Light Measurement Report

Print date: 16-6-2025
Measurement date and time: 16-6-2025 09:25:56 – Measurement no. VFR-250616-1560-MS
Measurement tracking No. and Link: VT250616-006265
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

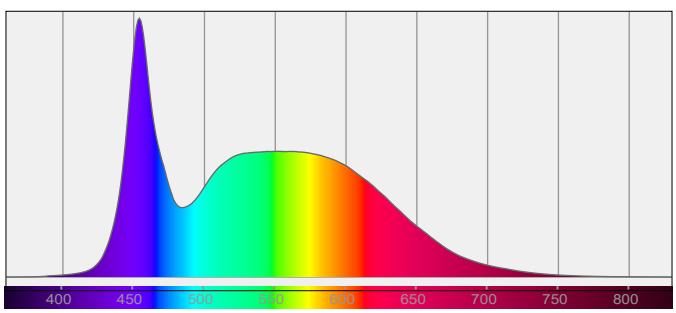
Number of C-planes and Resolution	28 planes – 12,86°
γ (gamma)-Resolution	5°
Test Distance	9,19 m
Input Power, Power and Displ. Factors	18,3 W – PF 0,96 – DPF 1,0
Input RMS Voltage and Current	230 V – 0,083 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 0 sec – 2,0%

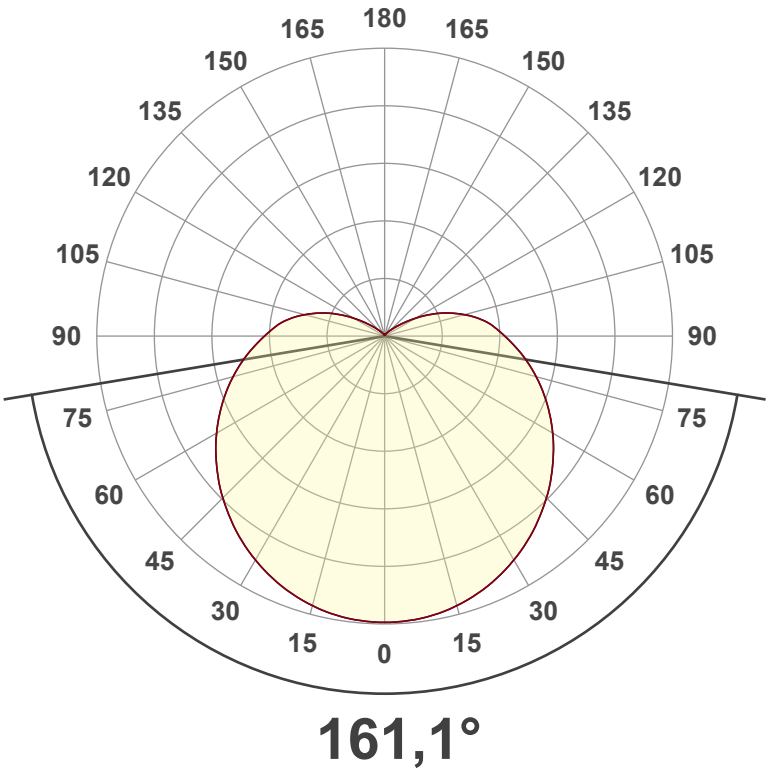
Tested Light Source

Product Name	805111-6500K
Item No. and Manufacturer	805111-6500K – Dutchfulfillment
Product Description (line 1)	LED T5 BUIS | 115CM | 18W

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	2486 lm – 18,94% / 81,06%
Efficiency	136 lm/W
Peak Intensity and Beam Angle	466 cd – 161,1°
Correlated Color Temperature, Target/Measured	CCT = 6500 K / 6335 K
Color Rendering Index	CRI 83,5
Color Rendering TM30-18	R_f 83,4 – R_g 92,7
Color Shift, CIE duv and MacAdam Steps	Duv 0,0071 – SDCM 9,7
Flicker	SVM 3,13 – PstLM 0,1





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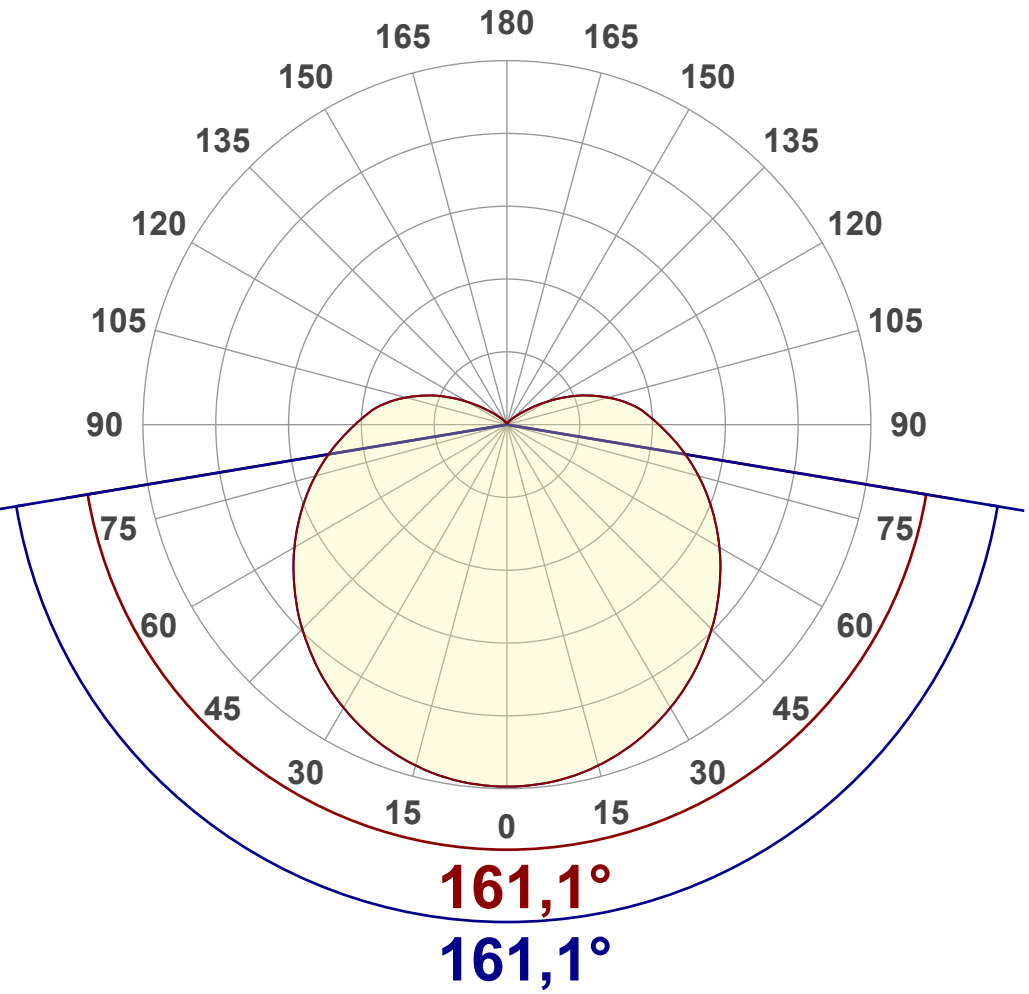
Luminous Intensity diagram Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2486 lm
Lumen Up% / Down%	18,94% / 81,06%
Peak Intensity	466 cd
Beam Angle (50%)	161,1°
Beam Angle (90%)	161,1°
Beam Angle (10%)	161,1°

Cut-off Angle

Average 2,5%	273,5°

Field Angle

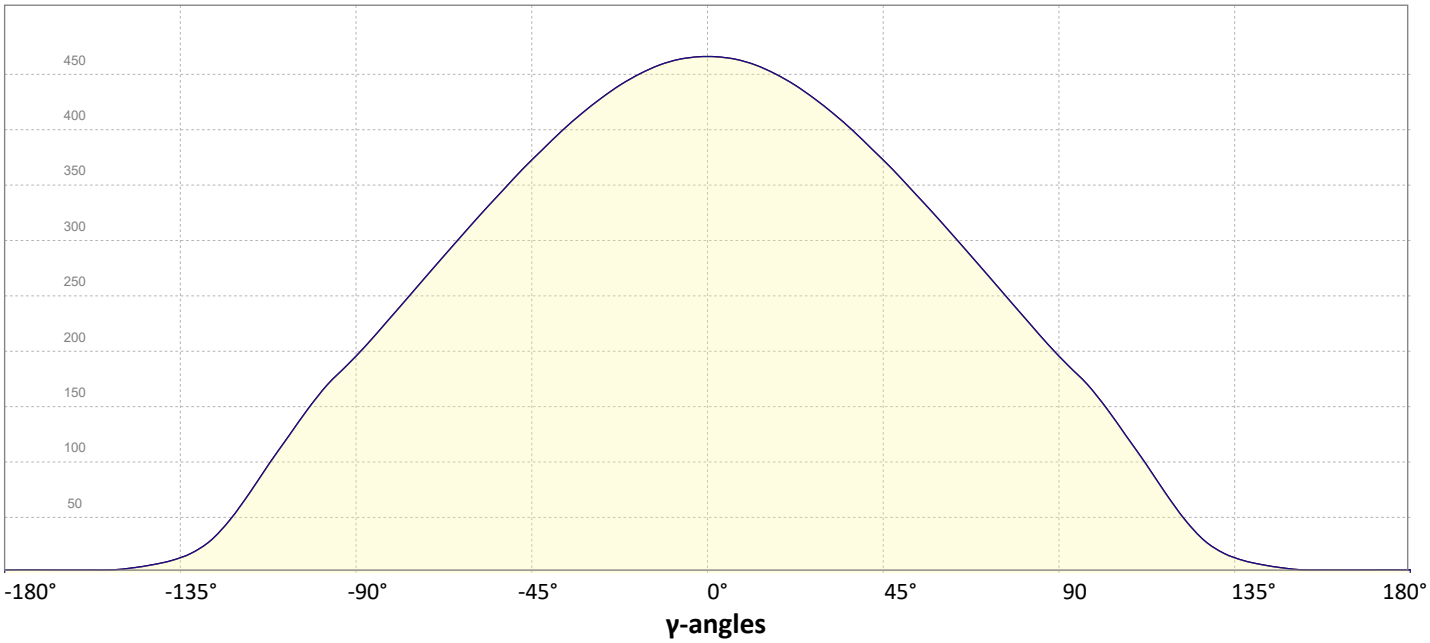
Average 10%	245,2°

Intensity Ratio

In 120° cone	48,9%
In 90° cone	30,9%

C000-C180
C090-C270

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



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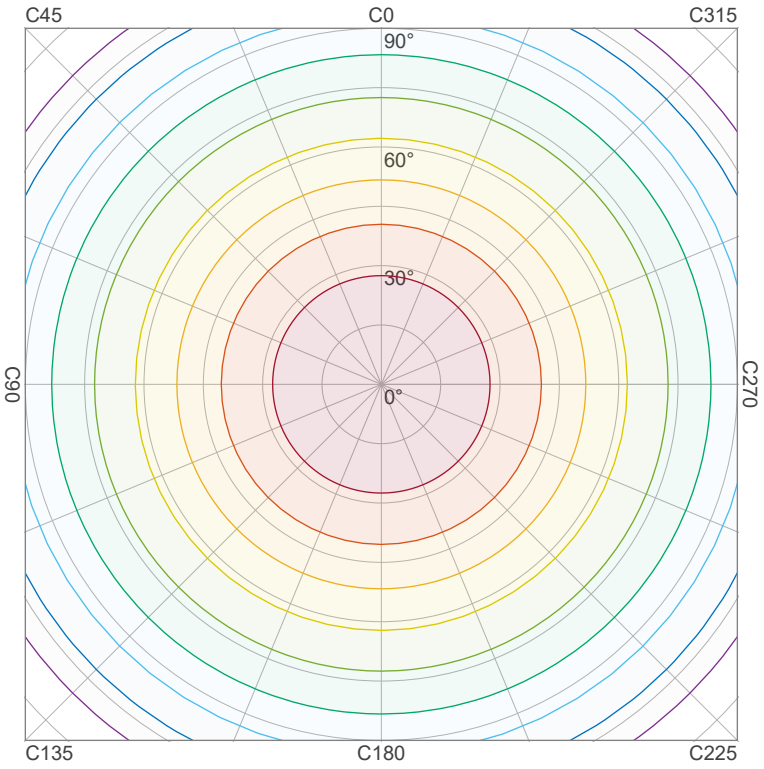
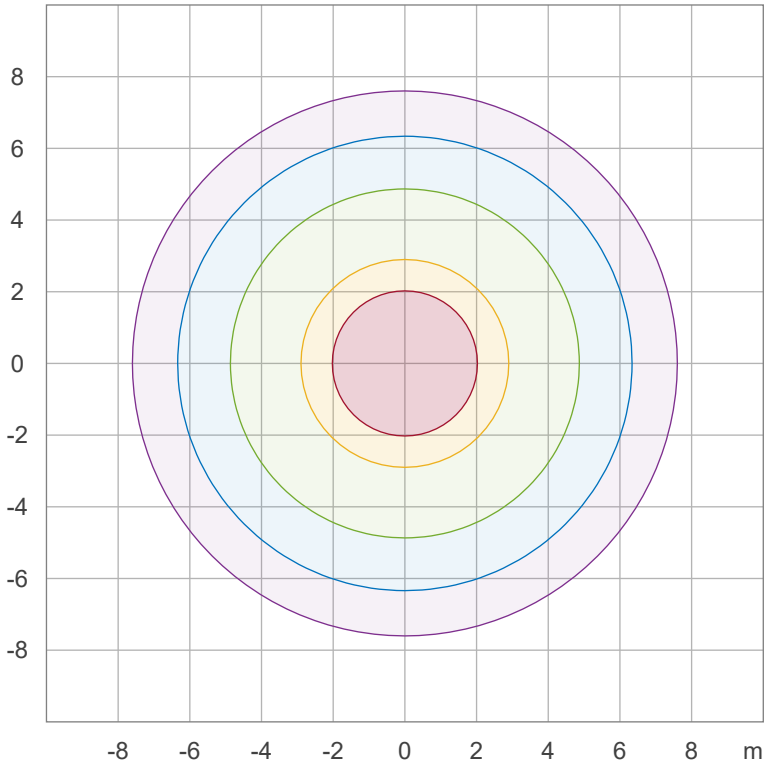
Iso-intensity Diagram (Iso-candela)



90 %	419,2 cd
80 %	372,7 cd
70 %	326,1 cd
60 %	279,5 cd
50 %	232,9 cd
40 %	186,3 cd
30 %	139,7 cd
20 %	93,2 cd
10 %	46,6 cd

Peak intensity: 465,8 cd
Number of c-planes: 28

Iso-illuminance Diagram (Iso-lux)



50,0 %	25,9 lx
30,0 %	15,5 lx
10,0 %	5,2 lx
5,0 %	2,6 lx
3,0 %	1,6 lx

Peak illuminance: 51,8 lx
Mounting height: 3,0 m
Number of c-planes: 28

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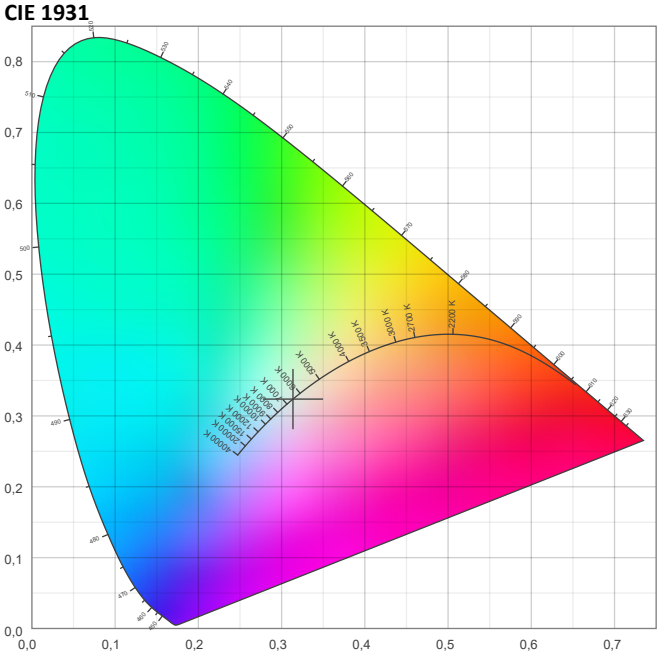
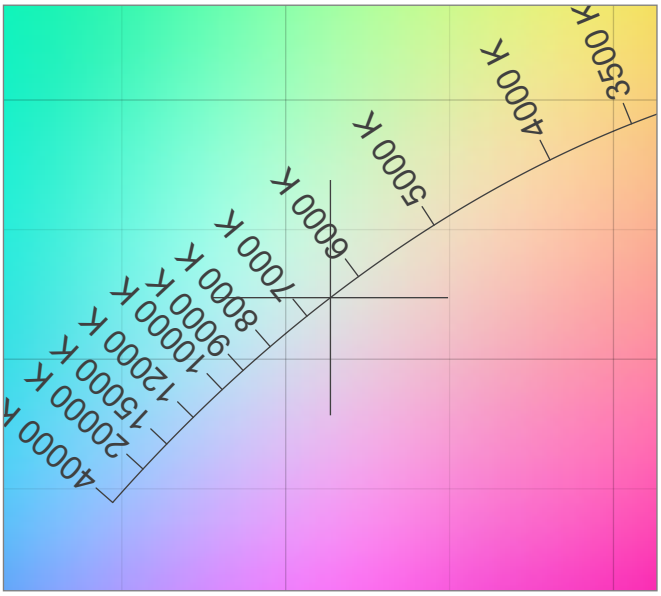
Color details

Correlated Color Temperature, Target	CCT = 6500 K
Correlated Color Temperature, Measured	CCT = 6335 K
Color Rendering Index	CRI 83,5
Color Rendering Index, R9 (red component)	R9 = 7,5
Color Rendering TM30-18	R_f 83,4 – R_g 92,7
Color Quality Scale	CQS = 81,8
MacAdam Steps	SDCM = 9,7
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 = 0,0071
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,200;0,466)

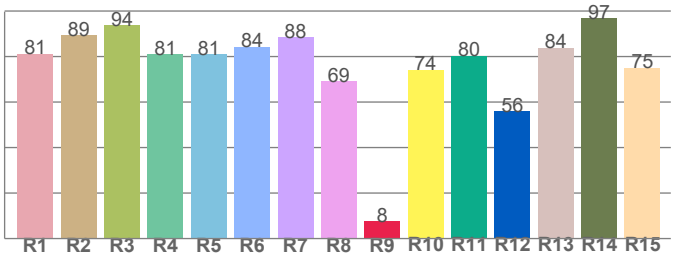
CIE 1931



CIE 1931 – zoomed on Planckian locus



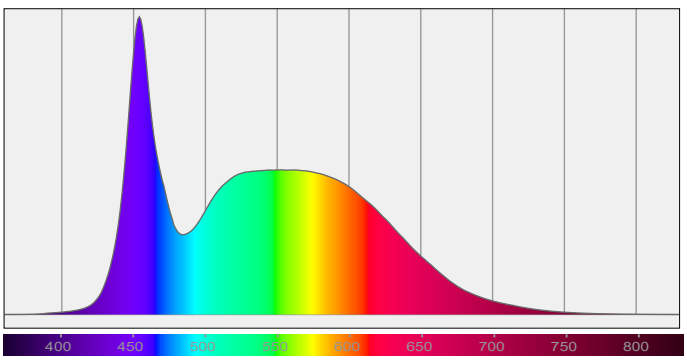
Color Rendering Index per reference color (CIE 1995)



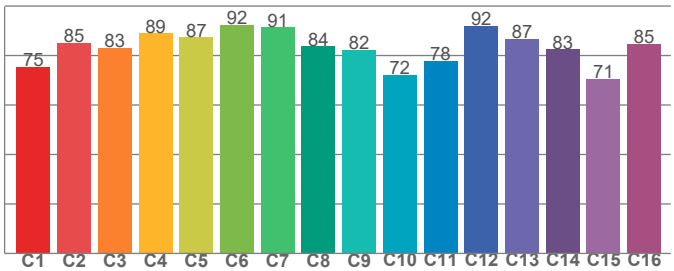
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
81,2	89,4	93,7	81,1	81,1	84,3	88,4	69,1	7,5	74,1	80,3	56,0	83,9	96,9	75,0

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



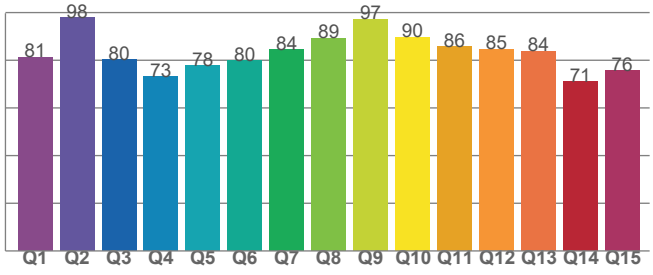
TM30-18 Rf-values per hue bin



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
75,5	85,2	83,1	89,1	87,5	92,4	91,3	83,7	82,3	72,2	77,9	92,0	86,8	82,6	70,6	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
81,2	97,9	80,3	73,1	77,8	79,8	84,4	89,3	97,3	89,7	85,7	84,6	83,8	71,1	75,5

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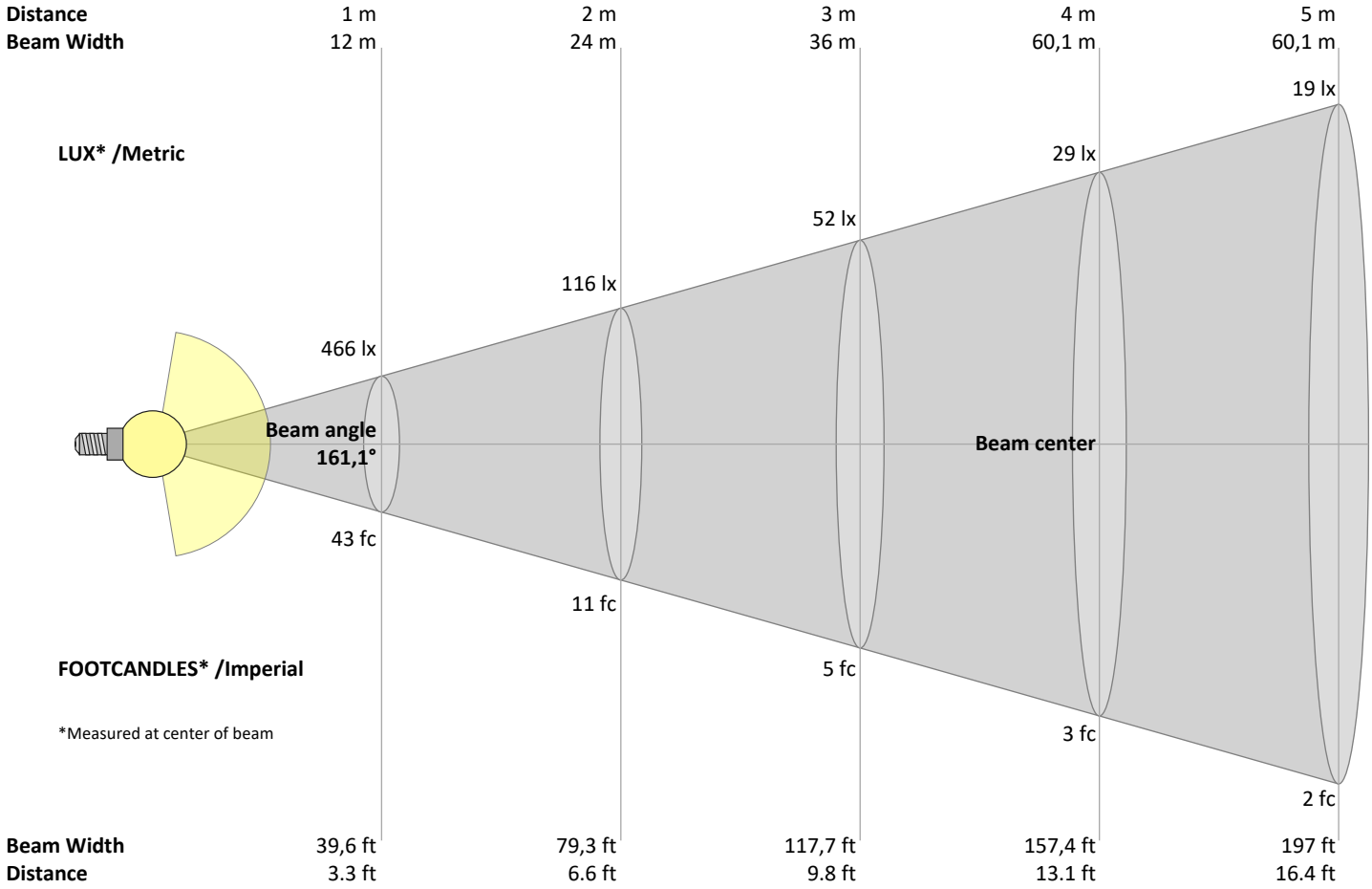
Beam Details



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
466	116	52	29	19	13	10	7	6	5	4	3	3	2	2	2	2	1	1	1	lux
43,3	10,8	4,8	2,7	1,7	1,2	0,9	0,7	0,5	0,4	0,4	0,3	0,3	0,2	0,2	0,2	0,1	0,1	0,1	0,1	fc

Intensities in 0° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
466	462	449	429	403	373	339	304	268	231	196	162	120	73	34	14	6	3	2	3	cd
100%	99%	96%	92%	86%	80%	73%	65%	57%	50%	42%	35%	26%	16%	7%	3%	1%	1%	1%	1%	of 0°val

Intensities in 90° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
466	462	449	429	403	373	339	304	268	231	196	162	120	73	34	14	6	3	2	3	cd
100%	99%	96%	92%	86%	80%	73%	65%	57%	50%	42%	35%	26%	16%	7%	3%	1%	1%	1%	1%	of 0°val

Intensities in 180° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
466	462	449	429	403	373	339	304	268	231	196	162	120	73	34	14	6	3	2	3	cd
100%	99%	96%	92%	86%	80%	73%	65%	57%	50%	42%	35%	26%	16%	7%	3%	1%	1%	1%	1%	of 0°val

Intensities in 270° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
466	462	449	429	403	373	339	304	268	231	196	162	120	73	34	14	6	3	2	3	cd
100%	99%	96%	92%	86%	80%	73%	65%	57%	50%	42%	35%	26%	16%	7%	3%	1%	1%	1%	1%	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	19,9	21,1	20,4	21,7	22,3	21,6	22,8	22,2	23,4	24,0
	3H	21,8	23,0	22,4	23,6	24,2	24,2	25,4	24,8	26,0	26,6
	4H	22,8	23,9	23,4	24,5	25,1	25,6	26,7	26,3	27,3	28,0
	6H	23,8	24,8	24,4	25,4	26,1	27,2	28,2	27,8	28,8	29,5
	8H	24,3	25,3	24,9	25,9	26,6	28,1	29,1	28,7	29,7	30,4
	12H	24,7	25,8	25,3	26,3	27,1	29,0	30,1	29,7	30,6	31,4
4H	2H	20,7	21,9	21,4	22,5	23,1	22,1	23,2	22,7	23,8	24,4
	3H	22,9	24,0	23,6	24,5	25,3	24,8	25,9	25,5	26,5	27,2
	4H	24,0	25,1	24,7	25,6	26,4	26,3	27,5	27,0	27,9	28,8
	6H	25,1	26,0	25,8	26,6	27,3	28,0	28,9	28,7	29,5	30,2
	8H	25,6	26,4	26,4	27,1	27,8	29,0	29,7	29,7	30,4	31,1
	12H	26,2	26,8	26,9	27,5	28,3	30,0	30,7	30,7	31,4	32,2
8H	4H	24,6	25,4	25,3	26,0	26,8	26,6	27,3	27,3	28,0	28,7
	6H	25,9	26,5	26,7	27,3	28,1	28,4	29,0	29,2	29,8	30,6
	8H	26,6	27,2	27,3	27,9	28,8	29,5	30,0	30,2	30,8	31,7
	12H	27,3	27,8	28,1	28,5	29,4	30,7	31,1	31,4	31,9	32,8
12H	4H	24,7	25,4	25,4	26,1	26,9	26,6	27,2	27,3	28,0	28,7
	6H	26,2	26,7	26,9	27,5	28,4	28,5	29,1	29,3	29,8	30,8
	8H	26,9	27,4	27,7	28,2	29,0	29,6	30,1	30,4	30,8	31,7

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

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	115	115	115	115	110	110	110	110	101	101	101	92	92	92	85	85	85	81
1	100	94	88	83	95	90	84	80	82	78	74	75	71	68	68	65	63	59
2	90	80	71	64	85	76	69	62	69	63	58	63	58	54	57	53	50	46
3	81	69	59	52	77	66	57	50	60	53	47	54	49	44	49	45	40	37
4	74	60	50	43	70	58	49	42	52	45	39	48	41	36	44	38	34	31
5	67	53	43	36	64	51	42	35	47	39	33	43	36	31	39	33	29	26
6	62	48	38	31	59	46	37	30	42	34	28	38	32	27	35	29	25	22
7	57	43	34	27	54	41	32	26	38	30	25	35	28	23	32	26	22	20
8	53	39	30	24	50	37	29	23	34	27	22	32	25	21	29	24	19	17
9	49	36	27	21	47	34	26	21	32	25	20	29	23	18	27	21	17	15
10	46	33	24	19	44	31	24	19	29	22	18	27	21	17	25	20	16	14

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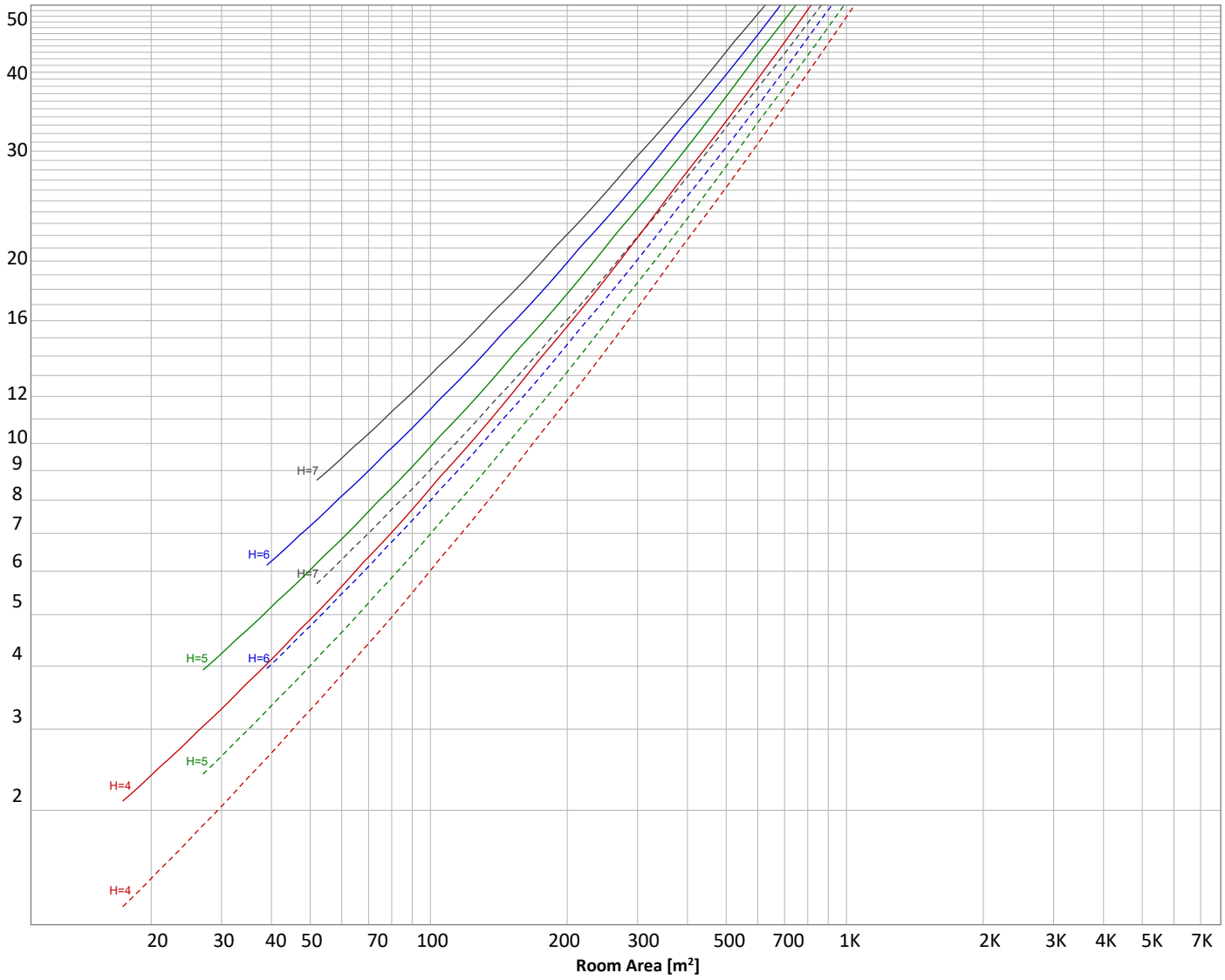
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 2486 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°
44,3 lm	129 lm	201 lm	255 lm	288 lm	301 lm	294 lm	270 lm	235 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
194 lm	142 lm	83,7 lm	34,1 lm	11,0 lm	3,60 lm	1,18 lm	0,702 lm	0,249 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	44 lm	1,8%
10-20°	129 lm	5,2%
20-30°	201 lm	8,1%
30-40°	255 lm	10,2%
40-50°	288 lm	11,6%
50-60°	301 lm	12,1%
60-70°	294 lm	11,8%
70-80°	270 lm	10,9%
80-90°	235 lm	9,4%
90-100°	194 lm	7,8%
100-110°	142 lm	5,7%
110-120°	84 lm	3,4%
120-130°	34 lm	1,4%
130-140°	11 lm	0,4%
140-150°	4 lm	0,1%
150-160°	1 lm	0,0%
160-170°	1 lm	0,0%
170-180°	0 lm	0,0%
Total	2486 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	373 lm	15,0%
0-40°	628 lm	25,3%
0-60°	1217 lm	48,9%
60-90°	798 lm	32,1%
70-100°	699 lm	28,1%
90-120°	420 lm	16,9%
0-90°	2015 lm	81,1%
90-180°	471 lm	18,9%
0-180°	2486 lm	100,0%

Intensity peaks

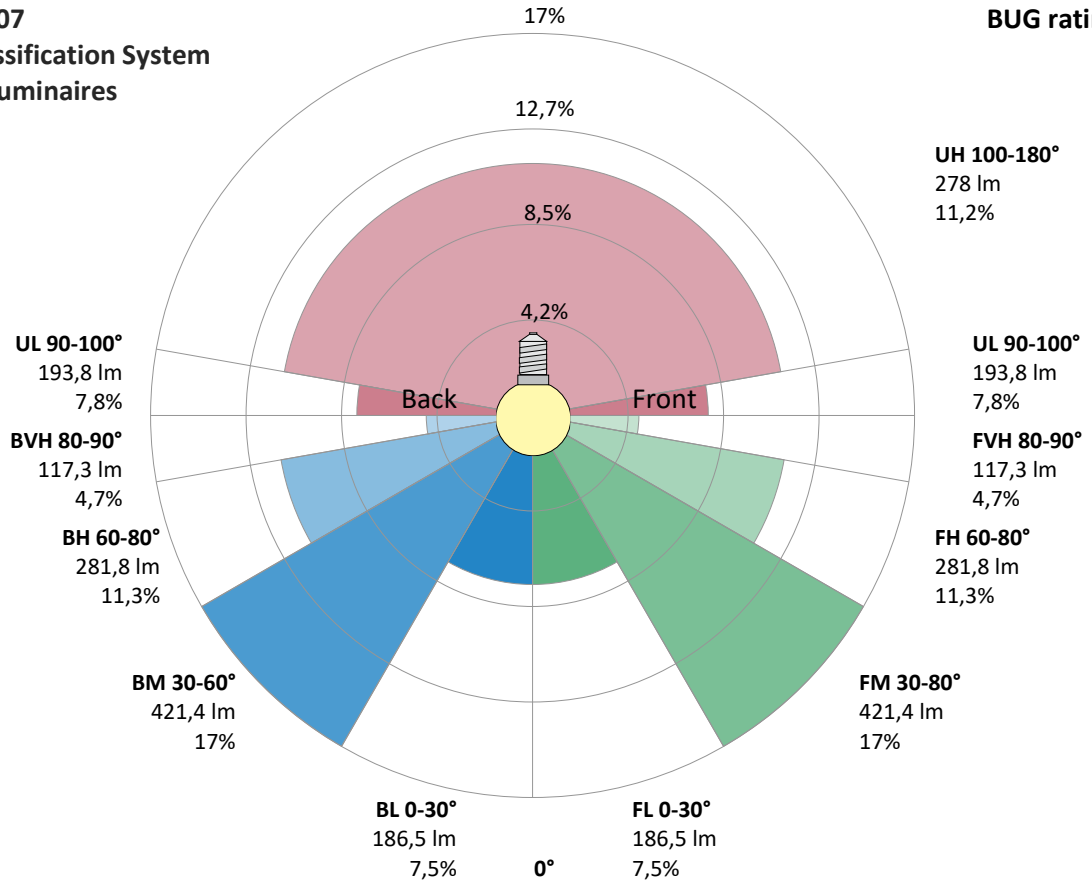
Max intensity	466 cd
Intensity, 90°	196 cd
Intensity, 0°	466 cd

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	186 lm	7,5%
Medium(30-60°)	421 lm	17,0%
High(60-80°)	282 lm	11,3%
Very high(80-90°)	117 lm	4,7%
Back light		
Low(0-30°)	186 lm	7,5%
Medium(30-60°)	421 lm	17,0%
High(60-80°)	282 lm	11,3%
Very high(80-90°)	117 lm	4,7%
Uplight		
Low(90-100°)	194 lm	7,8%
High(100-180°)	278 lm	11,2%

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

BUG rating B1 U3 G2



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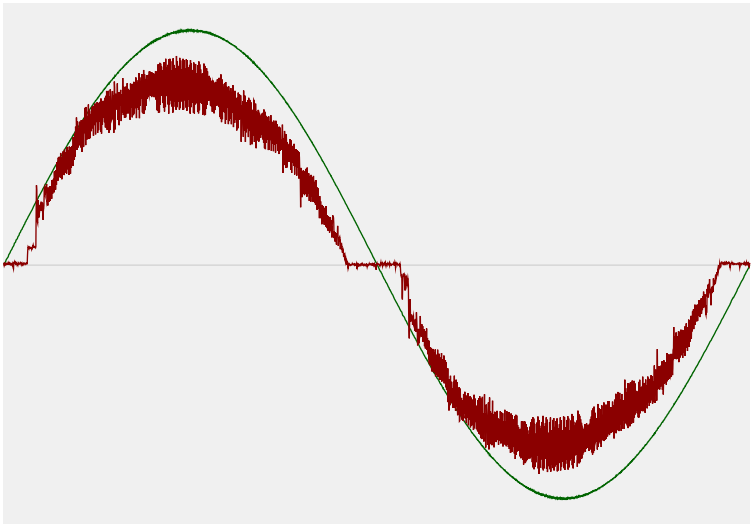
Power Details

Input Power

Power feed to light source	18,3 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,083 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	19,08 VA
Displacement factor of AC power feed	1,0
Power factor of AC current feed	0,96
Total harmonic distortion of the current	10,32%
Total harmonic distortion of the voltage	0,06%

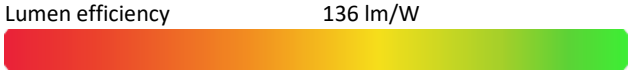
Input Power Curve



Efficiency

Radiated power efficiency 43,2%

Lumen efficiency 136 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	6484 K
CCT shift	+16 K
CCT end	6500 K

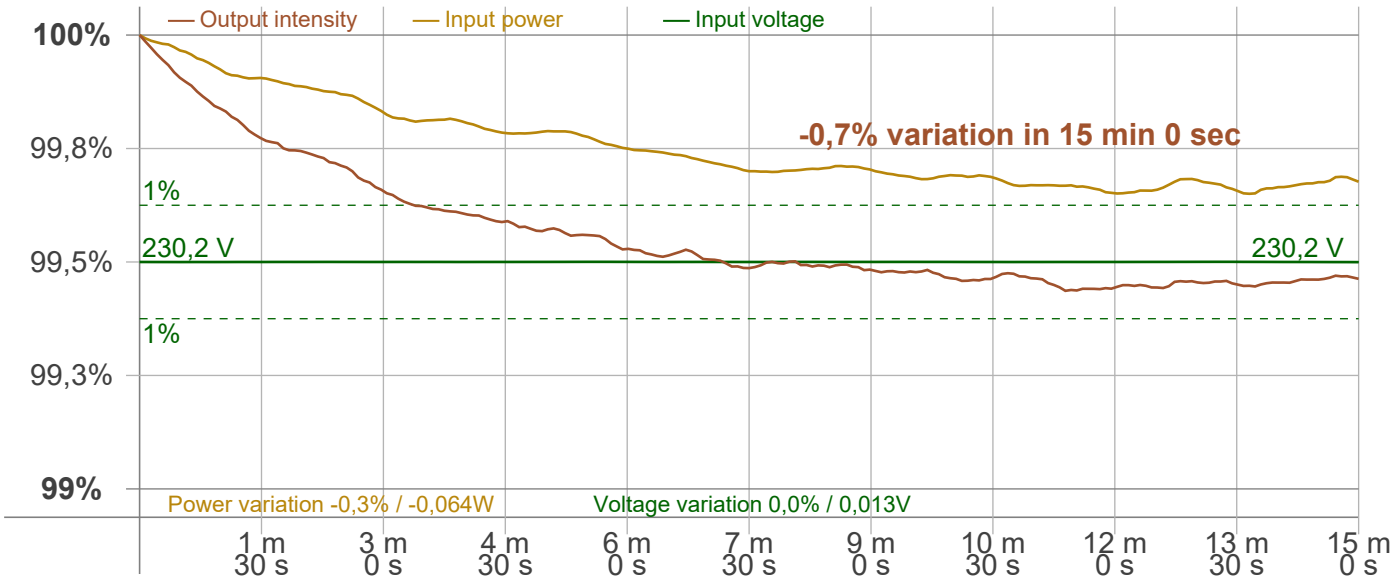
Warmup Result

Total warmup time	Lamp stabilized in 15 min 0 sec
Warmup variation	-0,7%

Output Change

Output start	2500 lm
Output change	-14 lm
Output end	2486 lm

Stabilization Curve



Light Measurement Report

Print date: 16-6-2025
Measurement date and time: 16-6-2025 09:25:56 – Measurement no. VFR-250616-1560-MS
Measurement tracking No. and Link: VT250616-006265
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	100 Hz
Percent Flicker	81,7 %
Flicker index	0,26

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

JA8/10 40 Hz	0,13 %
JA8/10 90 Hz	0,59 %
JA8/10 200 Hz	81,96 %
JA8/10 400 Hz	81,88 %
JA8/10 1000 Hz	81,68 %

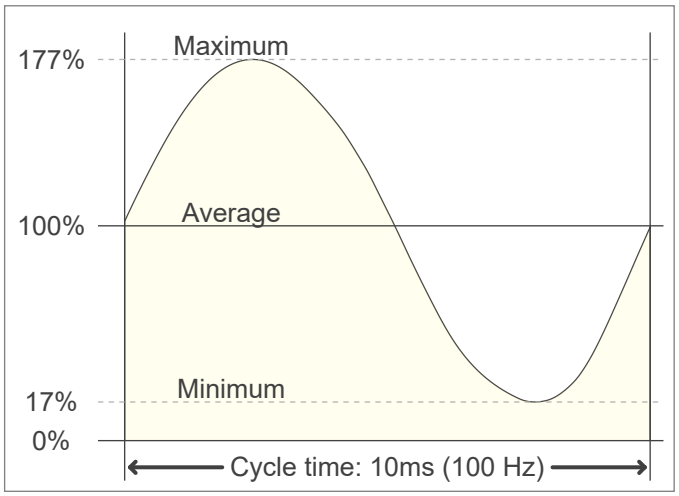
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz)	0,1
SVM value (80 < F < 2000 Hz)	3,13

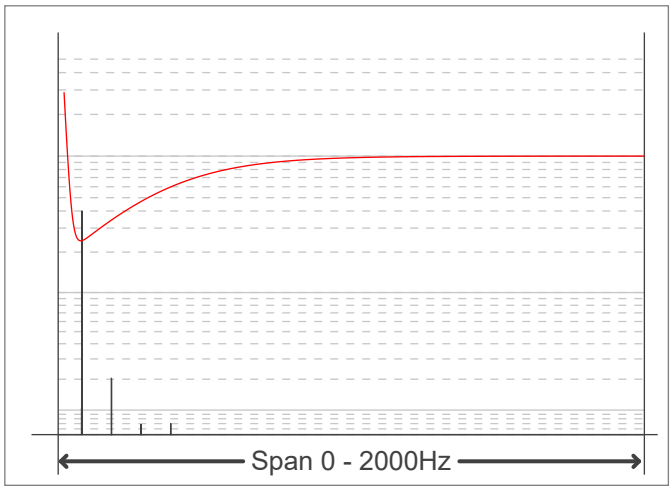
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp	0,05

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot