

Light Measurement Report

Print date: 20-8-2025

Measurement date and time: 20-8-2025 14:53:11 – Measurement no. VFR-250820-2649-MS

Measurement tracking No. and Link: [VT250820-003804](#)

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

γ (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°

3,99 m

99,3 W – PF 0,95 – DPF 0,96

230 V – 0,452 A

50 Hz

Lamp stabilized in 15 min 0 sec – 2,0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

UGR <23

812867-6500K-100W

812867-6500K-100W – Dutchfulfillment

LED HIGHBAY SPARTA | 0-10V | 150W/120W/80W | 90° | 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

15123 lm – 0,22% / 99,78%

152 lm/W

9551 cd – 82,6°

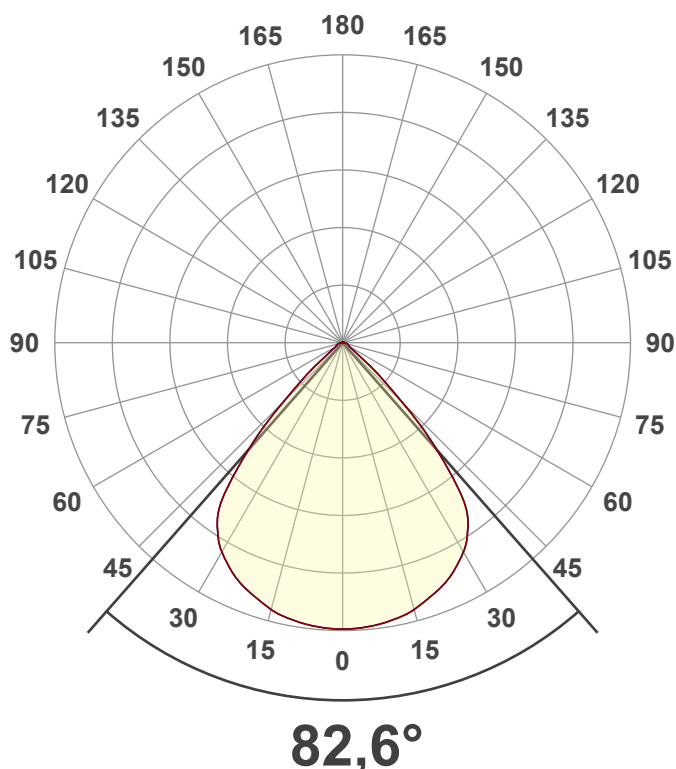
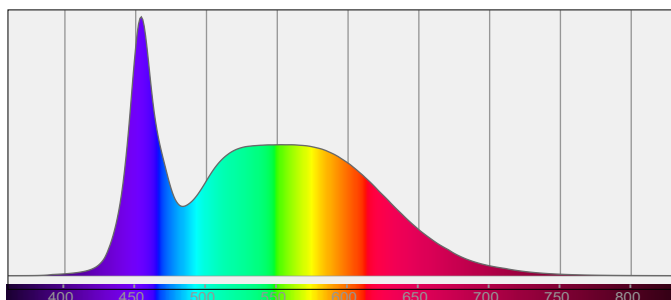
CCT = 6500 K / 6314 K

CRI 80,6

R_f 81,9 – R_g 90,9

Duv 0,0108 – SDCM 14,7

SVM 0 – PstLM 0,14



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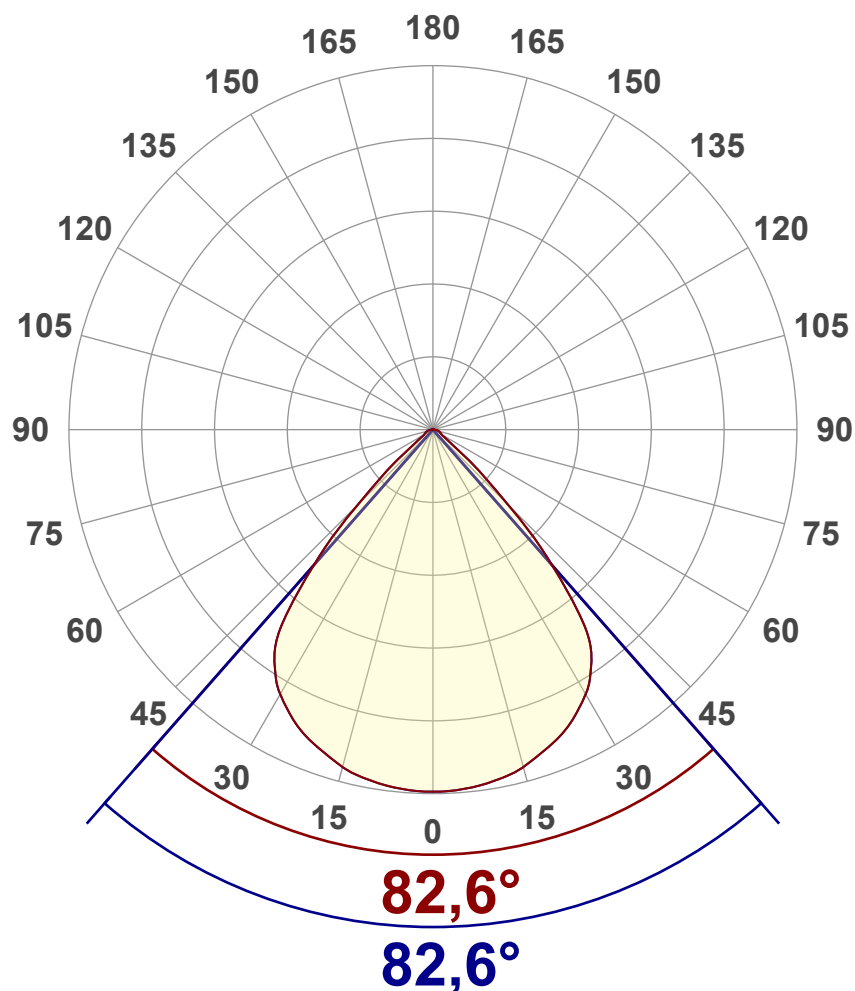
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	15123 lm
Lumen Up% / Down%	0,22% / 99,78%
Peak Intensity	9551 cd
Beam Angle (50%)	82,6°
Beam Angle (90%)	82,6°
Beam Angle (10%)	82,6°

Cut-off Angle

Average 2,5%	127,3°
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Field Angle

Average 10%	102,2°
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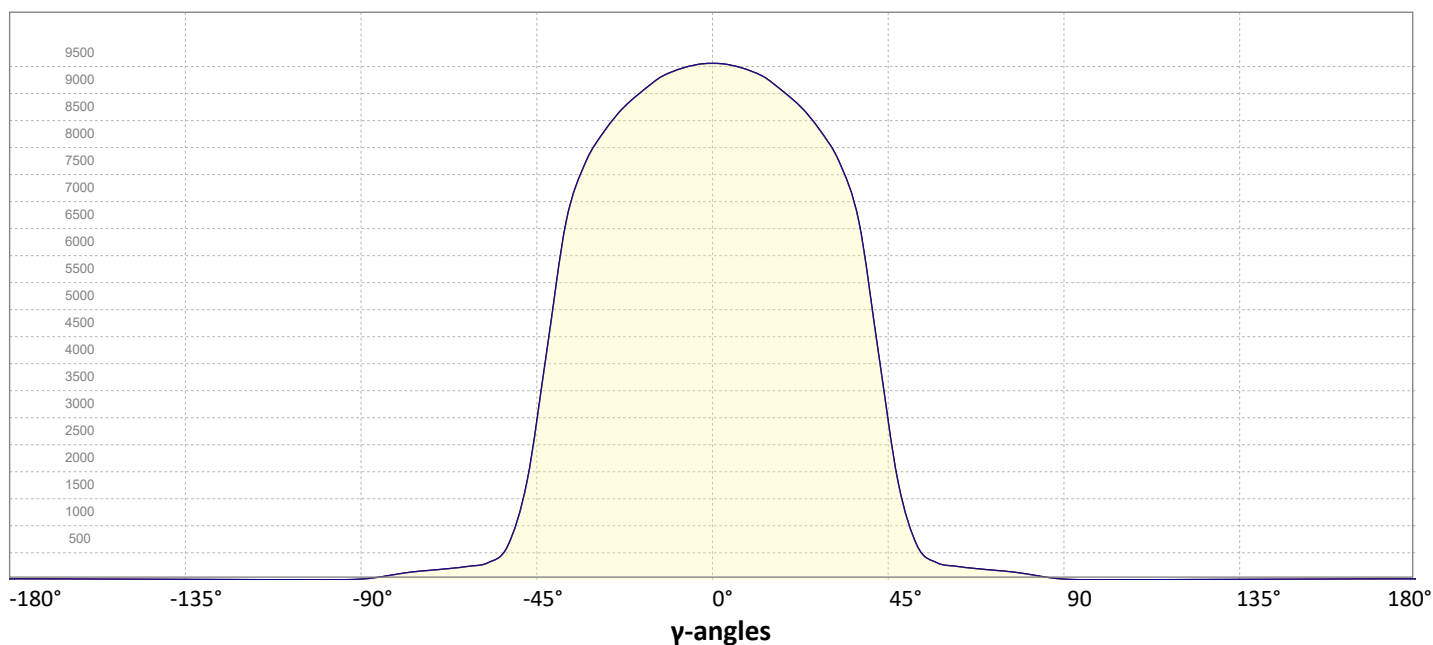
Intensity Ratio

In 120° cone	96,8%
In 90° cone	89,2%

C000-C180

C090-C270

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

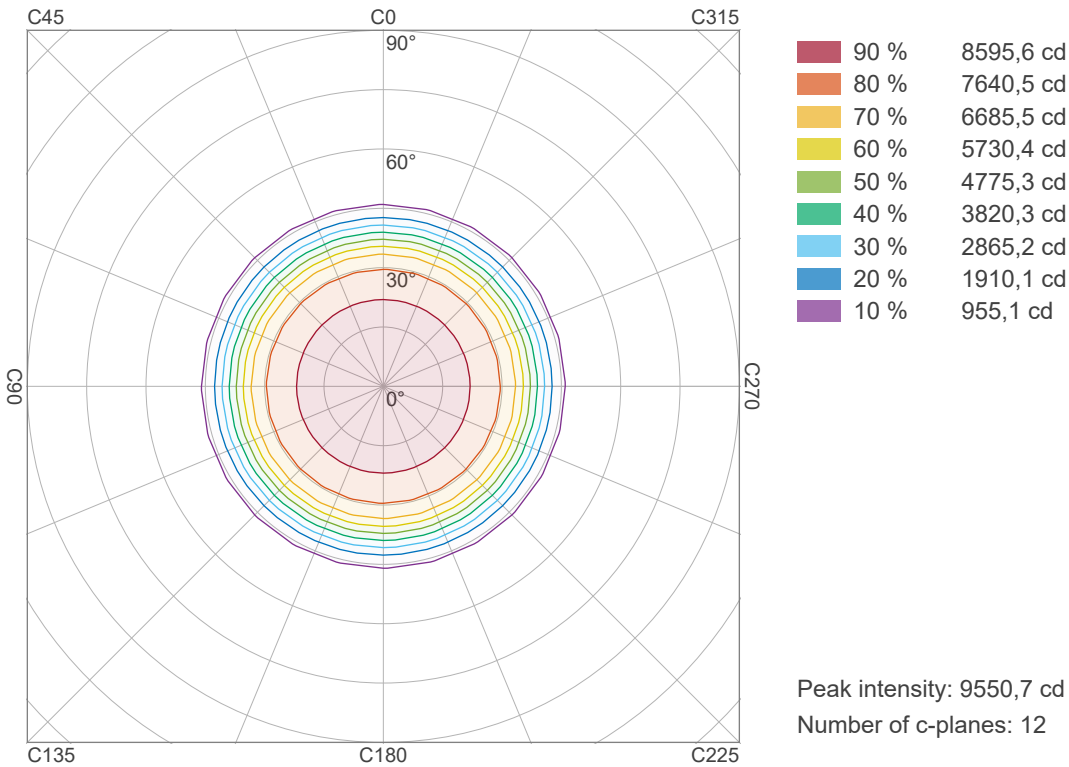


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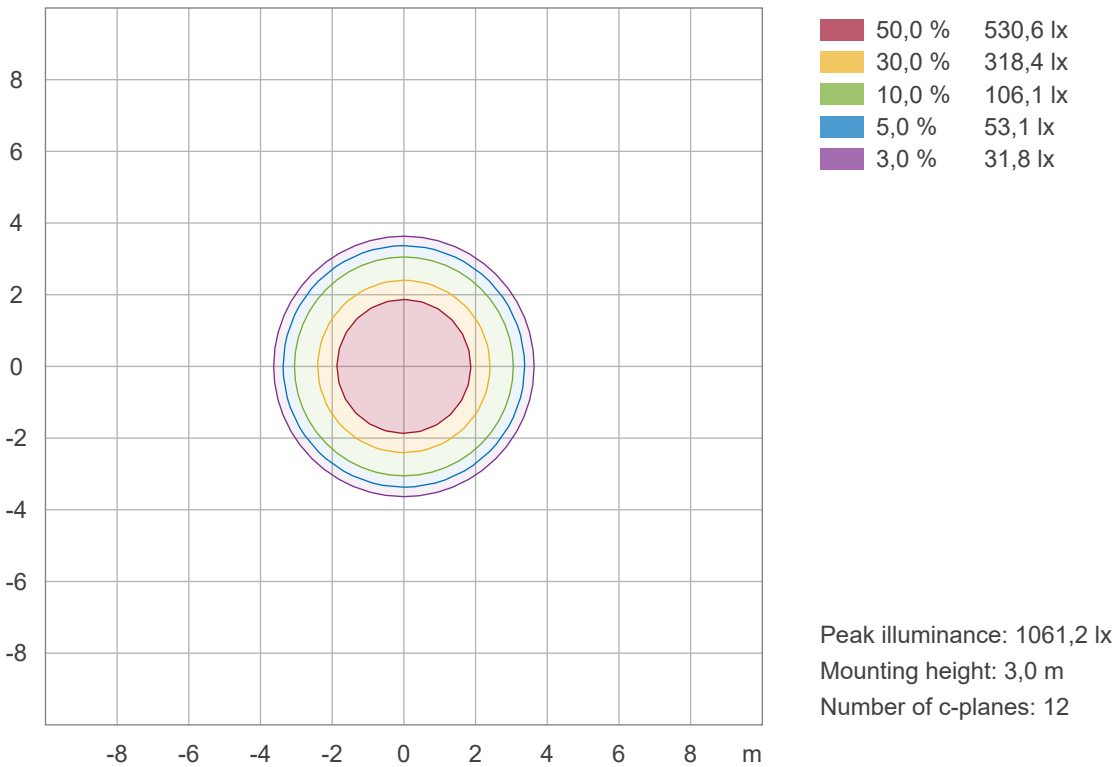
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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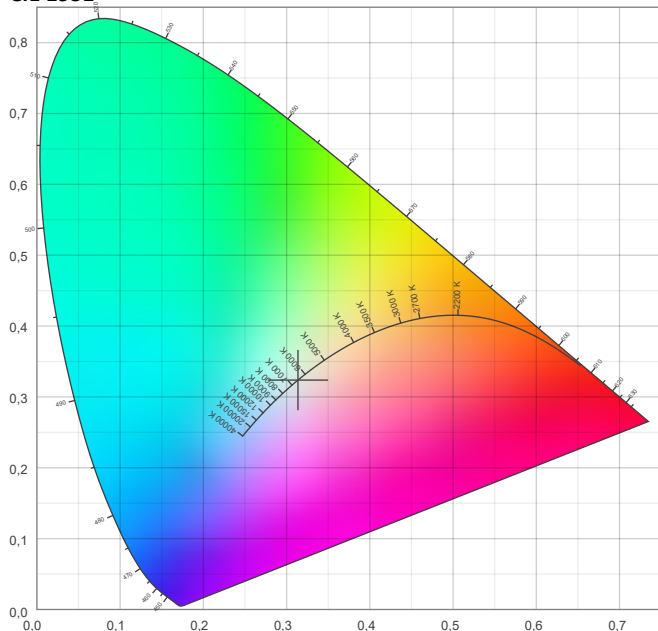


Color details

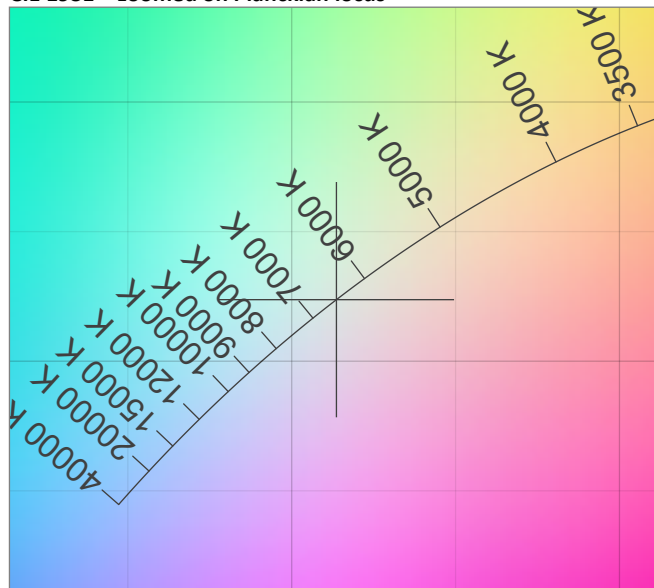
Correlated Color Temperature, Target CCT = 6500 K
Correlated Color Temperature, Measured CCT = 6314 K
Color Rendering Index CRI 80,6
Color Rendering Index, R9 (red component) R9 = -11,5
Color Rendering TM30-18 R_f 81,9 – R_g 90,9
Color Quality Scale CQS = 79,9

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0,314;0,324)
Color coordinate CIEs 1960 (u;v) = (0,200;0,310)
Color deviation from BBL Duv = 0,0108
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,200;0,466)

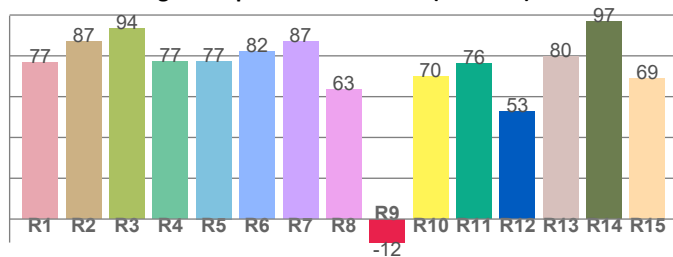
CIE 1931



CIE 1931 – zoomed on Planckian locus



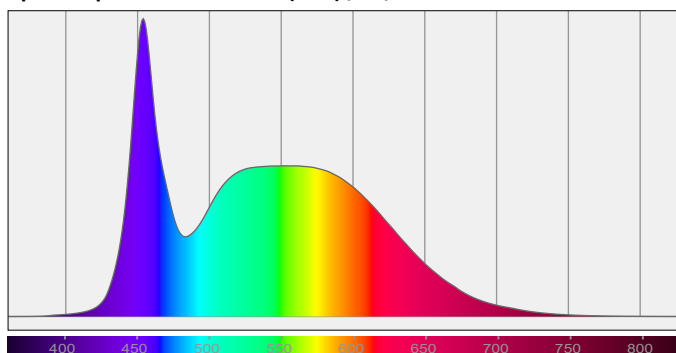
Color Rendering Index per reference color (CIE 1995)



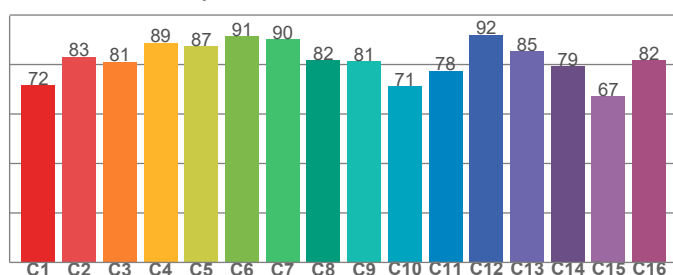
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
76,8	87,0	93,6	77,4	77,5	82,3	86,9	63,4	-11,5	69,8	76,3	52,8	79,9	96,7	68,9

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



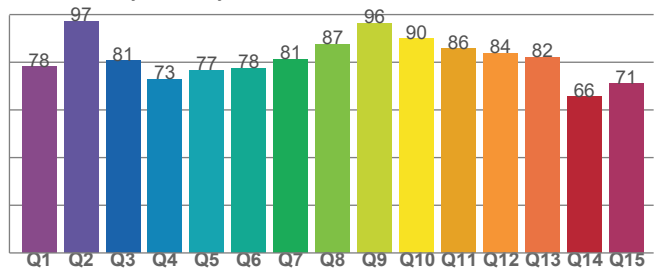
TM30-18 R_f-values per hue bin



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
71,6	83,2	81,2	88,8	87,3	91,5	90,3	81,8	81,4	71,2	77,5	92,1	85,4	79,2	67,1	81,6

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
78,0	97,2	80,6	72,9	76,6	77,6	81,2	87,5	96,4	89,8	85,7	83,9	82,1	65,6	71,1

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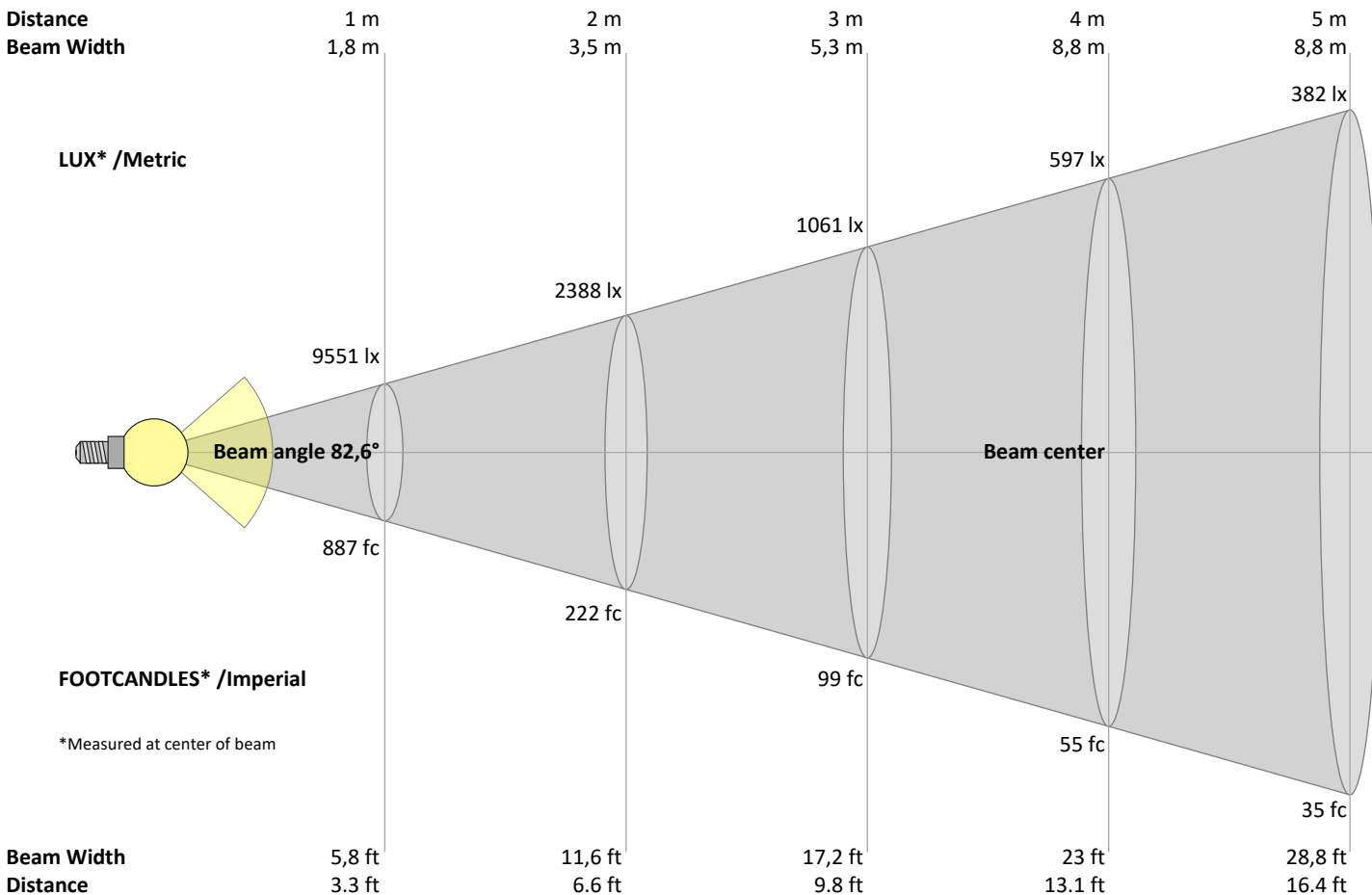
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Beam Details



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
9551	2388	1061	597	382	265	195	149	118	96	79	66	57	49	42	37	33	29	26	24	lux
887,3	221,8	98,6	55,5	35,5	24,6	18,1	13,9	11	8,9	7,3	6,2	5,3	4,5	3,9	3,5	3,1	2,7	2,5	2,2	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
9551	9513	9405	9210	8914	8541	8025	7174	5409	3007	1218	466	281	227	190	156	111	55	16	2	cd
100%	100%	98%	96%	93%	89%	84%	75%	57%	31%	13%	5%	3%	2%	2%	2%	1%	1%	0%	0%	of 0°va

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
9551	9513	9405	9210	8914	8541	8025	7174	5409	3007	1218	466	281	227	190	156	111	55	16	2	cd
100%	100%	98%	96%	93%	89%	84%	75%	57%	31%	13%	5%	3%	2%	2%	2%	1%	1%	0%	0%	of 0°va

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
9551	9513	9405	9210	8914	8541	8025	7174	5409	3007	1218	466	281	227	190	156	111	55	16	2	cd
100%	100%	98%	96%	93%	89%	84%	75%	57%	31%	13%	5%	3%	2%	2%	2%	1%	1%	0%	0%	of 0°va

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
9551	9513	9405	9210	8914	8541	8025	7174	5409	3007	1218	466	281	227	190	156	111	55	16	2	cd
100%	100%	98%	96%	93%	89%	84%	75%	57%	31%	13%	5%	3%	2%	2%	2%	1%	1%	0%	0%	of 0°va

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Light Planning – UGR table

Uncorrected, comprehensive UGR table according to 117-1995

Reflectances											
	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	23,9	24,8	24,1	25,0	25,2	23,9	24,8	24,1	25,0	25,2
	3H	23,8	24,7	24,2	24,9	25,1	23,8	24,7	24,2	24,9	25,1
	4H	23,8	24,6	24,2	24,9	25,1	23,8	24,6	24,2	24,9	25,1
	6H	23,9	24,6	24,2	24,9	25,3	23,9	24,6	24,2	24,9	25,3
	8H	23,9	24,6	24,2	24,9	25,3	23,9	24,6	24,2	24,9	25,3
	12H	23,8	24,5	24,2	24,9	25,3	23,8	24,5	24,2	24,9	25,3
4H	2H	23,6	24,5	24,0	24,8	25,0	23,6	24,5	24,0	24,8	25,0
	3H	23,7	24,4	24,1	24,7	25,2	23,7	24,4	24,1	24,7	25,2
	4H	23,7	24,3	24,1	24,8	25,3	23,7	24,3	24,1	24,8	25,3
	6H	23,8	24,4	24,3	24,8	25,1	23,8	24,4	24,3	24,8	25,1
	8H	23,8	24,4	24,3	24,7	25,1	23,8	24,4	24,3	24,7	25,1
	12H	23,8	24,3	24,3	24,7	25,1	23,8	24,3	24,3	24,7	25,1
8H	4H	23,6	24,2	24,2	24,6	25,0	23,6	24,2	24,2	24,6	25,0
	6H	23,8	24,2	24,3	24,7	25,2	23,8	24,2	24,3	24,7	25,2
	8H	23,9	24,2	24,4	24,8	25,4	23,9	24,2	24,4	24,8	25,4
	12H	23,9	24,2	24,5	24,7	25,3	23,9	24,2	24,5	24,7	25,3
12H	4H	23,6	24,1	24,1	24,5	25,0	23,6	24,1	24,1	24,5	25,0
	6H	23,8	24,2	24,3	24,7	25,3	23,8	24,2	24,3	24,7	25,3
	8H	23,9	24,2	24,5	24,7	25,3	23,9	24,2	24,5	24,7	25,3
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		1,9 / -3,9					1,9 / -3,9				
S = 1.5H		4,0 / -4,7					4,0 / -4,7				
S = 2.0H		5,8 / -5,0					5,8 / -5,0				

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	112	109	106	103	110	107	104	102	103	100	99	99	97	96	95	94	93	91
2	105	100	95	91	103	98	93	90	94	91	88	91	88	86	89	86	84	82
3	99	91	85	81	97	90	84	80	87	82	79	84	81	77	82	79	76	74
4	93	84	77	72	91	83	76	72	80	75	71	78	74	70	76	72	69	67
5	87	77	70	65	85	76	70	65	74	68	64	72	67	64	71	66	63	61
6	82	71	64	59	80	70	64	59	69	63	58	67	62	58	66	61	57	56
7	77	66	59	54	75	65	58	54	64	58	53	62	57	53	61	56	53	51
8	72	61	54	49	71	60	54	49	59	53	49	58	53	49	57	52	48	47
9	68	57	50	45	67	56	50	45	55	49	45	54	49	45	53	48	45	43
10	64	53	46	42	63	52	46	42	51	46	41	51	45	41	50	45	41	40

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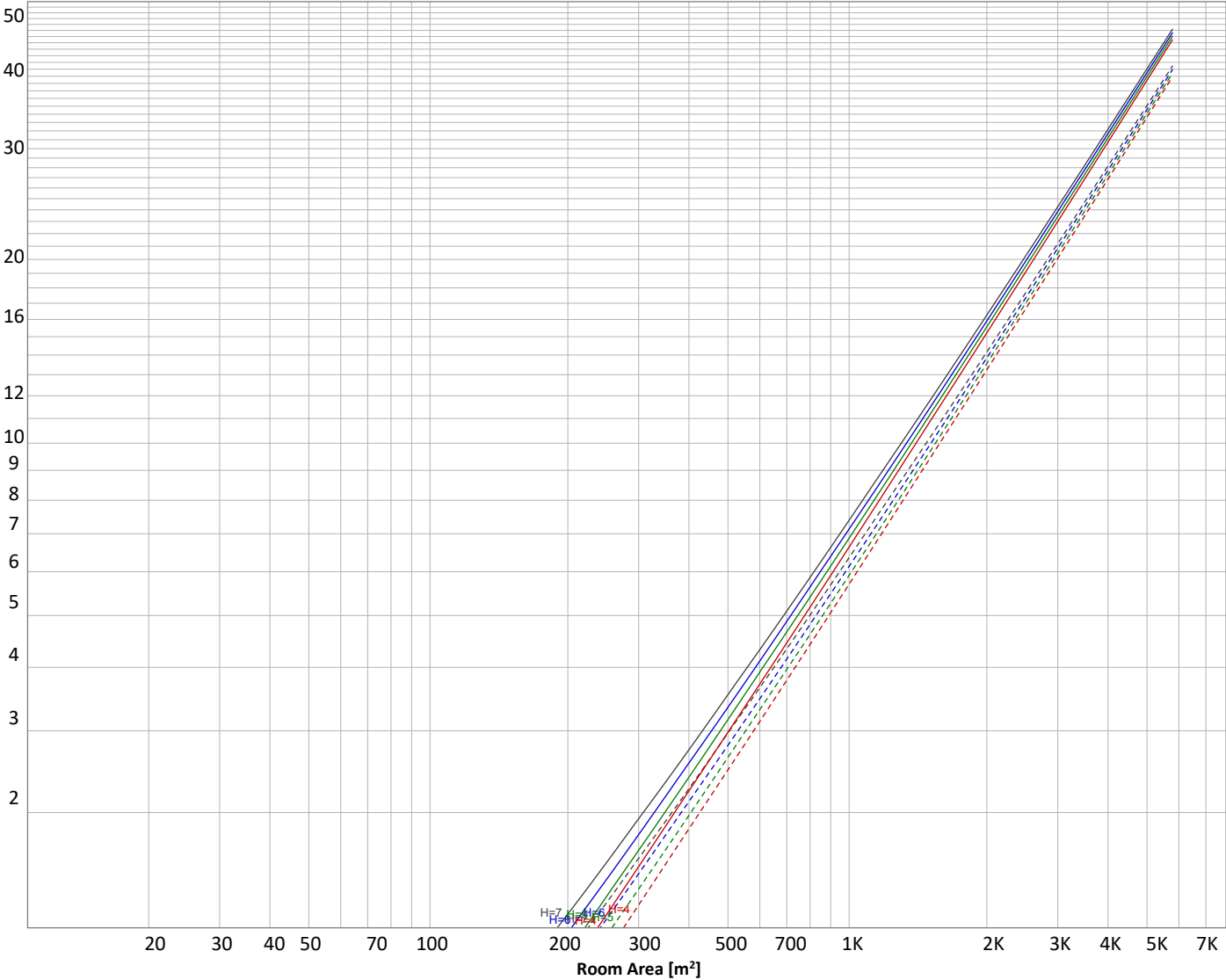
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 15123 lm	p(%)		
H _{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	Wall reflectance
H _{work} = Work area height from floor =	0.00 m	-----	70	50
E _{work} = 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°
906 lm	2602 lm	3944 lm	4483 lm	2290 lm	414 lm	225 lm	165 lm	60,1 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
2,48 lm	0,722 lm	2,14 lm	4,17 lm	5,76 lm	6,22 lm	5,54 lm	4,03 lm	1,53 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	906 lm	6,0%
10-20°	2602 lm	17,2%
20-30°	3944 lm	26,1%
30-40°	4483 lm	29,6%
40-50°	2290 lm	15,1%
50-60°	414 lm	2,7%
60-70°	225 lm	1,5%
70-80°	165 lm	1,1%
80-90°	60 lm	0,4%
90-100°	2 lm	0,0%
100-110°	1 lm	0,0%
110-120°	2 lm	0,0%
120-130°	4 lm	0,0%
130-140°	6 lm	0,0%
140-150°	6 lm	0,0%
150-160°	6 lm	0,0%
160-170°	4 lm	0,0%
170-180°	2 lm	0,0%
Total	15123 lm	100,0%

Intensity peaks

Max intensity	9551 cd
Intensity, 90°	16 cd
Intensity, 0°	9551 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	7452 lm	49,3%
0-40°	11936 lm	78,9%
0-60°	14640 lm	96,8%
60-90°	451 lm	3,0%
70-100°	228 lm	1,5%
90-120°	5 lm	0,0%
0-90°	15091 lm	99,8%
90-180°	33 lm	0,2%
0-180°	15123 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	3714 lm	24,6%
Medium(30-60°)	3605 lm	23,8%
High(60-80°)	195 lm	1,3%
Very high(80-90°)	31 lm	0,2%
Back light		
Low(0-30°)	3714 lm	24,6%
Medium(30-60°)	3605 lm	23,8%
High(60-80°)	195 lm	1,3%
Very high(80-90°)	31 lm	0,2%

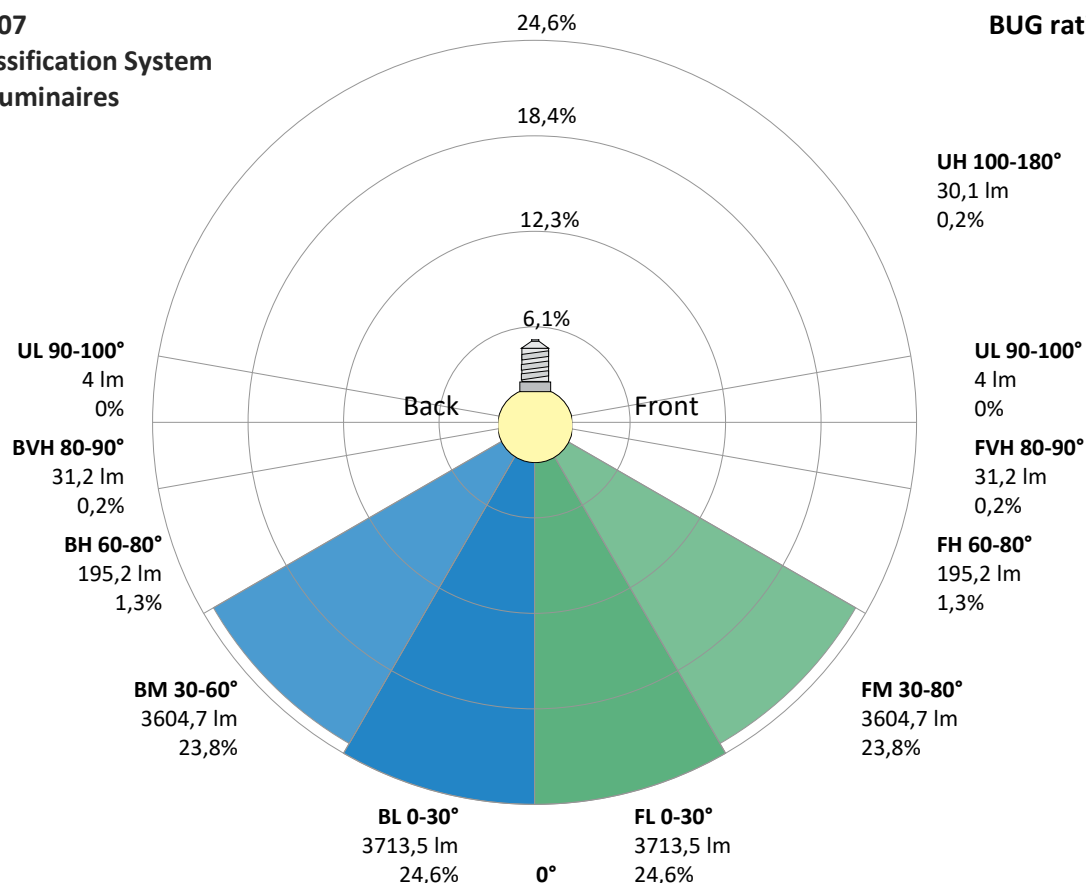
Uplight

Low(90-100°)	4 lm	0,0%
High(100-180°)	30 lm	0,2%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B4 U2 G1



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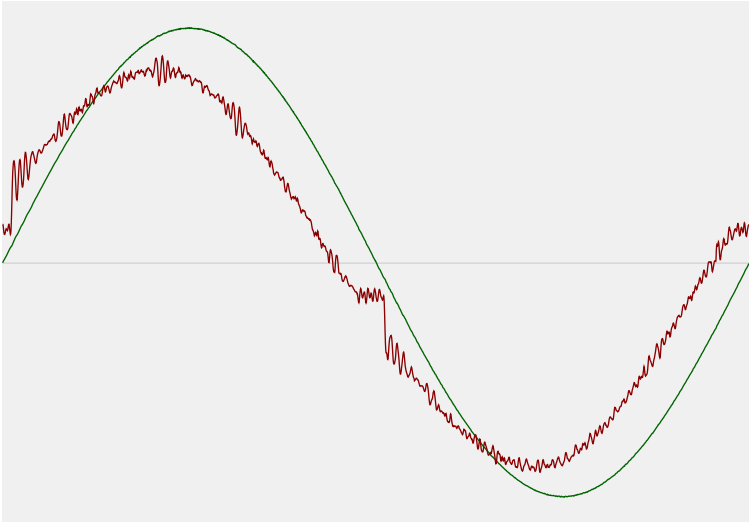


Power Details

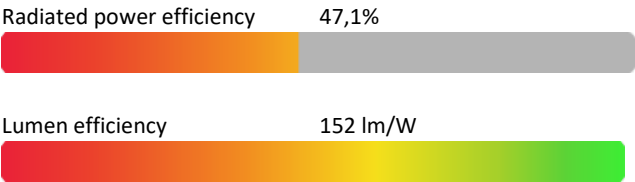
Input Power

Power feed to light source	99,3 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,452 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	104,04 VA
Displacement factor of AC power feed	0,96
Power factor of AC current feed	0,95
Total harmonic distortion of the current	4,76%
Total harmonic distortion of the voltage	0,07%

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	6516 K
CCT shift	-16 K
CCT end	6500 K

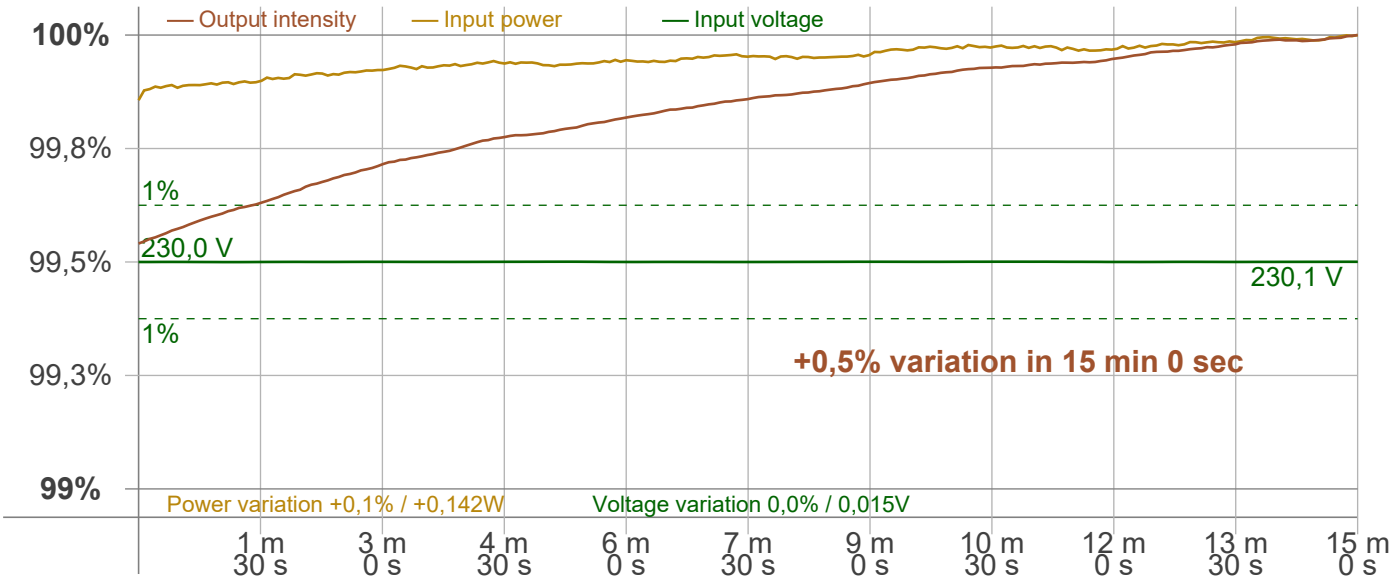
Warmup Result

Total warmup time	Lamp stabilized in 15 min 0 sec
Warmup variation	+0,5%

Output Change

Output start	15054 lm
Output change	+69 lm
Output end	15123 lm

Stabilization Curve



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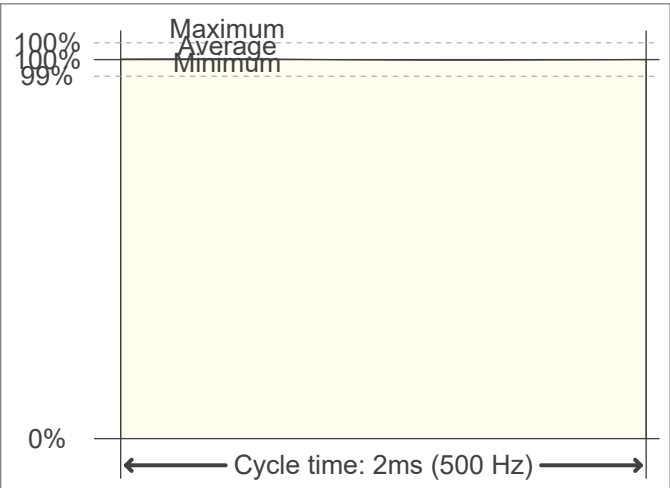
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Flicker /TLA details

Flicker Meter Type	Viso Systems LabFlicker	Measurement time	
Frequency of input power	50 Hz	PstLM	180 sec
Flicker/TLA sample rate	20000 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	500 Hz	JA8/10 40 Hz	0,29 %
Percent Flicker	0,62 %	JA8/10 90 Hz	0,29 %
Flicker index	0	JA8/10 200 Hz	0,39 %
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)		JA8/10 400 Hz	0,41 %
PstLM value (F < 80 Hz)	0,14	JA8/10 1000 Hz	0,61 %
SVM value (80 < F < 2000 Hz)	0	Flicker indices according to Lighting Research Center (2015)	
		Perception metric, Assist Mp	0,07

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

