



PHOTOMETRIC LIGHT REPORT

**Refl downl eco | Ø167mm |
white | 5-CCT | 6~15W |
EU plug**

Article number: 136-512



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TRONIX



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Introduction

Purpose of this Document

This document provides accurate and objective photometric data for Tronix Lighting item 136-512. 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 136-512 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 136-512 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	14.3 W – PF 0.97 – DPF 0.98
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 3 sec --1.9%

Tested light source

Manufacturer and Order Code	Tronix Lighting – 136-512
Product Description	Refl downl eco Ø167mm white 5-CCT 6~15W EU plug

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	1530 lm – 0% / 100%
Efficiency	107 lm/W
Energy efficiency class	E
Peak Intensity and Beam Angle	1518 cd – 61.5°
Correlated Colour Temperature	CCT = 3329 K
Colour Shift. CIE duv	Duv -0.0074
Colour Rendering Index	CRI 86.6
Colour Rendering TM30-18	R _f 85.3 – R _g 98.9
Television Lighting Consistency Index	TLCI = 72
Flicker	SVM 0 – PstLM 0.02



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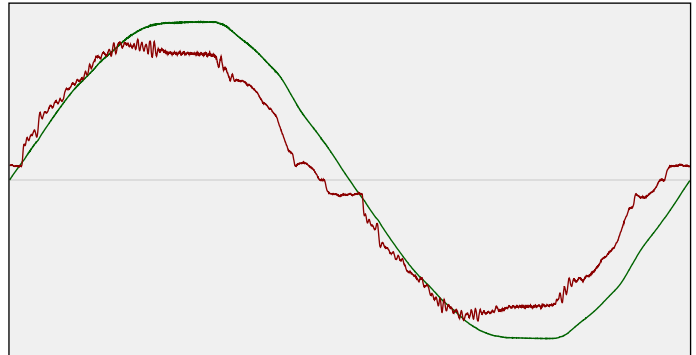
Electrical measurement details

Input Power

RMS Input voltage feed. V_{RMS}	229 V
RMS Input current feed. I_{RMS}	0.064 A
Total input power	14.3 W
Frequency of input power	50 Hz
Power factor	0.97
Displacement power factor	0.98
Total harmonic distortion of the current	8.31%
Total harmonic distortion of the voltage	2.39%

Input Power Curve

Voltage - Current



Efficiency

Radiated power efficiency: 32.2%



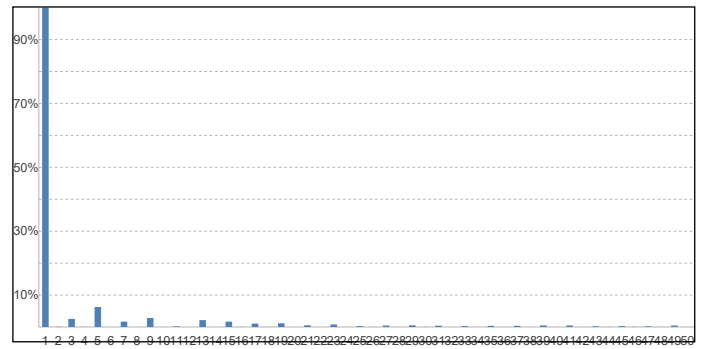
Lumen efficiency: 107 lm/W



Harmonics

3rd Harmonic	2.54%
5th Harmonic	6.25%
7th Harmonic	1.69%
9th Harmonic	2.8%
11th Harmonic	0.21%

Current Harmonics %



Stabilization Details

Warm-up Conditions

Stable period	15 min
Stable change max	2.0%
Minimum warm-up time	15 min

Colour temperature change during warm-up

CCT start	3340 K
CCT shift	-11 K
CCT end	3329 K

Warm-up Results

Total warmup time	Lamp stabilized in 15 min 3 sec
Warmup variation	-1.9%

Output intensity change during warm-up

Output start	1555 lm
Output change	-25 lm
Output end	1530 lm



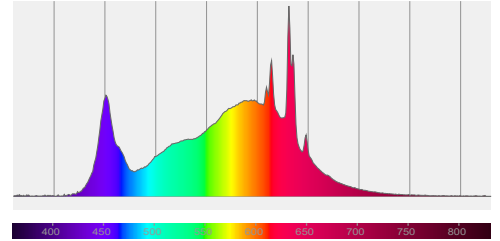
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Colour measurement details

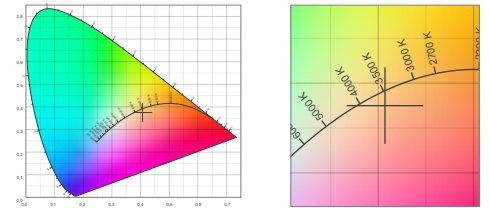
Total lumen output 1530 lm
 Correlated Colour Temperature 3329 K
 Colour coordinates CIE 1931 (x;y) = (0.407;0.375)
 Colour deviation from BBL Duv = -0.0074

TM30-18 Colour Fidelity Index R_f 85.3
 TM30-18 Colour Gamut Index R_g 98.9
 Colour Rendering Index (Ra) CRI 86.6
 Colour Rendering Index. (red component) R9 = 29.1

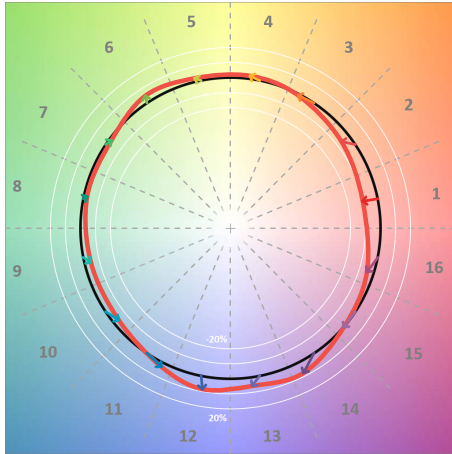
Colour Quality Scale CQS = 83.2
 Television Lighting Consistency Index TLCI = 72



Relative spectral power distribution



TM30 details

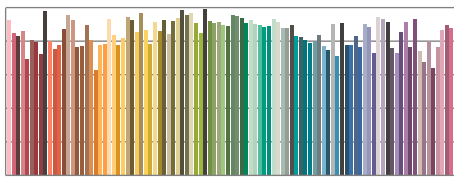


TM30 Colour vectors per hue bin

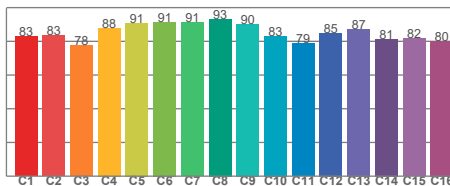


TM30 Colour distortion

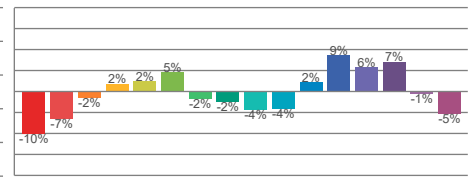
Hue Bin	R _f	Shifts (%)	
		Chroma	Hue
C1	83	-10%	0%
C2	83	-7%	7%
C3	78	-2%	12%
C4	88	2%	7%
C5	91	2%	4%
C6	91	5%	-2%
C7	91	-2%	-4%
C8	93	-2%	-2%
C9	90	-4%	4%
C10	83	-4%	10%
C11	79	2%	13%
C12	85	9%	3%
C13	87	6%	-6%
C14	81	7%	-13%
C15	82	-1%	-13%
C16	80	-5%	-11%



TM30-18 R_f-values per reference colour

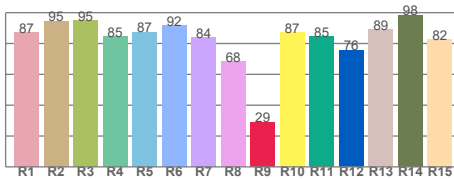


TM30-18 R_f-values per hue bin

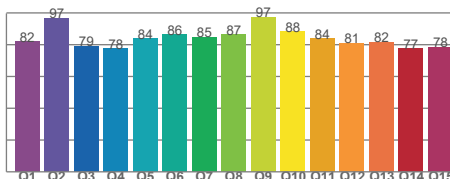


TM30 Chroma shift

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)

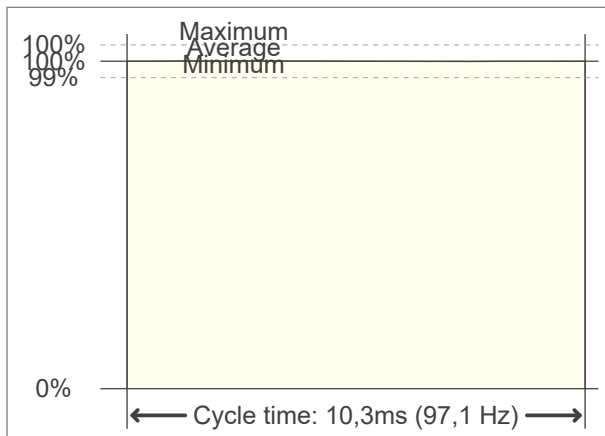
Flicker frequency	97.09 Hz
Percent flicker	0.15 %
Flicker index	0

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

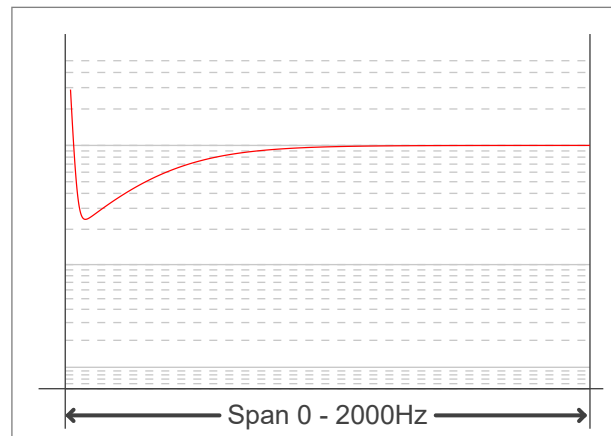
An LED luminaire is considered flicker-free if the SVM value is ≤ 0.4 and if the PstLM value is ≤ 1.0

PstLM value (F < 80 Hz)	0.02
SVM value (80 < F < 2000 Hz)	0

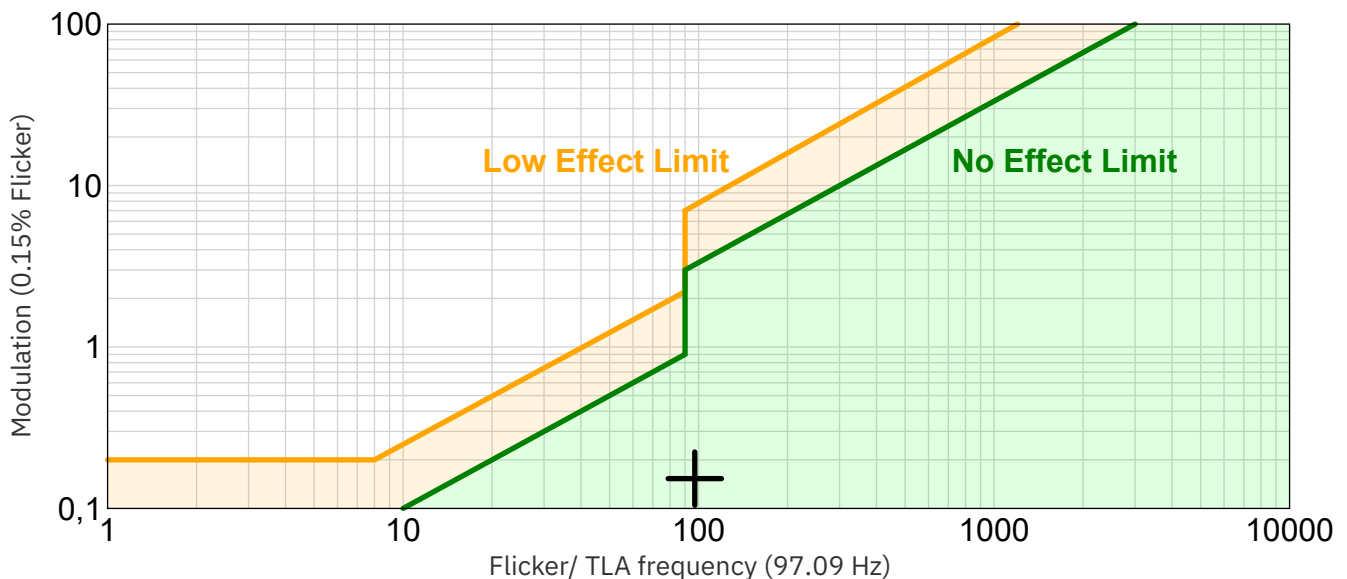
Flicker frame (one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789-2015 Lighting Flicker Risk Zones



