



PHOTOMETRIC LIGHT REPORT

**AR111 | 12 watt | 2000-
2900K | 36° | dim to warm**

Article number: 175-316



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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 175-316. 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 175-316 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 175-316 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
Gonio spectrometer system and type
Spectrometer manufacturer and model

Flicker meter manufacturer and model
Oscilloscope manufacturer and model
Power meter manufacturer and model

Power source manufacturer and model

Datalogger Manufacturer and Model

Tronix Lighting BV. Uden. The Netherlands
Viso Systems Type C. horizontal
(Gonio) Ocean Optics STS VIS
(Sphere) Admesy HERA VIS 380–780nm
Viso Systems LabFlicker
Tektronix MDO3024 oscilloscope (4 Channels. 200 MHz)
Vitretek PA900 Precision Multi-Channel Harmonic Power Analyzer
(DC) Keithley Source Measure Unit SMU-2420 3A DC Source Meter
(AC) Chroma 61601 AC Source
Omega 8-Channel Thermocouple Thermometer/Data Logger

Measurement conditions gonio spectrometer

Number of C-planes and Resolution
 γ (gamma)-Resolution
Test Distance
Room Temperature and Humidity
Input Power. Power and Displacement Factors
Frequency of Input Power
Warm-up Time and Variation

4 planes – 90°
4.5°
1.14 m
22°C +/- 10% – RH 50% +/- 20%
10.0 W – PF 0.99 – DPF 0.99
50 Hz
Lamp stabilized in 15 min 6 sec --2.2%

Tested light source

Manufacturer and Order Code
Product Description

Tronix Lighting – 175-316
AR111 | 12 watt | 2000-2900K | 36° | dim to warm

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)
Efficiency
Energy efficiency class
Peak Intensity and Beam Angle
Correlated Colour Temperature
Colour Shift. CIE duv
Colour Rendering Index
Colour Rendering TM30-18
Television Lighting Consistency Index
Flicker

550 lm – 0.13% / 99.87%
55 lm/W
G
2282 cd – 28.8°
CCT = 3193 K
Duv -0.0026
CRI 94.7
 R_f 93.3 – R_g 100.0
TLCI = 92
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

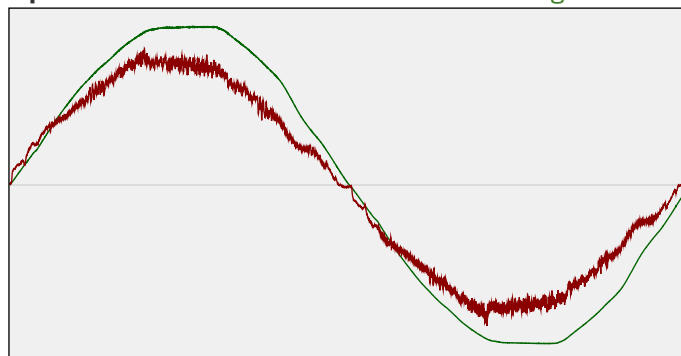
3.81%

Total harmonic distortion of the voltage

2.35%

Input Power Curve

Voltage - Current



Efficiency

Radiated power efficiency: 19.0%



Lumen efficiency: 55 lm/W



Harmonics

3rd Harmonic

1.51%

5th Harmonic

0.65%

7th Harmonic

2.37%

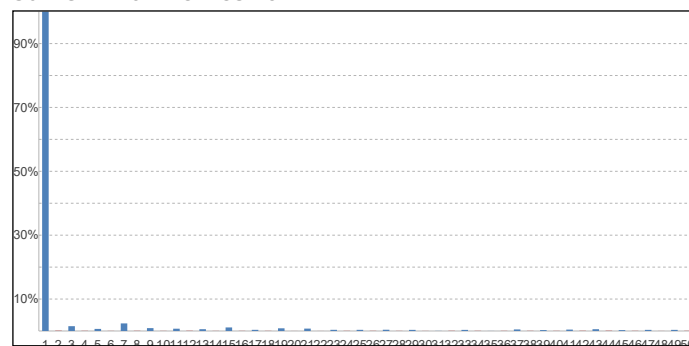
9th Harmonic

0.9%

11th Harmonic

0.71%

Current Harmonics %



Stabilization Details

Warm-up Conditions

Stable period

15 min CCT start

3187 K

Stable change max

2.0% CCT shift

+6 K

Minimum warm-up time

15 min CCT end

3193 K

Colour temperature change during warm-up

Warm-up Results

Total warmup time

Lamp stabilized in 15 min 6 sec

Output intensity change during warm-up

Output start

561 lm

Warmup variation

-2.2%

Output change

-10 lm

Output end

550 lm

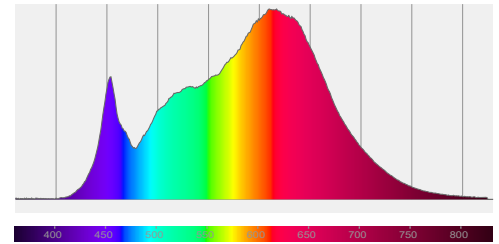
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Colour measurement details

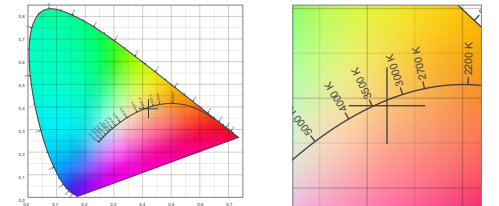
Total lumen output 550 lm
 Correlated Colour Temperature 3193 K
 Colour coordinates CIE 1931 (x;y) = (0.421;0.392)
 Colour deviation from BBL Duv = -0.0026

TM30-18 Colour Fidelity Index R_f 93.3
 TM30-18 Colour Gamut Index R_g 100.0
 Colour Rendering Index (Ra) CRI 94.7
 Colour Rendering Index. (red component) $R_9 = 64.8$

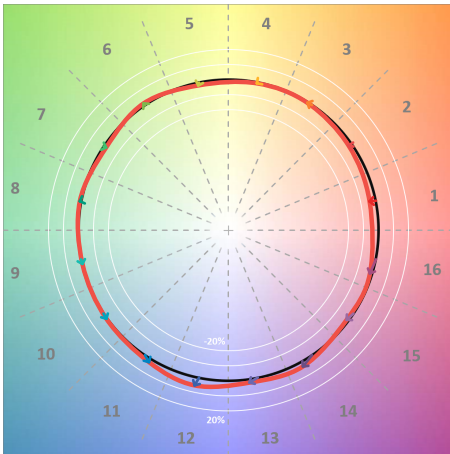
Colour Quality Scale CQS = 92.9
 Television Lighting Consistency Index TLCI = 92



Relative spectral power distribution



TM30 details

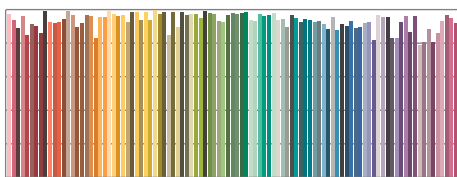


TM30 Colour vectors per hue bin

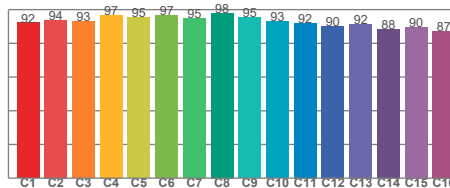


TM30 Colour distortion

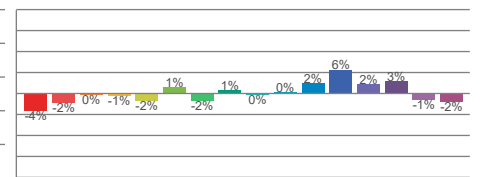
Hue Bin	R_f	Shifts (%)	
		Chroma	Hue
C1	92	-4%	0%
C2	94	-2%	2%
C3	93	0%	3%
C4	97	-1%	1%
C5	95	-2%	1%
C6	97	1%	0%
C7	95	-2%	0%
C8	98	1%	0%
C9	95	0%	3%
C10	93	0%	4%
C11	92	2%	5%
C12	90	6%	-2%
C13	92	2%	-6%
C14	88	3%	-9%
C15	90	-1%	-6%
C16	87	-2%	-10%



TM30-18 R_f -values per reference colour

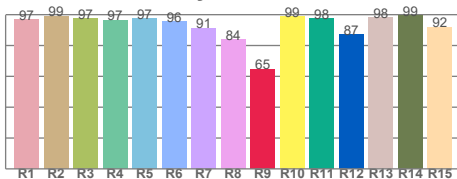


TM30-18 R_f -values per hue bin

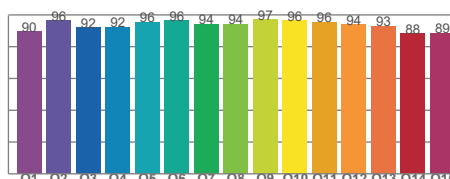


TM30 Chroma shift

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)

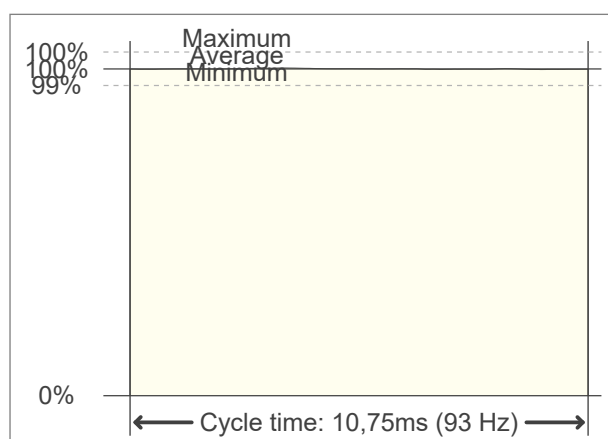
Flicker frequency	93.02 Hz
Percent flicker	0.39 %
Flicker index	0

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

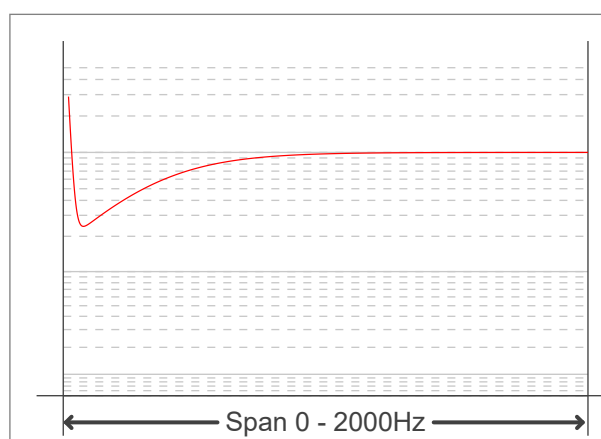
An LED luminaire is considered flicker-free if the SVM value is ≤ 0.4 and if the PstLM value is ≤ 1.0

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

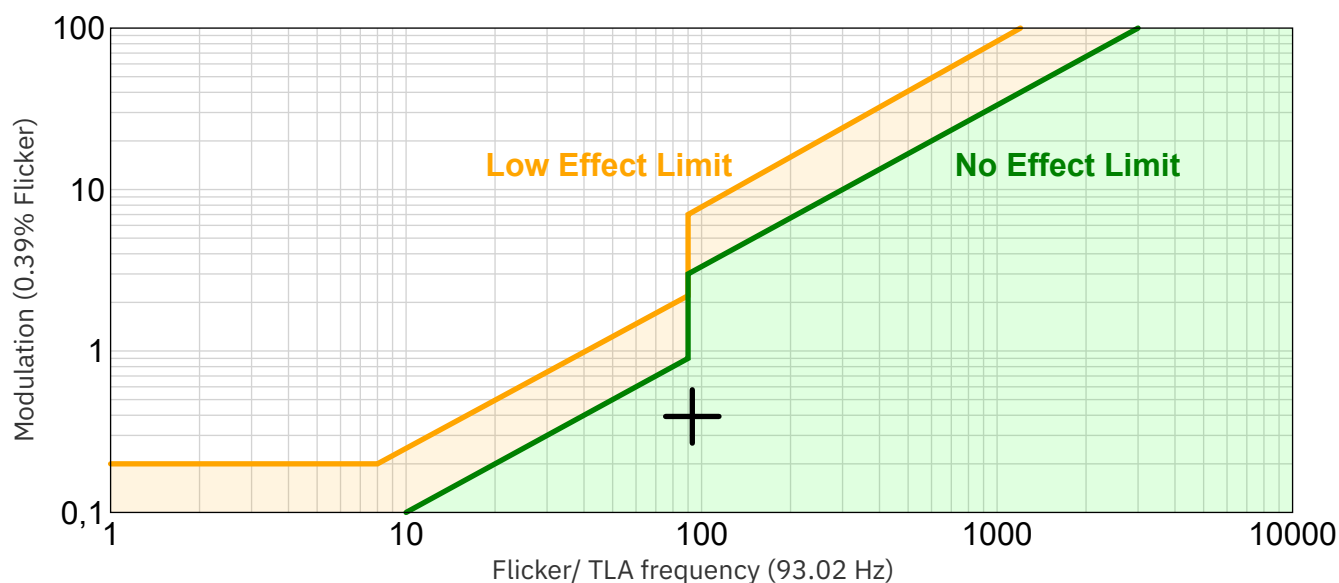
Flicker frame (one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789-2015 Lighting Flicker Risk Zones



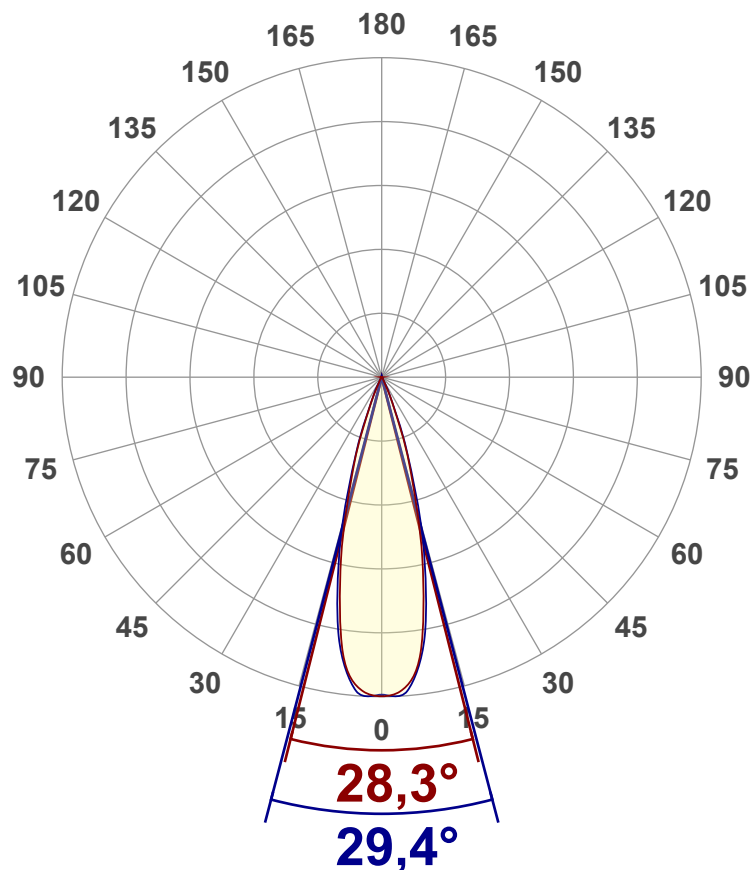
Document revision date: 17-7-2025 Measurement serial: VFR-250710-10408-SW

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Beam angle

Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	550 lm
Lumen Up/Down	0.13% / 99.87%
Peak Intensity	2282 cd
Beam Angle (50%)	28.8°
Beam Angle (90%)	29.4°
Beam Angle (10%)	28.3°

Cut-off Angle

Average 2.5%	53.9°
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Field Angle

Average 10%	44.8°
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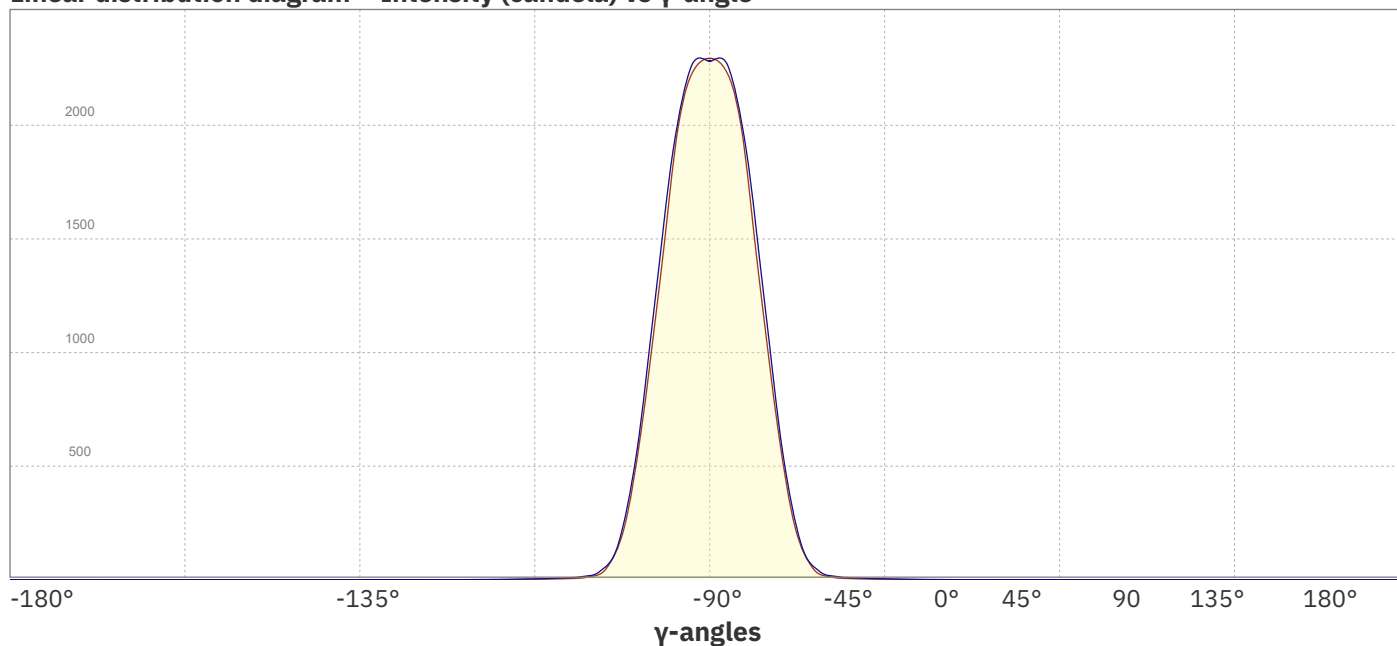
Intensity Ratio

In 120° cone	99.5%
In 90° cone	99.1%

C planes

C000-C180
C090-C270

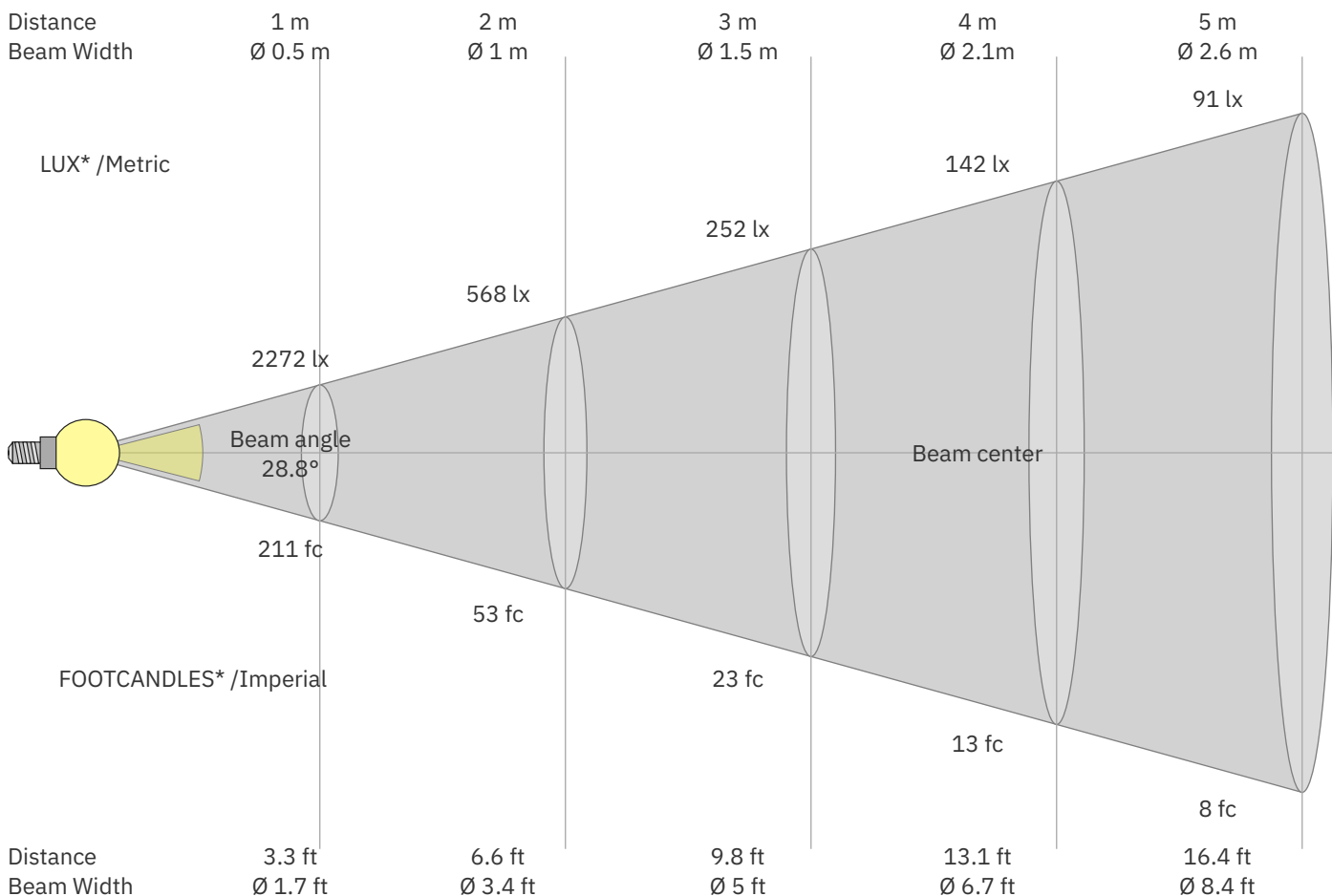
Linear distribution diagram - Intensity (candela) vs γ-angle



