Light Measurement Report

Print date: 26-11-2024
Measurement date and time: 26-11-2024 13:50:52 – Measurement no. VFR-241126-2175-MS
Measurement tracking No. and Link: VT241126-009505
Operator:

Laboratory and Equipment

Laboratory Owner and Location	Viso Systems, Copenhagen V, Denmark
Goniospectrometer System and Type	LabSpion – Type C, horizontal
Sensor Name, Calibr. Date and Serial No.	LabSensor Model2 – 11-1-2024 – 3130191315
Spectrometer Manufacturer and Model	Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

Measurement Conditions

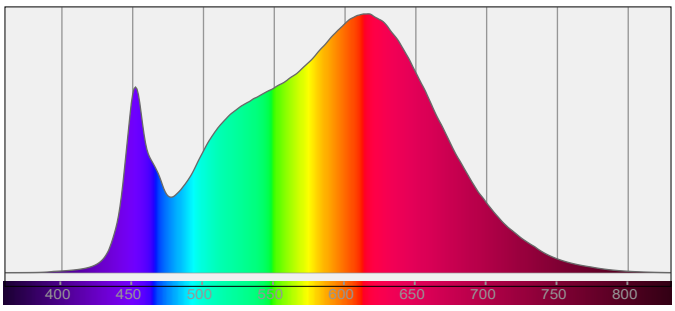
Number of C-planes and Resolution	20 planes – 18°
γ (gamma)-Resolution	5°
Test Distance	1,99 m
Input Power, Power and Displ. Factors	28,6 W – PF 0,81 – DPF 1,0
Input RMS Voltage and Current	230 V – 0,152 A
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 2 sec – 2,0%

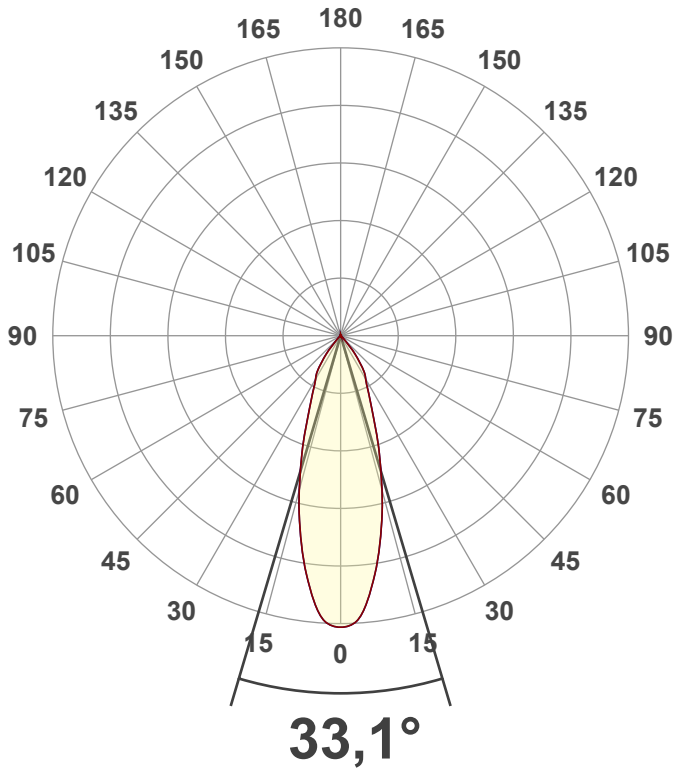
Tested Light Source

Product Name	807894-3000K-30W
Item No. and Manufacturer	807894-3000K-30W – Dutchfulfillment
Product Description (line 1)	3-FASE RAILSPOT | ROSALIN | 10W-20W-30W | ZWART | DIMBAAR | CCT-SWITCH

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	2263 lm – 0,07% / 99,93%
Efficiency	79 lm/W
Peak Intensity and Beam Angle	5060 cd – 33,1°
Correlated Color Temperature, Target/Measured	CCT = 3000 K / 3373 K
Color Rendering Index	CRI 92,7
Color Rendering TM30-18	R_f 91,0 – R_g 97,6
Color Shift, CIE duv and MacAdam Steps	Duv 0,0019 – SDCM 11,9
Flicker	SVM 0,03 – PstLM 0,04





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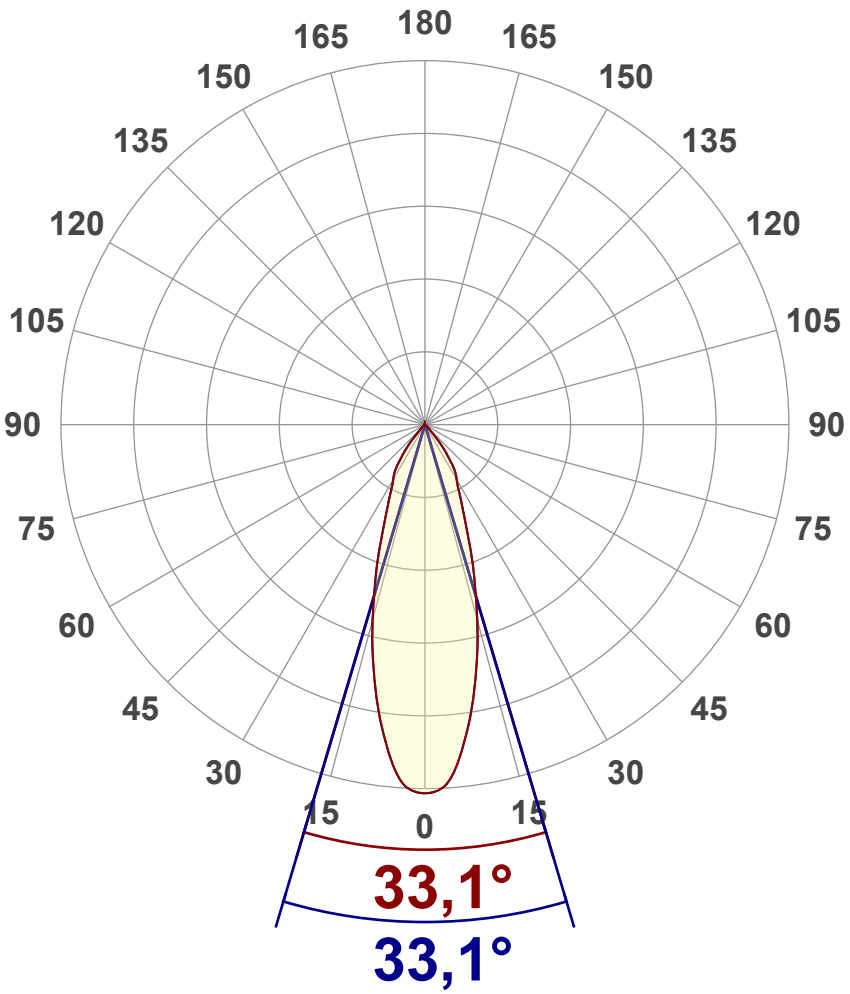
Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2263 lm
Lumen Up% / Down%	0,07% / 99,93%
Peak Intensity	5060 cd
Beam Angle (50%)	33,1°
Beam Angle (90%)	33,1°
Beam Angle (10%)	33,1°

Cut-off Angle

Average 2,5%	85,7°

Field Angle

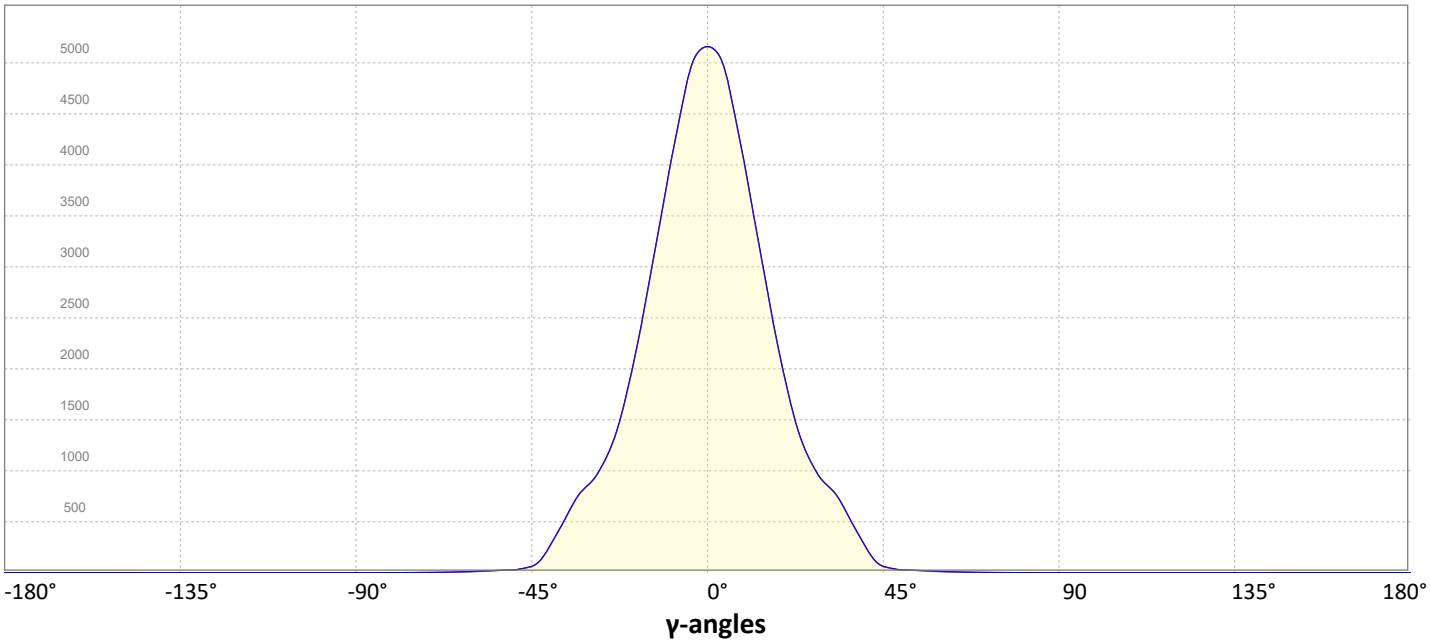
Average 10%	73,5°

Intensity Ratio

In 120° cone	99,5%
In 90° cone	97,9%

C000-C180
C090-C270

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



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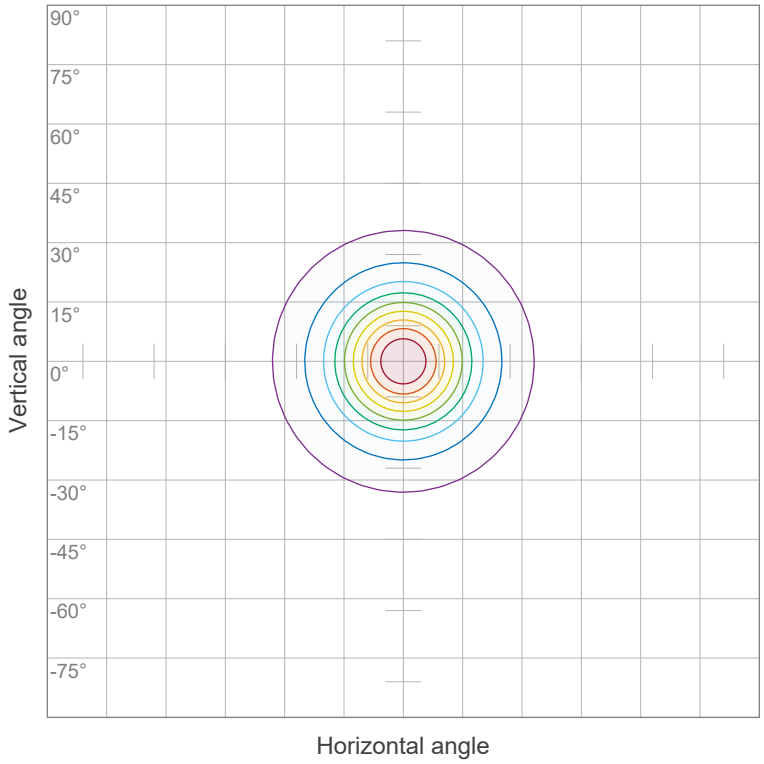
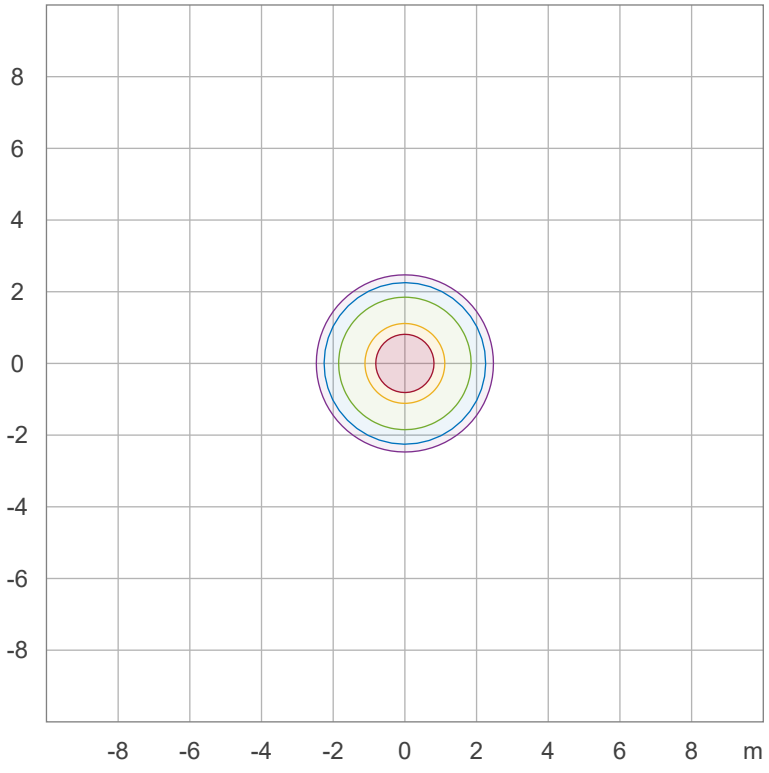
Iso-intensity Diagram (Iso-candela)



90 %	4553,6 cd
80 %	4047,7 cd
70 %	3541,7 cd
60 %	3035,7 cd
50 %	2529,8 cd
40 %	2023,8 cd
30 %	1517,9 cd
20 %	1011,9 cd
10 %	506,0 cd

Peak intensity: 5059,6 cd
Number of c-planes: 20

Iso-illuminance Diagram (Iso-lux)



50,0 %	281,1 lx
30,0 %	168,7 lx
10,0 %	56,2 lx
5,0 %	28,1 lx
3,0 %	16,9 lx

Peak illuminance: 562,2 lx
Mounting height: 3,0 m
Number of c-planes: 20

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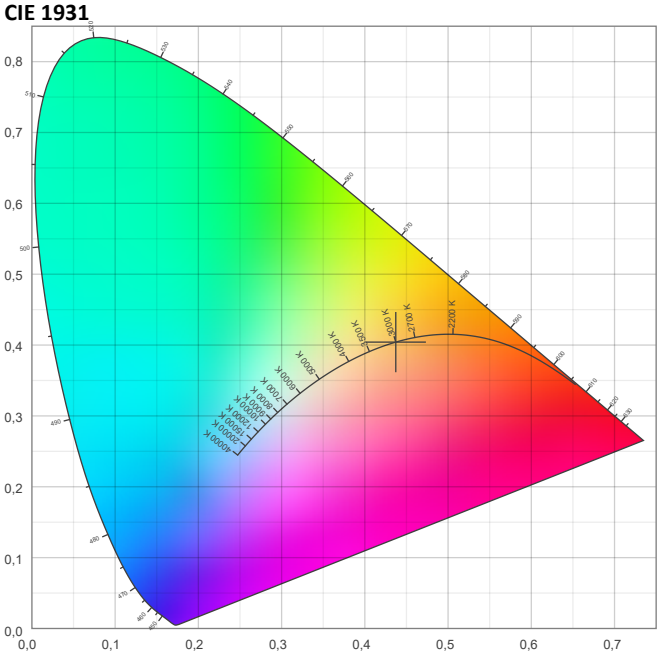
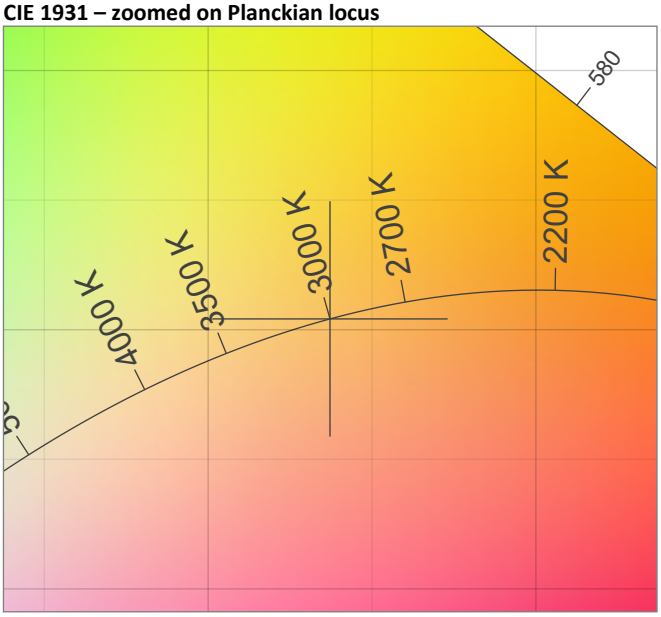
Color details

Correlated Color Temperature, Target	CCT = 3000 K
Correlated Color Temperature, Measured	CCT = 3373 K
Color Rendering Index	CRI 92,7
Color Rendering Index, R9 (red component)	R9 = 55,9
Color Rendering TM30-18	R_f 91,0 – R_g 97,6
Color Quality Scale	CQS = 91,8
MacAdam Steps	SDCM = 11,9
Color coordinates CIE 1931	(x;y) = (0,437;0,404)
Color coordinate CIEs 1960	(u;v) = (0,251;0,348)
Color deviation from BBL	Duv = 0,0019
Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0,251;0,521)

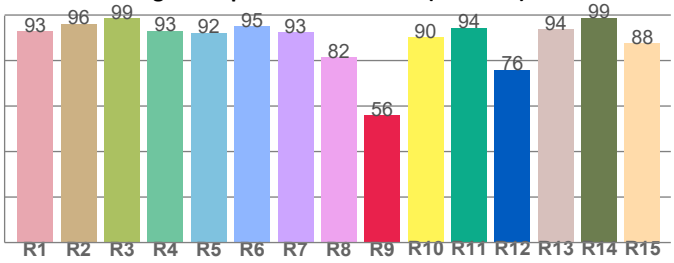
CIE 1931



CIE 1931 – zoomed on Planckian locus



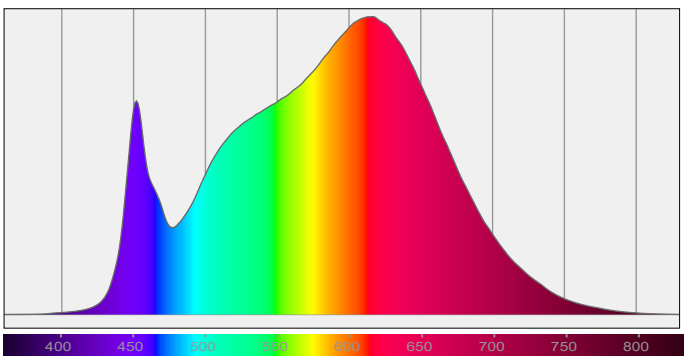
Color Rendering Index per reference color (CIE 1995)



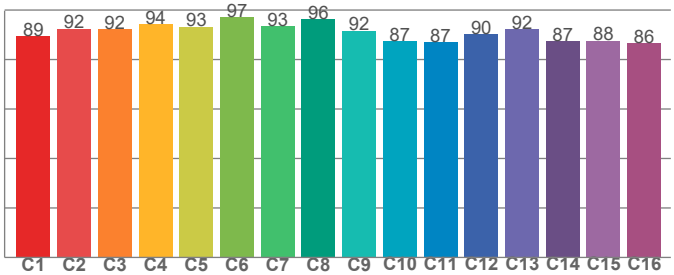
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
92,8	96,1	98,5	93,1	92,2	95,0	92,5	81,6	55,9	90,1	94,5	76,0	93,8	98,7	87,7

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



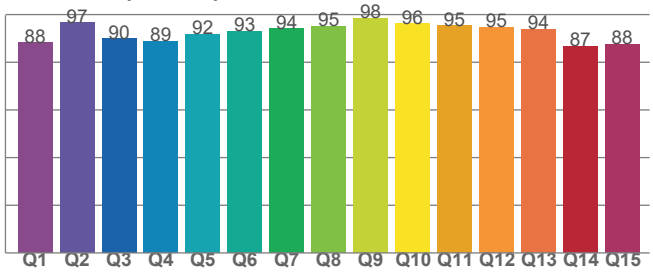
TM30-18 Rf-values per hue bin



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
89,4	92,4	92,4	94,1	93,2	97,1	93,3	96,4	91,7	87,4	87,0	90,1	92,3	87,4	87,6	86,5

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
88,2	96,6	89,9	88,8	91,7	93,1	94,2	95,2	98,4	96,1	95,4	94,8	94,0	86,7	87,5

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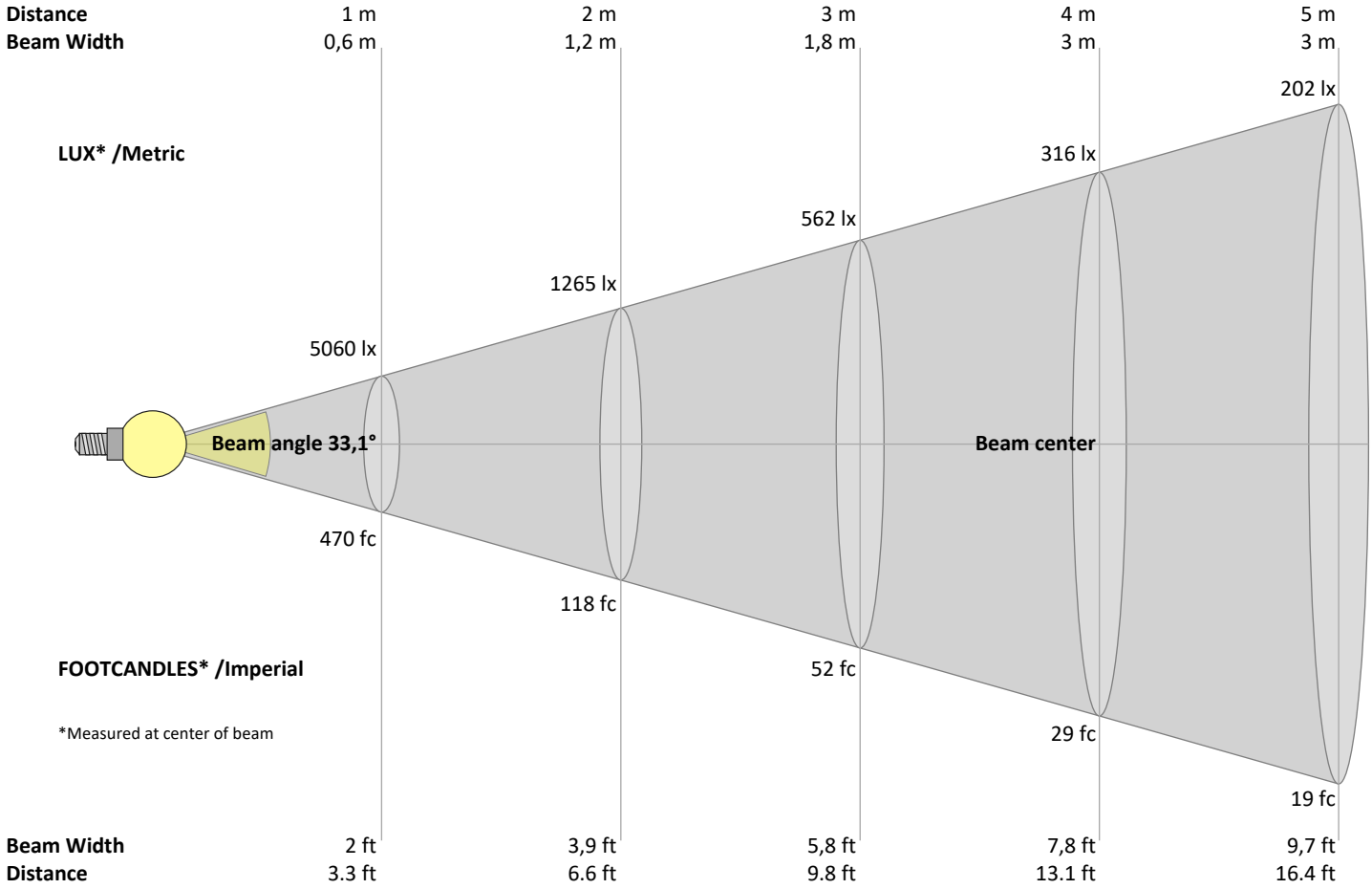
Beam Details



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
5060	1265	562	316	202	141	103	79	62	51	42	35	30	26	22	20	18	16	14	13	lux
470,1	117,5	52,2	29,4	18,8	13,1	9,6	7,3	5,8	4,7	3,9	3,3	2,8	2,4	2,1	1,8	1,6	1,5	1,3	1,2	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
5060	5060	4926	4607	4287	3879	3463	3049	2639	2229	1903	1584	1327	1156	985	891	804	695	558	420	cd
100%	100%	97%	91%	85%	77%	68%	60%	52%	44%	38%	31%	26%	23%	19%	18%	16%	14%	11%	8%	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
5060	5060	4926	4607	4287	3879	3463	3049	2639	2229	1903	1584	1327	1156	985	891	804	695	558	420	cd
100%	100%	97%	91%	85%	77%	68%	60%	52%	44%	38%	31%	26%	23%	19%	18%	16%	14%	11%	8%	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
5060	5060	4926	4607	4287	3879	3463	3049	2639	2229	1903	1584	1327	1156	985	891	804	695	558	420	cd
100%	100%	97%	91%	85%	77%	68%	60%	52%	44%	38%	31%	26%	23%	19%	18%	16%	14%	11%	8%	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
5060	5060	4926	4607	4287	3879	3463	3049	2639	2229	1903	1584	1327	1156	985	891	804	695	558	420	cd
100%	100%	97%	91%	85%	77%	68%	60%	52%	44%	38%	31%	26%	23%	19%	18%	16%	14%	11%	8%	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 H = mounting height above eye level		**Viewed Crosswise** (Viewing direction orthogonal to lamp length axis)					**Viewed Endwise** (Viewing direction parallel to lamp length axis)				
X	**Y**										
2H	2H	19,7	20,2	19,8	20,5	20,6	19,7	20,2	19,8	20,5	20,6
	3H	19,4	20,1	19,8	20,3	20,5	19,4	20,1	19,8	20,3	20,5
	4H	19,3	20,0	19,7	20,2	20,4	19,3	20,0	19,7	20,2	20,4
	6H	19,3	19,9	19,6	20,2	20,5	19,3	19,9	19,6	20,2	20,5
	8H	19,2	19,8	19,6	20,1	20,5	19,2	19,8	19,6	20,1	20,5
	12H	19,2	19,7	19,5	20,1	20,5	19,2	19,7	19,5	20,1	20,5
4H	2H	19,3	20,0	19,7	20,2	20,4	19,3	20,0	19,7	20,2	20,4
	3H	19,2	19,7	19,6	20,1	20,5	19,2	19,7	19,6	20,1	20,5
	4H	19,1	19,5	19,5	20,0	20,5	19,1	19,5	19,5	20,0	20,5
	6H	19,0	19,5	19,5	19,8	20,2	19,0	19,5	19,5	19,8	20,2
	8H	18,9	19,4	19,4	19,7	20,1	18,9	19,4	19,4	19,7	20,1
	12H	18,9	19,2	19,4	19,6	20,1	18,9	19,2	19,4	19,6	20,1
8H	4H	18,9	19,4	19,4	19,7	20,1	18,9	19,4	19,4	19,7	20,1
	6H	18,9	19,2	19,4	19,6	20,2	18,9	19,2	19,4	19,6	20,2
	8H	18,9	19,1	19,4	19,6	20,2	18,9	19,1	19,4	19,6	20,2
	12H	18,8	19,0	19,4	19,5	20,1	18,8	19,0	19,4	19,5	20,1
12H	4H	18,9	19,2	19,4	19,6	20,1	18,9	19,2	19,4	19,6	20,1
	6H	18,9	19,1	19,4	19,6	20,2	18,9	19,1	19,4	19,6	20,2
	8H	18,8	19,0	19,4	19,5	20,1	18,8	19,0	19,4	19,5	20,1

Variations with the observer position for the luminaire spacings, S:		
S = 1.0H	4,9 / -12,3	4,9 / -12,3
S = 1.5H	7,6 / -15,1	7,6 / -15,1
S = 2.0H	9,6 / -17,7	9,6 / -17,7

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	111	106	106	106	102	102	102	100
1	114	111	109	107	112	109	107	105	105	104	102	102	100	99	98	97	96	95
2	109	105	101	98	107	103	100	97	100	97	95	97	95	93	94	92	91	89
3	104	99	94	90	102	97	93	90	95	91	88	92	89	87	90	88	86	84
4	100	93	88	84	98	92	87	84	90	86	83	88	85	82	86	83	81	80
5	96	88	83	79	94	87	82	79	85	81	78	84	80	77	82	79	77	75
6	91	84	78	74	90	83	78	74	81	77	74	80	76	73	79	75	73	71
7	88	79	74	70	86	79	74	70	78	73	70	76	72	69	75	72	69	68
8	84	76	70	67	83	75	70	67	74	70	66	73	69	66	72	68	66	65
9	81	72	67	63	80	72	67	63	71	66	63	70	66	63	69	65	63	62
10	78	69	64	61	77	69	64	60	68	63	60	67	63	60	66	63	60	59

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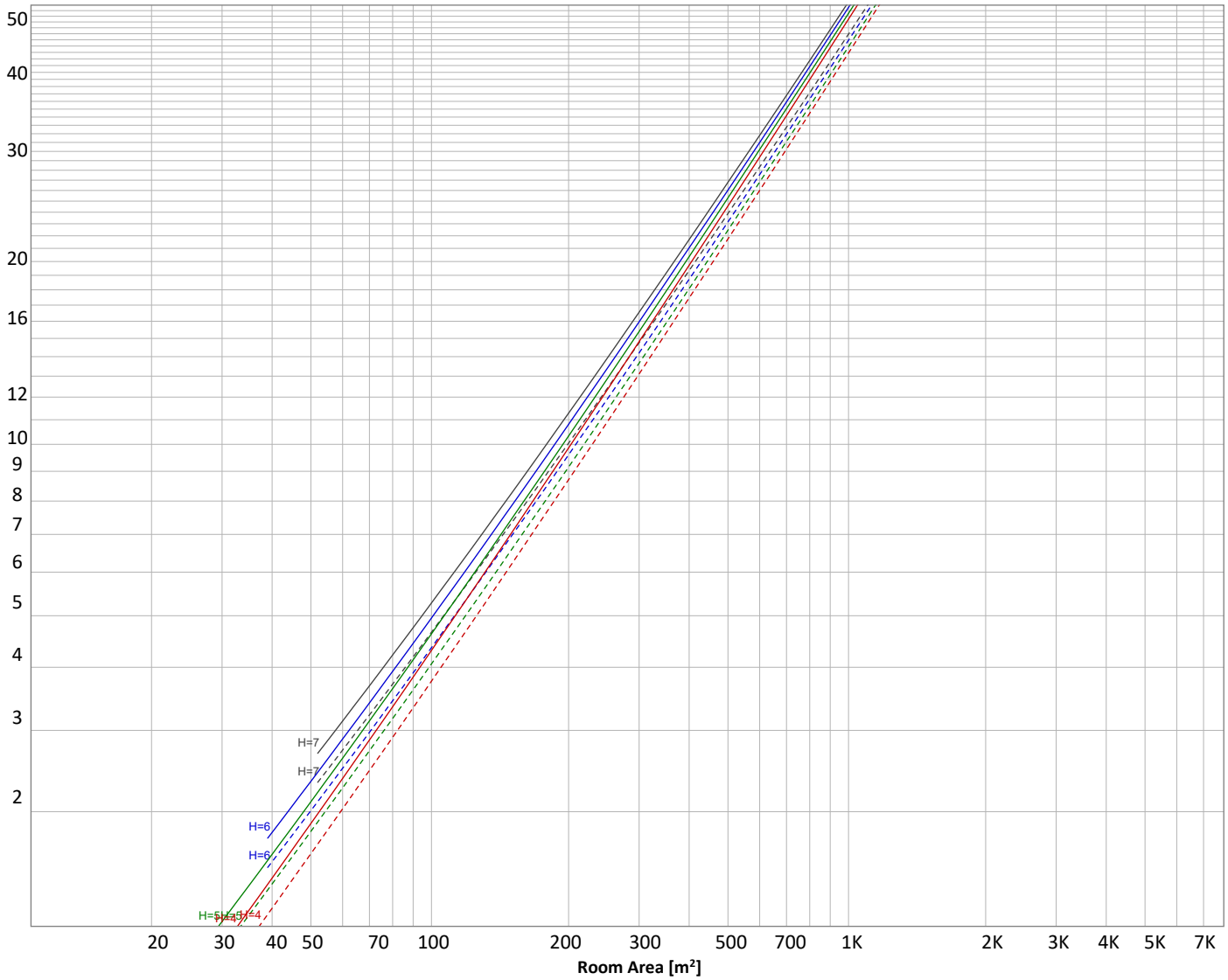
Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 2263 lm		ρ(%)		
H_{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	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°
431 lm	777 lm	573 lm	381 lm	72,1 lm	18,4 lm	6,79 lm	2,08 lm	0,320 lm

90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,161 lm	0,151 lm	0,132 lm	0,119 lm	0,142 lm	0,210 lm	0,299 lm	0,281 lm	0,088 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	431 lm	19,1%
10-20°	777 lm	34,3%
20-30°	573 lm	25,3%
30-40°	381 lm	16,8%
40-50°	72 lm	3,2%
50-60°	18 lm	0,8%
60-70°	7 lm	0,3%
70-80°	2 lm	0,1%
80-90°	0 lm	0,0%
90-100°	0 lm	0,0%
100-110°	0 lm	0,0%
110-120°	0 lm	0,0%
120-130°	0 lm	0,0%
130-140°	0 lm	0,0%
140-150°	0 lm	0,0%
150-160°	0 lm	0,0%
160-170°	0 lm	0,0%
170-180°	0 lm	0,0%
Total	2263 lm	100,0%

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	1781 lm	78,7%
0-40°	2162 lm	95,5%
0-60°	2253 lm	99,5%
60-90°	9 lm	0,4%
70-100°	3 lm	0,1%
90-120°	0 lm	0,0%
0-90°	2262 lm	99,9%
90-180°	2 lm	0,1%
0-180°	2263 lm	100,0%

Intensity peaks

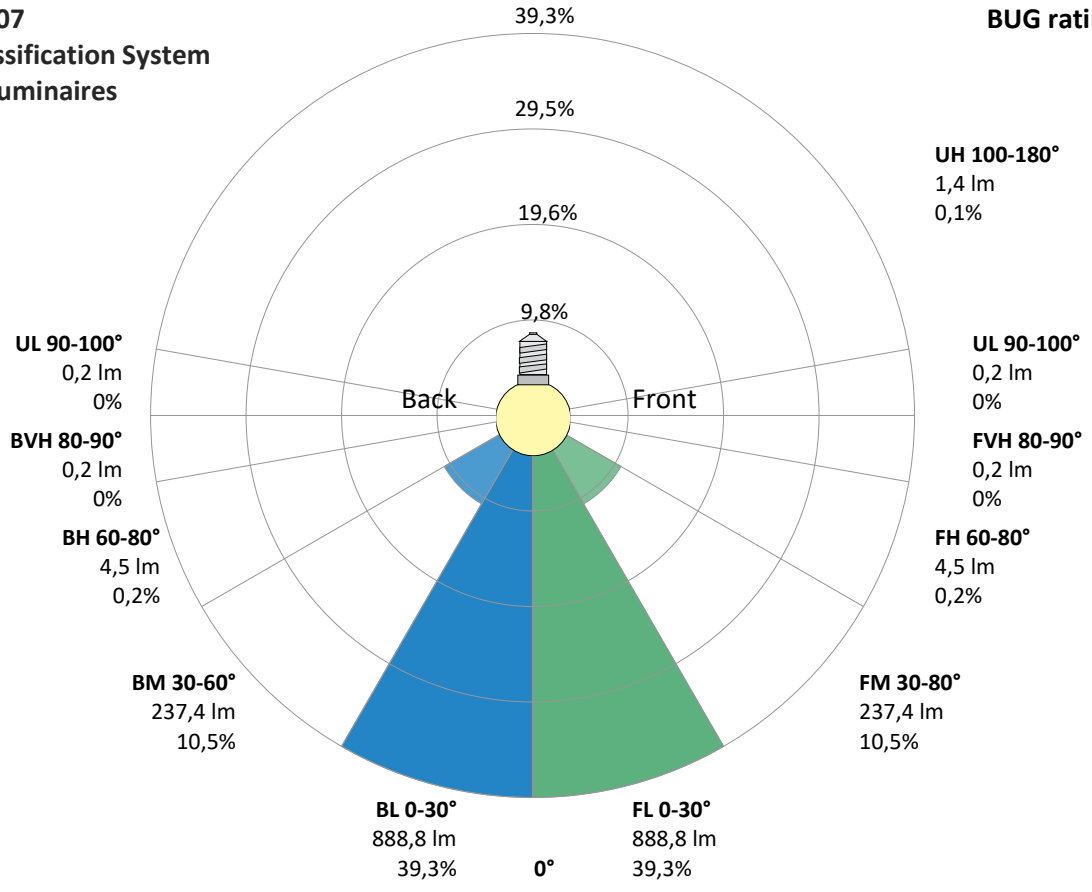
Max intensity	5060 cd
Intensity, 90°	0 cd
Intensity, 0°	5060 cd

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	889 lm	39,3%
Medium(30-60°)	237 lm	10,5%
High(60-80°)	5 lm	0,2%
Very high(80-90°)	0 lm	0,0%
Back light		
Low(0-30°)	889 lm	39,3%
Medium(30-60°)	237 lm	10,5%
High(60-80°)	5 lm	0,2%
Very high(80-90°)	0 lm	0,0%
Uplight		
Low(90-100°)	0 lm	0,0%
High(100-180°)	1 lm	0,1%

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

BUG rating B2 U1 G0



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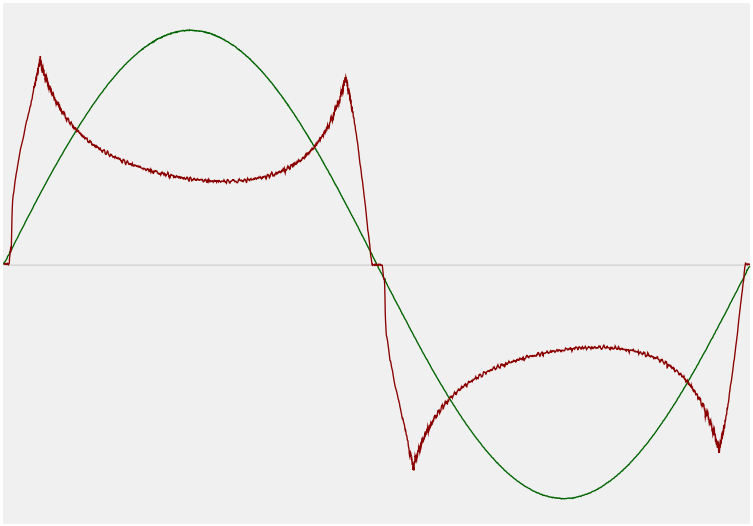
Power Details

Input Power

Power feed to light source	28,6 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,152 A
Volt-Ampere or apparent power = V_{RMS}*I_{RMS}	35,09 VA
Displacement factor of AC power feed	1,0
Power factor of AC current feed	0,81
Total harmonic distortion of the current	70,29%
Total harmonic distortion of the voltage	0,08%

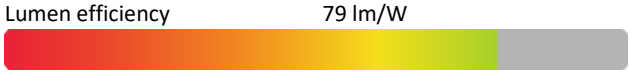
Input Power Curve



Efficiency

Radiated power efficiency 26,2%

Lumen efficiency 79 lm/W



Stabilization Details

Warmup Conditions

Stable period	15 min
Stable change max	2,0%
Minimum time	15 min

Color Temperature Change

CCT start	3000 K
CCT shift	+0 K
CCT end	3000 K

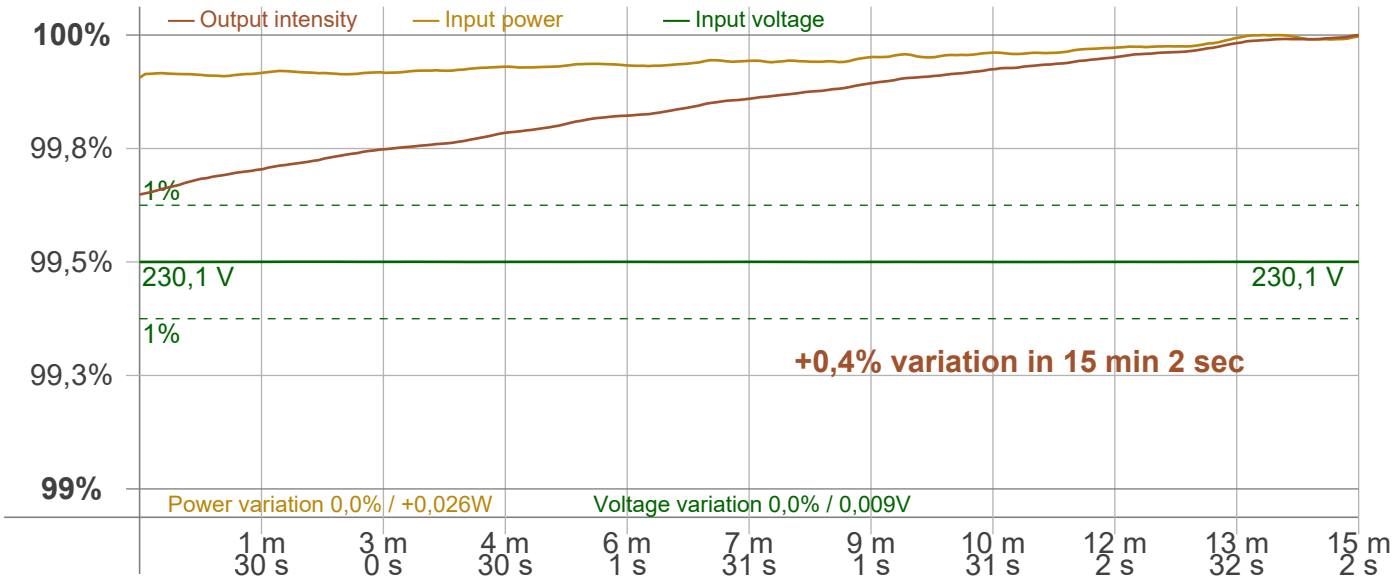
Warmup Result

Total warmup time	Lamp stabilized in 15 min 2 sec
Warmup variation	+0,4%

Output Change

Output start	2255 lm
Output change	+8 lm
Output end	2263 lm

Stabilization Curve



Light Measurement Report

Print date: 26-11-2024
Measurement date and time: 26-11-2024 13:50:52 – Measurement no. VFR-241126-2175-MS
Measurement tracking No. and Link: VT241126-009505
Operator:

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	99,5 Hz
Percent Flicker	1 %
Flicker index	0

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

JA8/10 40 Hz	0,04 %
JA8/10 90 Hz	0,04 %
JA8/10 200 Hz	0,79 %
JA8/10 400 Hz	0,99 %
JA8/10 1000 Hz	0,98 %

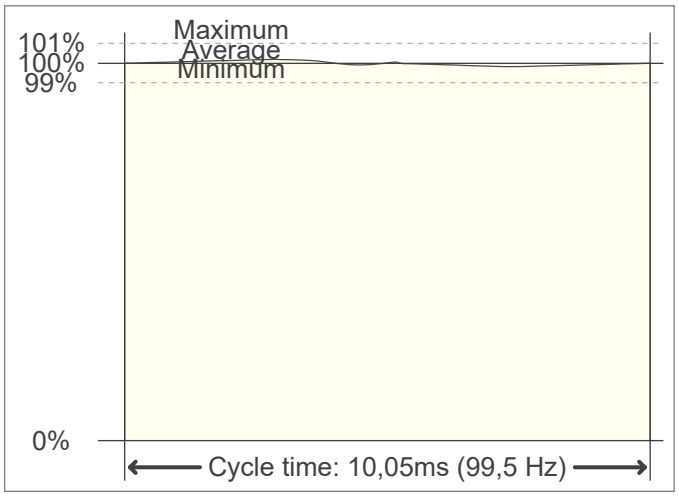
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value (F < 80 Hz)	0,04
SVM value (80 < F < 2000 Hz)	0,03

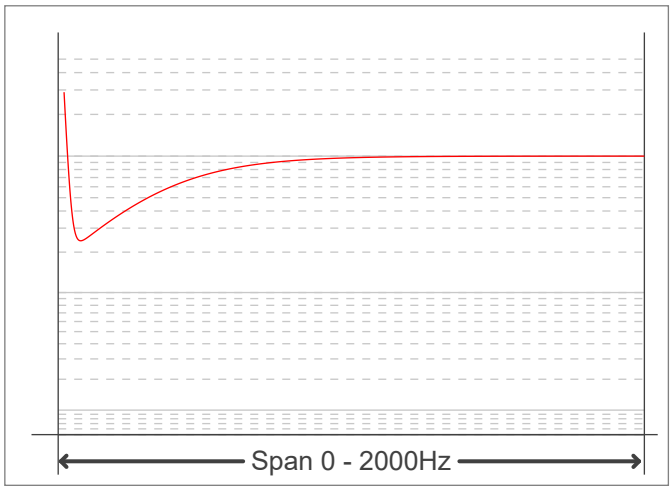
Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp	0,03

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot