

# Light Measurement Report

Print date: 1/7/2026  
Measurement date and time: 1/2/2026 2:46:12 PM – Measurement no. VFR-260102-0738-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 – 4/8/2025 – 1516006613
Spectrometer Manufacturer and Model	Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

## Measurement Conditions

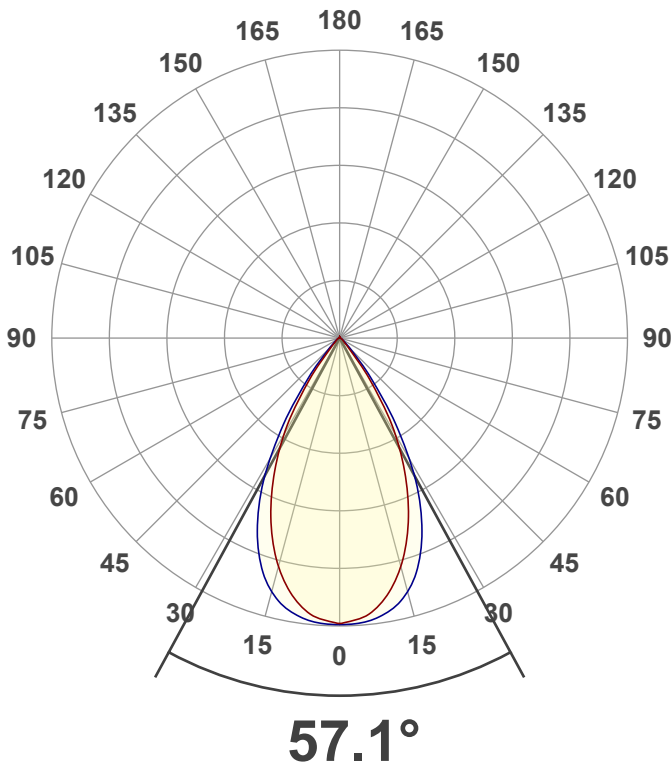
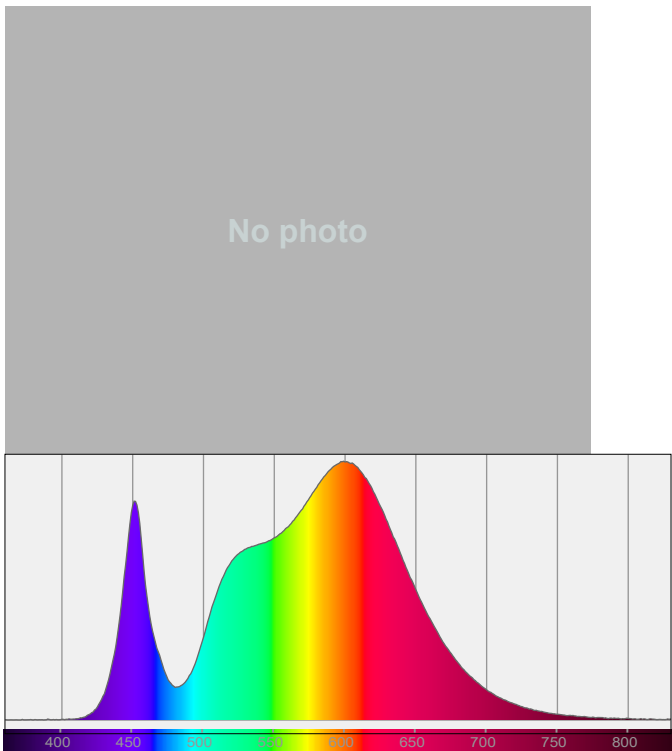
Number of C-planes and Resolution	12 planes – 30°
γ (gamma)-Resolution	5°
Test Distance	10.57 m
Input Power, Power and Displ. Factors	27.6 W – PF 0.96 – DPF 0.98
Input RMS Voltage and Current	121 V – 0.238 A
Frequency of Input Power	60 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 4 sec – 2.0%

## Tested Light Source

Product Name	HP1-P-D-4'-V-835-MLW-BLX2835
Item No. and Manufacturer	HP1-P-D-4'-V-835-MLW-BLX2835 – Finelite Inc.
Product Description (line 1)	

## Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	3603 lm – 0.69% / 99.31%
Efficiency	130 lm/W
Peak Intensity and Beam Angle	4139 cd – 57.1°
Correlated Color Temperature, Target/Measured	CCT = 3477 K / 3477 K
Color Rendering Index	CRI 81.2
Color Rendering TM30-18	R <sub>f</sub> 82.6 – R <sub>g</sub> 96.8
Color Shift, CIE duv and MacAdam Steps	Duv 0.0017 – SDCM n/a
Flicker	SVM n/a – PstLM n/a



