

Light Measurement Report

Print date: 2-7-2025

Measurement date and time: 2-7-2025 10:52:16 – Measurement no. VFR-250702-1871-MS

Measurement tracking No. and Link: [VT250702-003602](#)

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°
11,61 m
34,4 W – PF 0,98 – DPF 0,98
230 V – 0,153 A
50 Hz
Lamp stabilized in 15 min 1 sec – 2,0%

Tested Light Source

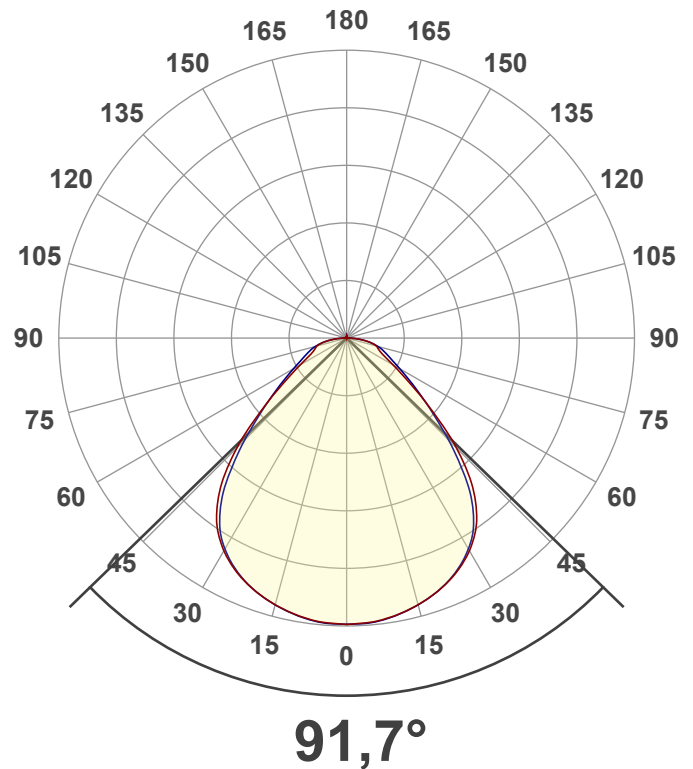
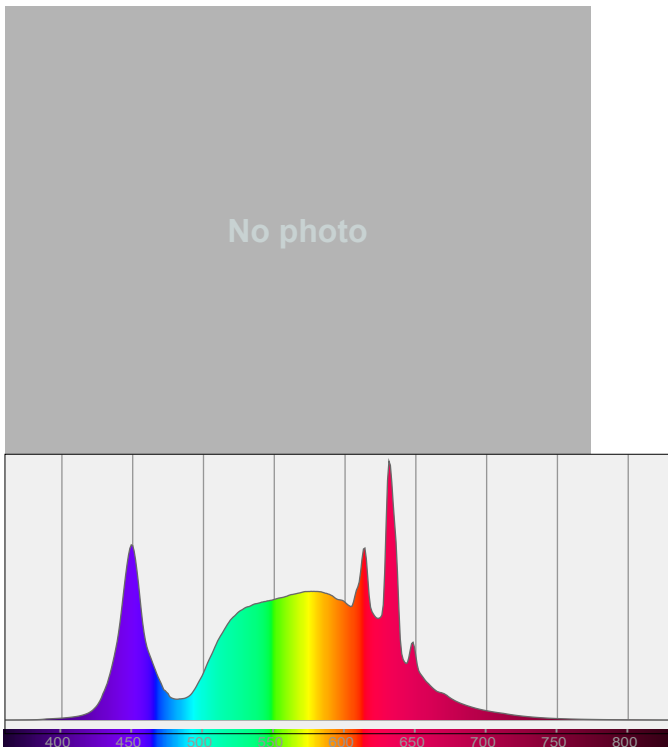
Product Name
Item No. and Manufacturer
Product Description (line 1)

810986-4000K
810986-4000K – Dutchfulfillment
BACK-LIT LED PANEEL | PONTUS | 150X11CM | 34W | 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

3975 lm – 0,82% / 99,18%
116 lm/W
1749 cd – 91,7°
CCT = 4000 K / 3907 K
CRI 83,7
 R_f 82,3 – R_g 101,0
Duv -0,0001 – SDCM 2,1
SVM 0,03 – PstLM 0,01



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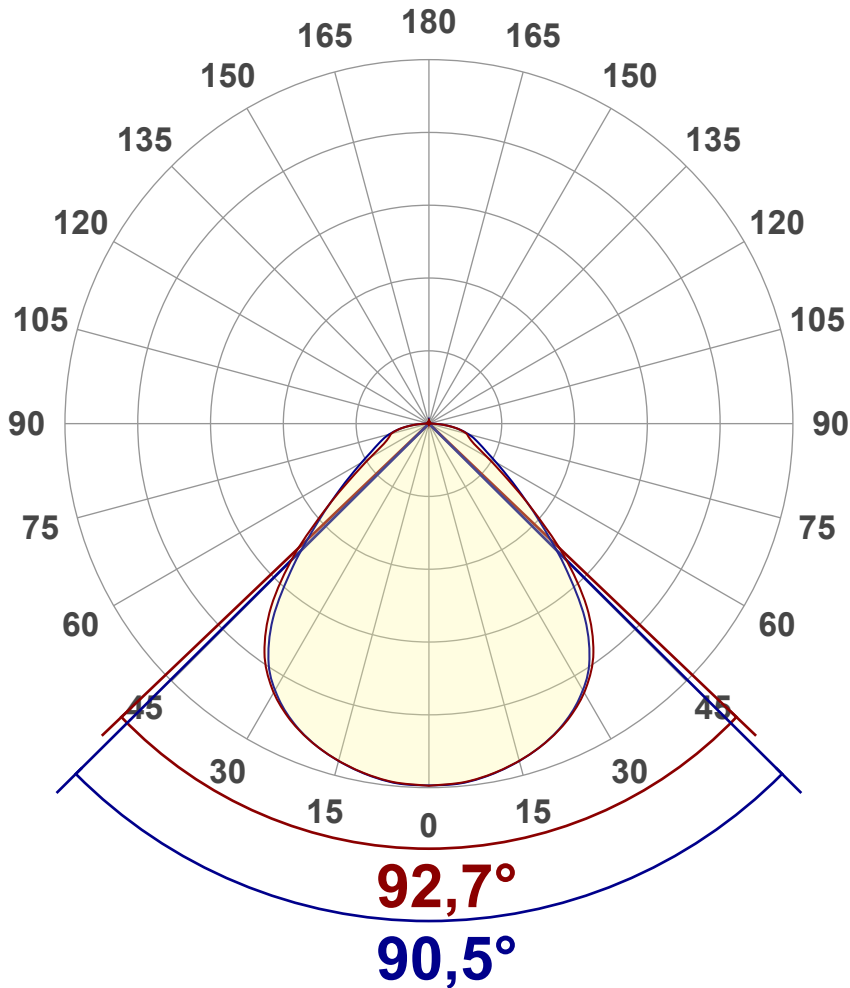
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	3975 lm
Lumen Up% / Down%	0,82% / 99,18%
Peak Intensity	1749 cd
Beam Angle (50%)	91,7°
Beam Angle (90%)	90,5°
Beam Angle (10%)	92,7°

Cut-off Angle

Average 2,5%	175°
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Field Angle

Average 10%	153,7°
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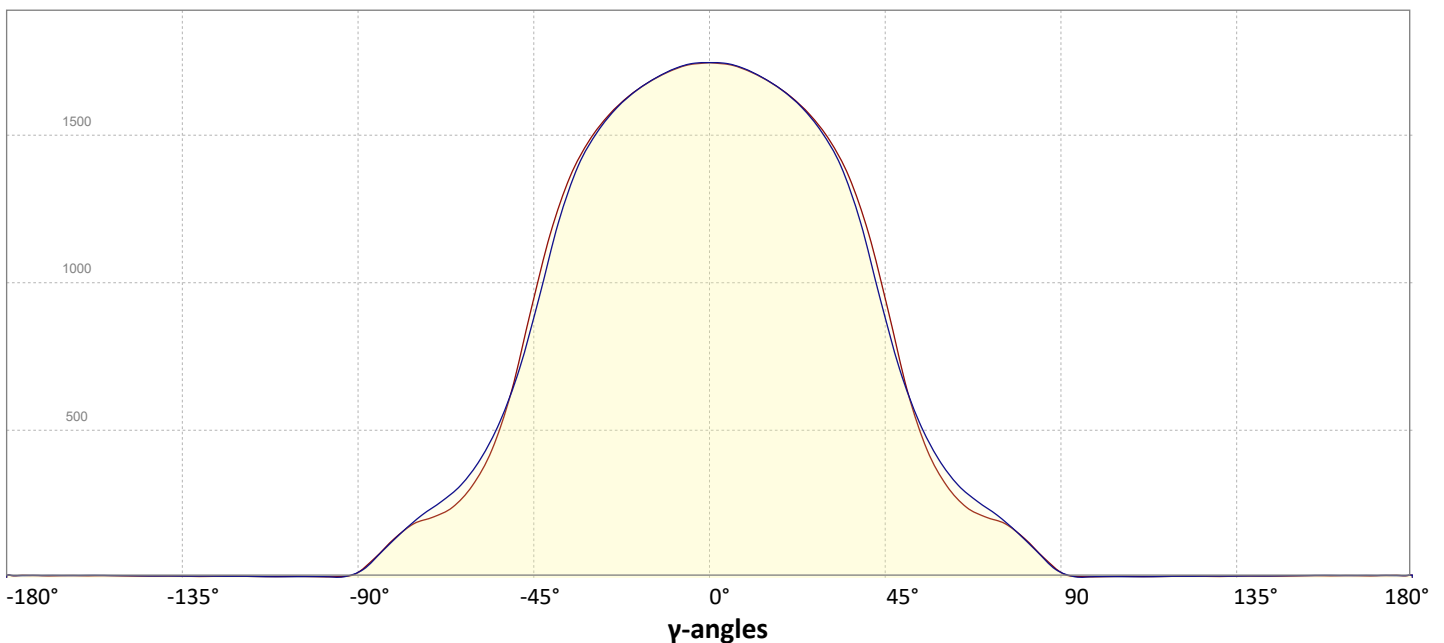
Intensity Ratio

