

# Light Measurement Report

Print date: 12-9-2025

Measurement date and time: 12-9-2025 11:08:58 – Measurement no. VFR-250912-3132-MS

Measurement tracking No. and Link: [VT250912-009692](#)

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

12 planes – 30°  
5°  
12,10 m  
38,3 W – PF 0,97 – DPF 0,98  
230 V – 0,171 A  
50 Hz  
Lamp stabilized in 15 min 1 sec – 2,0%

## Tested Light Source

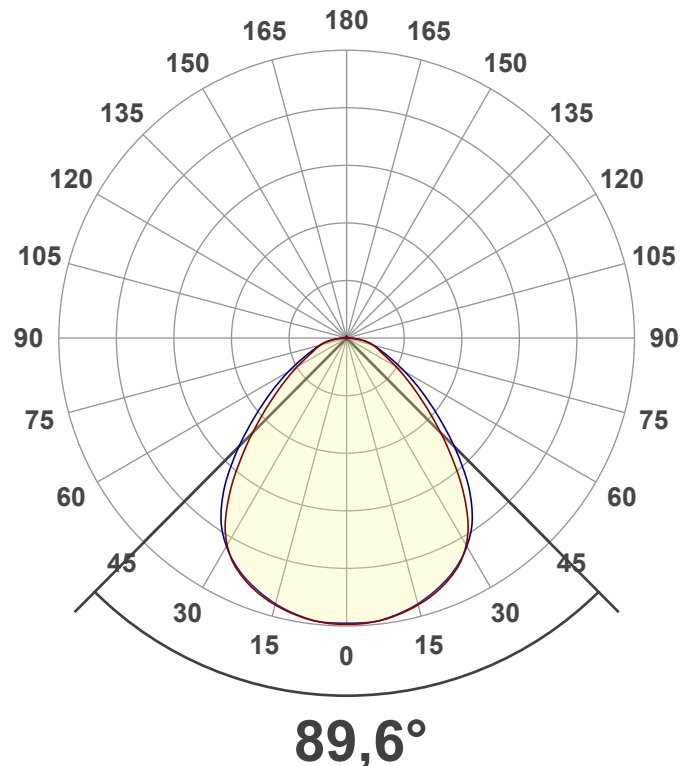
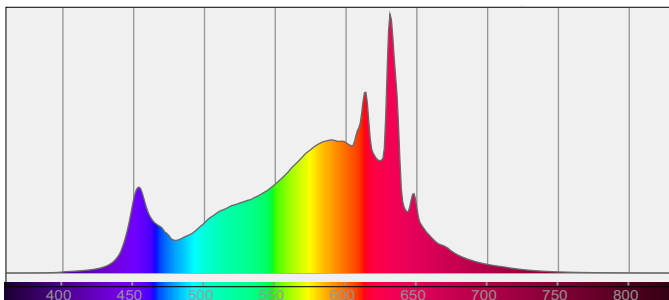
Product Name  
Item No. and Manufacturer  
Product Description (line 1)

812416-3000K  
812416-3000K – Dutchfulfillment  
BACK-LIT LED PANEEL | PONTUS | 150X30CM | 36W | 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

4400 lm – 0,94% / 99,06%  
115 lm/W  
1995 cd – 89,6°  
CCT = 3000 K / 2996 K  
CRI 85,2  
 $R_f$  85,4 –  $R_g$  94,9  
Duv -0,0001 – SDCM 0,1  
SVM 0,03 – PstLM 0,01



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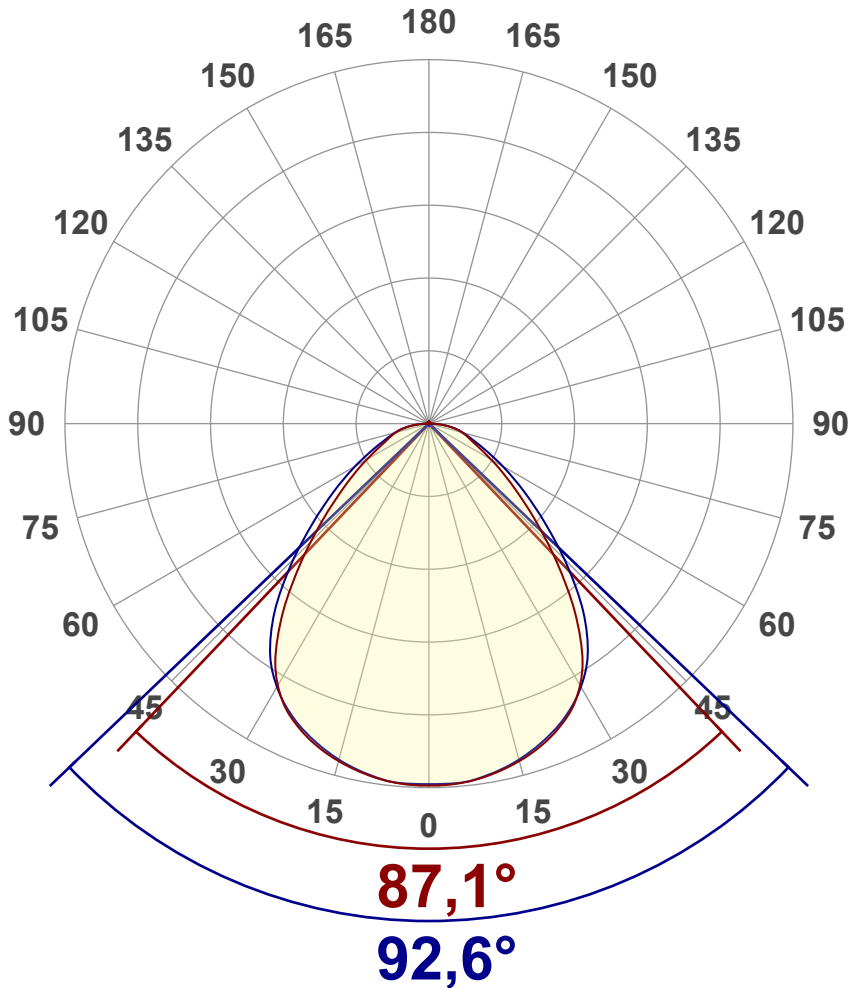
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## Luminous Intensity diagram

Unit: 0-100% of peak intensity



## Main Values

Output (total Lumen)	4400 lm
Lumen Up% / Down%	0,94% / 99,06%
Peak Intensity	1995 cd
Beam Angle (50%)	89,6°
Beam Angle (90%)	92,6°
Beam Angle (10%)	87,1°

## Cut-off Angle

Average 2,5%	173,6°
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## Field Angle

Average 10%	148,7°
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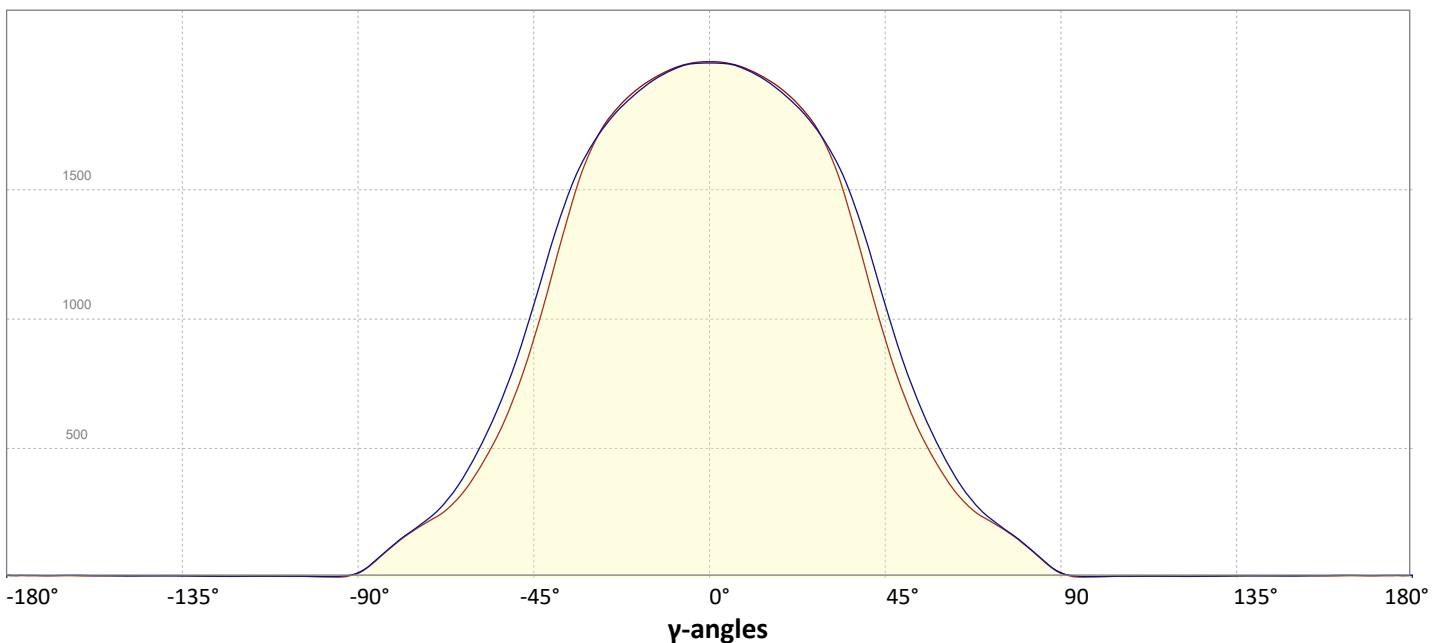
## Intensity Ratio

In 120° cone	85,3%
In 90° cone	65,8%

**C000-C180**

**C090-C270**

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



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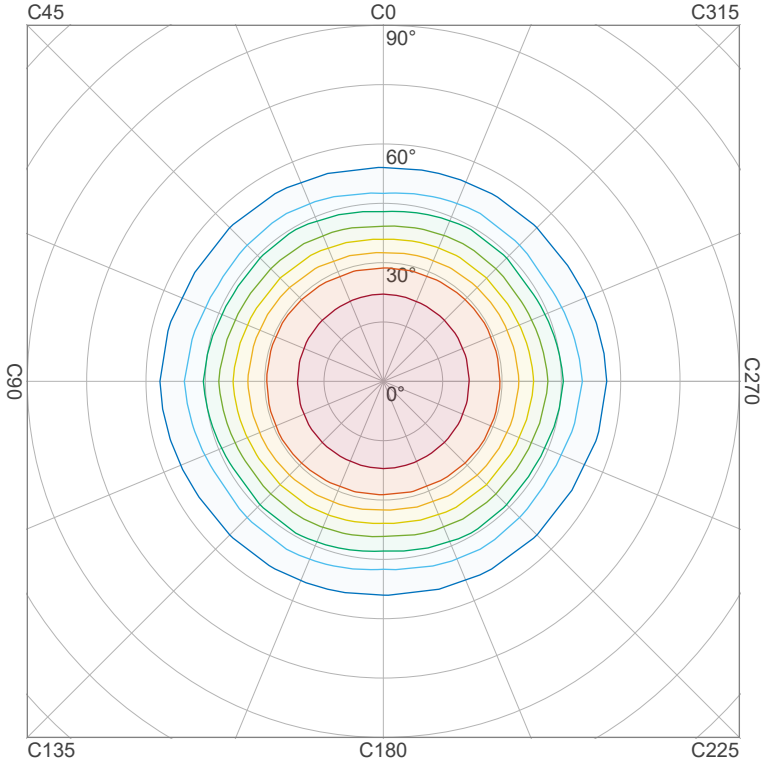
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Operator:



## Iso-intensity Diagram (Iso-candela)

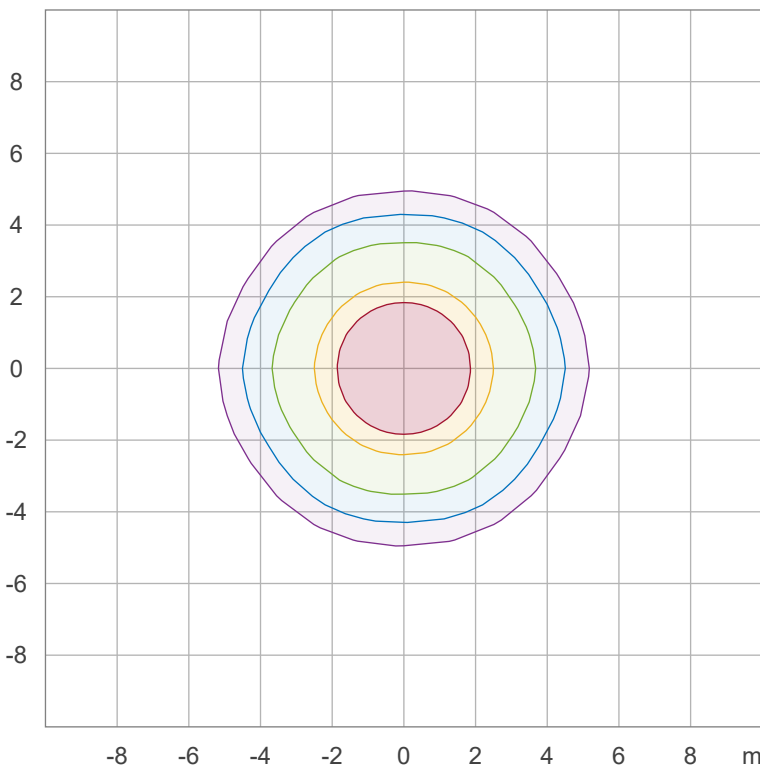


90 %	1794,9 cd
80 %	1595,5 cd
70 %	1396,0 cd
60 %	1196,6 cd
50 %	997,2 cd
40 %	797,7 cd
30 %	598,3 cd
20 %	398,9 cd
10 %	199,4 cd

Peak intensity: 1994,3 cd

Number of c-planes: 12

## Iso-illuminance Diagram (Iso-lux)



50,0 %	110,7 lx
30,0 %	66,4 lx
10,0 %	22,1 lx
5,0 %	11,1 lx
3,0 %	6,6 lx

Peak illuminance: 221,5 lx

Mounting height: 3,0 m

Number of c-planes: 12

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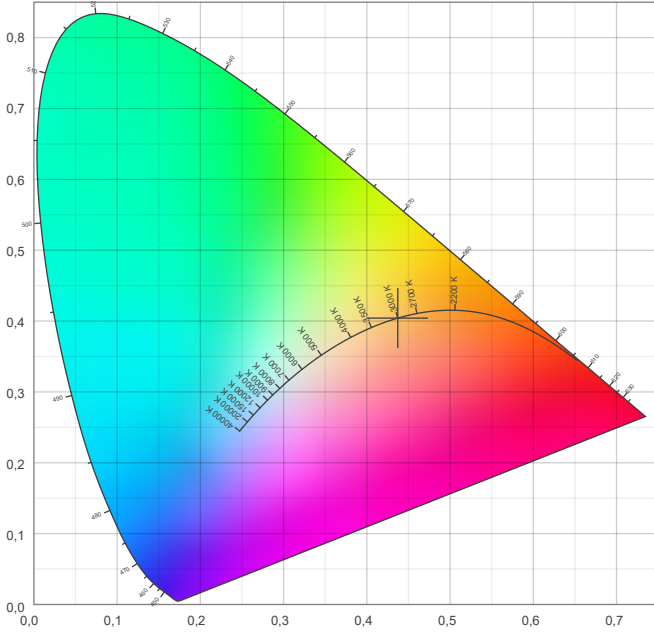


## Color details

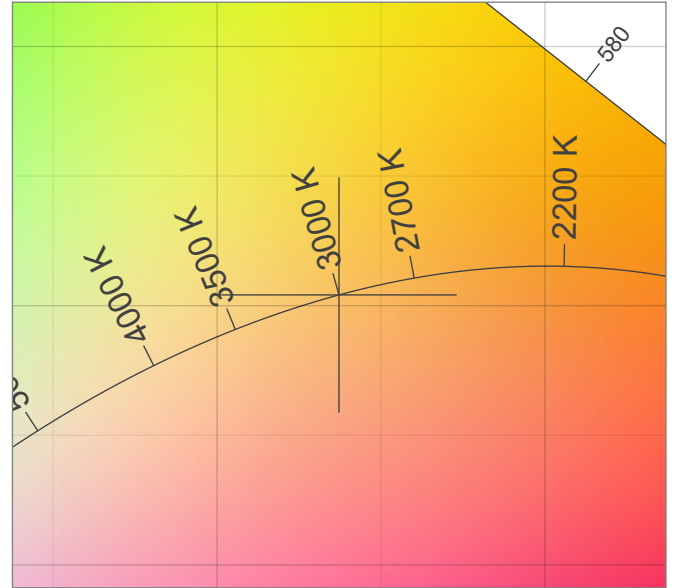
Correlated Color Temperature, Target CCT = 3000 K  
 Correlated Color Temperature, Measured CCT = 2996 K  
 Color Rendering Index CRI 85,2  
 Color Rendering Index, R9 (red component) R9 = 21,8  
 Color Rendering TM30-18 R<sub>f</sub> 85,4 – R<sub>g</sub> 94,9  
 Color Quality Scale CQS = 84,1