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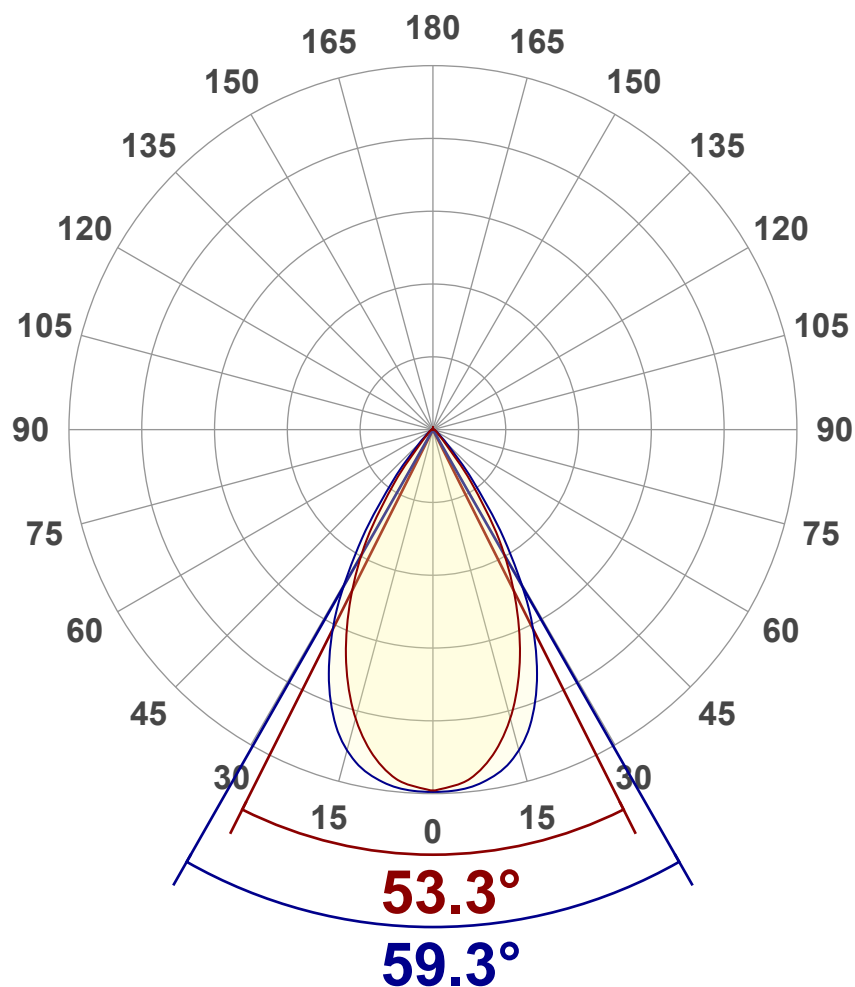
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## Luminous Intensity diagram

Unit: 0-100% of peak intensity



## Main Values

Output (total Lumen)	3603 lm
Lumen Up% / Down%	0.69% / 99.31%
Peak Intensity	4139 cd
Beam Angle (50%)	57.1°
Beam Angle (90%)	59.3°
Beam Angle (10%)	53.3°

## Cut-off Angle

Average 2,5%	100.9°
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## Field Angle

Average 10%	83.5°
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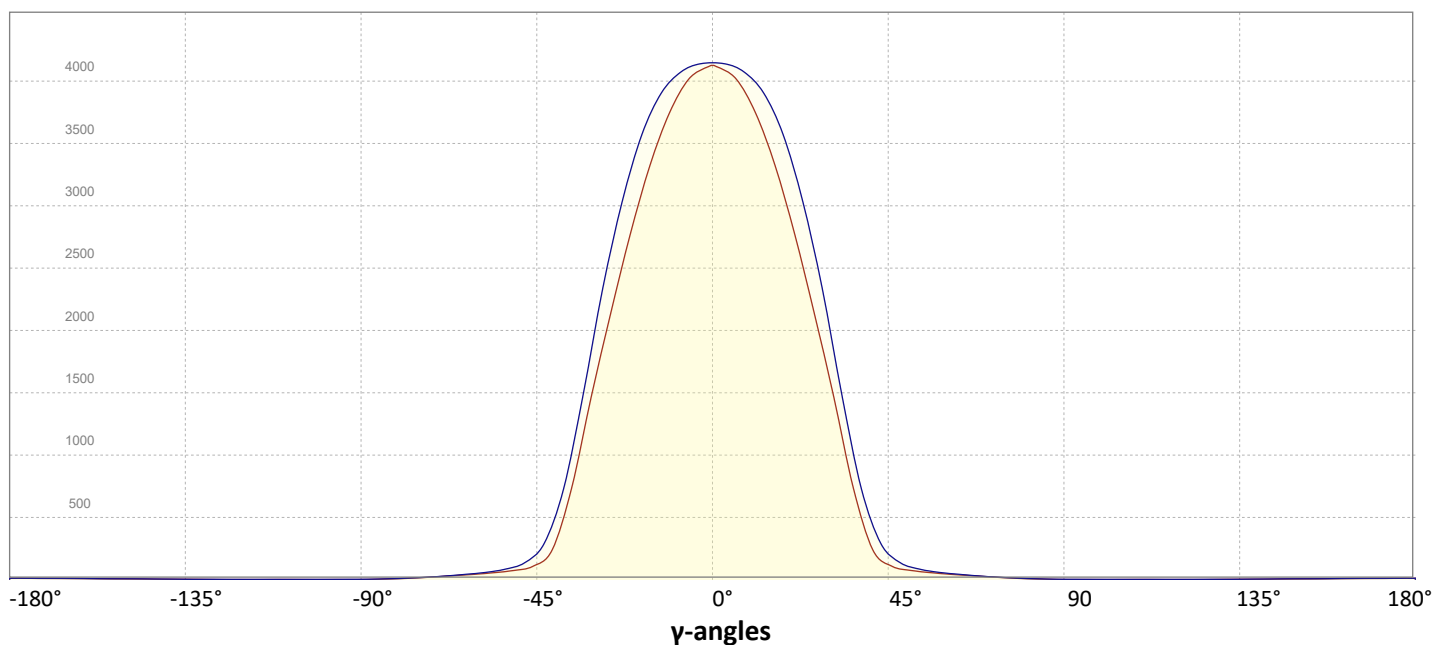
## Intensity Ratio

