

Light Measurement Report

Print date: 11-2-2025

Measurement date and time: 11-2-2025 12:14:07 – Measurement no. VFR-250211-3356-MS

Measurement tracking No. and Link: [VT250211-001533](https://www.viso-systems.com/VT250211-001533)

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

24 planes – 15°
5°
12,00 m
18,2 W – PF 0,9 – DPF 0,99
230 V – 0,087 A
50 Hz
Lamp stabilized in 15 min 3 sec – 2,0%

Tested Light Source

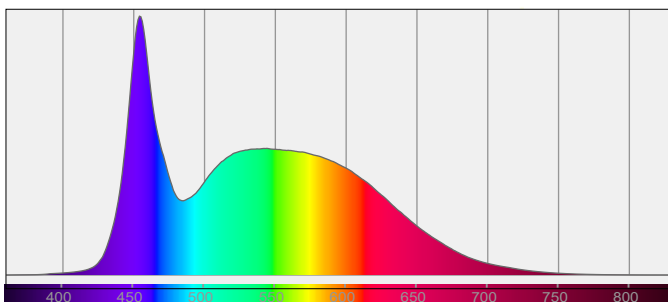
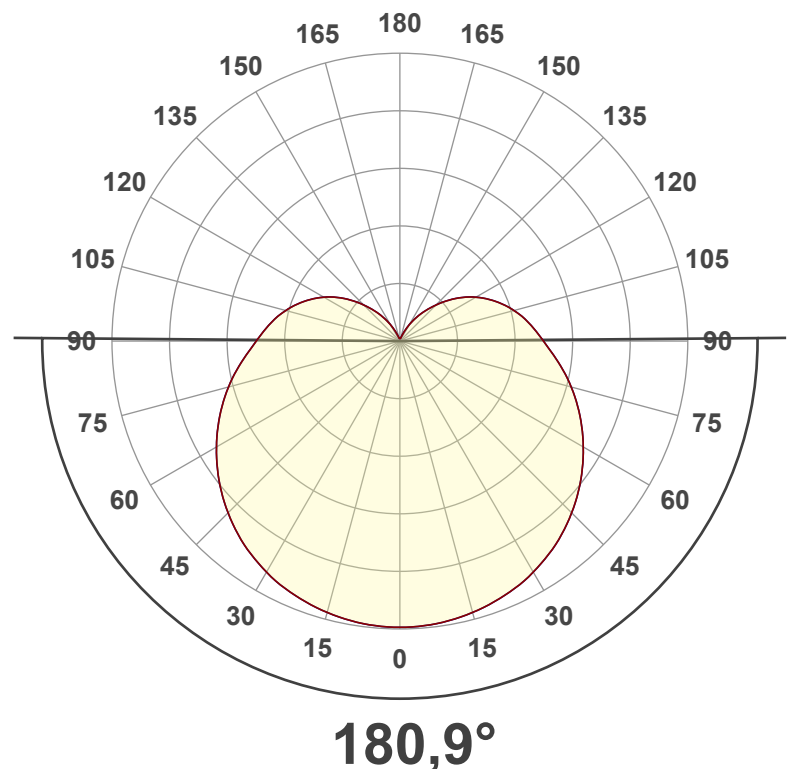
Product Name
Item No. and Manufacturer
Product Description (line 1)

848032-6000K
848032-6000K – Dutchfulfillment
LED TL-BUIS | T8 | YMIR | 120CM | 18W

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

2476 lm – 27,33% / 72,67%
136 lm/W
385 cd – 180,9°
CCT = 6000 K / 6582 K
CRI 83,3
 R_f 83,1 – R_g 91,4
Duv 0,0058 – SDCM 15,0
SVM n/a – PstLM n/a



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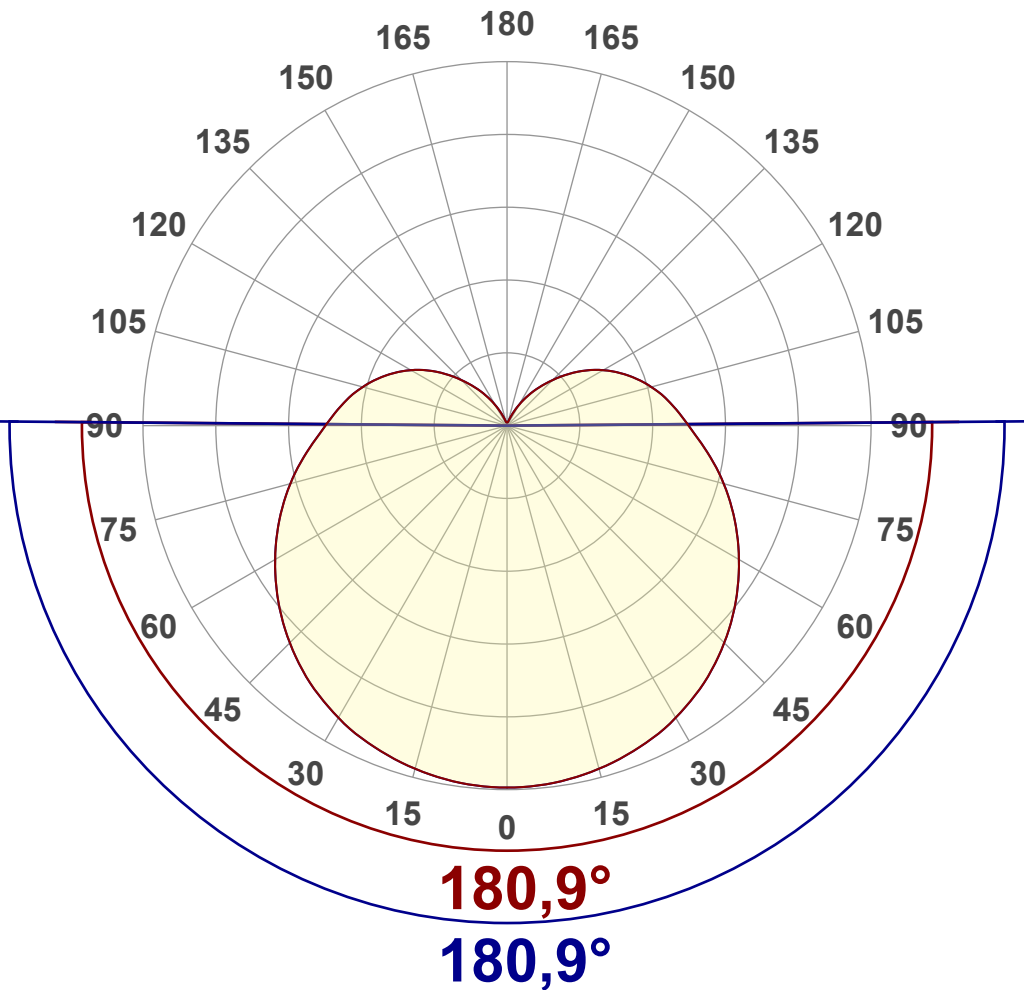
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2476 lm
Lumen Up% / Down%	27,33% / 72,67%
Peak Intensity	385 cd
Beam Angle (50%)	180,9°
Beam Angle (90%)	180,9°
Beam Angle (10%)	180,9°

Cut-off Angle

Average 2,5%	315,9°
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Field Angle

Average 10%	290,4°
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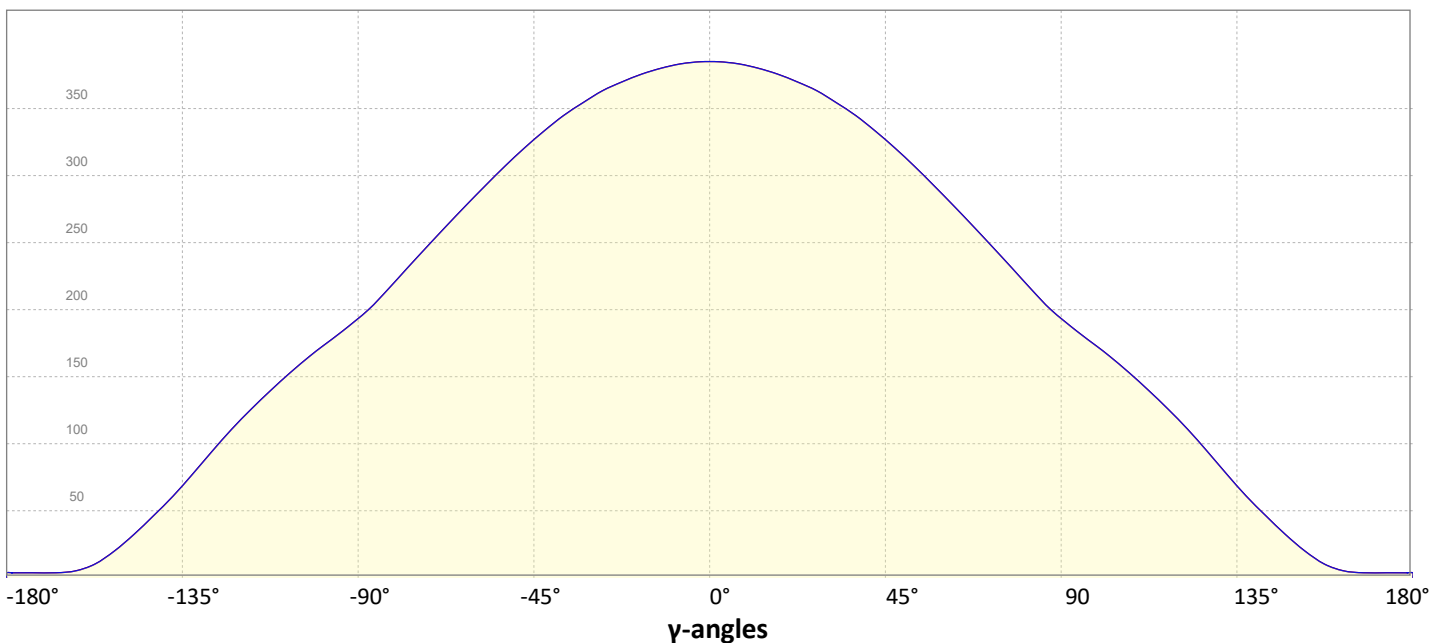
Intensity Ratio

In 120° cone	42,5%
In 90° cone	26,5%

C000-C180

C090-C270

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



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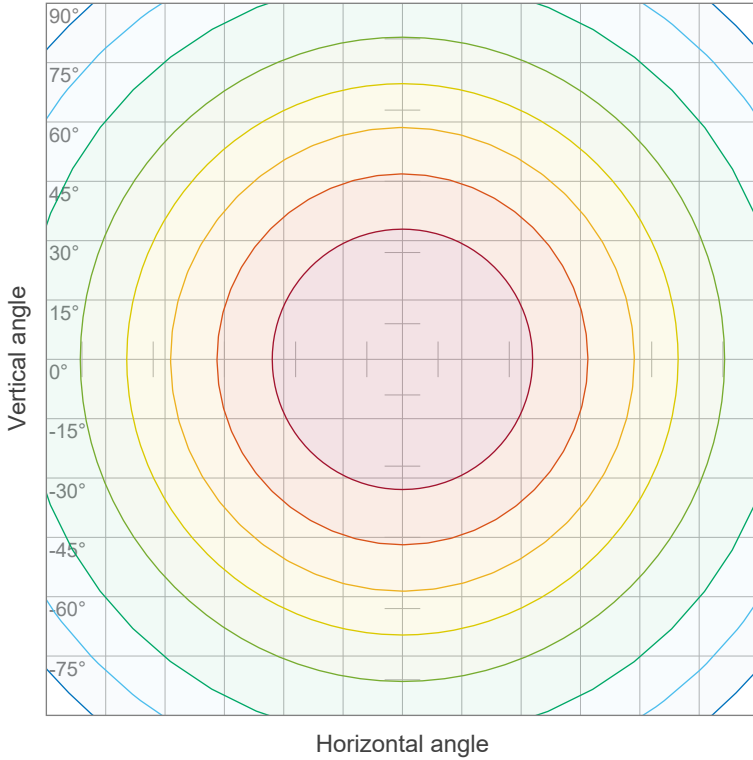
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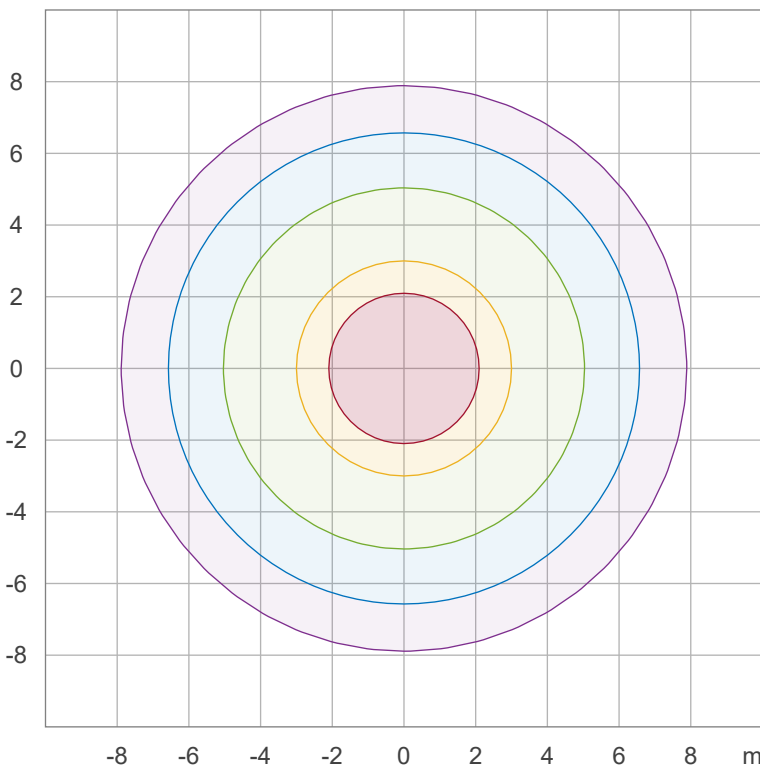
Iso-intensity Diagram (Iso-candela)



90 %	346,4 cd
80 %	307,9 cd
70 %	269,4 cd
60 %	230,9 cd
50 %	192,4 cd
40 %	153,9 cd
30 %	115,5 cd
20 %	77,0 cd
10 %	38,5 cd

Peak intensity: 384,9 cd
Number of c-planes: 24

Iso-illuminance Diagram (Iso-lux)



50,0 %	21,4 lx
30,0 %	12,8 lx
10,0 %	4,3 lx
5,0 %	2,1 lx
3,0 %	1,3 lx

Peak illuminance: 42,8 lx
Mounting height: 3,0 m
Number of c-planes: 24

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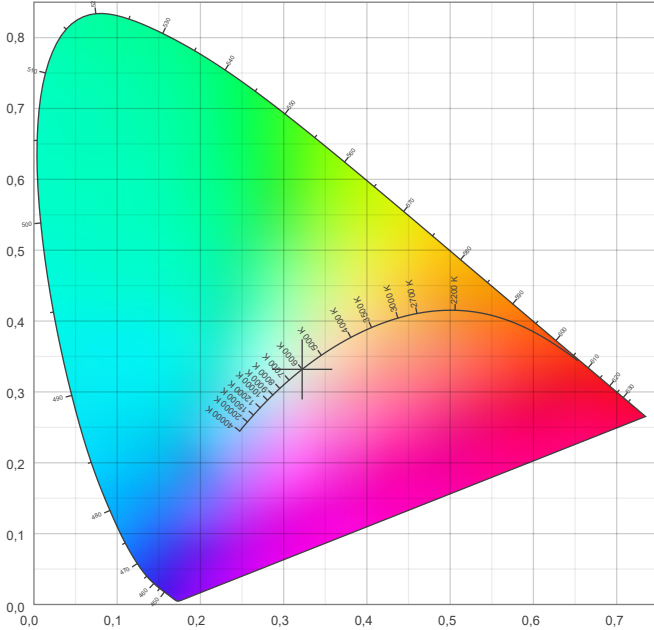


Color details

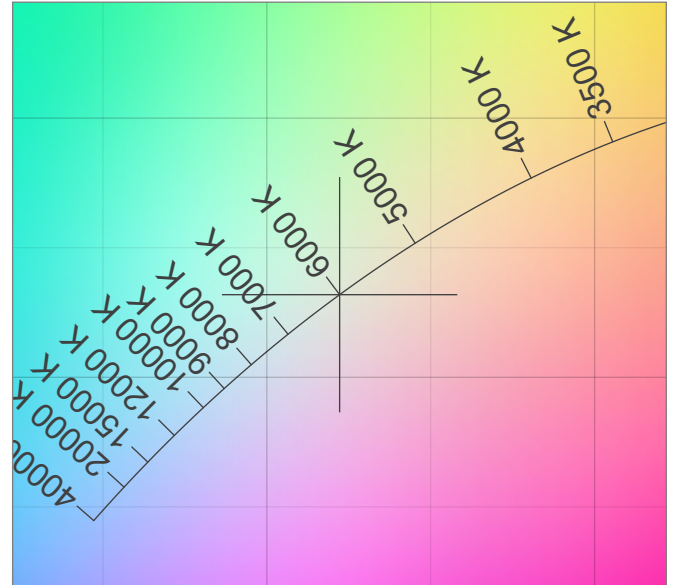
Correlated Color Temperature, Target CCT = 6000 K
 Correlated Color Temperature, Measured CCT = 6582 K
 Color Rendering Index CRI 83,3
 Color Rendering Index, R9 (red component) R9 = 6,1
 Color Rendering TM30-18 R_f 83,1 – R_g 91,4
 Color Quality Scale CQS = 82,0

MacAdam Steps
 Color coordinates CIE 1931 (x;y) = (0,322;0,332)
 Color coordinate CIEs 1960 (u;v) = (0,203;0,314)
 Color deviation from BBL Duv = 0,0058
 Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,203;0,471)

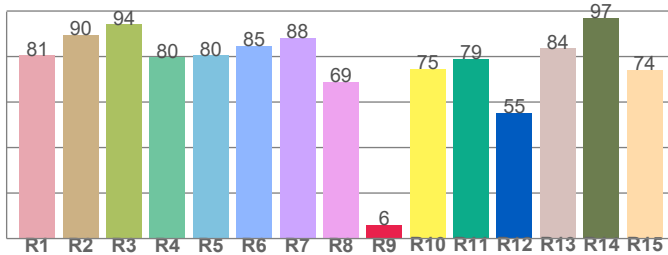
CIE 1931



CIE 1931 – zoomed on Planckian locus



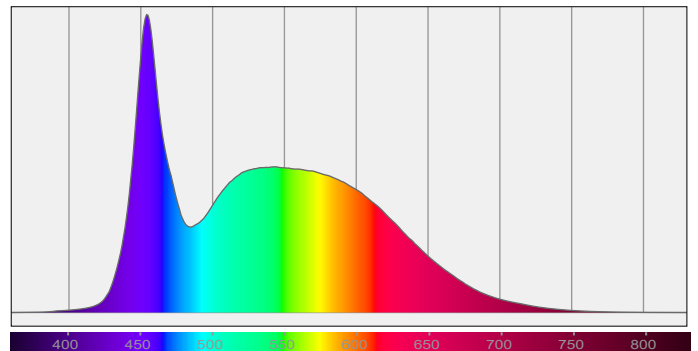
Color Rendering Index per reference color (CIE 1995)



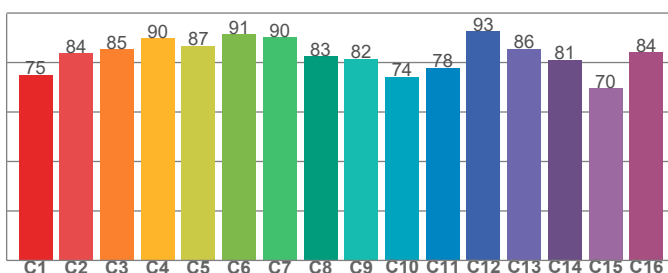
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
80,6	89,6	94,1	79,8	80,5	84,7	88,3	68,8	6,1	74,7	78,9	55,3	83,6	97,1	74,2

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



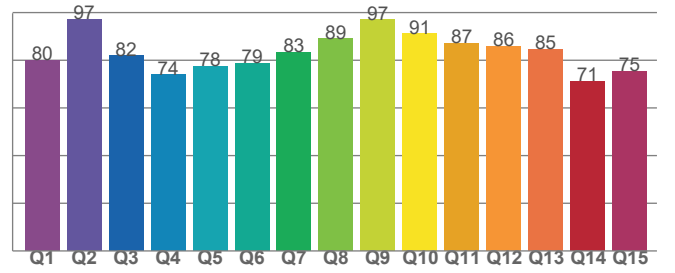
TM30-18 R_f-values per hue bin



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
75,0	83,8	85,3	89,8	86,8	91,5	90,2	82,5	81,6	74,3	77,8	92,7	85,6	81,2	69,6	84,1

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
80,1	97,2	81,9	73,9	77,6	78,9	83,3	89,0	97,0	91,1	87,1	85,9	84,7	71,1	75,4

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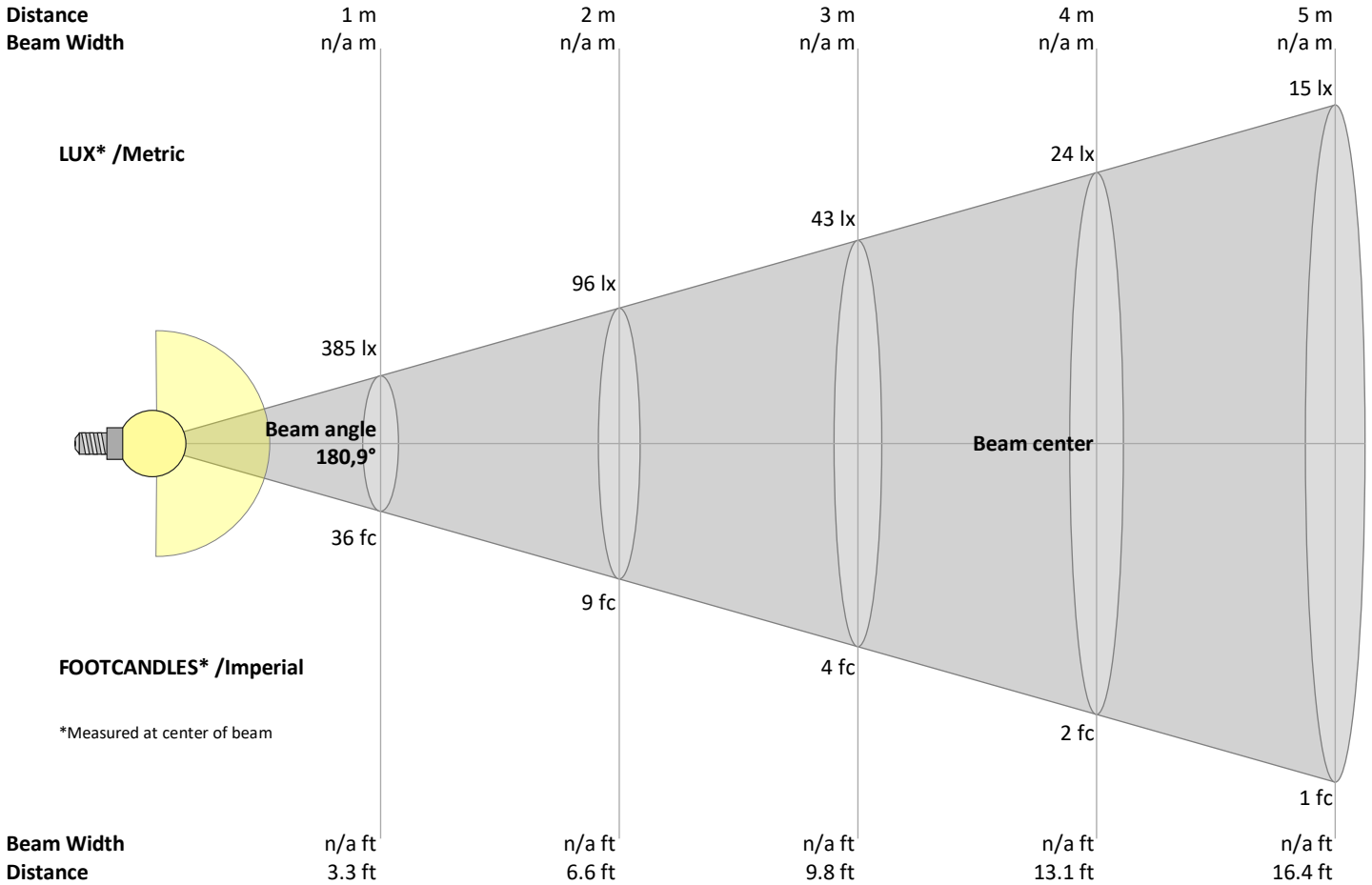
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Beam Details



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
385	96	43	24	15	11	8	6	5	4	3	3	2	2	2	2	1	1	1	1	lux
35,8	8,9	4	2,2	1,4	1	0,7	0,6	0,4	0,4	0,3	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,1	0,1	fc

Intensities in 0° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
385	382	375	364	347	327	302	276	248	219	194	173	151	127	99	69	42	19	5	4	cd
100%	99%	97%	95%	90%	85%	79%	72%	64%	57%	50%	45%	39%	33%	26%	18%	11%	5%	1%	1%	of 0°val

Intensities in 90° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
385	382	375	364	347	327	302	276	248	219	194	173	151	127	99	69	42	19	5	4	cd
100%	99%	97%	95%	90%	85%	79%	72%	64%	57%	50%	45%	39%	33%	26%	18%	11%	5%	1%	1%	of 0°val

Intensities in 180° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
385	382	375	364	347	327	302	276	248	219	194	173	151	127	99	69	42	19	5	4	cd
100%	99%	97%	95%	90%	85%	79%	72%	64%	57%	50%	45%	39%	33%	26%	18%	11%	5%	1%	1%	of 0°val

Intensities in 270° c-plane

0°	9°	18°	27°	36°	45°	54°	63°	72°	81°	90°	99°	108°	117°	126°	135°	144°	153°	162°	171°	γ
385	382	375	364	347	327	302	276	248	219	194	173	151	127	99	69	42	19	5	4	cd
100%	99%	97%	95%	90%	85%	79%	72%	64%	57%	50%	45%	39%	33%	26%	18%	11%	5%	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	20,4	21,5	21,1	22,2	23,0	19,4	20,6	20,1	21,2	22,0
	3H	23,1	24,2	23,8	24,9	25,6	21,7	22,8	22,4	23,5	24,2
	4H	24,6	25,6	25,3	26,3	27,1	22,9	23,9	23,6	24,6	25,4
	6H	26,3	27,2	27,0	27,9	28,8	24,1	25,0	24,8	25,7	26,6
	8H	27,2	28,1	27,9	28,8	29,7	24,7	25,6	25,4	26,3	27,1
	12H	28,2	29,2	28,9	29,9	30,7	25,2	26,2	25,9	26,9	27,7
4H	2H	21,1	22,1	21,8	22,8	23,6	20,3	21,4	21,1	22,1	22,9
	3H	24,0	25,0	24,7	25,6	26,5	22,8	23,8	23,6	24,5	25,3
	4H	25,5	26,6	26,3	27,1	28,1	24,1	25,2	24,9	25,7	26,6
	6H	27,3	28,1	28,1	28,8	29,7	25,4	26,2	26,2	26,9	27,8
	8H	28,3	29,0	29,1	29,8	30,6	26,1	26,8	26,9	27,5	28,4
	12H	29,5	30,0	30,2	30,9	31,7	26,7	27,3	27,5	28,1	29,0
8H	4H	25,9	26,6	26,7	27,4	28,2	24,7	25,4	25,5	26,2	27,0
	6H	27,9	28,5	28,7	29,3	30,2	26,3	26,8	27,1	27,7	28,6
	8H	29,0	29,5	29,9	30,4	31,4	27,1	27,6	27,9	28,5	29,5
	12H	30,3	30,8	31,2	31,6	32,6	27,9	28,3	28,8	29,2	30,2
12H	4H	26,0	26,5	26,7	27,4	28,3	24,9	25,5	25,7	26,3	27,2
	6H	28,0	28,5	28,9	29,4	30,4	26,5	27,0	27,4	27,9	28,9
	8H	29,2	29,7	30,1	30,5	31,5	27,4	27,9	28,3	28,7	29,7

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

S = 1.0H	0,1 / -0,1	0,1 / 0,0
S = 1.5H	0,1 / -0,1	0,1 / -0,1
S = 2.0H	0,3 / -0,3	0,1 / -0,2

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	113	113	113	113	107	107	107	107	96	96	96	86	86	86	77	77	77	73
1	99	92	86	81	93	87	82	77	78	74	70	69	66	63	61	59	56	52
2	88	78	70	63	83	74	67	60	66	60	55	58	54	49	51	48	44	41
3	79	67	58	51	74	64	55	49	57	50	44	50	45	40	44	40	36	32
4	72	59	49	42	68	56	47	40	50	42	37	44	38	33	39	34	30	27
5	66	52	42	35	62	49	41	34	44	37	31	39	33	28	35	30	25	23
6	61	47	37	30	57	44	35	29	39	32	27	35	29	24	31	26	22	19
7	56	42	33	26	53	40	31	25	36	28	23	32	26	21	28	23	19	17
8	52	38	29	23	49	36	28	22	32	25	20	29	23	19	26	21	17	15
9	48	35	26	20	45	33	25	20	30	23	18	27	21	17	24	19	15	13
10	45	32	24	18	43	30	23	18	27	21	16	25	19	15	22	17	14	12

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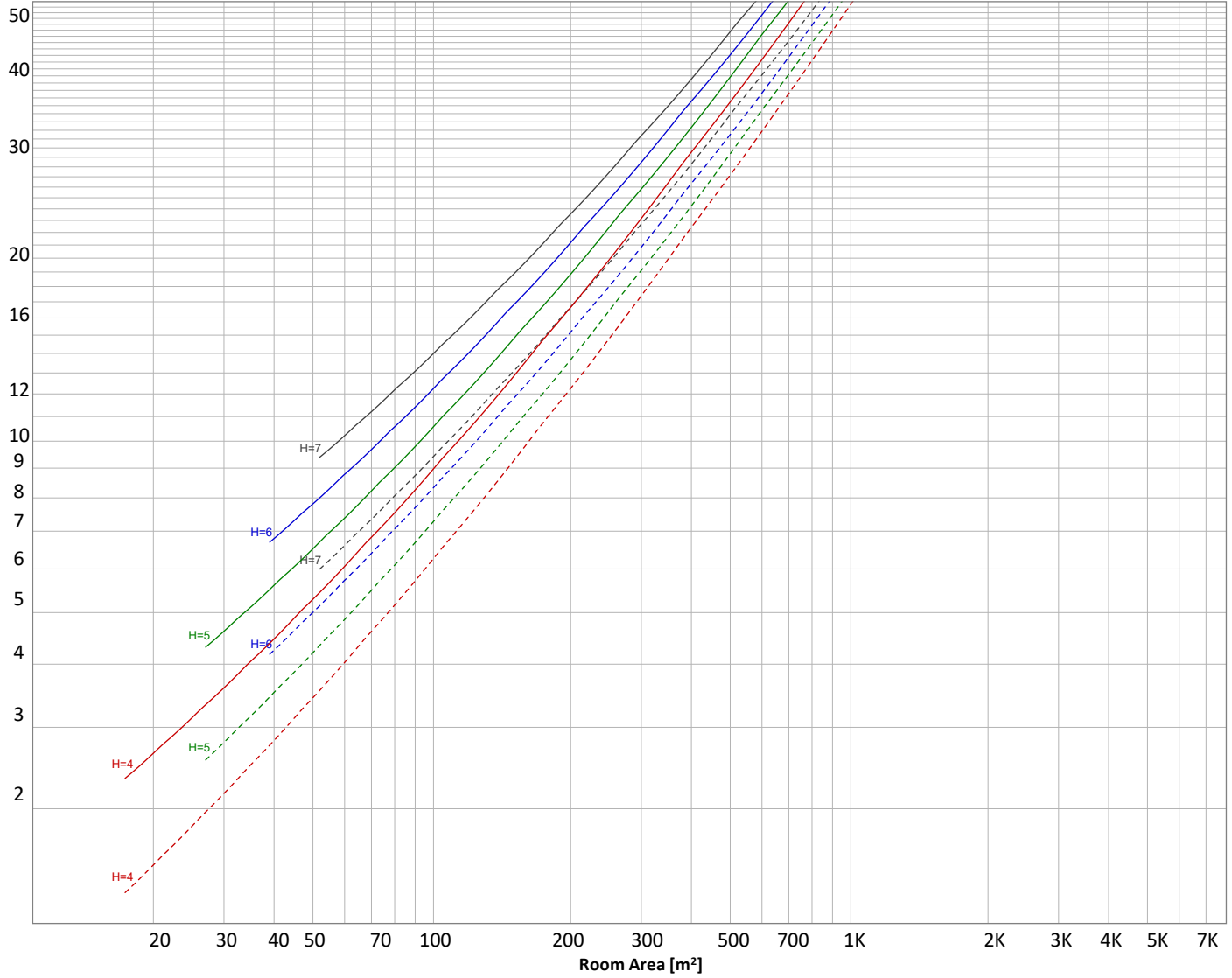
Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 2476 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°
36,6 lm	107 lm	169 lm	219 lm	253 lm	268 lm	268 lm	252 lm	226 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
198 lm	169 lm	132 lm	91,9 lm	53,5 lm	24,8 lm	7,12 lm	1,27 lm	0,350 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	37 lm	1,5%
10-20°	107 lm	4,3%
20-30°	169 lm	6,8%
30-40°	219 lm	8,9%
40-50°	253 lm	10,2%
50-60°	268 lm	10,8%
60-70°	268 lm	10,8%
70-80°	252 lm	10,2%
80-90°	226 lm	9,1%
90-100°	198 lm	8,0%
100-110°	169 lm	6,8%
110-120°	132 lm	5,3%
120-130°	92 lm	3,7%
130-140°	54 lm	2,2%
140-150°	25 lm	1,0%
150-160°	7 lm	0,3%
160-170°	1 lm	0,1%
170-180°	0 lm	0,0%
Total	2476 lm	100,0%

Intensity peaks

Max intensity	385 cd
Intensity, 90°	194 cd
Intensity, 0°	385 cd

Zonal Lumen summary

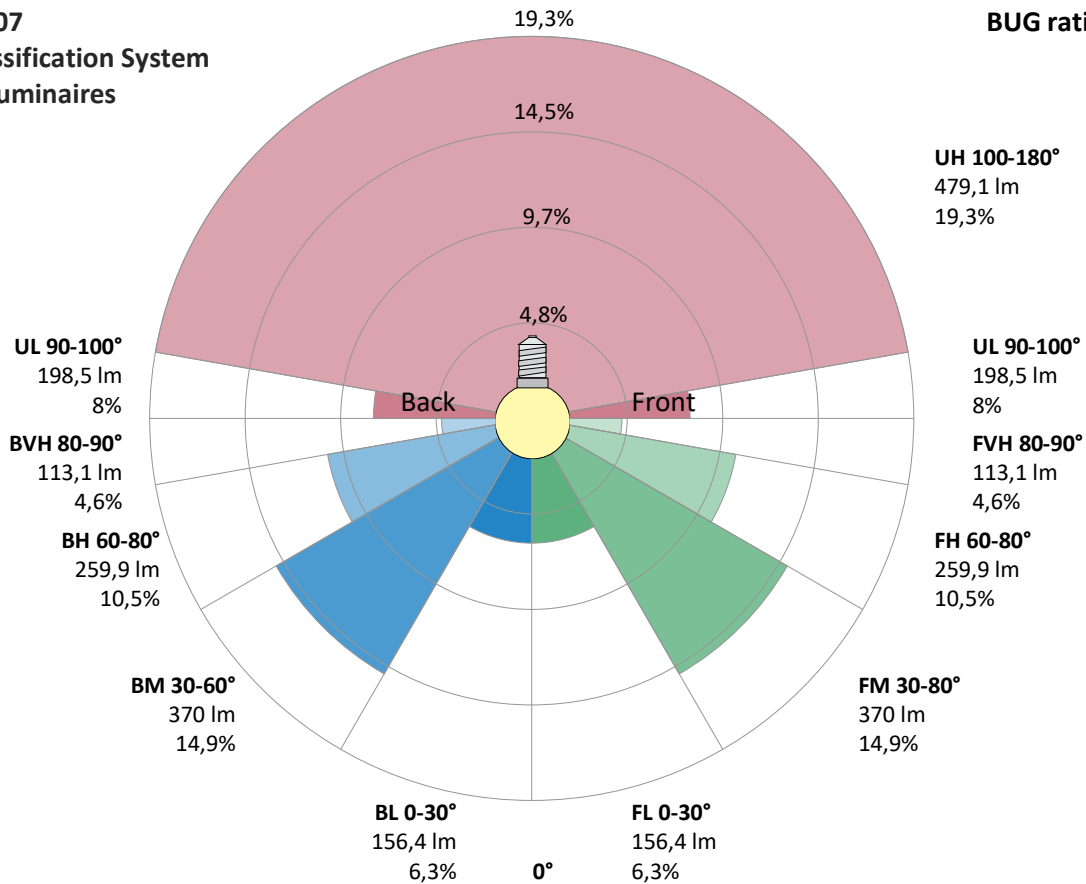
Zone (γ)	Lumen	% Total
0-30°	313 lm	12,6%
0-40°	532 lm	21,5%
0-60°	1054 lm	42,5%
60-90°	746 lm	30,1%
70-100°	676 lm	27,3%
90-120°	498 lm	20,1%
0-90°	1800 lm	72,7%
90-180°	677 lm	27,3%
0-180°	2476 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	156 lm	6,3%
Medium(30-60°)	370 lm	14,9%
High(60-80°)	260 lm	10,5%
Very high(80-90°)	113 lm	4,6%
Back light		
Low(0-30°)	156 lm	6,3%
Medium(30-60°)	370 lm	14,9%
High(60-80°)	260 lm	10,5%
Very high(80-90°)	113 lm	4,6%
Uplight		
Low(90-100°)	199 lm	8,0%
High(100-180°)	479 lm	19,3%

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

BUG rating B1 U3 G2



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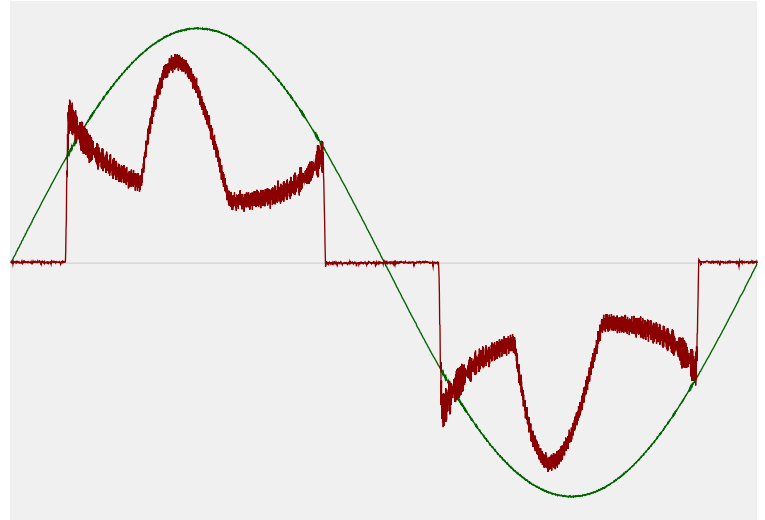


Power Details

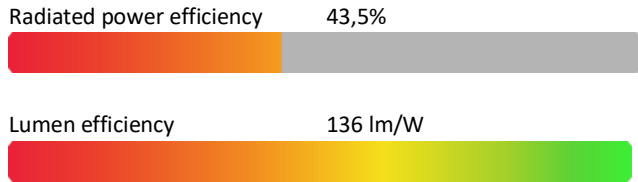
Input Power

Power feed to light source	18,2 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,087 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	20,13 VA
Displacement factor of AC power feed	0,99
Power factor of AC current feed	0,9
Total harmonic distortion of the current	42,4%
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	5977 K
CCT shift	+23 K
CCT end	6000 K

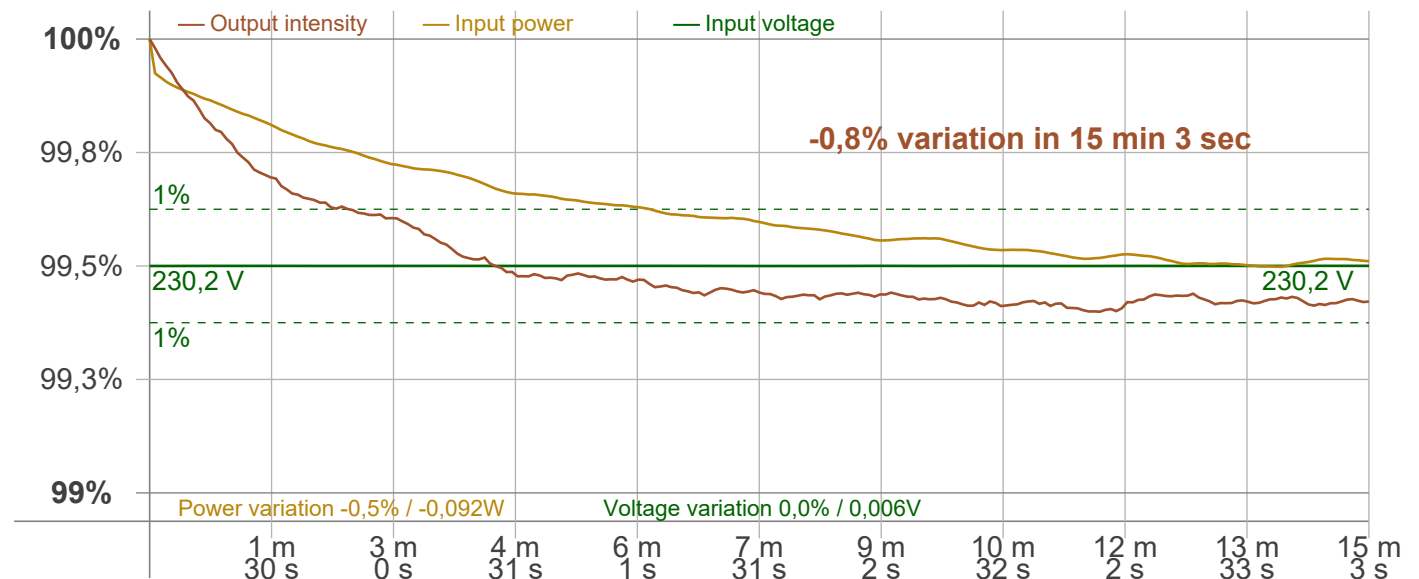
Warmup Result

Total warmup time	Lamp stabilized in 15 min 3 sec
Warmup variation	-0,8%

Output Change

Output start	2493 lm
Output change	-16 lm
Output end	2476 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 n/a samples/s

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

Flicker indices according to Illuminating Engineering Society (IES)

Flicker frequency n/a Hz
 Percent Flicker n/a %
 Flicker index n/a

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

JA8/10 40 Hz n/a %
 JA8/10 90 Hz n/a %
 JA8/10 200 Hz n/a %
 JA8/10 400 Hz n/a %
 JA8/10 1000 Hz n/a %

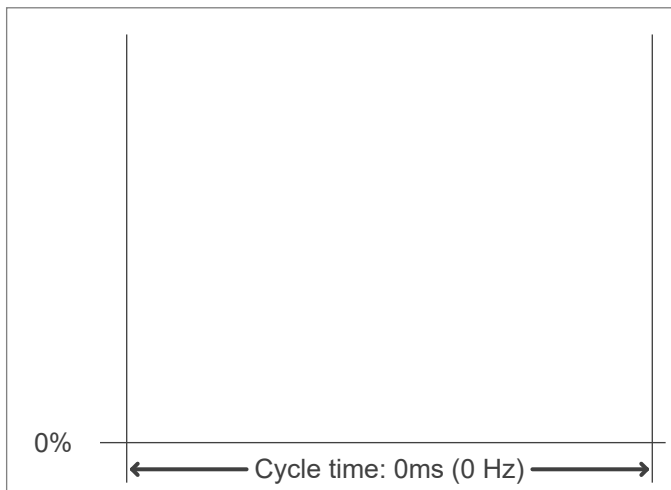
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz) n/a
 SVM value (80 < F < 2000 Hz) n/a

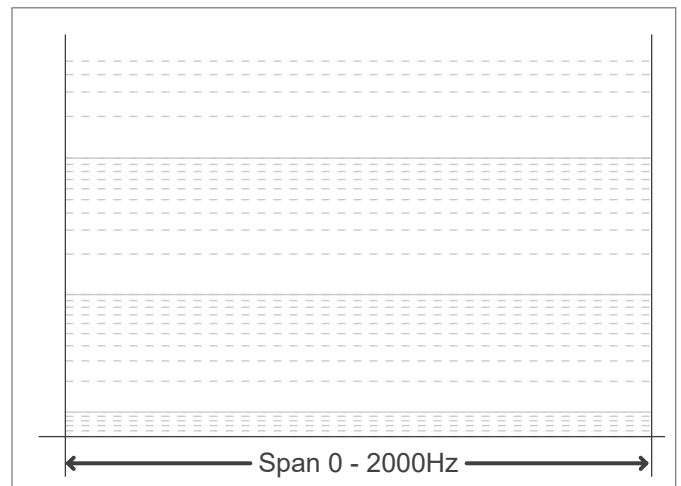
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp n/a

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

