

# Light Measurement Report

Print date: 1/7/2026

Measurement date and time: 12/18/2025 3:17:34 PM – Measurement no. VFR-251218-0678-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

$\gamma$  (gamma)-Resolution

Test Distance

Input Power, Power and Displ. Factors

Input RMS Voltage and Current

Frequency of Input Power

Warm-up Time and Variation

12 planes – 30°

5°

10.57 m

8.5 W – PF 0.98 – DPF 0.99

122 V – 0.072 A

60 Hz

Not completed – 2.0%

## Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

HP1-P-D-4'-S-835-MLW-BLX2835

HP1-P-D-4'-S-835-MLW-BLX2835 – Finelite Inc.

## 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

1189 lm – 0.64% / 99.36%

139 lm/W

1374 cd – 56.9°

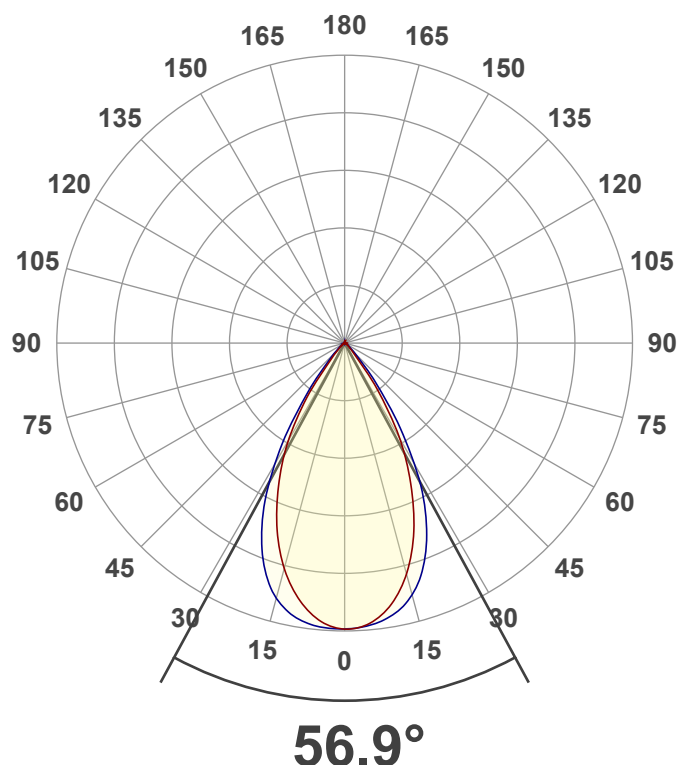
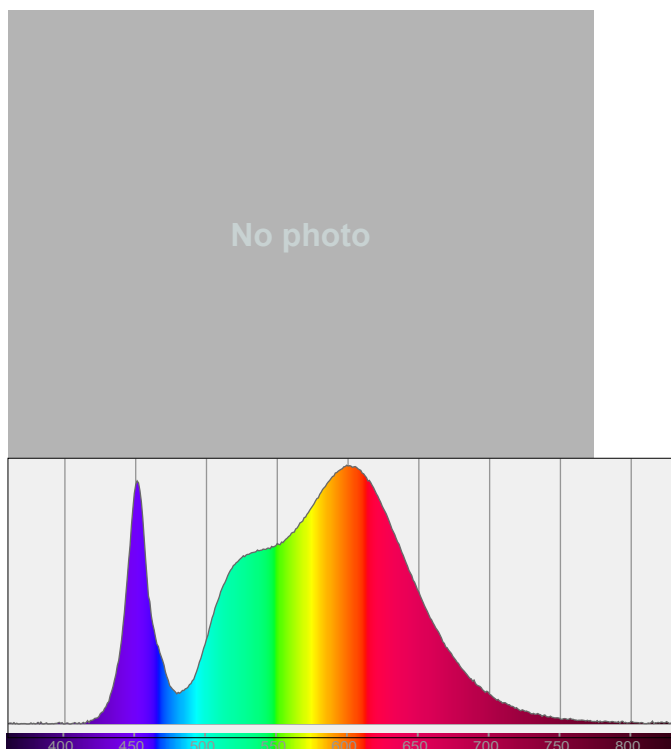
CCT = 3469 K / 3469 K

CRI 82.2

R<sub>f</sub> 83.0 – R<sub>g</sub> 97.4

Duv 0.0011 – SDCM n/a

SVM n/a – PstLM n/a



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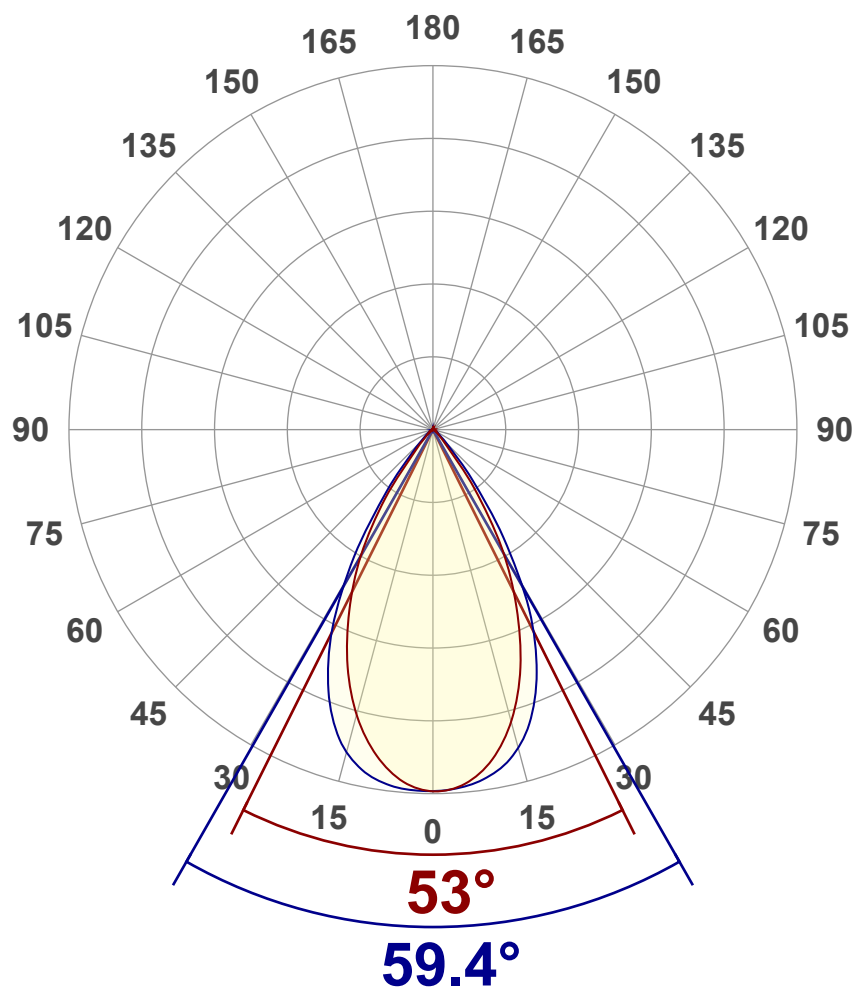
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## Luminous Intensity diagram

Unit: 0-100% of peak intensity



## Main Values

Output (total Lumen)	1189 lm
Lumen Up% / Down%	0.64% / 99.36%
Peak Intensity	1374 cd
Beam Angle (50%)	56.9°
Beam Angle (90%)	59.4°
Beam Angle (10%)	53°

## Cut-off Angle

Average 2,5%	100.5°
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## Field Angle

Average 10%	83.1°
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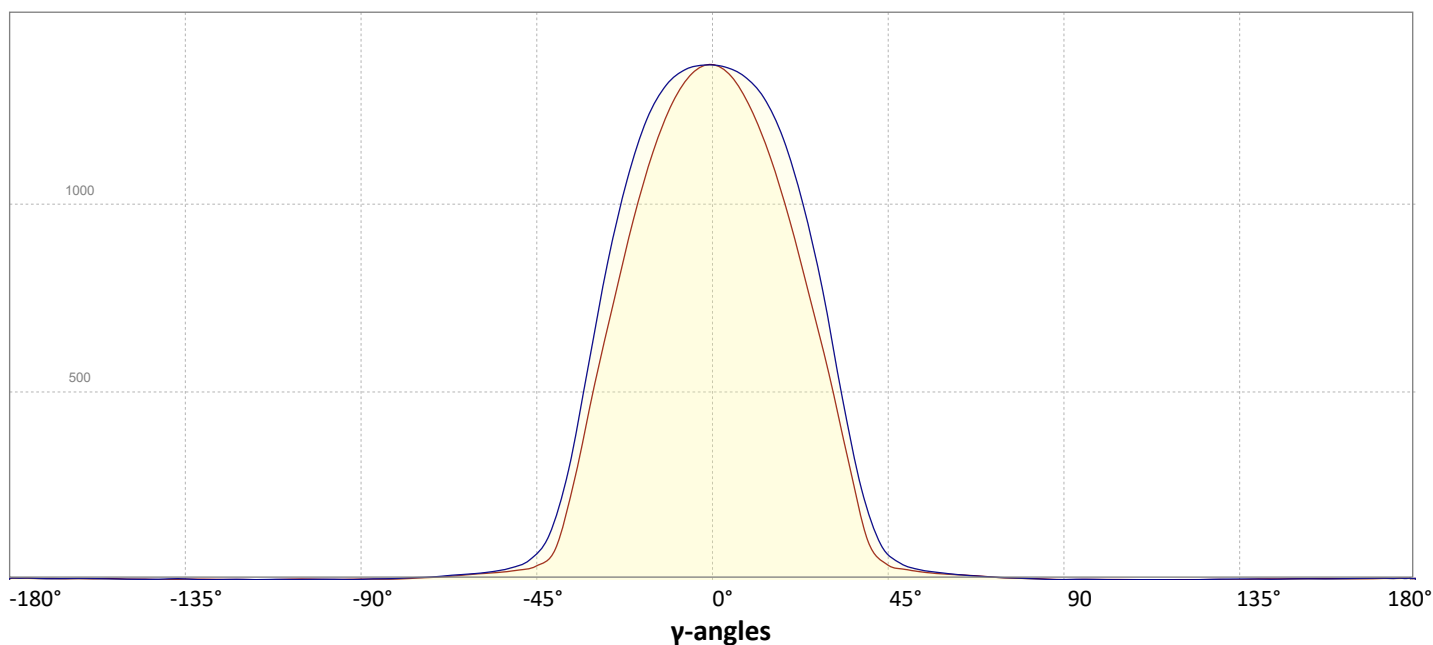
## Intensity Ratio

