PHOTOMETRIC LIGHT REPORT

Downlight | Ø192mm | white | 5-CCT | 6~15W | EU plug

Article number: 136-513

Go to the webshop of Tronix Lighting

TRONIX

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Introduction

Purpose of this Document

This document provides accurate and objective photometric data for Tronix Lighting item 136-513. 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 136-513 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 136-513 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	Vitrek 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	2°
Test Distance	1.81 m
Room Temperature and Humidity	22°C +/- 10% – RH 50% +/- 20%
Input Power. Power and Displacement Factors	13.9 W – PF 0.96 – DPF 0.97
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 0 sec –-0.4%

Tested light source

Manufacturer and Order Code	Tronix Lighting – 136-513
Product Description	Downlight | Ø192mm | white | 5-CCT | 6~15W | EU plug

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	1498 lm – 0% / 100%
Efficiency	108 lm/W
Energy efficiency class	E
Peak Intensity and Beam Angle	1438 cd – 62.7°
Correlated Colour Temperature	CCT = 3598 K
Colour Shift. CIE duv	Duv -0.0051
Colour Rendering Index	CRI 95.9
Colour Rendering TM30-18	R_f 93.3 – R_g 103.5
Television Lighting Consistency Index	TLCI = 90
Flicker	SVM 0 – PstLM 0.02

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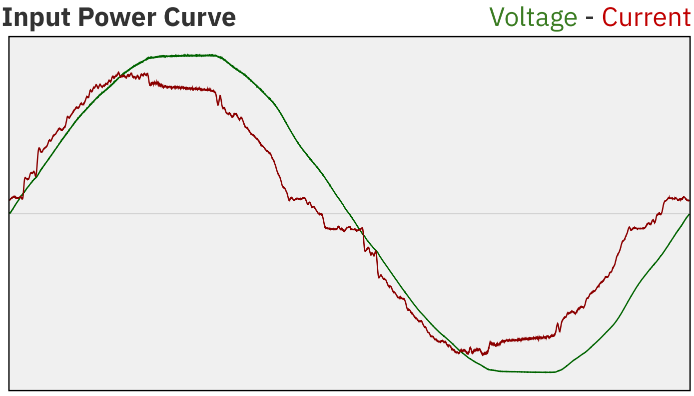
Electrical measurement details

Input Power

RMS Input voltage feed. V_{RMS}	231 V
RMS Input current feed. I_{RMS}	0.063 A
Total input power	13.9 W
Frequency of input power	50 Hz
Power factor	0.96
Displacement power factor	0.97
Total harmonic distortion of the current	10.46%
Total harmonic distortion of the voltage	2.35%

Input Power Curve



Efficiency

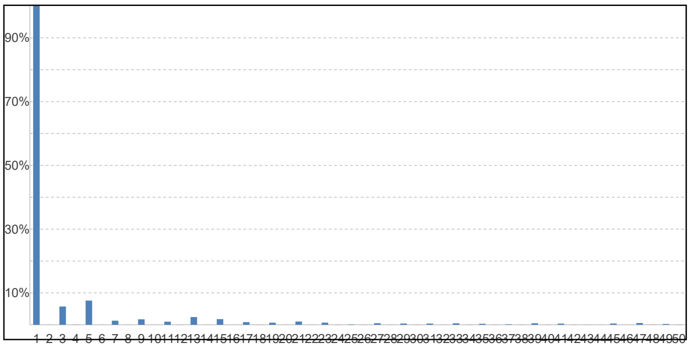
Radiated power efficiency: 34.6%

Lumen efficiency: 108 lm/W

Harmonics

3rd Harmonic	5.73%
5th Harmonic	7.59%
7th Harmonic	1.28%
9th Harmonic	1.72%
11th Harmonic	0.97%

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	3604 K
CCT shift	-6 K
CCT end	3598 K

Warm-up Results

Total warmup time	Lamp stabilized in 15 min 0 sec
Warmup variation	-0.4%

Output intensity change during warm-up

Output start	1503 lm
Output change	-4 lm
Output end	1498 lm

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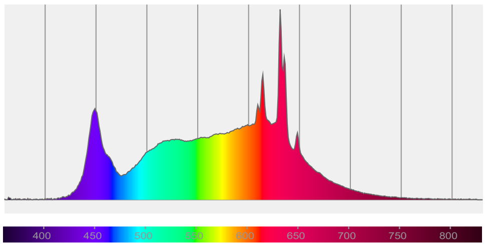
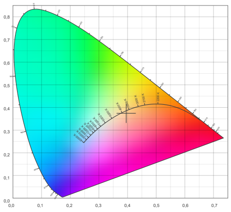
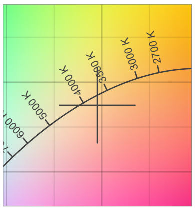
Colour measurement details

Total lumen output	1498 lm
Correlated Colour Temperature	3598 K
Colour coordinates CIE 1931	(x;y) = (0.395;0.374)
Colour deviation from BBL	Duv = -0.0051
TM30-18 Colour Fidelity Index	R_f 93.3
TM30-18 Colour Gamut Index	R_g 103.5
Colour Rendering Index (Ra)	CRI 95.9
Colour Rendering Index. (red component)	R9 = 86.0
Colour Quality Scale	CQS = 95.1
Television Lighting Consistency Index	TLCI = 90

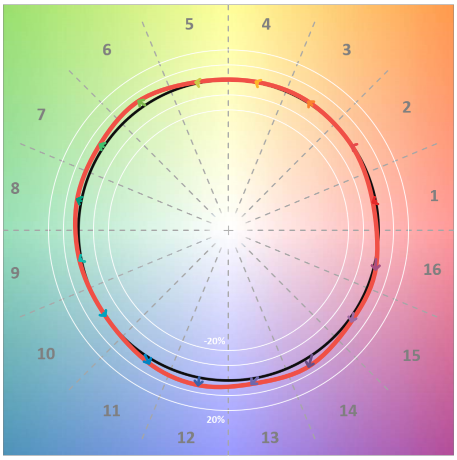


Relative spectral power distribution





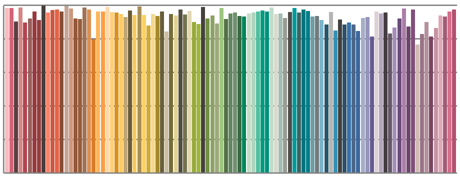
TM30 details

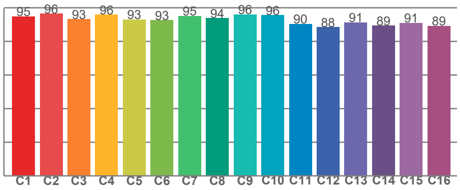


TM30 Colour vectors per hue bin

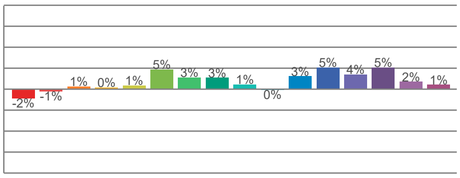

TM30 Colour distortion

		Shifts (%)	
Hue Bin	R_f	Chroma	Hue
C1	95	-2%	-1%
C2	96	-1%	1%
C3	93	1%	3%
C4	96	0%	1%
C5	93	1%	2%
C6	93	5%	2%
C7	95	3%	0%
C8	94	3%	0%
C9	96	1%	0%
C10	96	0%	2%
C11	90	3%	5%
C12	88	5%	0%
C13	91	4%	-5%
C14	89	5%	-6%
C15	91	2%	-5%
C16	89	1%	-7%


TM30-18 Rf-values per reference colour

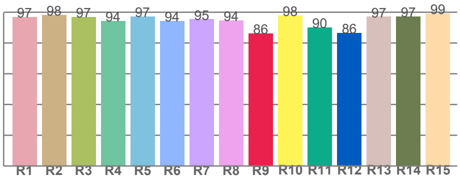


TM30-18 Rf-values per hue bin

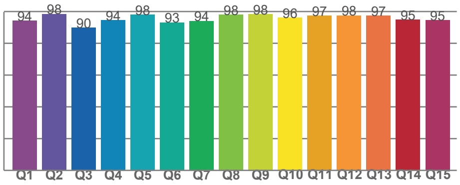


TM30 Chroma shift

Colour Quality details



Colour Rendering Index



Colour Qualitity 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)

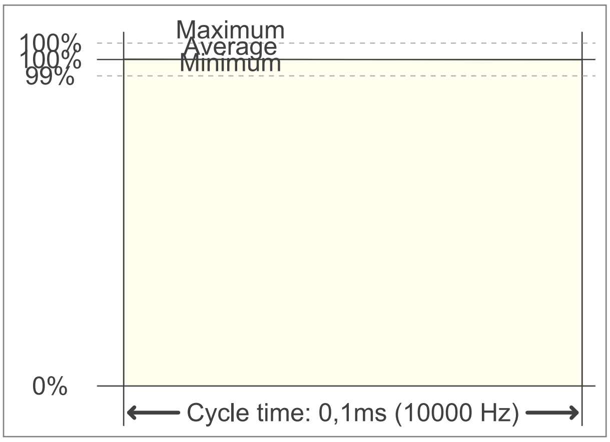
Flicker frequency	10000 Hz
Percent flicker	0.29 %
Flicker index	0

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

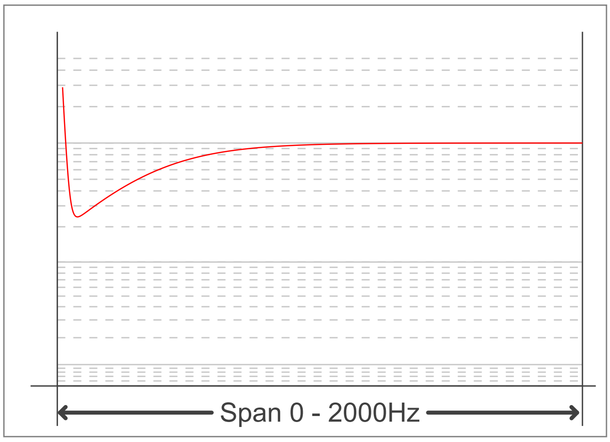
An LED luminaire is considered flicker-free if the SVM value is <= 0.4 and if the PstLM value is <=1.0

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

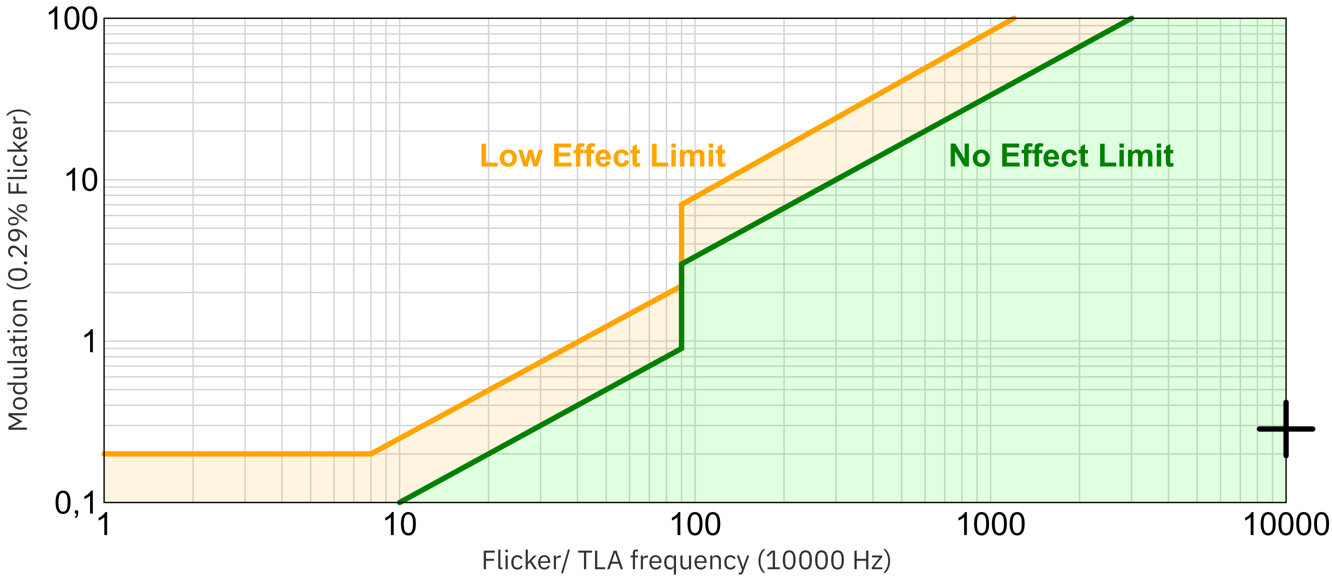
Flicker frame (one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789-2015 Lighting Flicker Risk Zones



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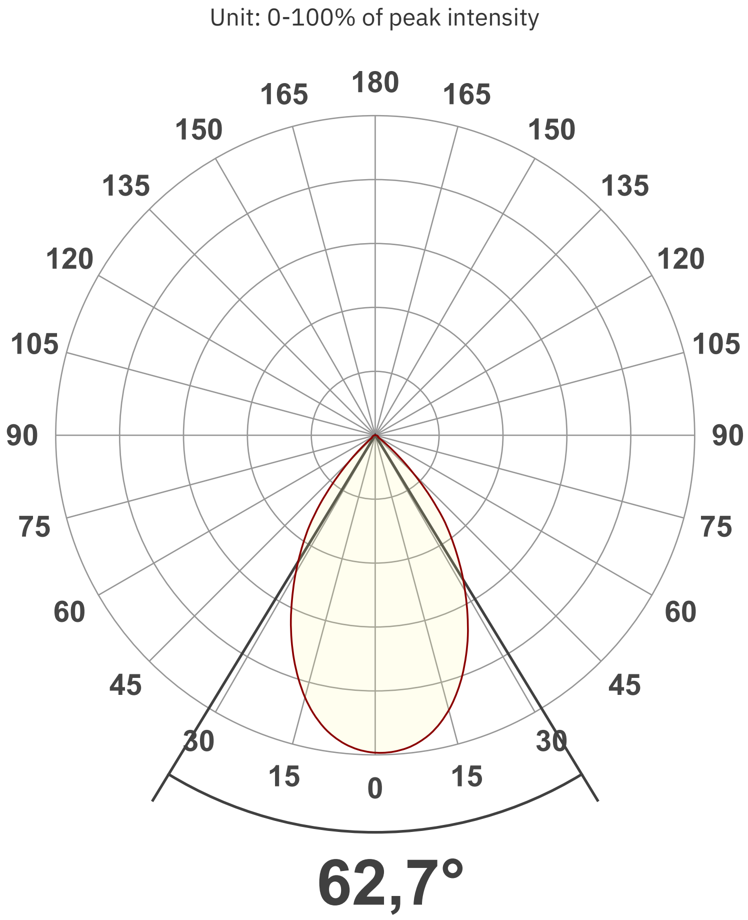
Beam angle

Luminous Intensity diagram



Main Values

Output (total Lumen)	1498 lm
Lumen Up/Down	0% / 100%
Peak Intensity	1438 cd
Beam Angle (50%)	62.7°
Beam Angle (90%)	62.7°
Beam Angle (10%)	62.7°

Cut-off Angle

Average 2.5%	104.1°

Field Angle

Average 10%	93.8°

Intensity Ratio

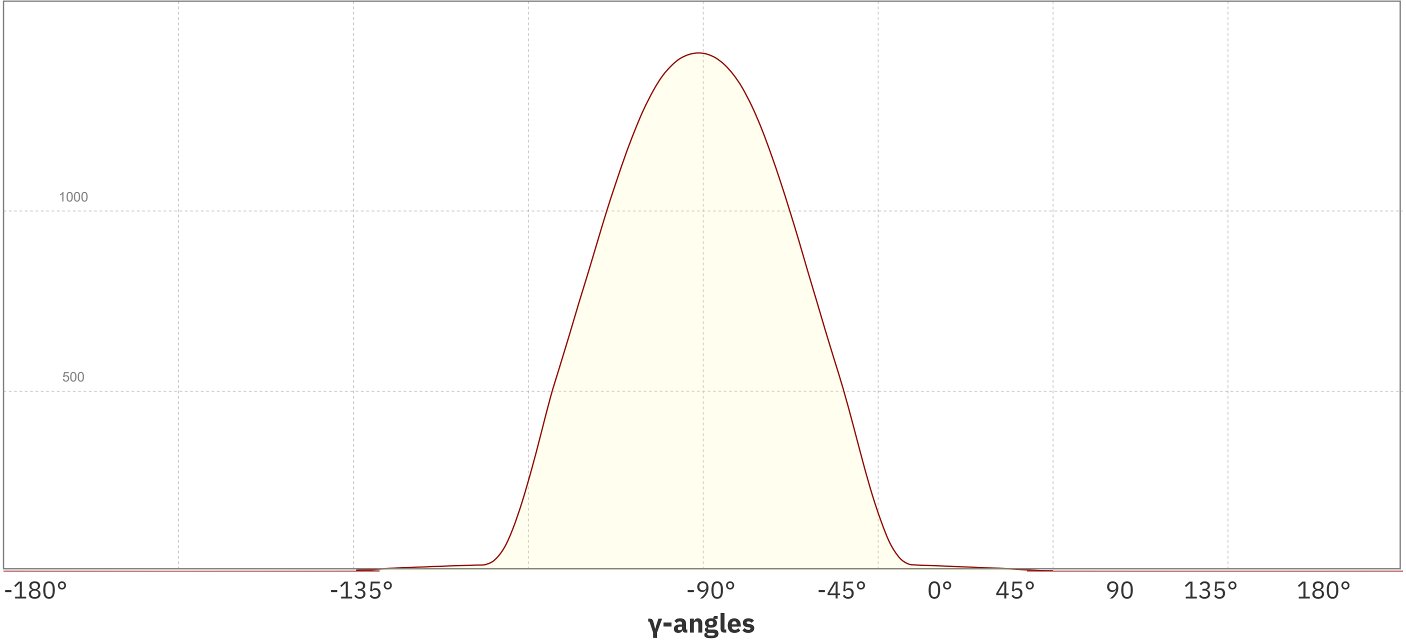
In 120° cone	98.1%
In 90° cone	93.0%

C planes

C000-C180

C090-C270

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



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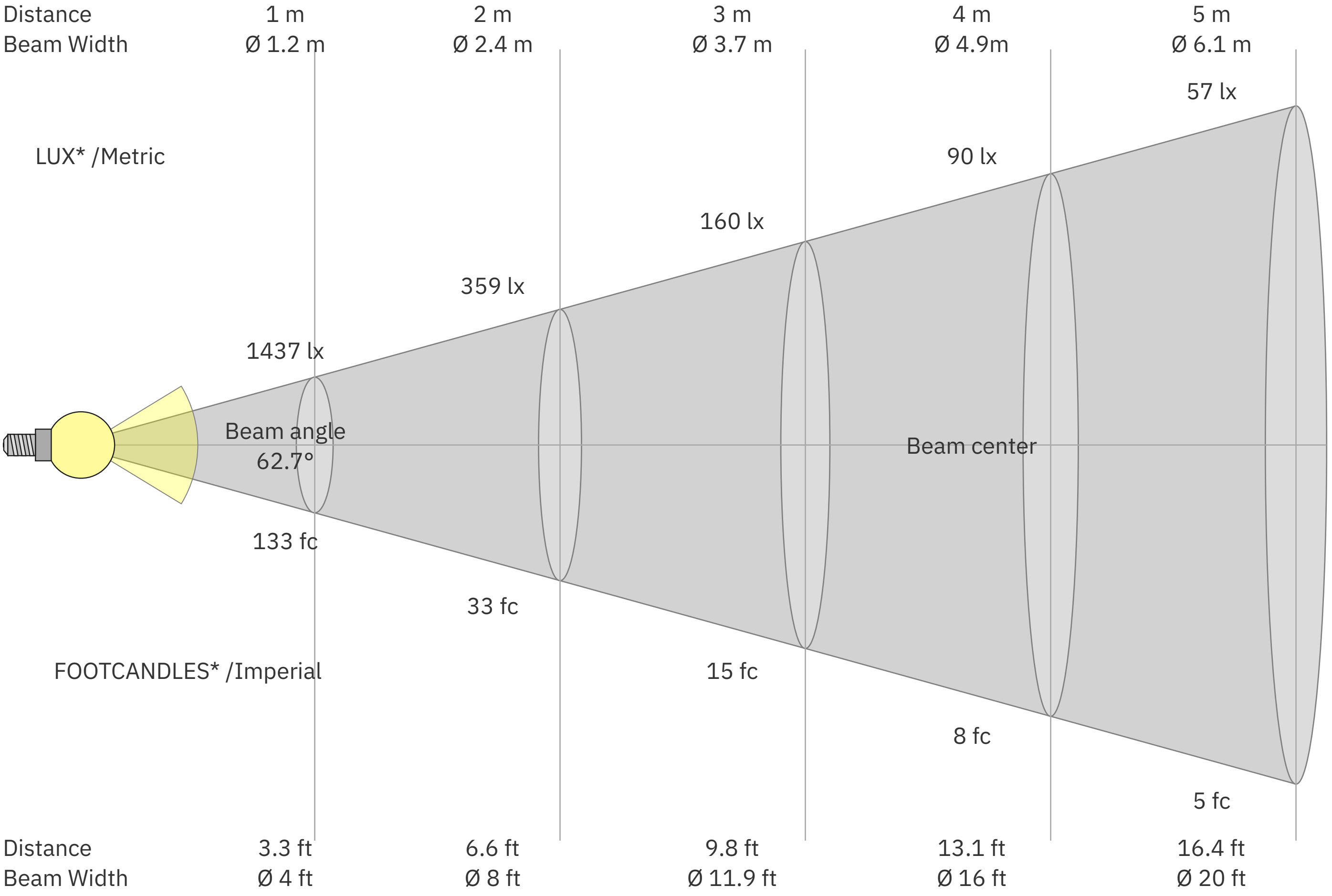
Beam Details



*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
1437	359	160	90	57	40	29	22	18	14	12	10	9	7	6	6	5	4	4	4	lux
133.5	33.4	14.8	8.3	5.3	3.7	2.7	2.1	1.6	1.3	1.1	0.9	0.8	0.7	0.6	0.5	0.5	0.4	0.4	0.3	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
1437	1437	1432	1422	1405	1381	1349	1309	1264	1212	1155	1092	1027	958	886	814	744	672	600	529	cd
100%	100%	100%	99%	98%	96%	94%	91%	88%	84%	80%	76%	71%	67%	62%	57%	52%	47%	42%	37%	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
1437	1437	1432	1422	1405	1381	1349	1309	1264	1212	1155	1092	1027	958	886	814	744	672	600	529	cd
100%	100%	100%	99%	98%	96%	94%	91%	88%	84%	80%	76%	71%	67%	62%	57%	52%	47%	42%	37%	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
1437	1430	1418	1400	1375	1343	1301	1254	1200	1140	1077	1009	939	866	793	720	648	577	507	428	cd
100%	100%	99%	97%	96%	93%	91%	87%	84%	79%	75%	70%	65%	60%	55%	50%	45%	40%	35%	30%	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
1437	1430	1418	1400	1375	1343	1301	1254	1200	1140	1077	1009	939	866	793	720	648	577	507	428	cd
100%	100%	99%	97%	96%	93%	91%	87%	84%	79%	75%	70%	65%	60%	55%	50%	45%	40%	35%	30%	of 0°val

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Light Planning – UGR table

Uncorrected. comprehensive UGR table according to CIE 117-1995

Reflectances ρ Ceiling ρ Walls ρ Floor										
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 H = mounting height above eye level **X** **Y**	**Viewed Crosswise** (Viewing direction orthogonal to lamp length axis)					**Viewed Endwise** (Viewing direction parallel to lamp length axis)				
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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

n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a

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	110	107	105	110	108	105	103	104	102	100	100	98	97	96	95	94	92
2	107	101	97	93	104	100	96	92	96	93	90	93	91	88	91	88	86	85
3	101	94	88	84	99	92	87	83	90	86	82	87	84	81	85	82	80	78
4	95	87	81	76	93	86	80	76	84	79	75	82	77	74	80	76	73	72
5	90	81	75	70	88	80	74	70	78	73	69	76	72	68	75	71	68	66
6	85	75	69	64	83	75	68	64	73	68	64	72	67	63	70	66	63	61
7	80	70	64	59	79	70	64	59	68	63	59	67	62	59	66	62	58	57
8	76	66	60	55	75	65	59	55	64	59	55	63	58	54	62	58	54	53
9	72	62	56	51	71	61	55	51	60	55	51	59	54	51	59	54	51	49
10	69	58	52	48	67	58	52	48	57	51	48	56	51	48	55	51	47	46

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