

# Light Measurement Report

Print date: 1/7/2026

Measurement date and time: 1/7/2026 4:24:24 PM – Measurement no. VFR-260107-0776-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

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)

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

HP1-P-I-4'-H-835-F-BLX2835 –

## 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

2142 lm – 0.8% / 99.2%

124 lm/W

842 cd – 100.2°

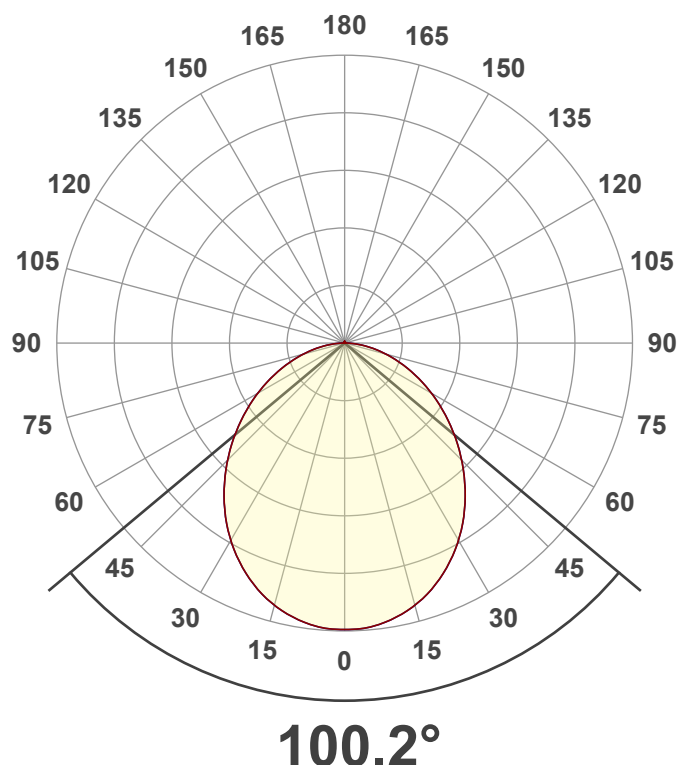
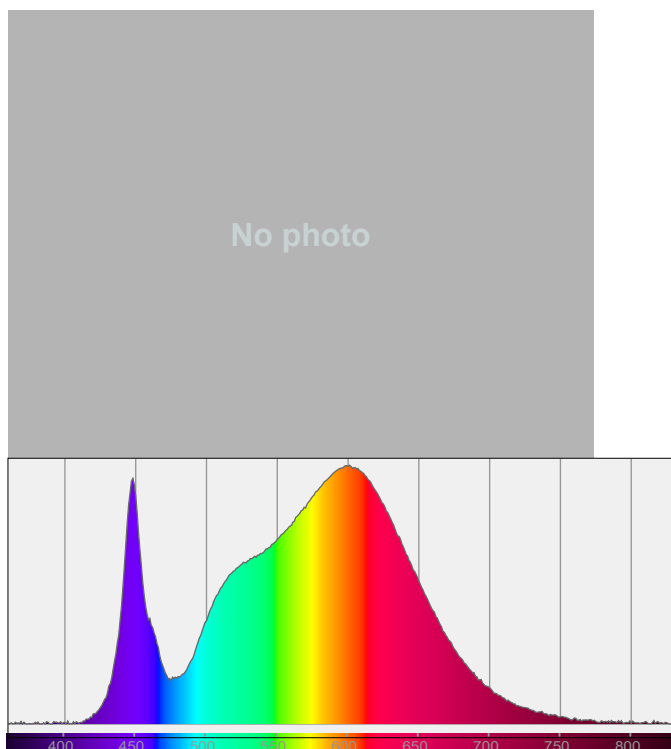
CCT = 3493 K / 3493 K

CRI 82.9

R<sub>f</sub> 84.1 – R<sub>g</sub> 97.7

Duv 0.0003 – SDCM n/a

SVM n/a – PstLM n/a



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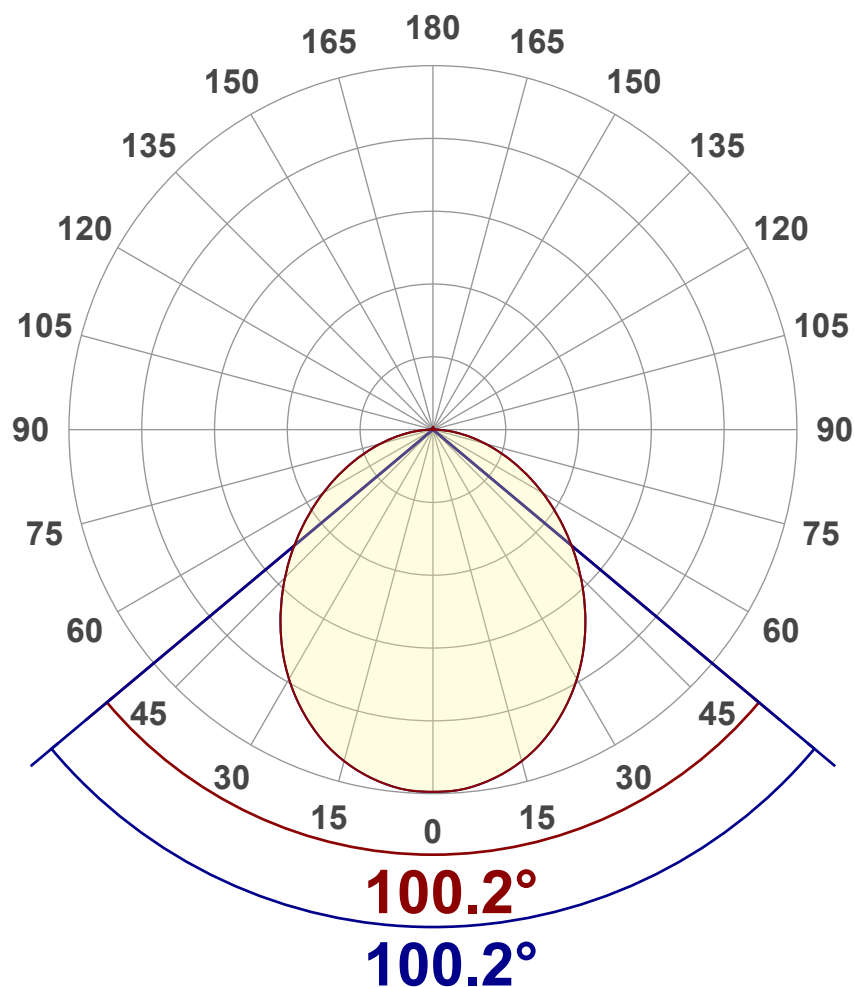
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## Luminous Intensity diagram

Unit: 0-100% of peak intensity



## Main Values

Output (total Lumen)	2142 lm
Lumen Up% / Down%	0.8% / 99.2%
Peak Intensity	842 cd
Beam Angle (50%)	100.2°
Beam Angle (90%)	100.2°
Beam Angle (10%)	100.2°

## Cut-off Angle

Average 2,5%	175°
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## Field Angle

Average 10%	159°
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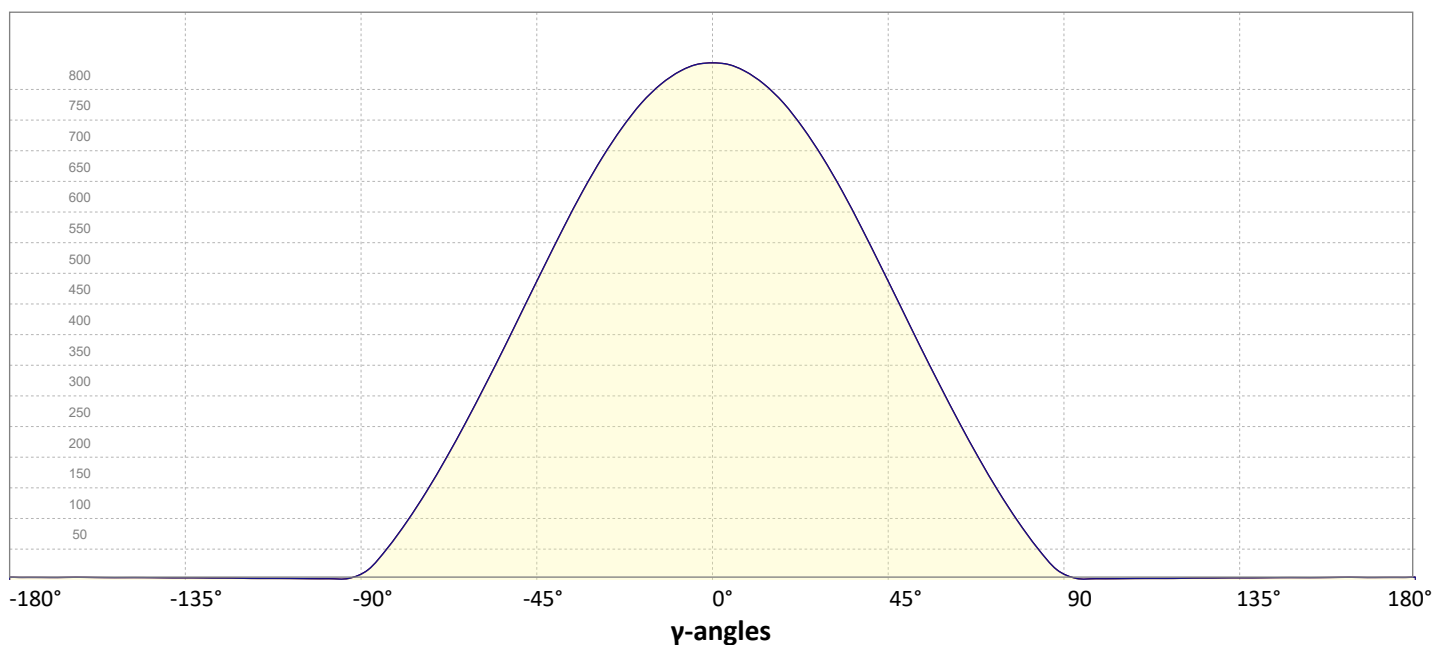
## Intensity Ratio

In 120° cone	80.1%
In 90° cone	56.5%

C000-C180

C090-C270

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

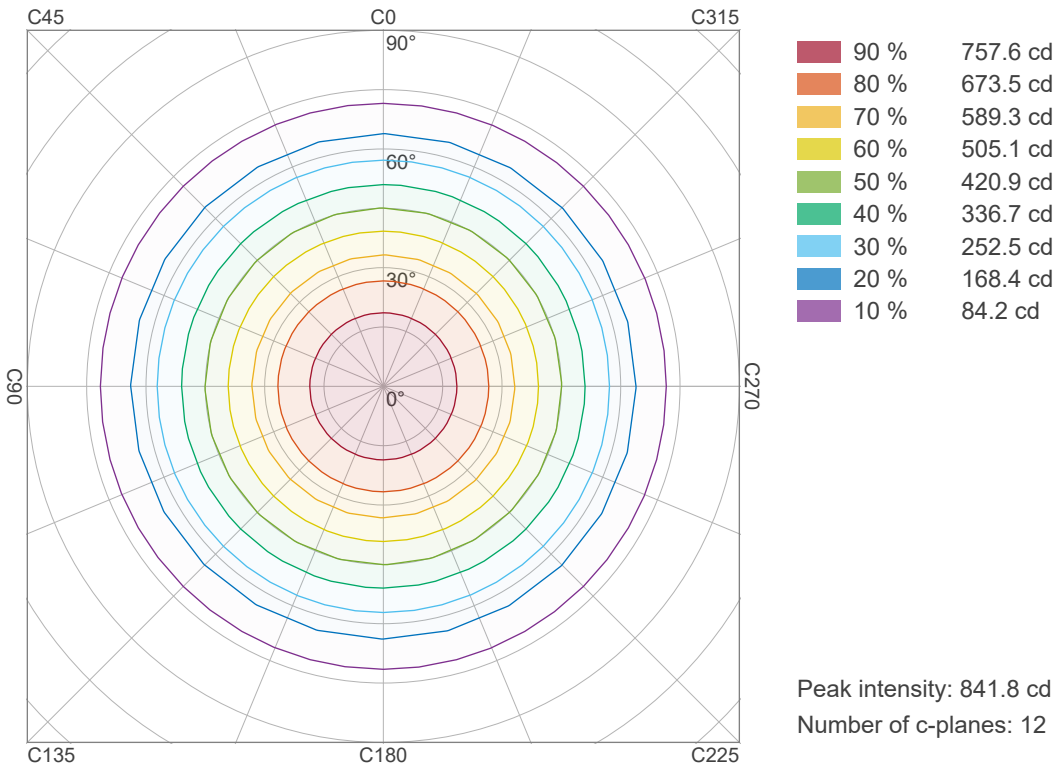


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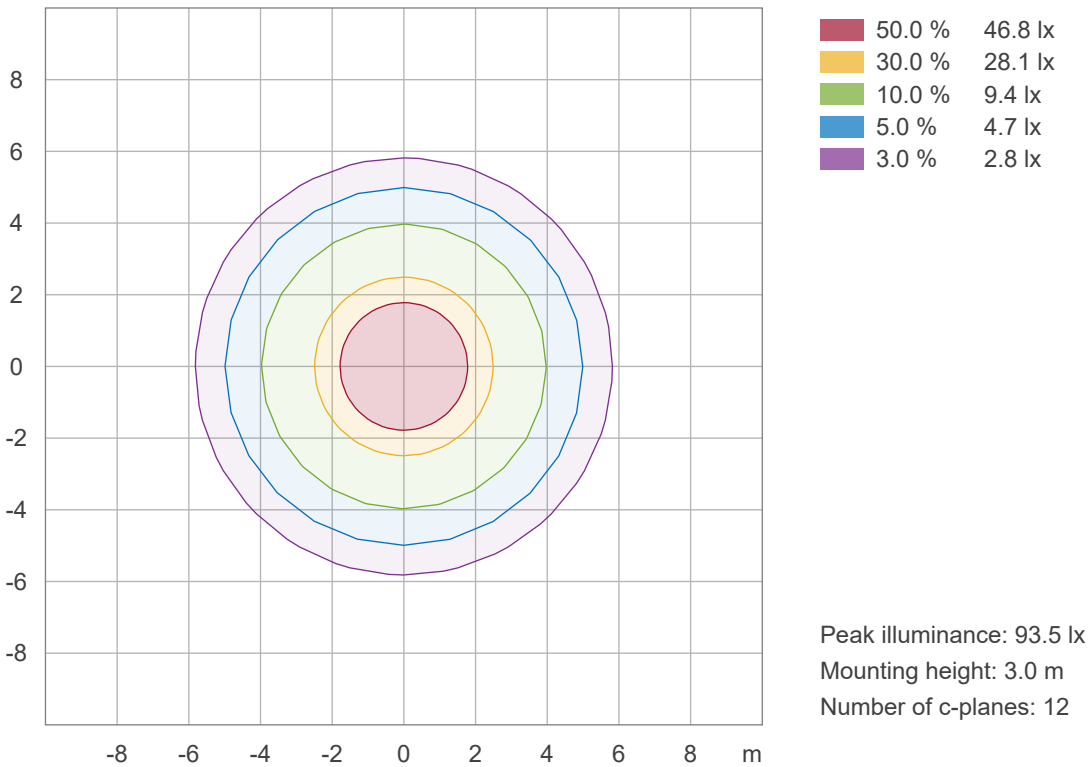
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## Iso-intensity Diagram (Iso-candela)



## Iso-illuminance Diagram (Iso-lux)



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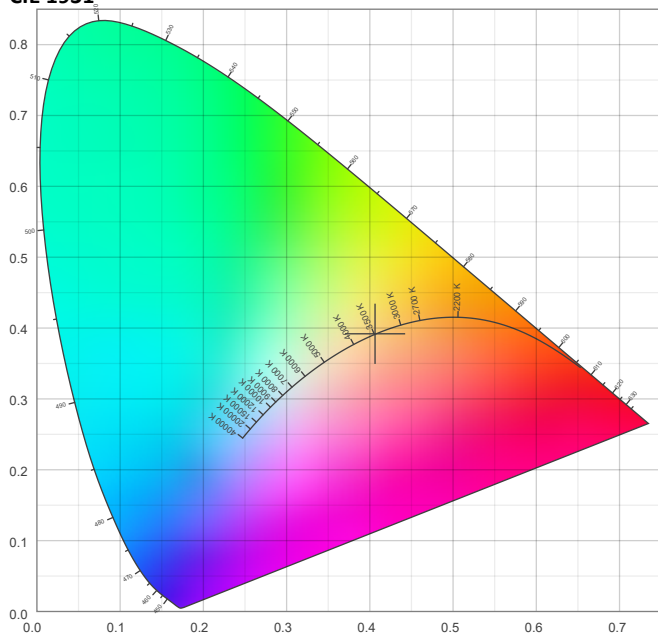


## Color details

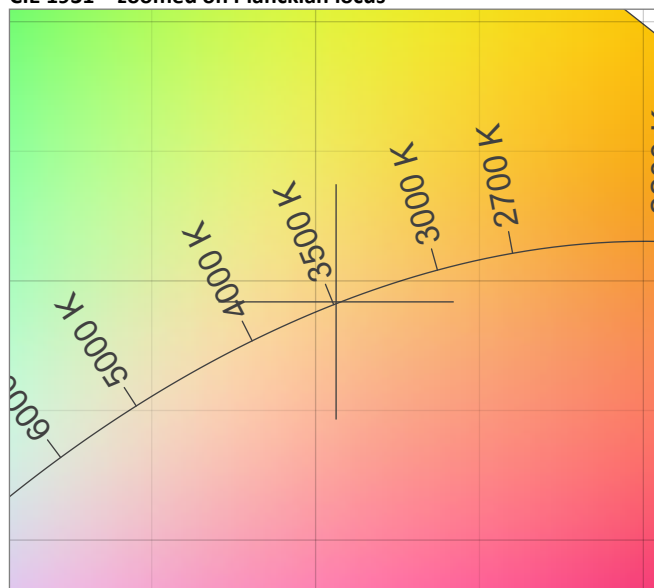
Correlated Color Temperature, Target CCT = 3493 K  
Correlated Color Temperature, Measured CCT = 3493 K  
Color Rendering Index CRI 82.9  
Color Rendering Index, R9 (red component) R9 = 9.5  
Color Rendering TM30-18 R<sub>f</sub> 84.1 – R<sub>g</sub> 97.7  
Color Quality Scale CQS = 82.9

MacAdam Steps  
Color coordinates CIE 1931 (x;y) = (0.406;0.392)  
Color coordinate CIEs 1960 (u;v) = (0.236;0.341)  
Color deviation from BBL Duv = 0.0003  
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0.236;0.512)

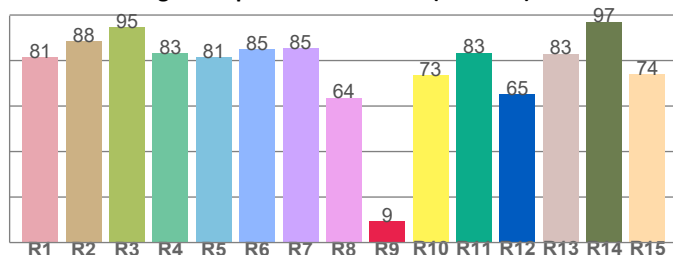
## CIE 1931



## CIE 1931 – zoomed on Planckian locus



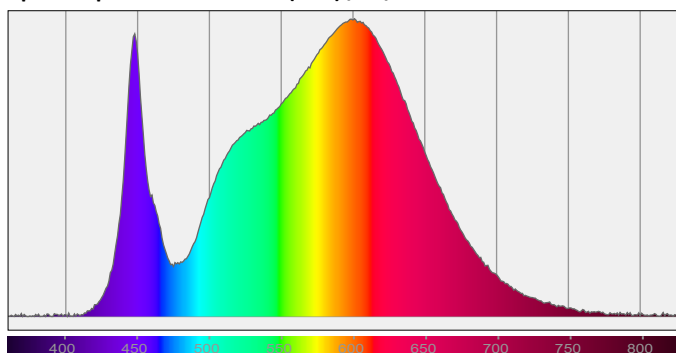
## Color Rendering Index per reference color (CIE 1995)



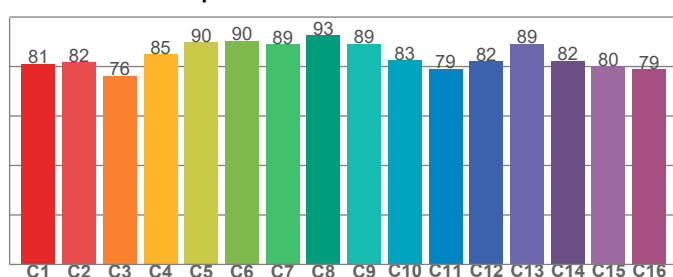
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
81.4	88.4	94.7	83.3	81.5	85.0	85.5	63.7	9.5	73.4	83.4	65.2	82.9	97.0	73.9

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



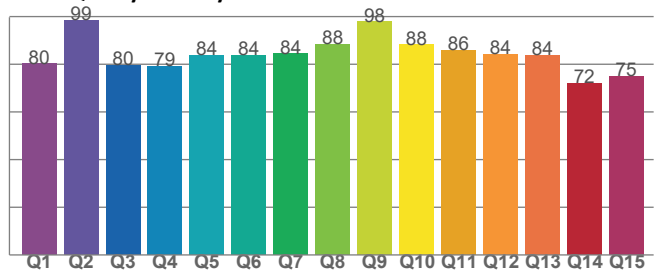
## TM30-18 R<sub>f</sub>-values per hue bin



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
81.1	81.9	76.3	85.0	89.8	90.4	89.0	92.6	89.3	82.5	79.0	82.1	89.2	82.3	80.2	78.8

## Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
80.1	98.5	79.7	79.3	83.7	83.9	84.5	88.3	97.9	88.1	85.8	84.3	83.8	72.1	74.9

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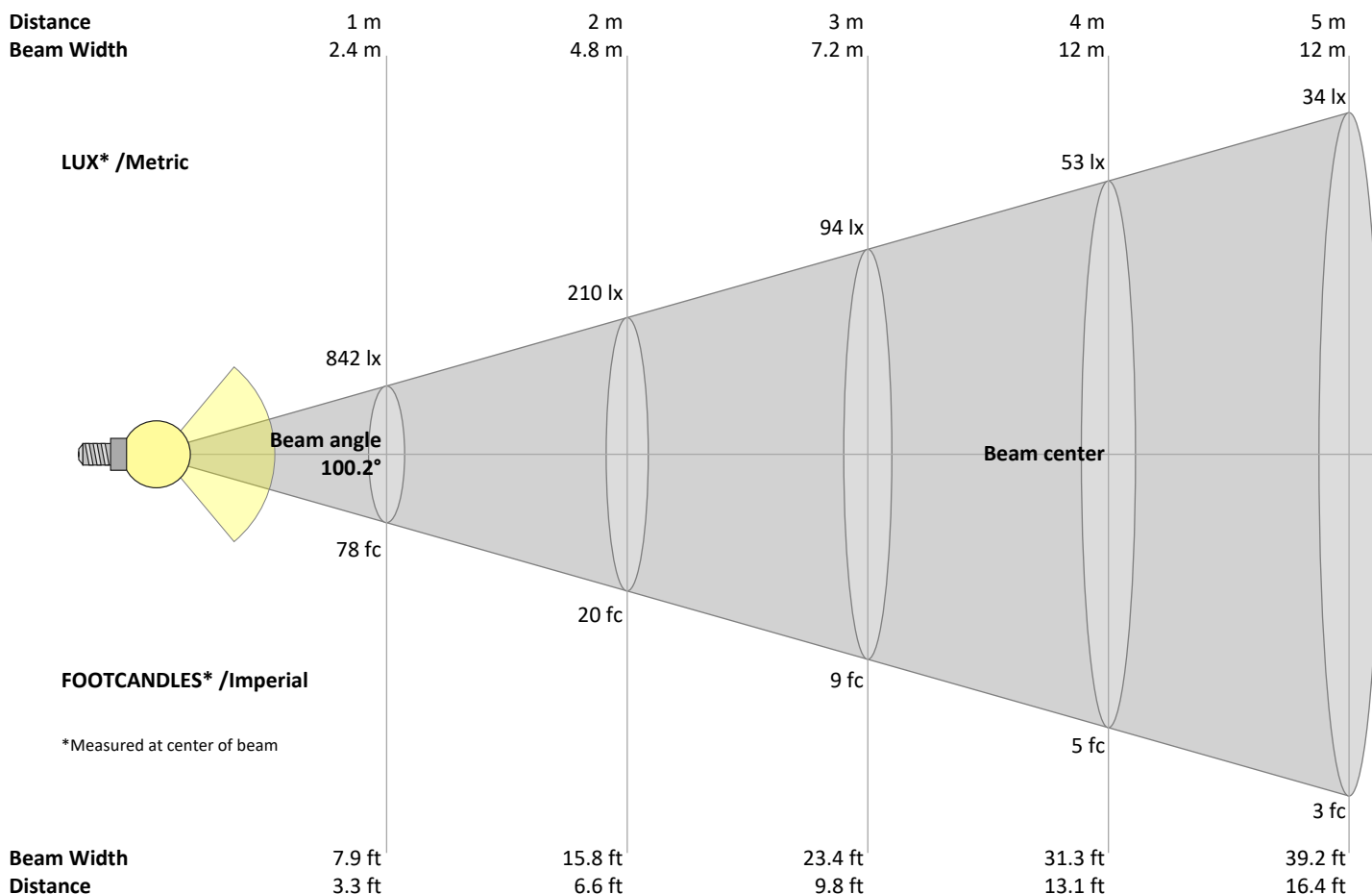
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## Beam Details



### 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
842	210	94	53	34	23	17	13	10	8	7	6	5	4	4	3	3	3	2	2	lux
78.2	19.6	8.7	4.9	3.1	2.2	1.6	1.2	1	0.8	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.2	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
842	838	822	797	763	720	669	612	551	487	422	358	295	235	179	127	80	39	11	2	cd
100%	99%	98%	95%	91%	85%	80%	73%	65%	58%	50%	42%	35%	28%	21%	15%	9%	5%	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
842	838	822	797	763	720	669	612	551	487	422	358	295	235	179	127	80	39	11	2	cd
100%	99%	98%	95%	91%	85%	80%	73%	65%	58%	50%	42%	35%	28%	21%	15%	9%	5%	1%	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
842	838	822	797	763	720	669	612	551	487	422	358	295	235	179	127	80	39	11	2	cd
100%	99%	98%	95%	91%	85%	80%	73%	65%	58%	50%	42%	35%	28%	21%	15%	9%	5%	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
842	838	822	797	763	720	669	612	551	487	422	358	295	235	179	127	80	39	11	2	cd
100%	99%	98%	95%	91%	85%	80%	73%	65%	58%	50%	42%	35%	28%	21%	15%	9%	5%	1%	0%	of 0°val



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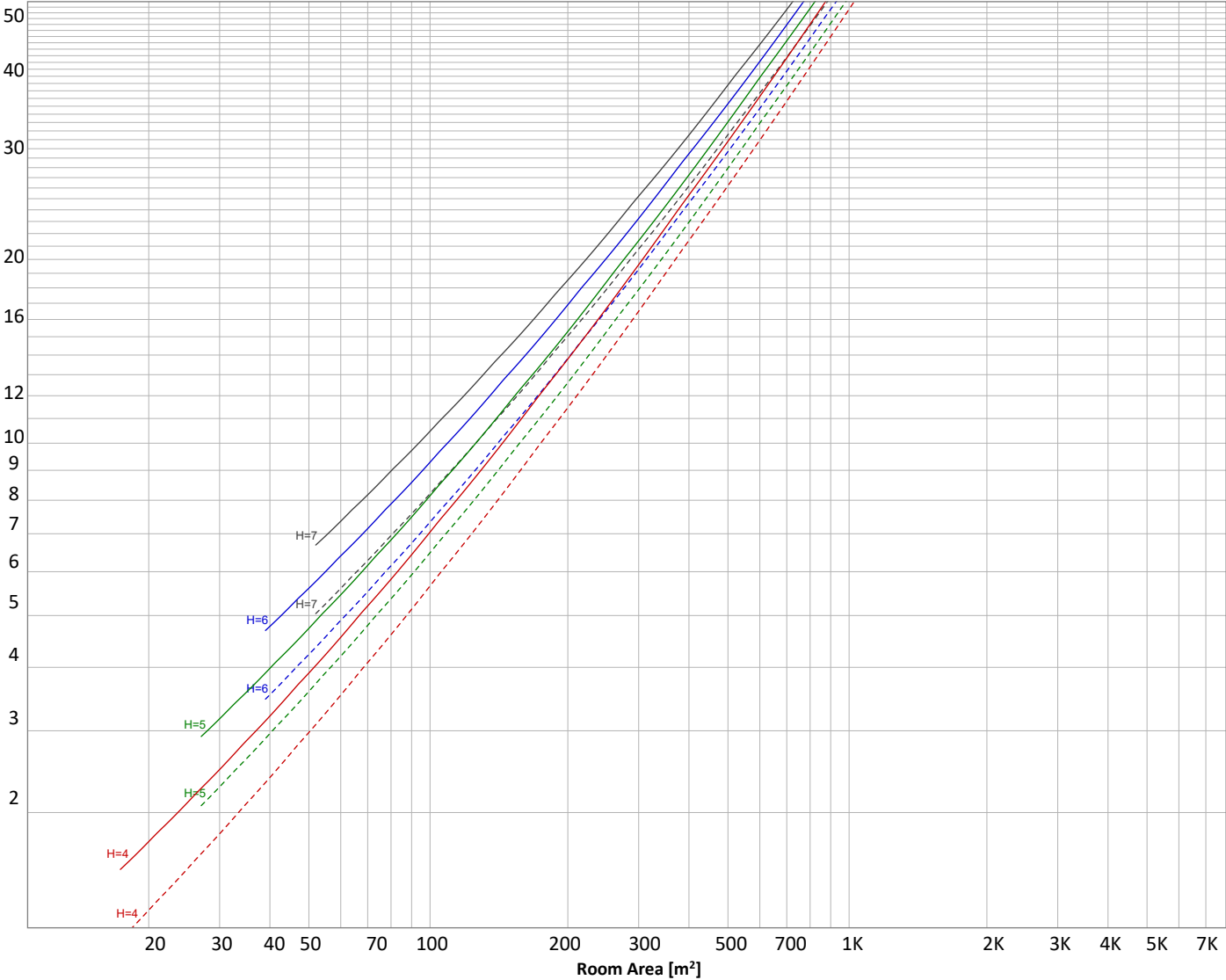
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## Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



### Conditions

H = Room height	Flux = 2142 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°
79.6 lm	225 lm	332 lm	383 lm	376 lm	320 lm	233 lm	134 lm	43.0 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
3.16 lm	1.94 lm	2.14 lm	2.39 lm	2.35 lm	2.15 lm	1.65 lm	1.10 lm	0.362 lm

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## Outdoor Light Planning

### Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	80 lm	3.7%
10-20°	225 lm	10.5%
20-30°	332 lm	15.5%
30-40°	383 lm	17.9%
40-50°	376 lm	17.5%
50-60°	320 lm	14.9%
60-70°	233 lm	10.9%
70-80°	134 lm	6.3%
80-90°	43 lm	2.0%
90-100°	3 lm	0.1%
100-110°	2 lm	0.1%
110-120°	2 lm	0.1%
120-130°	2 lm	0.1%
130-140°	2 lm	0.1%
140-150°	2 lm	0.1%
150-160°	2 lm	0.1%
160-170°	1 lm	0.1%
170-180°	0 lm	0.0%
<b>Total</b>	<b>2142 lm</b>	<b>100.0%</b>

### Intensity peaks

Max intensity	842 cd
Intensity, 90°	11 cd
Intensity, 0°	842 cd

### Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	636 lm	29.7%
0-40°	1019 lm	47.6%
0-60°	1715 lm	80.1%
60-90°	410 lm	19.1%
70-100°	180 lm	8.4%
90-120°	7 lm	0.3%
0-90°	2125 lm	99.2%
90-180°	17 lm	0.8%
0-180°	2142 lm	100.0%

### BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	318 lm	14.8%
Medium(30-60°)	539 lm	25.2%
High(60-80°)	184 lm	8.6%
Very high(80-90°)	22 lm	1.0%
<b>Back light</b>		
Low(0-30°)	318 lm	14.8%
Medium(30-60°)	539 lm	25.2%
High(60-80°)	184 lm	8.6%
Very high(80-90°)	22 lm	1.0%

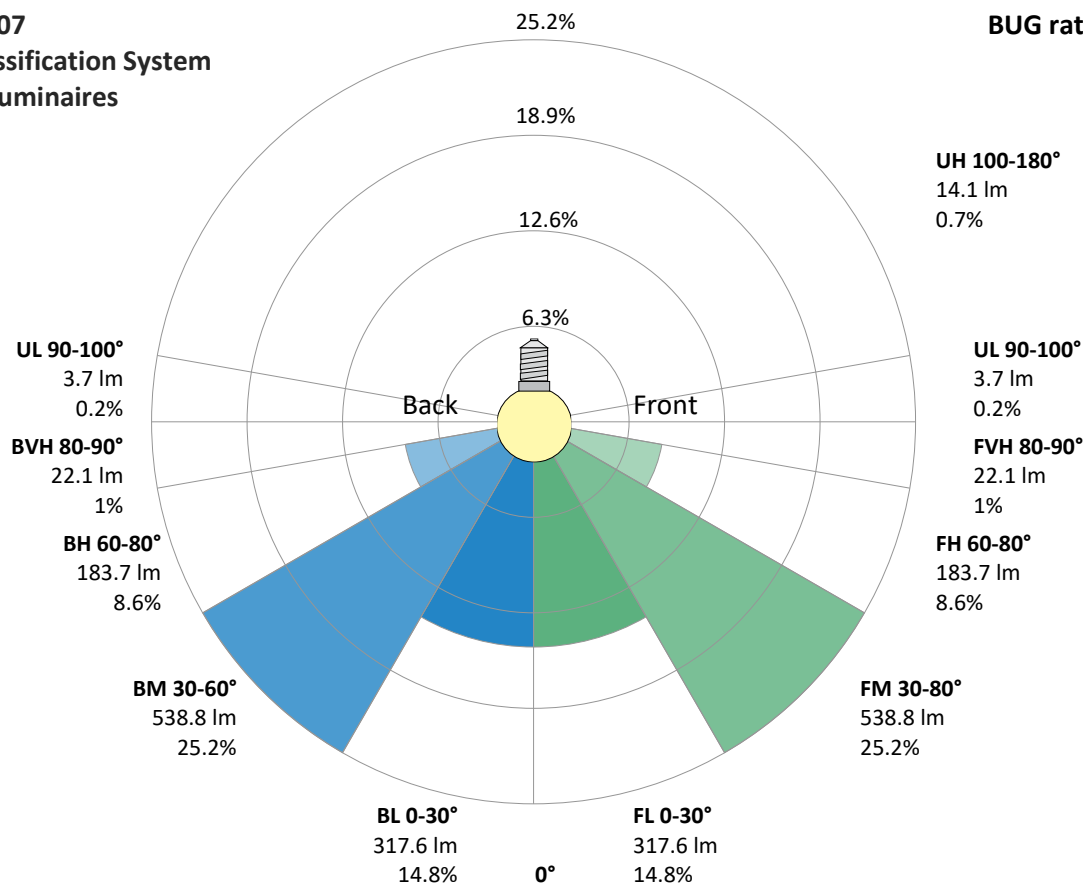
### Uplight

Low(90-100°)	4 lm	0.2%
High(100-180°)	14 lm	0.7%

## IESNA TM-15-07

### Luminaire Classification System For Outdoor Luminaires

### BUG rating B1 U2 G1





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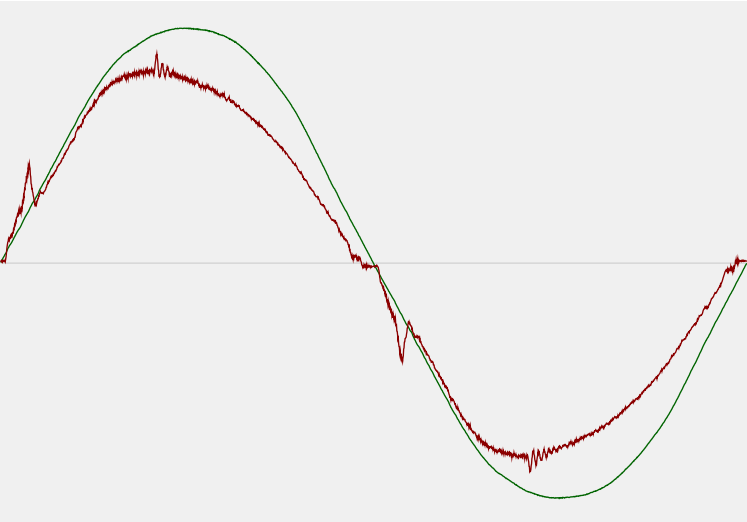


Power Details

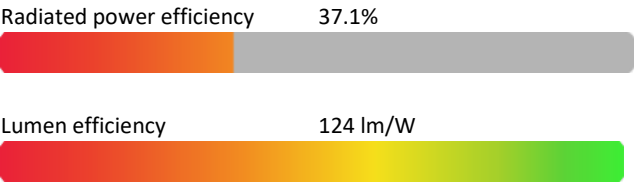
Input Power

Power feed to light source	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	6.25%
Total harmonic distortion of the voltage	1.73%

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	3493 K
CCT shift	0 K
CCT end	3493 K

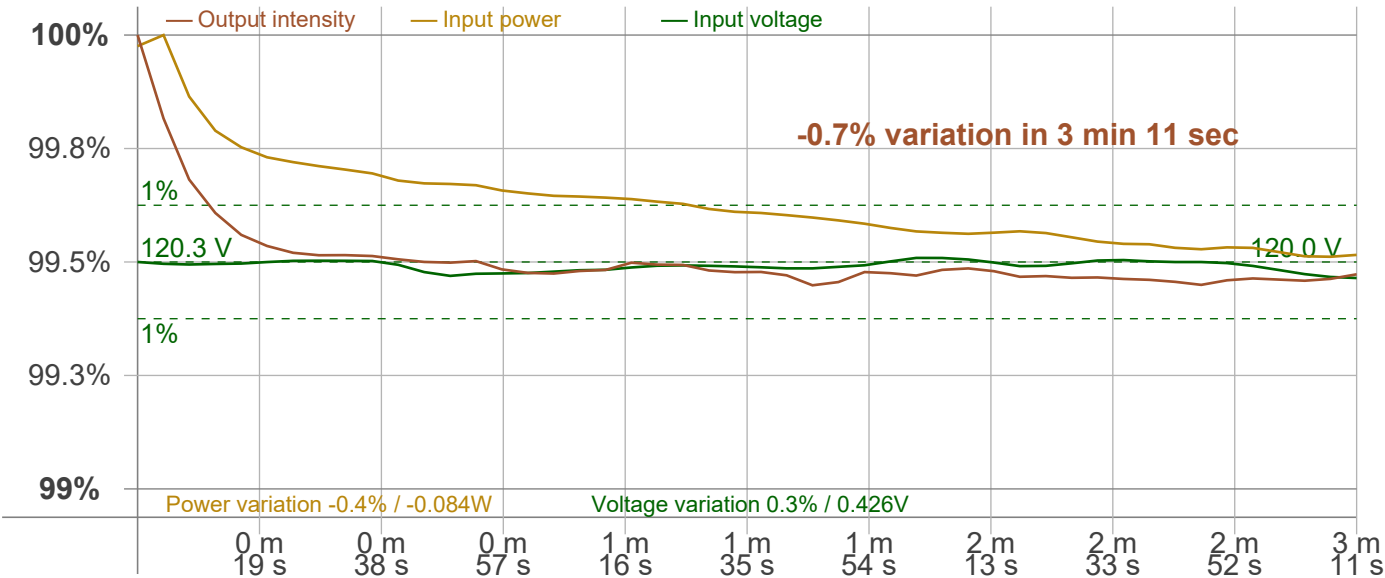
Warmup Result

Total warmup time	Not completed
Warmup variation	-0.7%

Output Change

Output start	2150 lm
Output change	-8 lm
Output end	2142 lm

Stabilization Curve



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## Flicker /TLA details

Flicker Meter Type Viso Systems LabFlicker  
Frequency of input power 60 Hz  
Flicker/TLA sample rate n/a samples/s

**Measurement time**  
PstLM 180 sec  
All other indices 1,2 sec

### Flicker indices according to Illuminating Engineering Society (IES)

Flicker frequency n/a Hz  
Percent Flicker n/a %  
Flicker index n/a

### Flicker indices according to California Energy Commission (CEC) 2016b

JA8/10 40 Hz n/a %  
JA8/10 90 Hz n/a %  
JA8/10 200 Hz n/a %  
JA8/10 400 Hz n/a %  
JA8/10 1000 Hz n/a %

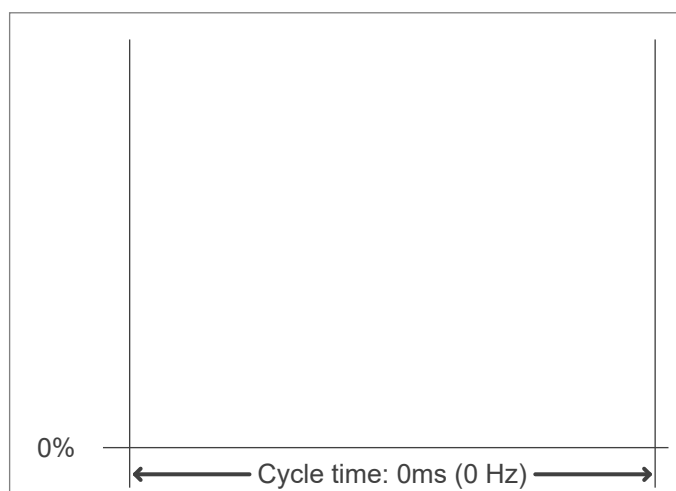
### TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value ( $F < 80$  Hz) n/a  
SVM value ( $80 < F < 2000$  Hz) n/a

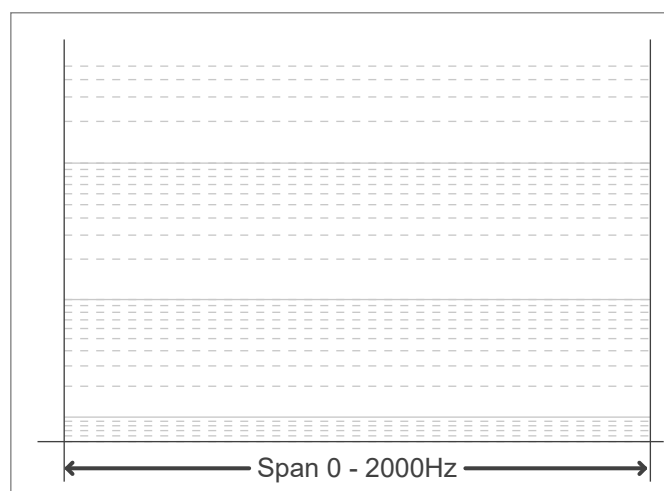
### Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp n/a

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



## Flicker FFT (flicker curve in frequency domain)



## IEEE 1789 Frequency/modulation plot

