



PHOTOMETRIC LIGHT REPORT

**Spot | 82x82mm | square |
black | 5/7W | 3CCT/DTW**

Article number: 136-821



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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 136-821. 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 136-821 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 136-821 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	1.14 m
Room Temperature and Humidity	22°C +/- 10% – RH 50% +/- 20%
Input Power. Power and Displacement Factors	6.5 W – PF 0.91 – DPF 0.94
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 3 sec --1.6%

Tested light source

Manufacturer and Order Code	Tronix Lighting – 136-821
Product Description	Spot 82x82mm square black 5/7W 3CCT/DTW

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	413 lm – 0% / 100%
Efficiency	64 lm/W
Energy efficiency class	G
Peak Intensity and Beam Angle	460 cd – 38.9°
Correlated Colour Temperature	CCT = 3107 K
Colour Shift. CIE duv	Duv -0.0021
Colour Rendering Index	CRI 93.5
Colour Rendering TM30-18	R _f 91.6 – R _g 99.7
Television Lighting Consistency Index	TLCI = 89
Flicker	SVM 0.01 – PstLM 0.21



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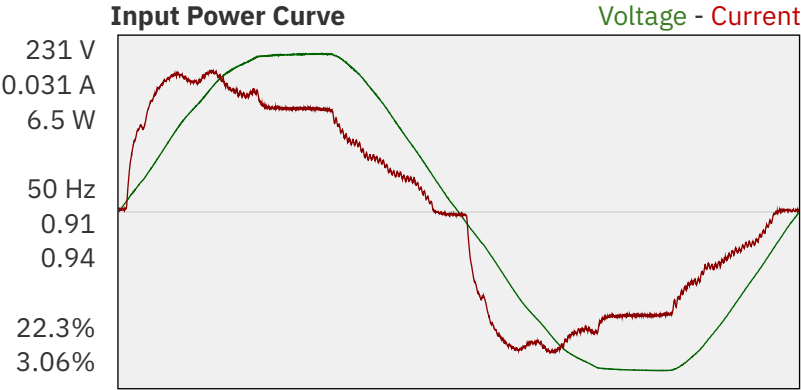
Electrical measurement details

Input Power

RMS Input voltage feed. V_{RMS}
RMS Input current feed. I_{RMS}
Total input power

Frequency of input power
Power factor
Displacement power factor

Total harmonic distortion of the current
Total harmonic distortion of the voltage



Efficiency

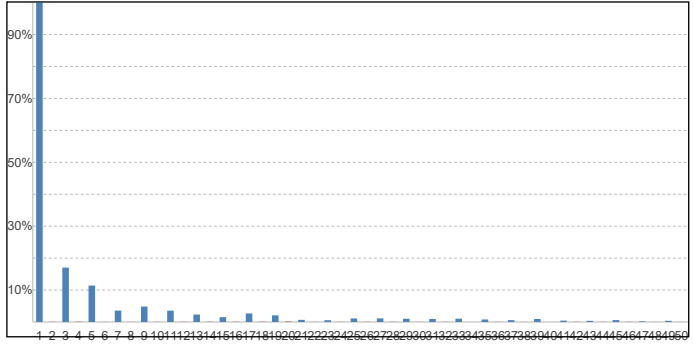
Radiated power efficiency: 21.2%

Lumen efficiency: 64 lm/W

Harmonics

3rd Harmonic 17.03%
5th Harmonic 11.41%
7th Harmonic 3.58%
9th Harmonic 4.84%
11th Harmonic 3.55%

Current Harmonics %



Stabilization Details

Warm-up Conditions

Stable period
Stable change max
Minimum warm-up time

Colour temperature change during warm-up

15 min CCT start 3096 K
2.0% CCT shift +11 K
15 min CCT end 3107 K

Warm-up Results

Total warmup time Lamp stabilized in 15 min 3 sec
Warmup variation -1.6%

Output intensity change during warm-up

Output start 419 lm
Output change -6 lm
Output end 413 lm

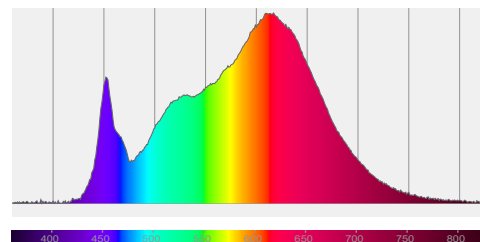
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Colour measurement details

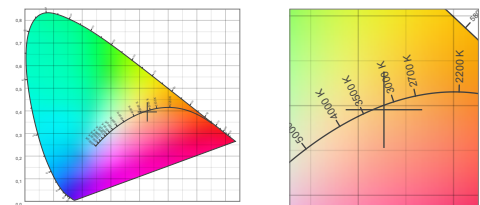
Total lumen output 413 lm
 Correlated Colour Temperature 3107 K
 Colour coordinates CIE 1931 (x;y) = (0.427;0.395)
 Colour deviation from BBL Duv = -0.0021

TM30-18 Colour Fidelity Index R_f 91.6
 TM30-18 Colour Gamut Index R_g 99.7
 Colour Rendering Index (Ra) CRI 93.5
 Colour Rendering Index. (red component) R_9 = 55.8

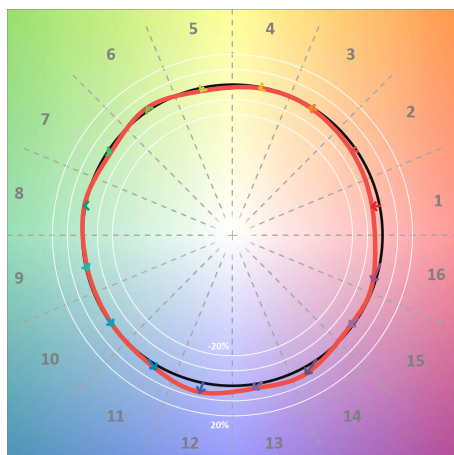
Colour Quality Scale CQS = 91.1
 Television Lighting Consistency Index TLCI = 89



Relative spectral power distribution



TM30 details

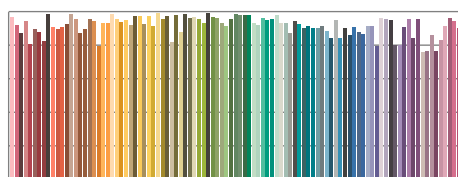


TM30 Colour vectors per hue bin

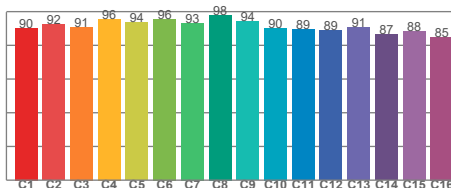


TM30 Colour distortion

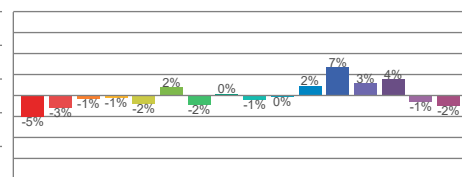
Hue Bin	R_f	Shifts (%)	
		Chroma	Hue
C1	90	-5%	0%
C2	92	-3%	3%
C3	91	-1%	5%
C4	96	-1%	1%
C5	94	-2%	2%
C6	96	2%	0%
C7	93	-2%	-1%
C8	98	0%	0%
C9	94	-1%	4%
C10	90	0%	5%
C11	89	2%	7%
C12	89	7%	-1%
C13	91	3%	-6%
C14	87	4%	-10%
C15	88	-1%	-7%
C16	85	-2%	-12%



TM30-18 R_f -values per reference colour

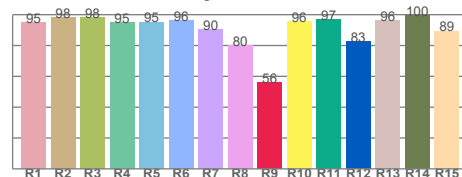


TM30-18 R_f -values per hue bin

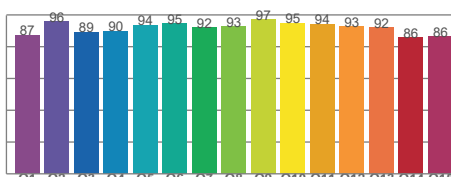


TM30 Chroma shift

Colour Quality details



Colour Rendering Index



Colour Quality Scale

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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	100 Hz
Percent flicker	0.5 %
Flicker index	0

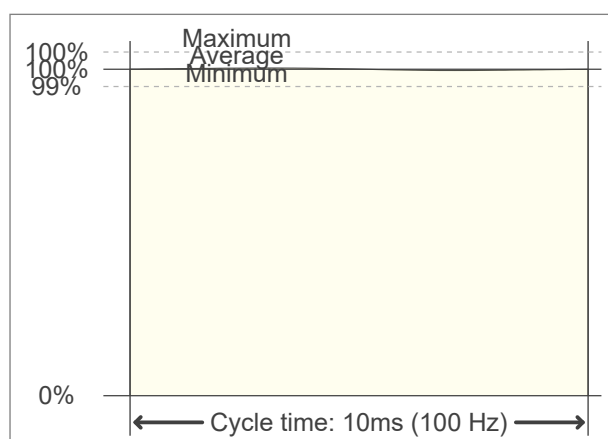
TLA indices (according IEC TR 61547-1, EN 61000-3-3 and EN 61000-4-15)

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

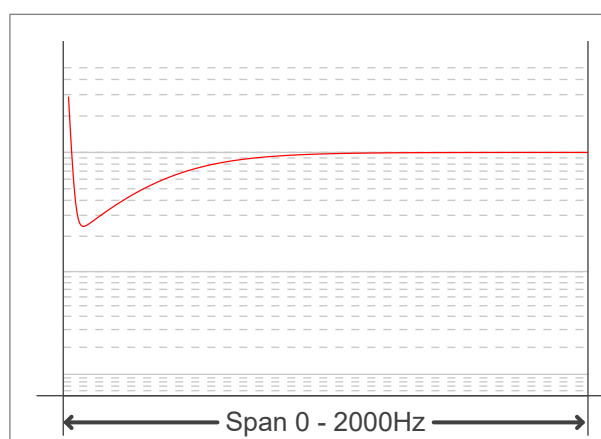
PstLM value ($F < 80$ Hz) 0.21

SVM value ($80 < F < 2000$ Hz) 0.01

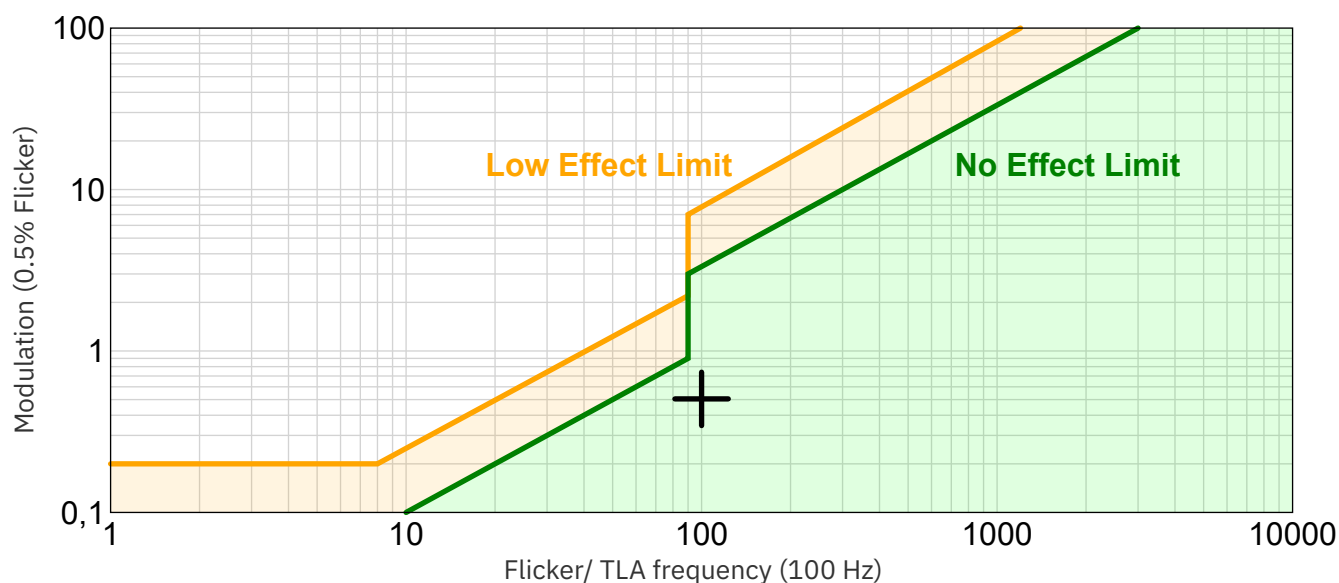
Flicker frame (one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789-2015 Lighting Flicker Risk Zones



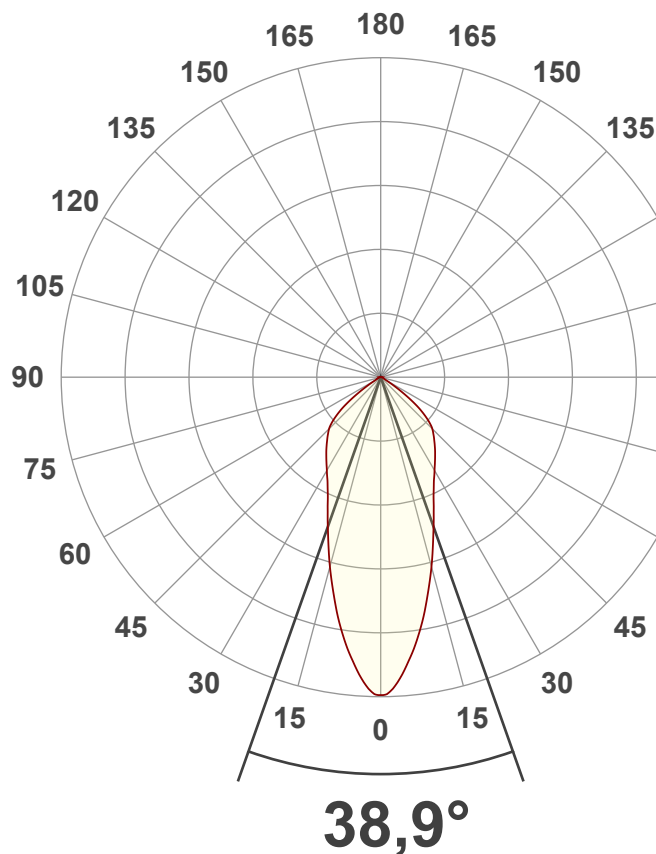
Document revision date: 11-12-2025 Measurement serial: VFR-251127-12369-SW

136-821 Spot | 82x82mm | square | black | 5/7W | 3CCT/DTW

Beam angle

Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	413 lm
Lumen Up/Down	0% / 100%
Peak Intensity	460 cd
Beam Angle (50%)	38.9°
Beam Angle (90%)	38.9°
Beam Angle (10%)	38.9°

Cut-off Angle

Average 2.5%	119.3°
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Field Angle

Average 10%	108.1°
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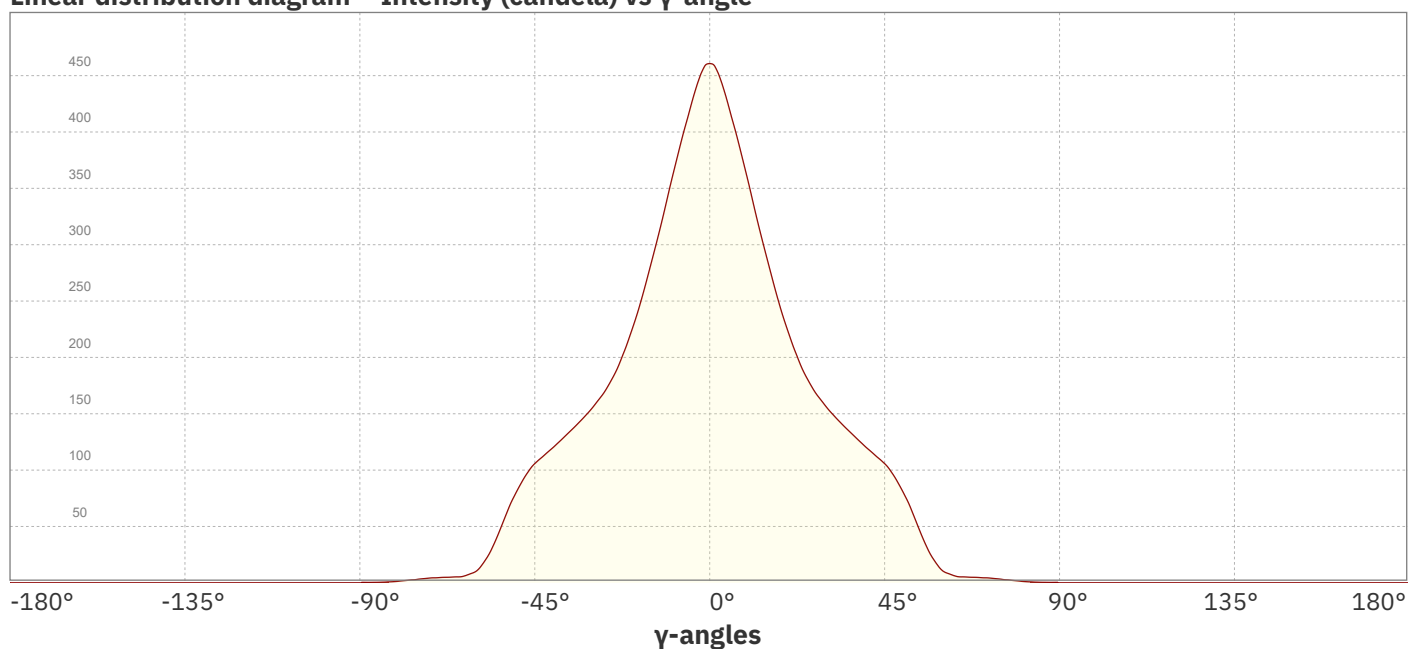
Intensity Ratio

In 120° cone	97.6%
In 90° cone	79.8%

C planes

C000-C180
C090-C270

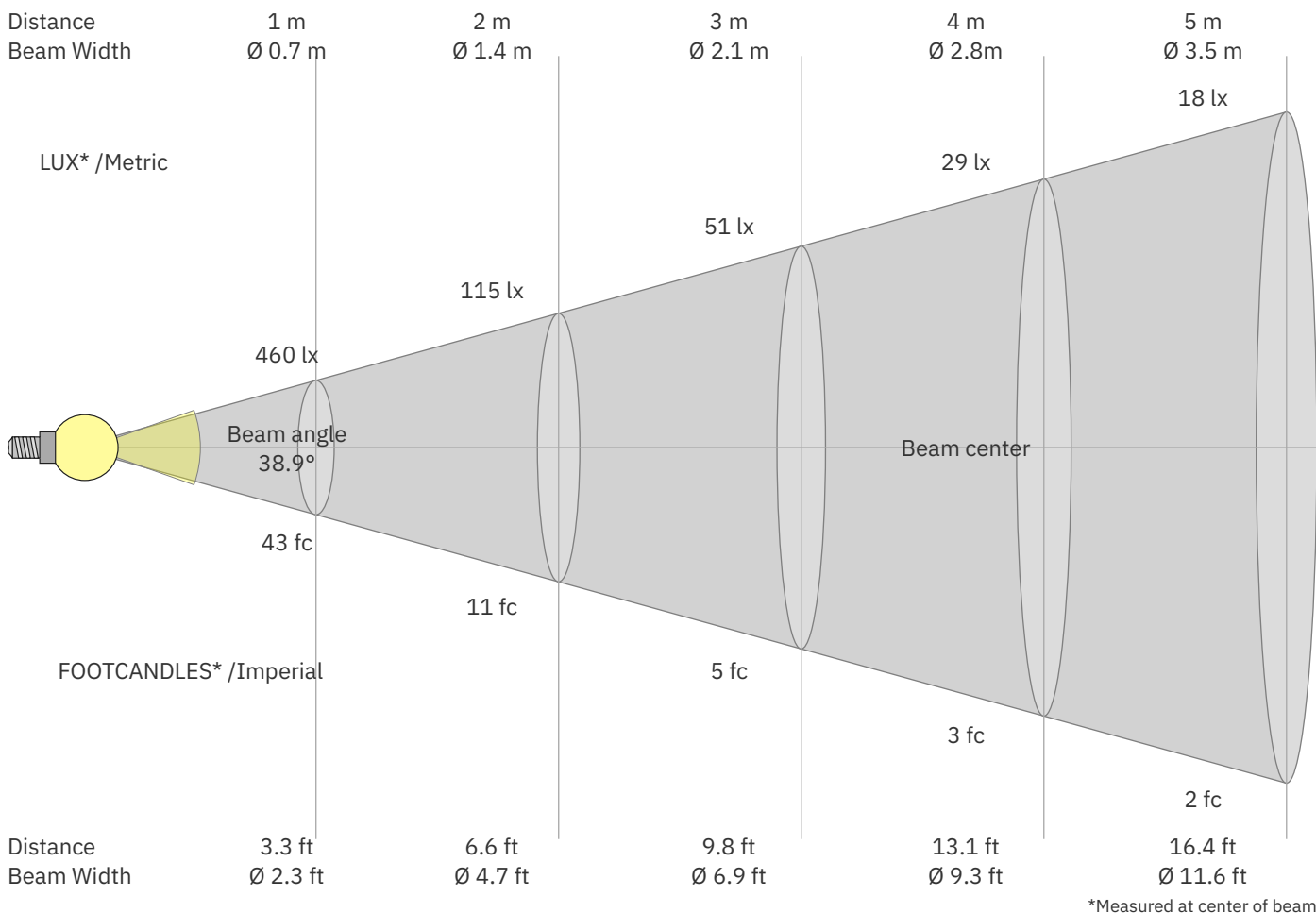
Linear distribution diagram - Intensity (candela) vs γ-angle



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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
460	115	51	29	18	13	9	7	6	5	4	3	3	2	2	2	2	1	1	1	lux
42.7	10.7	4.7	2.7	1.7	1.2	0.9	0.7	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	fc

Intensities in 0° c-plane

0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	γ
460	421	354	284	224	182	156	137	121	106	79	38	11	5	5	3	1	0	0	0	cd
100%	92%	77%	62%	49%	40%	34%	30%	26%	23%	17%	8%	2%	1%	1%	1%	0%	0%	0%	0%	of 0°val

Intensities in 90° c-plane

0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	γ
460	421	354	284	224	182	156	137	121	106	79	38	11	5	5	3	1	0	0	0	cd
100%	92%	77%	62%	49%	40%	34%	30%	26%	23%	17%	8%	2%	1%	1%	1%	0%	0%	0%	0%	of 0°val

Intensities in 180° c-plane

0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	γ
460	421	354	284	224	182	156	137	121	106	79	38	11	5	5	3	1	0	0	0	cd
100%	92%	77%	62%	49%	40%	34%	30%	26%	23%	17%	8%	2%	1%	1%	1%	0%	0%	0%	0%	of 0°val

Intensities in 270° c-plane

0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	γ
460	421	354	284	224	182	156	137	121	106	79	38	11	5	5	3	1	0	0	0	cd
100%	92%	77%	62%	49%	40%	34%	30%	26%	23%	17%	8%	2%	1%	1%	1%	0%	0%	0%	0%	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	26.2	27.0	26.3	27.3	27.5	26.2	27.0	26.3	27.3	27.5
	3H	26.0	26.9	26.4	27.1	27.3	26.0	26.9	26.4	27.1	27.3
	4H	25.9	26.8	26.3	27.1	27.3	25.9	26.8	26.3	27.1	27.3
	6H	26.0	26.7	26.3	27.0	27.4	26.0	26.7	26.3	27.0	27.4
	8H	25.9	26.6	26.2	27.0	27.3	25.9	26.6	26.2	27.0	27.3
	12H	25.9	26.6	26.2	26.9	27.3	25.9	26.6	26.2	26.9	27.3
4H	2H	25.9	26.8	26.3	27.1	27.3	25.9	26.8	26.3	27.1	27.3
	3H	25.9	26.6	26.3	27.0	27.4	25.9	26.6	26.3	27.0	27.4
	4H	25.8	26.5	26.3	26.9	27.4	25.8	26.5	26.3	26.9	27.4
	6H	25.8	26.5	26.3	26.8	27.2	25.8	26.5	26.3	26.8	27.2
	8H	25.8	26.4	26.3	26.7	27.1	25.8	26.4	26.3	26.7	27.1
	12H	25.7	26.2	26.2	26.6	27.1	25.7	26.2	26.2	26.6	27.1
8H	4H	25.8	26.4	26.3	26.7	27.1	25.8	26.4	26.3	26.7	27.1
	6H	25.8	26.2	26.3	26.6	27.2	25.8	26.2	26.3	26.6	27.2
	8H	25.8	26.1	26.3	26.6	27.2	25.8	26.1	26.3	26.6	27.2
	12H	25.7	26.0	26.3	26.5	27.1	25.7	26.0	26.3	26.5	27.1
12H	4H	25.7	26.2	26.2	26.6	27.1	25.7	26.2	26.2	26.6	27.1
	6H	25.8	26.1	26.3	26.6	27.2	25.8	26.1	26.3	26.6	27.2
	8H	25.7	26.0	26.3	26.5	27.1	25.7	26.0	26.3	26.5	27.1
Variations with the observer position for the luminaire spacings. S:											
S = 1.0H		1.1 / -2.5					1.1 / -2.5				
S = 1.5H		2.8 / -7.7					2.8 / -7.7				
S = 2.0H		4.5 / -8.3					4.5 / -8.3				

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	119	119	119	119	116	116	116	116	111	111	106	106	106	102	102	102	100	
1	112	109	106	103	110	107	104	102	103	101	99	99	97	96	95	94	93	91
2	105	99	95	90	103	98	93	89	94	91	87	91	88	86	88	86	84	82
3	99	91	85	80	96	89	84	79	87	82	78	84	80	77	82	78	76	74
4	92	83	77	71	90	82	76	71	80	74	70	78	73	69	76	72	68	67
5	86	76	69	64	85	75	69	64	74	68	63	72	67	63	70	66	62	61
6	81	71	63	58	79	70	63	58	68	62	58	67	61	57	65	60	57	55
7	76	65	58	53	75	65	58	53	63	57	53	62	57	52	61	56	52	51
8	72	61	54	49	70	60	53	49	59	53	49	58	52	48	57	52	48	47
9	68	57	50	45	67	56	50	45	55	49	45	54	49	45	53	48	45	43
10	64	53	46	42	63	53	46	42	52	46	42	51	45	42	50	45	42	40