In 120° cone	84,7%
In 90° cone	65,4%

C000-C180

C090-C270

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



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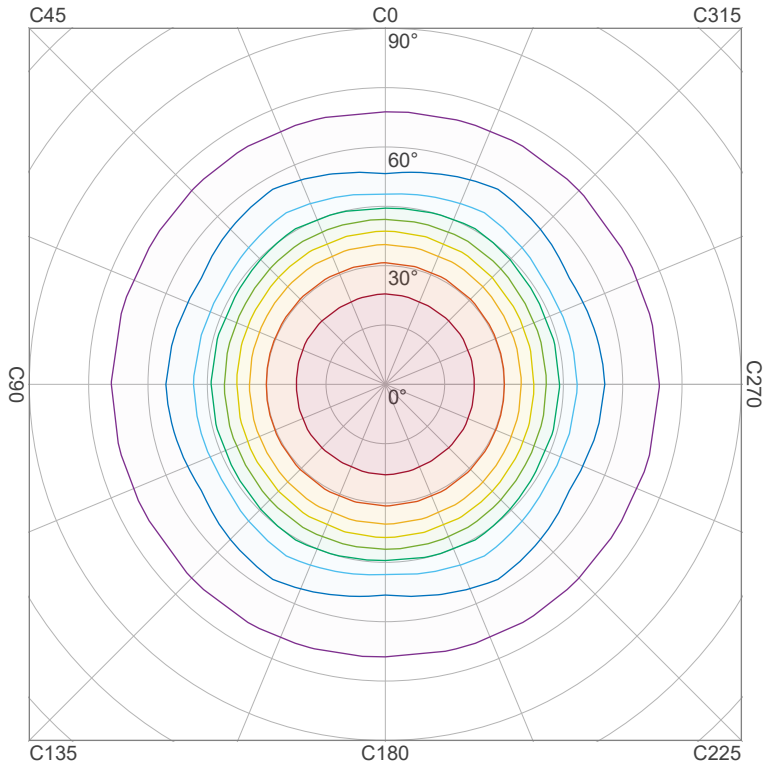
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Iso-intensity Diagram (Iso-candela)

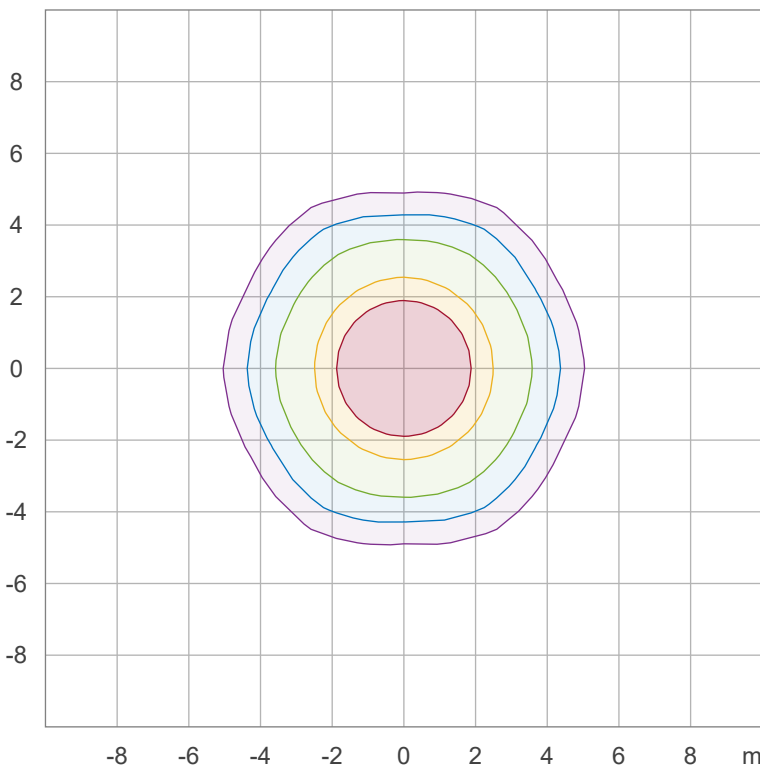


90 %	1572,5 cd
80 %	1397,7 cd
70 %	1223,0 cd
60 %	1048,3 cd
50 %	873,6 cd
40 %	698,9 cd
30 %	524,2 cd
20 %	349,4 cd
10 %	174,7 cd

Peak intensity: 1747,2 cd

Number of c-planes: 12

Iso-illuminance Diagram (Iso-lux)



50,0 %	97,0 lx
30,0 %	58,2 lx
10,0 %	19,4 lx
5,0 %	9,7 lx
3,0 %	5,8 lx

Peak illuminance: 194,1 lx

Mounting height: 3,0 m

Number of c-planes: 12

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Color details

Correlated Color Temperature, Target CCT = 4000 K
 Correlated Color Temperature, Measured CCT = 3907 K
 Color Rendering Index CRI 83,7
 Color Rendering Index, R9 (red component) R9 = 39,6
 Color Rendering TM30-18 R_f 82,3 – R_g 101,0
 Color Quality Scale CQS = 82,6

MacAdam Steps
 Color coordinates CIE 1931 (x;y) = (0,381;0,377)
 Color coordinate CIEs 1960 (u;v) = (0,225;0,334)
 Color deviation from BBL Duv = -0,0001
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,225;0,502)

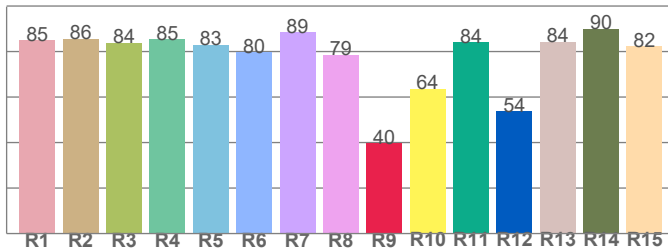
CIE 1931



CIE 1931 – zoomed on Planckian locus



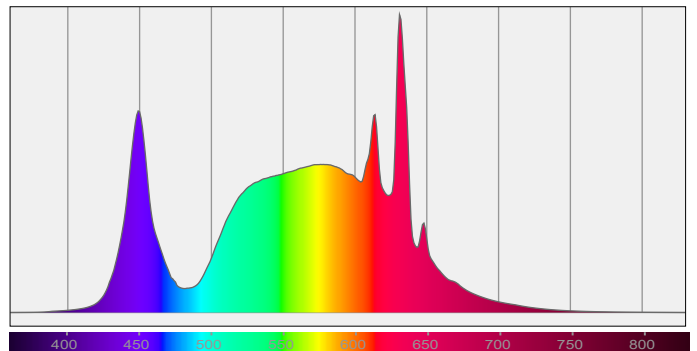
Color Rendering Index per reference color (CIE 1995)



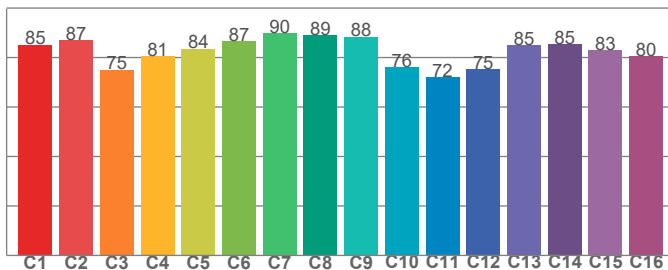
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
85,1	85,6	83,8	85,3	83,0	79,6	88,6	78,6	39,6	63,7	84,1	53,9	84,3	90,0	82,2

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



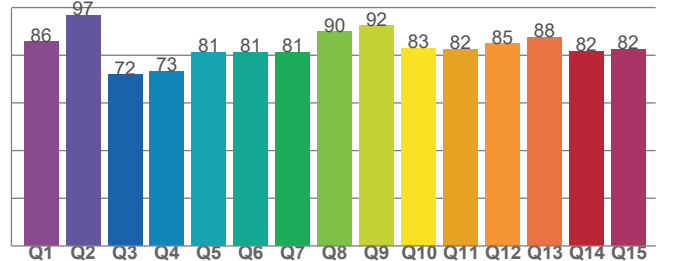
TM30-18 R_f-values per hue bin



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
85,2	86,9	75,1	80,6	83,6	86,6	89,9	89,0	88,4	75,9	71,9	75,1	84,9	85,4	83,0	80,4

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
85,7	96,9	71,8	73,2	81,2	81,4	81,3	89,9	92,4	82,9	82,5	84,9	87,5	81,6	82,5

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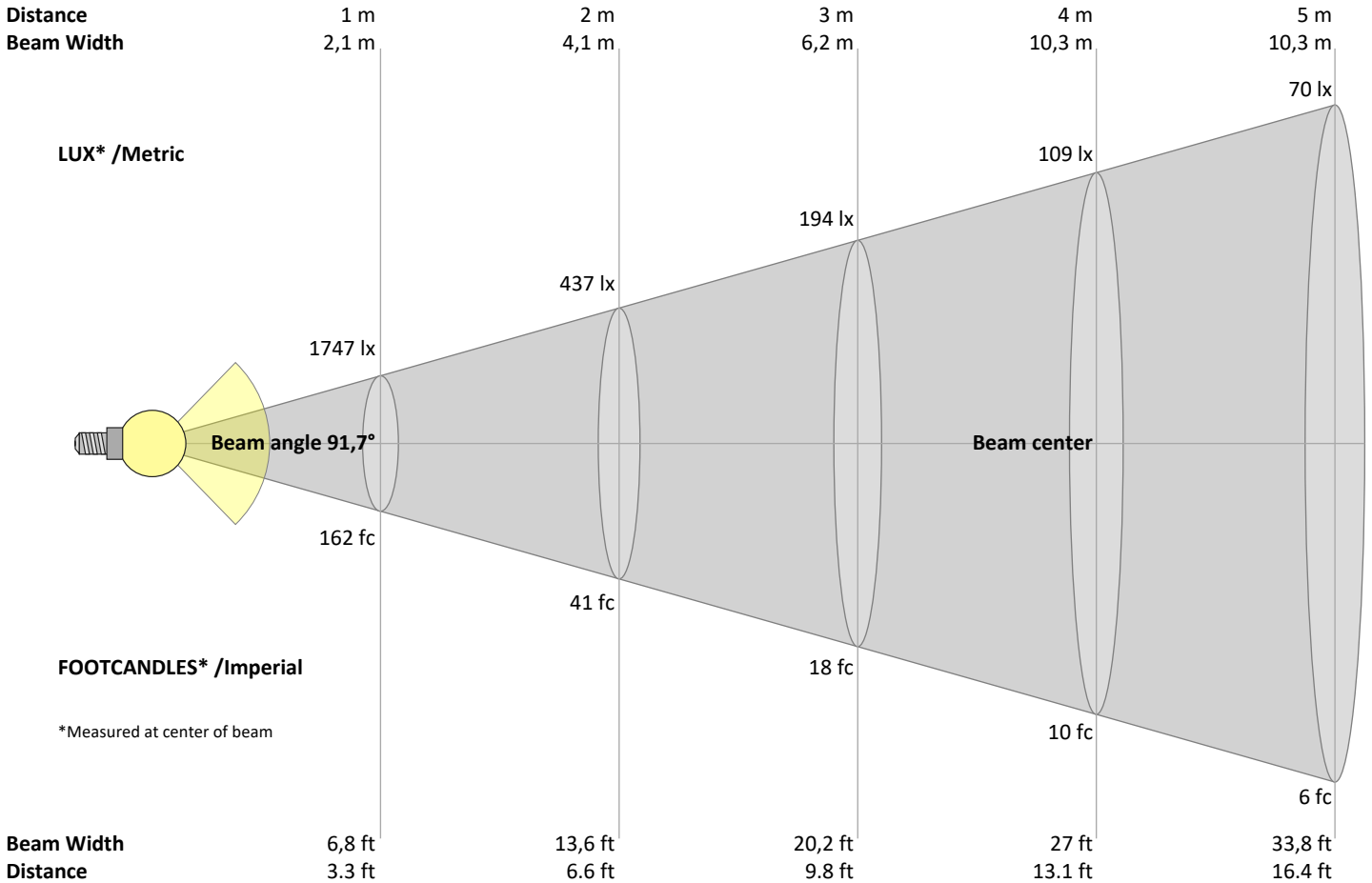
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Operator:



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
1747	437	194	109	70	49	36	27	22	17	14	12	10	9	8	7	6	5	5	4	lux
162,3	40,6	18	10,1	6,5	4,5	3,3	2,5	2	1,6	1,3	1,1	1	0,8	0,7	0,6	0,6	0,5	0,4	0,4	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
1747	1739	1717	1683	1638	1578	1496	1377	1195	945	671	462	330	250	211	186	140	76	20	5	cd
100%	100%	98%	96%	94%	90%	86%	79%	68%	54%	38%	26%	19%	14%	12%	11%	8%	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
1747	1739	1718	1683	1636	1572	1480	1344	1136	883	660	495	378	299	246	197	138	75	21	3	cd
100%	100%	98%	96%	94%	90%	85%	77%	65%	51%	38%	28%	22%	17%	14%	11%	8%	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
1747	1739	1717	1683	1638	1578	1496	1377	1195	945	671	462	330	250	211	186	140	76	20	5	cd
100%	100%	98%	96%	94%	90%	86%	79%	68%	54%	38%	26%	19%	14%	12%	11%	8%	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
1747	1739	1718	1683	1636	1572	1480	1344	1136	883	660	495	378	299	246	197	138	75	21	3	cd
100%	100%	98%	96%	94%	90%	85%	77%	65%	51%	38%	28%	22%	17%	14%	11%	8%	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	19,5	20,6	19,8	20,9	21,2	19,4	20,5	19,6	20,8	21,0
	3H	20,3	21,4	20,7	21,7	21,9	20,4	21,6	20,8	21,8	22,1
	4H	20,8	21,9	21,2	22,2	22,4	21,1	22,2	21,5	22,5	22,7
	6H	21,4	22,3	21,7	22,6	23,0	21,8	22,7	22,1	23,0	23,4
	8H	21,6	22,5	21,9	22,8	23,3	22,0	23,0	22,4	23,3	23,7
	12H	21,7	22,6	22,1	23,0	23,4	22,2	23,1	22,6	23,5	23,9
4H	2H	19,8	20,9	20,2	21,2	21,5	19,7	20,8	20,1	21,1	21,4
	3H	21,1	21,9	21,4	22,3	22,8	21,1	22,0	21,5	22,4	22,8
	4H	21,7	22,5	22,1	22,9	23,5	21,9	22,7	22,3	23,1	23,7
	6H	22,3	23,1	22,9	23,5	23,9	22,7	23,5	23,2	23,8	24,2
	8H	22,6	23,3	23,1	23,7	24,1	23,0	23,7	23,5	24,1	24,5
	12H	22,8	23,4	23,3	23,8	24,3	23,3	23,9	23,8	24,3	24,8
8H	4H	22,0	22,7	22,5	23,1	23,5	22,2	22,9	22,7	23,3	23,7
	6H	22,9	23,4	23,4	23,9	24,4	23,2	23,7	23,7	24,2	24,7
	8H	23,3	23,7	23,8	24,3	24,9	23,6	24,1	24,1	24,6	25,3
	12H	23,6	24,0	24,1	24,5	25,1	24,0	24,4	24,6	24,9	25,5
12H	4H	22,0	22,6	22,5	23,1	23,5	22,2	22,8	22,7	23,2	23,7
	6H	23,0	23,5	23,5	24,0	24,6	23,3	23,7	23,8	24,3	24,9
	8H	23,4	23,8	24,0	24,3	24,9	23,7	24,1	24,3	24,7	25,3

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

S = 1.0H	0,2 / -0,3	0,1 / -0,2
S = 1.5H	0,4 / -0,6	0,4 / -0,4
S = 2.0H	1,0 / -0,9	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	101	98	107	103	99	96	98	96	93	94	92	90	91	89	87	85
2	101	93	87	82	98	91	86	81	88	83	79	84	80	77	81	78	75	73
3	93	83	76	70	90	82	75	69	79	73	68	76	71	67	73	69	65	63
4	86	75	67	60	83	73	66	60	71	64	59	68	63	58	66	61	57	55
5	79	67	59	53	77	66	59	53	64	57	52	62	56	52	60	55	51	49
6	74	61	53	47	72	60	53	47	59	52	46	57	51	46	55	50	45	44
7	69	56	48	42	67	55	47	42	54	47	42	52	46	41	51	45	41	39
8	64	51	43	38	63	51	43	38	49	42	38	48	42	37	47	41	37	35
9	60	47	40	34	59	47	39	34	46	39	34	45	38	34	44	38	34	32
10	56	44	36	31	55	43	36	31	42	36	31	41	35	31	41	35	31	29

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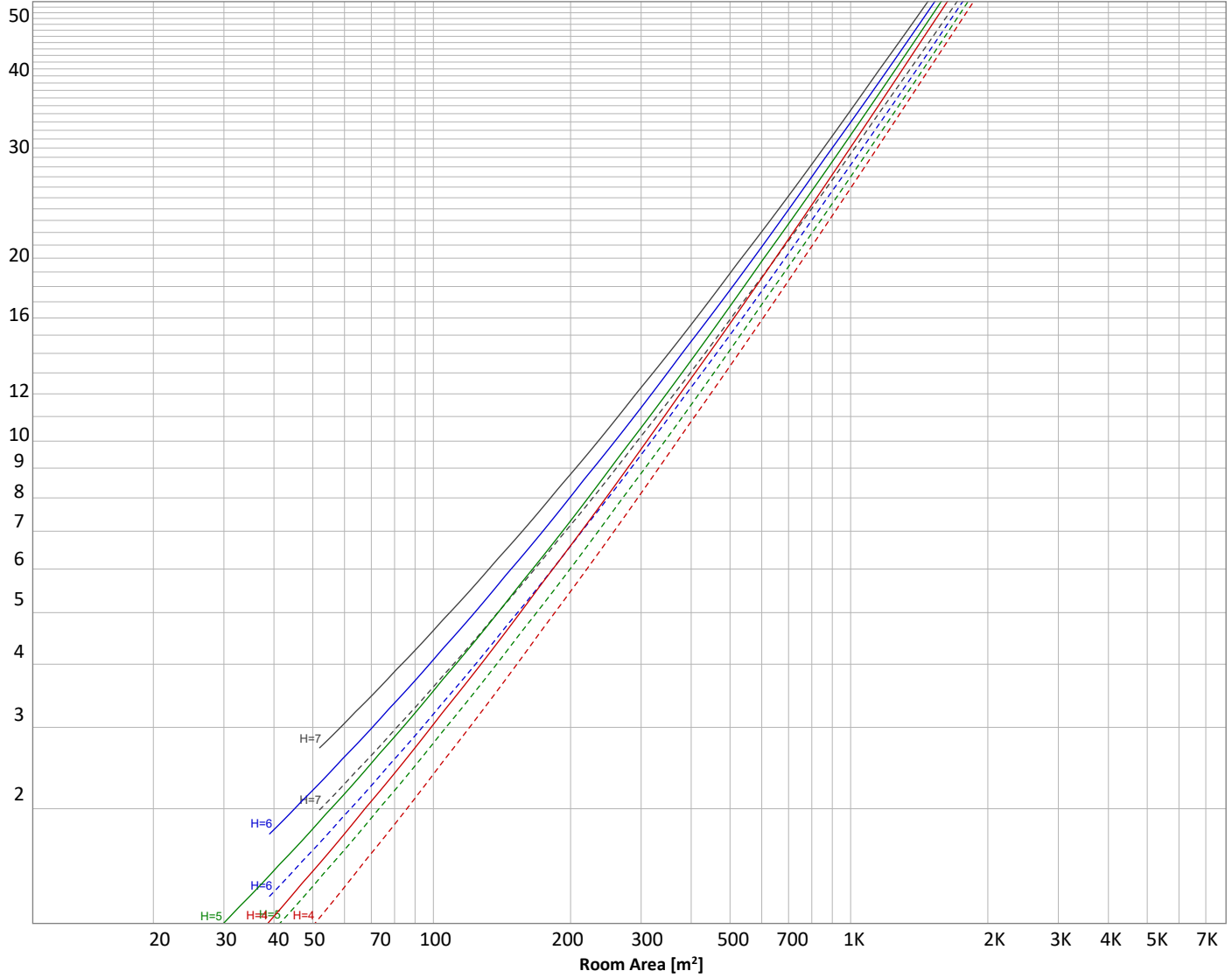
Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 3975 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°
165 lm	476 lm	726 lm	847 lm	705 lm	448 lm	291 lm	203 lm	82,5 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
5,99 lm	4,09 lm	4,28 lm	4,47 lm	4,12 lm	3,72 lm	3,13 lm	2,01 lm	0,718 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	165 lm	4,2%
10-20°	476 lm	12,0%
20-30°	726 lm	18,3%
30-40°	847 lm	21,3%
40-50°	705 lm	17,7%
50-60°	448 lm	11,3%
60-70°	291 lm	7,3%
70-80°	203 lm	5,1%
80-90°	83 lm	2,1%
90-100°	6 lm	0,2%
100-110°	4 lm	0,1%
110-120°	4 lm	0,1%
120-130°	4 lm	0,1%
130-140°	4 lm	0,1%
140-150°	4 lm	0,1%
150-160°	3 lm	0,1%
160-170°	2 lm	0,1%
170-180°	1 lm	0,0%
Total	3975 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	1367 lm	34,4%
0-40°	2214 lm	55,7%
0-60°	3366 lm	84,7%
60-90°	576 lm	14,5%
70-100°	292 lm	7,3%
90-120°	14 lm	0,4%
0-90°	3943 lm	99,2%
90-180°	33 lm	0,8%
0-180°	3975 lm	100,0%

BUG rating

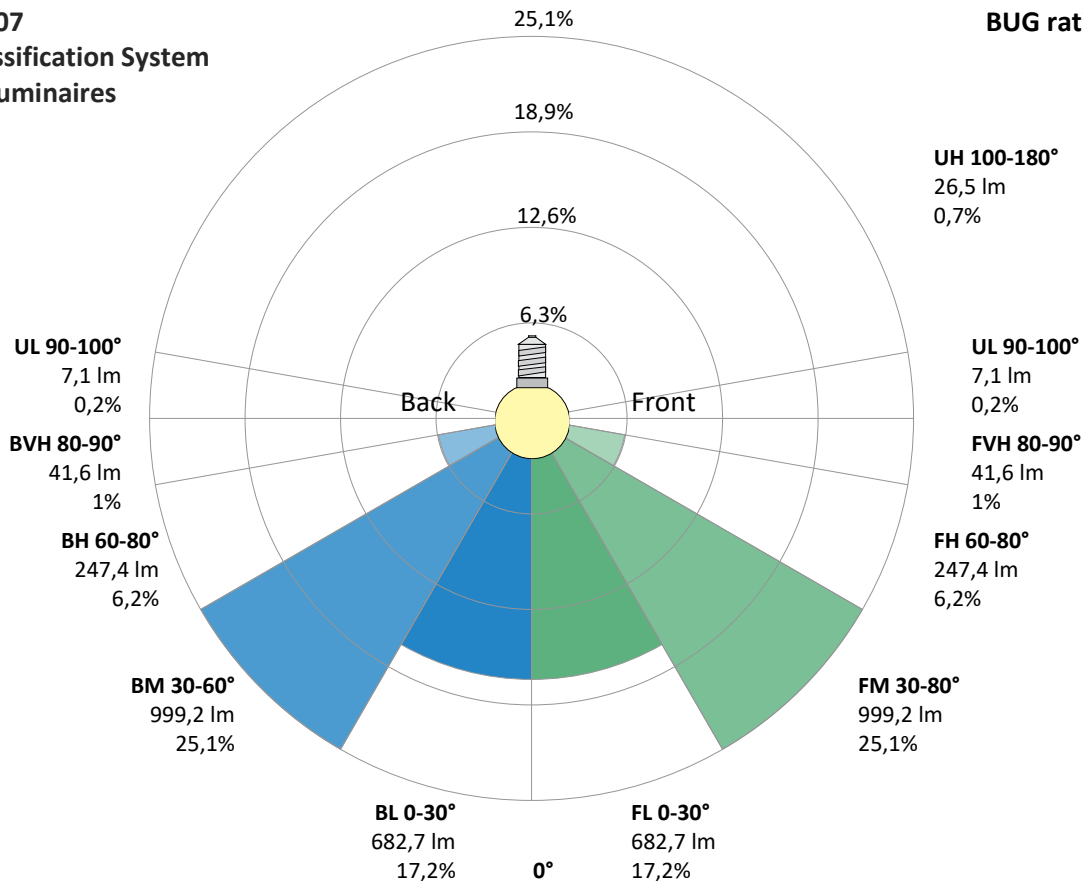
	Lumen	% Total
Forward light		
Low(0-30°)	683 lm	17,2%
Medium(30-60°)	999 lm	25,1%
High(60-80°)	247 lm	6,2%
Very high(80-90°)	42 lm	1,0%
Back light		
Low(0-30°)	683 lm	17,2%
Medium(30-60°)	999 lm	25,1%
High(60-80°)	247 lm	6,2%
Very high(80-90°)	42 lm	1,0%
Uplight		
Low(90-100°)	7 lm	0,2%
High(100-180°)	26 lm	0,7%

Intensity peaks

Max intensity	1749 cd
Intensity, 90°	20 cd
Intensity, 0°	1747 cd

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

BUG rating B2 U2 G1



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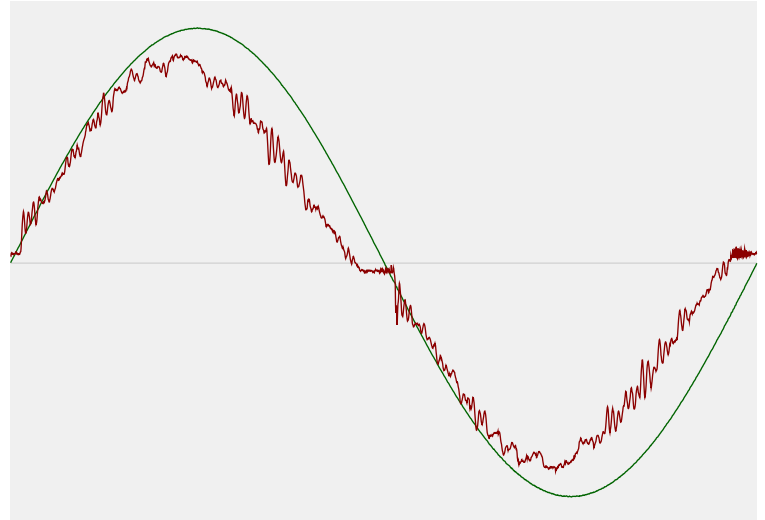


Power Details

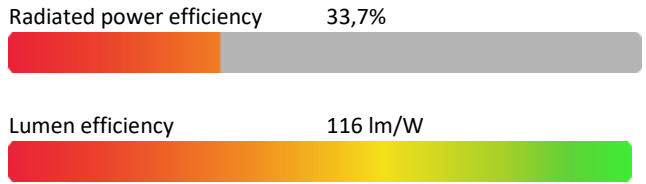
Input Power

Power feed to light source	34,4 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,153 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	35,18 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,98
Total harmonic distortion of the current	11,05%
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	3994 K
CCT shift	+6 K
CCT end	4000 K

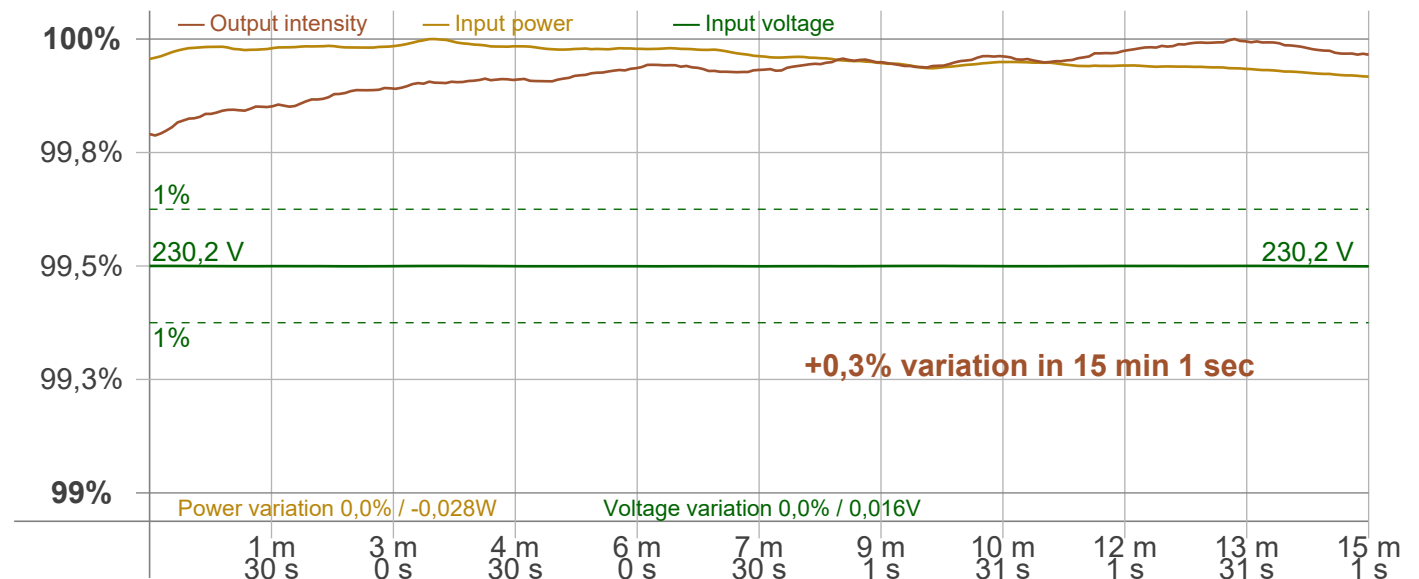
Warmup Result

Total warmup time	Lamp stabilized in 15 min 1 sec
Warmup variation	+0,3%

Output Change

Output start	3967 lm
Output change	+8 lm
Output end	3975 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 0,85 %
 Flicker index 0

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

JA8/10 40 Hz 0,03 %
 JA8/10 90 Hz 0,04 %
 JA8/10 200 Hz 0,77 %
 JA8/10 400 Hz 0,74 %
 JA8/10 1000 Hz 0,83 %

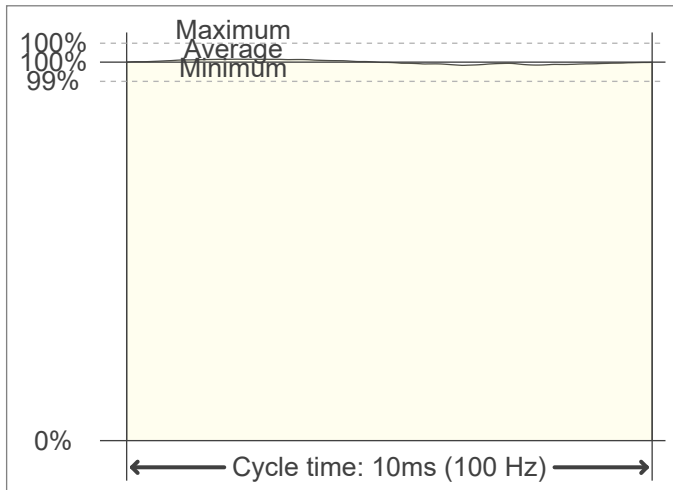
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

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

