

Light Measurement Report

Print date: 1/7/2026

Measurement date and time: 11/14/2025 12:45:16 PM – Measurement no. VFR-251114-0500-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

22.1 W – PF 0.95 – DPF 0.97

121 V – 0.192 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'-V-835-F-BLX2835

HP1-P-D-4'-V-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

2609 lm – 0.9% / 99.1%

118 lm/W

1138 cd – 91.1°

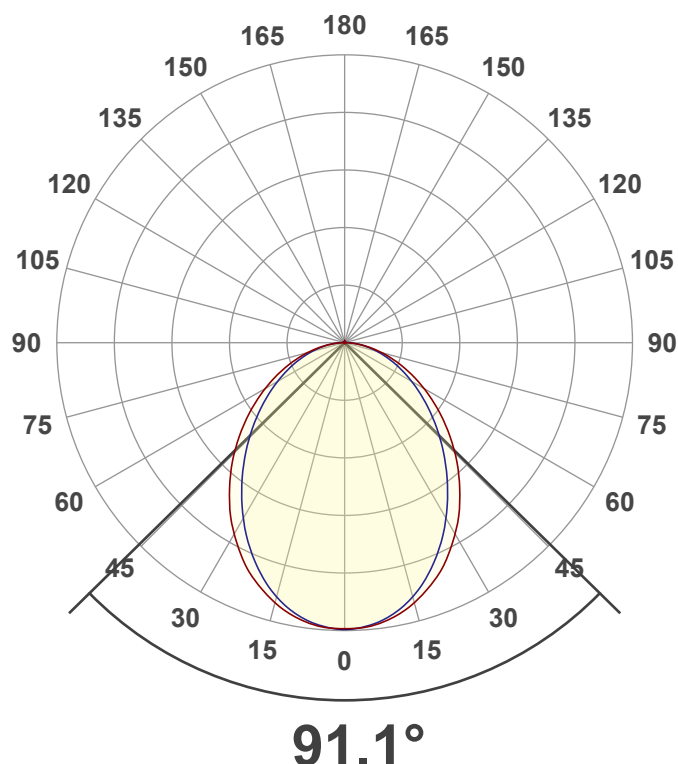
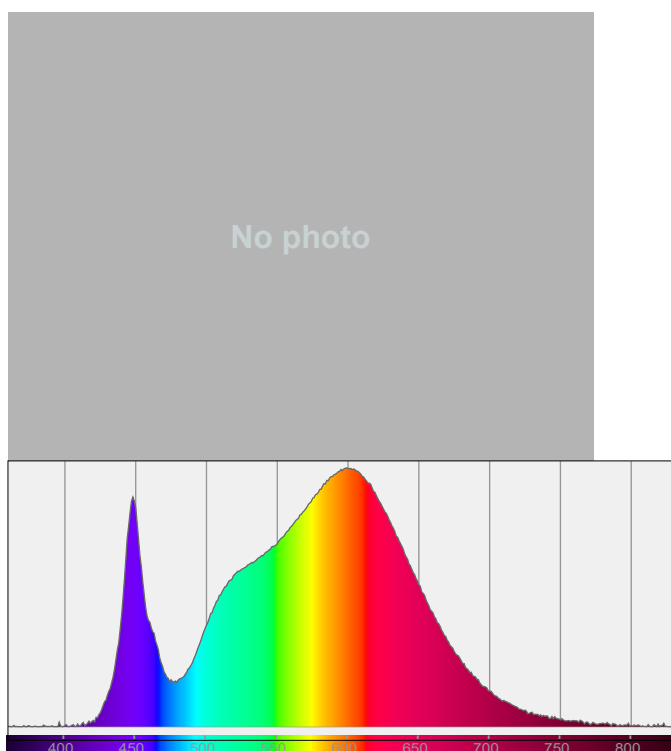
CCT = 3461 K / 3461 K

CRI 82.4

R_f 83.9 – R_g 97.2

Duv 0.0009 – SDCM n/a

SVM n/a – PstLM n/a



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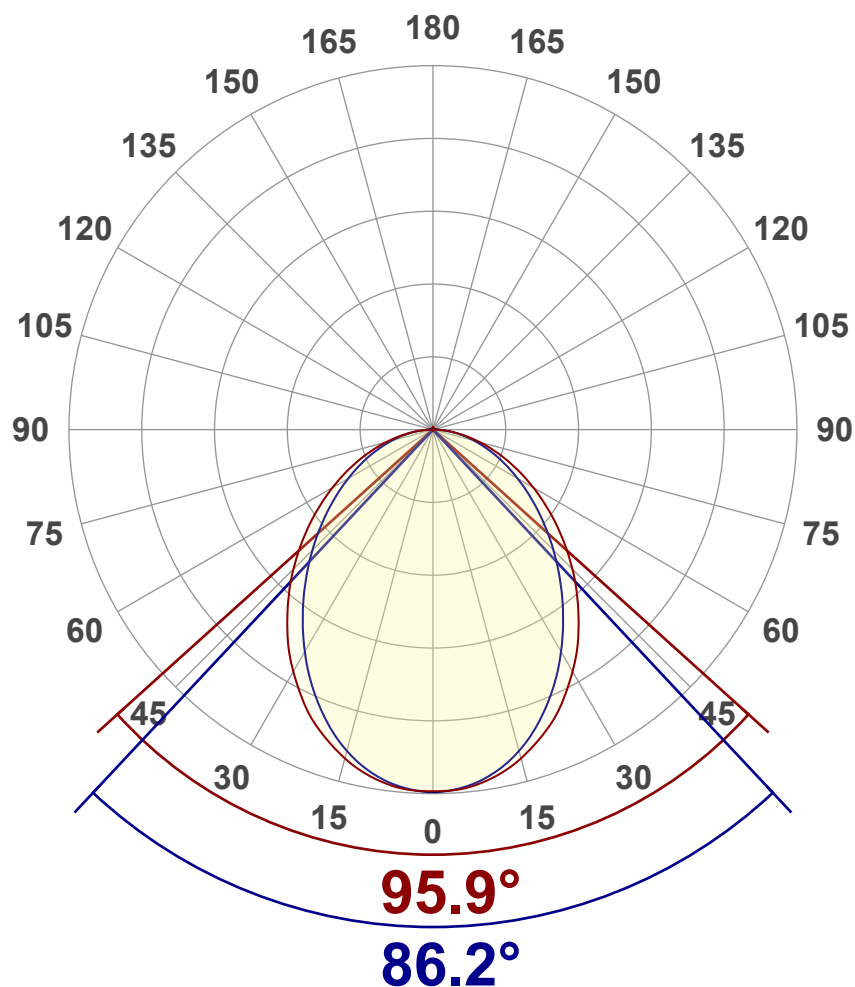
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2609 lm
Lumen Up% / Down%	0.9% / 99.1%
Peak Intensity	1138 cd
Beam Angle (50%)	91.1°
Beam Angle (90%)	86.2°
Beam Angle (10%)	95.9°

Cut-off Angle

Average 2,5%	174.2°
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Field Angle

Average 10%	155.4°
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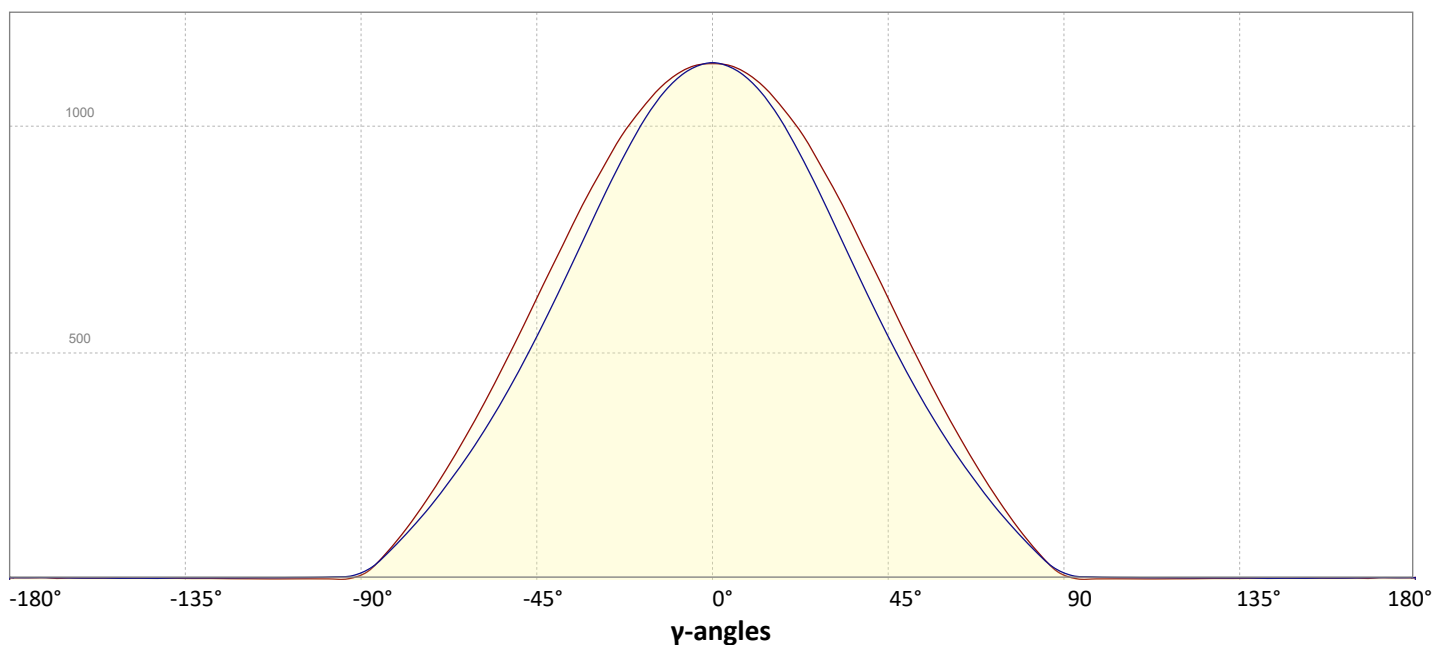
Intensity Ratio

In 120° cone	81.2%
In 90° cone	58.7%

C000-C180

C090-C270

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

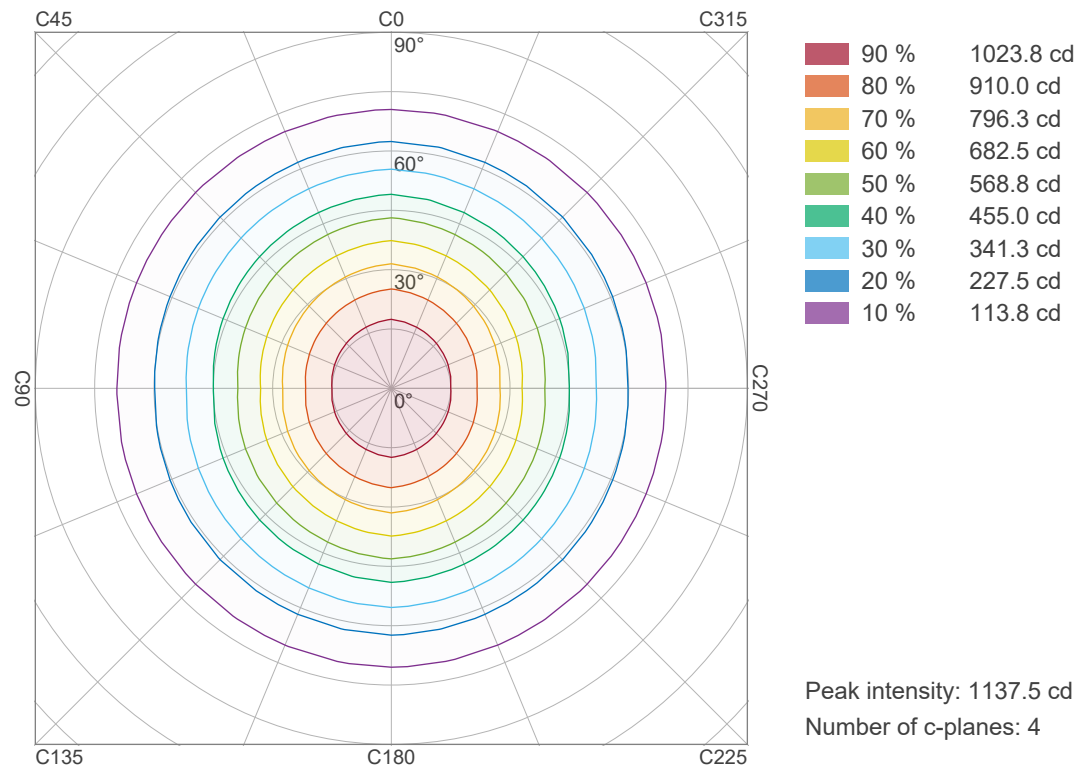


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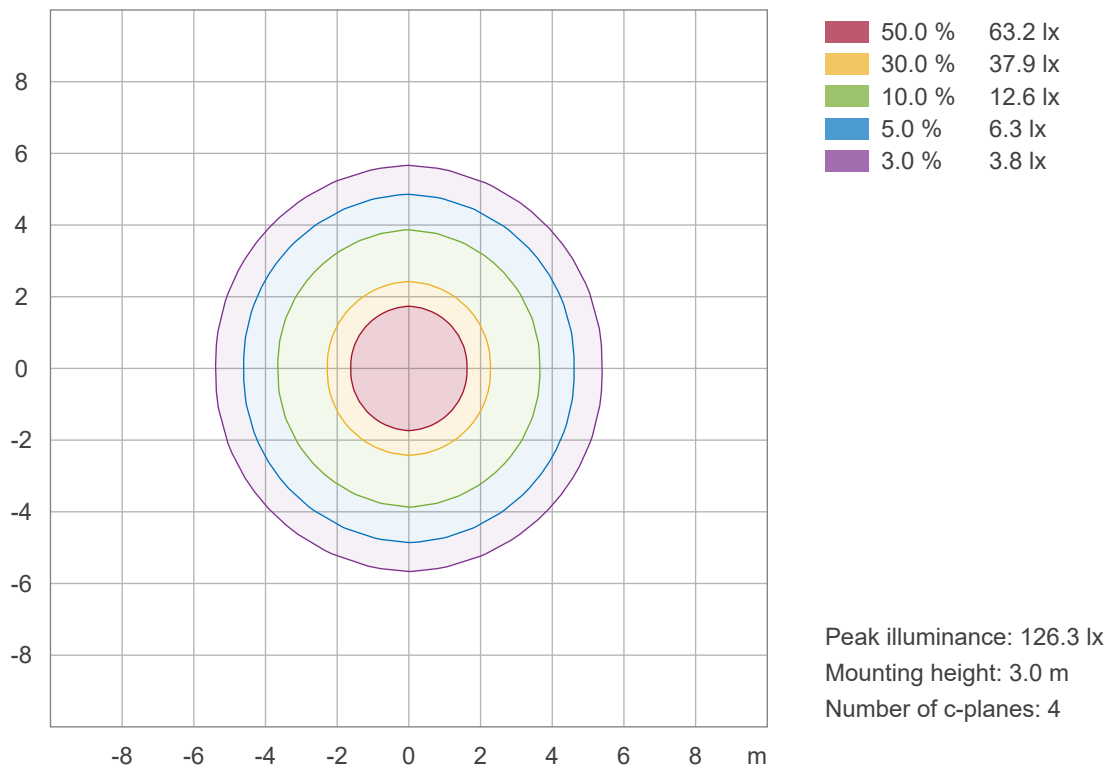
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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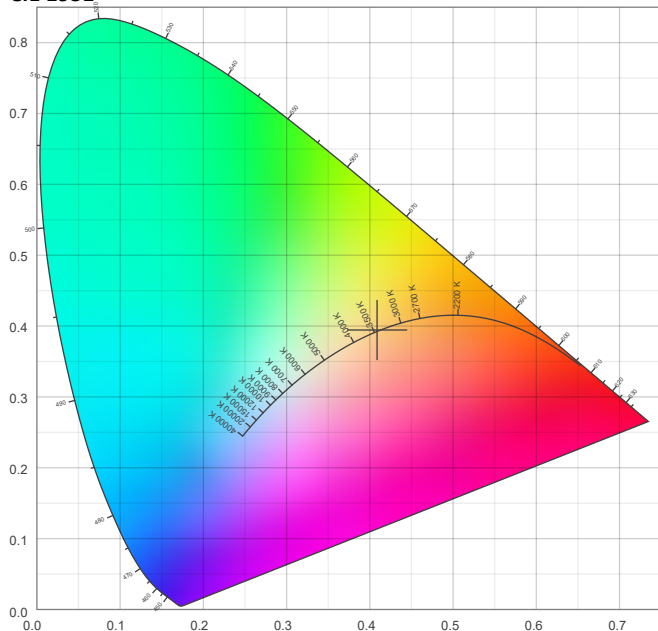


Color details

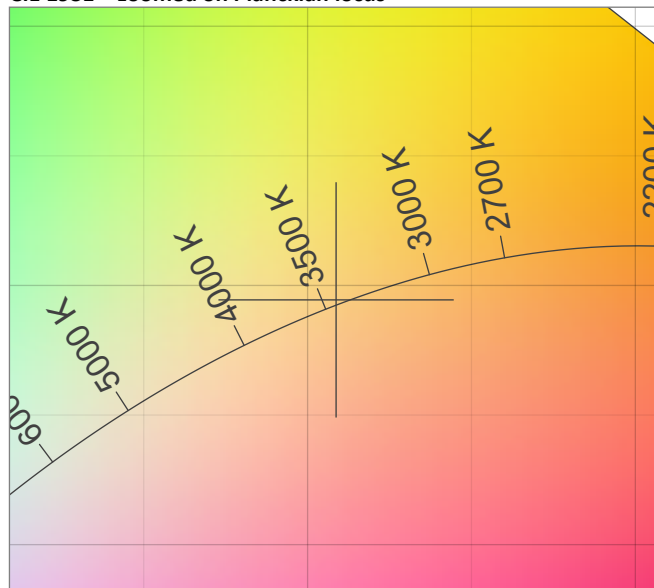
Correlated Color Temperature, Target CCT = 3461 K
Correlated Color Temperature, Measured CCT = 3461 K
Color Rendering Index CRI 82.4
Color Rendering Index, R9 (red component) R9 = 7.1
Color Rendering TM30-18 R_f 83.9 – R_g 97.2
Color Quality Scale CQS = 82.4

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0.409;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)

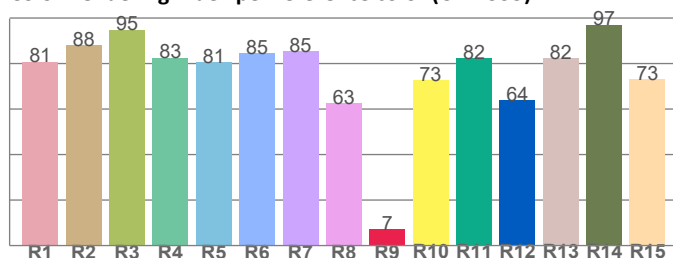
CIE 1931



CIE 1931 – zoomed on Planckian locus



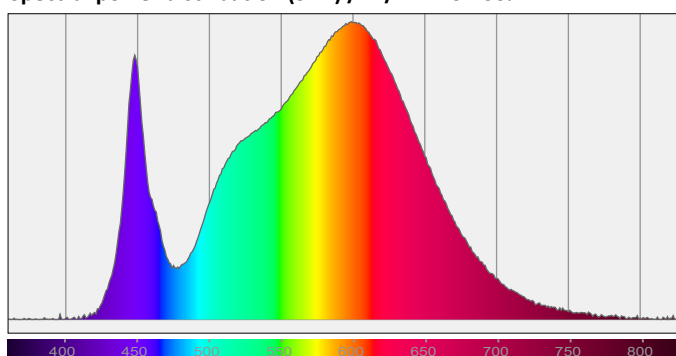
Color Rendering Index per reference color (CIE 1995)



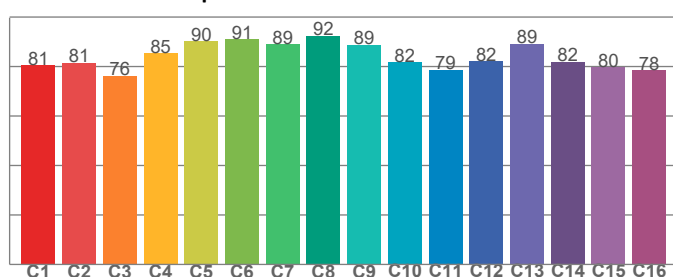
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
80.7	88.1	94.8	82.6	80.7	84.5	85.3	62.7	7.1	72.7	82.3	63.9	82.3	97.1	73.0

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



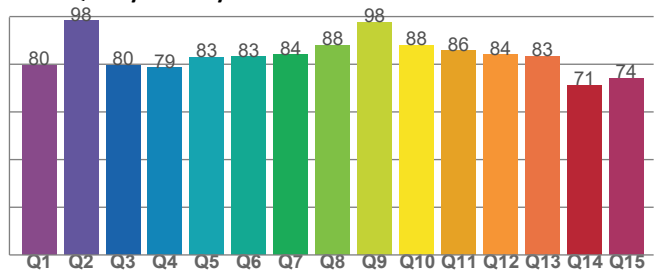
TM30-18 R_f-values per hue bin



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
80.5	81.5	76.3	85.3	90.2	90.9	89.1	92.4	88.9	81.7	78.7	82.2	89.2	81.9	79.8	78.4

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
79.6	98.2	79.5	78.6	83.0	83.2	84.0	87.9	97.6	88.0	85.6	84.0	83.4	71.3	74.2

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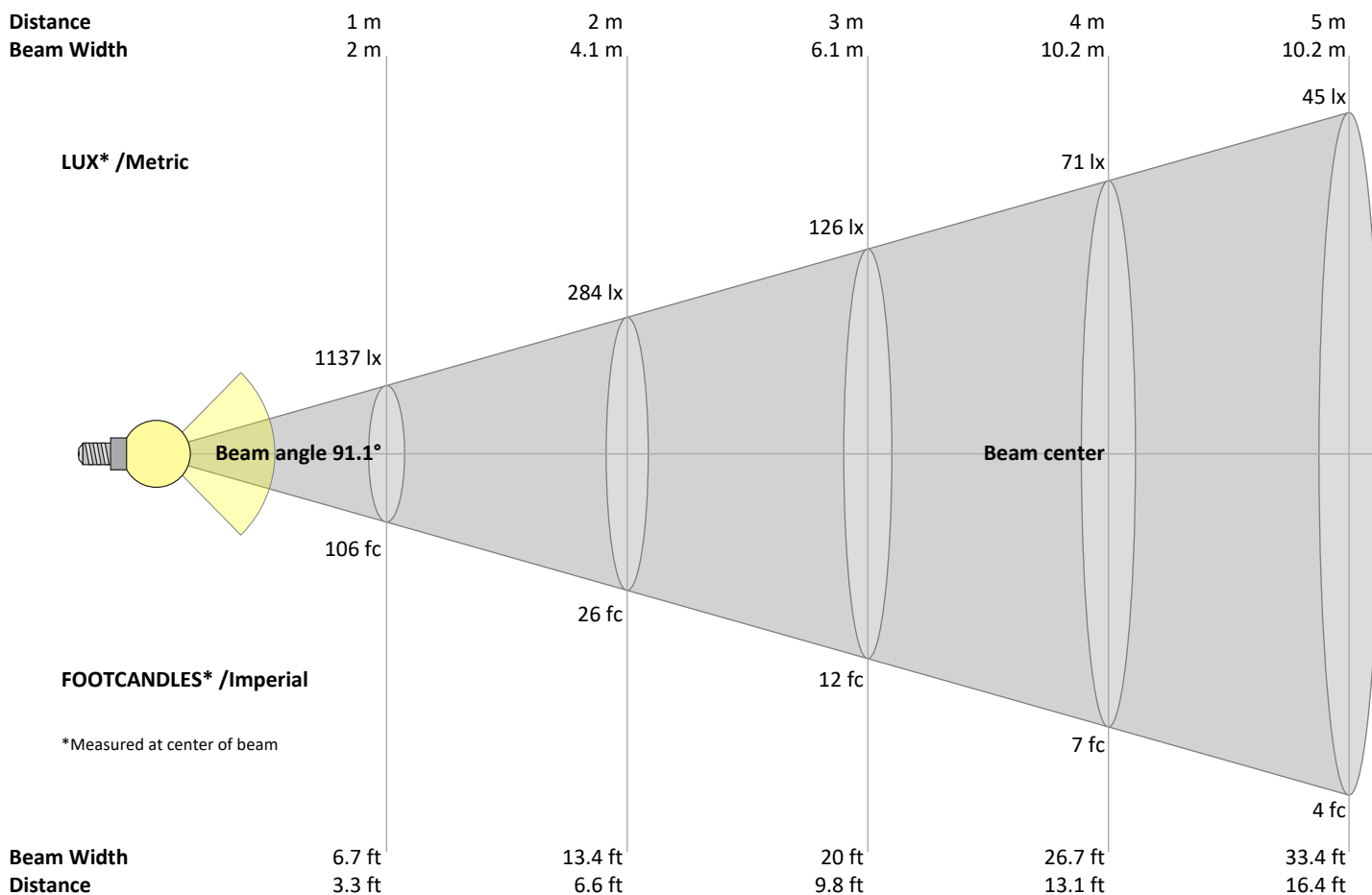
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Beam Details



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
1137	284	126	71	45	32	23	18	14	11	9	8	7	6	5	4	4	4	3	3	lux
105.6	26.4	11.7	6.6	4.2	2.9	2.2	1.6	1.3	1.1	0.9	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3	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
1137	1130	1108	1069	1017	953	878	796	709	621	532	447	365	289	219	154	96	46	13	2	cd
100%	99%	97%	94%	89%	84%	77%	70%	62%	55%	47%	39%	32%	25%	19%	14%	8%	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
1137	1126	1095	1044	975	894	806	714	624	537	455	378	309	245	187	135	87	45	17	8	cd
100%	99%	96%	92%	86%	79%	71%	63%	55%	47%	40%	33%	27%	22%	16%	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
1137	1130	1108	1069	1017	953	878	796	709	621	532	447	365	289	219	154	96	46	13	2	cd
100%	99%	97%	94%	89%	84%	77%	70%	62%	55%	47%	39%	32%	25%	19%	14%	8%	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
1137	1126	1095	1044	975	894	806	714	624	537	455	378	309	245	187	135	87	45	17	8	cd
100%	99%	96%	92%	86%	79%	71%	63%	55%	47%	40%	33%	27%	22%	16%	12%	8%	4%	2%	1%	of 0°val

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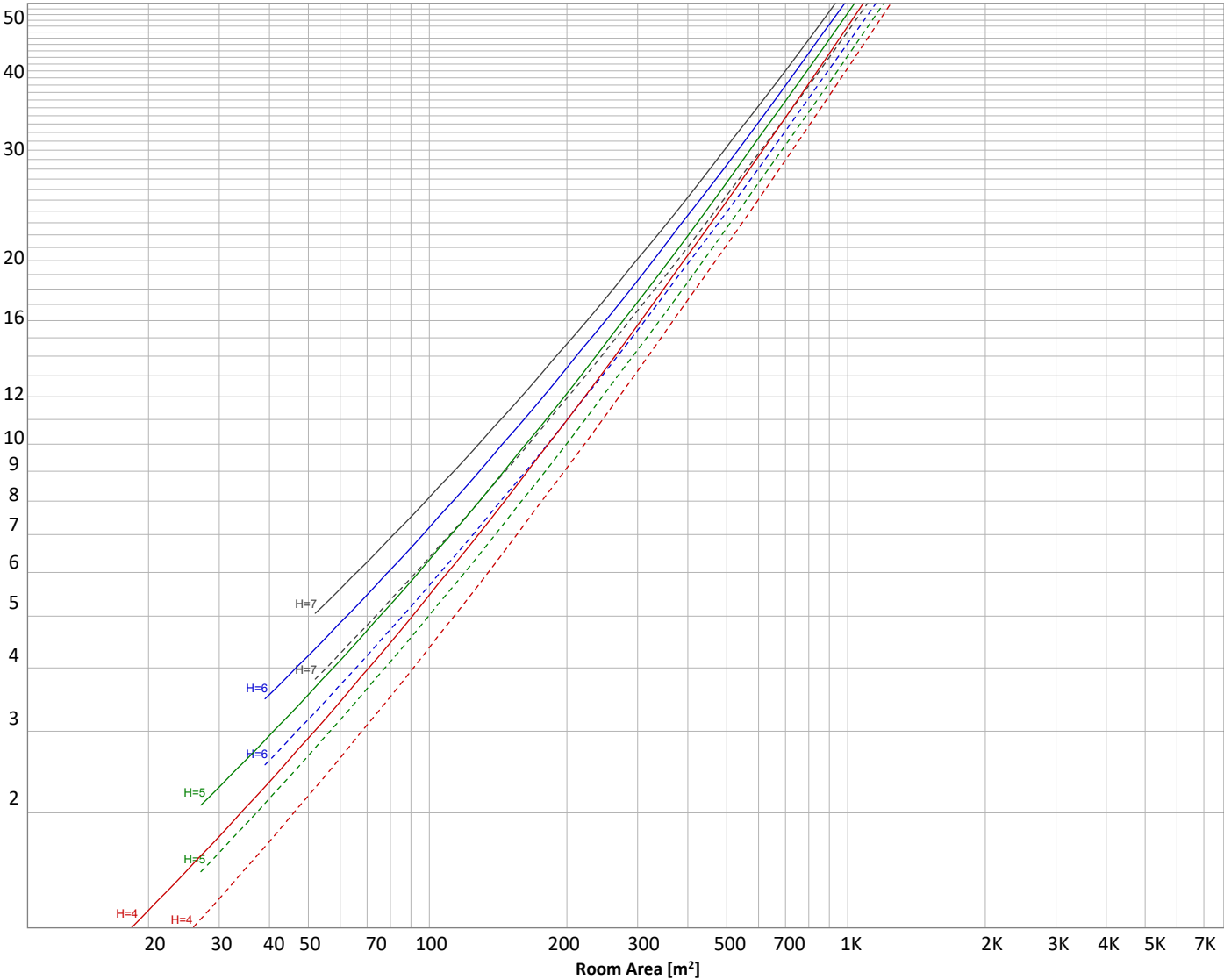
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 2609 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°
107 lm	298 lm	425 lm	472 lm	446 lm	369 lm	265 lm	152 lm	50.7 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
5.93 lm	3.69 lm	3.14 lm	2.99 lm	2.69 lm	2.04 lm	1.60 lm	1.06 lm	0.430 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	107 lm	4.1%
10-20°	298 lm	11.4%
20-30°	425 lm	16.3%
30-40°	472 lm	18.1%
40-50°	446 lm	17.1%
50-60°	369 lm	14.1%
60-70°	265 lm	10.2%
70-80°	152 lm	5.8%
80-90°	51 lm	1.9%
90-100°	6 lm	0.2%
100-110°	4 lm	0.1%
110-120°	3 lm	0.1%
120-130°	3 lm	0.1%
130-140°	3 lm	0.1%
140-150°	2 lm	0.1%
150-160°	2 lm	0.1%
160-170°	1 lm	0.0%
170-180°	0 lm	0.0%
Total	2609 lm	100.0%

Intensity peaks

Max intensity	1138 cd
Intensity, 90°	13 cd
Intensity, 0°	1137 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	830 lm	31.8%
0-40°	1302 lm	49.9%
0-60°	2117 lm	81.2%
60-90°	468 lm	17.9%
70-100°	209 lm	8.0%
90-120°	13 lm	0.5%
0-90°	2585 lm	99.1%
90-180°	24 lm	0.9%
0-180°	2609 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	414 lm	15.9%
Medium(30-60°)	643 lm	24.7%
High(60-80°)	209 lm	8.0%
Very high(80-90°)	26 lm	1.0%
Back light		
Low(0-30°)	414 lm	15.9%
Medium(30-60°)	643 lm	24.7%
High(60-80°)	209 lm	8.0%
Very high(80-90°)	26 lm	1.0%

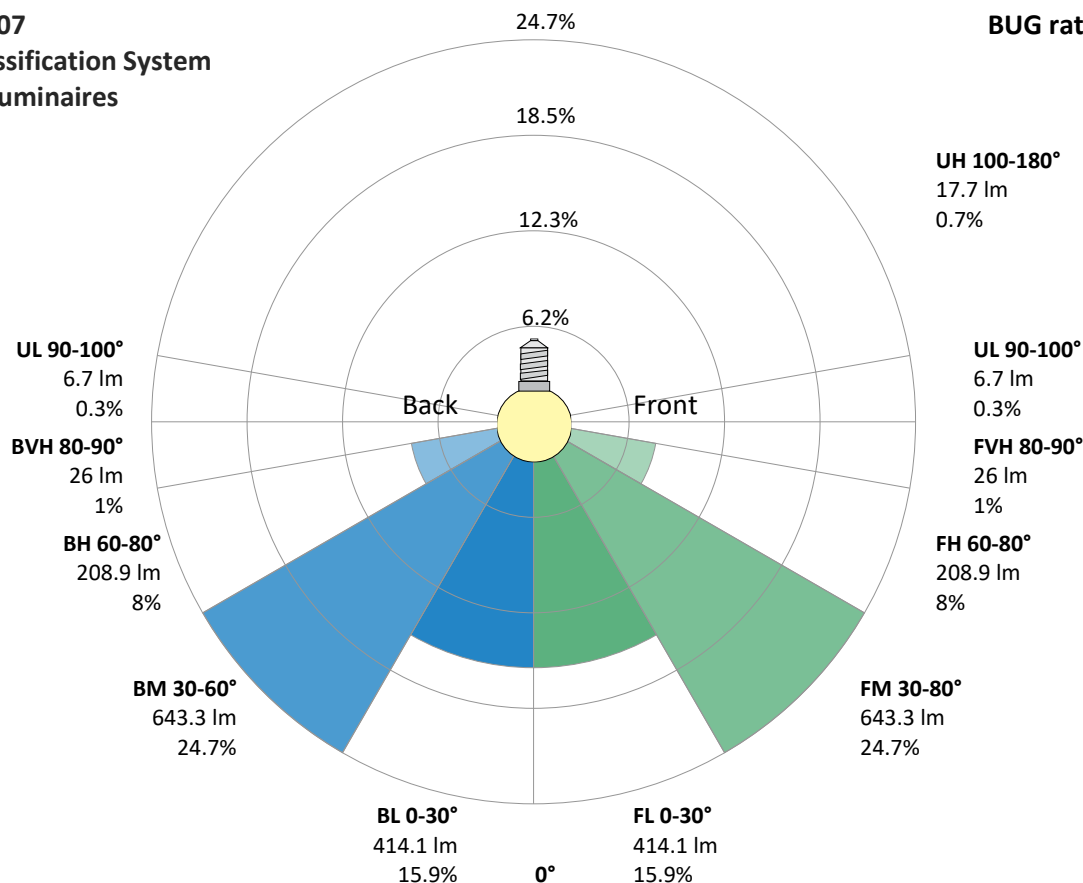
Uplight

Low(90-100°)	7 lm	0.3%
High(100-180°)	18 lm	0.7%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B1 U2 G1



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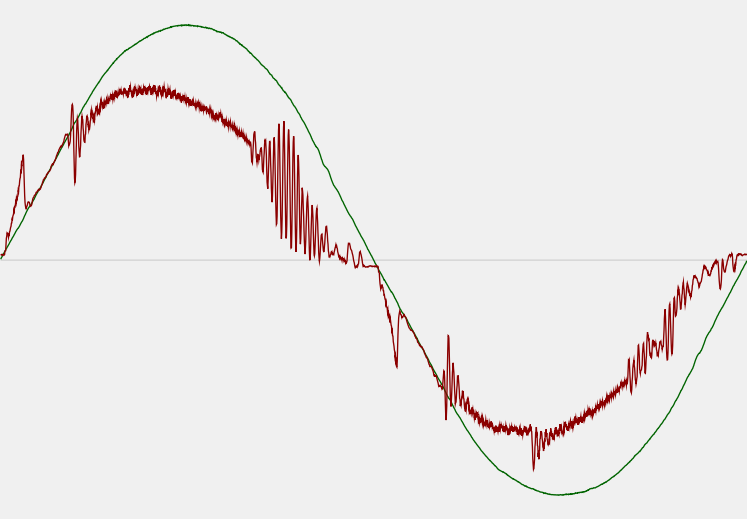


Power Details

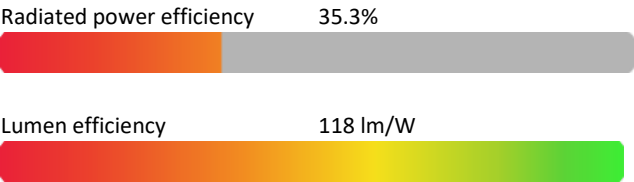
Input Power

Power feed to light source	22.1 W
Frequency of input power	60 Hz
RMS Input voltage feed, V_{RMS}	121 V
RMS Input current feed, I_{RMS}	0.192 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	23.13 VA
Displacement factor of AC power feed	0.97
Power factor of AC current feed	0.95
Total harmonic distortion of the current	9.15%
Total harmonic distortion of the voltage	1.77%

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	3461 K
CCT shift	+0 K
CCT end	3461 K

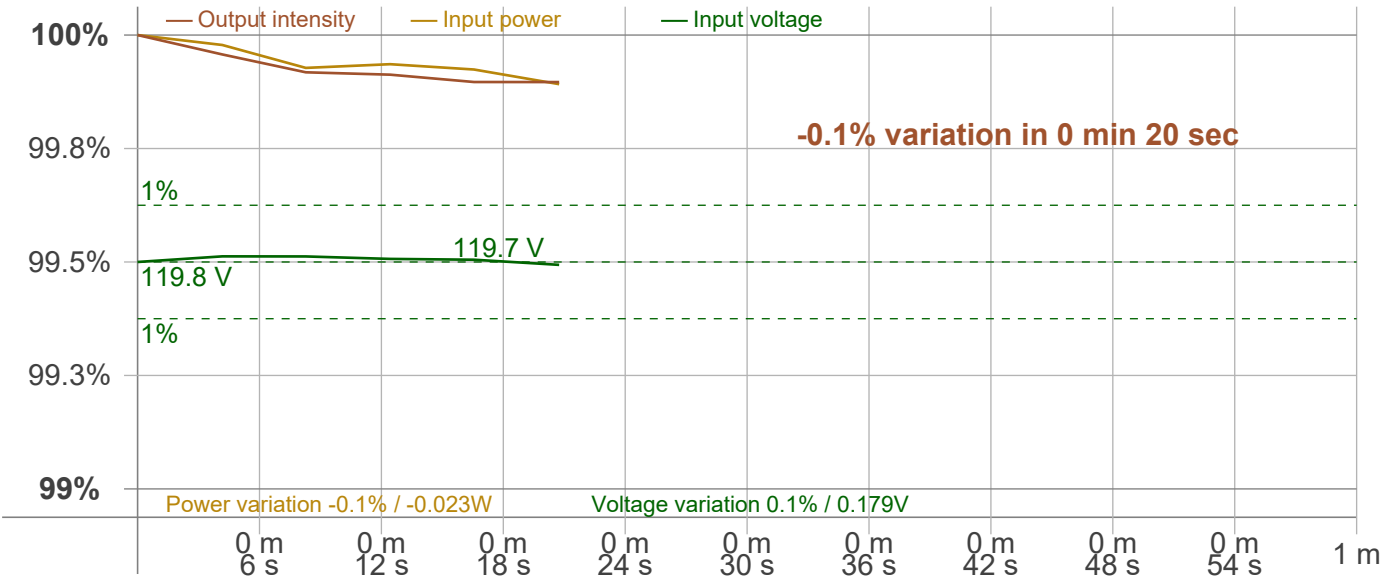
Warmup Result

Total warmup time	Not completed
Warmup variation	-0.1%

Output Change

Output start	2610 lm
Output change	-1 lm
Output end	2609 lm

Stabilization Curve



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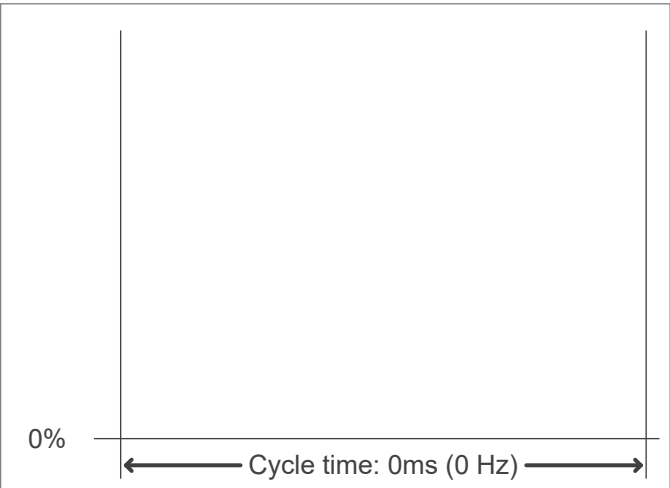
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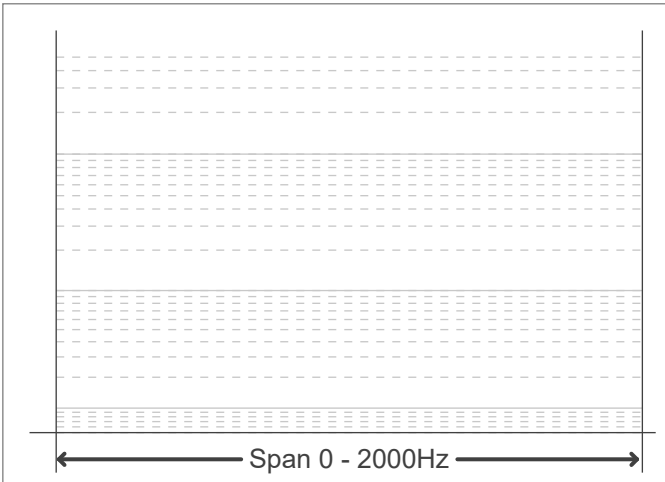
Flicker /TLA details

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

