PHOTOMETRIC LIGHT REPORT

AR111 | 12 watt | 2700K | 24° | dimmable

Article number: 175-323

Go to the webshop of Tronix Lighting

TRONIX

175-323 AR111 | 12 watt | 2700K | 24° | dimmable

Introduction

Purpose of this Document
This document provides accurate and objective photometric data for Tronix Lighting item 175-323. 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 175-323 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 175-323 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	4 planes – 90°
γ (gamma)-Resolution	4.5°
Test Distance	1.14 m
Room Temperature and Humidity	22°C +/- 10% – RH 50% +/- 20%
Input Power. Power and Displacement Factors	10.0 W – PF 0.99 – DPF 0.99
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 10 sec –-2.4%

Tested light source

Manufacturer and Order Code	Tronix Lighting – 175-323
Product Description	AR111 | 12 watt | 2700K | 24° | dimmable

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	817 lm – 0.47% / 99.53%
Efficiency	82 lm/W
Energy efficiency class	F
Peak Intensity and Beam Angle	7774 cd – 19.2°
Correlated Colour Temperature	CCT = 2710 K
Colour Shift. CIE duv	Duv -0.0026
Colour Rendering Index	CRI 95.3
Colour Rendering TM30-18	R_f 91.6 – R_g 101.8
Television Lighting Consistency Index	TLCI = 80
Flicker	SVM 0.01 – PstLM 0.04

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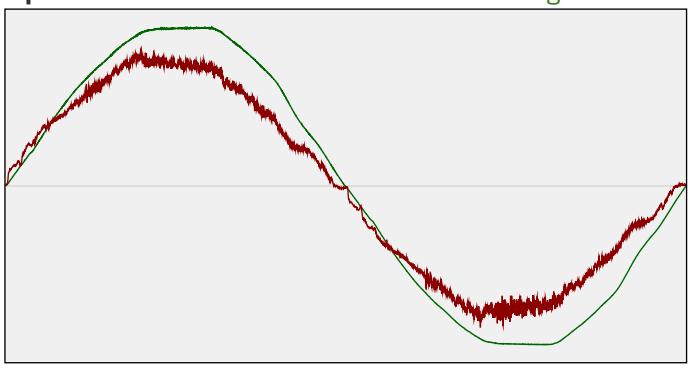
Electrical measurement details

Input Power

RMS Input voltage feed. V_{RMS}	231 V
RMS Input current feed. I_{RMS}	0.044 A
Total input power	10.0 W
Frequency of input power	50 Hz
Power factor	0.99
Displacement power factor	0.99
Total harmonic distortion of the current	3.82%
Total harmonic distortion of the voltage	2.36%

Input Power Curve Voltage - Current



Efficiency

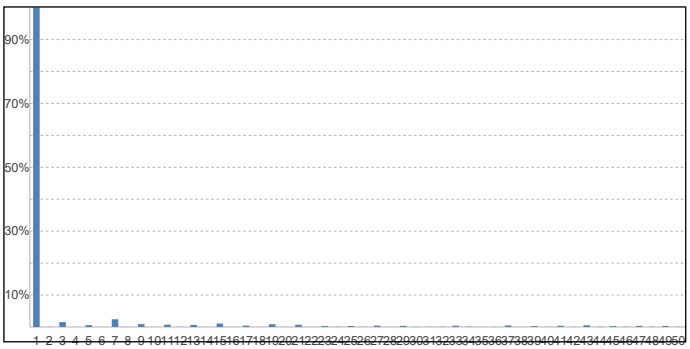
Radiated power efficiency: 24.2%

Lumen efficiency: 82 lm/W

Harmonics

3rd Harmonic	1.53%
5th Harmonic	0.58%
7th Harmonic	2.42%
9th Harmonic	0.91%
11th Harmonic	0.73%

Current Harmonics %



Stabilization Details

Warm-up Conditions

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

Warm-up Results

Total warmup time	Lamp stabilized in 15 min 10 sec
Warmup variation	-2.4%

Colour temperature change during warm-up

CCT start	2759 K
CCT shift	-49 K
CCT end	2710 K

Output intensity change during warm-up

Output start	834 lm
Output change	-17 lm
Output end	817 lm

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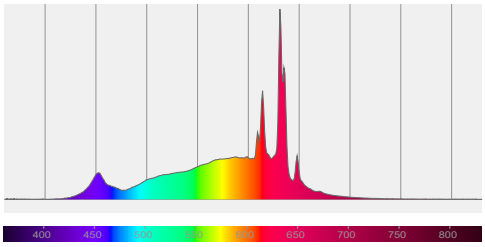
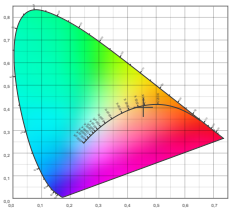
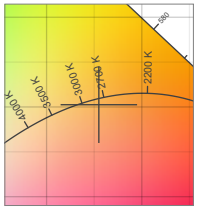
Colour measurement details

Total lumen output	817 lm
Correlated Colour Temperature	2710 K
Colour coordinates CIE 1931	(x;y) = (0.455;0.402)
Colour deviation from BBL	Duv = -0.0026
TM30-18 Colour Fidelity Index	R_f 91.6
TM30-18 Colour Gamut Index	R_g 101.8
Colour Rendering Index (Ra)	CRI 95.3
Colour Rendering Index. (red component)	R9 = 68.6
Colour Quality Scale	CQS = 91.1
Television Lighting Consistency Index	TLCI = 80

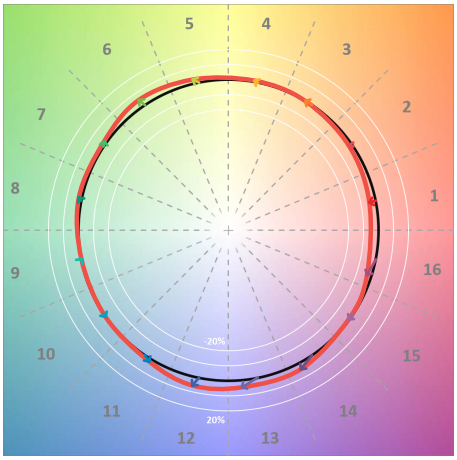


Relative spectral power distribution





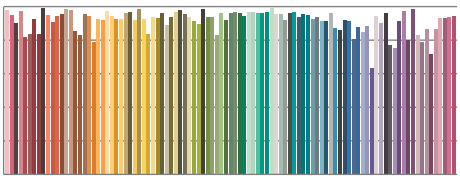
TM30 details



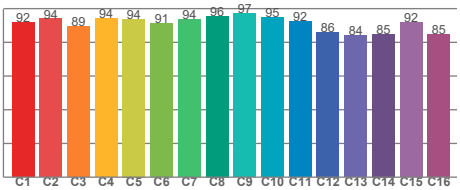
TM30 Colour vectors per hue bin

TM30 Colour distortion

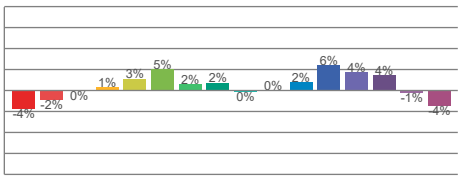
		Shifts (%)	
Hue Bin	R_f	Chroma	Hue
C1	92	-4%	0%
C2	94	-2%	2%
C3	89	0%	5%
C4	94	1%	2%
C5	94	3%	4%
C6	91	5%	2%
C7	94	2%	-3%
C8	96	2%	-2%
C9	97	0%	0%
C10	95	0%	3%
C11	92	2%	5%
C12	86	6%	-3%
C13	84	4%	-12%
C14	85	4%	-11%
C15	92	-1%	-5%
C16	85	-4%	-11%



TM30-18 Rf-values per reference colour

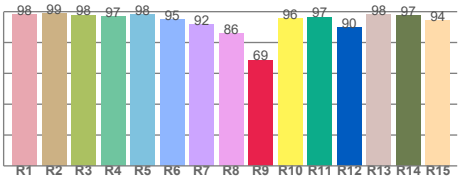


TM30-18 Rf-values per hue bin

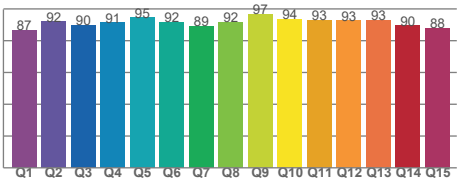


TM30 Chroma shift

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)

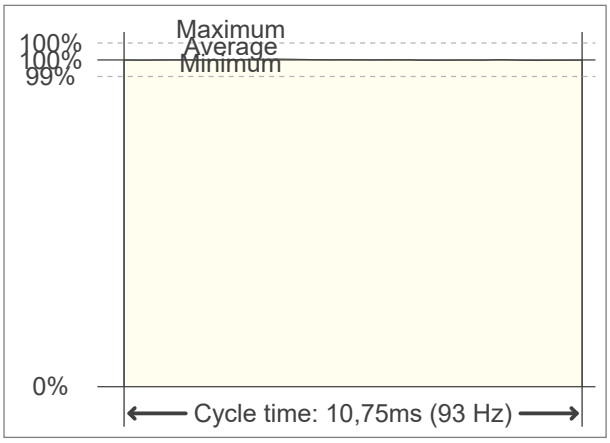
Flicker frequency	93.02 Hz
Percent flicker	0.39 %
Flicker index	0

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

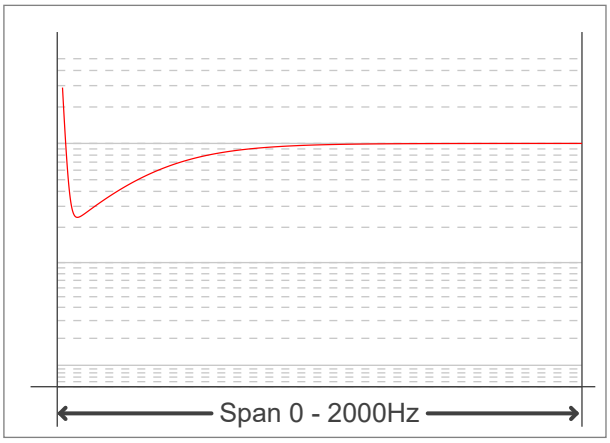
An LED luminaire is considered flicker-free if the SVM value is <= 0.4 and if the PstLM value is <=1.0

PstLM value (F < 80 Hz)	0.04
SVM value (80 < F < 2000 Hz)	0.01

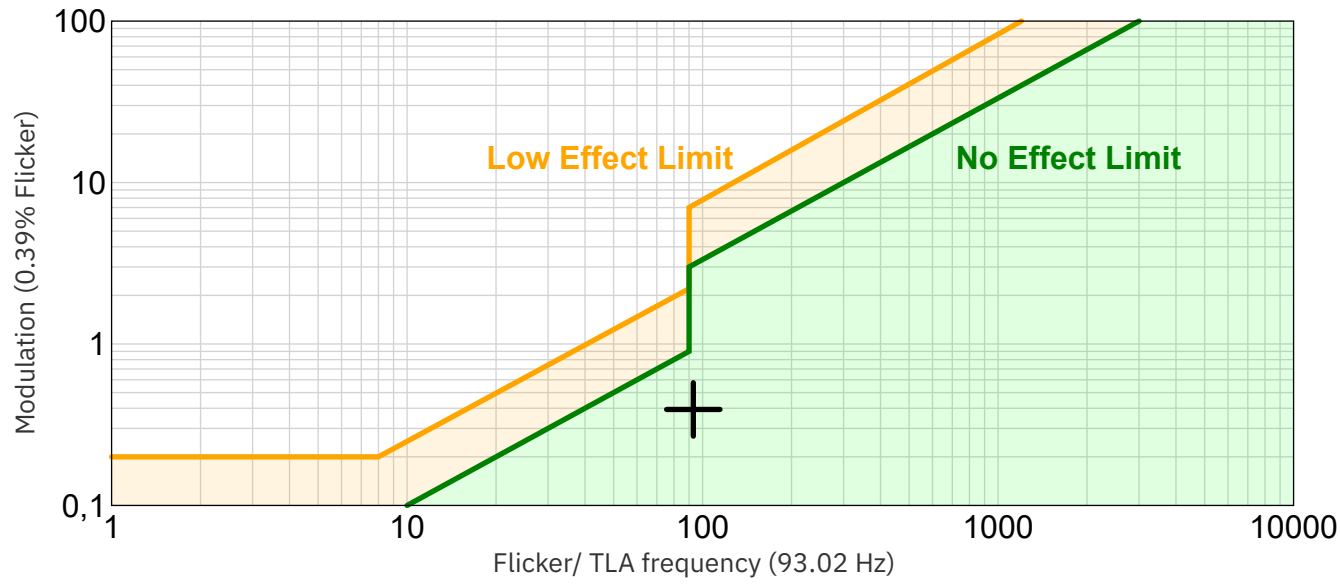
Flicker frame (one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789-2015 Lighting Flicker Risk Zones



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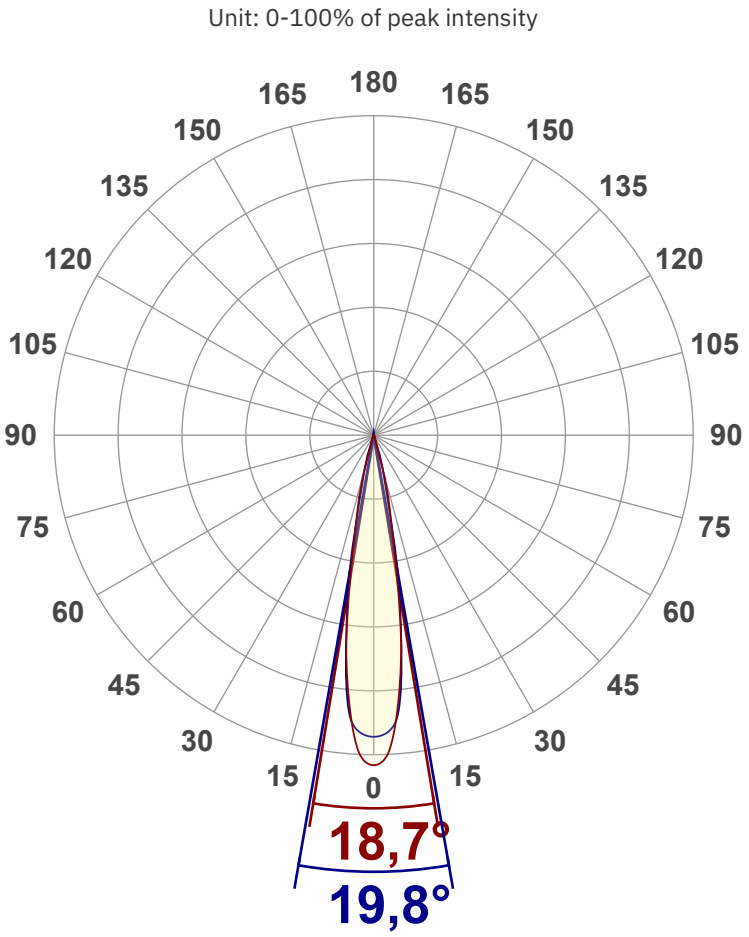
Beam angle

Luminous Intensity diagram



Main Values

Output (total Lumen)	817 lm
Lumen Up/Down	0.47% / 99.53%
Peak Intensity	7774 cd
Beam Angle (50%)	19.2°
Beam Angle (90%)	19.8°
Beam Angle (10%)	18.7°

Cut-off Angle

Average 2.5%	36.5°

Field Angle

Average 10%	30.9°

Intensity Ratio

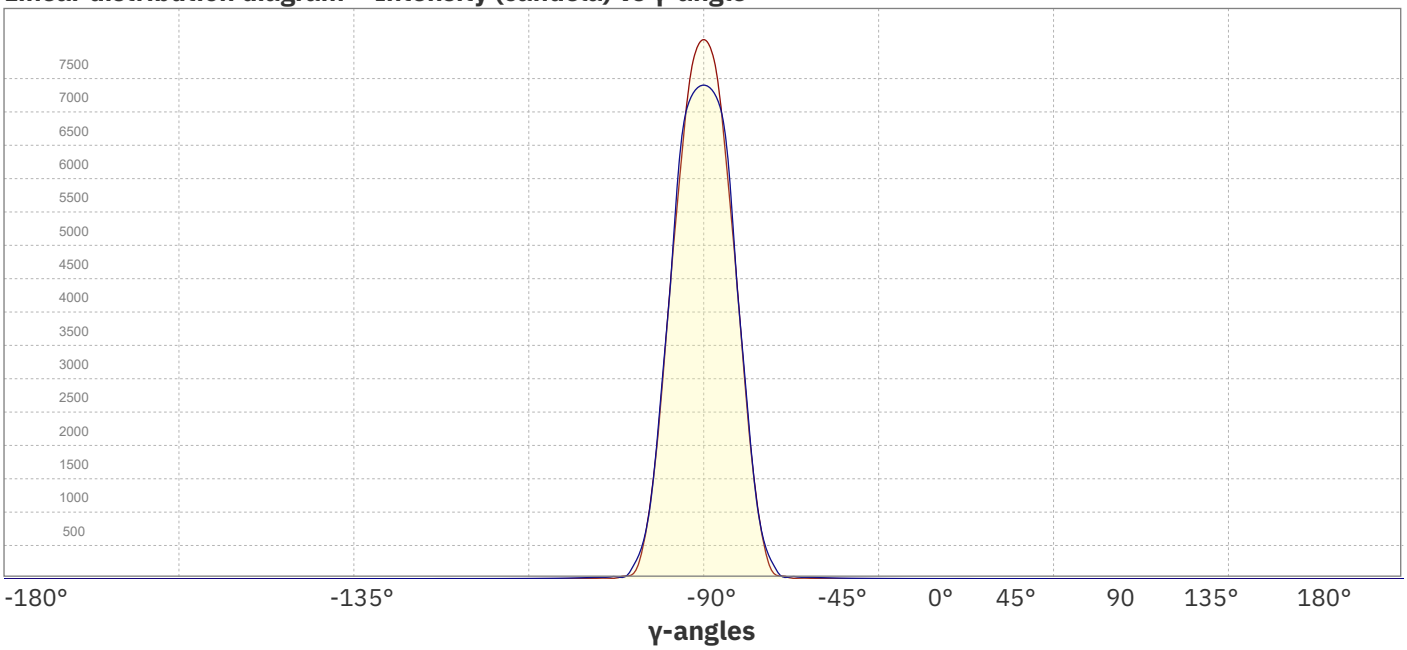
In 120° cone	98.6%
In 90° cone	98.1%

C planes

C000-C180

C090-C270

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



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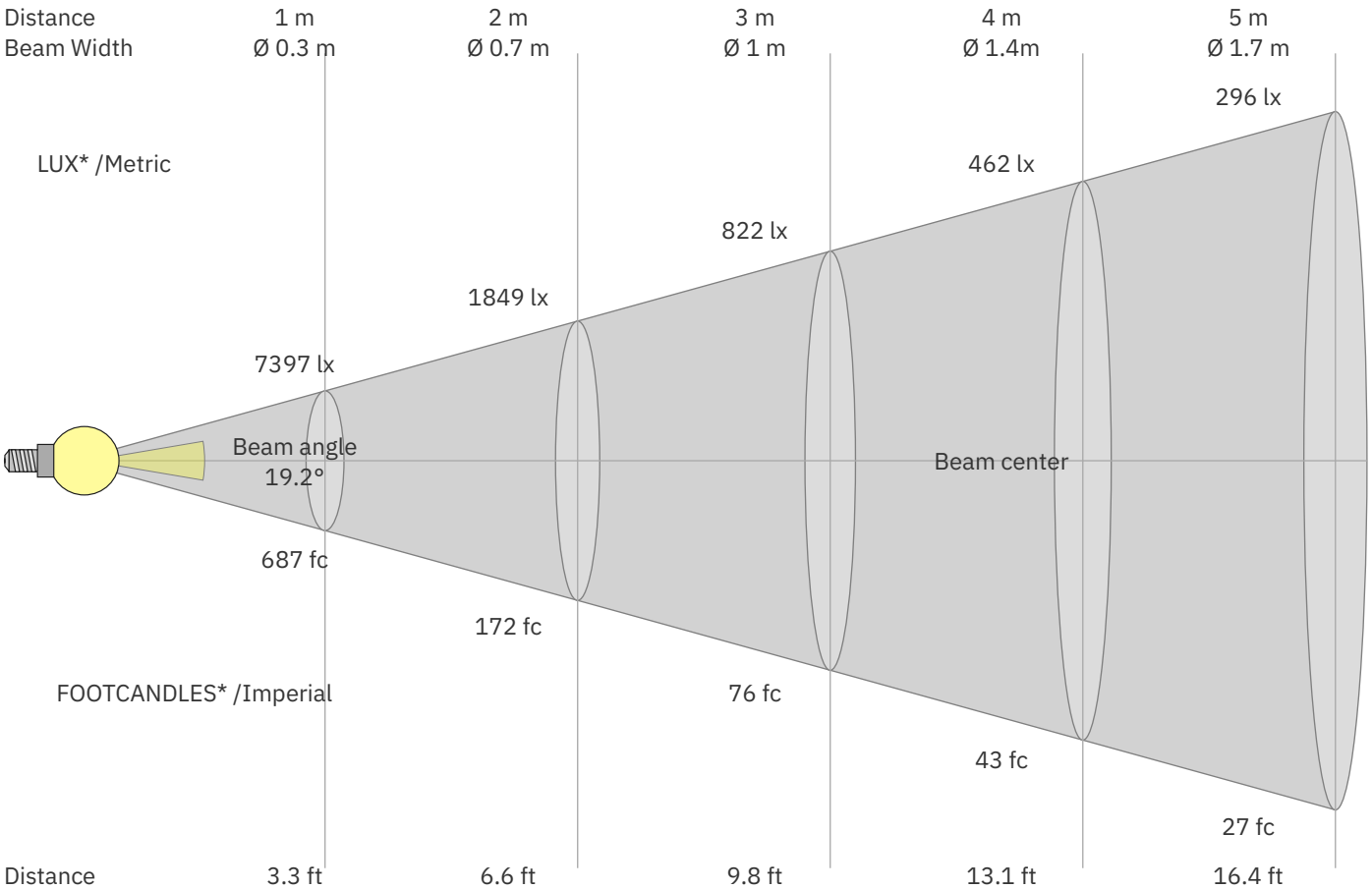
Beam Details



*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
7397	1849	822	462	296	205	151	116	91	74	61	51	44	38	33	29	26	23	20	18	lux
687.3	171.8	76.4	43	27.5	19.1	14	10.7	8.5	6.9	5.7	4.8	4.1	3.5	3.1	2.7	2.4	2.1	1.9	1.7	fc

Intensities in 0° c-plane

0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	γ
7398	7774	7774	7602	7064	6525	5987	5448	4801	4112	3422	2733	2043	1580	1210	839	469	240	192	144	cd
100%	105%	105%	103%	95%	88%	81%	74%	65%	56%	46%	37%	28%	21%	16%	11%	6%	3%	3%	2%	of 0°val

Intensities in 90° c-plane

0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	γ
7398	7021	7021	7021	7021	6668	6023	5377	4732	4087	3461	2840	2218	1597	1026	838	650	461	273	119	cd
100%	95%	95%	95%	95%	90%	81%	73%	64%	55%	47%	38%	30%	22%	14%	11%	9%	6%	4%	2%	of 0°val

