

Light Measurement Report

Print date: 7-1-2025

Measurement date and time: 7-1-2025 11:03:21 – Measurement no. VFR-250107-2742-MS

Measurement tracking No. and Link: [VT250107-005199](#)

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

16 planes – 22,5°

5°

2,00 m

1,8 W – PF 0,39 – DPF 0,99

230 V – 0,020 A

50 Hz

Not completed – 2,0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

FUT103-ROOD

FUT103-ROOD – Dutchfulfillment

Mi-Light | GU10 | RGB+CCT | 4W

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

30,6 lm – 1,49% / 98,51%

17 lm/W

78,0 cd – 28,3°

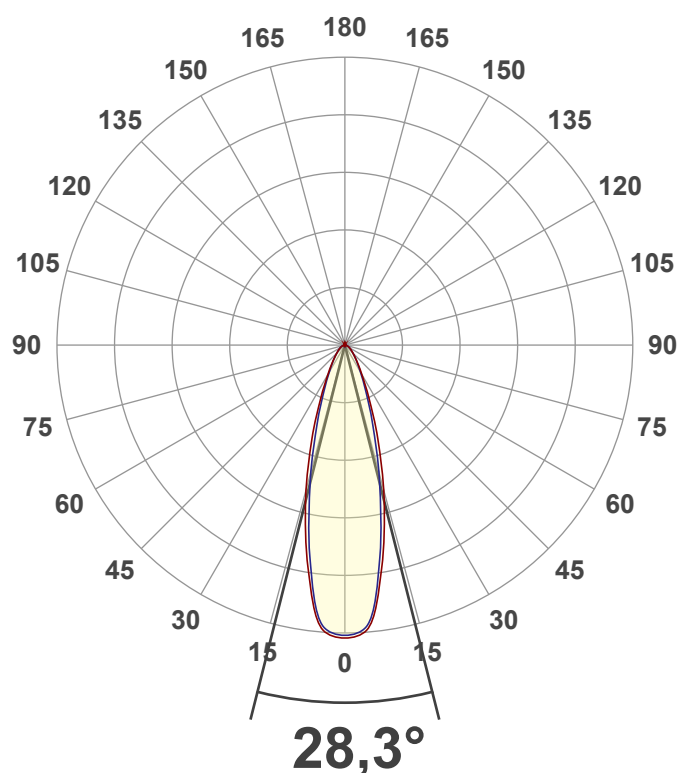
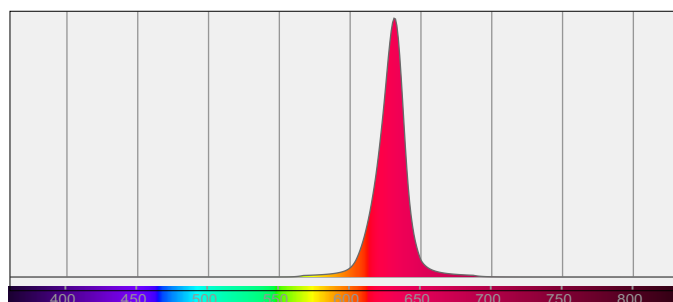
CCT = 0 K / 0 K

CRI 0,0

R_f 0,0 – R_g 0,0

Duv n/a – SDCM n/a

SVM 0 – PstLM 0,06



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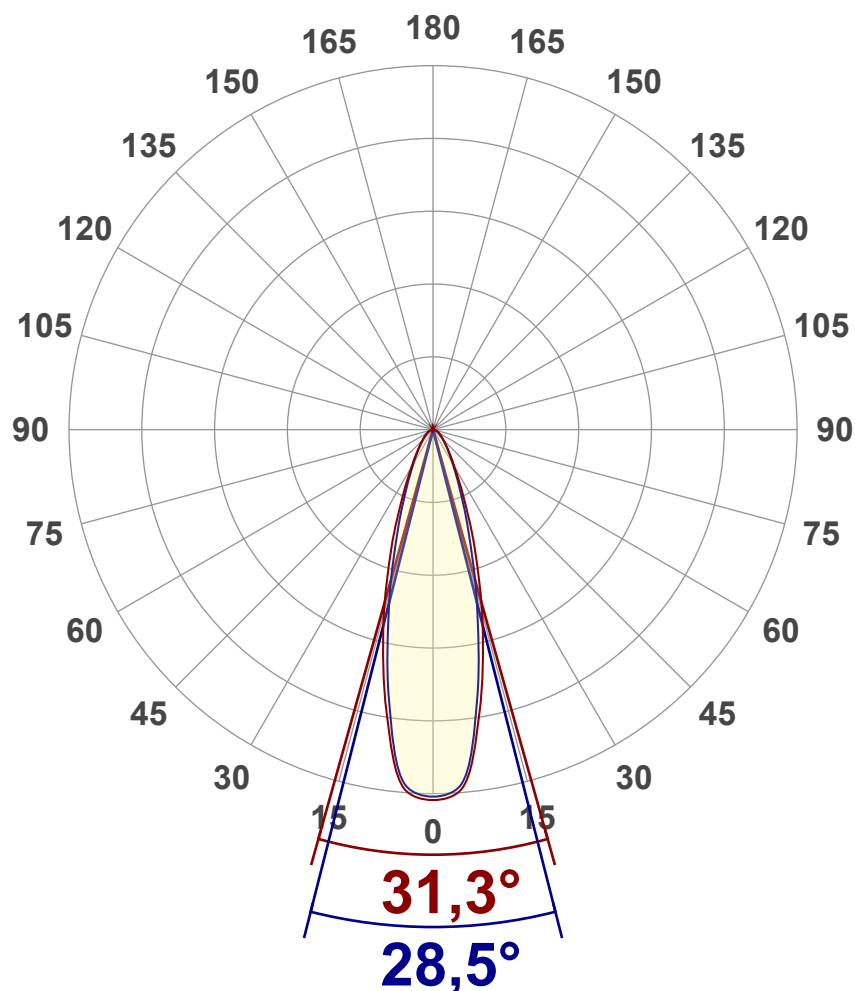
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	30,6 lm
Lumen Up% / Down%	1,49% / 98,51%
Peak Intensity	78,0 cd
Beam Angle (50%)	28,3°
Beam Angle (90%)	28,5°
Beam Angle (10%)	31,3°

Cut-off Angle

Average 2,5%	105°
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Field Angle

Average 10%	61,1°
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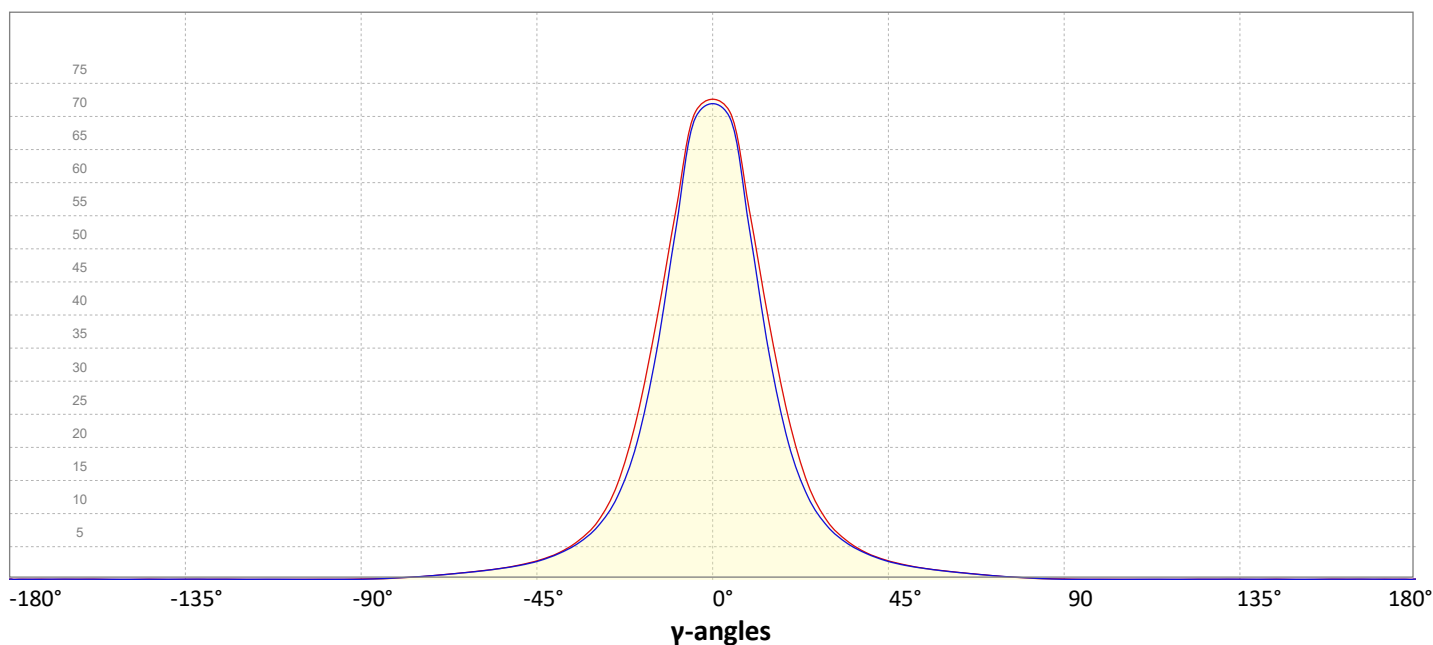
Intensity Ratio