In 120° cone	97.7%
In 90° cone	94.1%

C000-C180

C090-C270

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

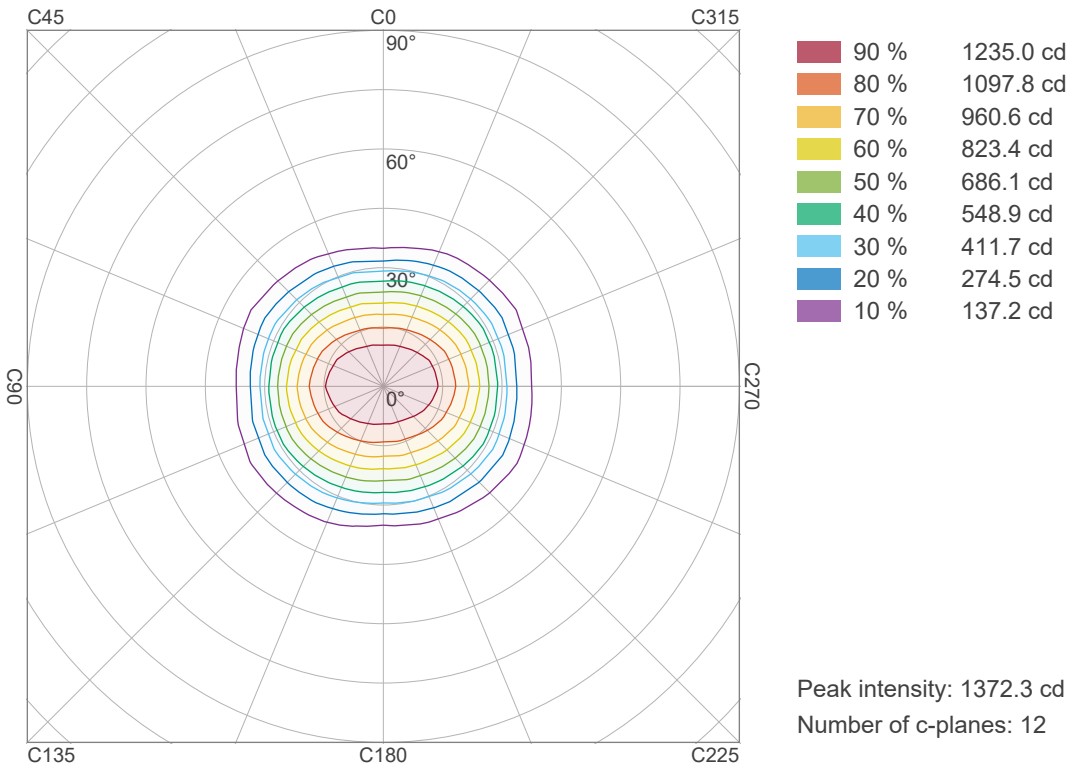


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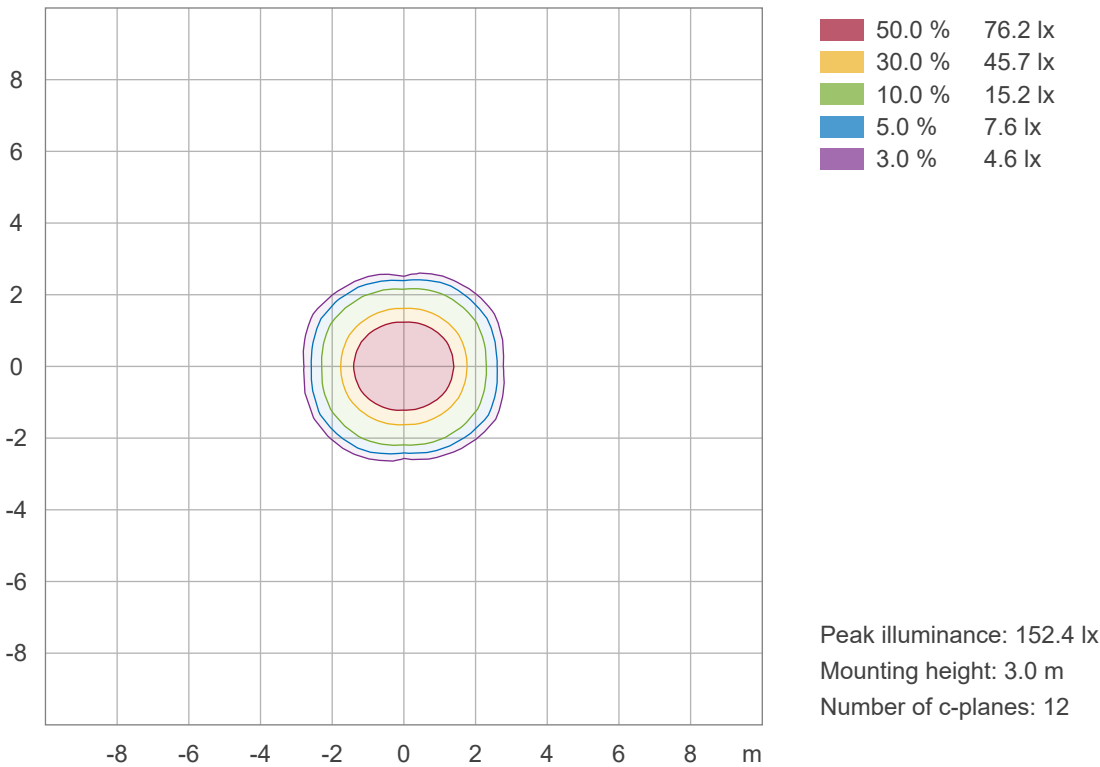
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## Iso-intensity Diagram (Iso-candela)



## Iso-illuminance Diagram (Iso-lux)



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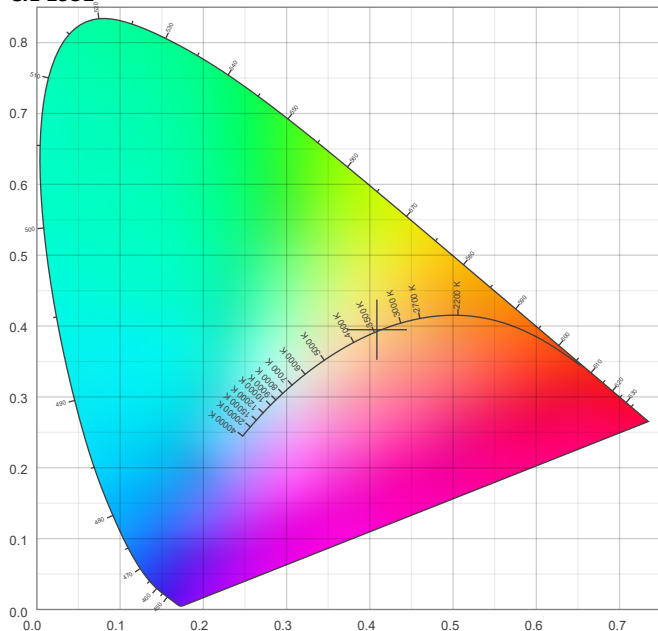


## Color details

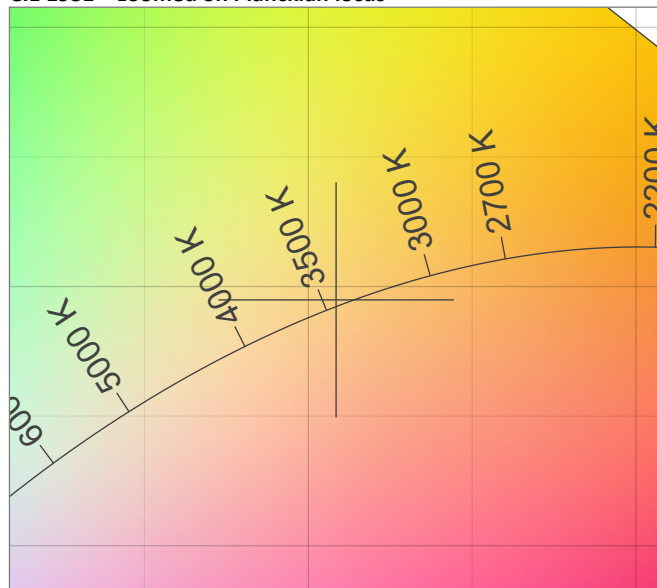
Correlated Color Temperature, Target CCT = 3469 K  
Correlated Color Temperature, Measured CCT = 3469 K  
Color Rendering Index CRI 82.2  
Color Rendering Index, R9 (red component) R9 = 4.3  
Color Rendering TM30-18 R<sub>f</sub> 83.0 – R<sub>g</sub> 97.4  
Color Quality Scale CQS = 81.9

MacAdam Steps  
Color coordinates CIE 1931 (x;y) = (0.408;0.395)  
Color coordinate CIEs 1960 (u;v) = (0.236;0.342)  
Color deviation from BBL Duv = 0.0011  
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0.236;0.513)

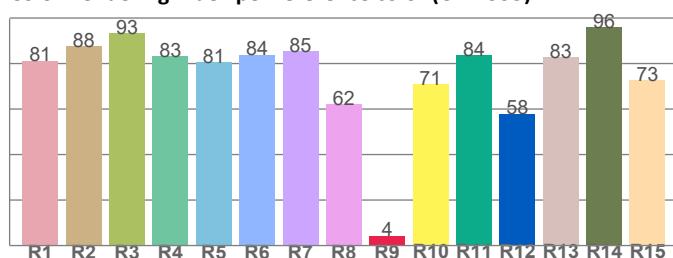
## CIE 1931



## CIE 1931 – zoomed on Planckian locus



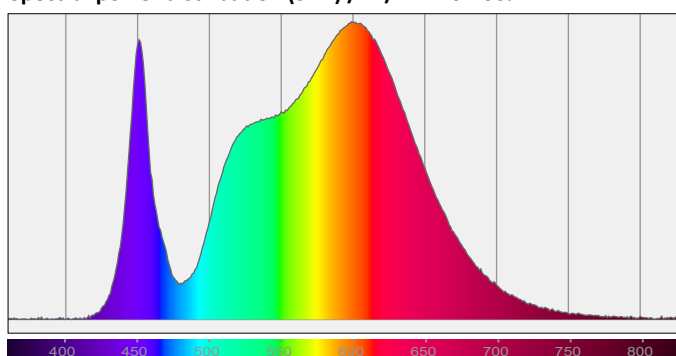
## Color Rendering Index per reference color (CIE 1995)



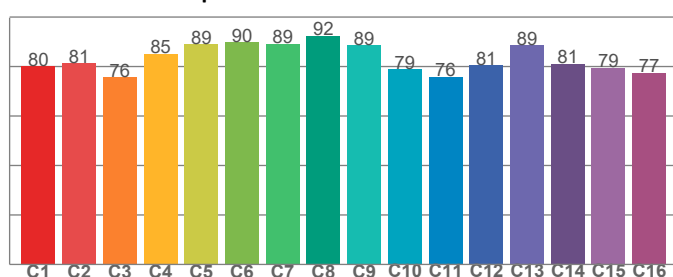
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
81.3	87.6	93.3	83.3	80.7	83.8	85.3	62.1	4.3	70.8	83.7	58.0	82.8	96.0	72.7

