

Light Measurement Report

Print date: 20-8-2025
Measurement date and time: 20-8-2025 10:19:57 – Measurement no. VFR-250820-2628-MS
Measurement tracking No. and Link: [n/a](#)
Operator:



Laboratory and Equipment

Laboratory Owner and Location	Viso Systems, Copenhagen V, Denmark
Goniospectrometer System and Type	LabSpion – Type C, horizontal
Sensor Name, Calibr. Date and Serial No.	LabSensor Model2 – 11-1-2024 – 3130191315
Spectrometer Manufacturer and Model	Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

Measurement Conditions

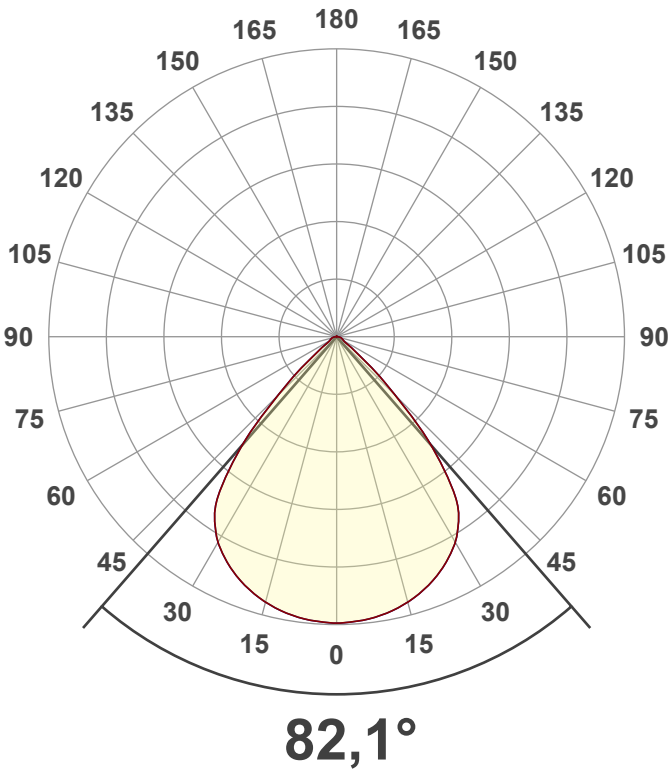
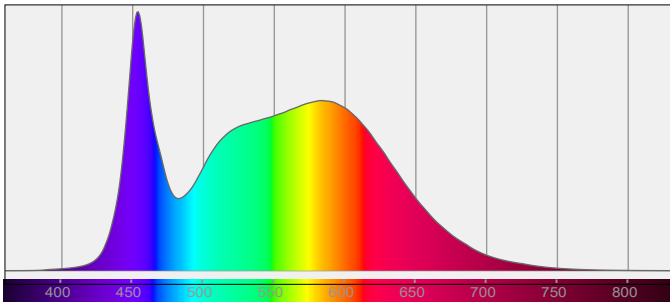
Number of C-planes and Resolution	12 planes – 30°
γ (gamma)-Resolution	5°
Test Distance	3,99 m
Input Power, Power and Displ. Factors	141,4 W – PF 0,98 – DPF 0,98
Input RMS Voltage and Current	230 V – 0,628 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 2 sec – 2,0%

Tested Light Source

Product Name	812867-5000K-150W
Item No. and Manufacturer	812867-5000K-150W – Dutchfulfillment
Product Description (line 1)	LED HIGHBAY SPARTA 0-10V 150W/120W/80W 90° CCT SWITCH
UGR <23	

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	22350 lm – 0,23% / 99,77%
Efficiency	158 lm/W
Peak Intensity and Beam Angle	14327 cd – 82,1°
Correlated Color Temperature, Target/Measured	CCT = 5000 K / 4973 K
Color Rendering Index	CRI 81,9
Color Rendering TM30-18	R _f 83,3 – R _g 93,2
Color Shift, CIE duv and MacAdam Steps	Duv 0,0060 – SDCM 5,9
Flicker	SVM 0 – PstLM 0,09



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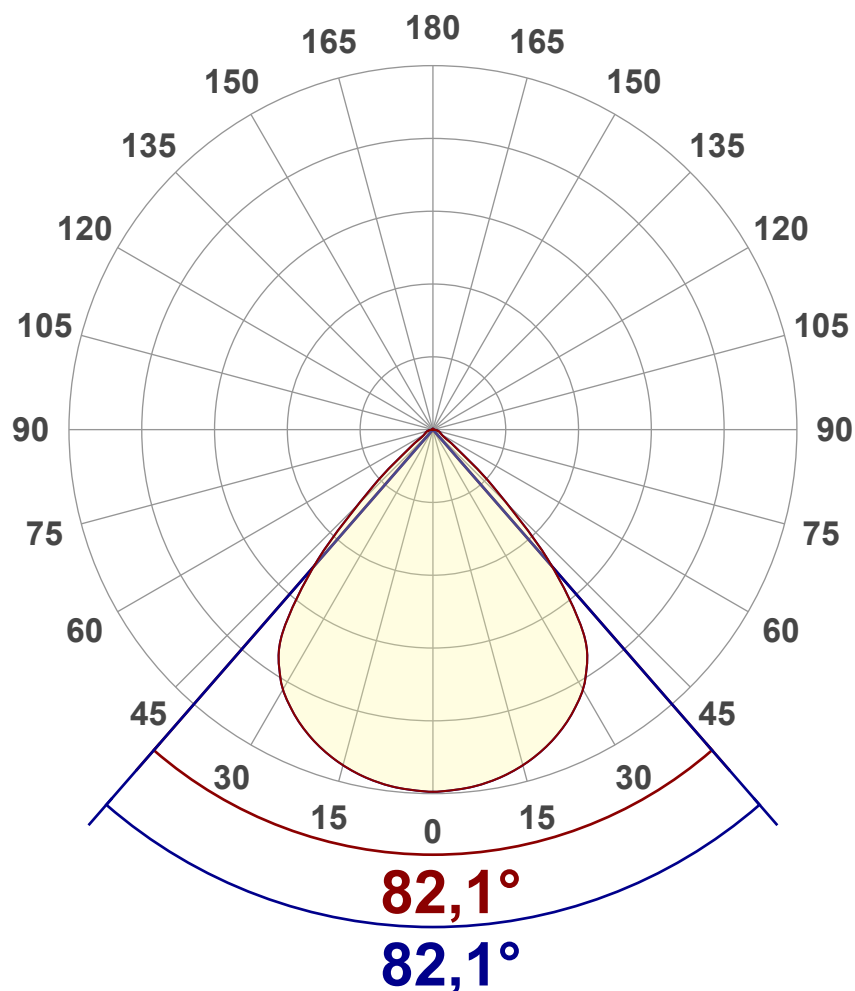
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	22350 lm
Lumen Up% / Down%	0,23% / 99,77%
Peak Intensity	14327 cd
Beam Angle (50%)	82,1°
Beam Angle (90%)	82,1°
Beam Angle (10%)	82,1°

Cut-off Angle

Average 2,5%	127°
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Field Angle

Average 10%	102°
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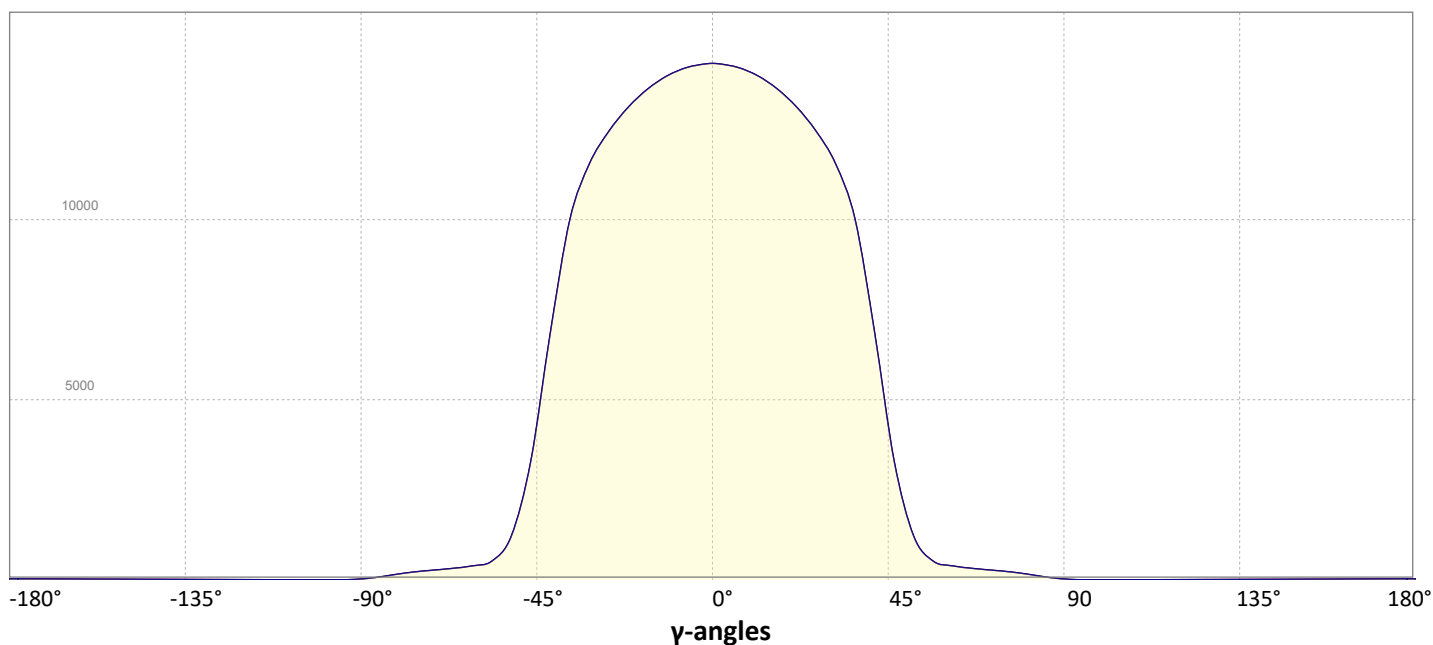
Intensity Ratio

In 120° cone	96,8%
In 90° cone	88,5%

C000-C180

C090-C270

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

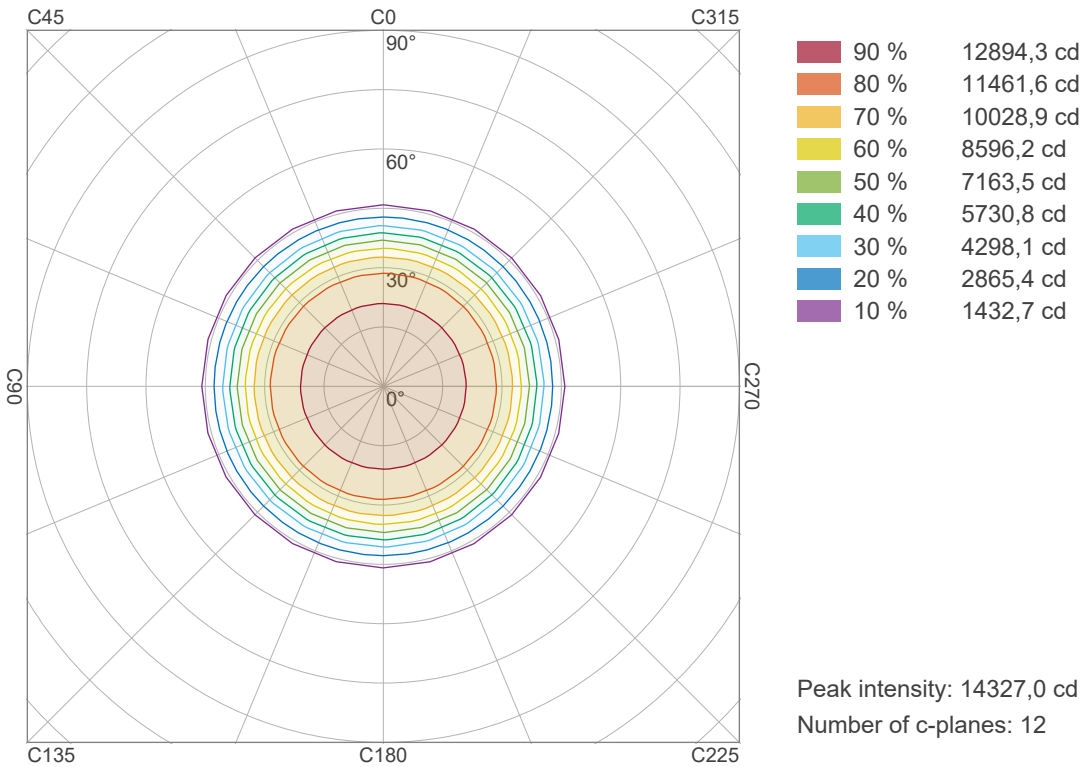


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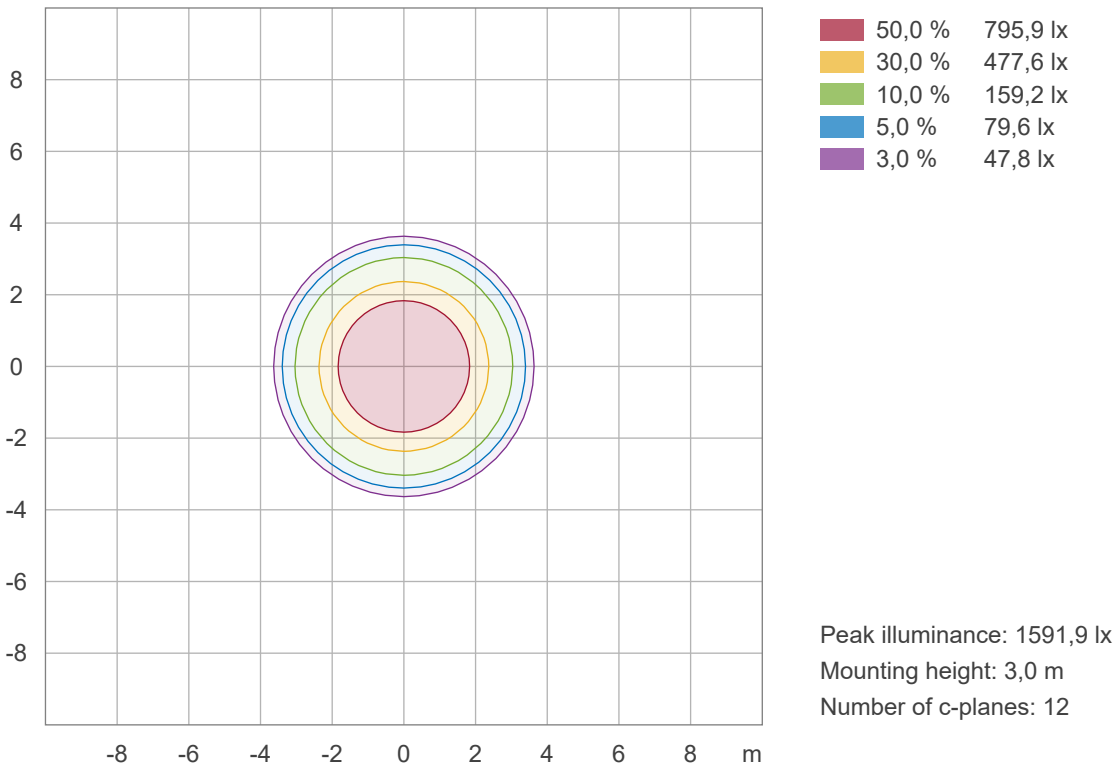
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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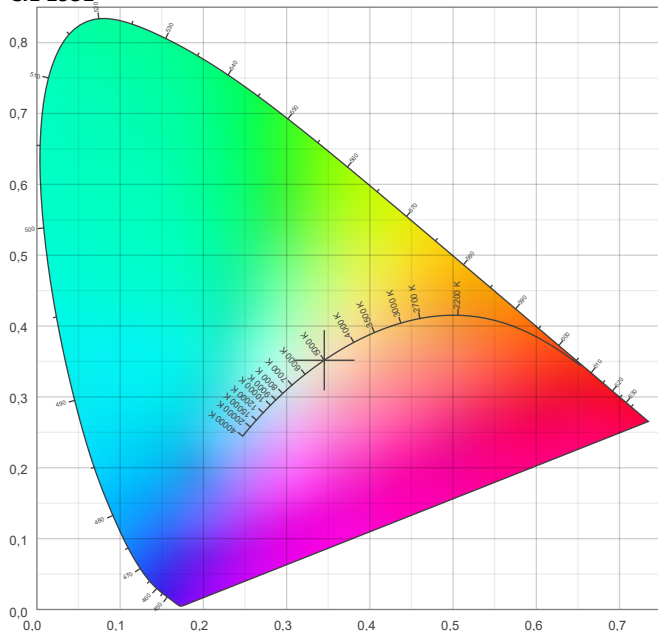


Color details

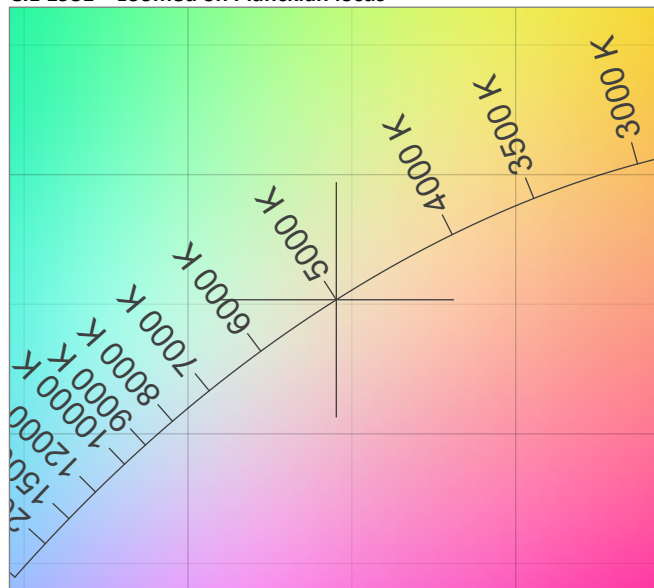
Correlated Color Temperature, Target CCT = 5000 K
Correlated Color Temperature, Measured CCT = 4973 K
Color Rendering Index CRI 81,9
Color Rendering Index, R9 (red component) R9 = -2,7
Color Rendering TM30-18 R_f 83,3 – R_g 93,2
Color Quality Scale CQS = 81,2

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0,345;0,352)
Color coordinate CIEs 1960 (u;v) = (0,211;0,323)
Color deviation from BBL Duv = 0,0060
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,211;0,485)

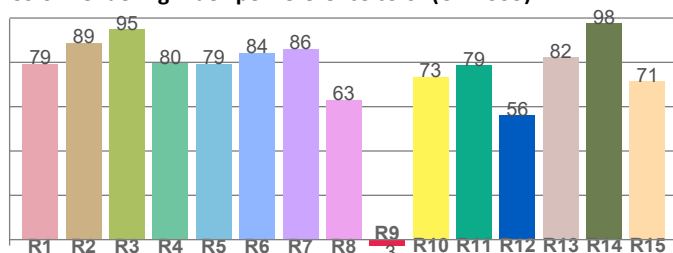
CIE 1931



CIE 1931 – zoomed on Planckian locus



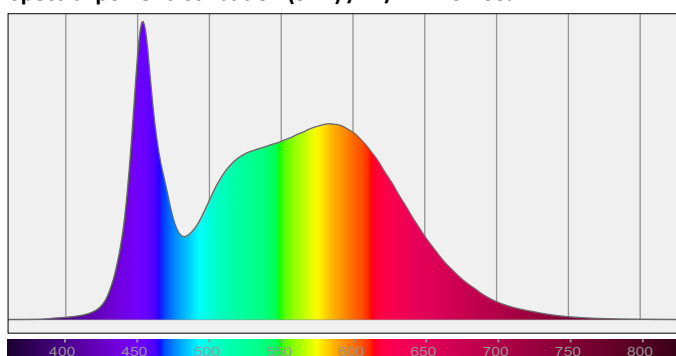
Color Rendering Index per reference color (CIE 1995)



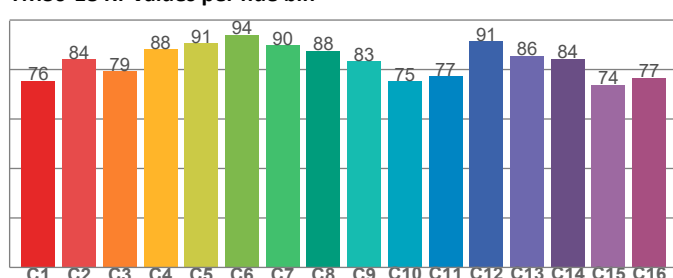
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
79,3	88,8	95,0	79,5	79,3	84,2	86,1	63,1	-2,7	73,5	78,7	56,1	82,1	97,6	71,4

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



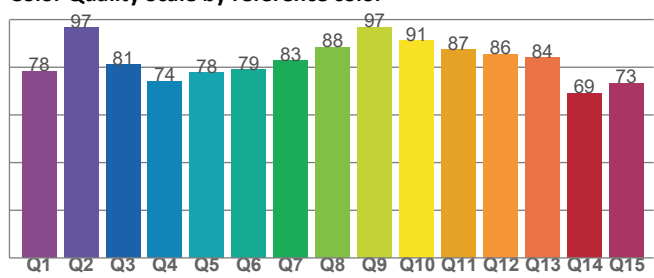
TM30-18 Rf-values per hue bin



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
75,5	84,2	79,2	88,2	90,6	94,1	89,9	87,6	83,4	75,3	77,3	91,3	85,5	84,3	73,8	76,6

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
78,3	96,7	81,0	74,0	77,7	79,0	82,7	88,5	96,8	91,2	87,3	85,5	83,9	69,1	73,2

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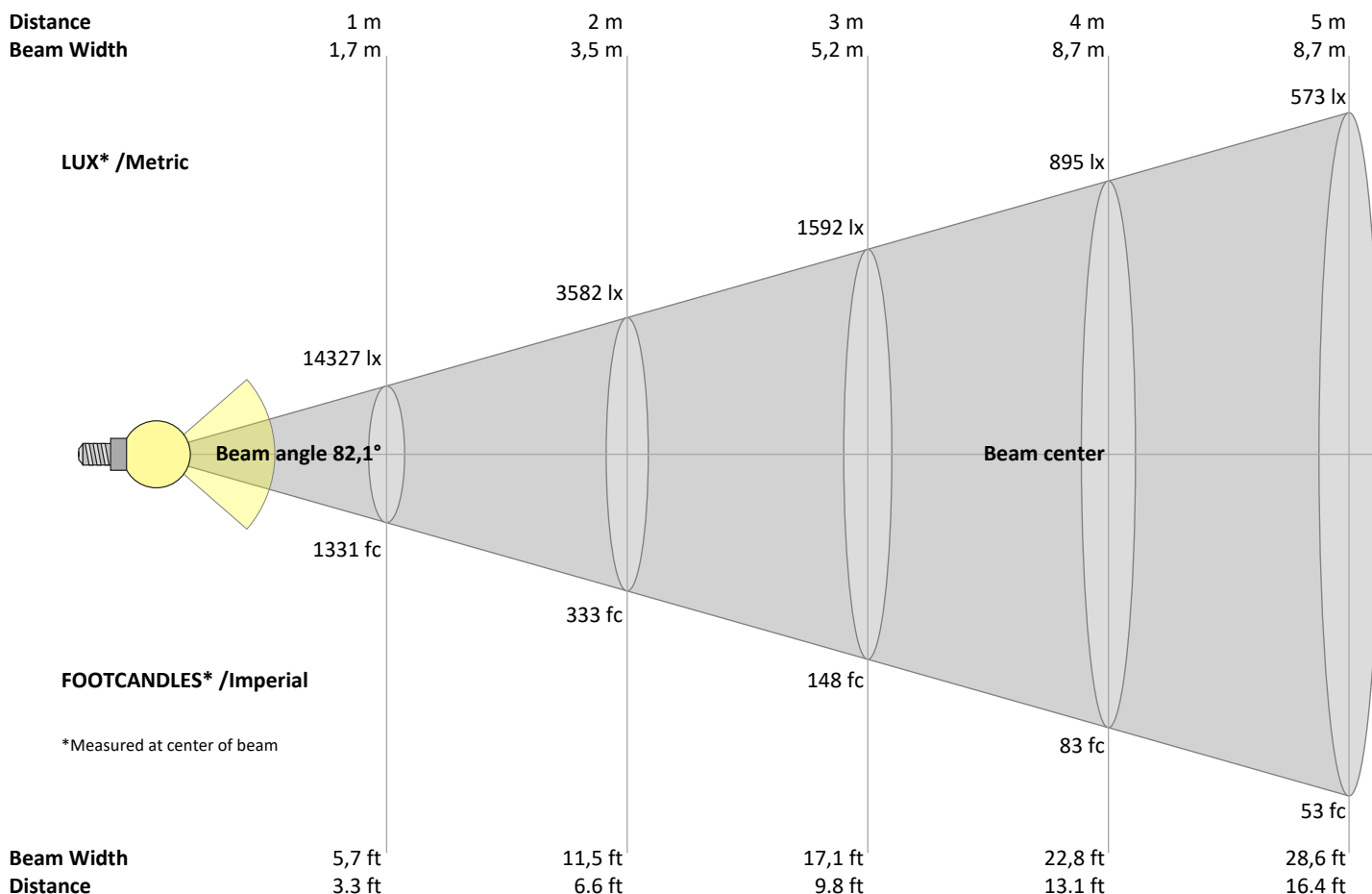
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Beam Details



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
14327	3582	1592	895	573	398	292	224	177	143	118	99	85	73	64	56	50	44	40	36	lux
1331	332,8	147,9	83,2	53,2	37	27,2	20,8	16,4	13,3	11	9,2	7,9	6,8	5,9	5,2	4,6	4,1	3,7	3,3	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
14,3K	14,3K	14,1K	13,7K	13,3K	12,7K	11,8K	10,5K	7,8K	4,4K	1,8K	0,7K	0,4K	0,3K	0,3K	0,2K	0,2K	0,1K	0,0K	0,0K	cd
100%	100%	98%	96%	93%	88%	83%	73%	55%	31%	13%	5%	3%	2%	2%	2%	1%	1%	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
14,3K	14,3K	14,1K	13,7K	13,3K	12,7K	11,8K	10,5K	7,8K	4,4K	1,8K	0,7K	0,4K	0,3K	0,3K	0,2K	0,2K	0,1K	0,0K	0,0K	cd
100%	100%	98%	96%	93%	88%	83%	73%	55%	31%	13%	5%	3%	2%	2%	2%	1%	1%	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
14,3K	14,3K	14,1K	13,7K	13,3K	12,7K	11,8K	10,5K	7,8K	4,4K	1,8K	0,7K	0,4K	0,3K	0,3K	0,2K	0,2K	0,1K	0,0K	0,0K	cd
100%	100%	98%	96%	93%	88%	83%	73%	55%	31%	13%	5%	3%	2%	2%	2%	1%	1%	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
14,3K	14,3K	14,1K	13,7K	13,3K	12,7K	11,8K	10,5K	7,8K	4,4K	1,8K	0,7K	0,4K	0,3K	0,3K	0,2K	0,2K	0,1K	0,0K	0,0K	cd
100%	100%	98%	96%	93%	88%	83%	73%	55%	31%	13%	5%	3%	2%	2%	2%	1%	1%	0%	0%	of 0°val

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Light Planning – UGR table

Uncorrected, 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	2H	25,8	26,6	25,9	26,9	27,1	25,8	26,6	25,9	26,9	27,1
	3H	25,6	26,5	26,0	26,8	26,9	25,6	26,5	26,0	26,8	26,9
	4H	25,6	26,5	26,0	26,7	27,0	25,6	26,5	26,0	26,7	27,0
	6H	25,7	26,4	26,0	26,7	27,1	25,7	26,4	26,0	26,7	27,1
	8H	25,7	26,4	26,0	26,7	27,1	25,7	26,4	26,0	26,7	27,1
	12H	25,7	26,4	26,0	26,7	27,2	25,7	26,4	26,0	26,7	27,2
4H	2H	25,5	26,4	25,9	26,6	26,9	25,5	26,4	25,9	26,6	26,9
	3H	25,5	26,2	25,9	26,6	27,0	25,5	26,2	25,9	26,6	27,0
	4H	25,5	26,2	26,0	26,6	27,1	25,5	26,2	26,0	26,6	27,1
	6H	25,6	26,3	26,1	26,6	27,0	25,6	26,3	26,1	26,6	27,0
	8H	25,6	26,2	26,2	26,6	27,0	25,6	26,2	26,2	26,6	27,0
	12H	25,6	26,1	26,1	26,5	27,0	25,6	26,1	26,1	26,5	27,0
8H	4H	25,5	26,1	26,0	26,4	26,8	25,5	26,1	26,0	26,4	26,8
	6H	25,7	26,1	26,2	26,5	27,1	25,7	26,1	26,2	26,5	27,1
	8H	25,8	26,1	26,3	26,6	27,2	25,8	26,1	26,3	26,6	27,2
	12H	25,8	26,1	26,4	26,6	27,2	25,8	26,1	26,4	26,6	27,2
12H	4H	25,5	25,9	26,0	26,3	26,8	25,5	25,9	26,0	26,3	26,8
	6H	25,7	26,0	26,2	26,5	27,2	25,7	26,0	26,2	26,5	27,2
	8H	25,7	26,0	26,3	26,5	27,1	25,7	26,0	26,3	26,5	27,1
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		1,9 / -3,8					1,9 / -3,8				
S = 1.5H		4,0 / -4,6					4,0 / -4,6				
S = 2.0H		5,8 / -4,9					5,8 / -4,9				

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	112	109	106	103	110	107	104	102	103	100	98	99	97	95	95	94	93	91
2	105	100	95	91	103	98	93	90	94	91	88	91	88	86	88	86	84	82
3	99	91	85	81	97	90	84	80	87	82	79	84	80	77	82	79	76	74
4	93	84	77	72	91	82	76	72	80	75	71	78	74	70	76	72	69	67
5	87	77	70	65	85	76	70	65	74	68	64	72	67	63	71	66	63	61
6	81	71	64	59	80	70	64	59	68	63	58	67	62	58	66	61	57	56
7	77	66	59	54	75	65	58	54	64	58	53	62	57	53	61	56	53	51
8	72	61	54	49	71	60	54	49	59	53	49	58	52	49	57	52	48	47
9	68	57	50	45	67	56	50	45	55	49	45	54	49	45	53	48	44	43
10	64	53	46	42	63	52	46	42	51	46	41	51	45	41	50	45	41	40

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	{LUM00-10} lm	#VALUE!
10-20°	{LUM10-20} lm	#VALUE!
20-30°	{LUM20-30} lm	#VALUE!
30-40°	{LUM30-40} lm	#VALUE!
40-50°	{LUM40-50} lm	#VALUE!
50-60°	{LUM50-60} lm	#VALUE!
60-70°	{LUM60-70} lm	#VALUE!
70-80°	{LUM70-80} lm	#VALUE!
80-90°	{LUM80-90} lm	#VALUE!
90-100°	{LUM90-100} lm	#VALUE!
100-110°	{LUM100-110} lm	#VALUE!
110-120°	{LUM110-120} lm	#VALUE!
120-130°	{LUM120-130} lm	#VALUE!
130-140°	{LUM130-140} lm	#VALUE!
140-150°	{LUM140-150} lm	#VALUE!
150-160°	{LUM150-160} lm	#VALUE!
160-170°	{LUM160-170} lm	#VALUE!
170-180°	{LUM170-180} lm	#VALUE!
Total	0 lm	#VALUE!

Intensity peaks

Max intensity	{PEAK} cd
Intensity, 90°	{INT90} cd
Intensity, 0°	{INT0} cd

Zonal Lumen summary

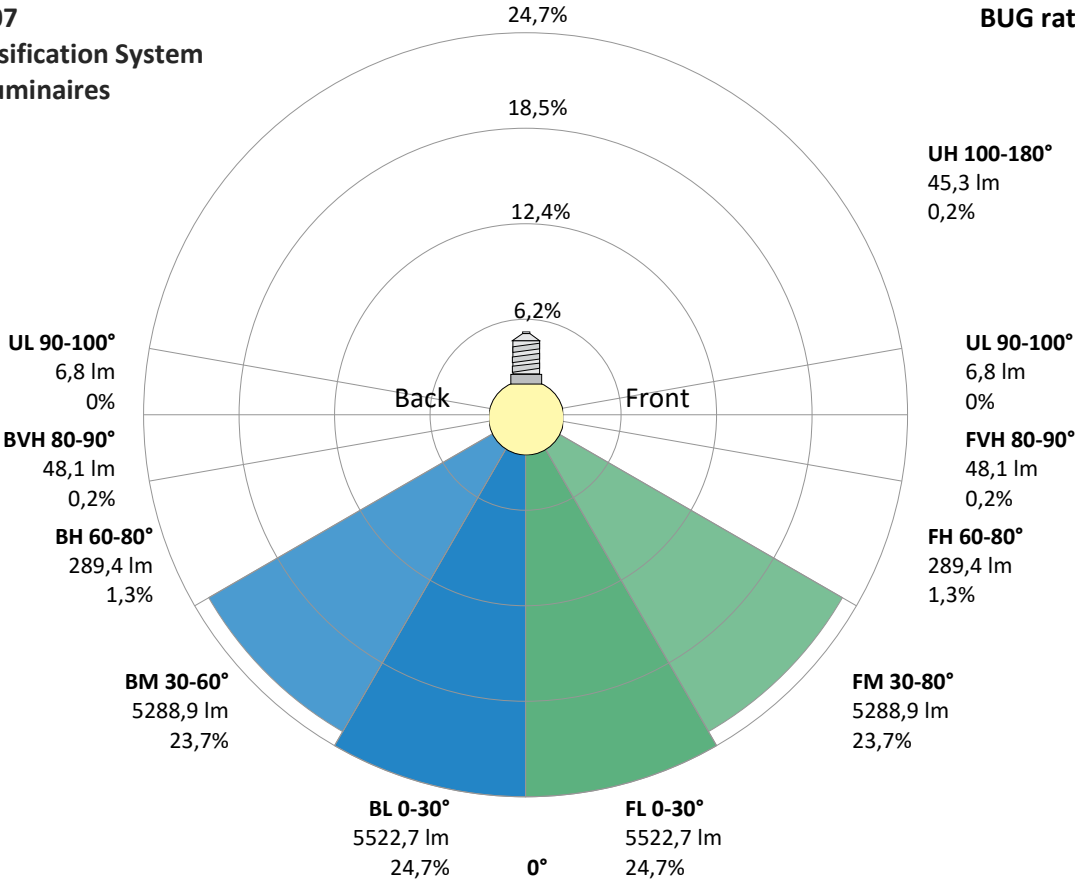
Zone (γ)	Lumen	% Total
0-30°	{LUM00-30} lm	#VALUE!
0-40°	{LUM00-40} lm	#VALUE!
0-60°	{LUM00-60} lm	#VALUE!
60-90°	{LUM60-90} lm	#VALUE!
70-100°	{LUM70-100} lm	#VALUE!
90-120°	{LUM90-120} lm	#VALUE!
0-90°	{LUM00-90} lm	#VALUE!
90-180°	{LUM90-180} lm	#VALUE!
0-180°	{LUM00-180} lm	#VALUE!

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	{BUG0} lm	#VALUE!
Medium(30-60°)	{BUG1} lm	#VALUE!
High(60-80°)	{BUG2} lm	#VALUE!
Very high(80-90°)	{BUG3} lm	#VALUE!
Back light		
Low(0-30°)	{BUG4} lm	#VALUE!
Medium(30-60°)	{BUG5} lm	#VALUE!
High(60-80°)	{BUG6} lm	#VALUE!
Very high(80-90°)	{BUG7} lm	#VALUE!
Uplight		
Low(90-100°)	{BUG8} lm	#VALUE!
High(100-180°)	{BUG9} lm	#VALUE!

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

BUG rating B5 U2 G1



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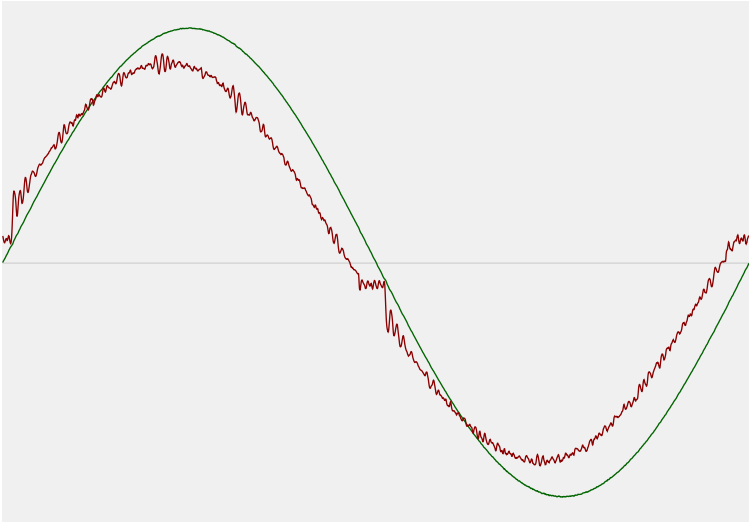


Power Details

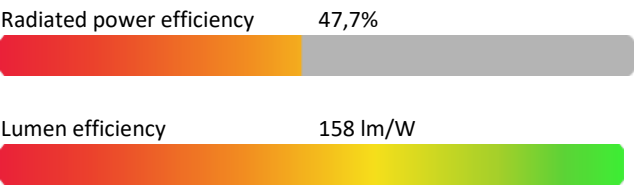
Input Power

Power feed to light source	141,4 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,628 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	144,5 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,98
Total harmonic distortion of the current	3,33%
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	4995 K
CCT shift	+5 K
CCT end	5000 K

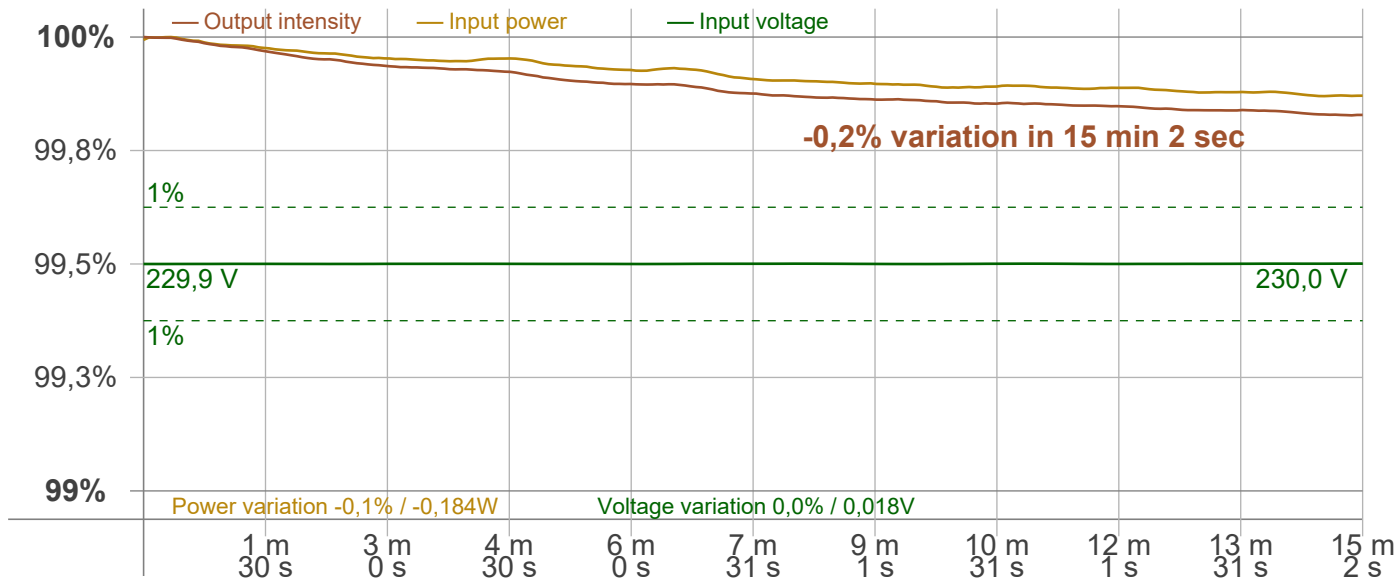
Warmup Result

Total warmup time	Lamp stabilized in 15 min 2 sec
Warmup variation	-0,2%

Output Change

Output start	22388 lm
Output change	-38 lm
Output end	22350 lm

Stabilization Curve



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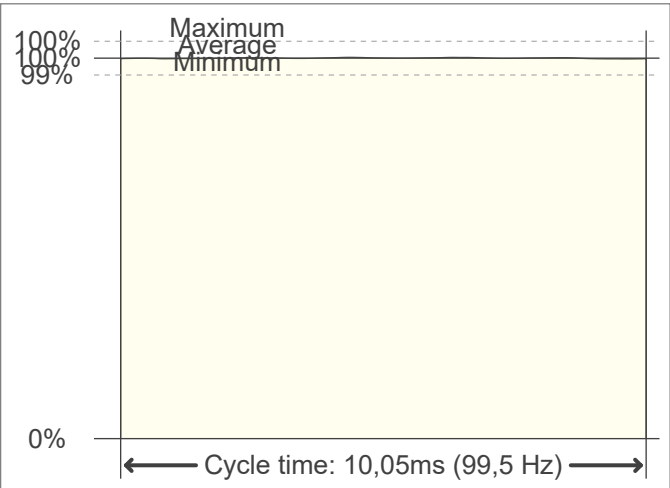
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Flicker /TLA details

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	99,5 Hz	JA8/10 40 Hz	0,18 %
Percent Flicker	0,55 %	JA8/10 90 Hz	0,2 %
Flicker index	0	JA8/10 200 Hz	0,34 %
		JA8/10 400 Hz	0,37 %
		JA8/10 1000 Hz	0,52 %
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)	0,09	Perception metric, Assist Mp	0,04
SVM value (80 < F < 2000 Hz)	0		

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

