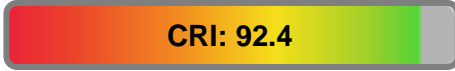


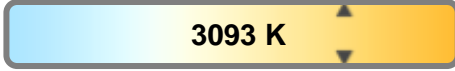
Light efficiency:



Light quality:



Color temperature:

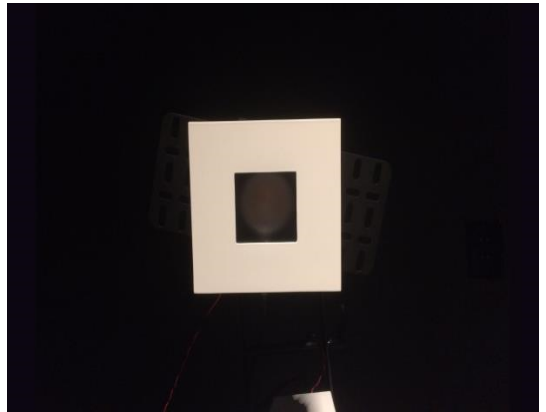


Output: 926 lm

Peak: 4381 cd

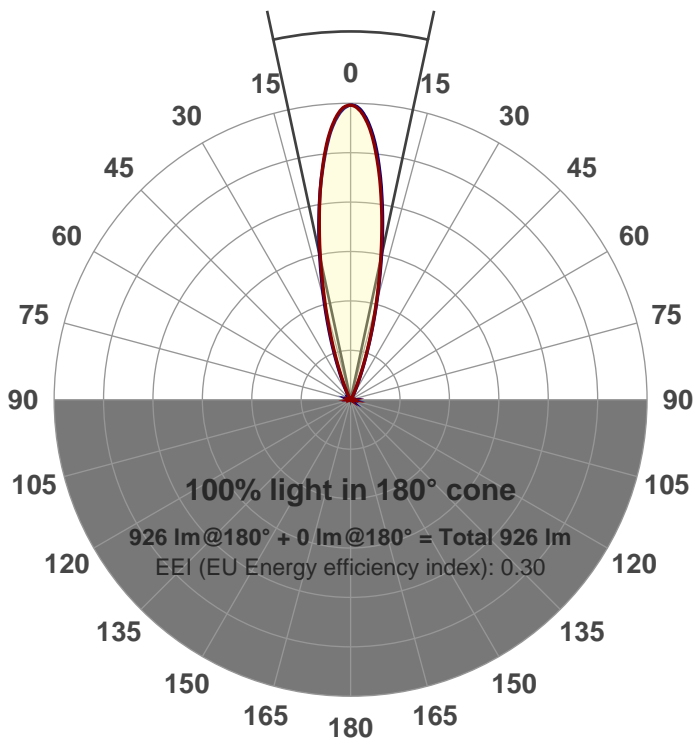
Power: 21.3 W

PF: 0.99



Beam angle

24.2°



Product name:

**GRF-CZ20-NF-SQ-91A**

Item number:

**GRF-CZ20-NF-SQ-91A**

Date and time:

**4/3/2017 12:49:41 PM**

Description:

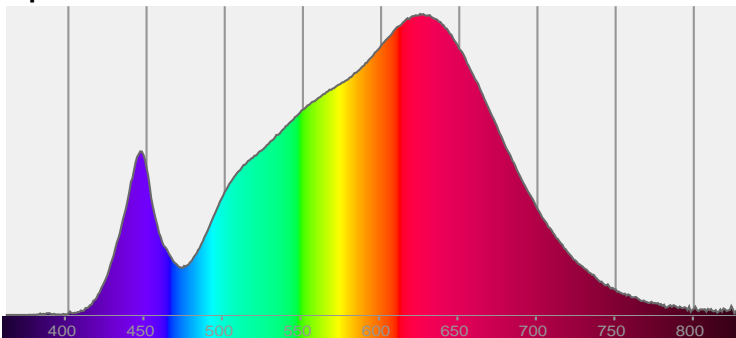
**LUM: 926**

**PPF: 15.0**

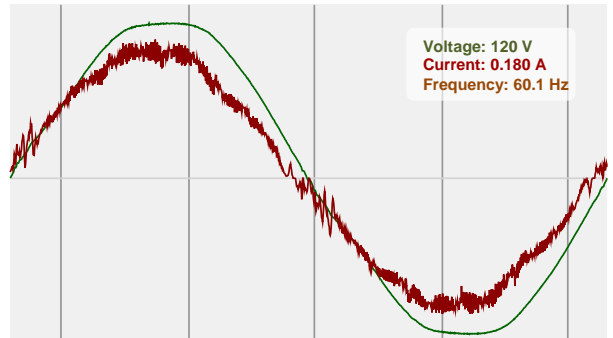


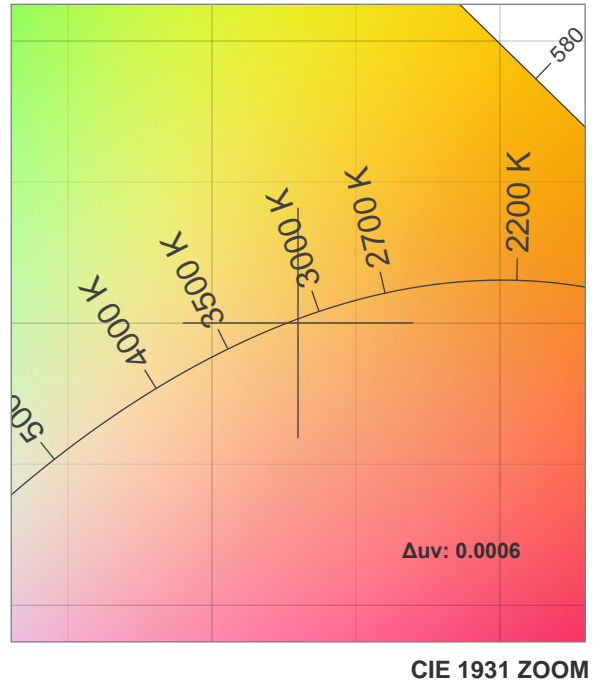
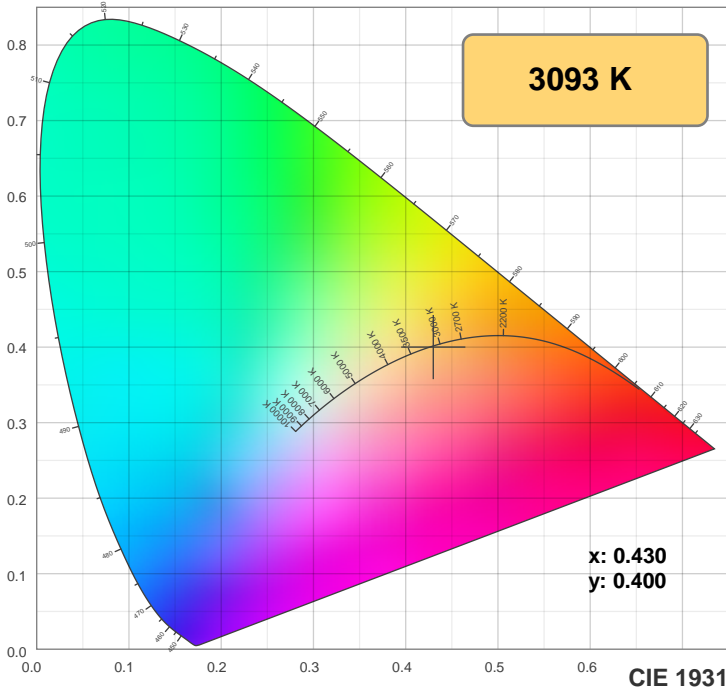
CIE 1931  
x: 0.430  
y: 0.400

Spectra



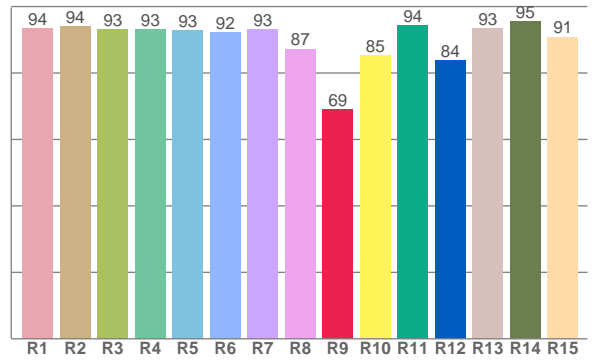
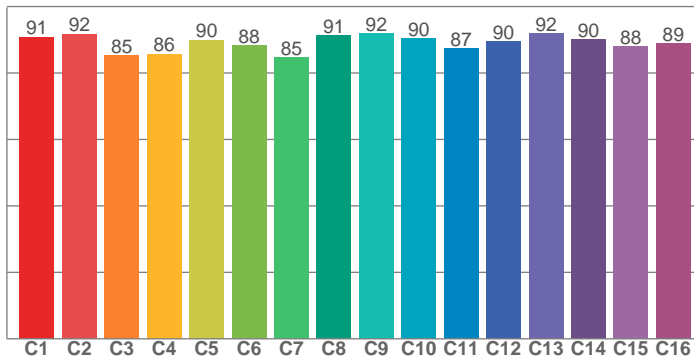
Power





**TM30: 89.2**

**CRI: 92.4 (R1-R8)**



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  |
| 93.6 | 94.0 | 93.1 | 93.2 | 92.8 | 92.2 | 93.2 | 87.3 | 69.1 | 85.4 | 94.3 | 83.7 | 93.3 | 95.5 | 90.9 |

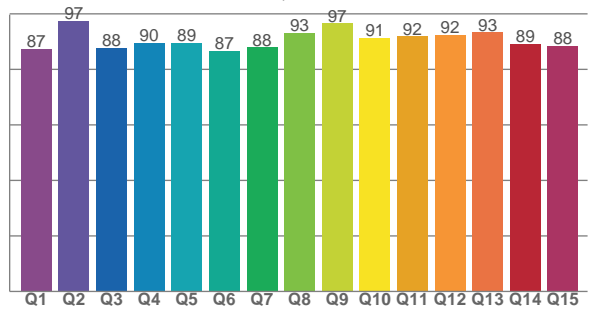
TM30 C values, 16 binned values out of total of 99 C values

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
| 90.9 | 91.7 | 85.3 | 85.7 | 89.9 | 88.3 | 84.8 | 91.2 | 92.0 | 90.3 | 87.3 | 89.5 | 91.8 | 90.1 | 87.9 | 89.0 |

CQS Q values

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
| 87.4 | 97.3 | 87.8 | 89.6 | 89.5 | 86.5 | 87.9 | 93.0 | 96.5 | 91.4 | 91.8 | 92.5 | 93.3 | 89.1 | 88.3 |

**CQS: 90.2**



## Color parameters

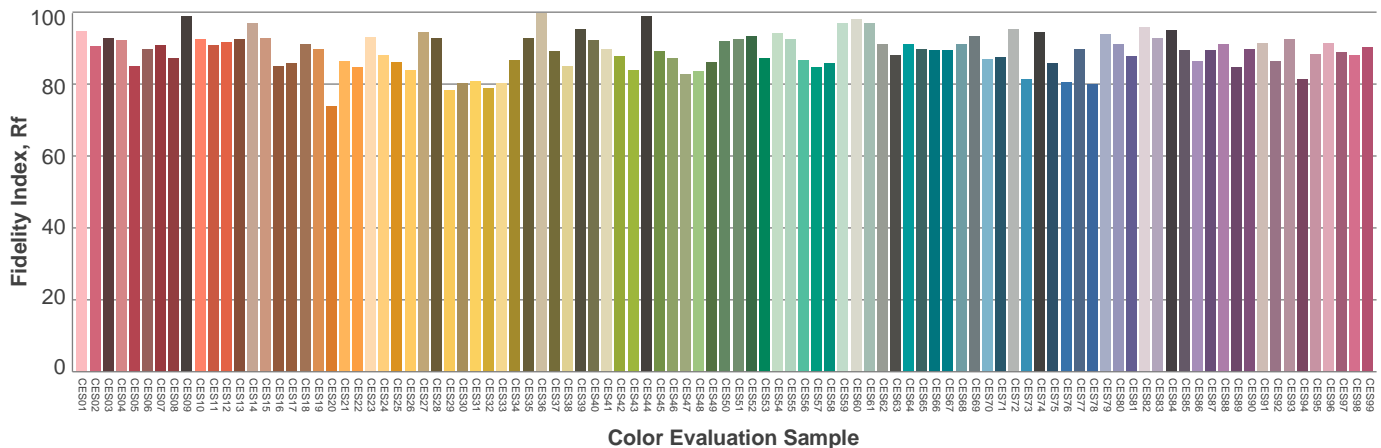
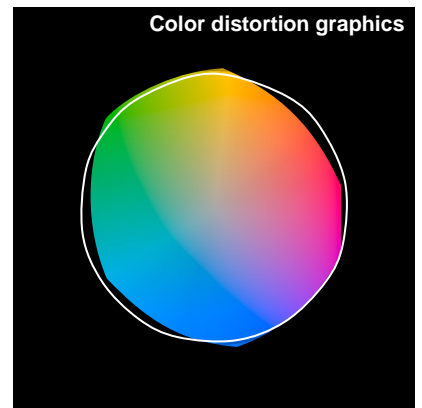
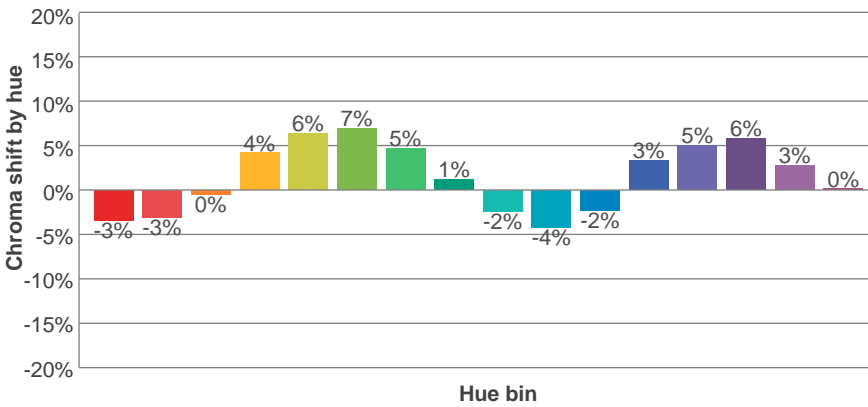
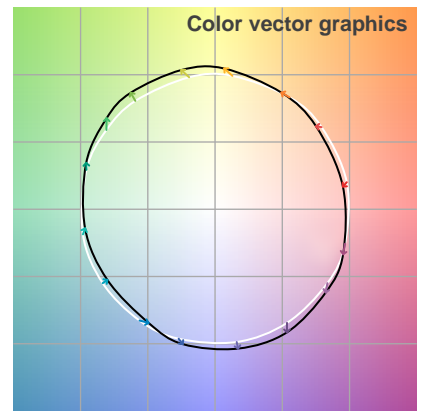
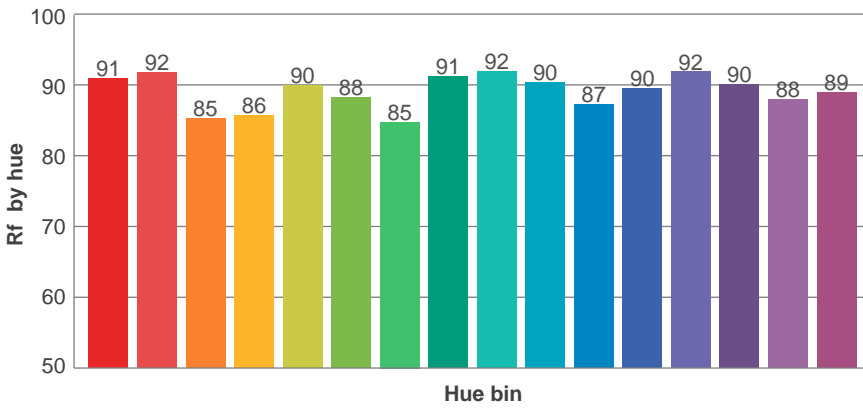
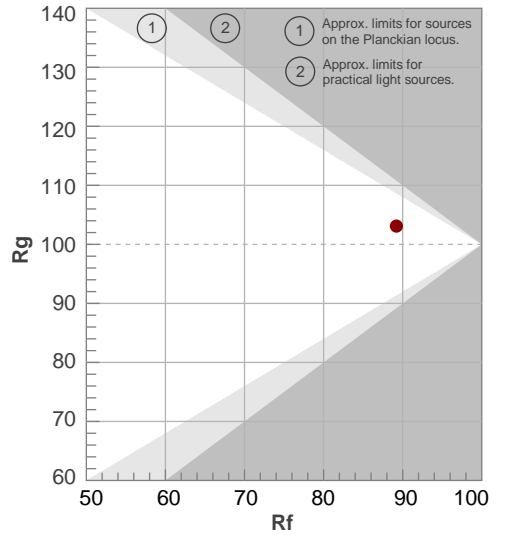
|                   |                       |               |                |                |                     |                           |                           |                  |                  |                                 |
|-------------------|-----------------------|---------------|----------------|----------------|---------------------|---------------------------|---------------------------|------------------|------------------|---------------------------------|
| Color temperature | Color rendering index | Red component | Color fidelity | Color gamut    | Color quality scale | Color coordinate cie 1931 | Color coordinate cie 1931 | Color coordinate | Color coordinate | Color deviation from black body |
| <b>CCT</b>        | <b>CRI</b>            | <b>CRI R9</b> | <b>TM30 Rf</b> | <b>TM30 Rg</b> | <b>CQS</b>          | <b>x</b>                  | <b>y</b>                  | <b>u</b>         | <b>v</b>         | <b>Δuv</b>                      |
| <b>3093 K</b>     | <b>92.4</b>           | <b>69.1</b>   | <b>89.2</b>    | <b>103.1</b>   | <b>90.2</b>         | <b>0.430</b>              | <b>0.400</b>              | <b>0.248</b>     | <b>0.346</b>     | <b>0.0006</b>                   |

# TM30 details

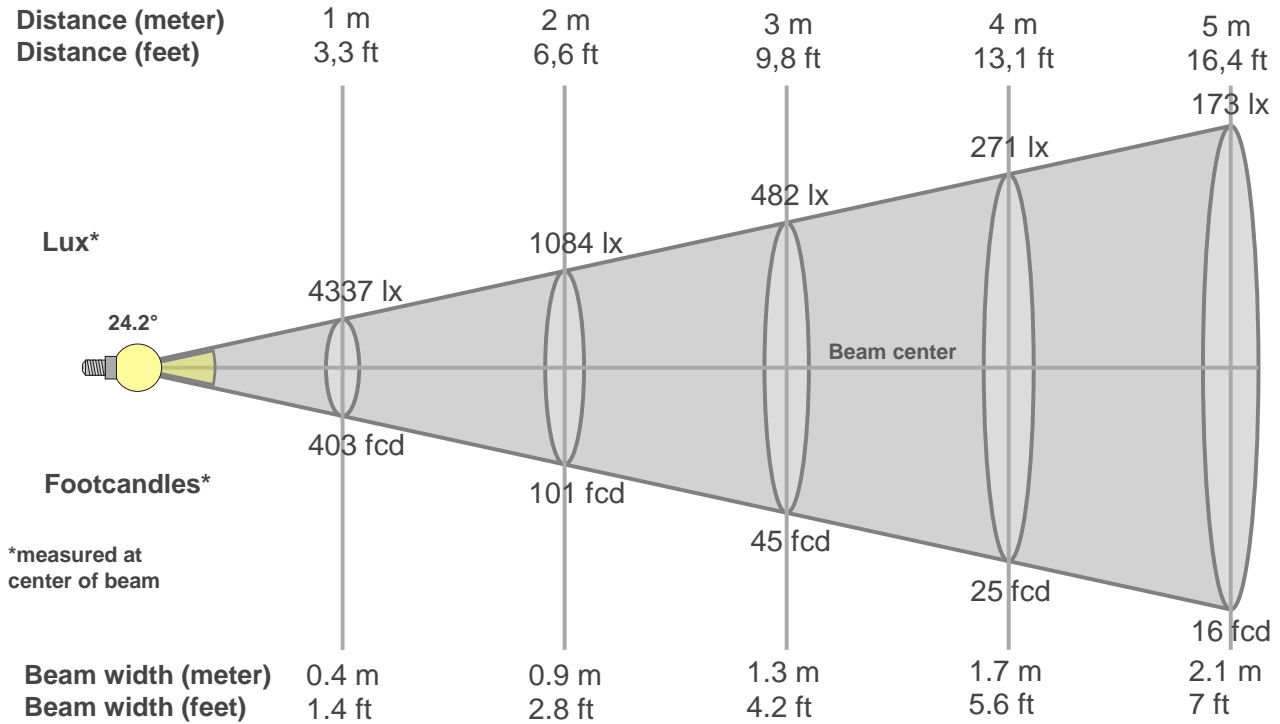
**Rf 89.2**  
Fidelity index Rf

**Rg 103.1**  
Gammut index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |     |
|---------|----------------|--------------------|-----|
|         |                | Chroma             | Hue |
| 1       | 91             | -3%                | -3% |
| 2       | 92             | -3%                | 3%  |
| 3       | 85             | 0%                 | 7%  |
| 4       | 86             | 4%                 | 7%  |
| 5       | 90             | 6%                 | 5%  |
| 6       | 88             | 7%                 | 0%  |
| 7       | 85             | 5%                 | -7% |
| 8       | 91             | 1%                 | -5% |
| 9       | 92             | -2%                | -4% |
| 10      | 90             | -4%                | 0%  |
| 11      | 87             | -2%                | 6%  |
| 12      | 90             | 3%                 | 4%  |
| 13      | 92             | 5%                 | 0%  |
| 14      | 90             | 6%                 | -4% |
| 15      | 88             | 3%                 | -6% |
| 16      | 89             | 0%                 | -8% |



# Beam details



## Beam intensities from 1-20m

| 1m       | 2m       | 3m      | 4m      | 5m      | 6m      | 7m     | 8m     | 9m     | 10m    | 11m    | 12m    | 13m    | 14m    | 15m    | 16m    | 17m    | 18m    | 19m    | 20m    |
|----------|----------|---------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 3.3ft    | 6.6ft    | 9.8ft   | 13.1ft  | 16.4ft  | 19.7ft  | 23ft   | 26.2ft | 29.5ft | 32.8ft | 36.1ft | 39.4ft | 42.7ft | 45.9ft | 49.2ft | 52.5ft | 55.8ft | 59.1ft | 62.3ft | 65.6ft |
| 4337lx   | 1084lx   | 482lx   | 271lx   | 173lx   | 120lx   | 89lx   | 68lx   | 54lx   | 43lx   | 36lx   | 30lx   | 26lx   | 22lx   | 19lx   | 17lx   | 15lx   | 13lx   | 12lx   | 11lx   |
| 402.9fcd | 100.7fcd | 44.8fcd | 25.2fcd | 16.1fcd | 11.2fcd | 8.2fcd | 6.3fcd | 5fcd   | 4fcd   | 3.3fcd | 2.8fcd | 2.4fcd | 2.1fcd | 1.8fcd | 1.6fcd | 1.4fcd | 1.2fcd | 1.1fcd | 1fcd   |

## 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° |
|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4337 | 4254 | 4012 | 3634 | 3167 | 2649 | 2136 | 1644 | 1219 | 853 | 556 | 345 | 206 | 124 | 76  | 51  | 36  | 28  | 22  | 18  |
| 100% | 98%  | 93%  | 84%  | 73%  | 61%  | 49%  | 38%  | 28%  | 20% | 13% | 8%  | 5%  | 3%  | 2%  | 1%  | 1%  | 1%  | 1%  | 0%  |

## 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° |
|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4337 | 4229 | 3986 | 3608 | 3168 | 2680 | 2190 | 1725 | 1307 | 949 | 648 | 421 | 263 | 167 | 107 | 69  | 45  | 32  | 24  | 18  |
| 100% | 98%  | 92%  | 83%  | 73%  | 62%  | 51%  | 40%  | 30%  | 22% | 15% | 10% | 6%  | 4%  | 2%  | 2%  | 1%  | 1%  | 1%  | 0%  |

## 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° |
|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4337 | 4238 | 3996 | 3610 | 3149 | 2644 | 2136 | 1664 | 1238 | 877 | 577 | 357 | 213 | 129 | 80  | 53  | 38  | 28  | 22  | 18  |
| 100% | 98%  | 92%  | 83%  | 73%  | 61%  | 49%  | 38%  | 29%  | 20% | 13% | 8%  | 5%  | 3%  | 2%  | 1%  | 1%  | 1%  | 1%  | 0%  |

## 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° |
|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4337 | 4260 | 4031 | 3671 | 3208 | 2704 | 2192 | 1705 | 1274 | 904 | 607 | 391 | 247 | 159 | 102 | 66  | 45  | 33  | 25  | 20  |
| 100% | 98%  | 93%  | 85%  | 74%  | 62%  | 51%  | 39%  | 29%  | 21% | 14% | 9%  | 6%  | 4%  | 2%  | 2%  | 1%  | 1%  | 1%  | 0%  |

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% | Intensity ratio in 120° cone | Intensity ratio in 90° cone |
|----------------|-----------------|-------------------|------------------------------|-----------------------------|
| 24.2°          | 44.9°           | 57°               | 1.0%                         | 1.0%                        |



