

# Light Measurement Report

Print date: 15-9-2025

Measurement date and time: 15-9-2025 12:23:15 – Measurement no. VFR-250915-3190-MS

Measurement tracking No. and Link: [VT250915-006783](#)

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 – 11-1-2024 – 3130191315  
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

60 planes – 6°  
5°  
9,59 m  
46,5 W – PF 0,99 – DPF 0,99  
230 V – 0,204 A  
50 Hz  
Lamp stabilized in 15 min 22 sec – 2,0%

## Tested Light Source

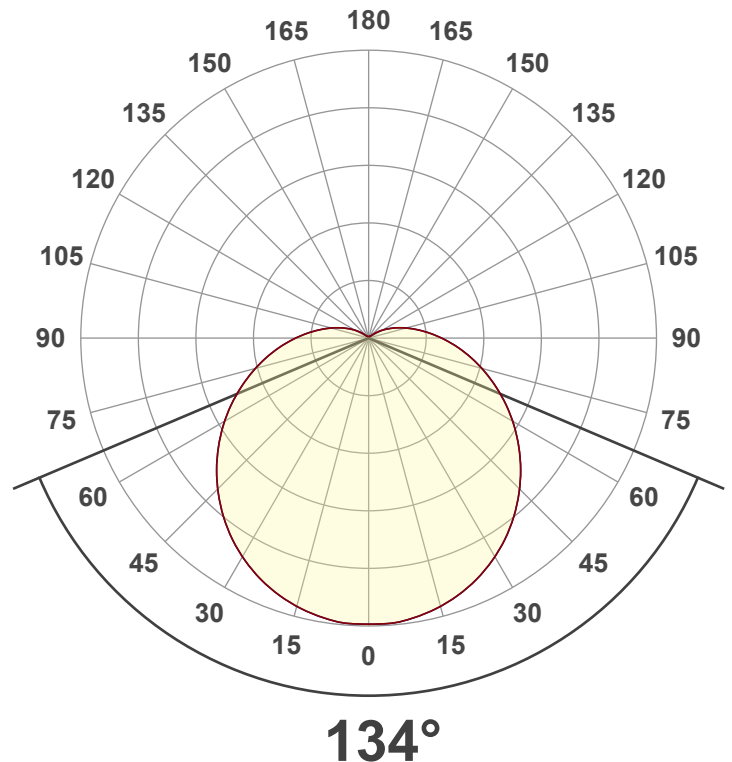
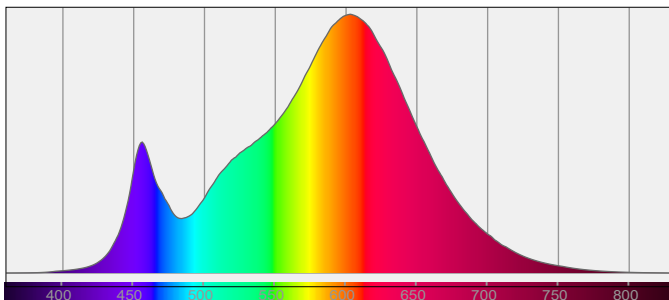
Product Name  
Item No. and Manufacturer  
Product Description (line 1)

813659-3000K-45W  
813659-3000K-45W – Dutchfulfillment  
LED BATTEN | CLIFF | 25-45W | 120CM | PHILIPS DRIVER | CCT-SWITCH

## 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

5425 lm – 11,89% / 88,11%  
117 lm/W  
1275 cd – 134°  
CCT = 3000 K / 2958 K  
CRI 82,2  
 $R_f$  84,3 –  $R_g$  94,3  
Duv -0,0010 – SDCM 1,6  
SVM 0,02 – PstLM 0,01



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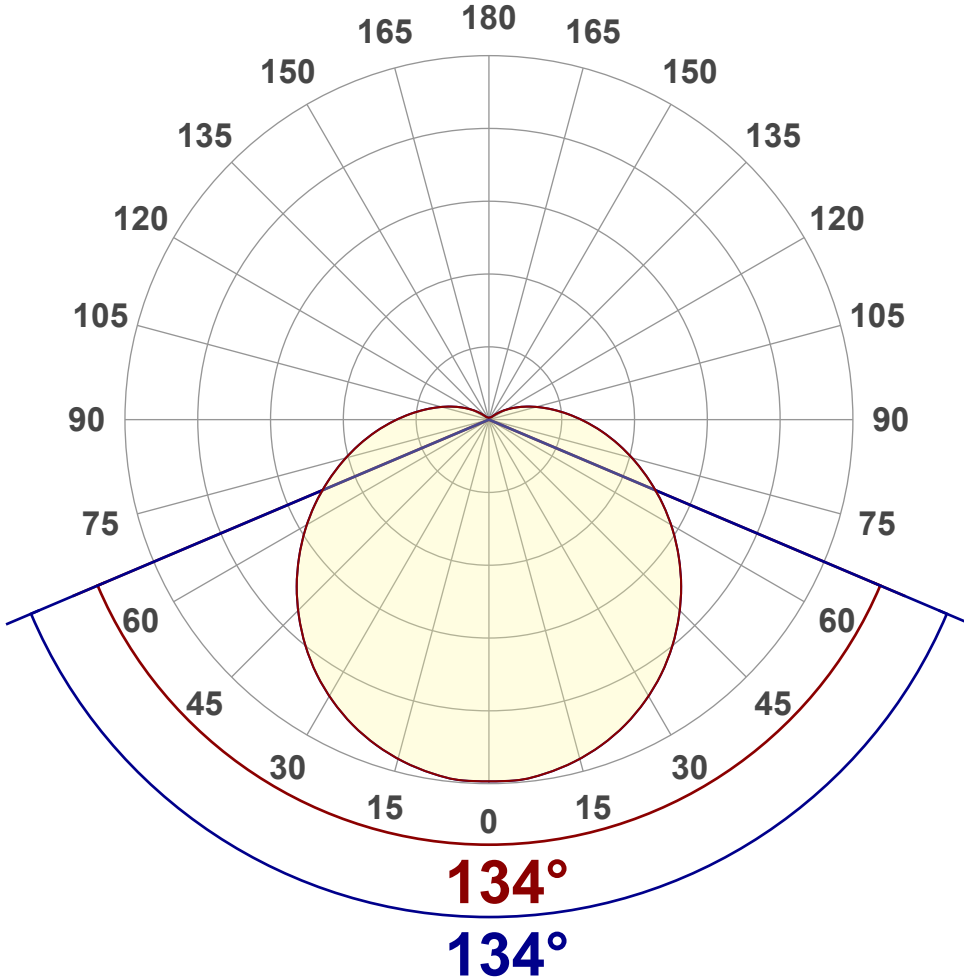
Measurement tracking No. and Link: [VT250915-006783](https://vt250915-006783)

Operator:



## Luminous Intensity diagram

Unit: 0-100% of peak intensity



## Main Values

Output (total Lumen)	5425 lm
Lumen Up% / Down%	11,89% / 88,11%
Peak Intensity	1275 cd
Beam Angle (50%)	134°
Beam Angle (90%)	134°
Beam Angle (10%)	134°

## Cut-off Angle

Average 2,5%	256°
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## Field Angle

Average 10%	221,8°
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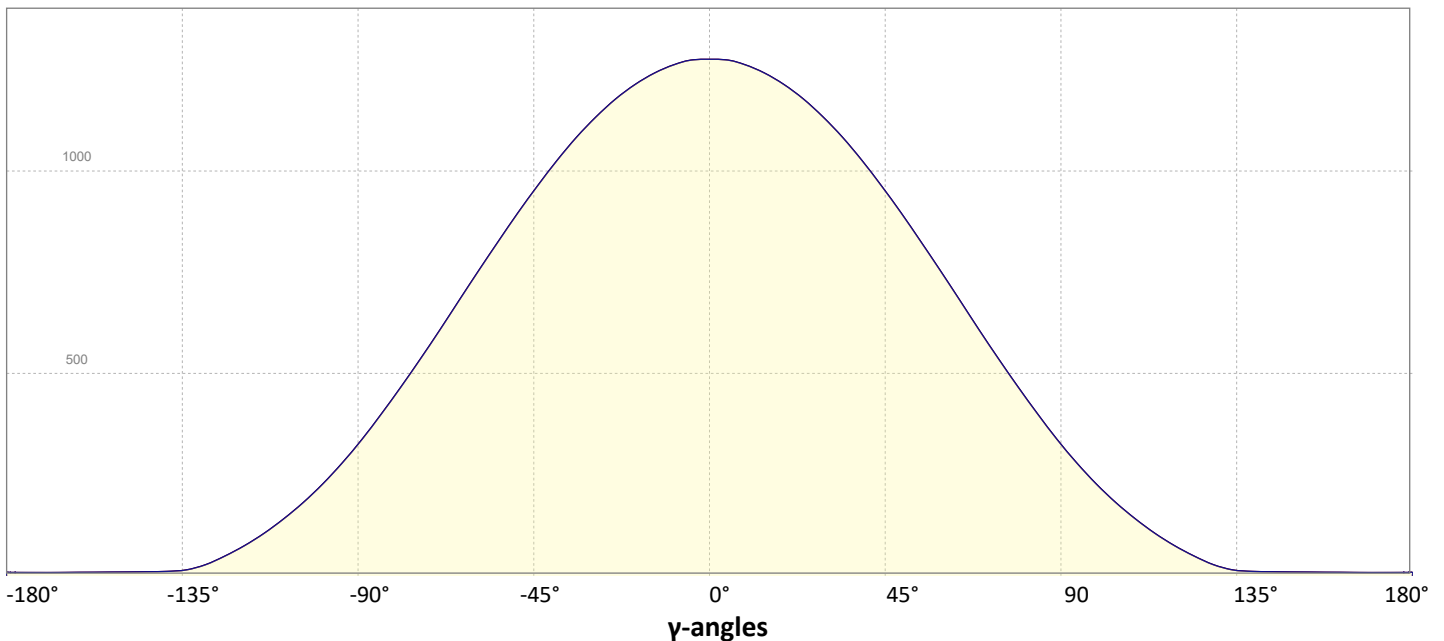
## Intensity Ratio

In 120° cone	57,9%
In 90° cone	37,7%

**C000-C180**

**C090-C270**

## Linear distribution diagram - Intensity (candela) vs $\gamma$ -angle



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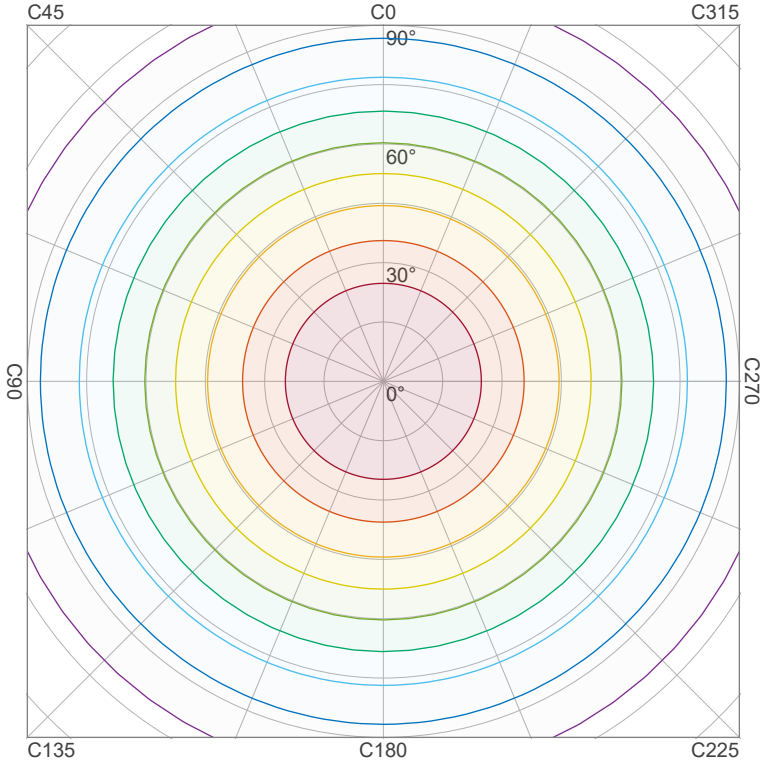
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Operator:



## Iso-intensity Diagram (Iso-candela)

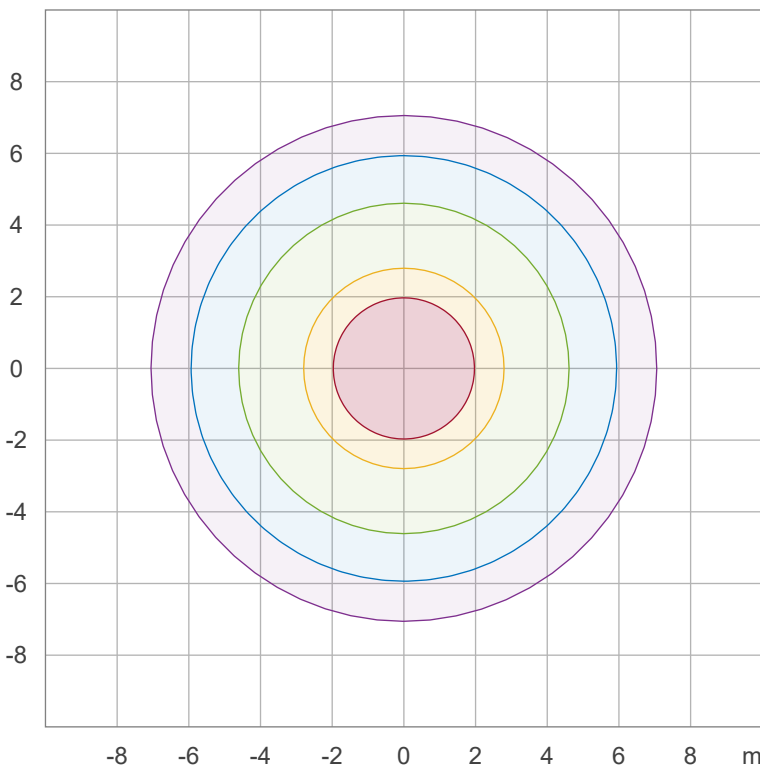


90 %	1147,3 cd
80 %	1019,8 cd
70 %	892,3 cd
60 %	764,9 cd
50 %	637,4 cd
40 %	509,9 cd
30 %	382,4 cd
20 %	255,0 cd
10 %	127,5 cd

Peak intensity: 1274,8 cd

Number of c-planes: 60

## Iso-illuminance Diagram (Iso-lux)



50,0 %	70,8 lx
30,0 %	42,5 lx
10,0 %	14,2 lx
5,0 %	7,1 lx
3,0 %	4,2 lx

Peak illuminance: 141,6 lx

Mounting height: 3,0 m

Number of c-planes: 60

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## Color details

Correlated Color Temperature, Target CCT = 3000 K  
 Correlated Color Temperature, Measured CCT = 2958 K  
 Color Rendering Index CRI 82,2  
 Color Rendering Index, R9 (red component) R9 = 5,0  
 Color Rendering TM30-18 R<sub>f</sub> 84,3 – R<sub>g</sub> 94,3  
 Color Quality Scale CQS = 81,5

MacAdam Steps SDCM = 1,6  
 Color coordinates CIE 1931 (x;y) = (0,437;0,404)  
 Color coordinate CIEs 1960 (u;v) = (0,251;0,348)  
 Color deviation from BBL Duv = -0,0010  
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,251;0,521)

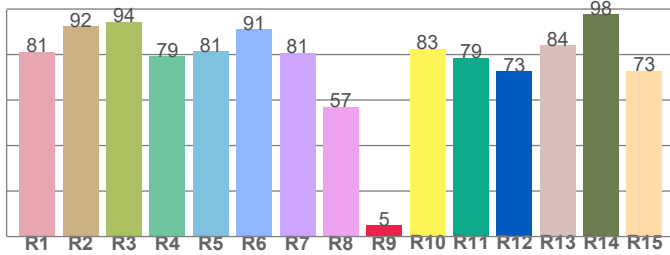
### CIE 1931



### CIE 1931 – zoomed on Planckian locus



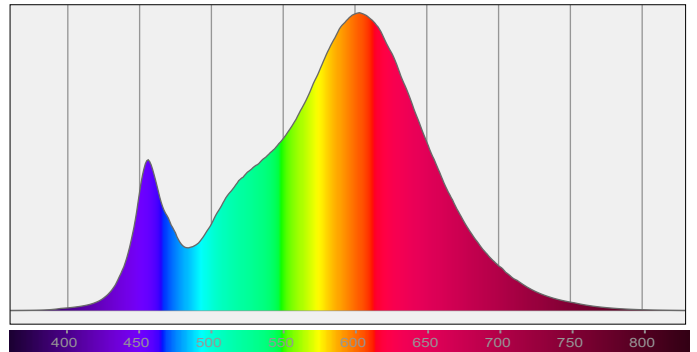
### Color Rendering Index per reference color (CIE 1995)



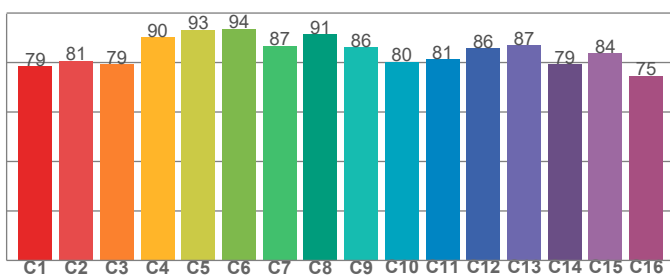
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
81,2	92,5	94,5	79,3	81,3	91,1	80,9	57,0	5,0	82,6	78,6	72,7	84,2	97,8	72,9

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



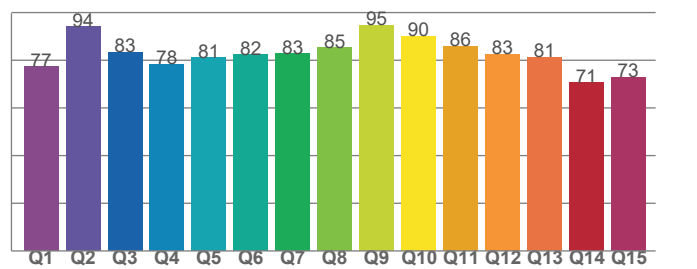
### TM30-18 R<sub>f</sub>-values per hue bin



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
78,6	80,7	79,3	90,1	93,3	93,7	86,8	91,4	86,2	80,3	81,4	85,7	87,0	79,3	83,8	74,6

### Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
77,3	94,1	83,3	78,2	81,0	82,4	82,8	85,2	94,7	90,2	85,9	82,6	81,3	70,6	72,8

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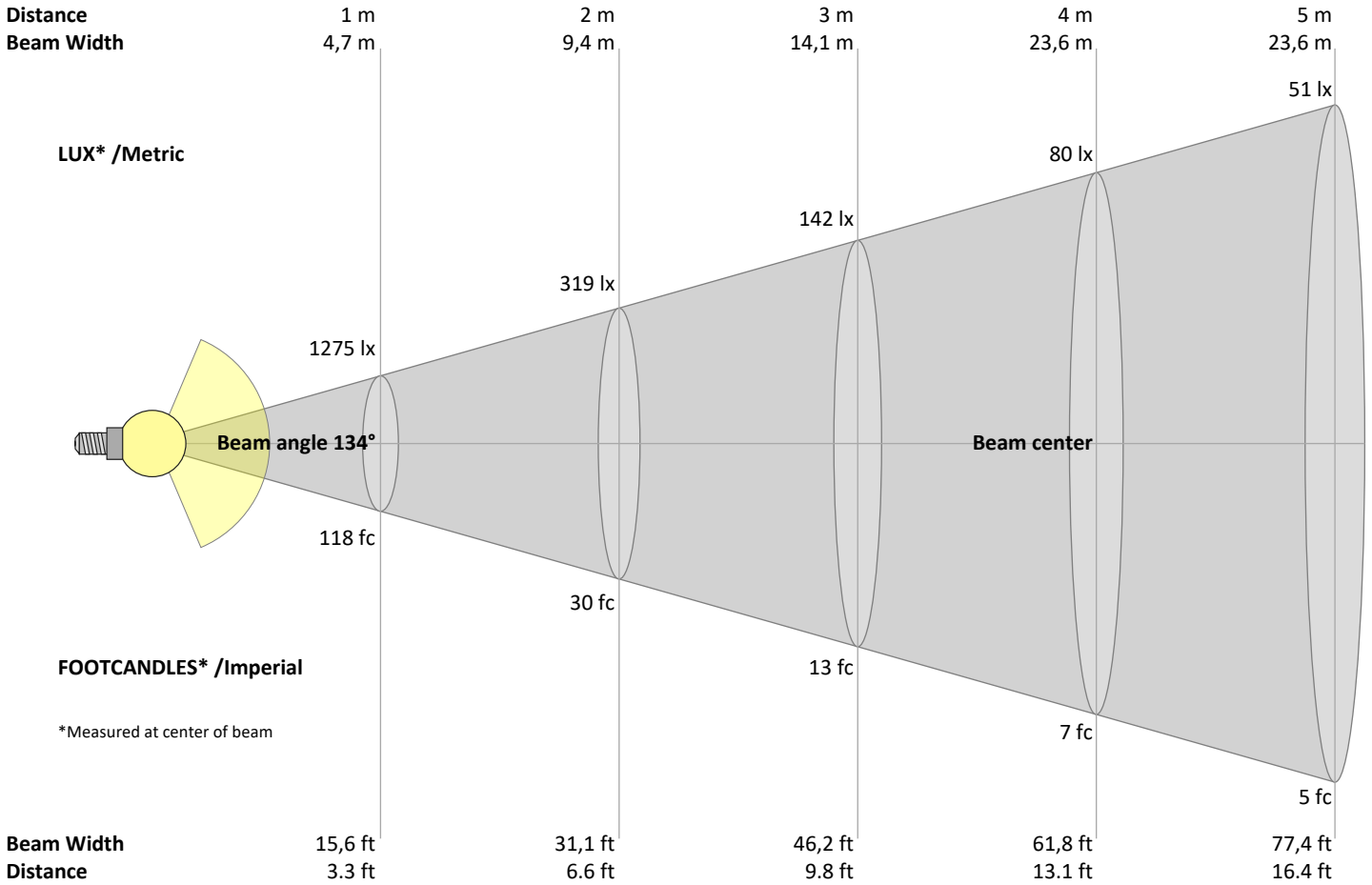
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## Beam Details



### 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
1275	319	142	80	51	35	26	20	16	13	11	9	8	7	6	5	4	4	4	3	lux
118,4	29,6	13,2	7,4	4,7	3,3	2,4	1,9	1,5	1,2	1	0,8	0,7	0,6	0,5	0,5	0,4	0,4	0,3	0,3	fc

### Intensities in 0° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
1275	1263	1220	1152	1061	951	827	697	565	440	325	227	149	87	41	14	10	9	9	8	cd
100%	99%	96%	90%	83%	75%	65%	55%	44%	35%	26%	18%	12%	7%	3%	1%	1%	1%	1%	1%	of 0°val

### Intensities in 90° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
1275	1263	1220	1152	1061	951	827	697	565	440	325	227	149	87	41	14	10	9	9	8	cd
100%	99%	96%	90%	83%	75%	65%	55%	44%	35%	26%	18%	12%	7%	3%	1%	1%	1%	1%	1%	of 0°val

### Intensities in 180° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
1275	1263	1220	1152	1061	951	827	697	565	440	325	227	149	87	41	14	10	9	9	8	cd
100%	99%	96%	90%	83%	75%	65%	55%	44%	35%	26%	18%	12%	7%	3%	1%	1%	1%	1%	1%	of 0°val

### Intensities in 270° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
1275	1263	1220	1152	1061	951	827	697	565	440	325	227	149	87	41	14	10	9	9	8	cd
100%	99%	96%	90%	83%	75%	65%	55%	44%	35%	26%	18%	12%	7%	3%	1%	1%	1%	1%	1%	of 0°val

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## Light Planning – UGR table

Uncorrected, comprehensive UGR table according to 117-1995

Reflectances		70	70	50	50	30	70	70	50	50	30
	ρ Ceiling	70	70	50	50	30	70	70	50	50	30
	ρ Walls	50	30	50	30	30	50	30	50	30	30
	ρ 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	2H	21,1	22,3	21,5	22,8	23,3	21,5	22,7	21,9	23,2	23,7
	3H	23,1	24,4	23,7	24,9	25,3	23,7	25,0	24,3	25,5	25,9
	4H	24,2	25,4	24,8	25,9	26,4	25,0	26,1	25,5	26,6	27,1
	6H	25,4	26,4	25,8	26,9	27,5	26,3	27,4	26,8	27,9	28,5
	8H	25,9	26,9	26,4	27,4	28,1	27,0	28,1	27,5	28,6	29,2
	12H	26,4	27,5	26,9	28,0	28,6	27,8	28,9	28,3	29,4	30,0
4H	2H	21,9	23,1	22,5	23,6	24,1	22,2	23,4	22,8	23,9	24,4
	3H	24,3	25,3	24,8	25,8	26,5	24,7	25,8	25,3	26,3	26,9
	4H	25,4	26,5	26,0	27,0	27,7	26,0	27,1	26,6	27,6	28,3
	6H	26,7	27,6	27,3	28,1	28,7	27,5	28,4	28,2	29,0	29,6
	8H	27,3	28,1	27,9	28,7	29,3	28,3	29,1	29,0	29,7	30,3
	12H	27,9	28,6	28,5	29,2	29,9	29,2	29,9	29,9	30,5	31,2
8H	4H	26,0	26,8	26,6	27,3	27,9	26,5	27,3	27,1	27,9	28,5
	6H	27,5	28,1	28,1	28,8	29,5	28,2	28,8	28,9	29,5	30,2
	8H	28,2	28,8	28,9	29,5	30,3	29,2	29,7	29,8	30,4	31,3
	12H	29,0	29,5	29,8	30,2	31,0	30,3	30,8	31,0	31,4	32,2
12H	4H	26,1	26,8	26,7	27,4	28,1	26,6	27,2	27,2	27,9	28,5
	6H	27,7	28,3	28,4	29,0	29,8	28,4	28,9	29,0	29,6	30,5
	8H	28,6	29,1	29,3	29,7	30,5	29,4	29,9	30,1	30,6	31,4

### Variations with the observer position for the luminaire spacings, S:

S = 1.0H	0,1 / 0,0	0,1 / -0,1
S = 1.5H	0,1 / -0,1	0,1 / -0,1
S = 2.0H	0,2 / -0,2	0,2 / -0,2

## 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	116	116	116	116	112	112	112	112	105	105	105	98	98	98	91	91	91	88
1	103	97	91	86	99	93	88	84	87	83	79	81	77	74	75	73	70	67
2	92	83	75	68	88	80	72	66	74	68	63	69	64	60	64	60	56	53
3	83	72	62	55	80	69	61	54	64	57	51	60	54	49	56	51	47	44
4	76	63	53	46	73	61	52	45	57	49	43	53	46	41	49	44	39	37
5	70	56	46	39	67	54	45	38	50	43	37	47	40	35	44	38	34	31
6	64	50	40	34	61	48	39	33	45	38	32	42	36	31	40	34	29	27
7	59	45	36	29	57	44	35	29	41	33	28	39	32	27	36	30	26	24
8	55	41	32	26	53	40	31	26	37	30	25	35	29	24	33	27	23	21
9	51	38	29	23	49	36	28	23	34	27	22	32	26	21	31	25	21	19
10	48	35	26	21	46	34	26	21	32	25	20	30	24	19	28	23	19	17

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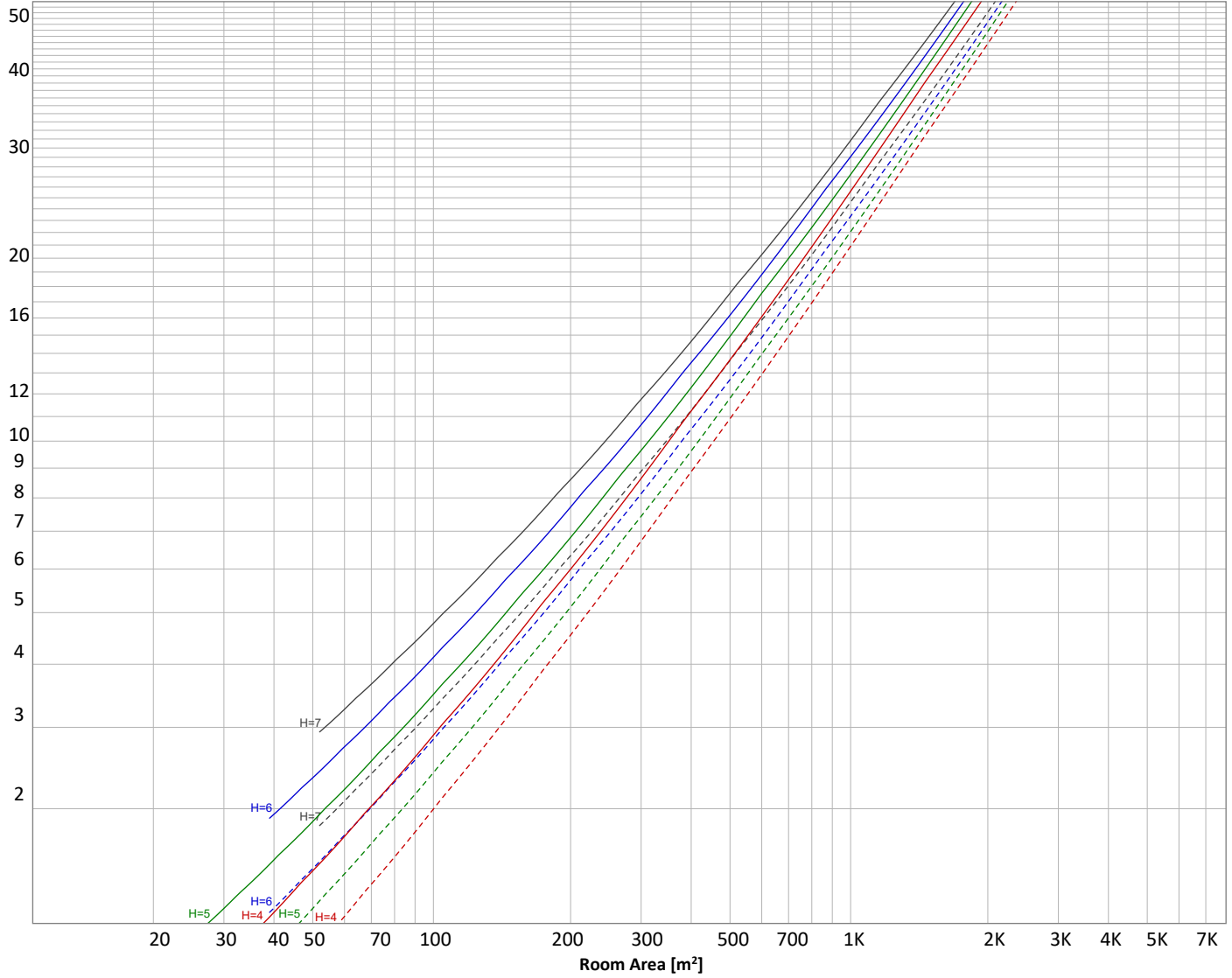
Operator:



## Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



### Conditions

H = Room height	Flux = 5425 lm				
H <sub>down</sub> = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	ρ(%) Wall reflectance	Floor reflectance
H <sub>work</sub> = Work area height from floor =	0.00 m	-----	70	50	30
E <sub>work</sub> = Average lux on work area =	100 lx	—————	50	30	20

### Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
121 lm	349 lm	539 lm	672 lm	734 lm	728 lm	661 lm	552 lm	423 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
294 lm	184 lm	99,7 lm	41,2 lm	11,9 lm	6,19 lm	4,15 lm	2,36 lm	0,770 lm

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## Outdoor Light Planning

### Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	121 lm	2,2%
10-20°	349 lm	6,4%
20-30°	539 lm	9,9%
30-40°	672 lm	12,4%
40-50°	734 lm	13,5%
50-60°	728 lm	13,4%
60-70°	661 lm	12,2%
70-80°	552 lm	10,2%
80-90°	423 lm	7,8%
90-100°	294 lm	5,4%
100-110°	184 lm	3,4%
110-120°	100 lm	1,8%
120-130°	41 lm	0,8%
130-140°	12 lm	0,2%
140-150°	6 lm	0,1%
150-160°	4 lm	0,1%
160-170°	2 lm	0,0%
170-180°	1 lm	0,0%
<b>Total</b>	<b>5425 lm</b>	<b>100,0%</b>

### Intensity peaks

Max intensity	1275 cd
Intensity, 90°	325 cd
Intensity, 0°	1275 cd

### Zonal Lumen summary

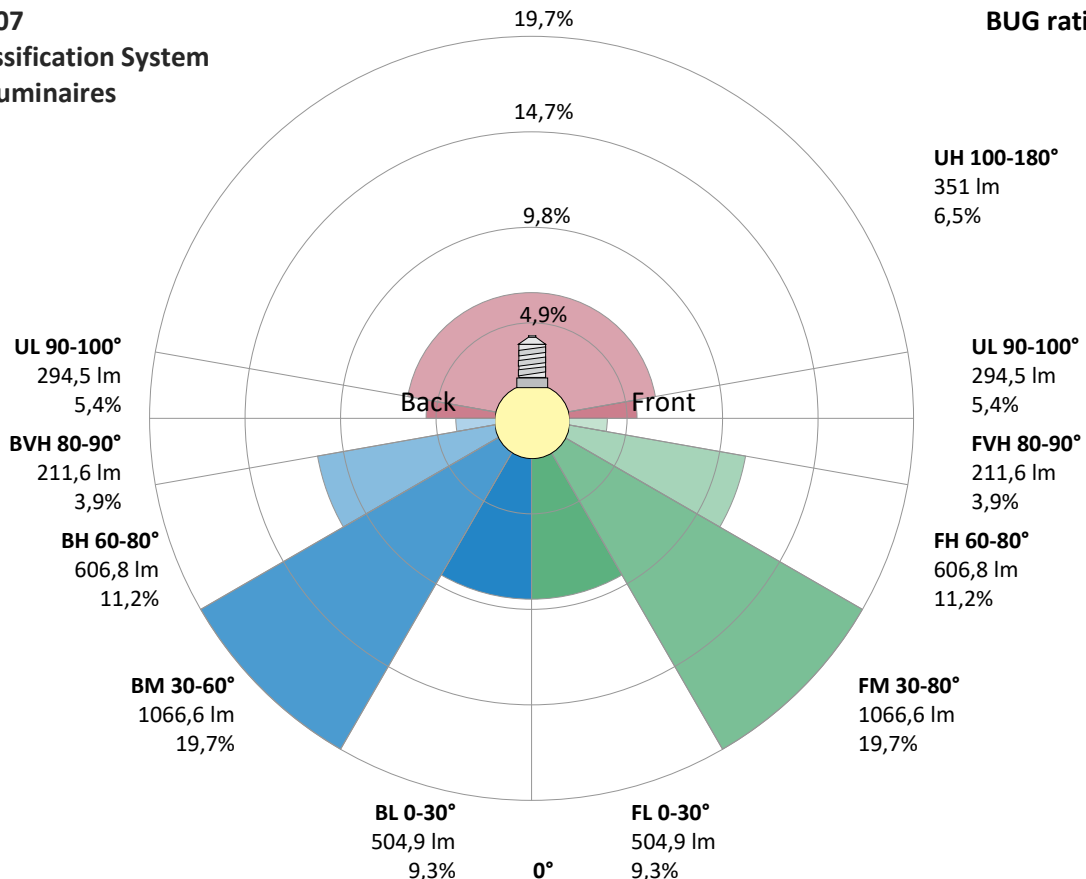
Zone (γ)	Lumen	% Total
0-30°	1010 lm	18,6%
0-40°	1681 lm	31,0%
0-60°	3143 lm	57,9%
60-90°	1637 lm	30,2%
70-100°	1270 lm	23,4%
90-120°	579 lm	10,7%
0-90°	4780 lm	88,1%
90-180°	645 lm	11,9%
0-180°	5425 lm	100,0%

### BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	505 lm	9,3%
Medium(30-60°)	1067 lm	19,7%
High(60-80°)	607 lm	11,2%
Very high(80-90°)	212 lm	3,9%
<b>Back light</b>		
Low(0-30°)	505 lm	9,3%
Medium(30-60°)	1067 lm	19,7%
High(60-80°)	607 lm	11,2%
Very high(80-90°)	212 lm	3,9%
<b>Uplight</b>		
Low(90-100°)	295 lm	5,4%
High(100-180°)	351 lm	6,5%

## IESNA TM-15-07 Luminaire Classification System For Outdoor Luminaires

**BUG rating B2 U3 G2**



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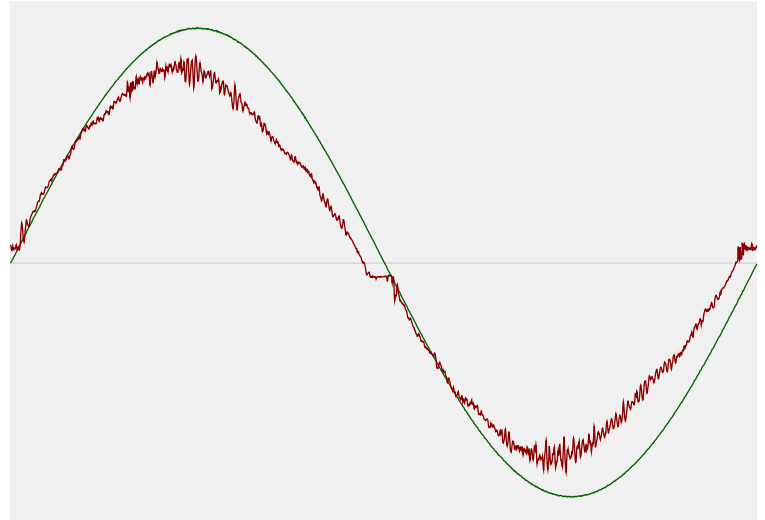


## Power Details

### Input Power

Power feed to light source	46,5 W
Frequency of input power	50 Hz
RMS Input voltage feed, $V_{RMS}$	230 V
RMS Input current feed, $I_{RMS}$	0,204 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	47,04 VA
Displacement factor of AC power feed	0,99
Power factor of AC current feed	0,99
Total harmonic distortion of the current	4,92%
Total harmonic distortion of the voltage	0,07%

### Input Power Curve



### Efficiency

Radiated power efficiency	35,7%
Lumen efficiency	117 lm/W

## Stabilization Details

### Warmup Conditions

Stable period	15 min
Stable change max	2,0%
Minimum time	15 min

### Color Temperature Change

CCT start	2990 K
CCT shift	+10 K
CCT end	3000 K

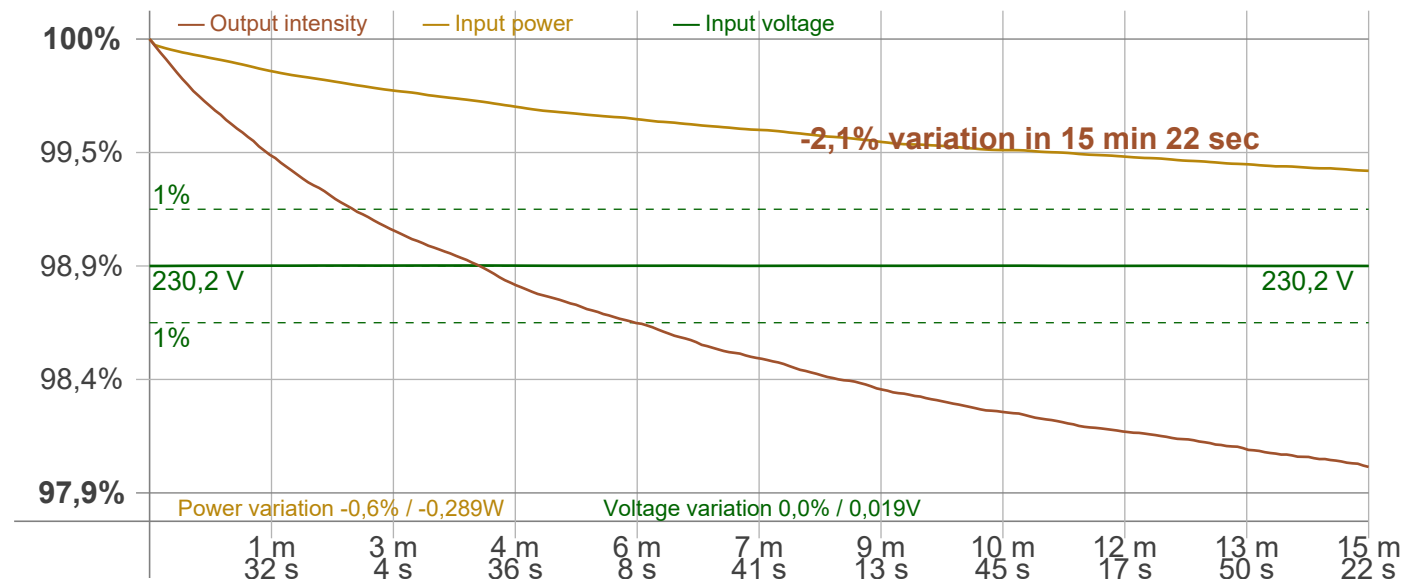
### Warmup Result

Total warmup time	Lamp stabilized in 15 min 22 sec
Warmup variation	-2,1%

### Output Change

Output start	5540 lm
Output change	-115 lm
Output end	5425 lm

### Stabilization Curve



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Operator:



## Flicker /TLA details

Flicker Meter Type: Viso Systems LabFlicker  
 Frequency of input power: 50 Hz  
 Flicker/TLA sample rate: 40000 samples/s

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

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

Flicker frequency: 98,04 Hz  
 Percent Flicker: 0,62 %  
 Flicker index: 0

### 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 %

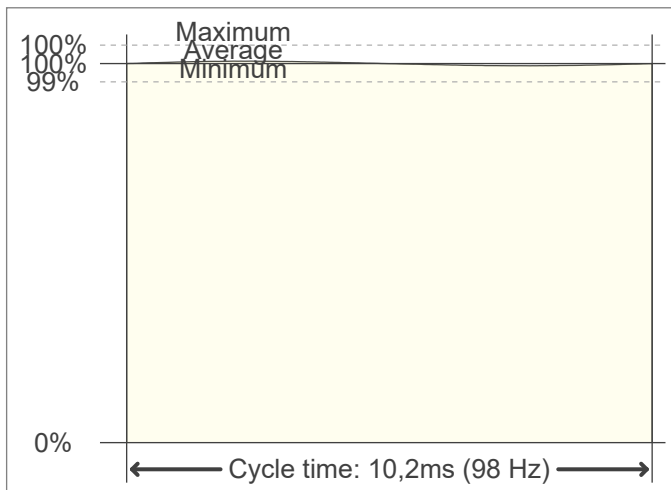
### TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz): 0,01  
 SVM value (80 < F < 2000 Hz): 0,02

### 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

