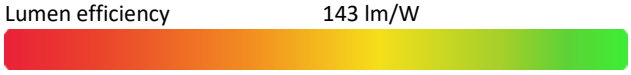
Input Power Curve



Efficiency

Radiated power efficiency 41,1%

Lumen efficiency 143 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	4071 K
CCT shift	+55 K
CCT end	4126 K

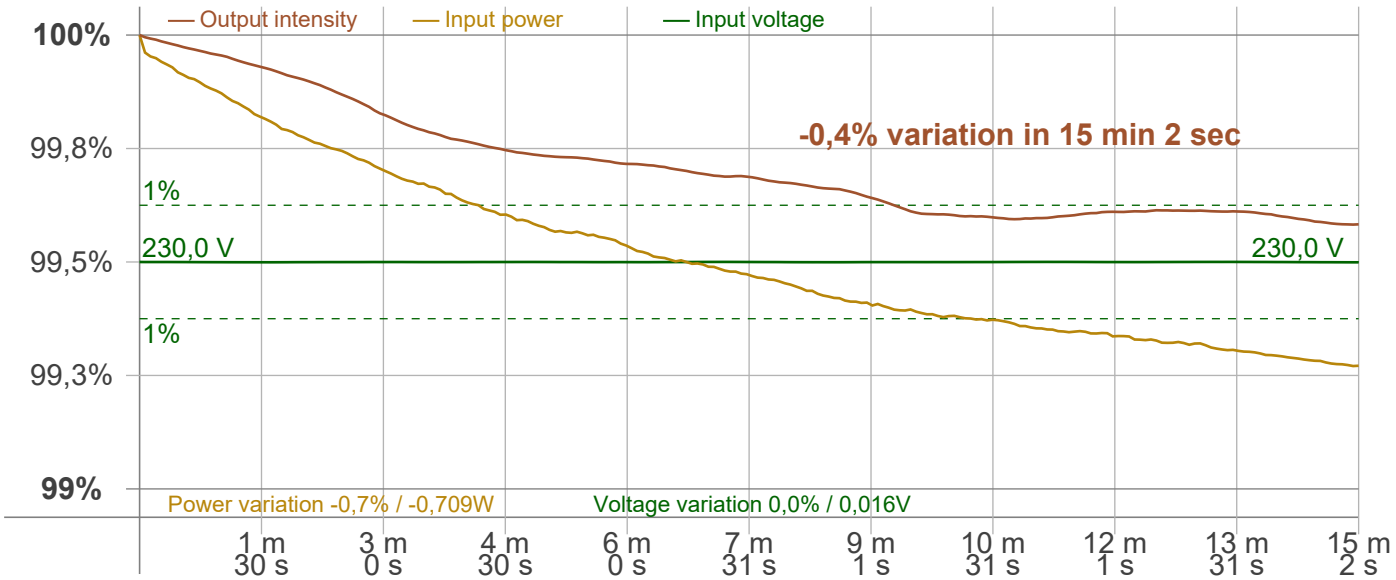
Warmup Result

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

Output Change

Output start	13867 lm
Output change	-58 lm
Output end	13809 lm

Stabilization Curve



Light Measurement Report

Print date: 25-9-2025
Measurement date and time: 25-9-2025 11:42:24 – Measurement no. VFR-250925-3356-MS
Measurement tracking No. and Link: VT250925-009332
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	500 Hz
Percent Flicker	0,53 %
Flicker index	0

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

PstLM value (F < 80 Hz)	0,13
SVM value (80 < F < 2000 Hz)	0

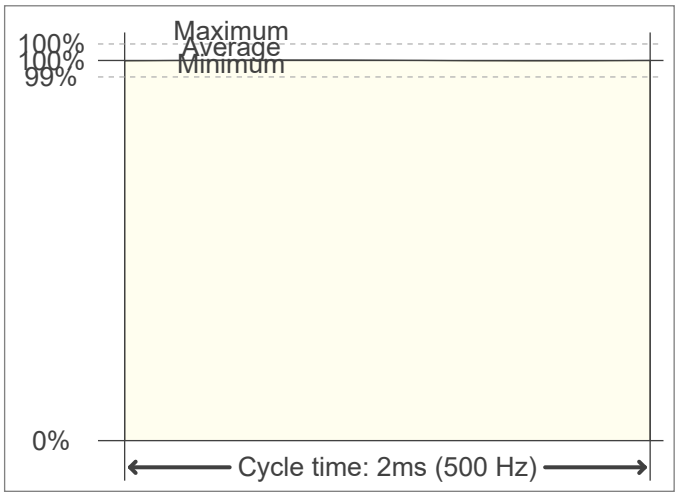
Flicker indices according to California Energy Commission (CEC) 2016b

JA8/10 40 Hz	0,26 %
JA8/10 90 Hz	0,27 %
JA8/10 200 Hz	0,33 %
JA8/10 400 Hz	0,34 %
JA8/10 1000 Hz	0,52 %

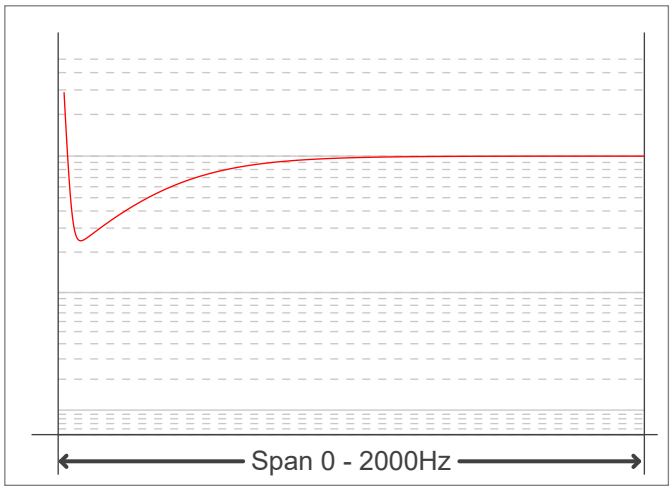
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp	0,06

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot