

Light Measurement Report

Print date: 7-1-2025

Measurement date and time: 7-1-2025 11:26:11 – Measurement no. VFR-250107-2745-MS

Measurement tracking No. and Link: [VT250107-001837](#)

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-BLAUW

FUT103-BLAUW – 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

14,8 lm – 3,27% / 96,73%

8 lm/W

31,4 cd – 30,9°

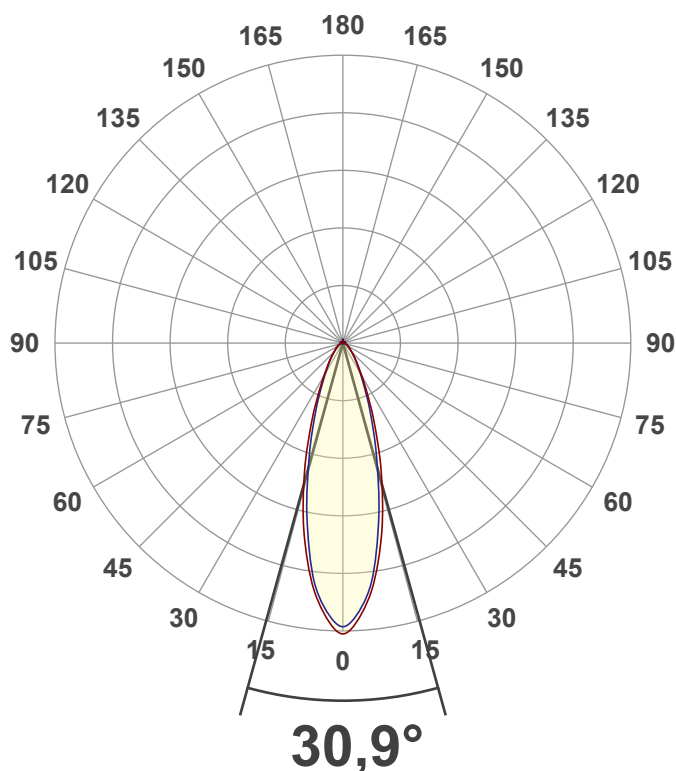
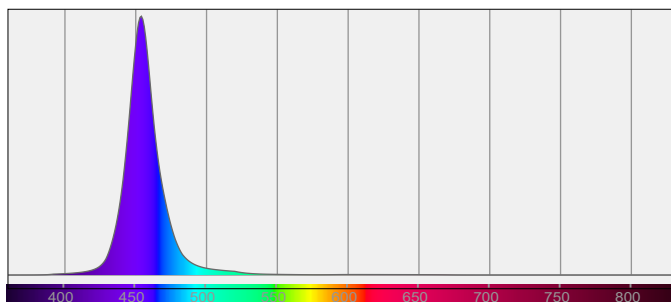
CCT = 0 K / 0 K

CRI 0,0

R_f 0,0 – R_g 0,0

Duv n/a – SDCM n/a

SVM 0 – PstLM 0,03



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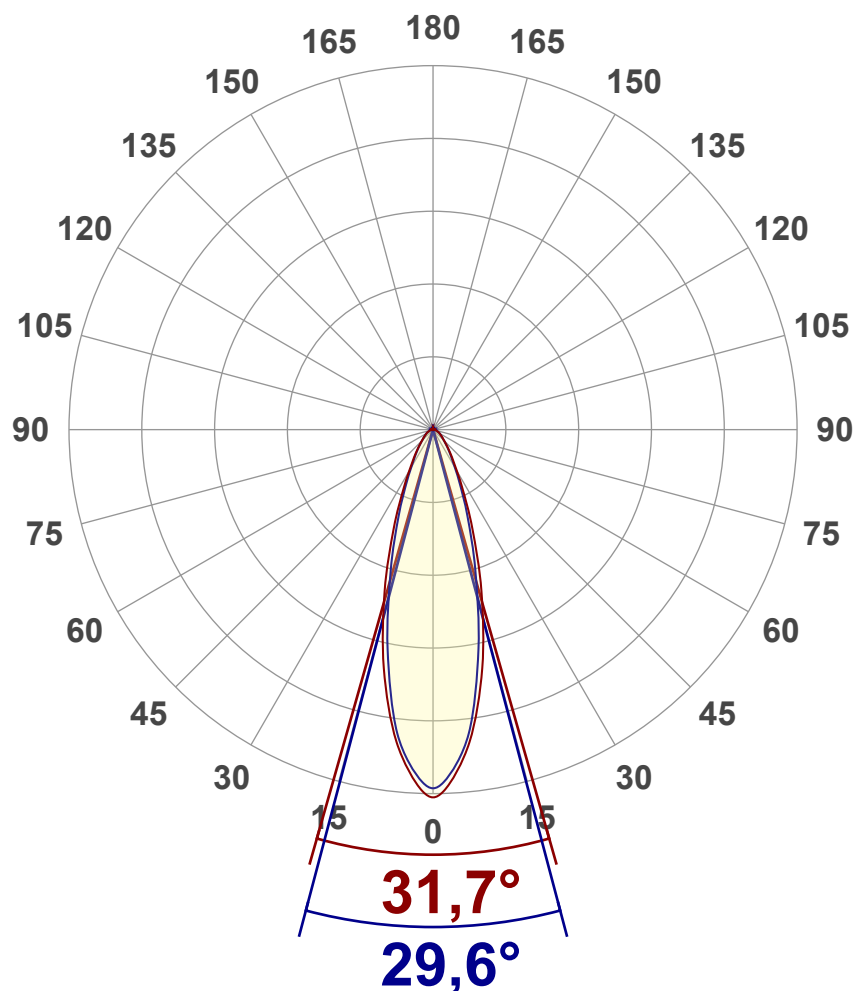
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	14,8 lm
Lumen Up% / Down%	3,27% / 96,73%
Peak Intensity	31,4 cd
Beam Angle (50%)	30,9°
Beam Angle (90%)	29,6°
Beam Angle (10%)	31,7°

Cut-off Angle

Average 2,5%	113,4°
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Field Angle

Average 10%	66,1°
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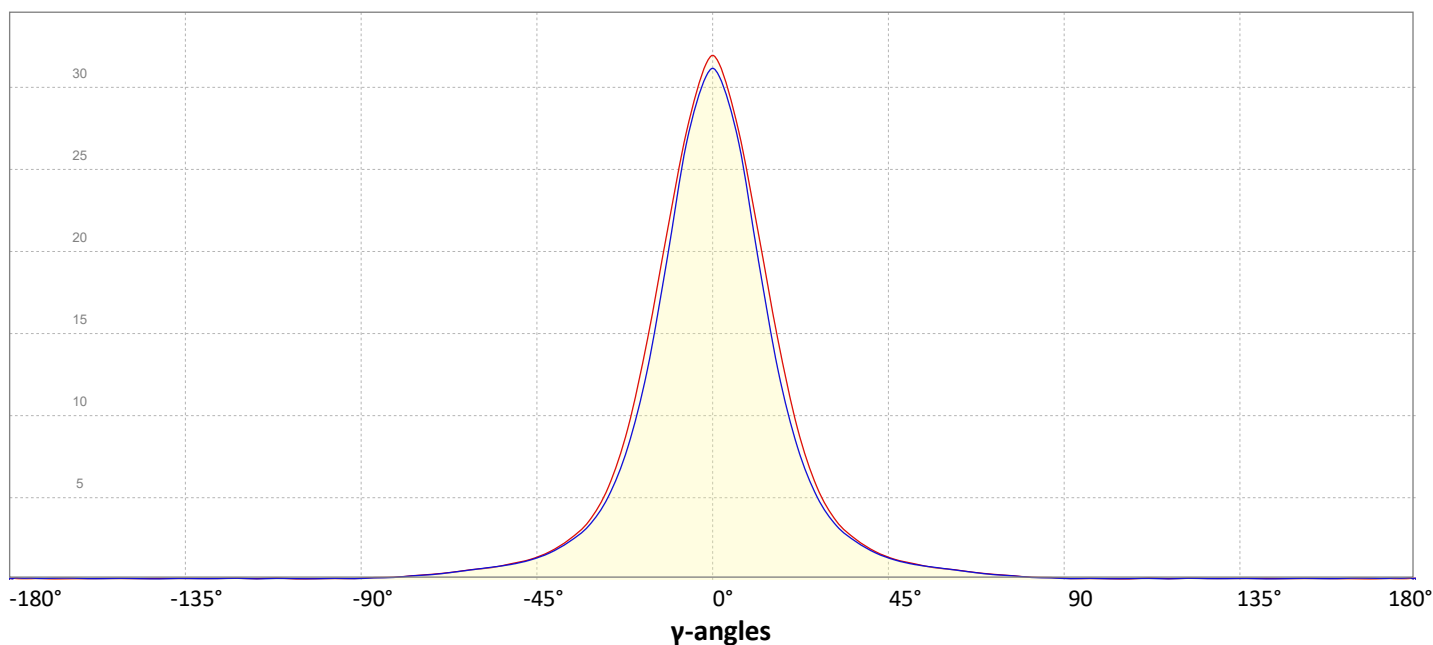
Intensity Ratio

In 120° cone	90,5%
In 90° cone	82,2%

C000-C180

C090-C270

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

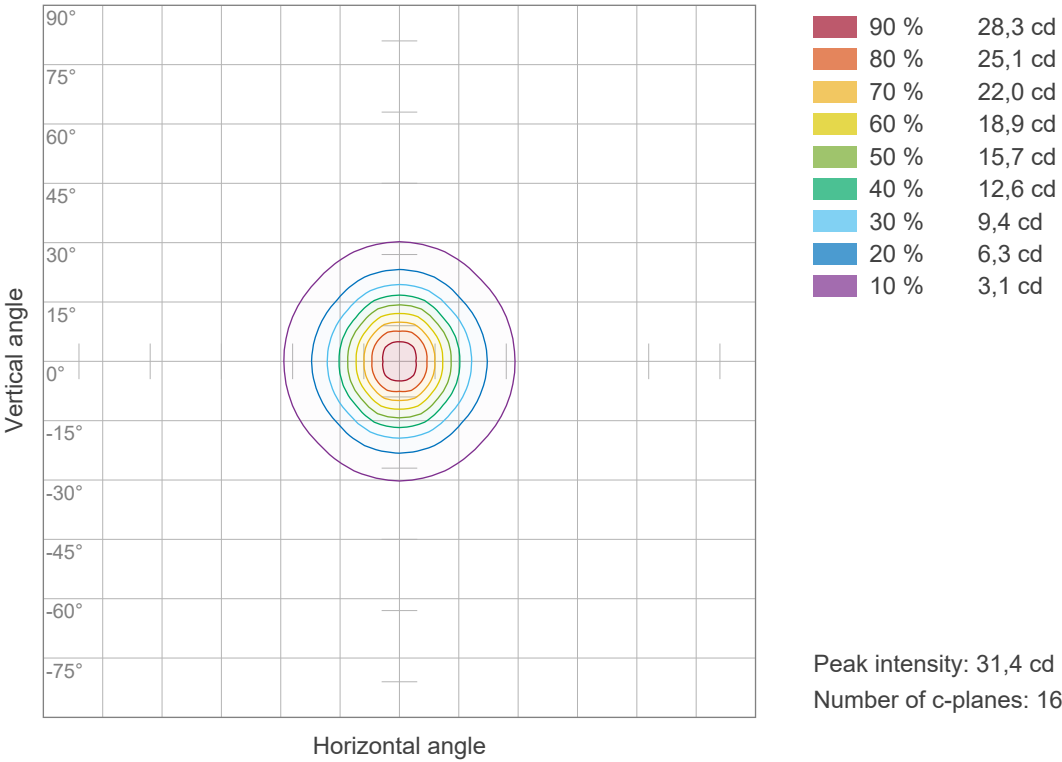


Light Measurement Report

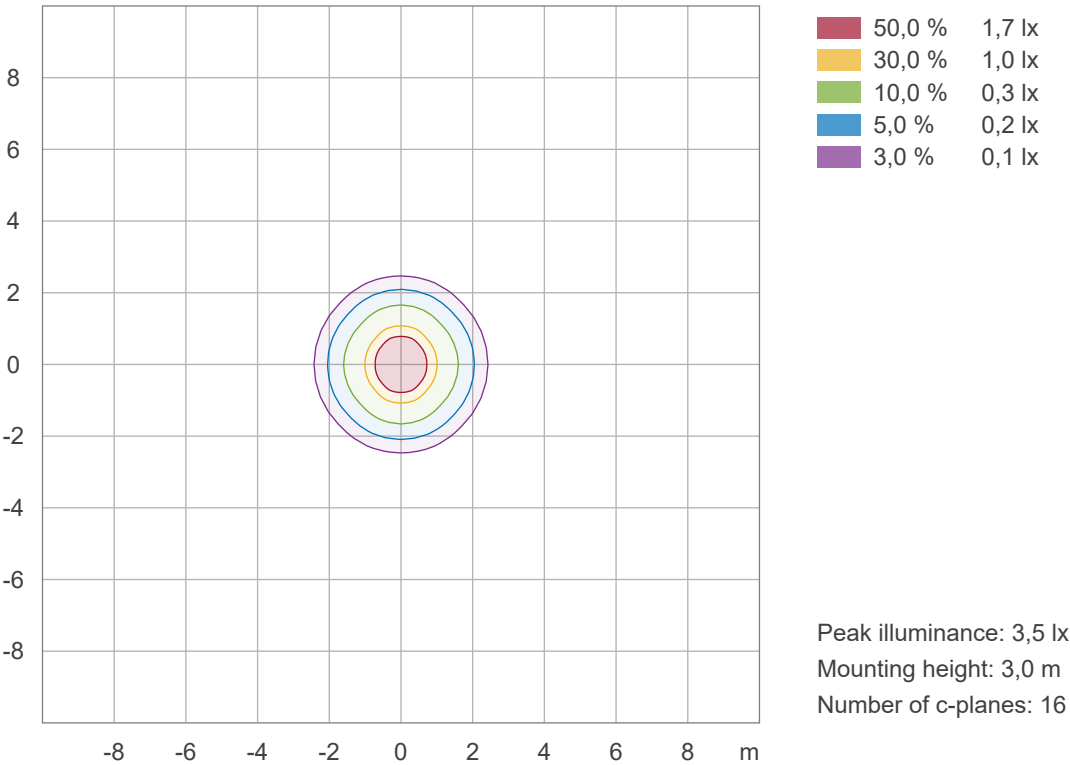
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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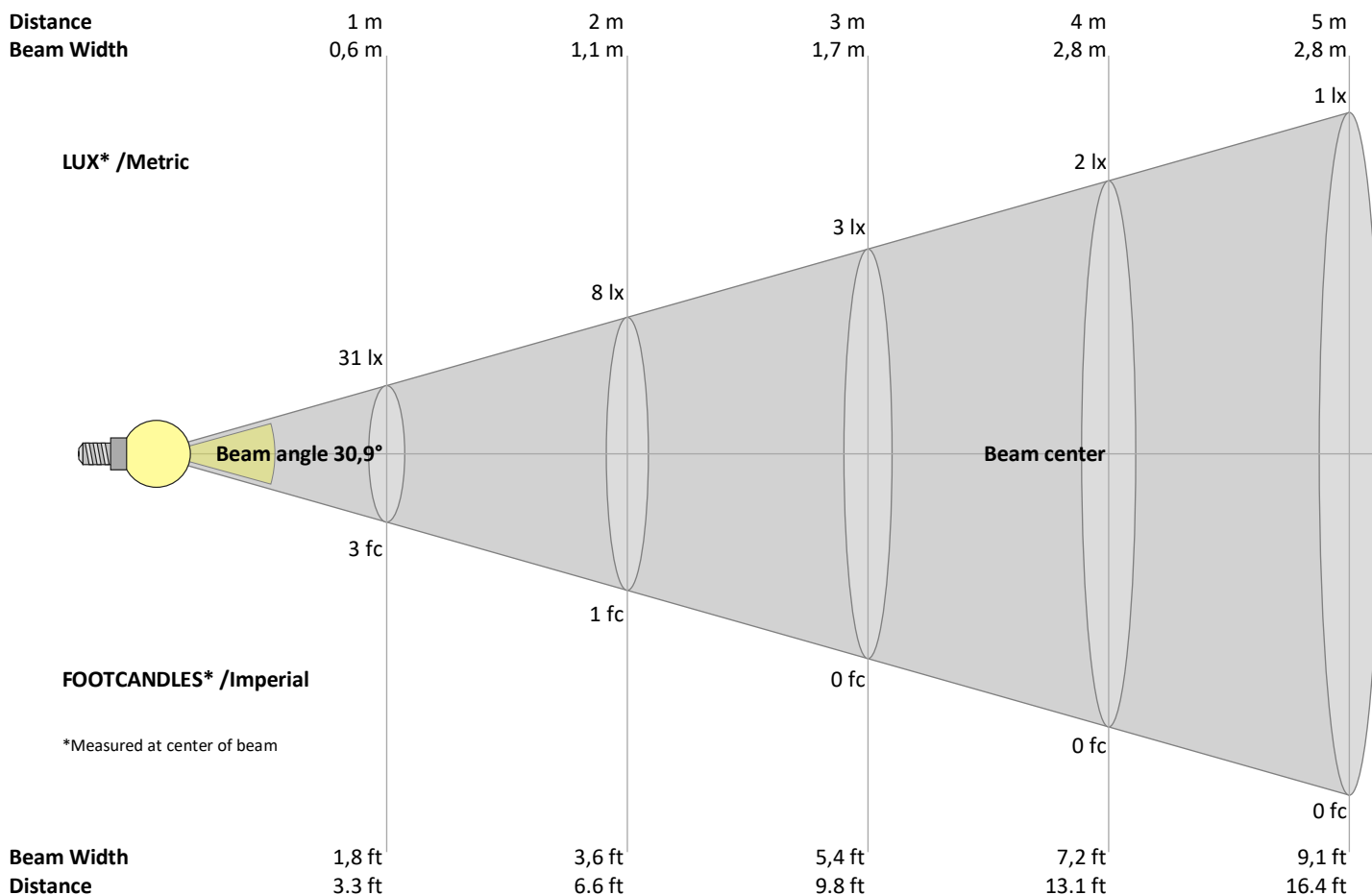
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Beam Details



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
31	8	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	lux
2,9	0,7	0,3	0,2	0,1	0,1	0,1	0	0	0	0	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
30,9	31,2	29,5	27,9	25,7	23,2	20,7	18,1	15,5	13,2	11,1	9,0	7,6	6,1	5,1	4,3	3,5	3,1	2,6	2,3	cd
100%	101%	96%	90%	83%	75%	67%	59%	50%	43%	36%	29%	25%	20%	17%	14%	11%	10%	8%	7%	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
30,9	30,4	28,8	27,2	24,7	21,9	19,1	16,4	13,7	11,6	9,7	7,9	6,7	5,5	4,6	3,9	3,2	2,8	2,5	2,1	cd
100%	99%	93%	88%	80%	71%	62%	53%	45%	38%	31%	26%	22%	18%	15%	13%	10%	9%	8%	7%	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
30,9	31,2	29,5	27,9	25,7	23,2	20,7	18,1	15,5	13,2	11,1	9,0	7,6	6,1	5,1	4,3	3,5	3,1	2,6	2,3	cd
100%	101%	96%	90%	83%	75%	67%	59%	50%	43%	36%	29%	25%	20%	17%	14%	11%	10%	8%	7%	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
30,9	30,4	28,8	27,2	24,7	21,9	19,1	16,4	13,7	11,6	9,7	7,9	6,7	5,5	4,6	3,9	3,2	2,8	2,5	2,1	cd
100%	99%	93%	88%	80%	71%	62%	53%	45%	38%	31%	26%	22%	18%	15%	13%	10%	9%	8%	7%	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	8,4	9,1	8,6	9,4	9,6	8,1	8,8	8,3	9,1	9,3
	3H	9,0	9,8	9,5	10,1	10,4	8,7	9,6	9,2	9,8	10,1
	4H	9,3	10,1	9,8	10,4	10,7	9,0	9,8	9,5	10,1	10,4
	6H	9,6	10,3	10,0	10,6	11,0	9,3	10,0	9,7	10,3	10,7
	8H	9,7	10,4	10,1	10,7	11,2	9,4	10,0	9,8	10,4	10,8
	12H	9,8	10,4	10,2	10,8	11,3	9,4	10,1	9,8	10,5	10,9
4H	2H	8,6	9,3	9,0	9,6	9,9	8,3	9,1	8,8	9,4	9,7
	3H	9,6	10,2	10,0	10,6	11,1	9,3	10,0	9,7	10,4	10,8
	4H	9,9	10,6	10,4	11,0	11,6	9,7	10,3	10,1	10,7	11,3
	6H	10,3	10,9	10,8	11,3	11,7	10,0	10,6	10,5	10,9	11,4
	8H	10,4	10,9	11,0	11,3	11,8	10,1	10,6	10,6	11,0	11,4
	12H	10,5	11,0	11,1	11,4	11,9	10,1	10,6	10,7	11,0	11,6
8H	4H	10,0	10,6	10,6	11,0	11,4	9,8	10,3	10,3	10,7	11,2
	6H	10,5	10,9	11,1	11,4	12,0	10,2	10,6	10,7	11,1	11,7
	8H	10,8	11,1	11,3	11,6	12,3	10,4	10,7	11,0	11,3	12,0
	12H	11,0	11,2	11,6	11,8	12,4	10,5	10,8	11,2	11,4	12,0
12H	4H	10,0	10,4	10,6	10,9	11,4	9,8	10,2	10,3	10,7	11,2
	6H	10,6	10,9	11,1	11,4	12,1	10,3	10,6	10,8	11,1	11,8
	8H	10,8	11,0	11,4	11,6	12,3	10,4	10,7	11,1	11,3	11,9
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		0,6 / -0,5					0,6 / -0,5				
S = 1.5H		1,4 / -0,8					1,4 / -0,8				
S = 2.0H		2,4 / -1,2					2,3 / -1,2				

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	118	118	118	118	115	115	115	115	109	109	109	104	104	104	99	99	99	97
1	112	109	106	103	109	106	104	101	101	99	98	97	96	94	93	92	91	89
2	106	100	96	92	103	98	94	91	94	91	88	91	88	86	88	85	84	82
3	100	93	88	83	98	91	86	82	88	84	81	85	82	79	83	80	77	76
4	95	87	81	77	93	85	80	76	83	78	75	80	77	73	78	75	72	70
5	90	81	75	71	88	80	75	70	78	73	69	76	72	69	74	71	68	66
6	86	77	71	66	84	76	70	66	74	69	65	72	68	64	71	67	64	62
7	82	73	67	62	80	72	66	62	70	65	61	69	64	61	67	63	60	59
8	78	69	63	59	77	68	63	59	67	62	58	66	61	58	64	60	57	56
9	75	66	60	56	74	65	59	56	64	59	55	63	58	55	62	58	55	53
10	72	63	57	53	71	62	57	53	61	56	53	60	56	52	59	55	52	51

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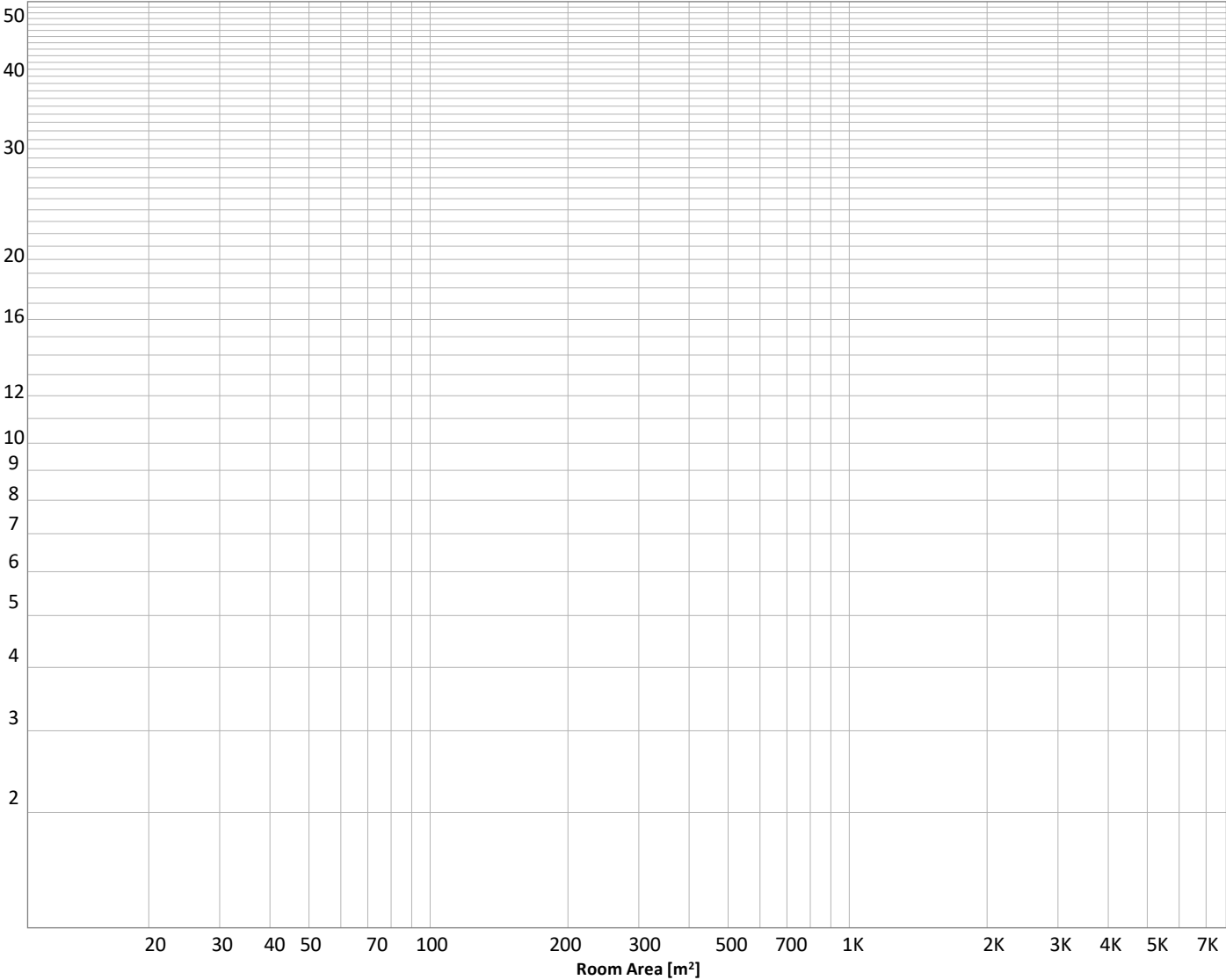
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 14,8 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°
2,61 lm	4,39 lm	2,87 lm	1,68 lm	1,07 lm	0,750 lm	0,515 lm	0,283 lm	0,127 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,083 lm	0,081 lm	0,078 lm	0,070 lm	0,060 lm	0,048 lm	0,036 lm	0,021 lm	0,007 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	3 lm	17,7%
10-20°	4 lm	29,7%
20-30°	3 lm	19,4%
30-40°	2 lm	11,4%
40-50°	1 lm	7,2%
50-60°	1 lm	5,1%
60-70°	1 lm	3,5%
70-80°	0 lm	1,9%
80-90°	0 lm	0,9%
90-100°	0 lm	0,6%
100-110°	0 lm	0,6%
110-120°	0 lm	0,5%
120-130°	0 lm	0,5%
130-140°	0 lm	0,4%
140-150°	0 lm	0,3%
150-160°	0 lm	0,2%
160-170°	0 lm	0,1%
170-180°	0 lm	0,0%
Total	15 lm	100,0%

Intensity peaks

Max intensity	31 cd
Intensity, 90°	0 cd
Intensity, 0°	31 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	10 lm	66,8%
0-40°	12 lm	78,2%
0-60°	13 lm	90,5%
60-90°	1 lm	6,3%
70-100°	0 lm	3,3%
90-120°	0 lm	1,6%
0-90°	14 lm	96,7%
90-180°	0 lm	3,3%
0-180°	15 lm	100,0%

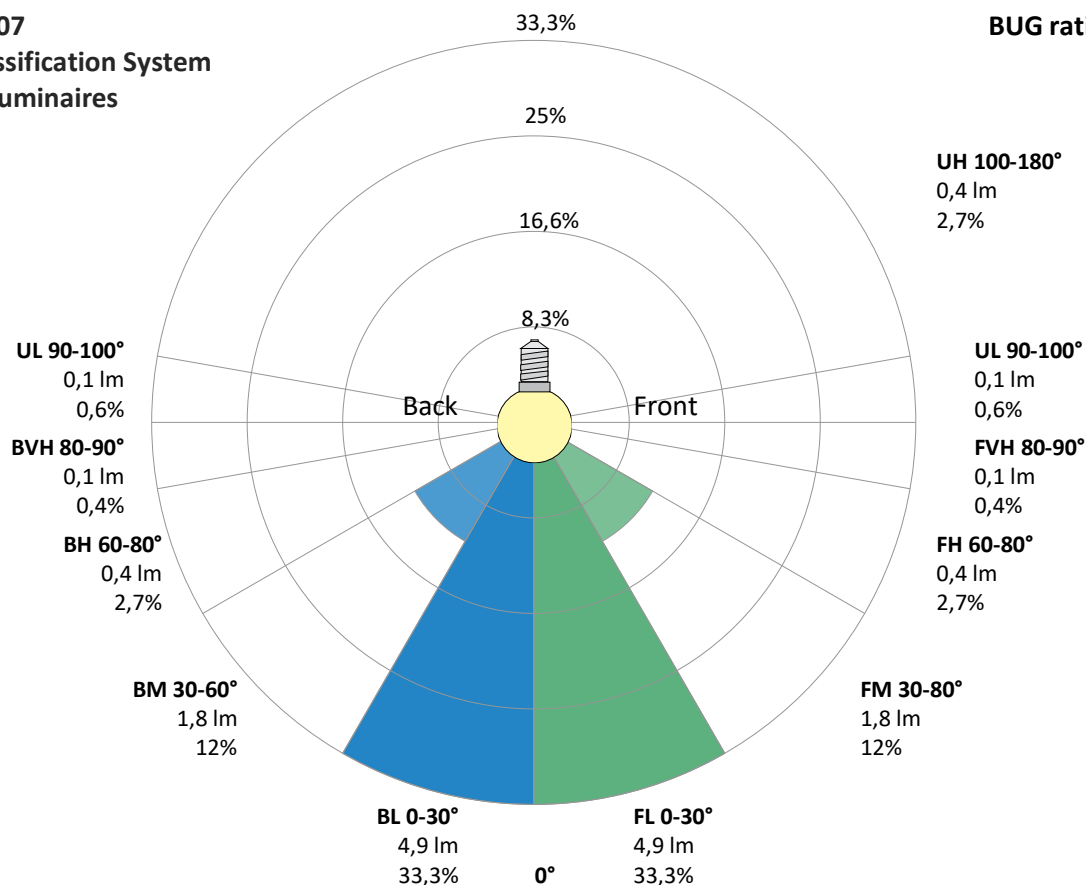
BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	5 lm	33,3%
Medium(30-60°)	2 lm	12,0%
High(60-80°)	0 lm	2,7%
Very high(80-90°)	0 lm	0,4%
Back light		
Low(0-30°)	5 lm	33,3%
Medium(30-60°)	2 lm	12,0%
High(60-80°)	0 lm	2,7%
Very high(80-90°)	0 lm	0,4%
Uplight		
Low(90-100°)	0 lm	0,6%
High(100-180°)	0 lm	2,7%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B0 U0 G0



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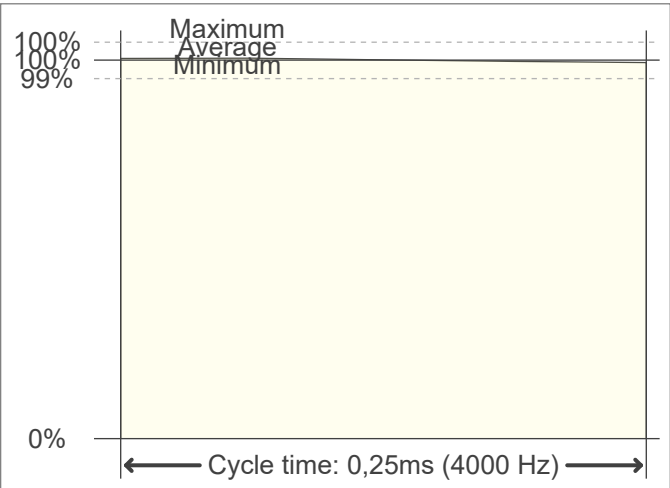
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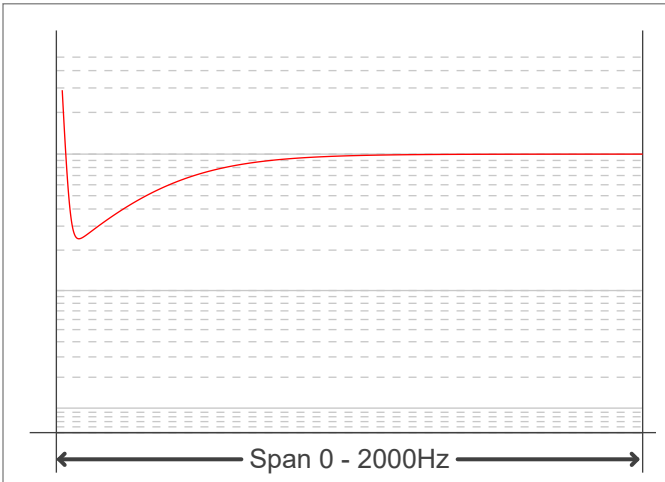
Flicker /TLA details

Flicker Meter Type	Viso Systems LabFlicker	Measurement time	
Frequency of input power	50 Hz	PstLM	180 sec
Flicker/TLA sample rate	20000 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	4000 Hz	JA8/10 40 Hz	0,03 %
Percent Flicker	0,75 %	JA8/10 90 Hz	0,04 %
Flicker index	0	JA8/10 200 Hz	0,05 %
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)		JA8/10 400 Hz	0,07 %
PstLM value (F < 80 Hz)	0,03	JA8/10 1000 Hz	0,1 %
SVM value (80 < F < 2000 Hz)	0	Flicker indices according to Lighting Research Center (2015)	
		Perception metric, Assist Mp	0,02

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

