



PHOTOMETRIC LIGHT REPORT

**AR111 | 12 watt | 3000K |
48° | dimmable**

Article number: 175-326



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TRONIX



175-326 AR111 | 12 watt | 3000K | 48° | dimmable

Introduction

Purpose of this Document

This document provides accurate and objective photometric data for Tronix Lighting item 175-326. 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 175-326 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 175-326 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	Vitrete 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 11 sec --2.5%

Tested light source

Manufacturer and Order Code	Tronix Lighting – 175-326
Product Description	AR111 12 watt 3000K 48° dimmable

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	827 lm – 0.09% / 99.91%
Efficiency	83 lm/W
Energy efficiency class	F
Peak Intensity and Beam Angle	1328 cd – 46.7°
Correlated Colour Temperature	CCT = 3078 K
Colour Shift. CIE duv	Duv -0.0058
Colour Rendering Index	CRI 96.0
Colour Rendering TM30-18	R _f 91.6 – R _g 102.8
Television Lighting Consistency Index	TLCI = 84
Flicker	SVM 0.01 – PstLM 0.04

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Electrical measurement details

Input Power

RMS Input voltage feed. V_{RMS}

235 V

RMS Input current feed. I_{RMS}

0.043 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

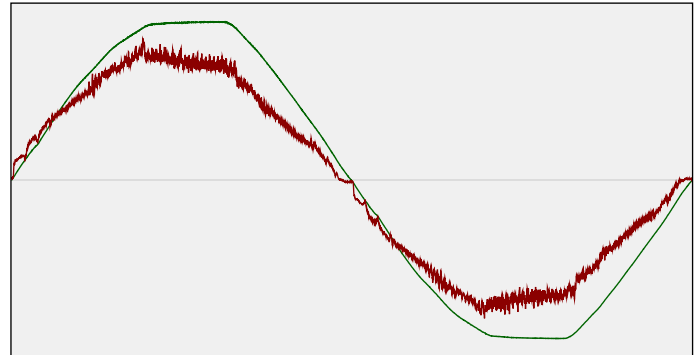
4.29%

Total harmonic distortion of the voltage

2.7%

Input Power Curve

Voltage - Current



Efficiency

Radiated power efficiency: 25.0%



Lumen efficiency: 83 lm/W



Harmonics

3rd Harmonic

1.75%

5th Harmonic

1.02%

7th Harmonic

3.17%

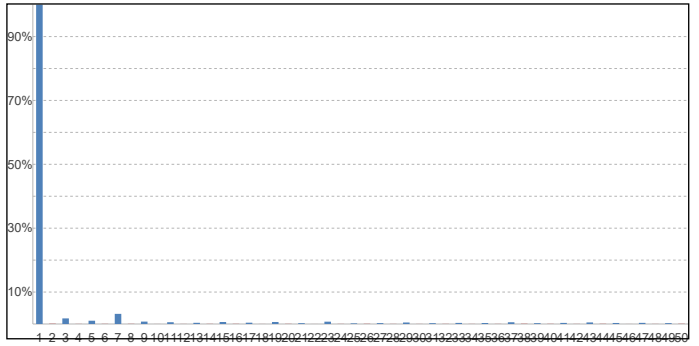
9th Harmonic

0.75%

11th Harmonic

0.55%

Current Harmonics %



Stabilization Details

Warm-up Conditions

Stable period

15 min CCT start

3121 K

Stable change max

2.0% CCT shift

-43 K

Minimum warm-up time

15 min CCT end

3078 K

Colour temperature change during warm-up

Warm-up Results

Total warmup time

Lamp stabilized in 15 min 11 sec

Output intensity change during warm-up

Output start

844 lm

Warmup variation

-2.5% Output change

-17 lm

Output end

827 lm

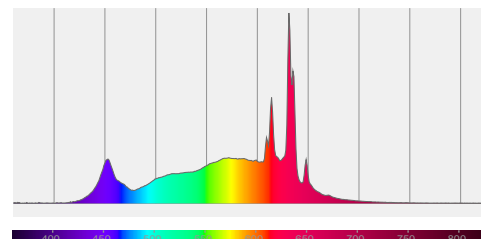
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Colour measurement details

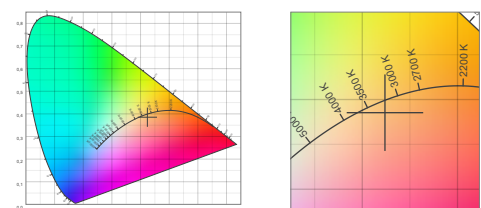
Total lumen output 827 lm
 Correlated Colour Temperature 3078 K
 Colour coordinates CIE 1931 (x;y) = (0.424;0.385)
 Colour deviation from BBL Duv = -0.0058

TM30-18 Colour Fidelity Index R_f 91.6
 TM30-18 Colour Gamut Index R_g 102.8
 Colour Rendering Index (Ra) CRI 96.0
 Colour Rendering Index. (red component) $R_9 = 80.6$

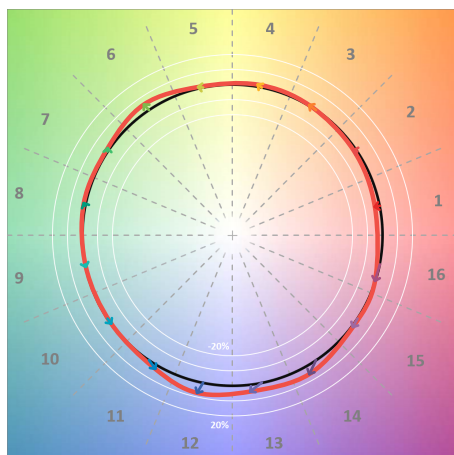
Colour Quality Scale CQS = 91.5
 Television Lighting Consistency Index TLCI = 84



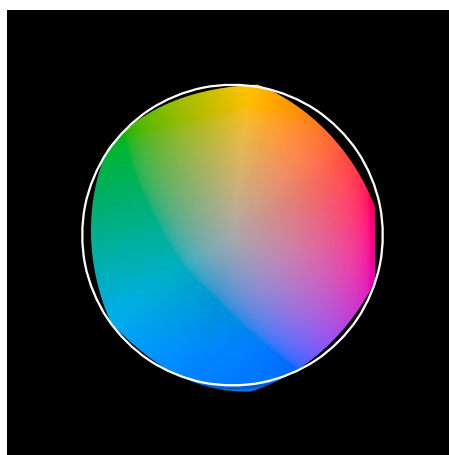
Relative spectral power distribution



TM30 details

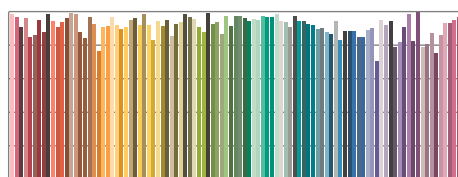


TM30 Colour vectors per hue bin

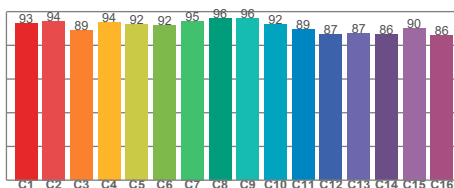


TM30 Colour distortion

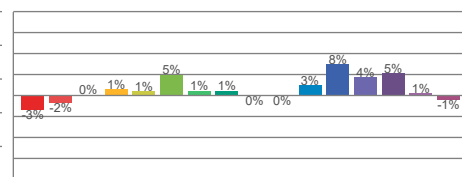
Hue Bin	R_f	Shifts (%)	
		Chroma	Hue
C1	93	-3%	0%
C2	94	-2%	2%
C3	89	0%	6%
C4	94	1%	3%
C5	92	1%	3%
C6	92	5%	1%
C7	95	1%	-2%
C8	96	1%	-2%
C9	96	0%	2%
C10	92	0%	4%
C11	89	3%	7%
C12	87	8%	-3%
C13	87	4%	-9%
C14	86	5%	-9%
C15	90	1%	-6%
C16	86	-1%	-11%



TM30-18 R_f -values per reference colour

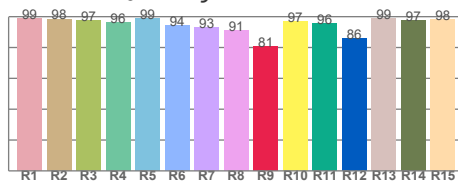


TM30-18 R_f -values per hue bin

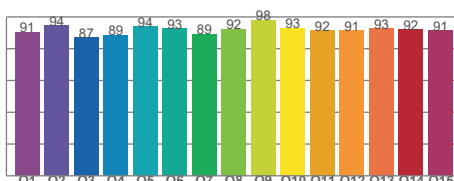


TM30 Chroma shift

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)

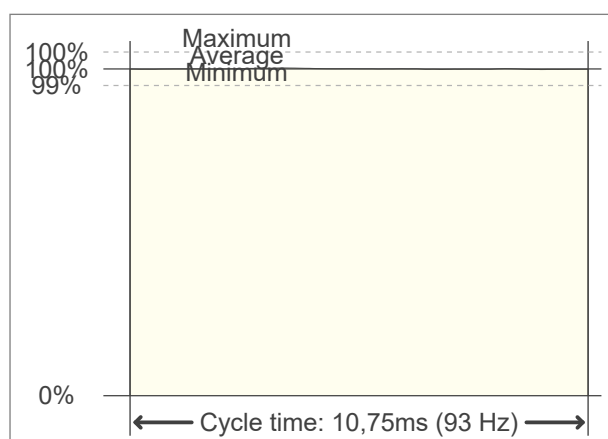
Flicker frequency	93.02 Hz
Percent flicker	0.39 %
Flicker index	0

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

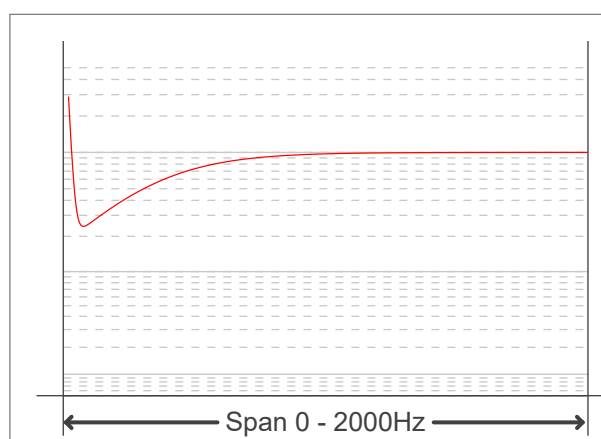
An LED luminaire is considered flicker-free if the SVM value is ≤ 0.4 and if the PstLM value is ≤ 1.0

