

Light Measurement Report

Print date: 12/11/2025

Measurement date and time: 12/11/2025 10:58:50 – Measurement no. VFR-251112-1070-MS

Measurement tracking No. and Link: [VT251112-008434](#)

Operator: CR



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 – 11/12/2024 – 3532797498

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

72 planes – 5°

5°

0,96 m

16,2 W – PF 0,9 – DPF 0,93

228 V – 0,079 A

50 Hz

Lamp stabilized in 20 min 33 sec – 2,0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

SUN 2700K 100D BLACK

33161994279102 – ELECTRUM

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

1082 lm – 50% / 50%

67 lm/W

231 cd – 360°

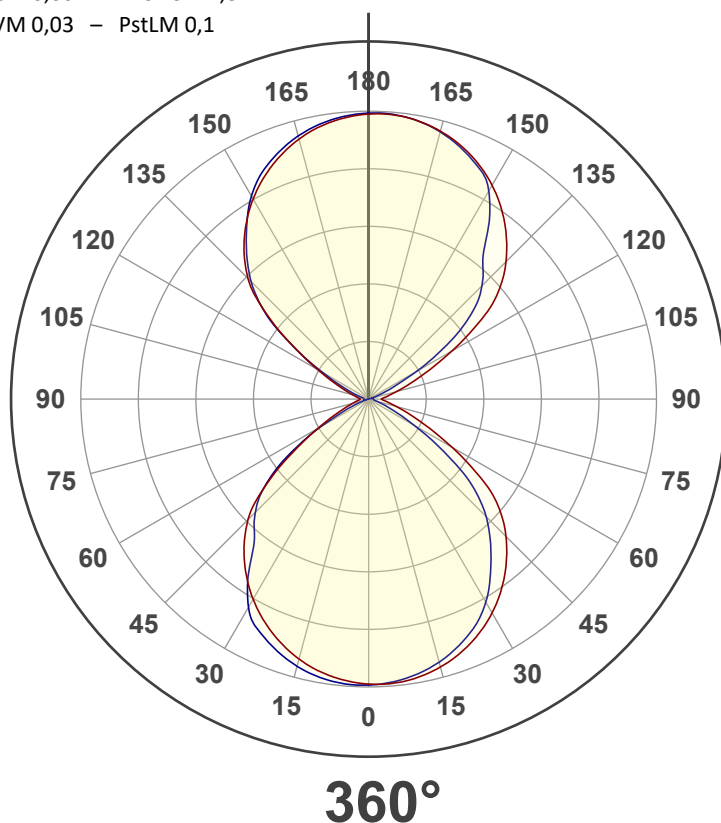
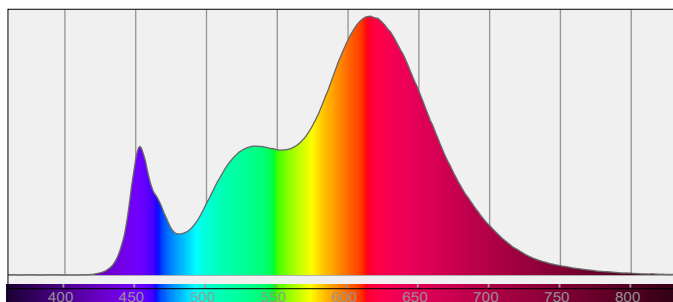
CCT = 2700 K / 2729 K

CRI 93,7

R_f 91,5 – R_g 101,8

Duv -0,0041 – SDCM 4,8

SVM 0,03 – PstLM 0,1



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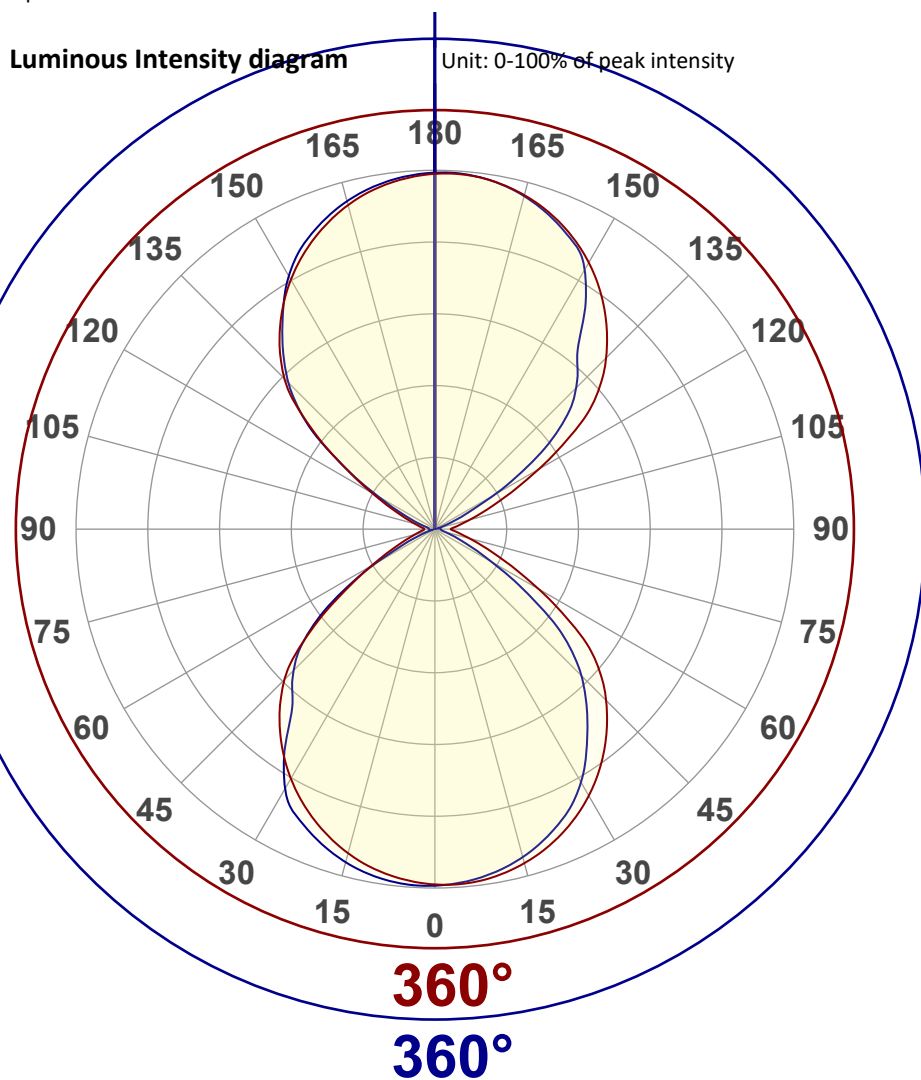
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1082 lm
Lumen Up% / Down%	50% / 50%
Peak Intensity	231 cd
Beam Angle (50%-FWHM)	360,00°

