



PHOTOMETRIC LIGHT REPORT

Bulkhead | 3-CCT | IK10 | IP65

Article number: 137-020



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TRONIX



137-020 Bulkhead | 3-CCT | IK10 | IP65

Introduction

Purpose of this Document

This document provides accurate and objective photometric data for Tronix Lighting item 137-020. 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 137-020 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 137-020 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

2 planes – 180°
4.5°
1.81 m
22°C +/- 10% – RH 50% +/- 20%
5.6 W – PF 0.9 – DPF 0.93
50 Hz
Lamp stabilized in 15 min 0 sec – +0.4%

Tested light source

Manufacturer and Order Code
Product Description

Tronix Lighting – 137-020
Bulkhead | 3-CCT | IK10 | IP65

Main Light Measurement Results

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

505 lm – 4.56% / 95.44%
90 lm/W
F
153 cd – 119.4°
CCT = 4471 K
Duv -0.0044
CRI 87.1
 R_f 84.2 – R_g 96.5
TLCI = 77
SVM 0 – PstLM 0.04

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Electrical measurement details

Input Power

RMS Input voltage feed. V_{RMS}

RMS Input current feed. I_{RMS}

Total input power

Frequency of input power

Power factor

Displacement power factor

Total harmonic distortion of the current

Total harmonic distortion of the voltage

230 V

0.027 A

5.6 W

50 Hz

0.9

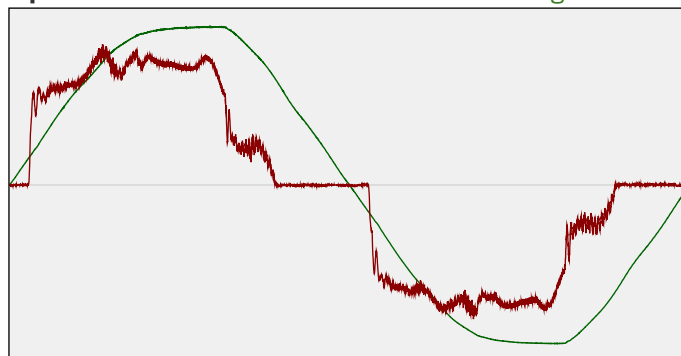
0.93

25.51%

3.11%

Input Power Curve

Voltage - Current



Efficiency

Radiated power efficiency: 28.6%

Lumen efficiency: 90 lm/W

Harmonics

3rd Harmonic

5th Harmonic

7th Harmonic

9th Harmonic

11th Harmonic

14.05%

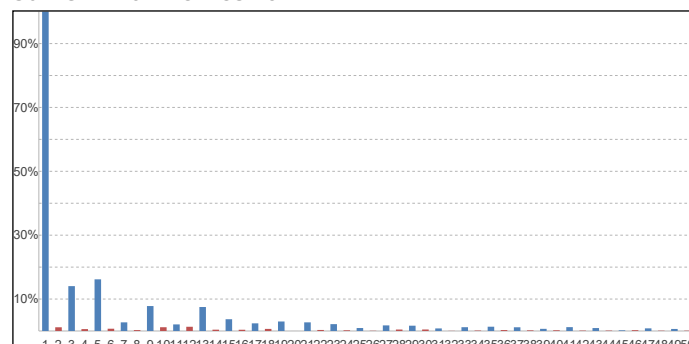
16.18%

2.7%

7.81%

2.06%

Current Harmonics %



Stabilization Details

Warm-up Conditions

Stable period

Stable change max

Minimum warm-up time

15 min CCT start

2.0% CCT shift

15 min CCT end

Colour temperature change during warm-up

4468 K

+3 K

4471 K

Warm-up Results

Total warmup time

Warmup variation

Lamp stabilized in 15 min 0 sec

+0.4%

Output intensity change during warm-up

Output start

Output change

Output end

504 lm

+1 lm

505 lm

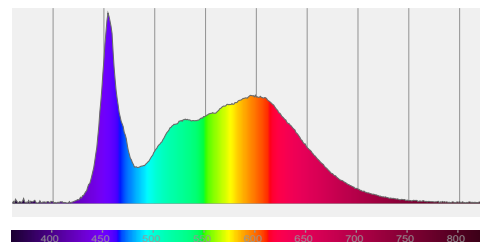
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Colour measurement details

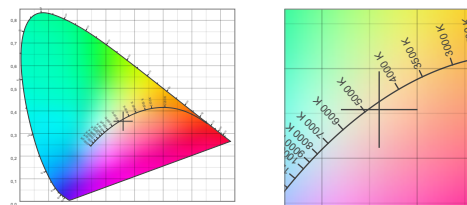
Total lumen output 505 lm
 Correlated Colour Temperature 4471 K
 Colour coordinates CIE 1931 (x;y) = (0.360;0.354)
 Colour deviation from BBL Duv = -0.0044

TM30-18 Colour Fidelity Index R_f 84.2
 TM30-18 Colour Gamut Index R_g 96.5
 Colour Rendering Index (Ra) CRI 87.1
 Colour Rendering Index. (red component) $R_9 = 30.1$

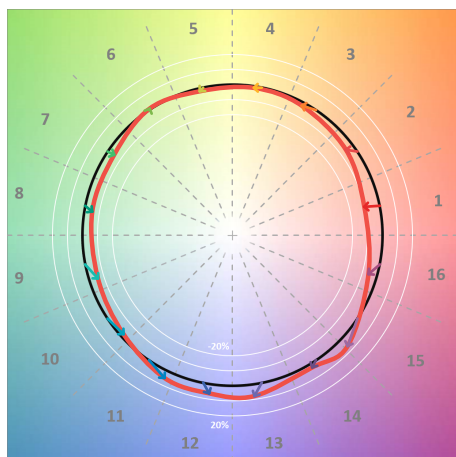
Colour Quality Scale CQS = 83.3
 Television Lighting Consistency Index TLCI = 77



Relative spectral power distribution



TM30 details

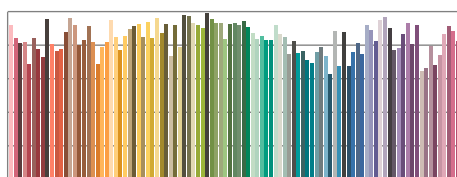


TM30 Colour vectors per hue bin

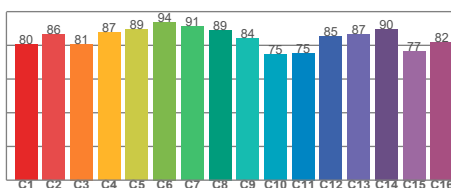


TM30 Colour distortion

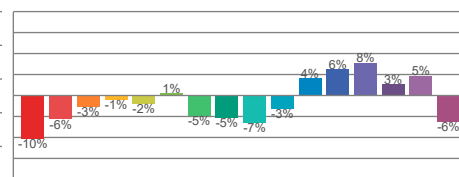
Hue Bin	R_f	Shifts (%)	
		Chroma	Hue
C1	80	-10%	1%
C2	86	-6%	5%
C3	81	-3%	10%
C4	87	-1%	5%
C5	89	-2%	3%
C6	94	1%	-1%
C7	91	-5%	-1%
C8	89	-5%	3%
C9	84	-7%	11%
C10	75	-3%	15%
C11	75	4%	15%
C12	85	6%	5%
C13	87	8%	-7%
C14	90	3%	-5%
C15	77	5%	-19%
C16	82	-6%	-8%



TM30-18 R_f -values per reference colour

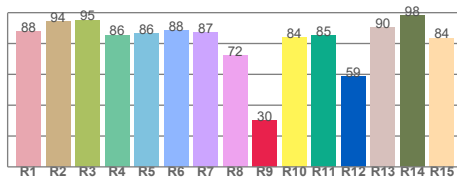


TM30-18 R_f -values per hue bin

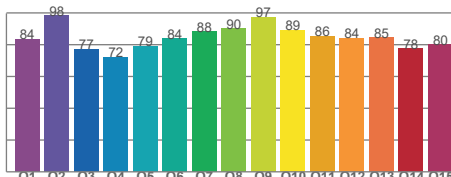


TM30 Chroma shift

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	100 Hz
Percent flicker	0.1 %
Flicker index	0

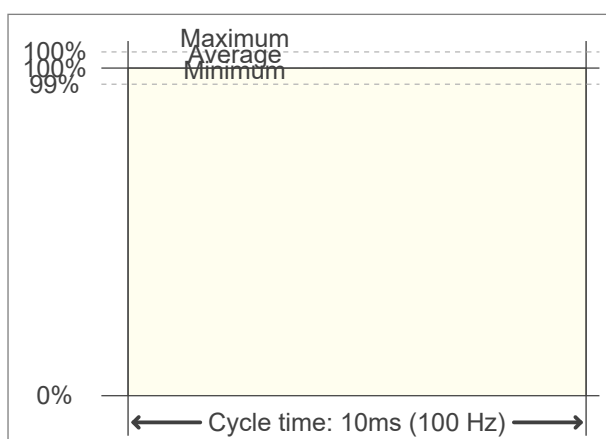
TLA indices (according IEC TR 61547-1, EN 61000-3-3 and EN 61000-4-15)

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

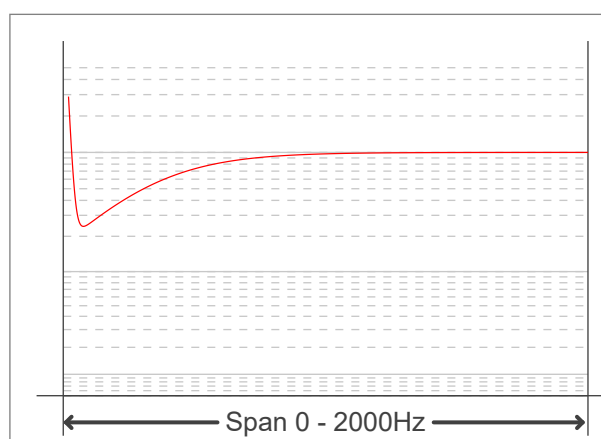
PstLM value ($F < 80$ Hz) 0.04

SVM value ($80 < F < 2000$ Hz) 0

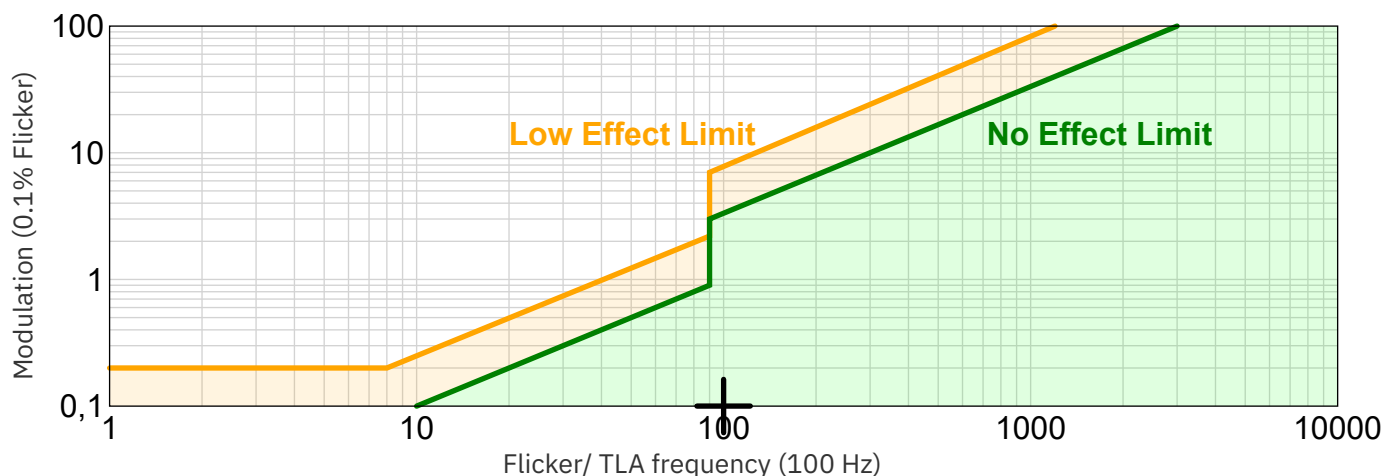
Flicker frame (one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



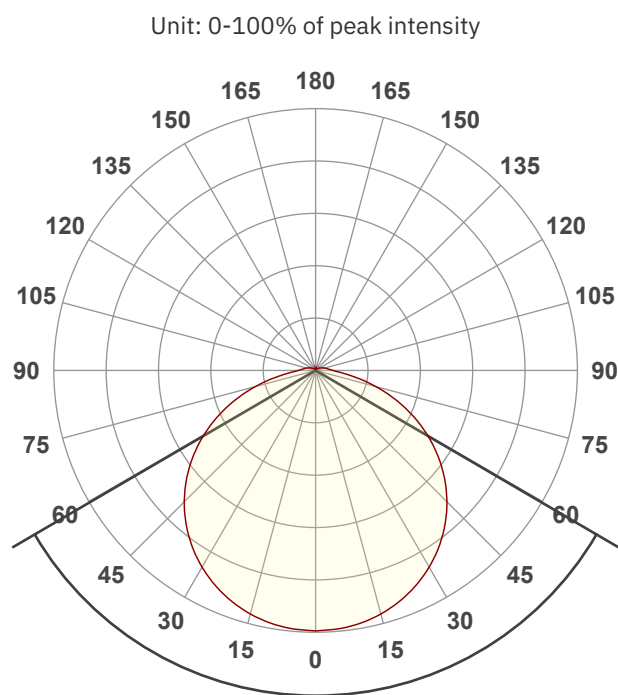
IEEE 1789-2015 Lighting Flicker Risk Zones



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Beam angle

Luminous Intensity diagram



119,4°

Main Values

Output (total Lumen)	505 lm
Lumen Up/Down	4.56% / 95.44%
Peak Intensity	153 cd
Beam Angle (50%)	119.4°
Beam Angle (90%)	119.4°
Beam Angle (10%)	119.4°

Cut-off Angle

Average 2.5%	227°
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Field Angle

Average 10%	170.4°
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Intensity Ratio

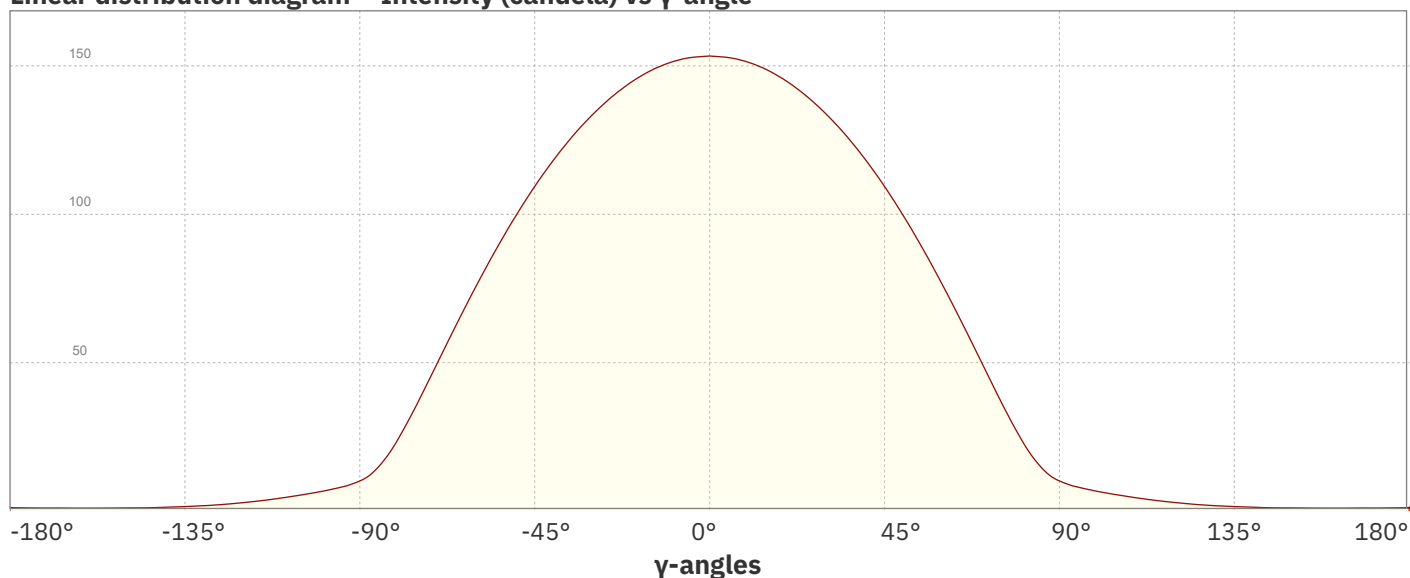
In 120° cone	71.9%
In 90° cone	48.0%

C planes

C000-C180

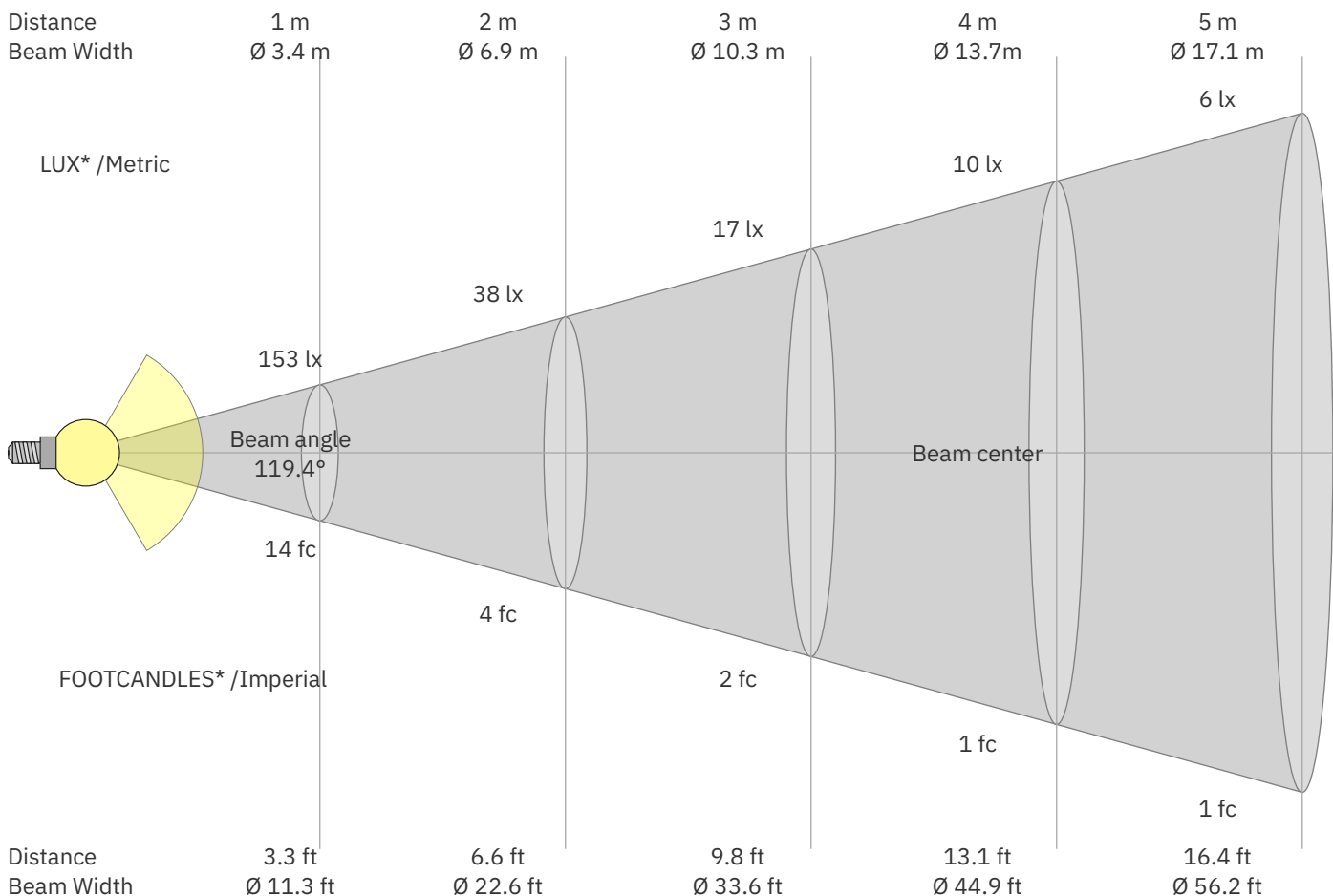
C090-C270

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
153	38	17	10	6	4	3	2	2	2	1	1	1	1	1	1	1	0	0	0	lux
14.2	3.6	1.6	0.9	0.6	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0	0	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
153	153	151	148	145	140	134	127	118	109	99	88	76	63	50	37	25	16	10	8	cd
100%	100%	99%	97%	94%	91%	87%	83%	77%	71%	65%	57%	50%	41%	33%	24%	16%	10%	7%	5%	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
153	153	151	148	145	140	134	127	118	109	99	88	76	63	50	37	25	16	10	8	cd
100%	100%	99%	97%	94%	91%	87%	83%	77%	71%	65%	57%	50%	41%	33%	24%	16%	10%	7%	5%	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
153	153	151	148	145	140	134	127	118	109	99	88	76	63	50	37	25	16	10	8	cd
100%	100%	99%	97%	94%	91%	87%	83%	77%	71%	65%	57%	50%	41%	33%	24%	16%	10%	7%	5%	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
153	153	151	148	145	140	134	127	118	109	99	88	76	63	50	37	25	16	10	8	cd
100%	100%	99%	97%	94%	91%	87%	83%	77%	71%	65%	57%	50%	41%	33%	24%	16%	10%	7%	5%	of 0°val

Document revision date: 9-2-2026 Measurement serial: VFR-260119-12766-SW

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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	14.4	15.6	14.7	16.0	16.3	15.2	16.4	15.5	16.8	17.1
	3H	15.6	16.8	16.1	17.2	17.5	16.6	17.8	17.1	18.2	18.5
	4H	16.1	17.3	16.6	17.6	18.0	17.2	18.4	17.7	18.7	19.1
	6H	16.5	17.5	16.9	17.9	18.3	17.7	18.8	18.1	19.1	19.6
	8H	16.6	17.6	17.0	18.0	18.5	17.9	18.9	18.3	19.3	19.8
	12H	16.7	17.6	17.1	18.0	18.6	18.0	19.0	18.4	19.4	19.9
4H	2H	15.0	16.1	15.4	16.5	16.8	15.6	16.7	16.1	17.1	17.4
	3H	16.5	17.4	16.9	17.8	18.4	17.3	18.3	17.7	18.7	19.2
	4H	17.0	17.9	17.5	18.4	19.0	17.9	18.9	18.4	19.3	19.9
	6H	17.4	18.3	18.0	18.7	19.1	18.5	19.3	19.0	19.8	20.2
	8H	17.5	18.3	18.1	18.8	19.2	18.7	19.5	19.3	19.9	20.4
	12H	17.7	18.3	18.2	18.8	19.4	18.9	19.5	19.4	20.0	20.6
8H	4H	17.2	18.0	17.8	18.4	18.9	18.1	18.8	18.6	19.3	19.8
	6H	17.8	18.4	18.3	18.9	19.5	18.8	19.4	19.3	19.9	20.5
	8H	18.0	18.5	18.6	19.1	19.8	19.1	19.6	19.6	20.2	20.9
	12H	18.2	18.6	18.8	19.2	19.9	19.3	19.8	20.0	20.3	21.0
12H	4H	17.2	17.9	17.8	18.4	18.9	18.1	18.7	18.6	19.2	19.8
	6H	17.8	18.4	18.4	19.0	19.7	18.8	19.3	19.4	19.9	20.6
	8H	18.1	18.5	18.7	19.1	19.8	19.1	19.6	19.7	20.1	20.8
Variations with the observer position for the luminaire spacings. S:											
S = 1.0H		0.1 / -0.1					0.0 / -0.1				
S = 1.5H		0.2 / -0.3					0.2 / -0.3				
S = 2.0H		0.5 / -0.7					0.6 / -0.7				

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	118	118	118	118	115	115	115	115	109	109	109	103	103	103	98	98	98	95
1	107	102	97	93	104	99	95	91	94	90	87	89	86	84	85	82	80	78
2	97	88	81	75	94	86	79	73	81	76	71	77	73	69	74	70	67	64
3	88	77	68	62	85	75	67	61	71	65	59	68	62	57	65	60	56	53
4	80	68	59	52	77	66	58	51	63	56	50	60	54	49	57	52	48	45
5	74	60	51	44	71	59	50	44	56	49	43	54	47	42	52	46	41	39
6	68	54	45	38	66	53	44	38	51	43	37	49	42	37	47	41	36	34
7	63	49	40	34	61	48	40	34	46	38	33	44	37	32	42	36	32	30
8	58	45	36	30	57	44	36	30	42	35	29	40	34	29	39	33	28	26
9	55	41	33	27	53	40	32	27	39	31	26	37	31	26	36	30	26	24
10	51	38	30	24	50	37	29	24	36	29	24	34	28	24	33	27	23	21