

Light Measurement Report

Print date: 15-4-2025

Measurement date and time: 15-4-2025 13:29:14 – Measurement no. VFR-250415-0783-MS

Measurement tracking No. and Link: [VT250415-003846](#)

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

36 planes – 10°

5°

11,89 m

47,5 W – PF 0,98 – DPF 0,98

230 V – 0,210 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)

271654-5000K

271654-5000K – Dutchfulfillment

LED BATTEN TELESTO 150CM 50W (OSRAM DRIVER)

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

6305 lm – 11,4% / 88,6%

133 lm/W

1524 cd – 131,5°

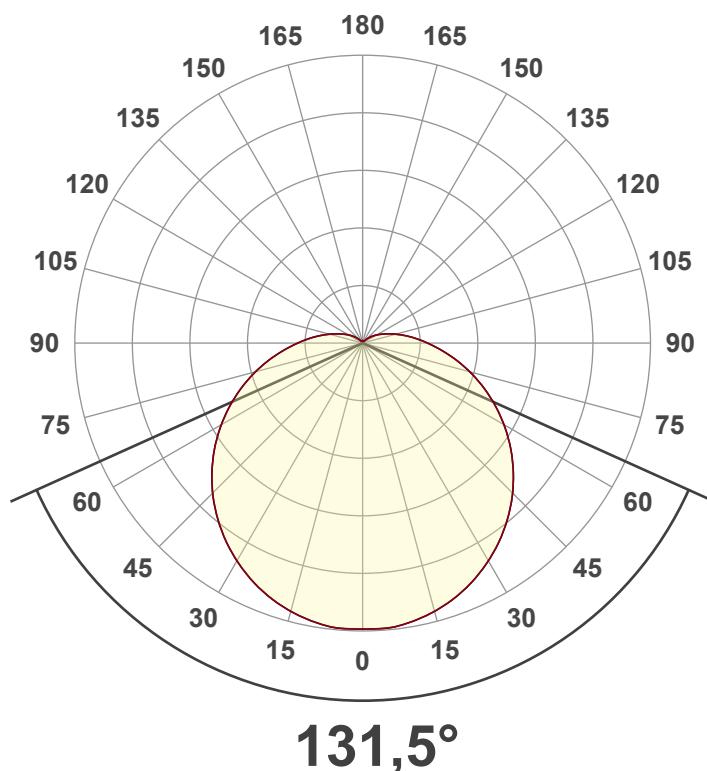
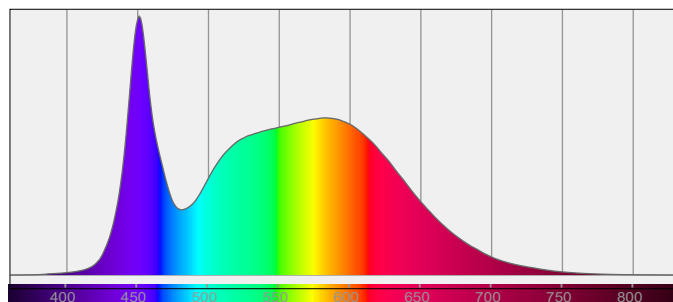
CCT = 5000 K / 5143 K

CRI 83,4

R_f 84,0 – R_g 96,0

Duv 0,0026 – SDCM 3,5

SVM 0 – PstLM 0,01



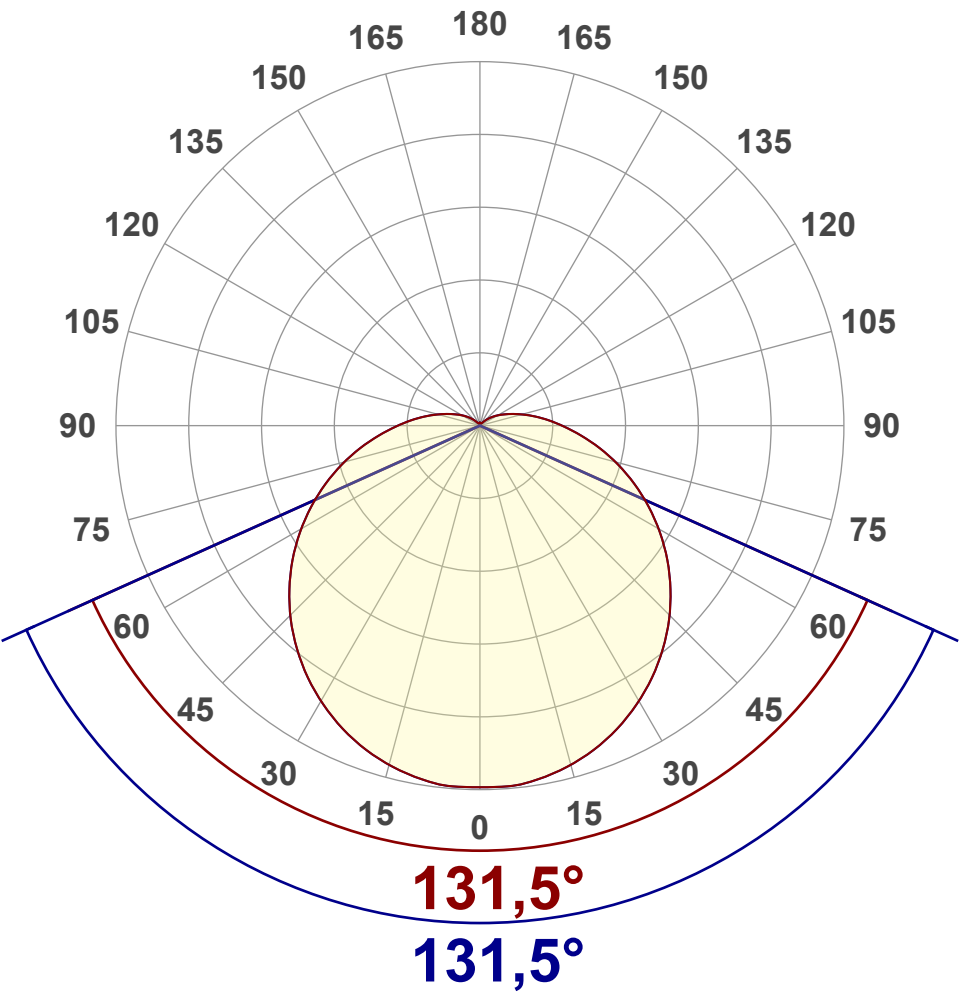
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	6305 lm
Lumen Up% / Down%	11,4% / 88,6%
Peak Intensity	1524 cd
Beam Angle (50%)	131,5°
Beam Angle (90%)	131,5°
Beam Angle (10%)	131,5°

Cut-off Angle

Average 2,5%	263,9°
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Field Angle

Average 10%	217,6°
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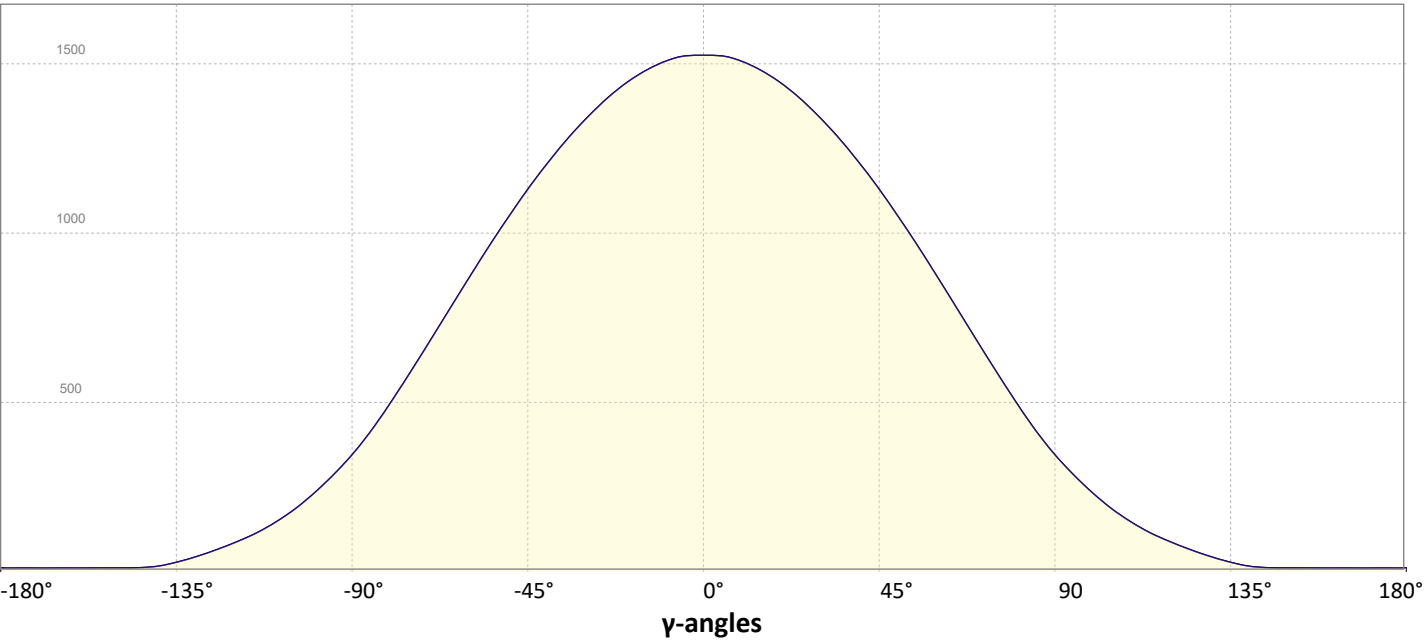
Intensity Ratio

In 120° cone	59,2%
In 90° cone	38,6%

C000-C180

C090-C270

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

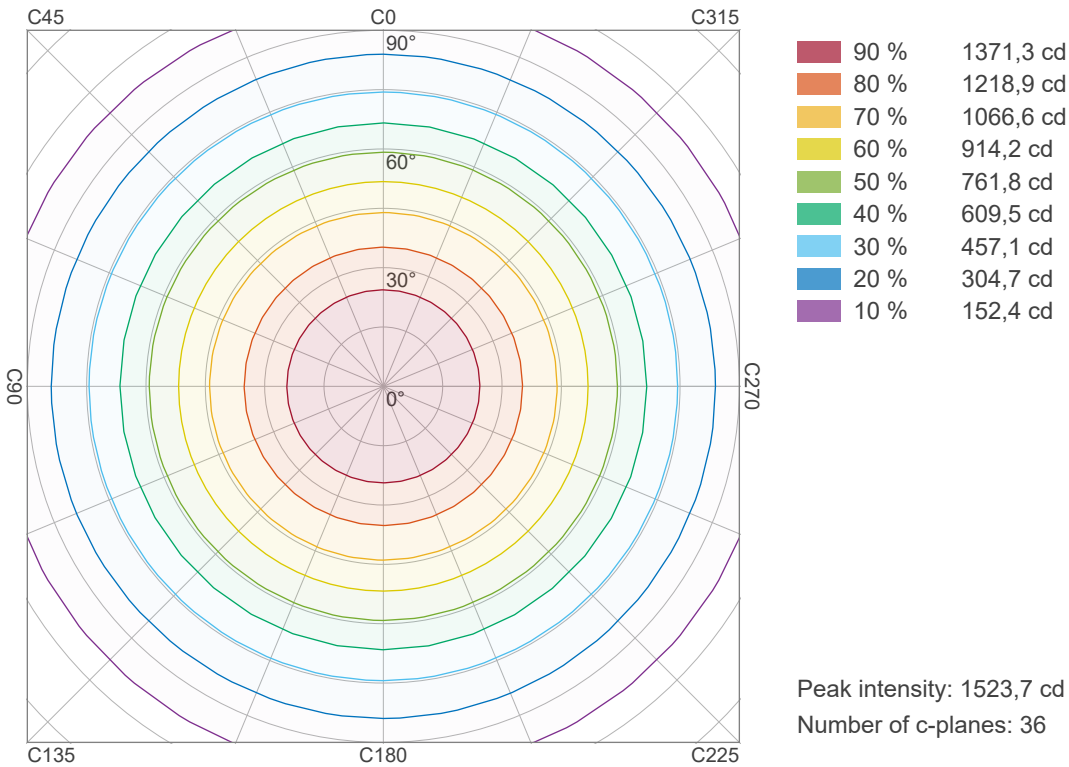


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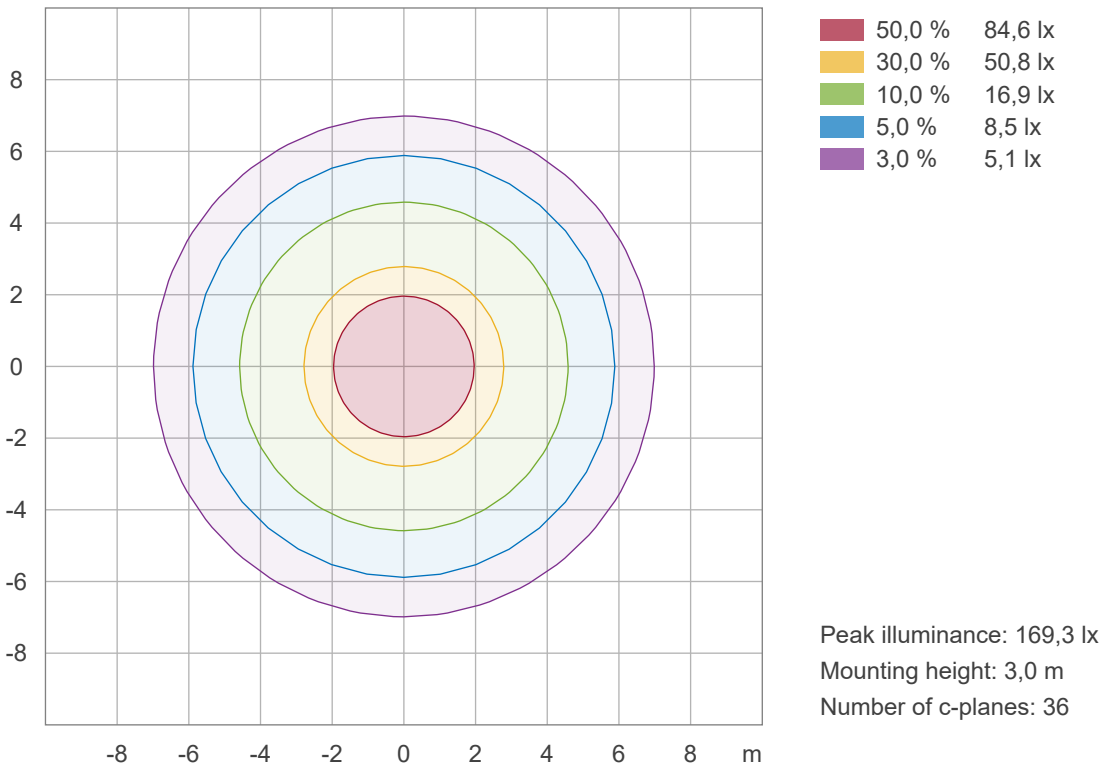
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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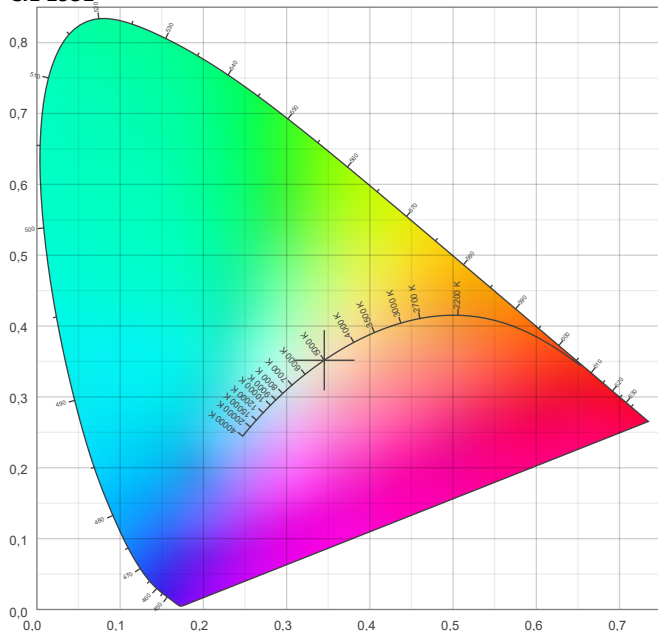


Color details

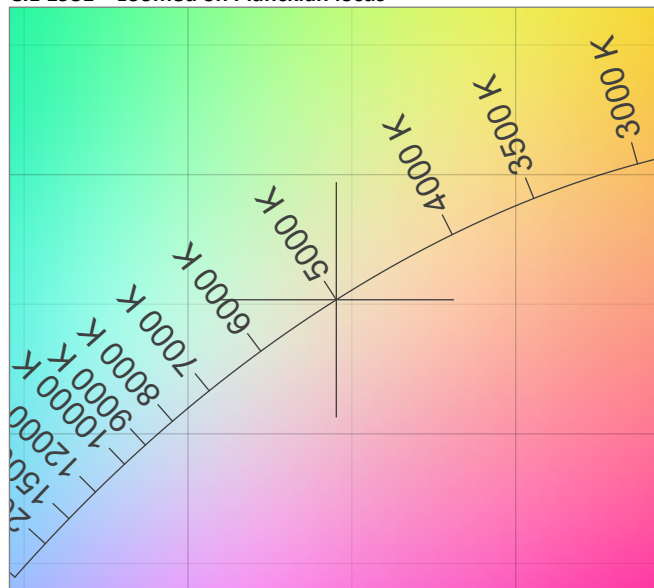
Correlated Color Temperature, Target CCT = 5000 K
Correlated Color Temperature, Measured CCT = 5143 K
Color Rendering Index CRI 83,4
Color Rendering Index, R9 (red component) R9 = 9,4
Color Rendering TM30-18 R_f 84,0 – R_g 96,0
Color Quality Scale CQS = 81,4

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0,345;0,352)
Color coordinate CIEs 1960 (u;v) = (0,211;0,323)
Color deviation from BBL Duv = 0,0026
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,211;0,485)

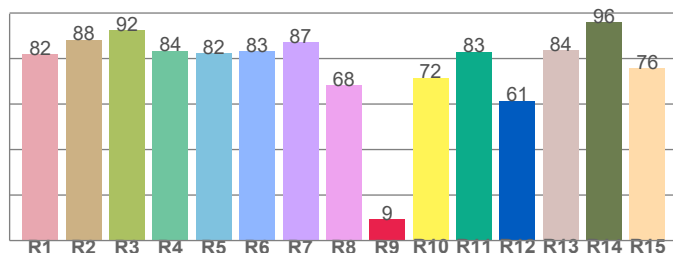
CIE 1931



CIE 1931 – zoomed on Planckian locus



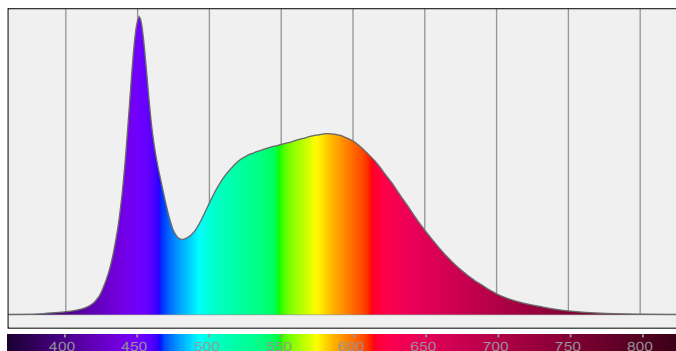
Color Rendering Index per reference color (CIE 1995)



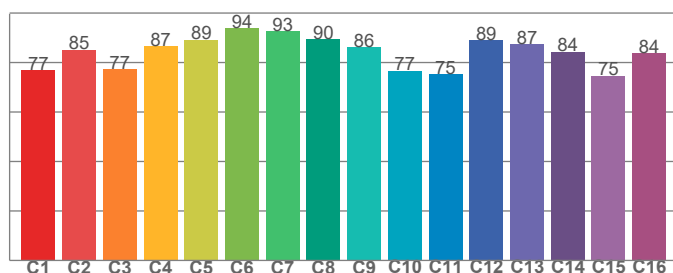
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
81,8	88,2	92,3	83,5	82,3	83,3	87,3	68,3	9,4	71,6	82,9	61,5	83,5	95,9	75,8

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



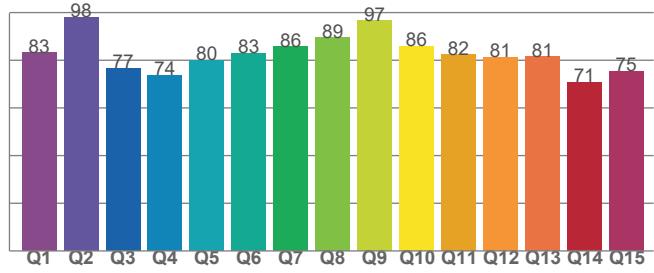
TM30-18 R_f-values per hue bin



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
76,9	85,2	77,3	86,6	89,2	93,8	92,5	89,5	86,1	76,6	75,2	89,0	87,4	84,4	74,7	83,7

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
83,1	98,2	76,6	73,6	80,1	83,0	85,7	89,5	96,6	85,9	82,2	81,3	81,5	70,8	75,4

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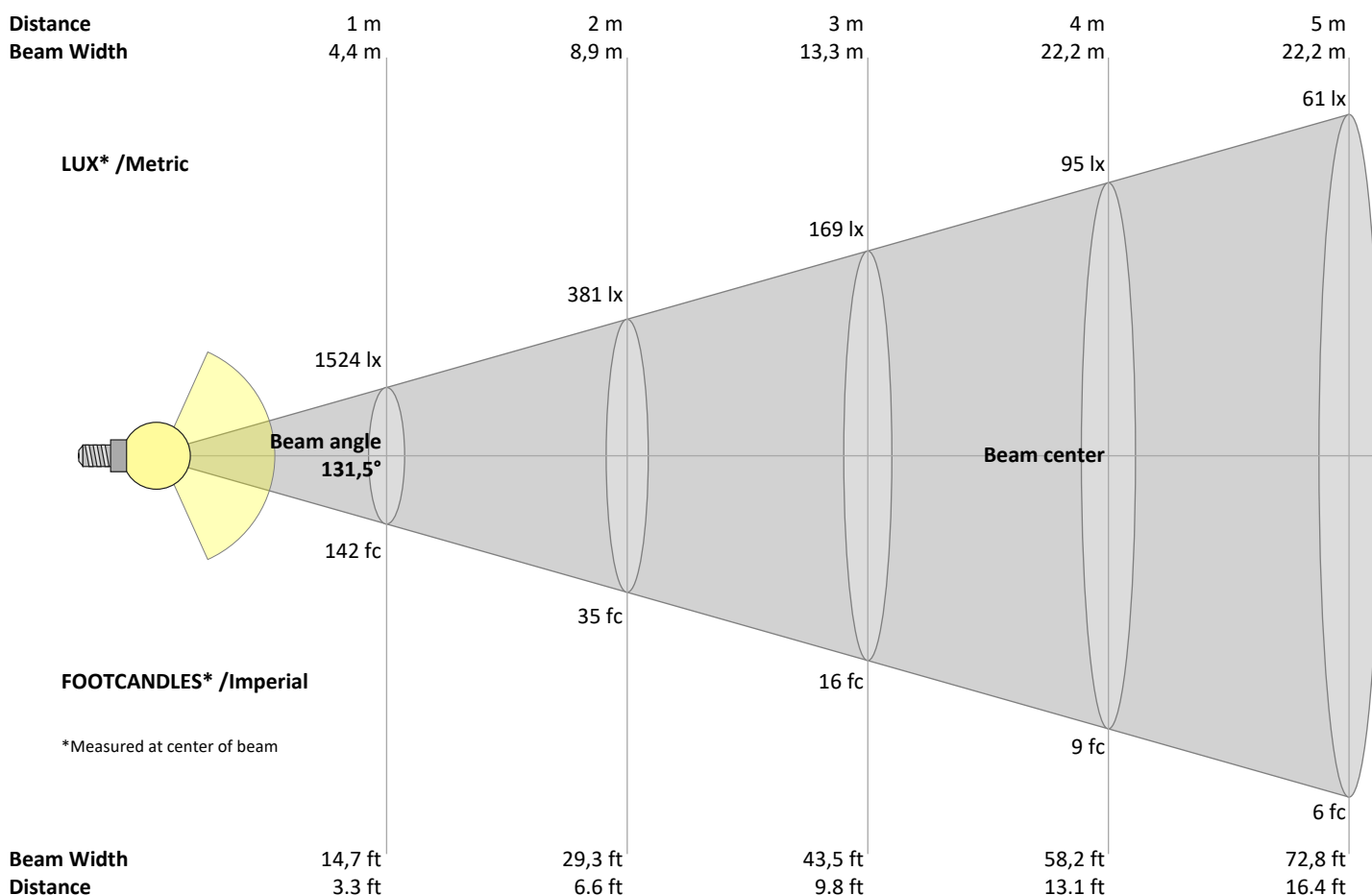
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Beam Details



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
1524	381	169	95	61	42	31	24	19	15	13	11	9	8	7	6	5	5	4	4	lux
141,6	35,4	15,7	8,8	5,7	3,9	2,9	2,2	1,7	1,4	1,2	1	0,8	0,7	0,6	0,6	0,5	0,4	0,4	0,4	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
1524	1510	1457	1372	1262	1129	978	813	646	485	346	240	159	102	60	28	13	11	11	11	cd
100%	99%	96%	90%	83%	74%	64%	53%	42%	32%	23%	16%	10%	7%	4%	2%	1%	1%	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
1524	1510	1457	1372	1262	1129	978	813	646	485	346	240	159	102	60	28	13	11	11	11	cd
100%	99%	96%	90%	83%	74%	64%	53%	42%	32%	23%	16%	10%	7%	4%	2%	1%	1%	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
1524	1510	1457	1372	1262	1129	978	813	646	485	346	240	159	102	60	28	13	11	11	11	cd
100%	99%	96%	90%	83%	74%	64%	53%	42%	32%	23%	16%	10%	7%	4%	2%	1%	1%	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
1524	1510	1457	1372	1262	1129	978	813	646	485	346	240	159	102	60	28	13	11	11	11	cd
100%	99%	96%	90%	83%	74%	64%	53%	42%	32%	23%	16%	10%	7%	4%	2%	1%	1%	1%	1%	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	21,6	22,8	22,0	23,3	23,8	20,4	21,7	20,9	22,2	22,6
	3H	23,7	25,0	24,3	25,5	25,9	22,1	23,4	22,7	23,9	24,3
	4H	24,9	26,1	25,5	26,6	27,0	23,0	24,2	23,6	24,7	25,1
	6H	26,2	27,2	26,6	27,7	28,3	23,8	24,9	24,3	25,4	26,0
	8H	26,8	27,8	27,3	28,3	28,9	24,2	25,2	24,7	25,7	26,3
	12H	27,5	28,5	28,0	29,0	29,6	24,5	25,6	25,0	26,0	26,7
4H	2H	22,1	23,3	22,6	23,7	24,2	21,2	22,4	21,8	22,9	23,4
	3H	24,5	25,6	25,0	26,0	26,7	23,2	24,3	23,7	24,7	25,4
	4H	25,7	26,8	26,3	27,2	28,0	24,1	25,2	24,7	25,7	26,4
	6H	27,1	28,0	27,7	28,5	29,1	25,0	26,0	25,7	26,5	27,1
	8H	27,8	28,6	28,4	29,1	29,7	25,5	26,3	26,1	26,8	27,4
	12H	28,6	29,3	29,2	29,9	30,5	25,9	26,6	26,5	27,2	27,9
8H	4H	26,0	26,8	26,6	27,4	27,9	24,6	25,4	25,3	26,0	26,6
	6H	27,5	28,2	28,2	28,8	29,5	25,8	26,4	26,4	27,0	27,8
	8H	28,4	28,9	29,0	29,6	30,4	26,3	26,9	27,0	27,6	28,4
	12H	29,3	29,8	30,0	30,5	31,2	26,9	27,4	27,6	28,0	28,8
12H	4H	26,0	26,7	26,6	27,3	28,0	24,7	25,4	25,3	26,0	26,7
	6H	27,6	28,2	28,3	28,9	29,7	26,0	26,5	26,6	27,2	28,0
	8H	28,5	29,0	29,2	29,7	30,4	26,6	27,1	27,3	27,8	28,5
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				0,3 / -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	116	116	116	116	112	112	112	112	105	105	105	98	98	98	92	92	92	89
1	103	97	92	87	99	94	89	85	87	83	80	81	78	75	76	73	71	68
2	93	83	75	69	89	80	73	67	75	69	64	70	65	60	65	61	57	54
3	84	72	63	56	80	70	61	55	65	58	52	61	55	50	57	52	47	45
4	76	63	54	47	73	61	52	46	57	50	44	53	47	42	50	45	40	37
5	70	56	47	40	67	54	45	39	51	43	37	48	41	36	45	39	34	32
6	64	50	41	34	62	49	40	34	46	38	32	43	36	31	40	35	30	28
7	60	46	36	30	57	44	36	29	42	34	28	39	32	27	37	31	26	24
8	55	41	33	26	53	40	32	26	38	30	25	36	29	24	34	28	24	21
9	52	38	29	24	50	37	29	23	35	28	23	33	26	22	31	25	21	19
10	48	35	27	21	47	34	26	21	32	25	20	30	24	20	29	23	19	17

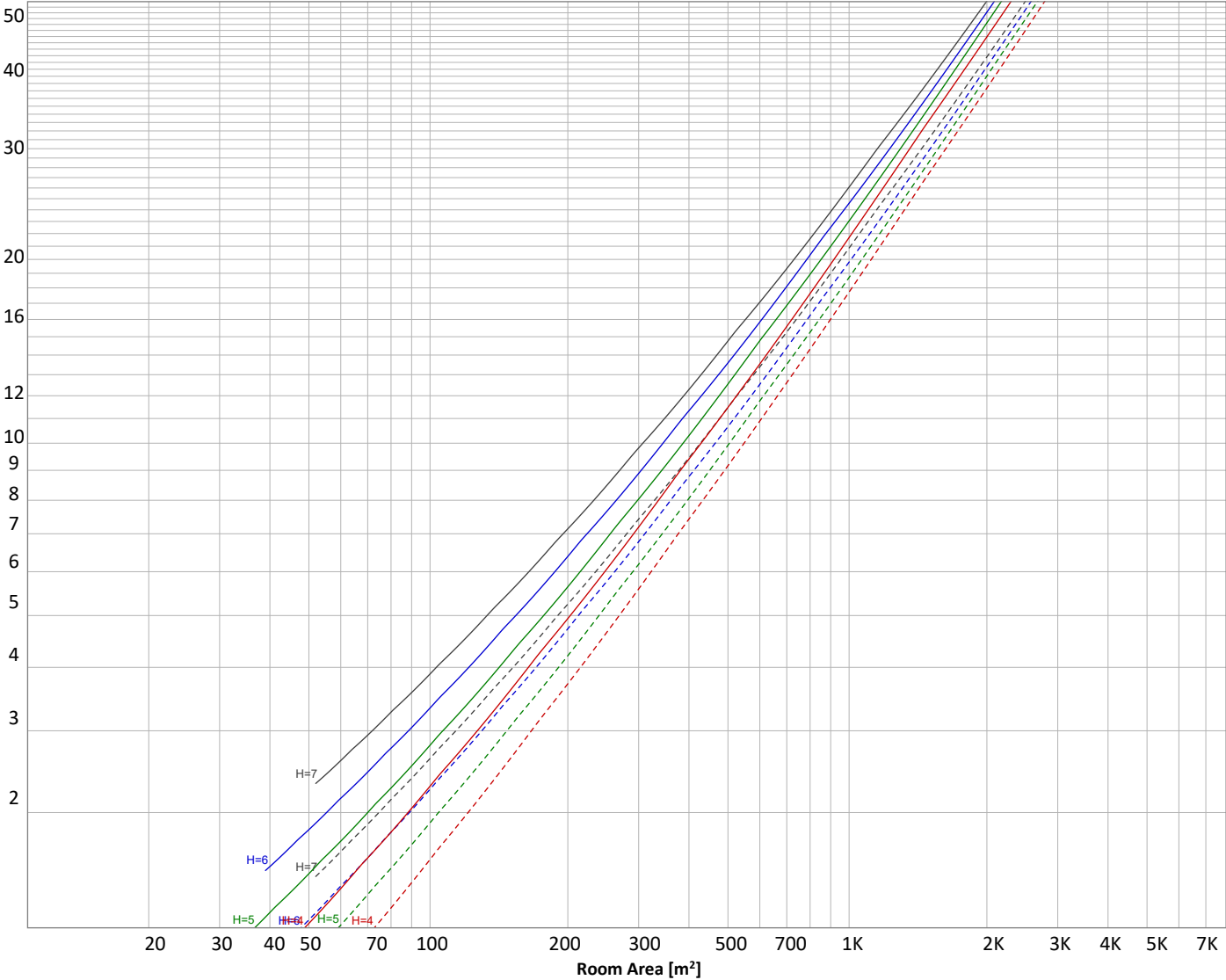
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Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995
LAMPS (number of lamps)



Conditions

H = Room height	Flux = 6305 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°
145 lm	417 lm	643 lm	799 lm	872 lm	858 lm	769 lm	625 lm	459 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
312 lm	195 lm	113 lm	58,4 lm	22,9 lm	8,18 lm	5,25 lm	3,15 lm	1,06 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	145 lm	2,3%
10-20°	417 lm	6,6%
20-30°	643 lm	10,2%
30-40°	799 lm	12,7%
40-50°	872 lm	13,8%
50-60°	858 lm	13,6%
60-70°	769 lm	12,2%
70-80°	625 lm	9,9%
80-90°	459 lm	7,3%
90-100°	312 lm	4,9%
100-110°	195 lm	3,1%
110-120°	113 lm	1,8%
120-130°	58 lm	0,9%
130-140°	23 lm	0,4%
140-150°	8 lm	0,1%
150-160°	5 lm	0,1%
160-170°	3 lm	0,0%
170-180°	1 lm	0,0%
Total	6305 lm	100,0%

Intensity peaks

Max intensity	1524 cd
Intensity, 90°	346 cd
Intensity, 0°	1524 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	1205 lm	19,1%
0-40°	2004 lm	31,8%
0-60°	3734 lm	59,2%
60-90°	1853 lm	29,4%
70-100°	1396 lm	22,1%
90-120°	620 lm	9,8%
0-90°	5587 lm	88,6%
90-180°	719 lm	11,4%
0-180°	6305 lm	100,0%

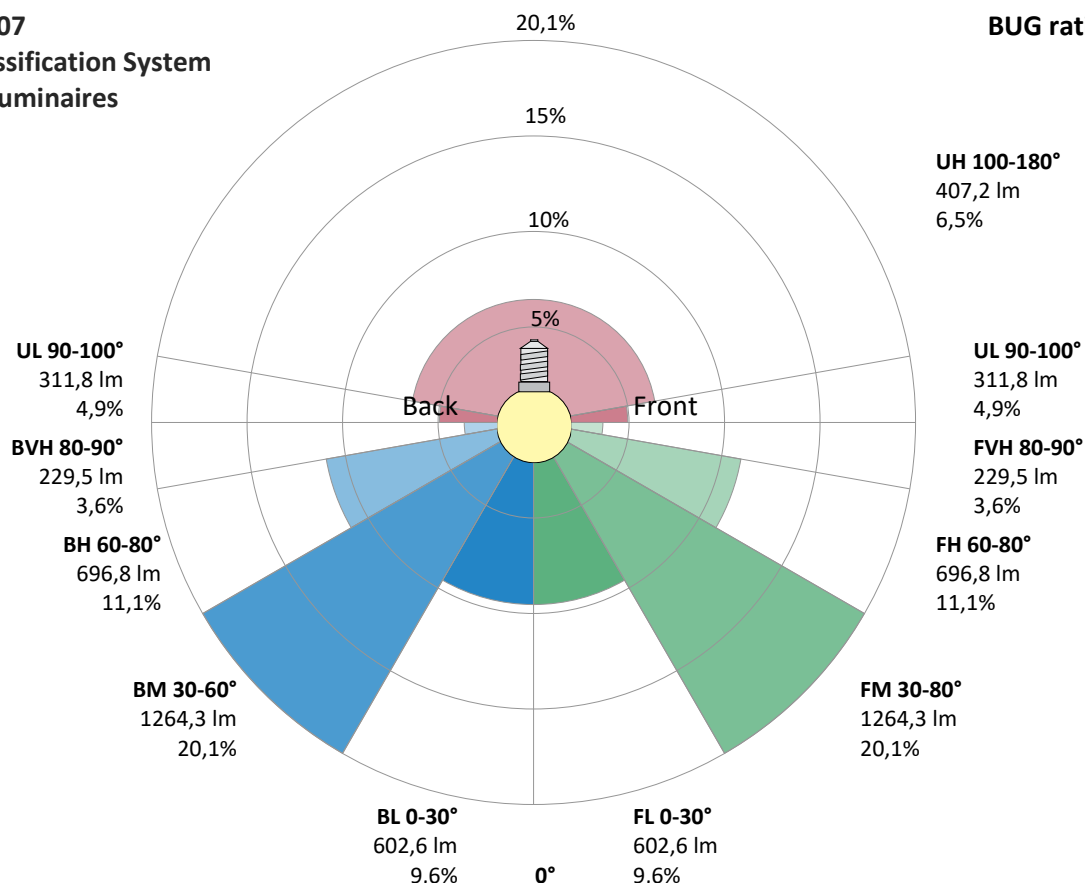
BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	603 lm	9,6%
Medium(30-60°)	1264 lm	20,1%
High(60-80°)	697 lm	11,1%
Very high(80-90°)	230 lm	3,6%
Back light		
Low(0-30°)	603 lm	9,6%
Medium(30-60°)	1264 lm	20,1%
High(60-80°)	697 lm	11,1%
Very high(80-90°)	230 lm	3,6%
Uplight		
Low(90-100°)	312 lm	4,9%
High(100-180°)	407 lm	6,5%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B2 U3 G3



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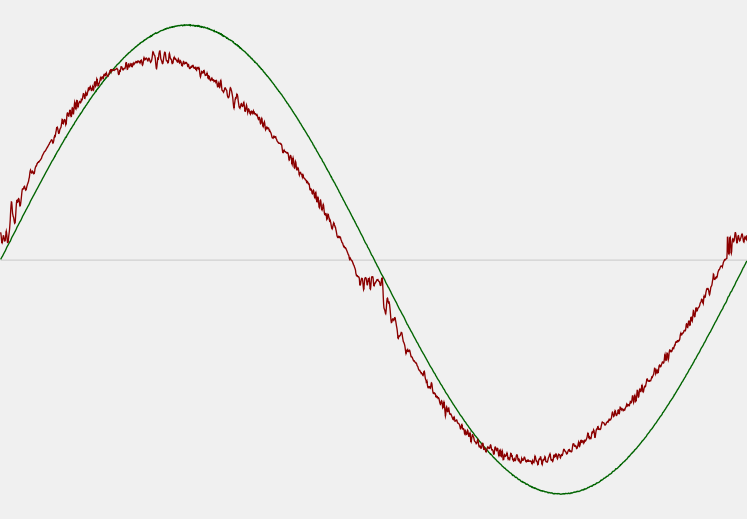


Power Details

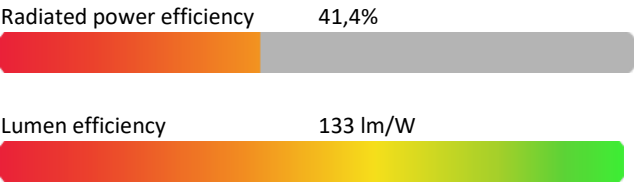
Input Power

Power feed to light source	47,5 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,210 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	48,37 VA
Displacement factor of AC power feed	0,98
Power factor of AC current feed	0,98
Total harmonic distortion of the current	4,03%
Total harmonic distortion of the voltage	0,13%

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	4975 K
CCT shift	+25 K
CCT end	5000 K

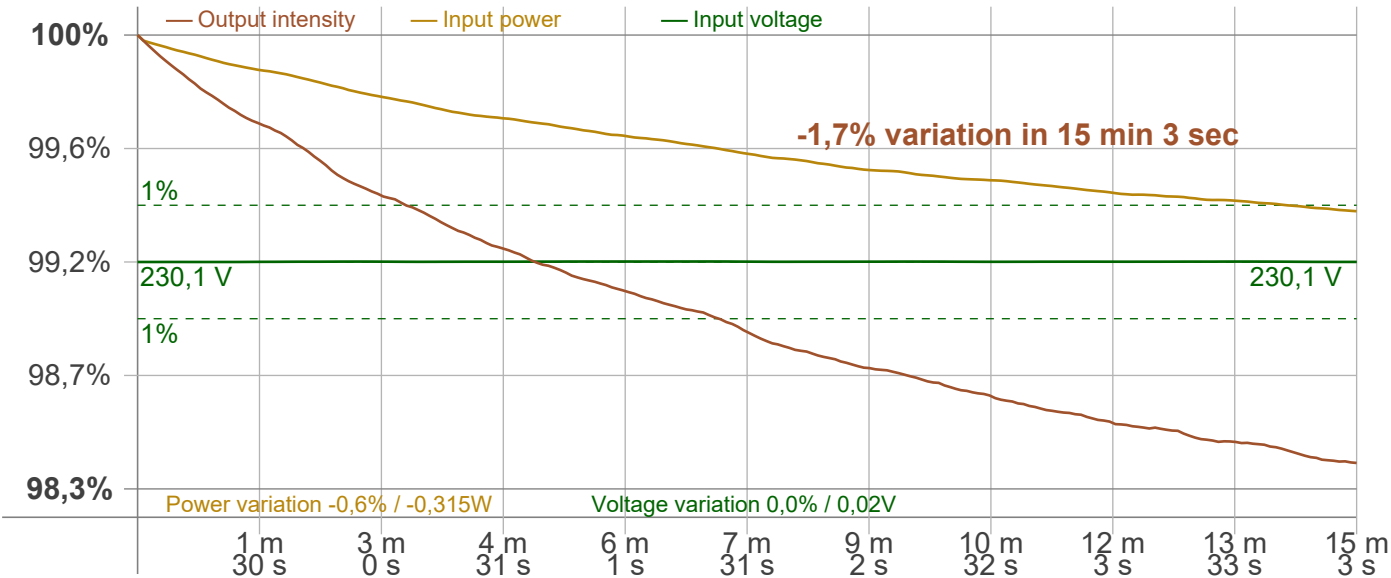
Warmup Result

Total warmup time	Lamp stabilized in 15 min 3 sec
Warmup variation	-1,7%

Output Change

Output start	6410 lm
Output change	-104 lm
Output end	6305 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

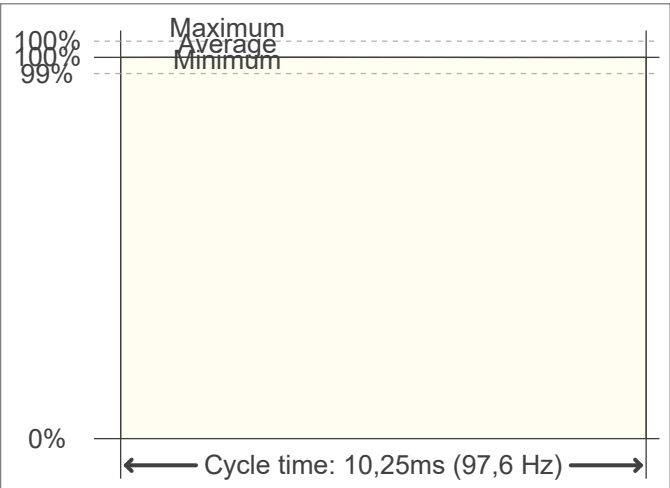
Flicker indices according to Illuminating Engineering Society (IES)
Flicker frequency 97,56 Hz
Percent Flicker 0,08 %
Flicker index 0

Flicker indices according to California Energy Commission (CEC) 2016b
JA8/10 40 Hz 0,02 %
JA8/10 90 Hz 0,02 %
JA8/10 200 Hz 0,06 %
JA8/10 400 Hz 0,07 %
JA8/10 1000 Hz 0,07 %

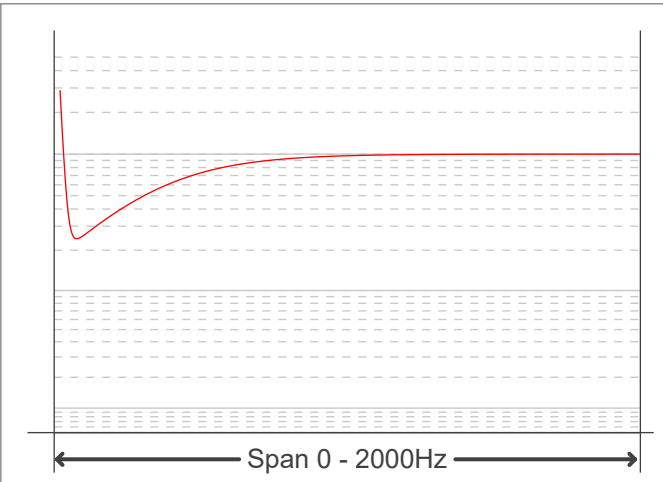
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)
PstLM value (F < 80 Hz) 0,01
SVM value (80 < F < 2000 Hz) 0

Flicker indices according to Lighting Research Center (2015)
Perception metric, Assist Mp 0,01

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



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

