

Light Measurement Report

Print date: 8/4/2025

Measurement date and time: 8/4/2025 4:01:27 PM – Measurement no. VFR-250804-0813-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 – 6/20/2022 – 0166732104

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

16 planes – 22.5°

5°

7.01 m

15.9 W – PF 0.92 – DPF 0.99

120 V – 0.144 A

60 Hz

Lamp stabilized in 30 min 1 sec – 0.5%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

TR1549 Pitch Wall fixture

PITCH SINGLE –

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

590 lm – 0.01% / 99.99%

37 lm/W

238 cd – 105.3°

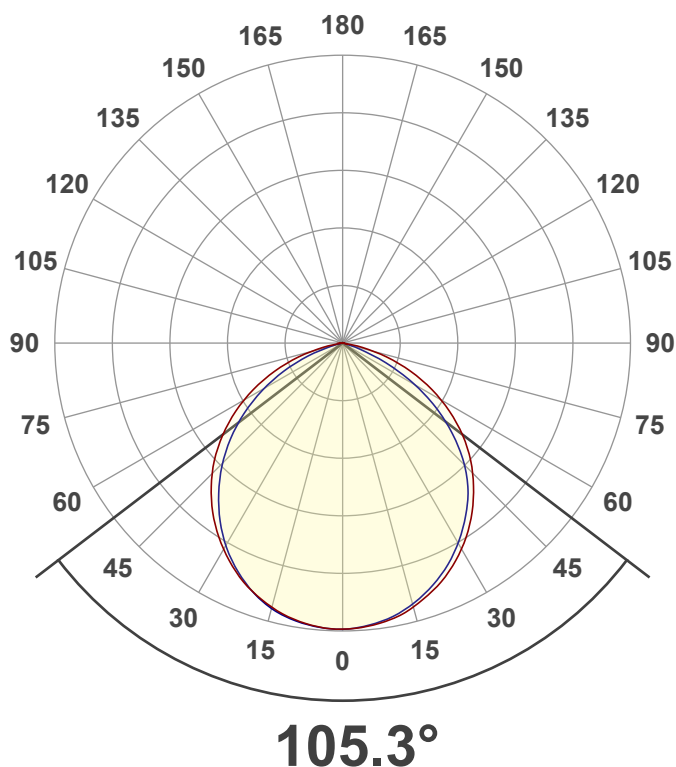
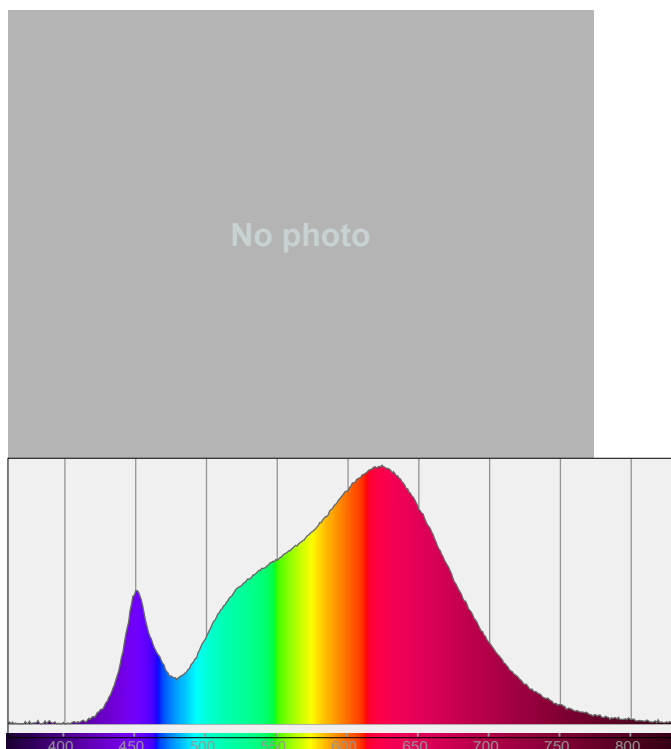
CCT = 2988 K / 2988 K

