

Light Measurement Report

Print date: 1-7-2025

Measurement date and time: 1-7-2025 13:11:04 – Measurement no. VFR-250701-1839-MS

Measurement tracking No. and Link: [VT250701-001542](#)

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°
2,29 m
97,4 W – PF 1,0 – DPF 1,0
230 V – 0,425 A
50 Hz
Lamp stabilized in 15 min 1 sec – 2,0%

Tested Light Source

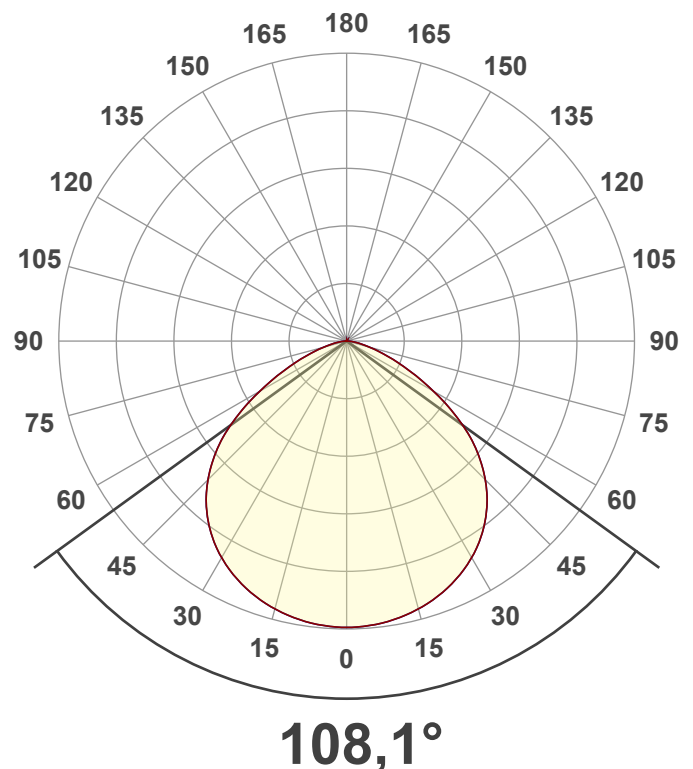
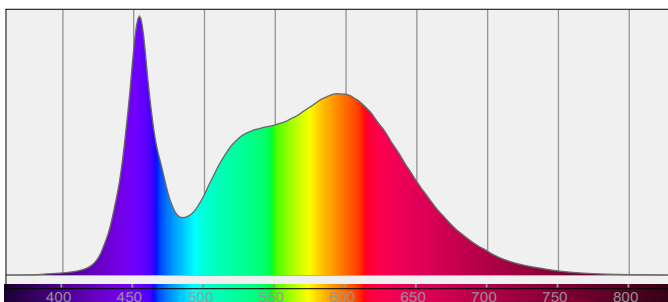
Product Name
Item No. and Manufacturer
Product Description (line 1)

811525-4000K
811525-4000K – Dutchfulfillment
LED FLOODLIGHT ISTOS | 100W | 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

9258 lm – 0,08% / 99,92%
95 lm/W
3546 cd – 108,1°
CCT = 4000 K / 4398 K
CRI 85,5
 R_f 83,9 – R_g 97,0
Duv -0,0036 – SDCM 8,7
SVM 3,69 – PstLM 0,07



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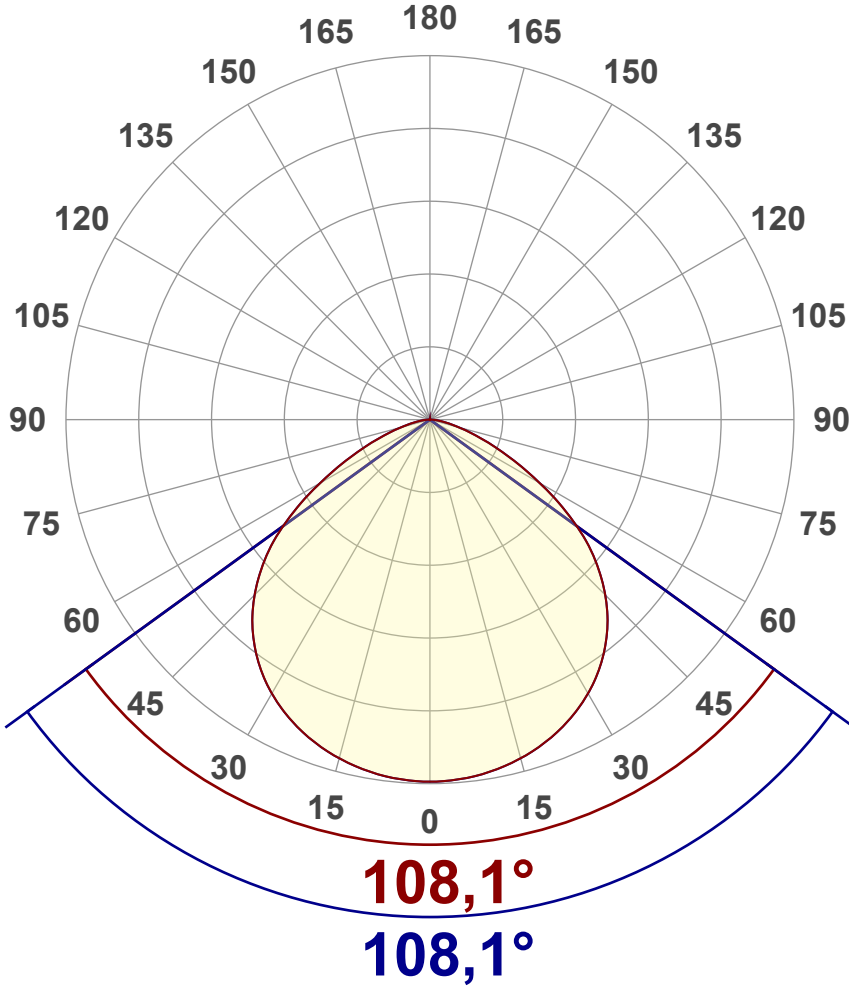
Measurement tracking No. and Link: [VT250701-001542](https://www.viso-systems.com/VT250701-001542)

Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	9258 lm
Lumen Up% / Down%	0,08% / 99,92%
Peak Intensity	3546 cd
Beam Angle (50%)	108,1°
Beam Angle (90%)	108,1°
Beam Angle (10%)	108,1°

Cut-off Angle

Average 2,5%	166,9°
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Field Angle

Average 10%	147,5°
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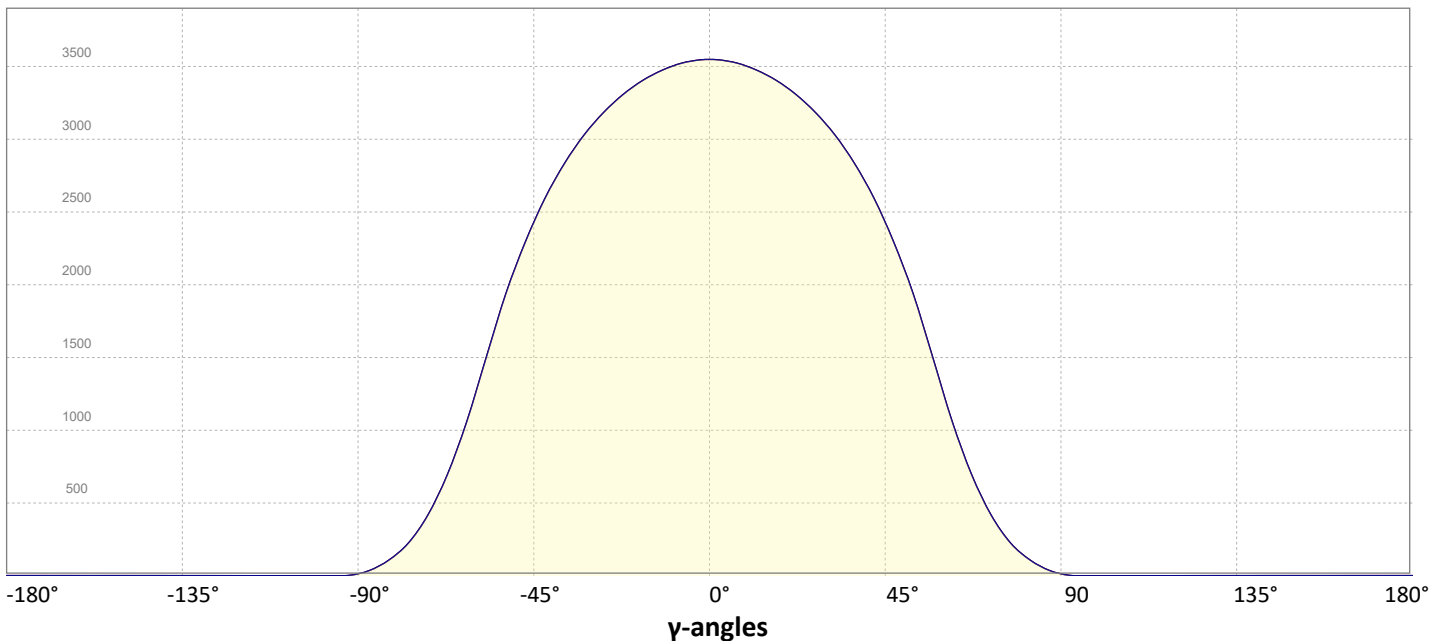
Intensity Ratio

In 120° cone	86,5%
In 90° cone	60,3%

C000-C180

C090-C270

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



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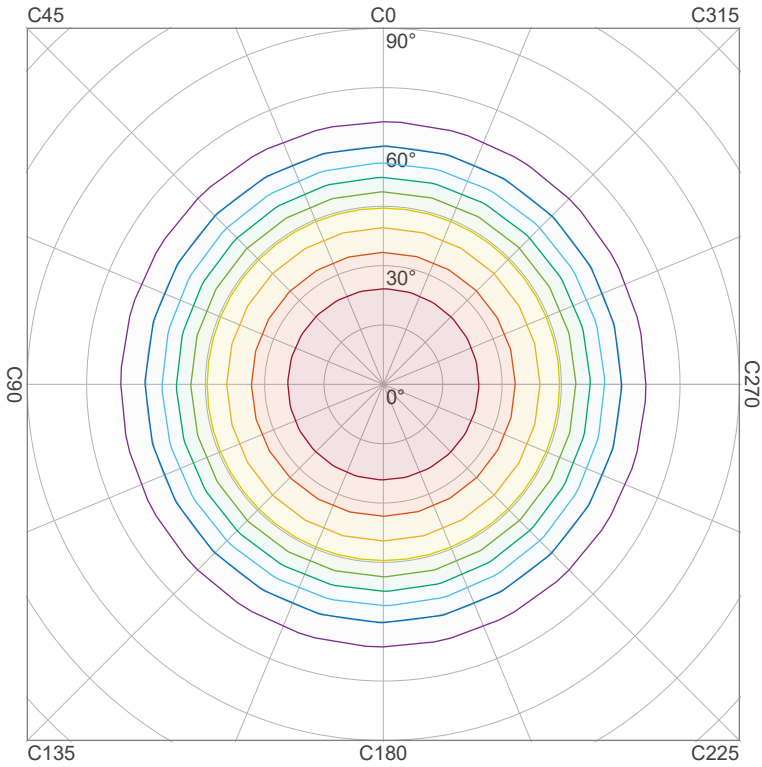
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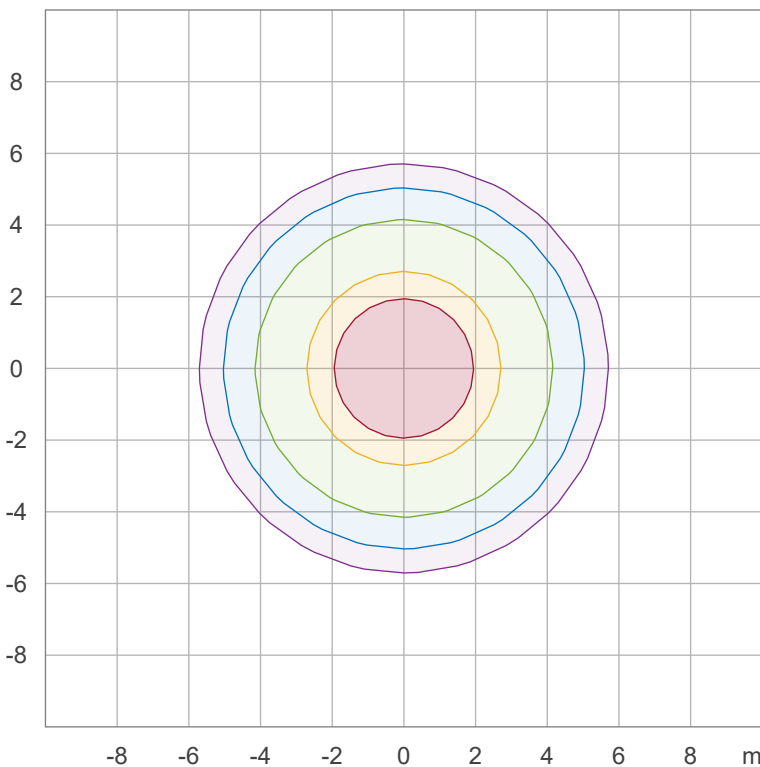
Iso-intensity Diagram (Iso-candela)



90 %	3191,3 cd
80 %	2836,7 cd
70 %	2482,1 cd
60 %	2127,5 cd
50 %	1772,9 cd
40 %	1418,4 cd
30 %	1063,8 cd
20 %	709,2 cd
10 %	354,6 cd

Peak intensity: 3545,9 cd
Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



50,0 %	197,0 lx
30,0 %	118,2 lx
10,0 %	39,4 lx
5,0 %	19,7 lx
3,0 %	11,8 lx

Peak illuminance: 394,0 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 = 4398 K
 Color Rendering Index CRI 85,5
 Color Rendering Index, R9 (red component) R9 = 23,0
 Color Rendering TM30-18 R_f 83,9 – R_g 97,0
 Color Quality Scale CQS = 82,3

MacAdam Steps SDCM = 8,7
 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 = -0,0036
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,225;0,502)

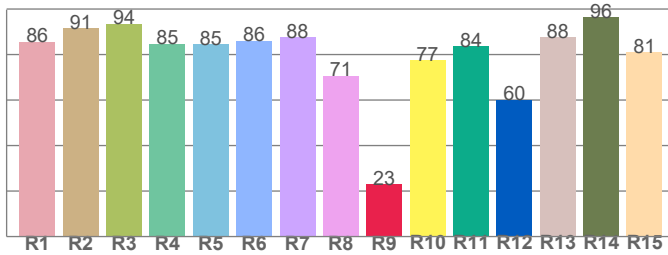
CIE 1931



CIE 1931 – zoomed on Planckian locus



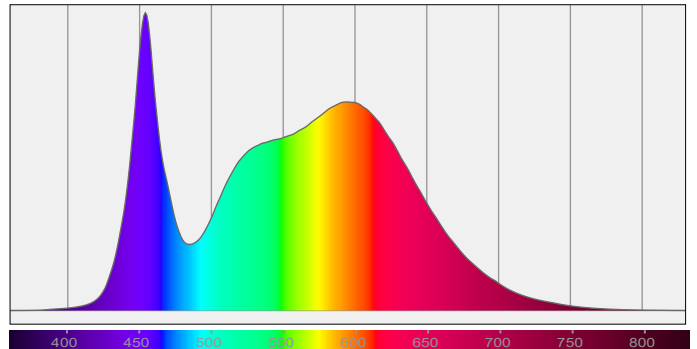
Color Rendering Index per reference color (CIE 1995)



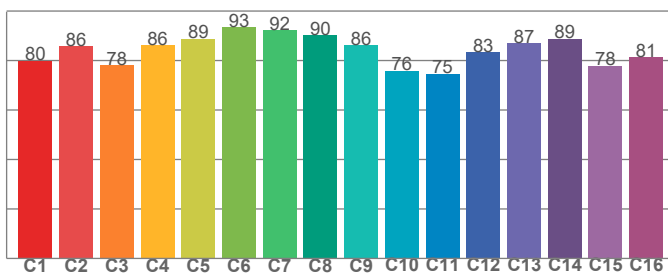
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
85,6	91,5	93,5	84,8	84,6	86,1	87,5	70,7	23,0	77,5	83,7	60,2	87,6	96,4	80,9

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



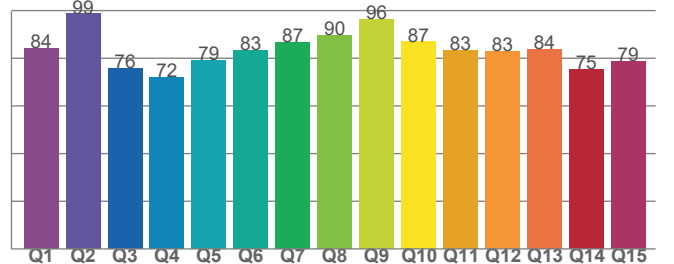
TM30-18 R_f-values per hue bin



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
79,9	85,7	78,0	86,2	88,8	93,5	92,2	90,1	86,2	75,8	74,7	83,3	86,9	88,9	77,8	81,3

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
84,2	98,6	75,9	72,0	79,2	83,3	86,6	89,7	96,3	86,9	83,4	83,0	83,7	75,4	78,7

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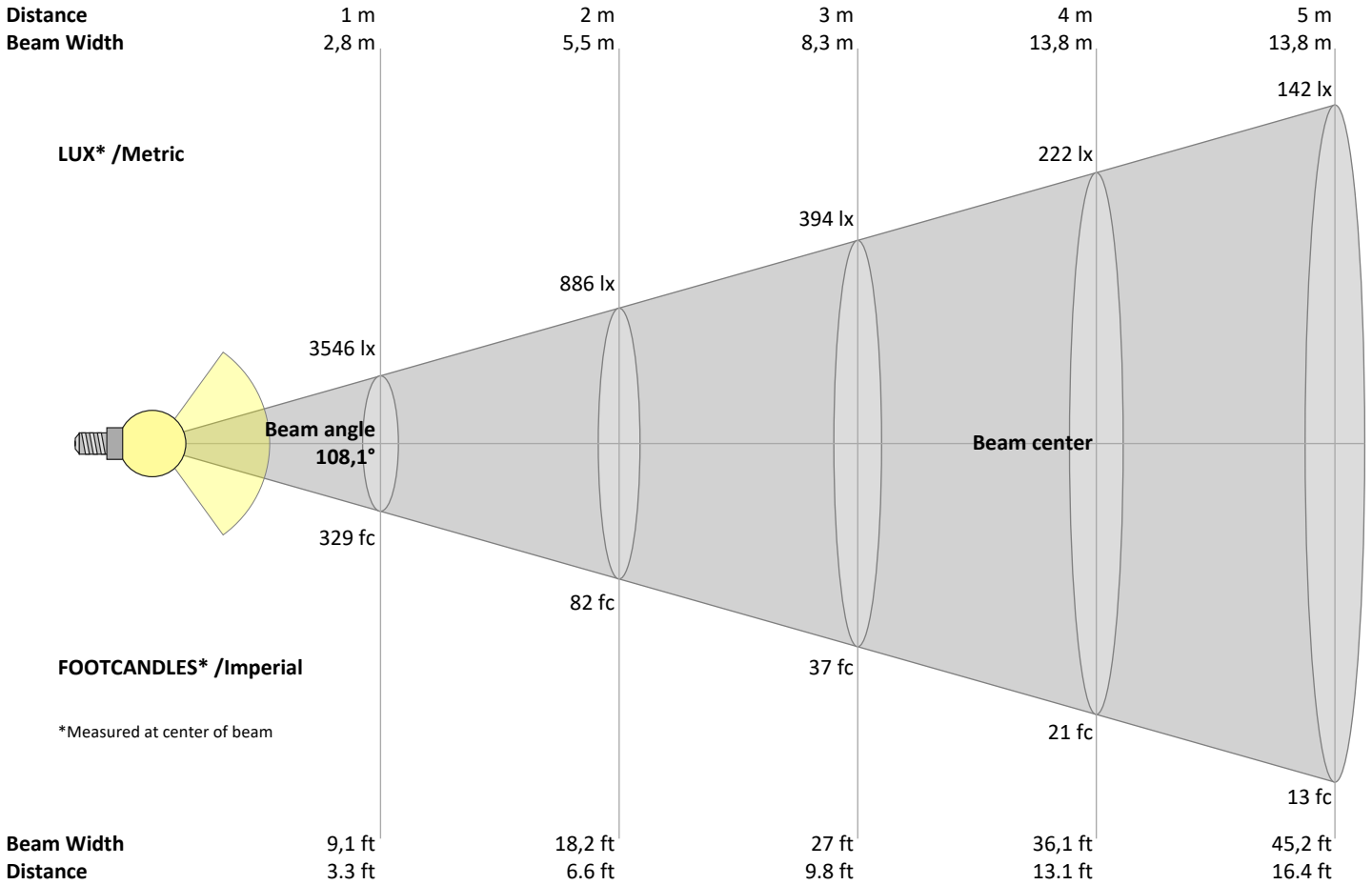
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Operator:



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
3546	886	394	222	142	98	72	55	44	35	29	25	21	18	16	14	12	11	10	9	lux
329,4	82,4	36,6	20,6	13,2	9,2	6,7	5,1	4,1	3,3	2,7	2,3	1,9	1,7	1,5	1,3	1,1	1	0,9	0,8	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
3546	3533	3495	3434	3348	3236	3095	2917	2696	2423	2092	1690	1251	851	535	306	157	66	17	2	cd
100%	100%	99%	97%	94%	91%	87%	82%	76%	68%	59%	48%	35%	24%	15%	9%	4%	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
3546	3533	3495	3434	3348	3236	3095	2917	2696	2423	2092	1690	1251	851	535	306	157	66	17	2	cd
100%	100%	99%	97%	94%	91%	87%	82%	76%	68%	59%	48%	35%	24%	15%	9%	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
3546	3533	3495	3434	3348	3236	3095	2917	2696	2423	2092	1690	1251	851	535	306	157	66	17	2	cd
100%	100%	99%	97%	94%	91%	87%	82%	76%	68%	59%	48%	35%	24%	15%	9%	4%	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
3546	3533	3495	3434	3348	3236	3095	2917	2696	2423	2092	1690	1251	851	535	306	157	66	17	2	cd
100%	100%	99%	97%	94%	91%	87%	82%	76%	68%	59%	48%	35%	24%	15%	9%	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	29,5	30,6	29,7	30,9	31,1	29,4	30,5	29,6	30,8	31,0
	3H	30,1	31,3	30,5	31,5	31,7	30,0	31,2	30,4	31,4	31,6
	4H	30,3	31,4	30,7	31,7	31,9	30,2	31,3	30,6	31,6	31,8
	6H	30,4	31,4	30,7	31,7	32,1	30,3	31,3	30,6	31,6	32,0
	8H	30,4	31,4	30,8	31,7	32,1	30,3	31,3	30,7	31,6	32,0
	12H	30,4	31,3	30,8	31,7	32,1	30,3	31,2	30,7	31,6	32,0
4H	2H	29,8	30,9	30,2	31,2	31,4	29,7	30,8	30,1	31,1	31,3
	3H	30,7	31,6	31,0	31,9	32,4	30,6	31,5	30,9	31,8	32,3
	4H	30,8	31,7	31,3	32,1	32,6	30,7	31,6	31,2	32,0	32,5
	6H	31,0	31,8	31,5	32,2	32,5	30,9	31,7	31,4	32,0	32,4
	8H	31,0	31,8	31,5	32,1	32,5	30,9	31,6	31,4	32,0	32,4
	12H	31,0	31,6	31,5	32,1	32,5	30,9	31,5	31,4	31,9	32,4
8H	4H	30,9	31,6	31,4	32,0	32,4	30,8	31,5	31,3	31,9	32,3
	6H	31,1	31,7	31,6	32,1	32,7	31,0	31,6	31,5	32,0	32,6
	8H	31,2	31,7	31,7	32,2	32,8	31,1	31,6	31,6	32,1	32,7
	12H	31,3	31,6	31,8	32,2	32,8	31,1	31,5	31,7	32,0	32,6
12H	4H	30,9	31,5	31,4	31,9	32,4	30,8	31,4	31,3	31,8	32,3
	6H	31,1	31,6	31,7	32,1	32,8	31,0	31,5	31,6	32,0	32,7
	8H	31,2	31,6	31,8	32,1	32,7	31,1	31,5	31,7	32,0	32,6

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

S = 1.0H	0,2 / -0,2	0,2 / -0,3
S = 1.5H	0,6 / -0,8	0,6 / -0,9
S = 2.0H	1,3 / -1,8	1,4 / -1,9

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	110	106	102	99	107	104	100	97	99	96	94	95	93	91	92	90	88	86
2	101	93	87	82	98	92	86	81	88	83	79	85	81	77	82	79	76	74
3	92	83	75	69	90	81	74	68	78	72	67	75	70	66	73	69	65	63
4	85	74	65	59	83	72	65	59	70	63	58	68	62	57	65	60	56	54
5	78	66	57	51	76	65	57	51	63	56	50	61	55	50	59	54	49	47
6	72	60	51	45	70	59	51	45	57	50	44	55	49	44	54	48	44	42
7	67	54	46	40	65	53	45	40	52	45	39	50	44	39	49	43	39	37
8	63	49	41	35	61	49	41	35	47	40	35	46	40	35	45	39	35	33
9	58	45	37	32	57	45	37	32	44	37	32	43	36	32	42	36	31	30
10	55	42	34	29	53	41	34	29	40	33	29	39	33	29	39	33	28	27

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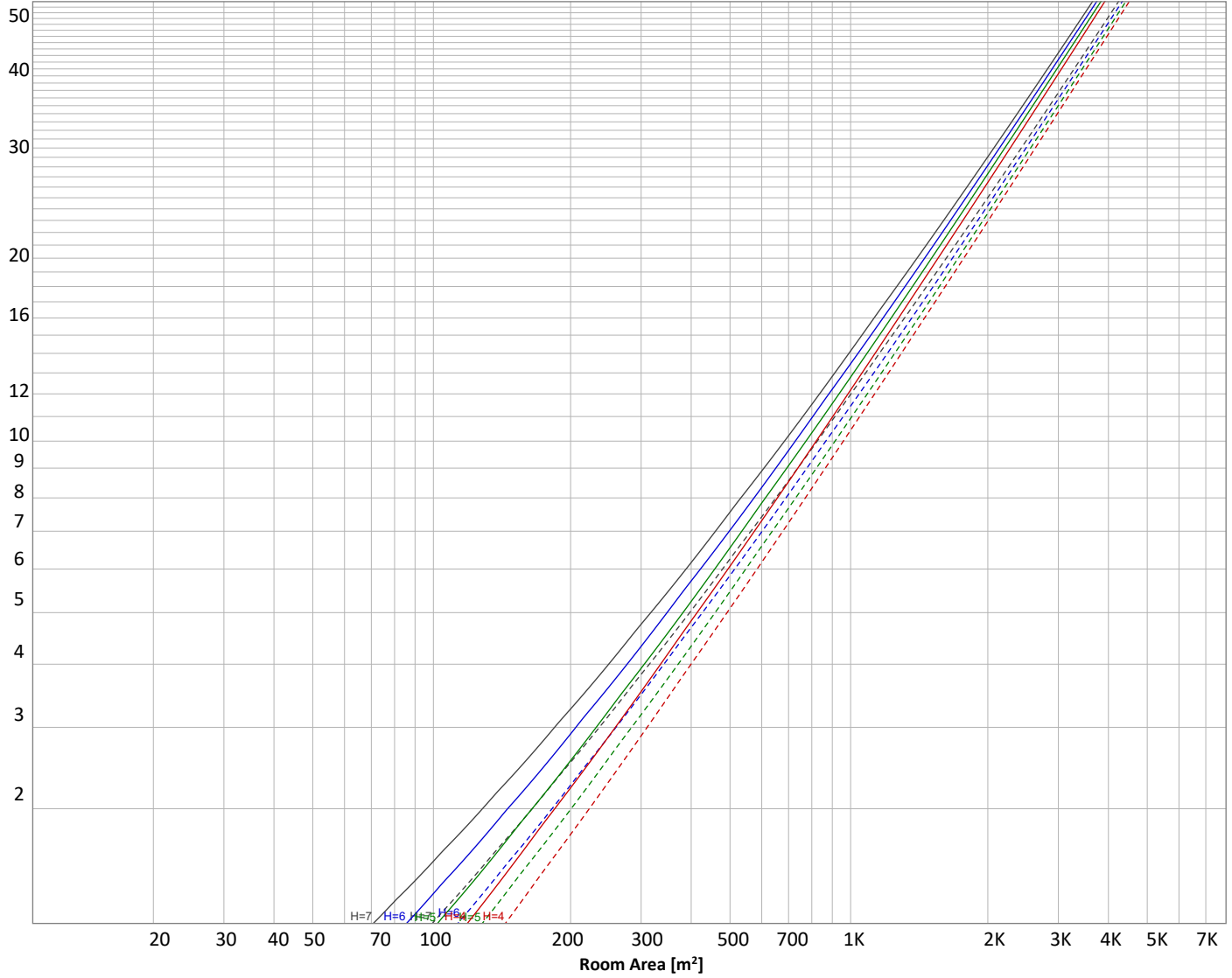
Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 9258 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°
336 lm	971 lm	1494 lm	1827 lm	1869 lm	1509 lm	844 lm	326 lm	73,8 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
1,86 lm	0,477 lm	0,707 lm	0,892 lm	0,931 lm	0,864 lm	0,659 lm	0,424 lm	0,146 lm

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Operator:



Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	336 lm	3,6%
10-20°	971 lm	10,5%
20-30°	1494 lm	16,1%
30-40°	1827 lm	19,7%
40-50°	1869 lm	20,2%
50-60°	1509 lm	16,3%
60-70°	844 lm	9,1%
70-80°	326 lm	3,5%
80-90°	74 lm	0,8%
90-100°	2 lm	0,0%
100-110°	0 lm	0,0%
110-120°	1 lm	0,0%
120-130°	1 lm	0,0%
130-140°	1 lm	0,0%
140-150°	1 lm	0,0%
150-160°	1 lm	0,0%
160-170°	0 lm	0,0%
170-180°	0 lm	0,0%
Total	9258 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	2802 lm	30,3%
0-40°	4629 lm	50,0%
0-60°	8007 lm	86,5%
60-90°	1244 lm	13,4%
70-100°	401 lm	4,3%
90-120°	3 lm	0,0%
0-90°	9251 lm	99,9%
90-180°	7 lm	0,1%
0-180°	9258 lm	100,0%

