



PHOTOMETRIC LIGHT REPORT

Bulkhead | 3-CCT | IK10 | IP65 | sensor

Article number: 137-021



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137-021 Bulkhead | 3-CCT | IK10 | IP65 | sensor

Introduction

Purpose of this Document

This document provides accurate and objective photometric data for Tronix Lighting item 137-021. 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 137-021 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 137-021 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.

137-021 Bulkhead | 3-CCT | IK10 | IP65 | sensor

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	2 planes – 180°
γ (gamma)-Resolution	4.5°
Test Distance	1.81 m
Room Temperature and Humidity	22°C +/- 10% – RH 50% +/- 20%
Input Power. Power and Displacement Factors	5.6 W – PF 0.9 – DPF 0.93
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 0 sec – +0.4%

Tested light source

Manufacturer and Order Code	Tronix Lighting – 137-021
Product Description	Bulkhead 3-CCT IK10 IP65 sensor

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	505 lm – 4.56% / 95.44%
Efficiency	90 lm/W
Energy efficiency class	F
Peak Intensity and Beam Angle	153 cd – 119.4°
Correlated Colour Temperature	CCT = 4471 K
Colour Shift. CIE duv	Duv -0.0044
Colour Rendering Index	CRI 87.1
Colour Rendering TM30-18	R _f 84.2 – R _g 96.5
Television Lighting Consistency Index	TLCI = 77
Flicker	SVM 0 – PstLM 0.04

137-021 Bulkhead | 3-CCT | IK10 | IP65 | sensor

Electrical measurement details

Input Power

RMS Input voltage feed. V_{RMS}

230 V

RMS Input current feed. I_{RMS}

0.027 A

Total input power

5.6 W

Frequency of input power

50 Hz

Power factor

0.9

Displacement power factor

0.93

Total harmonic distortion of the current

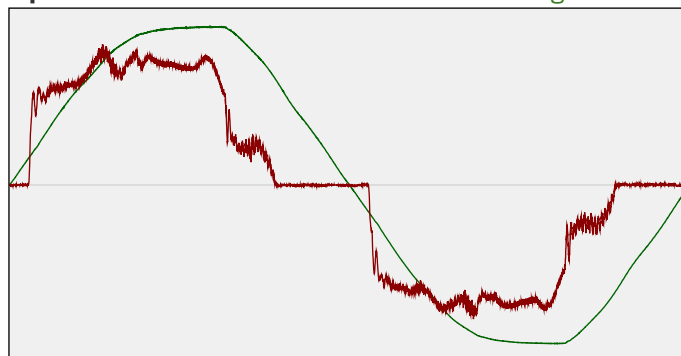
25.51%

Total harmonic distortion of the voltage

3.11%

Input Power Curve

Voltage - Current



Efficiency

Radiated power efficiency: 28.6%



Lumen efficiency: 90 lm/W



Harmonics

3rd Harmonic

14.05%

5th Harmonic

16.18%

7th Harmonic

2.7%

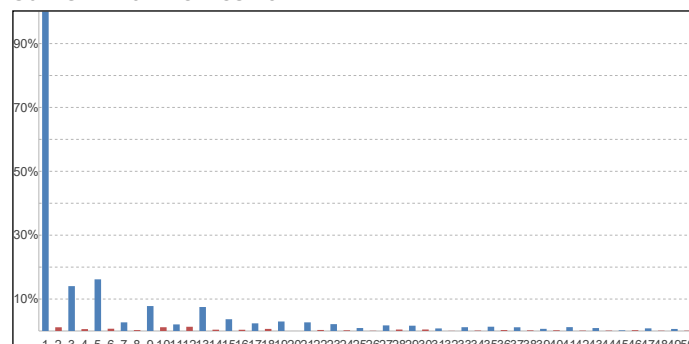
9th Harmonic

7.81%

11th Harmonic

2.06%

Current Harmonics %



Stabilization Details

Warm-up Conditions

Stable period

15 min CCT start

4468 K

Stable change max

2.0% CCT shift

+3 K

Minimum warm-up time

15 min CCT end

4471 K

Colour temperature change during warm-up

Warm-up Results

Total warmup time

Lamp stabilized in 15 min 0 sec

Warmup variation

+0.4%

Output intensity change during warm-up

Output start

504 lm

Output change

+1 lm

Output end

505 lm

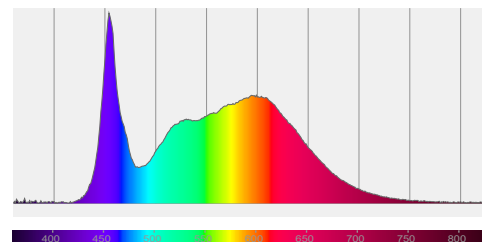
137-021 Bulkhead | 3-CCT | IK10 | IP65 | sensor

Colour measurement details

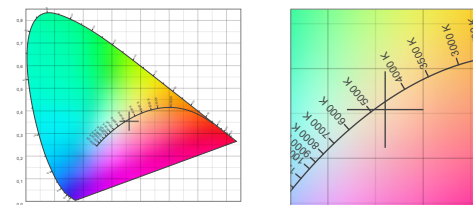
Total lumen output 505 lm
 Correlated Colour Temperature 4471 K
 Colour coordinates CIE 1931 (x;y) = (0.360;0.354)
 Colour deviation from BBL Duv = -0.0044

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) $R_9 = 30.1$

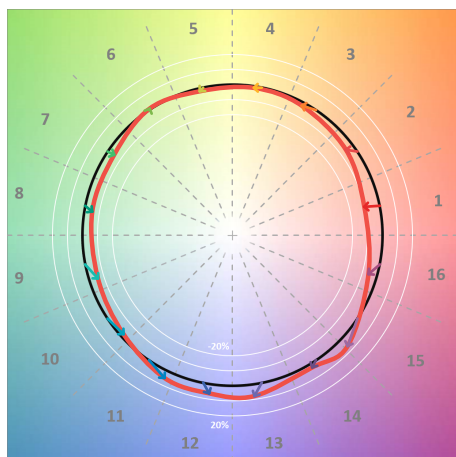
Colour Quality Scale CQS = 83.3
 Television Lighting Consistency Index TLCI = 77



Relative spectral power distribution



TM30 details

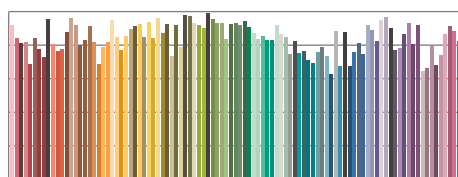


TM30 Colour vectors per hue bin

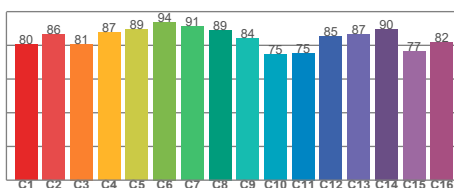


TM30 Colour distortion

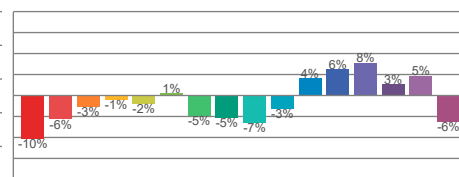
Hue Bin	R_f	Shifts (%)	
		Chroma	Hue
C1	80	-10%	1%
C2	86	-6%	5%
C3	81	-3%	10%
C4	87	-1%	5%
C5	89	-2%	3%
C6	94	1%	-1%
C7	91	-5%	-1%
C8	89	-5%	3%
C9	84	-7%	11%
C10	75	-3%	15%
C11	75	4%	15%
C12	85	6%	5%
C13	87	8%	-7%
C14	90	3%	-5%
C15	77	5%	-19%
C16	82	-6%	-8%



TM30-18 R_f -values per reference colour

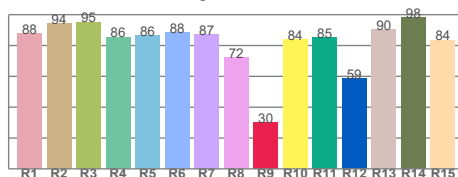


TM30-18 R_f -values per hue bin

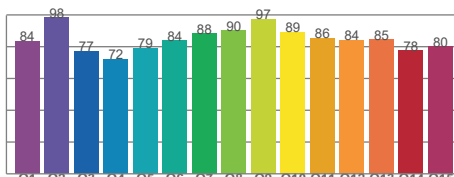


TM30 Chroma shift

Colour Quality details



Colour Rendering Index



Colour Quality Scale

137-021 Bulkhead | 3-CCT | IK10 | IP65 | sensor

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

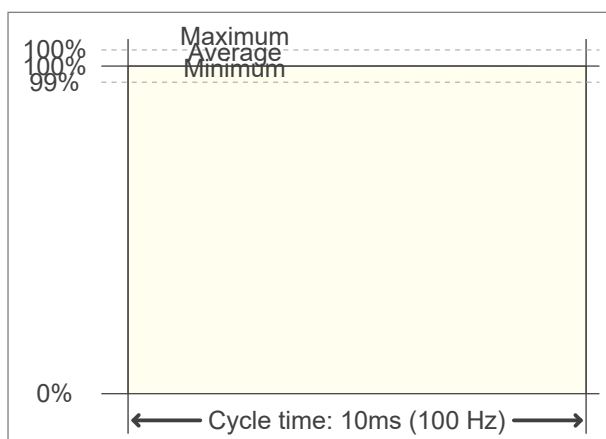
TLA indices (according IEC TR 61547-1, EN 61000-3-3 and EN 61000-4-15)

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

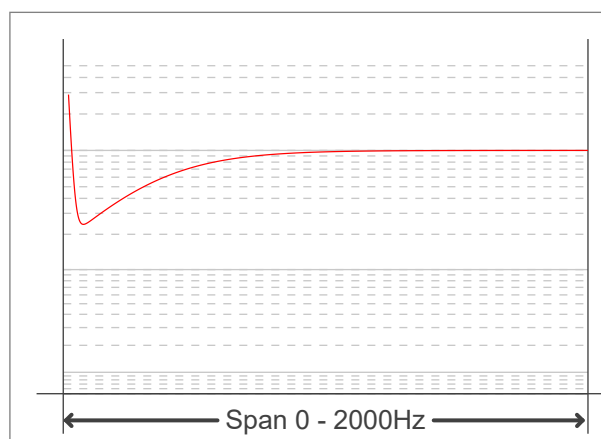
PstLM value ($F < 80$ Hz) 0.04

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

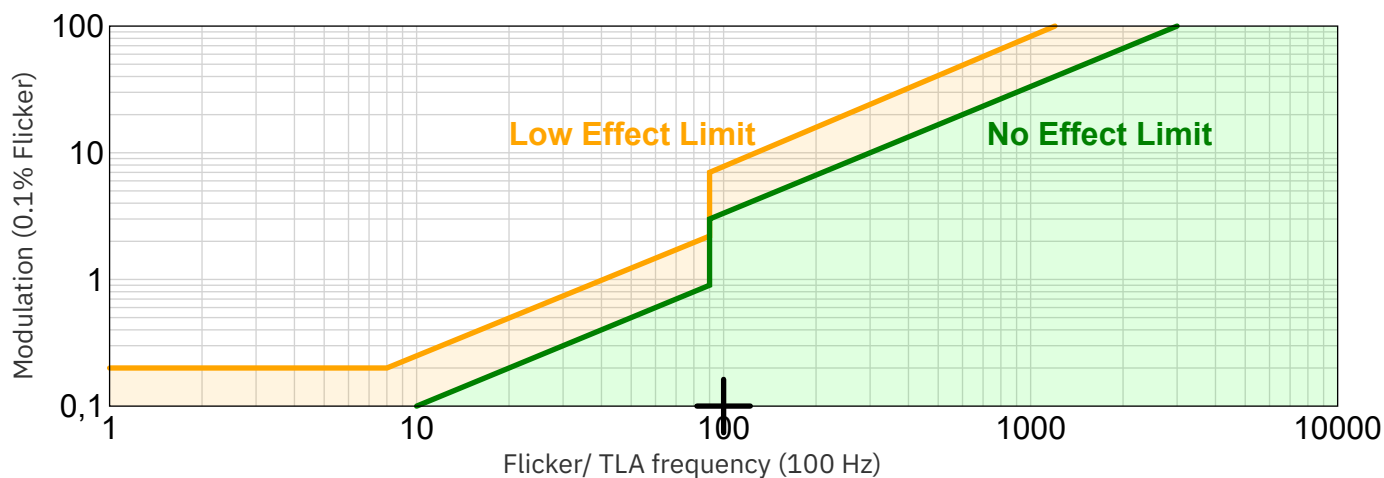
Flicker frame (one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



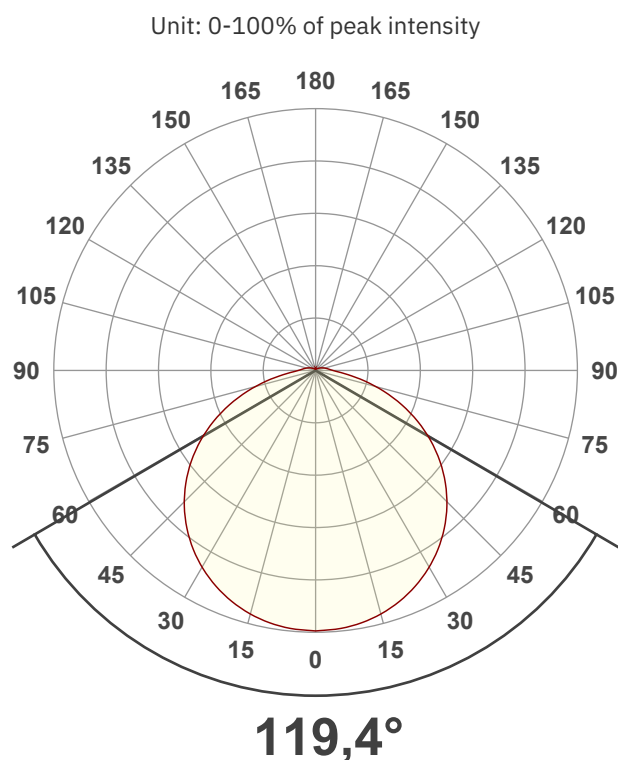
IEEE 1789-2015 Lighting Flicker Risk Zones



137-021 Bulkhead | 3-CCT | IK10 | IP65 | sensor

Beam angle

Luminous Intensity diagram



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

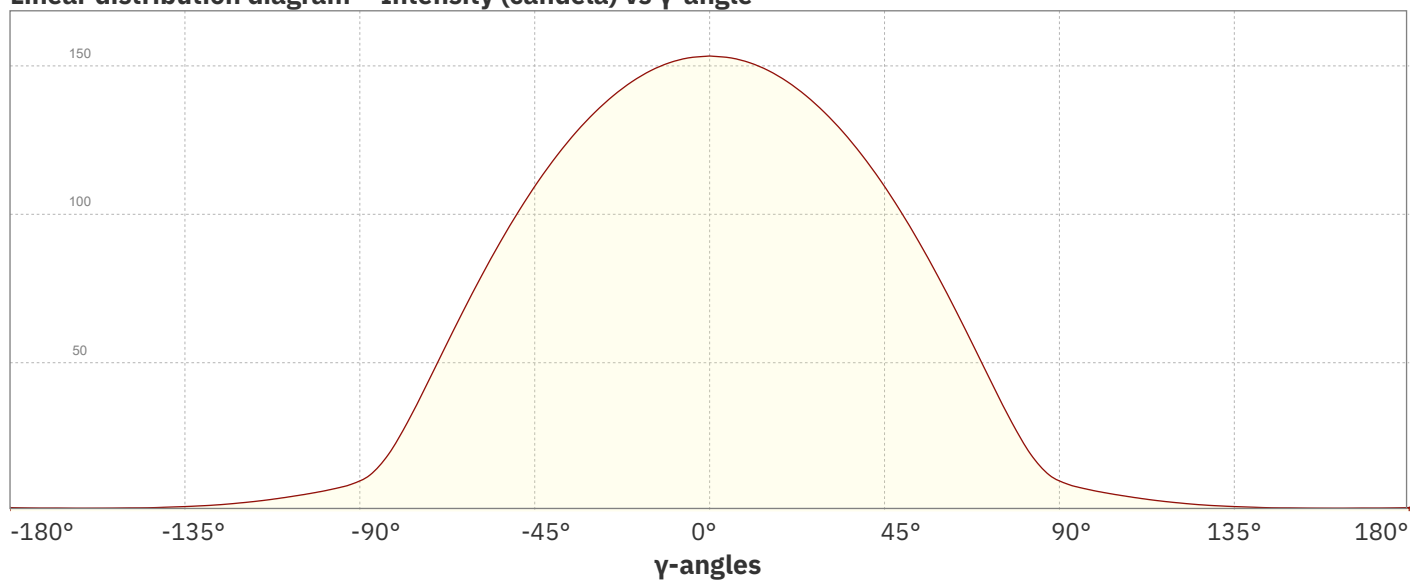
In 120° cone	71.9%
In 90° cone	48.0%

C planes

C000-C180

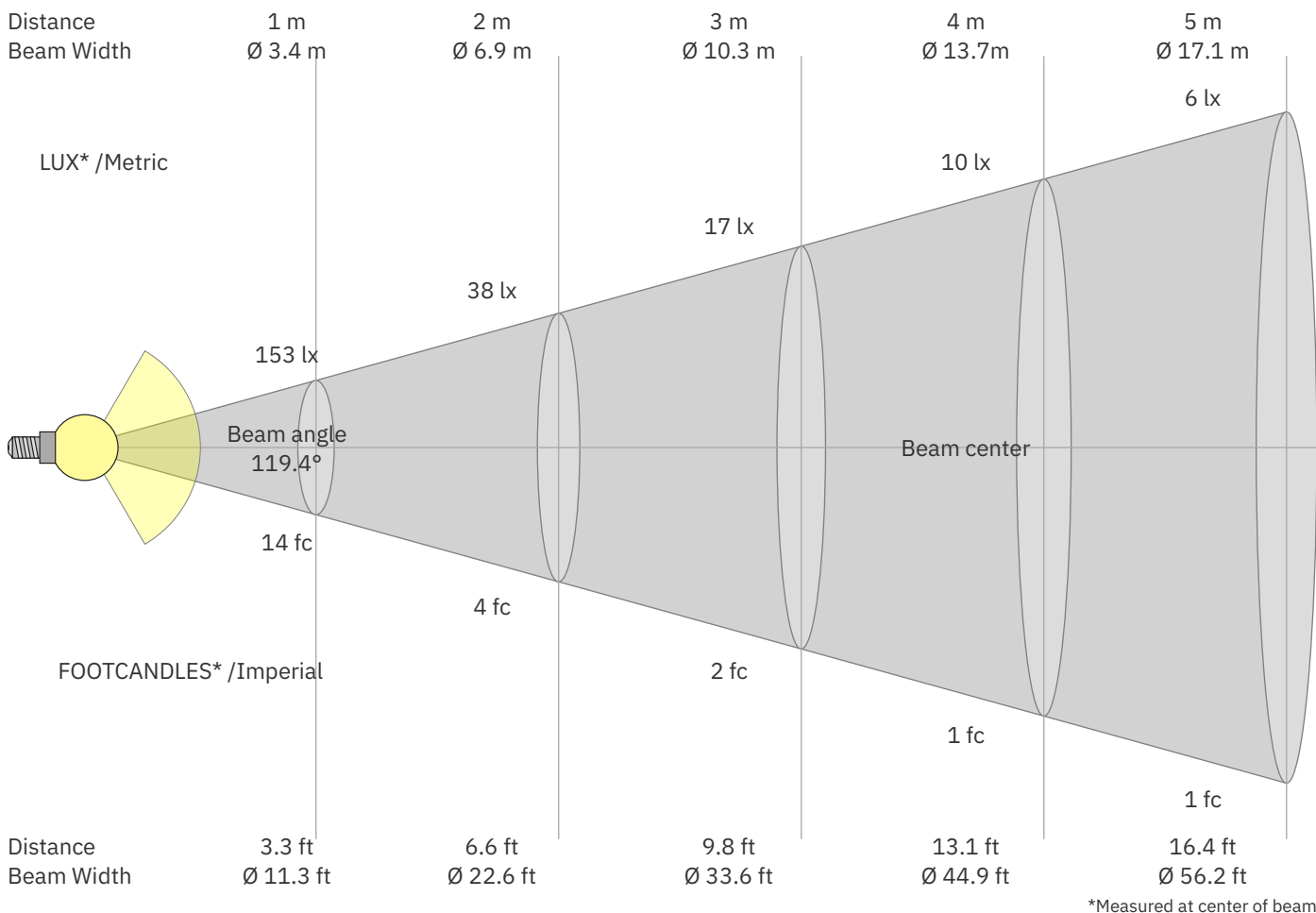
C090-C270

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



137-021 Bulkhead | 3-CCT | IK10 | IP65 | sensor

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
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

137-021 Bulkhead | 3-CCT | IK10 | IP65 | sensor

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