

# Light Measurement Report

Print date: 7-7-2025

Measurement date and time: 7-7-2025 10:20:21 – Measurement no. VFR-250707-1962-MS

Measurement tracking No. and Link: [VT250707-005184](#)

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

72 planes – 5°  
5°  
2,79 m  
29,9 W – PF 0,89 – DPF 0,99  
230 V – 0,147 A  
50 Hz  
Lamp stabilized in 15 min 2 sec – 2,0%

## Tested Light Source

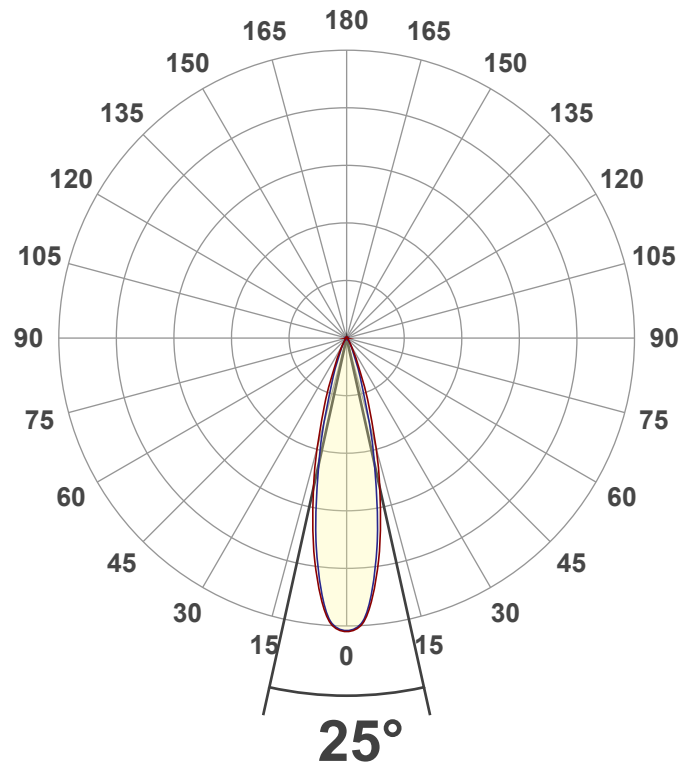
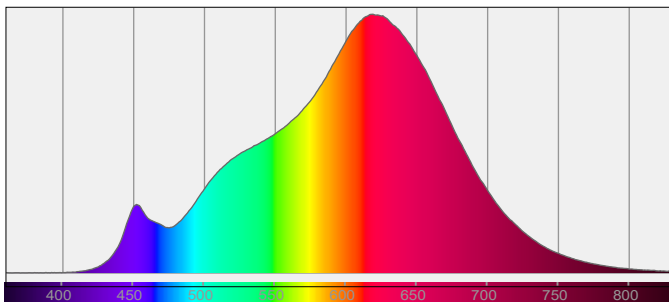
Product Name  
Item No. and Manufacturer  
Product Description (line 1)

812027-2700K-30W  
812027-2700K-30W – Dutchfulfillment  
3-FASE RAILSPOT | ZOOMABLE | WATT SWITCH | CCT-SWITCH | WIT

## 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

1763 lm – 0,04% / 99,96%  
59 lm/W  
8058 cd – 25°  
CCT = 2700 K / 2685 K  
CRI 94,5  
 $R_f$  92,9 –  $R_g$  96,7  
Duv 0,0026 – SDCM 3,1  
SVM 0,03 – PstLM 0,04



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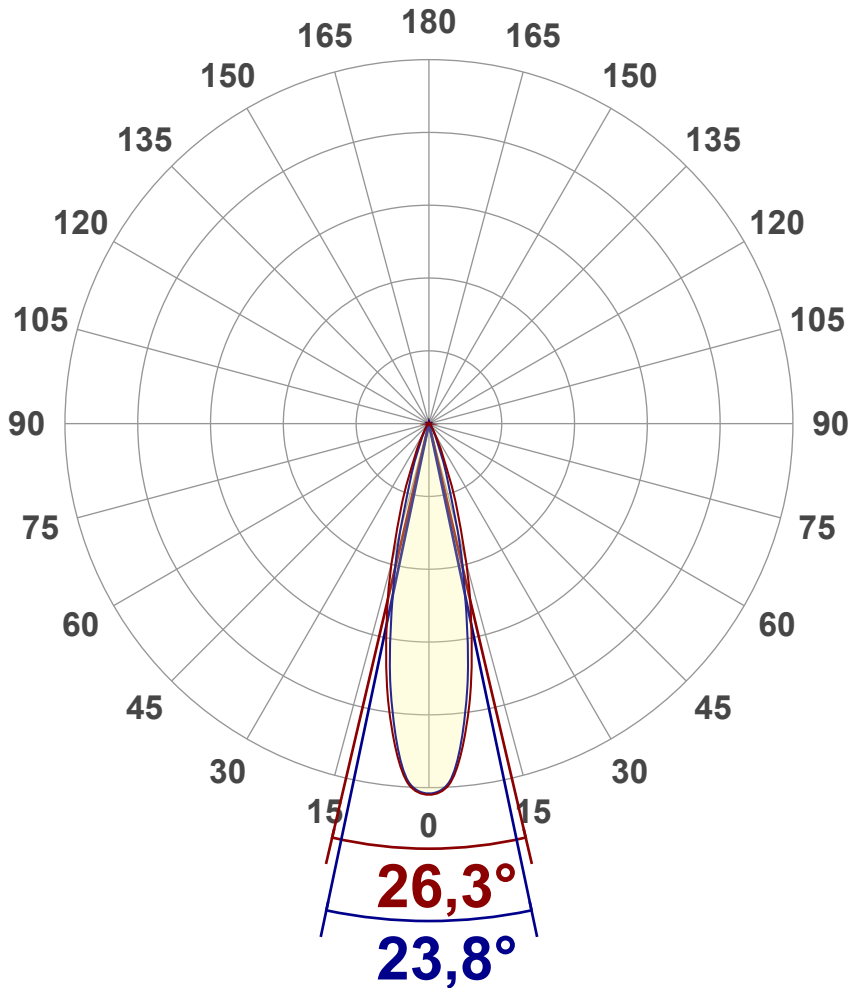
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## Luminous Intensity diagram

Unit: 0-100% of peak intensity



## Main Values

Output (total Lumen)	1763 lm
Lumen Up% / Down%	0,04% / 99,96%
Peak Intensity	8058 cd
Beam Angle (50%)	25°
Beam Angle (90%)	23,8°
Beam Angle (10%)	28,5°

## Cut-off Angle

Average 2,5%	63,3°
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## Field Angle

Average 10%	45,7°
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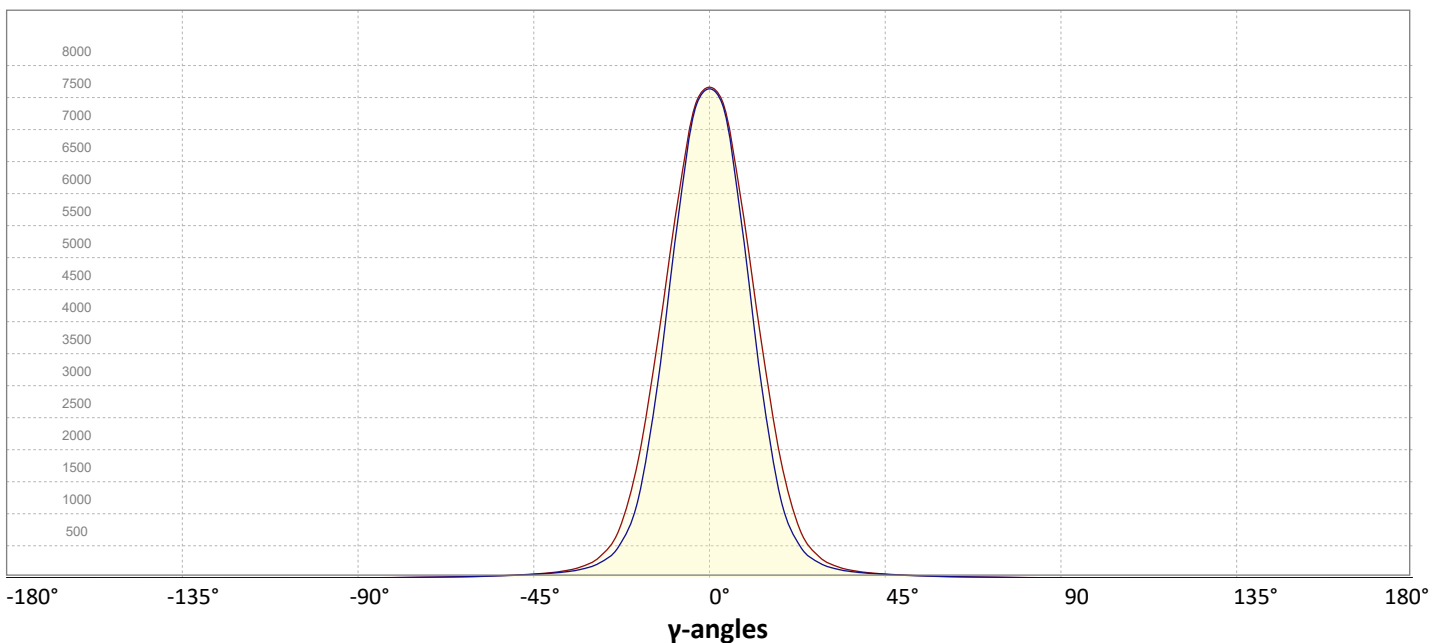
## Intensity Ratio

In 120° cone	98,7%
In 90° cone	96,1%

**C000-C180**

**C090-C270**

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



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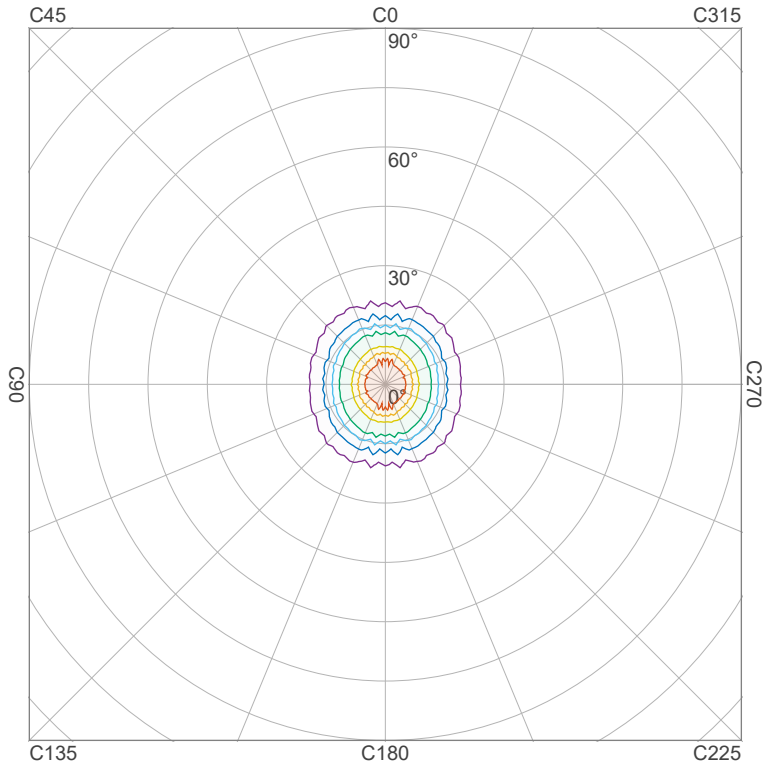
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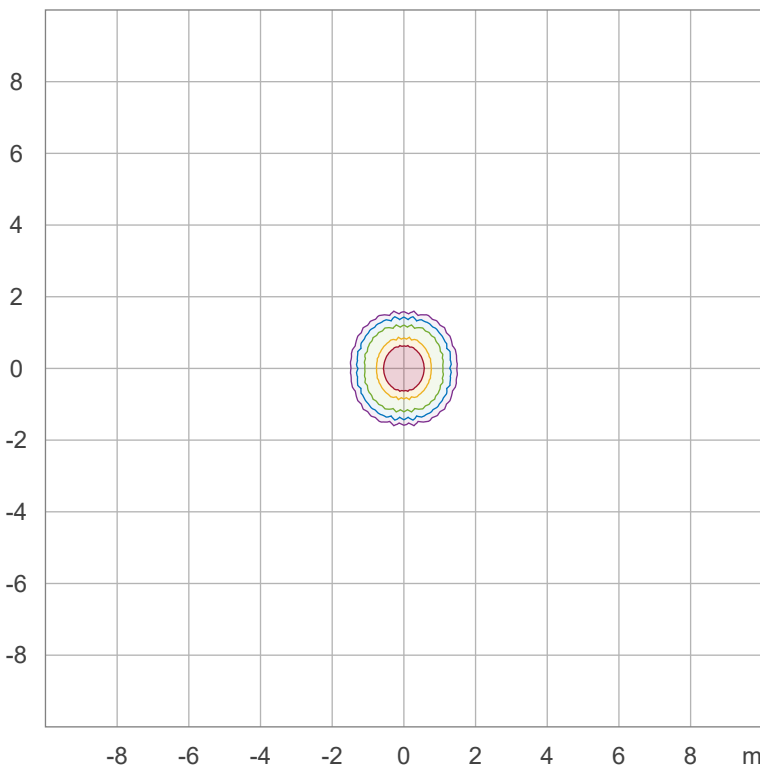
## Iso-intensity Diagram (Iso-candela)



90 %	7252,1 cd
80 %	6446,3 cd
70 %	5640,6 cd
60 %	4834,8 cd
50 %	4029,0 cd
40 %	3223,2 cd
30 %	2417,4 cd
20 %	1611,6 cd
10 %	805,8 cd

Peak intensity: 8057,9 cd  
Number of c-planes: 72

## Iso-illuminance Diagram (Iso-lux)



50,0 %	447,5 lx
30,0 %	268,5 lx
10,0 %	89,5 lx
5,0 %	44,7 lx
3,0 %	26,8 lx

Peak illuminance: 894,9 lx  
Mounting height: 3,0 m  
Number of c-planes: 72

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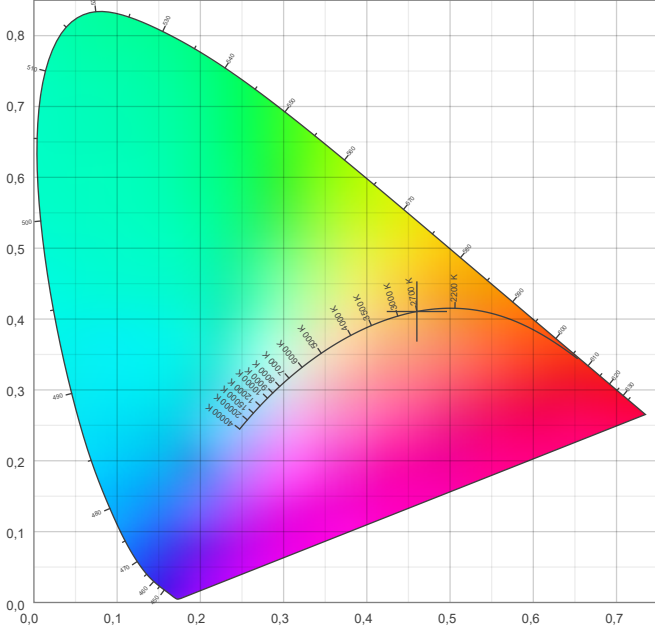


## Color details

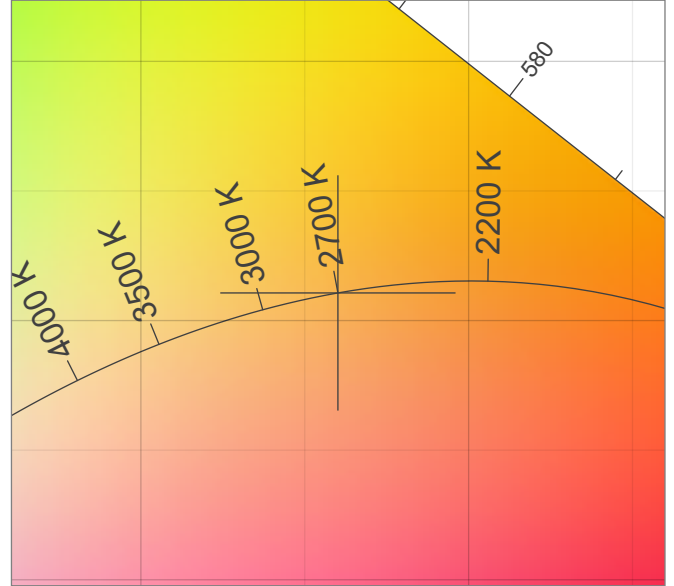
Correlated Color Temperature, Target CCT = 2700 K  
 Correlated Color Temperature, Measured CCT = 2685 K  
 Color Rendering Index CRI 94,5  
 Color Rendering Index, R9 (red component) R9 = 59,4  
 Color Rendering TM30-18 R<sub>f</sub> 92,9 – R<sub>g</sub> 96,7  
 Color Quality Scale CQS = 91,2

MacAdam Steps SDCM = 3,1  
 Color coordinates CIE 1931 (x;y) = (0,460;0,411)  
 Color coordinate CIEs 1960 (u;v) = (0,263;0,352)  
 Color deviation from BBL Duv = 0,0026  
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,263;0,527)

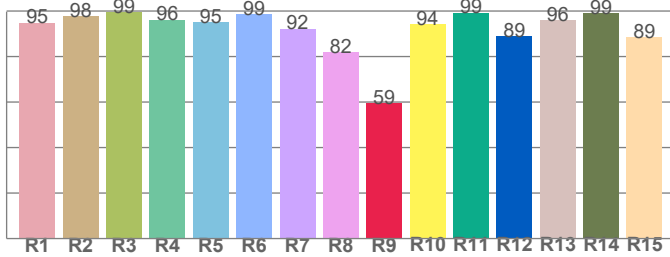
### CIE 1931



### CIE 1931 – zoomed on Planckian locus



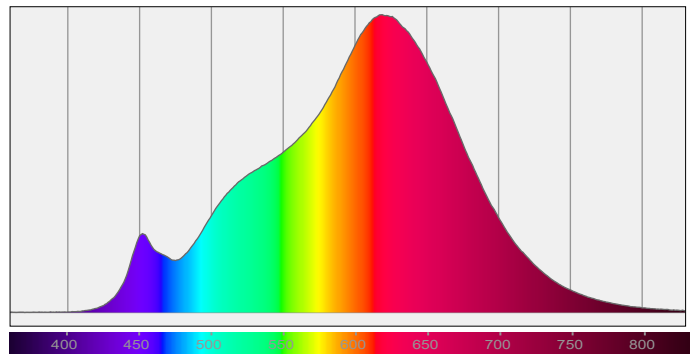
### Color Rendering Index per reference color (CIE 1995)



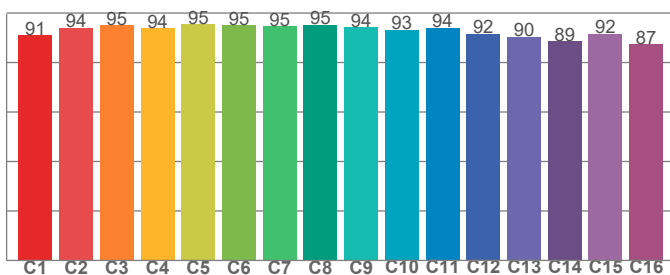
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
94,9	97,6	99,5	96,1	95,1	98,6	92,3	81,8	59,4	94,2	99,2	88,9	95,8	99,0	88,5

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



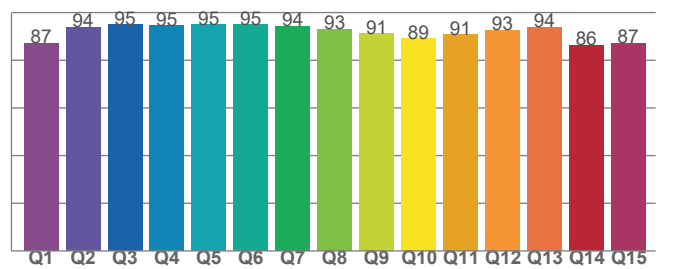
### TM30-18 R<sub>f</sub>-values per hue bin



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
91,0	94,1	95,0	93,8	95,5	95,0	94,6	95,2	94,2	93,3	94,1	91,6	90,4	88,7	91,7	87,3

### Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
87,2	93,8	95,0	94,5	94,9	95,0	94,3	93,1	91,2	89,1	90,7	92,7	93,8	86,3	87,1

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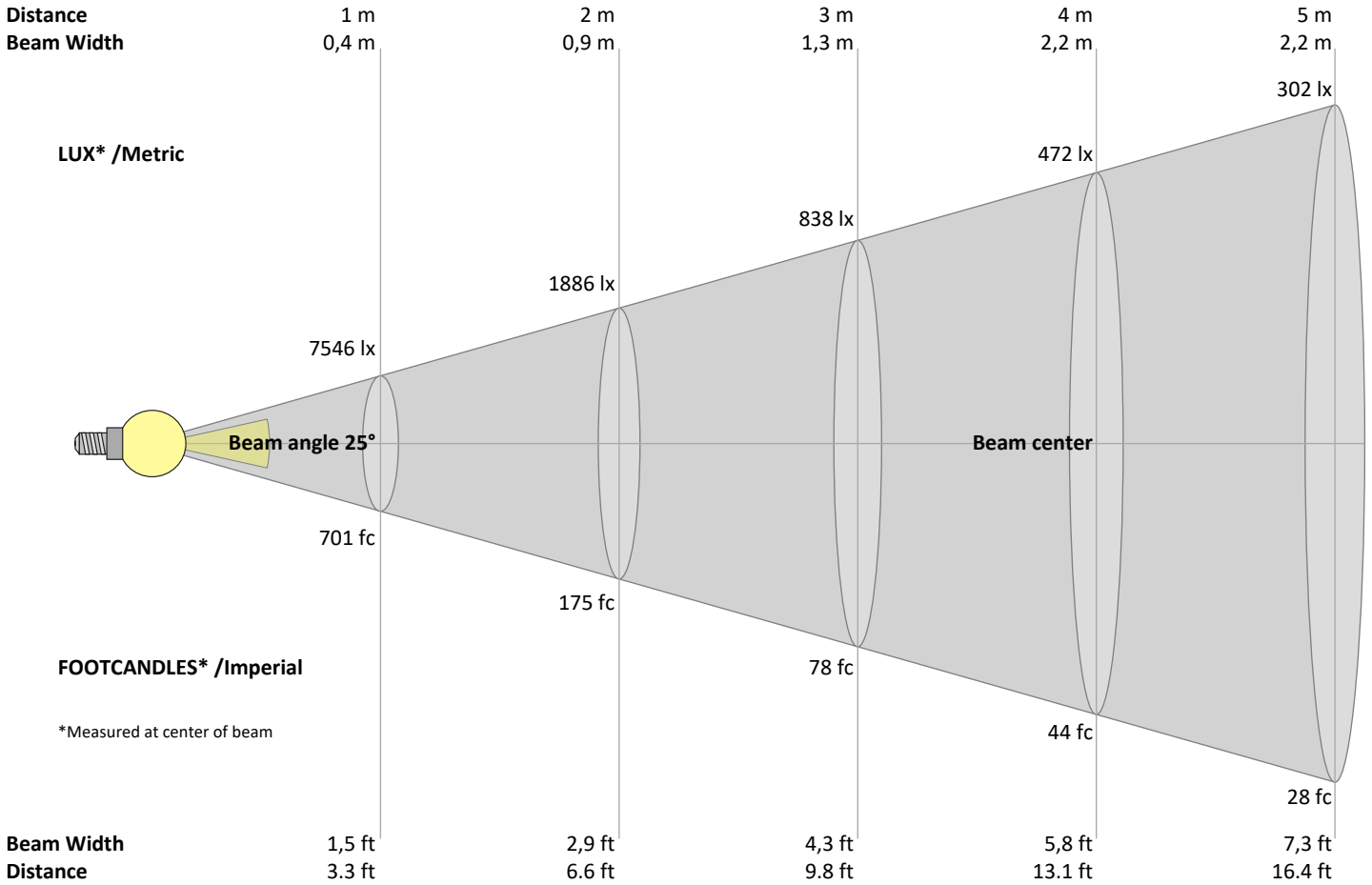
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Operator:



## 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
7546	1886	838	472	302	210	154	118	93	75	62	52	45	38	34	29	26	23	21	19	lux
701	175,3	77,9	43,8	28	19,5	14,3	11	8,7	7	5,8	4,9	4,1	3,6	3,1	2,7	2,4	2,2	1,9	1,8	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
7546	7461	7195	6555	5916	5079	4226	3417	2670	1924	1454	1008	678	508	338	266	202	154	127	100	cd
100%	99%	95%	87%	78%	67%	56%	45%	35%	25%	19%	13%	9%	7%	4%	4%	3%	2%	2%	1%	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
7546	7398	7120	6363	5606	4645	3651	2767	2043	1319	969	673	448	345	241	193	152	120	103	85	cd
100%	98%	94%	84%	74%	62%	48%	37%	27%	17%	13%	9%	6%	5%	3%	3%	2%	2%	1%	1%	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
7546	7461	7195	6555	5916	5079	4226	3417	2670	1924	1454	1008	678	508	338	266	202	154	127	100	cd
100%	99%	95%	87%	78%	67%	56%	45%	35%	25%	19%	13%	9%	7%	4%	4%	3%	2%	2%	1%	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
7546	7398	7120	6363	5606	4645	3651	2767	2043	1319	969	673	448	345	241	193	152	120	103	85	cd
100%	98%	94%	84%	74%	62%	48%	37%	27%	17%	13%	9%	6%	5%	3%	3%	2%	2%	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	16,0	16,5	16,1	16,7	16,9	15,3	15,7	15,4	15,9	16,1
	3H	16,2	16,8	16,6	17,0	17,2	15,5	16,1	15,9	16,3	16,5
	4H	16,4	17,0	16,7	17,2	17,4	15,7	16,3	16,1	16,5	16,7
	6H	16,5	17,0	16,8	17,3	17,6	15,8	16,3	16,1	16,6	16,9
	8H	16,5	17,0	16,8	17,3	17,7	15,8	16,3	16,1	16,6	17,0
	12H	16,5	16,9	16,8	17,3	17,7	15,8	16,2	16,1	16,6	17,0
4H	2H	16,0	16,6	16,4	16,8	17,0	15,3	15,9	15,7	16,1	16,4
	3H	16,5	17,0	16,8	17,3	17,7	15,9	16,4	16,2	16,7	17,1
	4H	16,7	17,1	17,1	17,5	18,0	16,1	16,5	16,5	16,9	17,4
	6H	16,8	17,3	17,3	17,6	18,0	16,2	16,7	16,7	17,0	17,3
	8H	16,8	17,3	17,3	17,6	18,0	16,2	16,6	16,7	17,0	17,3
	12H	16,8	17,1	17,3	17,5	18,0	16,1	16,5	16,6	16,9	17,3
8H	4H	16,7	17,1	17,2	17,4	17,8	16,1	16,5	16,6	16,9	17,2
	6H	16,9	17,2	17,4	17,6	18,2	16,3	16,6	16,8	17,0	17,6
	8H	17,0	17,2	17,5	17,7	18,4	16,4	16,6	16,9	17,1	17,7
	12H	17,0	17,2	17,6	17,7	18,3	16,3	16,5	16,9	17,0	17,6
12H	4H	16,6	17,0	17,1	17,4	17,8	16,1	16,4	16,6	16,8	17,3
	6H	16,9	17,1	17,4	17,7	18,3	16,3	16,6	16,8	17,1	17,7
	8H	17,0	17,2	17,6	17,7	18,3	16,3	16,5	16,9	17,0	17,6

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

S = 1.0H	2,1 / -1,3	1,5 / -1,1
S = 1.5H	3,9 / -2,0	3,0 / -1,9
S = 2.0H	5,6 / -2,6	4,5 / -2,6

## 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	102	102	102	100
1	115	112	110	108	112	110	108	107	106	105	103	103	101	100	99	98	98	96
2	110	107	103	101	108	105	102	100	102	99	97	99	97	95	96	95	93	92
3	107	102	98	95	105	100	97	94	98	95	92	95	93	91	93	91	90	88
4	103	97	93	90	101	96	92	89	94	91	88	92	89	87	91	88	86	85
5	100	93	89	86	98	92	88	85	91	87	85	89	86	84	88	85	83	82
6	97	90	85	82	95	89	85	82	88	84	81	87	83	81	85	83	80	79
7	94	87	82	79	93	86	82	79	85	81	79	84	81	78	83	80	78	77
8	91	84	80	76	90	83	79	76	82	79	76	82	78	76	81	78	75	74
9	88	81	77	74	87	81	77	74	80	76	74	79	76	74	79	76	73	72
10	86	79	75	72	85	79	75	72	78	74	72	77	74	71	77	74	71	70

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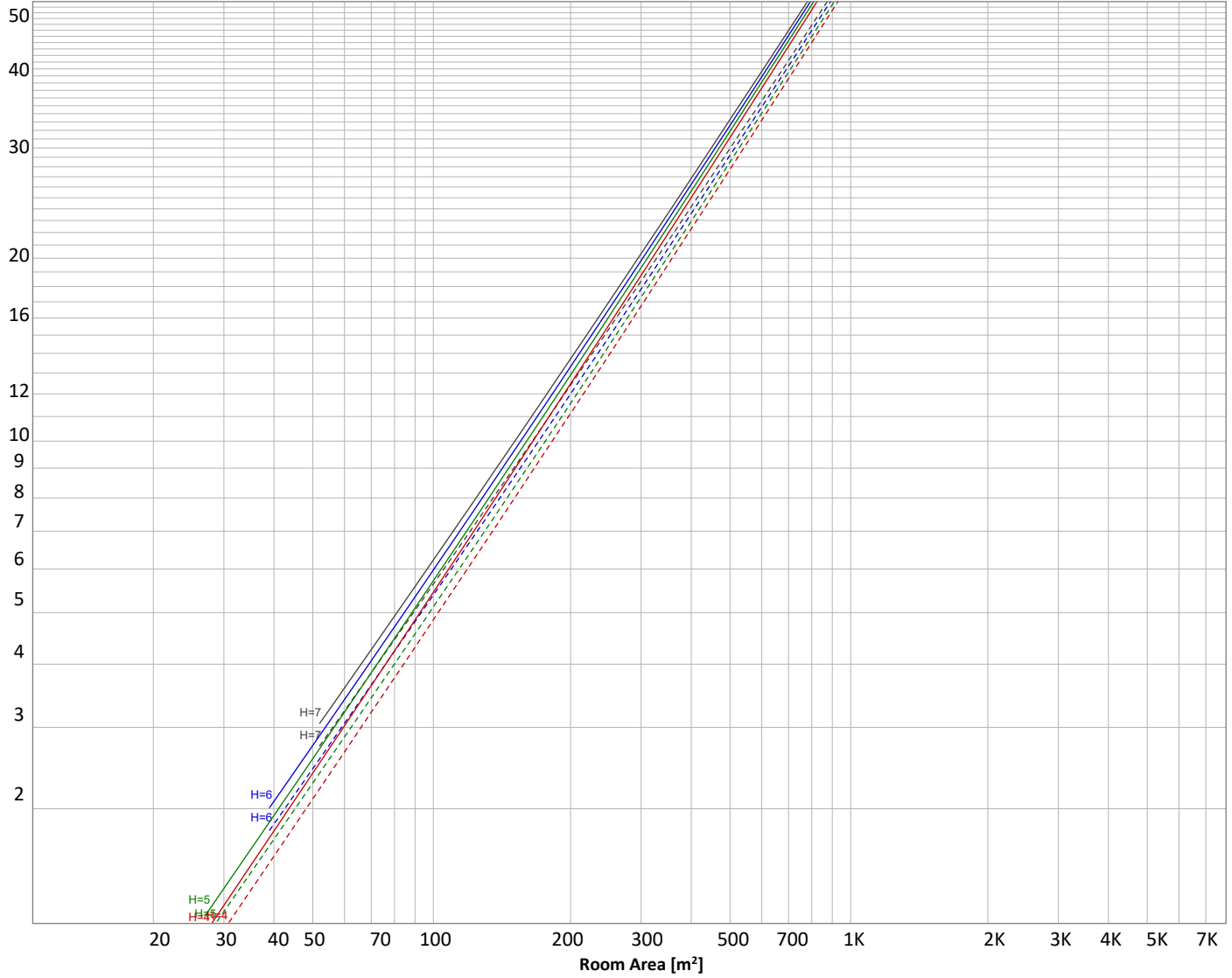
Operator:



## Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



### Conditions

H = Room height	Flux = 1763 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°
592 lm	747 lm	249 lm	81,9 lm	44,0 lm	25,8 lm	13,9 lm	7,09 lm	1,42 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,008 lm	0,001 lm	0,001 lm	0,002 lm	0,019 lm	0,146 lm	0,280 lm	0,237 lm	0,063 lm

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## Outdoor Light Planning

### Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	592 lm	33,6%
10-20°	747 lm	42,4%
20-30°	249 lm	14,1%
30-40°	82 lm	4,6%
40-50°	44 lm	2,5%
50-60°	26 lm	1,5%
60-70°	14 lm	0,8%
70-80°	7 lm	0,4%
80-90°	1 lm	0,1%
90-100°	0 lm	0,0%
100-110°	0 lm	0,0%
110-120°	0 lm	0,0%
120-130°	0 lm	0,0%
130-140°	0 lm	0,0%
140-150°	0 lm	0,0%
150-160°	0 lm	0,0%
160-170°	0 lm	0,0%
170-180°	0 lm	0,0%
<b>Total</b>	<b>1763 lm</b>	<b>100,0%</b>

### Intensity peaks

Max intensity	8058 cd
Intensity, 90°	0 cd
Intensity, 0°	7546 cd

### Zonal Lumen summary

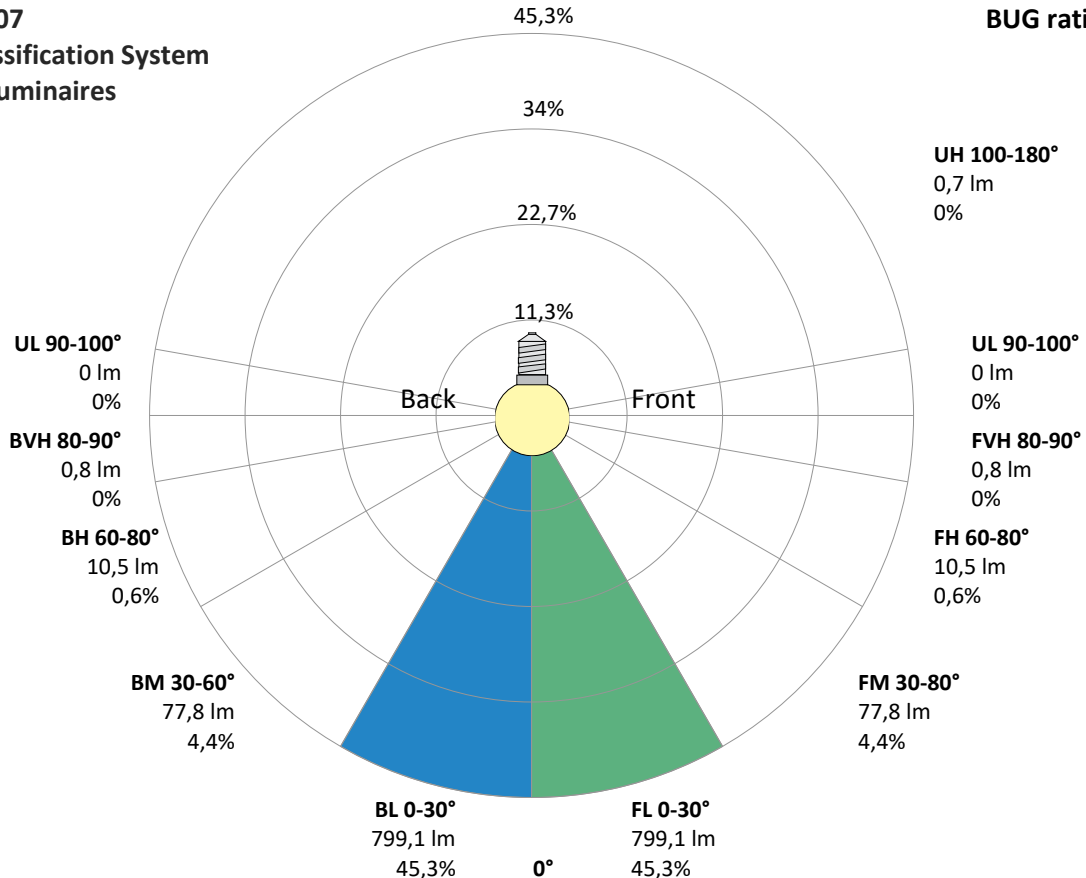
Zone (γ)	Lumen	% Total
0-30°	1588 lm	90,1%
0-40°	1670 lm	94,7%
0-60°	1740 lm	98,7%
60-90°	22 lm	1,3%
70-100°	9 lm	0,5%
90-120°	0 lm	0,0%
0-90°	1763 lm	100,0%
90-180°	1 lm	0,0%
0-180°	1763 lm	100,0%

### BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	799 lm	45,3%
Medium(30-60°)	78 lm	4,4%
High(60-80°)	11 lm	0,6%
Very high(80-90°)	1 lm	0,0%
<b>Back light</b>		
Low(0-30°)	799 lm	45,3%
Medium(30-60°)	78 lm	4,4%
High(60-80°)	11 lm	0,6%
Very high(80-90°)	1 lm	0,0%
<b>Uplight</b>		
Low(90-100°)	0 lm	0,0%
High(100-180°)	1 lm	0,0%

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

**BUG rating B2 U1 G0**



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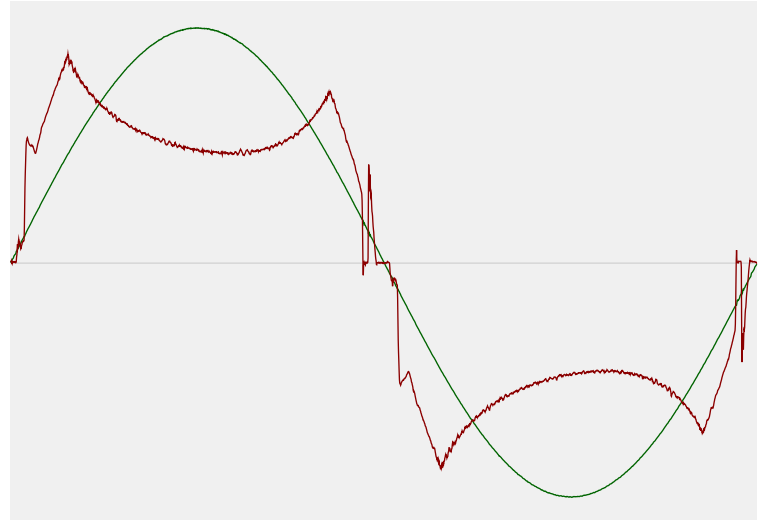


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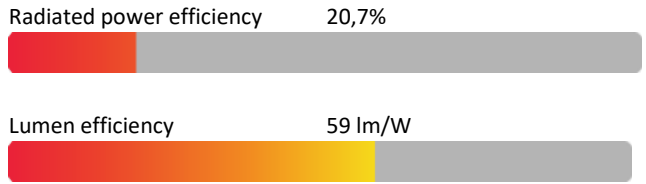
### Input Power

Power feed to light source	29,9 W
Frequency of input power	50 Hz
RMS Input voltage feed, $V_{RMS}$	230 V
RMS Input current feed, $I_{RMS}$	0,147 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	33,8 VA
Displacement factor of AC power feed	0,99
Power factor of AC current feed	0,89
Total harmonic distortion of the current	48,48%
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	2700 K
CCT shift	+0 K
CCT end	2700 K

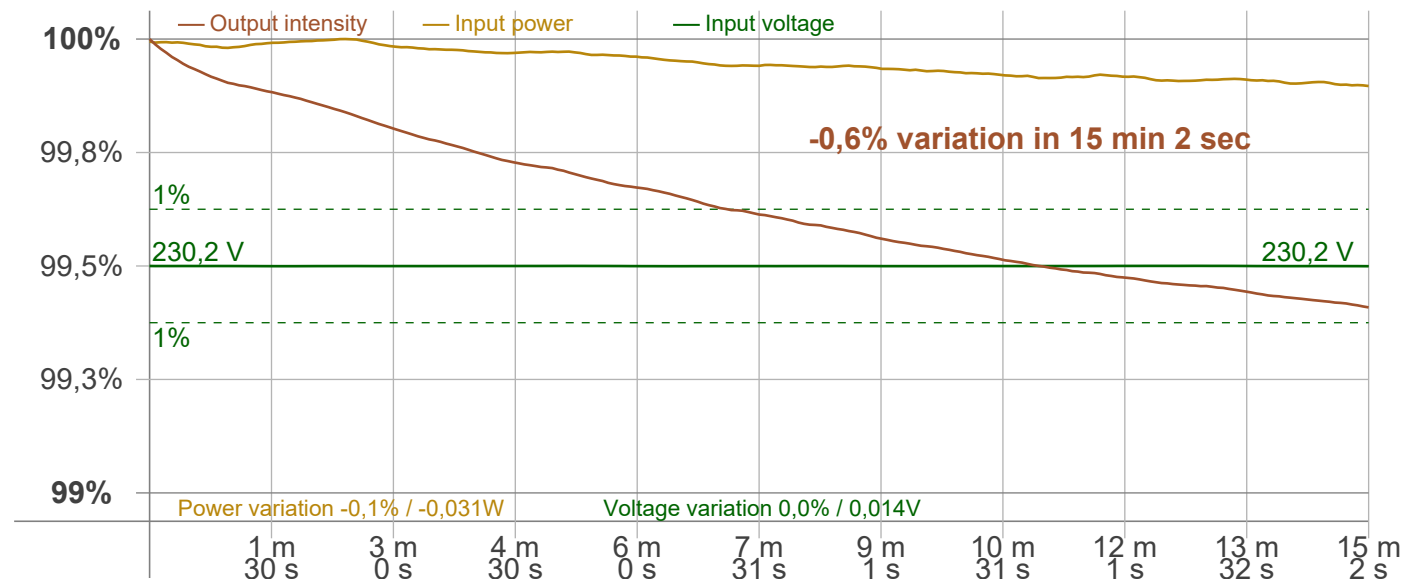
### Warmup Result

Total warmup time	Lamp stabilized in 15 min 2 sec
Warmup variation	-0,6%

### Output Change

Output start	1774 lm
Output change	-11 lm
Output end	1763 lm

### Stabilization Curve



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Measurement tracking No. and Link: [VT250707-005184](https://www.viso-systems.com/VT250707-005184)

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 0,9 %  
 Flicker index 0

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

JA8/10 40 Hz 0,05 %  
 JA8/10 90 Hz 0,05 %  
 JA8/10 200 Hz 0,74 %  
 JA8/10 400 Hz 0,88 %  
 JA8/10 1000 Hz 0,89 %

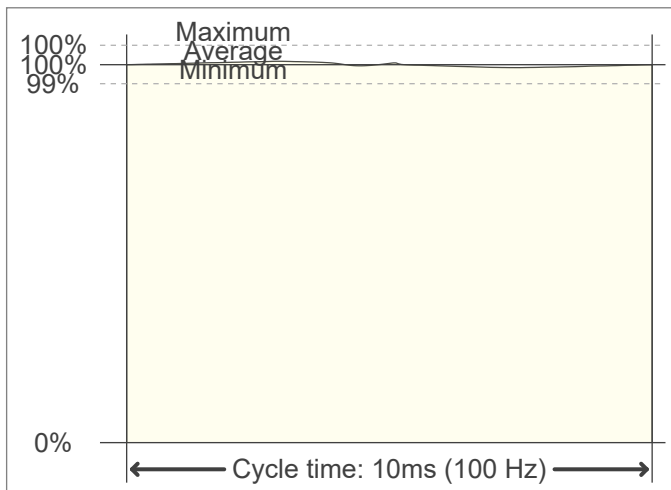
### TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz) 0,04  
 SVM value (80 < F < 2000 Hz) 0,03

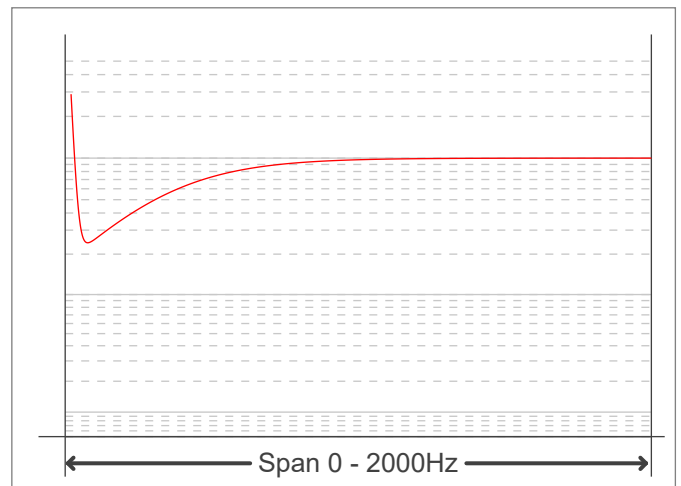
### Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp 0,02

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



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



### IEEE 1789 Frequency/modulation plot