BUG rating

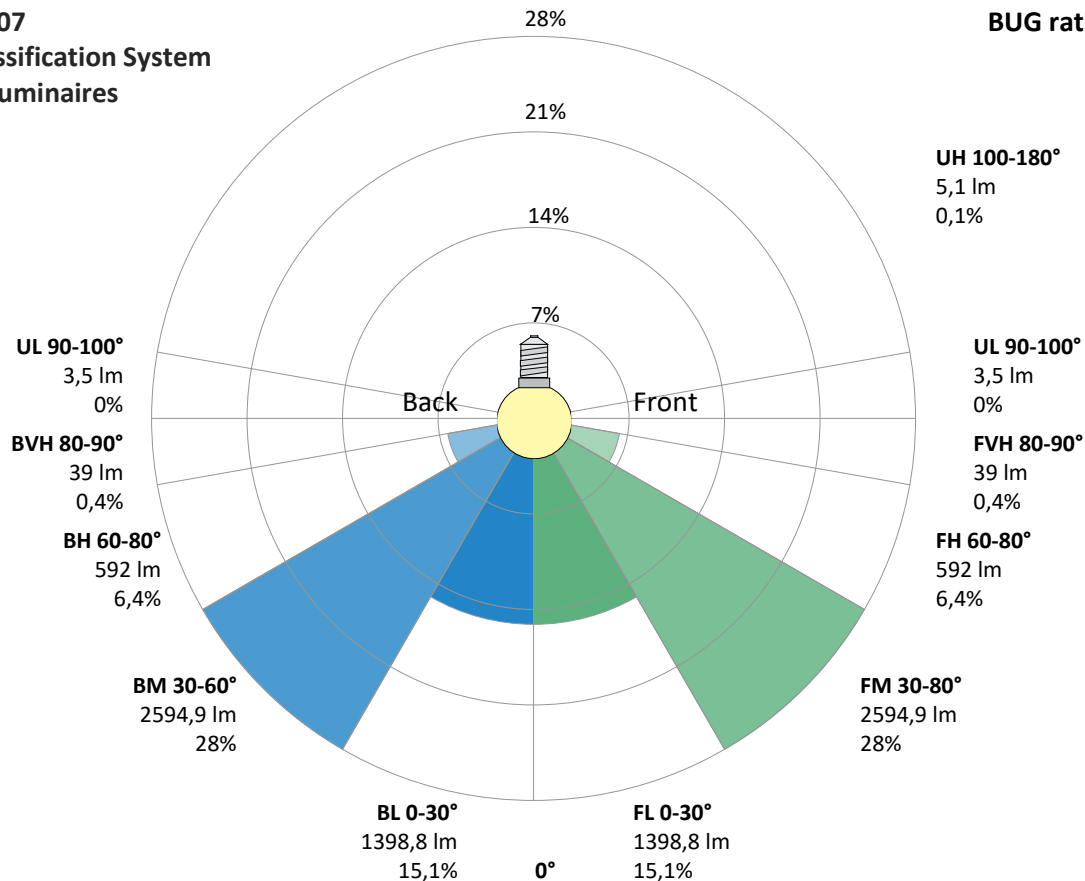
	Lumen	% Total
Forward light		
Low(0-30°)	1399 lm	15,1%
Medium(30-60°)	2595 lm	28,0%
High(60-80°)	592 lm	6,4%
Very high(80-90°)	39 lm	0,4%
Back light		
Low(0-30°)	1399 lm	15,1%
Medium(30-60°)	2595 lm	28,0%
High(60-80°)	592 lm	6,4%
Very high(80-90°)	39 lm	0,4%
Uplight		
Low(90-100°)	4 lm	0,0%
High(100-180°)	5 lm	0,1%

Intensity peaks

Max intensity	3546 cd
Intensity, 90°	17 cd
Intensity, 0°	3546 cd

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

BUG rating B3 U1 G1



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Power Details

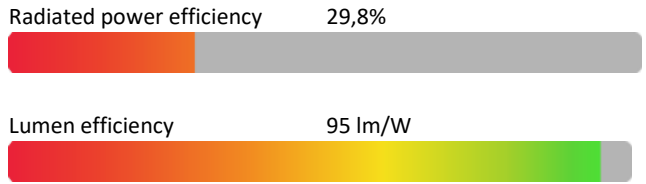
Input Power

Power feed to light source	97,4 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,425 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	97,82 VA
Displacement factor of AC power feed	1,0
Power factor of AC current feed	1,0
Total harmonic distortion of the current	9,04%
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	4001 K
CCT shift	-1 K
CCT end	4000 K

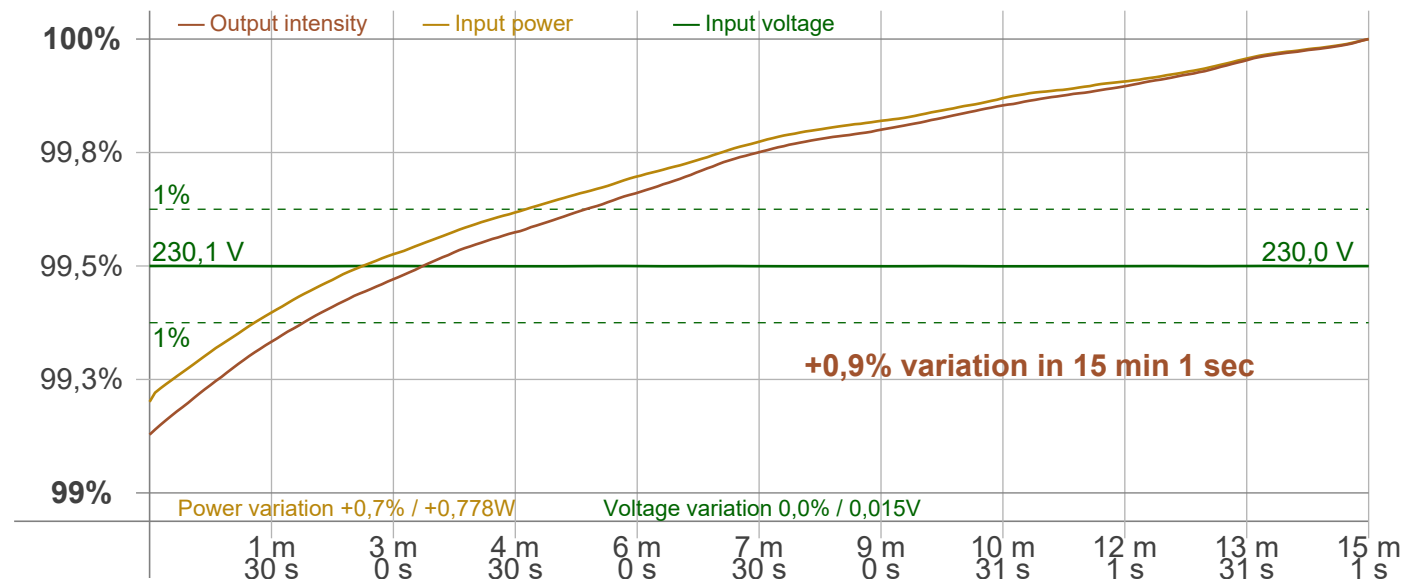
Warmup Result

Total warmup time	Lamp stabilized in 15 min 1 sec
Warmup variation	+0,9%

Output Change

Output start	9176 lm
Output change	+82 lm
Output end	9258 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 99,95 %
 Flicker index 0,31

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

JA8/10 40 Hz 0,18 %
 JA8/10 90 Hz 0,81 %
 JA8/10 200 Hz 103,7 %
 JA8/10 400 Hz 101,16 %
 JA8/10 1000 Hz 101,12 %

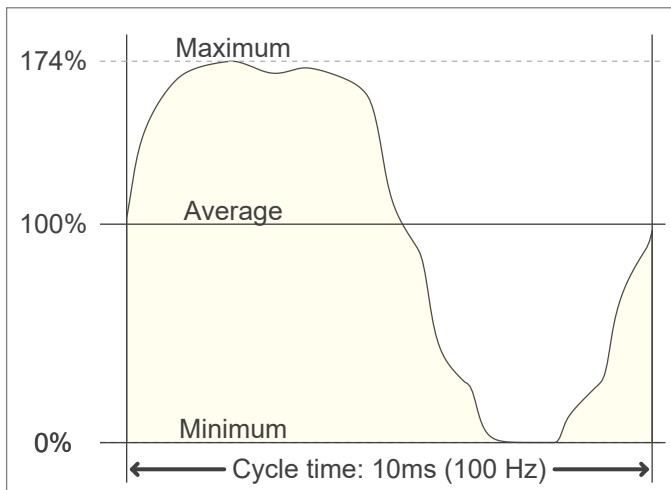
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz) 0,07
 SVM value (80 < F < 2000 Hz) 3,69

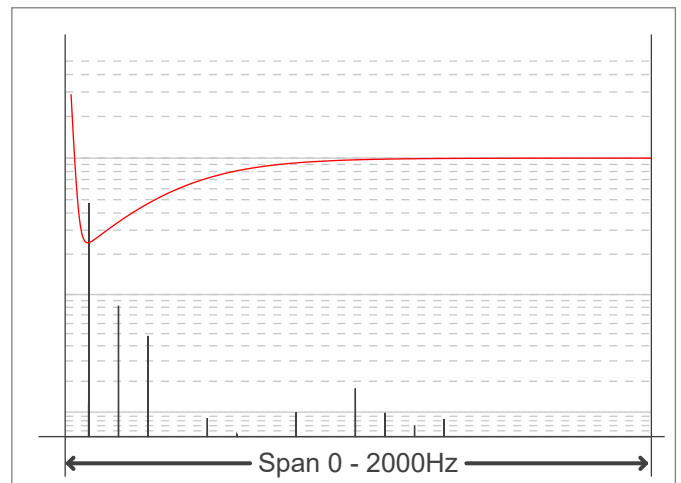
Flicker indices according to Lighting Research Center (2015)

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