CRI 92.4

R_f 91.1 – R_g 101.0

Duv -0.0005 – SDCM n/a

SVM n/a – PstLM n/a



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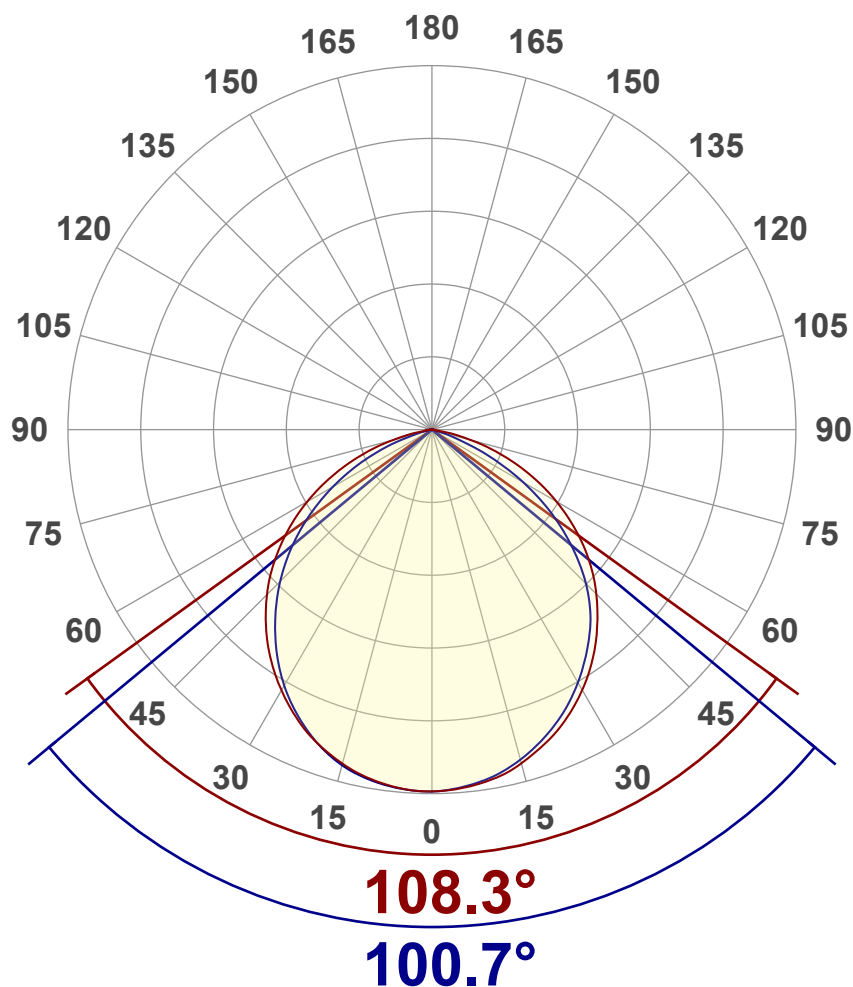
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	590 lm
Lumen Up% / Down%	0.01% / 99.99%
Peak Intensity	238 cd
Beam Angle (50%)	105.3°
Beam Angle (90%)	100.7°
Beam Angle (10%)	108.3°

Cut-off Angle

Average 2,5%	157.1°
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Field Angle

Average 10%	146.4°
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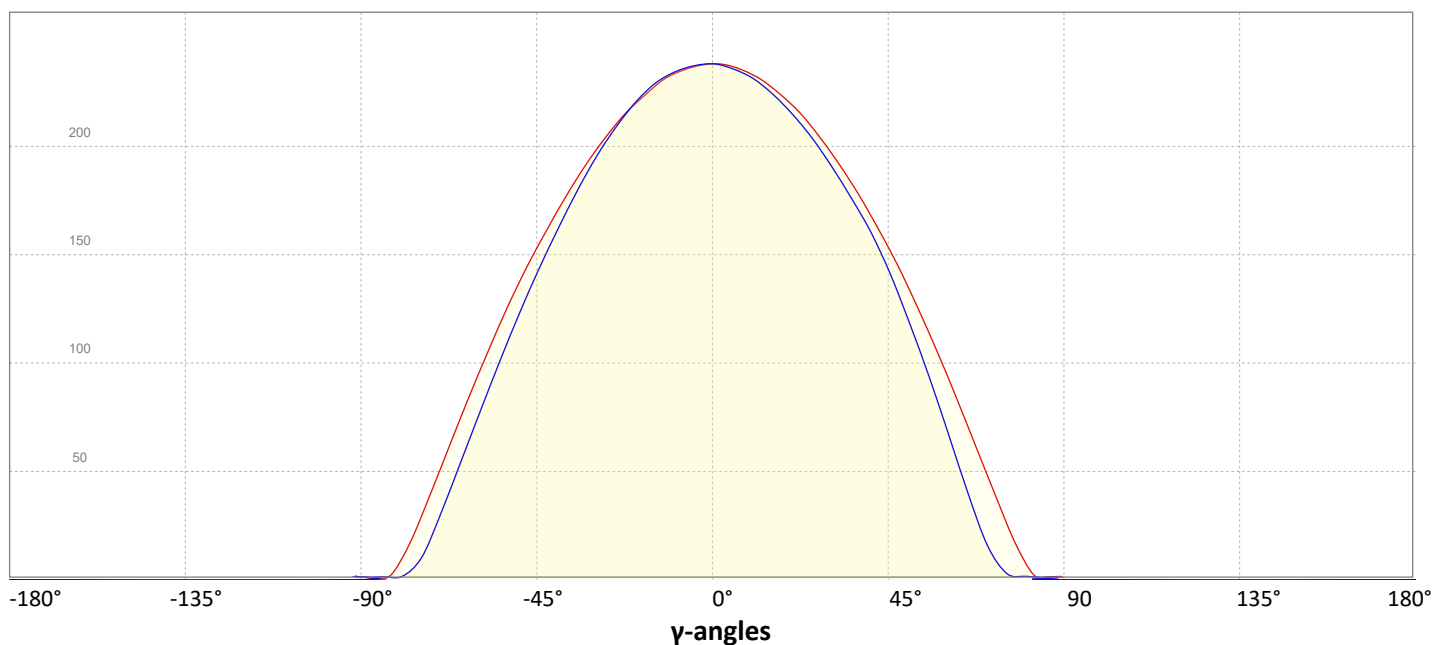
Intensity Ratio

In 120° cone	86.0%
In 90° cone	60.1%

C000-C180

C090-C270

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

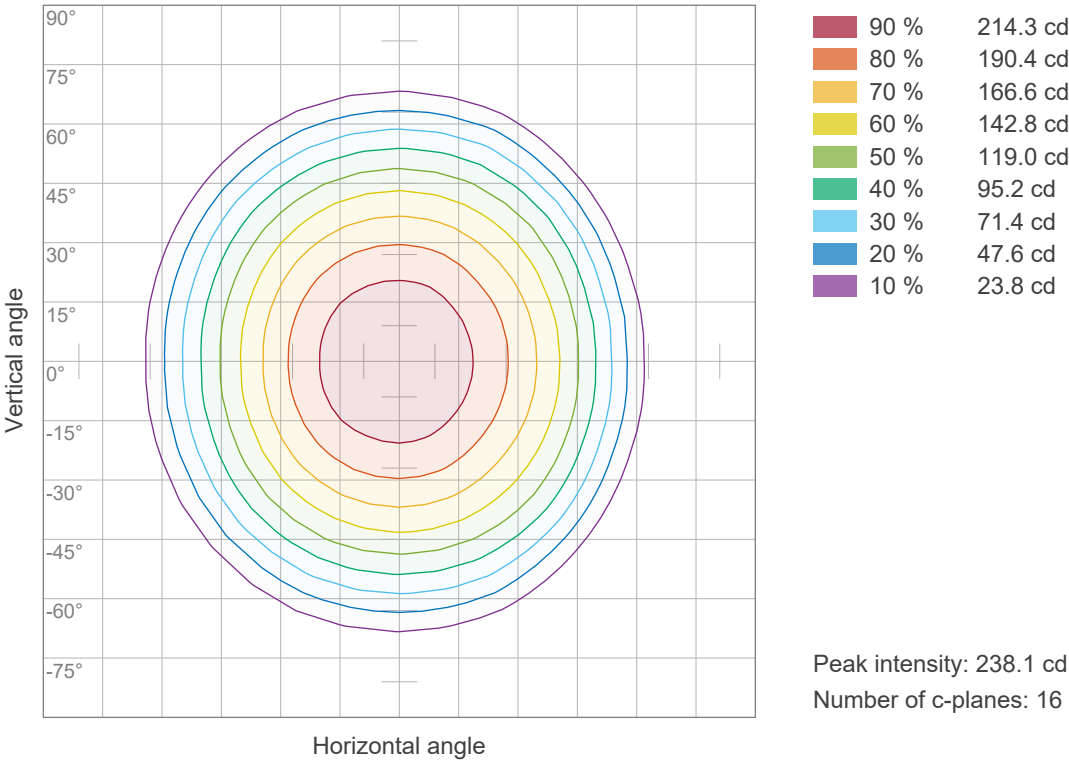


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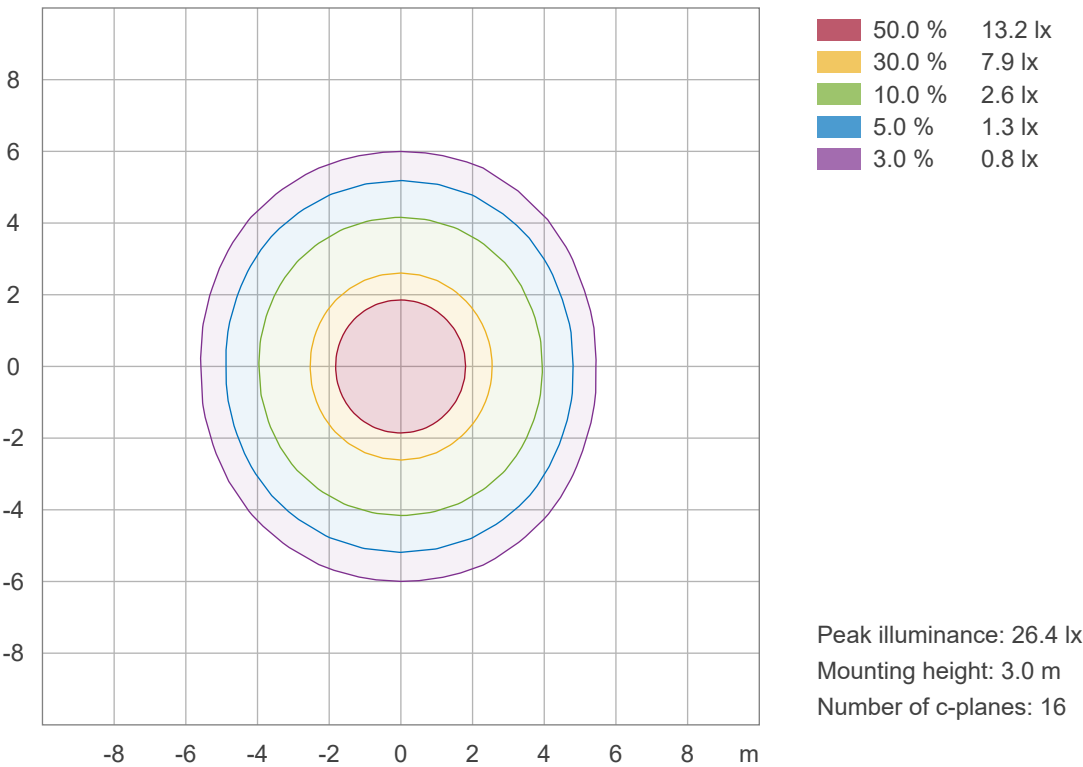
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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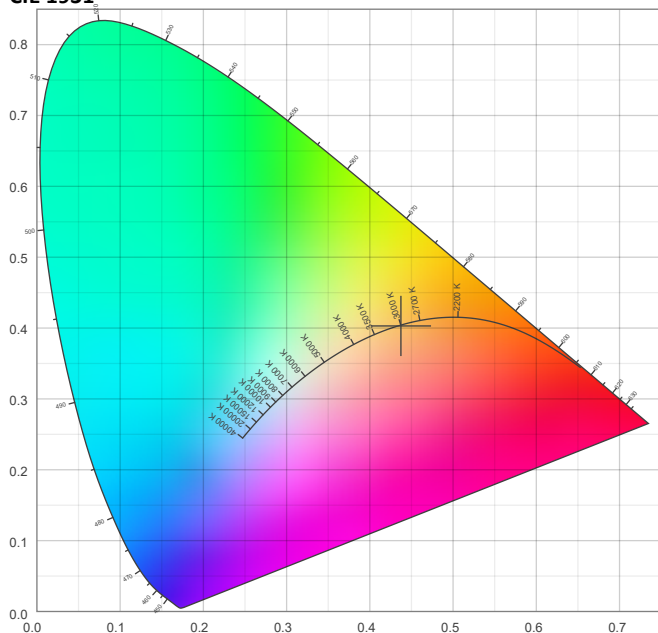


Color details

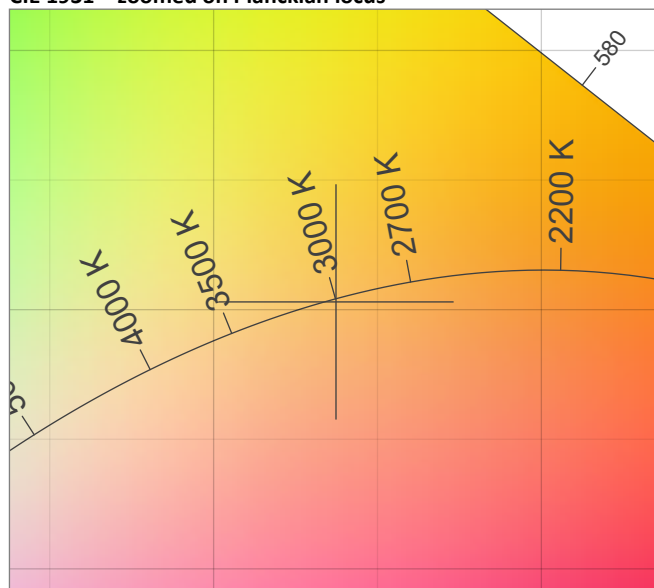
Correlated Color Temperature, Target CCT = 2988 K
Correlated Color Temperature, Measured CCT = 2988 K
Color Rendering Index CRI 92.4
Color Rendering Index, R9 (red component) R9 = 61.3
Color Rendering TM30-18 R_f 91.1 – R_g 101.0
Color Quality Scale CQS = 90.1

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0.437;0.403)
Color coordinate CIEs 1960 (u;v) = (0.251;0.347)
Color deviation from BBL Duv = -0.0005
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0.251;0.521)

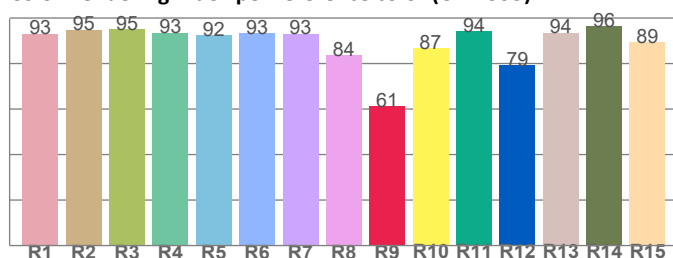
CIE 1931



CIE 1931 – zoomed on Planckian locus



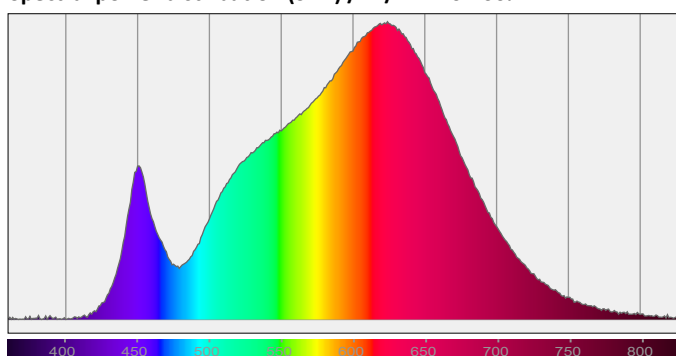
Color Rendering Index per reference color (CIE 1995)



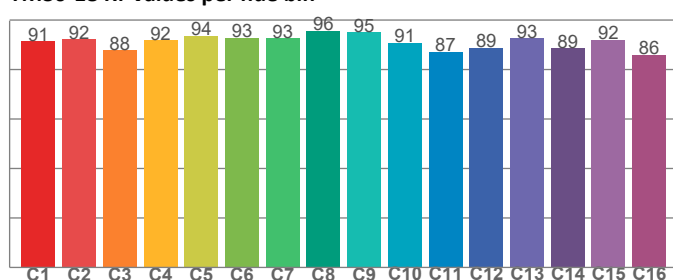
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
93.1	94.9	95.1	93.5	92.3	93.4	93.1	83.7	61.3	86.8	94.1	79.3	93.5	96.4	89.3

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



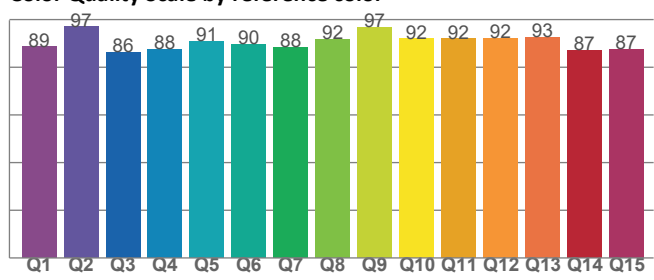
TM30-18 R_f-values per hue bin



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
91.4	92.1	87.8	91.8	93.6	92.8	92.5	95.7	95.0	90.9	87.2	88.8	92.5	88.7	92.1	86.0

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
88.6	97.0	86.3	87.7	90.9	89.7	88.4	91.8	96.9	92.0	92.0	92.2	92.5	87.2	87.5

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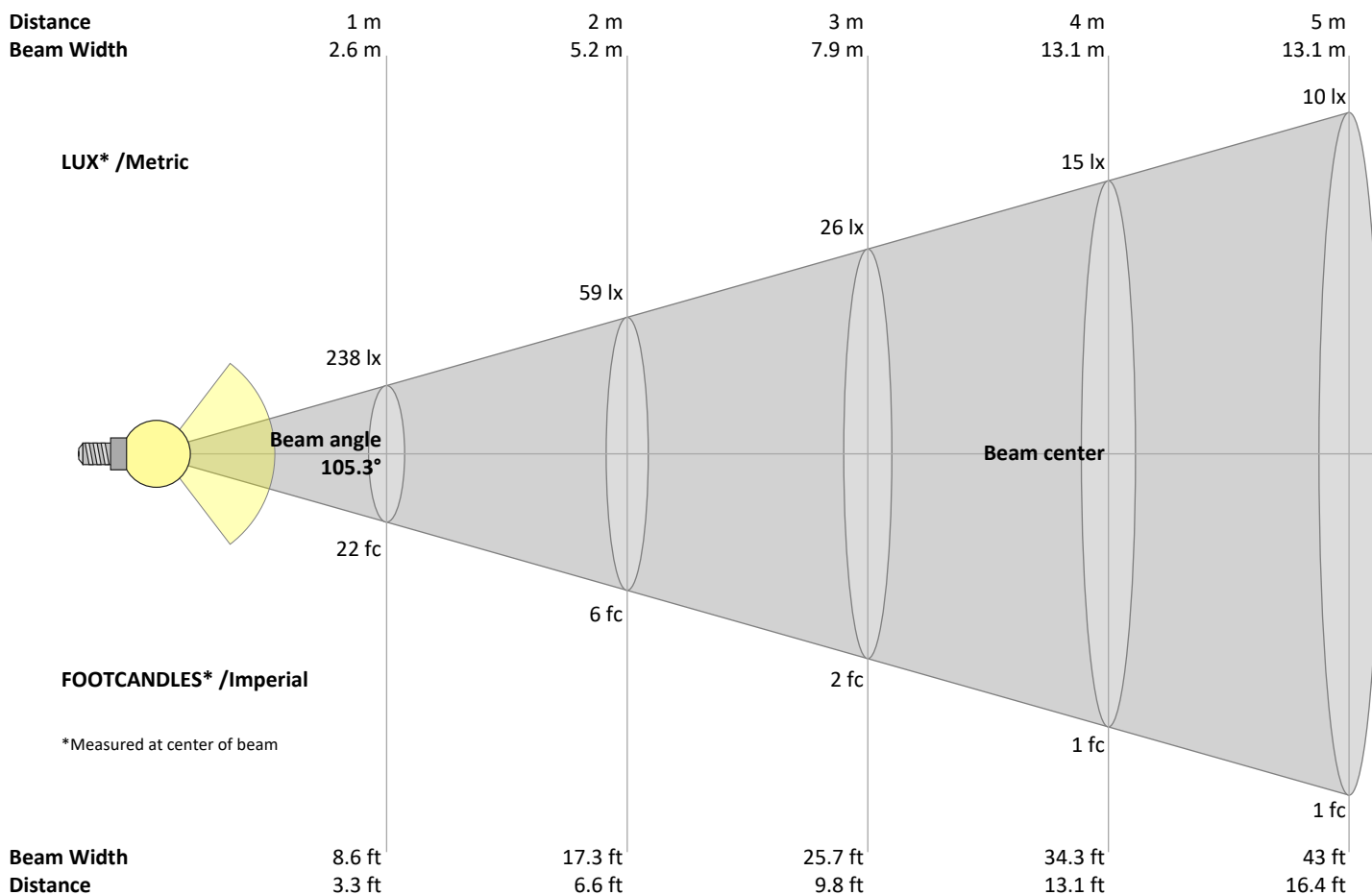
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Beam Details



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
238	59	26	15	10	7	5	4	3	2	2	2	1	1	1	1	1	1	1	1	lux
22.1	5.5	2.5	1.4	0.9	0.6	0.5	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	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
238	236	233	227	219	209	198	184	169	153	135	116	94	72	50	28	9	1	1	0	cd
100%	99%	98%	96%	92%	88%	83%	77%	71%	64%	57%	49%	40%	30%	21%	12%	4%	1%	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
238	236	232	225	216	205	192	178	162	143	121	96	69	42	18	4	2	1	0	0	cd
100%	99%	97%	95%	91%	86%	81%	75%	68%	60%	51%	40%	29%	18%	7%	2%	1%	0%	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
238	237	233	227	220	210	198	185	170	153	135	116	95	72	50	28	9	2	0	0	cd
100%	100%	98%	96%	92%	88%	83%	78%	71%	64%	57%	49%	40%	30%	21%	12%	4%	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
238	237	234	228	220	208	194	178	160	141	120	98	75	52	29	9	2	1	1	0	cd
100%	100%	98%	96%	92%	87%	82%	75%	67%	59%	51%	41%	32%	22%	12%	4%	1%	1%	0%	0%	of 0°val

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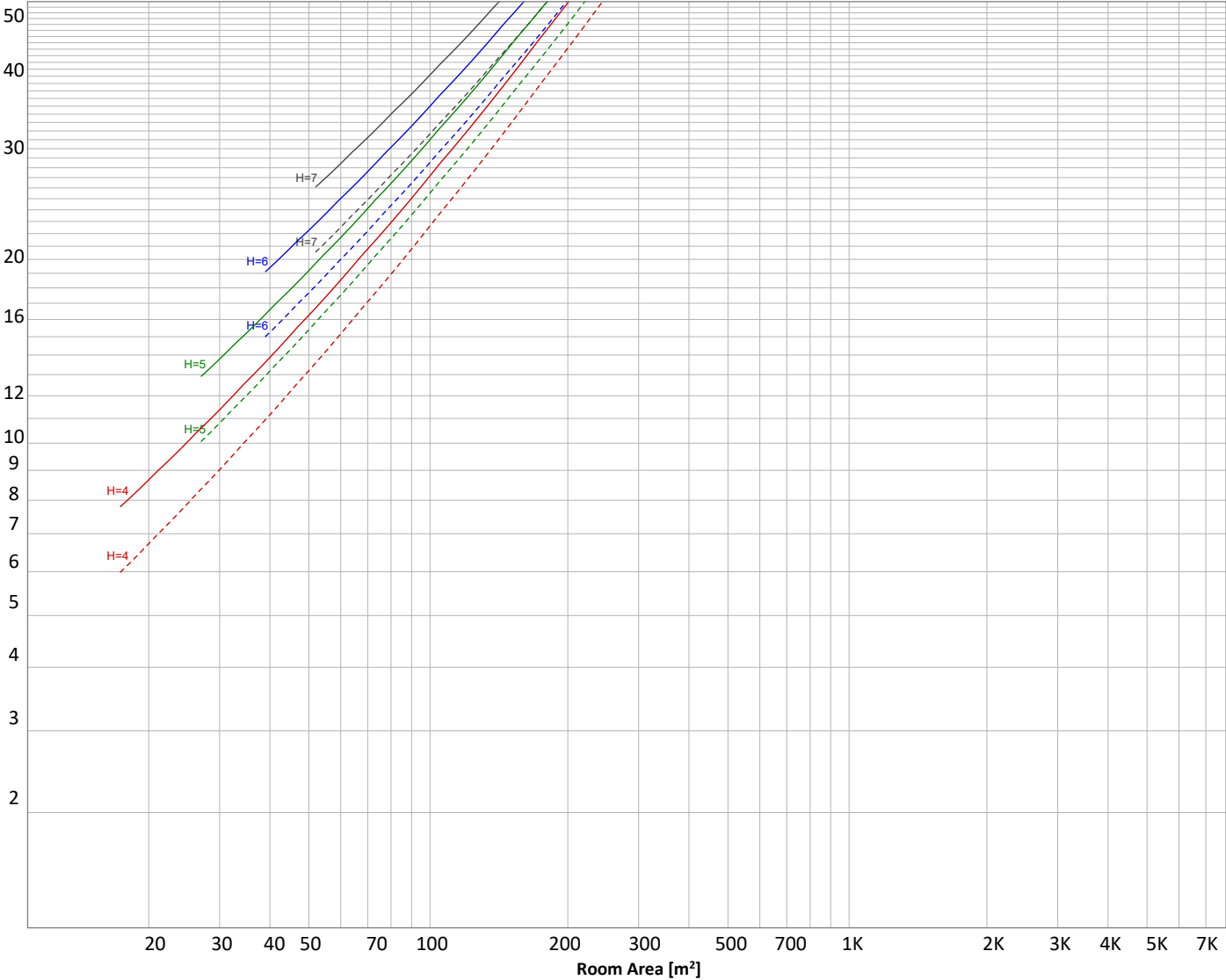
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 590 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°
22.5 lm	64.1 lm	95.9 lm	114 lm	114 lm	96.8 lm	61.4 lm	19.4 lm	1.70 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.078 lm	0.000 lm	0.000 lm	0.000 lm	0.000 lm	0.000 lm	0.000 lm	0.000 lm	0.000 lm

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Outdoor Light Planning

Lumen per Zone

Zone (y)	Lumen	% Total
0-10°	22 lm	3.8%
10-20°	64 lm	10.9%
20-30°	96 lm	16.3%
30-40°	114 lm	19.3%
40-50°	114 lm	19.4%
50-60°	97 lm	16.4%
60-70°	61 lm	10.4%
70-80°	19 lm	3.3%
80-90°	2 lm	0.3%
90-100°	0 lm	0.0%
100-110°	0 lm	0.0%
110-120°	0 lm	0.0%
120-130°	0 lm	0.0%
130-140°	0 lm	0.0%
140-150°	0 lm	0.0%
150-160°	0 lm	0.0%
160-170°	0 lm	0.0%
170-180°	0 lm	0.0%
Total	590 lm	100.0%

Intensity peaks

Max intensity	238 cd
Intensity, 90°	1 cd
Intensity, 0°	238 cd

Zonal Lumen summary

Zone (y)	Lumen	% Total
0-30°	182 lm	30.9%
0-40°	296 lm	50.2%
0-60°	507 lm	86.0%
60-90°	83 lm	14.0%
70-100°	21 lm	3.6%
90-120°	0 lm	0.0%
0-90°	590 lm	100.0%
90-180°	0 lm	0.0%
0-180°	590 lm	100.0%

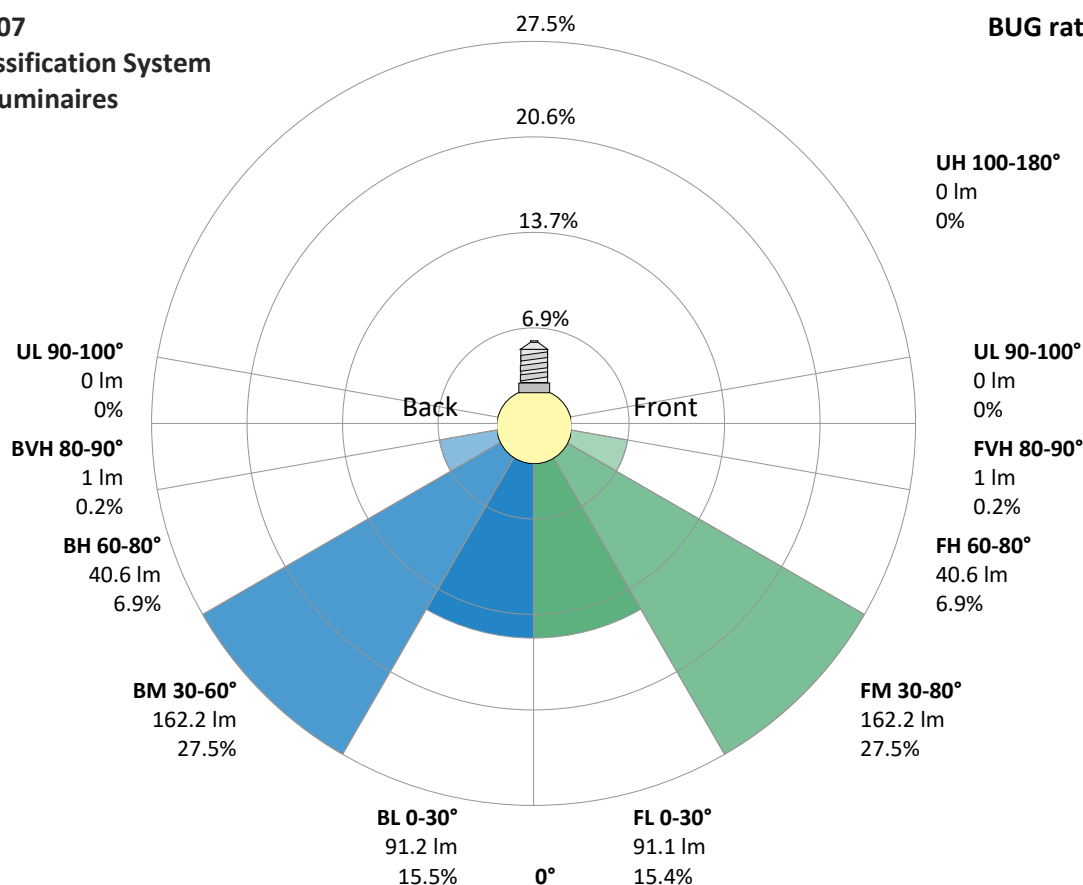
BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	91 lm	15.4%
Medium(30-60°)	162 lm	27.5%
High(60-80°)	41 lm	6.9%
Very high(80-90°)	1 lm	0.2%
Back light		
Low(0-30°)	91 lm	15.5%
Medium(30-60°)	162 lm	27.5%
High(60-80°)	41 lm	6.9%
Very high(80-90°)	1 lm	0.2%
Uplight		
Low(90-100°)	0 lm	0.0%
High(100-180°)	0 lm	0.0%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B0 U0 G0



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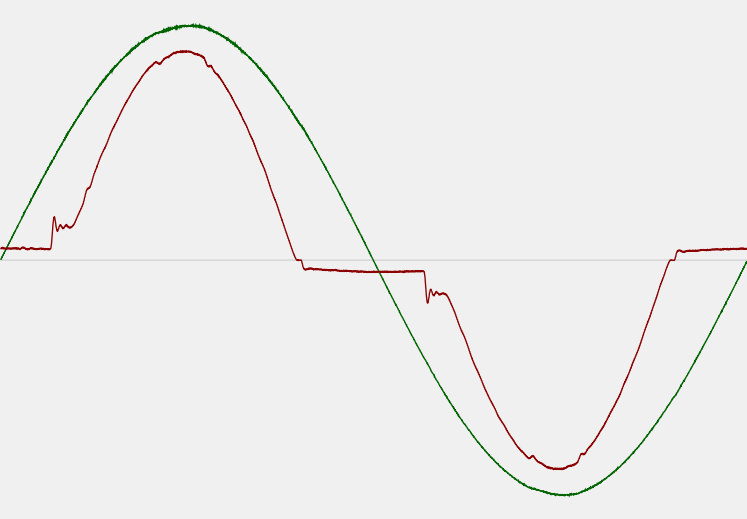


Power Details

Input Power

Power feed to light source	15.9 W
Frequency of input power	60 Hz
RMS Input voltage feed, V_{RMS}	120 V
RMS Input current feed, I_{RMS}	0.144 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	17.29 VA
Displacement factor of AC power feed	0.99
Power factor of AC current feed	0.92
Total harmonic distortion of the current	40.23%
Total harmonic distortion of the voltage	0.38%

Input Power Curve



Efficiency

Radiated power efficiency	12.8%
Lumen efficiency	37 lm/W

Stabilization Details

Warmup Conditions

Stable period	15 min
Stable change max	0.5%
Minimum time	30 min

Color Temperature Change

CCT start	2987 K
CCT shift	+1 K
CCT end	2988 K

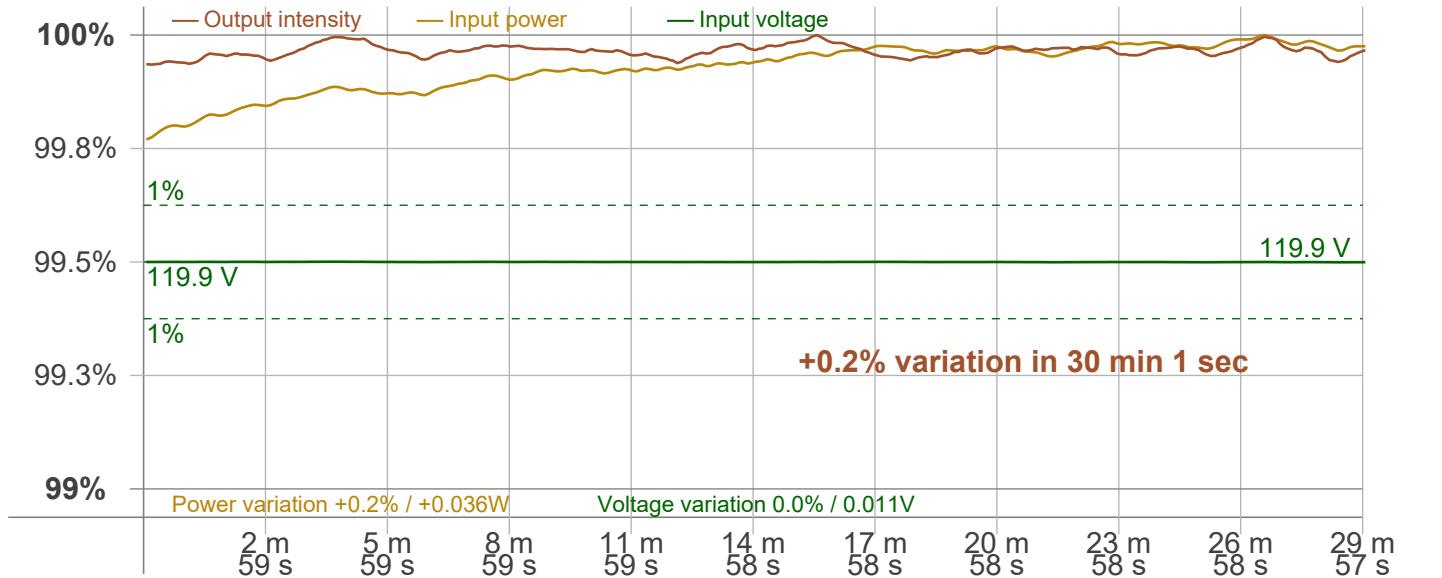
Warmup Result

Total warmup time	Lamp stabilized in 30 min 1 sec
Warmup variation	+0.2%

Output Change

Output start	590 lm
Output change	+1m
Output end	590 lm

Stabilization Curve



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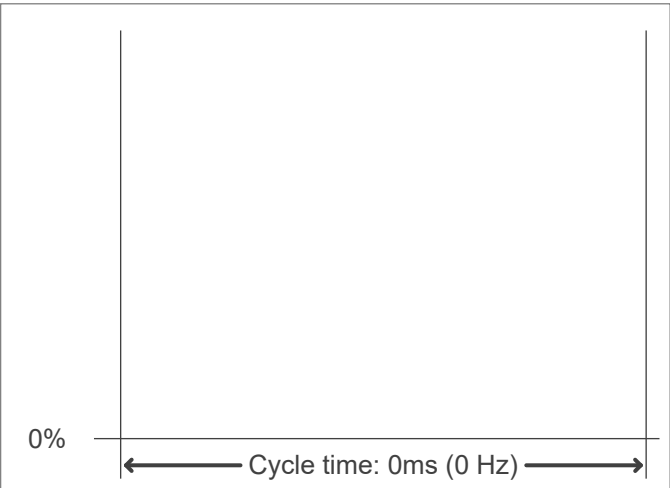
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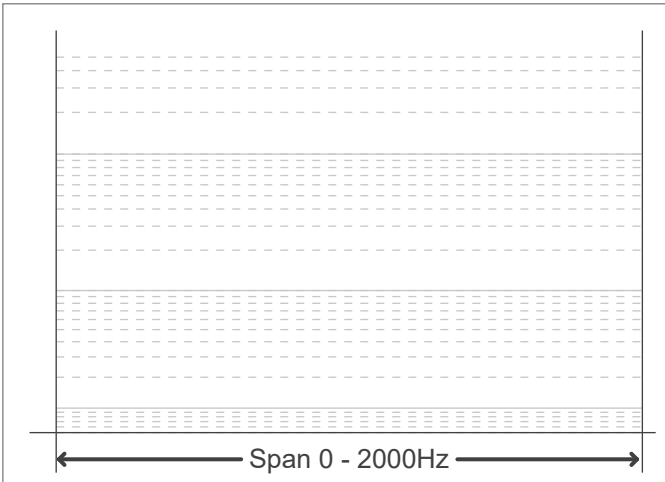
Flicker /TLA details

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

