

Light Measurement Report

Print date: 4-7-2025

Measurement date and time: 4-7-2025 08:34:09 – Measurement no. VFR-250704-1923-MS

Measurement tracking No. and Link: [VT250704-003683](#)

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

72 planes – 5°
5°
2,79 m
25,0 W – PF 0,88 – DPF 0,99
230 V – 0,124 A
50 Hz
Lamp stabilized in 16 min 37 sec – 2,0%

Tested Light Source

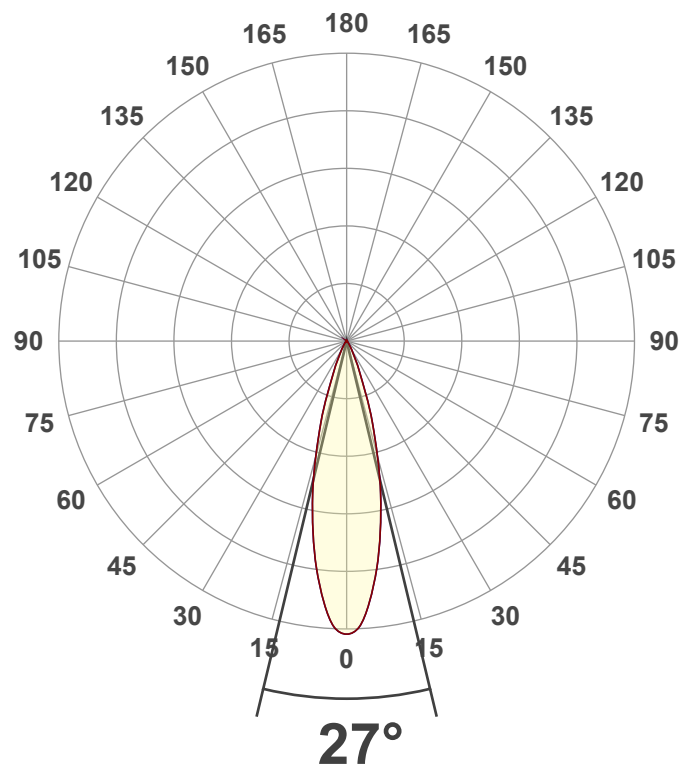
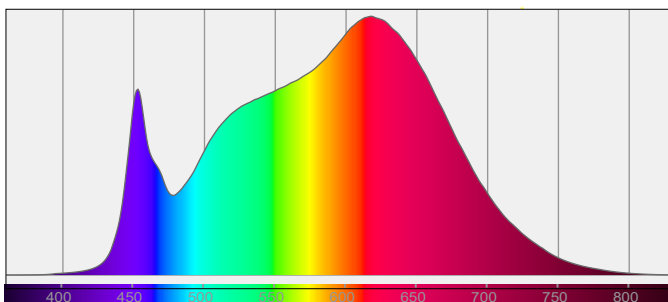
Product Name
Item No. and Manufacturer
Product Description (line 1)

812034-3000K-25W
812034-3000K-25W – Dutchfulfillment
3-FASE RAILSPOT | ZOOMABLE | WATT SWITCH | CCT-SWITCH | ZWART

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

2283 lm – 0,06% / 99,94%
91 lm/W
8909 cd – 27°
CCT = 3000 K / 3396 K
CRI 95,3
R_f 92,2 – R_g 98,4
Duv 0,0016 – SDCM 12,4
SVM 0,03 – PstLM 0,06



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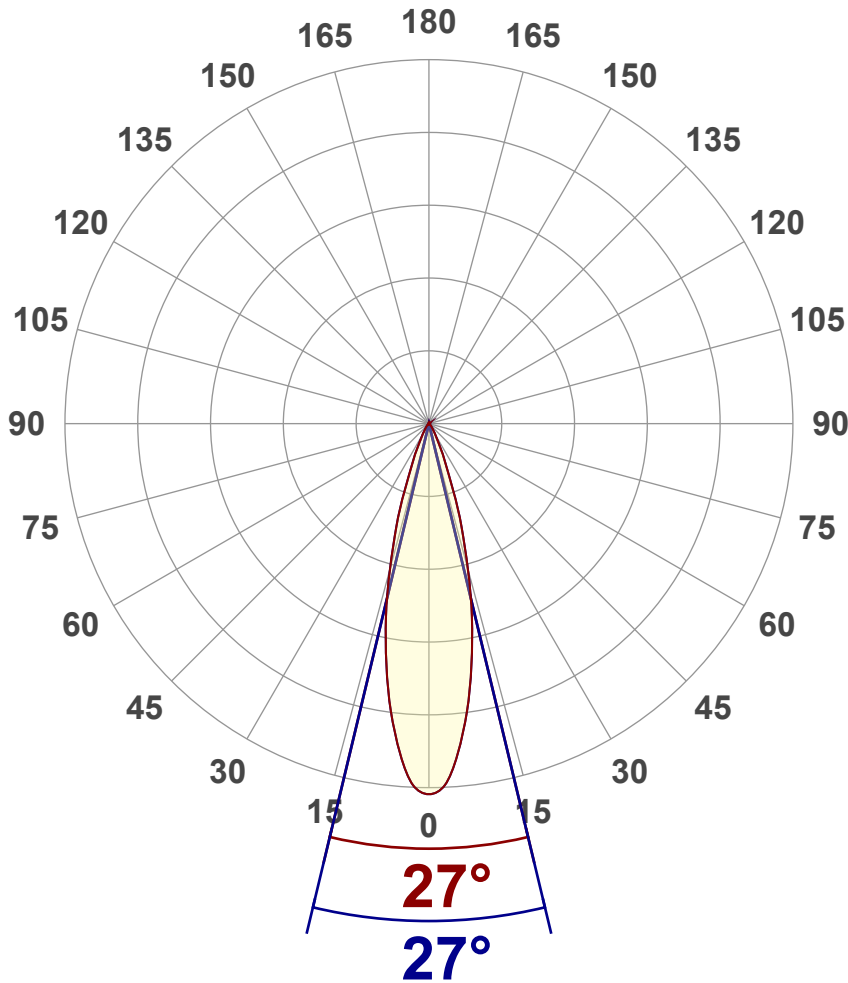
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2283 lm
Lumen Up% / Down%	0,06% / 99,94%
Peak Intensity	8909 cd
Beam Angle (50%)	27°
Beam Angle (90%)	27°
Beam Angle (10%)	27°