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

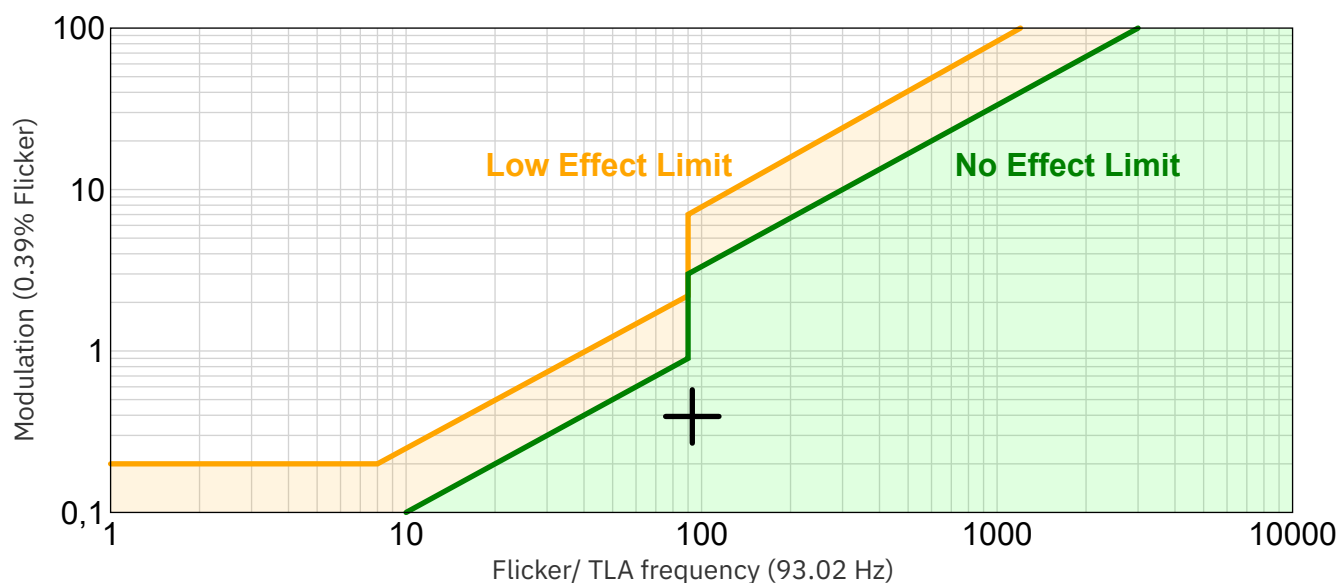
Flicker frame (one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789-2015 Lighting Flicker Risk Zones



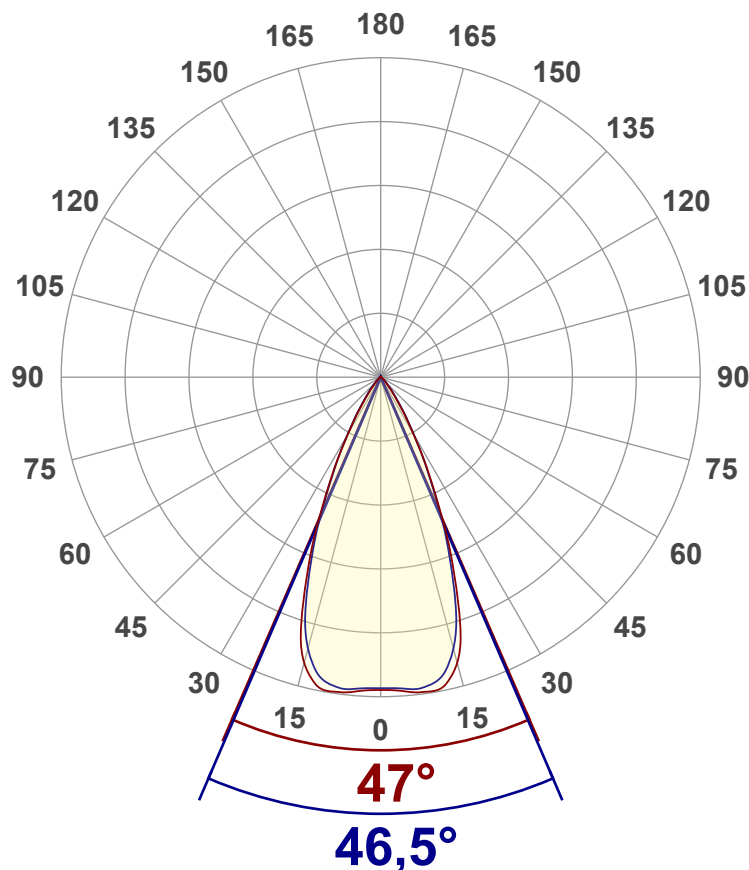
Document revision date: 17-7-2025 Measurement serial: VFR-250710-10420-SW

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Beam angle

Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	827 lm
Lumen Up/Down	0.09% / 99.91%
Peak Intensity	1328 cd
Beam Angle (50%)	46.7°
Beam Angle (90%)	46.5°
Beam Angle (10%)	47°

Cut-off Angle

Average 2.5%	88.9°
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Field Angle

Average 10%	70.3°
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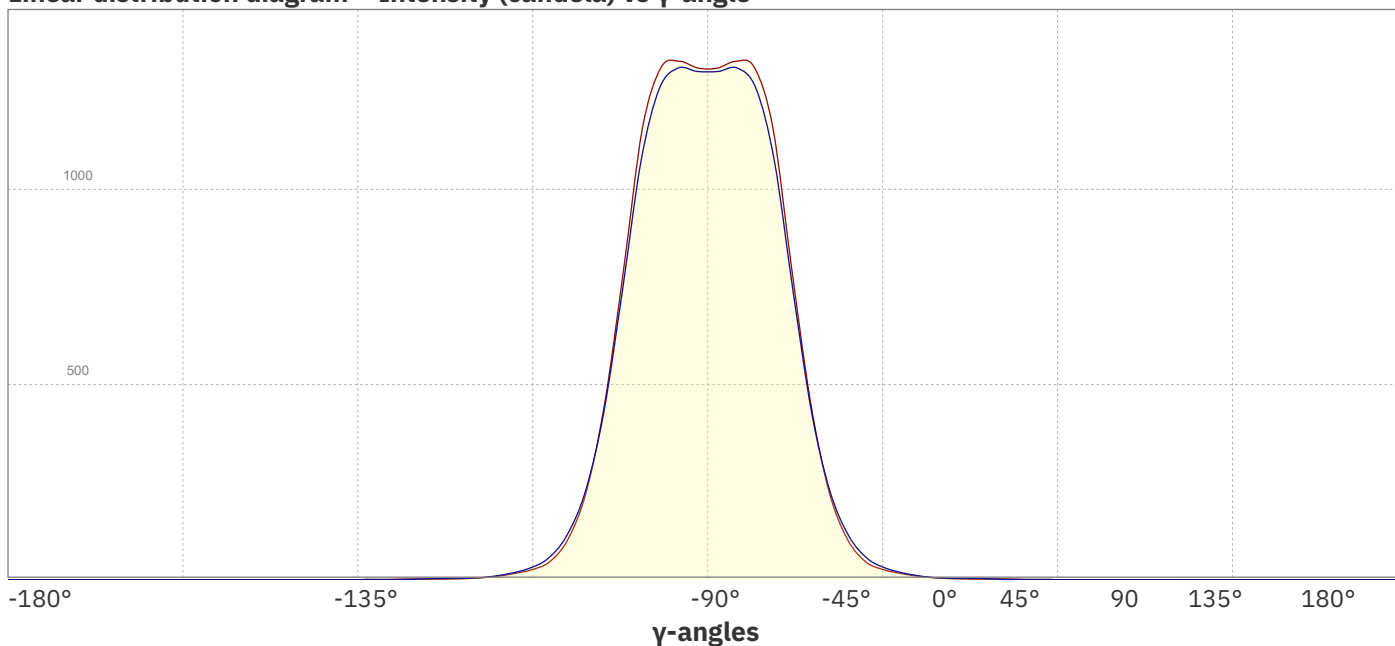
Intensity Ratio

