Light Measurement Report

Print date: 5-9-2025
Measurement date and time: 4-9-2025 13:10:20 – Measurement no. VFR-250904-2929-MS
Measurement tracking No. and Link: VT250904-000495
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

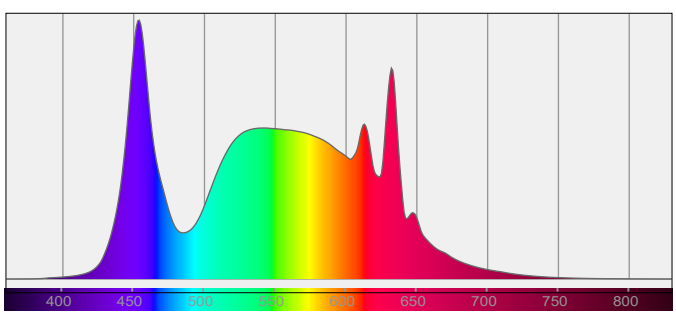
Number of C-planes and Resolution	12 planes – 30°
γ (gamma)-Resolution	2,5°
Test Distance	12,10 m
Input Power, Power and Displ. Factors	75,1 W – PF 0,98 – DPF 0,99
Input RMS Voltage and Current	230 V – 0,332 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 1 sec – 2,0%

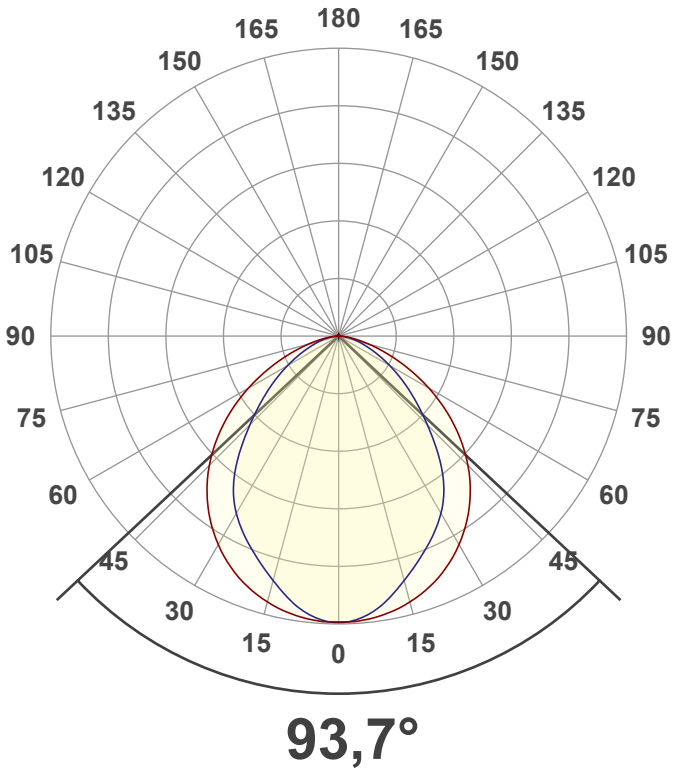
Tested Light Source

Product Name	813789-5000K
Item No. and Manufacturer	813789-5000K – Dutchfulfillment
Product Description (line 1)	

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	12738 lm – 0,96% / 99,04%
Efficiency	170 lm/W
Peak Intensity and Beam Angle	5751 cd – 93,7°
Correlated Color Temperature, Target/Measured	CCT = 5000 K / 5078 K
Color Rendering Index	CRI 84,5
Color Rendering TM30-18	R_f 83,9 – R_g 97,5
Color Shift, CIE duv and MacAdam Steps	Duv 0,0049 – SDCM 4,9
Flicker	SVM n/a – PstLM n/a





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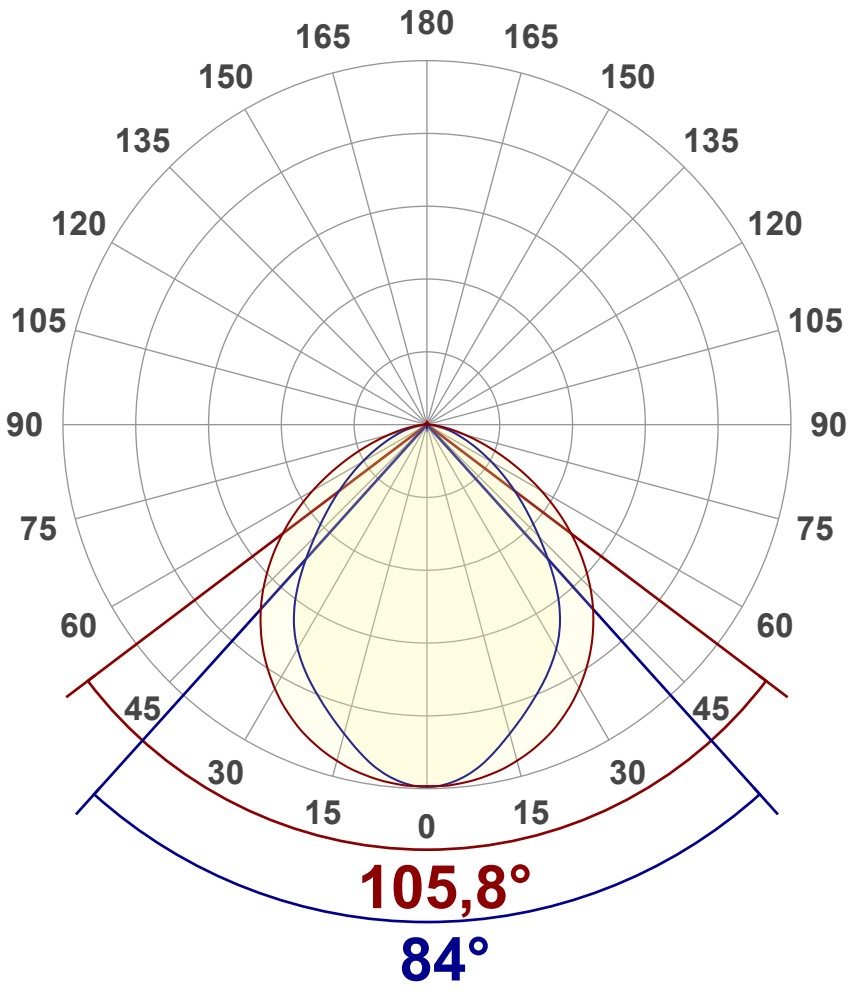
Luminous Intensity diagram Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	12738 lm
Lumen Up% / Down%	0,96% / 99,04%
Peak Intensity	5751 cd
Beam Angle (50%)	93,7°
Beam Angle (90%)	84°
Beam Angle (10%)	105,8°