In 120° cone	97.6%
In 90° cone	94.0%

C000-C180

C090-C270

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

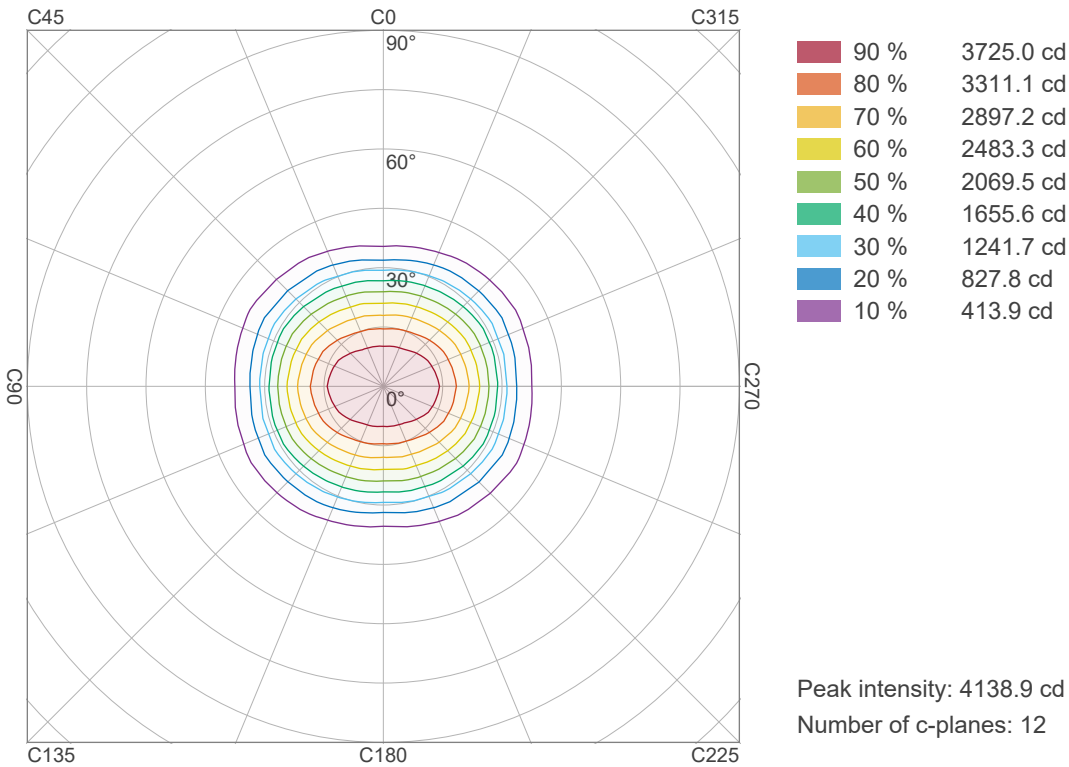


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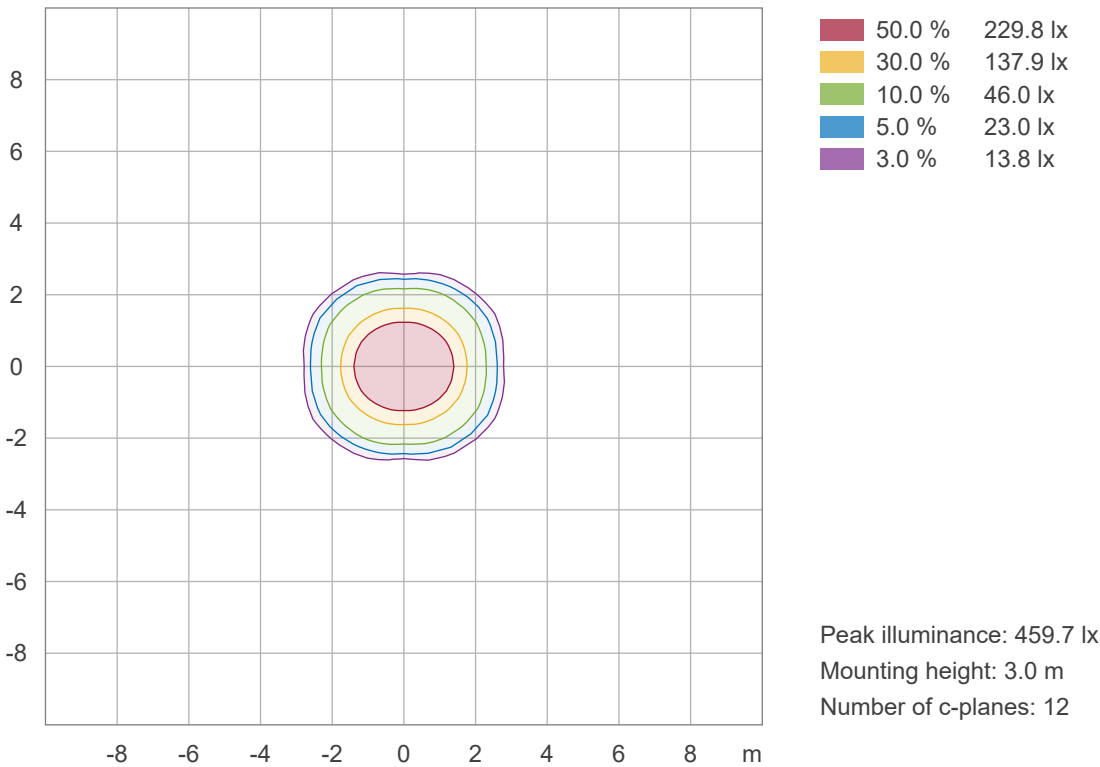
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## Iso-intensity Diagram (Iso-candela)



