

Light Measurement Report

Print date: 17-6-2025

Measurement date and time: 17-6-2025 09:34:12 – Measurement no. VFR-250617-1575-MS

Measurement tracking No. and Link: [VT250617-003943](#)

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

12 planes – 30°
5°
11,60 m
36,7 W – PF 0,96 – DPF 0,97
230 V – 0,166 A
50 Hz
Lamp stabilized in 15 min 21 sec – 2,0%

Tested Light Source

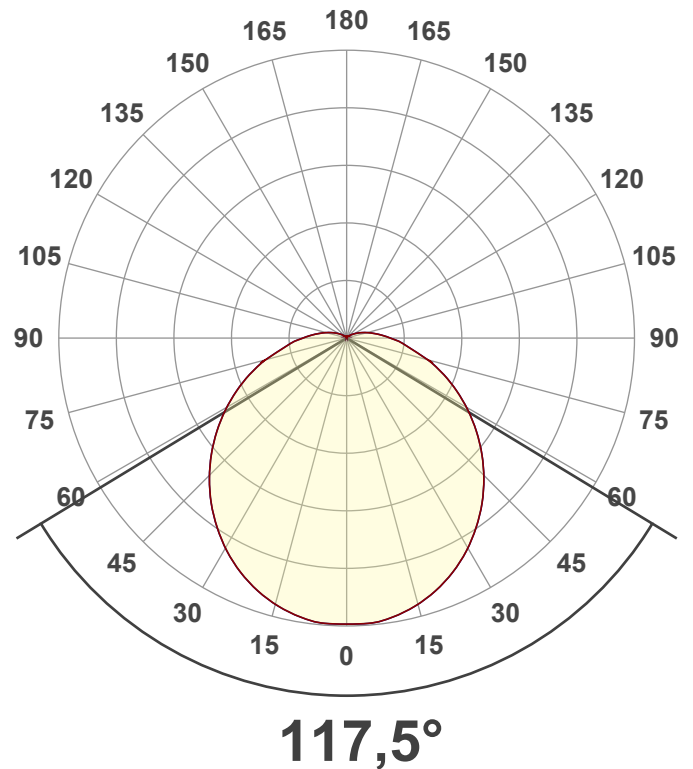
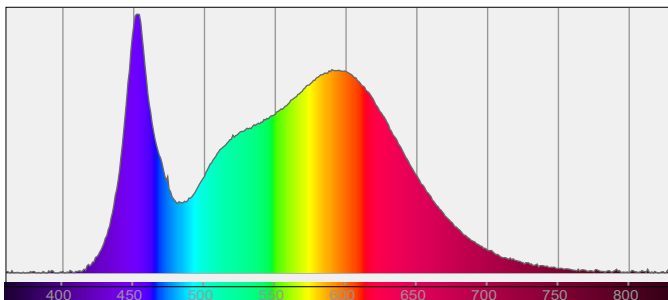
Product Name
Item No. and Manufacturer
Product Description (line 1)

806088-4000K
806088-4000K – Dutchfulfillment
LED MINI TRI-PROOF | HALIFAX | 150CM | 40W

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

4114 lm – 8,28% / 91,72%
112 lm/W
1168 cd – 117,5°
CCT = 4000 K / 4270 K
CRI 84,4
 R_f 83,8 – R_g 95,6
Duv -0,0034 – SDCM 6,4
SVM 1,7 – PstLM 0,07



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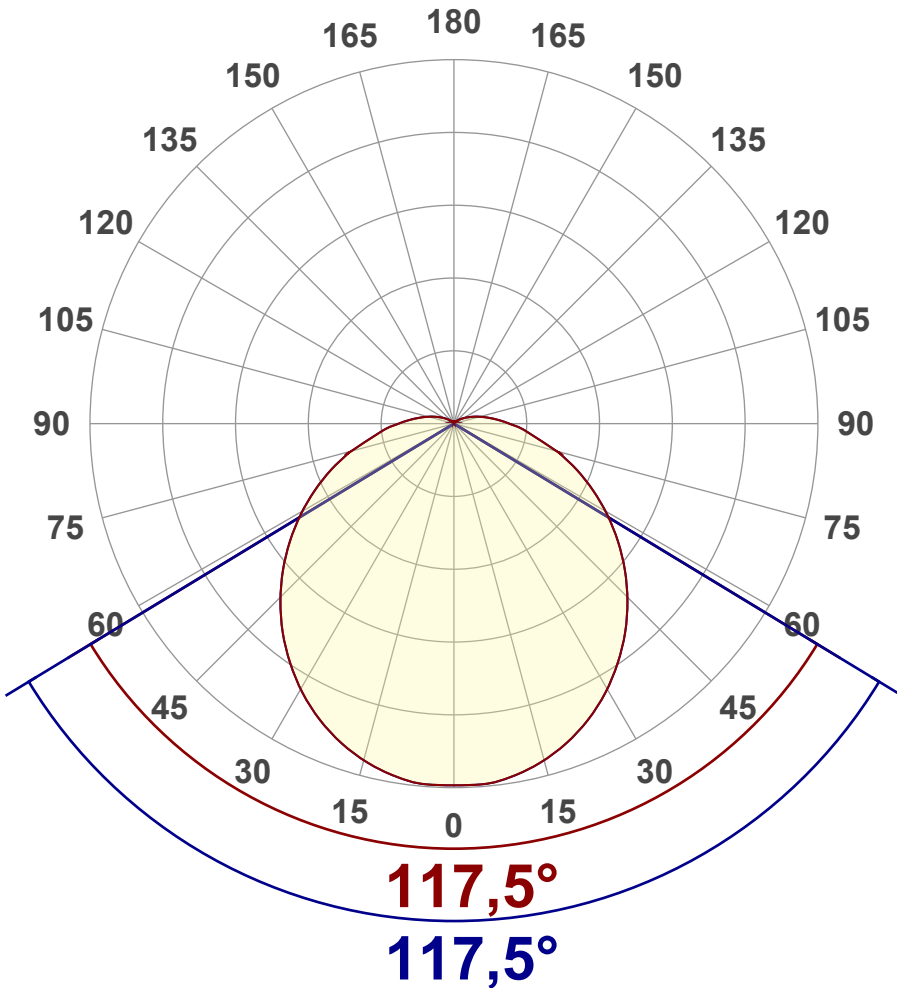
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	4114 lm
Lumen Up% / Down%	8,28% / 91,72%
Peak Intensity	1168 cd
Beam Angle (50%)	117,5°
Beam Angle (90%)	117,5°
Beam Angle (10%)	117,5°

Cut-off Angle

Average 2,5%	245,3°
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Field Angle

Average 10%	198°
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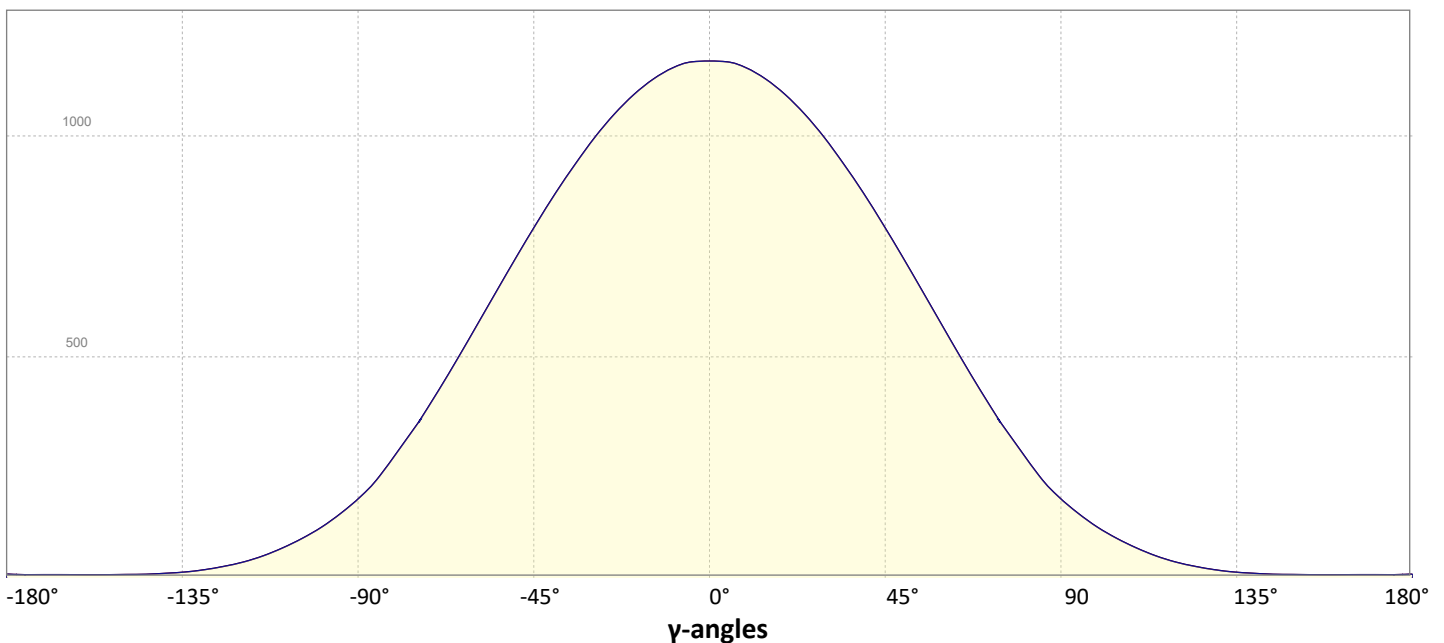
Intensity Ratio

In 120° cone	65,0%
In 90° cone	43,6%

C000-C180

C090-C270

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



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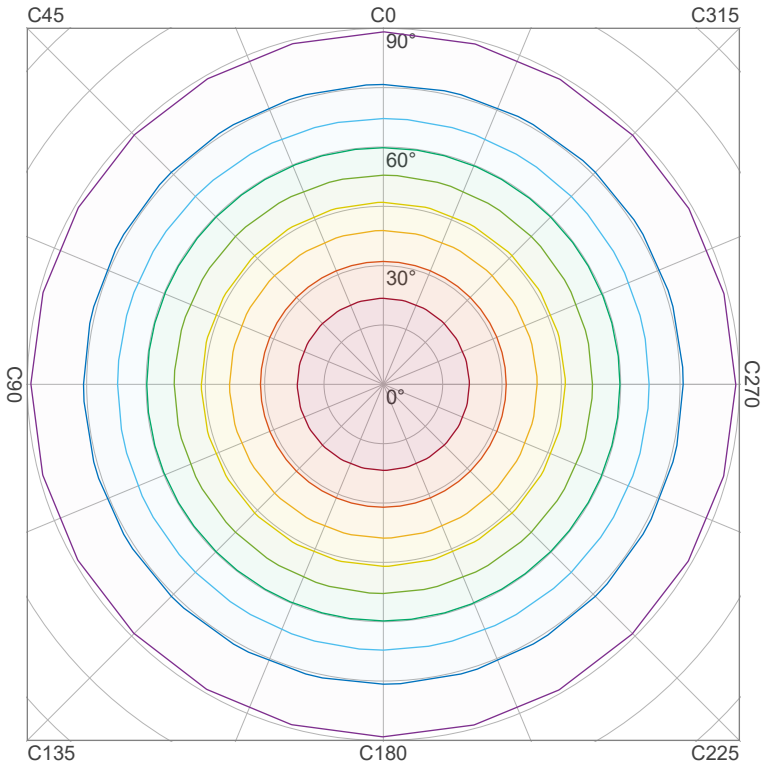
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Operator:



Iso-intensity Diagram (Iso-candela)

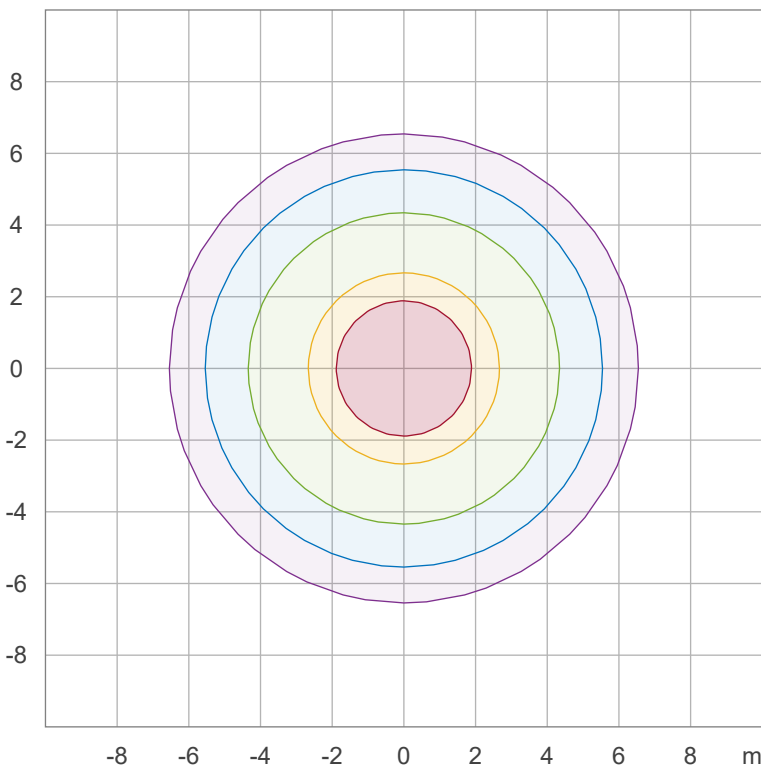


90 %	1051,0 cd
80 %	934,2 cd
70 %	817,4 cd
60 %	700,7 cd
50 %	583,9 cd
40 %	467,1 cd
30 %	350,3 cd
20 %	233,6 cd
10 %	116,8 cd

Peak intensity: 1167,8 cd

Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



50,0 %	64,9 lx
30,0 %	38,9 lx
10,0 %	13,0 lx
5,0 %	6,5 lx
3,0 %	3,9 lx

Peak illuminance: 129,8 lx

Mounting height: 3,0 m

Number of c-planes: 12

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Color details

Correlated Color Temperature, Target CCT = 4000 K
 Correlated Color Temperature, Measured CCT = 4270 K
 Color Rendering Index CRI 84,4
 Color Rendering Index, R9 (red component) R9 = 13,0
 Color Rendering TM30-18 R_f 83,8 – R_g 95,6
 Color Quality Scale CQS = 81,7

MacAdam Steps SDCM = 6,4
 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 = -0,0034
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,225;0,502)

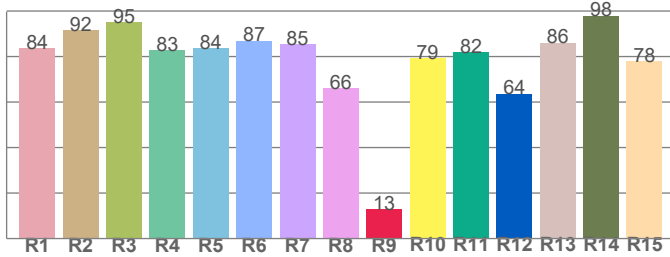
CIE 1931



CIE 1931 – zoomed on Planckian locus



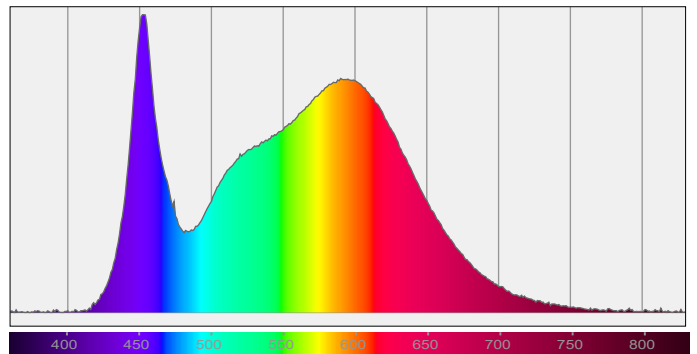
Color Rendering Index per reference color (CIE 1995)



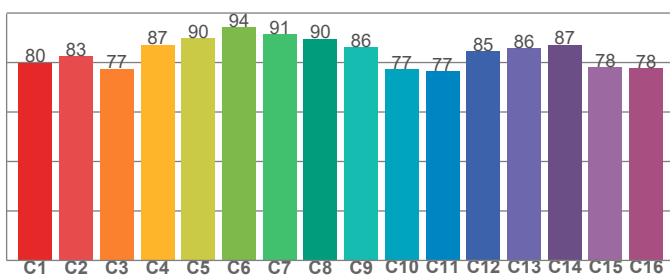
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
83,6	91,7	95,2	82,8	83,5	86,9	85,4	66,0	13,0	79,2	82,0	63,6	86,1	97,9	77,9

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



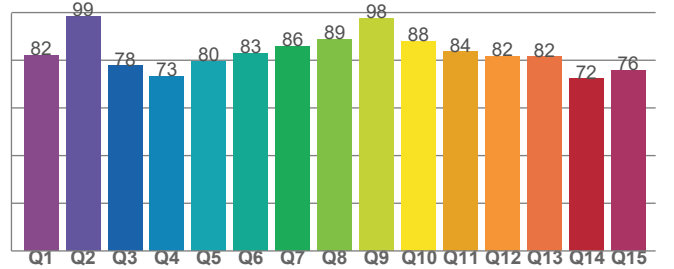
TM30-18 Rf-values per hue bin



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
80,0	82,6	77,4	87,3	89,9	94,3	91,4	89,5	86,1	77,2	76,6	84,6	85,8	87,3	78,0	77,8

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
82,0	98,5	77,7	73,4	79,6	83,0	85,9	88,7	97,7	88,0	83,5	81,6	81,6	72,3	75,9

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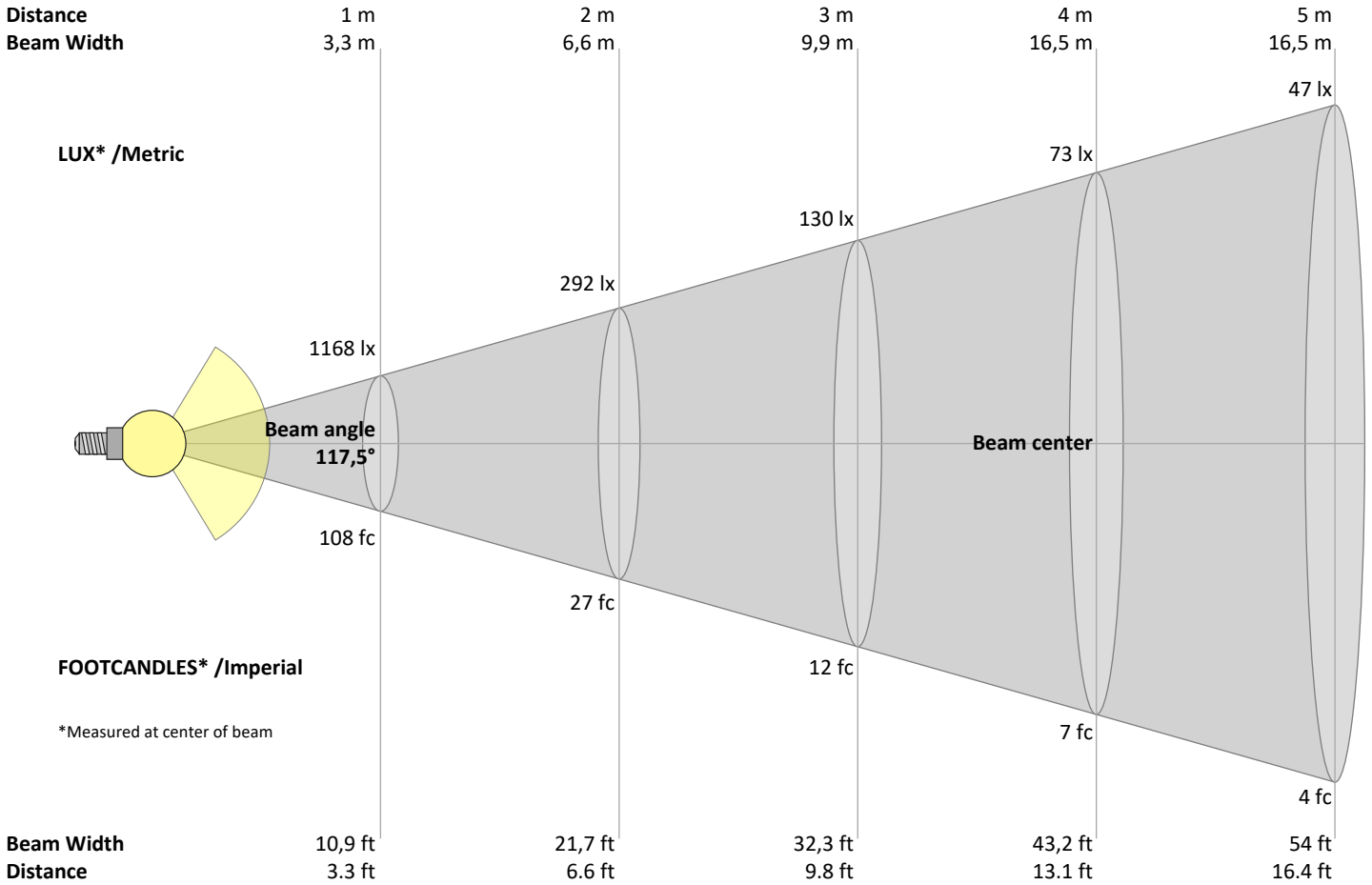
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Operator:



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
1168	292	130	73	47	32	24	18	14	12	10	8	7	6	5	5	4	4	3	3	lux
108,5	27,1	12,1	6,8	4,3	3	2,2	1,7	1,3	1,1	0,9	0,8	0,6	0,6	0,5	0,4	0,4	0,3	0,3	0,3	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
1168	1155	1103	1022	915	792	657	519	387	273	179	117	73	42	23	13	8	7	7	7	cd
100%	99%	94%	87%	78%	68%	56%	44%	33%	23%	15%	10%	6%	4%	2%	1%	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
1168	1155	1103	1022	915	792	657	519	387	273	179	117	73	42	23	13	8	7	7	7	cd
100%	99%	94%	87%	78%	68%	56%	44%	33%	23%	15%	10%	6%	4%	2%	1%	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
1168	1155	1103	1022	915	792	657	519	387	273	179	117	73	42	23	13	8	7	7	7	cd
100%	99%	94%	87%	78%	68%	56%	44%	33%	23%	15%	10%	6%	4%	2%	1%	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
1168	1155	1103	1022	915	792	657	519	387	273	179	117	73	42	23	13	8	7	7	7	cd
100%	99%	94%	87%	78%	68%	56%	44%	33%	23%	15%	10%	6%	4%	2%	1%	1%	1%	1%	1%	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	21,0	22,2	21,4	22,7	23,1	21,6	22,8	22,0	23,3	23,7
	3H	22,7	23,9	23,2	24,3	24,7	23,5	24,8	24,0	25,2	25,6
	4H	23,5	24,7	24,0	25,1	25,5	24,5	25,7	25,1	26,1	26,6
	6H	24,3	25,4	24,8	25,8	26,3	25,7	26,7	26,1	27,1	27,7
	8H	24,7	25,7	25,1	26,1	26,7	26,2	27,2	26,7	27,7	28,2
	12H	25,0	26,0	25,5	26,5	27,1	26,8	27,8	27,3	28,3	28,9
4H	2H	21,7	22,9	22,2	23,3	23,7	22,2	23,4	22,7	23,8	24,2
	3H	23,7	24,7	24,2	25,2	25,7	24,4	25,4	24,9	25,9	26,5
	4H	24,6	25,6	25,1	26,0	26,7	25,5	26,5	26,0	26,9	27,6
	6H	25,5	26,4	26,1	26,9	27,4	26,7	27,6	27,3	28,1	28,6
	8H	25,9	26,7	26,5	27,3	27,8	27,3	28,1	27,9	28,7	29,2
	12H	26,4	27,0	27,0	27,6	28,2	28,1	28,7	28,6	29,3	29,9
8H	4H	25,0	25,8	25,6	26,3	26,9	25,8	26,6	26,4	27,1	27,7
	6H	26,2	26,8	26,8	27,4	28,1	27,2	27,9	27,8	28,5	29,1
	8H	26,8	27,3	27,4	28,0	28,7	28,0	28,6	28,7	29,2	30,0
	12H	27,3	27,8	28,0	28,4	29,2	28,9	29,4	29,6	30,0	30,7
12H	4H	25,1	25,8	25,7	26,4	27,0	25,8	26,5	26,4	27,1	27,7
	6H	26,4	26,9	27,0	27,6	28,3	27,4	27,9	28,0	28,6	29,3
	8H	27,0	27,5	27,7	28,1	28,9	28,2	28,7	28,9	29,3	30,0

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

S = 1.0H	0,1 / -0,1	0,1 / 0,0
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	117	117	117	117	113	113	113	113	107	107	107	100	100	100	94	94	94	92
1	105	99	94	90	101	96	91	87	90	86	83	85	82	79	80	77	75	72
2	95	85	78	71	91	83	76	70	78	72	67	73	68	64	69	65	62	59
3	86	74	66	59	82	72	64	58	68	61	55	64	58	53	60	56	51	49
4	78	66	56	49	75	64	55	48	60	53	47	57	50	45	54	48	44	41
5	72	58	49	42	69	57	48	41	54	46	40	51	44	39	48	42	38	35
6	66	52	43	37	64	51	42	36	48	41	35	46	39	34	44	38	33	31
7	61	47	38	32	59	46	38	32	44	36	31	42	35	30	40	34	29	27
8	57	43	35	29	55	42	34	28	40	33	28	38	32	27	36	31	26	24
9	53	40	31	26	51	39	31	25	37	30	25	35	29	24	34	28	24	22
10	50	37	28	23	48	36	28	23	34	27	22	33	26	22	31	26	21	20

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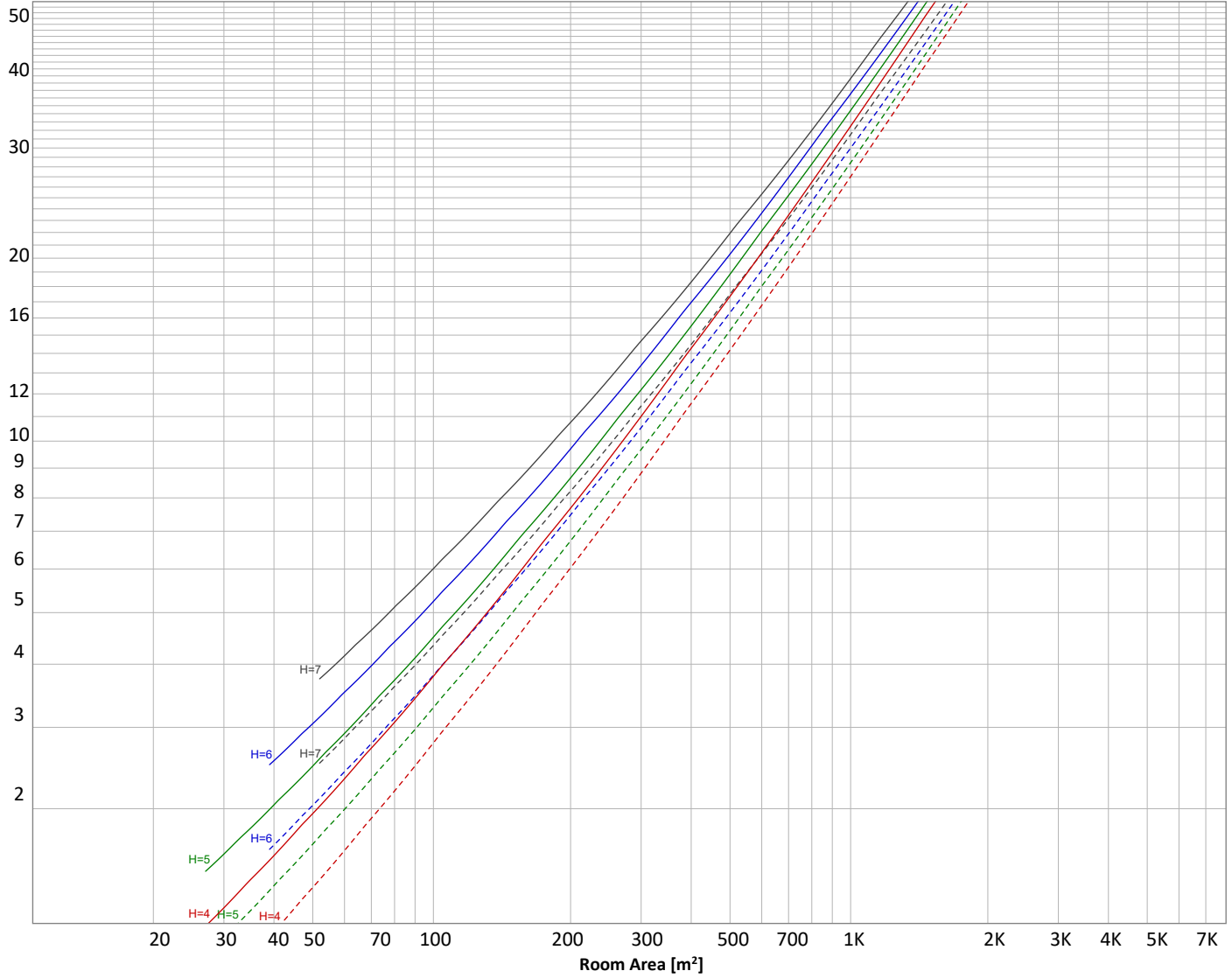
Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 4114 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°
111 lm	317 lm	480 lm	581 lm	611 lm	574 lm	484 lm	380 lm	236 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
156 lm	92,1 lm	48,3 lm	22,8 lm	10,2 lm	5,17 lm	3,25 lm	1,99 lm	0,680 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	111 lm	2,7%
10-20°	317 lm	7,7%
20-30°	480 lm	11,7%
30-40°	581 lm	14,1%
40-50°	611 lm	14,8%
50-60°	574 lm	13,9%
60-70°	484 lm	11,8%
70-80°	380 lm	9,2%
80-90°	236 lm	5,7%
90-100°	156 lm	3,8%
100-110°	92 lm	2,2%
110-120°	48 lm	1,2%
120-130°	23 lm	0,6%
130-140°	10 lm	0,2%
140-150°	5 lm	0,1%
150-160°	3 lm	0,1%
160-170°	2 lm	0,0%
170-180°	1 lm	0,0%
Total	4114 lm	100,0%

Intensity peaks

Max intensity	1168 cd
Intensity, 90°	179 cd
Intensity, 0°	1168 cd

Zonal Lumen summary

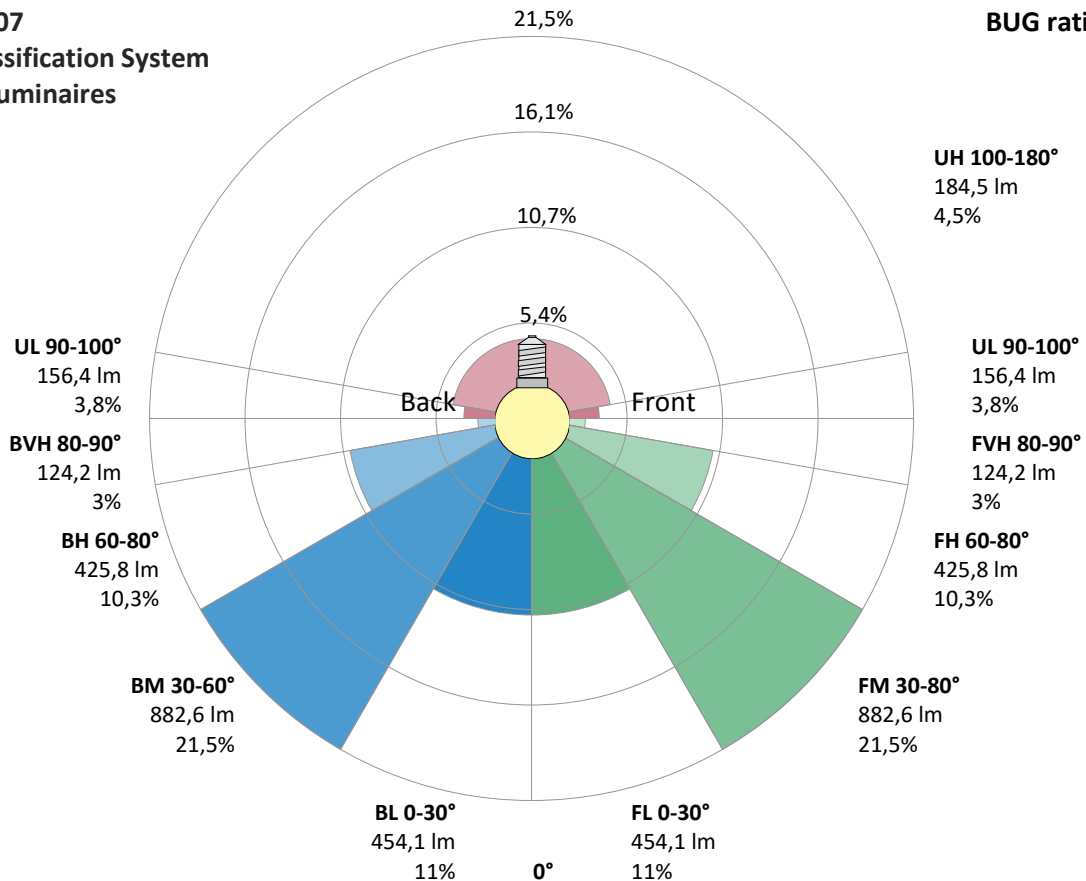
Zone (γ)	Lumen	% Total
0-30°	908 lm	22,1%
0-40°	1489 lm	36,2%
0-60°	2674 lm	65,0%
60-90°	1100 lm	26,7%
70-100°	772 lm	18,8%
90-120°	297 lm	7,2%
0-90°	3773 lm	91,7%
90-180°	341 lm	8,3%
0-180°	4114 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	454 lm	11,0%
Medium(30-60°)	883 lm	21,5%
High(60-80°)	426 lm	10,3%
Very high(80-90°)	124 lm	3,0%
Back light		
Low(0-30°)	454 lm	11,0%
Medium(30-60°)	883 lm	21,5%
High(60-80°)	426 lm	10,3%
Very high(80-90°)	124 lm	3,0%
Uplight		
Low(90-100°)	156 lm	3,8%
High(100-180°)	184 lm	4,5%

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

BUG rating B1 U3 G2



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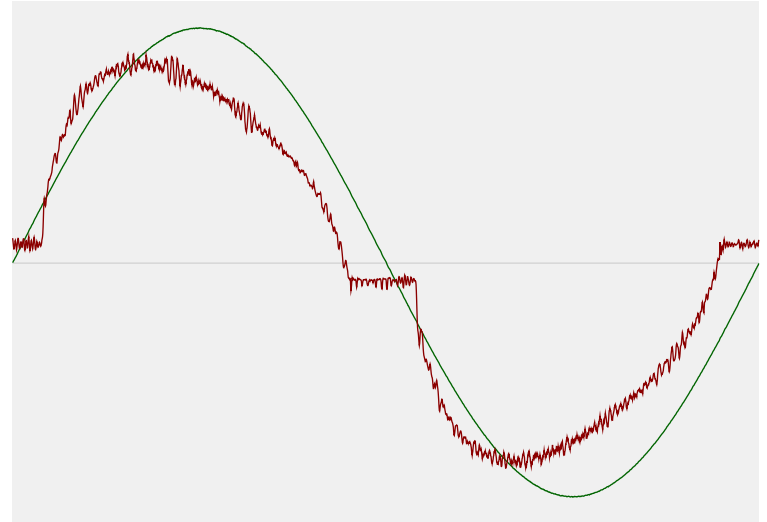


Power Details

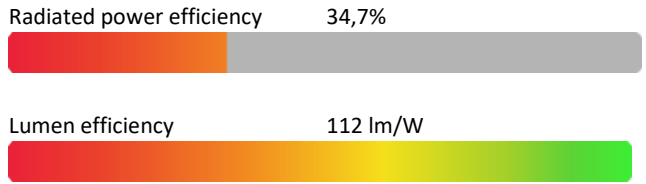
Input Power

Power feed to light source	36,7 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,166 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	38,21 VA
Displacement factor of AC power feed	0,97
Power factor of AC current feed	0,96
Total harmonic distortion of the current	14,42%
Total harmonic distortion of the voltage	0,06%

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	3978 K
CCT shift	+22 K
CCT end	4000 K

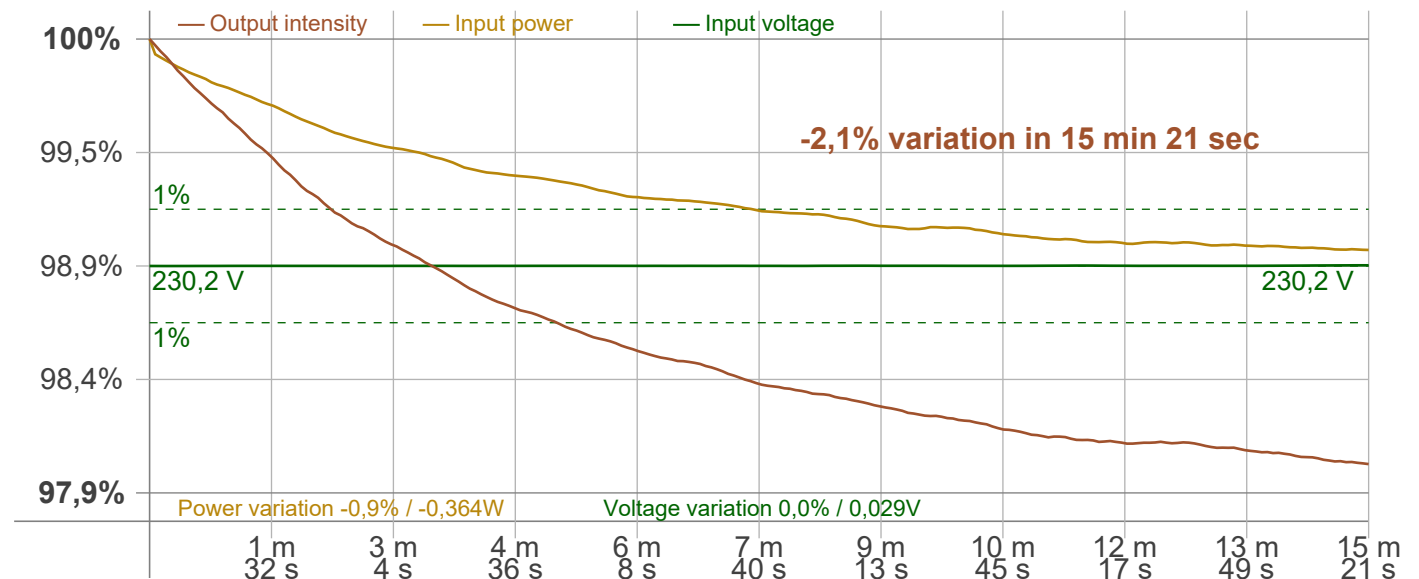
Warmup Result

Total warmup time	Lamp stabilized in 15 min 21 sec
Warmup variation	-2,1%

Output Change

Output start	4200 lm
Output change	-86 lm
Output end	4114 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 Hz
 Percent Flicker: 45,35 %
 Flicker index: 0,14

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

JA8/10 40 Hz: 0,07 %
 JA8/10 90 Hz: 0,27 %
 JA8/10 200 Hz: 44,39 %
 JA8/10 400 Hz: 45,05 %
 JA8/10 1000 Hz: 45,37 %

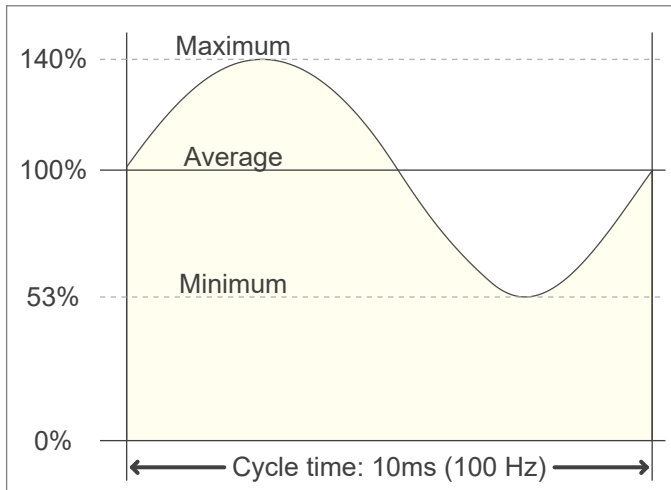
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz): 0,07
 SVM value (80 < F < 2000 Hz): 1,7

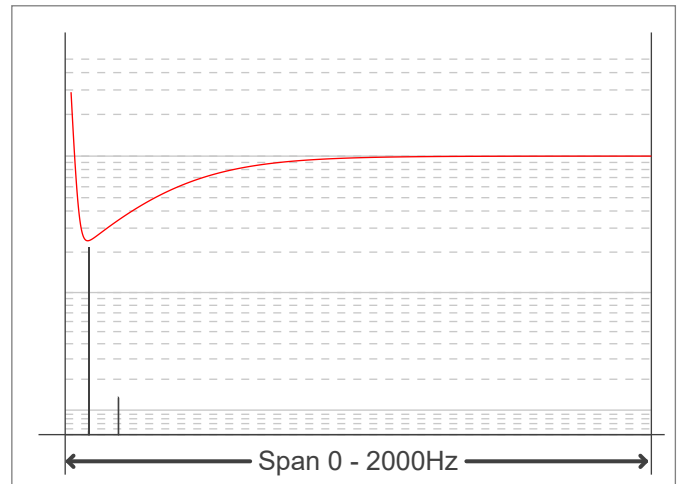
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp: 0,04

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

