

# Light Measurement Report

Print date: 1/7/2026

Measurement date and time: 1/7/2026 6:09:25 PM – Measurement no. VFR-260107-0788-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-WSO-BLX2835\_

HP1-P-I-4'-H-835-WSO-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

2210 lm – 0.82% / 99.18%

127 lm/W

696 cd – 131.2°

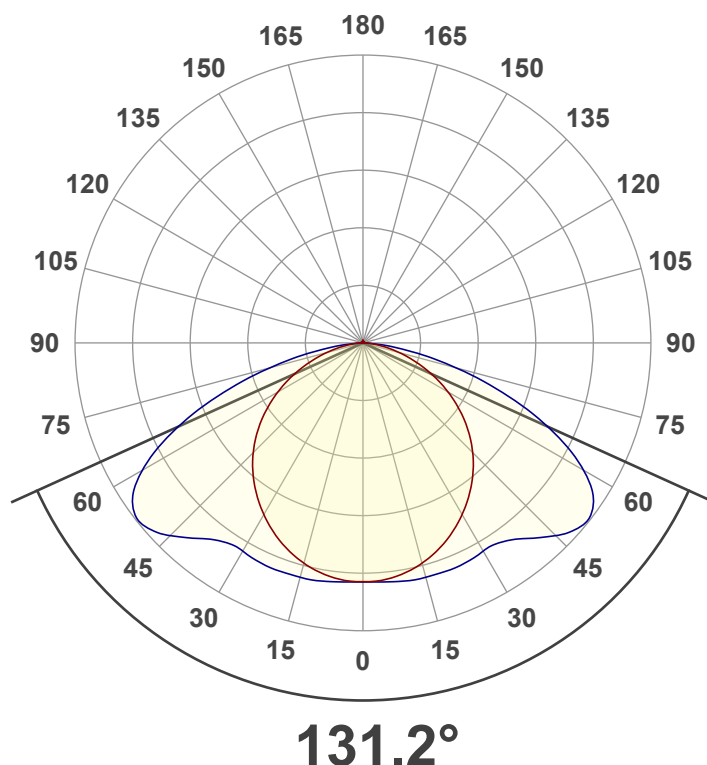
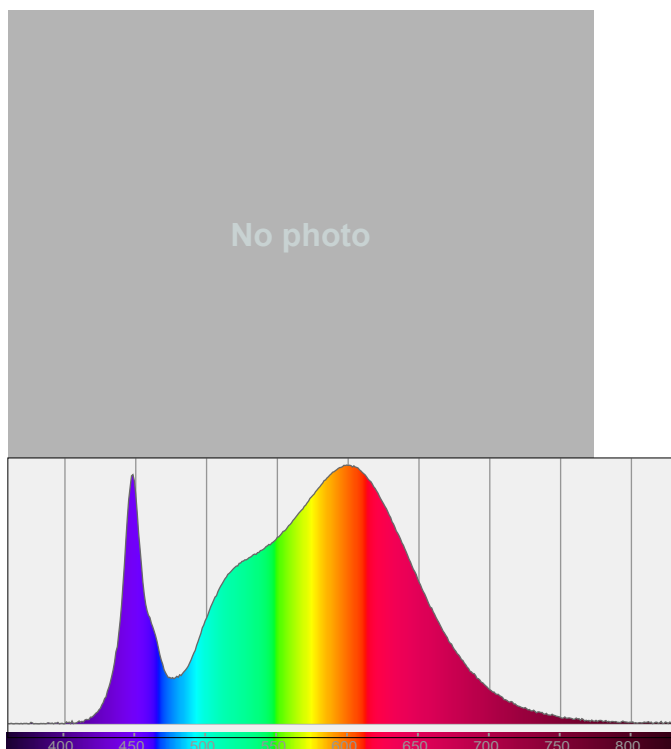
CCT = 3516 K / 3516 K

CRI 83.0

R<sub>f</sub> 84.2 – R<sub>g</sub> 97.6

Duv 0.0006 – SDCM n/a

SVM n/a – PstLM n/a



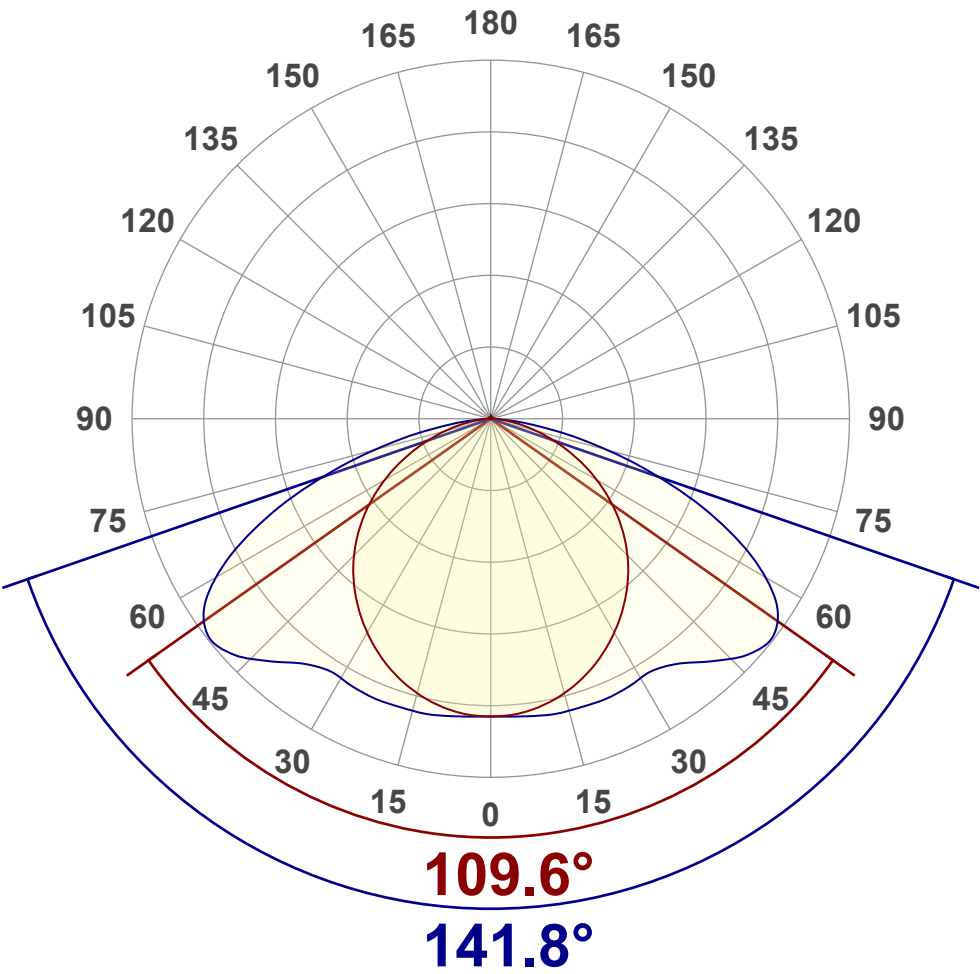
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2210 lm
Lumen Up% / Down%	0.82% / 99.18%
Peak Intensity	696 cd
Beam Angle (50%-FWHM)	131.21°

Cut-off Angle

Average 2,5%	174°
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Field Angle

Average 10%	164.4°
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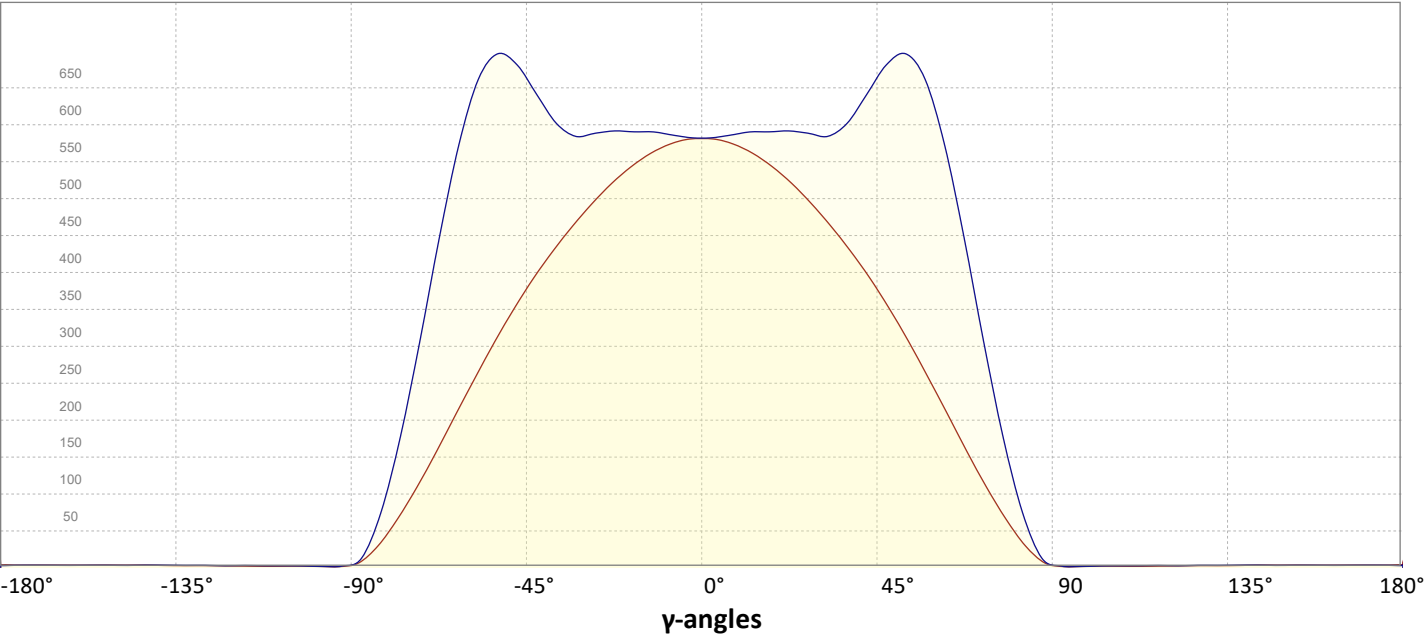
Intensity Ratio

In 120° cone	72.8%
In 90° cone	44.8%

C000-C180

C090-C270

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

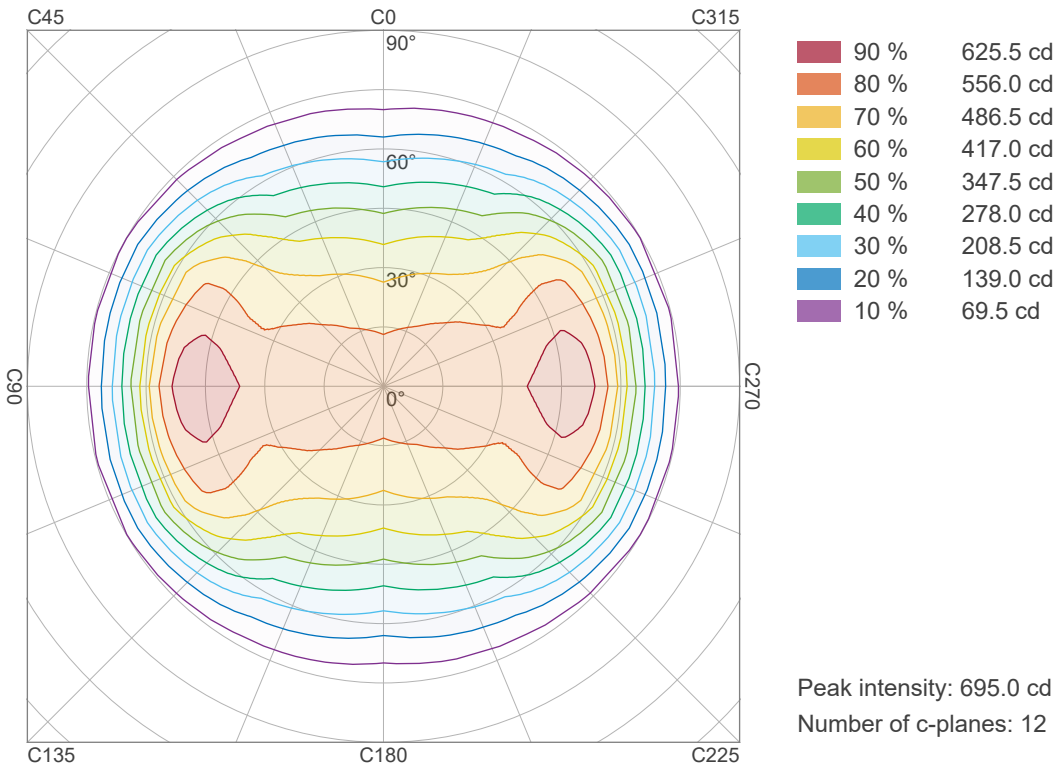


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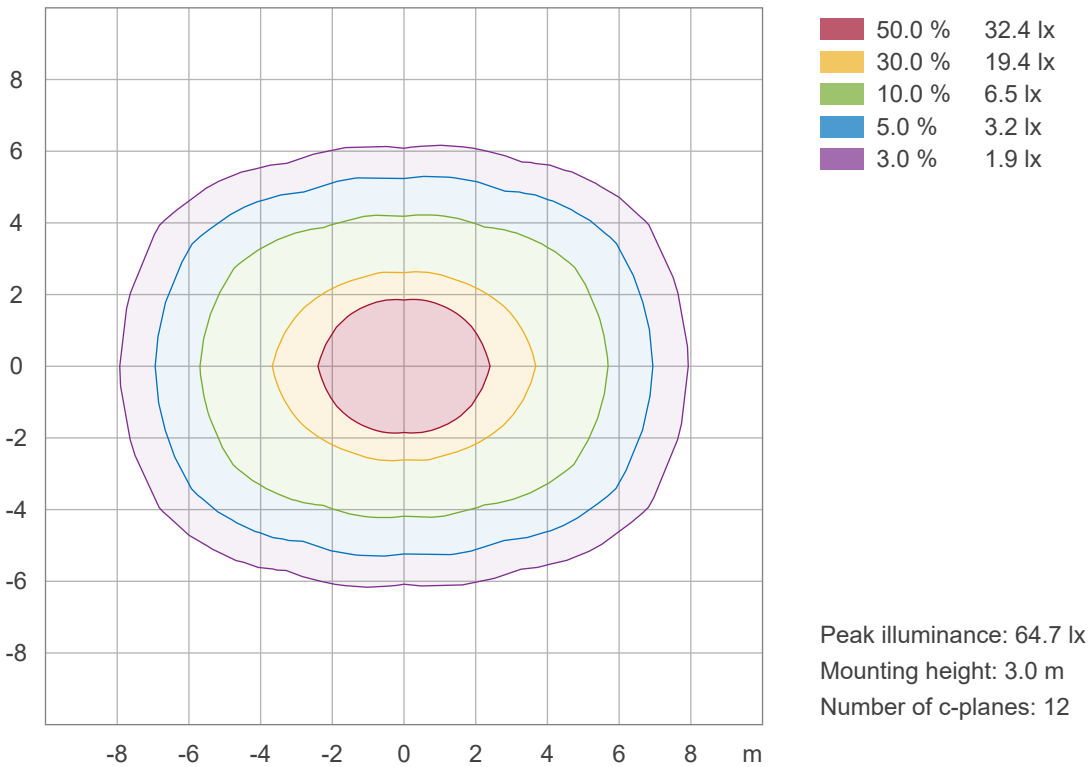
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## Iso-intensity Diagram (Iso-candela)



## Iso-illuminance Diagram (Iso-lux)



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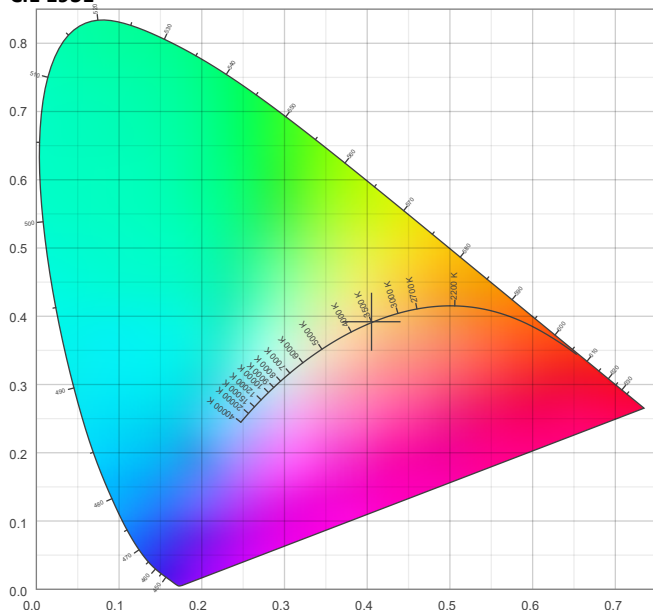


## Color details

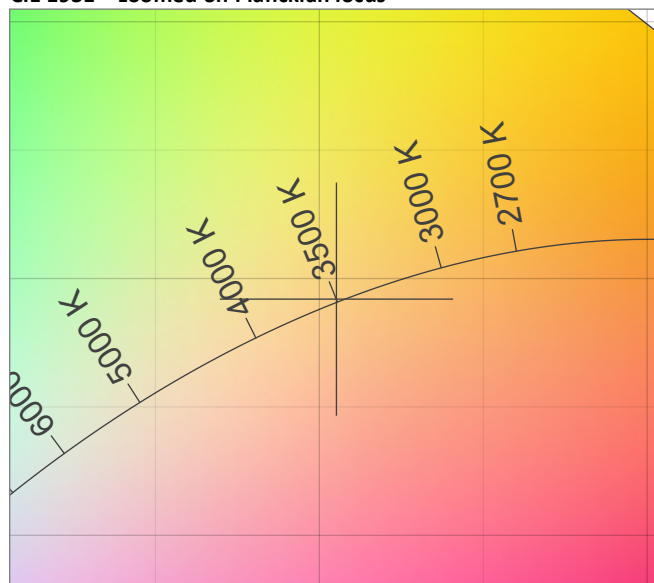
Correlated Color Temperature, Target CCT = 3516 K  
Correlated Color Temperature, Measured CCT = 3516 K  
Color Rendering Index CRI 83.0  
Color Rendering Index, R9 (red component) R9 = 9.5  
Color Rendering TM30-18 R<sub>f</sub> 84.2 – R<sub>g</sub> 97.6  
Color Quality Scale CQS = 82.9

MacAdam Steps  
Color coordinates CIE 1931 (x;y) = (0.405;0.392)  
Color coordinate CIEs 1960 (u;v) = (0.235;0.341)  
Color deviation from BBL Duv = 0.0006  
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0.235;0.512)

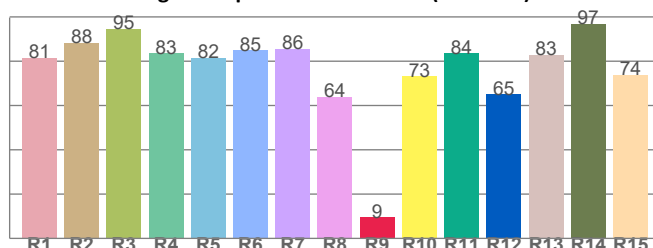
### CIE 1931



### CIE 1931 – zoomed on Planckian locus



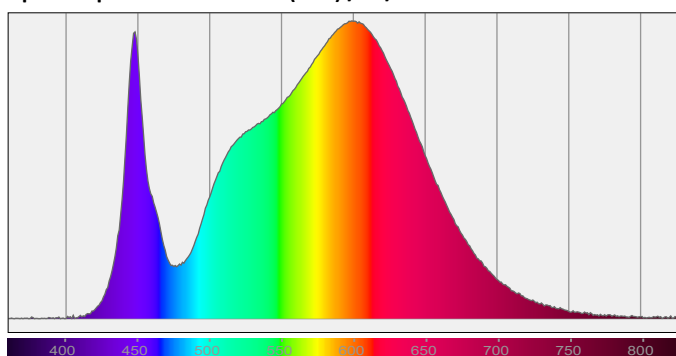
### Color Rendering Index per reference color (CIE 1995)



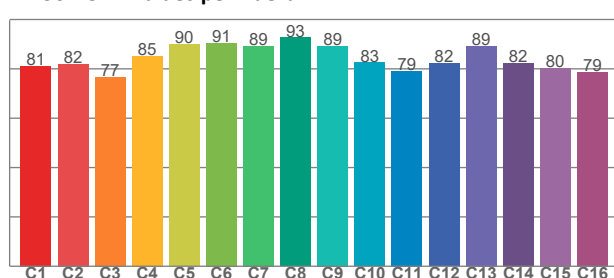
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
81.5	88.4	94.6	83.4	81.5	84.9	85.6	63.9	9.5	73.3	83.6	64.9	82.9	97.0	73.9

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



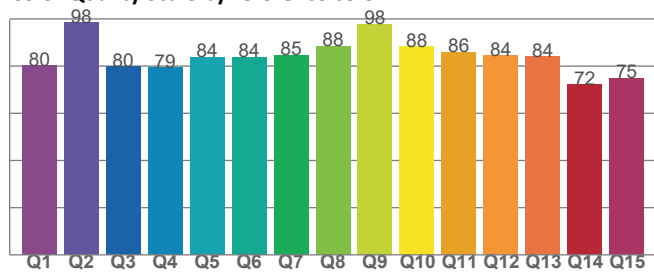
### TM30-18 Rf-values per hue bin



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	82.0	76.6	85.2	89.9	90.5	89.2	92.7	89.3	82.6	79.1	82.2	89.2	82.3	80.3	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
80.2	98.5	79.7	79.4	83.8	83.9	84.6	88.4	97.8	88.2	86.0	84.5	84.0	72.1	74.9

## Beam Details

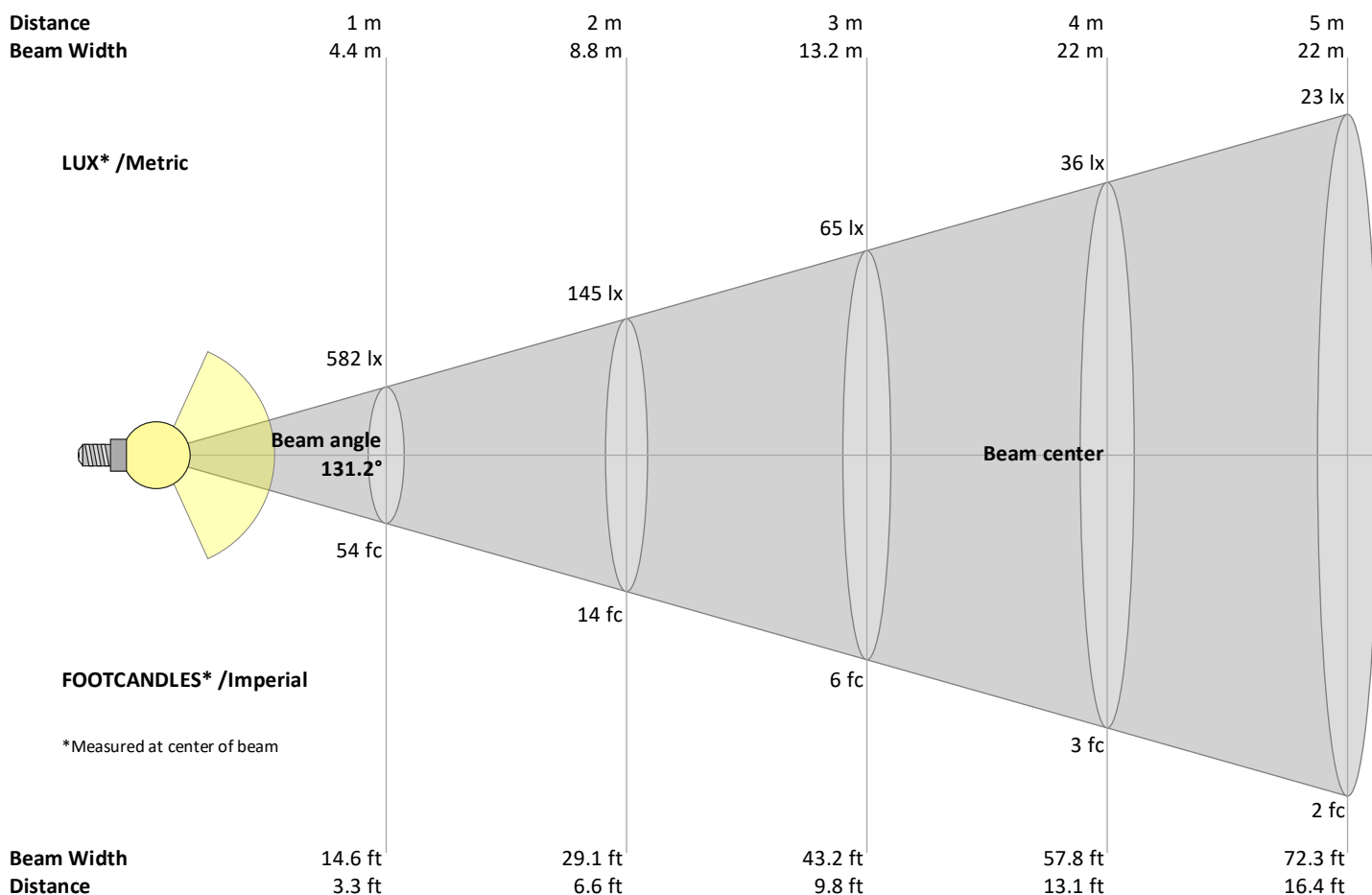
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## Beam intensities from 1 – 20 m

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
582	145	65	36	23	16	12	9	7	6	5	4	3	3	3	2	2	2	2	1	lux
54.1	13.5	6	3.4	2.2	1.5	1.1	0.8	0.7	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	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
582	578	569	554	535	510	482	450	416	377	334	288	239	189	139	93	52	21	5	2	cd
100%	99%	98%	95%	92%	88%	83%	77%	71%	65%	57%	50%	41%	32%	24%	16%	9%	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
582	584	588	590	591	590	586	594	623	662	689	678	614	506	373	238	123	42	7	2	cd
100%	100%	101%	101%	102%	101%	101%	102%	107%	114%	118%	116%	106%	87%	64%	41%	21%	7%	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
582	578	569	554	535	510	482	450	416	377	334	288	239	189	139	93	52	21	5	2	cd
100%	99%	98%	95%	92%	88%	83%	77%	71%	65%	57%	50%	41%	32%	24%	16%	9%	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
582	584	588	590	591	590	586	594	623	662	689	678	614	506	373	238	123	42	7	2	cd
100%	100%	101%	101%	102%	101%	101%	102%	107%	114%	118%	116%	106%	87%	64%	41%	21%	7%	1%	0%	of 0°val

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## Light Planning – UGR table

Corrected, comprehensive UGR table according to 117-1995

Reflectances											
$\rho$ Ceiling		70	70	50	50	30	70	70	50	50	30
$\rho$ Walls		50	30	50	30	30	50	30	50	30	30
$\rho$ Floor		20	20	20	20	20	20	20	20	20	20
Room size		Viewed Crosswise					Viewed Endwise				
H = mounting height above eye level		(Viewing direction orthogonal to lamp length axis)					(Viewing direction parallel to lamp length axis)				
X	Y										
2H	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4H	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8H	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12H	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Variations with the observer position for the luminaire spacings, S:											
n/a				n/a				n/a			
n/a				n/a				n/a			
n/a				n/a				n/a			

UGR data could not be calculated due to missing light source dimensions. Go to Edit -> Photometric -> Dimensions and set the source dimensions.

