PHOTOMETRIC LIGHT REPORT

Reflector downlight eco | white | Ø232mm | 20/28W | 3-CCT

Article number: 136-121

Go to the webshop of Tronix Lighting

TRONIX

136-121 Reflector downlight eco | white | Ø232mm | 20/28W | 3-CCT

Introduction

Purpose of this Document
This document provides accurate and objective photometric data for Tronix Lighting item 136-121. 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 136-121 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 136-121 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.

136-121 Reflector downlight eco | white | Ø232mm | 20/28W | 3-CCT

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	27.6 W – PF 0.97 – DPF 0.98
Frequency of Input Power	50 Hz
Warm-up Time and Variation	Lamp stabilized in 15 min 3 sec –-2.0%

Tested light source

Manufacturer and Order Code	Tronix Lighting – 136-121
Product Description	Reflector downlight eco | white | Ø232mm | 20/28W | 3-CCT

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)	2673 lm – 0.17% / 99.83%
Efficiency	97 lm/W
Energy efficiency class	F
Peak Intensity and Beam Angle	2554 cd – 63.1°
Correlated Colour Temperature	CCT = 6329 K
Colour Shift. CIE duv	Duv -0.0004
Colour Rendering Index	CRI 86.3
Colour Rendering TM30-18	R_f 83.9 – R_g 95.3
Television Lighting Consistency Index	TLCI = 78
Flicker	SVM 0.02 – PstLM 0.02

Document revision date: 1-7-2025 Measurement serial: VFR-250122-0722-MS

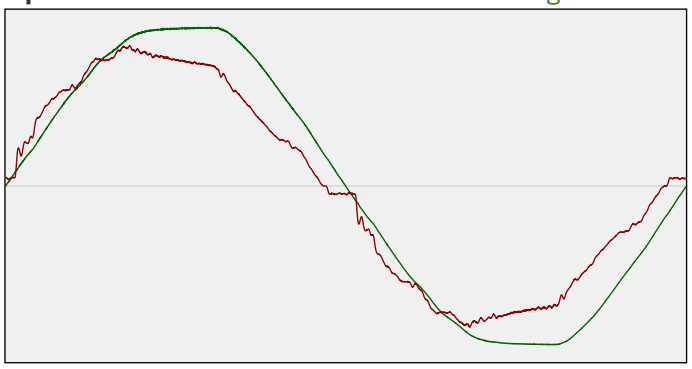
136-121 Reflector downlight eco | white | Ø232mm | 20/28W | 3-CCT

Electrical measurement details

Input Power

RMS Input voltage feed. V_{RMS}	231 V
RMS Input current feed. I_{RMS}	0.123 A
Total input power	27.6 W
Frequency of input power	50 Hz
Power factor	0.97
Displacement power factor	0.98
Total harmonic distortion of the current	7.63%
Total harmonic distortion of the voltage	2.78%

Input Power Curve Voltage - Current



Efficiency

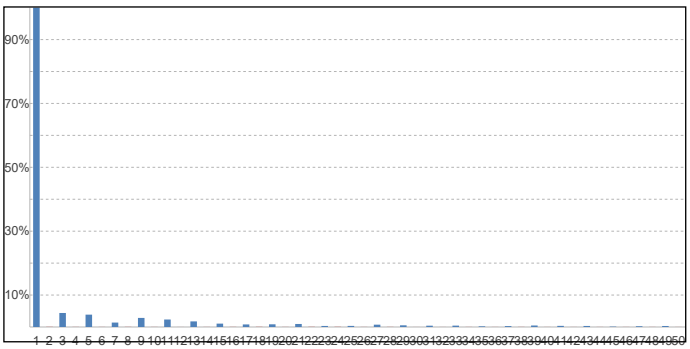
Radiated power efficiency: 31.7%

Lumen efficiency: 97 lm/W

Harmonics

3rd Harmonic	4.39%
5th Harmonic	3.87%
7th Harmonic	1.38%
9th Harmonic	2.84%
11th Harmonic	2.34%

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 15 min 3 sec
Warmup variation	-2.0%

Colour temperature change during warm-up

CCT start	6316 K
CCT shift	+13 K
CCT end	6329 K

Output intensity change during warm-up

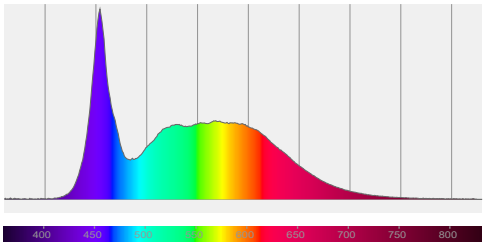
Output start	2721 lm
Output change	-48 lm
Output end	2673 lm

Document revision date: 1-7-2025 Measurement serial: VFR-250122-0722-MS

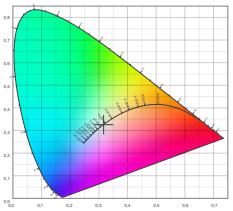
136-121 Reflector downlight eco | white | Ø232mm | 20/28W | 3-CCT

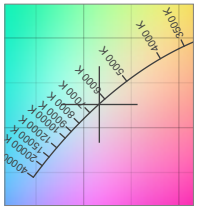
Colour measurement details

Total lumen output	2673 lm
Correlated Colour Temperature	6329 K
Colour coordinates CIE 1931	(x;y) = (0.316;0.326)
Colour deviation from BBL	Duv = -0.0004
TM30-18 Colour Fidelity Index	R_f 83.9
TM30-18 Colour Gamut Index	R_g 95.3
Colour Rendering Index (Ra)	CRI 86.3
Colour Rendering Index. (red component)	R9 = 25.2
Colour Quality Scale	CQS = 81.9
Television Lighting Consistency Index	TLCI = 78

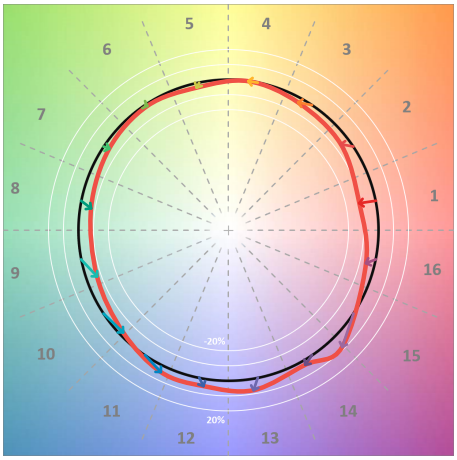


Relative spectral power distribution





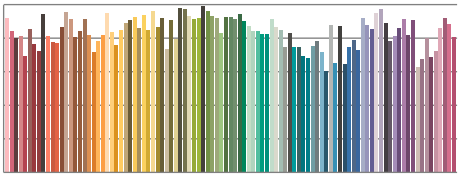
TM30 details



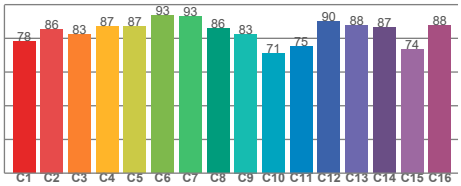
TM30 Colour vectors per hue bin

TM30 Colour distortion

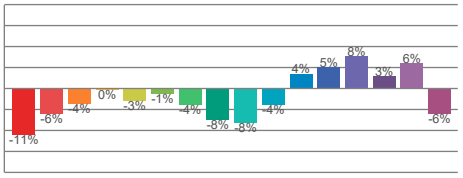
		Shifts (%)	
Hue Bin	R_f	Chroma	Hue
C1	78	-11%	1%
C2	86	-6%	6%
C3	83	-4%	9%
C4	87	0%	6%
C5	87	-3%	2%
C6	93	-1%	-1%
C7	93	-4%	-1%
C8	86	-8%	4%
C9	83	-8%	13%
C10	71	-4%	18%
C11	75	4%	15%
C12	90	5%	4%
C13	88	8%	-4%
C14	87	3%	-7%
C15	74	6%	-23%
C16	88	-6%	-4%



TM30-18 Rf-values per reference colour

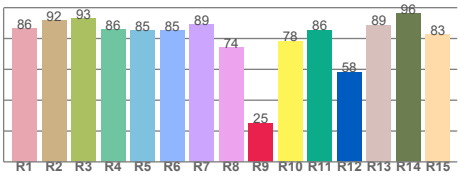


TM30-18 Rf-values per hue bin

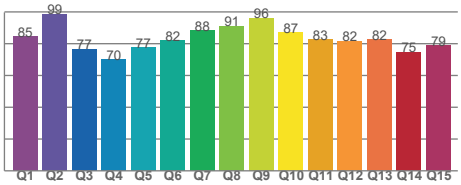


TM30 Chroma shift

Colour Quality details



Colour Rendering Index



Colour Qualitity Scale

Document revision date: 1-7-2025 Measurement serial: VFR-250122-0722-MS

136-121 Reflector downlight eco | white | Ø232mm | 20/28W | 3-CCT

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)

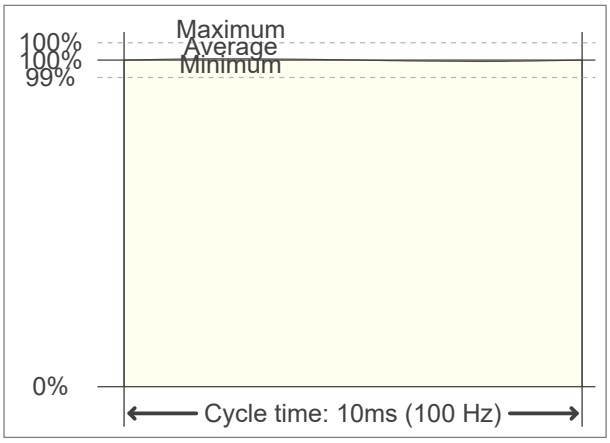
Flicker frequency	100 Hz
Percent flicker	0.44 %
Flicker index	0

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

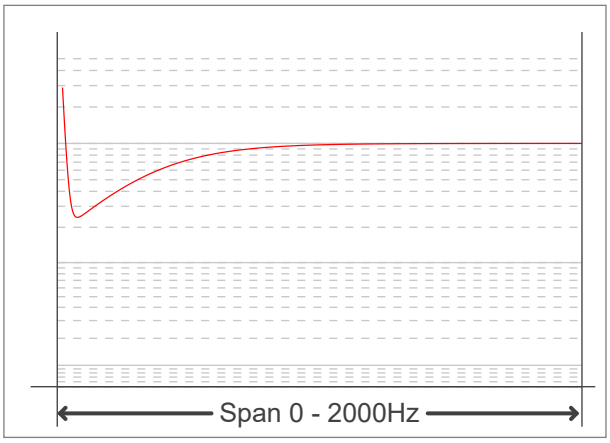
An LED luminaire is considered flicker-free if the SVM value is <= 0.4 and if the PstLM value is <=1.0

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

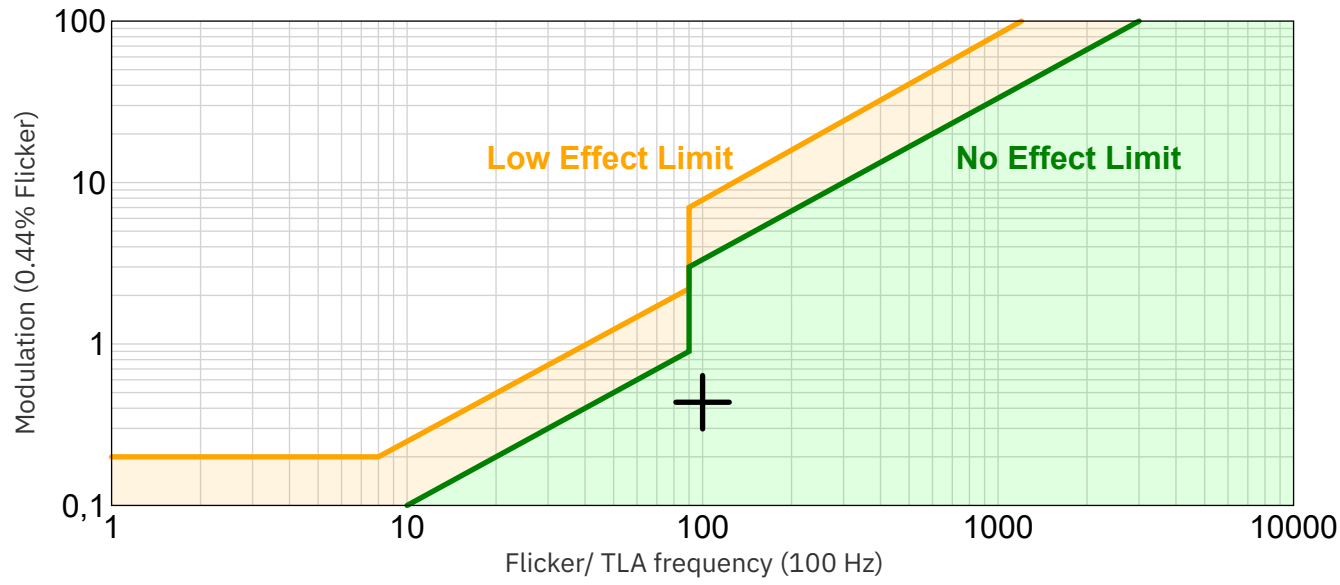
Flicker frame (one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789-2015 Lighting Flicker Risk Zones



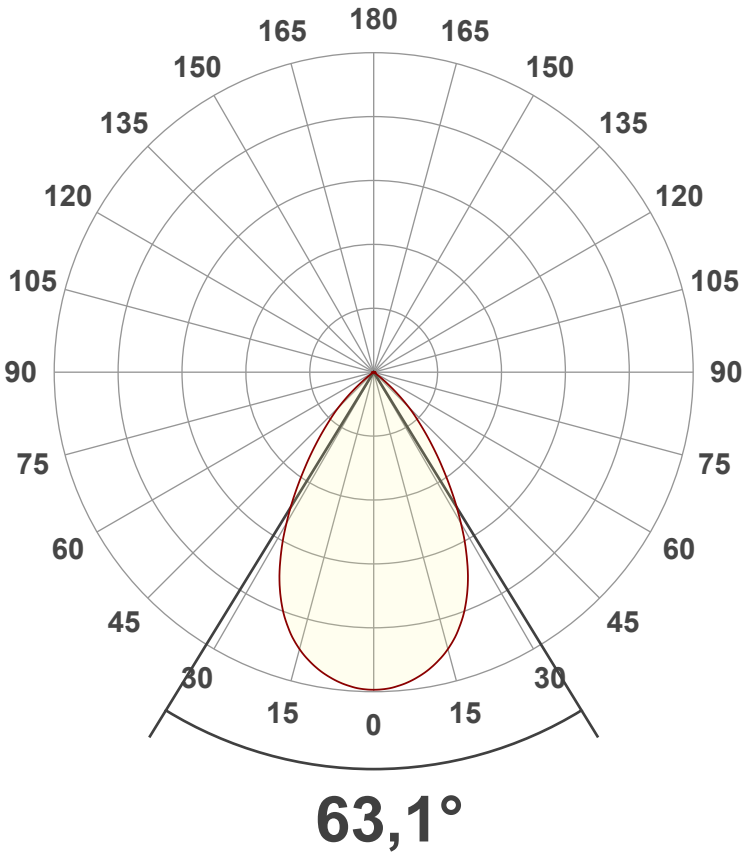
Document revision date: 1-7-2025 Measurement serial: VFR-250122-0722-MS

136-121 Reflector downlight eco | white | Ø232mm | 20/28W | 3-CCT

Beam angle

Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	2673 lm
Lumen Up/Down	0.17% / 99.83%
Peak Intensity	2554 cd
Beam Angle (50%)	63.1°
Beam Angle (90%)	63.1°
Beam Angle (10%)	63.1°

Cut-off Angle

Average 2.5%	104.7°

Field Angle

Average 10%	95.5°

Intensity Ratio

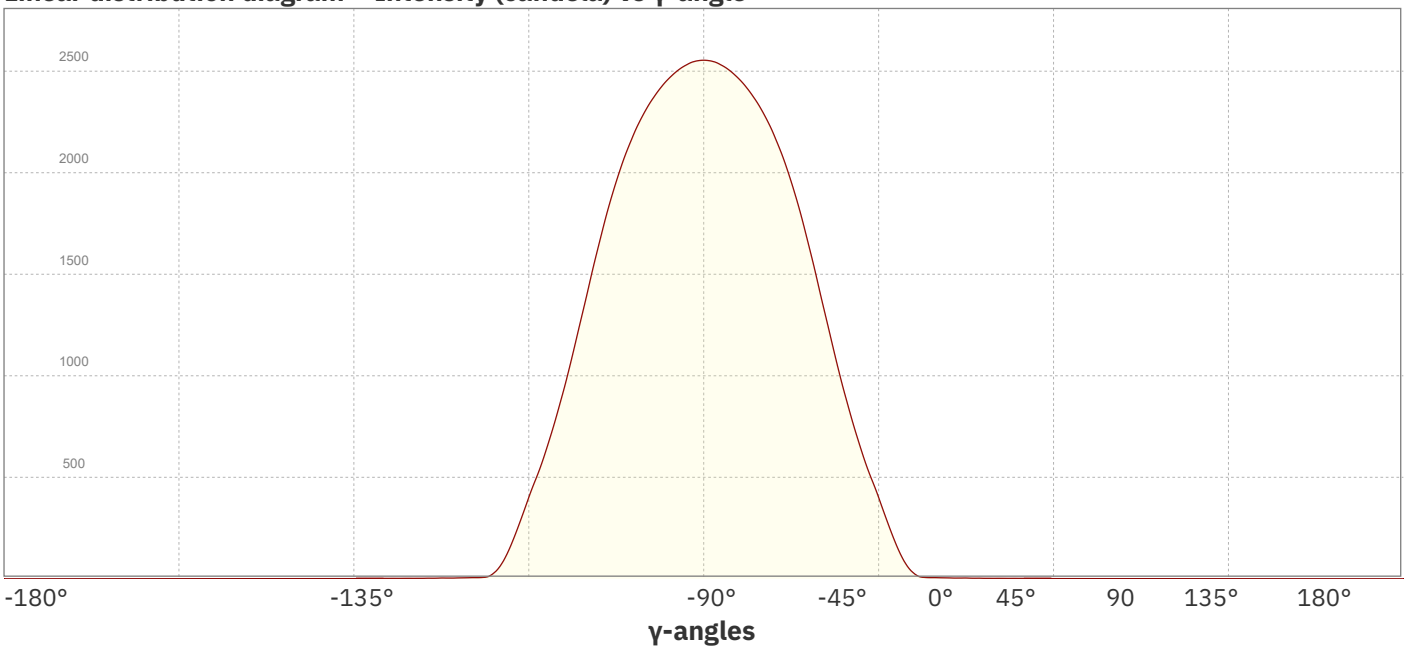
In 120° cone	99.5%
In 90° cone	94.3%

C planes

C000-C180

C090-C270

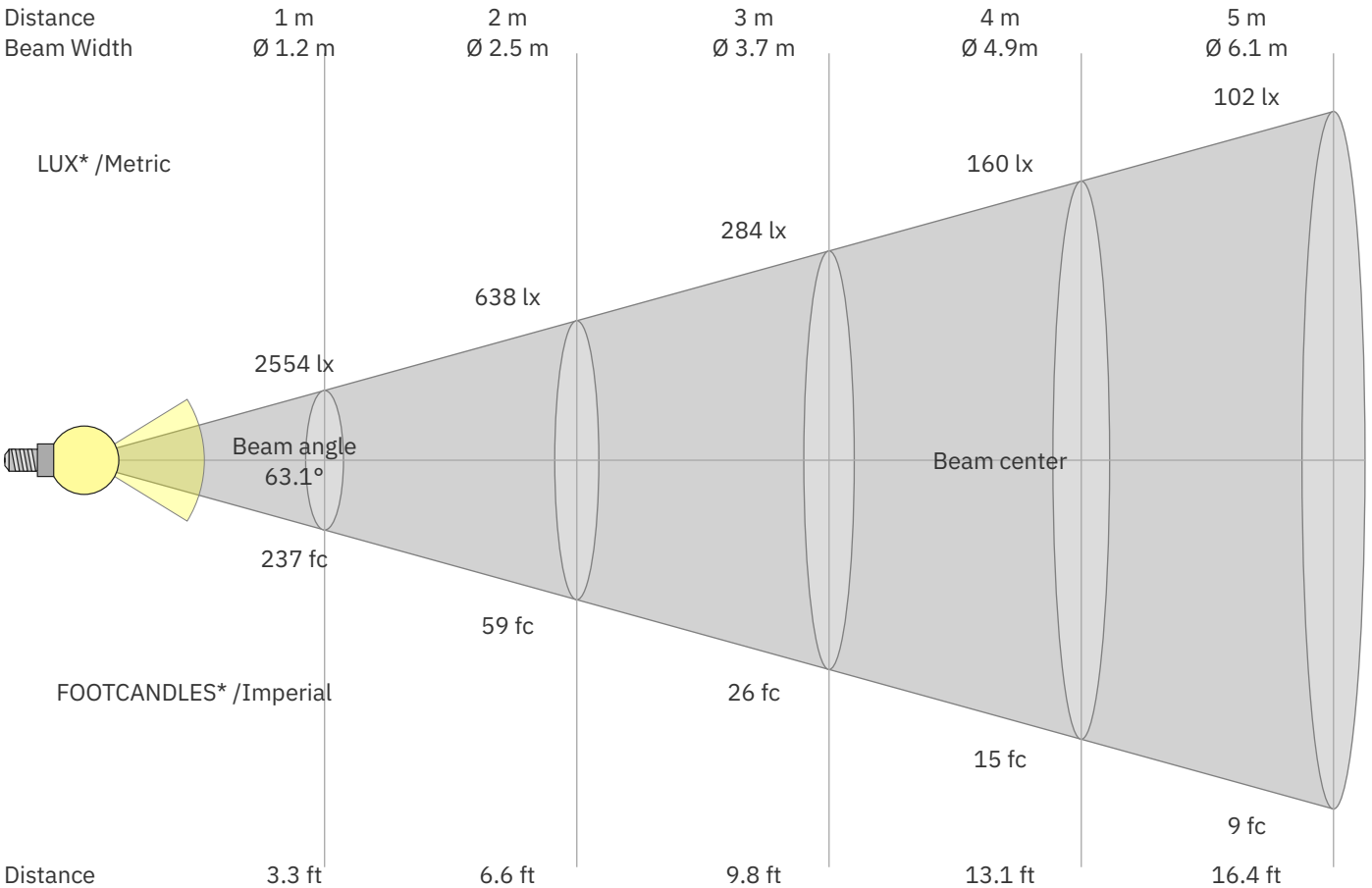
Linear distribution diagram - Intensity (candela) vs γ-angle



Document revision date: 1-7-2025 Measurement serial: VFR-250122-0722-MS

136-121 Reflector downlight eco | white | Ø232mm | 20/28W | 3-CCT

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
2554	638	284	160	102	71	52	40	32	26	21	18	15	13	11	10	9	8	7	6	lux
237.2	59.3	26.4	14.8	9.5	6.6	4.8	3.7	2.9	2.4	2	1.6	1.4	1.2	1.1	0.9	0.8	0.7	0.7	0.6	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
2554	2549	2535	2513	2481	2443	2395	2338	2270	2189	2095	1985	1861	1719	1567	1403	1243	1081	931	793	cd
100%	100%	99%	98%	97%	96%	94%	92%	89%	86%	82%	78%	73%	67%	61%	55%	49%	42%	36%	31%	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
2554	2549	2535	2513	2481	2443	2395	2338	2270	2189	2095	1985	1861	1719	1567	1403	1243	1081	931	793	cd
100%	100%	99%	98%	97%	96%	94%	92%	89%	86%	82%	78%	73%	67%	61%	55%	49%	42%	36%	31%	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
2554	2549	2535	2513	2481	2443	2395	2338	2270	2189	2095	1985	1861	1719	1567	1403	1243	1081	931	793	cd
100%	100%	99%	98%	97%	96%	94%	92%	89%	86%	82%	78%	73%	67%	61%	55%	49%	42%	36%	31%	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
2554	2549	2535	2513	2481	2443	2395	2338	2270	2189	2095	1985	1861	1719	1567	1403	1243	1081	931	793	cd
100%	100%	99%	98%	97%	96%	94%	92%	89%	86%	82%	78%	73%	67%	61%	55%	49%	42%	36%	31%	of 0°val

Document revision date: 1-7-2025 Measurement serial: VFR-250122-0722-MS

136-121 Reflector downlight eco | white | Ø232mm | 20/28W | 3-CCT

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										
X **Y**	**Viewed Crosswise** (Viewing direction orthogonal to lamp length axis)					**Viewed Endwise** (Viewing direction parallel to lamp length axis)				
2H 2H	18.8	19.5	18.9	19.7	19.9	18.8	19.5	18.9	19.7	19.9
3H	18.5	19.3	18.9	19.5	19.7	18.5	19.3	18.9	19.5	19.7
4H	18.4	19.2	18.8	19.4	19.7	18.4	19.2	18.8	19.4	19.7
6H	18.4	19.1	18.7	19.4	19.7	18.4	19.1	18.7	19.4	19.7
8H	18.4	19.0	18.7	19.3	19.7	18.4	19.0	18.7	19.3	19.7
12H	18.3	18.9	18.7	19.3	19.7	18.3	18.9	18.7	19.3	19.7
4H 2H	18.4	19.2	18.8	19.4	19.7	18.4	19.2	18.8	19.4	19.7
3H	18.3	18.9	18.7	19.3	19.7	18.3	18.9	18.7	19.3	19.7
4H	18.2	18.7	18.6	19.2	19.7	18.2	18.7	18.6	19.2	19.7
6H	18.1	18.7	18.6	19.0	19.4	18.1	18.7	18.6	19.0	19.4
8H	18.0	18.6	18.6	18.9	19.3	18.0	18.6	18.6	18.9	19.3
12H	18.0	18.4	18.5	18.8	19.3	18.0	18.4	18.5	18.8	19.3
8H 4H	18.0	18.6	18.6	18.9	19.3	18.0	18.6	18.6	18.9	19.3
6H	18.0	18.3	18.5	18.8	19.3	18.0	18.3	18.5	18.8	19.3
8H	18.0	18.3	18.5	18.8	19.4	18.0	18.3	18.5	18.8	19.4
12H	17.9	18.2	18.5	18.7	19.3	17.9	18.2	18.5	18.7	19.3
12H 4H	18.0	18.4	18.5	18.8	19.3	18.0	18.4	18.5	18.8	19.3
6H	18.0	18.3	18.5	18.8	19.4	18.0	18.3	18.5	18.8	19.4
8H	17.9	18.2	18.5	18.7	19.3	17.9	18.2	18.5	18.7	19.3

Variations with the observer position for the luminaire spacings. S:		
S = 1.0H	3.4 / -14.0	3.4 / -14.0
S = 1.5H	5.8 / -15.1	5.8 / -15.1
S = 2.0H	7.7 / -15.5	7.7 / -15.5

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	113	110	108	105	111	108	106	104	104	102	100	100	99	97	97	96	95	93
2	107	102	98	94	105	100	97	93	97	94	91	94	91	89	91	89	87	86
3	101	95	89	85	99	93	88	85	91	87	83	88	85	82	86	83	81	79
4	96	88	82	78	94	87	81	77	85	80	76	83	79	75	81	77	74	73
5	91	82	76	71	89	81	75	71	79	74	70	77	73	70	76	72	69	67
6	86	76	70	66	84	76	70	65	74	69	65	73	68	64	71	67	64	62
7	81	71	65	61	80	71	65	60	69	64	60	68	63	60	67	63	59	58
8	77	67	61	56	76	66	60	56	65	60	56	64	59	56	63	59	55	54
9	73	63	57	52	72	62	56	52	61	56	52	60	55	52	59	55	52	50
10	69	59	53	49	68	59	53	49	58	52	49	57	52	49	56	52	48	47