



PHOTOMETRIC LIGHT REPORT

**Track spot | 3-phase |
black | linear | 16W |
3000K | dim**

Article number: 169-310



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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 169-310. 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 169-310 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 169-310 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	4 planes – 90°
γ (gamma)-Resolution	5°
Test Distance	1.81 m
Room Temperature and Humidity	22°C +/- 10% – RH 50% +/- 20%
Input Power. Power and Displacement Factors	14.5 W – PF 0.93 – DPF 0.95
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 20 sec --2.2%

Tested light source

Manufacturer and Order Code	Tronix Lighting – 169-310
Product Description	Track spot 3-phase black linear 16W 3000K dim

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	1444 lm – 0% / 100%
Efficiency	99 lm/W
Energy efficiency class	F
Peak Intensity and Beam Angle	1157 cd – 69.5°
Correlated Colour Temperature	CCT = 2956 K
Colour Shift. CIE duv	Duv -0.0037
Colour Rendering Index	CRI 94.1
Colour Rendering TM30-18	R _f 90.5 – R _g 99.1
Television Lighting Consistency Index	TLCI = 90
Flicker	SVM 0.02 – PstLM 0.1

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Electrical measurement details

Input Power

RMS Input voltage feed. V_{RMS}

231 V

RMS Input current feed. I_{RMS}

0.068 A

Total input power

14.5 W

Frequency of input power

50 Hz

Power factor

0.93

Displacement power factor

0.95

Total harmonic distortion of the current

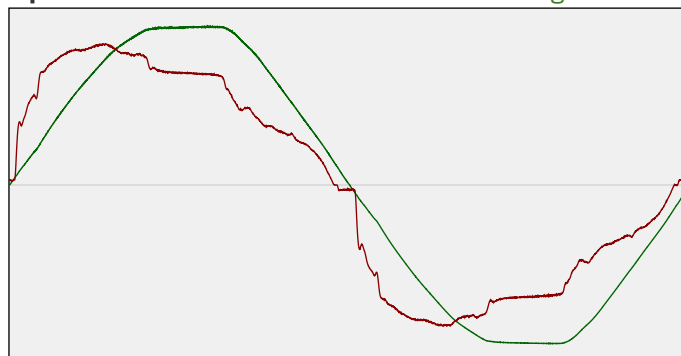
20.04%

Total harmonic distortion of the voltage

2.67%

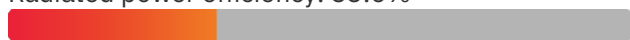
Input Power Curve

Voltage - Current



Efficiency

Radiated power efficiency: 33.6%



Lumen efficiency: 99 lm/W



Harmonics

3rd Harmonic

16.73%

5th Harmonic

8.92%

7th Harmonic

3.4%

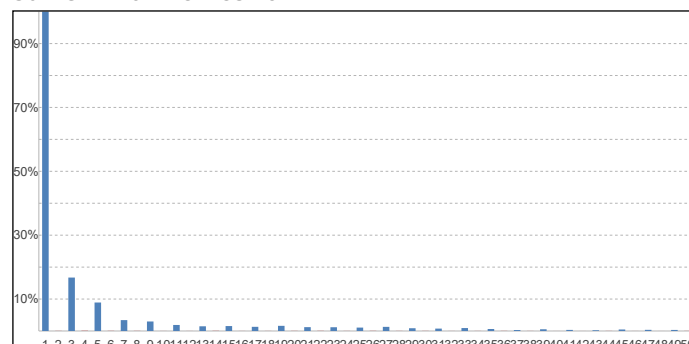
9th Harmonic

2.98%

11th Harmonic

1.89%

Current Harmonics %



Stabilization Details

Warm-up Conditions

Stable period

15 min CCT start

2949 K

Stable change max

2.0% CCT shift

+7 K

Minimum warm-up time

15 min CCT end

2956 K

Colour temperature change during warm-up

Warm-up Results

Total warmup time

Lamp stabilized in 15 min 20 sec

Output intensity change during warm-up

Output start

1472 lm

Warmup variation

-2.2% Output change

-28 lm

Output end

1444 lm

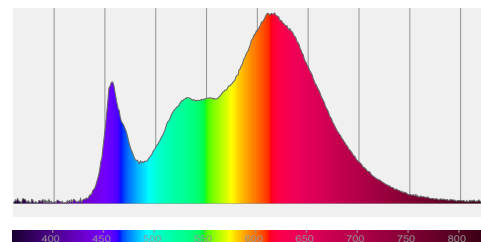
169-310 Track spot | 3-phase | black | linear | 16W | 3000K | dim

Colour measurement details

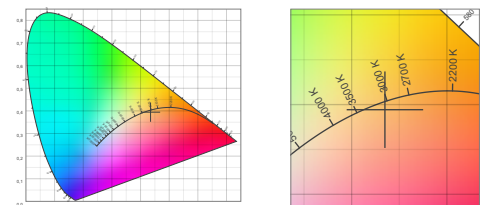
Total lumen output 1444 lm
 Correlated Colour Temperature 2956 K
 Colour coordinates CIE 1931 (x;y) = (0.435;0.394)
 Colour deviation from BBL Duv = -0.0037

TM30-18 Colour Fidelity Index R_f 90.5
 TM30-18 Colour Gamut Index R_g 99.1
 Colour Rendering Index (Ra) CRI 94.1
 Colour Rendering Index. (red component) $R_9 = 62.0$

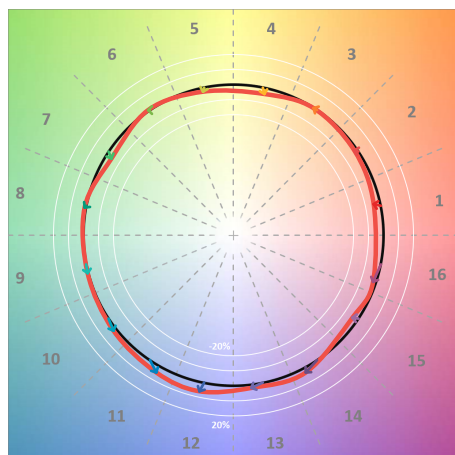
Colour Quality Scale CQS = 91.4
 Television Lighting Consistency Index TLCI = 90



Relative spectral power distribution



TM30 details

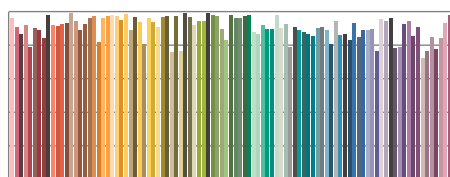


TM30 Colour vectors per hue bin

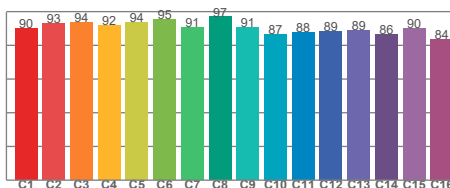


TM30 Colour distortion

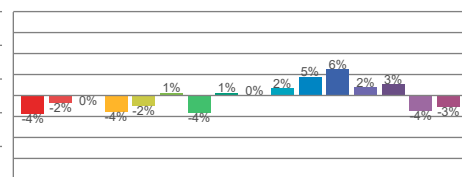
Hue Bin	R_f	Shifts (%)	
		Chroma	Hue
C1	90	-4%	2%
C2	93	-2%	2%
C3	94	0%	3%
C4	92	-4%	-2%
C5	94	-2%	1%
C6	95	1%	1%
C7	91	-4%	3%
C8	97	1%	1%
C9	91	0%	6%
C10	87	2%	9%
C11	88	5%	8%
C12	89	6%	-2%
C13	89	2%	-8%
C14	86	3%	-11%
C15	90	-4%	-2%
C16	84	-3%	-12%