## Coefficients of Utilization

Ceiling reflectance	80			70			50			30			10			0		
Wall reflectance	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
Floor reflectance	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0
RCR	(RCR: Room Cavity Ratio)			Room Values are expressed as percentage of Lumen delivered to the task surface														
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	101	101	101	99
1	108	103	98	94	105	100	96	92	96	92	89	92	89	86	88	86	83	81
2	97	88	81	74	94	86	79	73	82	77	72	79	74	70	76	72	68	66
3	88	76	67	60	85	74	66	60	71	64	59	68	62	57	66	61	56	54
4	80	67	57	50	77	65	56	50	63	55	49	60	53	48	58	52	47	45
5	73	59	49	42	70	58	49	42	55	47	41	53	46	41	51	45	40	38
6	67	53	43	36	65	52	43	36	50	42	36	48	41	35	46	40	35	33
7	62	47	38	32	60	46	38	31	45	37	31	43	36	31	42	35	31	28
8	57	43	34	28	55	42	34	28	41	33	27	39	32	27	38	32	27	25
9	53	39	31	25	52	39	30	25	37	30	25	36	29	24	35	29	24	22
10	50	36	28	22	48	35	28	22	34	27	22	33	27	22	32	26	22	20

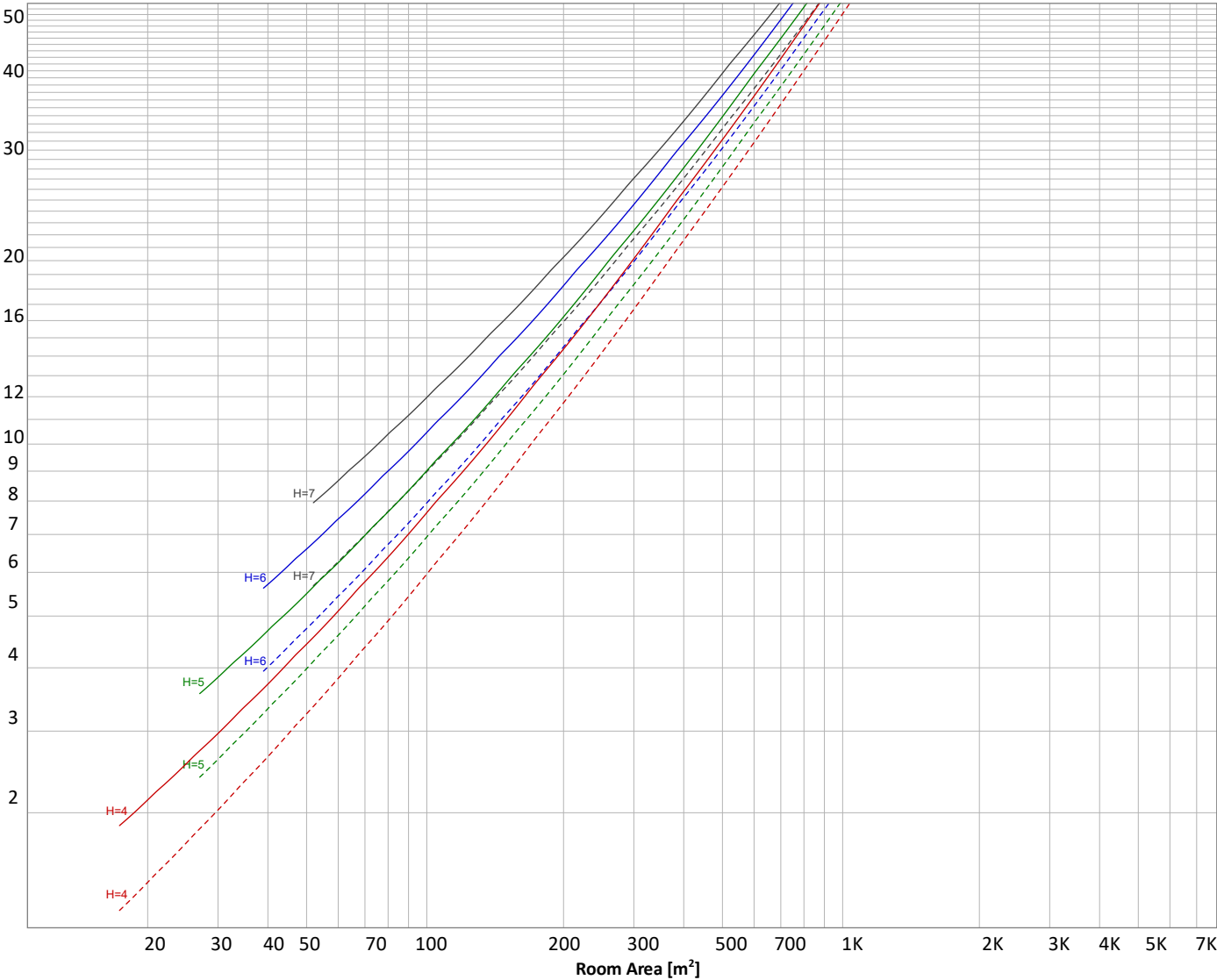
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## Luminaire budgetary diagram

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



### Conditions

H = Room height	Flux = 2210 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°
55.5 lm	162 lm	256 lm	328 lm	389 lm	418 lm	352 lm	192 lm	39.5 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
2.42 lm	2.53 lm	2.67 lm	2.71 lm	2.49 lm	2.23 lm	1.67 lm	1.02 lm	0.342 lm

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## Outdoor Light Planning

### Lumen per Zone

Zone (y)	Lumen	% Total
0-10°	56 lm	2.5%
10-20°	162 lm	7.4%
20-30°	256 lm	11.6%
30-40°	328 lm	14.8%
40-50°	389 lm	17.6%
50-60°	418 lm	18.9%
60-70°	352 lm	15.9%
70-80°	192 lm	8.7%
80-90°	39 lm	1.8%
90-100°	2 lm	0.1%
100-110°	3 lm	0.1%
110-120°	3 lm	0.1%
120-130°	3 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	0.0%
170-180°	0 lm	0.0%
<b>Total</b>	<b>2210 lm</b>	<b>100.0%</b>

