Light Measurement Report

Print date: 8-9-2025
Measurement date and time: 8-9-2025 16:31:21 – Measurement no. VFR-250908-3043-MS
Measurement tracking No. and Link: VT250908-001321
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

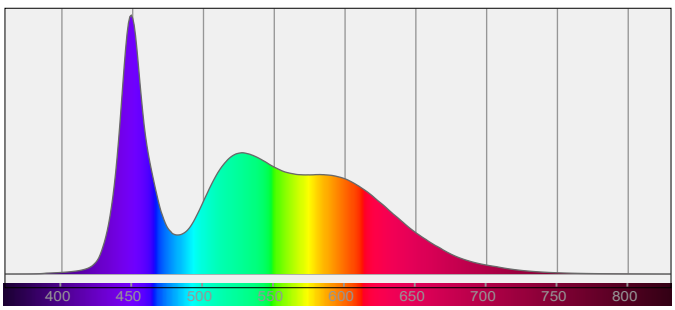
Number of C-planes and Resolution	12 planes – 30°
γ (gamma)-Resolution	5°
Test Distance	12,10 m
Input Power, Power and Displ. Factors	49,7 W – PF 0,98 – DPF 0,98
Input RMS Voltage and Current	230 V – 0,221 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 1 sec – 2,0%

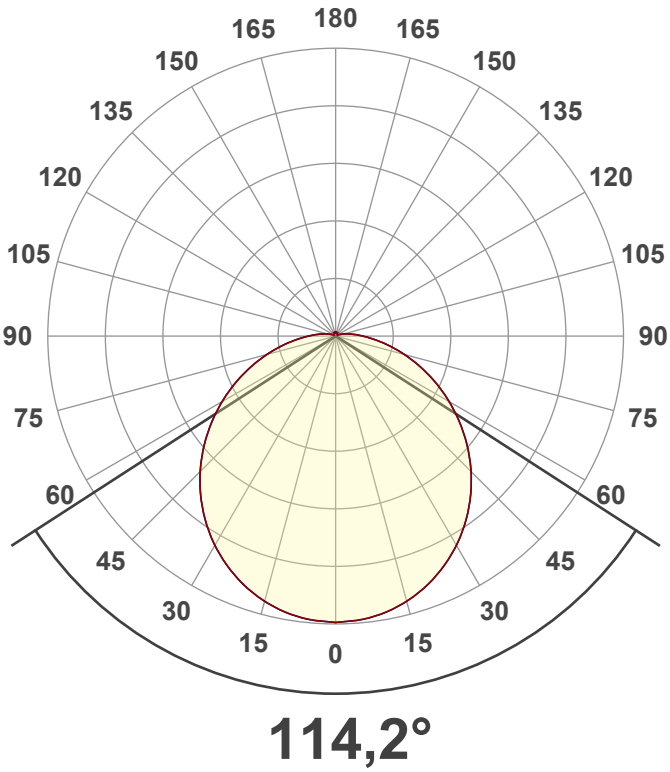
Tested Light Source

Product Name	812492-6500K
Item No. and Manufacturer	812492-6500K – Dutchfulfillment
Product Description (line 1)	LED BATTEN | CHARON | 150CM | 50W | CCT-SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	5482 lm – 4,45% / 95,55%
Efficiency	110 lm/W
Peak Intensity and Beam Angle	1713 cd – 114,2°
Correlated Color Temperature, Target/Measured	CCT = 6500 K / 6723 K
Color Rendering Index	CRI 82,7
Color Rendering TM30-18	R_f 83,0 – R_g 97,0
Color Shift, CIE duv and MacAdam Steps	Duv 0,0059 – SDCM 8,7
Flicker	SVM 0,01 – PstLM 0,01





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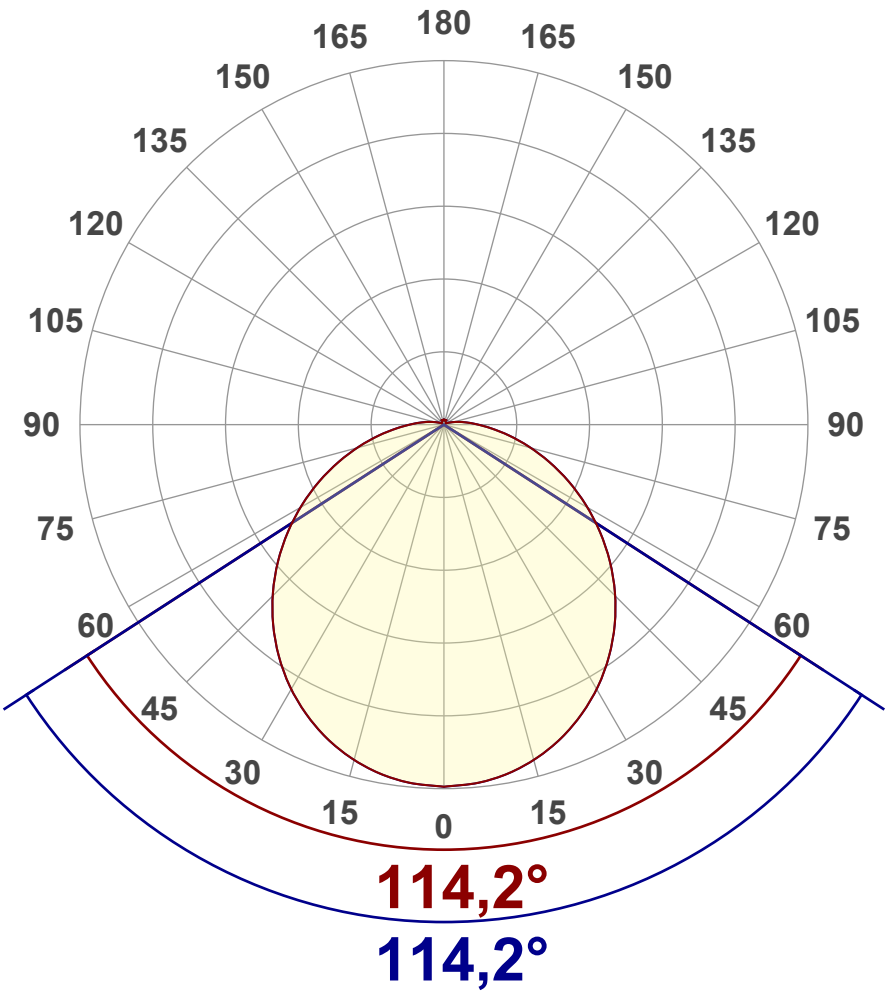
Luminous Intensity diagram Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	5482 lm
Lumen Up% / Down%	4,45% / 95,55%
Peak Intensity	1713 cd
Beam Angle (50%)	114,2°
Beam Angle (90%)	114,2°
Beam Angle (10%)	114,2°

Cut-off Angle

Average 2,5%	211,9°

Field Angle

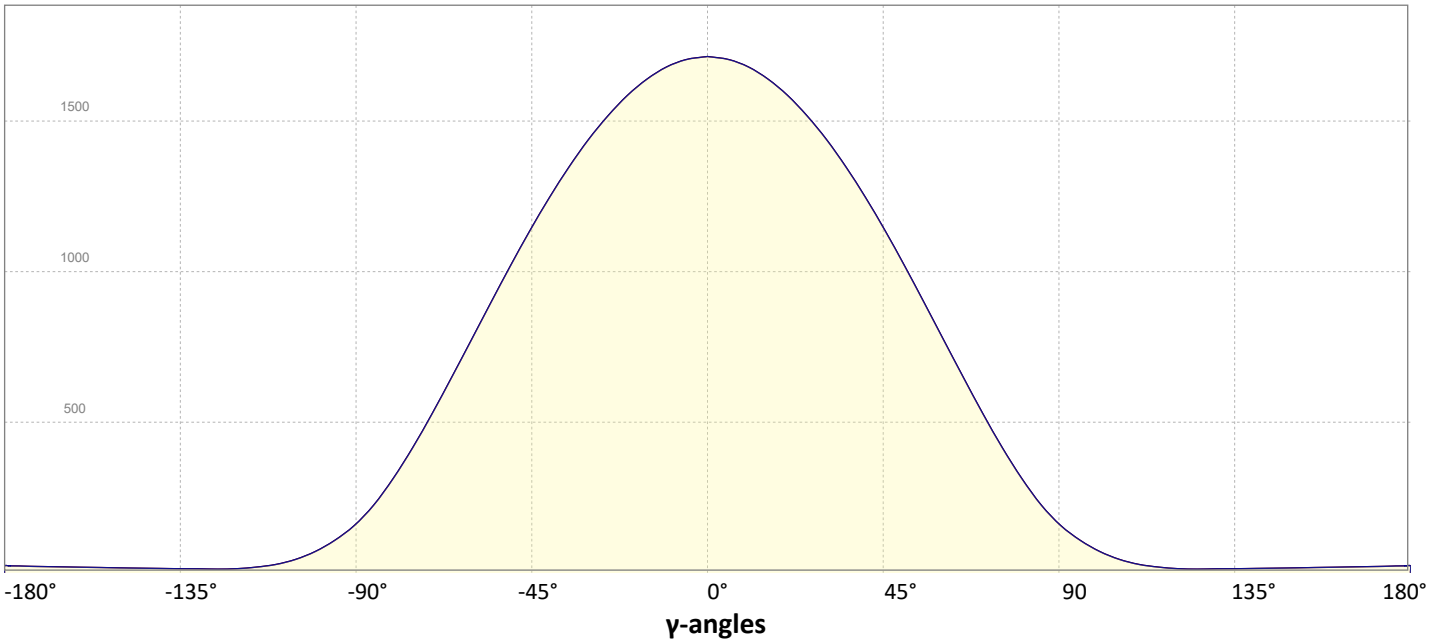
Average 10%	178,8°

Intensity Ratio

In 120° cone	70,6%
In 90° cone	47,8%

C000-C180
C090-C270

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



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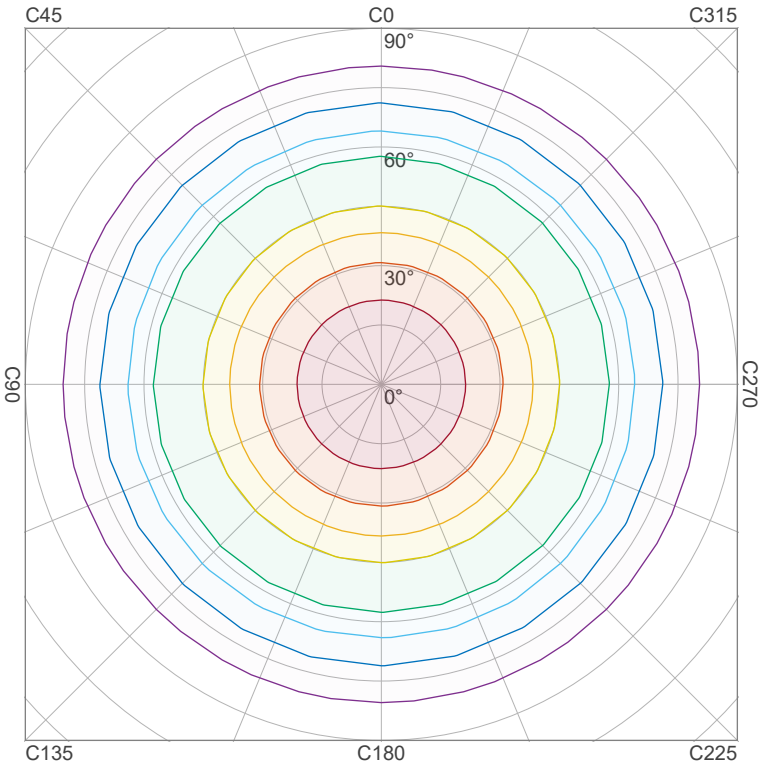
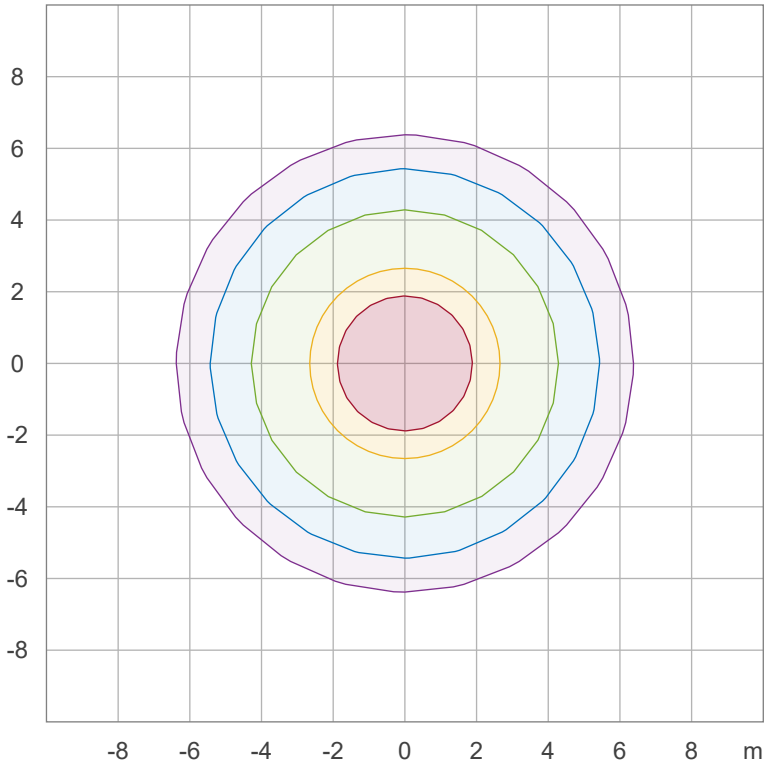
Iso-intensity Diagram (Iso-candela)



	90 %	1542,0 cd
	80 %	1370,7 cd
	70 %	1199,4 cd
	60 %	1028,0 cd
	50 %	856,7 cd
	40 %	685,3 cd
	30 %	514,0 cd
	20 %	342,7 cd
	10 %	171,3 cd

Peak intensity: 1713,4 cd
Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



	50,0 %	95,2 lx
	30,0 %	57,1 lx
	10,0 %	19,0 lx
	5,0 %	9,5 lx
	3,0 %	5,7 lx

Peak illuminance: 190,4 lx
Mounting height: 3,0 m
Number of c-planes: 12

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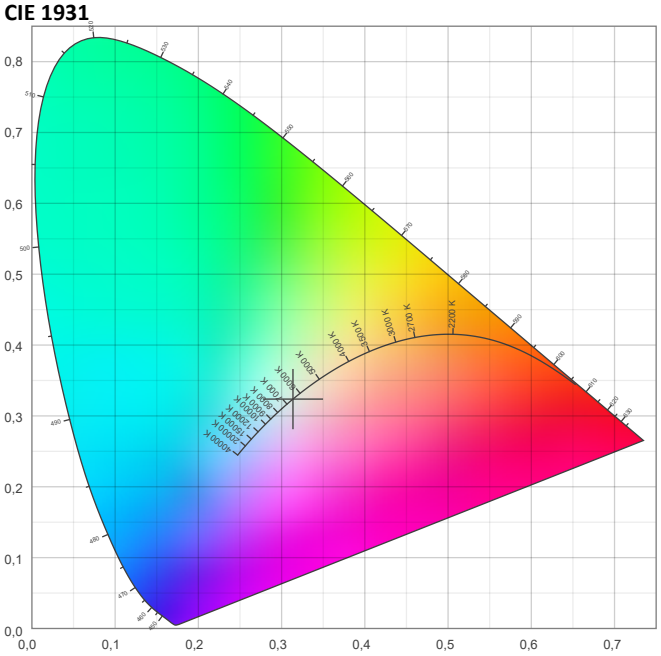
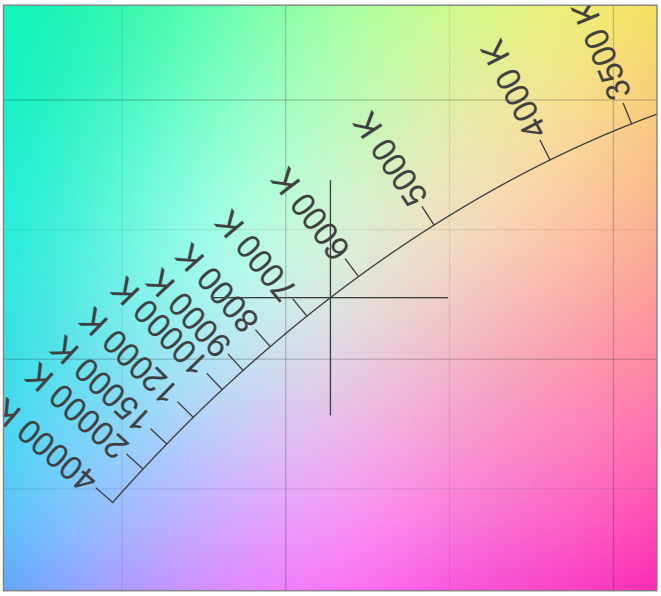
Color details

Correlated Color Temperature, Target	CCT = 6500 K
Correlated Color Temperature, Measured	CCT = 6723 K
Color Rendering Index	CRI 82,7
Color Rendering Index, R9 (red component)	R9 = 11,7
Color Rendering TM30-18	R_f 83,0 – R_g 97,0
Color Quality Scale	CQS = 82,4
MacAdam Steps	SDCM = 8,7
Color coordinates CIE 1931	(x;y) = (0,314;0,324)
Color coordinate CIEs 1960	(u;v) = (0,200;0,310)
Color deviation from BBL	Duv = 0,0059
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,200;0,466)

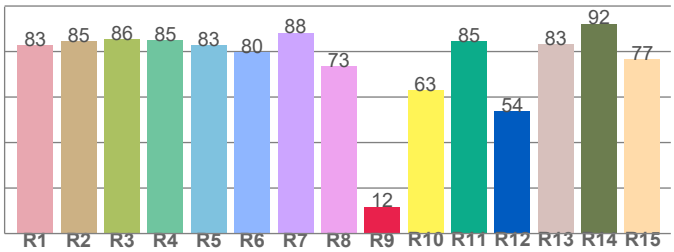
CIE 1931



CIE 1931 – zoomed on Planckian locus



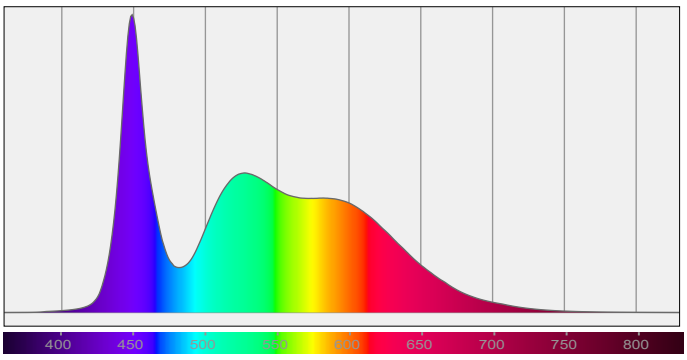
Color Rendering Index per reference color (CIE 1995)



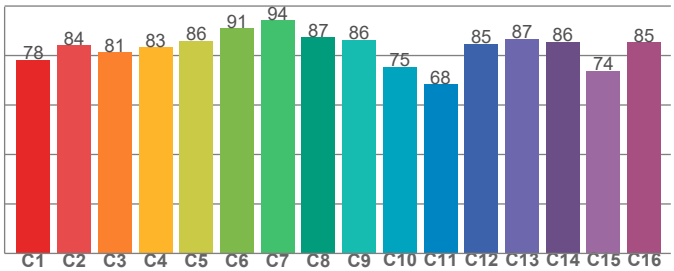
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
82,7	84,5	85,5	84,9	82,9	79,7	88,2	73,5	11,7	63,0	84,5	53,8	83,2	92,2	76,5

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



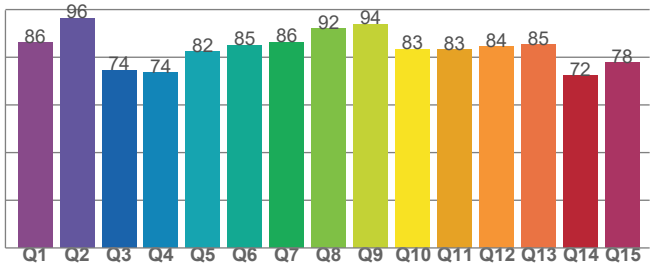
TM30-18 Rf-values per hue bin



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
78,3	84,2	81,4	83,4	86,0	91,0	94,2	87,4	86,4	75,4	68,3	84,8	86,7	85,5	73,9	85,4

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
86,1	96,3	74,5	73,5	82,3	85,0	86,3	91,9	93,8	83,4	83,1	84,3	85,3	72,3	77,8

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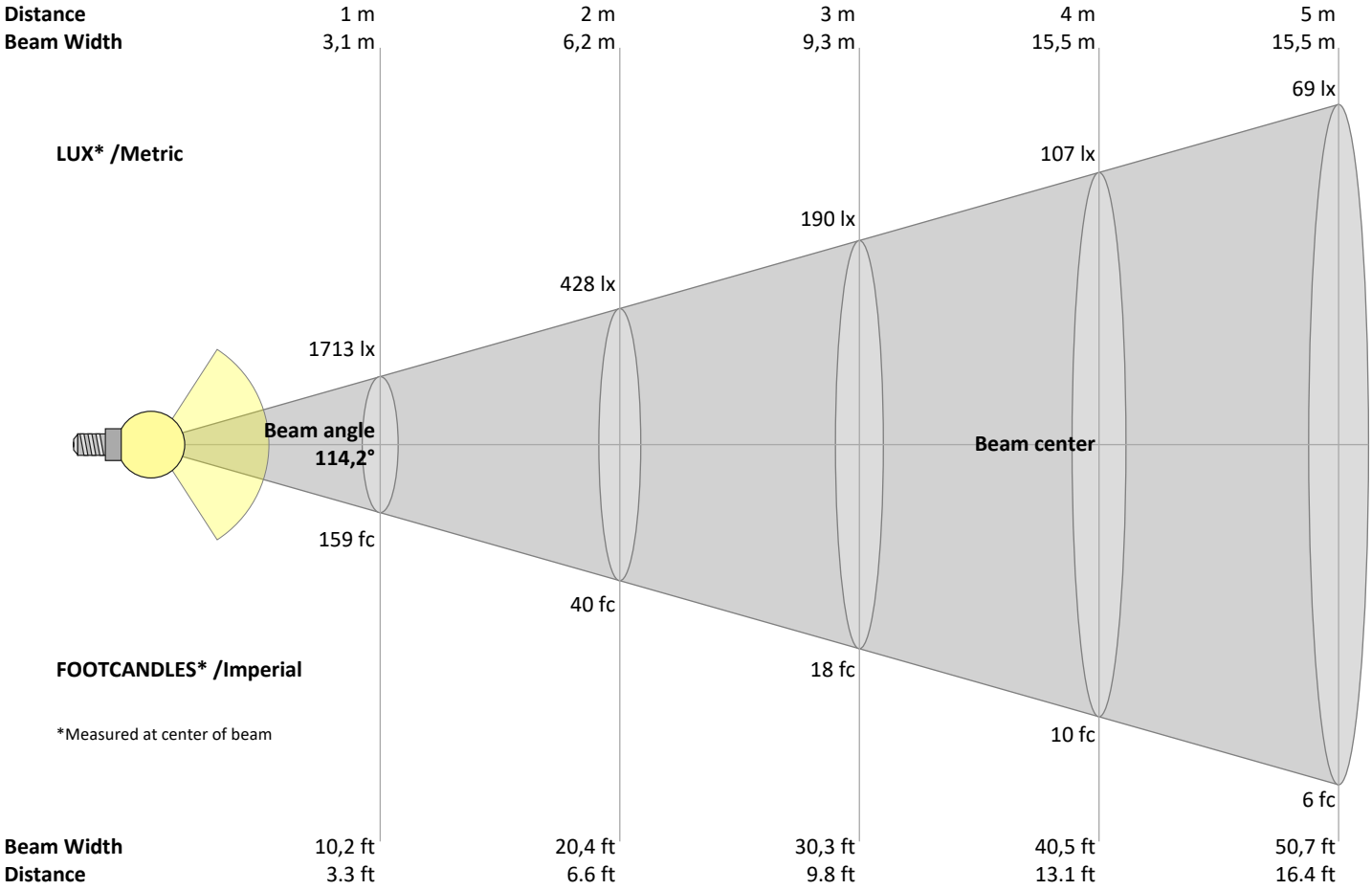
Beam Details



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
1713	428	190	107	69	48	35	27	21	17	14	12	10	9	8	7	6	5	5	4	lux
159,2	39,8	17,7	9,9	6,4	4,4	3,2	2,5	2	1,6	1,3	1,1	0,9	0,8	0,7	0,6	0,6	0,5	0,4	0,4	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
1713	1705	1682	1643	1591	1524	1446	1356	1256	1147	1030	909	785	662	541	427	323	233	163	112	cd
100%	100%	98%	96%	93%	89%	84%	79%	73%	67%	60%	53%	46%	39%	32%	25%	19%	14%	10%	7%	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
1713	1705	1682	1643	1591	1524	1446	1356	1256	1147	1030	909	785	662	541	427	323	233	163	112	cd
100%	100%	98%	96%	93%	89%	84%	79%	73%	67%	60%	53%	46%	39%	32%	25%	19%	14%	10%	7%	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
1713	1705	1682	1643	1591	1524	1446	1356	1256	1147	1030	909	785	662	541	427	323	233	163	112	cd
100%	100%	98%	96%	93%	89%	84%	79%	73%	67%	60%	53%	46%	39%	32%	25%	19%	14%	10%	7%	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
1713	1705	1682	1643	1591	1524	1446	1356	1256	1147	1030	909	785	662	541	427	323	233	163	112	cd
100%	100%	98%	96%	93%	89%	84%	79%	73%	67%	60%	53%	46%	39%	32%	25%	19%	14%	10%	7%	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	22,1	23,3	22,4	23,7	24,0	22,4	23,6	22,7	24,0	24,3
	3H	23,7	25,0	24,2	25,3	25,6	24,1	25,3	24,5	25,7	26,0
	4H	24,5	25,7	25,0	26,1	26,4	24,9	26,1	25,4	26,5	26,9
	6H	25,3	26,3	25,7	26,7	27,2	25,8	26,9	26,2	27,3	27,7
	8H	25,6	26,6	26,0	27,0	27,5	26,2	27,3	26,6	27,7	28,2
	12H	25,9	26,9	26,3	27,3	27,8	26,7	27,7	27,1	28,1	28,6
4H	2H	22,8	24,0	23,2	24,3	24,7	23,0	24,2	23,4	24,5	24,9
	3H	24,7	25,7	25,1	26,1	26,7	25,0	26,0	25,4	26,4	27,0
	4H	25,6	26,6	26,1	27,0	27,6	25,9	26,9	26,4	27,4	28,0
	6H	26,4	27,3	27,0	27,8	28,2	26,9	27,8	27,5	28,3	28,7
	8H	26,8	27,6	27,4	28,1	28,6	27,4	28,2	28,0	28,7	29,2
	12H	27,2	27,9	27,8	28,4	28,9	28,0	28,6	28,5	29,1	29,7
8H	4H	26,0	26,8	26,5	27,2	27,7	26,3	27,1	26,9	27,6	28,0
	6H	27,1	27,7	27,6	28,2	28,8	27,5	28,1	28,1	28,7	29,3
	8H	27,6	28,2	28,2	28,7	29,5	28,2	28,7	28,7	29,3	30,0
	12H	28,1	28,6	28,8	29,2	29,9	28,9	29,3	29,5	29,9	30,6
12H	4H	26,0	26,7	26,6	27,2	27,8	26,3	27,0	26,9	27,5	28,1
	6H	27,2	27,8	27,8	28,4	29,1	27,6	28,2	28,2	28,8	29,5
	8H	27,8	28,3	28,5	28,9	29,5	28,3	28,8	29,0	29,4	30,1

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

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	118	118	118	118	115	115	115	115	109	109	109	103	103	103	98	98	98	96
1	106	101	96	92	103	98	94	90	93	89	86	88	85	83	84	82	79	77
2	96	87	80	74	93	85	78	73	81	75	70	77	72	68	73	69	66	63
3	87	76	68	61	84	74	66	60	71	64	58	67	62	57	64	59	55	53
4	80	67	58	51	77	66	57	51	63	55	49	60	53	48	57	52	47	45
5	73	60	51	44	71	59	50	44	56	48	43	54	47	42	51	45	41	39
6	68	54	45	38	65	53	44	38	51	43	37	48	42	37	46	40	36	34
7	63	49	40	34	61	48	39	33	46	38	33	44	37	32	42	36	32	30
8	58	45	36	30	57	44	35	30	42	35	29	40	34	29	39	33	28	26
9	55	41	33	27	53	40	32	27	39	31	26	37	31	26	36	30	26	24
10	51	38	30	24	50	37	29	24	36	29	24	34	28	24	33	27	23	21

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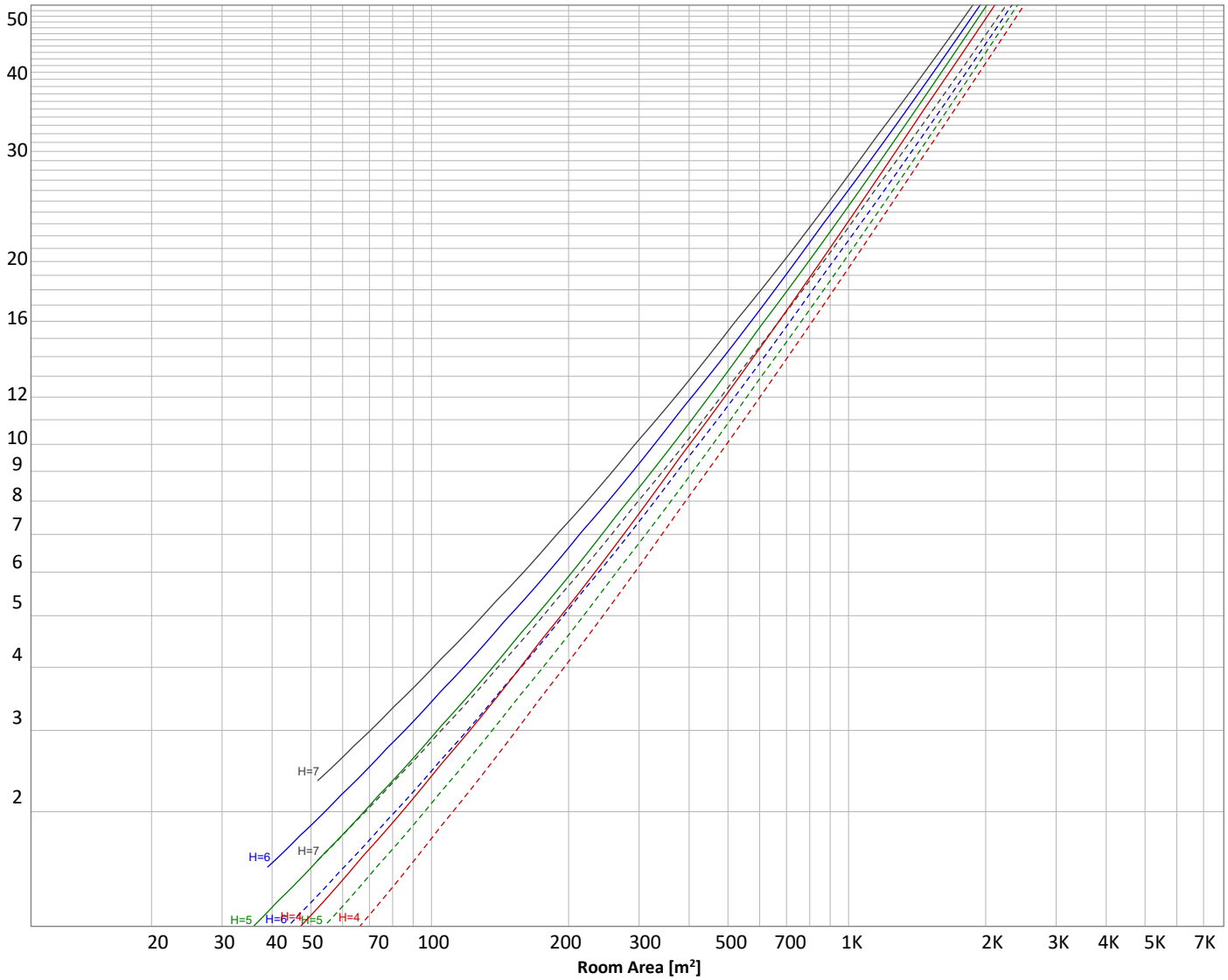
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 5482 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°
162 lm	463 lm	702 lm	848 lm	884 lm	812 lm	655 lm	453 lm	259 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
125 lm	51,8 lm	20,4 lm	11,4 lm	10,5 lm	9,48 lm	7,93 lm	5,45 lm	2,04 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	162 lm	3,0%
10-20°	463 lm	8,5%
20-30°	702 lm	12,8%
30-40°	848 lm	15,5%
40-50°	884 lm	16,1%
50-60°	812 lm	14,8%
60-70°	655 lm	12,0%
70-80°	453 lm	8,3%
80-90°	259 lm	4,7%
90-100°	125 lm	2,3%
100-110°	52 lm	0,9%
110-120°	20 lm	0,4%
120-130°	11 lm	0,2%
130-140°	10 lm	0,2%
140-150°	9 lm	0,2%
150-160°	8 lm	0,1%
160-170°	5 lm	0,1%
170-180°	2 lm	0,0%
Total	5482 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	1327 lm	24,2%
0-40°	2175 lm	39,7%
0-60°	3871 lm	70,6%
60-90°	1367 lm	24,9%
70-100°	836 lm	15,3%
90-120°	197 lm	3,6%
0-90°	5238 lm	95,5%
90-180°	244 lm	4,5%
0-180°	5482 lm	100,0%

Intensity peaks

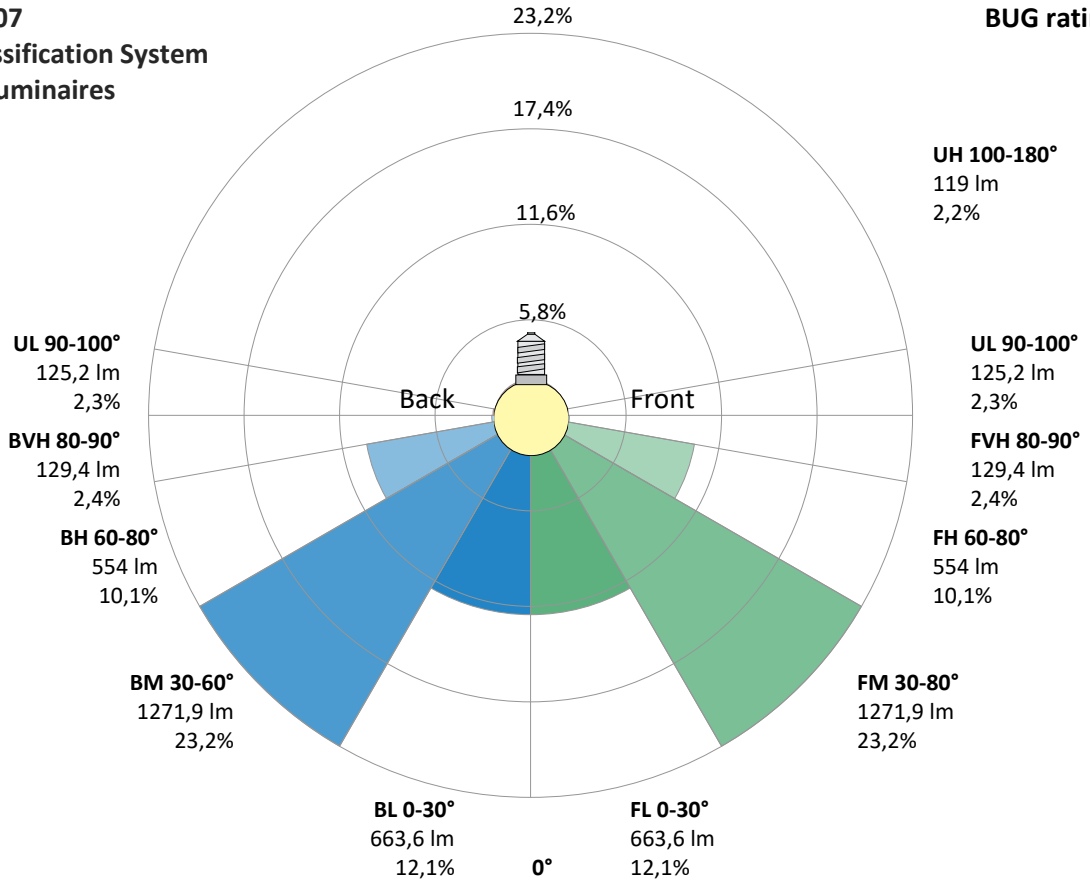
Max intensity	1713 cd
Intensity, 90°	163 cd
Intensity, 0°	1713 cd

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	664 lm	12,1%
Medium(30-60°)	1272 lm	23,2%
High(60-80°)	554 lm	10,1%
Very high(80-90°)	129 lm	2,4%
Back light		
Low(0-30°)	664 lm	12,1%
Medium(30-60°)	1272 lm	23,2%
High(60-80°)	554 lm	10,1%
Very high(80-90°)	129 lm	2,4%
Uplight		
Low(90-100°)	125 lm	2,3%
High(100-180°)	119 lm	2,2%

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

BUG rating B2 U3 G2



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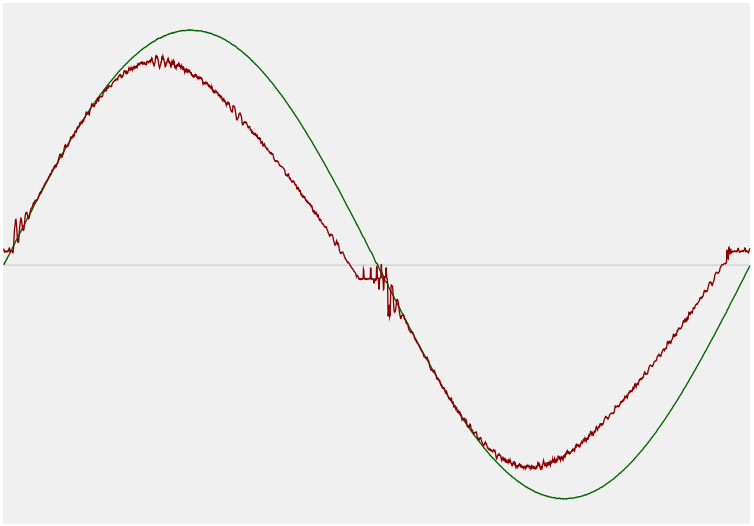
Power Details

Input Power

Power feed to light source	49,7 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,221 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	50,89 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,98
Total harmonic distortion of the current	9,24%
Total harmonic distortion of the voltage	0,07%

Input Power Curve



Efficiency

Radiated power efficiency 35,1%

Lumen efficiency 110 lm/W

Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	6497 K
CCT shift	+3 K
CCT end	6500 K