In 120° cone	99.2%
In 90° cone	97.1%

C planes

C000-C180
C090-C270

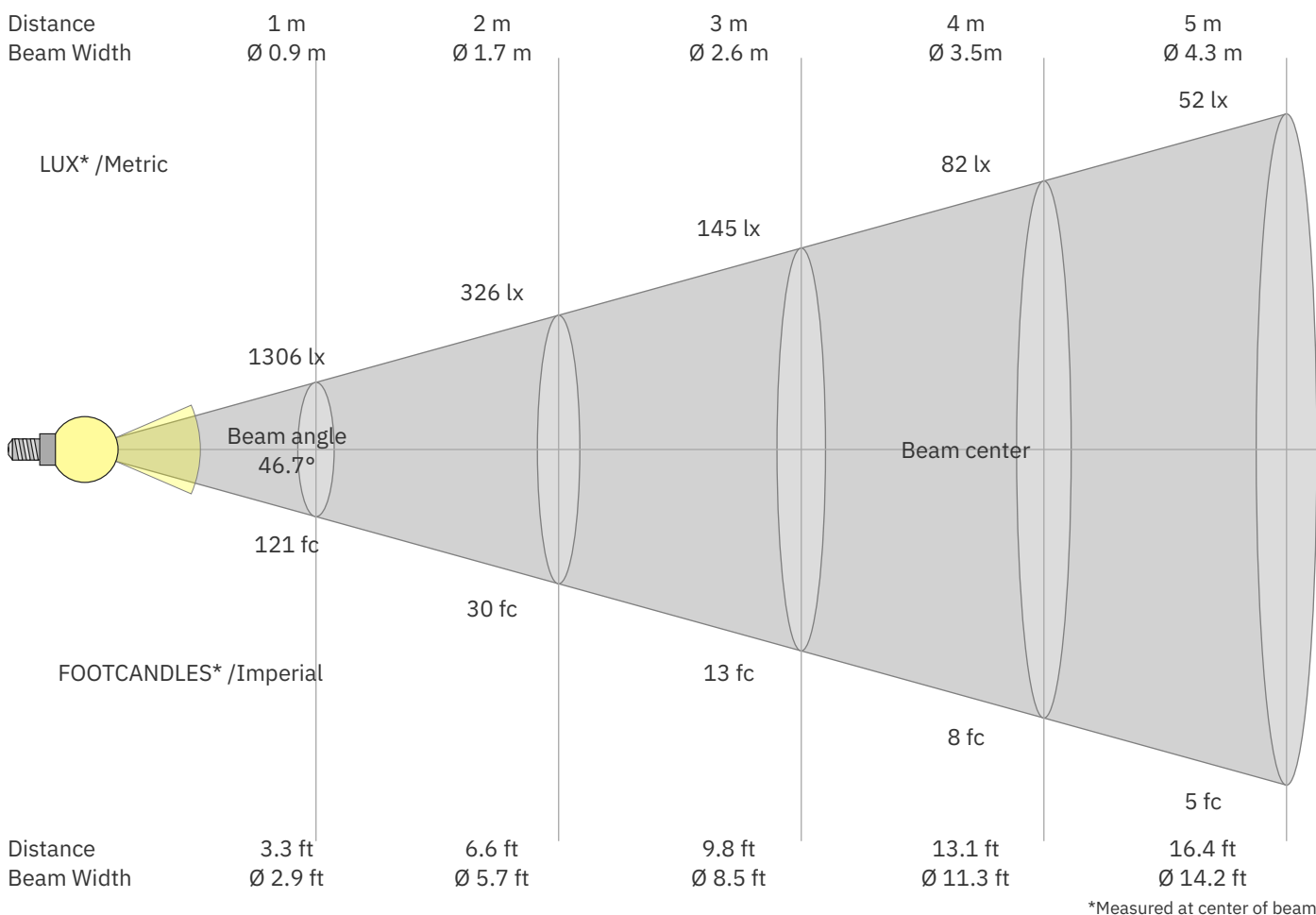
Linear distribution diagram - Intensity (candela) vs γ-angle