### Intensity peaks

Max intensity	696 cd
Intensity, 90°	5 cd
Intensity, 0°	582 cd

### Zonal Lumen summary

Zone (y)	Lumen	% Total
0-30°	474 lm	21.5%
0-40°	802 lm	36.3%
0-60°	1608 lm	72.8%
60-90°	583 lm	26.4%
70-100°	234 lm	10.6%
90-120°	8 lm	0.3%
0-90°	2191 lm	99.2%
90-180°	18 lm	0.8%
0-180°	2210 lm	100.0%

### BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	237 lm	10.7%
Medium(30-60°)	566 lm	25.6%
High(60-80°)	271 lm	12.3%
Very high(80-90°)	22 lm	1.0%

### Back light

Low(0-30°)	237 lm	10.7%
Medium(30-60°)	566 lm	25.6%
High(60-80°)	271 lm	12.3%
Very high(80-90°)	22 lm	1.0%

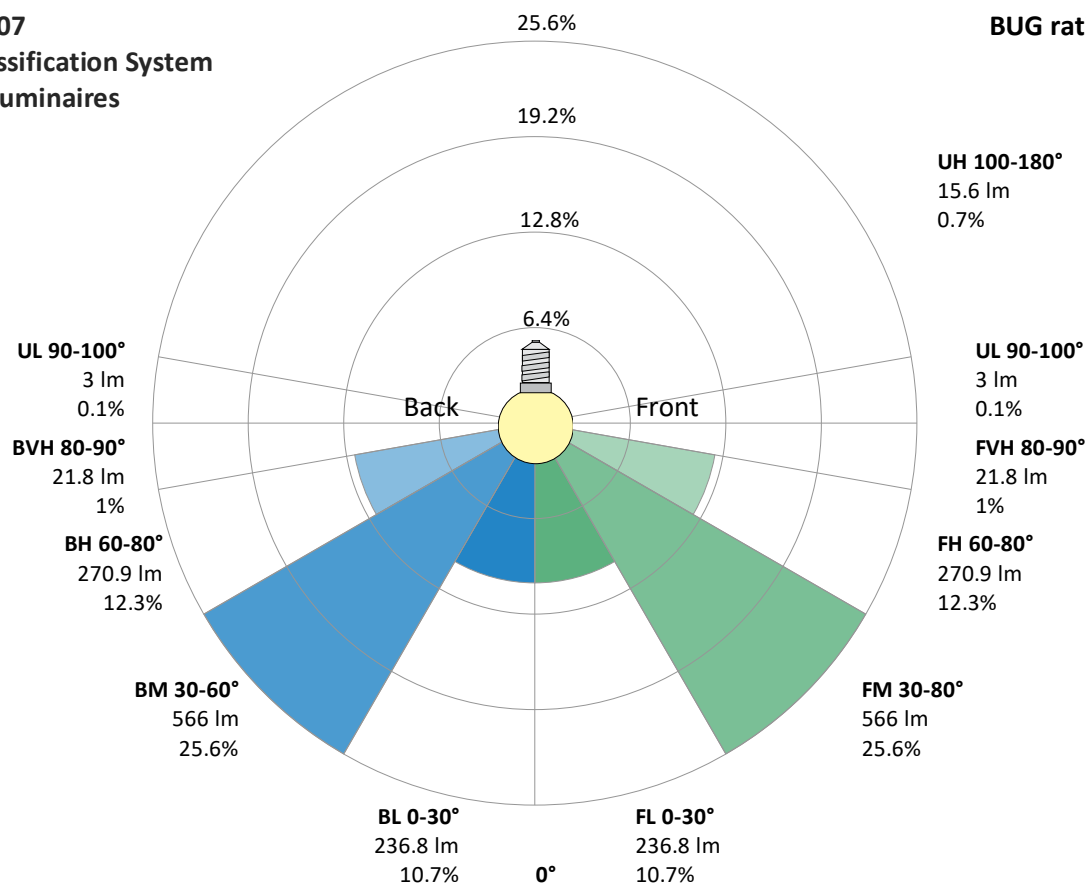
### Uplight

Low(90-100°)	3 lm	0.1%
High(100-180°)	16 lm	0.7%

## IESNA TM-15-07

### Luminaire Classification System For Outdoor Luminaires

### BUG rating B1 U2 G1





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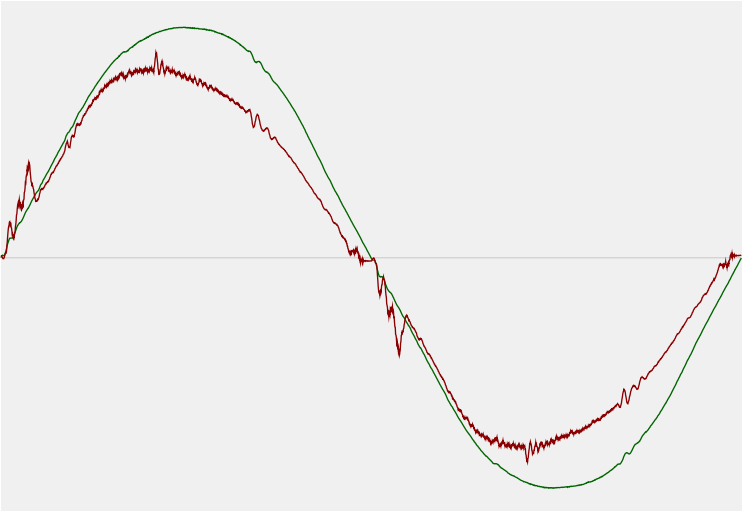