## Iso-illuminance Diagram (Iso-lux)



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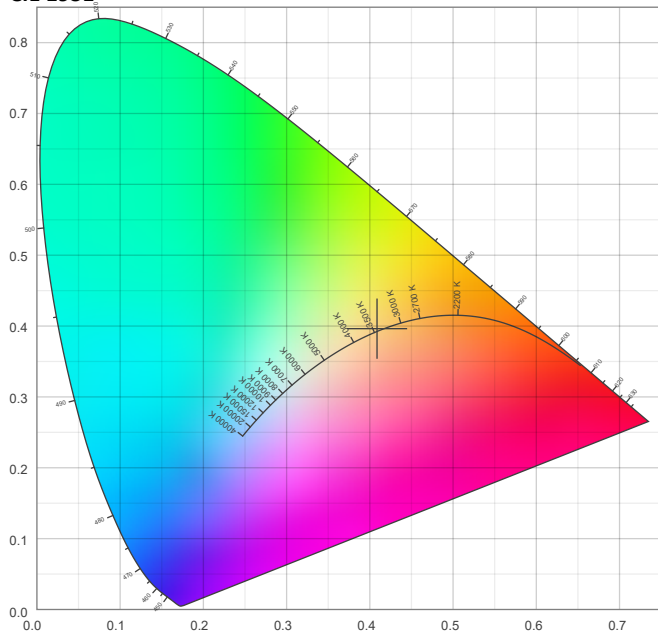


## Color details

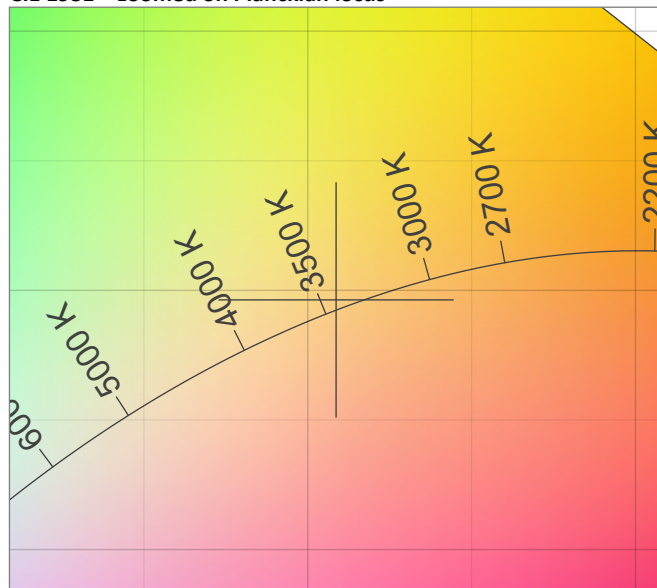
Correlated Color Temperature, Target CCT = 3477 K  
Correlated Color Temperature, Measured CCT = 3477 K  
Color Rendering Index CRI 81.2  
Color Rendering Index, R9 (red component) R9 = 0.9  
Color Rendering TM30-18 R<sub>f</sub> 82.6 – R<sub>g</sub> 96.8  
Color Quality Scale CQS = 81.3

MacAdam Steps  
Color coordinates CIE 1931 (x;y) = (0.409;0.396)  
Color coordinate CIEs 1960 (u;v) = (0.236;0.343)  
Color deviation from BBL Duv = 0.0017  
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0.236;0.514)

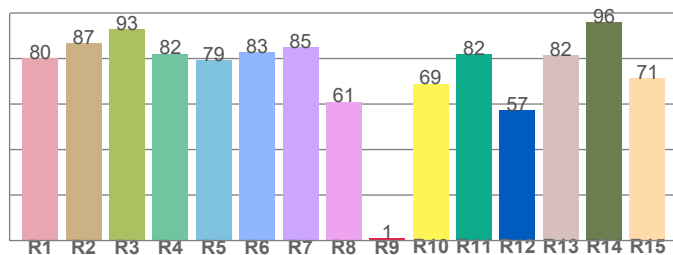
## CIE 1931



## CIE 1931 – zoomed on Planckian locus



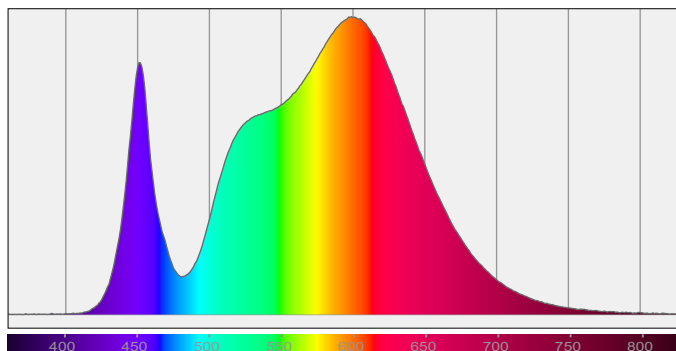
## Color Rendering Index per reference color (CIE 1995)



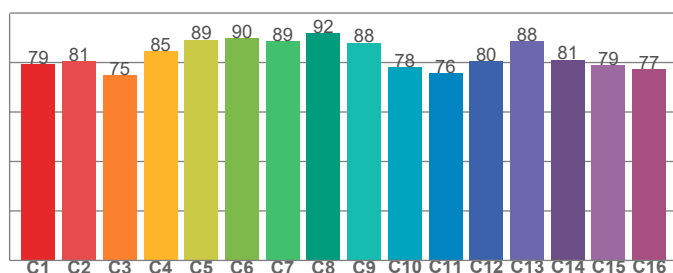
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
80.0	86.8	93.0	82.1	79.3	82.7	85.1	60.9	0.9	69.0	81.9	57.1	81.5	95.8	71.4

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



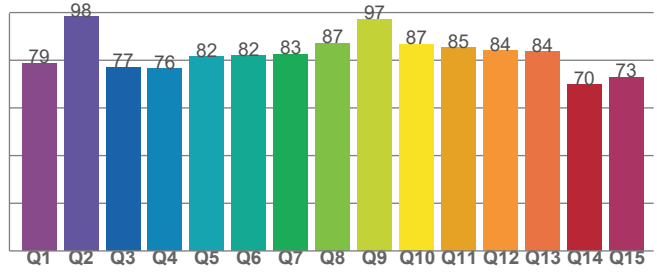
## TM30-18 R<sub>f</sub>-values per hue bin