Cut-off Angle

Average 2,5%	64,7°
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Field Angle

Average 10%	47,9°
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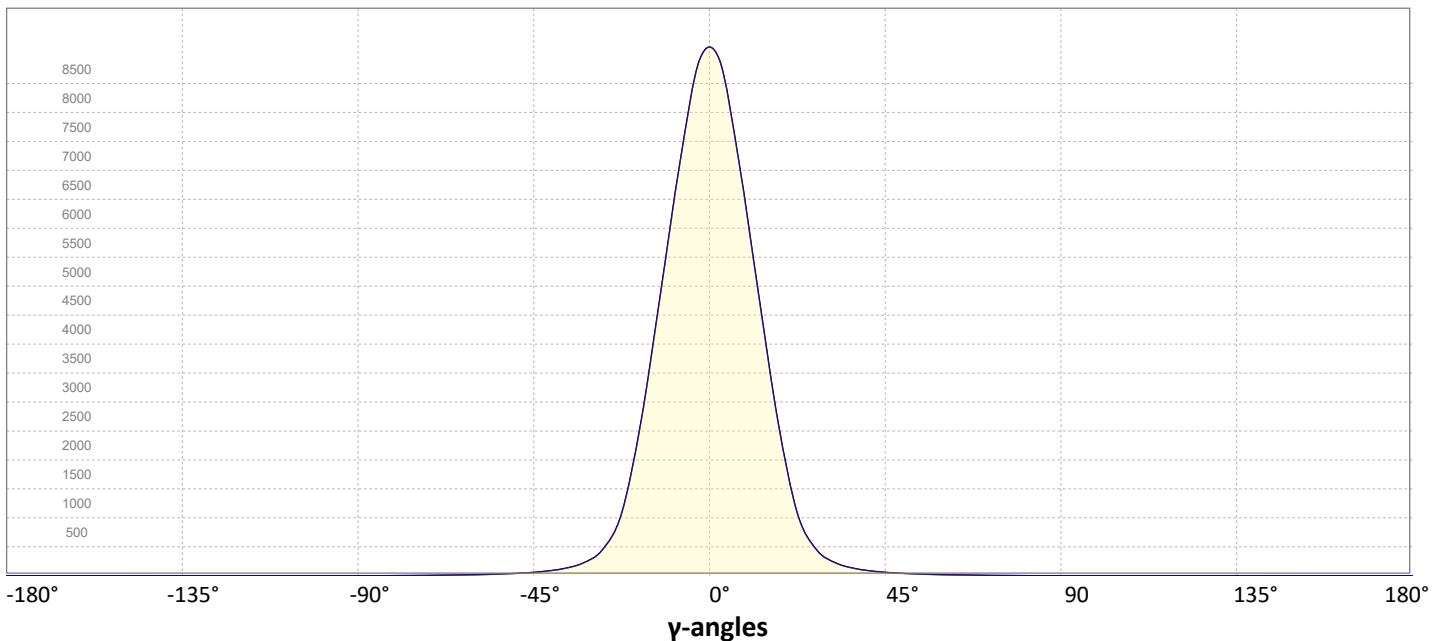
Intensity Ratio

In 120° cone	99,1%
In 90° cone	97,1%

C000-C180

C090-C270

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



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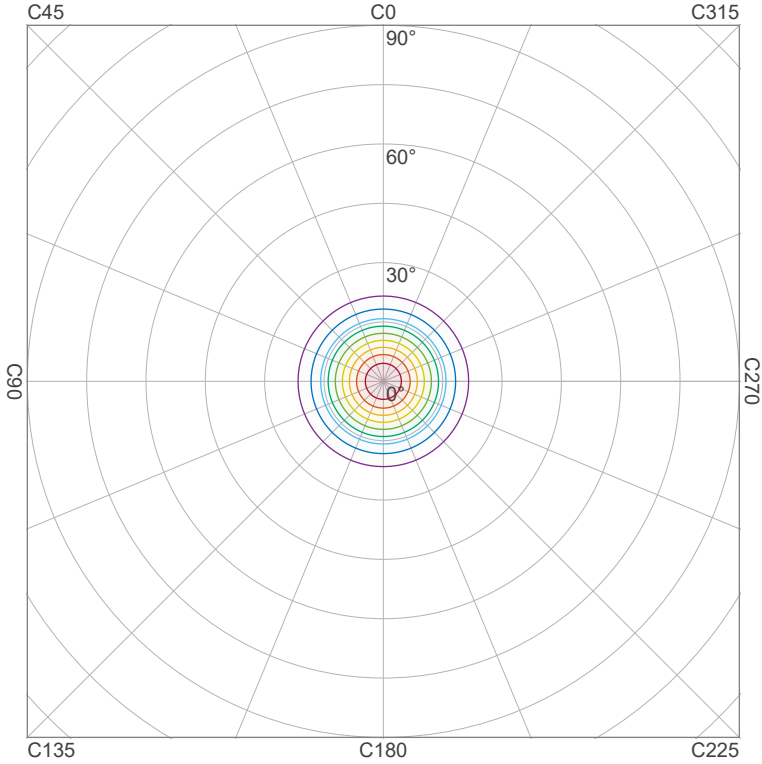
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Iso-intensity Diagram (Iso-candela)