## Power Details

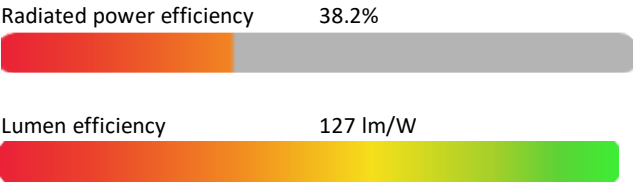
### Input Power

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 = $V_{RMS} \cdot I_{RMS}$	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	6.17%
Total harmonic distortion of the voltage	1.87%

### 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	3515 K
CCT shift	+1 K
CCT end	3516 K

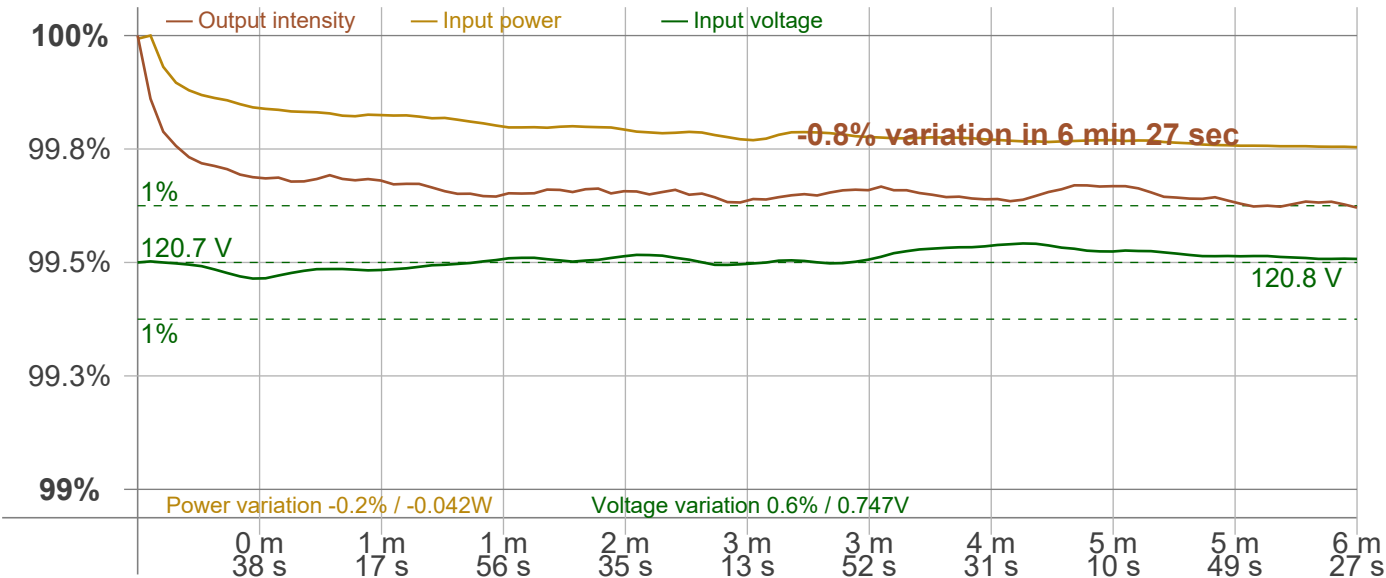
### Warmup Result

Total warmup time	Not completed
Warmup variation	-0.8%

### Output Change

Output start	2217 lm
Output change	-8 lm
Output end	2210 lm

## Stabilization Curve



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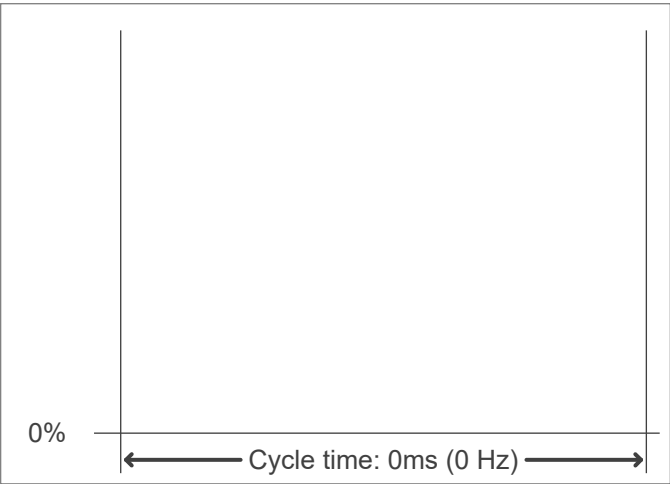
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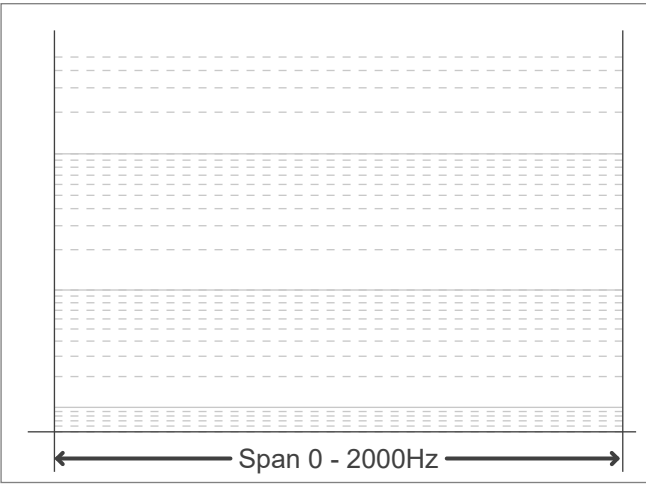
Flicker /TLA details

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

