PHOTOMETRIC LIGHT REPORT

Spot | white | cut out Ø68-73mm | 6W | 2200K | dim

Article number: 136-176

Go to the webshop of Tronix Lighting

TRONIX

136-176 Spot | white | cut out Ø68-73mm | 6W | 2200K | dim

Introduction

Purpose of this Document
This document provides accurate and objective photometric data for Tronix Lighting item 136-176. 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 136-176 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 136-176 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.

136-176 Spot | white | cut out Ø68-73mm | 6W | 2200K | dim

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	1°
Test Distance	1.81 m
Room Temperature and Humidity	22°C +/- 10% – RH 50% +/- 20%
Input Power. Power and Displacement Factors	6.2 W – PF 0.95 – DPF 0.97
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 23 min 0 sec –-6.2%

Tested light source

Manufacturer and Order Code	Tronix Lighting – 136-176
Product Description	Spot | white | cut out Ø68-73mm | 6W | 2200K | dim

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	303 lm – 0% / 100%
Efficiency	49 lm/W
Energy efficiency class	G
Peak Intensity and Beam Angle	659 cd – 38.2°
Correlated Colour Temperature	CCT = 2019 K
Colour Shift. CIE duv	Duv -0.0012
Colour Rendering Index	CRI 81.4
Colour Rendering TM30-18	R_f 84.1 – R_g 97.3
Television Lighting Consistency Index	TLCI = 64
Flicker	SVM 0.01 – PstLM 0.23

Document revision date: 1-7-2025 Measurement serial: VFR-250123-0902-MS

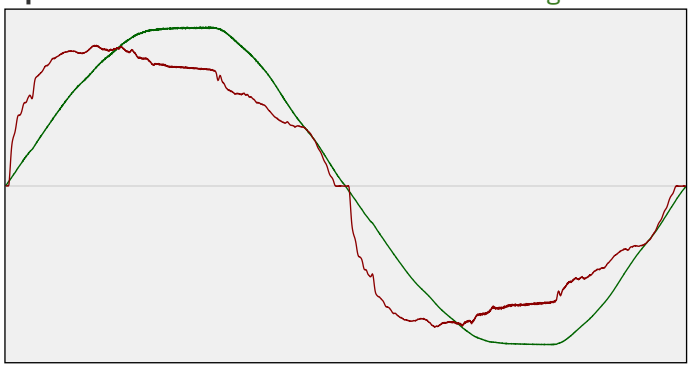
136-176 Spot | white | cut out Ø68-73mm | 6W | 2200K | dim

Electrical measurement details

Input Power

RMS Input voltage feed. V_{RMS}	229 V
RMS Input current feed. I_{RMS}	0.029 A
Total input power	6.2 W
Frequency of input power	50 Hz
Power factor	0.95
Displacement power factor	0.97
Total harmonic distortion of the current	20.92%
Total harmonic distortion of the voltage	2.65%

Input Power Curve Voltage - Current



Efficiency

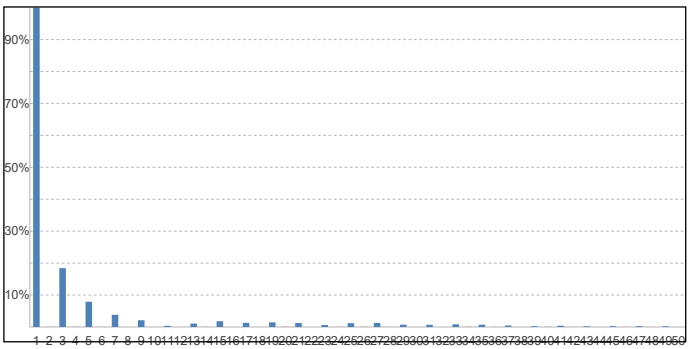
Radiated power efficiency: 17.1%

Lumen efficiency: 49 lm/W

Harmonics

3rd Harmonic	18.43%
5th Harmonic	7.91%
7th Harmonic	3.82%
9th Harmonic	2.11%
11th Harmonic	0.36%