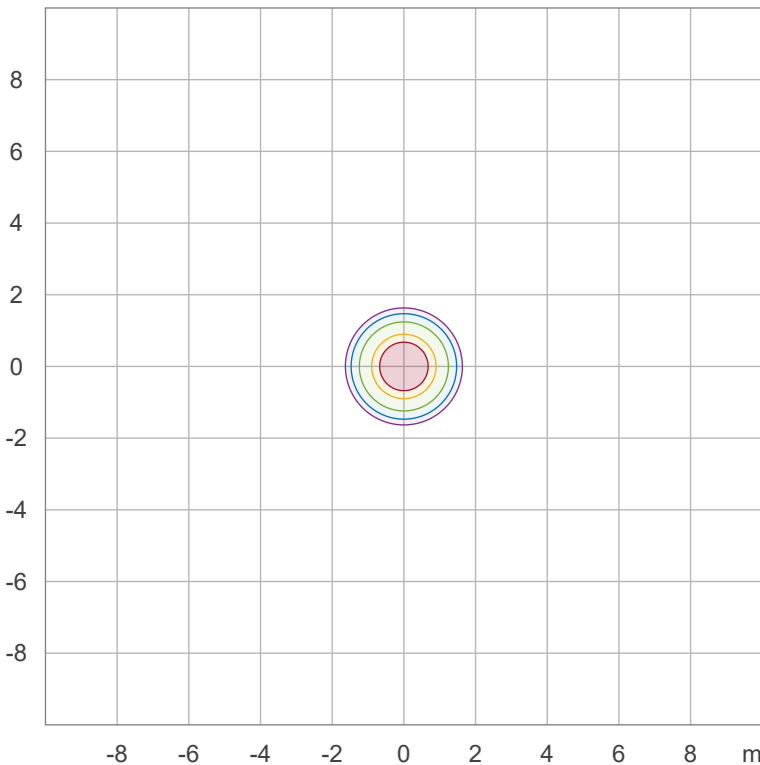


90 %	8017,7 cd
80 %	7126,9 cd
70 %	6236,0 cd
60 %	5345,1 cd
50 %	4454,3 cd
40 %	3563,4 cd
30 %	2672,6 cd
20 %	1781,7 cd
10 %	890,9 cd

Peak intensity: 8908,6 cd

Number of c-planes: 72

Iso-illuminance Diagram (Iso-lux)



50,0 %	494,9 lx
30,0 %	297,0 lx
10,0 %	99,0 lx
5,0 %	49,5 lx
3,0 %	29,7 lx

Peak illuminance: 989,8 lx

Mounting height: 3,0 m

Number of c-planes: 72

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Operator:



Color details

Correlated Color Temperature, Target CCT = 3000 K
 Correlated Color Temperature, Measured CCT = 3396 K
 Color Rendering Index CRI 95,3
 Color Rendering Index, R9 (red component) R9 = 70,3
 Color Rendering TM30-18 R_f 92,2 – R_g 98,4
 Color Quality Scale CQS = 94,1

MacAdam Steps SDCM = 12,4
 Color coordinates CIE 1931 (x;y) = (0,437;0,404)
 Color coordinate CIEs 1960 (u;v) = (0,251;0,348)
 Color deviation from BBL Duv = 0,0016
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,251;0,521)

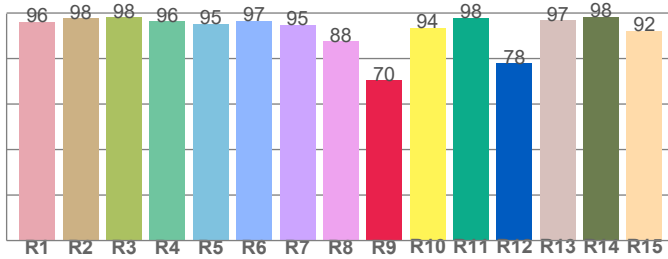
CIE 1931



CIE 1931 – zoomed on Planckian locus



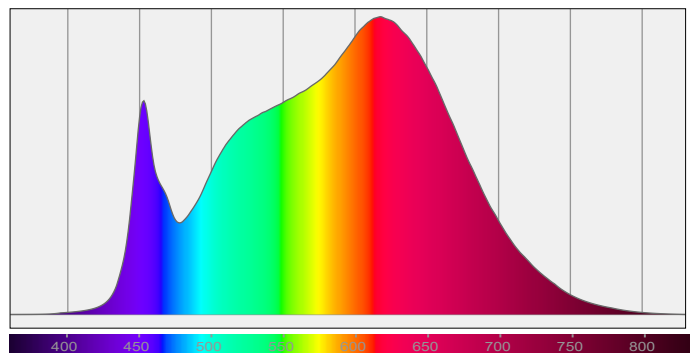
Color Rendering Index per reference color (CIE 1995)



