

Light Measurement Report

Print date: 1/7/2026

Measurement date and time: 11/14/2025 1:11:37 PM – Measurement no. VFR-251114-0505-MS

Measurement tracking No. and Link: [n/a](#)

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 – 4/8/2025 – 1516006613

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

4 planes – 90°

5°

10.57 m

17.3 W – PF 0.99 – DPF 0.99

121 V – 0.145 A

60 Hz

Not completed – 2.0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

casted endcap, where I was not powered.

HP1-P-D-4'-H-835-F-BLX2835

HP1-P-D-4'-H-835-F-BLX2835 – Finelite Inc.

Tested using the BLX 2835 boards, with the final HP1 I/D prototype with

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

2044 lm – 1.32% / 98.68%

118 lm/W

887 cd – 91°

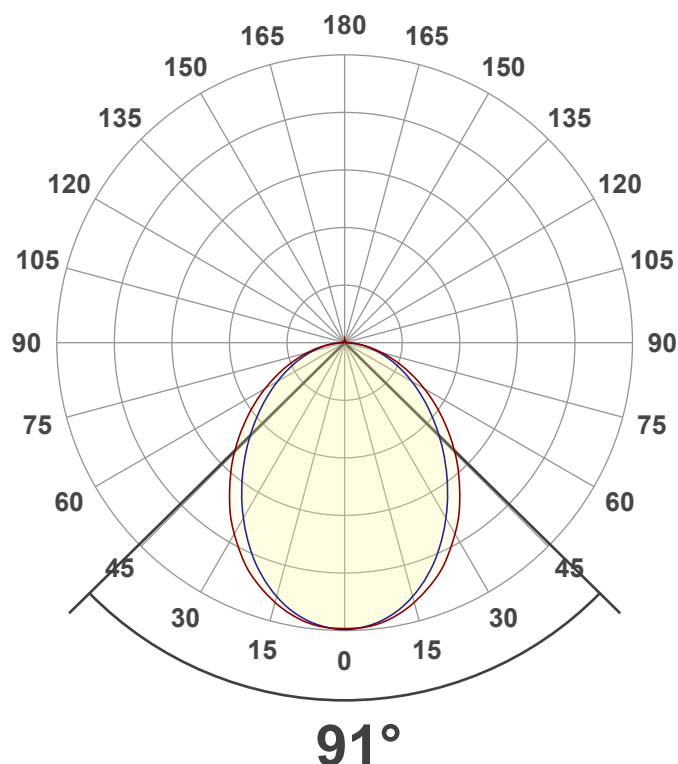
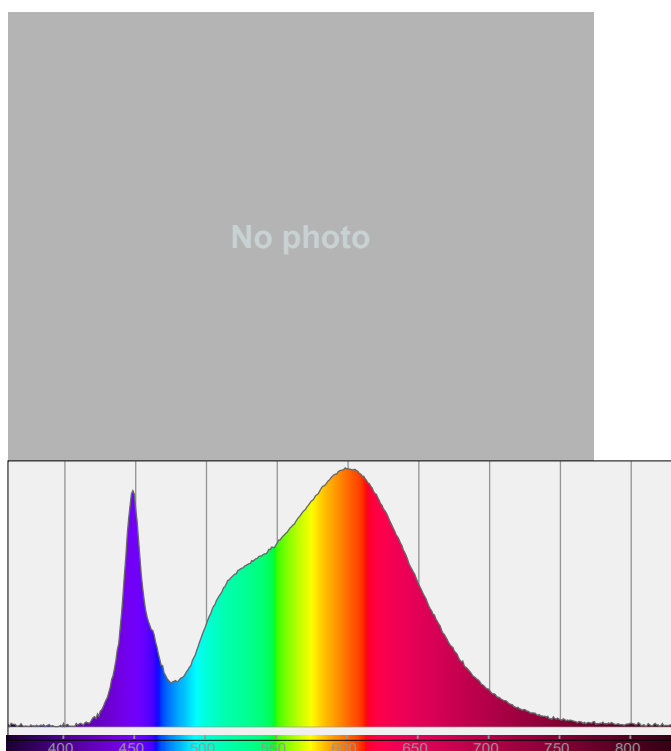
CCT = 3469 K / 3469 K

CRI 82.6

R_f 84.1 – R_g 97.3

Duv 0.0009 – SDCM n/a

SVM n/a – PstLM n/a



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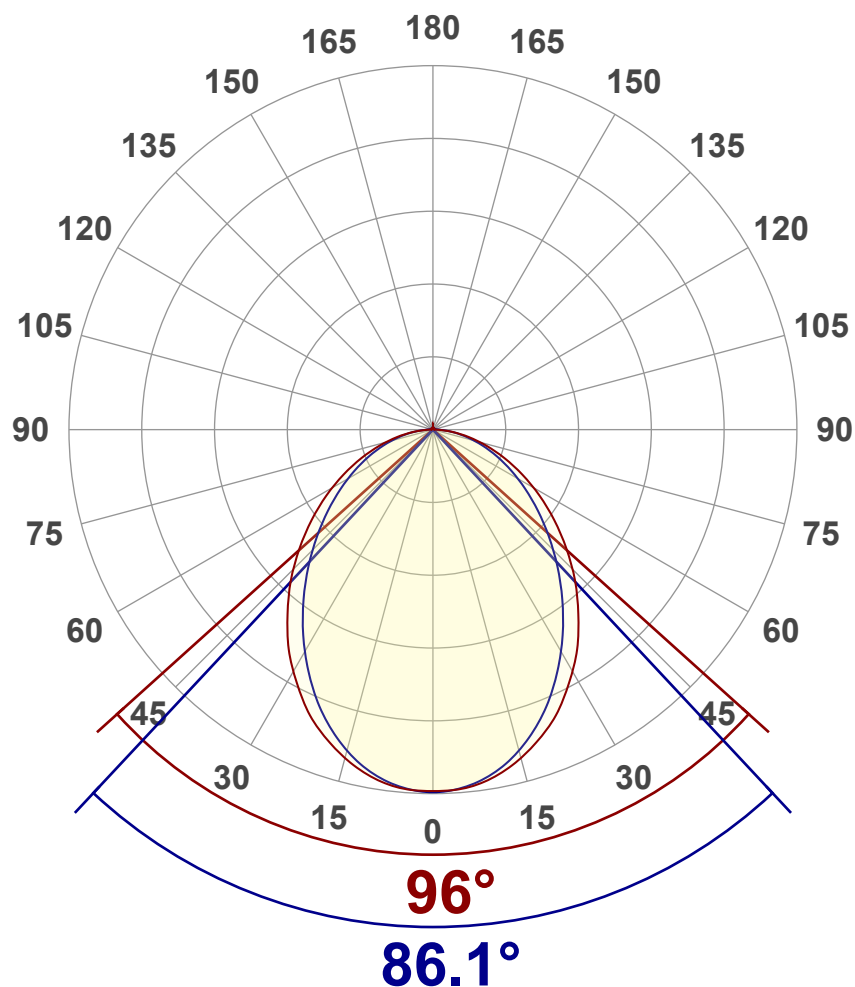
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2044 lm
Lumen Up% / Down%	1.32% / 98.68%
Peak Intensity	887 cd
Beam Angle (50%)	91°
Beam Angle (90%)	86.1°
Beam Angle (10%)	96°

Cut-off Angle

Average 2,5%	174.5°
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Field Angle

Average 10%	155.6°
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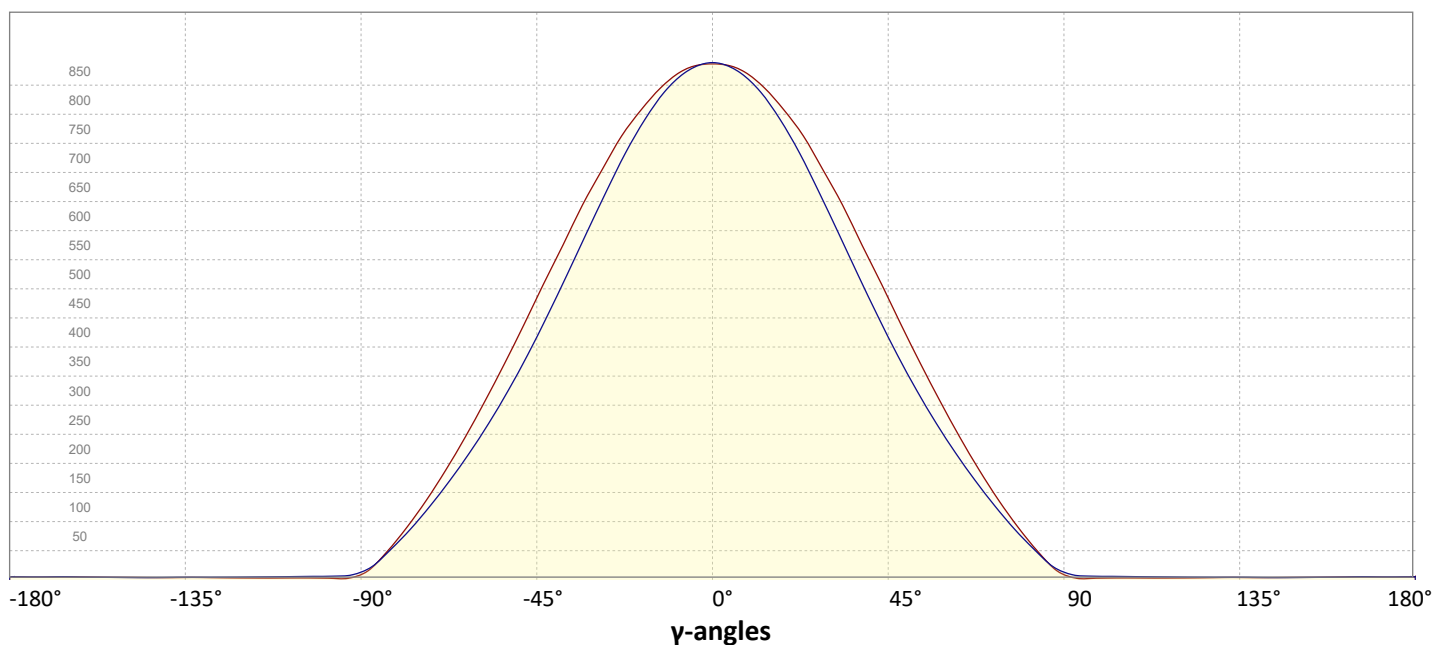
Intensity Ratio

In 120° cone	80.7%
In 90° cone	58.4%

C000-C180

C090-C270

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

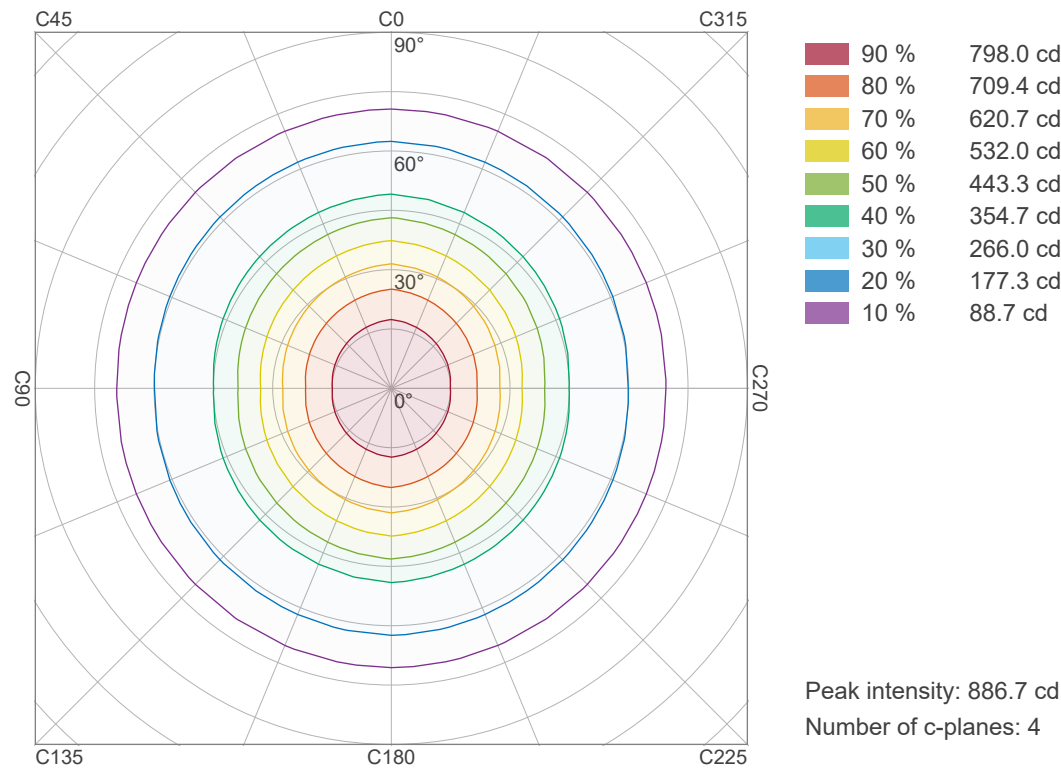


Light Measurement Report

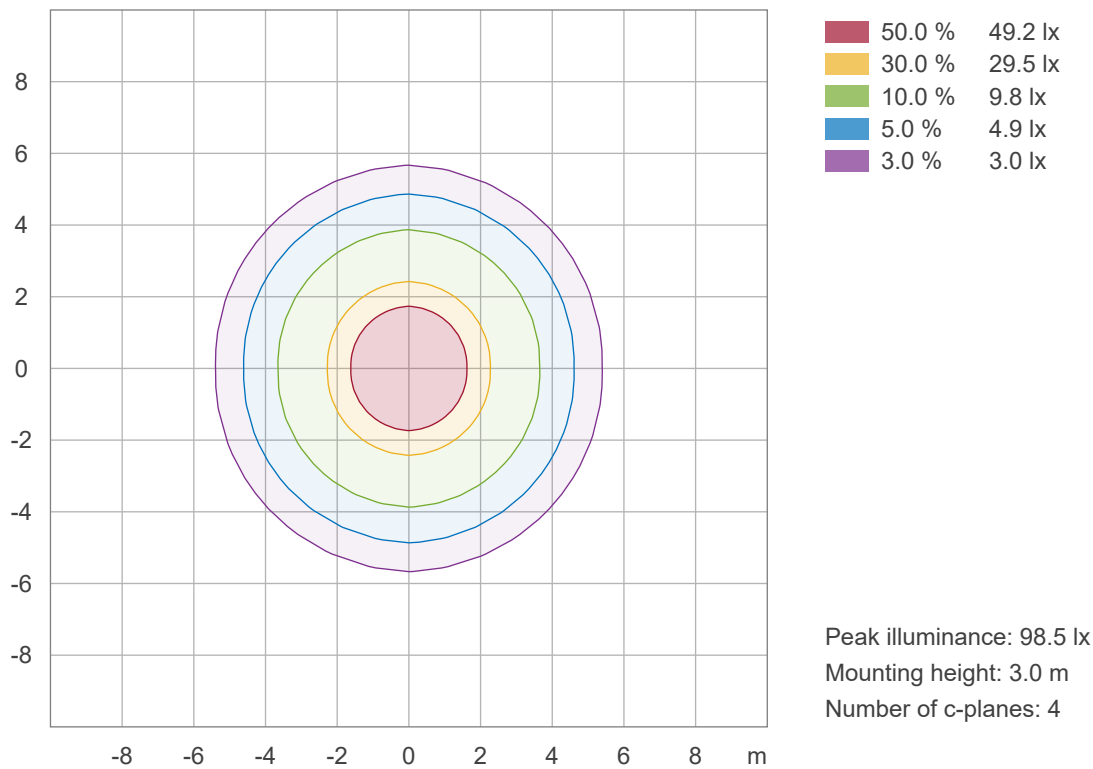
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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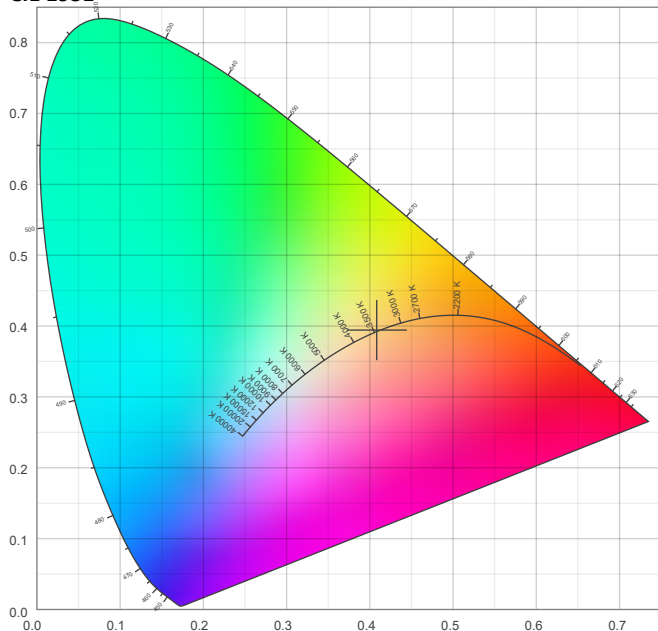


Color details

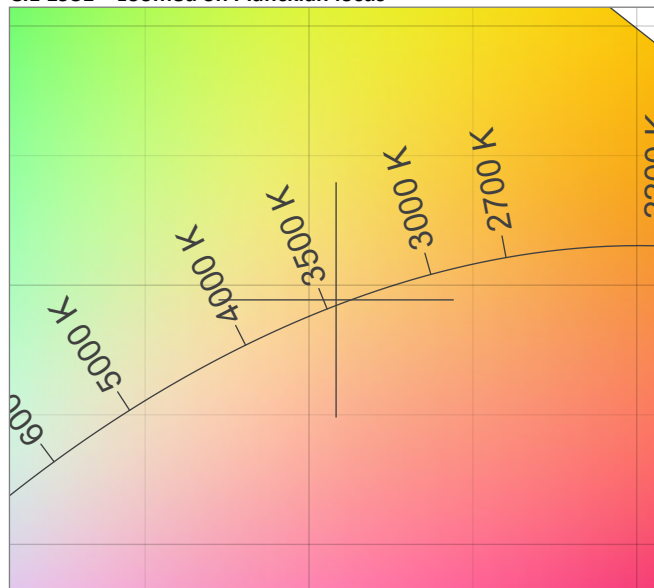
Correlated Color Temperature, Target CCT = 3469 K
Correlated Color Temperature, Measured CCT = 3469 K
Color Rendering Index CRI 82.6
Color Rendering Index, R9 (red component) R9 = 8.0
Color Rendering TM30-18 R_f 84.1 – R_g 97.3
Color Quality Scale CQS = 82.7

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0.408;0.394)
Color coordinate CIEs 1960 (u;v) = (0.236;0.342)
Color deviation from BBL Duv = 0.0009
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0.236;0.513)

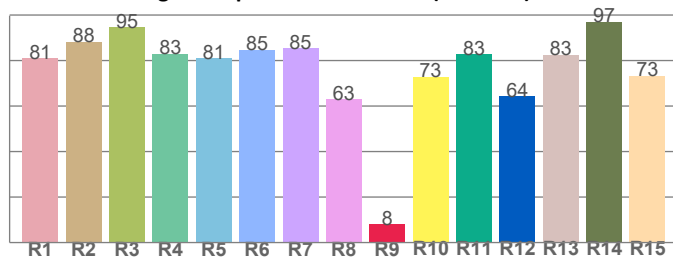
CIE 1931



CIE 1931 – zoomed on Planckian locus



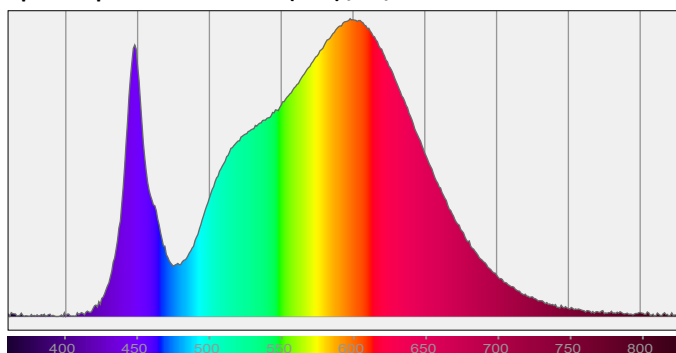
Color Rendering Index per reference color (CIE 1995)



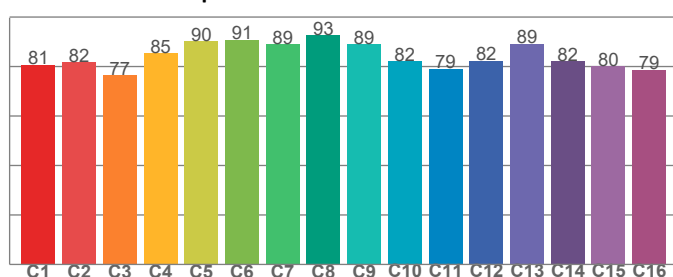
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
81.0	88.2	94.7	82.9	81.0	84.7	85.5	63.1	8.0	72.9	82.9	64.4	82.5	97.0	73.3

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



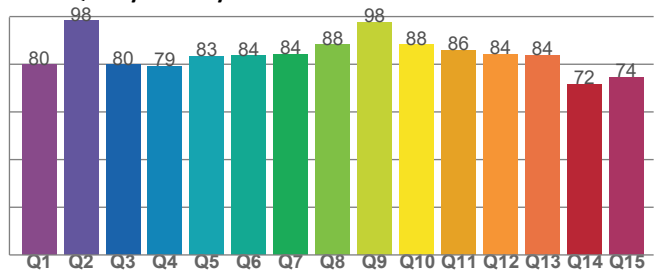
TM30-18 R_f -values per hue bin



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
80.8	81.7	76.5	85.3	90.1	90.8	89.1	92.5	89.1	82.2	79.0	82.4	89.2	82.1	80.0	78.6

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
79.8	98.3	79.8	79.1	83.4	83.5	84.3	88.2	97.7	88.2	85.9	84.3	83.7	71.6	74.4

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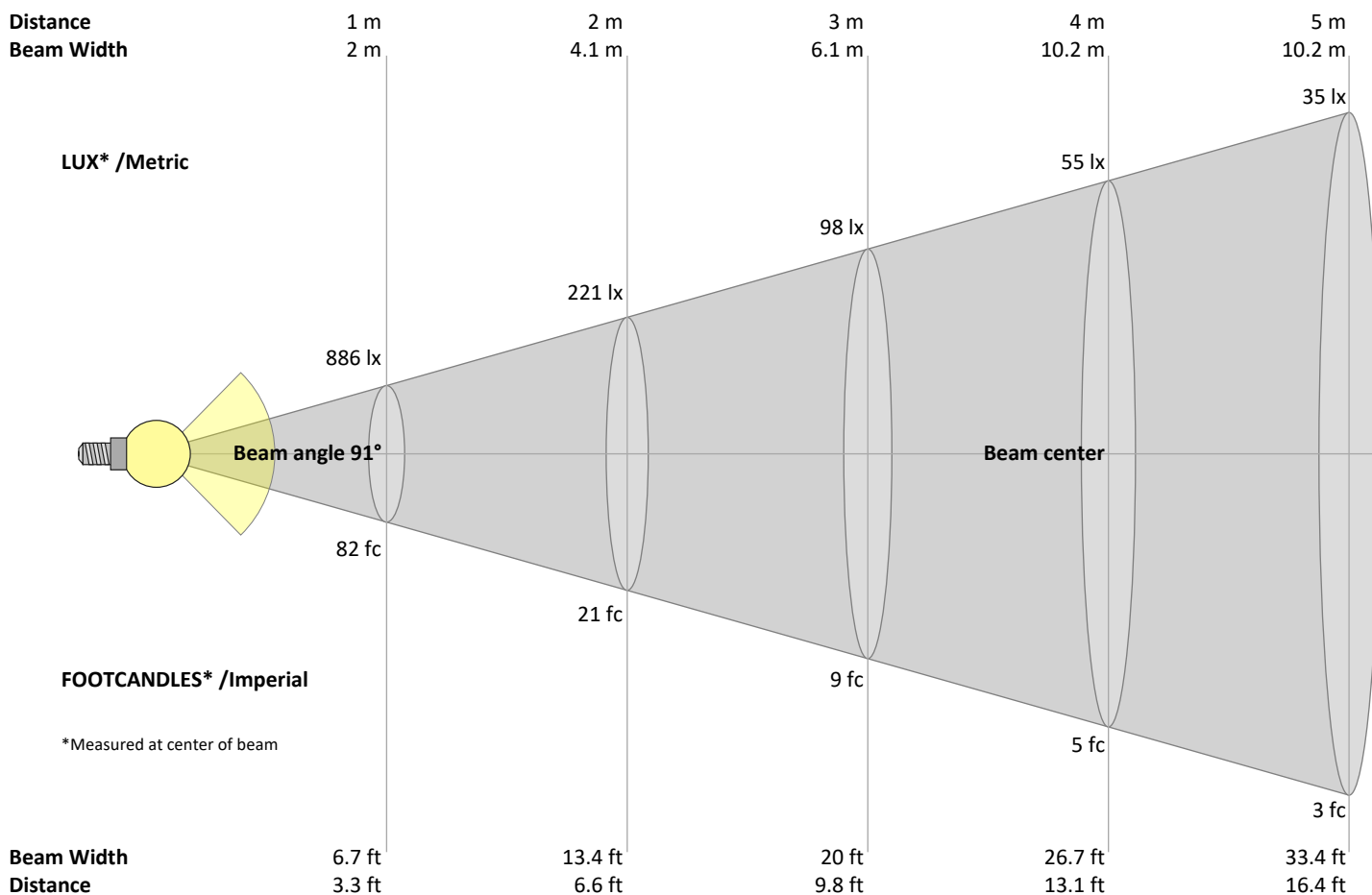
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Beam Details



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
886	221	98	55	35	25	18	14	11	9	7	6	5	5	4	3	3	3	2	2	lux
82.3	20.6	9.1	5.1	3.3	2.3	1.7	1.3	1	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	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
886	881	863	832	792	743	684	620	552	484	415	349	286	226	171	121	76	37	11	3	cd
100%	99%	97%	94%	89%	84%	77%	70%	62%	55%	47%	39%	32%	26%	19%	14%	9%	4%	1%	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
886	878	853	813	760	697	628	556	486	417	354	295	241	192	147	105	69	36	15	7	cd
100%	99%	96%	92%	86%	79%	71%	63%	55%	47%	40%	33%	27%	22%	17%	12%	8%	4%	2%	1%	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
886	881	863	832	792	743	684	620	552	484	415	349	286	226	171	121	76	37	11	3	cd
100%	99%	97%	94%	89%	84%	77%	70%	62%	55%	47%	39%	32%	26%	19%	14%	9%	4%	1%	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
886	878	853	813	760	697	628	556	486	417	354	295	241	192	147	105	69	36	15	7	cd
100%	99%	96%	92%	86%	79%	71%	63%	55%	47%	40%	33%	27%	22%	17%	12%	8%	4%	2%	1%	of 0°val

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Light Planning – UGR table

Uncorrected, comprehensive UGR table according to 117-1995

[illegible]

UGR data could not be calculated due to missing light source dimensions. Go to Edit -> Photometric -> Dimensions and set the source dimensions.

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	110	110	105	105	105	101	101	101	99	
1	109	104	100	97	106	102	98	95	97	94	92	93	91	89	90	88	86	84
2	100	92	85	80	97	90	84	79	86	81	77	83	78	75	79	76	73	71
3	91	81	73	67	89	80	72	66	76	70	65	73	68	64	71	66	63	60
4	84	72	64	58	82	71	63	57	68	62	56	66	60	55	64	59	54	52
5	77	65	56	50	75	64	56	50	62	55	49	60	53	48	58	52	48	46
6	72	59	50	44	70	58	50	44	56	49	43	54	48	43	53	47	42	40
7	67	54	45	39	65	53	45	39	51	44	39	50	43	38	48	42	38	36
8	62	49	41	35	61	49	41	35	47	40	35	46	39	35	45	39	34	32
9	58	45	37	32	57	45	37	32	44	37	32	42	36	31	41	35	31	29
10	55	42	34	29	54	41	34	29	40	34	29	39	33	29	38	33	29	27

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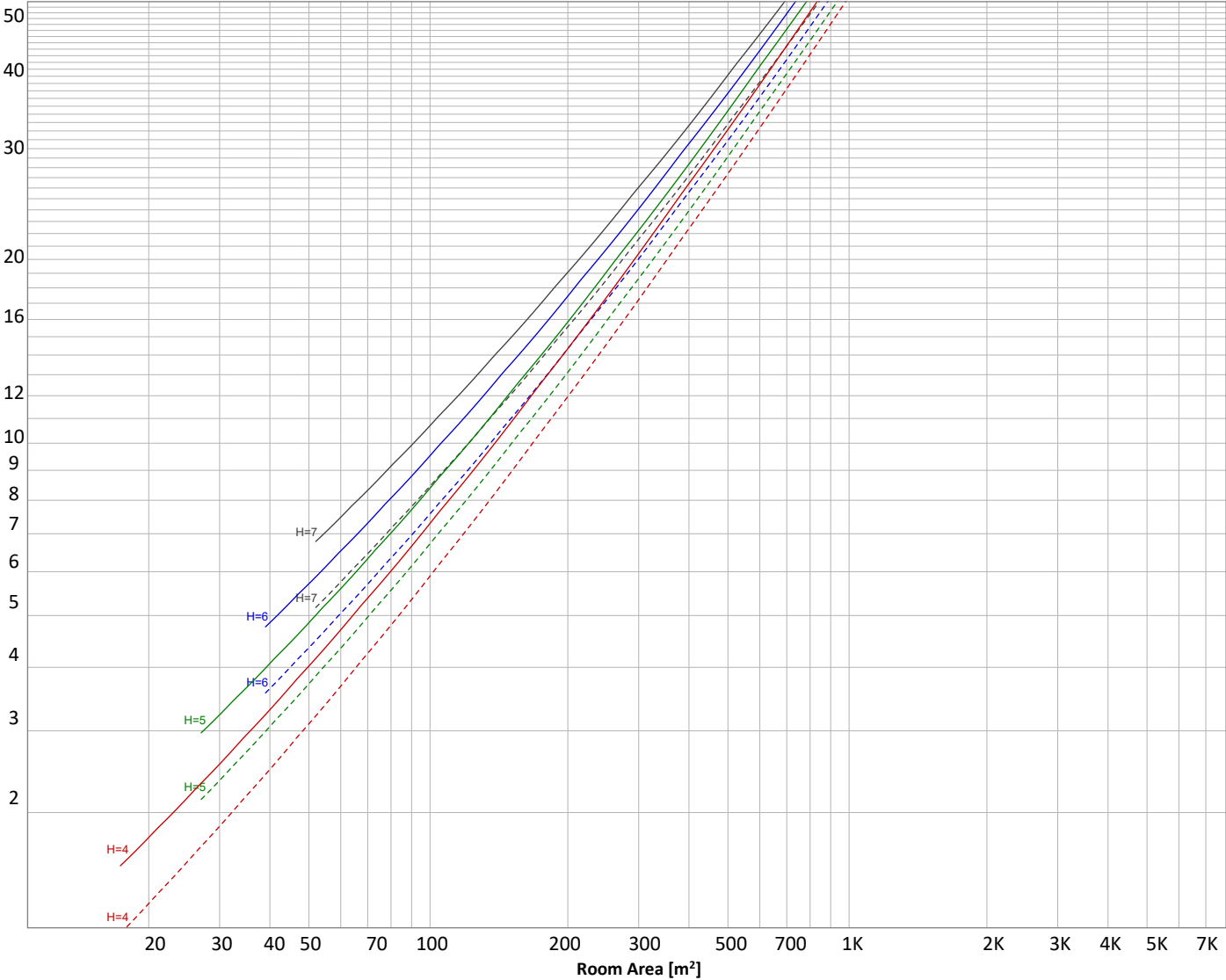
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 2044 lm	p(%)		
H _{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	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°
83.5 lm	232 lm	331 lm	368 lm	348 lm	288 lm	207 lm	119 lm	40.4 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
5.88 lm	4.54 lm	3.87 lm	3.45 lm	3.11 lm	2.40 lm	1.95 lm	1.34 lm	0.441 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	83 lm	4.1%
10-20°	232 lm	11.3%
20-30°	331 lm	16.2%
30-40°	368 lm	18.0%
40-50°	348 lm	17.0%
50-60°	288 lm	14.1%
60-70°	207 lm	10.1%
70-80°	119 lm	5.8%
80-90°	40 lm	2.0%
90-100°	6 lm	0.3%
100-110°	5 lm	0.2%
110-120°	4 lm	0.2%
120-130°	3 lm	0.2%
130-140°	3 lm	0.2%
140-150°	2 lm	0.1%
150-160°	2 lm	0.1%
160-170°	1 lm	0.1%
170-180°	0 lm	0.0%
Total	2044 lm	100.0%

Intensity peaks

Max intensity	887 cd
Intensity, 90°	11 cd
Intensity, 0°	886 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	647 lm	31.6%
0-40°	1015 lm	49.6%
0-60°	1650 lm	80.7%
60-90°	367 lm	17.9%
70-100°	166 lm	8.1%
90-120°	14 lm	0.7%
0-90°	2017 lm	98.7%
90-180°	27 lm	1.3%
0-180°	2044 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	323 lm	15.8%
Medium(30-60°)	501 lm	24.5%
High(60-80°)	163 lm	8.0%
Very high(80-90°)	21 lm	1.0%
Back light		
Low(0-30°)	323 lm	15.8%
Medium(30-60°)	501 lm	24.5%
High(60-80°)	163 lm	8.0%
Very high(80-90°)	21 lm	1.0%

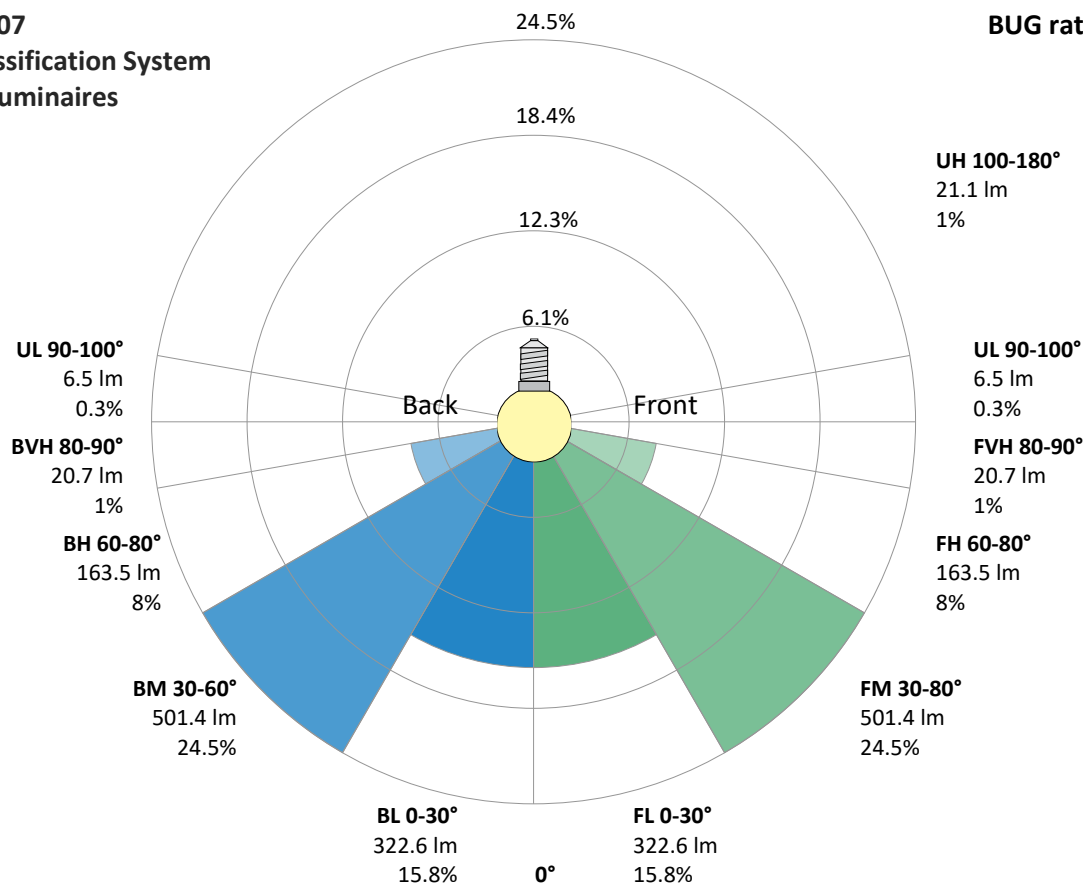
Uplight

Low(90-100°)	6 lm	0.3%
High(100-180°)	21 lm	1.0%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B1 U2 G1



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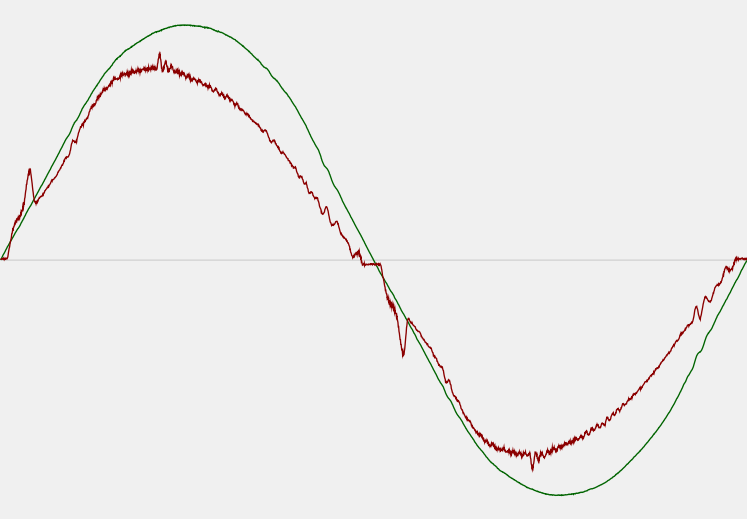


Power Details

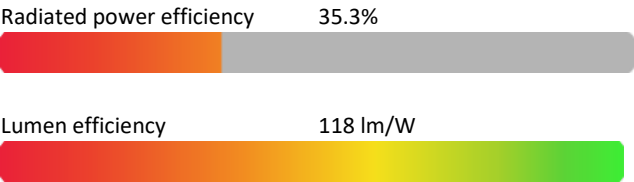
Input Power

Power feed to light source	17.3 W
Frequency of input power	60 Hz
RMS Input voltage feed, V_{RMS}	121 V
RMS Input current feed, I_{RMS}	0.145 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	17.51 VA
Displacement factor of AC power feed	0.99
Power factor of AC current feed	0.99
Total harmonic distortion of the current	7.4%
Total harmonic distortion of the voltage	1.78%

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	3468 K
CCT shift	+1 K
CCT end	3469 K

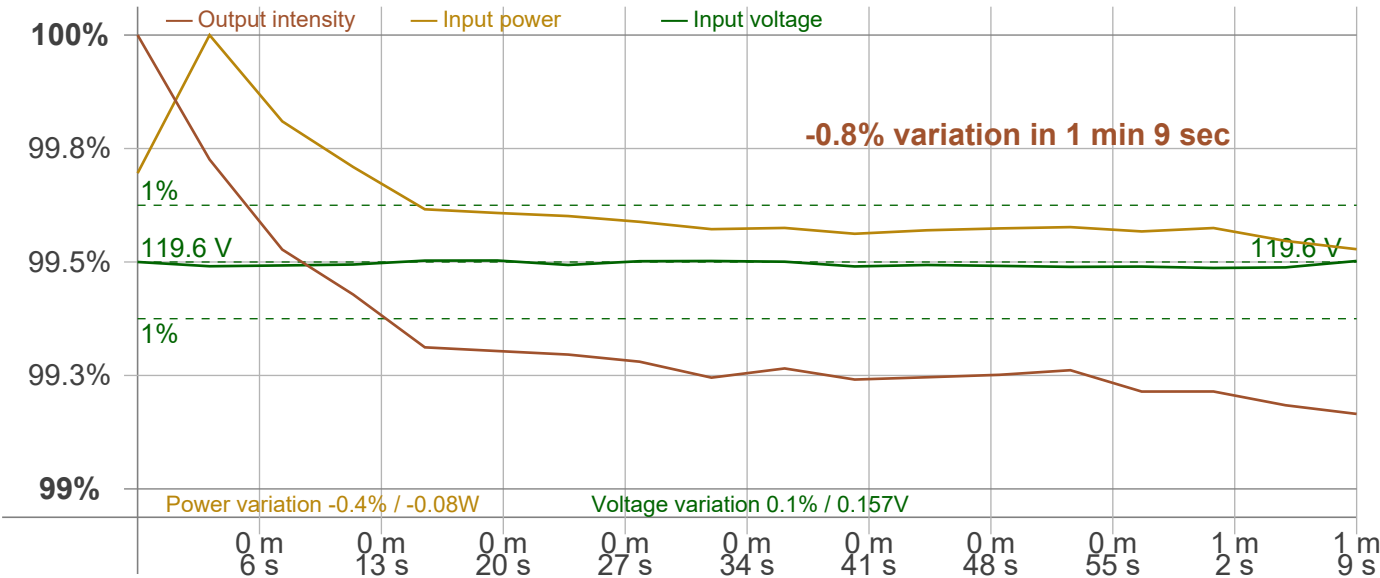
Warmup Result

Total warmup time	Not completed
Warmup variation	-0.8%

Output Change

Output start	2049 lm
Output change	-5 lm
Output end	2044 lm

Stabilization Curve



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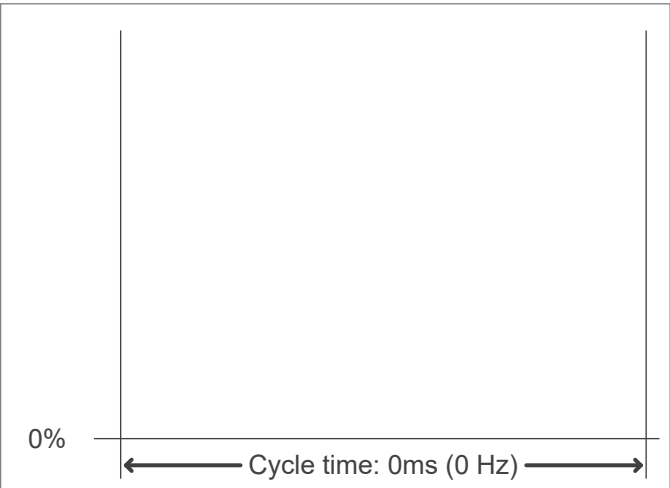
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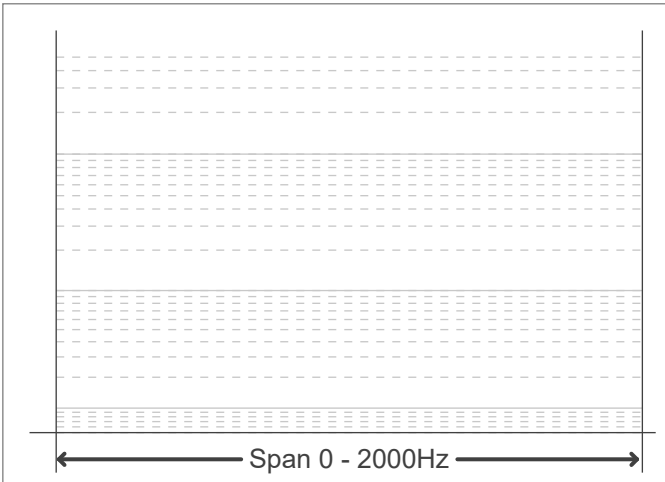
Flicker /TLA details

Flicker Meter Type	Viso Systems LabFlicker	Measurement time	
Frequency of input power	60 Hz	PstLM	180 sec
Flicker/TLA sample rate	n/a 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	n/a Hz	JA8/10 40 Hz	n/a %
Percent Flicker	n/a %	JA8/10 90 Hz	n/a %
Flicker index	n/a	JA8/10 200 Hz	n/a %
		JA8/10 400 Hz	n/a %
		JA8/10 1000 Hz	n/a %
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)	n/a	Perception metric, Assist Mp	n/a
SVM value (80 < F < 2000 Hz)	n/a		

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