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
79.4	80.6	75.0	84.5	89.2	89.9	88.7	91.9	88.0	78.2	75.6	80.5	88.5	81.1	79.0	77.2

## Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
78.7	98.2	77.0	76.4	81.6	82.0	82.6	87.2	97.2	86.8	85.2	84.0	83.5	69.7	72.8

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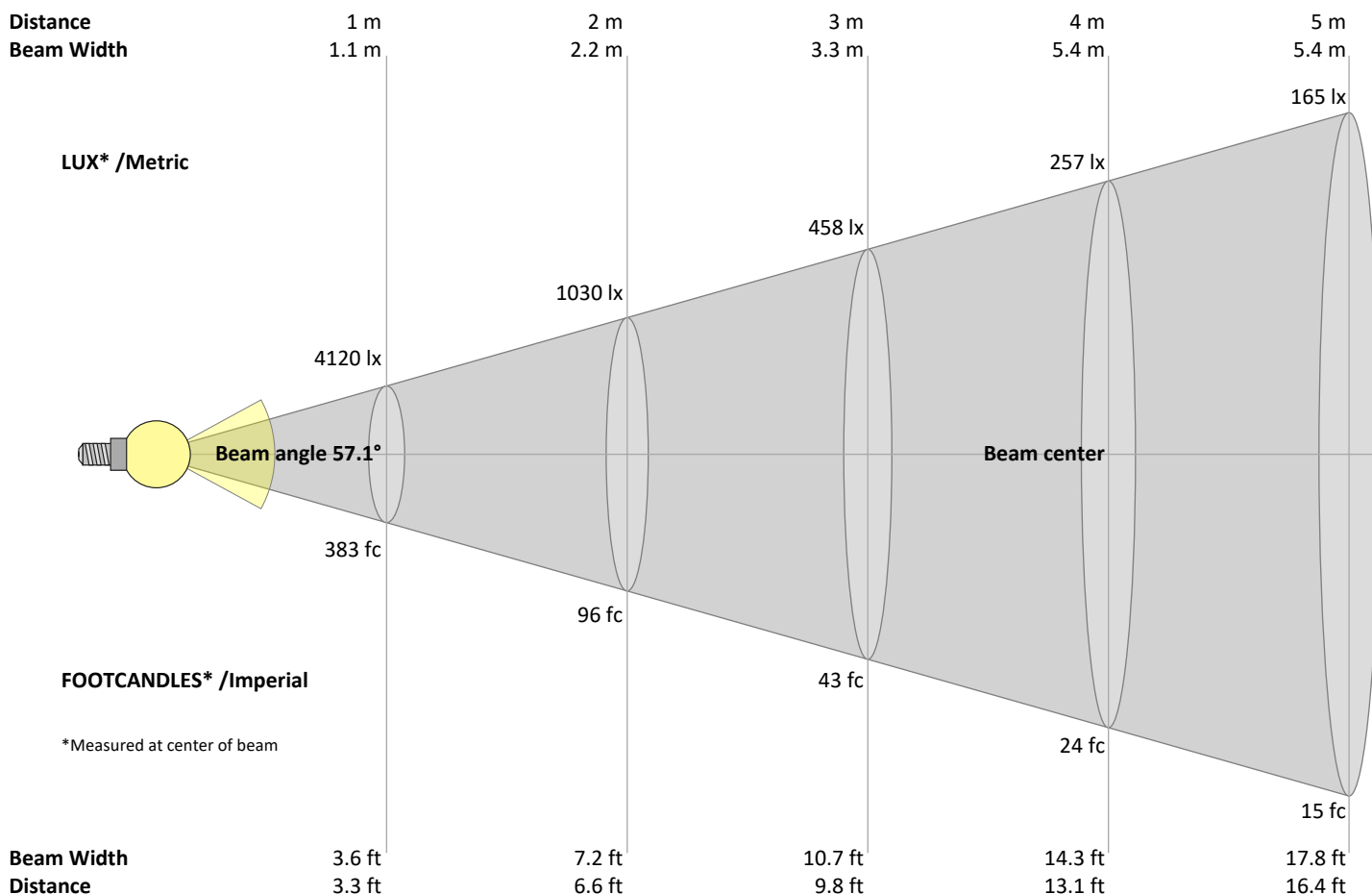
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## Beam Details



### 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
4120	1030	458	257	165	114	84	64	51	41	34	29	24	21	18	16	14	13	11	10	lux
382.8	95.7	42.5	23.9	15.3	10.6	7.8	6	4.7	3.8	3.2	2.7	2.3	2	1.7	1.5	1.3	1.2	1.1	1	fc

### Intensities in 0° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
4120	4097	4058	4018	3910	3800	3662	3493	3324	3106	2887	2651	2398	2145	1877	1608	1328	1036	745	544	cd
100%	99%	98%	98%	95%	92%	89%	85%	81%	75%	70%	64%	58%	52%	46%	39%	32%	25%	18%	13%	of 0°val

### Intensities in 90° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
4120	4139	4127	4101	4074	4009	3941	3844	3710	3576	3366	3153	2910	2631	2351	2014	1674	1351	1049	747	cd
100%	100%	100%	100%	99%	97%	96%	93%	90%	87%	82%	77%	71%	64%	57%	49%	41%	33%	25%	18%	of 0°val