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



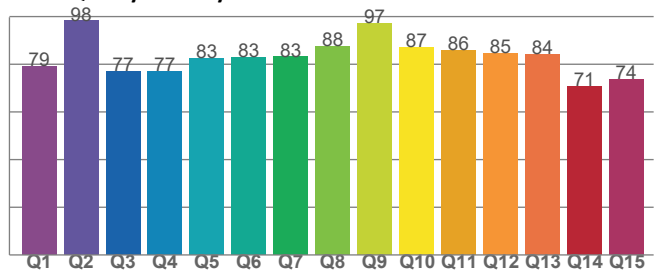
## TM30-18 R<sub>f</sub>-values per hue bin



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
80.1	81.4	75.7	85.1	89.1	89.8	89.2	92.4	88.6	79.0	75.9	80.6	88.5	81.1	79.5	77.4

## Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
79.2	98.2	77.1	77.1	82.6	82.9	83.1	87.6	97.3	87.2	85.9	84.7	84.2	70.7	73.7

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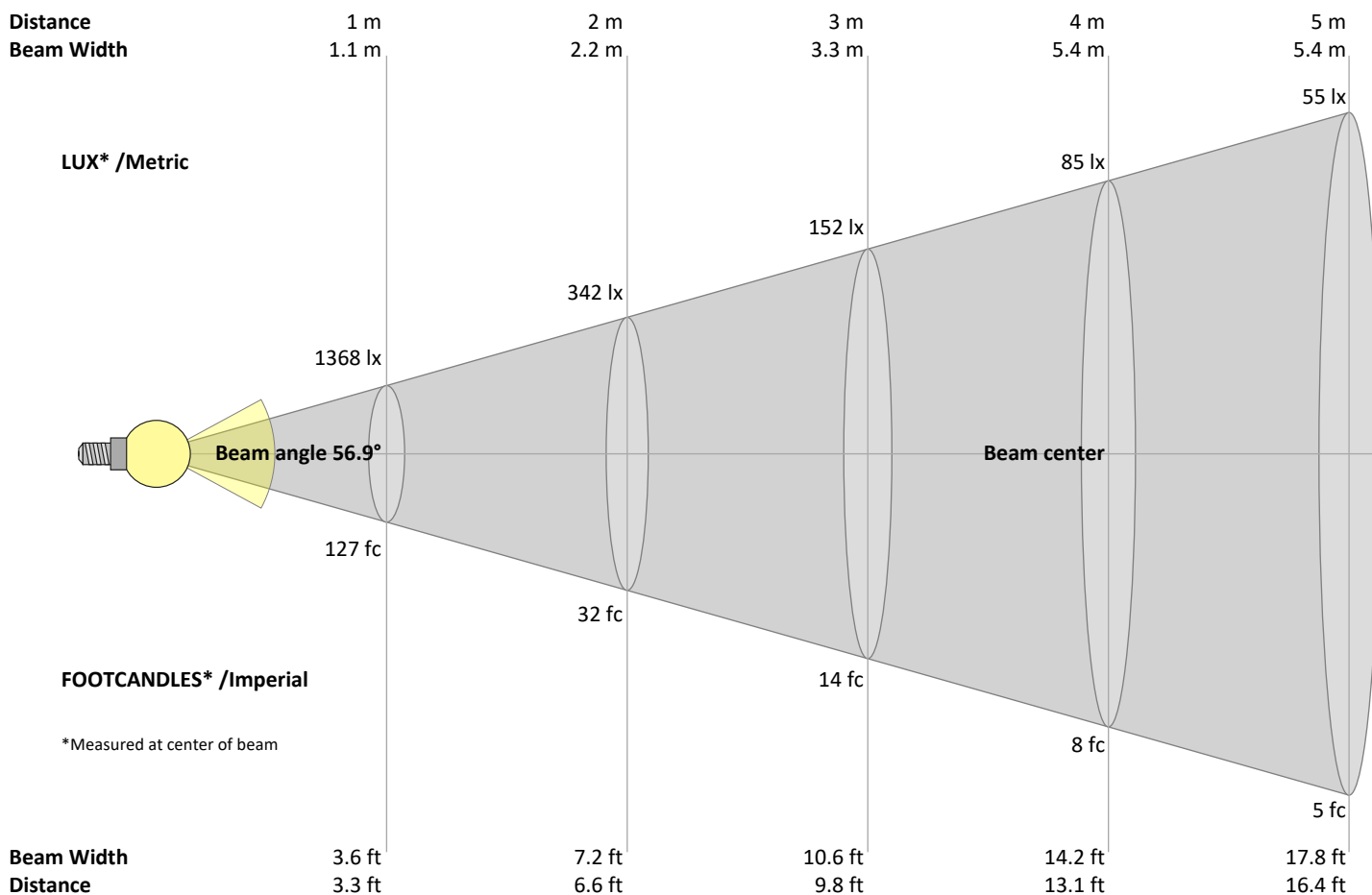
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## Beam Details



### 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
1368	342	152	85	55	38	28	21	17	14	11	9	8	7	6	5	5	4	4	3	lux
127.1	31.8	14.1	7.9	5.1	3.5	2.6	2	1.6	1.3	1.1	0.9	0.8	0.6	0.6	0.5	0.4	0.4	0.4	0.3	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
1368	1363	1354	1336	1305	1274	1224	1171	1111	1039	968	883	796	708	618	528	430	332	242	166	cd
100%	100%	99%	98%	95%	93%	89%	86%	81%	76%	71%	65%	58%	52%	45%	39%	31%	24%	18%	12%	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
1368	1366	1361	1351	1341	1319	1296	1265	1221	1177	1110	1040	962	871	780	669	555	447	348	249	cd
100%	100%	99%	99%	98%	96%	95%	92%	89%	86%	81%	76%	70%	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
1368	1358	1345	1320	1285	1249	1197	1145	1084	1016	947	868	788	706	623	540	446	353	265	180	cd
100%	99%	98%	96%	94%	91%	88%	84%	79%	74%	69%	63%	58%	52%	46%	39%	33%	26%	19%	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
1368	1370	1365	1361	1349	1332	1314	1277	1241	1188	1124	1058	970	882	780	669	558	448	339	252	cd
100%	100%	100%	99%	99%	97%	96%	93%	91%	87%	82%	77%	71%	64%	57%	49%	41%	33%	25%	18%	of 0°val



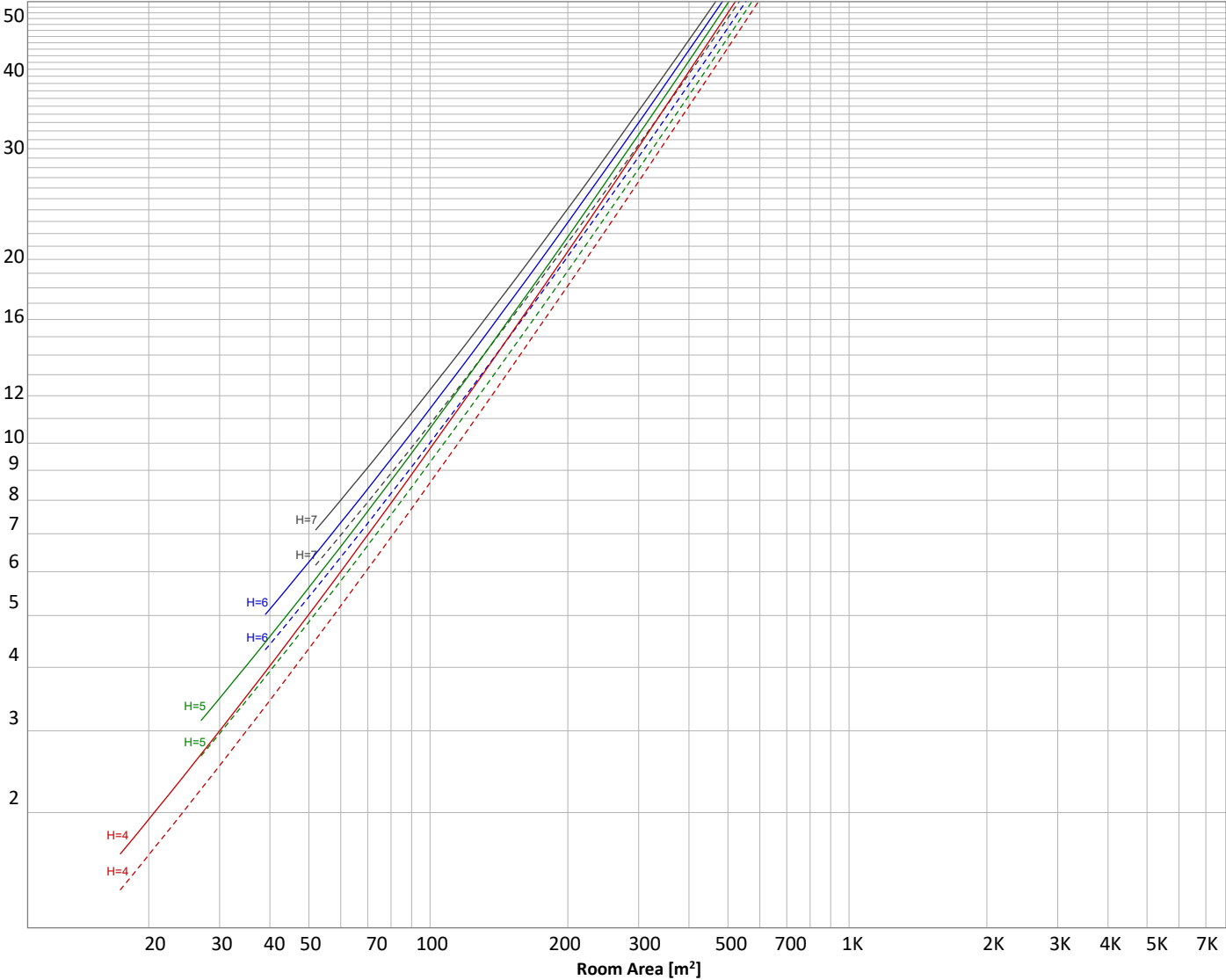
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995  
LAMPS (number of lamps)



Conditions

H = Room height	Flux = 1189 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°
127 lm	332 lm	383 lm	236 lm	62.6 lm	21.6 lm	12.5 lm	5.88 lm	2.00 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0.939 lm	0.856 lm	0.645 lm	0.696 lm	1.01 lm	1.05 lm	1.17 lm	0.869 lm	0.352 lm

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## Outdoor Light Planning

### Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	127 lm	10.7%
10-20°	332 lm	27.9%
20-30°	383 lm	32.2%
30-40°	236 lm	19.8%
40-50°	63 lm	5.3%
50-60°	22 lm	1.8%
60-70°	12 lm	1.0%
70-80°	6 lm	0.5%
80-90°	2 lm	0.2%
90-100°	1 lm	0.1%
100-110°	1 lm	0.1%
110-120°	1 lm	0.1%
120-130°	1 lm	0.1%
130-140°	1 lm	0.1%
140-150°	1 lm	0.1%
150-160°	1 lm	0.1%
160-170°	1 lm	0.1%
170-180°	0 lm	0.0%
<b>Total</b>	<b>1189 lm</b>	<b>100.0%</b>

