

Light Measurement Report

Print date: 5-9-2025

Measurement date and time: 4-9-2025 11:41:59 – Measurement no. VFR-250904-2923-MS

Measurement tracking No. and Link: [VT250904-000783](#)

Operator:



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 – 11-1-2024 – 3130191315
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

16 planes – 22,5°
2,5°
12,10 m
76,7 W – PF 0,98 – DPF 0,99
230 V – 0,339 A
50 Hz
Lamp stabilized in 15 min 1 sec – 2,0%

Tested Light Source

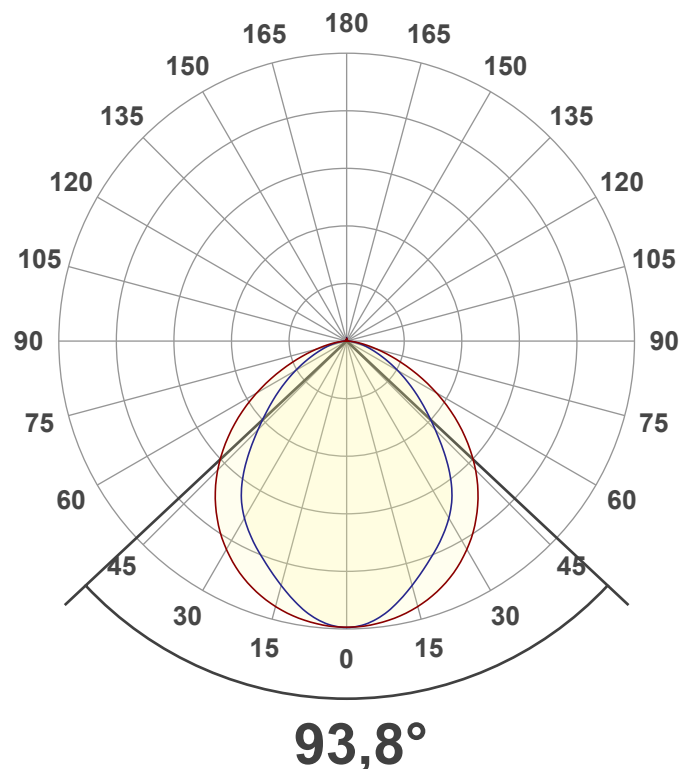
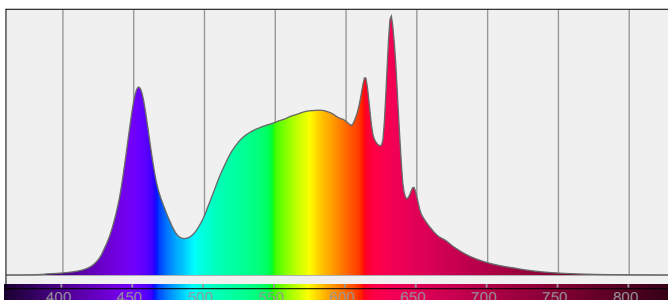
Product Name
Item No. and Manufacturer
Product Description (line 1)

813789-4000K
813789-4000K – Dutchfulfillment
LICHTLIJN MODULE | JUPITER | 65-80W | 90° | CCT-SWITCH

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

12497 lm – 0,96% / 99,04%
163 lm/W
5639 cd – 93,8°
CCT = 4000 K / 4000 K
CRI 83,3
 R_f 83,2 – R_g 97,0
Duv 0,0019 – SDCM 1,6
SVM 0,01 – PstLM 0,02



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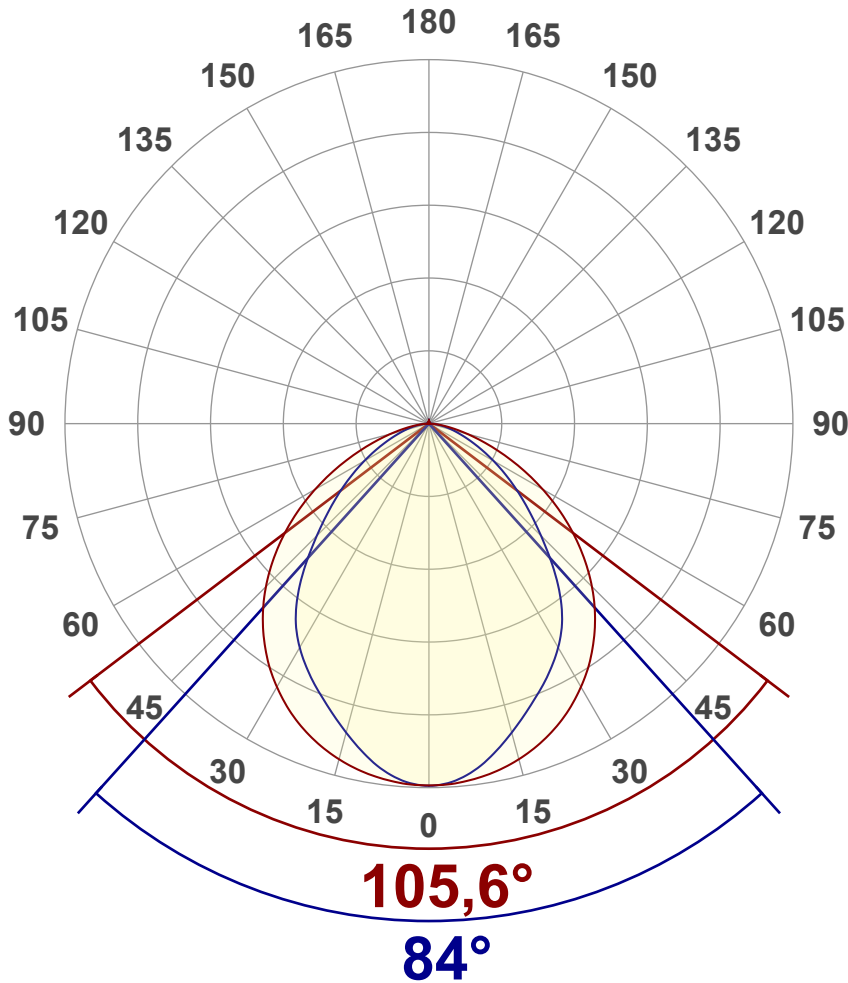
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	12497 lm
Lumen Up% / Down%	0,96% / 99,04%
Peak Intensity	5639 cd
Beam Angle (50%)	93,8°
Beam Angle (90%)	84°
Beam Angle (10%)	105,6°

Cut-off Angle

Average 2,5%	167,6°
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Field Angle

Average 10%	145,9°
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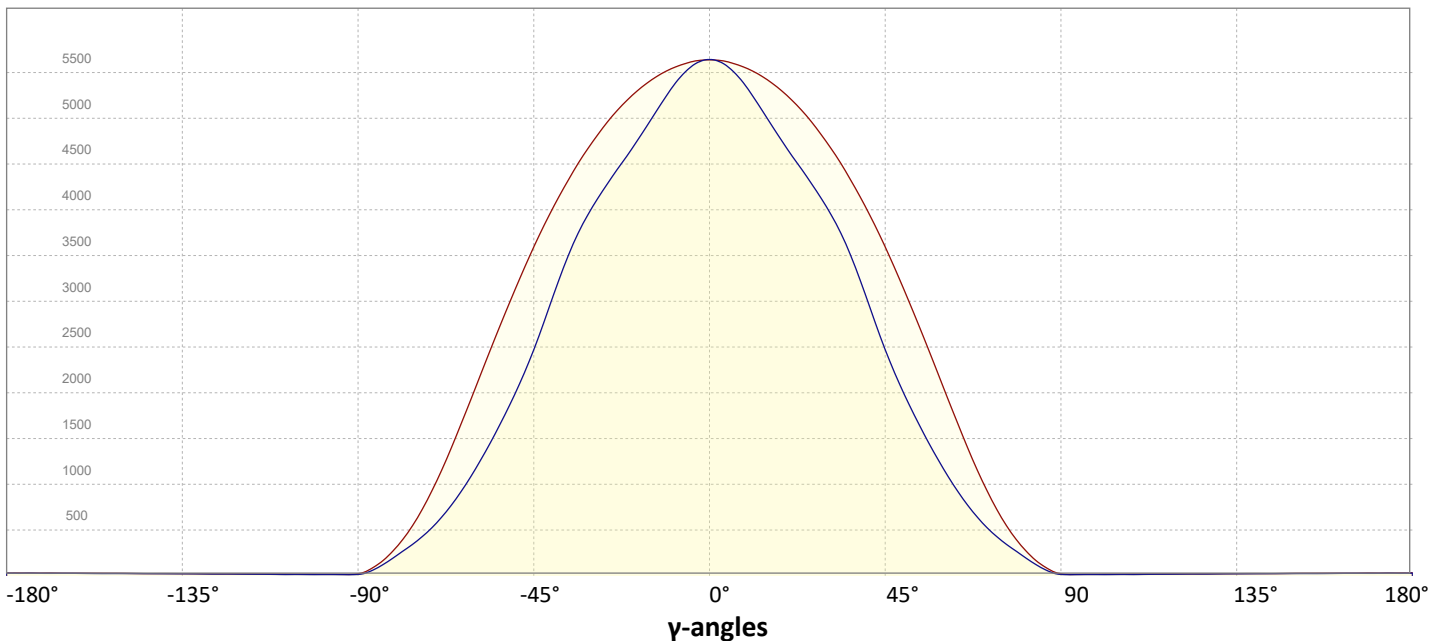
Intensity Ratio

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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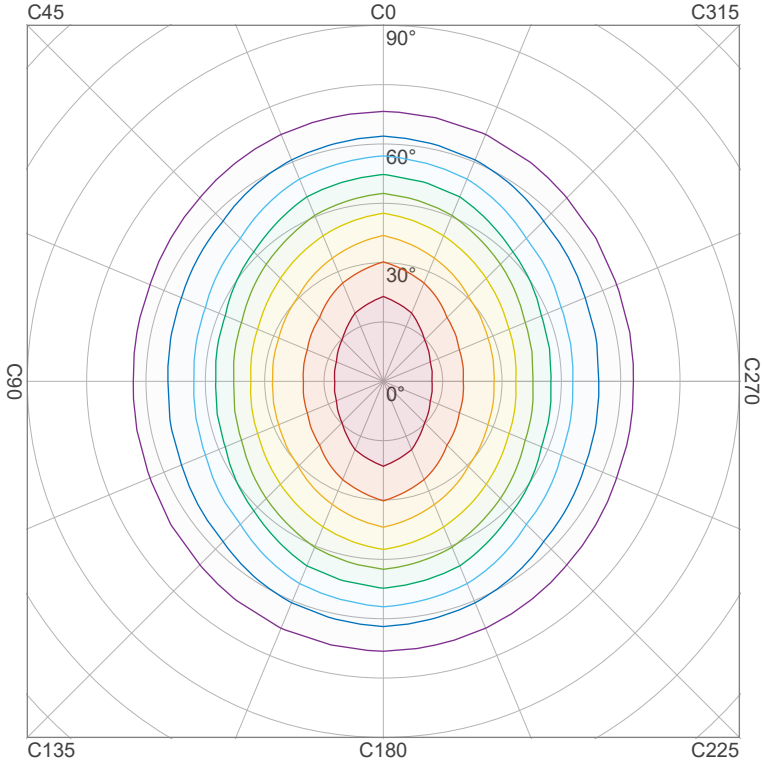
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Iso-intensity Diagram (Iso-candela)

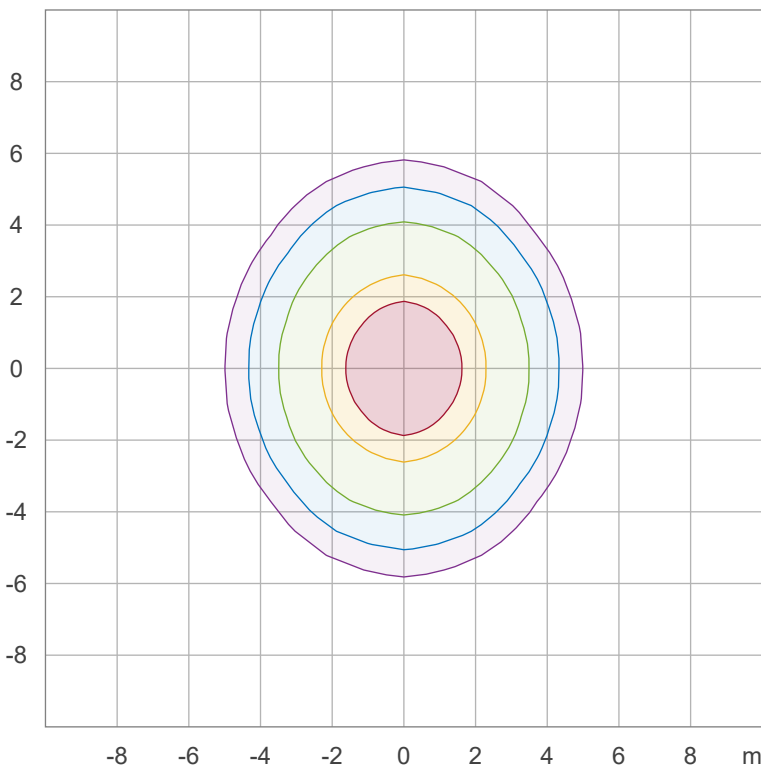


90 %	5073,5 cd
80 %	4509,8 cd
70 %	3946,1 cd
60 %	3382,4 cd
50 %	2818,6 cd
40 %	2254,9 cd
30 %	1691,2 cd
20 %	1127,5 cd
10 %	563,7 cd

Peak intensity: 5637,2 cd

Number of c-planes: 16

Iso-illuminance Diagram (Iso-lux)



50,0 %	313,1 lx
30,0 %	187,9 lx
10,0 %	62,6 lx
5,0 %	31,3 lx
3,0 %	18,8 lx

Peak illuminance: 626,3 lx

Mounting height: 3,0 m

Number of c-planes: 16

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Color details

Correlated Color Temperature, Target CCT = 4000 K
 Correlated Color Temperature, Measured CCT = 4000 K
 Color Rendering Index CRI 83,3
 Color Rendering Index, R9 (red component) R9 = 27,1
 Color Rendering TM30-18 R_f 83,2 – R_g 97,0
 Color Quality Scale CQS = 82,3

MacAdam Steps SDCM = 1,6
 Color coordinates CIE 1931 (x;y) = (0,381;0,377)
 Color coordinate CIEs 1960 (u;v) = (0,225;0,334)
 Color deviation from BBL Duv = 0,0019
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,225;0,502)

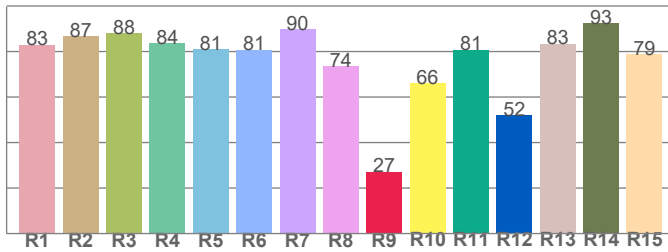
CIE 1931



CIE 1931 – zoomed on Planckian locus



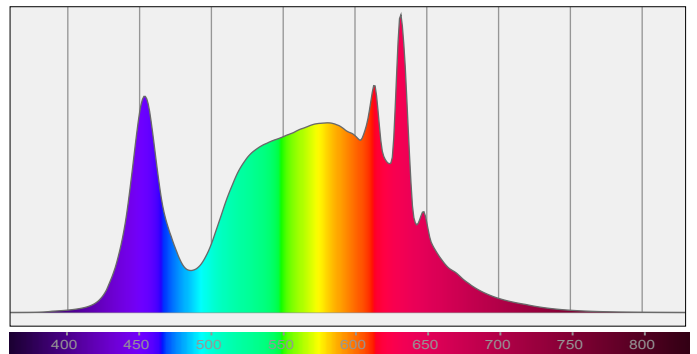
Color Rendering Index per reference color (CIE 1995)



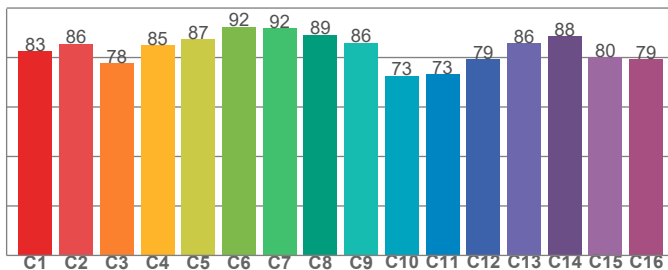
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
82,9	86,7	88,0	83,6	80,9	80,8	89,9	73,6	27,1	66,1	80,8	52,0	83,4	92,5	78,9

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



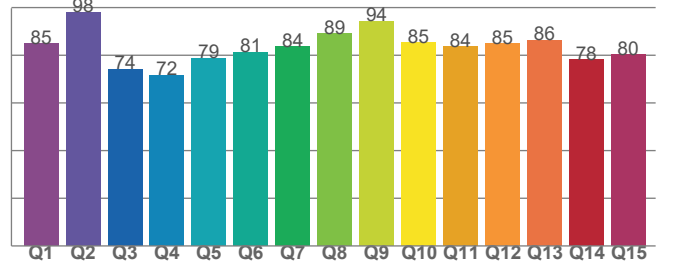
TM30-18 R_f-values per hue bin



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
82,5	85,6	77,7	84,9	87,3	92,4	91,7	89,1	85,9	72,6	73,2	79,3	85,8	88,5	80,2	79,4

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
84,9	98,0	74,2	71,7	78,8	81,3	83,5	89,1	94,4	85,3	83,5	84,8	86,3	78,2	80,2

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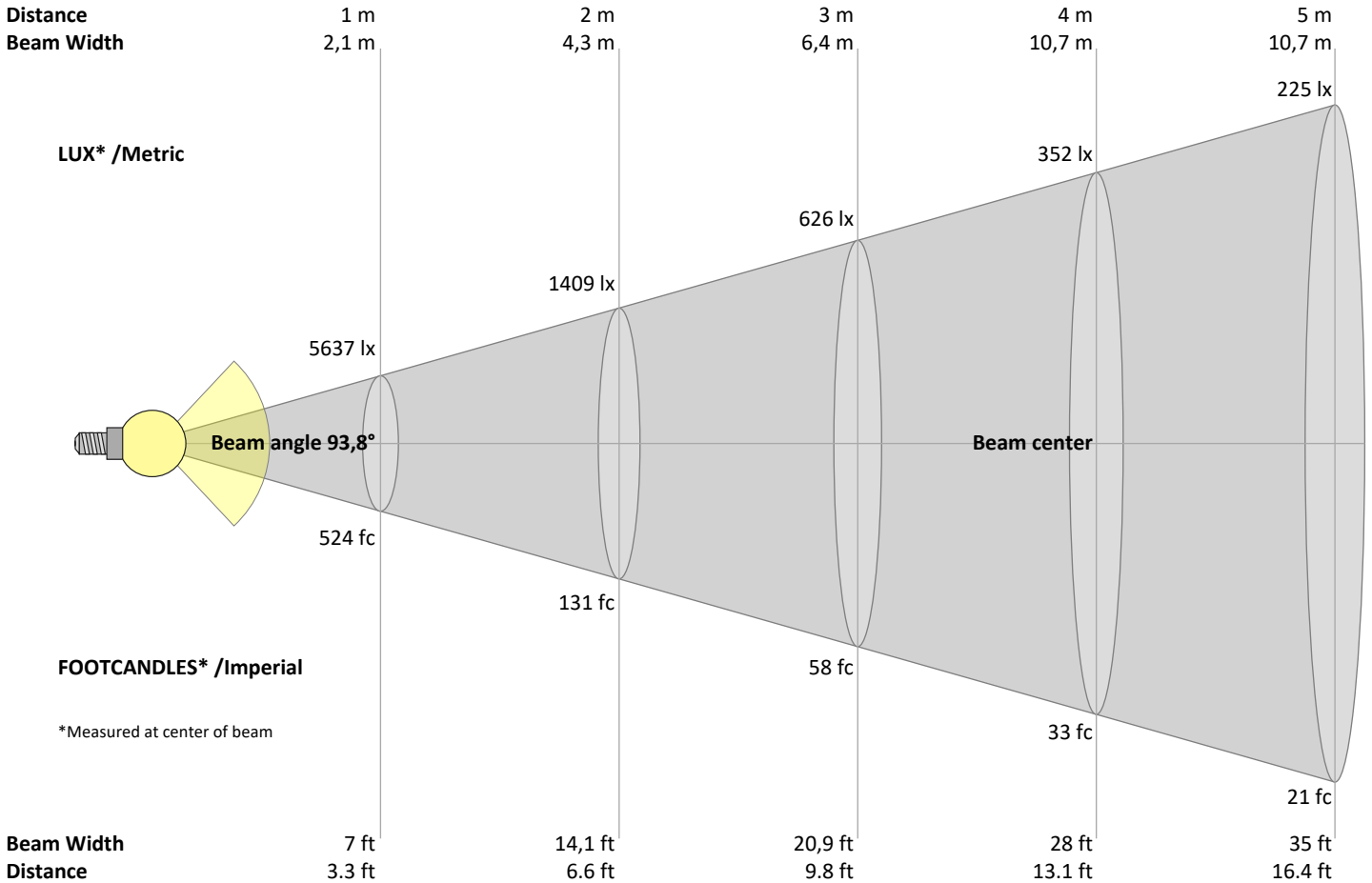
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Operator:



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
5637	1409	626	352	225	157	115	88	70	56	47	39	33	29	25	22	20	17	16	14	lux
523,7	130,9	58,2	32,7	20,9	14,5	10,7	8,2	6,5	5,2	4,3	3,6	3,1	2,7	2,3	2	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
5637	5611	5536	5413	5240	5016	4737	4408	4025	3591	3105	2587	2047	1514	1026	622	324	124	25	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
5637	5548	5307	4984	4660	4355	4026	3612	3060	2473	1973	1544	1164	837	575	379	225	89	17	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
5637	5611	5536	5413	5240	5016	4737	4408	4025	3591	3105	2587	2047	1514	1026	622	324	124	25	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
5637	5548	5307	4984	4660	4355	4026	3612	3060	2473	1973	1544	1164	837	575	379	225	89	17	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		70	70	50	50	30	70	70	50	50	30
	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	2H	27,3	28,4	27,5	28,7	28,9	25,3	26,4	25,6	26,7	27,0
	3H	28,1	29,3	28,5	29,6	29,8	26,0	27,2	26,4	27,4	27,7
	4H	28,4	29,5	28,8	29,8	30,1	26,3	27,4	26,7	27,7	27,9
	6H	28,6	29,6	28,9	29,9	30,3	26,6	27,5	26,9	27,8	28,2
	8H	28,6	29,6	29,0	29,9	30,3	26,6	27,5	27,0	27,9	28,3
	12H	28,6	29,5	29,0	29,9	30,3	26,6	27,5	27,0	27,9	28,3
4H	2H	27,4	28,5	27,8	28,8	29,0	25,8	26,9	26,2	27,2	27,4
	3H	28,6	29,5	28,9	29,8	30,3	26,7	27,6	27,1	28,0	28,5
	4H	28,9	29,7	29,3	30,1	30,7	27,0	27,9	27,5	28,3	28,8
	6H	29,1	29,9	29,6	30,3	30,6	27,3	28,1	27,8	28,5	28,9
	8H	29,1	29,9	29,7	30,2	30,6	27,4	28,1	27,9	28,5	28,9
	12H	29,1	29,7	29,6	30,2	30,7	27,4	28,0	27,9	28,5	29,0
8H	4H	28,9	29,6	29,4	30,0	30,4	27,2	27,9	27,7	28,3	28,7
	6H	29,2	29,8	29,7	30,2	30,8	27,6	28,1	28,1	28,6	29,1
	8H	29,3	29,8	29,9	30,3	31,0	27,7	28,2	28,3	28,7	29,4
	12H	29,4	29,7	30,0	30,3	30,9	27,8	28,2	28,4	28,7	29,3
12H	4H	28,9	29,5	29,4	29,9	30,4	27,2	27,8	27,7	28,2	28,7
	6H	29,2	29,7	29,8	30,2	30,9	27,6	28,1	28,1	28,6	29,3
	8H	29,3	29,7	29,9	30,2	30,9	27,8	28,1	28,4	28,7	29,3

Variations with the observer position for the luminaire spacings, S:

S = 1.0H	0,1 / -0,2	0,2 / -0,4
S = 1.5H	0,5 / -0,7	0,5 / -0,8
S = 2.0H	1,3 / -1,5	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	75	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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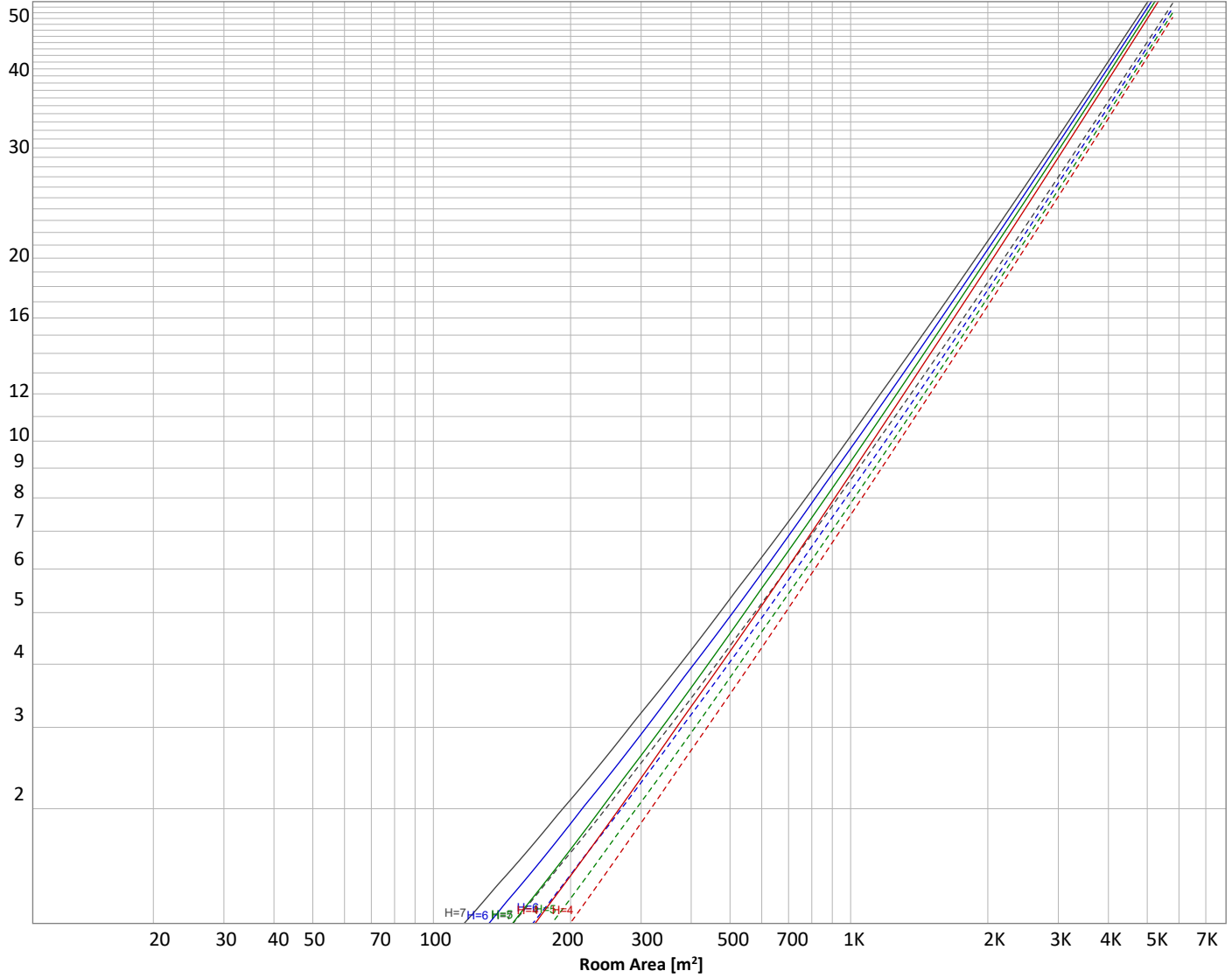
Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 12497 lm			
H _{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	ρ(%) 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°
528 lm	1459 lm	2123 lm	2447 lm	2296 lm	1772 lm	1105 lm	517 lm	130 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
15,4 lm	16,0 lm	17,2 lm	17,5 lm	16,6 lm	14,9 lm	11,9 lm	7,69 lm	2,71 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	528 lm	4,2%
10-20°	1459 lm	11,7%
20-30°	2123 lm	17,0%
30-40°	2447 lm	19,6%
40-50°	2296 lm	18,4%
50-60°	1772 lm	14,2%
60-70°	1105 lm	8,8%
70-80°	517 lm	4,1%
80-90°	130 lm	1,0%
90-100°	15 lm	0,1%
100-110°	16 lm	0,1%
110-120°	17 lm	0,1%
120-130°	17 lm	0,1%
130-140°	17 lm	0,1%
140-150°	15 lm	0,1%
150-160°	12 lm	0,1%
160-170°	8 lm	0,1%
170-180°	3 lm	0,0%
Total	12497 lm	100,0%