Cut-off Angle

Average 2,5%	360°
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Field Angle

Average 10%	360°
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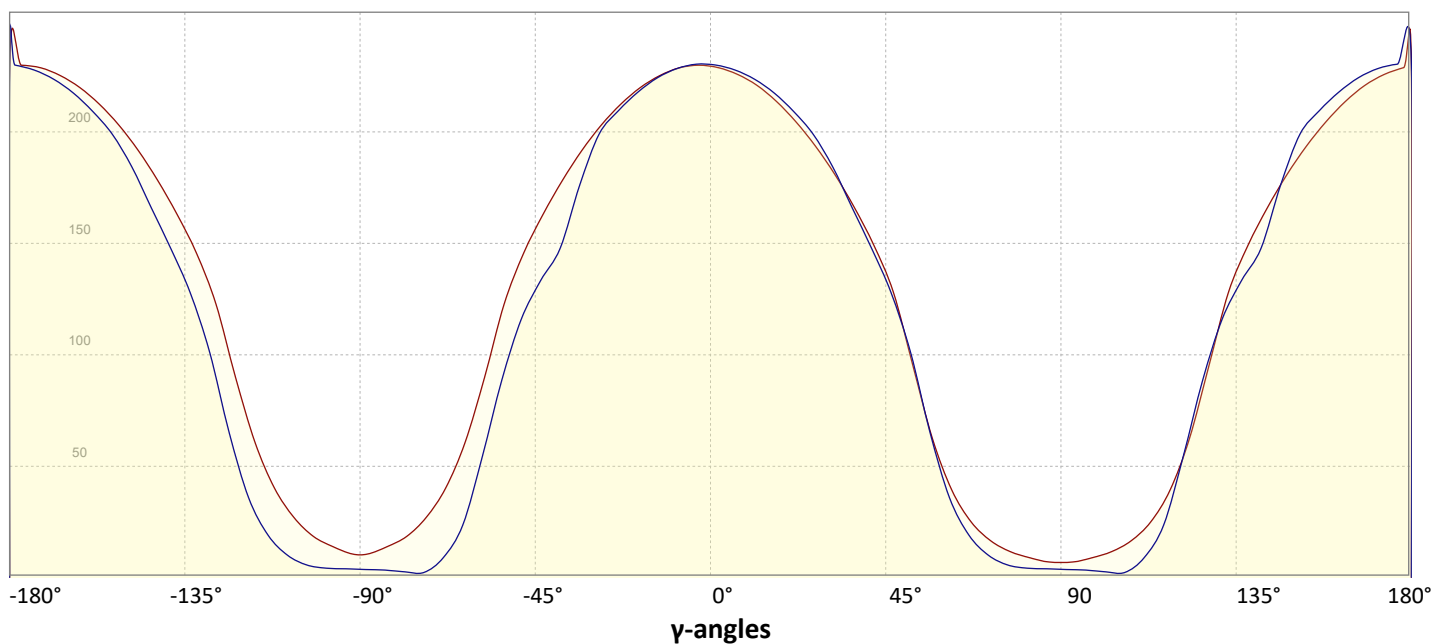
Intensity Ratio

In 120° cone	44,3%
In 90° cone	31,9%

C000-C180

C090-C270

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



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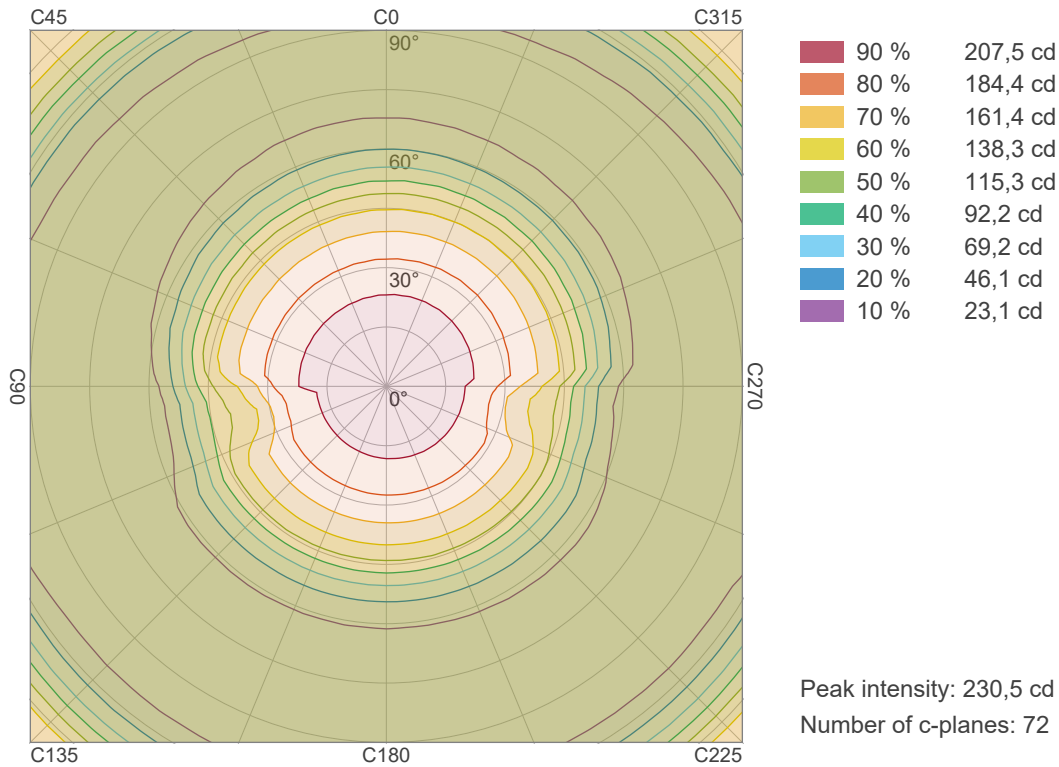
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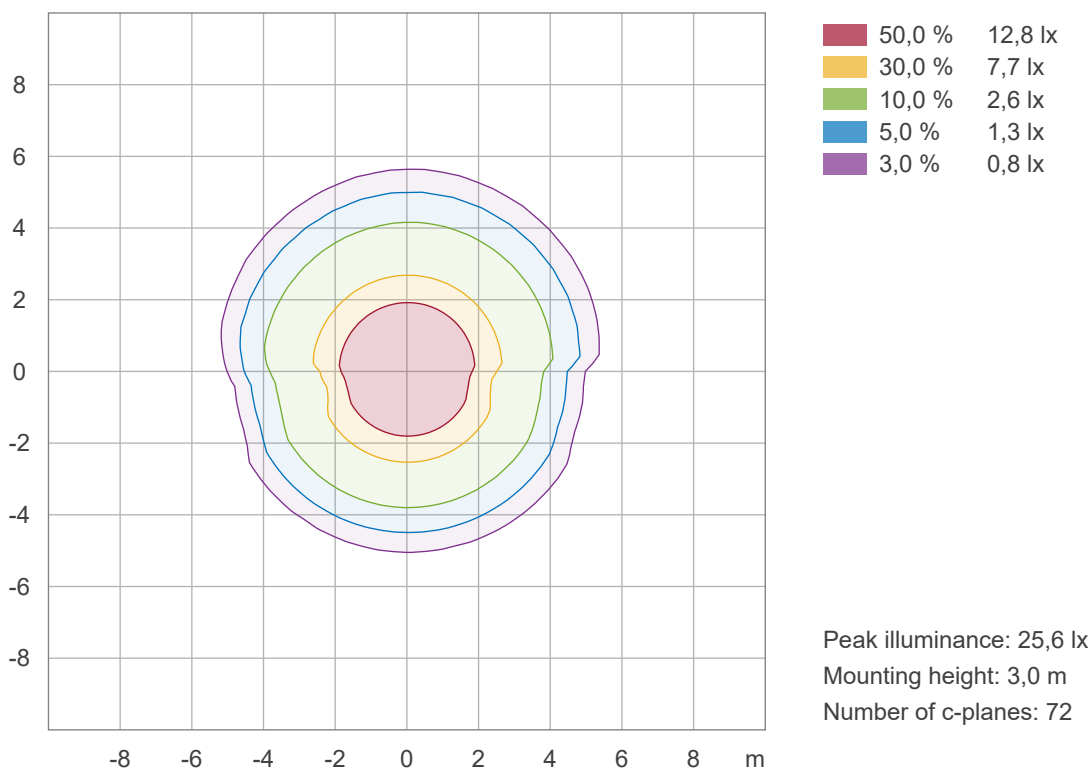
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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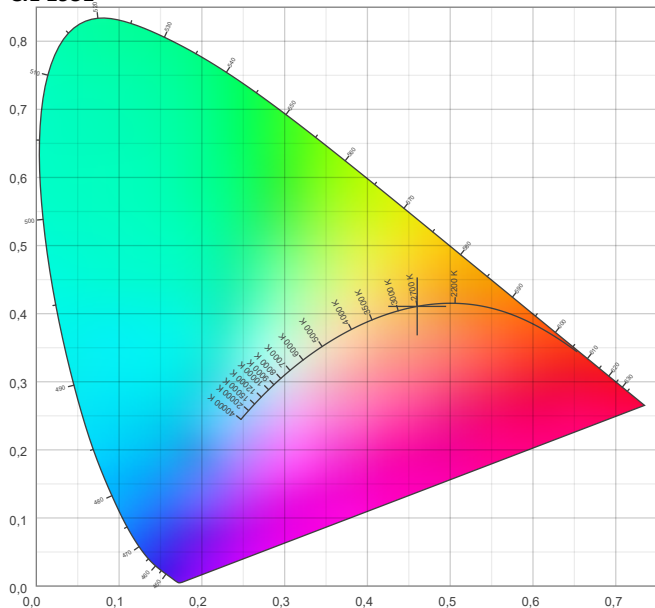


