



PHOTOMETRIC LIGHT REPORT

Spot | white | cut out Ø68- 73mm | 6W | 4000K | dim

Article number: 136-102



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Lighting



TRONIX



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Introduction

Purpose of this Document

This document provides accurate and objective photometric data for Tronix Lighting item 136-102. All information is based on actual measurements taken from standard production units. No modifications were made to enhance performance results. In some cases, minor adjustments—such as temporary removal of covers, cables, or mounting features—were necessary for testing purposes. These did not influence product performance.

Test Methodology

Testing was conducted using randomly selected, unopened samples from regular inventory. All tests comply with the LM-79-19 standard, the recognized method for photometric and electrical measurements of LED and OLED luminaires. This standard, an update of IES LM-79-2008, outlines environmental test conditions, stabilization procedures, measurement methods, and approved instruments. It uses absolute photometry, meaning results directly reflect the performance of the tested product, without comparison to rated lamp standards.

Product 136-102 was tested using:

- A photogoniometer to measure luminous intensity distribution at various angles
- An integrating sphere to determine total luminous flux and colour characteristics

Compliance & Certification

Item 136-102 meets the requirements of the following EU directives. Tronix Lighting certifies that all relevant tests were executed in accordance with the applicable standards, and the CE mark is applied accordingly:

- General Product Safety – Directive 2023/988/EC
- Low Voltage Directive (LVD) – Directive 2014/35/EU
- Electromagnetic Compatibility (EMC) – Directive 2004/108/EC
- Ecodesign – Directive 2009/125/EC
- RoHS 3 – Directive 2011/65/EU + Amendment 2015/863/EU

Recycling & Sustainability

Tronix Lighting is affiliated with national recycling systems for electrical and electronic waste. The luminaire is over 90% recyclable when disposed of as electronic waste at end of life. In addition, Tronix Lighting participates in national packaging recycling schemes, ensuring full compliance with both the WEEE and packaging directives.



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Laboratory and equipment

Laboratory owner and location	Tronix Lighting BV. Uden. The Netherlands
Gonio spectrometer system and type	Viso Systems Type C. horizontal
Spectrometer manufacturer and model	(Gonio) Ocean Optics STS VIS (Sphere) Admesy HERA VIS 380–780nm
Flicker meter manufacturer and model	Viso Systems LabFlicker
Oscilloscope manufacturer and model	Tektronix MDO3024 oscilloscope (4 Channels. 200 MHz)
Power meter manufacturer and model	Vitretek PA900 Precision Multi-Channel Harmonic Power Analyzer
Power source manufacturer and model	(DC) Keithley Source Measure Unit SMU-2420 3A DC Source Meter (AC) Chroma 61601 AC Source
Datalogger Manufacturer and Model	Omega 8-Channel Thermocouple Thermometer/Data Logger

Measurement conditions gonio spectrometer

Number of C-planes and Resolution	2 planes – 180°
γ (gamma)-Resolution	1°
Test Distance	1.81 m
Room Temperature and Humidity	22°C +/- 10% – RH 50% +/- 20%
Input Power. Power and Displacement Factors	6.3 W – PF 0.95 – DPF 0.97
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 22 min 34 sec --6.2%

Tested light source

Manufacturer and Order Code	Tronix Lighting – 136-102
Product Description	Spot white cut out Ø68-73mm 6W 4000K dim

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	511 lm – 0% / 100%
Efficiency	81 lm/W
Energy efficiency class	F
Peak Intensity and Beam Angle	947 cd – 39.6°
Correlated Colour Temperature	CCT = 4173 K
Colour Shift. CIE duv	Duv -0.0011
Colour Rendering Index	CRI 84.8
Colour Rendering TM30-18	R _f 84.9 – R _g 95.7
Television Lighting Consistency Index	TLCI = 71
Flicker	SVM 0.01 – PstLM 0.21



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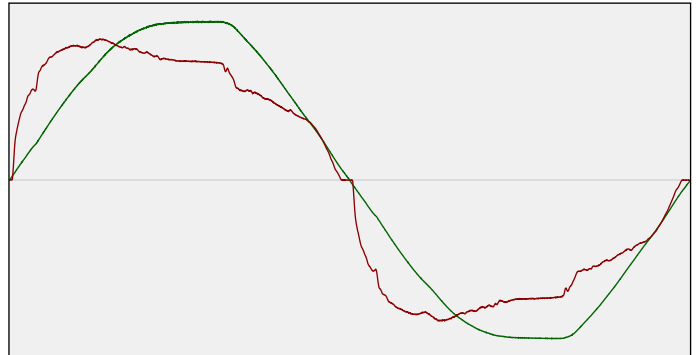
Electrical measurement details

Input Power

RMS Input voltage feed. V_{RMS}	232 V
RMS Input current feed. I_{RMS}	0.029 A
Total input power	6.3 W
Frequency of input power	50 Hz
Power factor	0.95
Displacement power factor	0.97
Total harmonic distortion of the current	21.79%
Total harmonic distortion of the voltage	2.88%

Input Power Curve

Voltage - Current



Efficiency

Radiated power efficiency: 25.0%



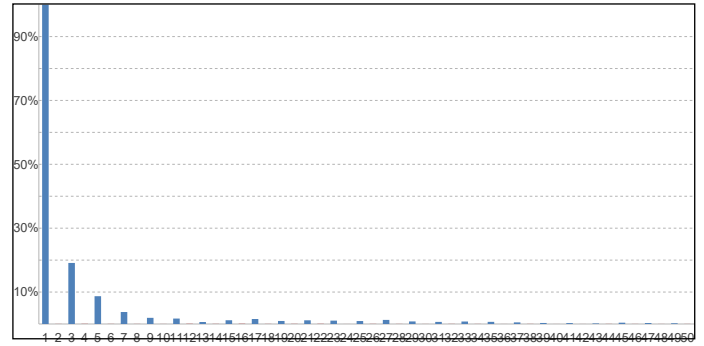
Lumen efficiency: 81 lm/W



Harmonics

3rd Harmonic	19.11%
5th Harmonic	8.7%
7th Harmonic	3.75%
9th Harmonic	1.93%
11th Harmonic	1.7%

Current Harmonics %



Stabilization Details

Warm-up Conditions

Stable period	15 min	Colour temperature change during warm-up	CCT start	4121 K
Stable change max	2.0%		CCT shift	+52 K
Minimum warm-up time	15 min		CCT end	4173 K

Warm-up Results

Total warmup time	Lamp stabilized in 22 min 34 sec	Output intensity change during warm-up	Output start	543 lm
Warmup variation	-6.2%		Output change	-31 lm
			Output end	511 lm



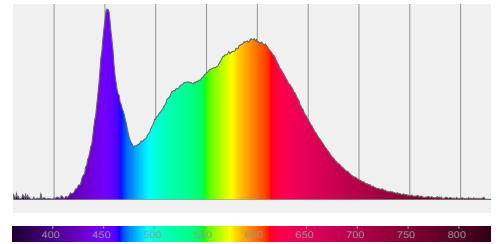
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Colour measurement details

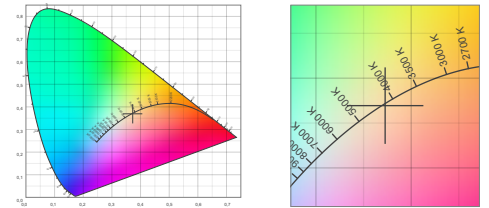
Total lumen output 511 lm
 Correlated Colour Temperature 4173 K
 Colour coordinates CIE 1931 (x;y) = (0.373;0.369)
 Colour deviation from BBL Duv = -0.0011

TM30-18 Colour Fidelity Index R_f 84.9
 TM30-18 Colour Gamut Index R_g 95.7
 Colour Rendering Index (Ra) CRI 84.8
 Colour Rendering Index. (red component) R9 = 14.0

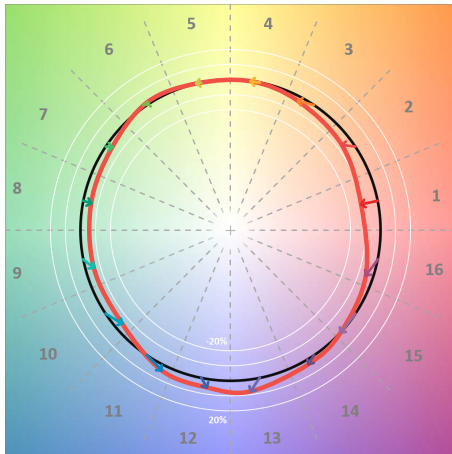
Colour Quality Scale CQS = 83.1
 Television Lighting Consistency Index TLCI = 71



Relative spectral power distribution



TM30 details

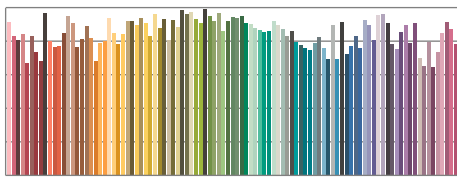


TM30 Colour vectors per hue bin

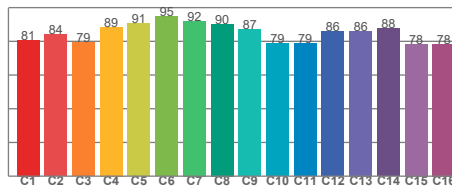


TM30 Colour distortion

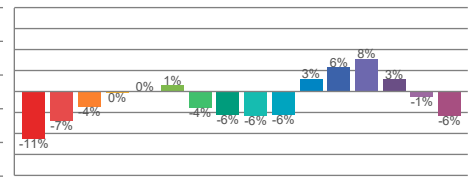
Hue Bin	R _f	Shifts (%)	
		Chroma	Hue
C1	81	-11%	0%
C2	84	-7%	6%
C3	79	-4%	10%
C4	89	0%	6%
C5	91	0%	3%
C6	95	1%	-1%
C7	92	-4%	-2%
C8	90	-6%	0%
C9	87	-6%	7%
C10	79	-6%	12%
C11	79	3%	14%
C12	86	6%	5%
C13	86	8%	-8%
C14	88	3%	-6%
C15	78	-1%	-16%
C16	78	-6%	-12%



TM30-18 R_f-values per reference colour

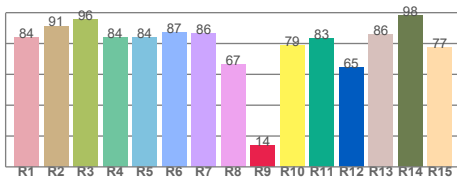


TM30-18 R_f-values per hue bin

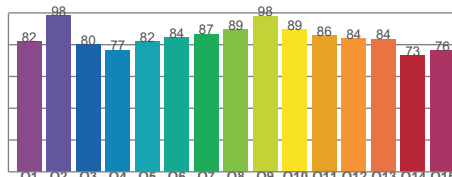


TM30 Chroma shift

Colour Quality details



Colour Rendering Index



Colour Quality Scale

Document revision date: 1-7-2025 Measurement serial: VFR-250123-0914-MS



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Flicker / temporal light artefacts details

Measurement conditions

Flicker meter type	Viso Systems LabFlicker
Flicker/TLA sample rate	20000 samples/s
Measurement time	5x 180 seconds (15 minutes) for PstLM. 1.2 sec for all other indices

Flicker indices according to Illuminating Engineering Society (IES)

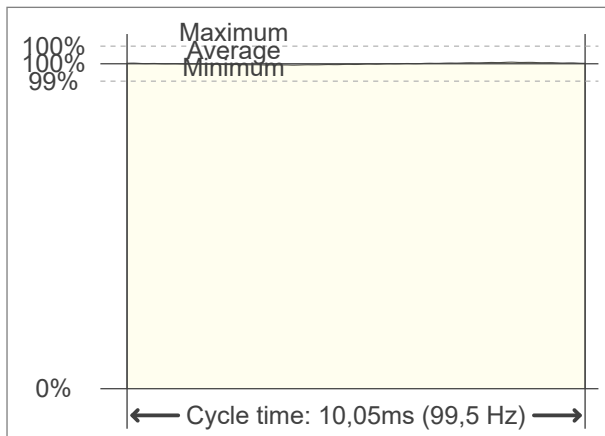
Flicker frequency	99.5 Hz
Percent flicker	0.74 %
Flicker index	0

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

An LED luminaire is considered flicker-free if the SVM value is ≤ 0.4 and if the PstLM value is ≤ 1.0

PstLM value (F < 80 Hz)	0.21
SVM value (80 < F < 2000 Hz)	0.01

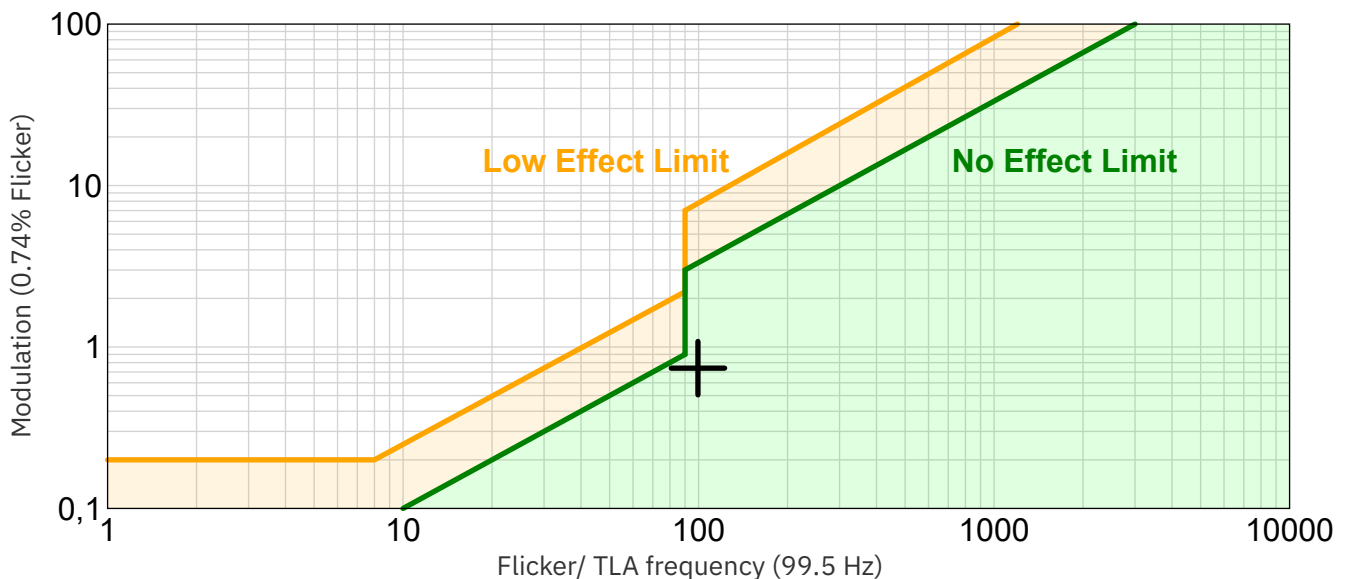
Flicker frame (one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789-2015 Lighting Flicker Risk Zones



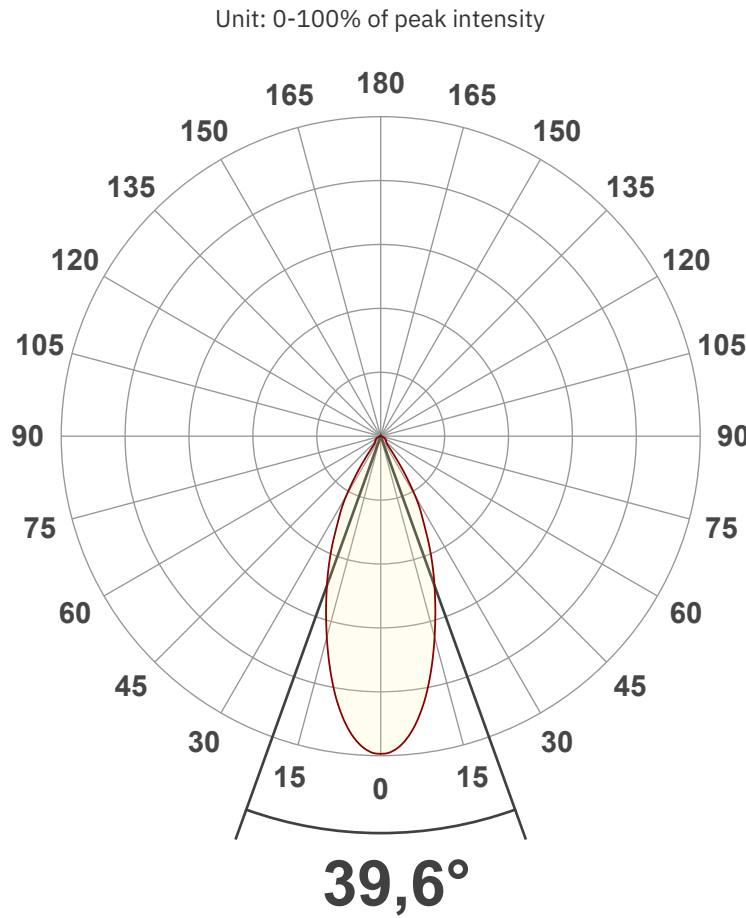
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Beam angle

Luminous Intensity diagram



Main Values

Output (total Lumen)	511 lm
Lumen Up/Down	0% / 100%
Peak Intensity	947 cd
Beam Angle (50%)	39.6°
Beam Angle (90%)	39.6°
Beam Angle (10%)	39.6°

Cut-off Angle

Average 2.5%	87.6°
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Field Angle

Average 10%	68.4°
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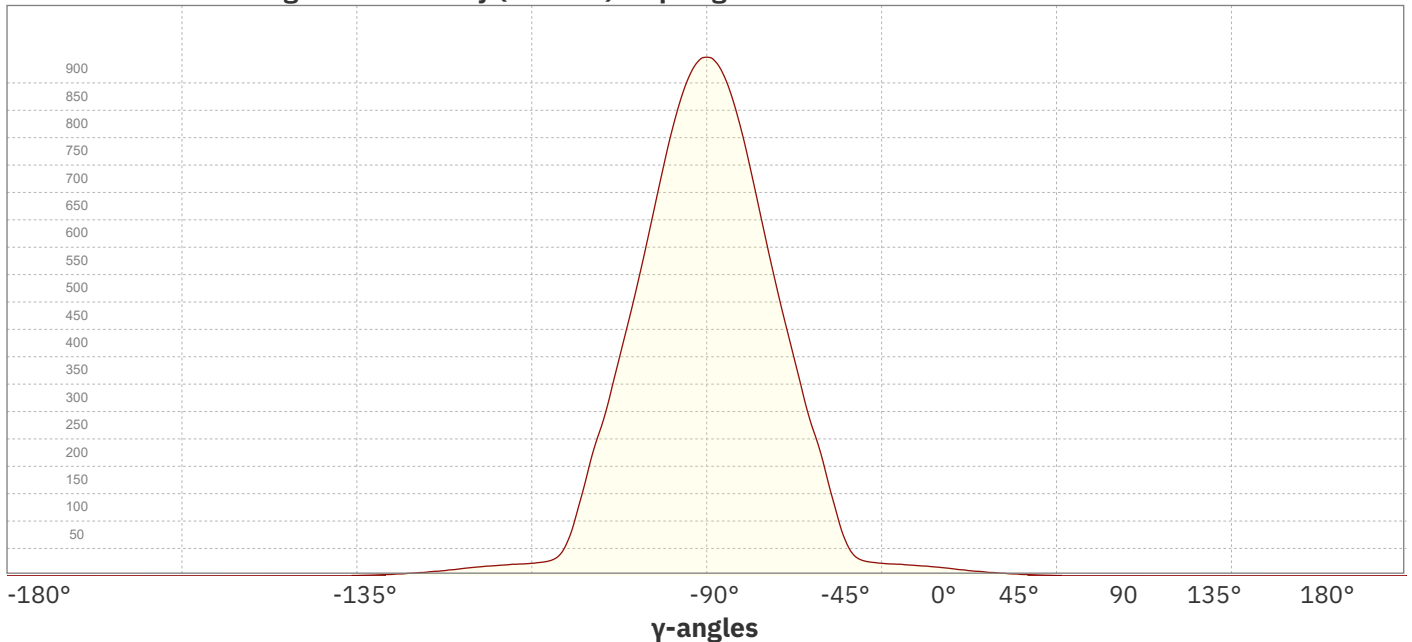
Intensity Ratio

In 120° cone	96.3%
In 90° cone	91.4%

C planes

- C000-C180
- C090-C270

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

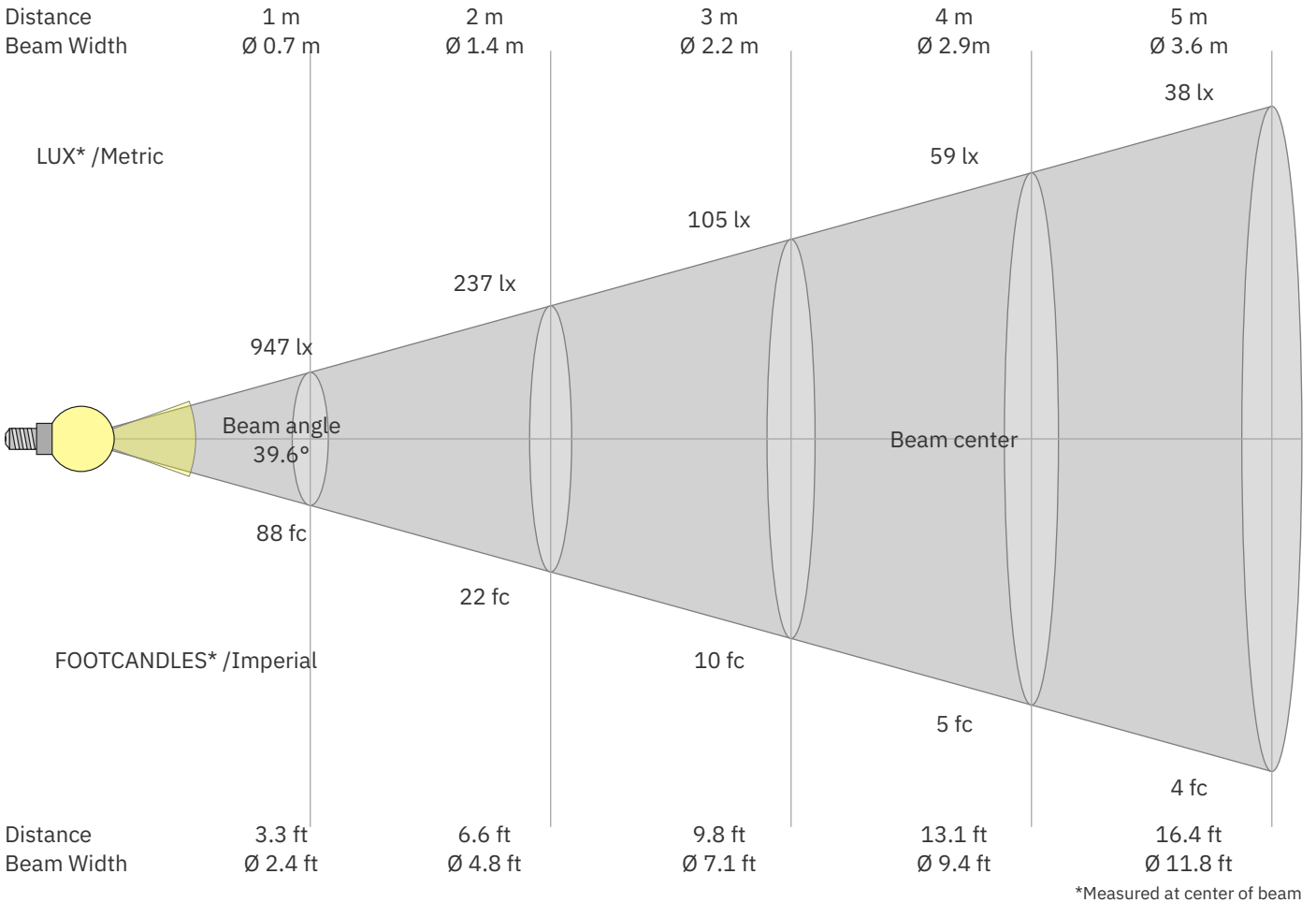


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Beam Details



*Measured at center of beam

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
947	237	105	59	38	26	19	15	12	9	8	7	6	5	4	4	3	3	3	2	lux
88	22	9.8	5.5	3.5	2.4	1.8	1.4	1.1	0.9	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	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
947	941	919	885	838	782	719	653	589	527	468	411	355	299	254	206	151	100	60	37	cd
100%	99%	97%	93%	88%	83%	76%	69%	62%	56%	49%	43%	37%	32%	27%	22%	16%	11%	6%	4%	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
947	941	919	885	838	782	719	653	589	527	468	411	355	299	254	206	151	100	60	37	cd
100%	99%	97%	93%	88%	83%	76%	69%	62%	56%	49%	43%	37%	32%	27%	22%	16%	11%	6%	4%	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
947	941	919	885	838	782	719	653	589	527	468	411	355	299	254	206	151	100	60	37	cd
100%	99%	97%	93%	88%	83%	76%	69%	62%	56%	49%	43%	37%	32%	27%	22%	16%	11%	6%	4%	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
947	941	919	885	838	782	719	653	589	527	468	411	355	299	254	206	151	100	60	37	cd
100%	99%	97%	93%	88%	83%	76%	69%	62%	56%	49%	43%	37%	32%	27%	22%	16%	11%	6%	4%	of 0°val

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Light Planning – UGR table

Uncorrected, comprehensive UGR table according to CIE 117-1995

Reflectances		70	70	50	50	30	70	70	50	50	30
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	16.7	17.3	16.8	17.6	17.7	16.7	17.3	16.8	17.6	17.7
	3H	17.4	18.1	17.8	18.4	18.5	17.4	18.1	17.8	18.4	18.5
	4H	17.7	18.4	18.1	18.7	18.9	17.7	18.4	18.1	18.7	18.9
	6H	18.0	18.6	18.3	18.9	19.2	18.0	18.6	18.3	18.9	19.2
	8H	18.0	18.6	18.4	19.0	19.3	18.0	18.6	18.4	19.0	19.3
	12H	18.1	18.7	18.4	19.0	19.4	18.1	18.7	18.4	19.0	19.4
4H	2H	16.9	17.7	17.3	17.9	18.1	16.9	17.7	17.3	17.9	18.1
	3H	18.0	18.6	18.3	18.9	19.3	18.0	18.6	18.3	18.9	19.3
	4H	18.3	18.8	18.7	19.3	19.8	18.3	18.8	18.7	19.3	19.8
	6H	18.6	19.2	19.1	19.5	19.9	18.6	19.2	19.1	19.5	19.9
	8H	18.7	19.2	19.2	19.6	20.0	18.7	19.2	19.2	19.6	20.0
	12H	18.8	19.2	19.3	19.6	20.1	18.8	19.2	19.3	19.6	20.1
8H	4H	18.4	19.0	19.0	19.3	19.7	18.4	19.0	19.0	19.3	19.7
	6H	18.9	19.2	19.4	19.7	20.2	18.9	19.2	19.4	19.7	20.2
	8H	19.1	19.4	19.6	19.9	20.5	19.1	19.4	19.6	19.9	20.5
	12H	19.2	19.5	19.8	20.0	20.6	19.2	19.5	19.8	20.0	20.6
12H	4H	18.4	18.8	18.9	19.2	19.7	18.4	18.8	18.9	19.2	19.7
	6H	18.9	19.2	19.4	19.7	20.4	18.9	19.2	19.4	19.7	20.4
	8H	19.1	19.4	19.7	19.9	20.5	19.1	19.4	19.7	19.9	20.5

Variations with the observer position for the luminaire spacings. S:

S = 1.0H	1.9 / -0.6	1.9 / -0.6
S = 1.5H	3.5 / -0.8	3.5 / -0.8
S = 2.0H	4.9 / -1.2	4.9 / -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	119 119 119	119 116 116	116 116 111	111 111 106	106 106 102	102 102 100
1	113 111 108	106 111 108	106 104 104	103 101 101	99 98 97	96 95 93
2	108 103 99	96 106 101	98 94 98	95 92 95	93 90 92	90 89 87
3	103 96 91	88 101 95	90 87 92	89 85 90	87 84 88	85 83 81
4	98 91 85	81 96 89	84 81 87	83 80 85	82 79 83	80 78 76
5	93 85 80	76 92 84	79 75 83	78 75 81	77 74 80	76 73 72
6	89 81 75	71 88 80	75 71 79	74 70 77	73 70 76	72 69 68
7	85 77 71	67 84 76	71 67 75	70 66 74	69 66 72	69 66 64
8	82 73 67	63 81 72	67 63 71	66 63 70	66 63 69	65 62 61
9	79 69 64	60 77 69	64 60 68	63 60 67	63 60 66	62 60 58
10	75 66 61	57 74 66	61 57 65	60 57 64	60 57 64	60 57 56