Intensity peaks

Max intensity	5639 cd
Intensity, 90°	25 cd
Intensity, 0°	5637 cd

Zonal Lumen summary

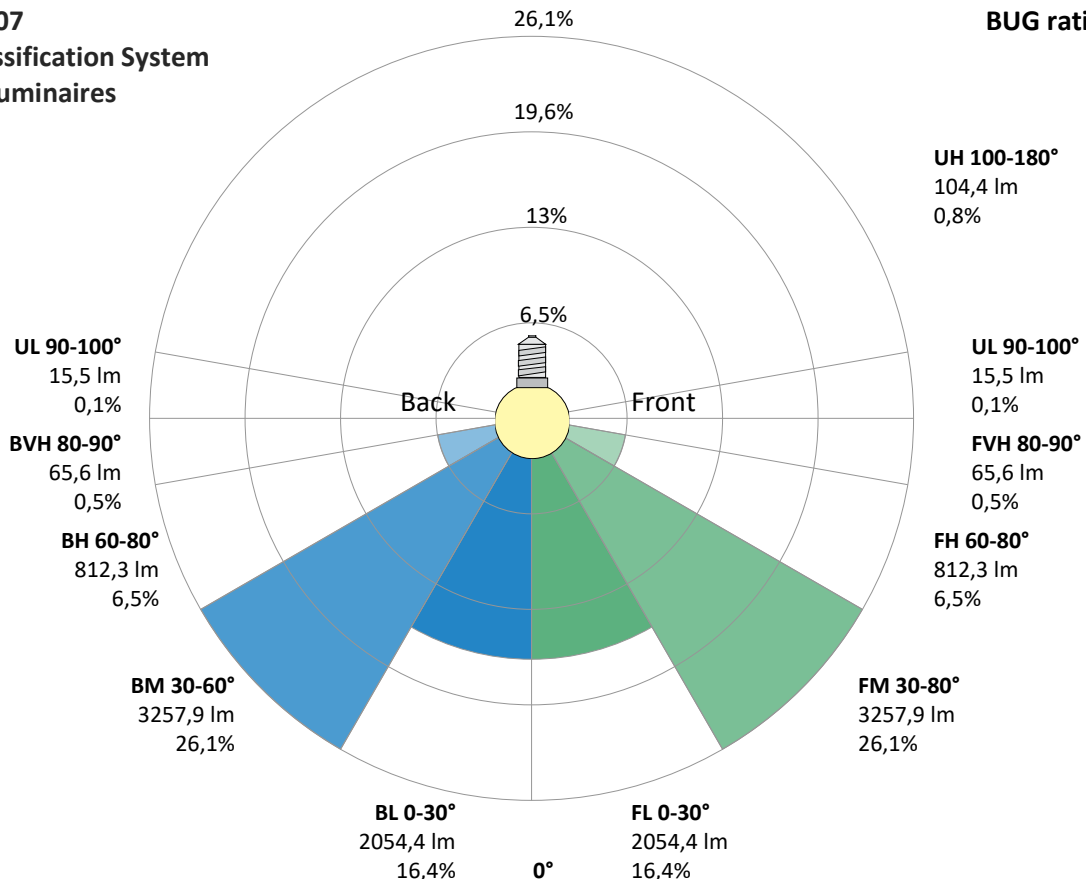
Zone (γ)	Lumen	% Total
0-30°	4109 lm	32,9%
0-40°	6556 lm	52,5%
0-60°	10624 lm	85,0%
60-90°	1753 lm	14,0%
70-100°	663 lm	5,3%
90-120°	49 lm	0,4%
0-90°	12377 lm	99,0%
90-180°	120 lm	1,0%
0-180°	12497 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	2054 lm	16,4%
Medium(30-60°)	3258 lm	26,1%
High(60-80°)	812 lm	6,5%
Very high(80-90°)	66 lm	0,5%
Back light		
Low(0-30°)	2054 lm	16,4%
Medium(30-60°)	3258 lm	26,1%
High(60-80°)	812 lm	6,5%
Very high(80-90°)	66 lm	0,5%
Uplight		
Low(90-100°)	15 lm	0,1%
High(100-180°)	104 lm	0,8%

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

BUG rating B3 U3 G1



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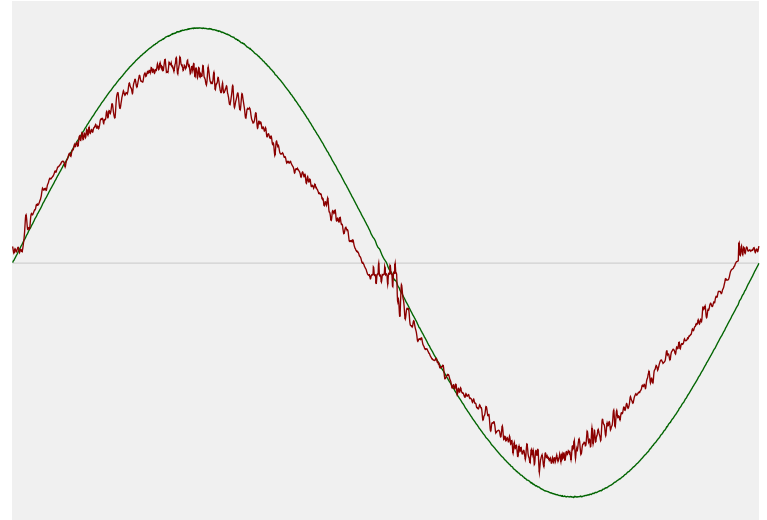


Power Details

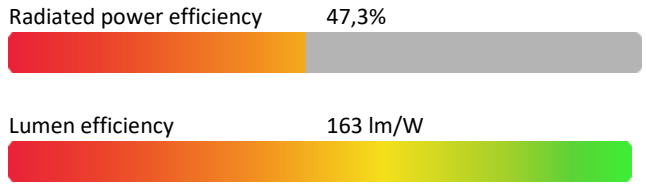
Input Power

Power feed to light source	76,7 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,339 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	77,89 VA
Displacement factor of AC power feed	0,99
Power factor of AC current feed	0,98
Total harmonic distortion of the current	6,5%
Total harmonic distortion of the voltage	0,07%

Input Power Curve



Efficiency



Stabilization Details

Warmup Conditions

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

Color Temperature Change

CCT start	4000 K
CCT shift	+0 K
CCT end	4000 K

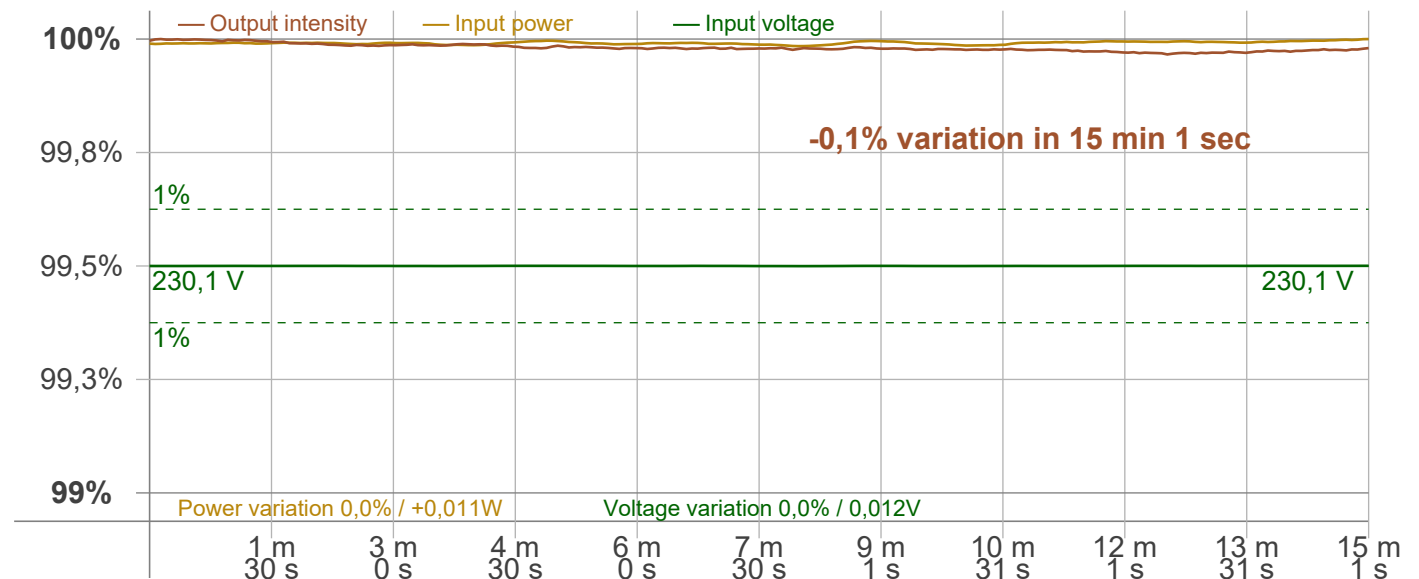
Warmup Result

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

Output Change

Output start	12499 lm
Output change	-3 lm
Output end	12497 lm

Stabilization Curve



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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 100,5 Hz
 Percent Flicker 0,32 %
 Flicker index 0

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

JA8/10 40 Hz 0,03 %
 JA8/10 90 Hz 0,03 %
 JA8/10 200 Hz 0,31 %
 JA8/10 400 Hz 0,31 %
 JA8/10 1000 Hz 0,31 %

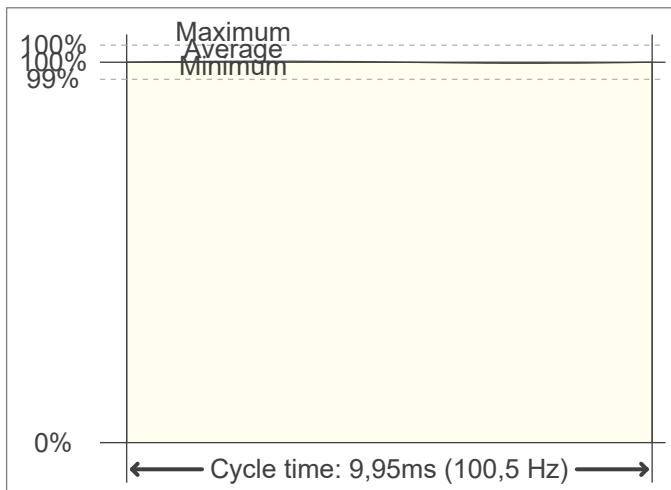
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz) 0,02
 SVM value (80 < F < 2000 Hz) 0,01

Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp 0,01

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