Current Harmonics %



Stabilization Details

Warm-up Conditions

Stable period	15 min
Stable change max	2.0%
Minimum warm-up time	15 min

Warm-up Results

Total warmup time	Lamp stabilized in 23 min 0 sec
Warmup variation	-6.2%

Colour temperature change during warm-up

CCT start	2016 K
CCT shift	+3 K
CCT end	2019 K

Output intensity change during warm-up

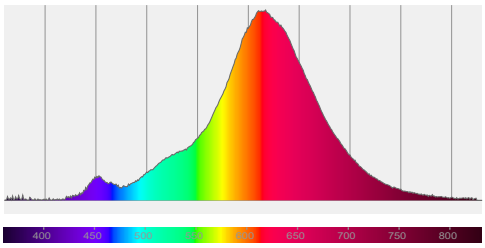
Output start	322 lm
Output change	-19 lm
Output end	303 lm

Document revision date: 1-7-2025 Measurement serial: VFR-250123-0902-MS

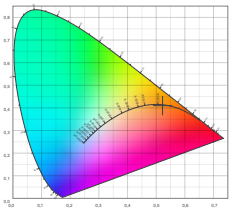
136-176 Spot | white | cut out Ø68-73mm | 6W | 2200K | dim

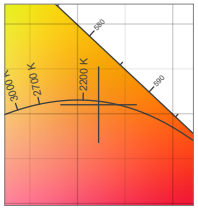
Colour measurement details

Total lumen output	303 lm
Correlated Colour Temperature	2019 K
Colour coordinates CIE 1931	(x;y) = (0.522;0.410)
Colour deviation from BBL	Duv = -0.0012
TM30-18 Colour Fidelity Index	R_f 84.1
TM30-18 Colour Gamut Index	R_g 97.3
Colour Rendering Index (Ra)	CRI 81.4
Colour Rendering Index. (red component)	R9 = 8.8
Colour Quality Scale	CQS = 74.0
Television Lighting Consistency Index	TLCI = 64

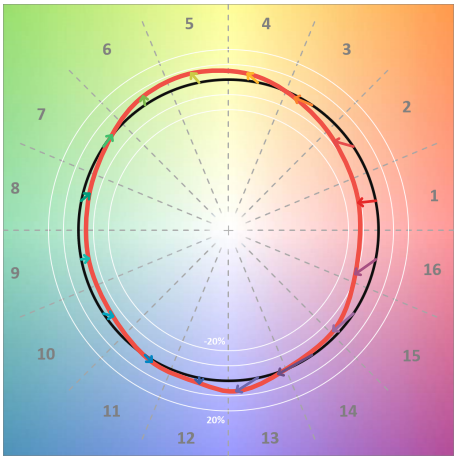


Relative spectral power distribution





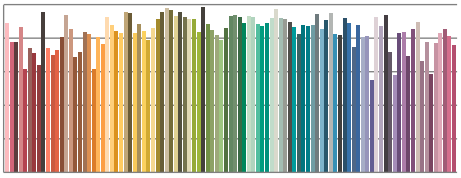
TM30 details



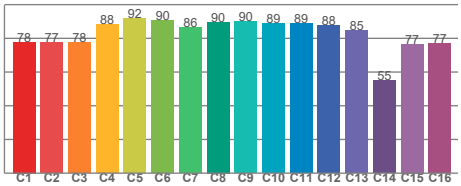
TM30 Colour vectors per hue bin

TM30 Colour distortion

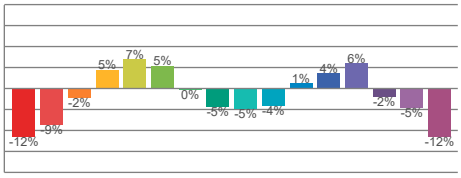
		Shifts (%)	
Hue Bin	R_f	Chroma	Hue
C1	78	-12%	1%
C2	77	-9%	10%
C3	78	-2%	12%
C4	88	5%	8%
C5	92	7%	4%
C6	90	5%	-2%
C7	86	0%	-9%
C8	90	-5%	-6%
C9	90	-5%	0%
C10	89	-4%	5%
C11	89	1%	6%
C12	88	4%	1%
C13	85	6%	-16%
C14	55	-2%	-25%
C15	77	-5%	-17%
C16	77	-12%	-12%



TM30-18 Rf-values per reference colour

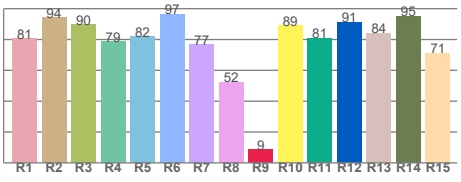


TM30-18 Rf-values per hue bin

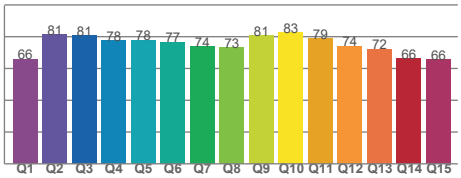


TM30 Chroma shift

Colour Quality details



Colour Rendering Index



Colour Qualitity Scale

Document revision date: 1-7-2025 Measurement serial: VFR-250123-0902-MS

136-176 Spot | white | cut out Ø68-73mm | 6W | 2200K | dim

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)

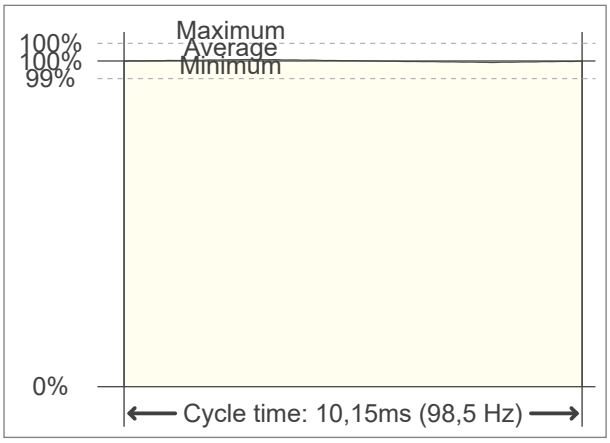
Flicker frequency	98.52 Hz
Percent flicker	0.79 %
Flicker index	0

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

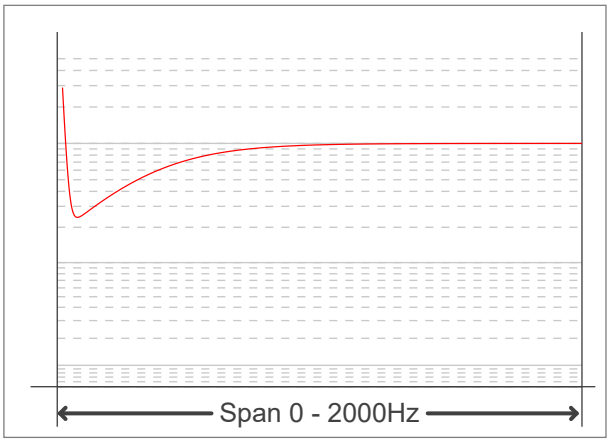
An LED luminaire is considered flicker-free if the SVM value is <= 0.4 and if the PstLM value is <=1.0

PstLM value (F < 80 Hz)	0.23
SVM value (80 < F < 2000 Hz)	0.01

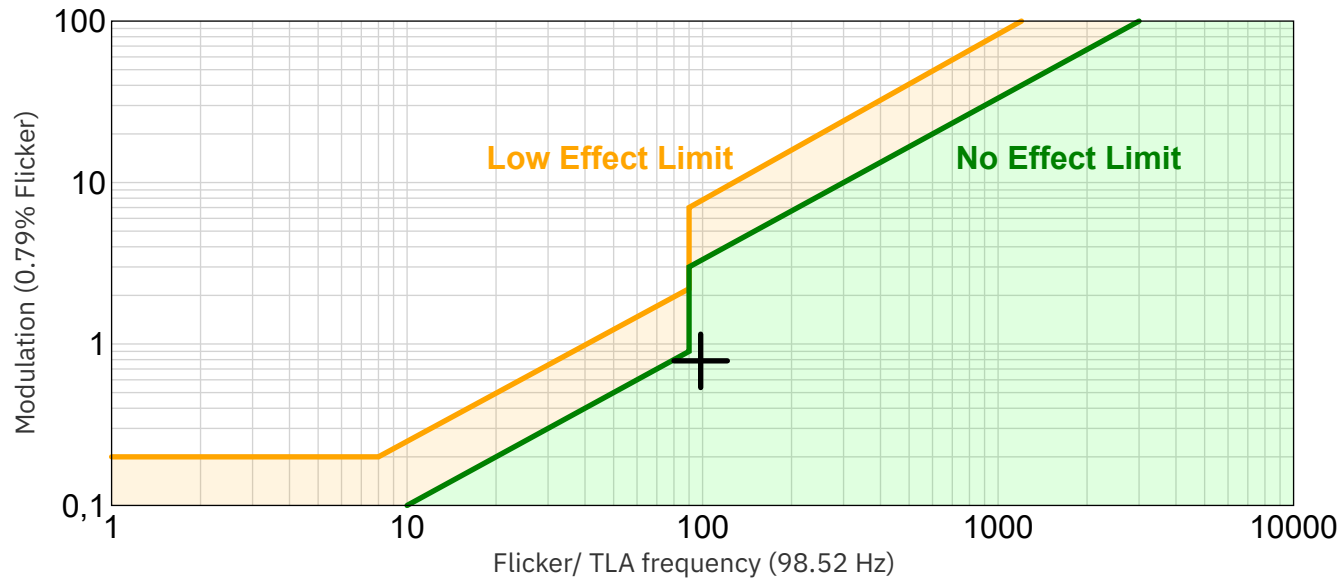
Flicker frame (one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789-2015 Lighting Flicker Risk Zones



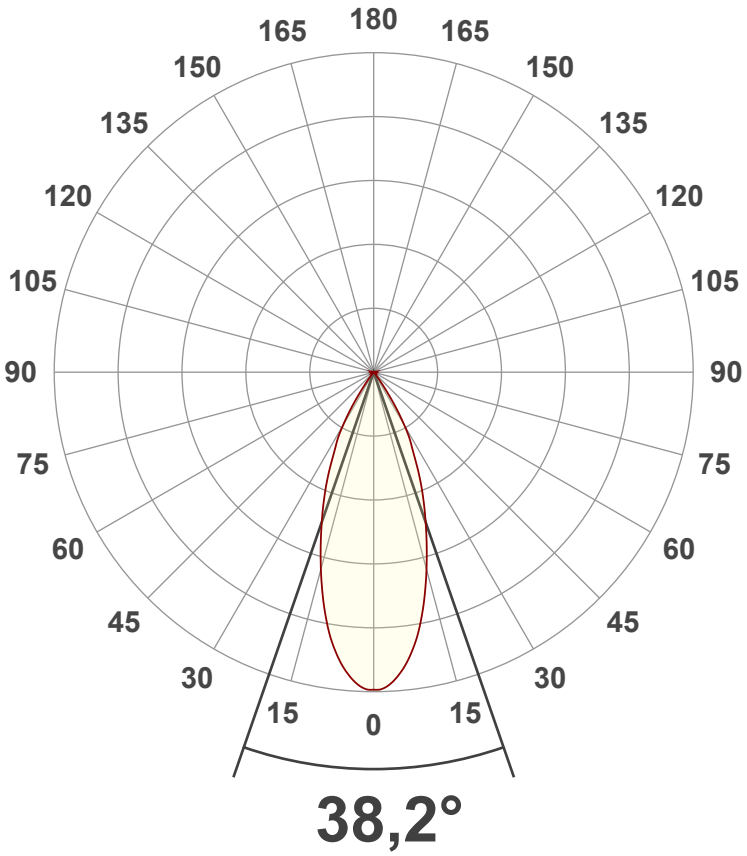
Document revision date: 1-7-2025 Measurement serial: VFR-250123-0902-MS

136-176 Spot | white | cut out Ø68-73mm | 6W | 2200K | dim

Beam angle

Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	303 lm
Lumen Up/Down	0% / 100%
Peak Intensity	659 cd
Beam Angle (50%)	38.2°
Beam Angle (90%)	38.2°
Beam Angle (10%)	38.2°

Cut-off Angle

Average 2.5%	73.6°

Field Angle

Average 10%	66.4°

Intensity Ratio

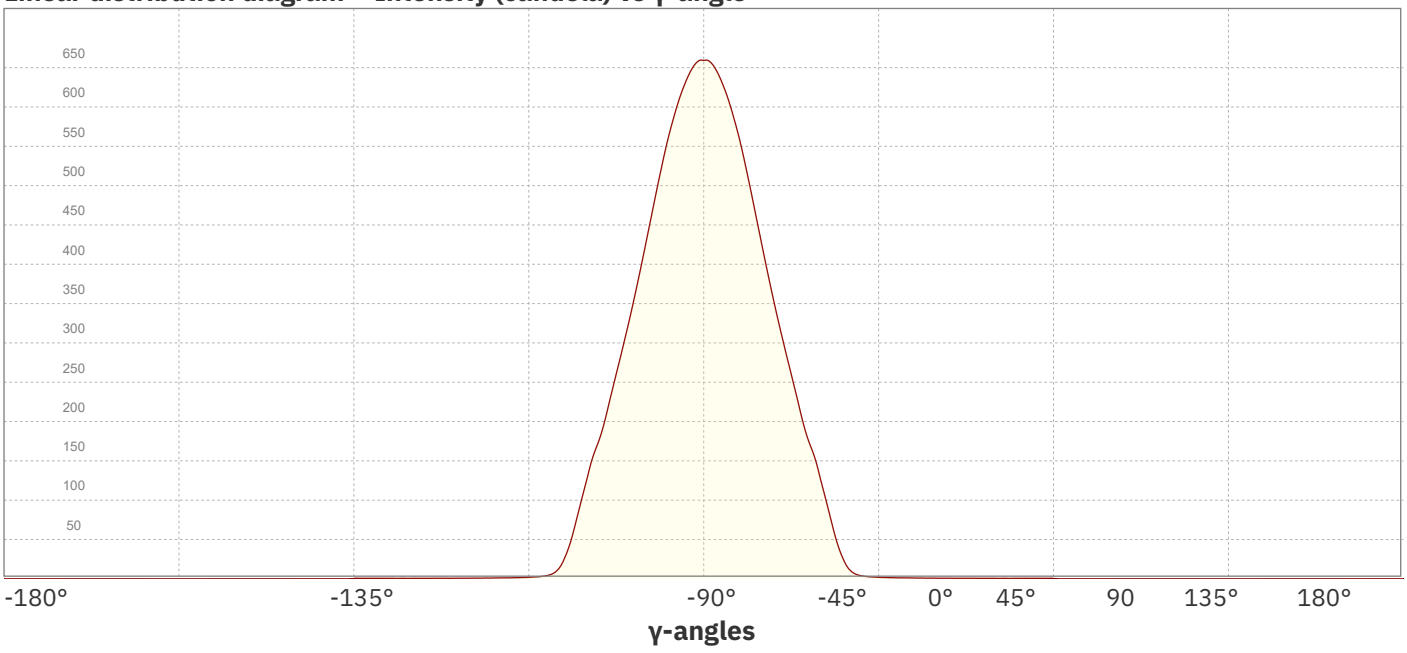
In 120° cone	99.3%
In 90° cone	98.8%

C planes

C000-C180

C090-C270

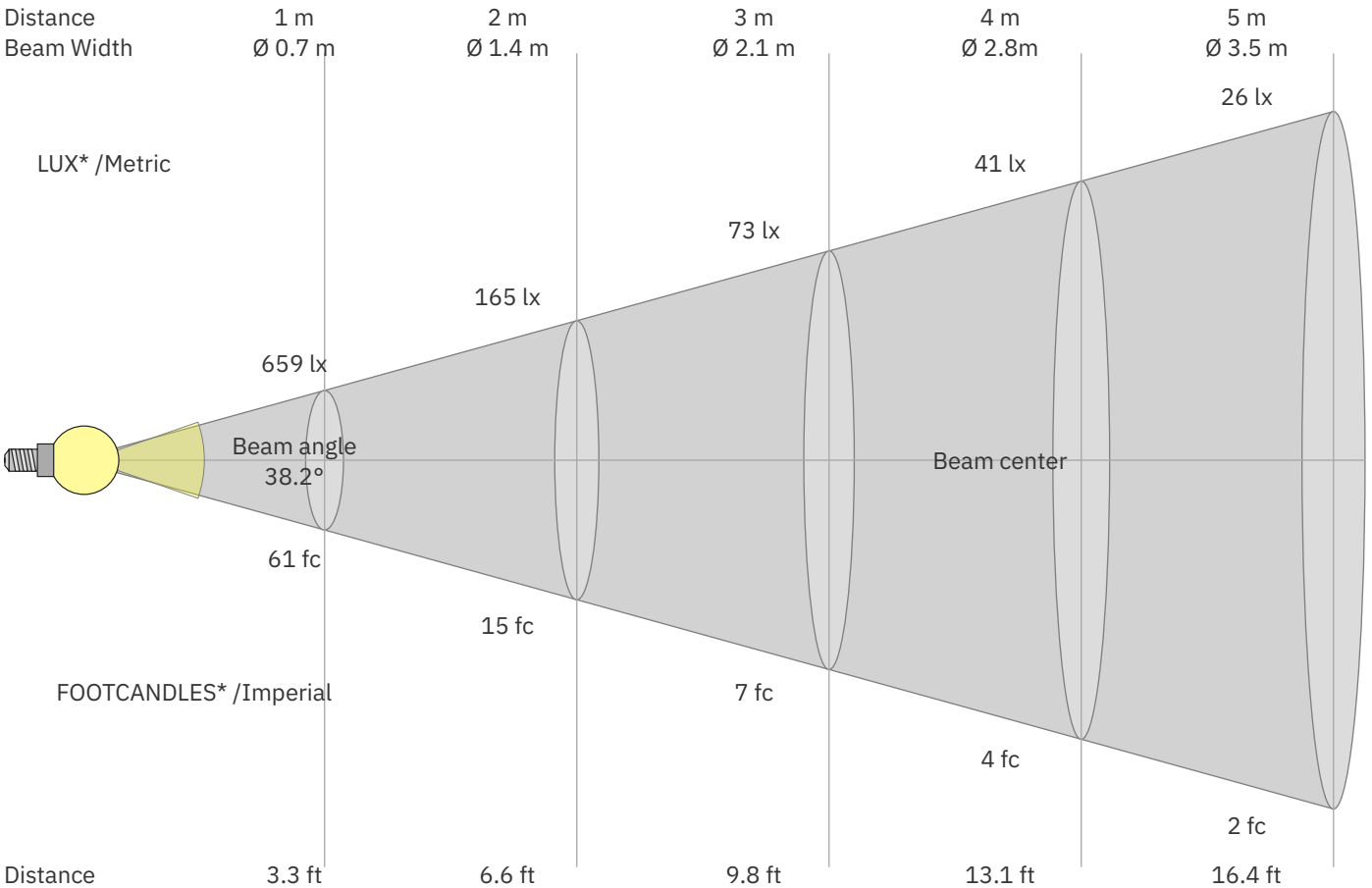
Linear distribution diagram - Intensity (candela) vs γ-angle



Document revision date: 1-7-2025 Measurement serial: VFR-250123-0902-MS

136-176 Spot | white | cut out Ø68-73mm | 6W | 2200K | dim

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
659	165	73	41	26	18	13	10	8	7	5	5	4	3	3	3	2	2	2	2	lux
61.2	15.3	6.8	3.8	2.4	1.7	1.2	1	0.8	0.6	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	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
659	656	639	614	581	542	496	448	400	354	311	270	230	191	162	128	89	51	24	10	cd
100%	99%	97%	93%	88%	82%	75%	68%	61%	54%	47%	41%	35%	29%	25%	19%	14%	8%	4%	1%	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
659	656	639	614	581	542	496	448	400	354	311	270	230	191	162	128	89	51	24	10	cd
100%	99%	97%	93%	88%	82%	75%	68%	61%	54%	47%	41%	35%	29%	25%	19%	14%	8%	4%	1%	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
659	656	639	614	581	542	496	448	400	354	311	270	230	191	162	128	89	51	24	10	cd
100%	99%	97%	93%	88%	82%	75%	68%	61%	54%	47%	41%	35%	29%	25%	19%	14%	8%	4%	1%	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
659	656	639	614	581	542	496	448	400	354	311	270	230	191	162	128	89	51	24	10	cd
100%	99%	97%	93%	88%	82%	75%	68%	61%	54%	47%	41%	35%	29%	25%	19%	14%	8%	4%	1%	of 0°val

Document revision date: 1-7-2025 Measurement serial: VFR-250123-0902-MS

136-176 Spot | white | cut out Ø68-73mm | 6W | 2200K | dim

Light Planning – UGR table

Uncorrected. comprehensive UGR table according to CIE 117-1995

Reflectances										
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 H = mounting height above eye level	**Viewed Crosswise** (Viewing direction orthogonal to lamp length axis)					**Viewed Endwise** (Viewing direction parallel to lamp length axis)				
X **Y**										
2H 2H	10.9	11.4	11.0	11.6	11.8	10.9	11.4	11.0	11.6	11.8
3H	10.6	11.3	11.0	11.5	11.7	10.6	11.3	11.0	11.5	11.7
4H	10.6	11.3	11.0	11.5	11.7	10.6	11.3	11.0	11.5	11.7
6H	10.7	11.3	11.0	11.6	11.9	10.7	11.3	11.0	11.6	11.9
8H	10.8	11.3	11.1	11.6	12.0	10.8	11.3	11.1	11.6	12.0
12H	10.9	11.4	11.2	11.8	12.2	10.9	11.4	11.2	11.8	12.2
4H 2H	10.5	11.2	10.9	11.4	11.6	10.5	11.2	10.9	11.4	11.6
3H	10.5	11.0	10.9	11.4	11.8	10.5	11.0	10.9	11.4	11.8
4H	10.5	10.9	10.9	11.3	11.9	10.5	10.9	10.9	11.3	11.9
6H	10.6	11.1	11.1	11.4	11.8	10.6	11.1	11.1	11.4	11.8
8H	10.7	11.2	11.2	11.5	11.9	10.7	11.2	11.2	11.5	11.9
12H	10.9	11.3	11.5	11.7	12.2	10.9	11.3	11.5	11.7	12.2
8H 4H	10.4	10.9	10.9	11.2	11.6	10.4	10.9	10.9	11.2	11.6
6H	10.6	10.9	11.1	11.4	11.9	10.6	10.9	11.1	11.4	11.9
8H	10.9	11.2	11.4	11.7	12.3	10.9	11.2	11.4	11.7	12.3
12H	11.3	11.5	11.9	12.0	12.6	11.3	11.5	11.9	12.0	12.6
12H 4H	10.3	10.7	10.8	11.1	11.6	10.3	10.7	10.8	11.1	11.6
6H	10.7	10.9	11.2	11.4	12.1	10.7	10.9	11.2	11.4	12.1
8H	11.0	11.2	11.6	11.7	12.3	11.0	11.2	11.6	11.7	12.3

Variations with the observer position for the luminaire spacings. S:		
S = 1.0H	5.2 / -2.9	5.2 / -2.9
S = 1.5H	7.9 / -3.0	7.9 / -3.0
S = 2.0H	9.8 / -3.2	9.8 / -3.2

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	112	110	108	112	110	108	106	106	104	103	102	101	100	98	98	97	95
2	110	105	102	99	107	104	100	98	100	98	96	98	95	94	95	93	92	90
3	105	100	95	92	103	98	94	91	96	92	90	93	91	88	91	89	87	86
4	101	95	90	86	99	93	89	86	91	88	85	89	86	84	88	85	83	81
5	97	90	85	81	95	89	84	81	87	83	80	86	82	80	84	81	79	78
6	93	86	81	77	92	85	80	77	83	79	76	82	79	76	81	78	75	74
7	90	82	77	73	88	81	76	73	80	76	73	79	75	72	78	74	72	71
8	86	78	73	70	85	78	73	70	77	72	69	76	72	69	75	71	69	68
9	83	75	70	67	82	74	70	66	74	69	66	73	69	66	72	68	66	65
10	80	72	67	64	79	71	67	64	71	66	63	70	66	63	69	66	63	62

Document revision date: 1-7-2025 Measurement serial: VFR-250123-0902-MS