Color details

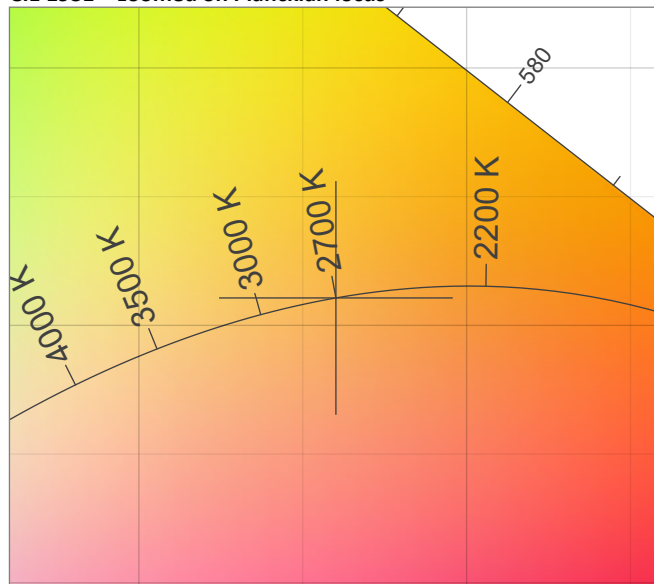
Correlated Color Temperature, Target CCT = 2700 K
Correlated Color Temperature, Measured CCT = 2729 K
Color Rendering Index CRI 93,7
Color Rendering Index, R9 (red component) R9 = 56,8
Color Rendering TM30-18 R_f 91,5 – R_g 101,8
Color Quality Scale CQS = 90,7

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0,460;0,411)
Color coordinate CIEs 1960 (u;v) = (0,263;0,352)
Color deviation from BBL Duv = -0,0041
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,263;0,527)

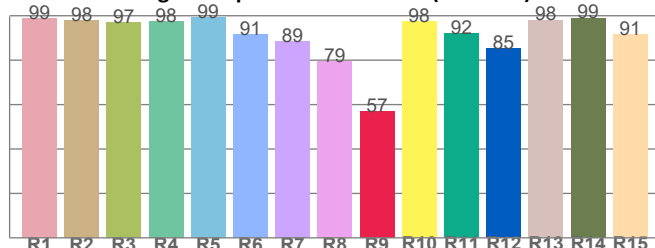
CIE 1931



CIE 1931 – zoomed on Planckian locus



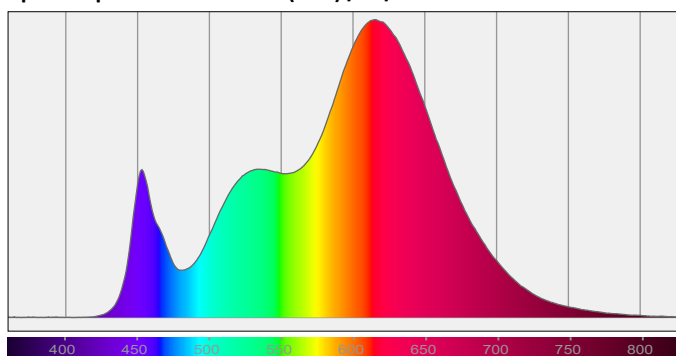
Color Rendering Index per reference color (CIE 1995)



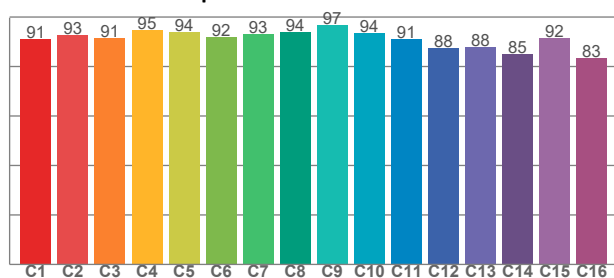
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
98,6	97,8	97,1	97,6	99,1	91,5	88,5	79,5	56,8	97,5	92,0	85,3	98,1	99,0	91,5

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



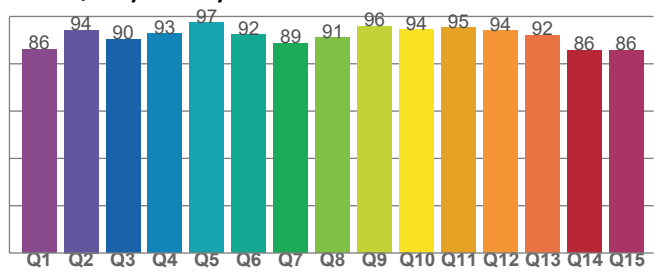
TM30-18 R_f-values per hue bin



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
91,0	92,9	91,4	94,7	93,7	92,0	93,2	93,8	96,6	93,7	91,0	87,6	87,8	85,0	91,7	83,4

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	94,3	90,3	92,8	97,3	92,3	88,6	90,9	95,8	94,5	95,3	93,9	92,0	85,8	85,7

Beam Details

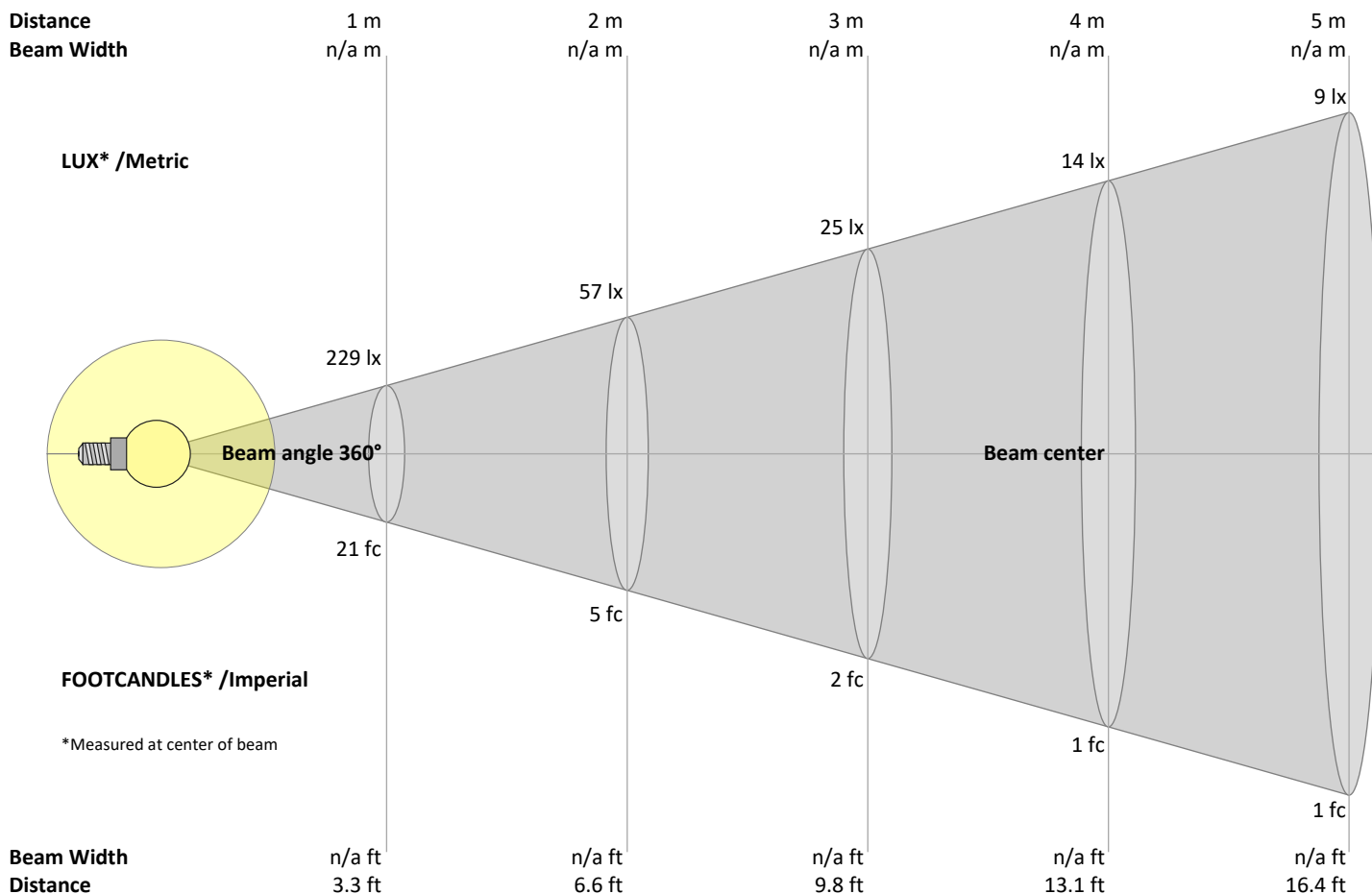
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Beam intensities from 1 – 20 m

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
229	57	25	14	9	6	5	4	3	2	2	2	1	1	1	1	1	1	1	1	lux
21,3	5,3	2,4	1,3	0,9	0,6	0,4	0,3	0,3	0,2	0,2	0,1	0,1	0,1	0,1	0,1	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
229	228	220	205	184	156	116	61	30	16	11	16	30	61	116	156	184	205	220	228	cd
100%	100%	96%	89%	80%	68%	51%	27%	13%	7%	5%	7%	13%	27%	51%	68%	80%	89%	96%	100%	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
229	226	215	197	167	133	82	30	10	4	4	3	5	27	86	128	162	202	219	228	cd
100%	98%	94%	86%	73%	58%	36%	13%	4%	2%	2%	1%	2%	12%	37%	56%	71%	88%	95%	100%	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
229	224	212	193	169	136	82	36	17	10	7	10	17	36	82	136	169	193	212	224	cd
100%	98%	92%	84%	74%	60%	36%	16%	7%	4%	3%	4%	7%	16%	36%	60%	74%	84%	92%	98%	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
229	228	219	202	162	128	86	27	5	3	4	4	10	30	82	133	167	197	215	226	cd
100%	100%	95%	88%	71%	56%	37%	12%	2%	1%	2%	2%	4%	13%	36%	58%	73%	86%	94%	98%	of 0°val

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Light Planning – UGR table

Corrected, 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	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
4H	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
8H	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
12H	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	107	107	107	107	99	99	99	99	83	83	83	69	69	69	56	56	56	50
1	98	94	91	87	91	87	84	81	74	72	70	62	60	59	50	49	49	43
2	90	83	77	72	83	77	72	68	65	62	59	55	52	50	45	43	42	37
3	83	73	66	61	76	68	62	57	58	54	50	49	46	43	41	38	36	32
4	76	65	58	52	70	61	54	49	52	47	43	44	40	37	37	34	32	28
5	70	58	51	45	64	54	47	42	47	41	37	40	36	32	33	30	28	25
6	64	52	45	39	59	49	42	37	42	37	33	36	32	29	30	27	25	22
7	59	47	40	34	55	44	37	32	38	33	29	33	29	25	28	24	22	19
8	55	43	36	30	51	40	34	29	35	30	26	30	26	23	25	22	20	17
9	51	39	32	27	47	37	30	26	32	27	23	28	23	20	23	20	18	16
10	48	36	29	24	44	34	27	23	30	24	21	26	21	18	22	18	16	14

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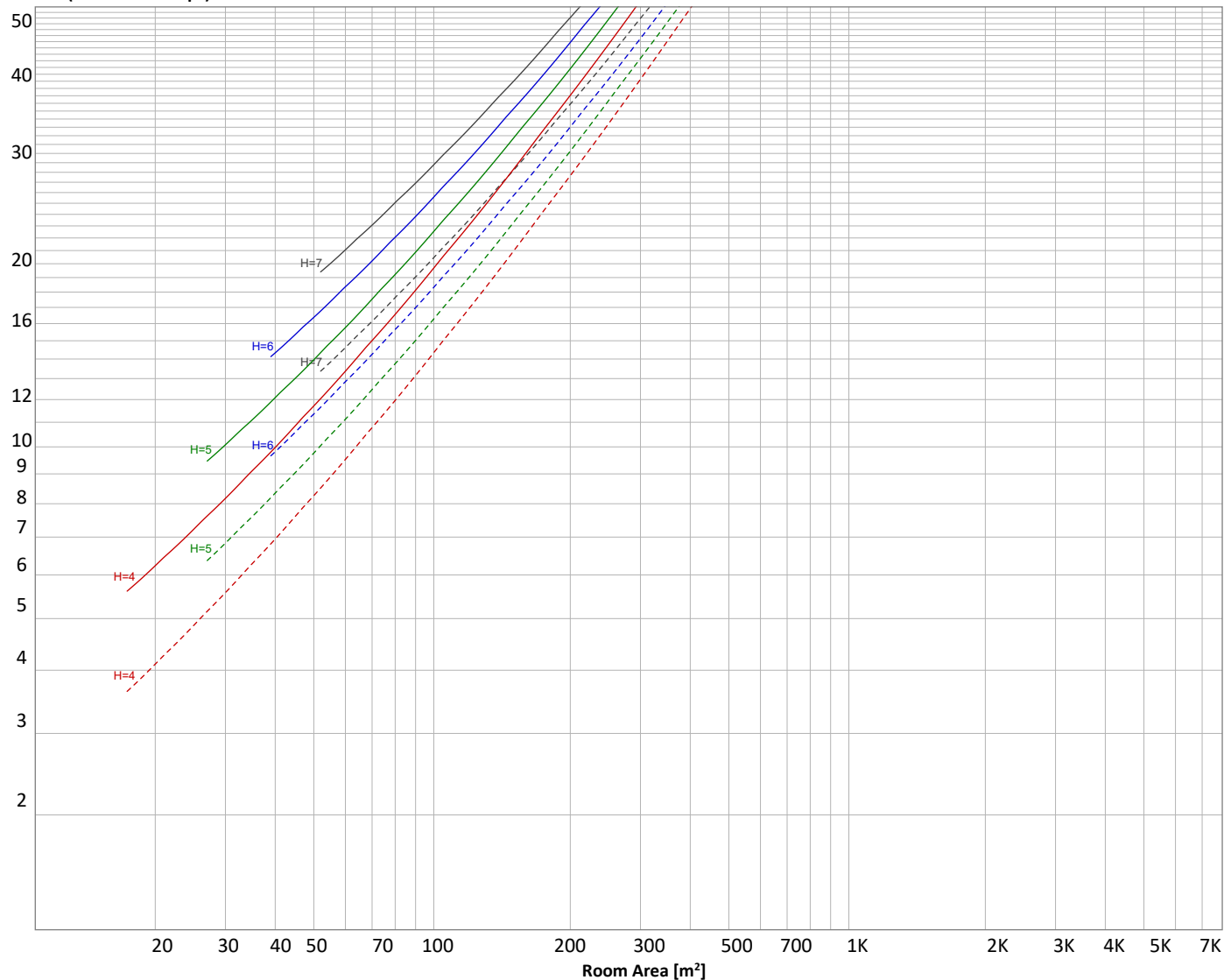
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 1082 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°
21,7 lm	62,1 lm	93,7 lm	111 lm	111 lm	80,3 lm	36,9 lm	15,8 lm	9,07 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
9,07 lm	15,8 lm	36,9 lm	80,3 lm	111 lm	111 lm	93,7 lm	62,1 lm	21,7 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	22 lm	2,0%
10-20°	62 lm	5,7%
20-30°	94 lm	8,7%
30-40°	111 lm	10,2%
40-50°	111 lm	10,2%
50-60°	80 lm	7,4%
60-70°	37 lm	3,4%
70-80°	16 lm	1,5%
80-90°	9 lm	0,8%
90-100°	9 lm	0,8%
100-110°	16 lm	1,5%
110-120°	37 lm	3,4%
120-130°	80 lm	7,4%
130-140°	111 lm	10,2%
140-150°	111 lm	10,2%
150-160°	94 lm	8,7%
160-170°	62 lm	5,7%
170-180°	22 lm	2,0%
Total	1082 lm	100,0%

Intensity peaks

Max intensity	231 cd
Intensity, 90°	11 cd
Intensity, 0°	229 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	177 lm	16,4%
0-40°	288 lm	26,6%
0-60°	479 lm	44,3%
60-90°	62 lm	5,7%
70-100°	34 lm	3,1%
90-120°	62 lm	5,7%
0-90°	541 lm	50,0%
90-180°	541 lm	50,0%
0-180°	1082 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	90 lm	8,3%
Medium(30-60°)	162 lm	15,0%
High(60-80°)	33 lm	3,0%
Very high(80-90°)	5 lm	0,5%
Back light		
Low(0-30°)	87 lm	8,0%
Medium(30-60°)	138 lm	12,7%
High(60-80°)	21 lm	1,9%
Very high(80-90°)	4 lm	0,3%