Cut-off Angle

Average 2,5%	167,6°

Field Angle

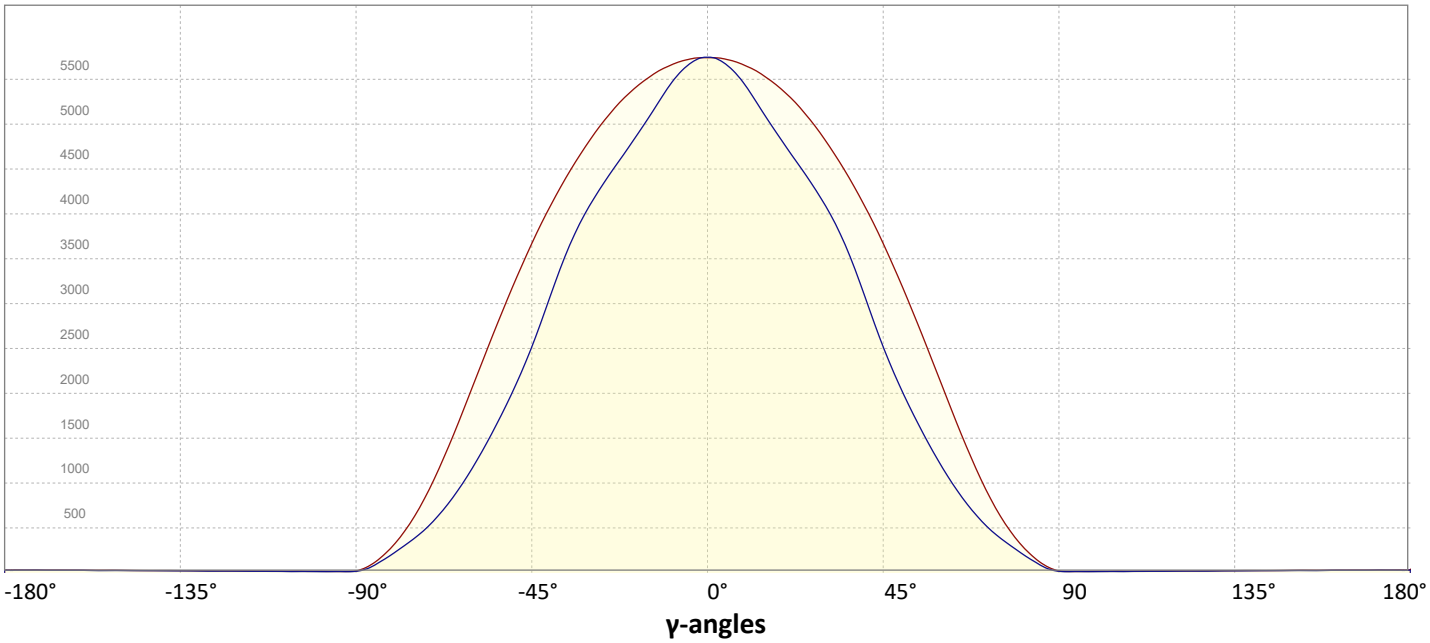
Average 10%	146°

Intensity Ratio

In 120° cone	85,0%
In 90° cone	62,0%

C000-C180
C090-C270

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



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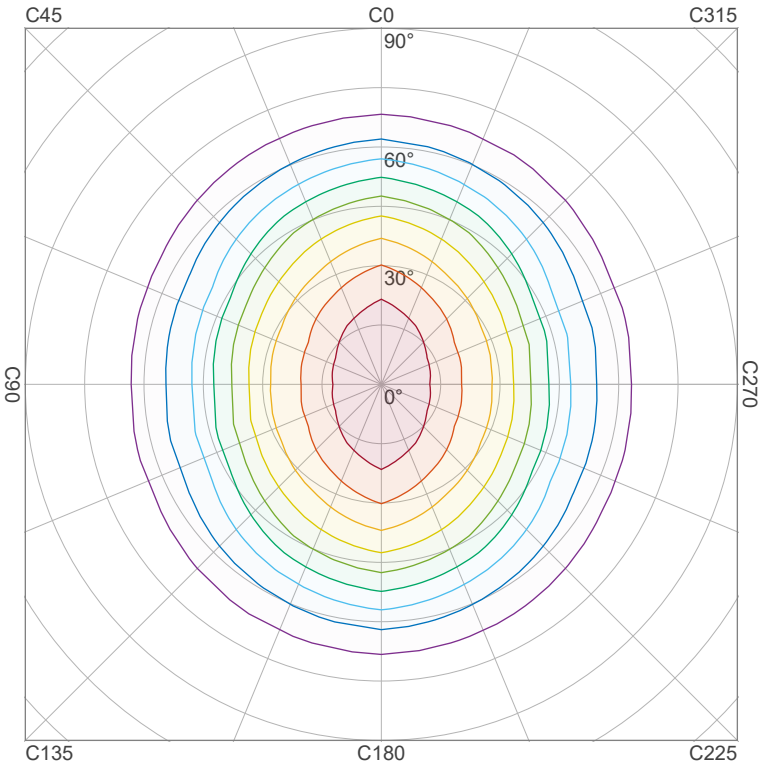
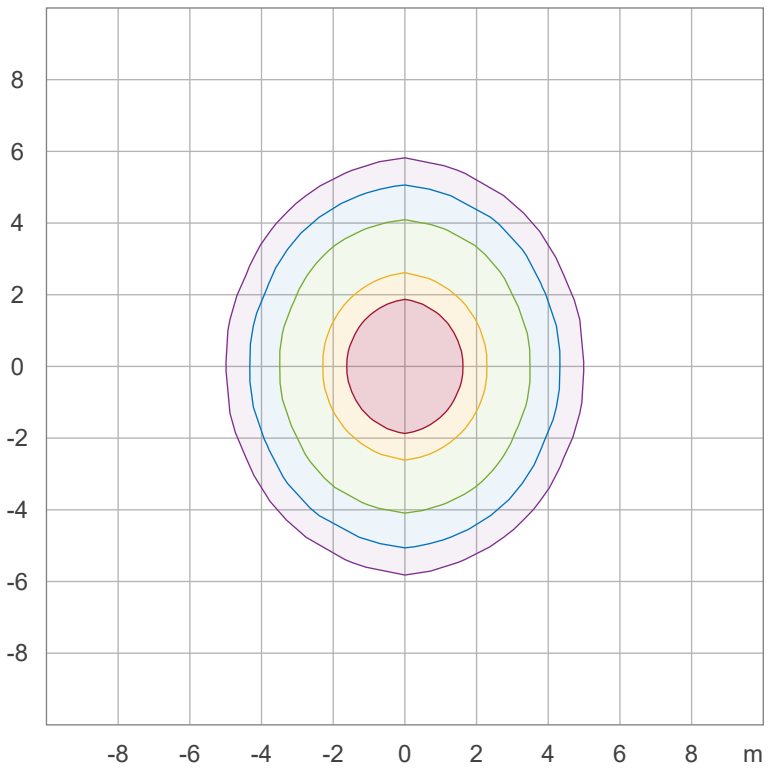
Iso-intensity Diagram (Iso-candela)



90 %	5170,3 cd
80 %	4595,8 cd
70 %	4021,4 cd
