

# Test report

Light measurement results

## Laboratory and Equipment

Test lab  
Spectrometer Manufacturer and Model  
Measurement date

Viso LightSpion - Seriennummer: 1435906163 Sensorseriennumm  
LightSpion – Type C, horizontal  
24.09.2026

## Measurement Conditions

Tested c-planes  
Tested gamma resolution  
Input Power  
Input RMS Voltage and Current

4 planes – 90.00°  
7.50°  
14.32 W  
24 V – 0.60 A

## Tested Light Source

Luminaire  
Item No.  
Manufacturer  
Measured length  
Dimension (Lamp w x h) | (Light w x h)  
Description

NEON FLEX 3D 1616 24V 15W WW 1m 260716  
ANF3D161615W06  
awLed by audiowerk GmbH  
1000mm  
16mm x 16mm | 16mm x 16mm  
Charge: 260716

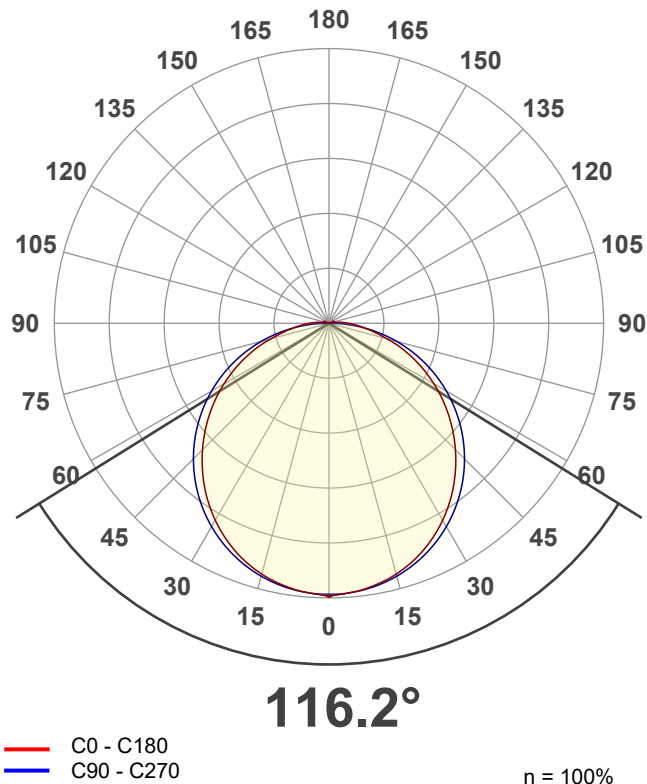
## Main Light Measurement Results

Output – Total Lumen (Up% / Down%)  
Efficiency  
Peak Intensity  
Correlated Color Temperature, CCT  
Color Rendering Index  
Ecodesign Energy Class

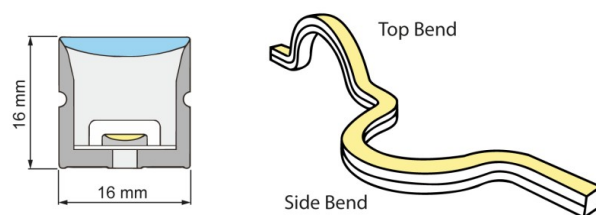
1272 lm – 1.152% / 98.85%  
88.82 lm/W  
414.3 cd  
3000 K  
CRI 95.2  
G

## Polar light distribution diagram

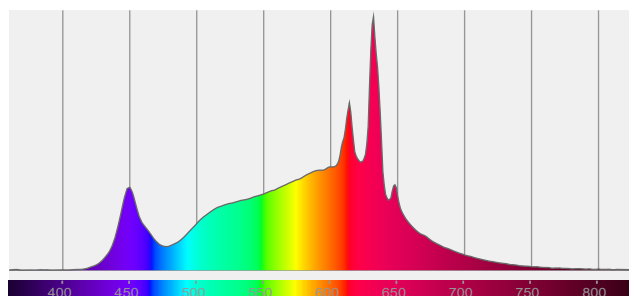
Unit: 0-100% of peak intensity



## Product photo



## Spectral power distribution

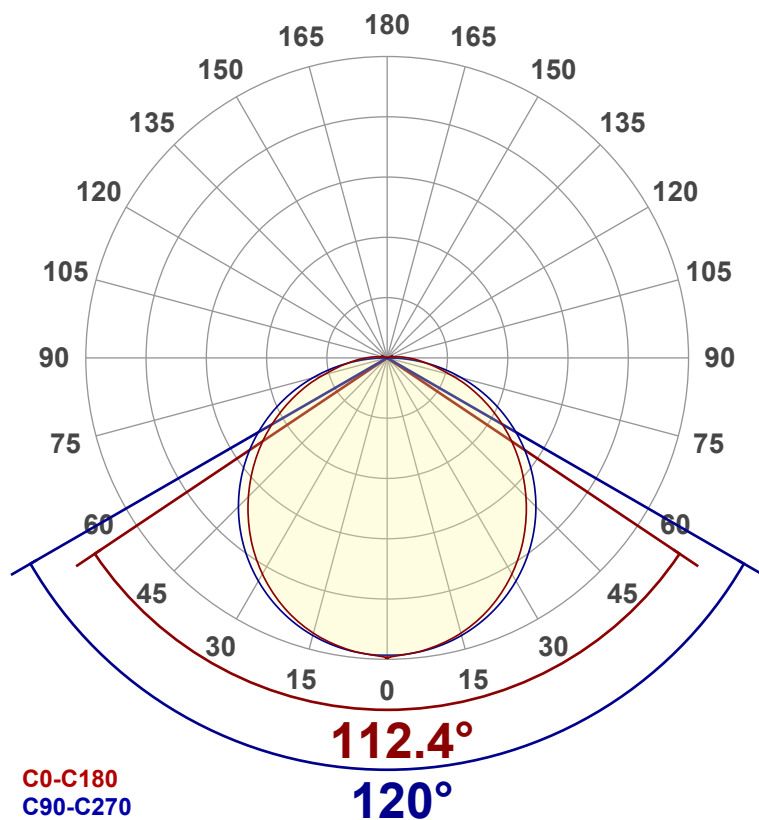


# Test report

Light measurement results

## Luminous Intensity diagram

Unit: 0-100% of peak intensity



## Main Values

|                       |                 |
|-----------------------|-----------------|
| Output (total Lumen)  | 1272 lm         |
| Lumen Up% / Down%     | 1.152% / 98.85% |
| Peak Intensity        | 414.3 cd        |
| Beam Angle (50%-FWHM) | 116.2°          |

## EU Ecodesign parameters

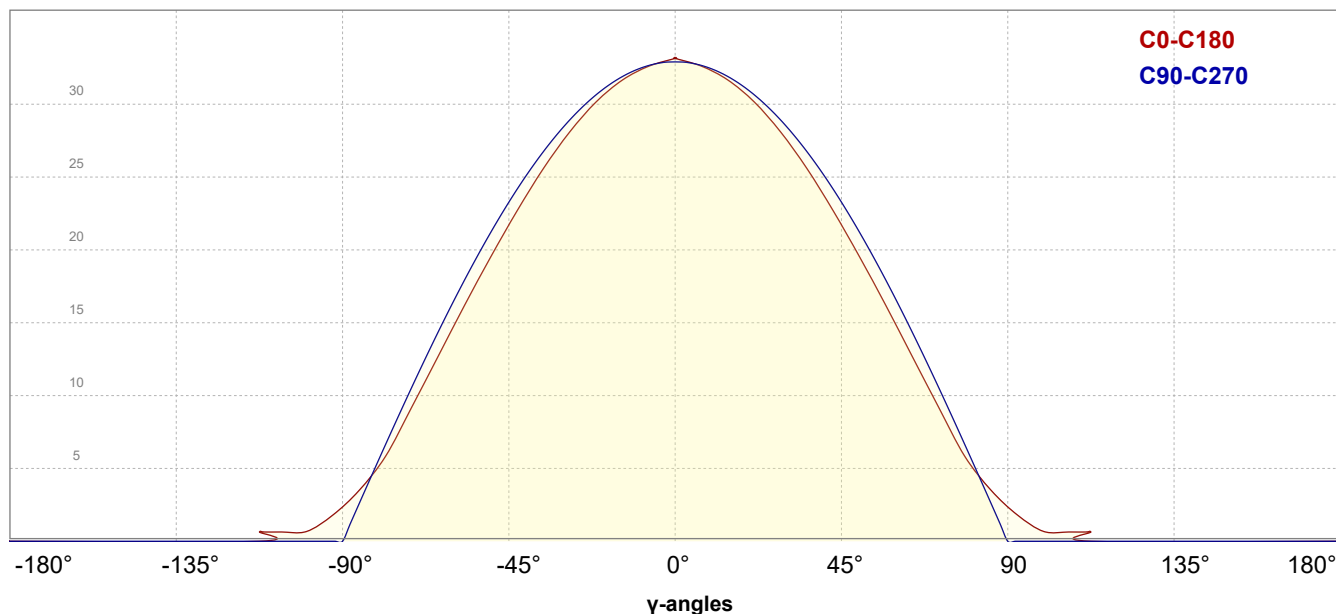
|                                |         |
|--------------------------------|---------|
| Directionality (DLS or NDLS)   | NDLS    |
| Ecodesign Useful Luminous Flux | 1272 lm |
| Ecodesign Energy Class         | G       |

## Intensity Ratio

|              |        |
|--------------|--------|
| In 120° cone | 74.37% |
| In 90° cone  | 50.01% |

## Linear distribution diagram

Intensity [cd]



# Test report

Light measurement results

## Color details

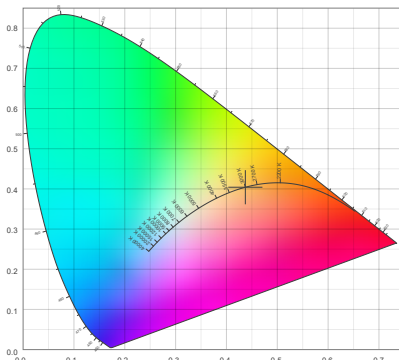
Correlated Color Temperature, Target  
Correlated Color Temperature, Measured  
Color Rendering Index  
Color Rendering Index, R9 (red)  
Color Rendering TM30-18

CCT = 3000 K  
CCT = 2979 K  
CRI 95.2  
R9 = 70.6  
Rf 91.1  
Rg 103.6

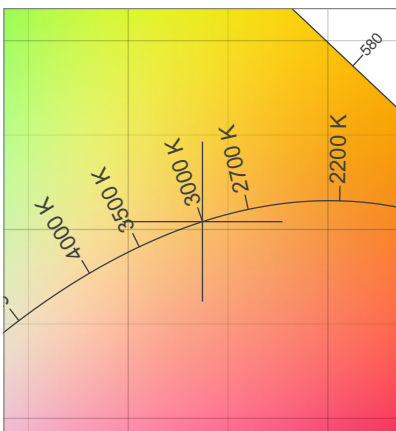
MacAdam Steps  
Color deviation from BBL  
Color coordinates CIE 1931  
Color coordinate CIEs 1960  
Color coordinate CIEs 1976  
Color Quality Scale