Intensities in 180° c-plane

0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	γ
7398	7774	7774	7602	7064	6525	5987	5448	4801	4112	3422	2733	2043	1580	1210	839	469	240	192	144	cd
100%	105%	105%	103%	95%	88%	81%	74%	65%	56%	46%	37%	28%	21%	16%	11%	6%	3%	3%	2%	of 0°val

Intensities in 270° c-plane

0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	γ
7398	7021	7021	7021	7021	6668	6023	5377	4732	4087	3461	2840	2218	1597	1026	838	650	461	273	119	cd
100%	95%	95%	95%	95%	90%	81%	73%	64%	55%	47%	38%	30%	22%	14%	11%	9%	6%	4%	2%	of 0°val

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Light Planning – UGR table

Uncorrected. comprehensive UGR table according to CIE 117-1995

Reflectances										
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)				
2H 2H	-1.6	-1.2	-1.6	-1.1	-0.9	-0.1	0.3	0.0	0.5	0.7
3H	1.1	1.7	1.5	1.9	2.0	2.1	2.7	2.5	2.9	3.1
4H	2.5	3.0	2.8	3.2	3.5	3.5	4.1	3.9	4.3	4.5
6H	4.4	4.8	4.7	5.1	5.5	5.3	5.8	5.6	6.1	6.4
8H	5.5	5.9	5.8	6.3	6.6	6.4	6.8	6.7	7.2	7.5
12H	6.8	7.3	7.1	7.6	8.0	7.6	8.0	7.9	8.4	8.8
4H 2H	-0.6	0.0	-0.2	0.2	0.5	0.5	1.1	0.9	1.3	1.5
3H	2.5	2.9	2.8	3.3	3.7	3.2	3.7	3.6	4.0	4.4
4H	3.9	4.3	4.3	4.8	5.3	4.7	5.1	5.1	5.6	6.1
6H	5.9	6.4	6.4	6.8	7.1	6.7	7.2	7.2	7.5	7.9
8H	7.1	7.6	7.6	8.0	8.3	7.9	8.4	8.4	8.7	9.1
12H	8.5	8.9	9.0	9.3	9.8	9.2	9.6	9.7	10.0	10.5
8H 4H	4.7	5.2	5.2	5.5	5.9	5.3	5.8	5.8	6.1	6.5
6H	7.0	7.4	7.5	7.8	8.4	7.7	8.0	8.2	8.5	9.0
8H	8.5	8.8	9.0	9.3	9.9	9.1	9.4	9.6	9.9	10.5
12H	10.1	10.4	10.7	10.9	11.5	10.6	10.9	11.2	11.4	12.0
12H 4H	4.9	5.3	5.4	5.7	6.2	5.5	5.9	6.0	6.3	6.7
6H	7.5	7.8	8.0	8.3	8.9	8.0	8.3	8.5	8.8	9.4
8H	9.0	9.2	9.5	9.7	10.3	9.5	9.8	10.1	10.3	10.9

Variations with the observer position for the luminaire spacings. S:		
S = 1.0H	0.1 / -0.1	0.1 / -0.1
S = 1.5H	0.1 / -0.1	0.2 / -0.1
S = 2.0H	0.2 / -0.2	0.2 / -0.2

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	116	114	112	111	113	112	110	109	108	106	105	104	103	102	100	100	99	98
2	113	110	107	105	111	108	106	104	105	103	102	102	101	99	99	98	97	96
3	110	106	103	101	108	105	102	100	103	100	99	100	99	97	98	97	96	94
4	108	104	100	98	106	103	100	97	101	98	96	99	97	95	97	96	94	93
5	106	101	98	96	105	100	97	95	99	96	94	97	95	94	96	94	93	92
6	104	99	96	94	103	99	96	93	97	95	93	96	94	92	95	93	92	91
7	102	97	94	92	101	97	94	92	96	93	91	95	93	91	94	92	91	90
8	101	96	93	91	100	95	92	90	94	92	90	94	91	90	93	91	89	89
9	99	94	91	89	98	94	91	89	93	91	89	93	90	89	92	90	88	88
10	98	93	90	88	97	93	90	88	92	90	88	92	89	88	91	89	87	87

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