TM30-18 R_f -values per reference colour

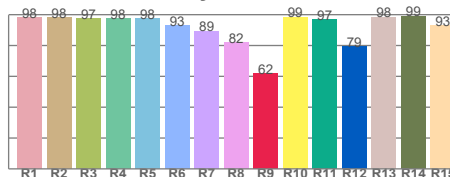


TM30-18 R_f -values per hue bin

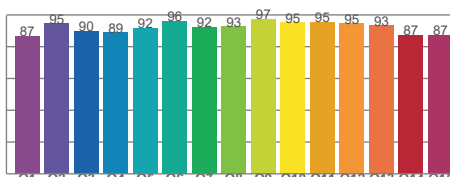


TM30 Chroma shift

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)

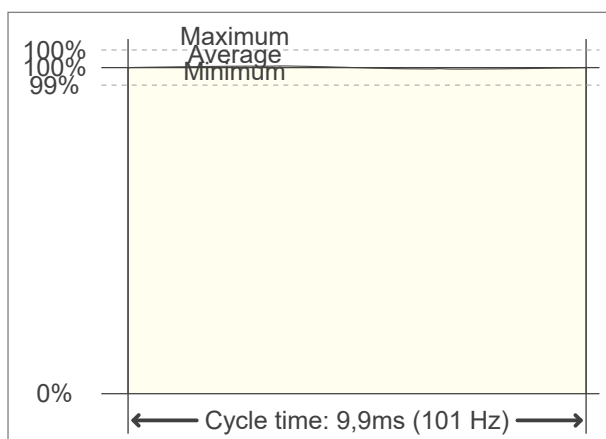
Flicker frequency	101.01 Hz
Percent flicker	0.58 %
Flicker index	0

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

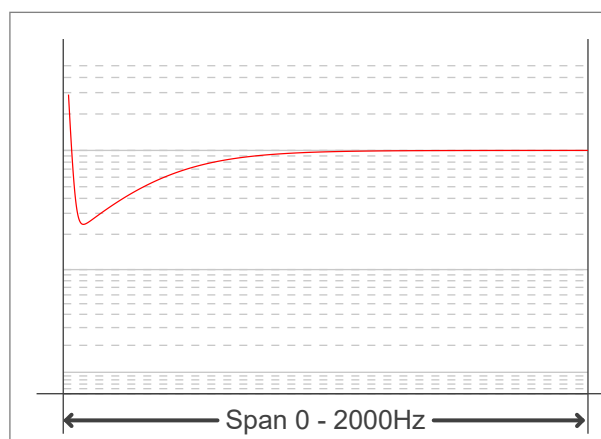
An LED luminaire is considered flicker-free if the SVM value is ≤ 0.4 and if the PstLM value is ≤ 1.0

PstLM value ($F < 80$ Hz)	0.1
SVM value ($80 < F < 2000$ Hz)	0.02

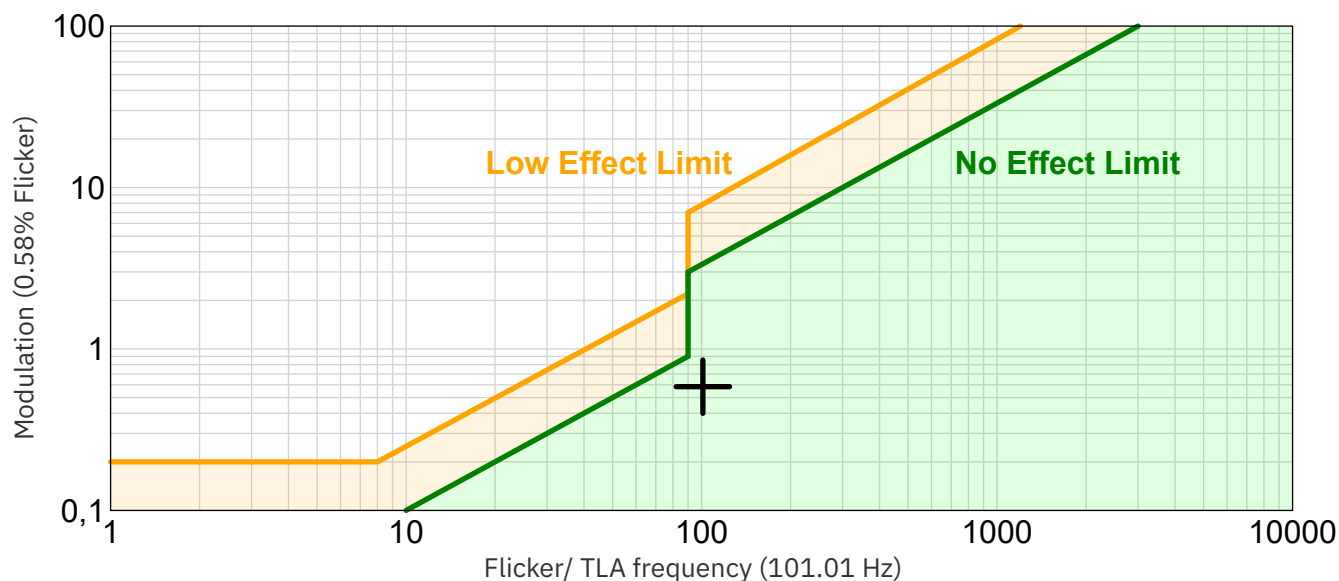
Flicker frame (one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789-2015 Lighting Flicker Risk Zones



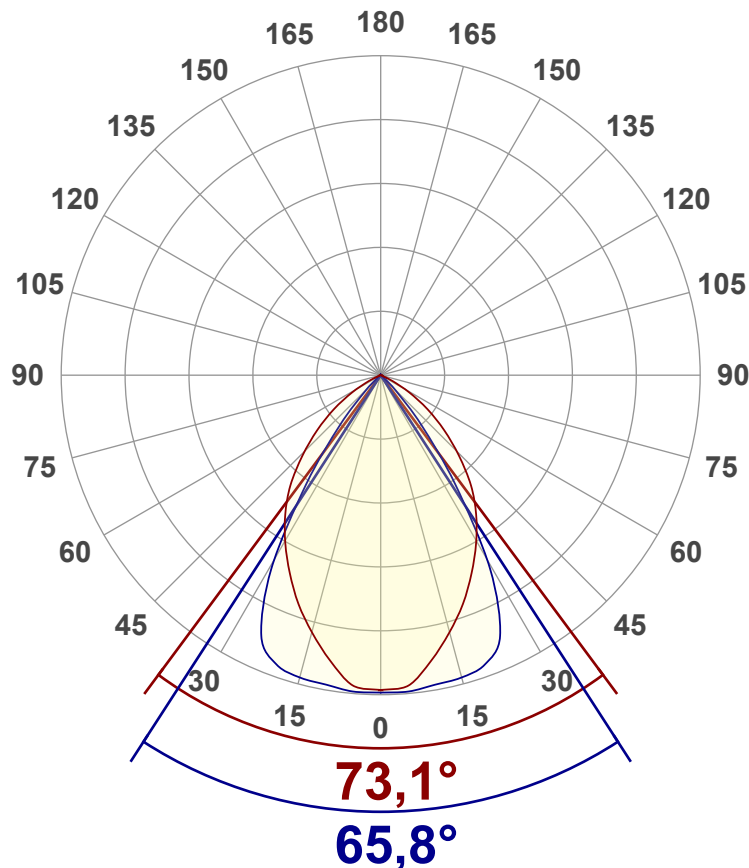
Document revision date: 8-7-2025 Measurement serial: VFR-250708-10379-SW

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Beam angle

Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	1444 lm
Lumen Up/Down	0% / 100%
Peak Intensity	1157 cd
Beam Angle (50%)	69.5°
Beam Angle (90%)	65.8°
Beam Angle (10%)	73.1°

Cut-off Angle

Average 2.5%	114.6°
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Field Angle

Average 10%	102.4°
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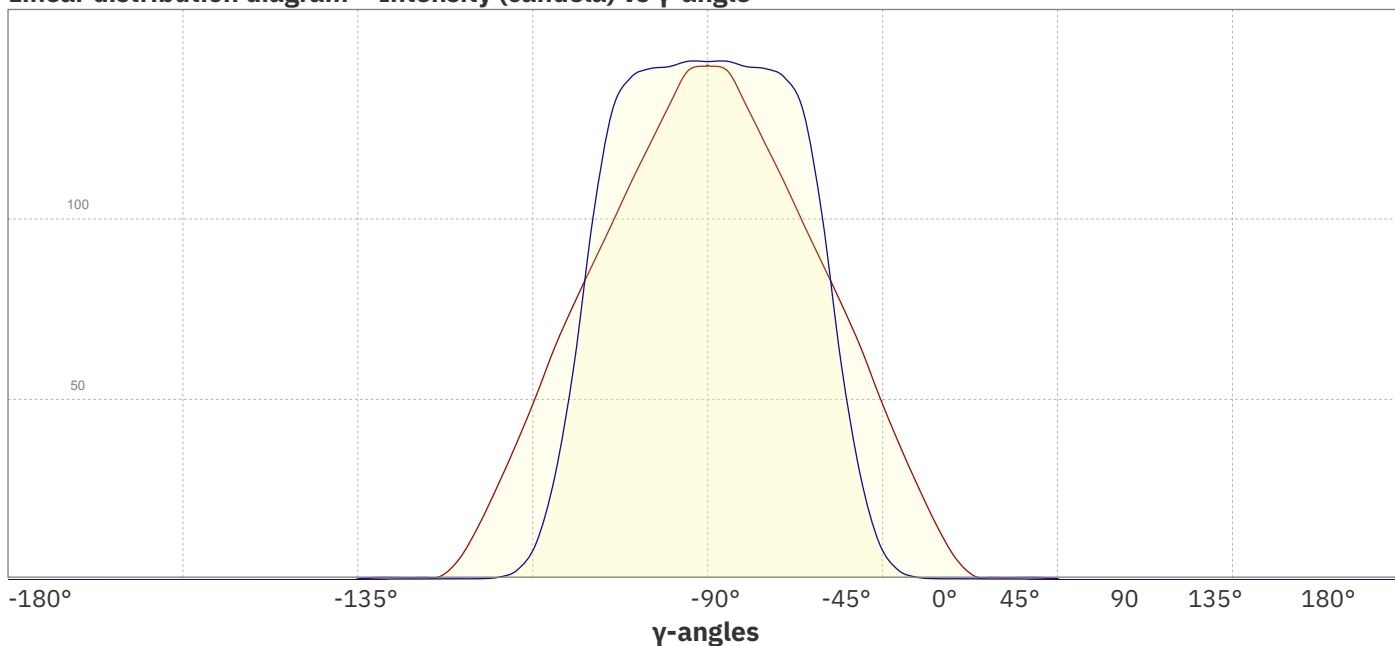
Intensity Ratio

In 120° cone	98.0%
In 90° cone	86.5%

C planes

C000-C180
C090-C270

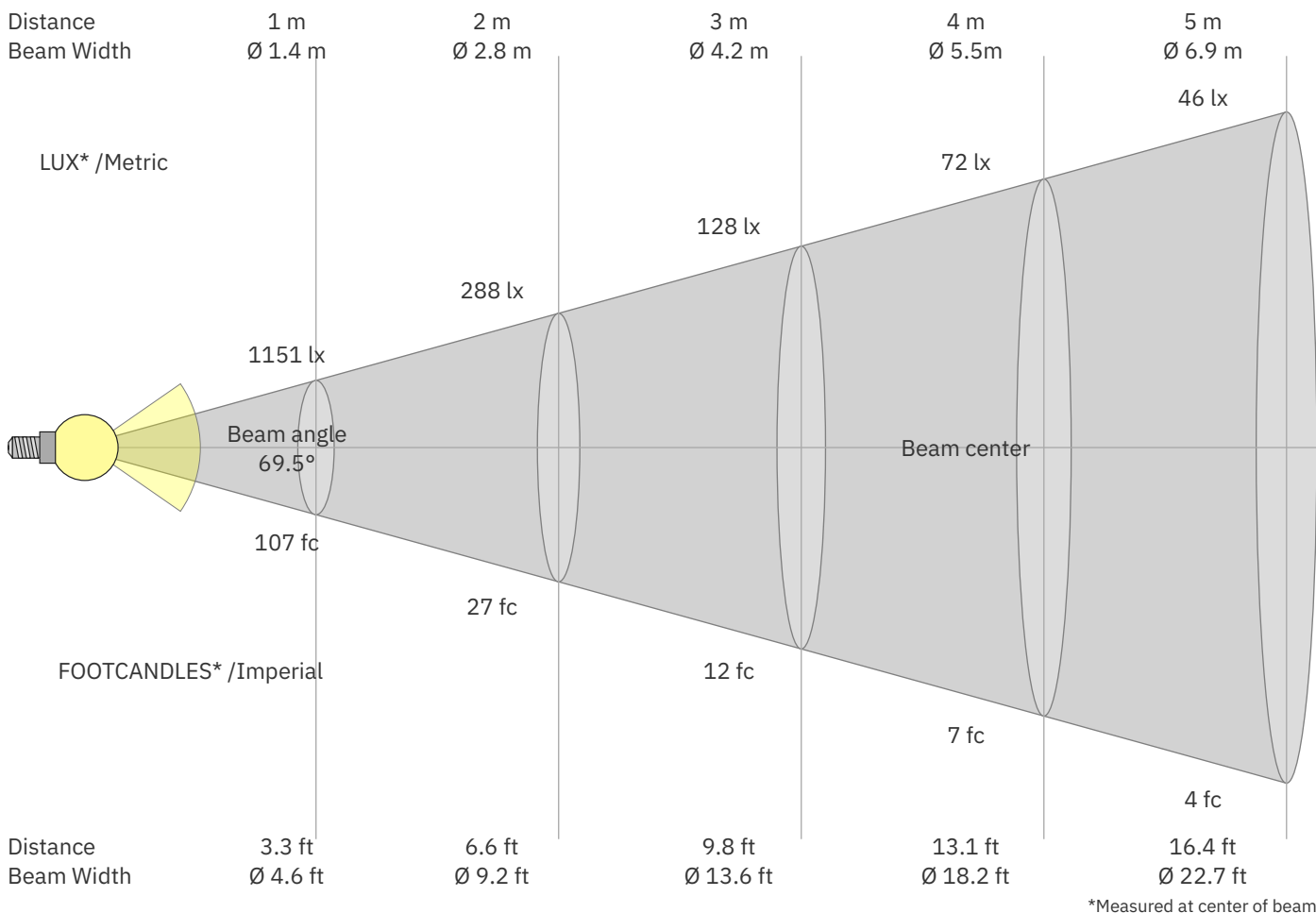
Linear distribution diagram - Intensity (candela) vs γ-angle



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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
1151	288	128	72	46	32	23	18	14	12	10	8	7	6	5	4	4	4	3	3	lux
107	26.7	11.9	6.7	4.3	3	2.2	1.7	1.3	1.1	0.9	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3	fc

Intensities in 0° c-plane

0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	γ
1151	1135	1057	969	882	788	696	604	504	392	288	192	105	38	8	5	5	5	2	0	cd
100%	99%	92%	84%	77%	68%	60%	52%	44%	34%	25%	17%	9%	3%	1%	0%	0%	0%	0%	0%	of 0°val

Intensities in 90° c-plane

0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	γ
1151	1157	1145	1140	1117	1026	774	448	210	71	19	5	2	2	2	2	2	2	1	0	cd
100%	100%	99%	99%	97%	89%	67%	39%	18%	6%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	of 0°val

Intensities in 180° c-plane

0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	γ
1151	1135	1057	969	882	788	696	604	504	392	288	192	105	38	8	5	5	5	2	0	cd
100%	99%	92%	84%	77%	68%	60%	52%	44%	34%	25%	17%	9%	3%	1%	0%	0%	0%	0%	0%	of 0°val

Intensities in 270° c-plane

0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	γ
1151	1157	1145	1140	1117	1026	774	448	210	71	19	5	2	2	2	2	2	2	1	0	cd
100%	100%	99%	99%	97%	89%	67%	39%	18%	6%	2%	0%	0%	0%	0%	0%	0%	0%	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	18.9	19.7	19.1	20.0	20.2	16.3	17.1	16.4	17.3	17.5
	3H	18.7	19.6	19.1	19.8	20.0	16.0	16.9	16.4	17.1	17.3
	4H	18.6	19.4	19.0	19.7	19.9	15.9	16.8	16.3	17.0	17.3
	6H	18.6	19.3	18.9	19.6	20.0	16.0	16.7	16.2	17.0	17.3
	8H	18.6	19.2	18.9	19.6	20.0	15.9	16.6	16.2	16.9	17.3
	12H	18.5	19.2	18.9	19.5	19.9	15.9	16.5	16.2	16.9	17.3
4H	2H	18.6	19.5	19.0	19.7	20.0	16.1	17.0	16.5	17.2	17.5
	3H	18.6	19.2	18.9	19.6	20.0	16.1	16.7	16.4	17.1	17.5
	4H	18.4	19.0	18.9	19.5	20.0	15.9	16.5	16.3	17.0	17.5
	6H	18.4	19.0	18.9	19.3	19.7	15.8	16.5	16.3	16.8	17.2
	8H	18.3	18.9	18.8	19.2	19.6	15.8	16.4	16.3	16.7	17.1
	12H	18.3	18.7	18.8	19.1	19.6	15.8	16.2	16.3	16.6	17.1
8H	4H	18.3	18.9	18.8	19.2	19.6	15.8	16.4	16.3	16.7	17.1
	6H	18.2	18.6	18.8	19.1	19.6	15.7	16.1	16.3	16.6	17.1
	8H	18.3	18.6	18.8	19.1	19.7	15.8	16.1	16.3	16.6	17.2
	12H	18.2	18.5	18.8	19.0	19.6	15.7	16.0	16.3	16.5	17.1
12H	4H	18.2	18.7	18.7	19.1	19.6	15.7	16.2	16.2	16.6	17.1
	6H	18.2	18.6	18.8	19.1	19.7	15.7	16.1	16.3	16.6	17.2
	8H	18.2	18.5	18.8	19.0	19.6	15.7	16.0	16.3	16.5	17.1
Variations with the observer position for the luminaire spacings. S:											
S = 1.0H		1.4 / -2.3					4.1 / -7.2				
S = 1.5H		3.2 / -7.1					6.5 / -11.6				
S = 2.0H		5.0 / -12.6					8.3 / -13.1				

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	106	106	106	102	102	102	100	
1	113	109	107	104	110	107	105	102	103	101	99	99	98	96	96	95	94	92
2	106	100	96	92	104	99	94	91	95	92	89	92	89	87	89	87	85	83
3	100	92	87	82	97	91	86	81	88	84	80	86	82	79	83	80	77	76
4	94	85	79	74	92	84	78	73	81	76	72	79	75	71	77	74	71	69
5	88	78	72	67	86	77	71	66	76	70	66	74	69	65	72	68	65	63
6	83	73	66	61	81	72	65	61	70	64	60	69	64	60	67	63	59	58
7	78	67	61	56	77	67	60	56	65	60	55	64	59	55	63	58	55	53
8	74	63	56	51	72	62	56	51	61	55	51	60	55	51	59	54	51	49
9	70	59	52	48	68	58	52	48	57	51	47	56	51	47	55	51	47	46
10	66	55	49	44	65	55	48	44	54	48	44	53	48	44	52	47	44	42