

Light Measurement Report

Print date: 2-7-2025

Measurement date and time: 2-7-2025 09:27:47 – Measurement no. VFR-250702-1863-MS

Measurement tracking No. and Link: [VT250702-008318](#)

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°
2,99 m
150,1 W – PF 0,99 – DPF 1,0
230 V – 0,657 A
50 Hz
Lamp stabilized in 15 min 1 sec – 2,0%

Tested Light Source

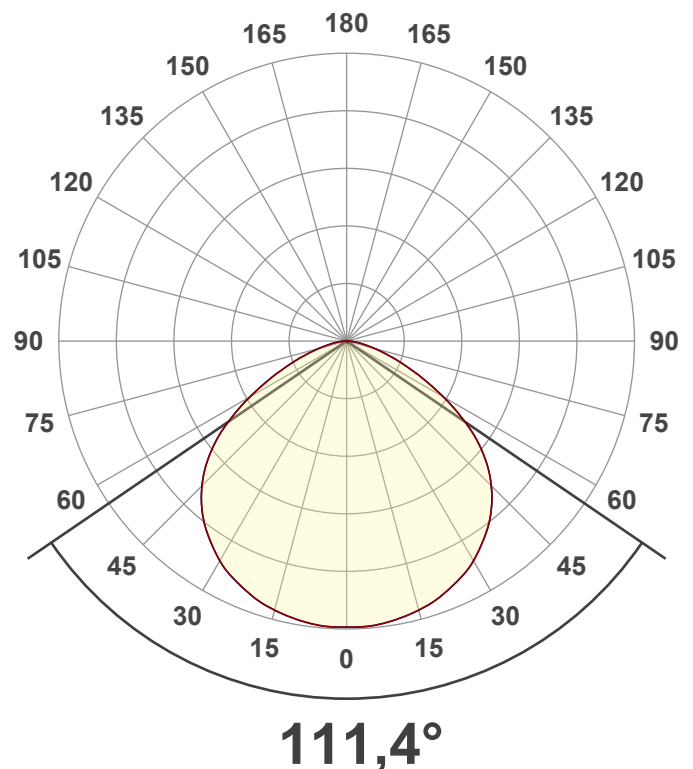
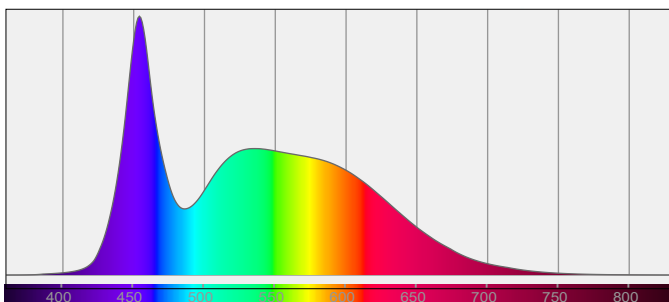
Product Name
Item No. and Manufacturer
Product Description (line 1)

811532-6500K
811532-6500K – Dutchfulfillment
LED FLOODLIGHT ISTOS | 150W | 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

13629 lm – 0,16% / 99,84%
91 lm/W
4959 cd – 111,4°
CCT = 6500 K / 7000 K
CRI 83,9
 R_f 83,3 – R_g 93,7
Duv 0,0055 – SDCM 9,5
SVM 3,67 – PstLM 0,07



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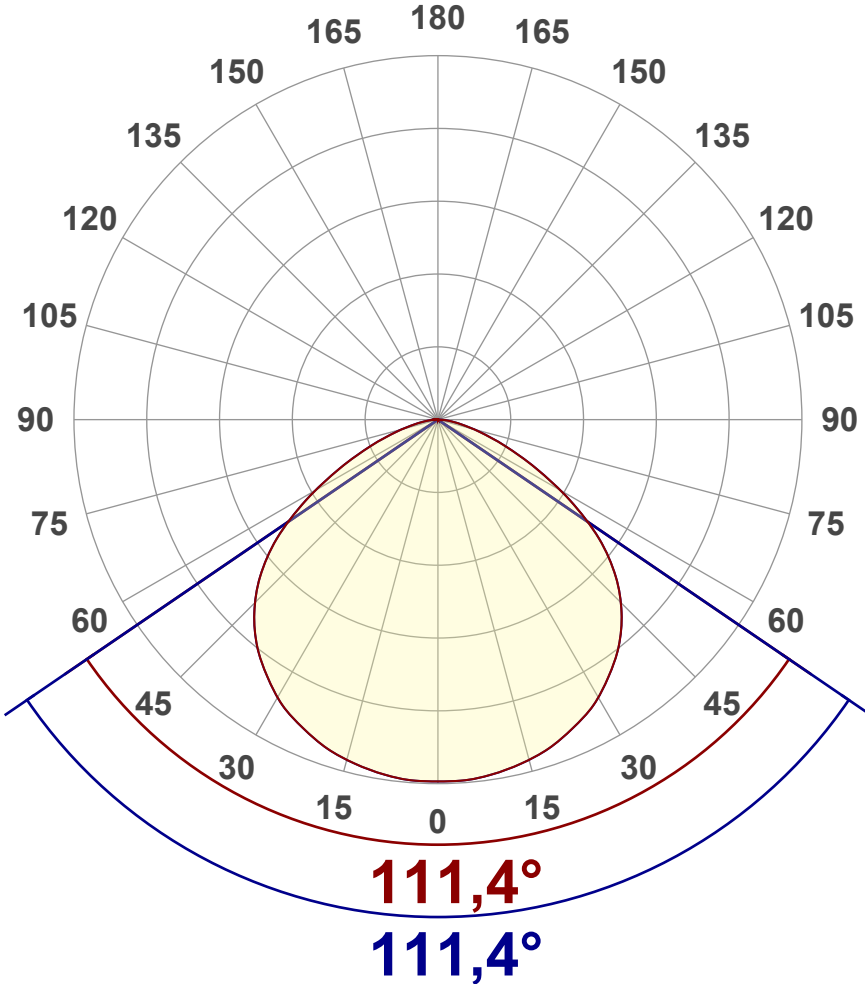
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	13629 lm
Lumen Up% / Down%	0,16% / 99,84%
Peak Intensity	4959 cd
Beam Angle (50%)	111,4°
Beam Angle (90%)	111,4°
Beam Angle (10%)	111,4°