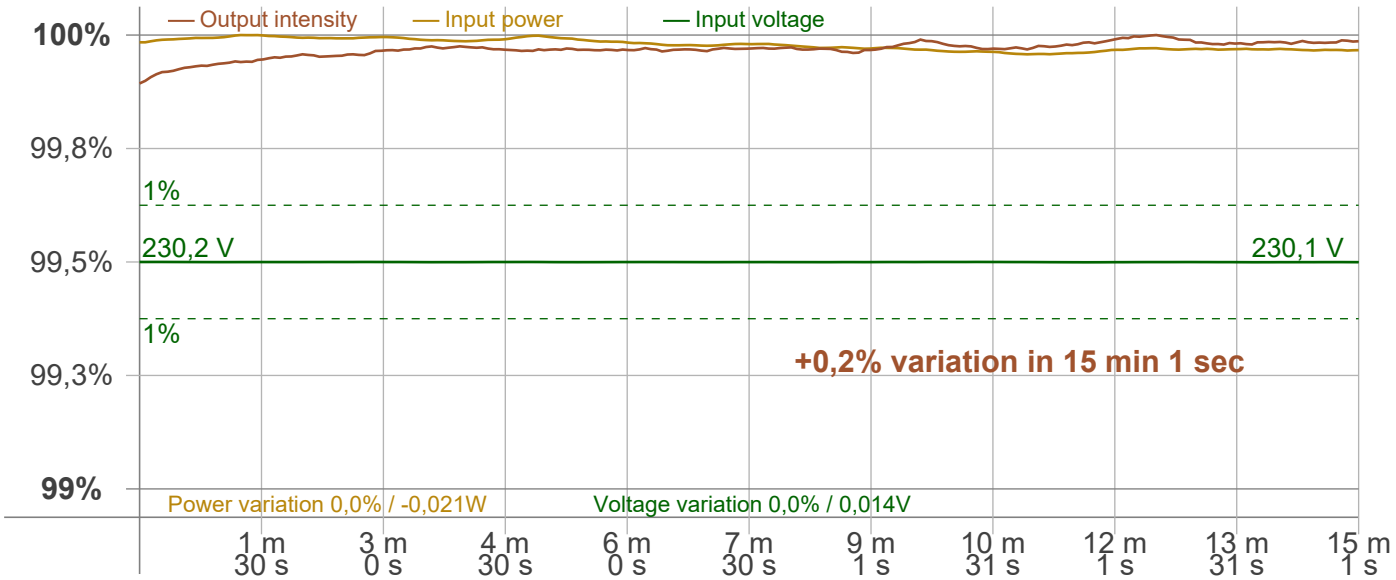
Warmup Result

Total warmup time	Lamp stabilized in 15 min 1 sec
Warmup variation	+0,2%

Output Change

Output start	5476 lm
Output change	+6 lm
Output end	5482 lm

Stabilization Curve



Light Measurement Report

Print date: 8-9-2025
Measurement date and time: 8-9-2025 16:31:21 – Measurement no. VFR-250908-3043-MS
Measurement tracking No. and Link: VT250908-001321
Operator:

Flicker /TLA details

Flicker Meter Type	Viso Systems LabFlicker
Frequency of input power	50 Hz
Flicker/TLA sample rate	40000 samples/s

Measurement time

PstLM	180 sec
All other indices	1,2 sec

Flicker indices according to Illuminating Engineering Society (IES)

Flicker frequency	98,04 Hz
Percent Flicker	0,3 %
Flicker index	0

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 %

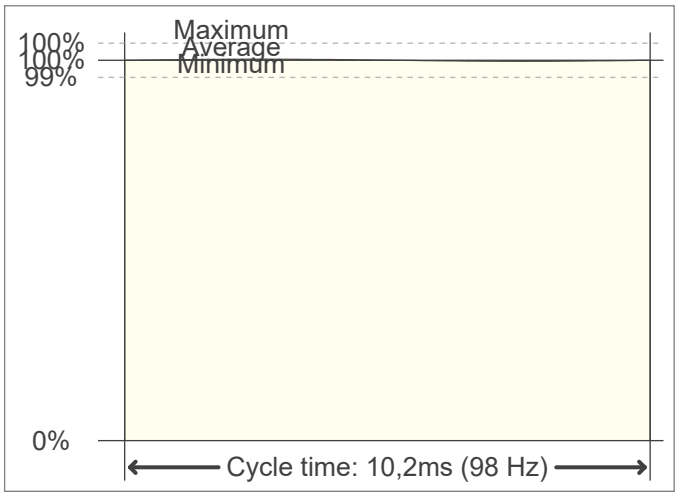
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz)	0,01
SVM value (80 < F < 2000 Hz)	0,01

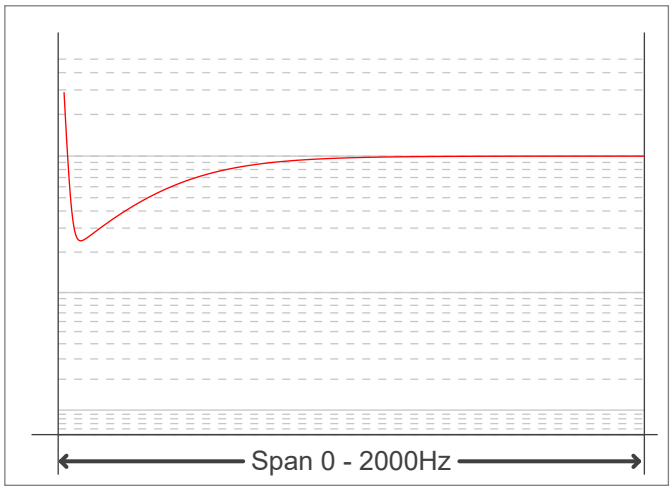
Flicker indices according to Lighting Research Center (2015)

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