In 120° cone	93,0%
In 90° cone	84,9%

C000-C180

C090-C270

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

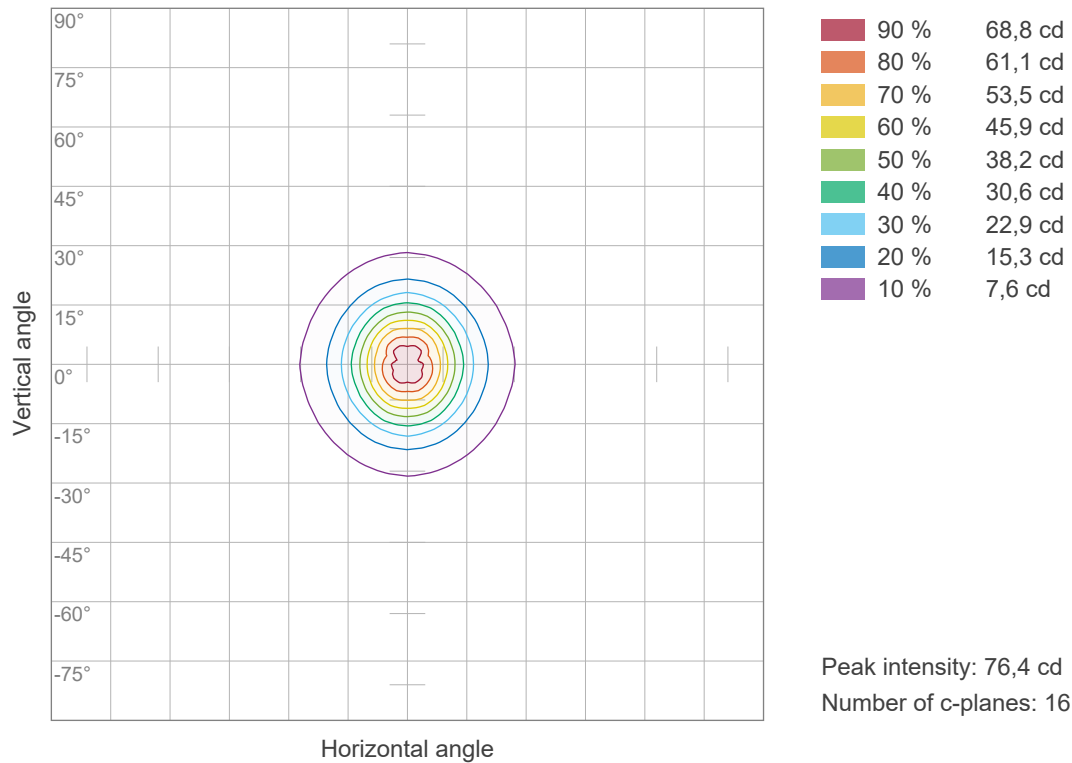


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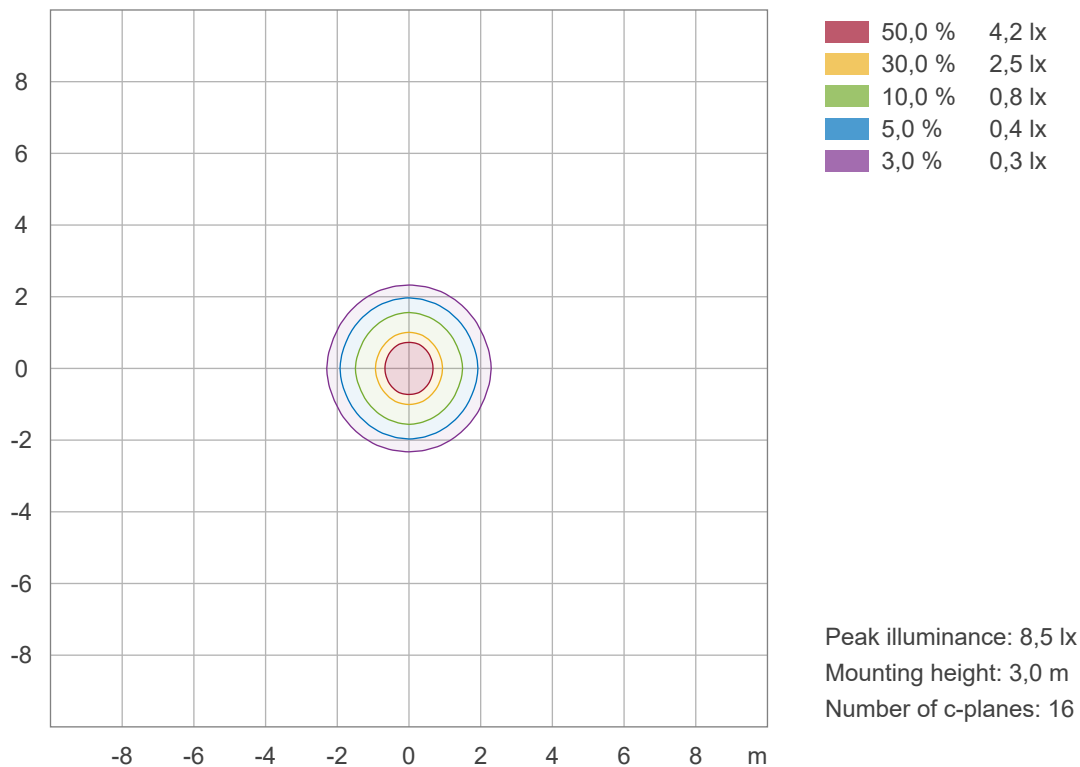
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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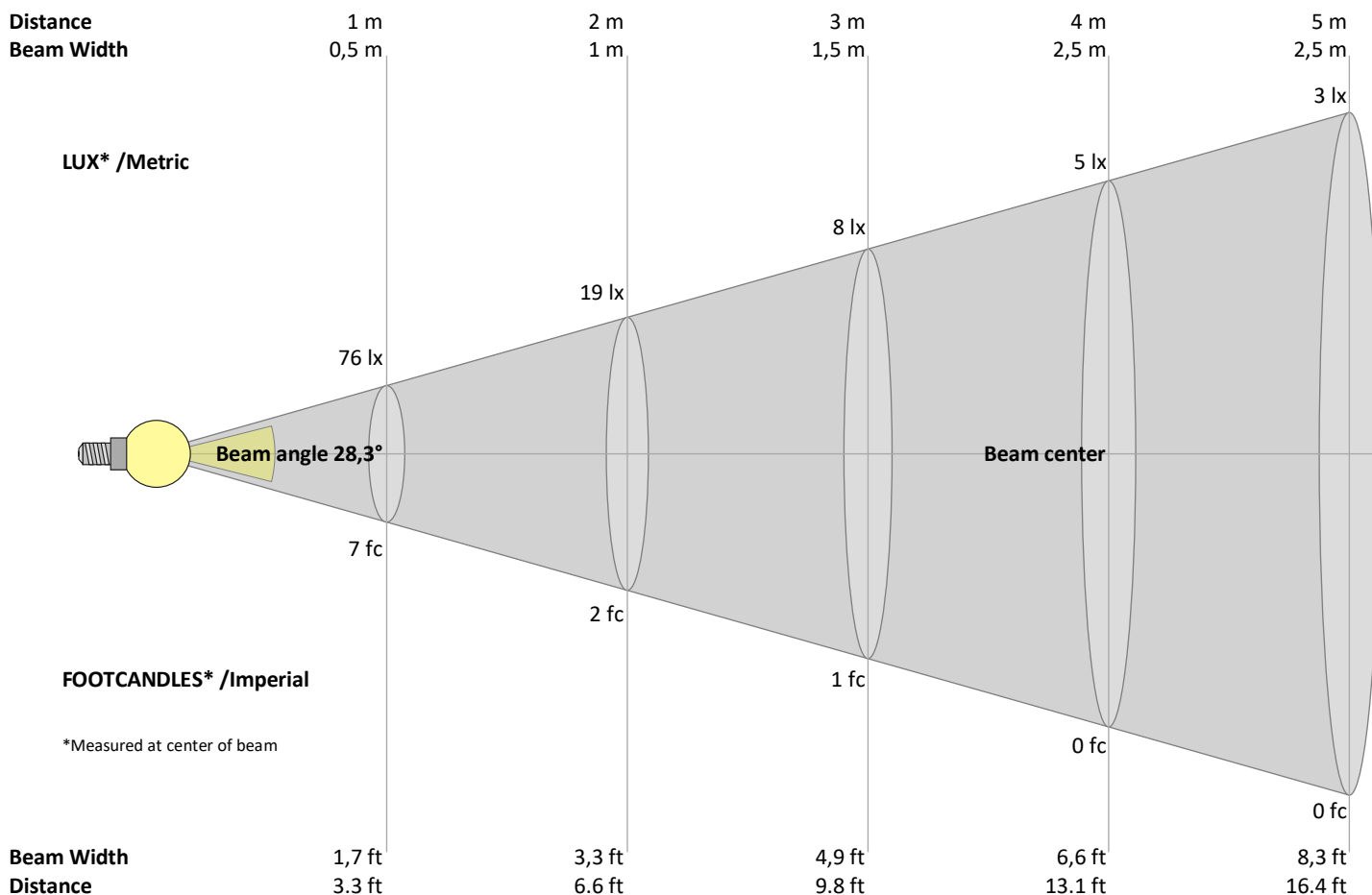
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Beam Details



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
76	19	8	5	3	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	lux
7	1,8	0,8	0,4	0,3	0,2	0,1	0,1	0,1	0,1	0,1	0	0	0	0	0	0	0	0	0	fc

Intensities in 0° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
75,6	70,8	70,8	65,9	60,0	53,8	47,0	40,3	34,3	28,5	23,3	19,2	15,2	12,6	10,4	8,5	7,3	6,1	5,3	4,6	cd
100%	94%	94%	87%	79%	71%	62%	53%	45%	38%	31%	25%	20%	17%	14%	11%	10%	8%	7%	6%	of 0°val

Intensities in 90° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
75,6	69,8	69,8	64,4	57,7	50,8	43,3	35,8	30,0	24,5	19,7	16,4	13,2	11,1	9,3	7,8	6,7	5,7	5,0	4,4	cd
100%	92%	92%	85%	76%	67%	57%	47%	40%	32%	26%	22%	17%	15%	12%	10%	9%	8%	7%	6%	of 0°val

Intensities in 180° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
75,6	70,8	70,8	65,9	60,0	53,8	47,0	40,3	34,3	28,5	23,3	19,2	15,2	12,6	10,4	8,5	7,3	6,1	5,3	4,6	cd
100%	94%	94%	87%	79%	71%	62%	53%	45%	38%	31%	25%	20%	17%	14%	11%	10%	8%	7%	6%	of 0°val

Intensities in 270° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
75,6	69,8	69,8	64,4	57,7	50,8	43,3	35,8	30,0	24,5	19,7	16,4	13,2	11,1	9,3	7,8	6,7	5,7	5,0	4,4	cd
100%	92%	92%	85%	76%	67%	57%	47%	40%	32%	26%	22%	17%	15%	12%	10%	9%	8%	7%	6%	of 0°val

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Light Planning – UGR table

Uncorrected, comprehensive UGR table according to 117-1995

Reflectances											
	p Ceiling	70	70	50	50	30	70	70	50	50	30
	p Walls	50	30	50	30	30	50	30	50	30	30
	p 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	10,7	11,3	10,8	11,6	11,8	10,3	11,0	10,5	11,2	11,5
	3H	11,2	12,0	11,6	12,3	12,5	10,9	11,7	11,3	11,9	12,1
	4H	11,5	12,2	11,9	12,5	12,8	11,2	11,9	11,6	12,2	12,4
	6H	11,7	12,3	12,0	12,6	13,0	11,4	12,0	11,7	12,3	12,7
	8H	11,7	12,3	12,1	12,7	13,1	11,4	12,0	11,8	12,4	12,8
	12H	11,7	12,3	12,1	12,7	13,1	11,4	12,0	11,8	12,4	12,9
4H	2H	10,8	11,6	11,2	11,8	12,1	10,5	11,3	10,9	11,5	11,8
	3H	11,8	12,4	12,1	12,7	13,2	11,4	12,1	11,8	12,4	12,9
	4H	12,0	12,6	12,5	13,0	13,6	11,7	12,3	12,2	12,7	13,3
	6H	12,2	12,8	12,8	13,2	13,6	12,0	12,6	12,5	12,9	13,3
	8H	12,3	12,8	12,8	13,2	13,6	12,0	12,6	12,6	12,9	13,3
	12H	12,3	12,7	12,8	13,2	13,7	12,0	12,5	12,6	12,9	13,4
8H	4H	12,1	12,7	12,6	13,0	13,4	11,8	12,4	12,4	12,7	13,1
	6H	12,4	12,8	13,0	13,3	13,8	12,2	12,5	12,7	13,0	13,6
	8H	12,6	12,9	13,1	13,4	14,1	12,3	12,6	12,9	13,2	13,8
	12H	12,6	12,9	13,2	13,4	14,0	12,4	12,6	13,0	13,2	13,8
12H	4H	12,1	12,5	12,6	12,9	13,4	11,8	12,2	12,3	12,7	13,1
	6H	12,5	12,8	13,0	13,3	14,0	12,2	12,5	12,7	13,1	13,7
	8H	12,6	12,8	13,2	13,4	14,0	12,3	12,6	12,9	13,1	13,7
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		0,7 / -0,6					0,7 / -0,5				
S = 1.5H		1,7 / -1,0					1,6 / -1,0				
S = 2.0H		2,7 / -1,5					2,6 / -1,6				

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	110	110	105	105	105	101	101	101	99	
1	113	109	107	104	110	107	105	103	103	101	99	99	97	96	95	94	93	91
2	107	101	97	93	104	100	96	92	96	93	90	93	90	88	90	88	86	84
3	101	94	89	85	99	93	88	84	90	86	83	87	84	81	85	82	80	78
4	96	88	83	78	94	87	82	78	85	80	77	83	79	76	81	77	75	73
5	92	83	77	73	90	82	77	72	80	75	72	78	74	71	77	73	70	69
6	87	78	72	68	86	78	72	68	76	71	67	74	70	67	73	69	66	65
7	84	74	68	64	82	74	68	64	72	67	64	71	66	63	70	66	63	61
8	80	71	65	61	79	70	65	61	69	64	60	68	63	60	67	63	60	58
9	77	67	62	58	76	67	61	58	66	61	57	65	60	57	64	60	57	56
10	74	65	59	55	73	64	59	55	63	58	55	62	58	55	61	57	55	53

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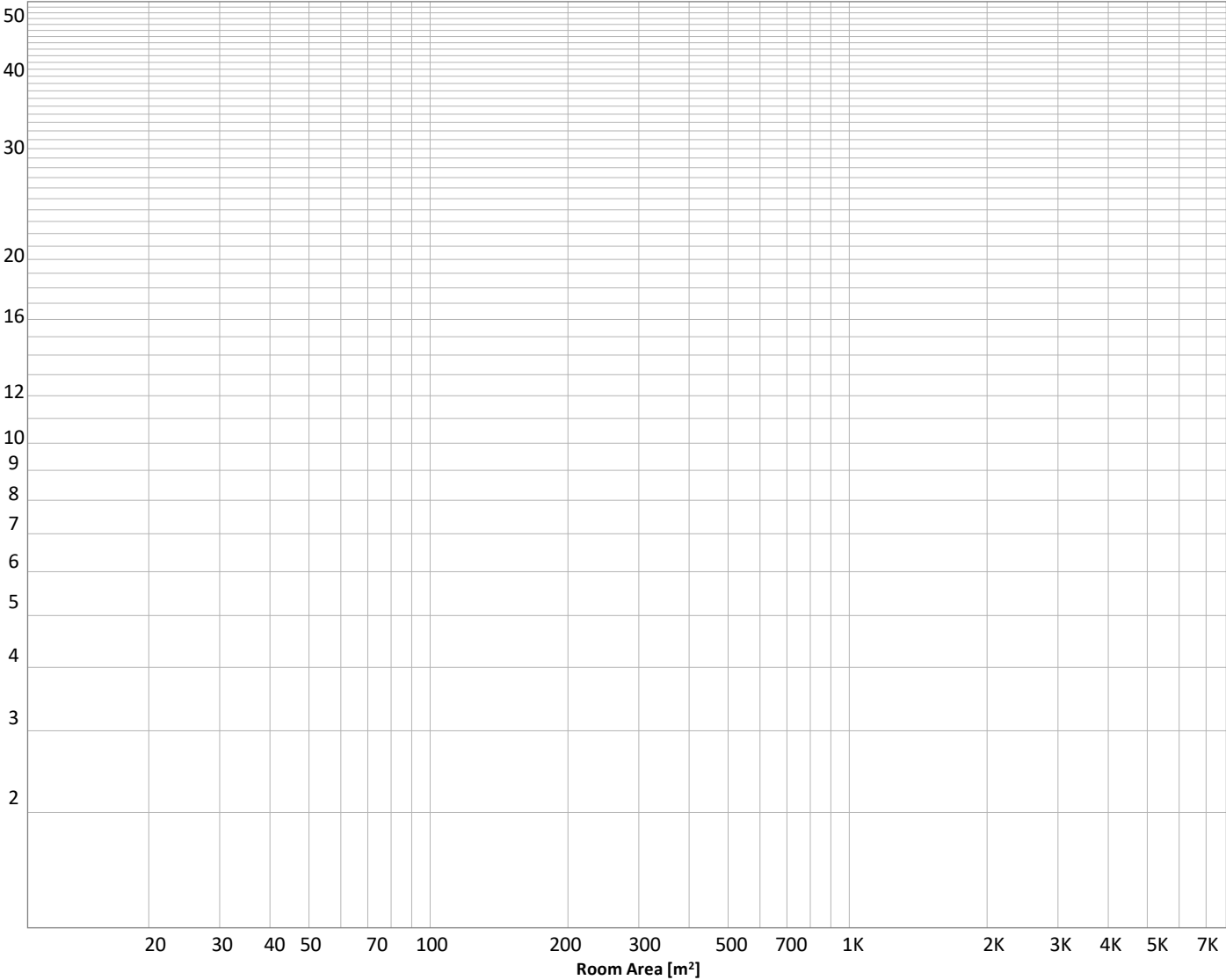
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 30,6 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°
5,87 lm	9,53 lm	5,91 lm	3,44 lm	2,20 lm	1,50 lm	0,975 lm	0,524 lm	0,189 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,078 lm	0,079 lm	0,069 lm	0,065 lm	0,056 lm	0,046 lm	0,032 lm	0,024 lm	0,007 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	6 lm	19,2%
10-20°	10 lm	31,2%
20-30°	6 lm	19,3%
30-40°	3 lm	11,2%
40-50°	2 lm	7,2%
50-60°	1 lm	4,9%
60-70°	1 lm	3,2%
70-80°	1 lm	1,7%
80-90°	0 lm	0,6%
90-100°	0 lm	0,3%
100-110°	0 lm	0,3%
110-120°	0 lm	0,2%
120-130°	0 lm	0,2%
130-140°	0 lm	0,2%
140-150°	0 lm	0,1%
150-160°	0 lm	0,1%
160-170°	0 lm	0,1%
170-180°	0 lm	0,0%
Total	31 lm	100,0%

Intensity peaks

Max intensity	78 cd
Intensity, 90°	0 cd
Intensity, 0°	76 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	21 lm	69,7%
0-40°	25 lm	80,9%
0-60°	28 lm	93,0%
60-90°	2 lm	5,5%
70-100°	1 lm	2,6%
90-120°	0 lm	0,7%
0-90°	30 lm	98,5%
90-180°	0 lm	1,5%
0-180°	31 lm	100,0%

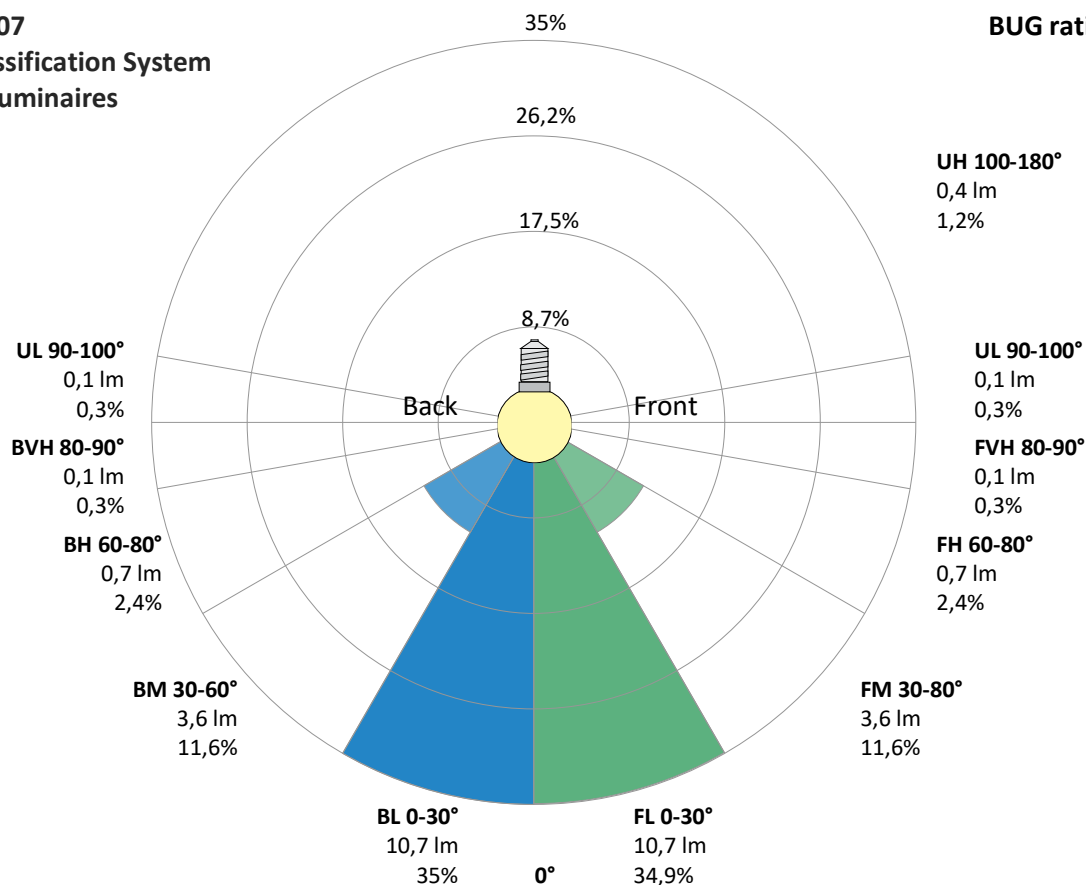
BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	11 lm	34,9%
Medium(30-60°)	4 lm	11,6%
High(60-80°)	1 lm	2,4%
Very high(80-90°)	0 lm	0,3%
Back light		
Low(0-30°)	11 lm	35,0%
Medium(30-60°)	4 lm	11,6%
High(60-80°)	1 lm	2,4%
Very high(80-90°)	0 lm	0,3%
Uplight		
Low(90-100°)	0 lm	0,3%
High(100-180°)	0 lm	1,2%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B0 U0 G0



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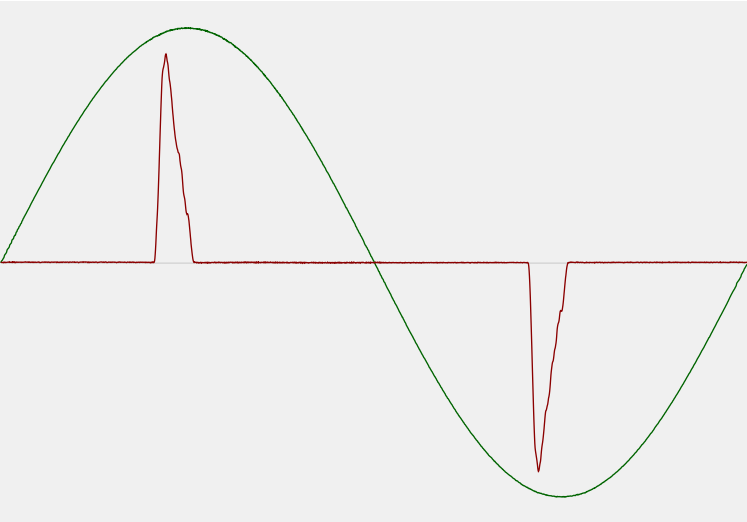


Power Details

Input Power

Power feed to light source	1,8 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,020 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	4,59 VA
Displacement factor of AC power feed	0,99
Power factor of AC current feed	0,39
Total harmonic distortion of the current	230,68%
Total harmonic distortion of the voltage	0,09%

Input Power Curve



Efficiency

Radiated power efficiency	8,7%
Lumen efficiency	17 lm/W

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

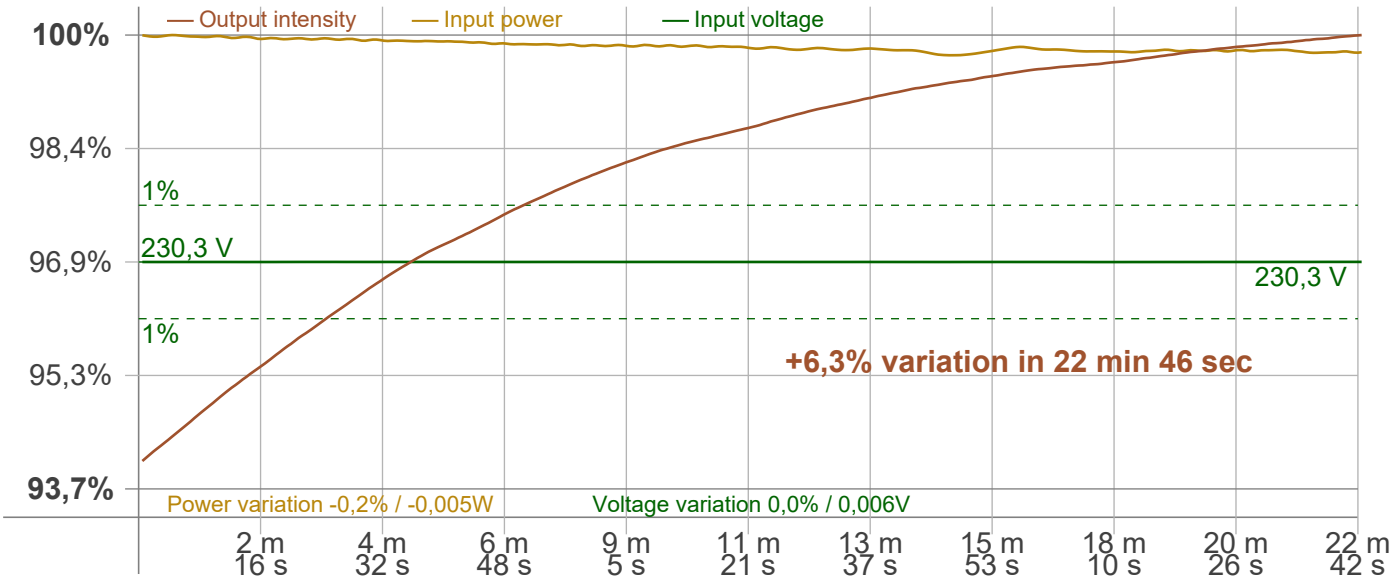
Warmup Result

Total warmup time	Not completed
Warmup variation	+6,3%

Output Change

Output start	28,7 lm
Output change	+1,9 lm
Output end	30,6 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

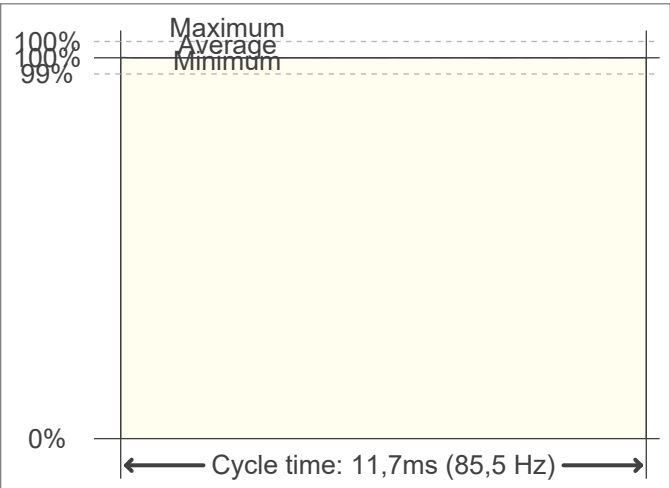
Flicker indices according to Illuminating Engineering Society (IES)
Flicker frequency 85,47 Hz
Percent Flicker 0,12 %
Flicker index 0

Flicker indices according to California Energy Commission (CEC) 2016b
JA8/10 40 Hz 0,06 %
JA8/10 90 Hz 0,07 %
JA8/10 200 Hz 0,08 %
JA8/10 400 Hz 0,08 %
JA8/10 1000 Hz 0,1 %

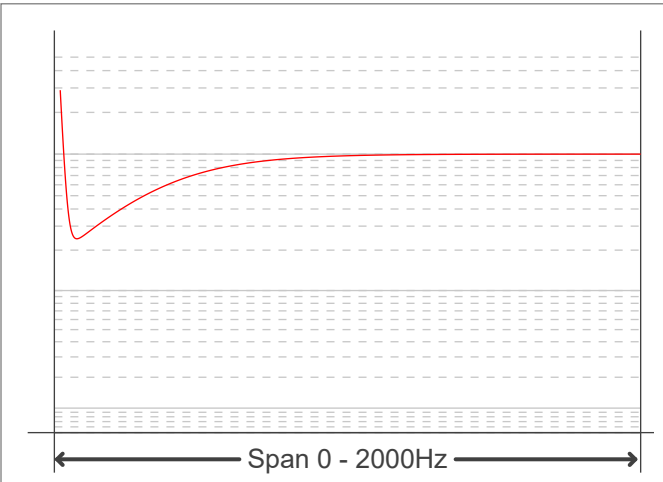
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)
PstLM value (F < 80 Hz) 0,06
SVM value (80 < F < 2000 Hz) 0

Flicker indices according to Lighting Research Center (2015)
Perception metric, Assist Mp 0,05

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