MacAdam Steps SDCM = 0,1  
 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 = -0,0001  
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,251;0,521)

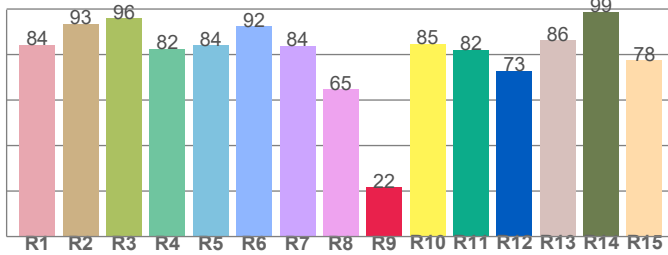
### CIE 1931



### CIE 1931 – zoomed on Planckian locus



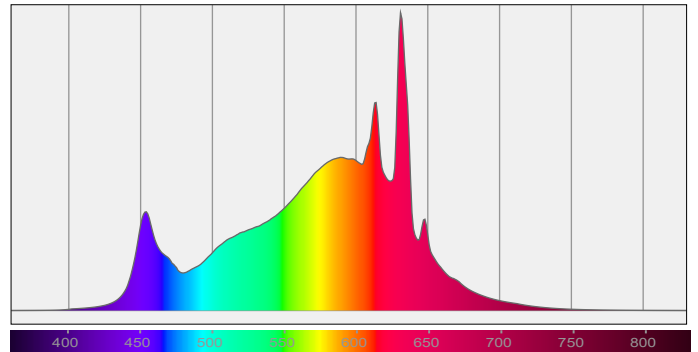
### Color Rendering Index per reference color (CIE 1995)



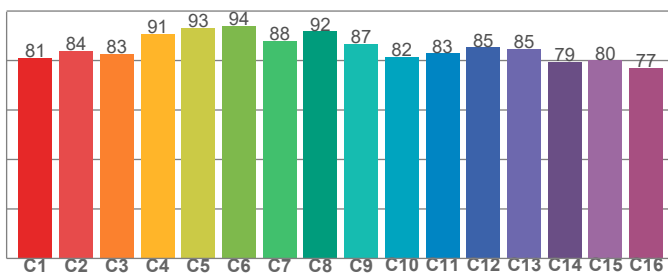
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
84,3	93,5	96,0	82,5	84,2	92,5	83,8	64,8	21,8	84,7	82,0	72,8	86,3	98,8	77,6

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



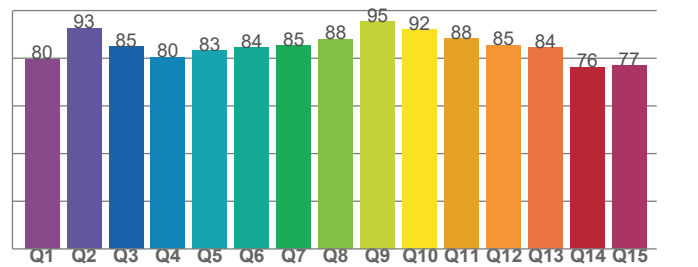
### TM30-18 R<sub>f</sub>-values per hue bin



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	84,0	82,7	90,8	93,2	94,1	88,0	91,9	86,8	81,5	83,0	85,4	84,8	79,5	80,2	77,1

### Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
79,6	92,7	84,9	80,4	83,1	84,5	85,3	87,9	95,3	92,1	88,1	85,4	84,4	76,1	76,9

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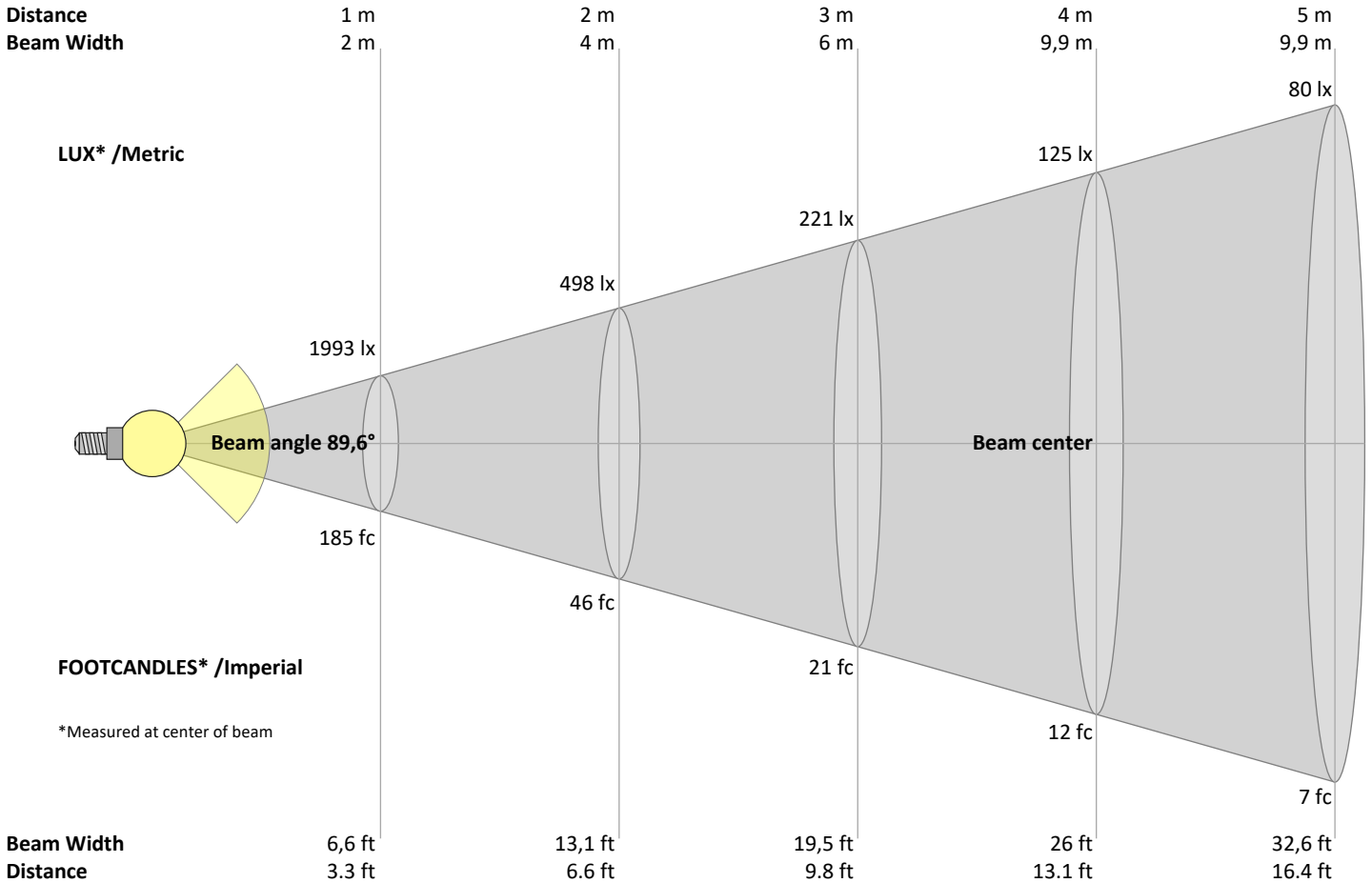
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## Beam Details



### 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
1993	498	221	125	80	55	41	31	25	20	16	14	12	10	9	8	7	6	6	5	lux
185,2	46,3	20,6	11,6	7,4	5,1	3,8	2,9	2,3	1,9	1,5	1,3	1,1	0,9	0,8	0,7	0,6	0,6	0,5	0,5	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
1993	1986	1963	1923	1867	1785	1656	1452	1189	927	704	532	400	301	237	189	135	73	23	5	cd
100%	100%	98%	96%	94%	90%	83%	73%	60%	46%	35%	27%	20%	15%	12%	9%	7%	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
1993	1984	1959	1916	1856	1779	1673	1524	1309	1056	820	627	471	345	255	194	138	75	20	6	cd
100%	100%	98%	96%	93%	89%	84%	76%	66%	53%	41%	31%	24%	17%	13%	10%	7%	4%	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
1993	1986	1963	1923	1867	1785	1656	1452	1189	927	704	532	400	301	237	189	135	73	23	5	cd
100%	100%	98%	96%	94%	90%	83%	73%	60%	46%	35%	27%	20%	15%	12%	9%	7%	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
1993	1984	1959	1916	1856	1779	1673	1524	1309	1056	820	627	471	345	255	194	138	75	20	6	cd
100%	100%	98%	96%	93%	89%	84%	76%	66%	53%	41%	31%	24%	17%	13%	10%	7%	4%	1%	0%	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	15,2	16,3	15,4	16,6	16,8	15,6	16,7	15,9	17,0	17,2
	3H	16,0	17,1	16,4	17,4	17,6	16,5	17,6	16,9	17,9	18,1
	4H	16,5	17,6	16,9	17,9	18,2	17,0	18,1	17,4	18,4	18,6
	6H	17,1	18,0	17,4	18,3	18,7	17,6	18,5	17,9	18,8	19,2
	8H	17,3	18,2	17,6	18,5	18,9	17,8	18,7	18,1	19,0	19,4
	12H	17,4	18,3	17,8	18,7	19,1	17,9	18,8	18,3	19,1	19,6
4H	2H	15,5	16,6	15,9	16,9	17,1	15,9	17,0	16,3	17,2	17,5
	3H	16,7	17,6	17,1	18,0	18,4	17,2	18,0	17,5	18,4	18,9
	4H	17,3	18,1	17,8	18,6	19,1	17,7	18,6	18,2	19,0	19,5
	6H	18,0	18,8	18,5	19,1	19,5	18,4	19,2	18,9	19,5	19,9
	8H	18,3	19,0	18,8	19,3	19,7	18,6	19,4	19,2	19,7	20,1
	12H	18,5	19,1	19,0	19,5	20,0	18,9	19,5	19,4	19,9	20,4
8H	4H	17,6	18,3	18,1	18,7	19,1	18,0	18,7	18,5	19,1	19,5
	6H	18,5	19,0	19,0	19,5	20,0	18,8	19,3	19,3	19,8	20,4
	8H	18,9	19,3	19,4	19,9	20,5	19,2	19,7	19,7	20,2	20,8
	12H	19,2	19,6	19,8	20,1	20,7	19,5	19,9	20,1	20,4	21,1
12H	4H	17,6	18,2	18,1	18,7	19,1	18,0	18,6	18,5	19,0	19,5
	6H	18,6	19,0	19,1	19,6	20,2	18,9	19,4	19,4	19,9	20,5
	8H	19,0	19,4	19,6	19,9	20,5	19,3	19,7	19,9	20,2	20,8

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

S = 1.0H	0,2 / -0,2	0,1 / -0,2
S = 1.5H	0,4 / -0,5	0,4 / -0,4
S = 2.0H	0,8 / -0,8	0,9 / -0,7

## 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	106	106	106	101	101	101	99	
1	110	105	102	98	107	103	100	96	99	96	93	95	92	90	91	89	87	85
2	101	94	87	82	98	92	86	81	88	83	79	85	81	77	82	78	76	73
3	93	84	76	70	91	82	75	70	79	73	68	76	71	67	74	69	66	64
4	86	75	67	61	84	74	66	61	71	65	60	69	63	59	67	62	58	56
5	80	68	60	54	78	67	59	53	65	58	53	63	57	52	61	56	51	49
6	74	62	53	48	72	61	53	47	59	52	47	57	51	46	56	50	46	44
7	69	56	48	43	67	56	48	42	54	47	42	53	46	42	51	46	41	39
8	64	52	44	38	63	51	44	38	50	43	38	48	42	38	47	42	37	36
9	60	48	40	35	59	47	40	35	46	39	35	45	39	34	44	38	34	32
10	57	44	37	32	56	44	37	32	43	36	32	42	36	31	41	35	31	30

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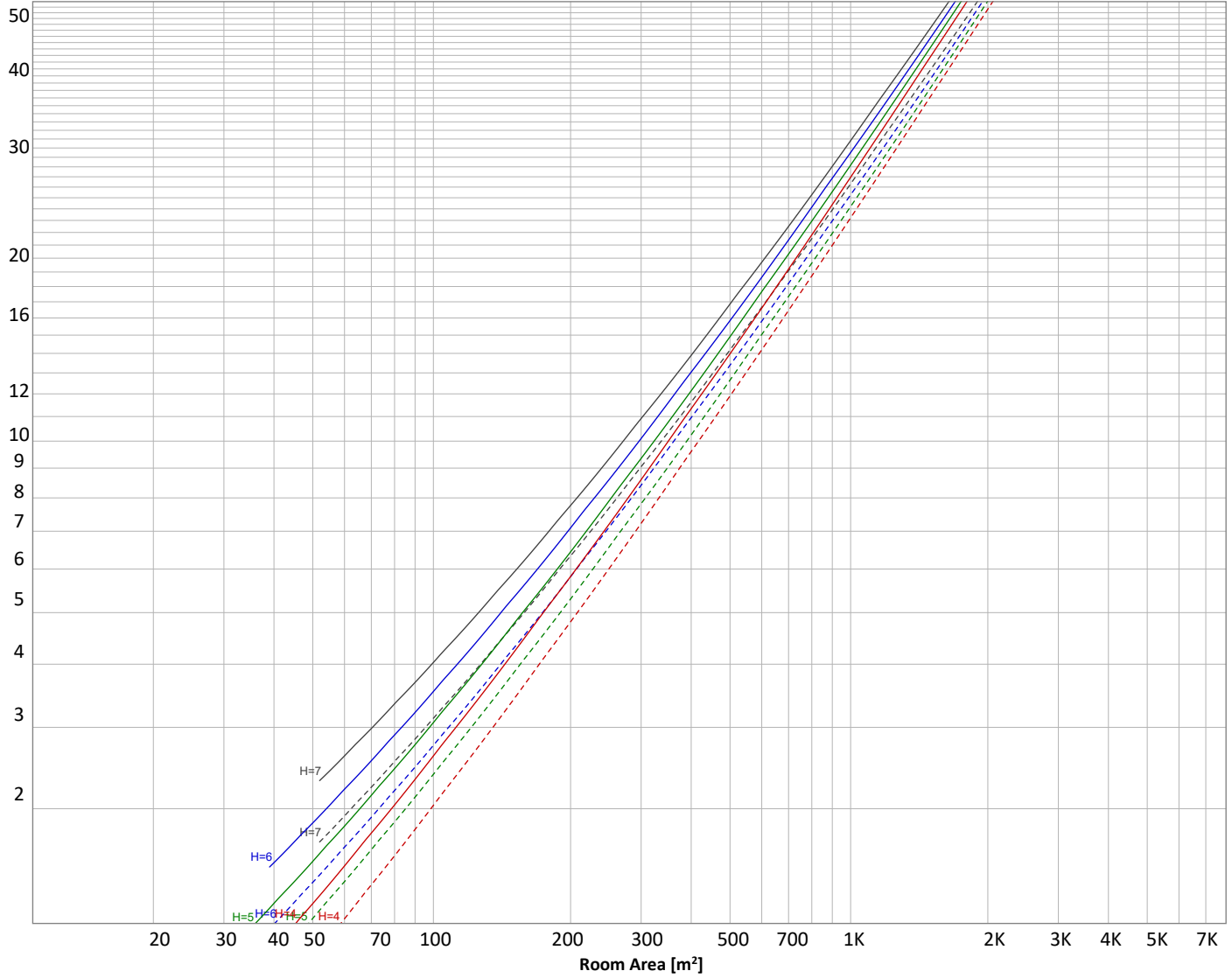
Operator:



## Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



### Conditions

H = Room height	Flux = 4400 lm	$\rho(\%)$			
H <sub>down</sub> = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	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°
189 lm	542 lm	821 lm	929 lm	761 lm	513 lm	322 lm	203 lm	78,6 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
7,11 lm	5,84 lm	6,07 lm	5,54 lm	5,39 lm	4,66 lm	3,68 lm	2,39 lm	0,809 lm

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## Outdoor Light Planning

### Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	189 lm	4,3%
10-20°	542 lm	12,3%
20-30°	821 lm	18,7%
30-40°	929 lm	21,1%
40-50°	761 lm	17,3%
50-60°	513 lm	11,7%
60-70°	322 lm	7,3%
70-80°	203 lm	4,6%
80-90°	79 lm	1,8%
90-100°	7 lm	0,2%
100-110°	6 lm	0,1%
110-120°	6 lm	0,1%
120-130°	6 lm	0,1%
130-140°	5 lm	0,1%
140-150°	5 lm	0,1%
150-160°	4 lm	0,1%
160-170°	2 lm	0,1%
170-180°	1 lm	0,0%
<b>Total</b>	<b>4400 lm</b>	<b>100,0%</b>

### Intensity peaks

Max intensity	1995 cd
Intensity, 90°	23 cd
Intensity, 0°	1993 cd

### Zonal Lumen summary

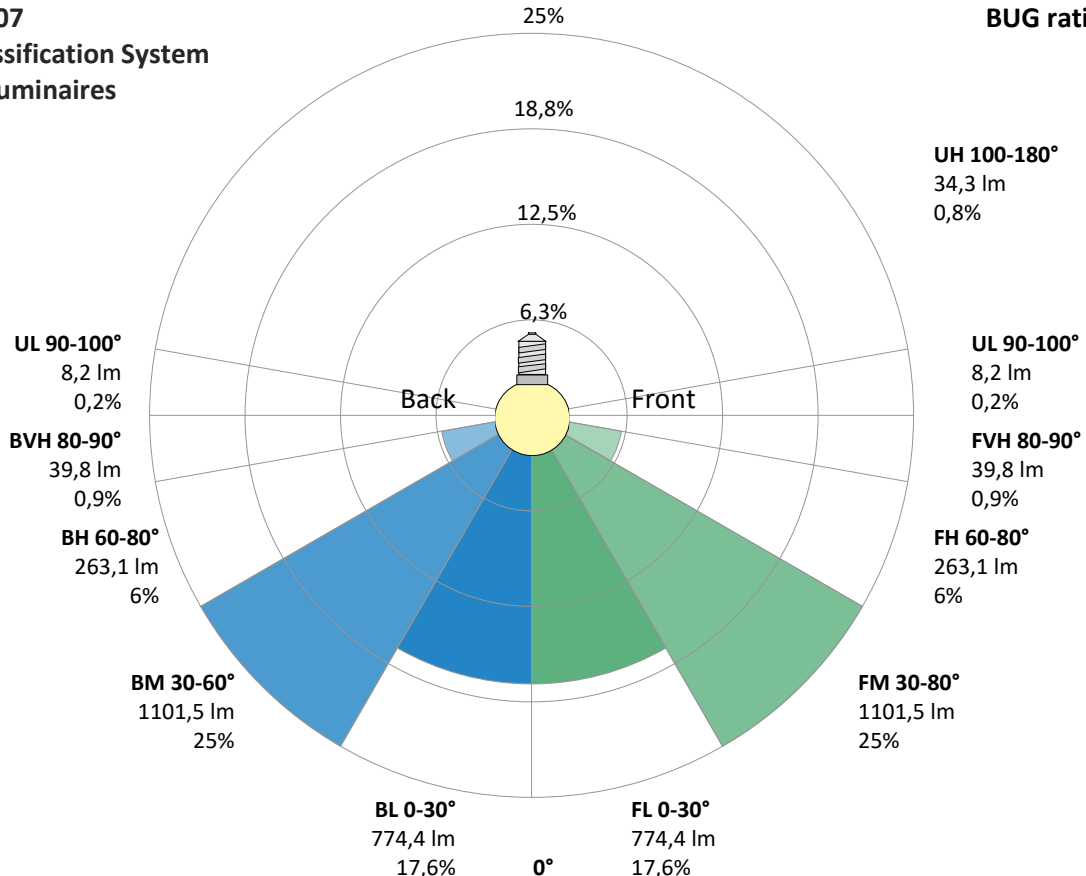
Zone (γ)	Lumen	% Total
0-30°	1551 lm	35,3%
0-40°	2481 lm	56,4%
0-60°	3755 lm	85,3%
60-90°	604 lm	13,7%
70-100°	288 lm	6,6%
90-120°	19 lm	0,4%
0-90°	4359 lm	99,1%
90-180°	42 lm	0,9%
0-180°	4400 lm	100,0%

### BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	774 lm	17,6%
Medium(30-60°)	1101 lm	25,0%
High(60-80°)	263 lm	6,0%
Very high(80-90°)	40 lm	0,9%
<b>Back light</b>		
Low(0-30°)	774 lm	17,6%
Medium(30-60°)	1101 lm	25,0%
High(60-80°)	263 lm	6,0%
Very high(80-90°)	40 lm	0,9%
<b>Uplight</b>		
Low(90-100°)	8 lm	0,2%
High(100-180°)	34 lm	0,8%

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

**BUG rating B2 U2 G1**



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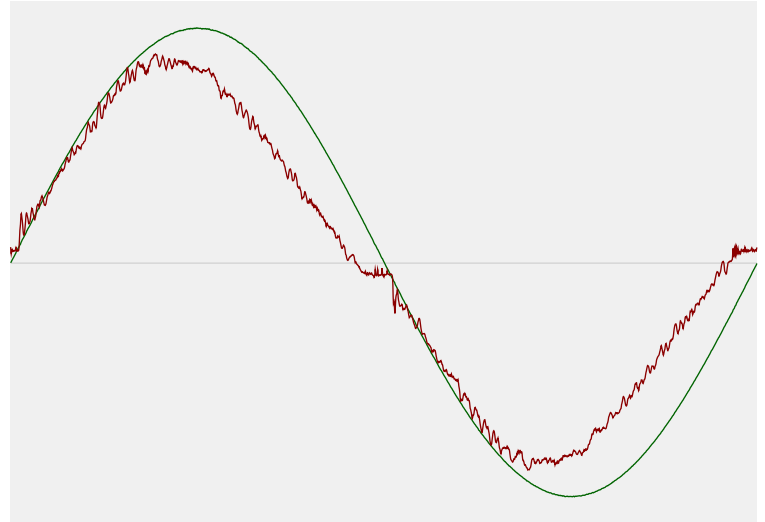


## Power Details

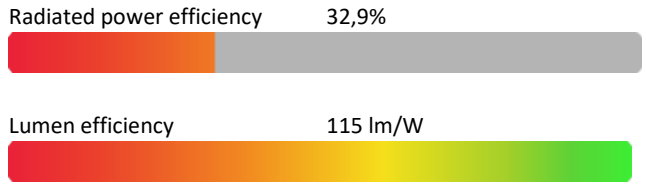
### Input Power

Power feed to light source	38,3 W
Frequency of input power	50 Hz
RMS Input voltage feed, $V_{RMS}$	230 V
RMS Input current feed, $I_{RMS}$	0,171 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	39,31 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,97
Total harmonic distortion of the current	10,62%
Total harmonic distortion of the voltage	0,08%

### 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	3000 K
CCT shift	0 K
CCT end	3000 K

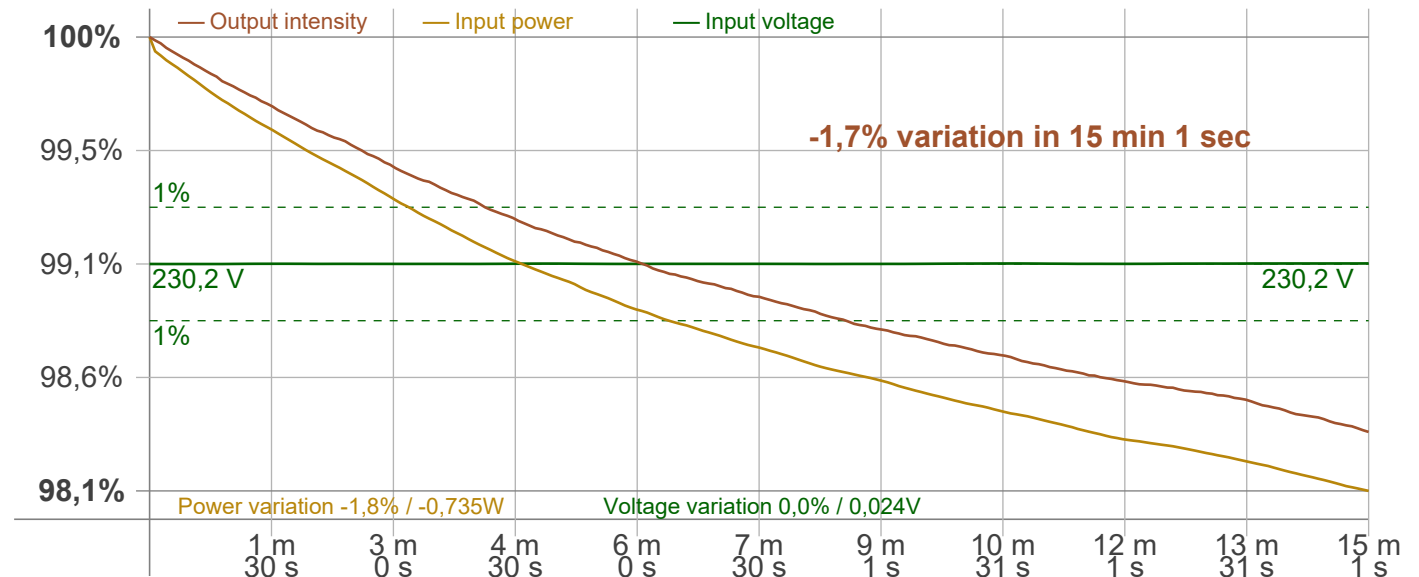
### Warmup Result

Total warmup time	Lamp stabilized in 15 min 1 sec
Warmup variation	-1,7%

### Output Change

Output start	4473 lm
Output change	-73 lm
Output end	4400 lm

## Stabilization Curve



# Light Measurement Report

Print date: 12-9-2025

Measurement date and time: 12-9-2025 11:08:58 – Measurement no. VFR-250912-3132-MS

Measurement tracking No. and Link: [VT250912-009692](https://www.viso-systems.com/VT250912-009692)

Operator:



## Flicker /TLA details

Flicker Meter Type: Viso Systems LabFlicker  
 Frequency of input power: 50 Hz  
 Flicker/TLA sample rate: 20000 samples/s

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

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

Flicker frequency: 100 Hz  
 Percent Flicker: 1,39 %  
 Flicker index: 0

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

JA8/10 40 Hz: 0,02 %  
 JA8/10 90 Hz: 0,04 %  
 JA8/10 200 Hz: 0,89 %  
 JA8/10 400 Hz: 1,24 %  
 JA8/10 1000 Hz: 1,37 %

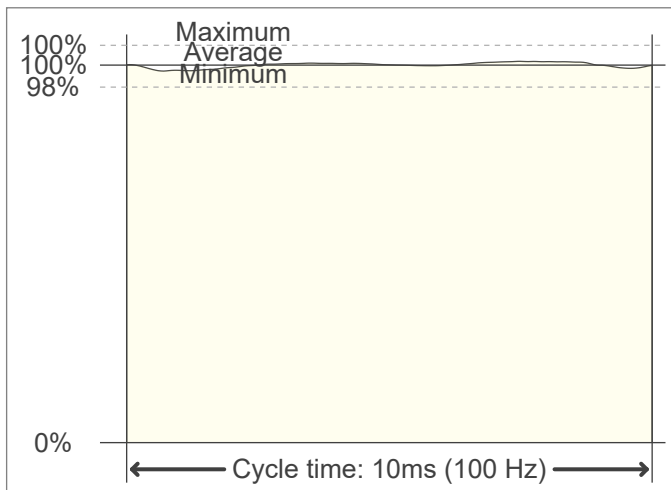
### TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz): 0,01  
 SVM value (80 < F < 2000 Hz): 0,03

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

Perception metric, Assist Mp: 0,01

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



### Flicker FFT (flicker curve in frequency domain)



### IEEE 1789 Frequency/modulation plot