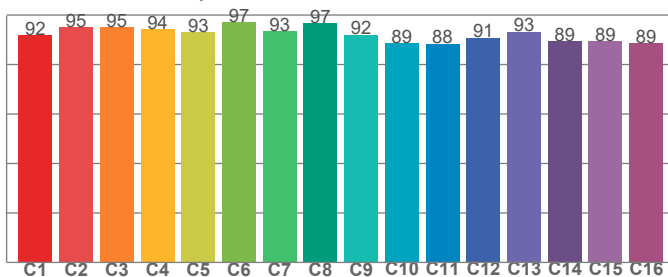
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
96,2	97,7	98,2	96,3	95,2	96,6	94,8	87,7	70,3	93,6	97,9	78,0	96,9	98,3	92,2

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



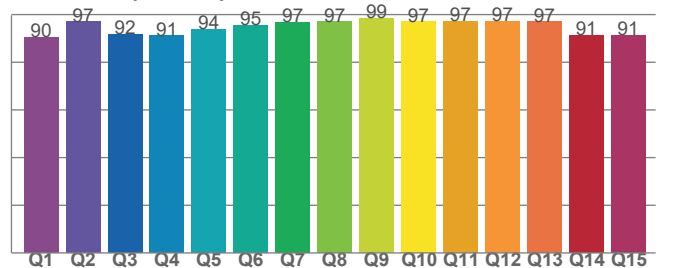
TM30-18 R_f-values per hue bin



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
91,9	95,0	95,1	94,2	93,0	97,2	93,4	96,7	92,0	88,6	88,5	90,9	93,2	89,5	89,3	88,7

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
90,4	96,9	91,7	91,0	93,8	95,5	96,7	97,1	98,6	97,0	97,2	97,3	97,0	91,3	91,3

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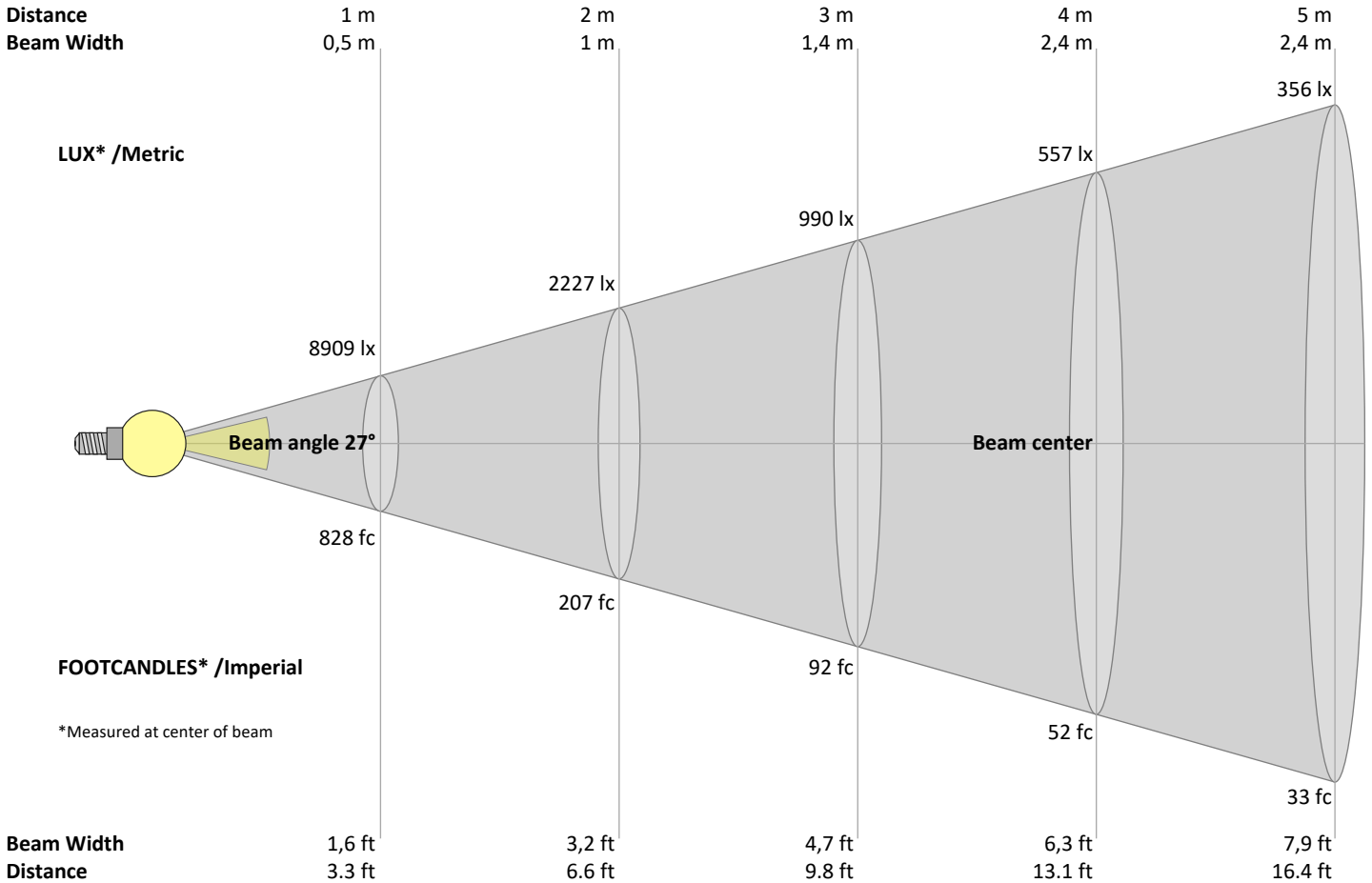
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Operator:



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
8909	2227	990	557	356	247	182	139	110	89	74	62	53	45	40	35	31	27	25	22	lux
827,6	206,9	92	51,7	33,1	23	16,9	12,9	10,2	8,3	6,8	5,7	4,9	4,2	3,7	3,2	2,9	2,6	2,3	2,1	fc

Intensities in 0° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
8909	8909	8392	7687	6934	6027	5119	4227	3342	2515	1878	1240	886	633	419	329	239	188	150	117	cd
100%	100%	94%	86%	78%	68%	57%	47%	38%	28%	21%	14%	10%	7%	5%	4%	3%	2%	2%	1%	of 0°val

Intensities in 90° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
8909	8909	8392	7687	6934	6027	5119	4227	3342	2515	1878	1240	886	633	419	329	239	188	150	117	cd
100%	100%	94%	86%	78%	68%	57%	47%	38%	28%	21%	14%	10%	7%	5%	4%	3%	2%	2%	1%	of 0°val

Intensities in 180° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
8909	8909	8392	7687	6934	6027	5119	4227	3342	2515	1878	1240	886	633	419	329	239	188	150	117	cd
100%	100%	94%	86%	78%	68%	57%	47%	38%	28%	21%	14%	10%	7%	5%	4%	3%	2%	2%	1%	of 0°val

Intensities in 270° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
8909	8909	8392	7687	6934	6027	5119	4227	3342	2515	1878	1240	886	633	419	329	239	188	150	117	cd
100%	100%	94%	86%	78%	68%	57%	47%	38%	28%	21%	14%	10%	7%	5%	4%	3%	2%	2%	1%	of 0°val

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Operator:



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	15,6	16,0	15,7	16,2	16,4	15,6	16,0	15,7	16,2	16,4
	3H	15,6	16,2	16,0	16,4	16,6	15,6	16,2	16,0	16,4	16,6
	4H	15,7	16,3	16,1	16,5	16,7	15,7	16,3	16,1	16,5	16,7
	6H	15,8	16,3	16,1	16,6	16,9	15,8	16,3	16,1	16,6	16,9
	8H	15,8	16,2	16,1	16,6	16,9	15,8	16,2	16,1	16,6	16,9
	12H	15,7	16,2	16,1	16,5	17,0	15,7	16,2	16,1	16,5	17,0
4H	2H	15,4	16,0	15,8	16,3	16,5	15,4	16,0	15,8	16,3	16,5
	3H	15,8	16,2	16,1	16,6	17,0	15,8	16,2	16,1	16,6	17,0
	4H	15,8	16,3	16,3	16,7	17,2	15,8	16,3	16,3	16,7	17,2
	6H	15,9	16,4	16,4	16,7	17,1	15,9	16,4	16,4	16,7	17,1
	8H	15,9	16,3	16,4	16,7	17,0	15,9	16,3	16,4	16,7	17,0
	12H	15,9	16,2	16,4	16,6	17,1	15,9	16,2	16,4	16,6	17,1
8H	4H	15,8	16,2	16,3	16,6	16,9	15,8	16,2	16,3	16,6	16,9
	6H	15,9	16,2	16,4	16,7	17,2	15,9	16,2	16,4	16,7	17,2
	8H	16,0	16,2	16,5	16,7	17,4	16,0	16,2	16,5	16,7	17,4
	12H	16,0	16,2	16,6	16,7	17,3	16,0	16,2	16,6	16,7	17,3
12H	4H	15,7	16,1	16,2	16,5	16,9	15,7	16,1	16,2	16,5	16,9
	6H	16,0	16,2	16,5	16,7	17,3	16,0	16,2	16,5	16,7	17,3
	8H	16,0	16,2	16,6	16,7	17,3	16,0	16,2	16,6	16,7	17,3

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

S = 1.0H	2,8 / -2,0	2,8 / -2,0
S = 1.5H	5,0 / -2,9	5,0 / -2,9
S = 2.0H	6,7 / -3,6	6,7 / -3,6

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	102	102	102	100
1	115	112	110	109	112	110	109	107	106	105	104	103	102	101	99	98	98	96
2	111	107	104	101	109	105	102	100	102	100	98	99	97	96	96	95	94	92
3	107	102	98	95	105	100	97	94	98	95	93	96	93	91	93	92	90	89
4	103	97	93	90	102	96	92	89	94	91	88	92	90	87	91	88	87	85
5	100	94	89	86	98	93	89	86	91	88	85	90	87	84	88	86	83	82
6	97	90	86	82	95	89	85	82	88	84	82	87	84	81	86	83	81	80
7	94	87	82	79	93	86	82	79	85	81	79	84	81	78	83	80	78	77
8	91	84	80	77	90	84	79	76	83	79	76	82	78	76	81	78	76	75
9	88	81	77	74	88	81	77	74	80	76	74	79	76	74	79	76	73	72
10	86	79	75	72	85	79	75	72	78	74	72	77	74	71	77	74	71	70

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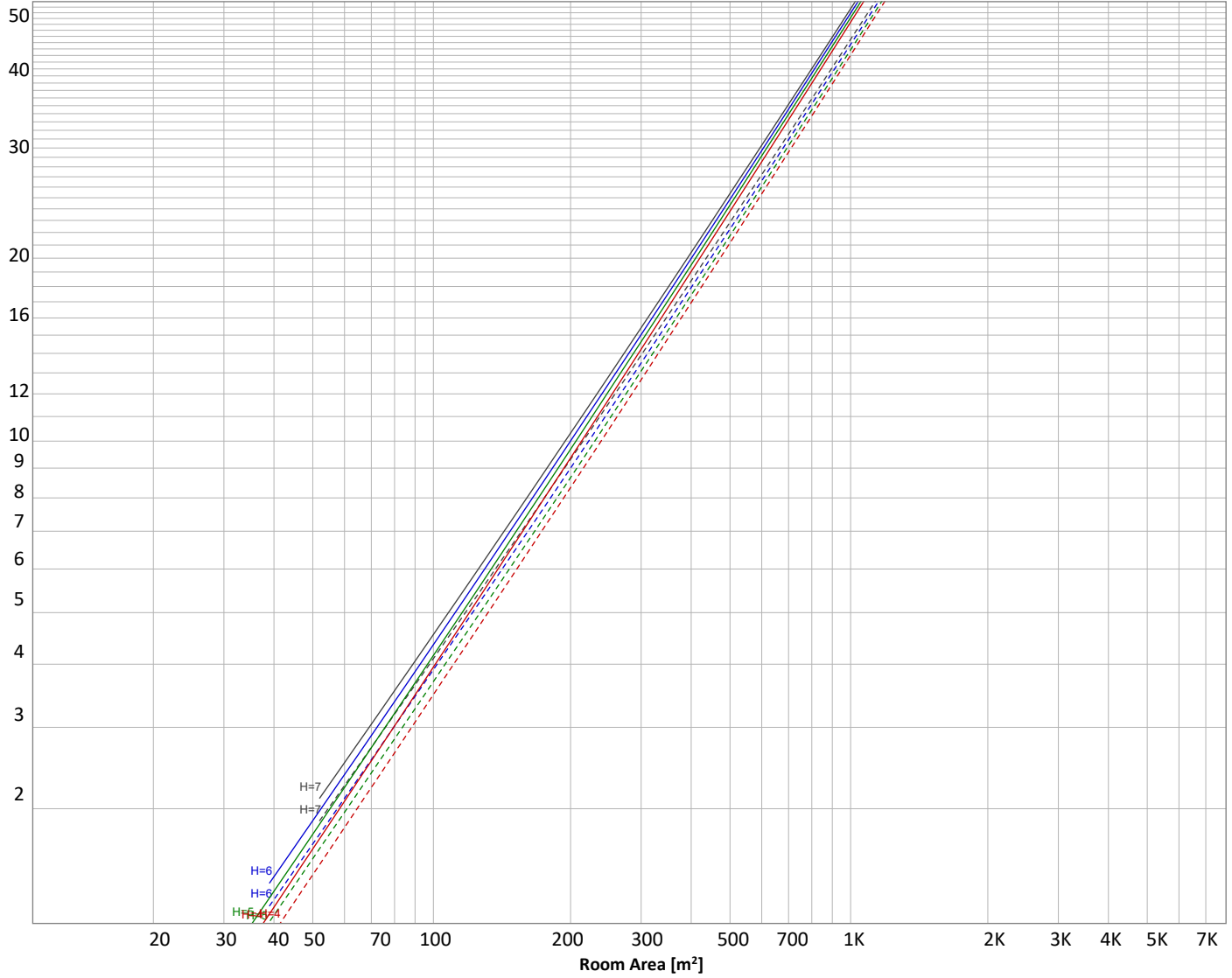
Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 2283 lm				
H _{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	ρ(%) 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°
725 lm	1021 lm	339 lm	105 lm	47,3 lm	24,2 lm	12,8 lm	5,78 lm	1,63 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,001 lm	0,000 lm	0,000 lm	0,000 lm	0,108 lm	0,290 lm	0,478 lm	0,451 lm	0,140 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	725 lm	31,8%
10-20°	1021 lm	44,7%
20-30°	339 lm	14,8%
30-40°	105 lm	4,6%
40-50°	47 lm	2,1%
50-60°	24 lm	1,1%
60-70°	13 lm	0,6%
70-80°	6 lm	0,3%
80-90°	2 lm	0,1%
90-100°	0 lm	0,0%
100-110°	0 lm	0,0%
110-120°	0 lm	0,0%
120-130°	0 lm	0,0%
130-140°	0 lm	0,0%
140-150°	0 lm	0,0%
150-160°	0 lm	0,0%
160-170°	0 lm	0,0%
170-180°	0 lm	0,0%
Total	2283 lm	100,0%