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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
2272	568	252	142	91	63	46	36	28	23	19	16	13	12	10	9	8	7	6	6	lux
211.1	52.8	23.5	13.2	8.4	5.9	4.3	3.3	2.6	2.1	1.7	1.5	1.2	1.1	0.9	0.8	0.7	0.7	0.6	0.5	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
2272	2262	2225	2114	2002	1715	1427	1149	877	618	422	230	152	73	39	23	11	9	6	5	cd
100%	100%	98%	93%	88%	75%	63%	51%	39%	27%	19%	10%	7%	3%	2%	1%	1%	0%	0%	0%	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
2272	2273	2265	2157	2000	1806	1521	1237	953	670	457	287	144	94	44	29	19	13	10	8	cd
100%	100%	100%	95%	88%	79%	67%	54%	42%	29%	20%	13%	6%	4%	2%	1%	1%	1%	0%	0%	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
2272	2262	2225	2114	2002	1715	1427	1149	877	618	422	230	152	73	39	23	11	9	6	5	cd
100%	100%	98%	93%	88%	75%	63%	51%	39%	27%	19%	10%	7%	3%	2%	1%	1%	0%	0%	0%	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
2272	2273	2265	2157	2000	1806	1521	1237	953	670	457	287	144	94	44	29	19	13	10	8	cd
100%	100%	100%	95%	88%	79%	67%	54%	42%	29%	20%	13%	6%	4%	2%	1%	1%	1%	0%	0%	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	-2.8	-2.4	-2.8	-2.2	-2.0	-1.4	-1.0	-1.3	-0.8	-0.6
	3H	-2.5	-1.9	-2.1	-1.7	-1.5	-1.3	-0.6	-0.9	-0.4	-0.3
	4H	-1.9	-1.2	-1.5	-1.0	-0.8	-1.0	-0.4	-0.6	-0.2	0.1
	6H	-0.8	-0.3	-0.6	0.0	0.3	-0.6	-0.1	-0.3	0.2	0.5
	8H	-0.3	0.2	0.0	0.5	0.9	-0.4	0.1	-0.1	0.4	0.8
	12H	0.3	0.8	0.6	1.1	1.5	0.1	0.6	0.4	0.9	1.3
4H	2H	-2.9	-2.3	-2.5	-2.1	-1.9	-1.6	-1.0	-1.2	-0.8	-0.5
	3H	-2.1	-1.6	-1.8	-1.2	-0.8	-1.0	-0.5	-0.7	-0.2	0.2
	4H	-1.3	-0.8	-0.8	-0.4	0.2	-0.7	-0.2	-0.3	0.2	0.7
	6H	-0.1	0.5	0.4	0.8	1.2	-0.2	0.4	0.3	0.7	1.0
	8H	0.6	1.1	1.1	1.5	1.8	0.2	0.7	0.7	1.1	1.4
	12H	1.4	1.8	1.9	2.2	2.7	0.9	1.3	1.4	1.7	2.2
8H	4H	-1.0	-0.5	-0.5	-0.1	0.2	-0.5	0.0	0.0	0.4	0.7
	6H	0.5	0.9	1.0	1.3	1.9	0.3	0.7	0.8	1.1	1.6
	8H	1.4	1.7	1.9	2.2	2.9	0.9	1.2	1.4	1.8	2.4
	12H	2.4	2.7	3.0	3.2	3.8	1.9	2.2	2.5	2.7	3.3
12H	4H	-1.0	-0.5	-0.5	-0.1	0.3	-0.4	0.0	0.1	0.4	0.8
	6H	0.7	1.0	1.2	1.5	2.1	0.5	0.8	1.0	1.3	1.9
	8H	1.6	1.9	2.2	2.4	3.0	1.2	1.5	1.8	2.0	2.6
Variations with the observer position for the luminaire spacings. S:											
S = 1.0H		0.6 / -0.3					1.5 / -0.6				
S = 1.5H		1.4 / -0.3					3.0 / -0.7				
S = 2.0H		2.2 / -0.6					4.5 / -1.0				

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	115	113	111	109	113	111	109	108	107	106	104	103	102	101	100	99	98	97
2	112	108	105	103	109	106	104	102	103	101	99	100	99	97	98	96	95	94
3	108	104	100	97	106	102	99	97	100	97	95	98	95	94	96	94	92	91
4	105	100	96	93	104	99	95	93	97	94	92	95	93	91	93	91	90	88
5	102	97	93	90	101	96	92	89	94	91	89	93	90	88	91	89	87	86
6	99	93	89	87	98	93	89	86	91	88	86	90	87	85	89	87	85	84
7	97	91	87	84	96	90	86	84	89	86	83	88	85	83	87	84	83	82
8	94	88	84	82	93	88	84	81	87	83	81	86	83	81	85	82	80	80
9	92	86	82	79	91	85	82	79	85	81	79	84	81	79	83	80	78	78
10	90	84	80	77	89	83	80	77	83	79	77	82	79	77	81	79	77	76