### Intensity peaks

Max intensity	1374 cd
Intensity, 90°	2 cd
Intensity, 0°	1368 cd

### Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	842 lm	70.7%
0-40°	1077 lm	90.6%
0-60°	1162 lm	97.7%
60-90°	20 lm	1.7%
70-100°	9 lm	0.7%
90-120°	2 lm	0.2%
0-90°	1182 lm	99.4%
90-180°	8 lm	0.6%
0-180°	1189 lm	100.0%

### BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	422 lm	35.4%
Medium(30-60°)	159 lm	13.4%
High(60-80°)	9 lm	0.8%
Very high(80-90°)	1 lm	0.1%
<b>Back light</b>		
Low(0-30°)	416 lm	35.0%
Medium(30-60°)	164 lm	13.8%
High(60-80°)	9 lm	0.8%
Very high(80-90°)	1 lm	0.1%

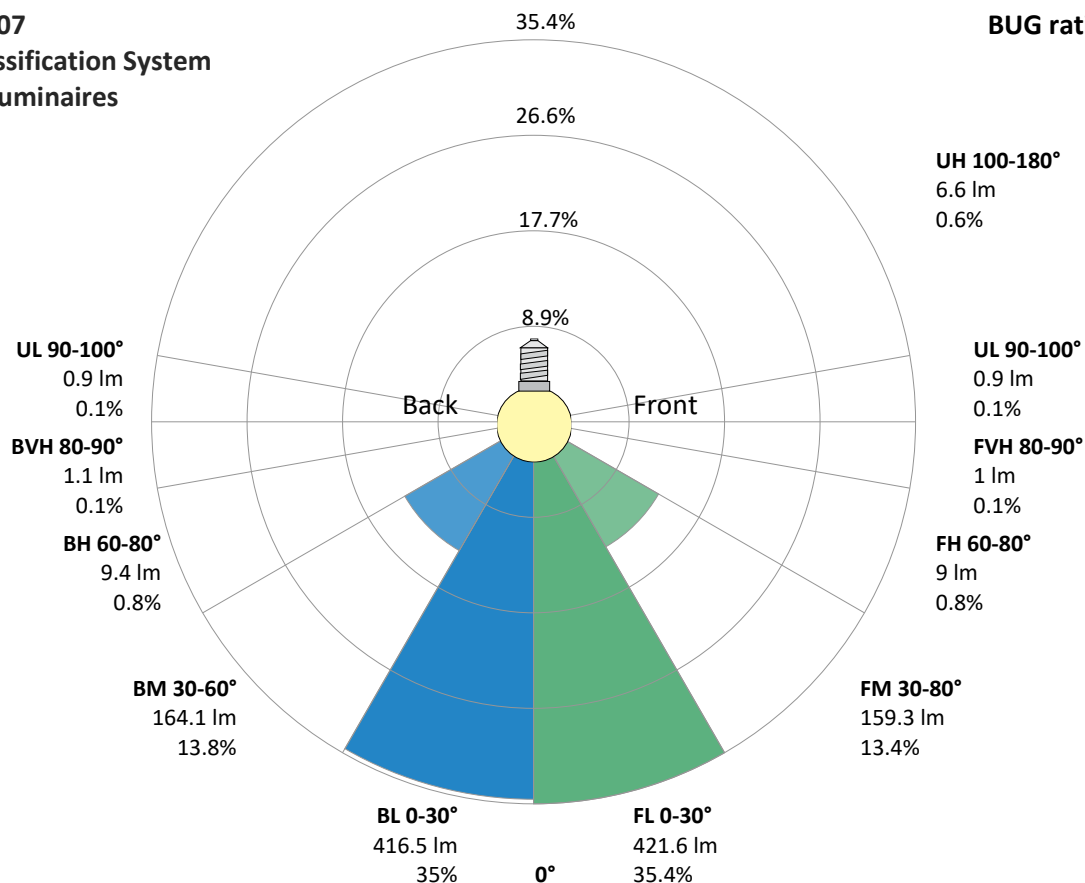
### Uplight

Low(90-100°)	1 lm	0.1%
High(100-180°)	7 lm	0.6%

## IESNA TM-15-07

### Luminaire Classification System For Outdoor Luminaires

### BUG rating B1 U1 G0





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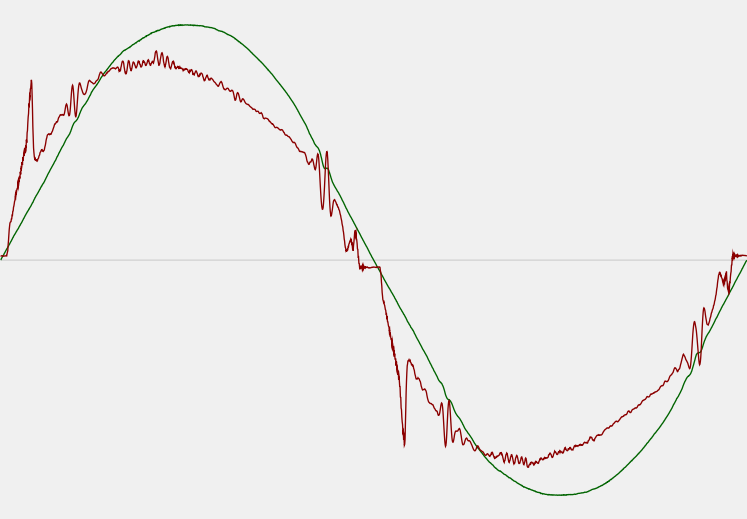


## Power Details

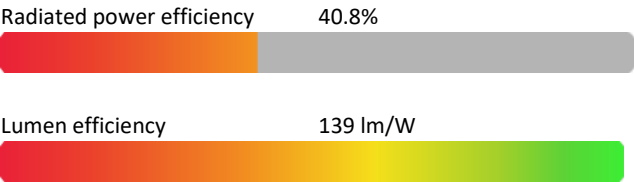
### Input Power

Power feed to light source	8.5 W
Frequency of input power	60 Hz
RMS Input voltage feed, $V_{RMS}$	122 V
RMS Input current feed, $I_{RMS}$	0.072 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	8.72 VA
Displacement factor of AC power feed	0.99
Power factor of AC current feed	0.98
Total harmonic distortion of the current	11.59%
Total harmonic distortion of the voltage	2%

### 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	3465 K
CCT shift	+4 K
CCT end	3469 K

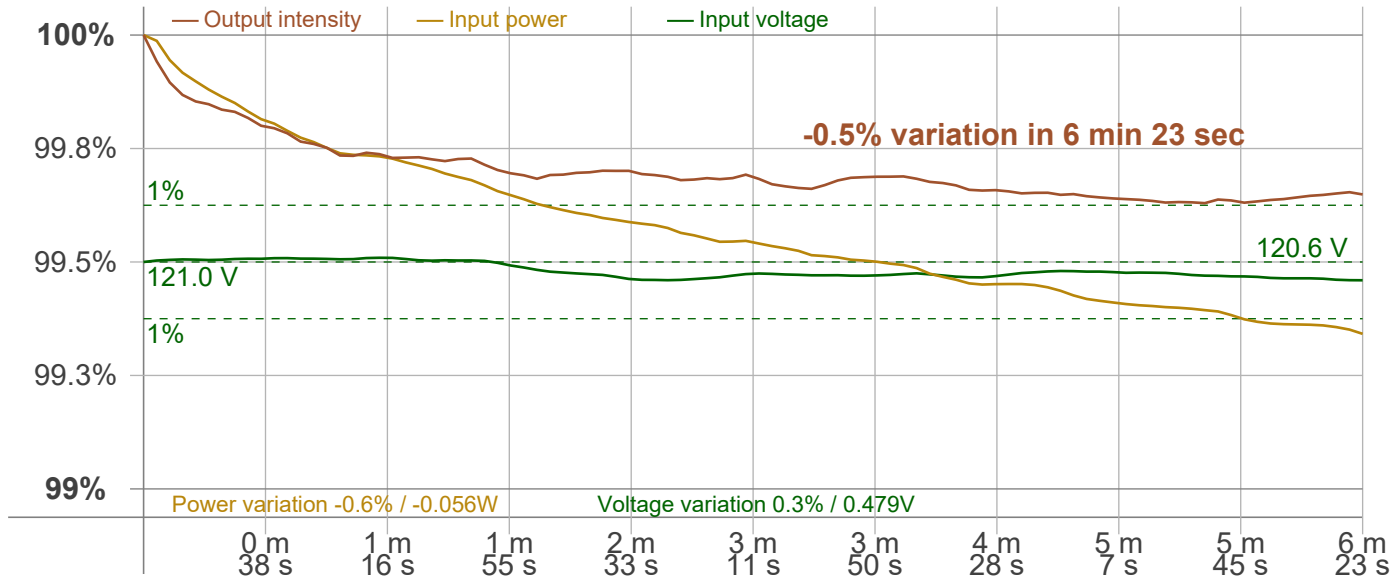
### Warmup Result

Total warmup time	Not completed
Warmup variation	-0.5%

### Output Change

Output start	1194 lm
Output change	-4 lm
Output end	1189 lm

### Stabilization Curve



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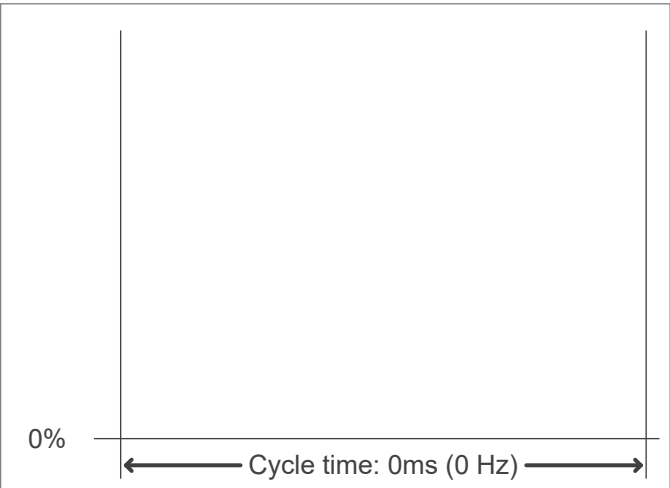
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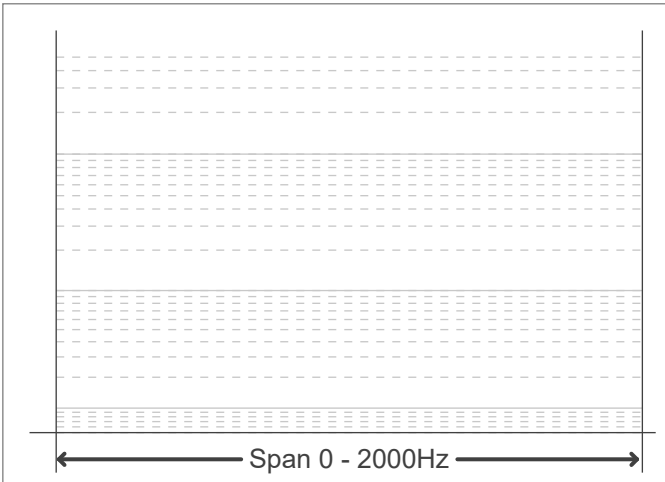
## Flicker /TLA details

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