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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
1306	326	145	82	52	36	27	20	16	13	11	9	8	7	6	5	5	4	4	3	lux
121.3	30.3	13.5	7.6	4.9	3.4	2.5	1.9	1.5	1.2	1	0.8	0.7	0.6	0.5	0.5	0.4	0.4	0.3	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
1306	1310	1316	1323	1325	1319	1312	1247	1182	1066	916	768	627	486	381	284	206	154	103	79	cd
100%	100%	101%	101%	101%	101%	100%	95%	90%	82%	70%	59%	48%	37%	29%	22%	16%	12%	8%	6%	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
1306	1302	1304	1308	1306	1284	1263	1196	1117	1013	874	736	606	476	374	289	213	167	120	92	cd
100%	100%	100%	100%	100%	98%	97%	92%	86%	78%	67%	56%	46%	36%	29%	22%	16%	13%	9%	7%	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
1306	1310	1316	1323	1325	1319	1312	1247	1182	1066	916	768	627	486	381	284	206	154	103	79	cd
100%	100%	101%	101%	101%	101%	100%	95%	90%	82%	70%	59%	48%	37%	29%	22%	16%	12%	8%	6%	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
1306	1302	1304	1308	1306	1284	1263	1196	1117	1013	874	736	606	476	374	289	213	167	120	92	cd
100%	100%	100%	100%	100%	98%	97%	92%	86%	78%	67%	56%	46%	36%	29%	22%	16%	13%	9%	7%	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	12.9	13.5	13.0	13.7	13.9	13.3	13.9	13.4	14.1	14.3
	3H	12.6	13.3	13.0	13.5	13.7	13.1	13.8	13.4	14.0	14.2
	4H	12.6	13.3	13.0	13.5	13.8	13.0	13.8	13.4	14.0	14.2
	6H	12.6	13.2	12.9	13.5	13.9	13.1	13.7	13.4	14.0	14.3
	8H	12.6	13.2	12.9	13.5	13.9	13.0	13.6	13.3	13.9	14.3
	12H	12.6	13.2	12.9	13.5	13.9	13.0	13.6	13.3	13.9	14.3
4H	2H	12.5	13.3	12.9	13.5	13.7	12.9	13.7	13.3	13.9	14.1
	3H	12.5	13.1	12.9	13.4	13.9	13.0	13.5	13.3	13.9	14.3
	4H	12.4	13.0	12.9	13.4	13.9	12.9	13.4	13.3	13.9	14.4
	6H	12.5	13.1	13.0	13.4	13.7	12.8	13.4	13.3	13.8	14.1
	8H	12.5	13.0	13.0	13.4	13.7	12.8	13.4	13.3	13.7	14.1
	12H	12.5	12.9	13.0	13.3	13.8	12.8	13.2	13.3	13.6	14.1
8H	4H	12.3	12.9	12.9	13.2	13.6	12.8	13.3	13.3	13.7	14.0
	6H	12.4	12.8	12.9	13.3	13.8	12.8	13.2	13.3	13.6	14.2
	8H	12.5	12.8	13.0	13.3	14.0	12.8	13.1	13.3	13.7	14.3
	12H	12.5	12.8	13.1	13.3	13.9	12.8	13.1	13.4	13.6	14.2
12H	4H	12.3	12.7	12.8	13.1	13.6	12.7	13.2	13.2	13.6	14.0
	6H	12.4	12.7	12.9	13.3	13.9	12.8	13.1	13.3	13.6	14.3
	8H	12.5	12.7	13.0	13.2	13.9	12.8	13.1	13.3	13.6	14.2
Variations with the observer position for the luminaire spacings. S:											
S = 1.0H		4.7 / -4.6					4.6 / -4.9				
S = 1.5H		7.2 / -5.5					7.2 / -6.2				
S = 2.0H		9.1 / -6.1					9.1 / -6.5				

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	114	111	109	107	112	109	107	105	105	104	102	102	100	99	98	97	96	94
2	109	105	101	98	107	103	100	97	100	97	95	97	95	93	94	92	91	89
3	104	99	94	90	102	97	93	90	95	91	88	92	89	87	90	88	86	84
4	100	93	88	84	98	92	87	84	90	86	83	88	85	82	86	83	81	80
5	96	88	83	79	94	87	82	79	85	81	78	84	80	77	82	79	77	75
6	92	84	78	74	90	83	78	74	81	77	74	80	76	73	79	75	73	71
7	88	80	74	70	87	79	74	70	78	73	70	77	72	70	75	72	69	68
8	84	76	70	67	83	75	70	67	74	70	66	73	69	66	72	69	66	65
9	81	72	67	64	80	72	67	63	71	66	63	70	66	63	69	66	63	62
10	78	69	64	61	77	69	64	60	68	63	60	67	63	60	66	63	60	59