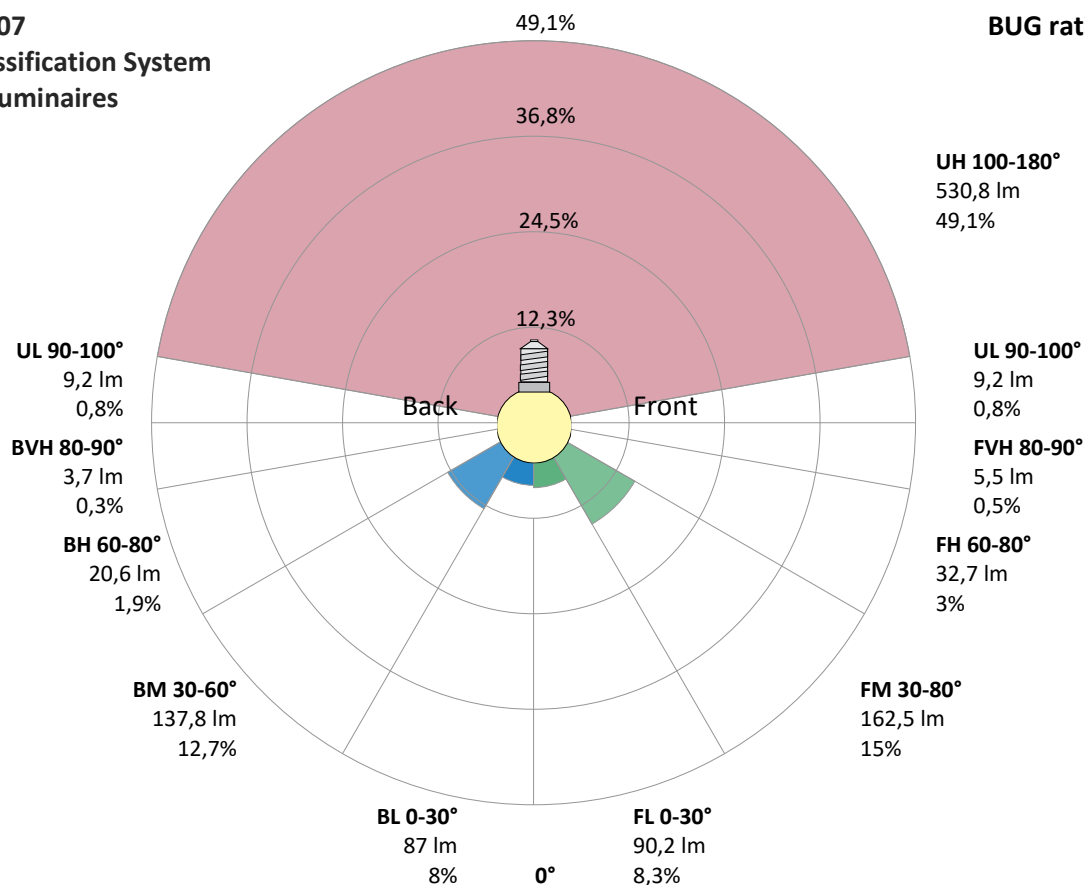
Uplight

Low(90-100°)	9 lm	0,8%
High(100-180°)	531 lm	49,1%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B0 U4 G0



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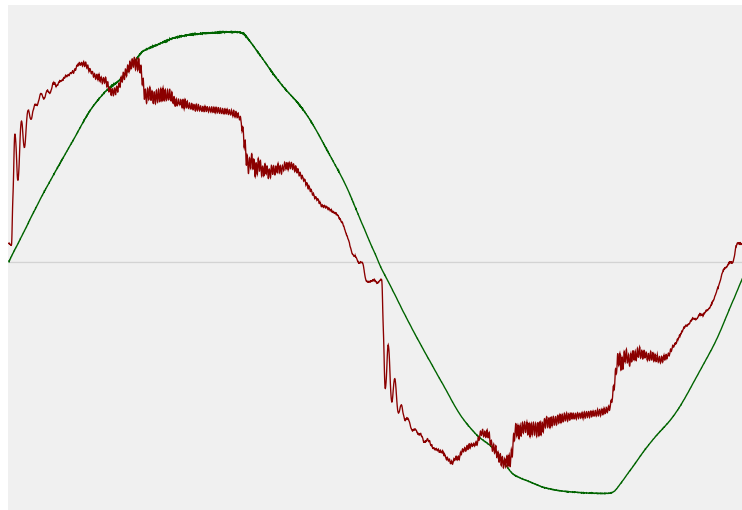


Power Details

Input Power

Power feed to light source	16,2 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	228 V
RMS Input current feed, I_{RMS}	0,079 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	17,91 VA
Displacement factor of AC power feed	0,93
Power factor of AC current feed	0,9
Total harmonic distortion of the current	21,89%
Total harmonic distortion of the voltage	3,31%

Input Power Curve



Efficiency

Radiated power efficiency 22,3%



Lumen efficiency 67 lm/W



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	2697 K
CCT shift	+3 K
CCT end	2700 K

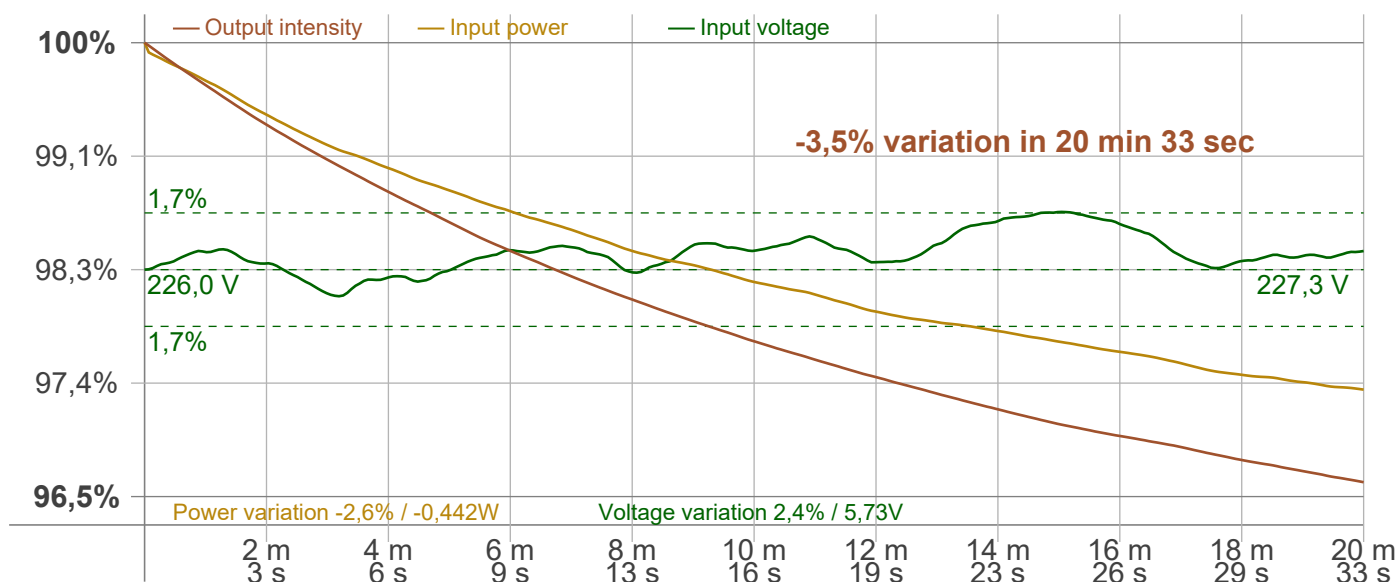
Warmup Result

Total warmup time	Lamp stabilized in 20 min 33 sec
Warmup variation	-3,5%

Output Change

Output start	1120 lm
Output change	-38 lm
Output end	1082 lm

Stabilization Curve



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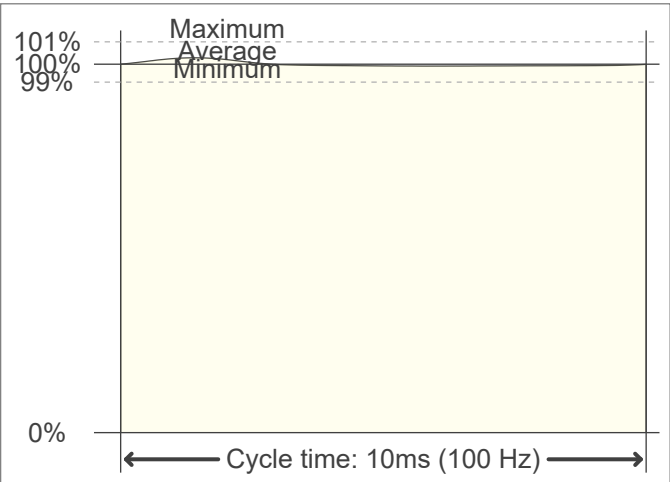
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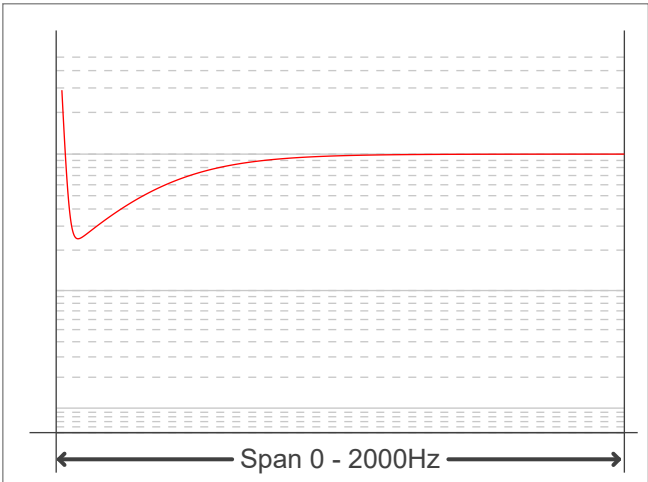
Flicker /TLA details

Flicker Meter Type	Viso Systems LabFlicker	Measurement time	
Frequency of input power	50 Hz	PstLM	180 sec
Flicker/TLA sample rate	20000 samples/s	All other indices	1,2 sec
Flicker indices according to Illuminating Engineering Society (IES)		Flicker indices according to California Energy Commission (CEC) 2016b	
Flicker frequency	100 Hz	JA8/10 40 Hz	0,09 %
Percent Flicker	1,22 %	JA8/10 90 Hz	0,19 %
Flicker index	0	JA8/10 200 Hz	1,08 %
		JA8/10 400 Hz	1,27 %
		JA8/10 1000 Hz	1,22 %
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)		Flicker indices according to Lighting Research Center (2015)	
PstLM value (F < 80 Hz)	0,1	Perception metric, Assist Mp	0,02
SVM value (80 < F < 2000 Hz)	0,03		

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