### Intensities in 180° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
4120	4097	4058	4018	3910	3800	3662	3493	3324	3106	2887	2651	2398	2145	1877	1608	1328	1036	745	544	cd
100%	99%	98%	98%	95%	92%	89%	85%	81%	75%	70%	64%	58%	52%	46%	39%	32%	25%	18%	13%	of 0°val

### Intensities in 270° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
4120	4139	4127	4101	4074	4009	3941	3844	3710	3576	3366	3153	2910	2631	2351	2014	1674	1351	1049	747	cd
100%	100%	100%	100%	99%	97%	96%	93%	90%	87%	82%	77%	71%	64%	57%	49%	41%	33%	25%	18%	of 0°val



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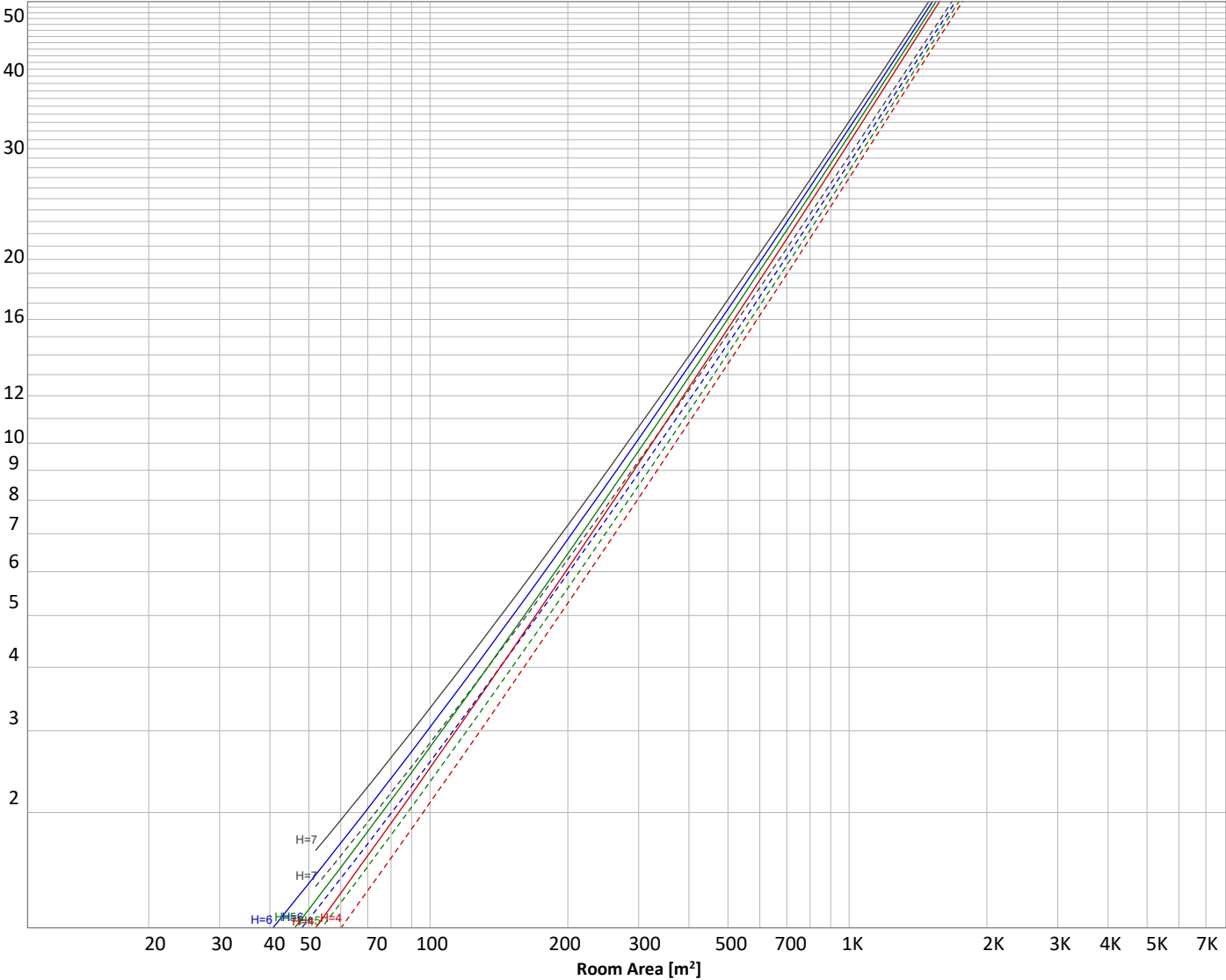
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 3603 lm	p(%)		
H <sub>down</sub> = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	Wall reflectance
H <sub>work</sub> = Work area height from floor =	0.00 m	-----	70	50
E <sub>work</sub> = 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°
384 lm	1002 lm	1155 lm	713 lm	194 lm	66.5 lm	38.1 lm	18.5 lm	6.35 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
2.94 lm	2.68 lm	2.51 lm	2.40 lm	3.08 lm	3.60 lm	3.60 lm	2.82 lm	1.08 lm

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## Outdoor Light Planning

### Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	384 lm	10.7%
10-20°	1002 lm	27.8%
20-30°	1155 lm	32.1%
30-40°	713 lm	19.8%
40-50°	194 lm	5.4%
50-60°	66 lm	1.8%
60-70°	38 lm	1.1%
70-80°	18 lm	0.5%
80-90°	6 lm	0.2%
90-100°	3 lm	0.1%
100-110°	3 lm	0.1%
110-120°	3 lm	0.1%
120-130°	2 lm	0.1%
130-140°	3 lm	0.1%
140-150°	4 lm	0.1%
150-160°	4 lm	0.1%
160-170°	3 lm	0.1%
170-180°	1 lm	0.0%
<b>Total</b>	<b>3603 lm</b>	<b>100.0%</b>

### Intensity peaks

Max intensity	4139 cd
Intensity, 90°	3 cd
Intensity, 0°	4120 cd

### Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	2541 lm	70.5%
0-40°	3255 lm	90.3%
0-60°	3515 lm	97.6%
60-90°	63 lm	1.7%
70-100°	28 lm	0.8%
90-120°	8 lm	0.2%
0-90°	3578 lm	99.3%
90-180°	25 lm	0.7%
0-180°	3603 lm	100.0%

### BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	1266 lm	35.1%
Medium(30-60°)	492 lm	13.6%
High(60-80°)	28 lm	0.8%
Very high(80-90°)	3 lm	0.1%

### Back light

Low(0-30°)	1266 lm	35.1%
Medium(30-60°)	492 lm	13.6%
High(60-80°)	28 lm	0.8%
Very high(80-90°)	3 lm	0.1%

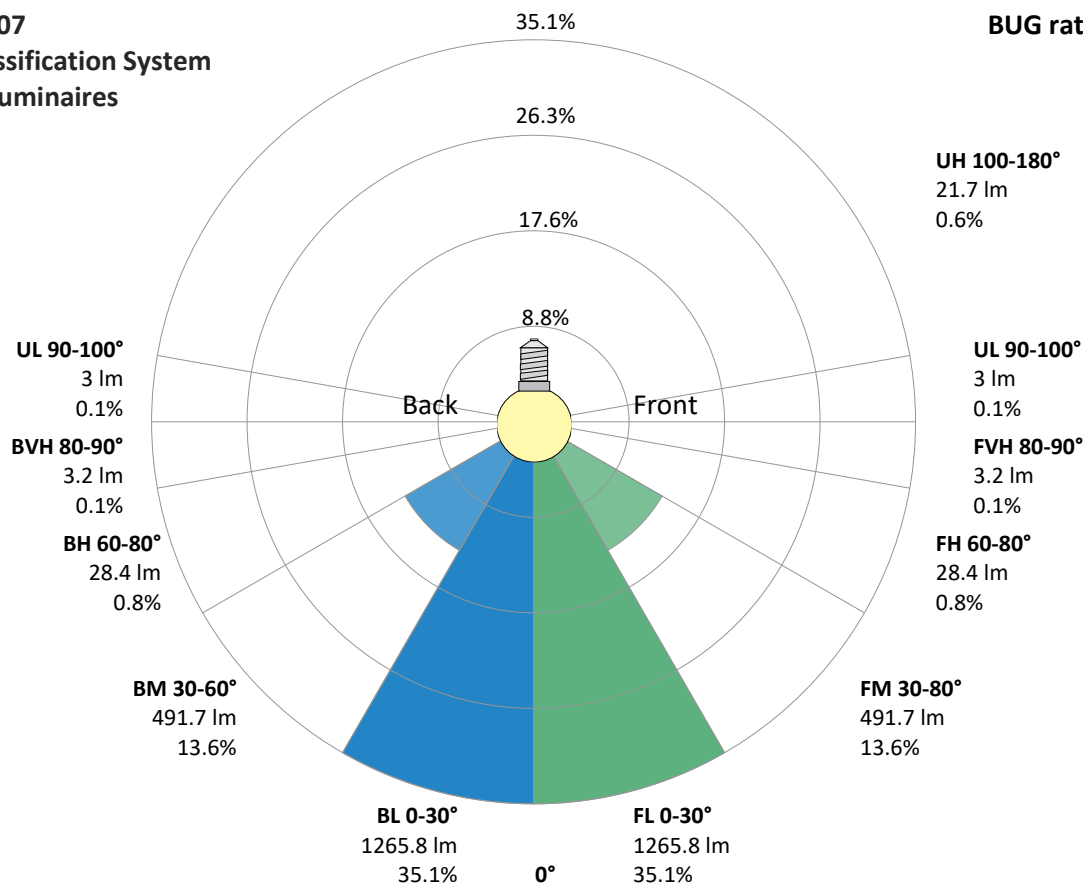
### Uplight

Low(90-100°)	3 lm	0.1%
High(100-180°)	22 lm	0.6%

## IESNA TM-15-07

### Luminaire Classification System For Outdoor Luminaires

### BUG rating B3 U2 G0





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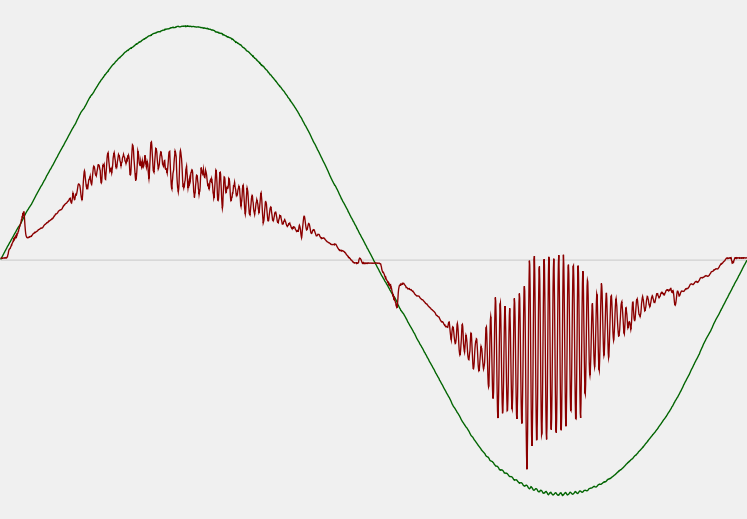


Power Details

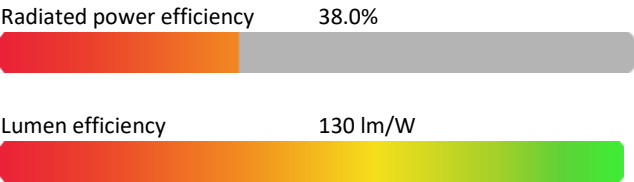
Input Power

Power feed to light source	27.6 W
Frequency of input power	60 Hz
RMS Input voltage feed, $V_{RMS}$	121 V
RMS Input current feed, $I_{RMS}$	0.238 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	28.83 VA
Displacement factor of AC power feed	0.98
Power factor of AC current feed	0.96
Total harmonic distortion of the current	14.28%
Total harmonic distortion of the voltage	1.68%

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	3474 K
CCT shift	+3 K
CCT end	3477 K

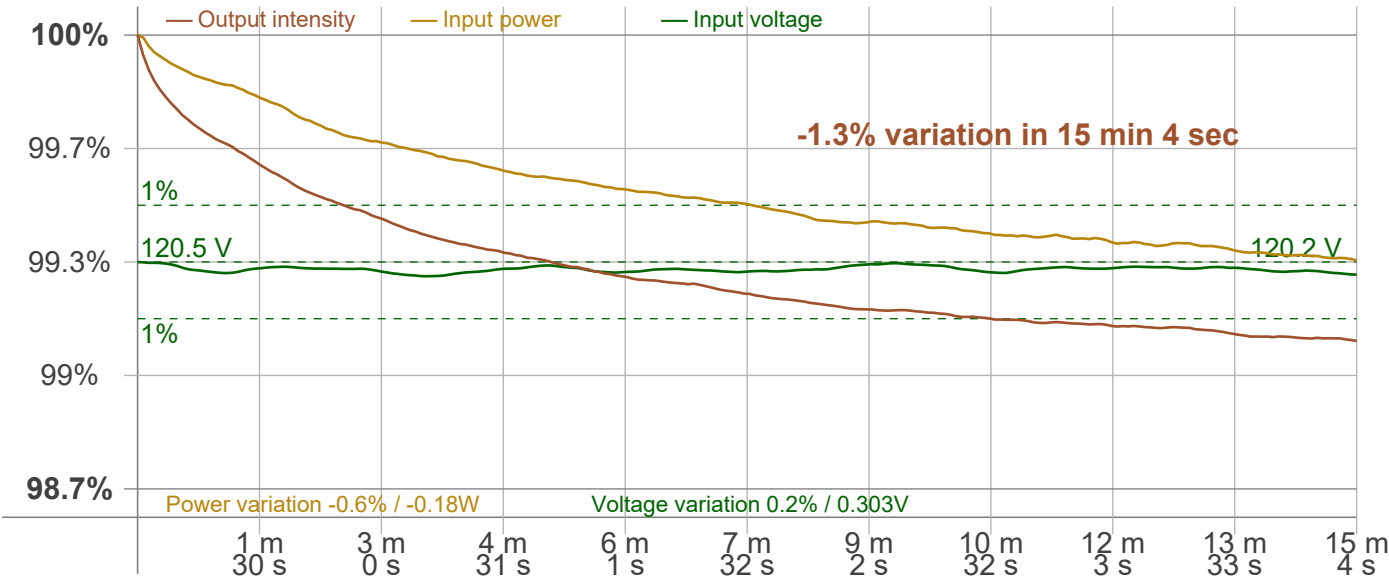
Warmup Result

Total warmup time	Lamp stabilized in 15 min 4 sec
Warmup variation	-1.3%

Output Change

Output start	3640 lm
Output change	-38 lm
Output end	3603 lm

Stabilization Curve



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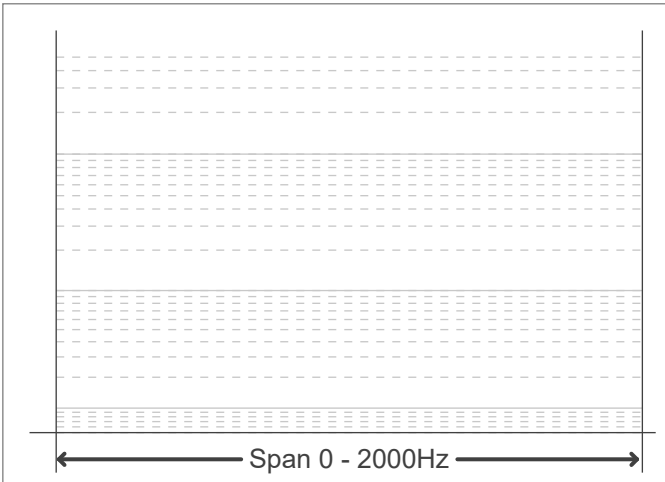
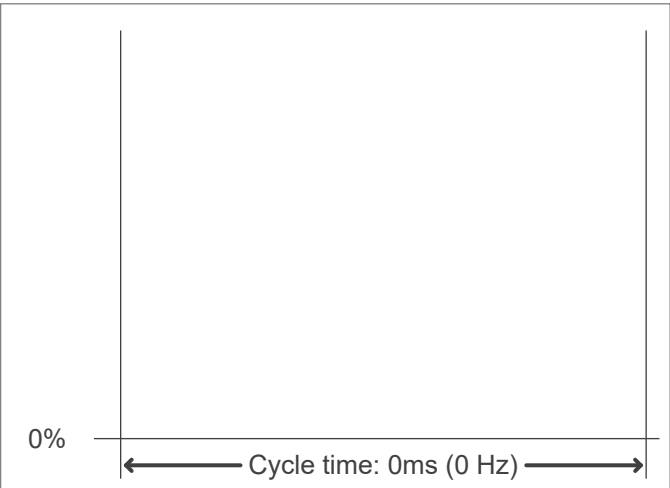


Flicker /TLA details

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