Intensity peaks

Max intensity	8909 cd
Intensity, 90°	0 cd
Intensity, 0°	8909 cd

Zonal Lumen summary

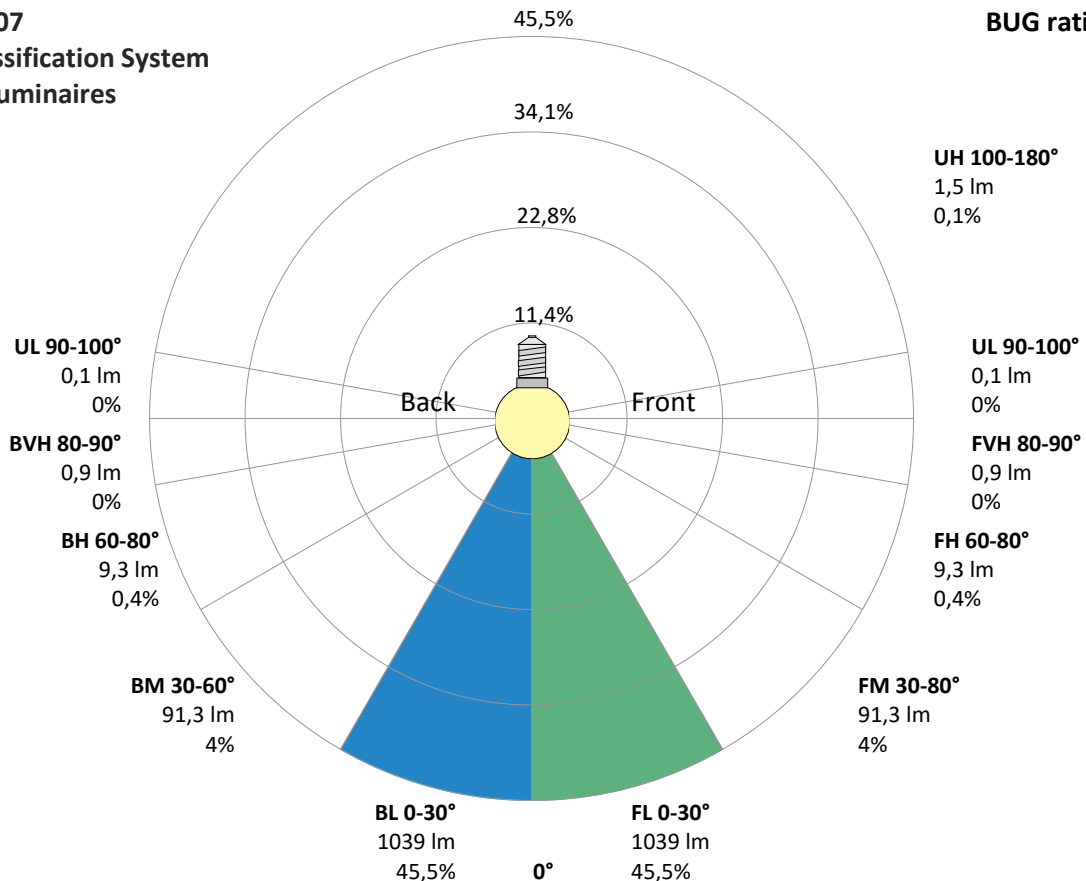
Zone (γ)	Lumen	% Total
0-30°	2085 lm	91,3%
0-40°	2189 lm	95,9%
0-60°	2261 lm	99,1%
60-90°	20 lm	0,9%
70-100°	7 lm	0,3%
90-120°	0 lm	0,0%
0-90°	2281 lm	99,9%
90-180°	1 lm	0,1%
0-180°	2283 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	1039 lm	45,5%
Medium(30-60°)	91 lm	4,0%
High(60-80°)	9 lm	0,4%
Very high(80-90°)	1 lm	0,0%
Back light		
Low(0-30°)	1039 lm	45,5%
Medium(30-60°)	91 lm	4,0%
High(60-80°)	9 lm	0,4%
Very high(80-90°)	1 lm	0,0%
Uplight		
Low(90-100°)	0 lm	0,0%
High(100-180°)	1 lm	0,1%

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

BUG rating B3 U1 G0



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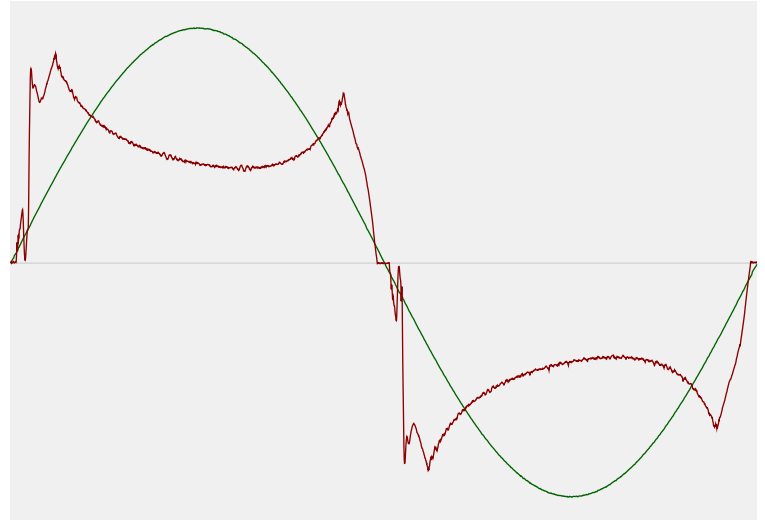