Cut-off Angle

Average 2,5%	170°
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Field Angle

Average 10%	150,9°
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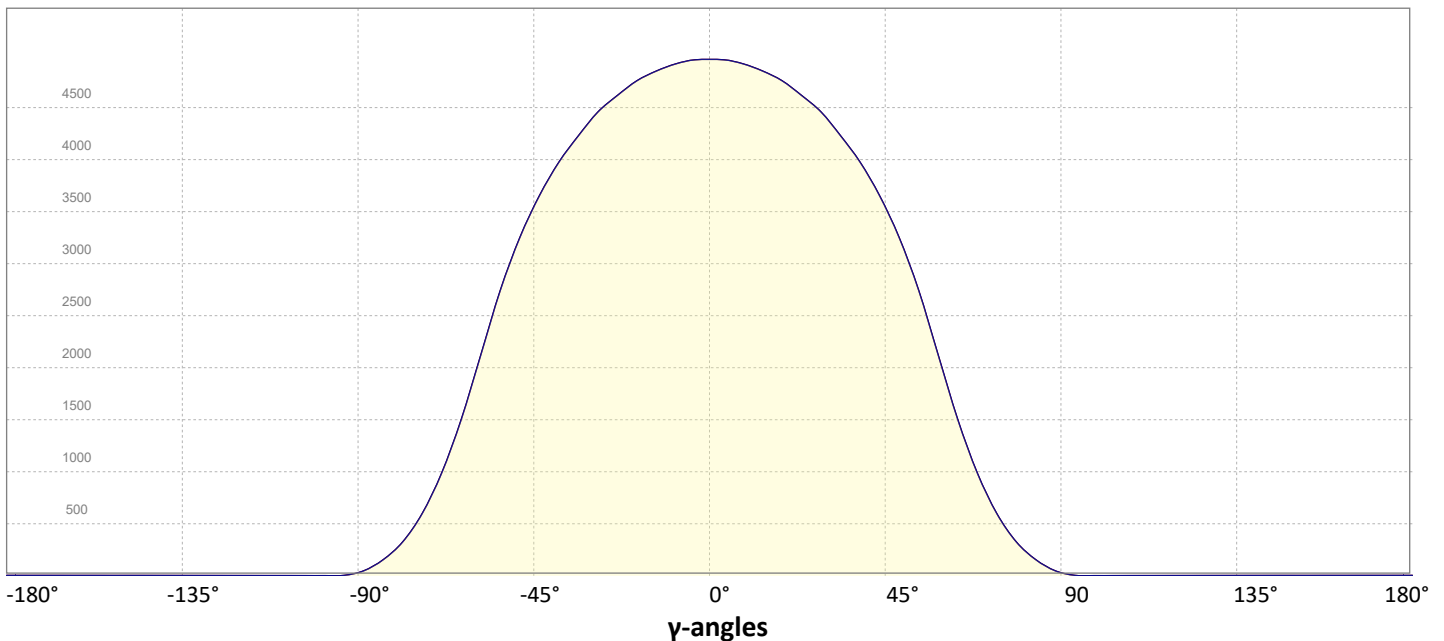
Intensity Ratio

In 120° cone	84,8%
In 90° cone	58,2%

C000-C180

C090-C270

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



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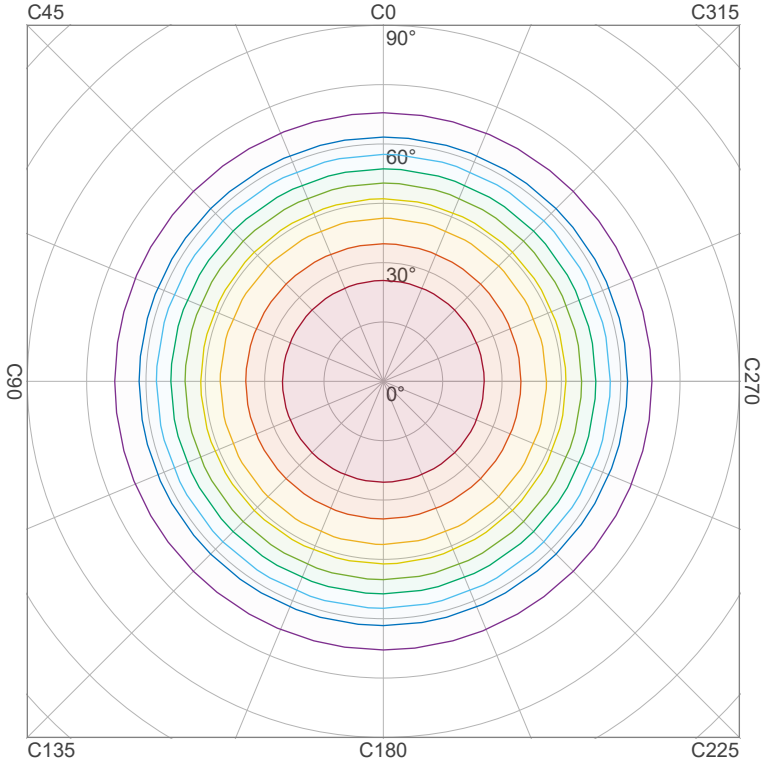
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Iso-intensity Diagram (Iso-candela)

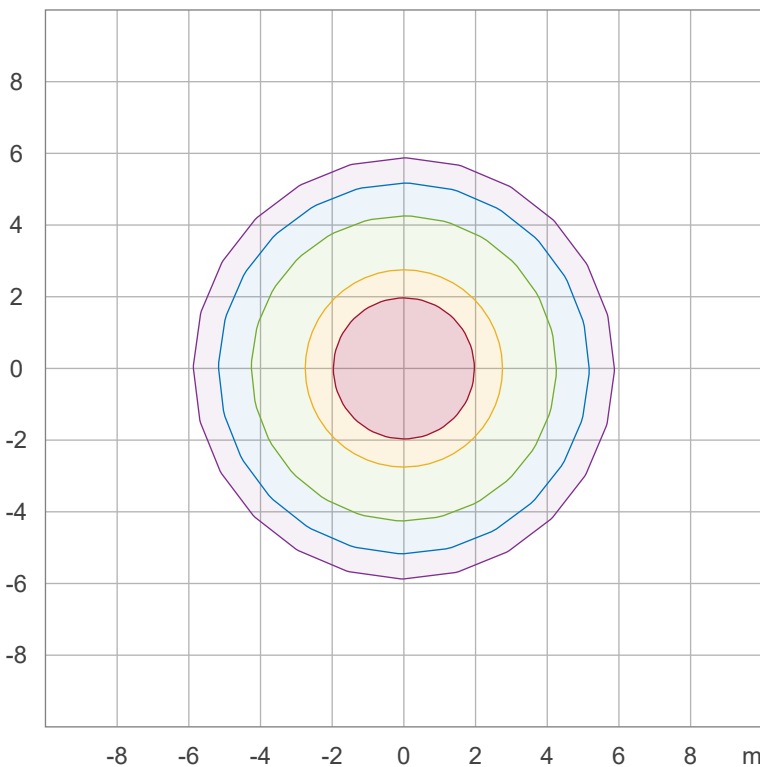


90 %	4463,3 cd
80 %	3967,3 cd
70 %	3471,4 cd
60 %	2975,5 cd
50 %	2479,6 cd
40 %	1983,7 cd
30 %	1487,8 cd
20 %	991,8 cd
10 %	495,9 cd

Peak intensity: 4959,2 cd

Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



50,0 %	275,5 lx
30,0 %	165,3 lx
10,0 %	55,1 lx
5,0 %	27,6 lx
3,0 %	16,5 lx

Peak illuminance: 551,0 lx

Mounting height: 3,0 m

Number of c-planes: 12

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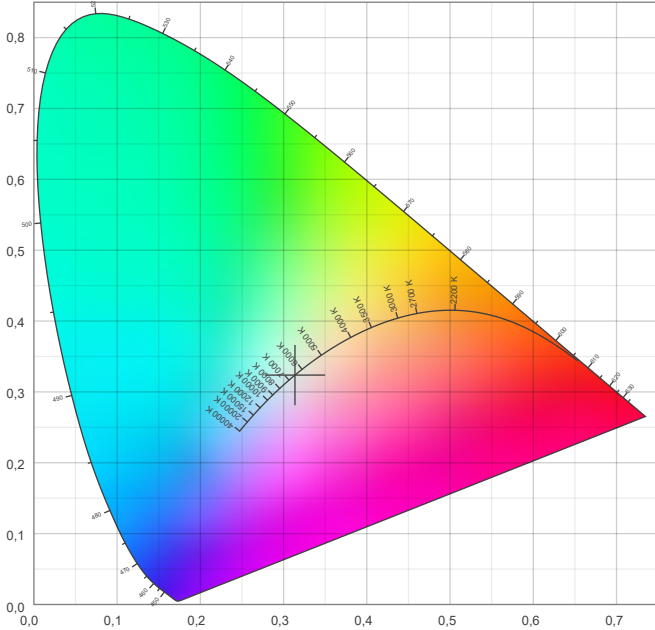


Color details

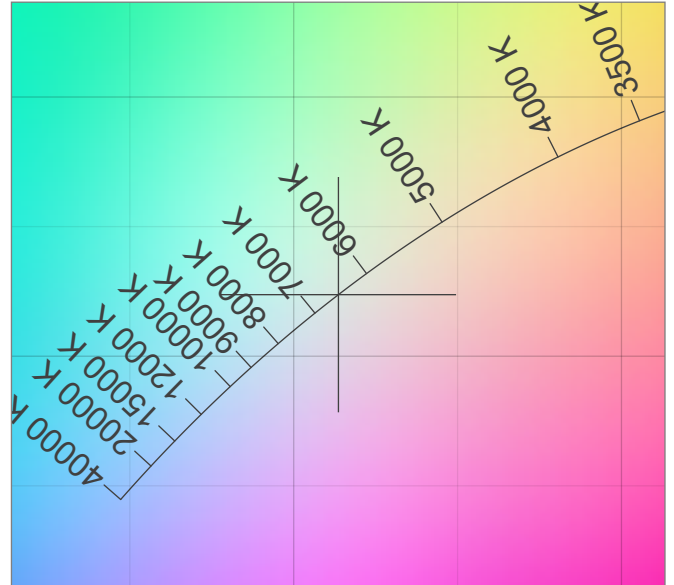
Correlated Color Temperature, Target CCT = 6500 K
 Correlated Color Temperature, Measured CCT = 7000 K
 Color Rendering Index CRI 83,9
 Color Rendering Index, R9 (red component) R9 = 12,4
 Color Rendering TM30-18 R_f 83,3 – R_g 93,7
 Color Quality Scale CQS = 81,6

MacAdam Steps SDCM = 9,5
 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 = 0,0055
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,200;0,466)

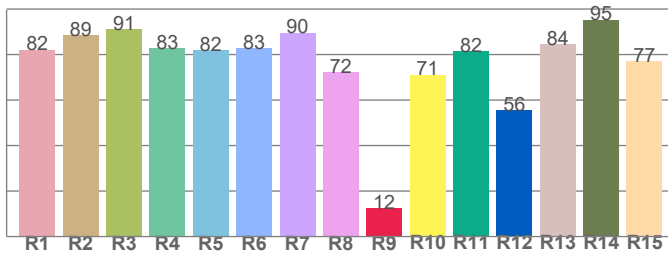
CIE 1931



CIE 1931 – zoomed on Planckian locus



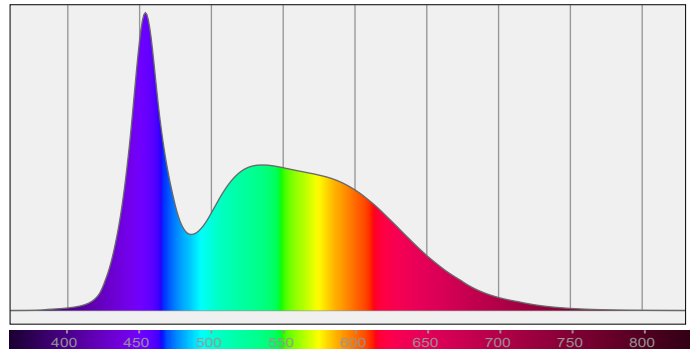
Color Rendering Index per reference color (CIE 1995)



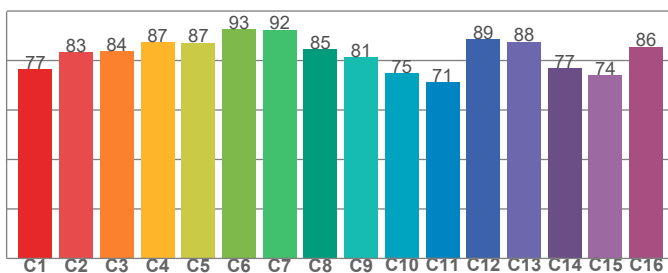
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
82,2	88,5	91,1	82,7	81,8	82,9	89,6	72,2	12,4	71,2	81,5	55,6	84,4	95,4	77,1

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



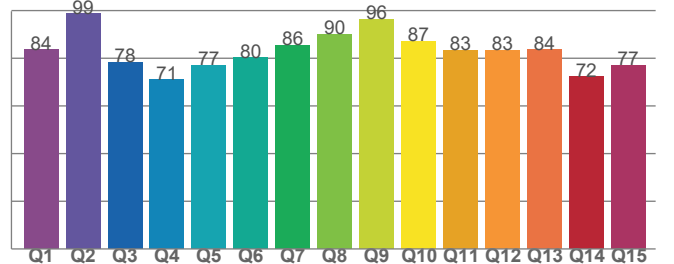
TM30-18 R_f-values per hue bin



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
76,5	83,4	83,7	87,5	87,2	92,7	92,5	84,6	81,3	74,9	71,3	88,7	87,7	77,0	73,9	85,5

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
83,6	98,6	78,3	71,1	77,1	80,2	85,6	90,0	96,3	87,2	83,4	83,4	83,6	72,3	77,1

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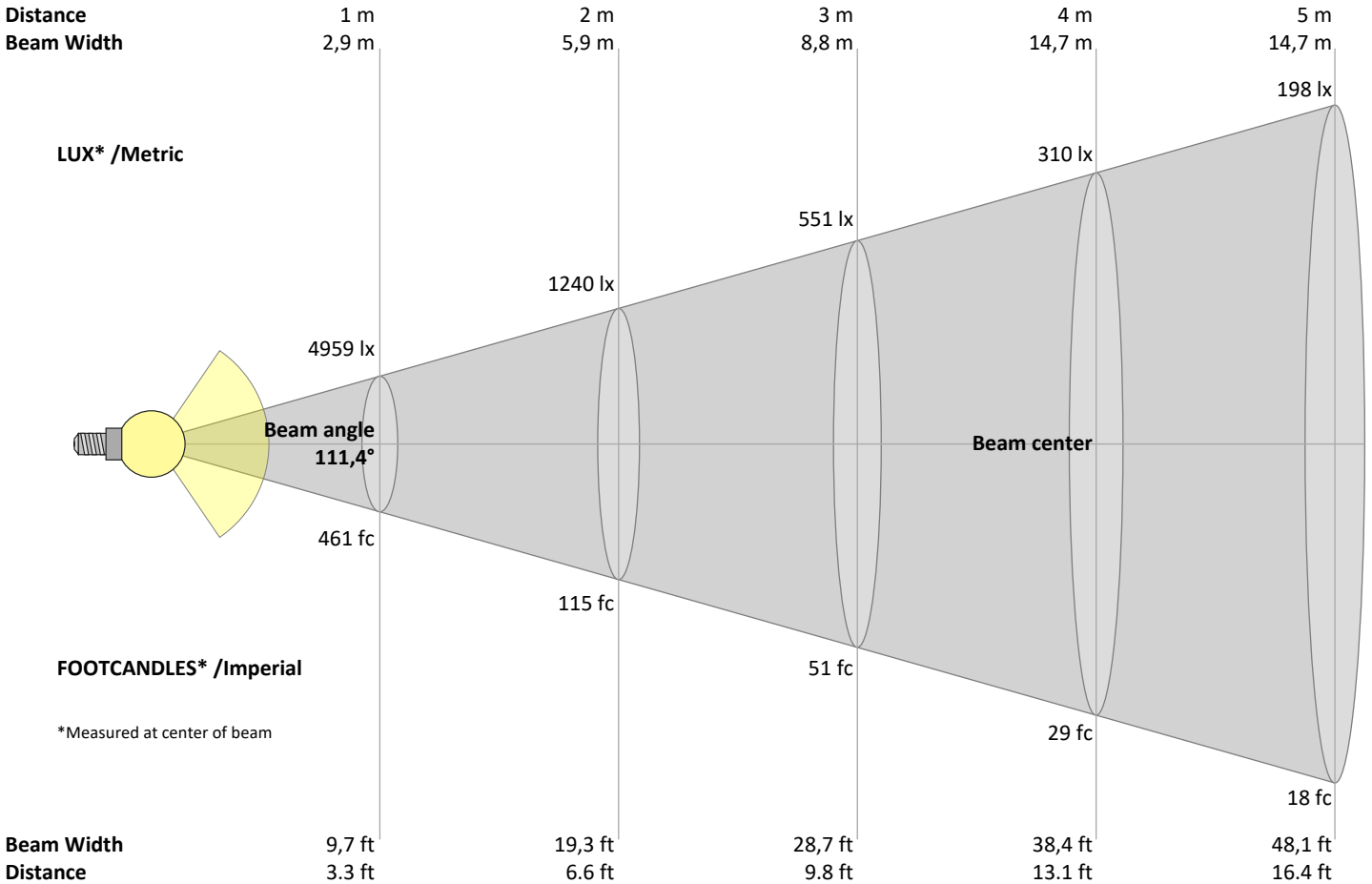
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Operator:



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
4959	1240	551	310	198	138	101	77	61	50	41	34	29	25	22	19	17	15	14	12	lux
460,7	115,2	51,2	28,8	18,4	12,8	9,4	7,2	5,7	4,6	3,8	3,2	2,7	2,4	2	1,8	1,6	1,4	1,3	1,2	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
4959	4948	4901	4825	4718	4571	4392	4156	3883	3537	3106	2566	1945	1356	877	520	276	124	35	3	cd
100%	100%	99%	97%	95%	92%	89%	84%	78%	71%	63%	52%	39%	27%	18%	10%	6%	2%	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
4959	4948	4901	4825	4718	4571	4392	4156	3883	3537	3106	2566	1945	1356	877	520	276	124	35	3	cd
100%	100%	99%	97%	95%	92%	89%	84%	78%	71%	63%	52%	39%	27%	18%	10%	6%	2%	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
4959	4948	4901	4825	4718	4571	4392	4156	3883	3537	3106	2566	1945	1356	877	520	276	124	35	3	cd
100%	100%	99%	97%	95%	92%	89%	84%	78%	71%	63%	52%	39%	27%	18%	10%	6%	2%	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
4959	4948	4901	4825	4718	4571	4392	4156	3883	3537	3106	2566	1945	1356	877	520	276	124	35	3	cd
100%	100%	99%	97%	95%	92%	89%	84%	78%	71%	63%	52%	39%	27%	18%	10%	6%	2%	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	29,5	30,6	29,7	31,0	31,2	29,4	30,6	29,7	30,9	31,1
	3H	30,2	31,4	30,6	31,7	31,9	30,2	31,4	30,6	31,6	31,8
	4H	30,5	31,6	30,9	31,9	32,1	30,4	31,5	30,8	31,8	32,1
	6H	30,7	31,7	31,0	32,0	32,3	30,6	31,6	30,9	31,9	32,2
	8H	30,7	31,7	31,0	32,0	32,4	30,6	31,6	30,9	31,9	32,3
	12H	30,7	31,6	31,1	32,0	32,4	30,6	31,5	31,0	31,9	32,3
4H	2H	29,8	31,0	30,3	31,3	31,5	29,8	30,9	30,2	31,2	31,5
	3H	30,9	31,8	31,2	32,1	32,6	30,8	31,7	31,2	32,1	32,5
	4H	31,1	32,0	31,5	32,4	32,9	31,0	31,9	31,5	32,3	32,9
	6H	31,3	32,1	31,8	32,5	32,9	31,2	32,1	31,7	32,4	32,8
	8H	31,4	32,1	31,9	32,5	32,9	31,3	32,0	31,8	32,4	32,8
	12H	31,4	32,0	31,9	32,4	32,9	31,3	31,9	31,8	32,3	32,8
8H	4H	31,2	31,9	31,7	32,3	32,7	31,1	31,9	31,6	32,2	32,6
	6H	31,5	32,0	32,0	32,5	33,1	31,4	32,0	31,9	32,4	33,0
	8H	31,6	32,1	32,1	32,6	33,3	31,5	32,0	32,0	32,5	33,2
	12H	31,7	32,1	32,3	32,6	33,2	31,6	32,0	32,2	32,5	33,1
12H	4H	31,2	31,8	31,7	32,2	32,7	31,1	31,7	31,6	32,1	32,6
	6H	31,5	32,0	32,0	32,5	33,2	31,4	31,9	32,0	32,4	33,1
	8H	31,6	32,0	32,2	32,5	33,2	31,5	31,9	32,1	32,5	33,1

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

S = 1.0H	0,1 / -0,2	0,1 / -0,2
S = 1.5H	0,5 / -0,6	0,5 / -0,7
S = 2.0H	1,1 / -1,5	1,1 / -1,5

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	102	102	102	100	100
1	110	105	101	98	107	103	99	96	99	96	93	95	93	90	91	89	88	86
2	100	93	86	81	98	91	85	80	87	82	78	84	80	76	81	78	75	72
3	92	82	74	68	89	80	73	67	77	71	66	75	69	65	72	68	64	62
4	84	73	64	58	82	71	64	57	69	62	57	67	61	56	64	59	55	53
5	78	65	56	50	75	64	56	50	62	55	49	60	54	49	58	53	48	46
6	72	59	50	44	70	58	49	43	56	49	43	54	48	43	53	47	42	40
7	66	53	45	39	65	52	44	38	51	43	38	49	43	38	48	42	38	36
8	62	48	40	34	60	48	40	34	46	39	34	45	39	34	44	38	34	32
9	58	44	36	31	56	44	36	31	43	36	31	42	35	30	41	35	30	29
10	54	41	33	28	53	40	33	28	39	33	28	39	32	28	38	32	28	26

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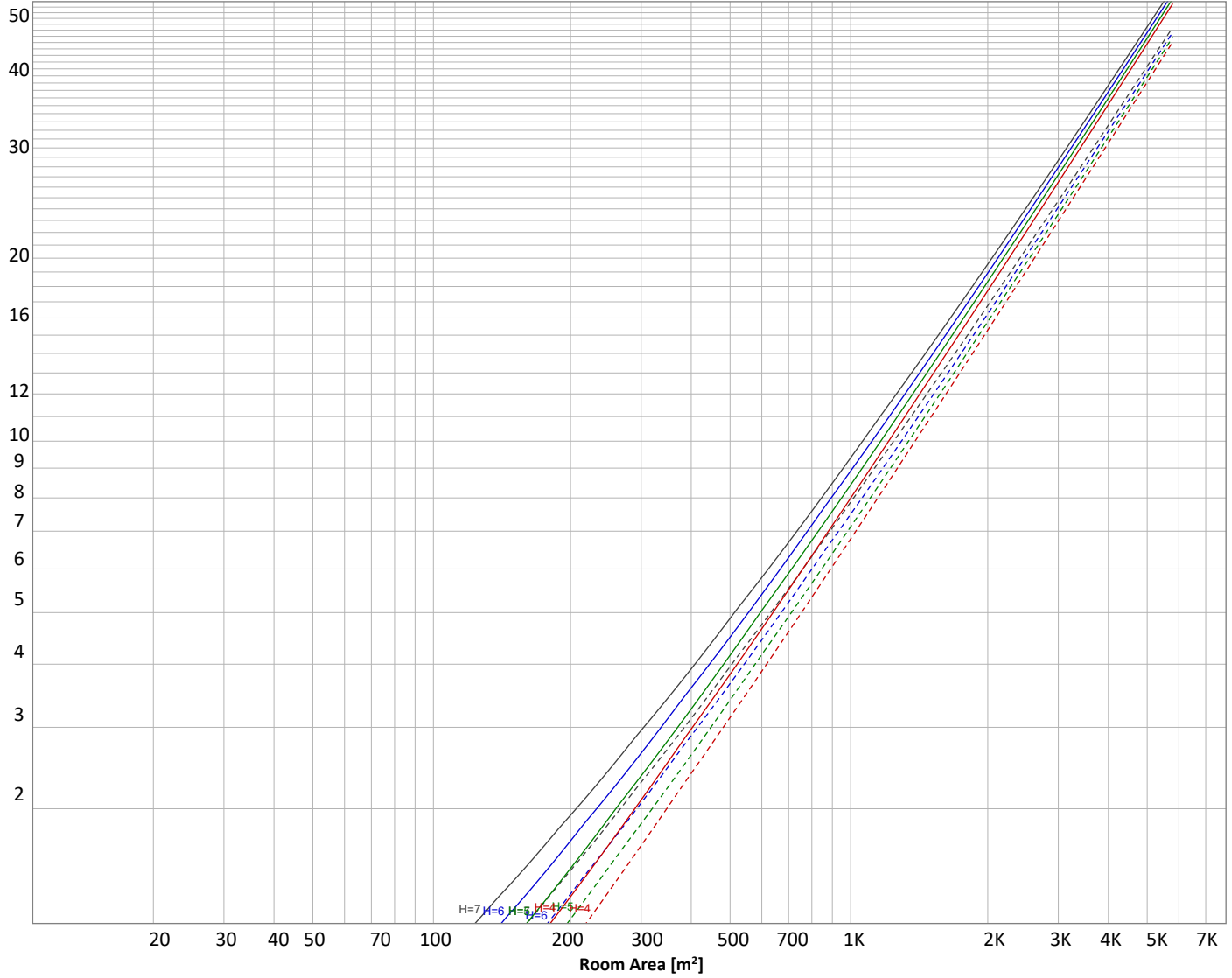
Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 13629 lm				
H _{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	ρ(%) Wall reflectance	Floor reflectance
H _{work} = Work area height from floor =	0.00 m	-----	70	50	30
E _{work} = 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°
471 lm	1364 lm	2111 lm	2603 lm	2724 lm	2280 lm	1350 lm	561 lm	142 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
8,39 lm	1,82 lm	2,18 lm	2,35 lm	2,33 lm	2,12 lm	1,61 lm	1,04 lm	0,359 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	471 lm	3,5%
10-20°	1364 lm	10,0%
20-30°	2111 lm	15,5%
30-40°	2603 lm	19,1%
40-50°	2724 lm	20,0%
50-60°	2280 lm	16,7%
60-70°	1350 lm	9,9%
70-80°	561 lm	4,1%
80-90°	142 lm	1,0%
90-100°	8 lm	0,1%
100-110°	2 lm	0,0%
110-120°	2 lm	0,0%
120-130°	2 lm	0,0%
130-140°	2 lm	0,0%
140-150°	2 lm	0,0%
150-160°	2 lm	0,0%
160-170°	1 lm	0,0%
170-180°	0 lm	0,0%
Total	13629 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	3946 lm	29,0%
0-40°	6549 lm	48,1%
0-60°	11554 lm	84,8%
60-90°	2053 lm	15,1%
70-100°	712 lm	5,2%
90-120°	12 lm	0,1%
0-90°	13606 lm	99,8%
90-180°	22 lm	0,2%
0-180°	13629 lm	100,0%

BUG rating

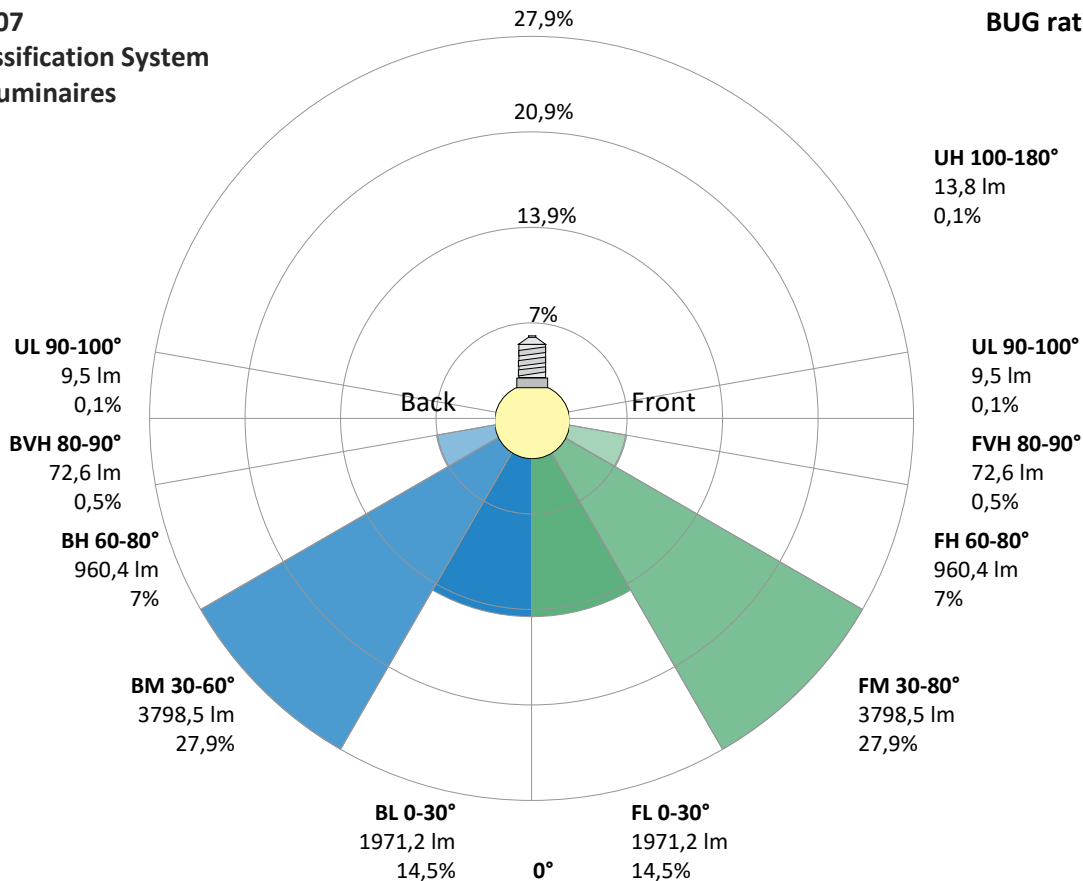
	Lumen	% Total
Forward light		
Low(0-30°)	1971 lm	14,5%
Medium(30-60°)	3798 lm	27,9%
High(60-80°)	960 lm	7,0%
Very high(80-90°)	73 lm	0,5%
Back light		
Low(0-30°)	1971 lm	14,5%
Medium(30-60°)	3798 lm	27,9%
High(60-80°)	960 lm	7,0%
Very high(80-90°)	73 lm	0,5%
Uplight		
Low(90-100°)	9 lm	0,1%
High(100-180°)	14 lm	0,1%

Intensity peaks

Max intensity	4959 cd
Intensity, 90°	35 cd
Intensity, 0°	4959 cd

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

BUG rating B3 U2 G1



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Power Details

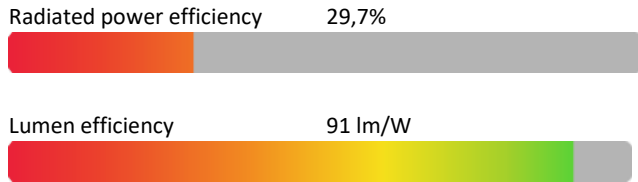
Input Power

Power feed to light source	150,1 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,657 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	150,97 VA
Displacement factor of AC power feed	1,0
Power factor of AC current feed	0,99
Total harmonic distortion of the current	10,15%
Total harmonic distortion of the voltage	0,06%

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	6477 K
CCT shift	+23 K
CCT end	6500 K

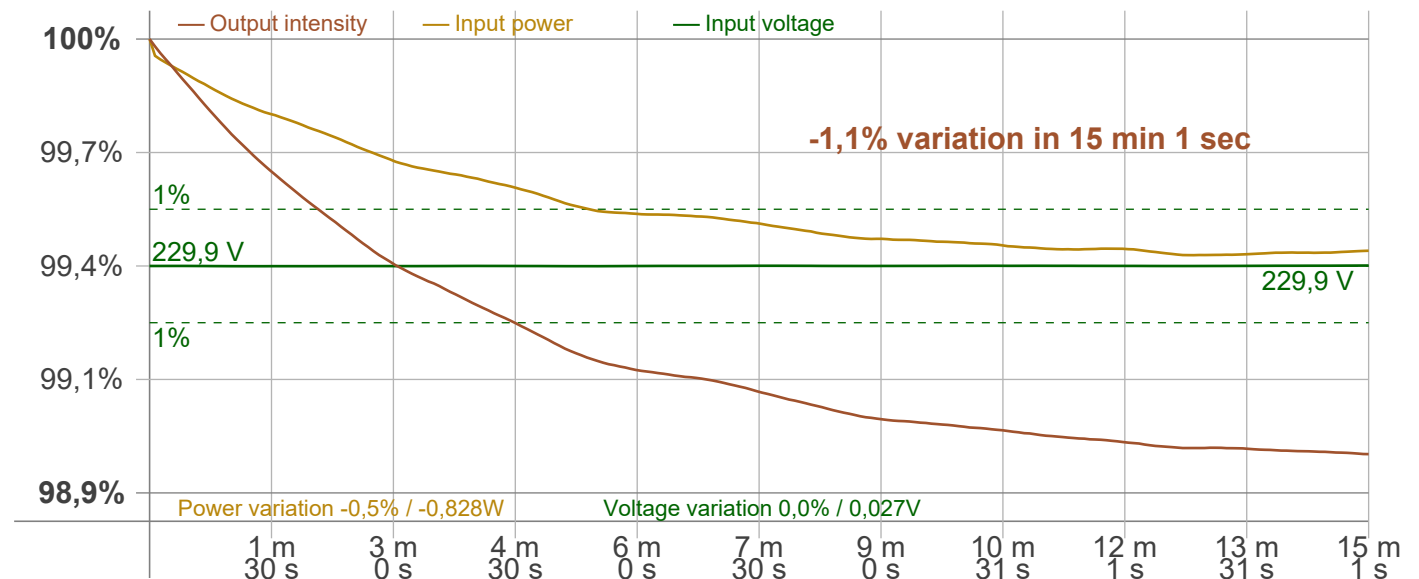
Warmup Result

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

Output Change

Output start	13780 lm
Output change	-151 lm
Output end	13629 lm

Stabilization Curve



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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 99,95 %
 Flicker index 0,31

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

JA8/10 40 Hz 0,21 %
 JA8/10 90 Hz 0,87 %
 JA8/10 200 Hz 103,26 %
 JA8/10 400 Hz 101,62 %
 JA8/10 1000 Hz 102,74 %

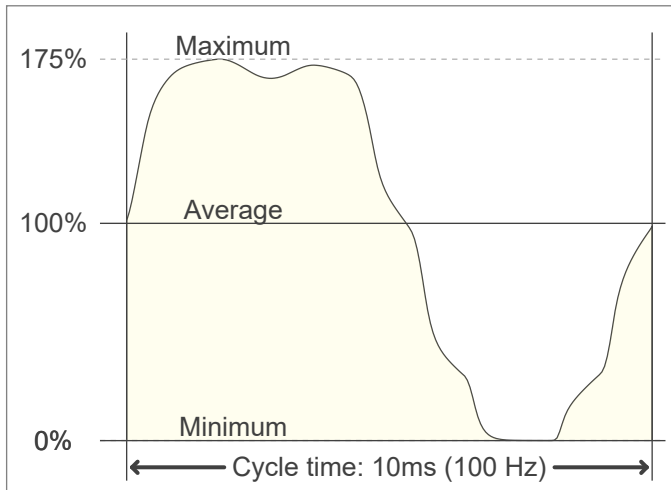
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz) 0,07
 SVM value (80 < F < 2000 Hz) 3,67

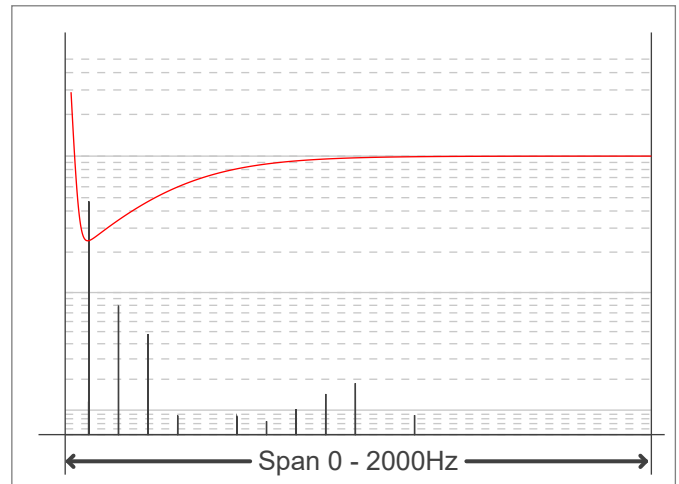
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp 0,04

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

