

Light Measurement Report

Print date: 14-1-2025

Measurement date and time: 14-1-2025 16:09:03 – Measurement no. VFR-250114-2938-MS

Measurement tracking No. and Link: [VT250114-008393](#)

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°

1,99 m

2,6 W – PF 0,35 – DPF 0,99

230 V – 0,032 A

50 Hz

Not completed – 2,0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

FUT012-GROEN

FUT012-GROEN – Dutchfulfillment

MI-LIGHT LED LAMP E27 9W RGB+CCT

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

118 lm – 21,55% / 78,45%

46 lm/W

24,3 cd – 135,6°

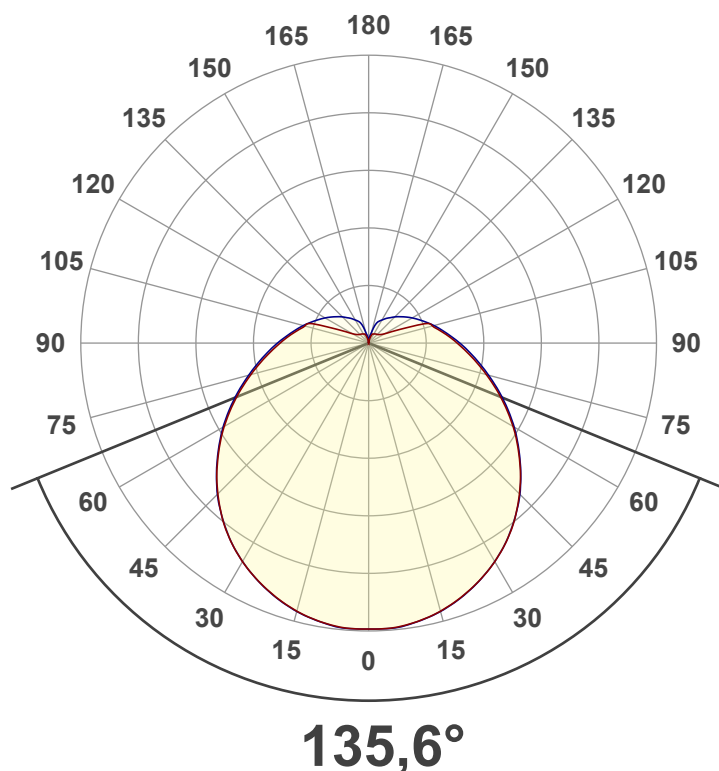
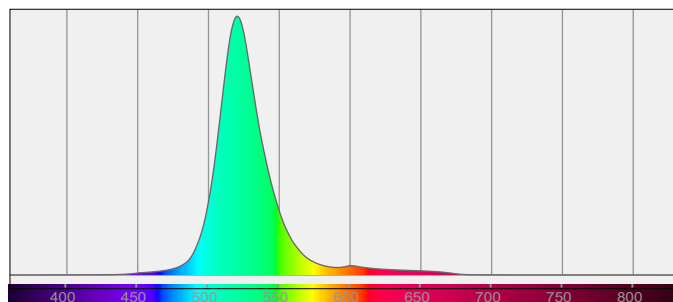
CCT = 0 K / 0 K

CRI 0,0

R_f 0,0 – R_g 0,0

Duv n/a – SDCM n/a

SVM n/a – PstLM n/a



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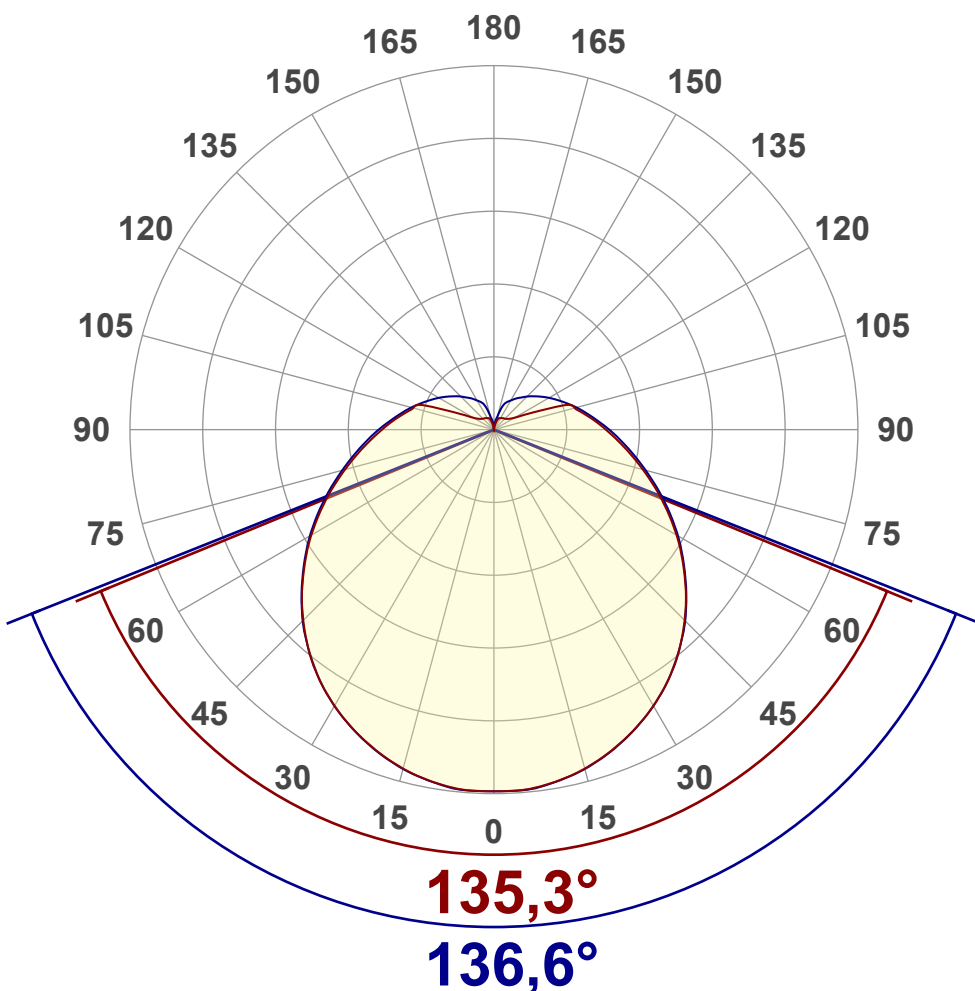
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	118 lm
Lumen Up% / Down%	21,55% / 78,45%
Peak Intensity	24,3 cd
Beam Angle (50%)	135,6°
Beam Angle (90%)	136,6°
Beam Angle (10%)	135,3°

Cut-off Angle

Average 2,5%	335,4°
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Field Angle

Average 10%	282,6°
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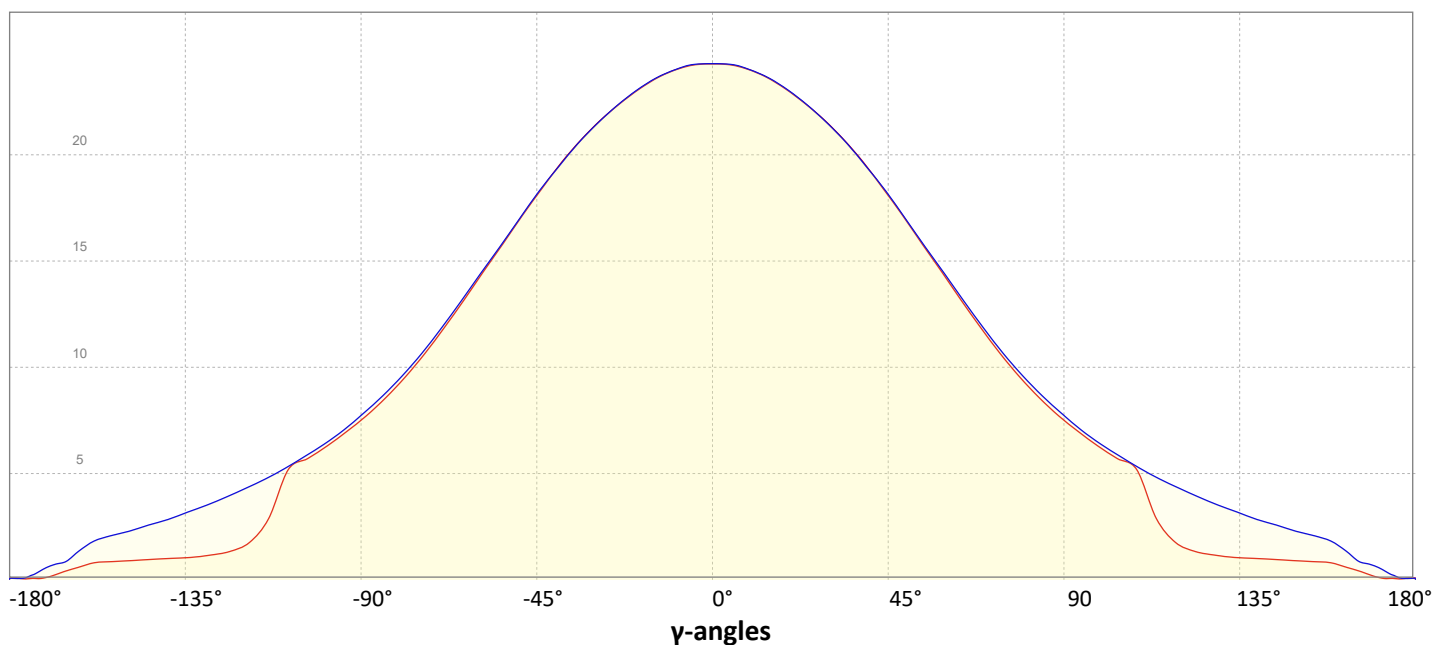
Intensity Ratio

In 120° cone	50,6%
In 90° cone	32,9%

C000-C180

C090-C270

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

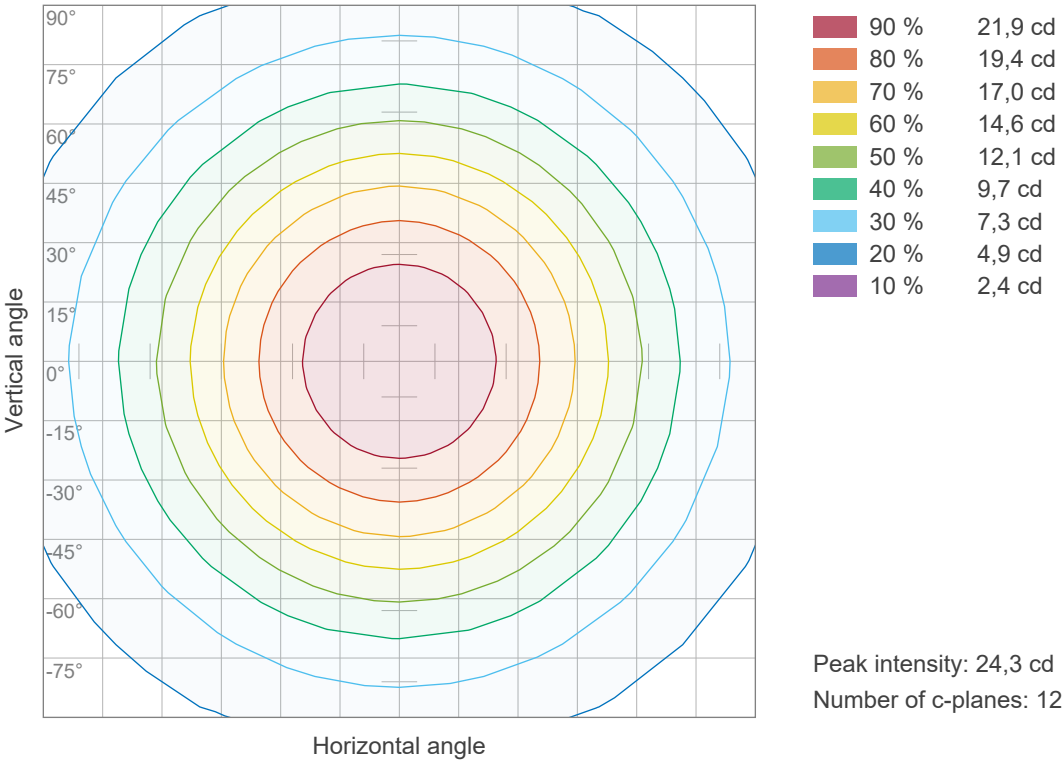


Light Measurement Report

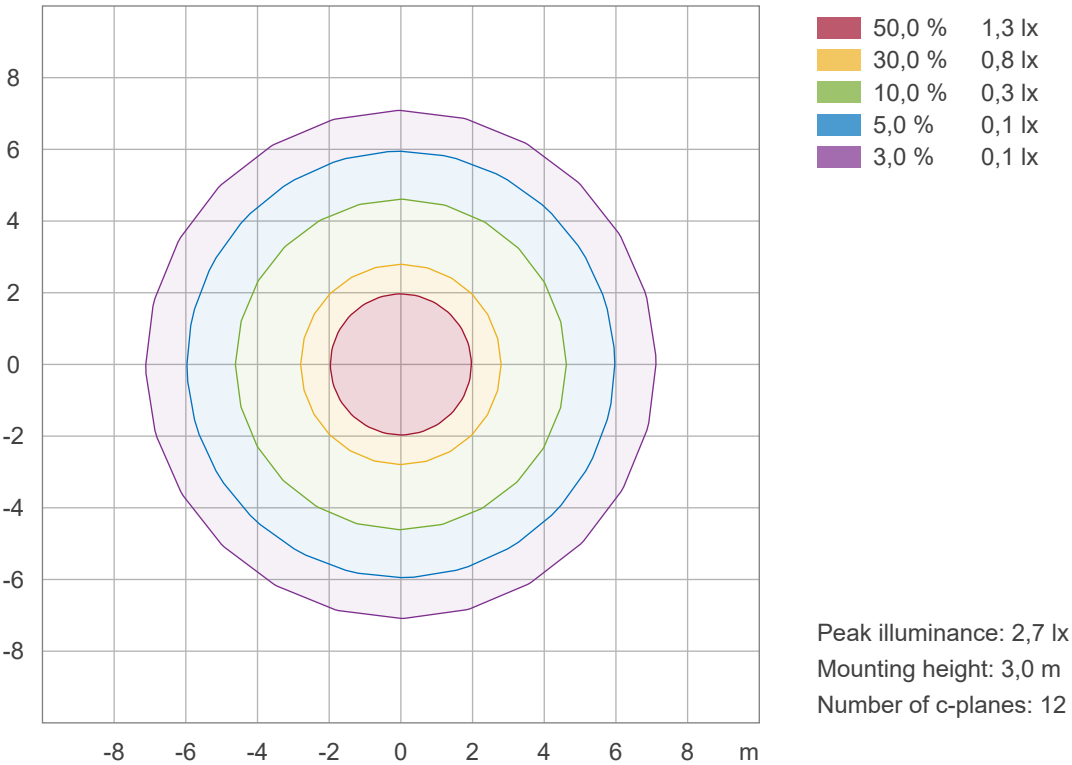
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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Color details

Correlated Color Temperature, Target

Correlated Color Temperature, Measured

Color Rendering Index

Color Rendering Index, R9 (red component)

Color Rendering TM30-18

Color Quality Scale

CCT = 0 K

CCT = 0 K

CRI 0,0

R9 = 0,0

R_f 0,0 – R_g 0,0

CQS = 0,0

MacAdam Steps

Color coordinates CIE 1931

Color coordinate CIEs 1960

Color deviation from BBL

Color coordinate CIEs 1976 (CIELUV)

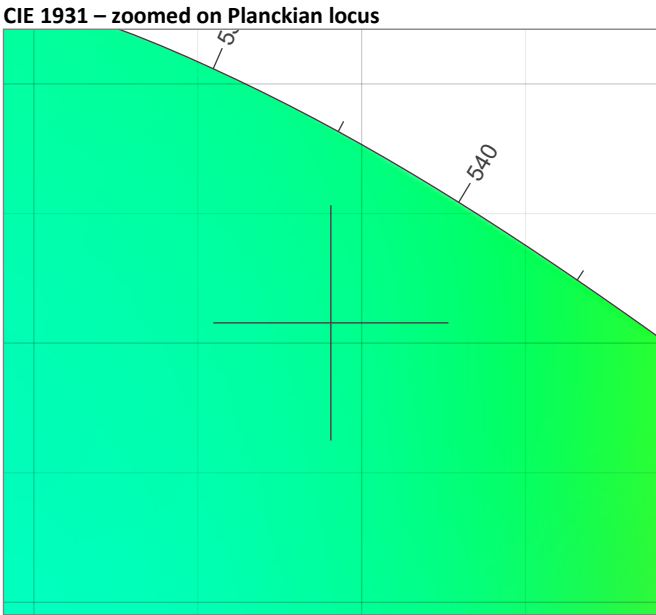
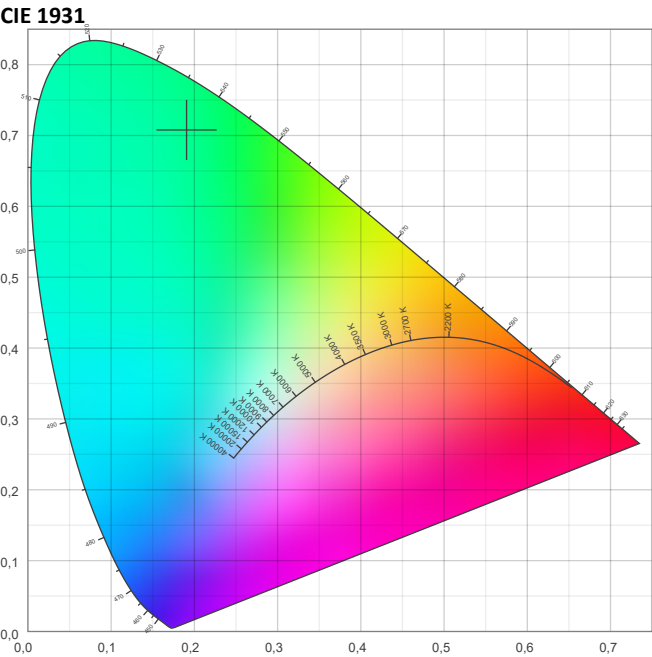
SDCM = n/a

(x;y) = (0,191;0,708)

(u;v) = (0,069;0,382)

Duv = n/a

(u';v') = (0,069;0,573)



Color Rendering Index per reference color (CIE 1995)

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	

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
0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

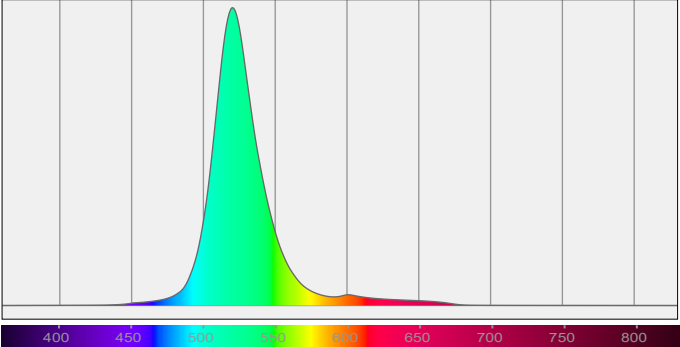
TM30-18 Rf-values per hue bin

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16

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
0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

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



Color Quality Scale by reference color

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	

CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

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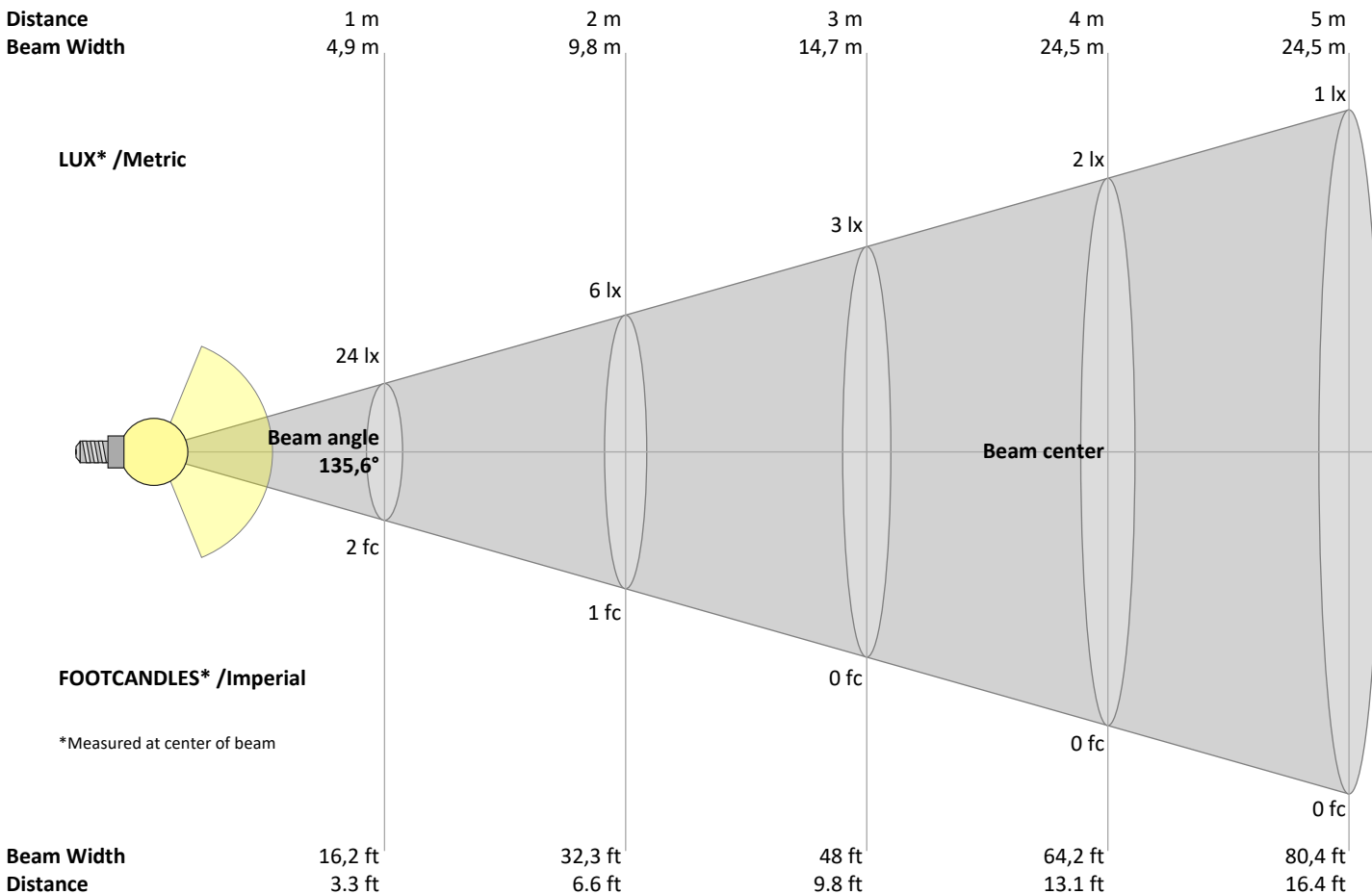
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Beam Details



Beam intensities from 1 – 20 m

[illegible]

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
24,3	24,0	23,2	21,9	20,2	18,1	15,7	13,3	11,1	9,1	7,5	6,3	5,2	2,1	1,2	1,0	1,0	0,9	0,6	0,1	cd
100%	99%	96%	90%	83%	74%	65%	55%	46%	37%	31%	26%	22%	9%	5%	4%	4%	4%	2%	0%	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
24,3	24,0	23,2	21,9	20,2	18,1	15,8	13,5	11,2	9,3	7,7	6,4	5,4	4,5	3,8	3,1	2,6	2,1	1,4	0,5	cd
100%	99%	96%	90%	83%	75%	65%	56%	46%	38%	32%	27%	22%	19%	16%	13%	11%	9%	6%	2%	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
24,3	24,0	23,2	21,9	20,2	18,1	15,7	13,3	11,1	9,1	7,5	6,3	5,2	2,1	1,2	1,0	1,0	0,9	0,6	0,1	cd
100%	99%	96%	90%	83%	74%	65%	55%	46%	37%	31%	26%	22%	9%	5%	4%	4%	4%	2%	0%	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
24,3	24,0	23,2	21,9	20,2	18,1	15,8	13,5	11,2	9,3	7,7	6,4	5,4	4,5	3,8	3,1	2,6	2,1	1,4	0,5	cd
100%	99%	96%	90%	83%	75%	65%	56%	46%	38%	32%	27%	22%	19%	16%	13%	11%	9%	6%	2%	of 0°val

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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	15,5	16,6	16,1	17,2	17,9	15,5	16,7	16,1	17,3	17,9
	3H	17,1	18,3	17,8	18,9	19,5	17,2	18,3	17,9	18,9	19,5
	4H	17,9	19,0	18,6	19,6	20,3	18,0	19,0	18,7	19,7	20,3
	6H	18,7	19,7	19,3	20,3	21,0	18,8	19,7	19,4	20,4	21,1
	8H	19,1	20,0	19,7	20,6	21,4	19,1	20,1	19,8	20,7	21,5
	12H	19,4	20,4	20,0	21,0	21,8	19,5	20,5	20,1	21,0	21,8
4H	2H	16,1	17,2	16,8	17,8	18,5	16,1	17,2	16,8	17,8	18,5
	3H	18,0	19,0	18,7	19,6	20,4	18,0	19,1	18,7	19,6	20,4
	4H	18,9	20,0	19,6	20,5	21,3	18,9	20,0	19,7	20,5	21,4
	6H	19,8	20,6	20,5	21,3	22,0	19,9	20,7	20,6	21,3	22,1
	8H	20,2	20,9	21,0	21,6	22,4	20,3	21,0	21,1	21,7	22,5
	12H	20,6	21,2	21,4	22,0	22,8	20,7	21,3	21,5	22,1	22,9
8H	4H	19,3	20,0	20,0	20,7	21,4	19,3	20,0	20,0	20,7	21,5
	6H	20,4	20,9	21,1	21,7	22,6	20,5	21,0	21,2	21,8	22,6
	8H	21,0	21,5	21,7	22,3	23,2	21,0	21,5	21,8	22,3	23,3
	12H	21,5	22,0	22,3	22,8	23,6	21,6	22,0	22,4	22,8	23,7
12H	4H	19,3	19,9	20,0	20,7	21,5	19,3	19,9	20,1	20,7	21,5
	6H	20,5	21,0	21,3	21,8	22,8	20,6	21,1	21,3	21,9	22,8
	8H	21,2	21,6	22,0	22,4	23,3	21,2	21,7	22,0	22,5	23,3
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		0,1 / -0,1					0,1 / -0,1				
S = 1.5H		0,1 / -0,1					0,1 / -0,1				
S = 2.0H		0,2 / -0,3					0,2 / -0,3				

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	114	114	114	114	109	109	109	109	99	99	99	90	90	90	82	82	82	78
1	101	95	89	84	96	90	85	81	82	78	75	74	71	68	67	65	63	59
2	90	81	73	66	86	77	70	64	70	64	59	63	59	55	57	54	50	47
3	82	70	61	54	77	67	59	52	61	54	48	55	50	45	50	45	41	38
4	74	62	52	45	70	59	50	44	54	46	41	49	43	38	44	39	35	32
5	68	55	45	38	65	52	44	37	48	40	35	43	37	32	39	34	30	27
6	63	49	40	33	59	47	38	32	43	35	30	39	33	28	36	30	26	24
7	58	44	35	29	55	42	34	28	39	32	26	35	29	25	32	27	23	21
8	54	40	31	25	51	38	30	25	35	28	23	32	26	22	30	24	20	18
9	50	37	28	23	48	35	27	22	32	26	21	30	24	20	27	22	18	16
10	47	34	26	20	45	32	25	20	30	23	19	28	22	18	25	20	17	15