Power Details

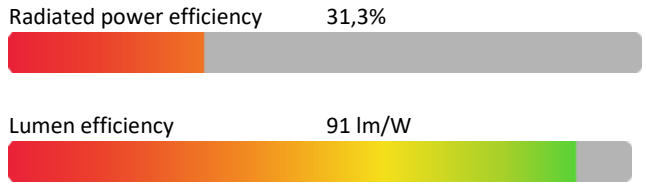
Input Power

Power feed to light source	25,0 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,124 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	28,59 VA
Displacement factor of AC power feed	0,99
Power factor of AC current feed	0,88
Total harmonic distortion of the current	59,42%
Total harmonic distortion of the voltage	0,09%

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	3002 K
CCT shift	-2 K
CCT end	3000 K

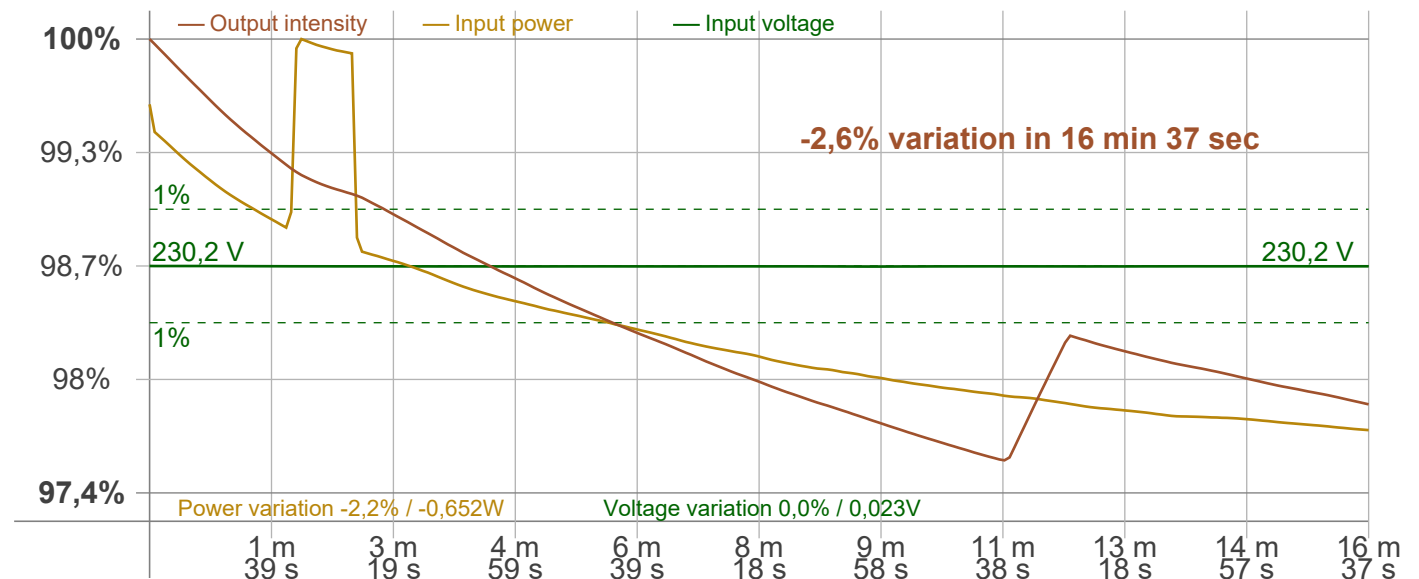
Warmup Result

Total warmup time	Lamp stabilized in 16 min 37 sec
Warmup variation	-2,6%

Output Change

Output start	2334 lm
Output change	-51 lm
Output end	2283 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 1,06 %
 Flicker index 0

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

JA8/10 40 Hz 0,04 %
 JA8/10 90 Hz 0,04 %
 JA8/10 200 Hz 0,92 %
 JA8/10 400 Hz 1,02 %
 JA8/10 1000 Hz 1,05 %

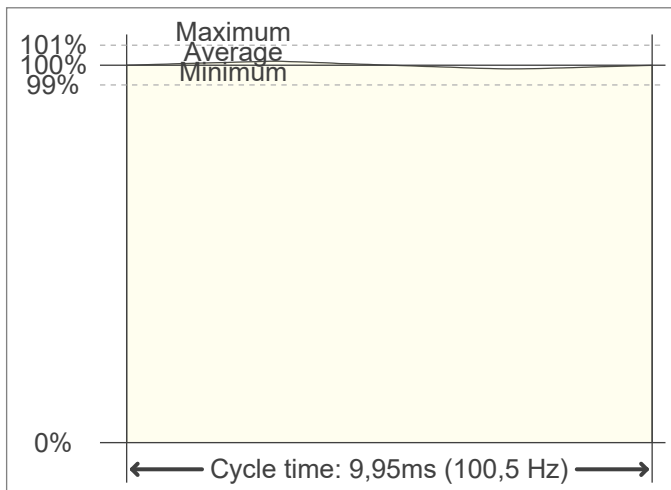
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz) 0,06
 SVM value (80 < F < 2000 Hz) 0,03

Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp 0,03

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