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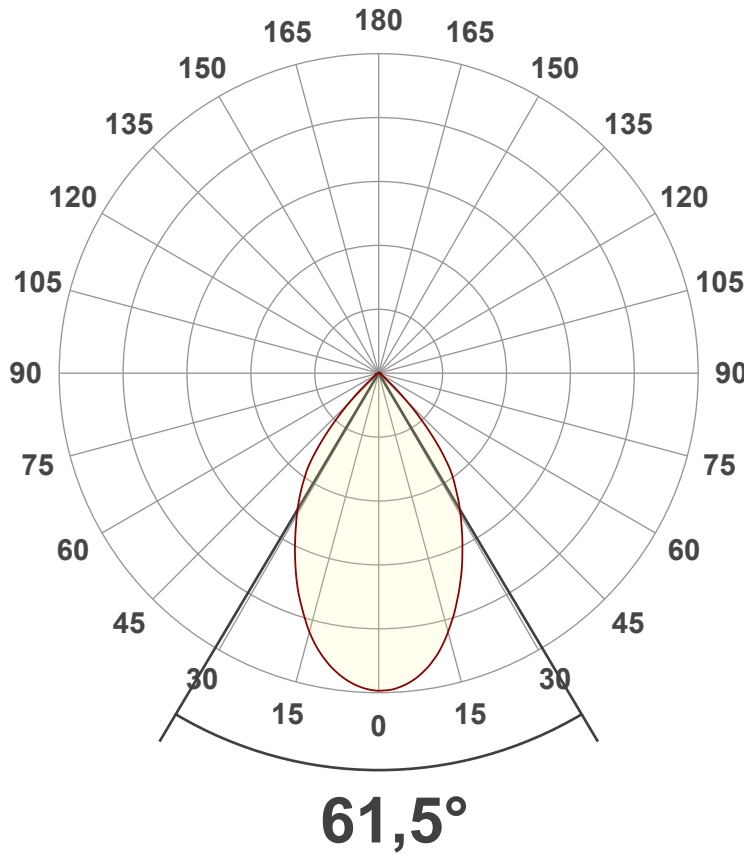


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Beam angle

Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1530 lm
Lumen Up/Down	0% / 100%
Peak Intensity	1518 cd
Beam Angle (50%)	61.5°
Beam Angle (90%)	61.5°
Beam Angle (10%)	61.5°

Cut-off Angle

Average 2.5%	104.7°
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Field Angle

Average 10%	92.6°
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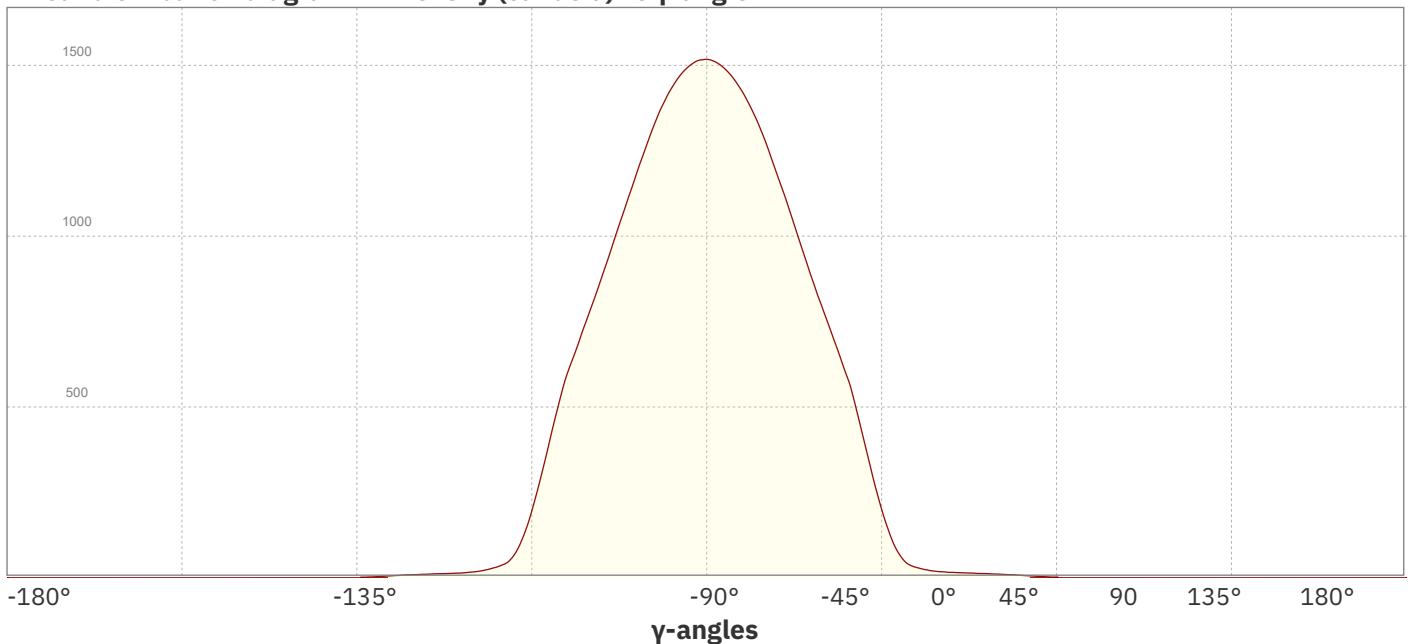
Intensity Ratio

In 120° cone	98.1%
In 90° cone	93.2%

C planes

- C000-C180
- C090-C270

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

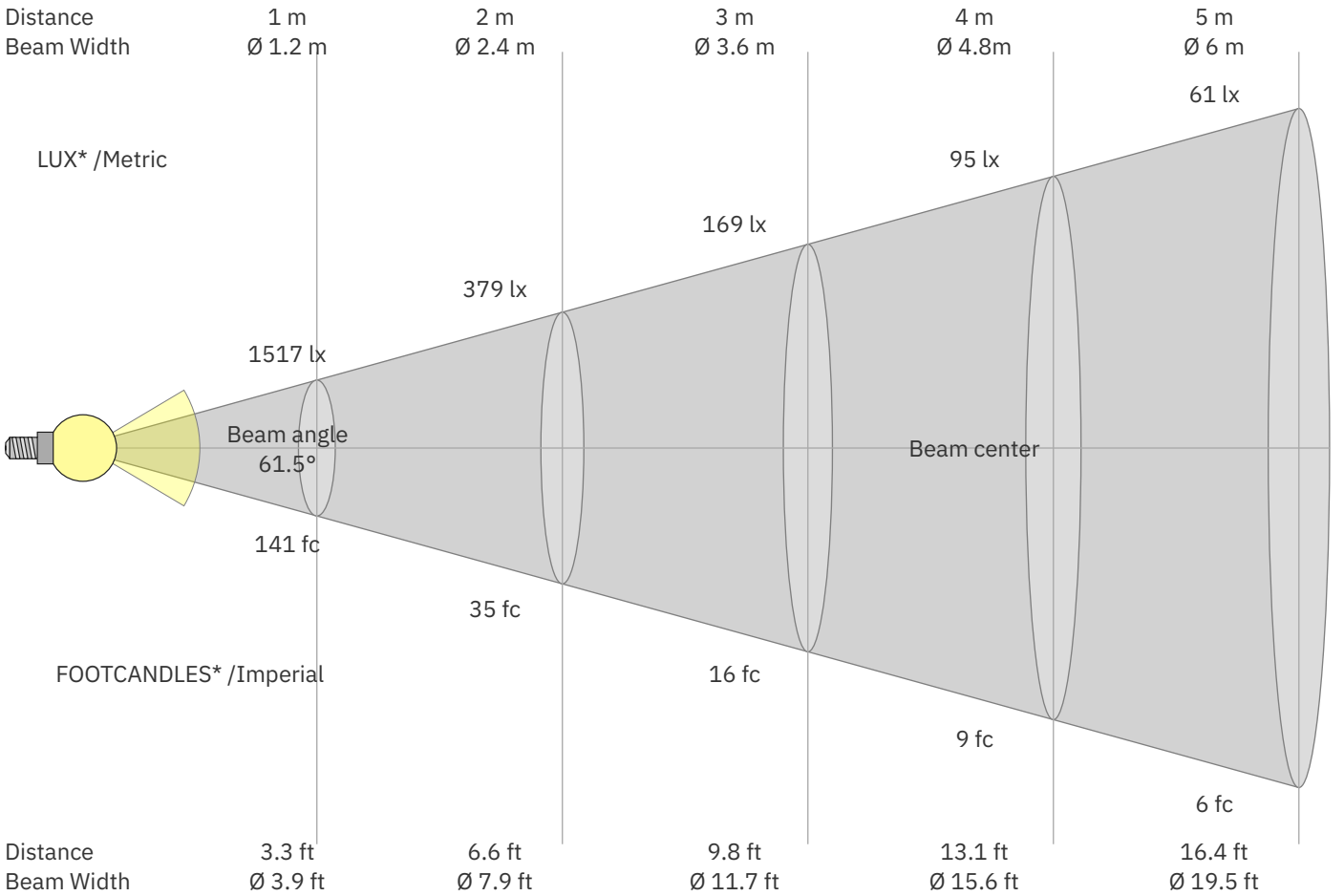


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Beam Details



*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
1517	379	169	95	61	42	31	24	19	15	13	11	9	8	7	6	5	5	4	4	lux
141	35.2	15.7	8.8	5.6	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°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
1517	1515	1502	1481	1452	1414	1368	1311	1249	1185	1118	1050	982	913	846	783	720	655	592	511	cd
100%	100%	99%	98%	96%	93%	90%	86%	82%	78%	74%	69%	65%	60%	56%	52%	47%	43%	39%	34%	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
1517	1515	1502	1481	1452	1414	1368	1311	1249	1185	1118	1050	982	913	846	783	720	655	592	511	cd
100%	100%	99%	98%	96%	93%	90%	86%	82%	78%	74%	69%	65%	60%	56%	52%	47%	43%	39%	34%	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
1517	1511	1496	1474	1443	1406	1361	1309	1249	1184	1120	1051	981	913	845	782	720	657	592	515	cd
100%	100%	99%	97%	95%	93%	90%	86%	82%	78%	74%	69%	65%	60%	56%	52%	47%	43%	39%	34%	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
1517	1511	1496	1474	1443	1406	1361	1309	1249	1184	1120	1051	981	913	845	782	720	657	592	515	cd
100%	100%	99%	97%	95%	93%	90%	86%	82%	78%	74%	69%	65%	60%	56%	52%	47%	43%	39%	34%	of 0°val

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