SDCM = 4.7  
Duv = -0.0049  
(x;y) = (0.4372;0.4042)  
(u;v) = (0.2507;0.3476)  
(u';v') = (0.2507;0.5215)  
CQS = 90.8

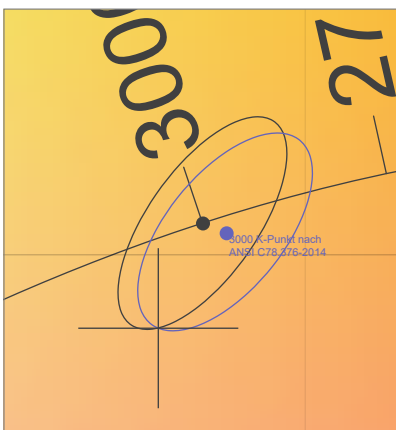
## CIE 1931 Chromaticity diagram



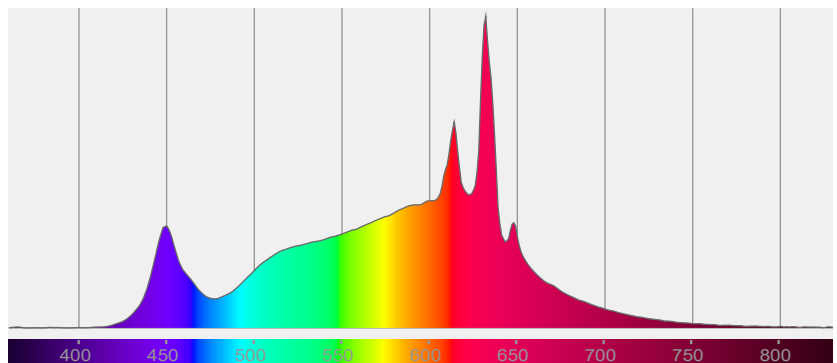
## CIE 1931 Chromaticity - zoomed



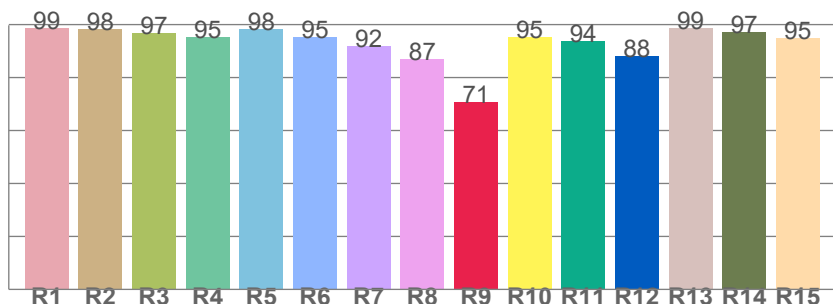
## CIE 1931 Chromaticity - SDCM



## Spectral power distribution



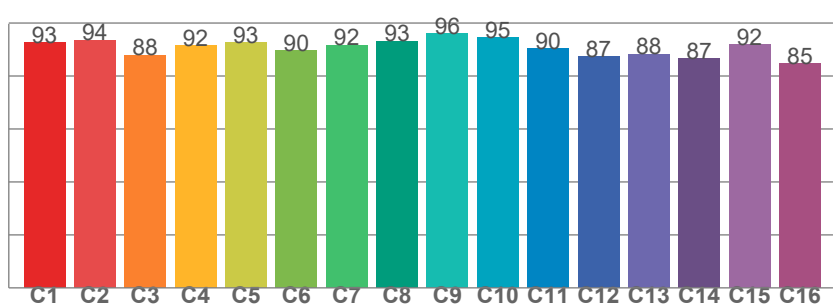
## Color Rendering Index per reference color (CIE 1995)



CRI R values, only R1-R8 are used to calculate final CRI value

| R1   | R2   | R3   | R4   | R5   | R6   | R7   | R8   | R9   | R10  | R11  | R12  | R13  | R14  | R15  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 98.6 | 98.3 | 96.8 | 95.4 | 98.4 | 95.1 | 92.0 | 87.0 | 70.6 | 95.3 | 93.8 | 88.2 | 98.6 | 97.0 | 95.0 |

## TM30-18 Rf-values per hue bin

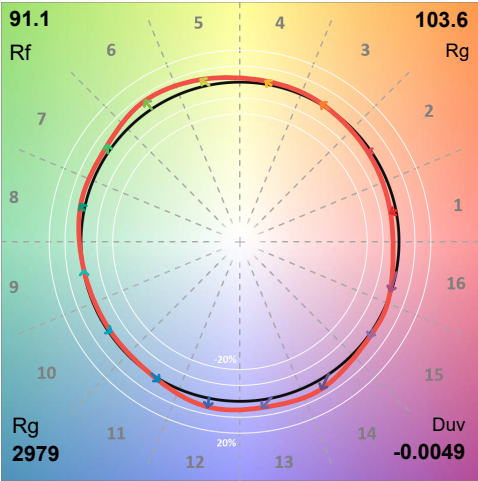


TM30-18 Rf-values per hue bin

| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 92.5 | 93.6 | 88.0 | 91.6 | 92.6 | 89.6 | 91.8 | 93.2 | 96.0 | 94.6 | 90.3 | 87.4 | 88.3 | 86.7 | 92.0 | 84.8 |

Color details - ANSI/IES TM-30-18 Color Rendition Report

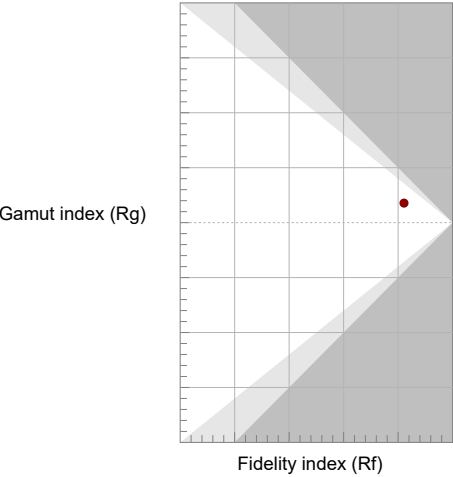
Color Vector Graphic



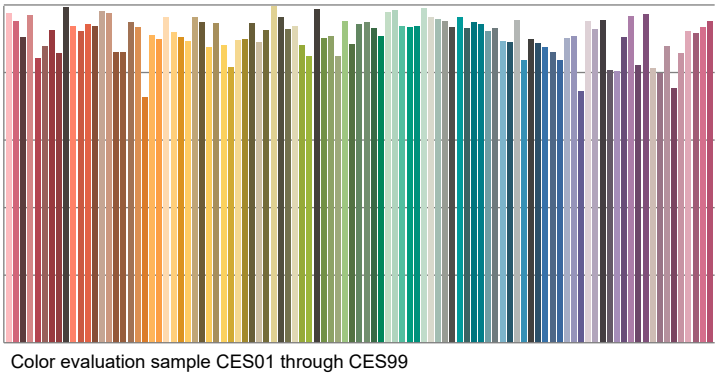
Color Distortion Graphic



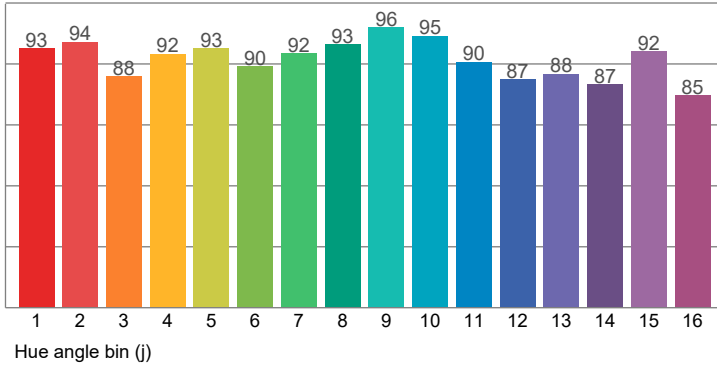
Gamut Index vs. Fidelity Index



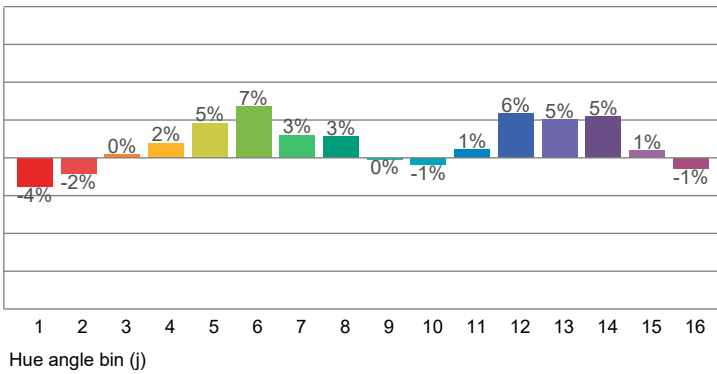
Color Rendition by Color Evaluation Sample (CES)



Local Color Fidelity (per hue bin)



Local Chroma Shift (per hue bin)



CIE x 0.4372  
CIE y 0.4042  
CIE u' 0.2507  
CIE v' 0.5215

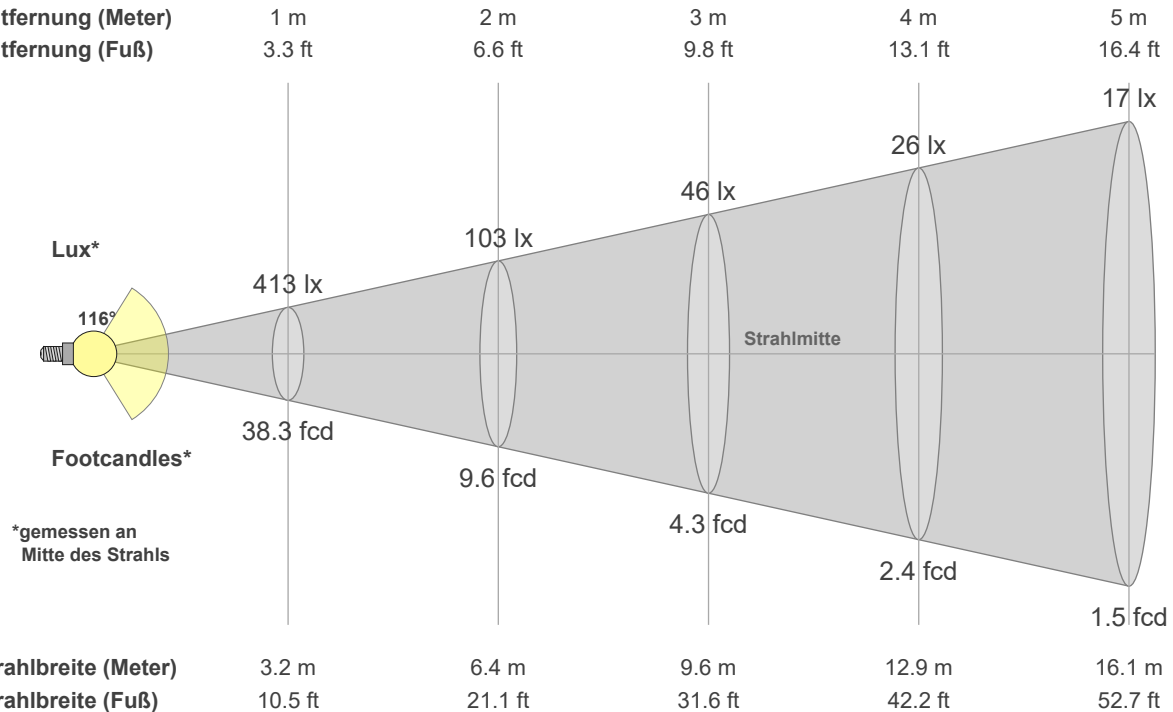
CIE 13.3-1995

Ra 95.2  
R9 70.6

# Test report

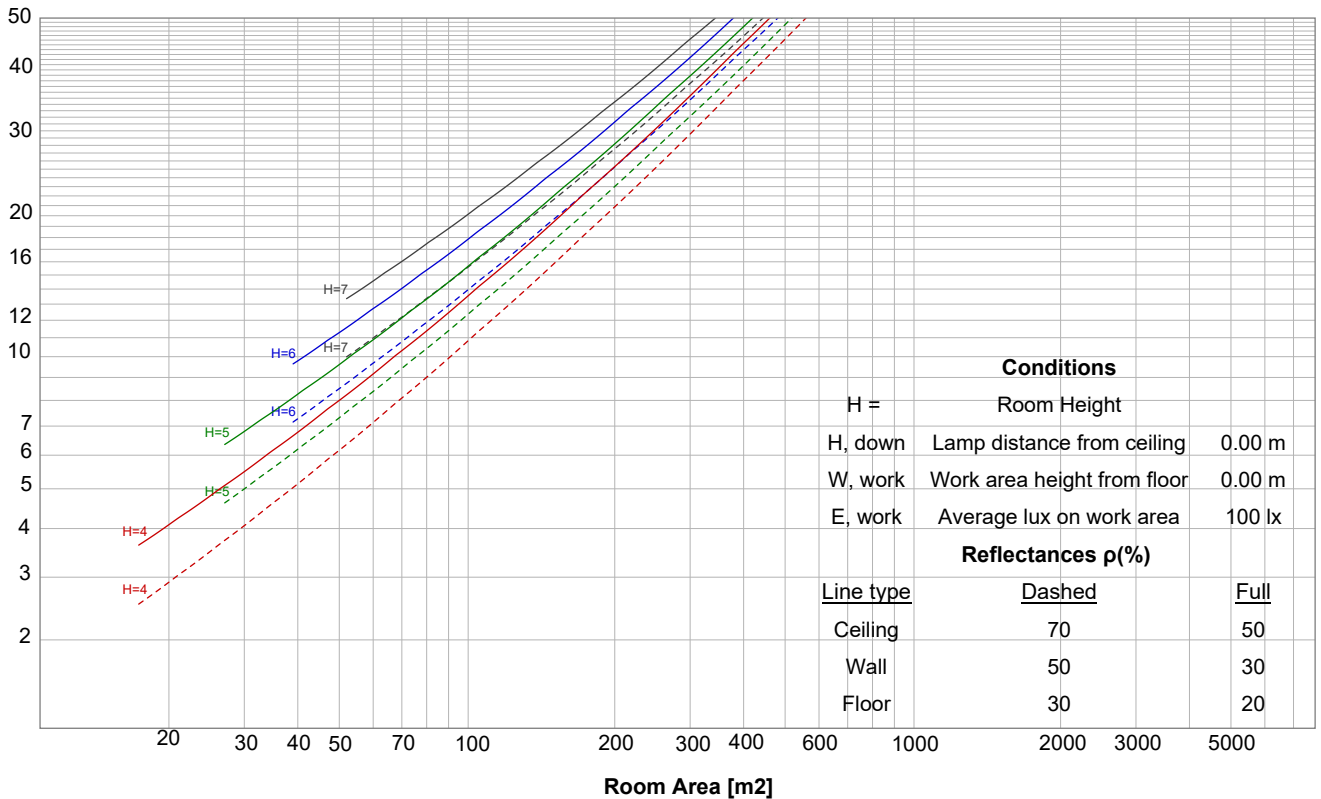
Light measurement results

## Beam details



## Luminaire budgetary diagram

LAMPS (number of lamps)



## Intensity 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  |
| 413  | 103 | 46  | 26   | 17   | 11   | 8   | 6    | 5    | 4    | 3    | 3    | 2    | 2    | 2    | 2    | 1    | 1    | 1    | 1    | lux |
| 38.3 | 9.6 | 4.3 | 2.4  | 1.5  | 1.1  | 0.8 | 0.6  | 0.5  | 0.4  | 0.3  | 0.3  | 0.2  | 0.2  | 0.2  | 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        |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------|
| 413  | 410 | 403 | 394 | 381 | 364 | 345 | 323 | 298 | 271 | 243 | 214 | 184 | 153 | 123 | 93  | 66  | 46  | 30  | 18  | cd       |
| 100% | 99% | 98% | 95% | 92% | 88% | 84% | 78% | 72% | 66% | 59% | 52% | 45% | 37% | 30% | 23% | 16% | 11% | 7%  | 4%  | 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        |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------|
| 413  | 410 | 405 | 397 | 387 | 373 | 356 | 337 | 315 | 291 | 264 | 236 | 206 | 174 | 141 | 106 | 71  | 36  | 0   | 0   | cd       |
| 100% | 99% | 98% | 96% | 94% | 90% | 86% | 82% | 76% | 70% | 64% | 57% | 50% | 42% | 34% | 26% | 17% | 9%  | 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        |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------|
| 413  | 410 | 403 | 394 | 381 | 364 | 345 | 323 | 298 | 271 | 243 | 214 | 184 | 153 | 123 | 93  | 66  | 46  | 30  | 18  | cd       |
| 100% | 99% | 98% | 95% | 92% | 88% | 84% | 78% | 72% | 66% | 59% | 52% | 45% | 37% | 30% | 23% | 16% | 11% | 7%  | 4%  | 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        |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------|
| 413  | 410 | 405 | 397 | 387 | 373 | 356 | 337 | 315 | 291 | 264 | 236 | 206 | 174 | 141 | 106 | 71  | 36  | 0   | 0   | cd       |
| 100% | 99% | 98% | 96% | 94% | 90% | 86% | 82% | 76% | 70% | 64% | 57% | 50% | 42% | 34% | 26% | 17% | 9%  | 0%  | 0%  | of 0°val |

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## UGR Table

Corrected, comprehensive UGR table according to 117-1995, S/H ratio=0.25

| 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                                                            |     |           | 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  |           | 20.5                                               | 21.7 | 20.8 | 22.1 | 22.3 | 22.6                                             | 23.8 | 22.9 | 24.2 | 24.4 |
|                                                                      | 3H  |           | 21.6                                               | 22.9 | 22.1 | 23.2 | 23.5 | 24.3                                             | 25.6 | 24.8 | 25.9 | 26.2 |
|                                                                      | 4H  |           | 22.1                                               | 23.3 | 22.5 | 23.6 | 23.9 | 25.1                                             | 26.4 | 25.6 | 26.7 | 27.0 |
|                                                                      | 6H  |           | 22.5                                               | 23.6 | 22.8 | 23.9 | 24.3 | 25.9                                             | 27.0 | 26.2 | 27.3 | 27.7 |
|                                                                      | 8H  |           | 22.6                                               | 23.7 | 23.0 | 24.0 | 24.4 | 26.1                                             | 27.2 | 26.5 | 27.5 | 27.9 |
|                                                                      | 12H |           | 22.7                                               | 23.7 | 23.1 | 24.1 | 24.6 | 26.3                                             | 27.3 | 26.7 | 27.7 | 28.2 |
| 4H                                                                   | 2H  |           | 21.2                                               | 22.4 | 21.6 | 22.7 | 23.0 | 22.9                                             | 24.1 | 23.3 | 24.4 | 24.7 |
|                                                                      | 3H  |           | 22.6                                               | 23.7 | 23.0 | 24.0 | 24.5 | 24.9                                             | 25.9 | 25.3 | 26.2 | 26.7 |
|                                                                      | 4H  |           | 23.1                                               | 24.1 | 23.6 | 24.5 | 25.1 | 25.7                                             | 26.7 | 26.2 | 27.1 | 27.6 |
|                                                                      | 6H  |           | 23.6                                               | 24.5 | 24.1 | 24.9 | 25.3 | 26.5                                             | 27.4 | 27.0 | 27.8 | 28.2 |
|                                                                      | 8H  |           | 23.7                                               | 24.6 | 24.2 | 24.9 | 25.4 | 26.8                                             | 27.6 | 27.3 | 28.0 | 28.4 |
|                                                                      | 12H |           | 23.8                                               | 24.5 | 24.4 | 25.0 | 25.5 | 27.0                                             | 27.7 | 27.5 | 28.1 | 28.6 |
| 8H                                                                   | 4H  |           | 23.5                                               | 24.3 | 24.0 | 24.7 | 25.1 | 25.8                                             | 26.6 | 26.3 | 27.0 | 27.4 |
|                                                                      | 6H  |           | 24.1                                               | 24.7 | 24.6 | 25.2 | 25.8 | 26.7                                             | 27.3 | 27.2 | 27.8 | 28.4 |
|                                                                      | 8H  |           | 24.3                                               | 24.9 | 24.8 | 25.4 | 26.1 | 27.1                                             | 27.6 | 27.6 | 28.2 | 28.8 |
|                                                                      | 12H |           | 24.5                                               | 25.0 | 25.1 | 25.5 | 26.2 | 27.4                                             | 27.9 | 28.0 | 28.4 | 29.0 |
| 12H                                                                  | 4H  |           | 23.5                                               | 24.2 | 24.0 | 24.6 | 25.1 | 25.8                                             | 26.5 | 26.3 | 26.9 | 27.4 |
|                                                                      | 6H  |           | 24.2                                               | 24.7 | 24.7 | 25.3 | 25.9 | 26.7                                             | 27.3 | 27.2 | 27.8 | 28.5 |
|                                                                      | 8H  |           | 24.4                                               | 24.9 | 25.0 | 25.4 | 26.1 | 27.1                                             | 27.6 | 27.7 | 28.1 | 28.7 |
| Variations with the observer position for the luminaire spacings, S: |     |           |                                                    |      |      |      |      |                                                  |      |      |      |      |
| S = 1.0H                                                             |     |           | 0.1 / -0.2                                         |      |      |      |      | 0.1 / -0.1                                       |      |      |      |      |
| S = 1.5H                                                             |     |           | 0.2 / -0.4                                         |      |      |      |      | 0.4 / -0.4                                       |      |      |      |      |
| S = 2.0H                                                             |     |           | 0.5 / -0.7                                         |      |      |      |      | 0.8 / -0.9                                       |      |      |      |      |

## 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    | 20   |
| RCR                 |       | (Room Cavity Ratio) |       |       |       | Room values are expressed as percentage of Lumen delivered to the task surface |       |       |       |       |       |       |       |       |       |       |       |      |
| 0                   | 118.8 | 118.8               | 118.8 | 118.8 | 115.9 | 115.9                                                                          | 115.9 | 115.9 | 110.5 | 110.5 | 110.5 | 105.5 | 105.5 | 105.5 | 101.0 | 101.0 | 101.0 | 98.8 |
| 1                   | 107.5 | 102.3               | 97.6  | 93.4  | 104.6 | 99.9                                                                           | 95.6  | 91.8  | 95.3  | 91.8  | 88.6  | 91.2  | 88.3  | 85.7  | 87.4  | 85.1  | 82.9  | 80.7 |
| 2                   | 97.3  | 88.5                | 81.3  | 75.2  | 94.5  | 86.5                                                                           | 79.8  | 74.2  | 82.7  | 77.1  | 72.3  | 79.2  | 74.5  | 70.4  | 76.0  | 72.1  | 68.7  | 66.3 |
| 3                   | 88.4  | 77.4                | 68.8  | 62.0  | 85.8  | 75.7                                                                           | 67.7  | 61.4  | 72.5  | 65.7  | 60.1  | 69.5  | 63.7  | 58.9  | 66.8  | 61.9  | 57.7  | 55.4 |
| 4                   | 80.8  | 68.3                | 59.2  | 52.2  | 78.4  | 66.9                                                                           | 58.4  | 51.8  | 64.2  | 56.8  | 50.9  | 61.7  | 55.3  | 50.1  | 59.4  | 53.8  | 49.3  | 47.0 |
| 5                   | 74.2  | 60.9                | 51.6  | 44.8  | 72.0  | 59.7                                                                           | 51.0  | 44.5  | 57.4  | 49.7  | 43.8  | 55.3  | 48.5  | 43.2  | 53.3  | 47.4  | 42.7  | 40.4 |
| 6                   | 68.4  | 54.7                | 45.5  | 38.9  | 66.4  | 53.7                                                                           | 45.0  | 38.7  | 51.8  | 44.0  | 38.3  | 49.9  | 43.1  | 37.8  | 48.2  | 42.1  | 37.4  | 35.2 |
| 7                   | 63.4  | 49.6                | 40.6  | 34.3  | 61.6  | 48.7                                                                           | 40.2  | 34.1  | 47.0  | 39.3  | 33.8  | 45.4  | 38.6  | 33.4  | 44.0  | 37.8  | 33.1  | 31.0 |
| 8                   | 59.0  | 45.2                | 36.5  | 30.5  | 57.3  | 44.4                                                                           | 36.1  | 30.4  | 43.0  | 35.5  | 30.1  | 41.6  | 34.8  | 29.8  | 40.4  | 34.2  | 29.6  | 27.6 |
| 9                   | 55.1  | 41.4                | 33.1  | 27.4  | 53.6  | 40.8                                                                           | 32.8  | 27.3  | 39.5  | 32.2  | 27.1  | 38.4  | 31.7  | 26.9  | 37.2  | 31.1  | 26.7  | 24.8 |
| 10                  | 51.6  | 38.2                | 30.2  | 24.8  | 50.3  | 37.6                                                                           | 29.9  | 24.7  | 36.5  | 29.4  | 24.5  | 35.5  | 29.0  | 24.4  | 34.5  | 28.5  | 24.2  | 22.4 |

# Test report

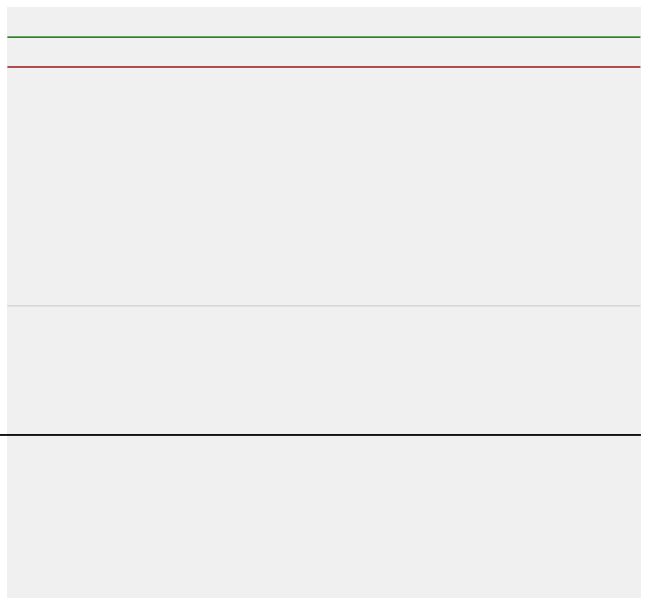
Light measurement results

## Power details

### Input power

|                                          |         |
|------------------------------------------|---------|
| Frequency of input power                 | 0.0 Hz  |
| Power feed to light source               | 14.32 W |
| RMS Input voltage feed V,RMS             | 24 V    |
| RMS Input current feed I,RMS             | 0.60 A  |
| Volt-Amp or apparent power = V,RMS*I,RMS | 14.3 VA |
| Displacement factor of AC power feed     | 0.00    |
| Power factor of AC current feed          | 1.00    |
| Total harmonic distortion of the current | 0%      |
| Total harmonic distortion of the voltage | 0%      |

### Input power curve



### Efficiency

|                           |            |
|---------------------------|------------|
| Radiated power efficiency | 27.96      |
| Lumen efficiency          | 88.82 lm/W |

## Stabilization details

### Warmup Conditions

|                   |       |
|-------------------|-------|
| Stable period     | 3 Min |
| Stable change max | 5%    |
| Minimum time      | 3 Min |

### Color Temperature Change

|           |        |
|-----------|--------|
| CCT start | 3005 K |
| CCT shift | -5 K   |
| CCT end   | 3000 K |

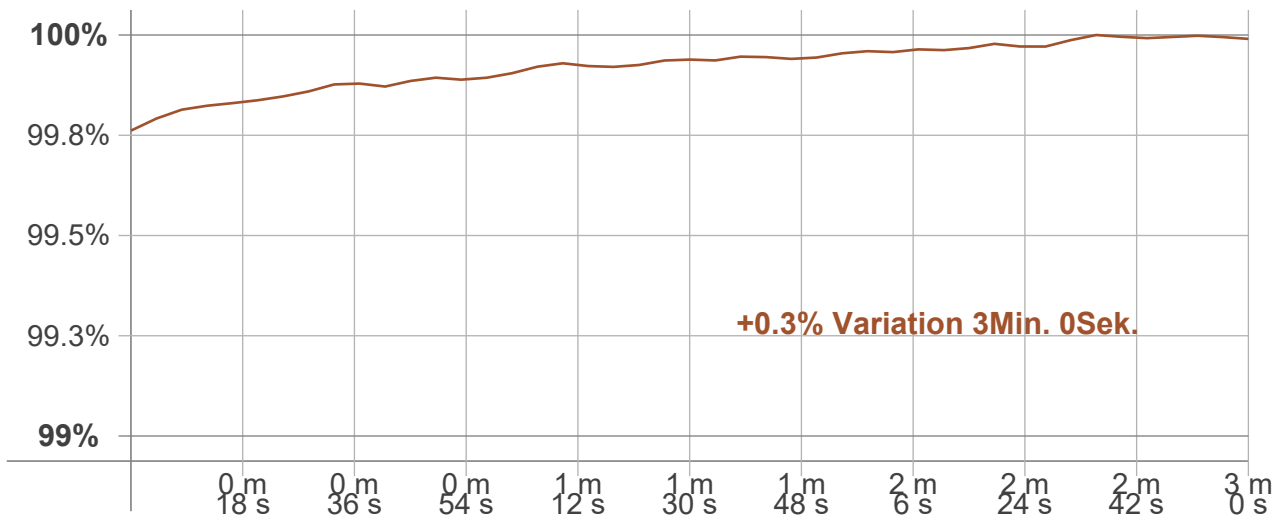
### Warmup Result

|                   |                       |
|-------------------|-----------------------|
| Total warmup time | Lampe stabilisiert in |
| Warmup variation  | 0.2614%               |

### Output Change

|               |         |
|---------------|---------|
| Output start  | 1269 lm |
| Output change | 2.57 lm |
| Output end    | 1272 lm |

## Stabilization Curve



## Flicker TLA details

Flicker Meter Type Viso Systems LabFlicker  
Frequency of input power 0.0 Hz  
Flicker/TLA sample rate NaN samples/s

**Measurement time**  
PstLM 180 sec.  
All other indices 1,5 sec,

### Flicker indices according to Illuminating Engineering Society (IES)

Flicker frequency NaN Hz  
Percent Flicker NaN %  
Flicker index NaN

### Flicker indices according to California Energy Commission (CEC) 2016b

JA8/10 40 Hz NaN %  
JA8/10 90 Hz NaN %  
JA8/10 200 Hz NaN %  
JA8/10 400 Hz NaN %  
JA8/10 1000 Hz NaN %

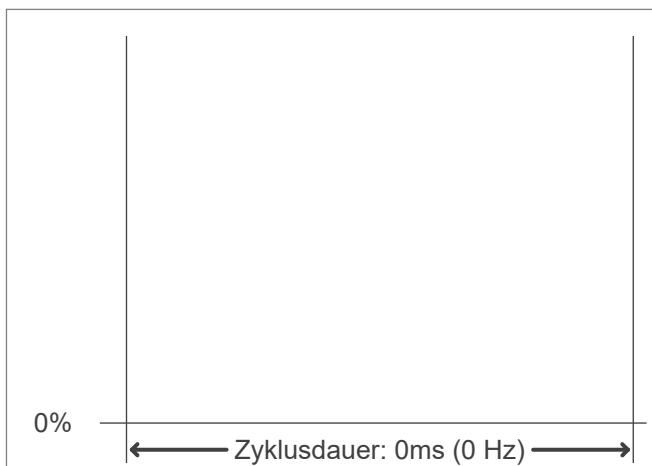
### TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)

PstLM value ( $F < 80$  Hz) NaN  
SVM value ( $80 < F < 2000$  Hz) NaN

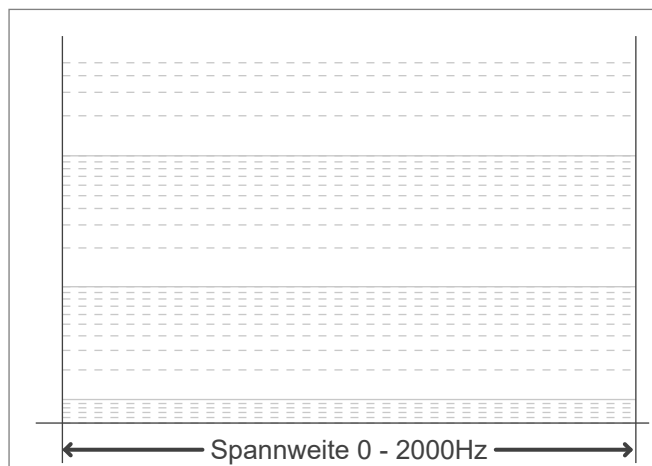
### Flicker indices according to Lighting Research Center (2015)

Perception metric, Assist Mp NaN

### Flicker frame (frame of one flicker period in time domain)



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



### IEEE 1789 Frequency/modulation plot