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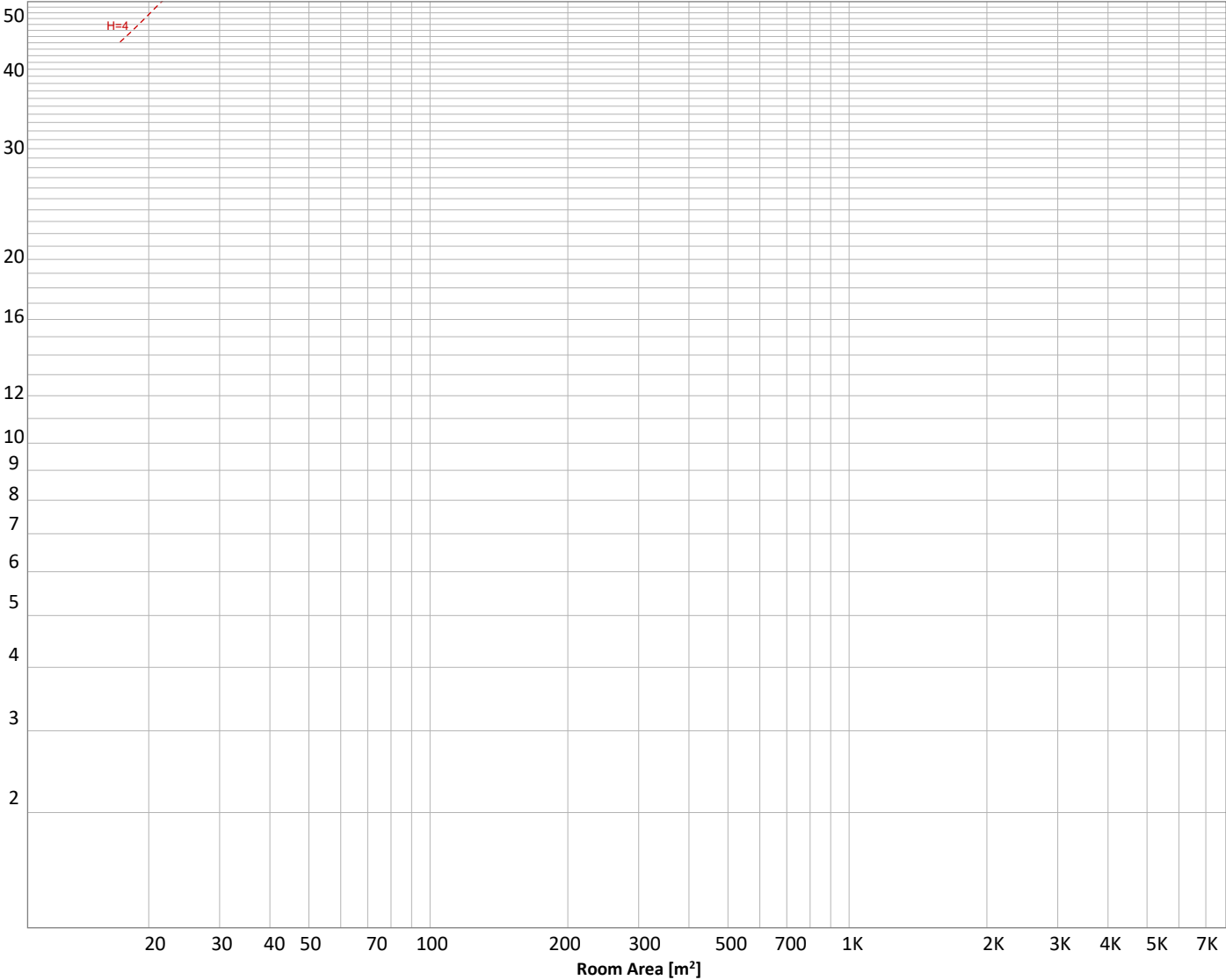
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 118 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°
2,30 lm	6,65 lm	10,3 lm	12,8 lm	14,0 lm	13,9 lm	12,7 lm	11,0 lm	9,19 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
7,49 lm	5,97 lm	4,30 lm	3,05 lm	2,14 lm	1,41 lm	0,824 lm	0,277 lm	0,020 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	2 lm	1,9%
10-20°	7 lm	5,6%
20-30°	10 lm	8,7%
30-40°	13 lm	10,8%
40-50°	14 lm	11,8%
50-60°	14 lm	11,7%
60-70°	13 lm	10,8%
70-80°	11 lm	9,3%
80-90°	9 lm	7,8%
90-100°	7 lm	6,3%
100-110°	6 lm	5,0%
110-120°	4 lm	3,6%
120-130°	3 lm	2,6%
130-140°	2 lm	1,8%
140-150°	1 lm	1,2%
150-160°	1 lm	0,7%
160-170°	0 lm	0,2%
170-180°	0 lm	0,0%
Total	118 lm	100,0%

Intensity peaks

Max intensity	24 cd
Intensity, 90°	8 cd
Intensity, 0°	24 cd

Zonal Lumen summary

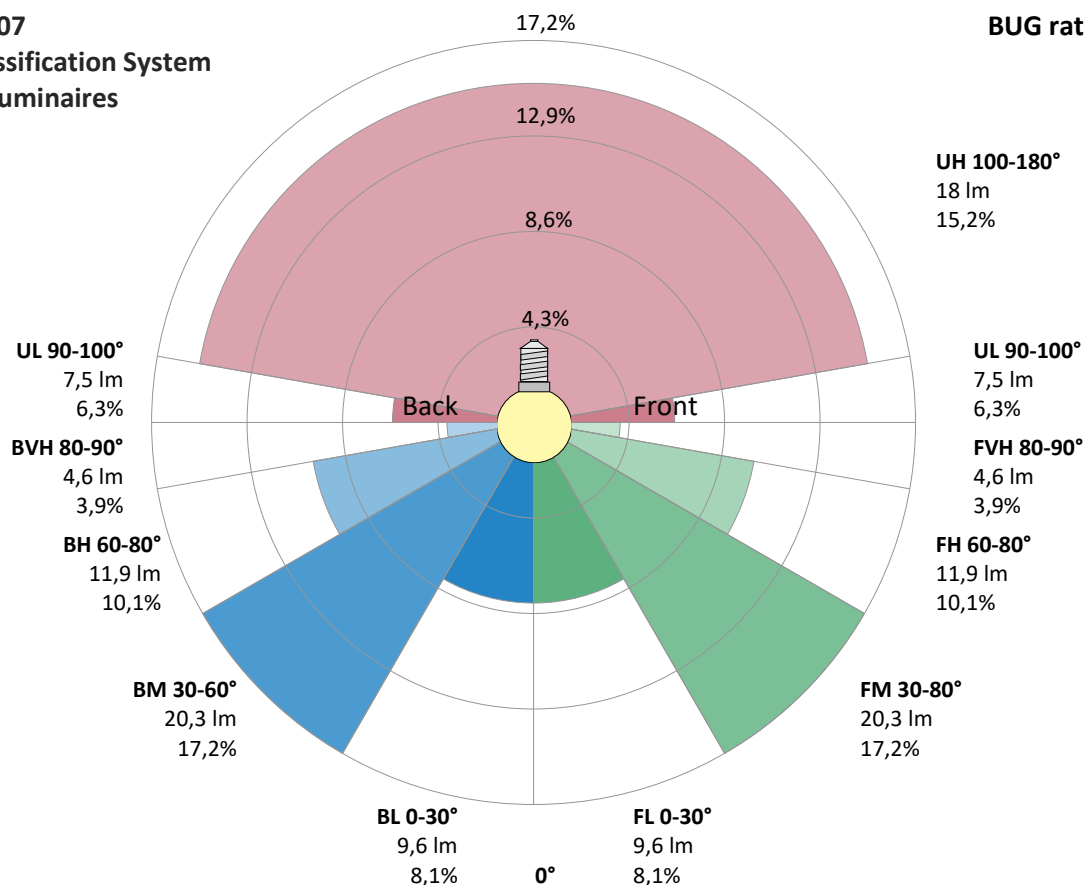
Zone (γ)	Lumen	% Total
0-30°	19 lm	16,2%
0-40°	32 lm	27,0%
0-60°	60 lm	50,6%
60-90°	33 lm	27,9%
70-100°	28 lm	23,4%
90-120°	18 lm	15,0%
0-90°	93 lm	78,5%
90-180°	25 lm	21,5%
0-180°	118 lm	100,0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	10 lm	8,1%
Medium(30-60°)	20 lm	17,2%
High(60-80°)	12 lm	10,1%
Very high(80-90°)	5 lm	3,9%
Back light		
Low(0-30°)	10 lm	8,1%
Medium(30-60°)	20 lm	17,2%
High(60-80°)	12 lm	10,1%
Very high(80-90°)	5 lm	3,9%
Uplight		
Low(90-100°)	7 lm	6,3%
High(100-180°)	18 lm	15,2%

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

BUG rating B0 U2 G0



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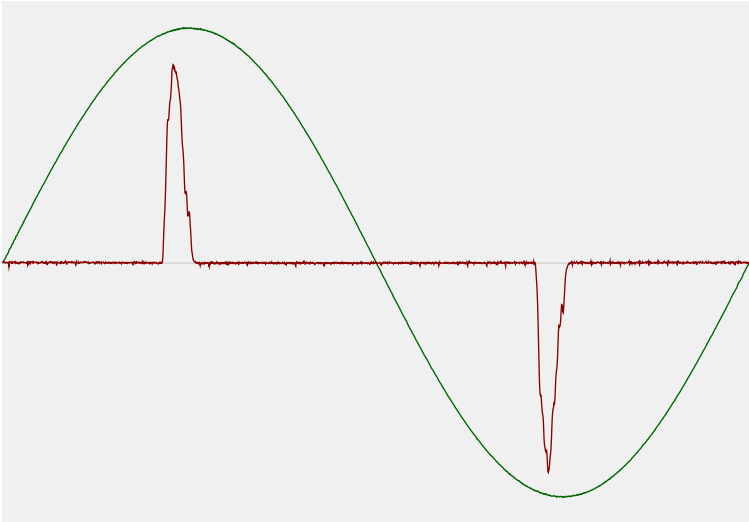


Power Details

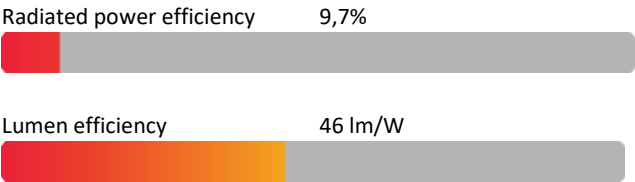
Input Power

Power feed to light source	2,6 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,032 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	7,34 VA
Displacement factor of AC power feed	0,99
Power factor of AC current feed	0,35
Total harmonic distortion of the current	260,79%
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	0 K
CCT shift	0 K
CCT end	0 K

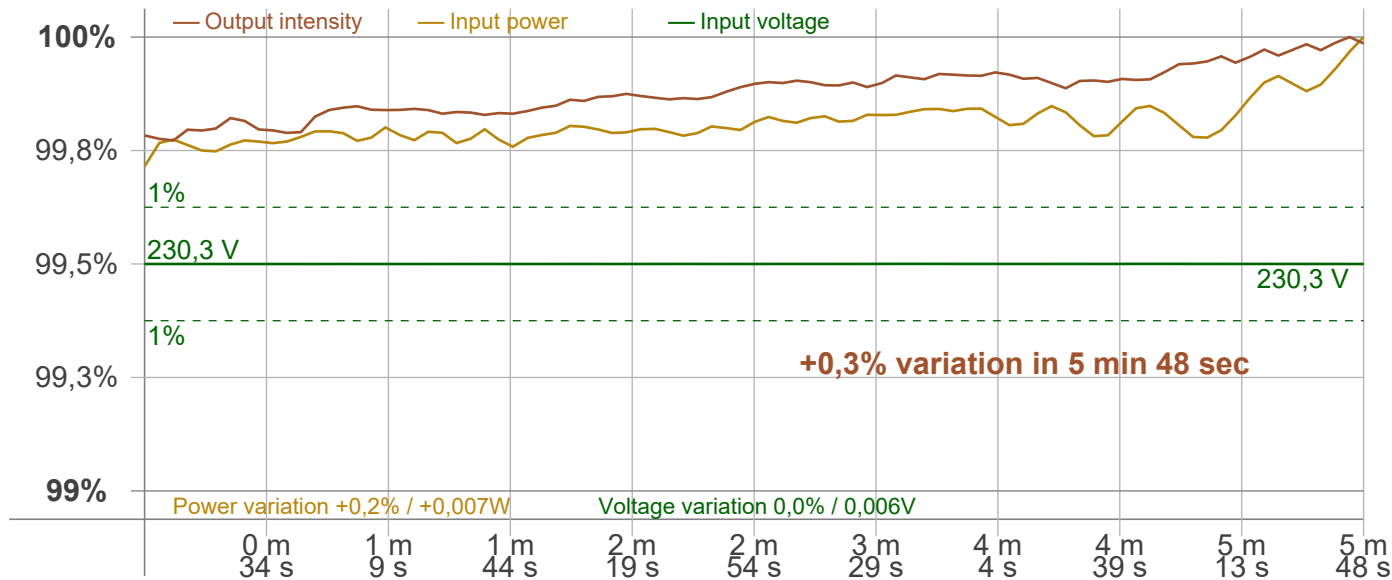
Warmup Result

Total warmup time	Not completed
Warmup variation	+0,3%

Output Change

Output start	118 lm
Output change	+ lm
Output end	118 lm

Stabilization Curve



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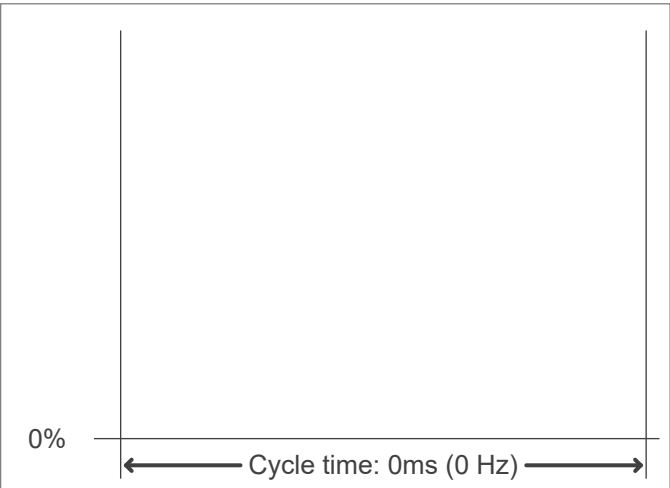
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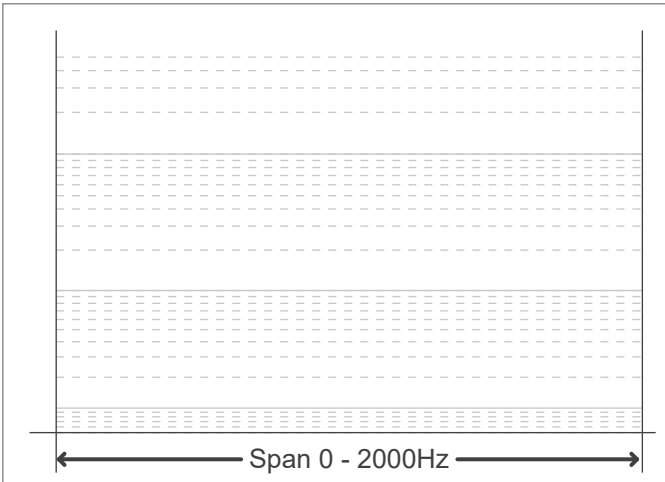
Flicker /TLA details

Flicker Meter Type	Viso Systems LabFlicker	Measurement time	
Frequency of input power	50 Hz	PstLM	180 sec
Flicker/TLA sample rate	n/a 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	n/a Hz	JA8/10 40 Hz	n/a %
Percent Flicker	n/a %	JA8/10 90 Hz	n/a %
Flicker index	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)		Flicker indices according to Lighting Research Center (2015)	
PstLM value (F < 80 Hz)	n/a	Perception metric, Assist Mp	n/a
SVM value (80 < F < 2000 Hz)	n/a		

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