60 %	3446,9 cd
50 %	2872,4 cd
40 %	2297,9 cd
30 %	1723,4 cd
20 %	1149,0 cd
10 %	574,5 cd

Peak intensity: 5744,8 cd
Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



50,0 %	319,2 lx
30,0 %	191,5 lx
10,0 %	63,8 lx
5,0 %	31,9 lx
3,0 %	19,1 lx

Peak illuminance: 638,3 lx
Mounting height: 3,0 m
Number of c-planes: 12

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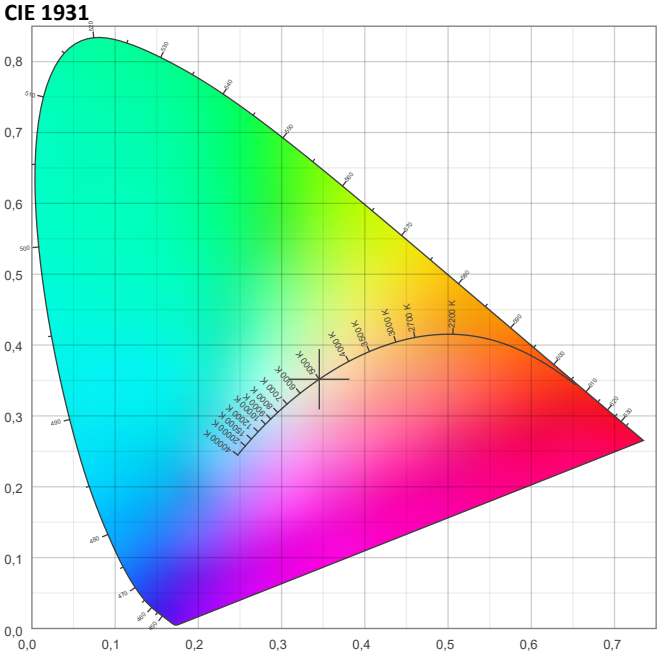
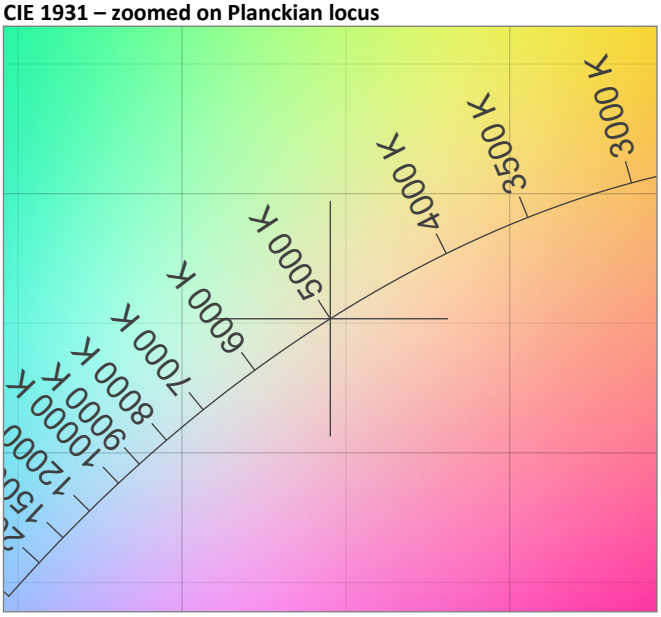
Color details

