



## PHOTOMETRIC LIGHT REPORT

**Spot | black | cut out Ø68-  
73mm | 6W | 2200K | dim**

**Article number: 136-178**



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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 136-178. 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 136-178 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 136-178 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	5.4 W – PF 0.79 – DPF 0.98
Frequency of Input Power	50.1 Hz
Warm-up Time and Variation	Lamp stabilized in 20 min 50 sec --4.7%

### Tested light source

Manufacturer and Order Code	Tronix Lighting – 136-178
Product Description	Spot   black   cut out Ø68-73mm   6W   2200K   dim

### Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	380 lm – 0.28% / 99.72%
Efficiency	70 lm/W
Energy efficiency class	G
Peak Intensity and Beam Angle	827 cd – 38.7°
Correlated Colour Temperature	CCT = 4129 K
Colour Shift. CIE duv	Duv -0.0019
Colour Rendering Index	CRI 84.9
Colour Rendering TM30-18	R <sub>f</sub> 84.8 – R <sub>g</sub> 95.9
Television Lighting Consistency Index	TLCI = 71
Flicker	SVM 0.01 – PstLM 0.23



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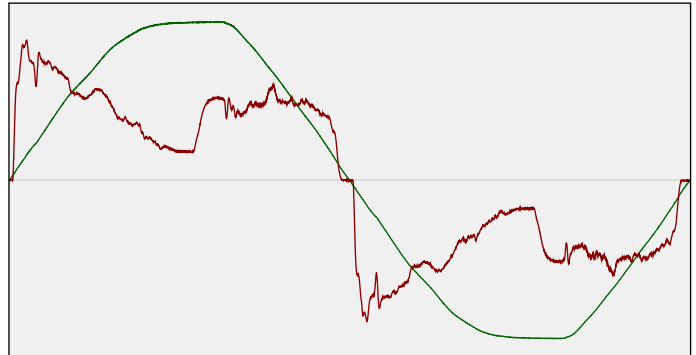
Electrical measurement details

**Input Power**

RMS Input voltage feed. $V_{RMS}$	231 V
RMS Input current feed. $I_{RMS}$	0.030 A
Total input power	5.4 W
Frequency of input power	50.1 Hz
Power factor	0.79
Displacement power factor	0.98
Total harmonic distortion of the current	74.63%
Total harmonic distortion of the voltage	2.85%

Input Power Curve

Voltage - Current



**Efficiency**

Radiated power efficiency: 21.6%



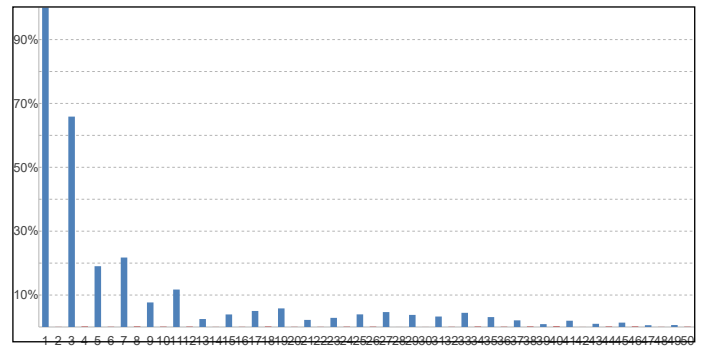
Lumen efficiency: 70 lm/W



**Harmonics**

3rd Harmonic	65.88%
5th Harmonic	19.03%
7th Harmonic	21.75%
9th Harmonic	7.69%
11th Harmonic	11.73%

Current Harmonics %



Stabilization Details

**Warm-up Conditions**

Stable period	15 min	<b>Colour temperature change during warm-up</b>	CCT start	4098 K
Stable change max	2.0%		CCT shift	+31 K
Minimum warm-up time	15 min		CCT end	4129 K

**Warm-up Results**

Total warmup time	Lamp stabilized in 20 min 50 sec	<b>Output intensity change during warm-up</b>	Output start	397 lm
Warmup variation	-4.7%		Output change	-18 lm
			Output end	380 lm



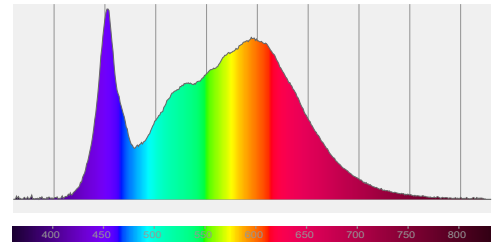
136-178 Spot | black | cut out Ø68-73mm | 6W | 2200K | dim

Colour measurement details

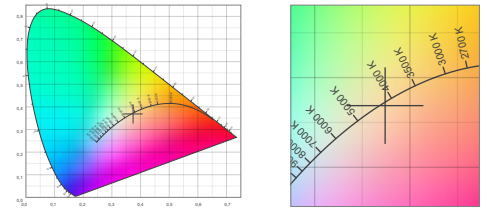
Total lumen output 380 lm  
 Correlated Colour Temperature 4129 K  
 Colour coordinates CIE 1931 (x;y) = (0.374;0.369)  
 Colour deviation from BBL Duv = -0.0019

TM30-18 Colour Fidelity Index R<sub>f</sub> 84.8  
 TM30-18 Colour Gamut Index R<sub>g</sub> 95.9  
 Colour Rendering Index (Ra) CRI 84.9  
 Colour Rendering Index. (red component) R9 = 15.0

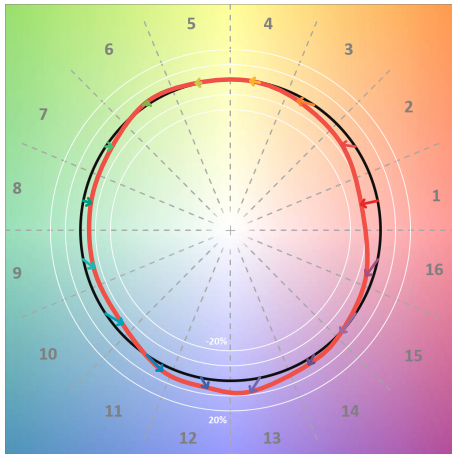
Colour Quality Scale CQS = 83.1  
 Television Lighting Consistency Index TLCI = 71



Relative spectral power distribution



TM30 details

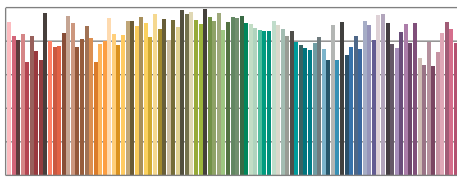


TM30 Colour vectors per hue bin

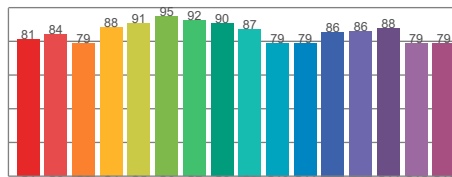


TM30 Colour distortion

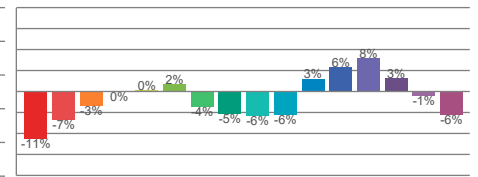
Hue Bin	R <sub>f</sub>	Shifts (%)	
		Chroma	Hue
C1	81	-11%	0%
C2	84	-7%	6%
C3	79	-3%	11%
C4	88	0%	6%
C5	91	0%	3%
C6	95	2%	-1%
C7	92	-4%	-2%
C8	90	-5%	0%
C9	87	-6%	7%
C10	79	-6%	12%
C11	79	3%	14%
C12	86	6%	5%
C13	86	8%	-8%
C14	88	3%	-6%
C15	79	-1%	-16%
C16	79	-6%	-12%



TM30-18 R<sub>f</sub>-values per reference colour

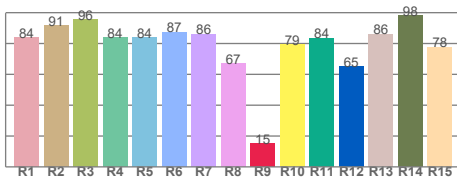


TM30-18 R<sub>f</sub>-values per hue bin

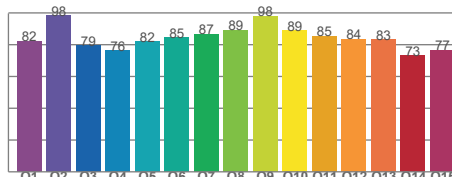


TM30 Chroma shift

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)**

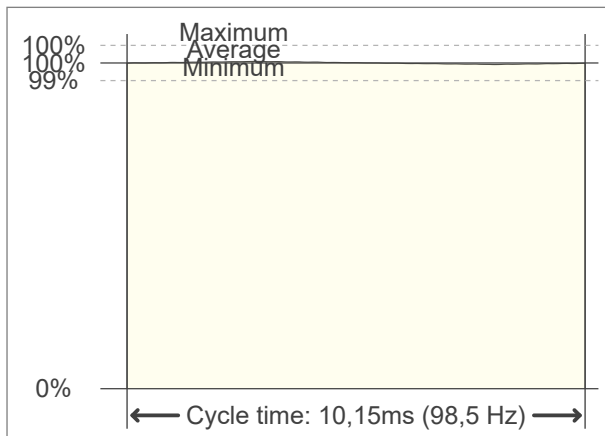
Flicker frequency	98.52 Hz
Percent flicker	0.79 %
Flicker index	0

**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  $\leq 0.4$  and if the PstLM value is  $\leq 1.0$

PstLM value (F < 80 Hz)	0.23
SVM value (80 < F < 2000 Hz)	0.01

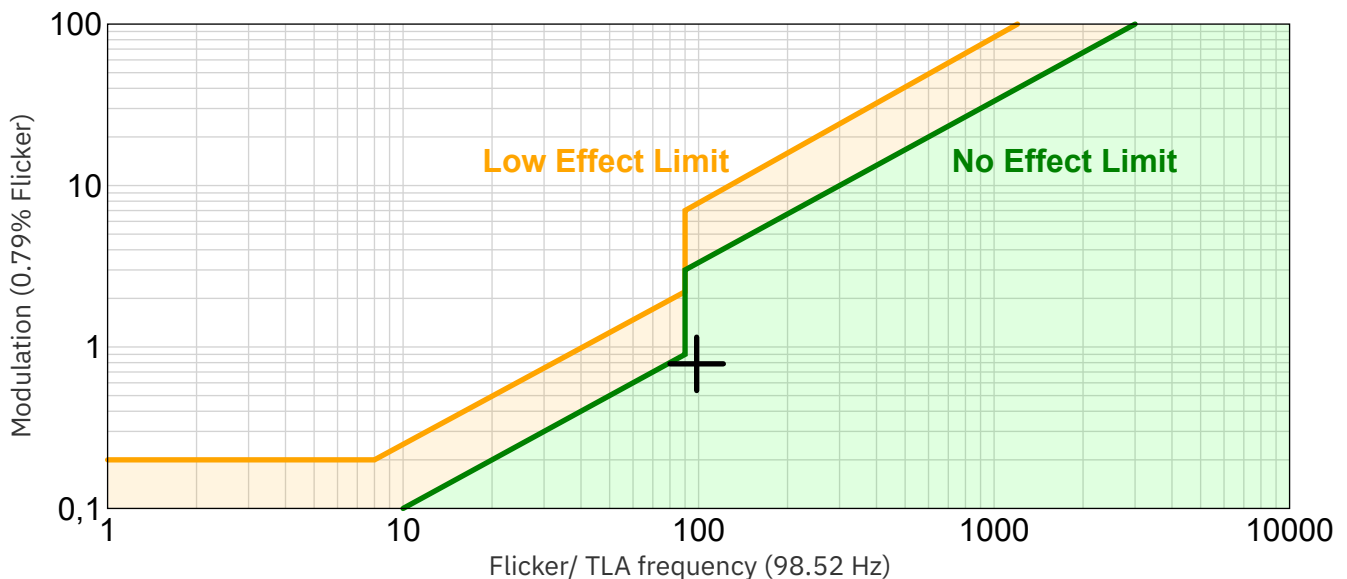
**Flicker frame (one flicker period in time domain)**



**Flicker FFT (flicker curve in frequency domain)**



**IEEE 1789-2015 Lighting Flicker Risk Zones**



Document revision date: 1-7-2025 Measurement serial: VFR-250123-0882-MS

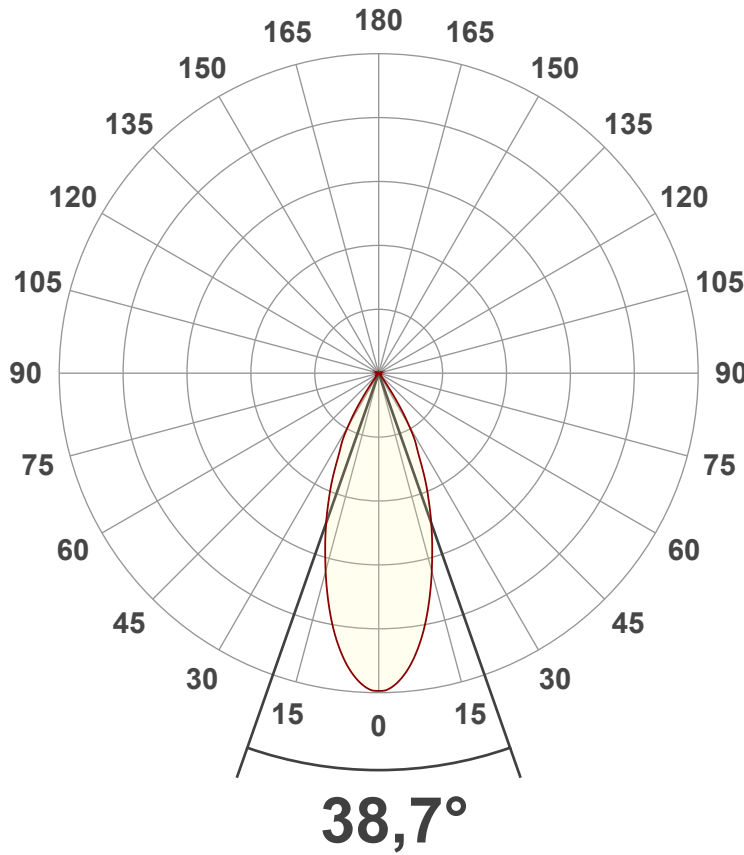


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Beam angle

**Luminous Intensity diagram**

Unit: 0-100% of peak intensity



**Main Values**

Output (total Lumen)	380 lm
Lumen Up/Down	0.28% / 99.72%
Peak Intensity	827 cd
Beam Angle (50%)	38.7°
Beam Angle (90%)	38.7°
Beam Angle (10%)	38.7°

**Cut-off Angle**

Average 2.5%	73.2°
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**Field Angle**

Average 10%	66°
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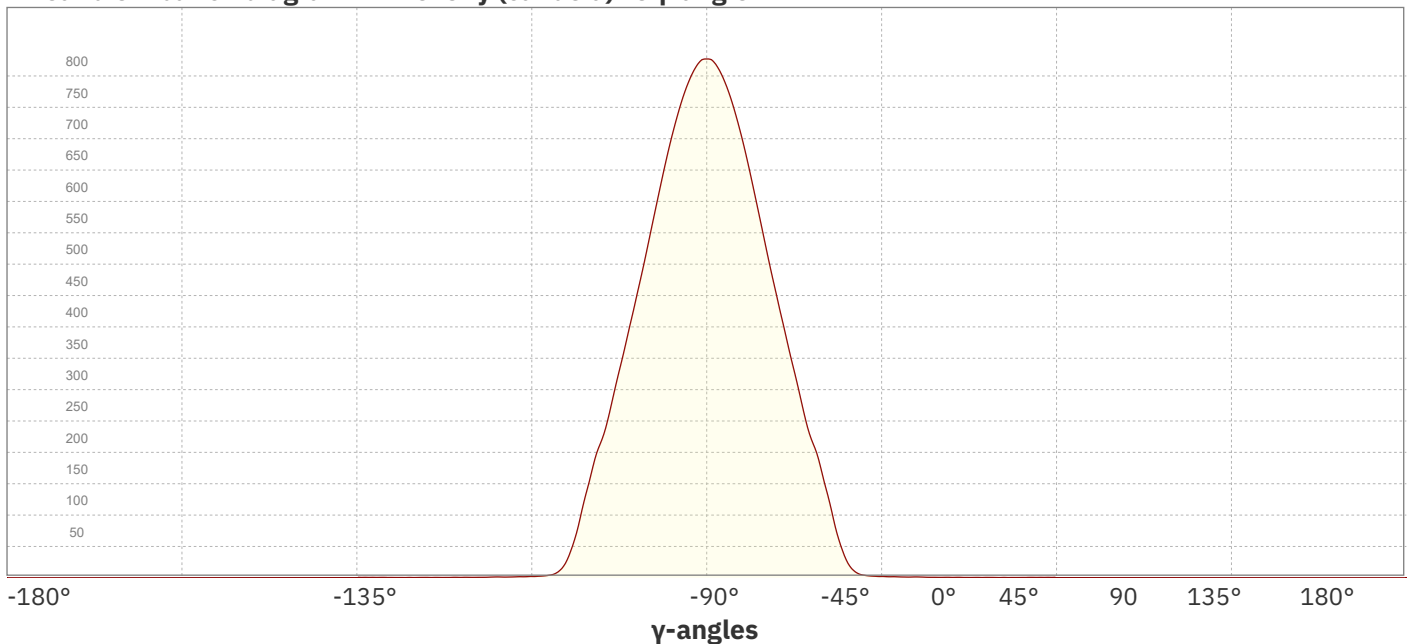
**Intensity Ratio**

In 120° cone	99.3%
In 90° cone	98.8%

**C planes**

- C000-C180
- C090-C270

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

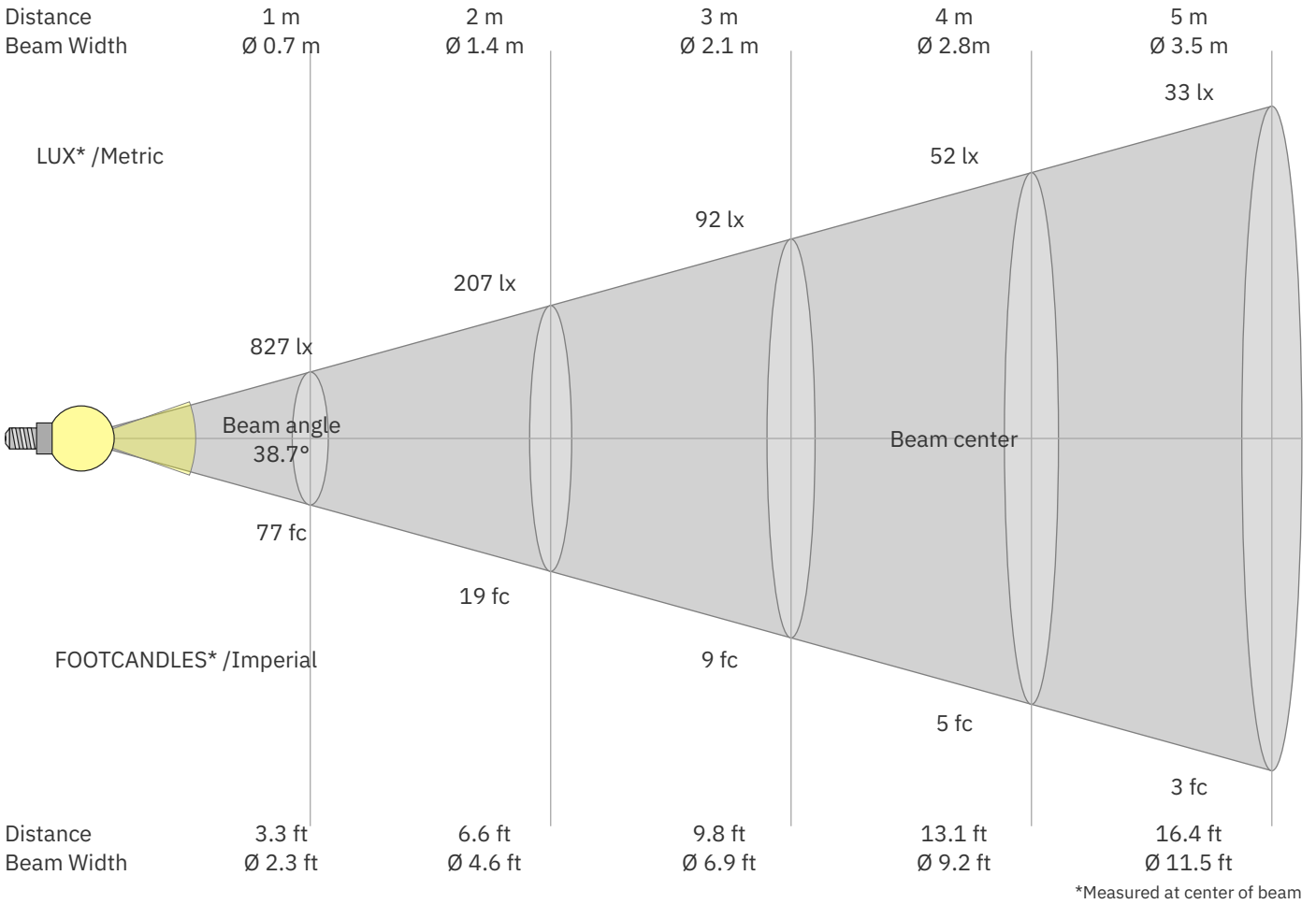


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Beam Details



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
827	207	92	52	33	23	17	13	10	8	7	6	5	4	4	3	3	3	2	2	lux
76.8	19.2	8.5	4.8	3.1	2.1	1.6	1.2	0.9	0.8	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.2	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
827	821	800	768	726	677	621	563	504	449	395	342	290	239	204	159	110	61	27	11	cd
100%	99%	97%	93%	88%	82%	75%	68%	61%	54%	48%	41%	35%	29%	25%	19%	13%	7%	3%	1%	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
827	821	800	768	726	677	621	563	504	449	395	342	290	239	204	159	110	61	27	11	cd
100%	99%	97%	93%	88%	82%	75%	68%	61%	54%	48%	41%	35%	29%	25%	19%	13%	7%	3%	1%	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
827	821	800	768	726	677	621	563	504	449	395	342	290	239	204	159	110	61	27	11	cd
100%	99%	97%	93%	88%	82%	75%	68%	61%	54%	48%	41%	35%	29%	25%	19%	13%	7%	3%	1%	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
827	821	800	768	726	677	621	563	504	449	395	342	290	239	204	159	110	61	27	11	cd
100%	99%	97%	93%	88%	82%	75%	68%	61%	54%	48%	41%	35%	29%	25%	19%	13%	7%	3%	1%	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		11.4	11.9	11.5	12.1	12.3	11.4	11.9	11.5	12.1	12.3
3H		11.1	11.8	11.5	12.0	12.1	11.1	11.8	11.5	12.0	12.1
4H		11.1	11.7	11.5	11.9	12.2	11.1	11.7	11.5	11.9	12.2
6H		11.1	11.6	11.4	11.9	12.3	11.1	11.6	11.4	11.9	12.3
8H		11.1	11.6	11.4	11.9	12.3	11.1	11.6	11.4	11.9	12.3
12H		11.2	11.6	11.5	12.0	12.4	11.2	11.6	11.5	12.0	12.4
4H 2H		11.0	11.7	11.4	11.9	12.1	11.0	11.7	11.4	11.9	12.1
3H		11.0	11.5	11.3	11.8	12.2	11.0	11.5	11.3	11.8	12.2
4H		10.9	11.3	11.3	11.8	12.3	10.9	11.3	11.3	11.8	12.3
6H		10.9	11.4	11.4	11.7	12.0	10.9	11.4	11.4	11.7	12.0
8H		10.9	11.4	11.4	11.7	12.1	10.9	11.4	11.4	11.7	12.1
12H		11.0	11.4	11.5	11.8	12.2	11.0	11.4	11.5	11.8	12.2
8H 4H		10.8	11.2	11.3	11.6	11.9	10.8	11.2	11.3	11.6	11.9
6H		10.8	11.1	11.3	11.6	12.1	10.8	11.1	11.3	11.6	12.1
8H		11.0	11.2	11.5	11.7	12.4	11.0	11.2	11.5	11.7	12.4
12H		11.2	11.4	11.8	11.9	12.5	11.2	11.4	11.8	11.9	12.5
12H 4H		10.7	11.1	11.2	11.5	11.9	10.7	11.1	11.2	11.5	11.9
6H		10.9	11.1	11.4	11.6	12.2	10.9	11.1	11.4	11.6	12.2
8H		11.0	11.2	11.6	11.7	12.3	11.0	11.2	11.6	11.7	12.3

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

S = 1.0H	6.0 / -4.4	6.0 / -4.4
S = 1.5H	8.7 / -4.6	8.7 / -4.6
S = 2.0H	10.7 / -4.8	10.7 / -4.8

Coefficients of Utilization

Ceiling reflectance	80	70	50	30	10	0												
Wall reflectance	70	50	30	10	70	50	30	10	50	30	10	0						
Floor reflectance	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	114	112	110	108	112	110	108	106	106	104	103	102	101	99	98	97	97	95
2	110	105	102	99	107	104	101	98	100	98	96	97	95	94	95	93	92	90
3	105	100	95	92	103	98	94	91	96	93	90	93	91	88	91	89	87	86
4	101	95	90	86	99	93	89	86	91	88	85	89	86	84	88	85	83	82
5	97	90	85	81	95	89	84	81	87	83	80	86	82	80	84	81	79	78
6	93	86	81	77	92	85	80	77	84	79	76	82	79	76	81	78	75	74
7	90	82	77	73	88	81	76	73	80	76	73	79	75	72	78	74	72	71
8	86	78	73	70	85	78	73	70	77	72	69	76	72	69	75	71	69	68
9	83	75	70	67	82	75	70	67	74	69	66	73	69	66	72	68	66	65
10	80	72	67	64	79	72	67	64	71	66	64	70	66	63	69	66	63	62