PHOTOMETRIC LIGHT REPORT

# Ground spot | 145mm | 10.3W | asymmetrical | 3000K

**Article number: 140-074**

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TRONIX

# 140-074 Ground spot | 145mm | 10.3W | asymmetrical | 3000K

## Introduction

### Purpose of this Document

This document provides accurate and objective photometric data for Tronix Lighting item 140-074. 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 140-074 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 140-074 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<br>(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<br>(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 | 8 planes – 45° |
| γ (gamma)-Resolution | 5° |
| Test Distance | 1.14 m |
| Room Temperature and Humidity | 22°C +/- 10% – RH 50% +/- 20% |
| Input Power. Power and Displacement Factors | 10.2 W – PF 0.93 – DPF 0.95 |
| Frequency of Input Power | 50 Hz |
| Warm-up Time and Variation | Lamp stabilized in 15 min 1 sec –-0.8% |

## Tested light source

| | |
|---|---|
| Manufacturer and Order Code | Tronix Lighting – 140-074 |
| Product Description | Ground spot \| 145mm \| 10.3W \| asymmetrical \| 3000K |

## Main Light Measurement Results

| | |
|---|---|
| Output – Total Lumen (Up% / Down%) | 413 lm – 0% / 100% |
| Efficiency | 40 lm/W |
| Energy efficiency class | G |
| Peak Intensity and Beam Angle | 370 cd – 61.5° |
| Correlated Colour Temperature | CCT = 3161 K |
| Colour Shift. CIE duv | Duv 0.0027 |
| Colour Rendering Index | CRI 84.8 |
| Colour Rendering TM30-18 | $R_f$ 87.3 – $R_g$ 94.9 |
| Television Lighting Consistency Index | TLCI = 74 |
| Flicker | SVM 0.02 – PstLM 0.1 |

Document revision date: 14-7-2025 Measurement serial: VFR-250714-10448-SW

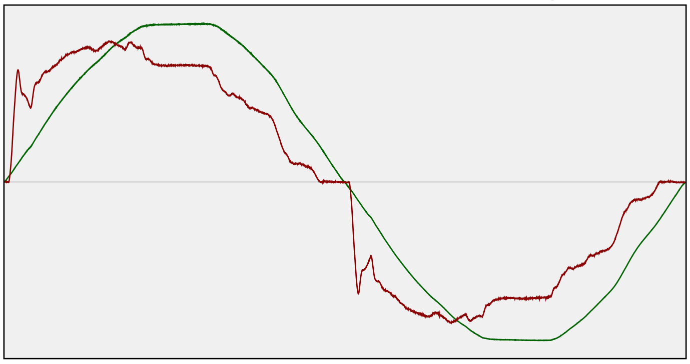
# 140-074 Ground spot | 145mm | 10.3W | asymmetrical | 3000K

## Electrical measurement details

### Input Power

| | |
|---|---|
| RMS Input voltage feed. $V_{RMS}$ | 232 V |
| RMS Input current feed. $I_{RMS}$ | 0.047 A |
| Total input power | 10.2 W |
| Frequency of input power | 50 Hz |
| Power factor | 0.93 |
| Displacement power factor | 0.95 |
| Total harmonic distortion of the current | 16.1% |
| Total harmonic distortion of the voltage | 2.42% |

**Input Power Curve** Voltage - Current



### Efficiency

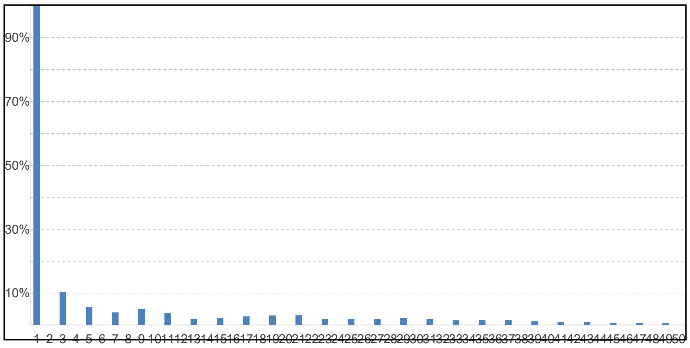
Radiated power efficiency: 12.3%

Lumen efficiency: 40 lm/W

### Harmonics

| | |
|---|---|
| 3rd Harmonic | 10.38% |
| 5th Harmonic | 5.56% |
| 7th Harmonic | 3.95% |
| 9th Harmonic | 5.08% |
| 11th Harmonic | 3.79% |

**Current Harmonics %**



## Stabilization Details

### Warm-up Conditions

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

### Colour temperature change during warm-up

| | |
|---|---|
| CCT start | 3162 K |
| CCT shift | -1 K |
| CCT end | 3161 K |

### Warm-up Results

| | |
|---|---|
| Total warmup time | Lamp stabilized in 15 min 1 sec |
| Warmup variation | -0.8% |

### Output intensity change during warm-up

| | |
|---|---|
| Output start | 416 lm |
| Output change | -3 lm |
| Output end | 413 lm |

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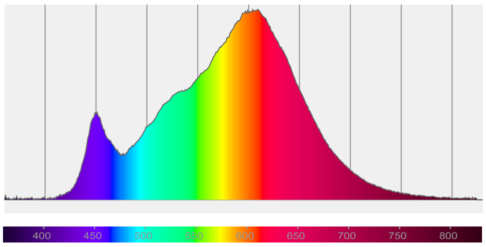
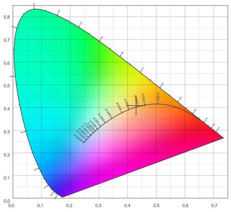
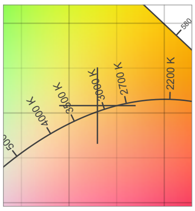
## Colour measurement details

| | |
|---|---|
| Total lumen output | 413 lm |
| Correlated Colour Temperature | 3161 K |
| Colour coordinates CIE 1931 | (x;y) = (0.430;0.408) |
| Colour deviation from BBL | Duv = 0.0027 |
| TM30-18 Colour Fidelity Index | $R_f$ 87.3 |
| TM30-18 Colour Gamut Index | $R_g$ 94.9 |
| Colour Rendering Index (Ra) | CRI 84.8 |
| Colour Rendering Index. (red component) | R9 = 12.7 |
| Colour Quality Scale | CQS = 84.7 |
| Television Lighting Consistency Index | TLCI = 74 |

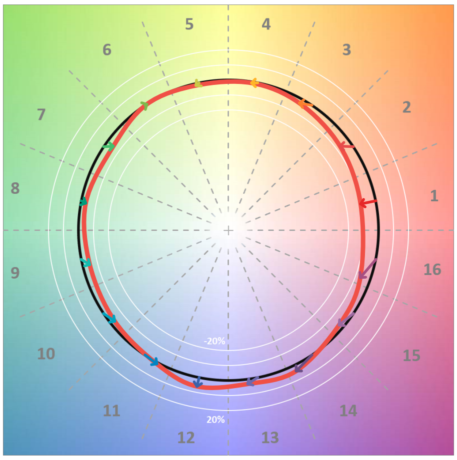


Relative spectral power distribution





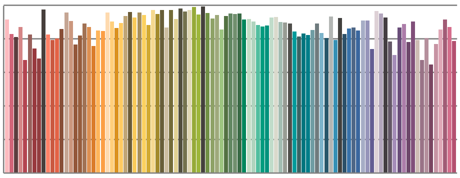
## TM30 details



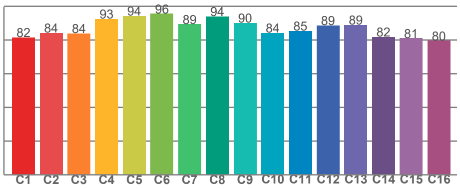
TM30 Colour vectors per hue bin

TM30 Colour distortion

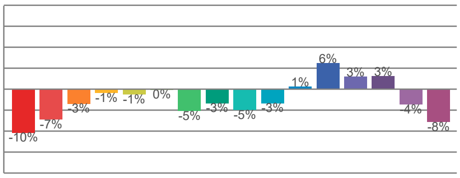
| | | Shifts (%) | |
|---|---|---|---|
| Hue Bin | $R_f$ | Chroma | Hue |
| C1 | 82 | -10% | 0% |
| C2 | 84 | -7% | 5% |
| C3 | 84 | -3% | 8% |
| C4 | 93 | -1% | 4% |
| C5 | 94 | -1% | 2% |
| C6 | 96 | 0% | -1% |
| C7 | 89 | -5% | -4% |
| C8 | 94 | -3% | 1% |
| C9 | 90 | -5% | 5% |
| C10 | 84 | -3% | 8% |
| C11 | 85 | 1% | 10% |
| C12 | 89 | 6% | 0% |
| C13 | 89 | 3% | -7% |
| C14 | 82 | 3% | -15% |
| C15 | 81 | -4% | -12% |
| C16 | 80 | -8% | -14% |



TM30-18 Rf-values per reference colour

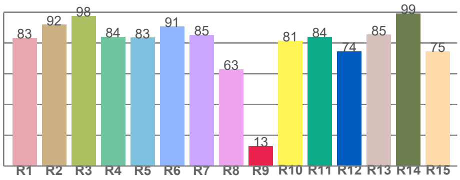


TM30-18 Rf-values per hue bin

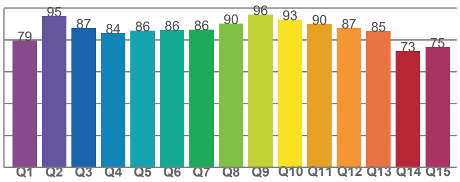


TM30 Chroma shift

## Colour Quality details



Colour Rendering Index



Colour Qualitity Scale

Document revision date: 14-7-2025 Measurement serial: VFR-250714-10448-SW

# 140-074 Ground spot | 145mm | 10.3W | asymmetrical | 3000K

## 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)**

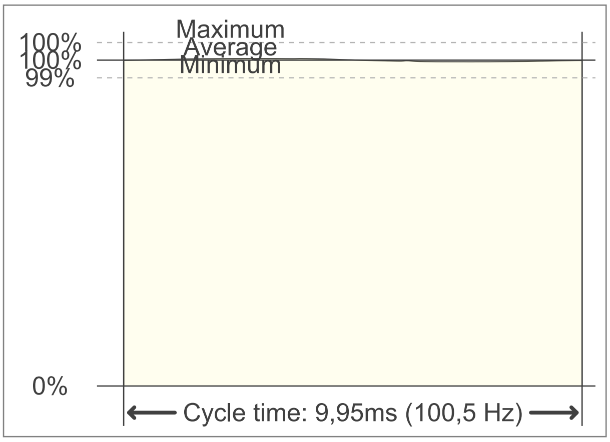
| | |
|---|---|
| Flicker frequency | 100.5 Hz |
| Percent flicker | 0.6 % |
| Flicker index | 0 |

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

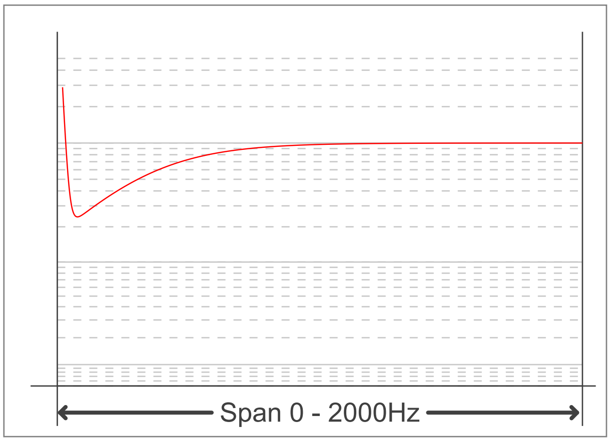
An LED luminaire is considered flicker-free if the SVM value is <= 0.4 and if the PstLM value is <=1.0

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

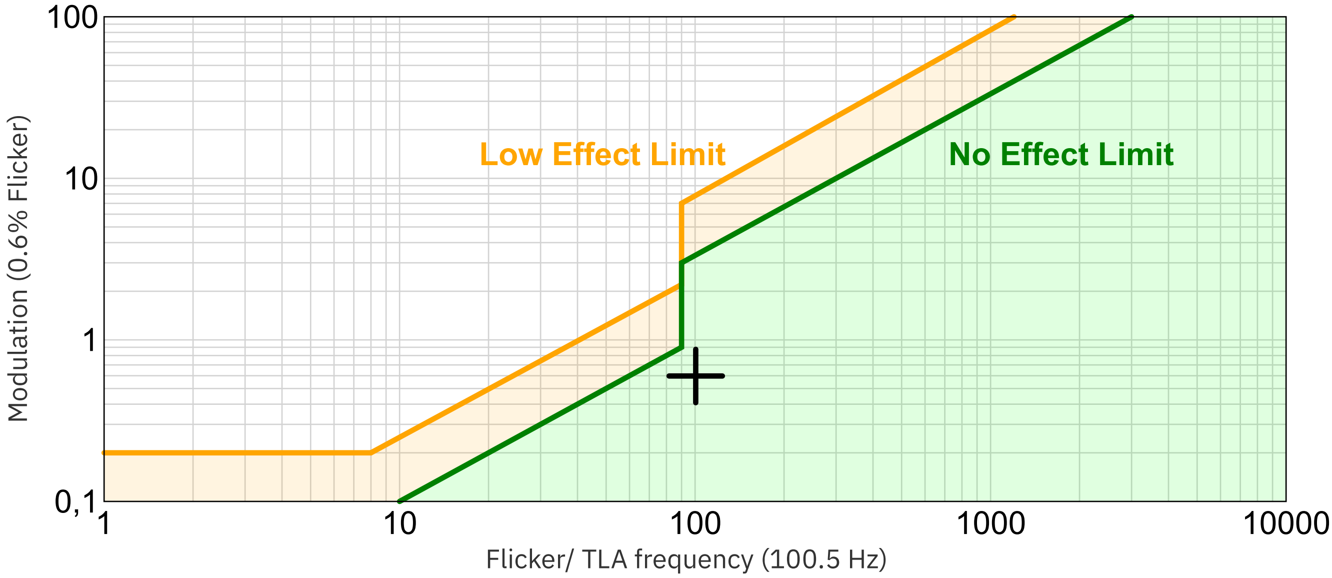
**Flicker frame (one flicker period in time domain)**



**Flicker FFT (flicker curve in frequency domain)**



**IEEE 1789-2015 Lighting Flicker Risk Zones**



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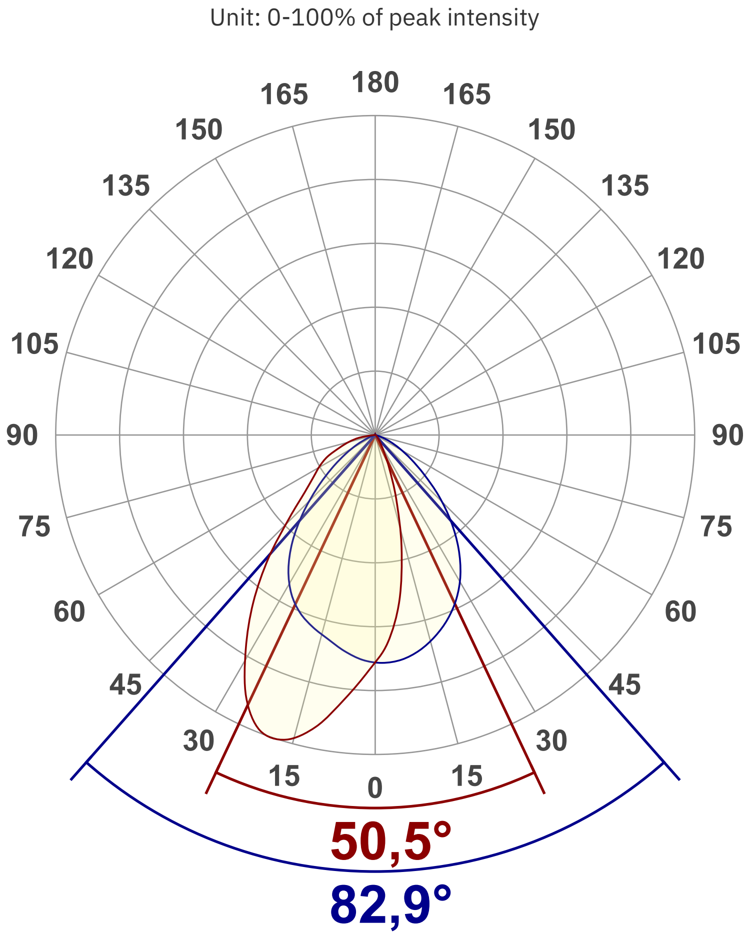
## Beam angle

**Luminous Intensity diagram**



**Main Values**

| | |
|---|---|
| Output (total Lumen) | 413 lm |
| Lumen Up/Down | 0% / 100% |
| Peak Intensity | 370 cd |
| Beam Angle (50%) | 61.5° |
| Beam Angle (90%) | 82.9° |
| Beam Angle (10%) | 50.5° |

**Cut-off Angle**

| | |
|---|---|
| Average 2.5% | 124.4° |

**Field Angle**

| | |
|---|---|
| Average 10% | 104.1° |

**Intensity Ratio**

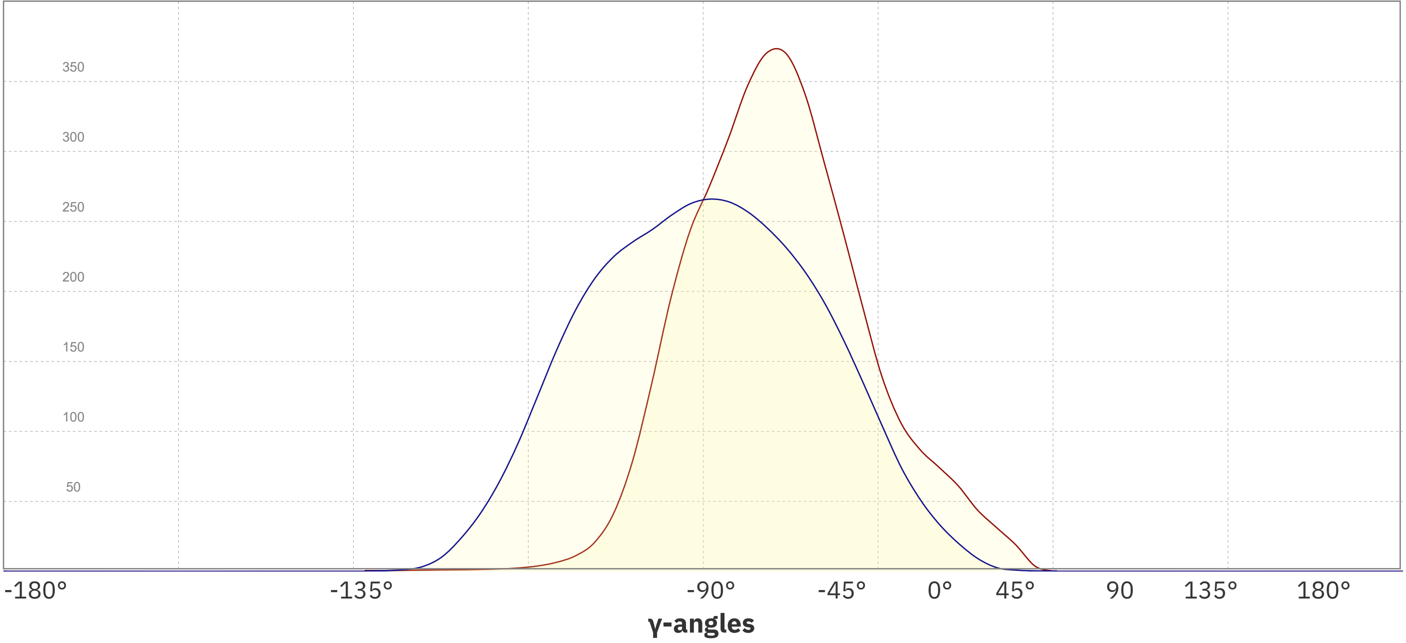
| | |
|---|---|
| In 120° cone | 91.6% |
| In 90° cone | 74.4% |

**C planes**

C000-C180

C090-C270

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



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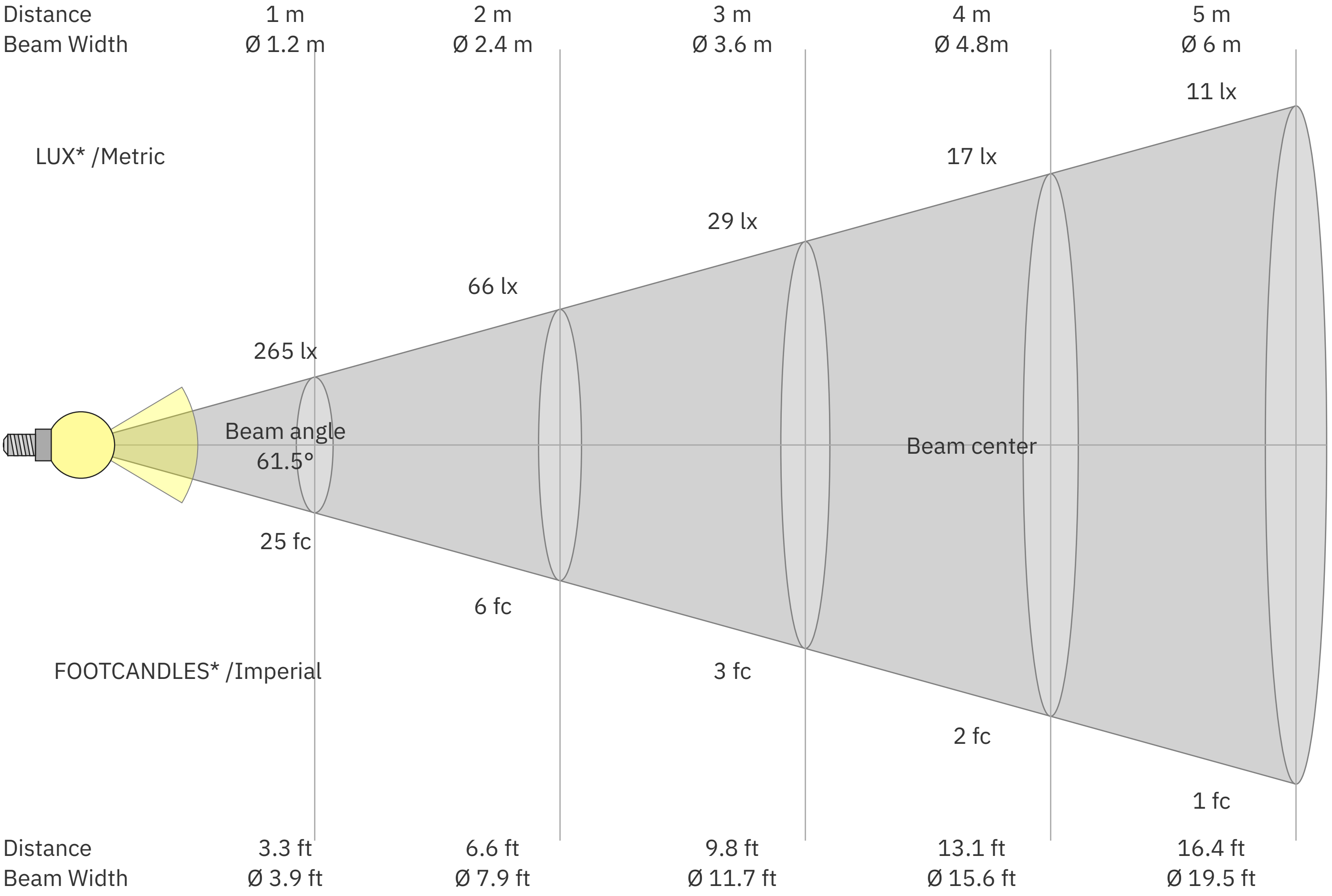
## Beam Details



*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 |
| 265 | 66 | 29 | 17 | 11 | 7 | 5 | 4 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | lux |
| 24.6 | 6.2 | 2.7 | 1.5 | 1 | 0.7 | 0.5 | 0.4 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 265 | 228 | 174 | 114 | 65 | 33 | 17 | 9 | 5 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | cd |
| 100% | 86% | 66% | 43% | 24% | 13% | 6% | 3% | 2% | 1% | 1% | 1% | 0% | 0% | 0% | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 265 | 265 | 259 | 249 | 235 | 218 | 197 | 171 | 142 | 110 | 80 | 55 | 36 | 22 | 11 | 3 | 1 | 0 | 0 | 0 | cd |
| 100% | 100% | 98% | 94% | 89% | 82% | 74% | 65% | 54% | 42% | 30% | 21% | 14% | 8% | 4% | 1% | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 265 | 299 | 336 | 364 | 370 | 348 | 303 | 252 | 200 | 149 | 112 | 90 | 76 | 63 | 46 | 32 | 20 | 5 | 0 | 0 | cd |
| 100% | 113% | 127% | 137% | 140% | 131% | 115% | 95% | 75% | 56% | 42% | 34% | 29% | 24% | 17% | 12% | 8% | 2% | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 265 | 260 | 251 | 241 | 231 | 218 | 200 | 174 | 143 | 109 | 78 | 52 | 32 | 16 | 6 | 2 | 1 | 0 | 0 | 0 | cd |
| 100% | 98% | 95% | 91% | 87% | 82% | 75% | 66% | 54% | 41% | 29% | 20% | 12% | 6% | 2% | 1% | 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** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 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**<br>H = mounting height above eye level<br>**X** **Y** | **Viewed Crosswise**<br>(Viewing direction orthogonal to lamp length axis) | | | | | **Viewed Endwise**<br>(Viewing direction parallel to lamp length axis) | | | | |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |

| **Variations with the observer position for the luminaire spacings. S:** | | |
|---|---|---|
| n/a | n/a | n/a |
| n/a | n/a | n/a |
| n/a | n/a | n/a |

## 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 | 111 | 108 | 104 | 101 | 109 | 105 | 102 | 100 | 101 | 99 | 97 | 97 | 96 | 94 | 94 | 92 | 91 | 89 |
| 2 | 103 | 97 | 92 | 87 | 101 | 95 | 90 | 86 | 92 | 88 | 84 | 89 | 85 | 82 | 86 | 83 | 80 | 79 |
| 3 | 96 | 88 | 81 | 76 | 94 | 86 | 80 | 75 | 83 | 78 | 74 | 81 | 76 | 73 | 78 | 75 | 71 | 70 |
| 4 | 89 | 80 | 72 | 67 | 87 | 78 | 72 | 66 | 76 | 70 | 65 | 74 | 69 | 65 | 72 | 67 | 64 | 62 |
| 5 | 83 | 73 | 65 | 59 | 81 | 72 | 64 | 59 | 70 | 63 | 59 | 68 | 62 | 58 | 66 | 61 | 57 | 56 |
| 6 | 78 | 67 | 59 | 53 | 76 | 66 | 58 | 53 | 64 | 58 | 53 | 62 | 57 | 52 | 61 | 56 | 52 | 50 |
| 7 | 73 | 61 | 54 | 48 | 71 | 60 | 53 | 48 | 59 | 53 | 48 | 58 | 52 | 48 | 56 | 51 | 47 | 46 |
| 8 | 68 | 57 | 49 | 44 | 67 | 56 | 49 | 44 | 55 | 48 | 44 | 54 | 48 | 44 | 53 | 47 | 43 | 42 |
| 9 | 64 | 53 | 45 | 40 | 63 | 52 | 45 | 40 | 51 | 45 | 40 | 50 | 44 | 40 | 49 | 44 | 40 | 38 |
| 10 | 61 | 49 | 42 | 37 | 60 | 49 | 42 | 37 | 48 | 41 | 37 | 47 | 41 | 37 | 46 | 41 | 37 | 35 |

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