Correlated Color Temperature, Target	CCT = 5000 K
Correlated Color Temperature, Measured	CCT = 5078 K
Color Rendering Index	CRI 84,5
Color Rendering Index, R9 (red component)	R9 = 34,3
Color Rendering TM30-18	R_f 83,9 – R_g 97,5
Color Quality Scale	CQS = 82,9
MacAdam Steps	SDCM = 4,9
Color coordinates CIE 1931	(x;y) = (0,345;0,352)
Color coordinate CIEs 1960	(u;v) = (0,211;0,323)
Color deviation from BBL	Duv = 0,0049
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,211;0,485)

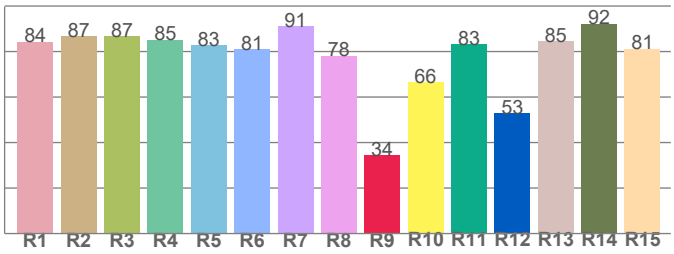
CIE 1931



CIE 1931 – zoomed on Planckian locus



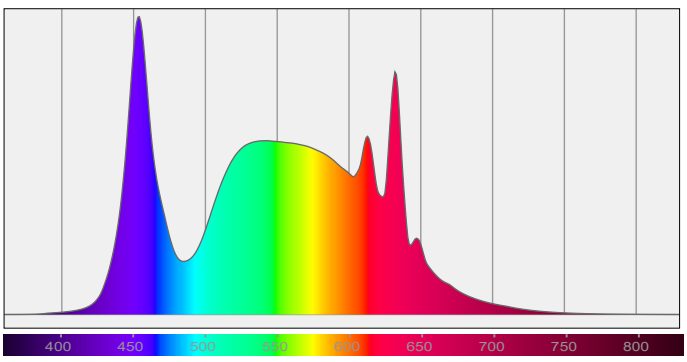
Color Rendering Index per reference color (CIE 1995)



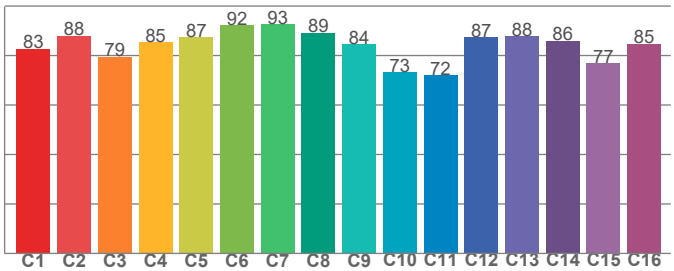
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
84,2	86,8	86,7	85,3	82,8	81,0	91,0	78,2	34,3	66,4	83,2	52,8	84,5	92,2	81,2

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



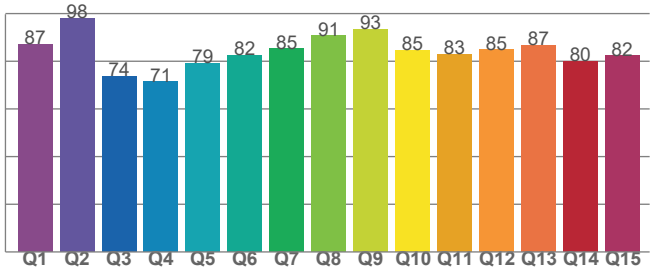
TM30-18 Rf-values per hue bin



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
82,7	88,0	79,5	85,3	87,4	92,3	92,8	89,2	84,5	73,3	72,1	87,3	87,7	86,0	76,8	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
87,2	98,0	73,8	71,4	79,2	82,5	85,3	90,7	93,5	84,6	83,0	84,8	86,7	80,0	82,2

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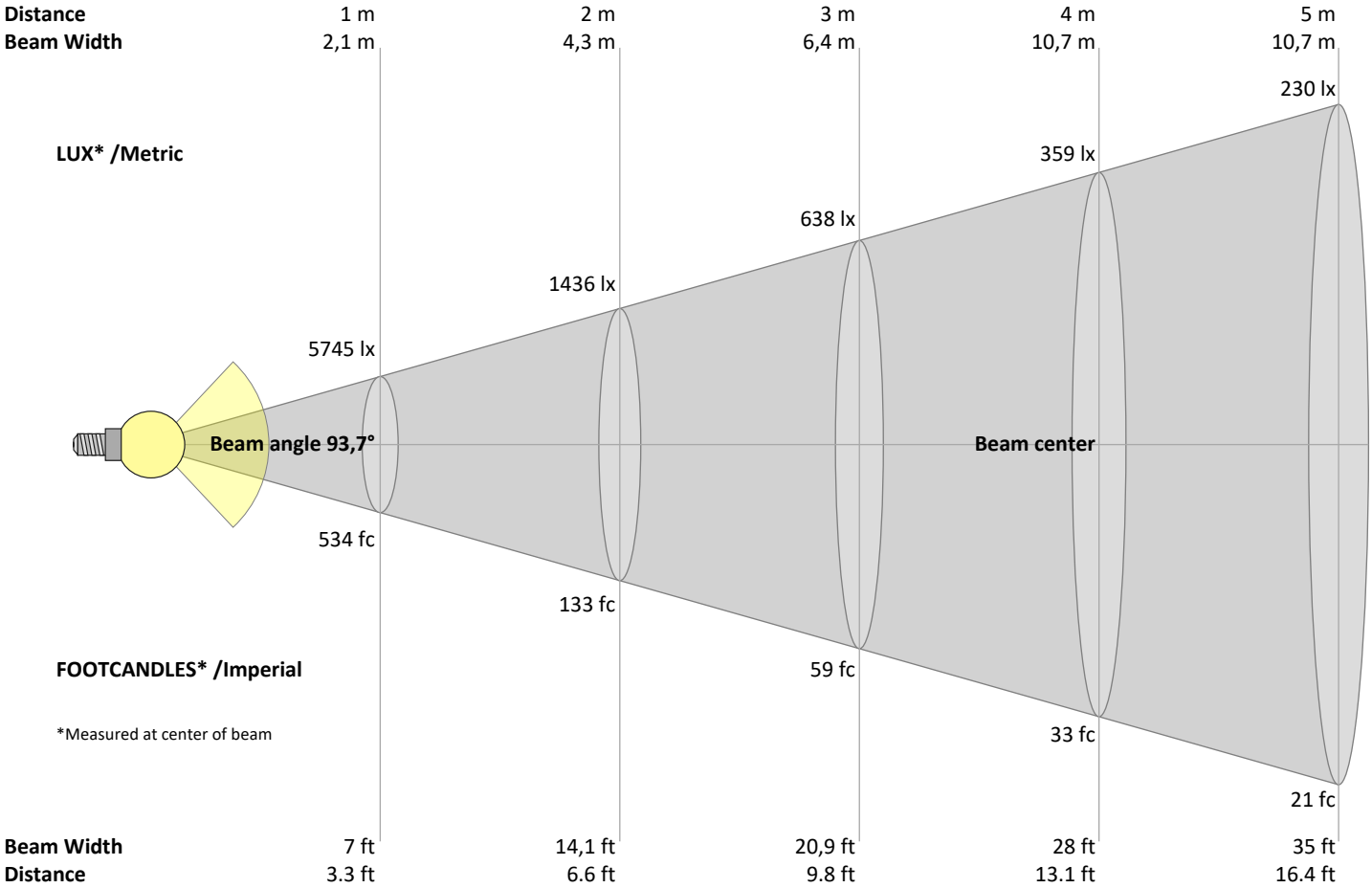
Beam Details



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
5745	1436	638	359	230	160	117	90	71	57	47	40	34	29	26	22	20	18	16	14	lux
533,7	133,4	59,3	33,4	21,3	14,8	10,9	8,3	6,6	5,3	4,4	3,7	3,2	2,7	2,4	2,1	1,8	1,6	1,5	1,3	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
5745	5720	5646	5521	5346	5115	4830	4494	4107	3669	3177	2647	2093	1542	1043	631	328	123	21	15	cd
100%	100%	98%	96%	93%	89%	84%	78%	71%	64%	55%	46%	36%	27%	18%	11%	6%	2%	0%	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
5745	5653	5410	5078	4755	4443	4103	3675	3114	2520	2011	1573	1184	853	587	387	230	93	18	13	cd
100%	98%	94%	88%	83%	77%	71%	64%	54%	44%	35%	27%	21%	15%	10%	7%	4%	2%	0%	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
5745	5720	5646	5521	5346	5115	4830	4494	4107	3669	3177	2647	2093	1542	1043	631	328	123	21	15	cd
100%	100%	98%	96%	93%	89%	84%	78%	71%	64%	55%	46%	36%	27%	18%	11%	6%	2%	0%	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
5745	5653	5410	5078	4755	4443	4103	3675	3114	2520	2011	1573	1184	853	587	387	230	93	18	13	cd
100%	98%	94%	88%	83%	77%	71%	64%	54%	44%	35%	27%	21%	15%	10%	7%	4%	2%	0%	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**										
2H	2H	27,3	28,4	27,5	28,7	28,9	25,4	26,5	25,7	26,8	27,1
	3H	28,1	29,3	28,5	29,6	29,8	26,1	27,3	26,5	27,6	27,8
	4H	28,4	29,5	28,8	29,8	30,1	26,4	27,5	26,8	27,8	28,1
	6H	28,6	29,6	28,9	29,9	30,3	26,7	27,6	27,0	27,9	28,3
	8H	28,6	29,5	29,0	29,9	30,3	26,7	27,7	27,1	28,0	28,4
	12H	28,6	29,5	29,0	29,9	30,3	26,7	27,6	27,1	28,0	28,4
4H	2H	27,4	28,5	27,8	28,8	29,1	25,9	27,0	26,3	27,3	27,6
	3H	28,6	29,5	29,0	29,8	30,3	26,9	27,8	27,2	28,1	28,6
	4H	28,9	29,7	29,3	30,1	30,7	27,2	28,0	27,6	28,4	29,0
	6H	29,1	29,9	29,6	30,3	30,6	27,4	28,2	27,9	28,6	29,0
	8H	29,1	29,9	29,7	30,2	30,6	27,5	28,2	28,0	28,6	29,0
	12H	29,1	29,7	29,6	30,2	30,7	27,6	28,2	28,1	28,6	29,1
8H	4H	28,9	29,6	29,4	30,0	30,4	27,3	28,0	27,8	28,4	28,8
	6H	29,2	29,8	29,8	30,2	30,8	27,7	28,2	28,2	28,7	29,3
	8H	29,3	29,8	29,9	30,3	31,0	27,9	28,3	28,4	28,8	29,5
	12H	29,4	29,8	30,0	30,3	30,9	27,9	28,3	28,5	28,8	29,5
12H	4H	28,9	29,5	29,4	29,9	30,4	27,3	27,9	27,8	28,3	28,8
	6H	29,3	29,7	29,8	30,2	30,9	27,7	28,2	28,3	28,7	29,4
	8H	29,3	29,7	29,9	30,2	30,9	27,9	28,3	28,5	28,8	29,4

Variations with the observer position for the luminaire spacings, S:		
S = 1.0H	0,1 / -0,2	0,2 / -0,3
S = 1.5H	0,5 / -0,7	0,5 / -0,8
S = 2.0H	1,3 / -1,6	1,0 / -1,5

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	101	101	101	99
1	110	106	102	98	107	103	100	97	99	96	93	95	93	90	91	89	88	86
2	101	93	87	82	98	91	86	81	88	83	79	84	81	77	81	78	75	73
3	93	83	76	70	90	81	74	69	78	72	68	76	70	66	73	69	65	63
4	85	74	66	60	83	73	65	59	70	64	59	68	62	58	66	61	57	55
5	79	67	58	52	77	66	58	52	64	57	51	61	55	51	60	54	50	48
6	73	61	52	46	71	60	52	46	58	51	45	56	50	45	54	49	44	43
7	68	55	47	41	66	54	46	41	53	46	41	51	45	40	50	44	40	38
8	63	51	42	37	62	50	42	37	48	41	37	47	41	36	46	40	36	34
9	59	47	39	33	58	46	38	33	45	38	33	44	37	33	43	37	33	31
10	56	43	36	30	54	43	35	30	42	35	30	41	34	30	40	34	30	28

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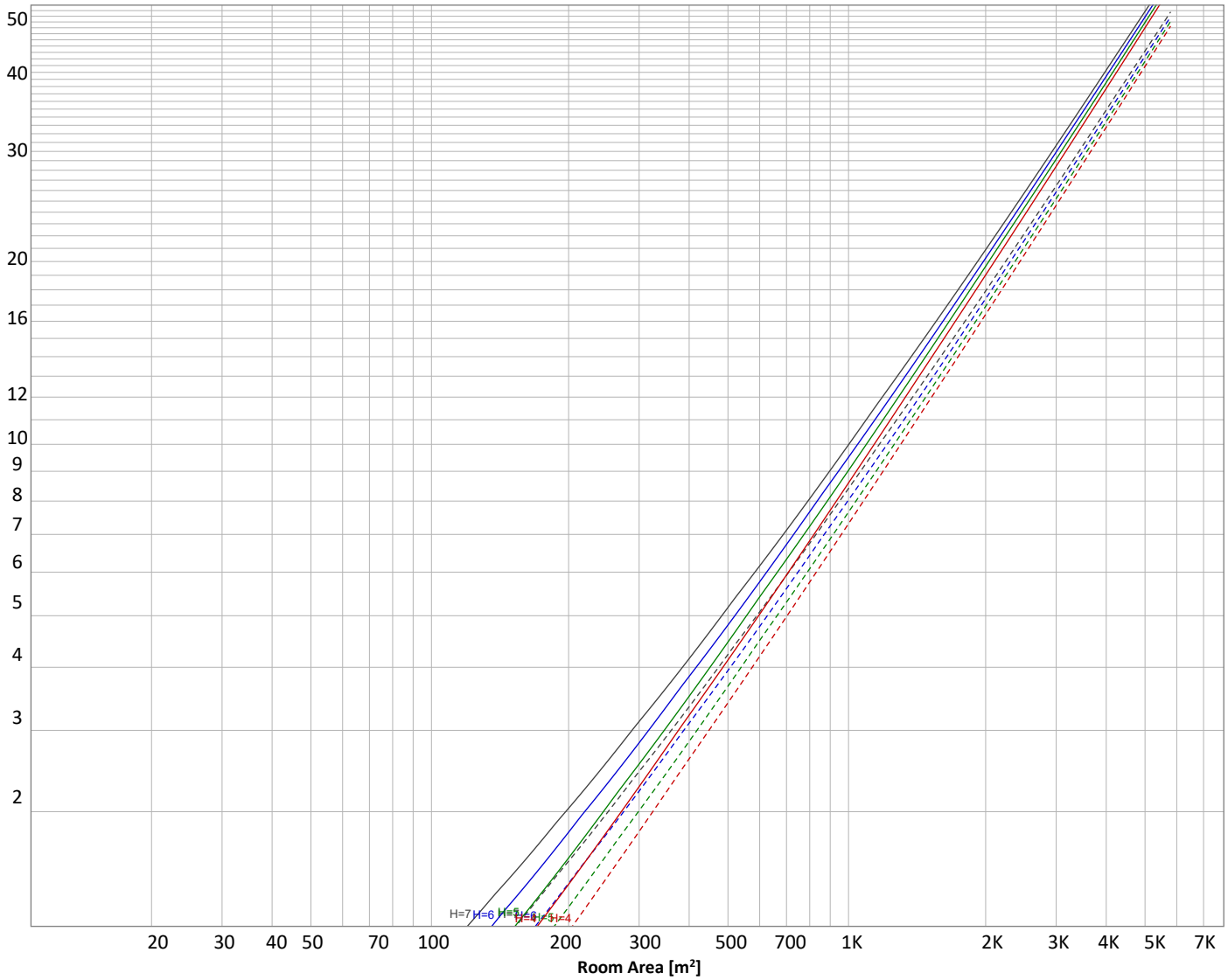
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 12738 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°
538 lm	1488 lm	2164 lm	2493 lm	2341 lm	1809 lm	1125 lm	527 lm	132 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
15,5 lm	16,4 lm	17,6 lm	17,4 lm	17,0 lm	15,3 lm	12,2 lm	7,91 lm	2,78 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!

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!

Intensity peaks

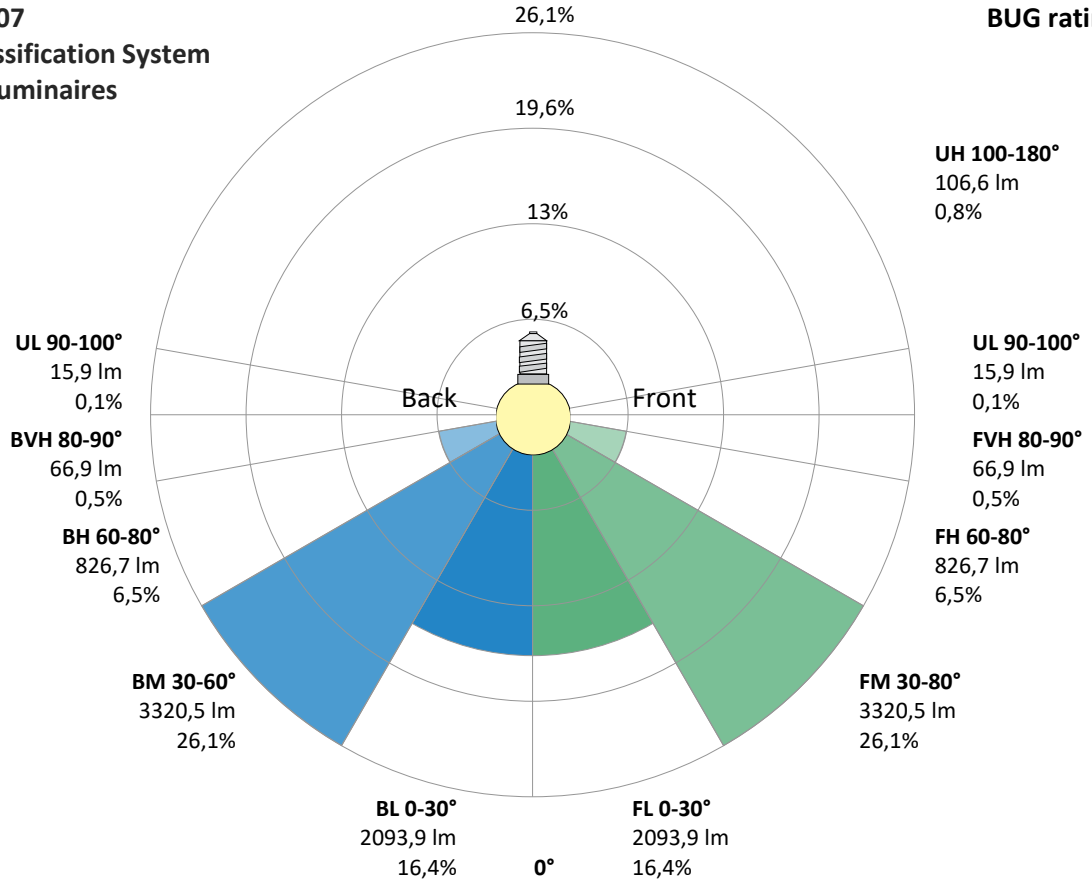
Max intensity	{PEAK}	cd
Intensity, 90°	{INT90}	cd
Intensity, 0°	{INT0}	cd

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 U3 G1



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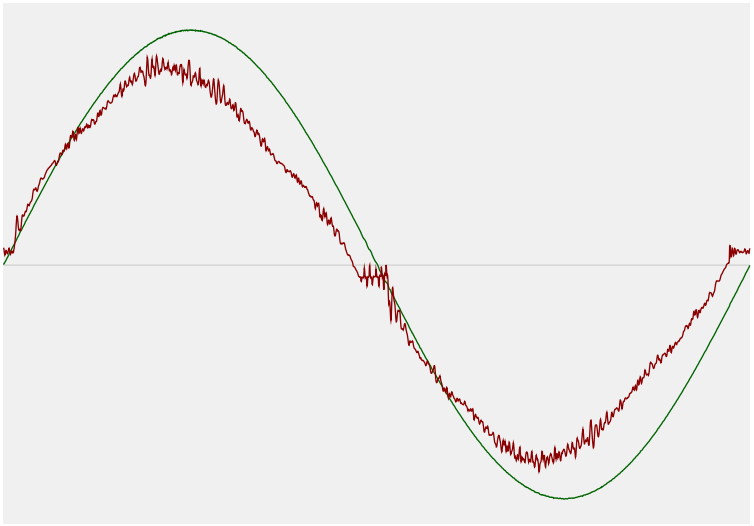
Power Details

Input Power

Power feed to light source	75,1 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,332 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	76,37 VA
Displacement factor of AC power feed	0,99
Power factor of AC current feed	0,98
Total harmonic distortion of the current	6,2%
Total harmonic distortion of the voltage	0,07%

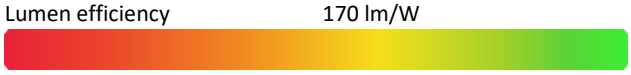
Input Power Curve



Efficiency

Radiated power efficiency 50,7%

Lumen efficiency 170 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	5000 K
CCT shift	0 K
CCT end	5000 K

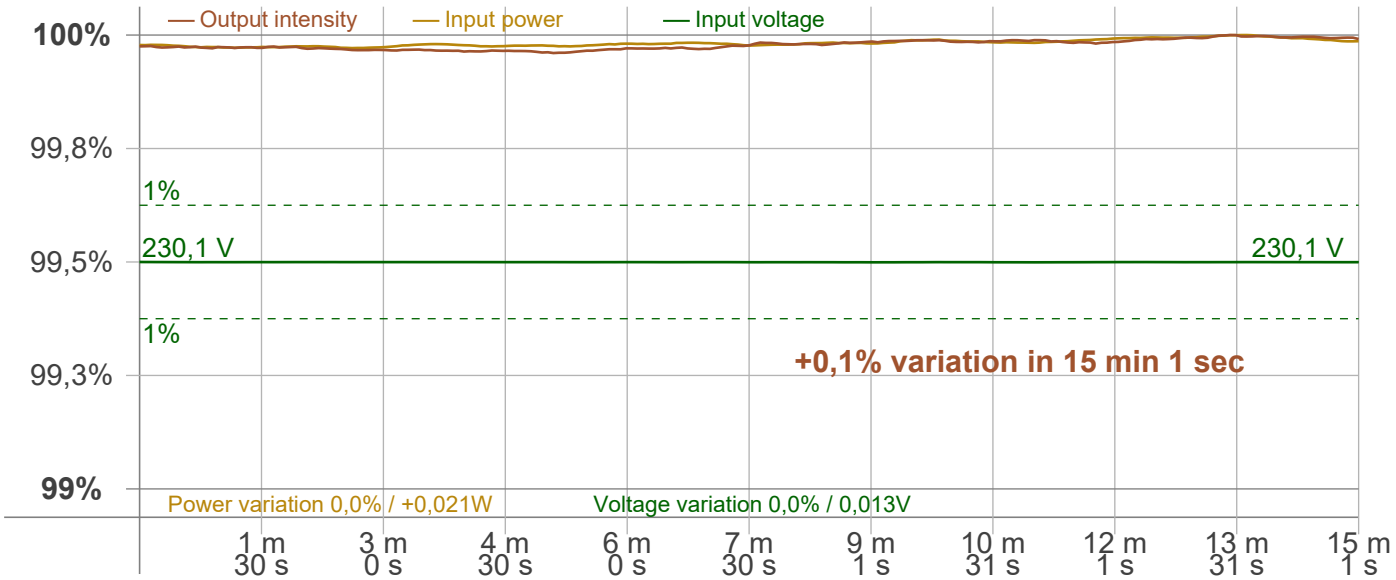
Warmup Result

Total warmup time	Lamp stabilized in 15 min 1 sec
Warmup variation	+0,1%

Output Change

Output start	12735 lm
Output change	+3 lm
Output end	12738 lm

Stabilization Curve



Light Measurement Report

Print date: 5-9-2025
Measurement date and time: 4-9-2025 13:10:20 – Measurement no. VFR-250904-2929-MS
Measurement tracking No. and Link: VT250904-000495
Operator:

Flicker /TLA details

Flicker Meter Type	Viso Systems LabFlicker
Frequency of input power	50 Hz
Flicker/TLA sample rate	n/a samples/s

Measurement time

PstLM	180 sec
All other indices	1,2 sec

Flicker indices according to Illuminating Engineering Society (IES)

Flicker frequency	n/a Hz
Percent Flicker	n/a %
Flicker index	n/a

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

JA8/10 40 Hz	n/a %
JA8/10 90 Hz	n/a %
JA8/10 200 Hz	n/a %
JA8/10 400 Hz	n/a %
JA8/10 1000 Hz	n/a %

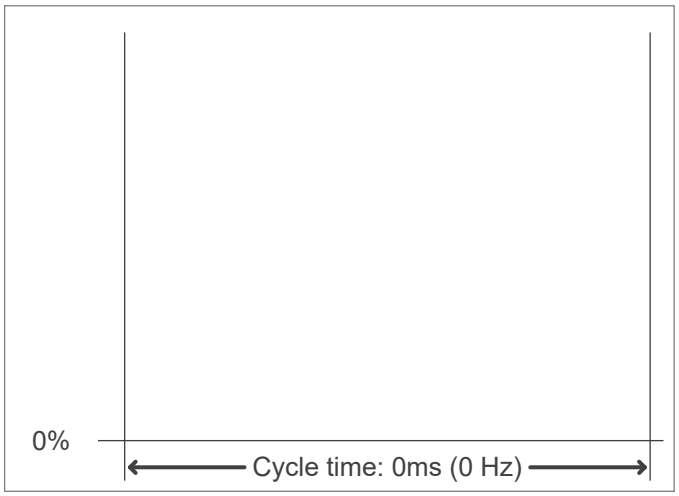
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz)	n/a
SVM value (80 < F < 2000 Hz)	n/a

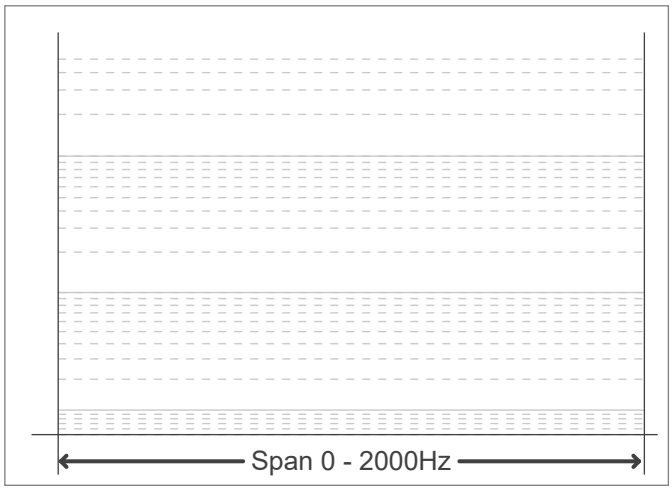
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp	n/a

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot