



## **KL Panel XL**

Photometric Test Report

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**Elation Professional USA** | 6122 S. Eastern Ave. | Los Angeles, CA. 90040

323-582-3322 | 323-832-9142 fax | [www.elationlighting.com](http://www.elationlighting.com) | [info@elationlighting.com](mailto:info@elationlighting.com)

**Elation Professional B.V.** | Junostraat 2 | 6468 EW Kerkrade, The Netherlands

+31 45 546 85 66 | +31 45 546 85 96 fax | [www.elationlighting.eu](http://www.elationlighting.eu) | [info@elationlighting.eu](mailto:info@elationlighting.eu)

**Elation Professional Mexico** | AV Santa Ana 30 | Parque Industrial Lerma, Lerma, Mexico 52000

+52 (728) 282-7070

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| KL Panel        | Diffuser | No Diffuser |
| 2700K           | 5        | 35          |
| 3200K           | 8        | 38          |
| 4000K           | 11       | 41          |
| 4500K           | 14       | 44          |
| 5600K           | 17       | 47          |
| 6000K           | 20       | 50          |
| 6500K           | 23       | 53          |
| 8000K           | 26       | 56          |
| Red             | 29       |             |
| Green           | 30       |             |
| Blue            | 31       |             |
| White           | 32       |             |
| Lime            | 33       |             |
| Cyan            | 34       |             |

# Testing Process

## **Total Lumen Measurements**

Lumens are measured using a Viso Systems Lab Spion. As a goniophotometer, the Viso calculates the field lumens of the fixture by taking multiple measurements across the light beam.

Many lumens figures provided for entertainment lighting fixtures are only  $2\pi$  sphere values, some even emphasize the LED engine lumens. All Elation product photometric data is the actual light output from the fixture lens, never a theoretical value based on calculation or using the source lumens as the fixtures output. We advise to always compare total fixture lumens acquired with identical measurement systems when comparing lighting fixtures.

## **Test Lab Equipment and Process**

Elation operates an optical testing laboratory at its Los Angeles, CA headquarters to provide accurate photometric data for its lighting products. The testing lab is both light and climate- controlled and contains a variety of precise lighting measurement systems. Fixtures are analyzed with the sophisticated [Viso Systems Lab Spion](#) equipment, which measures all light and color parameters by panning the light beam at a precise speed and from different angles through a calibrated, laser aligned light and color sensor. Test data is collected and summarized by the Viso Light Inspector software. This type of measurement system is referred to as a Goniophotometer.

The Viso software calculates all relevant types of measurements, from beam angles, candela to center light intensity at a variety of distances to the latest color quality measurements like TM30 or CQS as well as accurate color temperature. This wealth of data is then processed by an Elation specific template which is included in the photometric test report for various fixture conditions such as zoom angles and color correction filters.

The Viso software also creates IES (Illuminating Engineering Society) files for each test report. IES is an industry standard file format created for the easy electronic transfer of photometric test data, which is widely used by lighting manufacturers for photometric data distribution.

Additionally, fixtures are periodically rechecked for accuracy using various hand-held light meters including one or more of the devices listed below. This is done to ensure the test data contained in this report is as accurate as possible.

[Asenstek Lighting Passport](#) | [Konica Minolta T-10](#) | [Sekonic C700T](#)

**Total Lumen Output: 34334 lm**

**Color Temperature: 2720 K**

**CRI: 92.7**

**TLCI: 83**

**TM30: 91.2**

**CQS: 89.8**

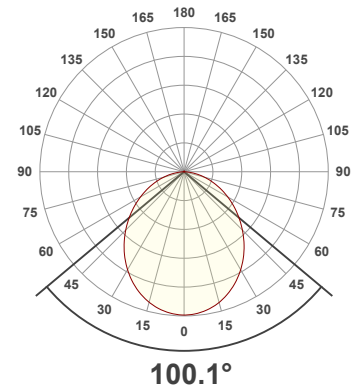
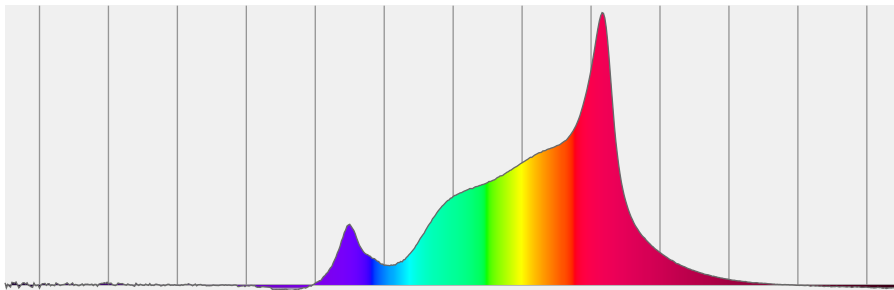
**Measurement Date: 3/25/2022**

**Voltage: 117 V, Current: 3.51 A**

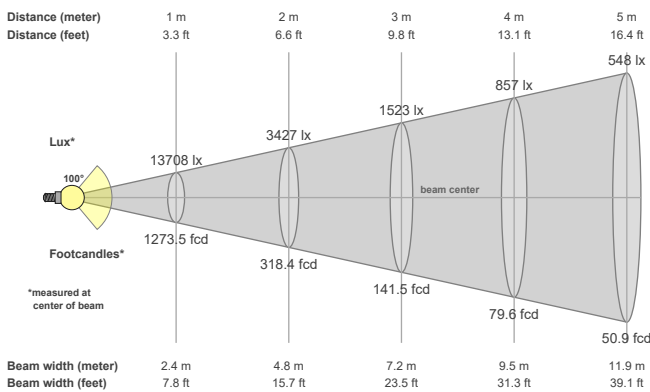
**Power: 411 W**

**Efficacy: 84 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 583



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>100.1°</b>  | <b>157.8°</b>   | <b>171.8°</b>     |

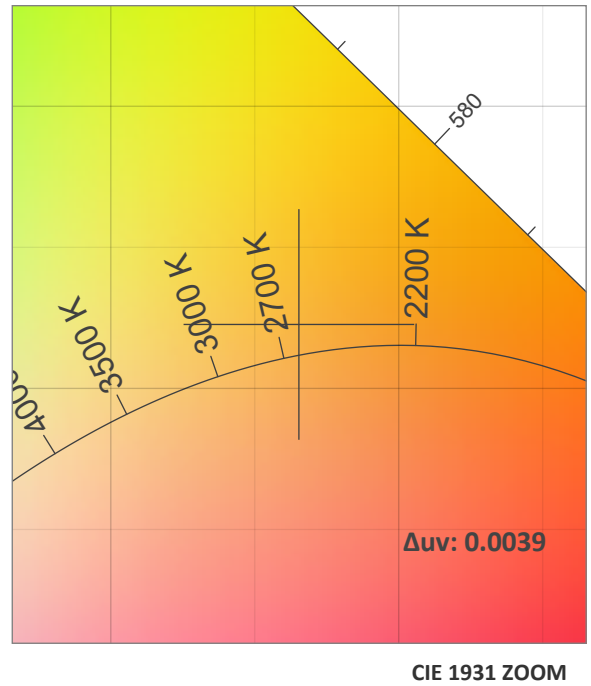
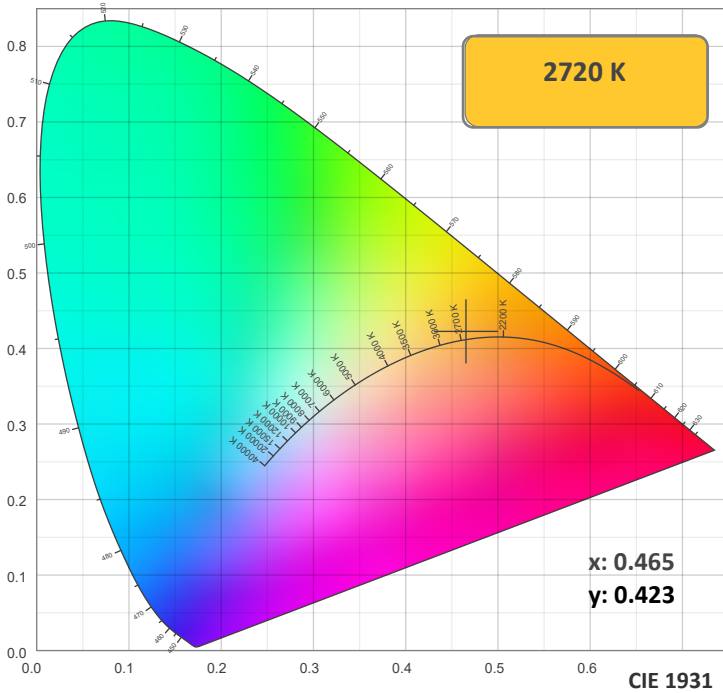
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>13717 cd</b> | <b>80.9%</b>            | <b>57.1%</b>           |

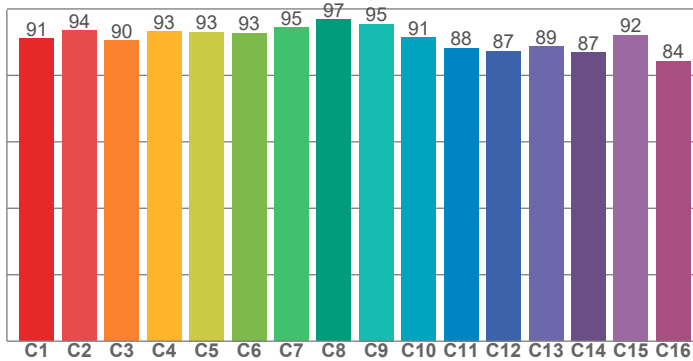
**Beam Intensities from 1-20m**

| M         | 1      | 2     | 3     | 4    | 5    | 6    | 7   | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|-------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 13708  | 3427  | 1523  | 857  | 548  | 381  | 280 | 214  | 169  | 137  | 113  | 95   | 81   | 70   | 61   | 54   | 47   | 42   | 38   | 34   |
| <b>FC</b> | 1273.5 | 318.4 | 141.5 | 79.6 | 50.9 | 35.4 | 26  | 19.9 | 15.7 | 12.7 | 10.5 | 8.8  | 7.5  | 6.5  | 5.7  | 5    | 4.4  | 3.9  | 3.5  | 3.2  |

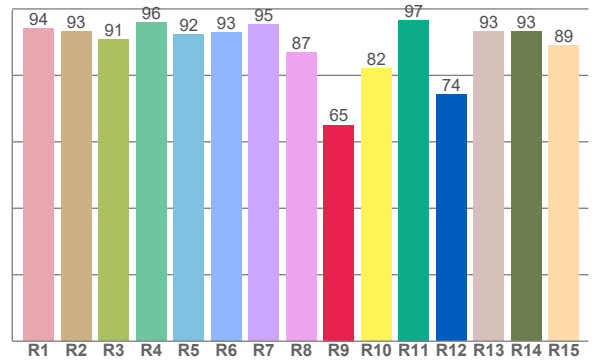
### Color Details



TM30: 91.2



CRI: 92.7 (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  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 94.0 | 93.4 | 90.7 | 95.9 | 92.3 | 93.1 | 95.4 | 86.8 | 65.1 | 82.1 | 96.7 | 74.3 | 93.3 | 93.1 | 89.1 |

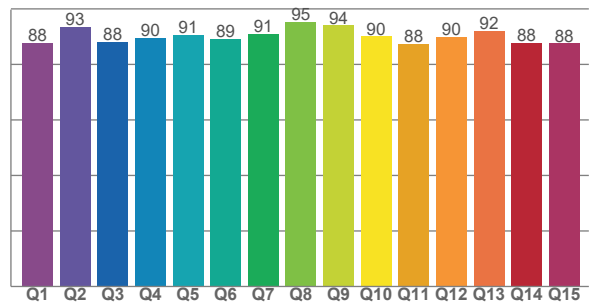
TM30 C Values, 16 binned values out of total of 99 C values

| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 91.0 | 93.5 | 90.5 | 93.2 | 93.1 | 92.7 | 94.5 | 96.9 | 95.5 | 91.5 | 88.2 | 87.3 | 88.7 | 86.9 | 92.2 | 84.3 |

CQS Q Values

| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 87.7 | 93.4 | 88.0 | 89.7 | 90.6 | 89.0 | 91.0 | 95.3 | 94.0 | 90.1 | 87.5 | 89.8 | 92.0 | 87.8 | 87.5 |

CQS: 89.8



### Color Parameters

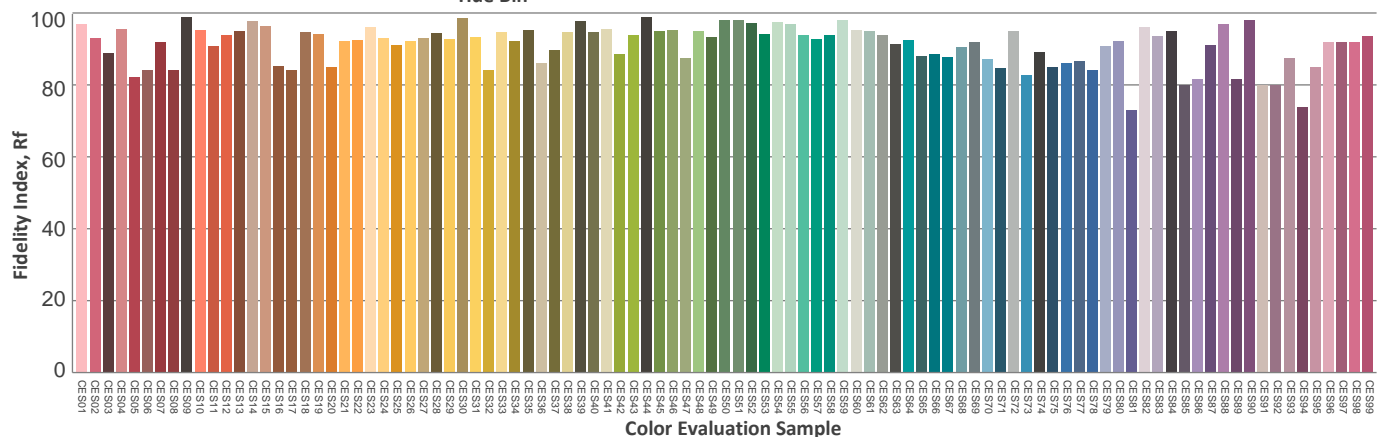
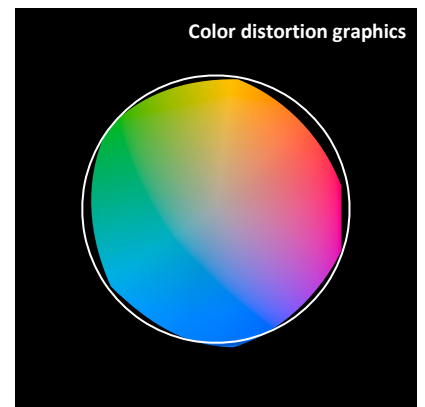
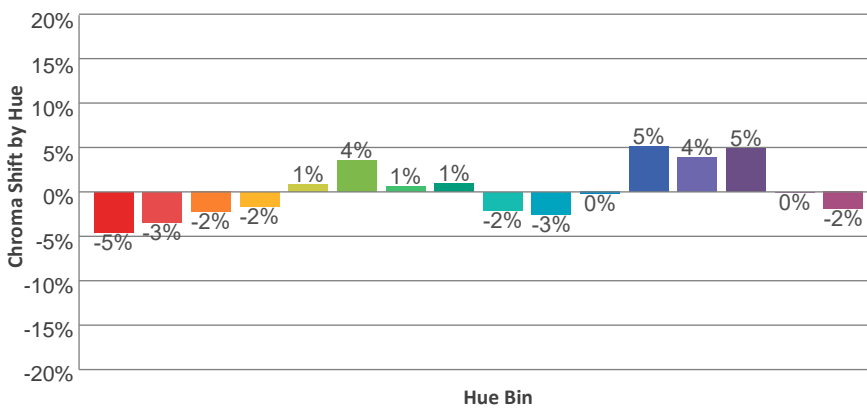
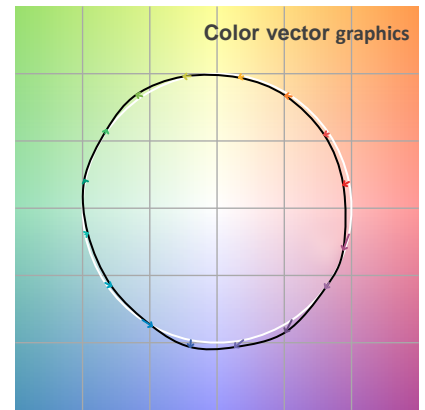
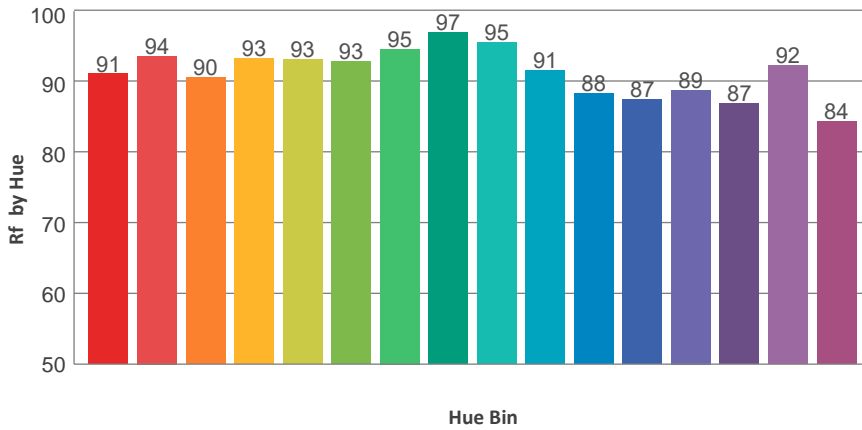
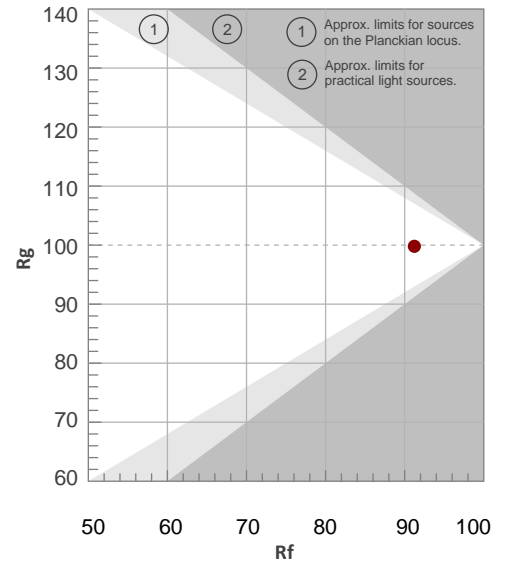
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 2720 K            | 92.7                  | 65.1          | 91.2           | 99.8        | 89.8                | 0.465                     | 0.423                     | 0.261            | 0.355            | 0.0039                     |

TM30 Details

**Rf 91.2**  
Fidelity Index Rf

**Rg 99.8**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 91             | -5%                | -1%  |
| 2       | 94             | -3%                | 1%   |
| 3       | 90             | -2%                | 4%   |
| 4       | 93             | -2%                | 3%   |
| 5       | 93             | 1%                 | 5%   |
| 6       | 93             | 4%                 | 3%   |
| 7       | 95             | 1%                 | -3%  |
| 8       | 97             | 1%                 | -1%  |
| 9       | 95             | -2%                | 0%   |
| 10      | 91             | -3%                | 4%   |
| 11      | 88             | 0%                 | 9%   |
| 12      | 87             | 5%                 | 1%   |
| 13      | 89             | 4%                 | -7%  |
| 14      | 87             | 5%                 | -9%  |
| 15      | 92             | 0%                 | -4%  |
| 16      | 84             | -2%                | -12% |



**Total Lumen Output: 28936 lm**

**Color Temperature: 3192 K**

**CRI: 92.8**

**TLCI: 84**

**TM30: 91.2**

**CQS: 91.2**

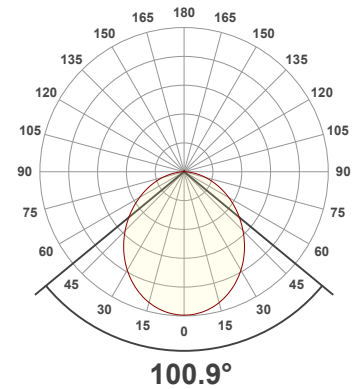
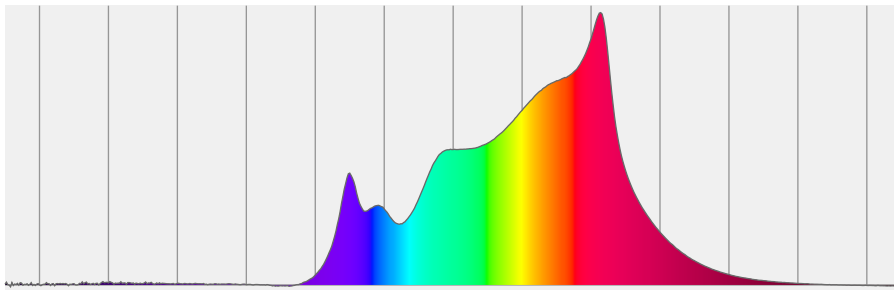
**Measurement Date: 3/25/2022**

**Voltage: 118 V, Current: 2.89 A**

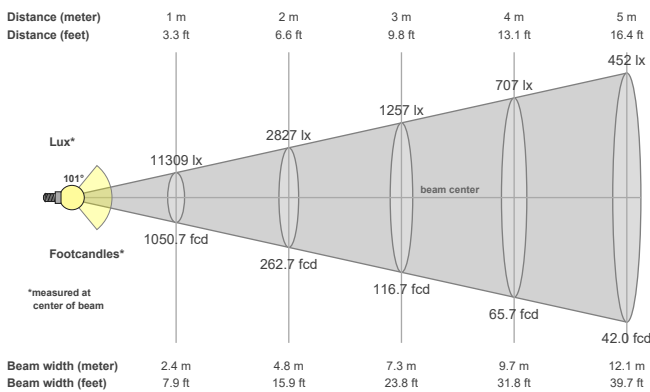
**Power: 341.1 W**

**Efficacy: 85 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 582



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>100.9°</b>  | <b>159.2°</b>   | <b>173.2°</b>     |

**Beam intensities**

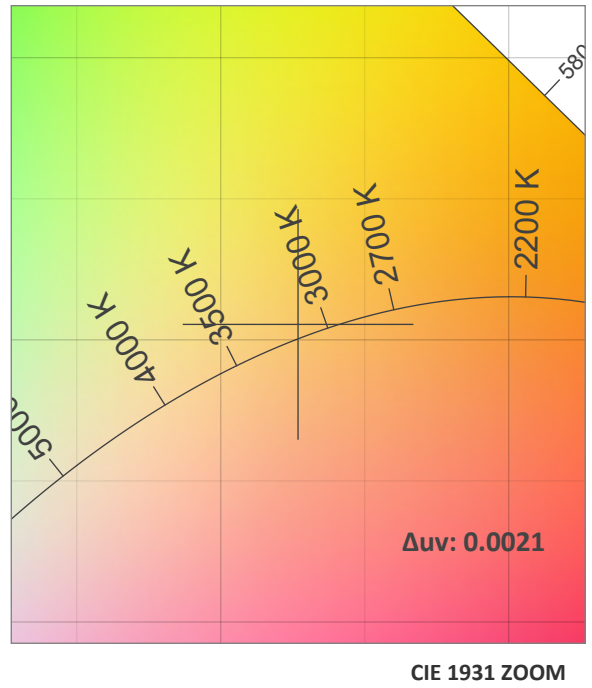
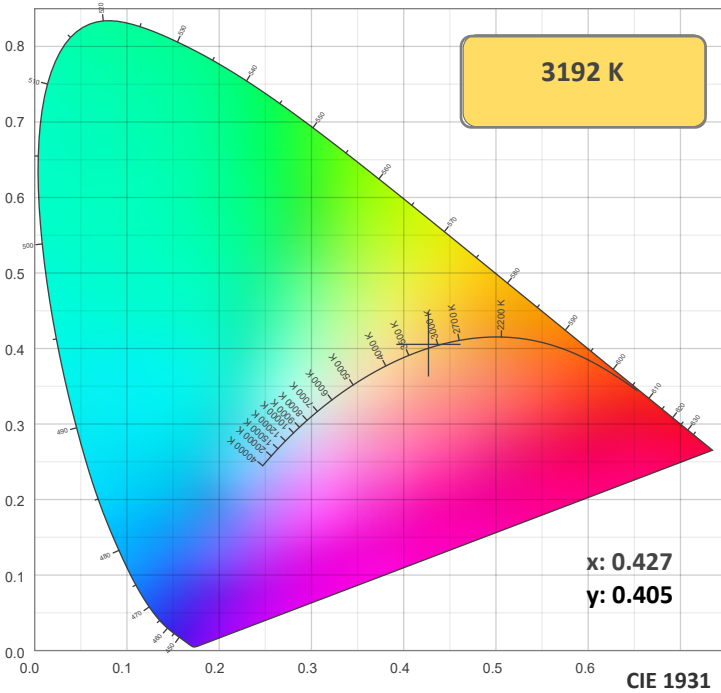
| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>11316 cd</b> | <b>79.9%</b>            | <b>56.2%</b>           |

**Beam Intensities from 1-20m**

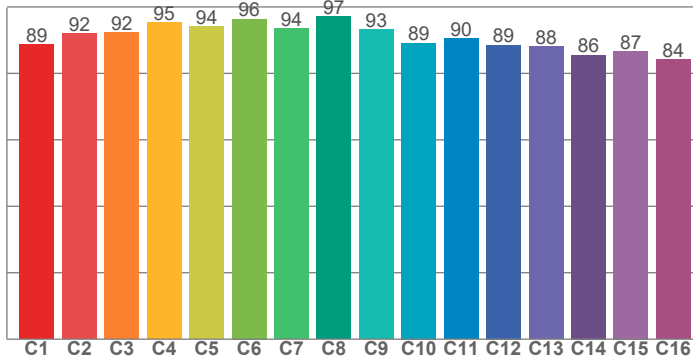
| M         | 1      | 2     | 3     | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 11309  | 2827  | 1257  | 707  | 452  | 314  | 231  | 177  | 140  | 113  | 93   | 79   | 67   | 58   | 50   | 44   | 39   | 35   | 31   | 28   |
| <b>FC</b> | 1050.7 | 262.7 | 116.7 | 65.7 | 42   | 29.2 | 21.4 | 16.4 | 13   | 10.5 | 8.7  | 7.3  | 6.2  | 5.4  | 4.7  | 4.1  | 3.6  | 3.2  | 2.9  | 2.6  |



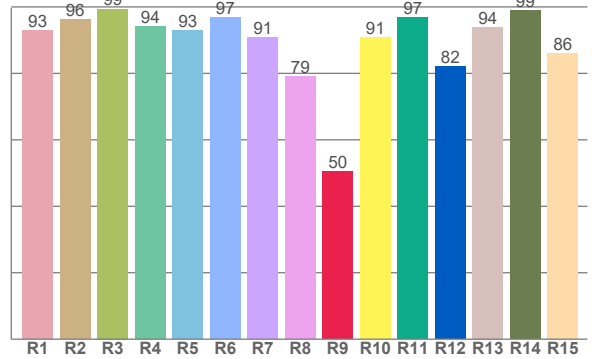
Color Details



TM30: 91.2



CRI: 92.8 (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  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 93.0 | 96.2 | 99.4 | 94.1 | 92.9 | 96.7 | 90.9 | 79.0 | 50.4 | 90.8 | 96.8 | 82.0 | 93.9 | 99.0 | 86.2 |

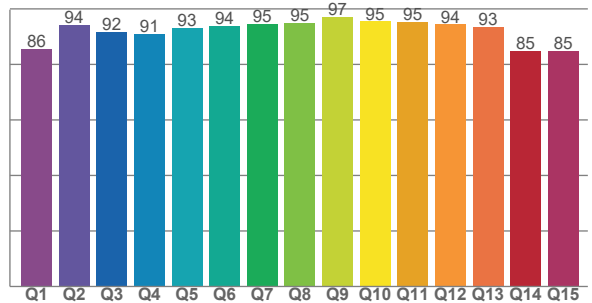
TM30 C Values, 16 binned values out of total of 99 C values

| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 88.8 | 91.9 | 92.2 | 95.4 | 94.1 | 96.4 | 93.5 | 97.0 | 93.2 | 89.2 | 90.4 | 88.6 | 88.2 | 85.6 | 86.7 | 84.2 |

CQS Q Values

| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 85.6 | 94.1 | 91.8 | 91.1 | 93.0 | 93.9 | 94.6 | 95.1 | 96.9 | 95.5 | 95.2 | 94.4 | 93.4 | 84.9 | 85.0 |

CQS: 91.2



Color Parameters

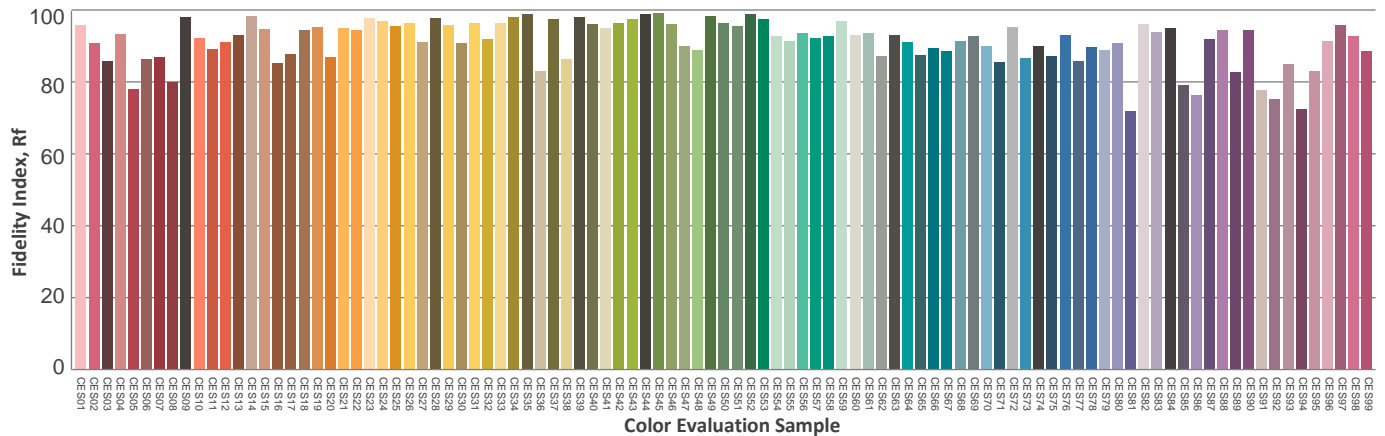
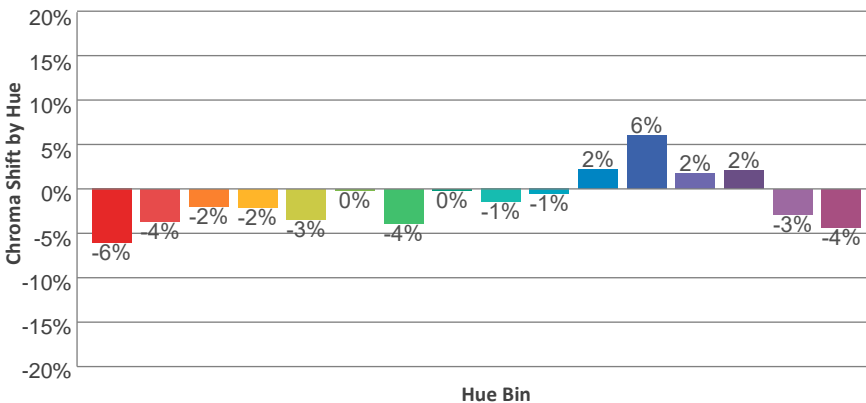
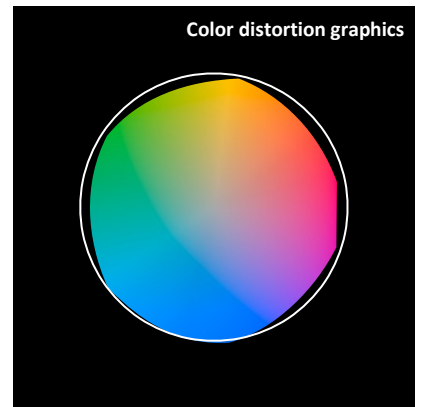
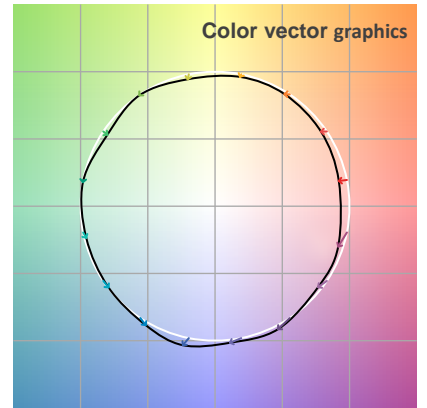
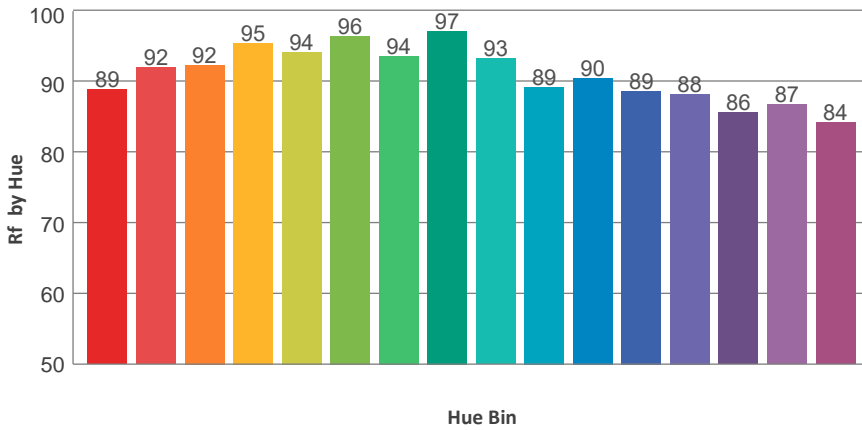
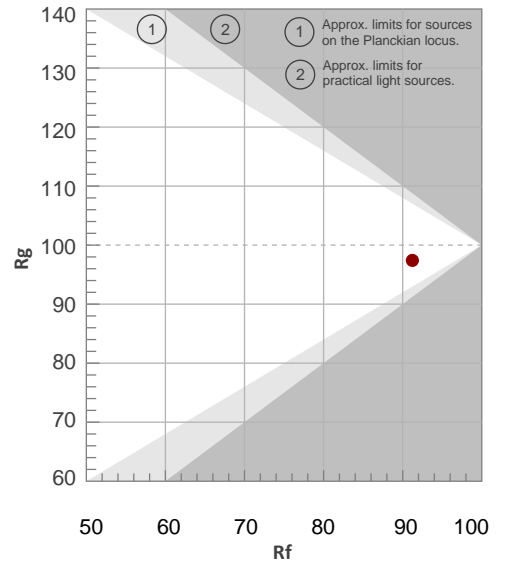
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 3192 K            | 92.8                  | 50.4          | 91.2           | 97.4        | 91.2                | 0.427                     | 0.405                     | 0.243            | 0.347            | 0.0021                     |

TM30 Details

**Rf 91.2**  
Fidelity Index Rf

**Rg 97.4**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 89             | -6%                | 0%   |
| 2       | 92             | -4%                | 2%   |
| 3       | 92             | -2%                | 3%   |
| 4       | 95             | -2%                | 1%   |
| 5       | 94             | -3%                | 2%   |
| 6       | 96             | 0%                 | 1%   |
| 7       | 94             | -4%                | 0%   |
| 8       | 97             | 0%                 | 2%   |
| 9       | 93             | -1%                | 4%   |
| 10      | 89             | -1%                | 6%   |
| 11      | 90             | 2%                 | 6%   |
| 12      | 89             | 6%                 | -3%  |
| 13      | 88             | 2%                 | -9%  |
| 14      | 86             | 2%                 | -12% |
| 15      | 87             | -3%                | -7%  |
| 16      | 84             | -4%                | -12% |



**Total Lumen Output: 28272 lm**

**Color Temperature: 3985 K**

**CRI: 93.2**

**TLCI: 85**

**TM30: 89.2**

**CQS: 92.5**

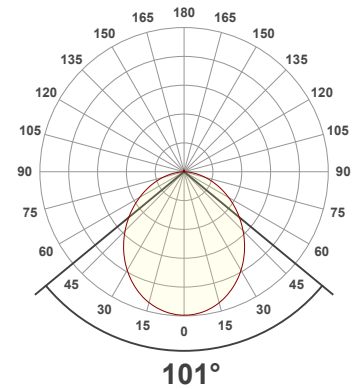
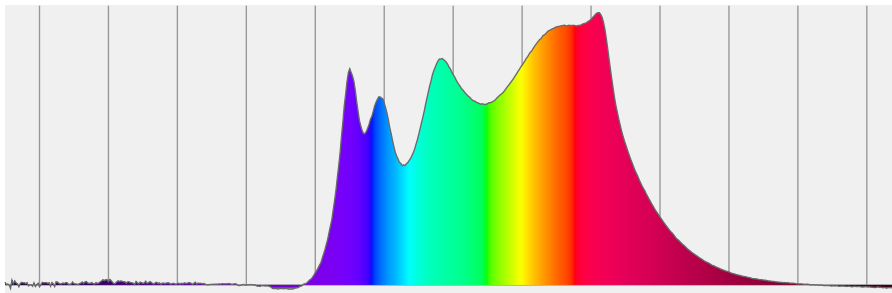
**Measurement Date: 3/25/2022**

**Voltage: 118 V, Current: 3.06 A**

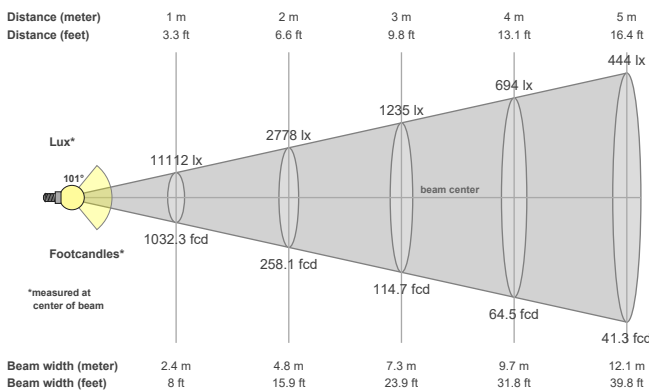
**Power: 362 W**

**Efficacy: 78 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 580



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>101°</b>    | <b>158.9°</b>   | <b>172.7°</b>     |

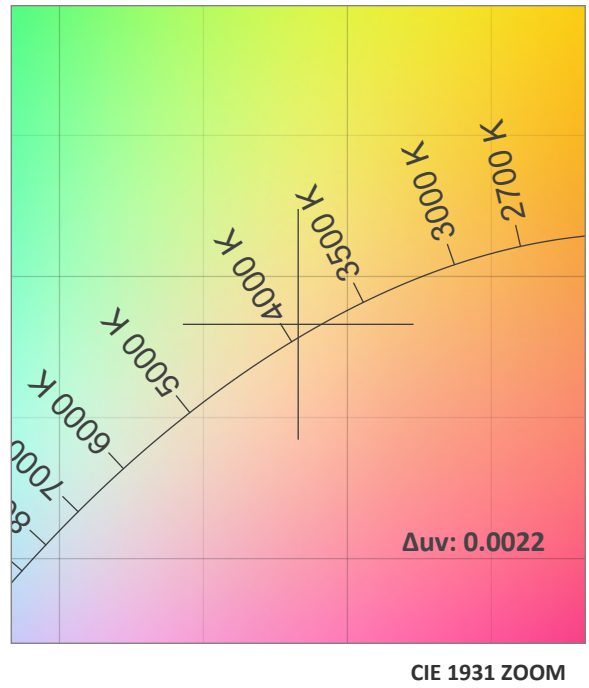
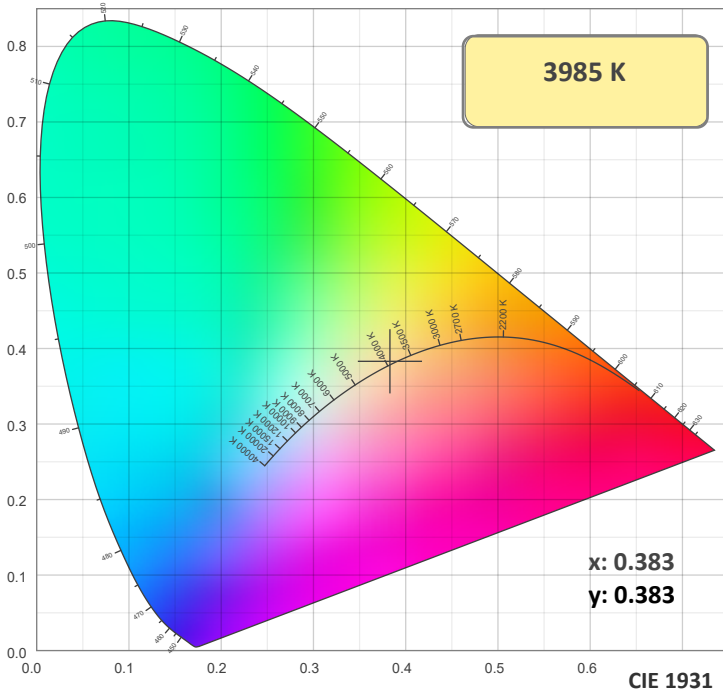
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>11116 cd</b> | <b>80.4%</b>            | <b>56.5%</b>           |

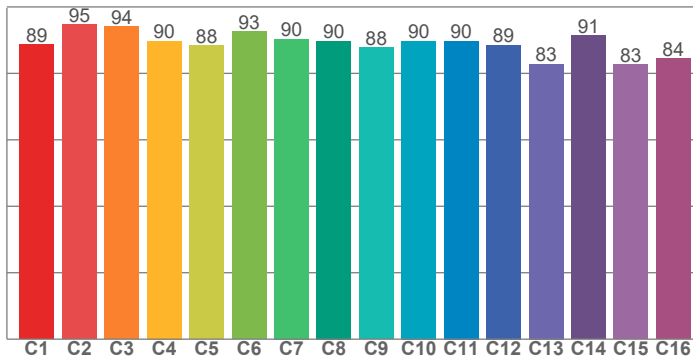
**Beam Intensities from 1-20m**

| M         | 1      | 2     | 3     | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 11112  | 2778  | 1235  | 694  | 444  | 309  | 227  | 174  | 137  | 111  | 92   | 77   | 66   | 57   | 49   | 43   | 38   | 34   | 31   | 28   |
| <b>FC</b> | 1032.3 | 258.1 | 114.7 | 64.5 | 41.3 | 28.7 | 21.1 | 16.1 | 12.7 | 10.3 | 8.5  | 7.2  | 6.1  | 5.3  | 4.6  | 4    | 3.6  | 3.2  | 2.9  | 2.6  |

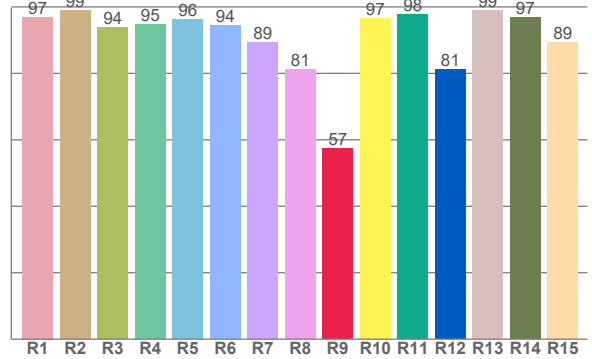
### Color Details



TM30: 89.2



CRI: 93.2 (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  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 97.0 | 98.9 | 93.8 | 94.6 | 96.3 | 94.3 | 89.3 | 81.2 | 57.3 | 96.6 | 97.6 | 81.2 | 99.0 | 96.9 | 89.4 |

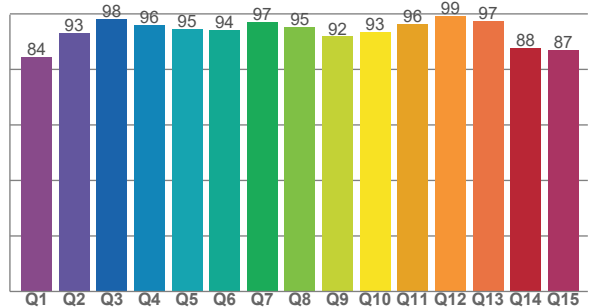
TM30 C Values, 16 binned values out of total of 99 C values

| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 88.7 | 94.8 | 94.0 | 89.8 | 88.5 | 92.6 | 90.3 | 89.8 | 87.9 | 89.8 | 89.7 | 88.5 | 82.8 | 91.4 | 82.7 | 84.4 |

CQS Q Values

| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 84.4 | 93.2 | 98.2 | 96.1 | 94.6 | 94.2 | 96.9 | 95.3 | 91.9 | 93.4 | 96.4 | 99.2 | 97.4 | 87.8 | 86.9 |

CQS: 92.5



### Color Parameters

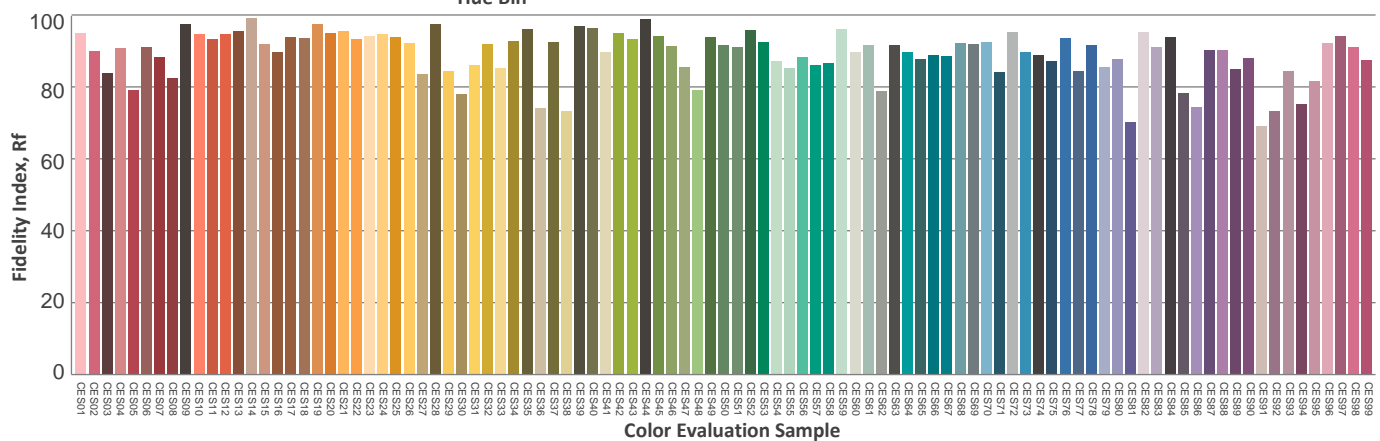
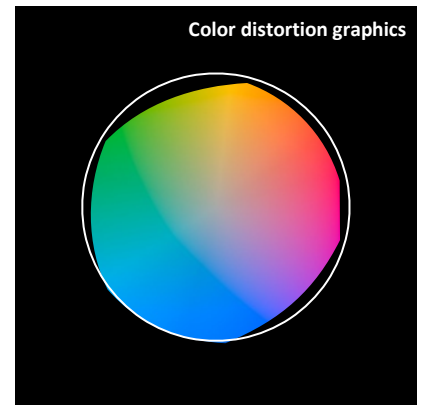
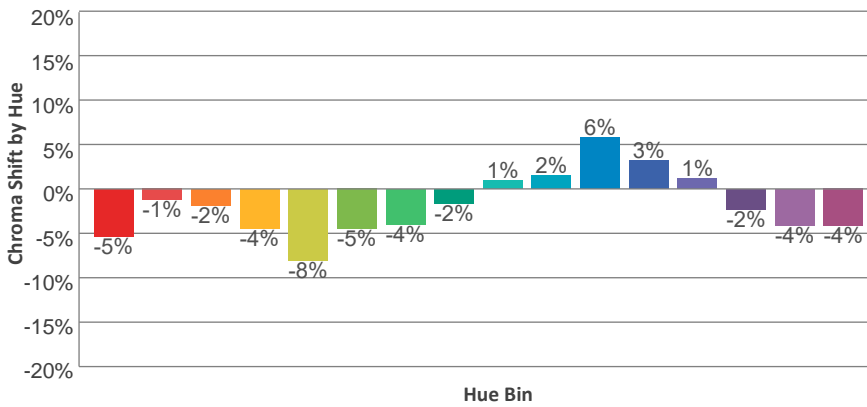
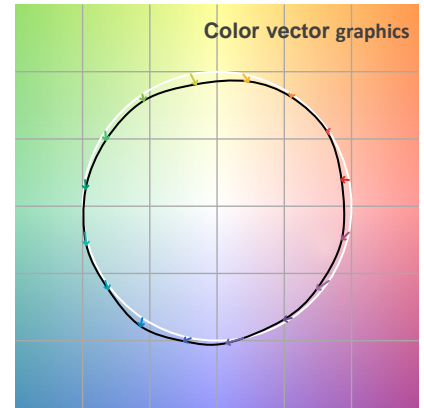
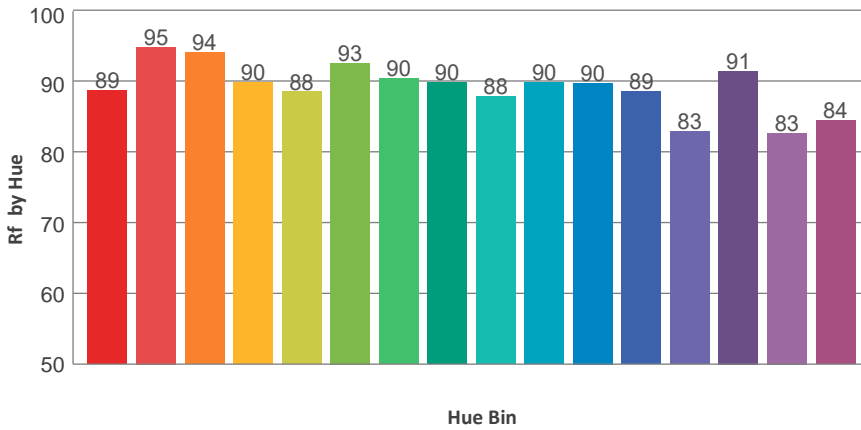
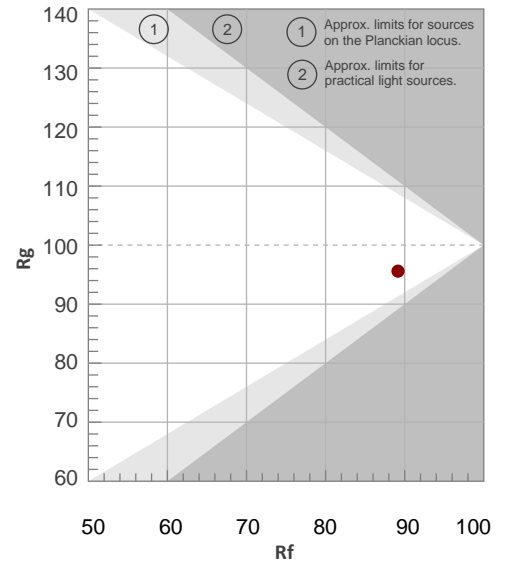
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 3985 K            | 93.2                  | 57.3          | 89.2           | 95.6        | 92.5                | 0.383                     | 0.383                     | 0.224            | 0.336            | 0.0022                     |

TM30 Details

**Rf 89.2**  
Fidelity Index Rf

**Rg 95.6**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 89             | -5%                | 1%   |
| 2       | 95             | -1%                | 1%   |
| 3       | 94             | -2%                | -1%  |
| 4       | 90             | -4%                | -5%  |
| 5       | 88             | -8%                | -2%  |
| 6       | 93             | -5%                | 2%   |
| 7       | 90             | -4%                | 5%   |
| 8       | 90             | -2%                | 6%   |
| 9       | 88             | 1%                 | 9%   |
| 10      | 90             | 2%                 | 6%   |
| 11      | 90             | 6%                 | 2%   |
| 12      | 89             | 3%                 | -5%  |
| 13      | 83             | 1%                 | -13% |
| 14      | 91             | -2%                | -6%  |
| 15      | 83             | -4%                | -10% |
| 16      | 84             | -4%                | -6%  |



**Total Lumen Output: 30652 lm**

**Color Temperature: 4465 K**

**CRI: 93.4**

**TLCI: 89**

**TM30: 90.1**

**CQS: 92.8**

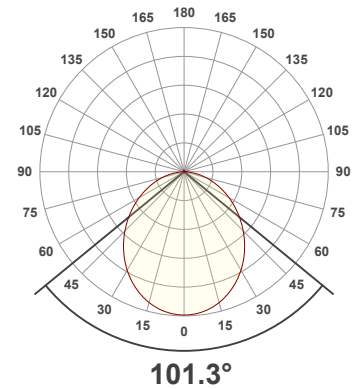
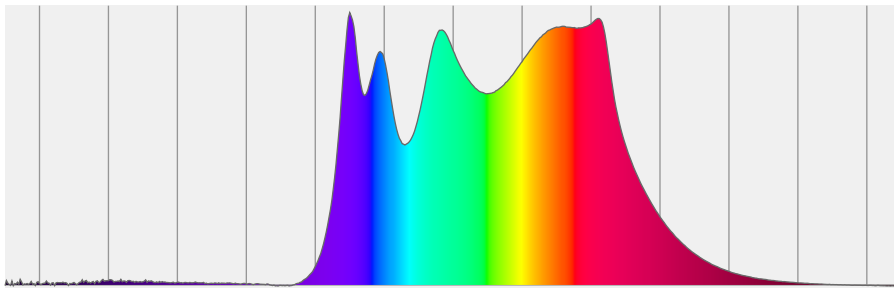
**Measurement Date: 3/25/2022**

**Voltage: 119 V, Current: 3.33 A**

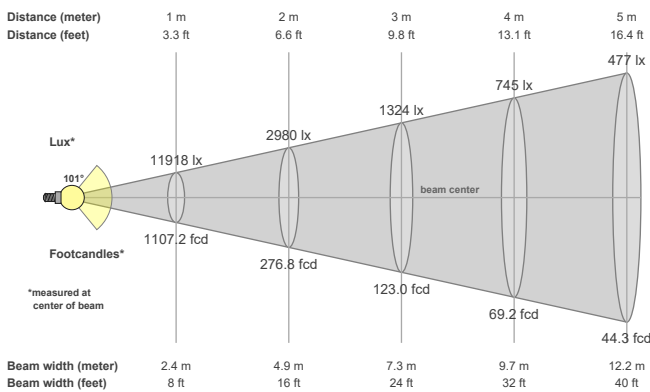
**Power: 396 W**

**Efficacy: 77 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 580



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>101.3°</b>  | <b>159.5°</b>   | <b>173.9°</b>     |

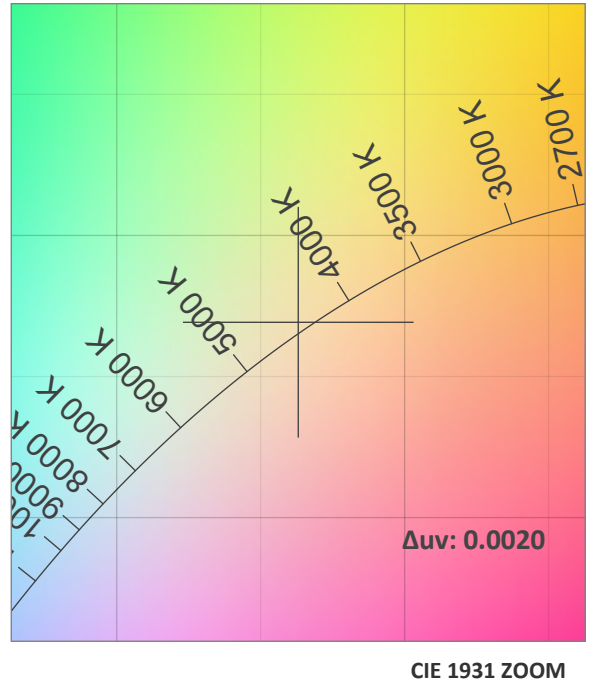
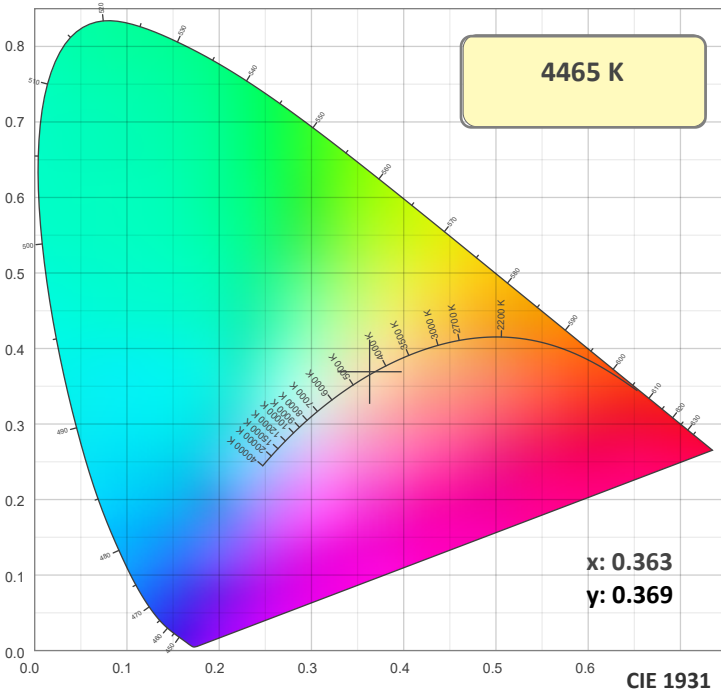
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>11927 cd</b> | <b>79.6%</b>            | <b>55.9%</b>           |

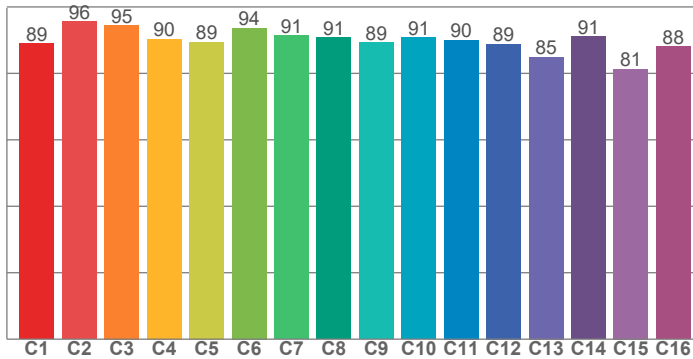
**Beam Intensities from 1-20m**

| M         | 1      | 2     | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 11918  | 2980  | 1324 | 745  | 477  | 331  | 243  | 186  | 147  | 119  | 98   | 83   | 71   | 61   | 53   | 47   | 41   | 37   | 33   | 30   |
| <b>FC</b> | 1107.2 | 276.8 | 123  | 69.2 | 44.3 | 30.8 | 22.6 | 17.3 | 13.7 | 11.1 | 9.2  | 7.7  | 6.6  | 5.6  | 4.9  | 4.3  | 3.8  | 3.4  | 3.1  | 2.8  |

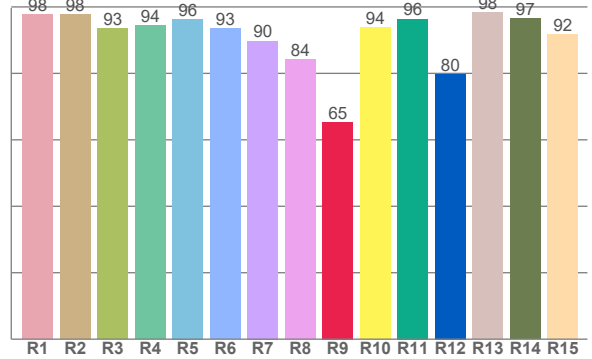
### Color Details



#### TM30: 90.1



#### CRI: 93.4 (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  |
| 97.7 | 97.7 | 93.4 | 94.5 | 96.3 | 93.4 | 89.8 | 84.2 | 65.3 | 93.9 | 96.4 | 79.8 | 98.3 | 96.5 | 91.7 |

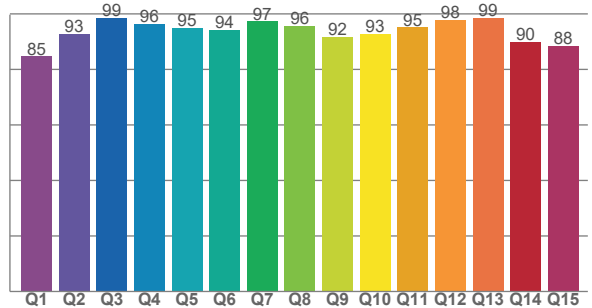
#### TM30 C Values, 16 binned values out of total of 99 C values

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
| 88.9 | 95.6 | 94.5 | 90.3 | 89.4 | 93.6 | 91.4 | 90.7 | 89.4 | 90.8 | 90.1 | 88.8 | 84.9 | 91.0 | 81.3 | 88.0 |

#### CQS Q Values

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
| 84.7 | 92.8 | 98.5 | 96.5 | 94.8 | 94.1 | 97.3 | 95.7 | 91.6 | 92.9 | 95.1 | 97.9 | 98.6 | 90.0 | 88.3 |

#### CQS: 92.8



#### Color Parameters

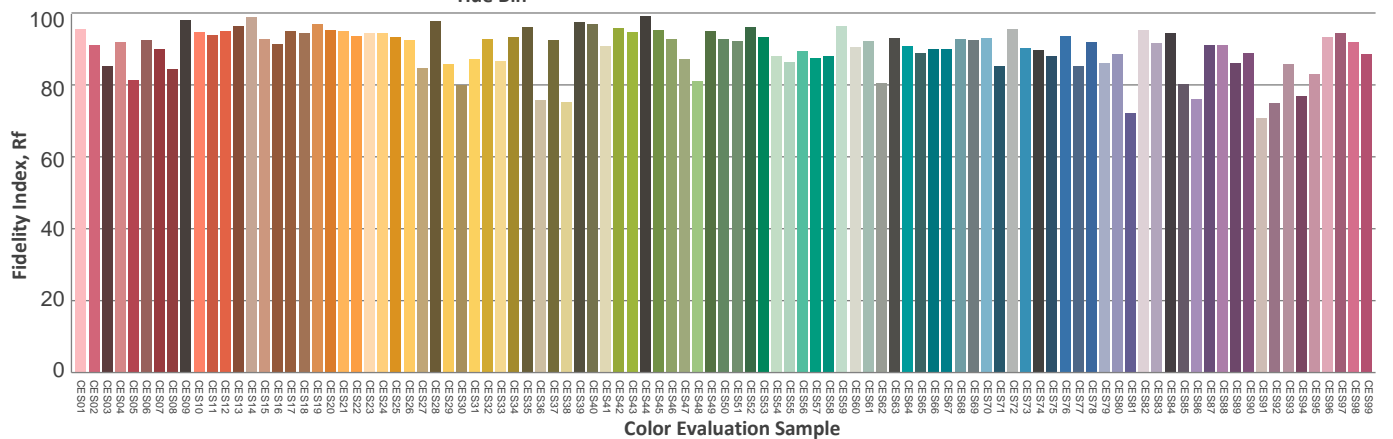
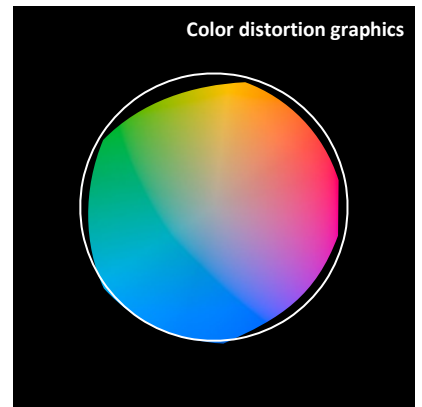
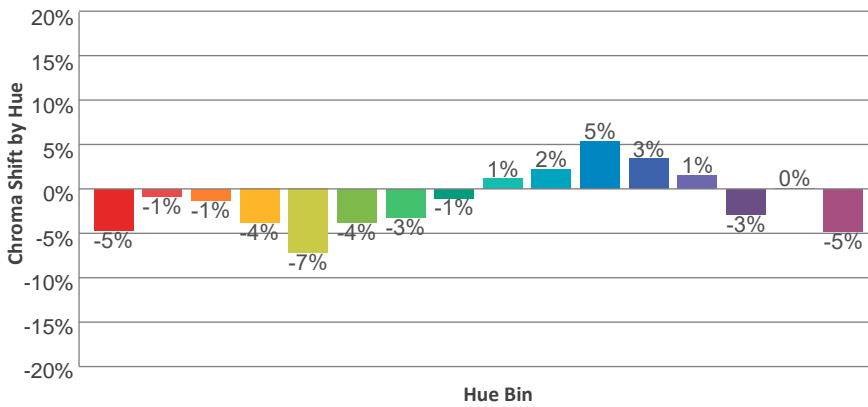
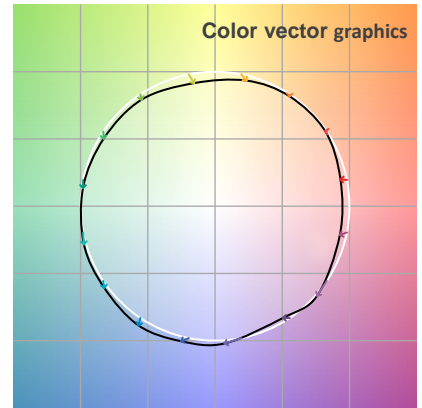
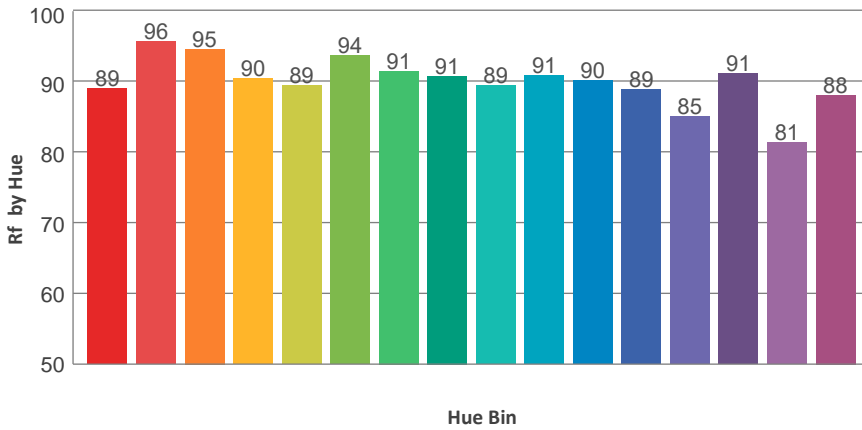
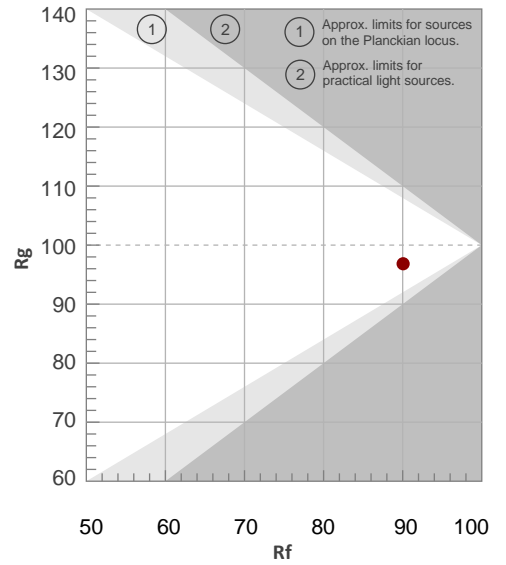
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 4465 K            | 93.4                  | 65.3          | 90.1           | 96.8        | 92.8                | 0.363                     | 0.369                     | 0.217            | 0.330            | 0.0020                     |

TM30 Details

**Rf 90.1**  
Fidelity Index Rf

**Rg 96.8**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 89             | -5%                | 1%   |
| 2       | 96             | -1%                | 1%   |
| 3       | 95             | -1%                | -1%  |
| 4       | 90             | -4%                | -5%  |
| 5       | 89             | -7%                | -2%  |
| 6       | 94             | -4%                | 1%   |
| 7       | 91             | -3%                | 4%   |
| 8       | 91             | -1%                | 6%   |
| 9       | 89             | 1%                 | 9%   |
| 10      | 91             | 2%                 | 5%   |
| 11      | 90             | 5%                 | 2%   |
| 12      | 89             | 3%                 | -5%  |
| 13      | 85             | 1%                 | -13% |
| 14      | 91             | -3%                | -4%  |
| 15      | 81             | 0%                 | -13% |
| 16      | 88             | -5%                | -3%  |





**Total Lumen Output: 34495 lm**

**Color Temperature: 5575 K**

**CRI: 93.5**

**TLCI: 93**

**TM30: 90.6**

**CQS: 93.9**

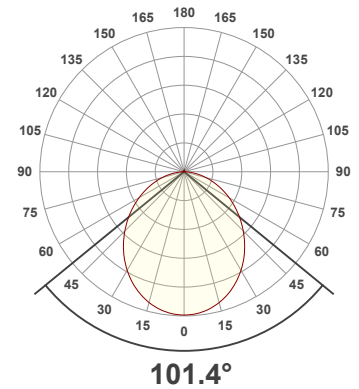
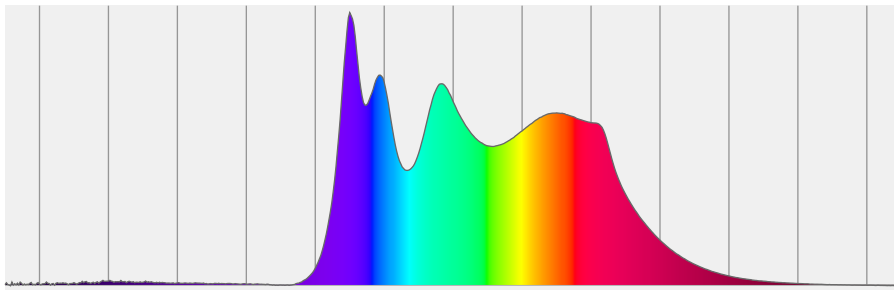
**Measurement Date: 3/25/2022**

**Voltage: 119 V, Current: 3.88 A**

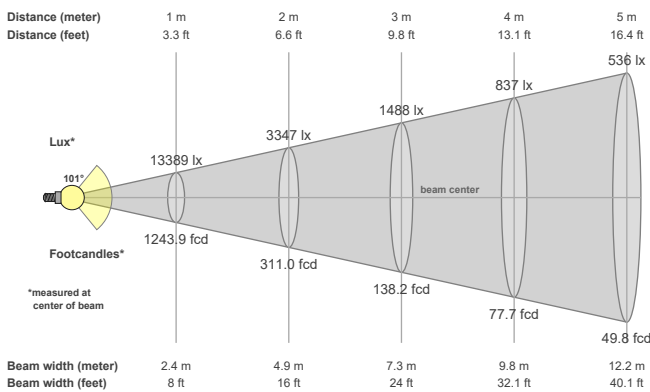
**Power: 463 W**

**Efficacy: 75 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 580



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>101.4°</b>  | <b>159.5°</b>   | <b>174.2°</b>     |

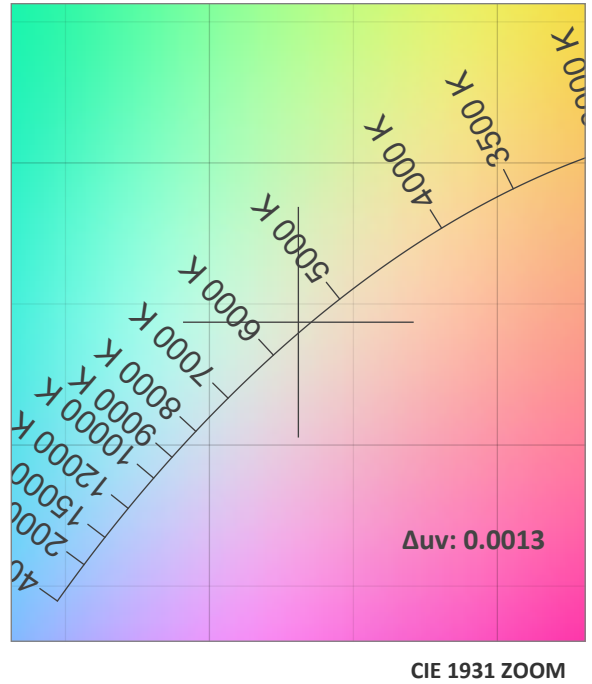
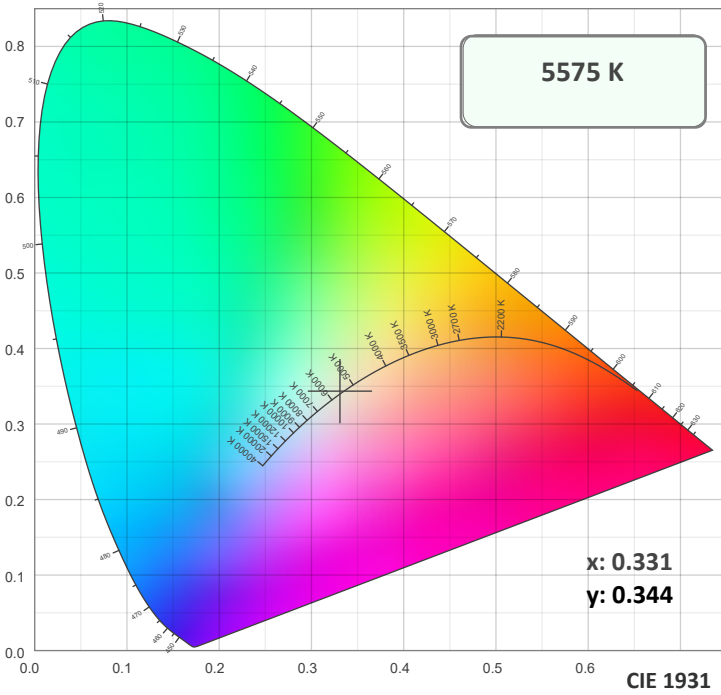
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>13393 cd</b> | <b>79.5%</b>            | <b>55.8%</b>           |

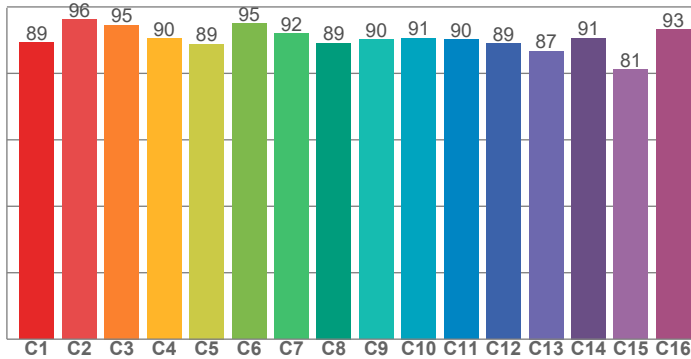
**Beam Intensities from 1-20m**

| M         | 1      | 2    | 3     | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 13389  | 3347 | 1488  | 837  | 536  | 372  | 273  | 209  | 165  | 134  | 111  | 93   | 79   | 68   | 60   | 52   | 46   | 41   | 37   | 33   |
| <b>FC</b> | 1243.9 | 311  | 138.2 | 77.7 | 49.8 | 34.6 | 25.4 | 19.4 | 15.4 | 12.4 | 10.3 | 8.6  | 7.4  | 6.3  | 5.5  | 4.9  | 4.3  | 3.8  | 3.4  | 3.1  |

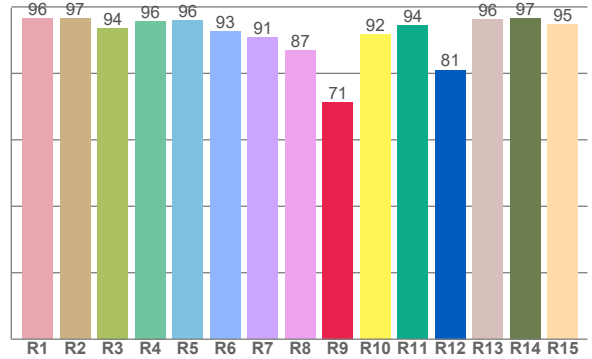
### Color Details



**TM30: 90.6**



**CRI: 93.5 (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  |
| 96.4 | 96.5 | 93.7 | 95.7 | 96.0 | 92.5 | 90.7 | 86.8 | 71.3 | 91.8 | 94.4 | 81.1 | 96.3 | 96.6 | 94.7 |

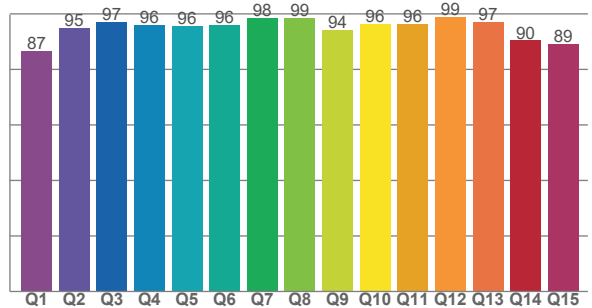
**TM30 C Values, 16 binned values out of total of 99 C values**

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
| 89.4 | 96.2 | 94.6 | 90.4 | 88.9 | 95.0 | 92.1 | 89.1 | 90.2 | 90.7 | 90.1 | 88.9 | 86.8 | 90.6 | 81.1 | 93.3 |

**CQS Q Values**

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
| 86.5 | 95.0 | 97.0 | 95.9 | 95.7 | 95.9 | 98.4 | 98.6 | 94.3 | 96.2 | 96.4 | 98.9 | 96.9 | 90.4 | 89.1 |

**CQS: 93.9**



**Color Parameters**

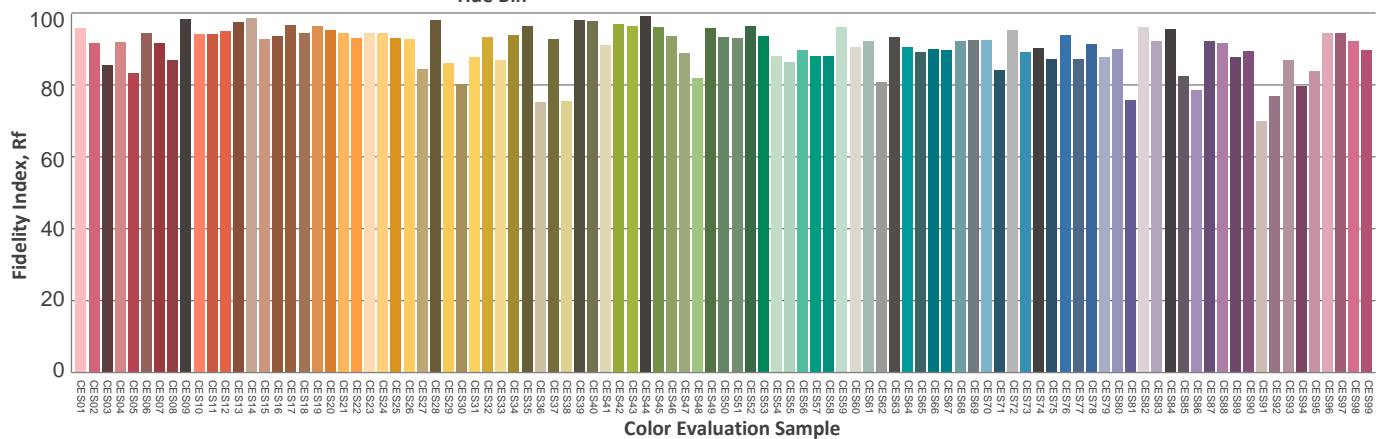
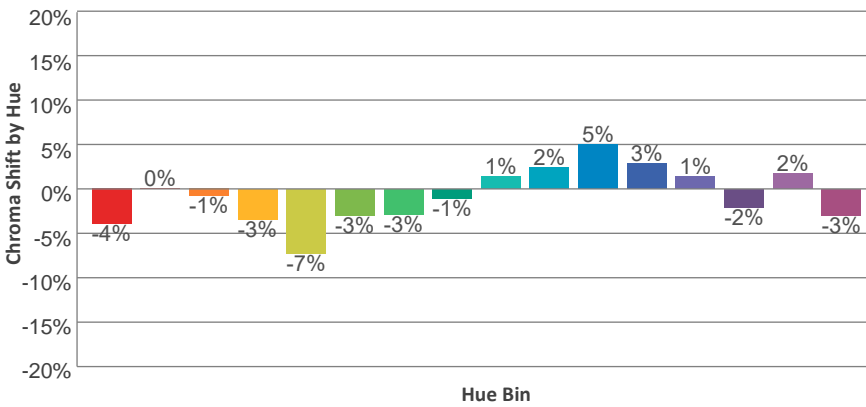
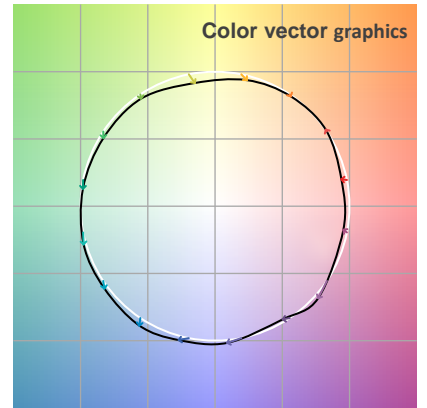
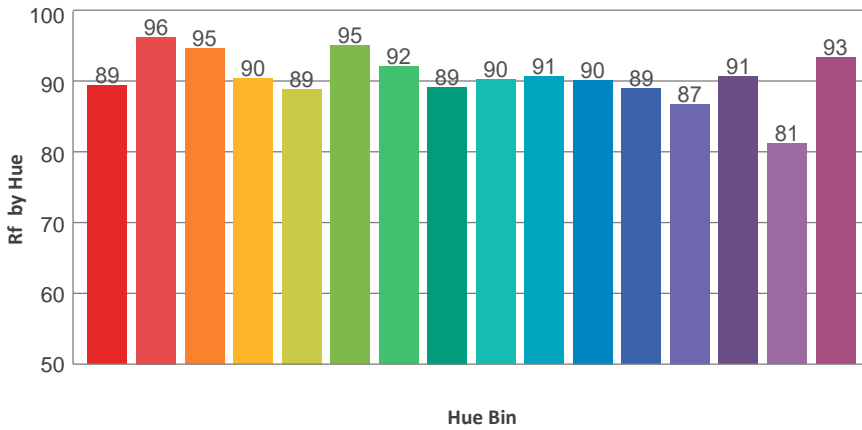
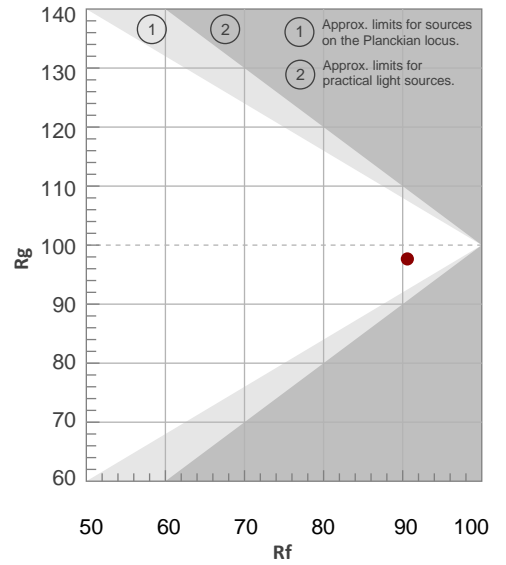
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 5575 K            | 93.5                  | 71.3          | 90.6           | 97.7        | 93.9                | 0.331                     | 0.344                     | 0.205            | 0.319            | 0.0013                     |

TM30 Details

**Rf 90.6**  
Fidelity Index Rf

**Rg 97.7**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 89             | -4%                | 1%   |
| 2       | 96             | 0%                 | 2%   |
| 3       | 95             | -1%                | -2%  |
| 4       | 90             | -3%                | -5%  |
| 5       | 89             | -7%                | -3%  |
| 6       | 95             | -3%                | 1%   |
| 7       | 92             | -3%                | 4%   |
| 8       | 89             | -1%                | 6%   |
| 9       | 90             | 1%                 | 9%   |
| 10      | 91             | 2%                 | 5%   |
| 11      | 90             | 5%                 | 2%   |
| 12      | 89             | 3%                 | -7%  |
| 13      | 87             | 1%                 | -11% |
| 14      | 91             | -2%                | -5%  |
| 15      | 81             | 2%                 | -14% |
| 16      | 93             | -3%                | 1%   |



**Total Lumen Output: 35099 lm**

**Color Temperature: 5988 K**

**CRI: 93.2**

**TLCI: 92**

**TM30: 90.0**

**CQS: 93.7**

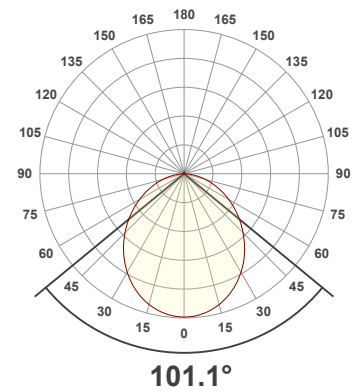
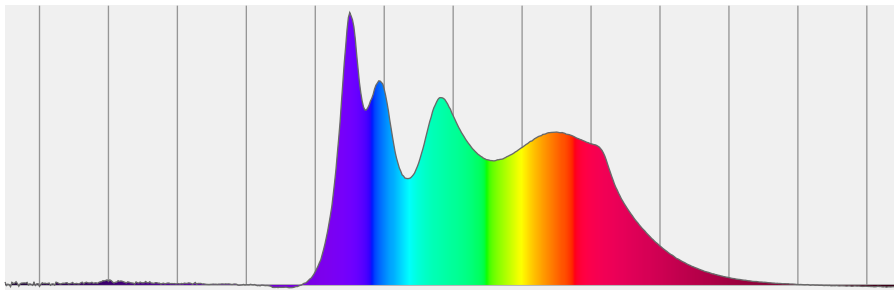
**Measurement Date: 3/25/2022**

**Voltage: 119 V, Current: 4.05 A**

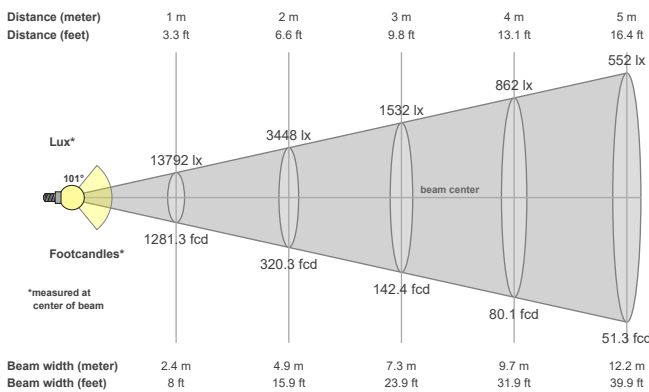
**Power: 484 W**

**Efficacy: 73 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 582



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>101.1°</b>  | <b>158.9°</b>   | <b>173.3°</b>     |

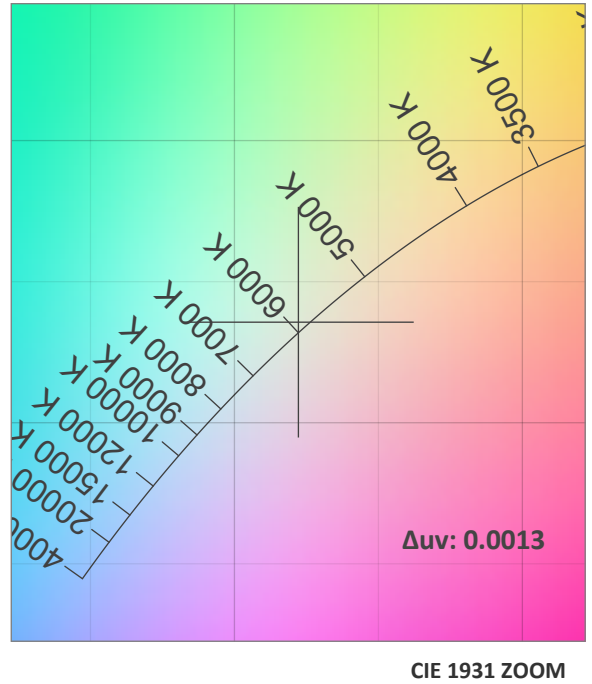
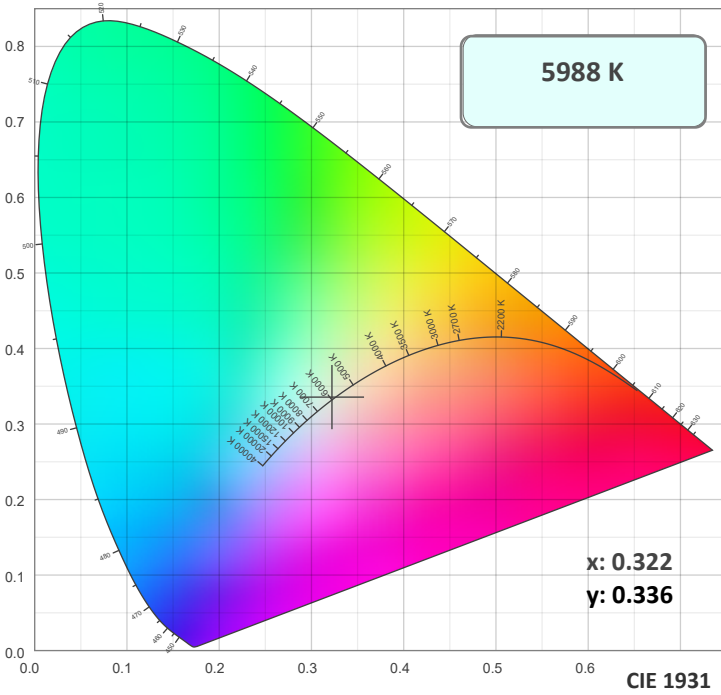
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>13794 cd</b> | <b>80.3%</b>            | <b>56.4%</b>           |

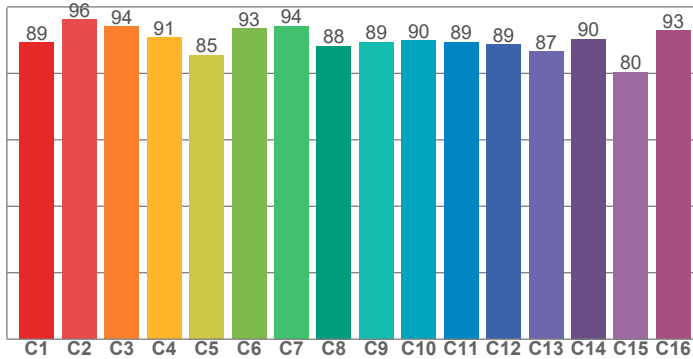
**Beam Intensities from 1-20m**

| M         | 1      | 2     | 3     | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 13792  | 3448  | 1532  | 862  | 552  | 383  | 281  | 215  | 170  | 138  | 114  | 96   | 82   | 70   | 61   | 54   | 48   | 43   | 38   | 34   |
| <b>FC</b> | 1281.3 | 320.3 | 142.4 | 80.1 | 51.3 | 35.6 | 26.1 | 20   | 15.8 | 12.8 | 10.6 | 8.9  | 7.6  | 6.5  | 5.7  | 5    | 4.4  | 4    | 3.5  | 3.2  |

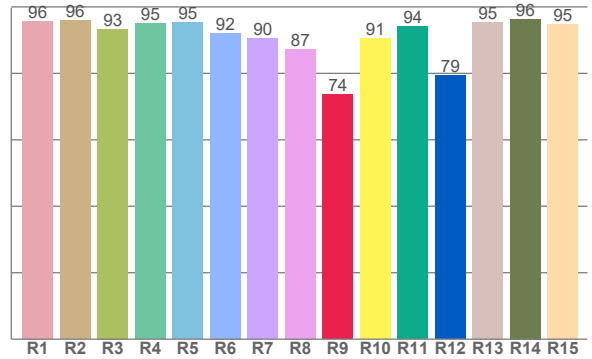
### Color Details



#### TM30: 90.0



#### CRI: 93.2 (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  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 95.7 | 96.0 | 93.3 | 95.0 | 95.4 | 92.2 | 90.5 | 87.3 | 73.6 | 90.6 | 94.0 | 79.3 | 95.5 | 96.4 | 94.9 |

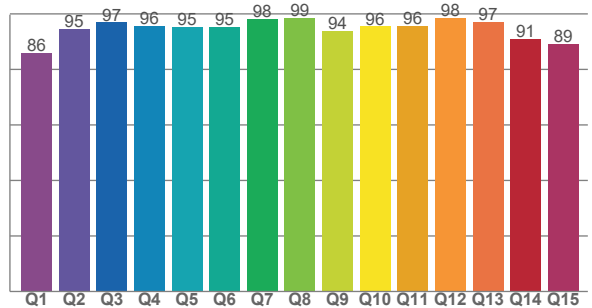
#### TM30 C Values, 16 binned values out of total of 99 C values

| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 89.3 | 96.2 | 94.1 | 90.8 | 85.5 | 93.4 | 94.2 | 88.2 | 89.4 | 89.9 | 89.5 | 88.7 | 86.5 | 90.4 | 80.5 | 93.0 |

#### CQS Q Values

| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 85.9 | 94.6 | 96.9 | 95.6 | 95.2 | 95.4 | 98.1 | 98.5 | 93.8 | 95.5 | 95.7 | 98.5 | 97.2 | 90.9 | 89.2 |

#### CQS: 93.7



### Color Parameters

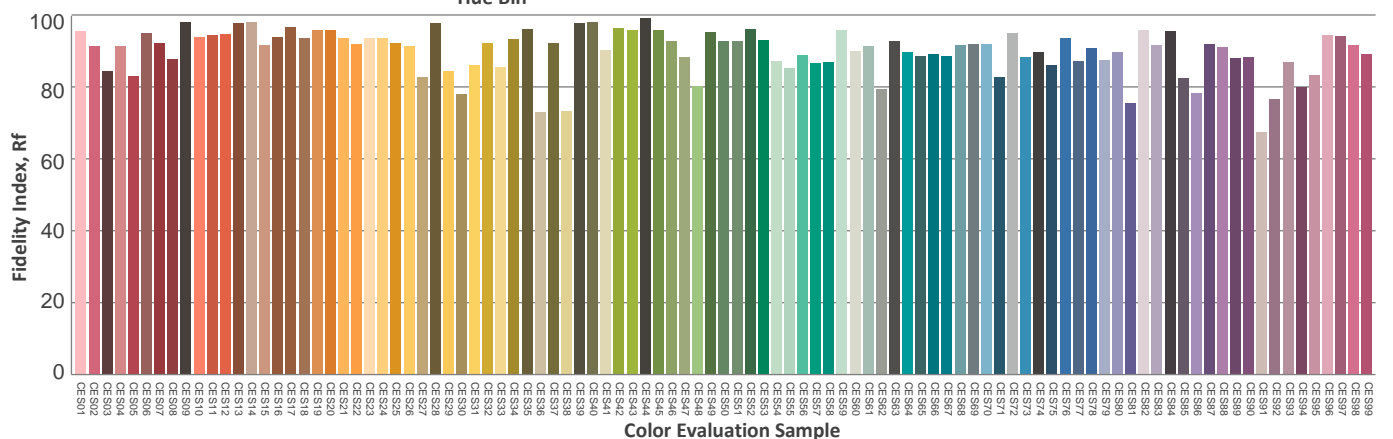
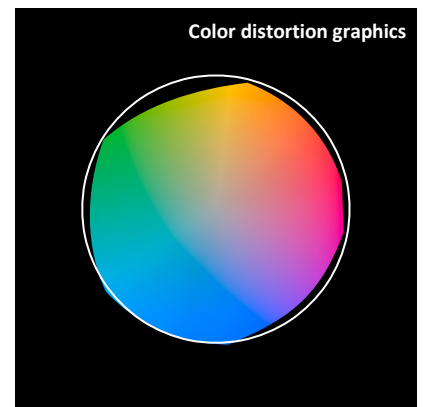
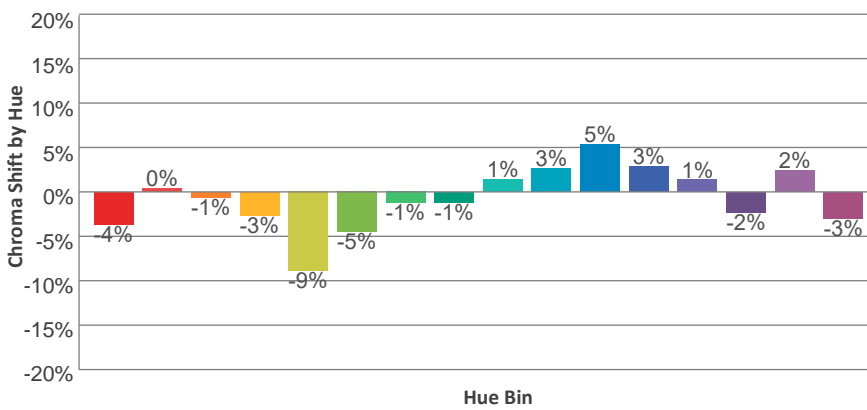
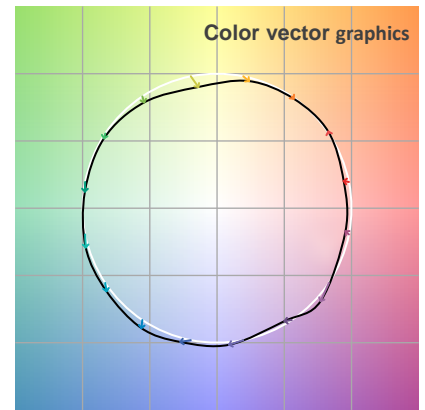
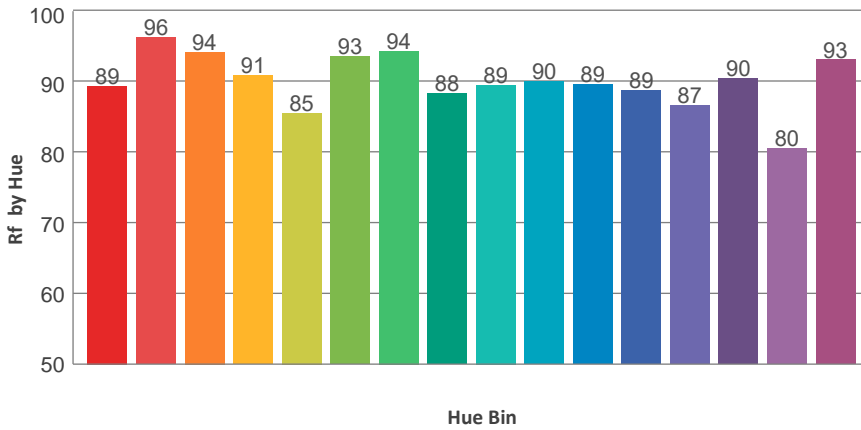
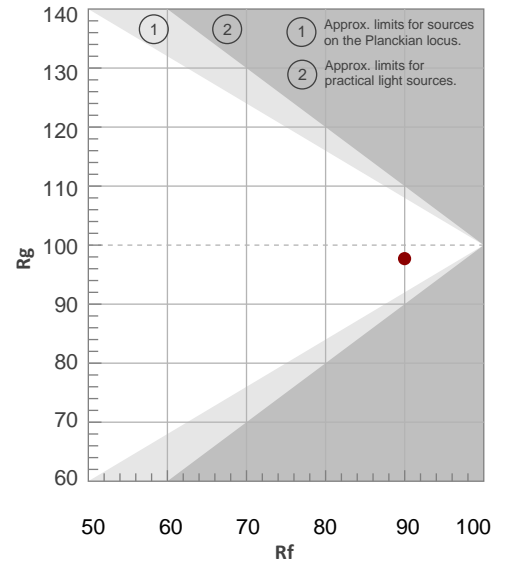
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 5988 K            | 93.2                  | 73.6          | 90.0           | 97.7        | 93.7                | 0.322                     | 0.336                     | 0.202            | 0.315            | 0.0013                     |

TM30 Details

**Rf 90.0**  
Fidelity Index Rf

**Rg 97.7**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 89             | -4%                | 1%   |
| 2       | 96             | 0%                 | 1%   |
| 3       | 94             | -1%                | -2%  |
| 4       | 91             | -3%                | -5%  |
| 5       | 85             | -9%                | -4%  |
| 6       | 93             | -5%                | 1%   |
| 7       | 94             | -1%                | 3%   |
| 8       | 88             | -1%                | 7%   |
| 9       | 89             | 1%                 | 10%  |
| 10      | 90             | 3%                 | 6%   |
| 11      | 89             | 5%                 | 3%   |
| 12      | 89             | 3%                 | -7%  |
| 13      | 87             | 1%                 | -11% |
| 14      | 90             | -2%                | -5%  |
| 15      | 80             | 2%                 | -15% |
| 16      | 93             | -3%                | 2%   |



**Total Lumen Output: 35938 lm**

**Color Temperature: 6482 K**

**CRI: 93.0**

**TLCI: 92**

**TM30: 89.7**

**CQS: 93.7**

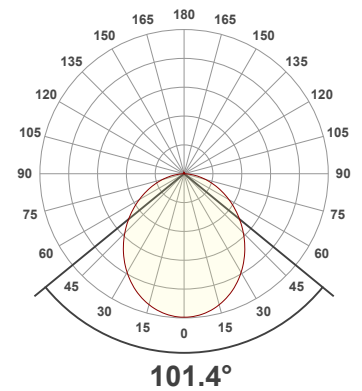
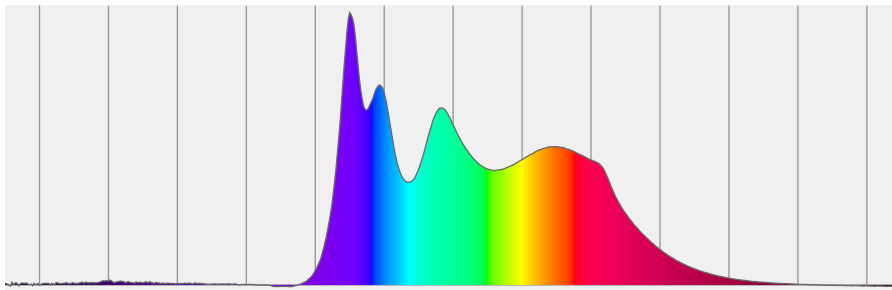
**Measurement Date: 3/25/2022**

**Voltage: 120 V, Current: 4.22 A**

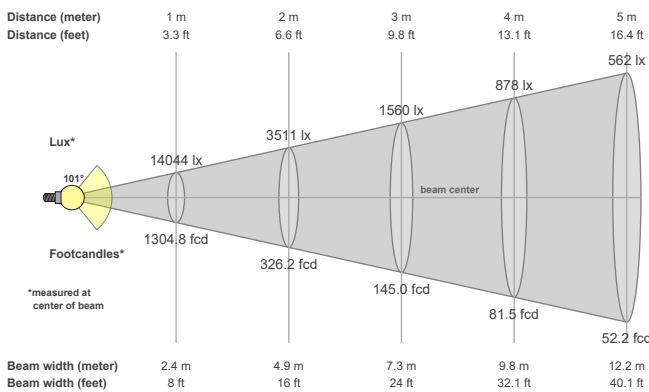
**Power: 505 W**

**Efficacy: 71 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 360



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>101.4°</b>  | <b>159.2°</b>   | <b>172.9°</b>     |

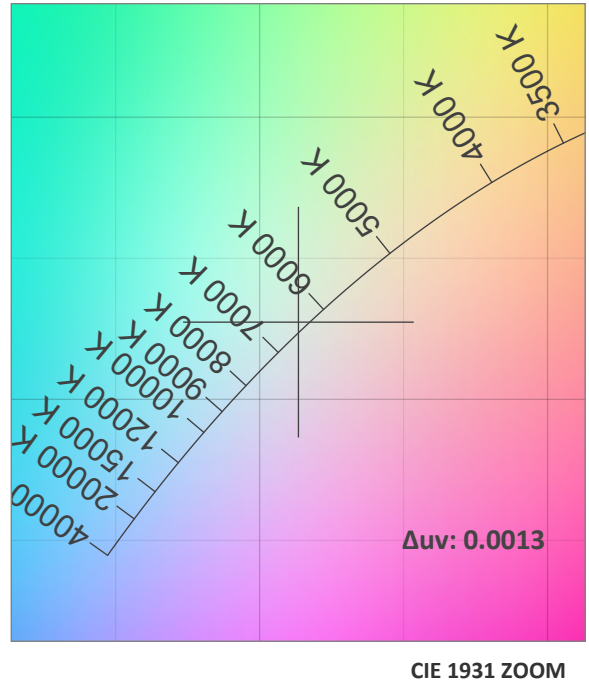
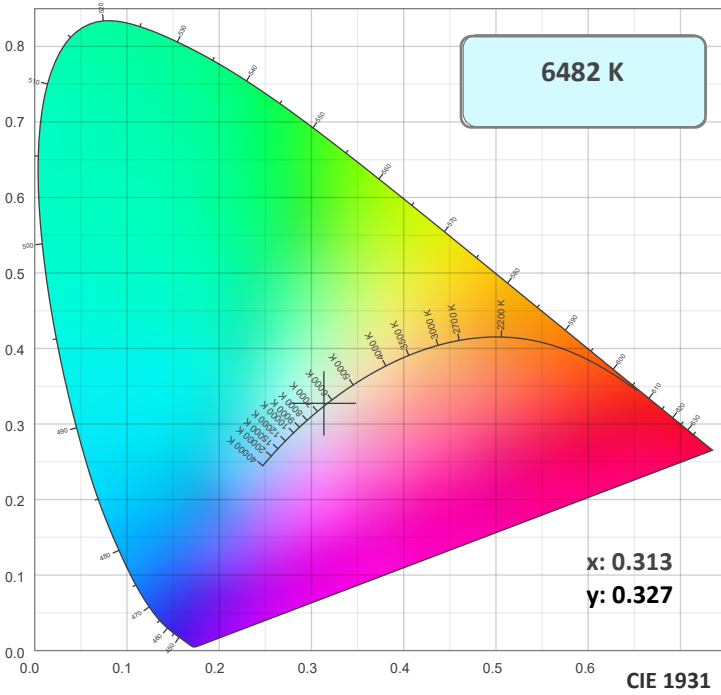
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>14045 cd</b> | <b>80.3%</b>            | <b>56.4%</b>           |

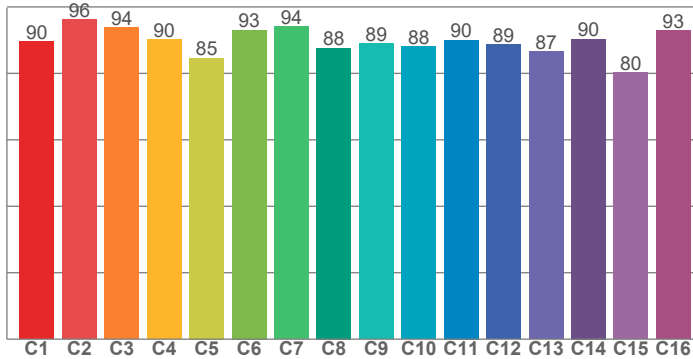
**Beam Intensities from 1-20m**

| M         | 1      | 2     | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 14044  | 3511  | 1560 | 878  | 562  | 390  | 287  | 219  | 173  | 140  | 116  | 98   | 83   | 72   | 62   | 55   | 49   | 43   | 39   | 35   |
| <b>FC</b> | 1304.8 | 326.2 | 145  | 81.5 | 52.2 | 36.2 | 26.6 | 20.4 | 16.1 | 13   | 10.8 | 9.1  | 7.7  | 6.7  | 5.8  | 5.1  | 4.5  | 4    | 3.6  | 3.3  |

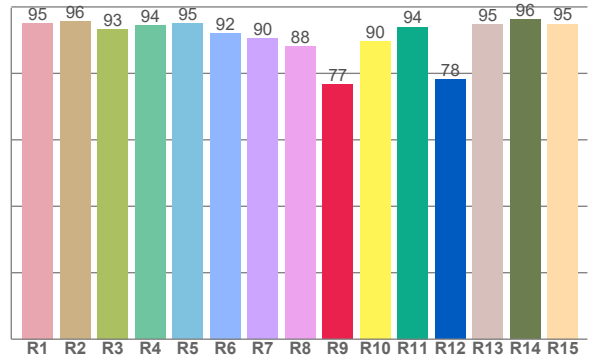
### Color Details



TM30: 89.7



CRI: 93.0 (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  |
| 95.1 | 95.5 | 93.3 | 94.4 | 94.9 | 92.1 | 90.5 | 88.1 | 76.6 | 89.7 | 94.0 | 78.1 | 94.8 | 96.2 | 94.9 |

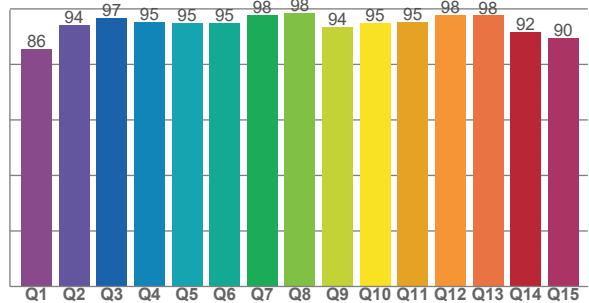
TM30 C Values, 16 binned values out of total of 99 C values

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
| 89.5 | 96.2 | 93.7 | 90.1 | 84.6 | 93.1 | 94.1 | 87.7 | 88.9 | 88.2 | 90.1 | 88.7 | 86.6 | 90.3 | 80.4 | 92.9 |

CQS Q Values

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
| 85.7 | 94.3 | 96.9 | 95.3 | 94.9 | 95.1 | 97.8 | 98.4 | 93.6 | 95.0 | 95.2 | 98.0 | 97.6 | 91.7 | 89.6 |

CQS: 93.7



### 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 Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 6482 K            | 93.0                  | 76.6          | 89.7           | 97.6        | 93.7                | 0.313                     | 0.327                     | 0.199            | 0.312            | 0.0013                     |

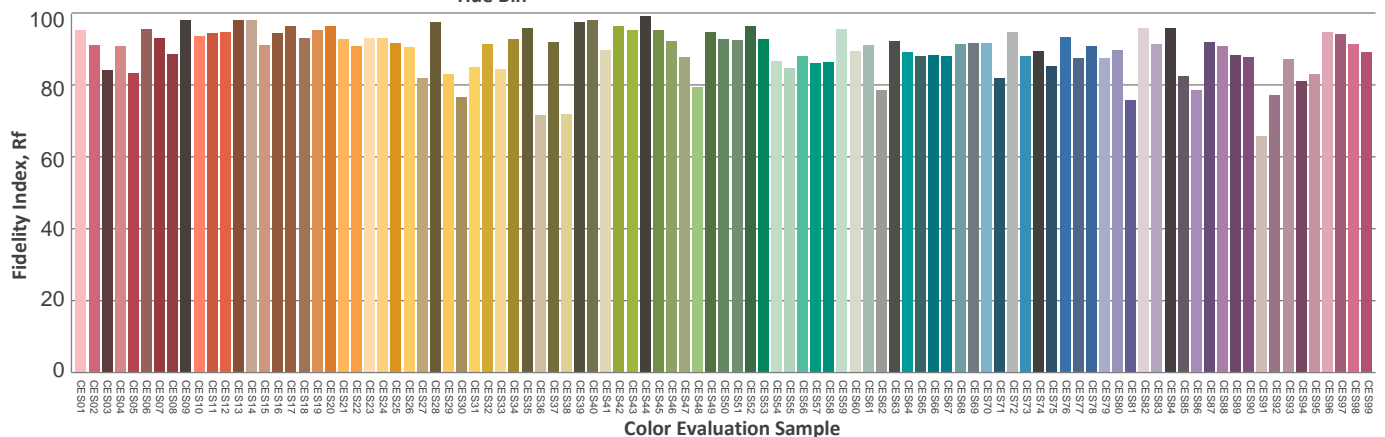
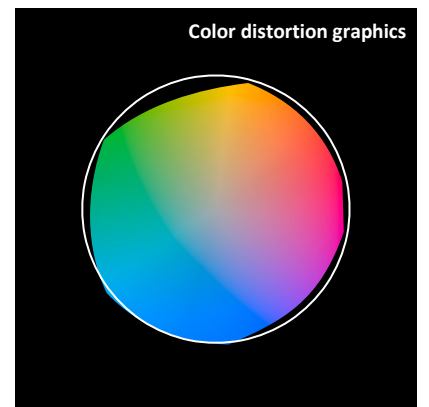
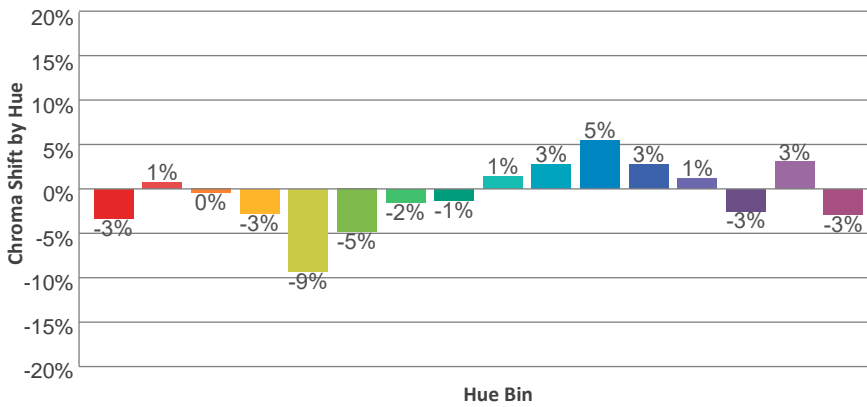
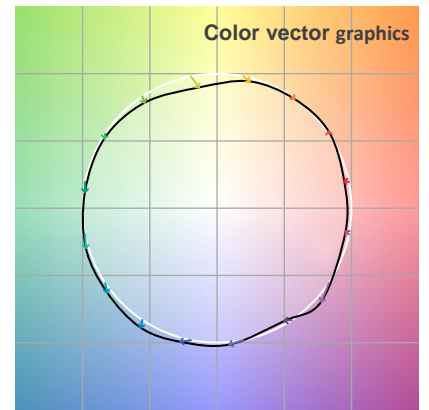
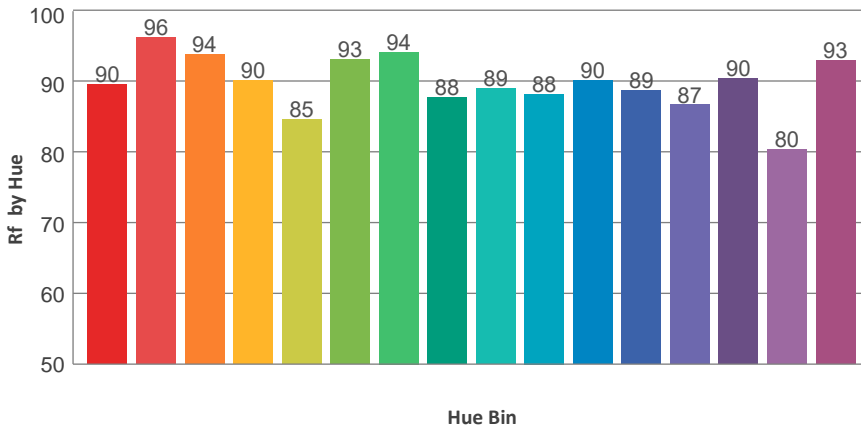
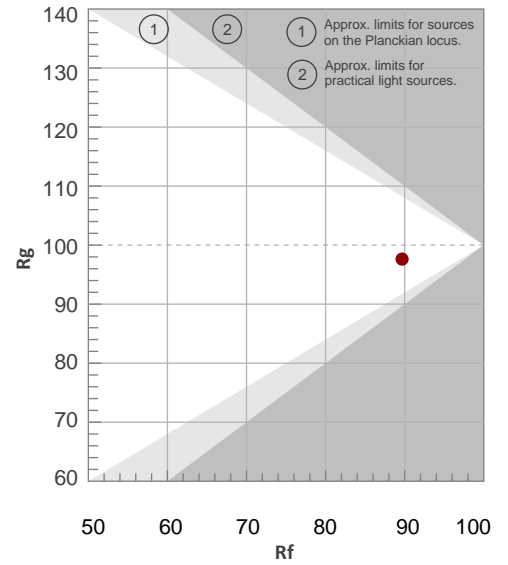


TM30 Details

**Rf 89.7**  
Fidelity Index Rf

**Rg 97.6**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 90             | -3%                | 2%   |
| 2       | 96             | 1%                 | 1%   |
| 3       | 94             | 0%                 | -3%  |
| 4       | 90             | -3%                | -5%  |
| 5       | 85             | -9%                | -4%  |
| 6       | 93             | -5%                | 1%   |
| 7       | 94             | -2%                | 3%   |
| 8       | 88             | -1%                | 7%   |
| 9       | 89             | 1%                 | 10%  |
| 10      | 88             | 3%                 | 7%   |
| 11      | 90             | 5%                 | 2%   |
| 12      | 89             | 3%                 | -7%  |
| 13      | 87             | 1%                 | -11% |
| 14      | 90             | -3%                | -5%  |
| 15      | 80             | 3%                 | -15% |
| 16      | 93             | -3%                | 2%   |



**Total Lumen Output: 36935 lm**

**Color Temperature: 7980 K**

**CRI: 92.4**

**TLCI: 91**

**TM30: 88.9**

**CQS: 93.4**

**Measurement Date: 3/25/2022**

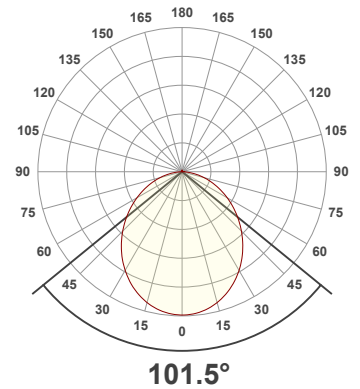
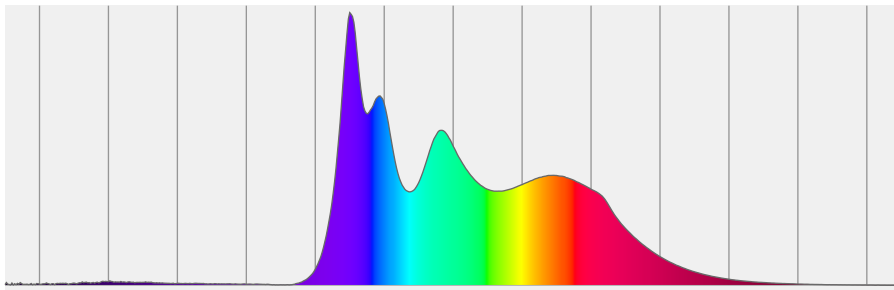
**Voltage: 120 V, Current: 4.45 A**

**Power: 532 W**

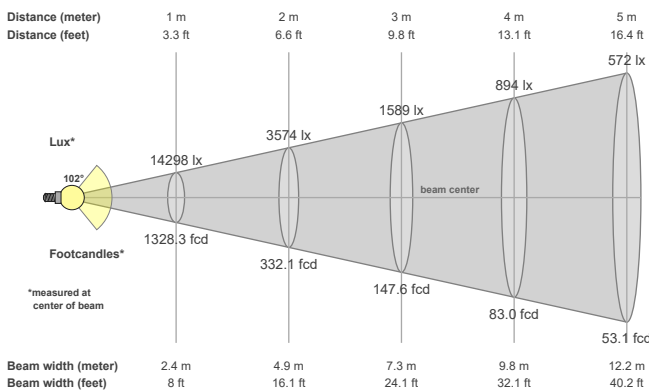
**Efficacy: 69 Lumen/Watt**

**Spectral distribution**

Dominant Wavelength 475



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>101.5°</b>  | <b>159.6°</b>   | <b>174.1°</b>     |

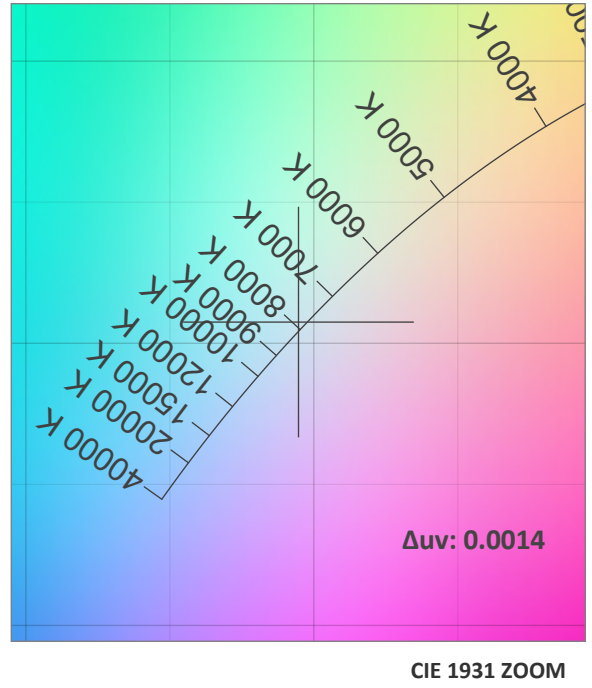
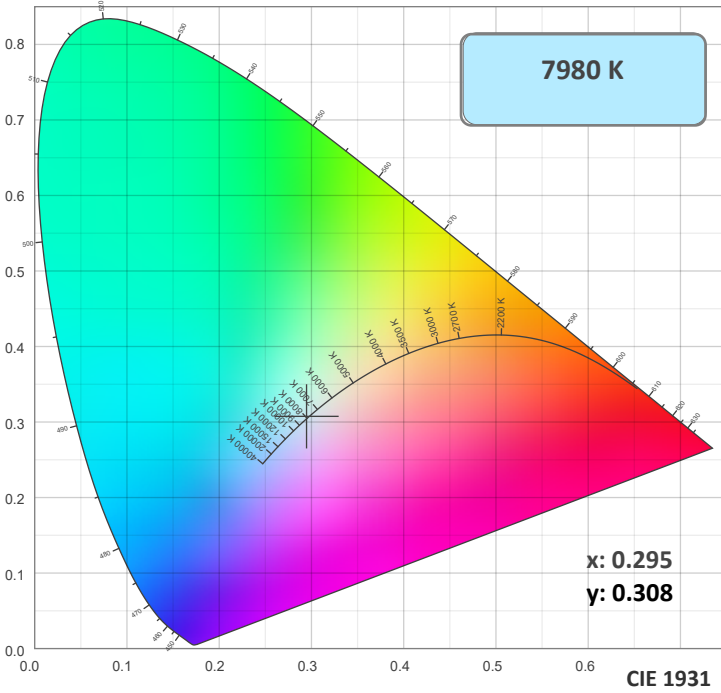
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>14309 cd</b> | <b>79.4%</b>            | <b>55.7%</b>           |

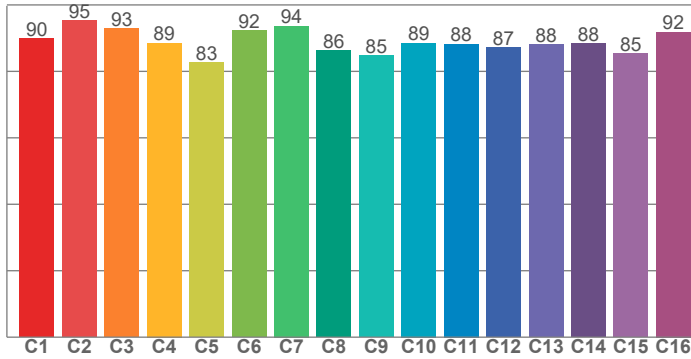
**Beam Intensities from 1-20m**

| M         | 1      | 2     | 3     | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 14298  | 3574  | 1589  | 894  | 572  | 397  | 292  | 223  | 177  | 143  | 118  | 99   | 85   | 73   | 64   | 56   | 49   | 44   | 40   | 36   |
| <b>FC</b> | 1328.3 | 332.1 | 147.6 | 83   | 53.1 | 36.9 | 27.1 | 20.8 | 16.4 | 13.3 | 11   | 9.2  | 7.9  | 6.8  | 5.9  | 5.2  | 4.6  | 4.1  | 3.7  | 3.3  |

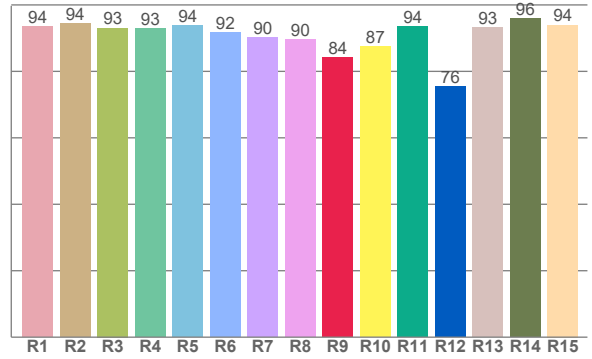
### Color Details



TM30: 88.9



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 | 94.4 | 93.1 | 92.9 | 93.9 | 91.8 | 90.3 | 89.6 | 84.1 | 87.5 | 93.6 | 75.5 | 93.1 | 95.9 | 94.0 |

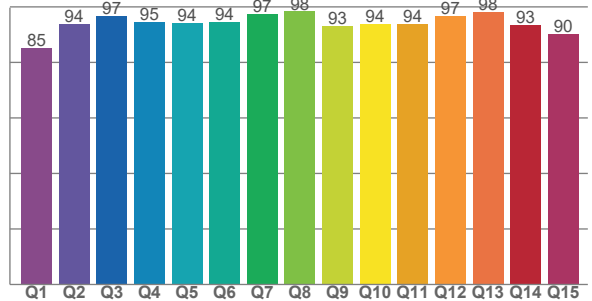
TM30 C Values, 16 binned values out of total of 99 C values

| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 90.0 | 95.3 | 92.9 | 88.5 | 82.6 | 92.4 | 93.6 | 86.3 | 84.9 | 88.5 | 88.2 | 87.2 | 88.0 | 88.4 | 85.5 | 91.9 |

CQS Q Values

| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 85.1 | 93.7 | 96.8 | 94.7 | 94.1 | 94.5 | 97.3 | 98.4 | 93.1 | 93.9 | 93.9 | 96.7 | 98.2 | 93.4 | 90.4 |

CQS: 93.4



### Color Parameters

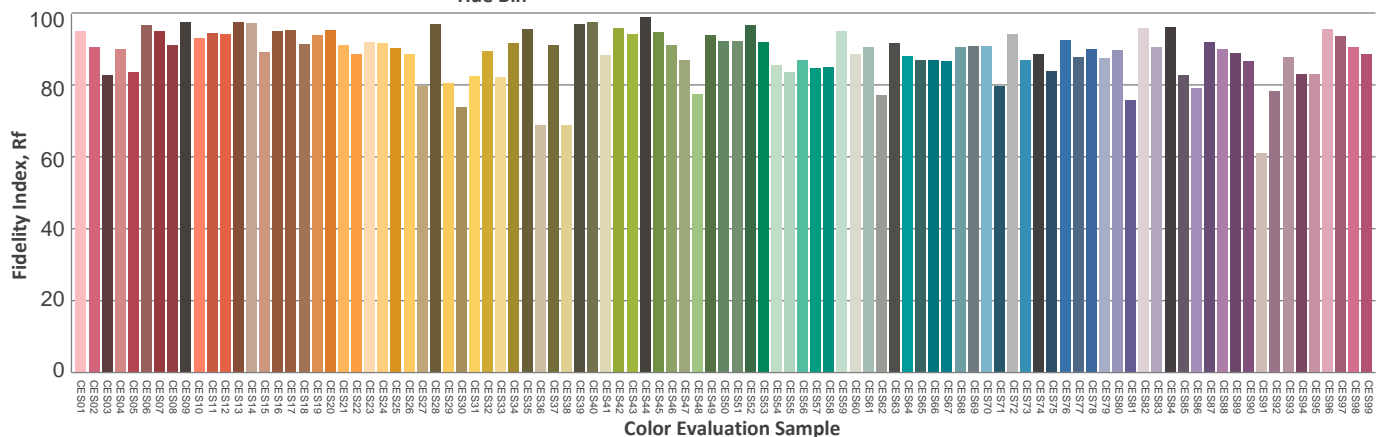
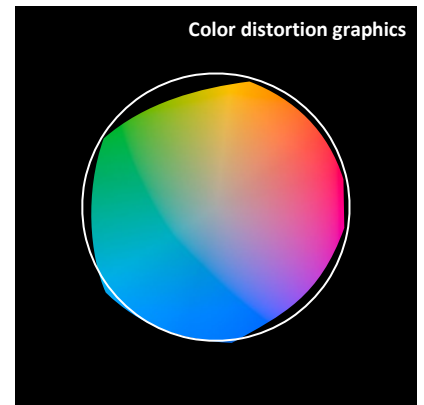
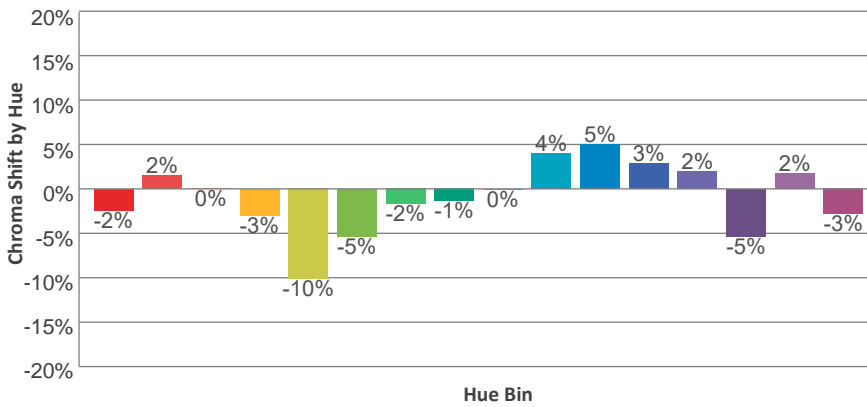
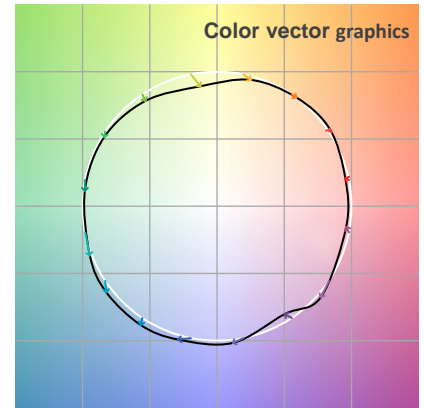
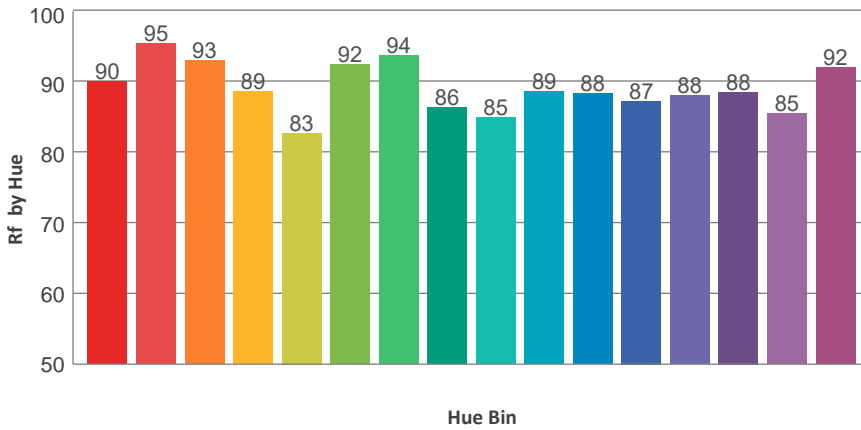
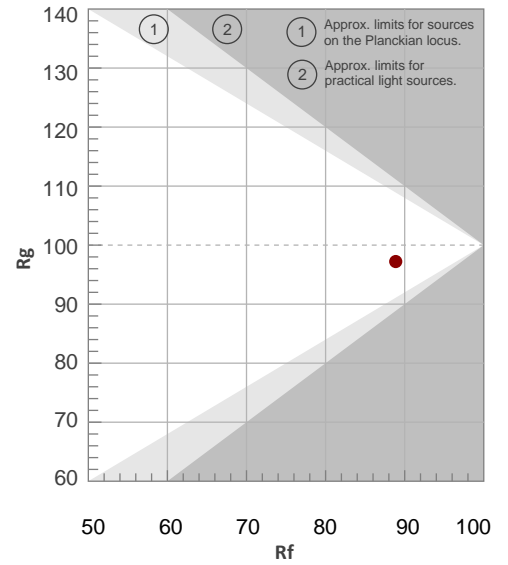
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 7980 K            | 92.4                  | 84.1          | 88.9           | 97.2        | 93.4                | 0.295                     | 0.308                     | 0.193            | 0.302            | 0.0014                     |

TM30 Details

**Rf 88.9**  
Fidelity Index Rf

**Rg 97.2**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 90             | -2%                | 2%   |
| 2       | 95             | 2%                 | 1%   |
| 3       | 93             | 0%                 | -4%  |
| 4       | 89             | -3%                | -6%  |
| 5       | 83             | -10%               | -5%  |
| 6       | 92             | -5%                | 1%   |
| 7       | 94             | -2%                | 4%   |
| 8       | 86             | -1%                | 8%   |
| 9       | 85             | 0%                 | 17%  |
| 10      | 89             | 4%                 | 7%   |
| 11      | 88             | 5%                 | 2%   |
| 12      | 87             | 3%                 | -9%  |
| 13      | 88             | 2%                 | -8%  |
| 14      | 88             | -5%                | -3%  |
| 15      | 85             | 2%                 | -13% |
| 16      | 92             | -3%                | 4%   |



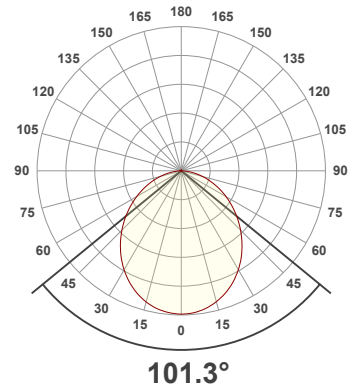
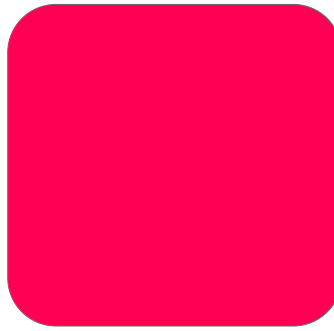
**Total Lumen Output: 6890 lm**

**Voltage: 118 V, Current: 1.86 A**

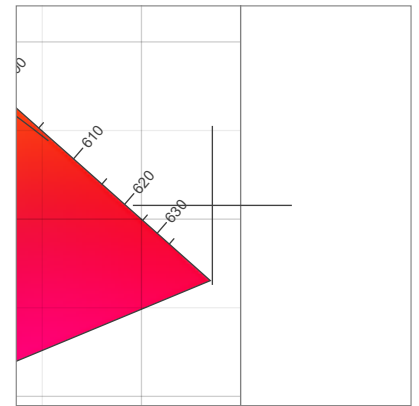
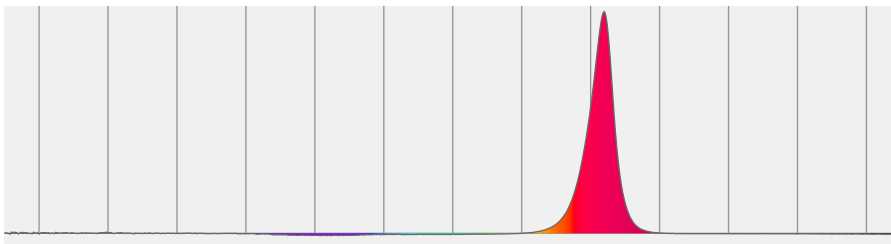
**Power: 220 W**

**Efficacy: 31 Lumen/Watt**

**Measurement Date: 3/24/2022**

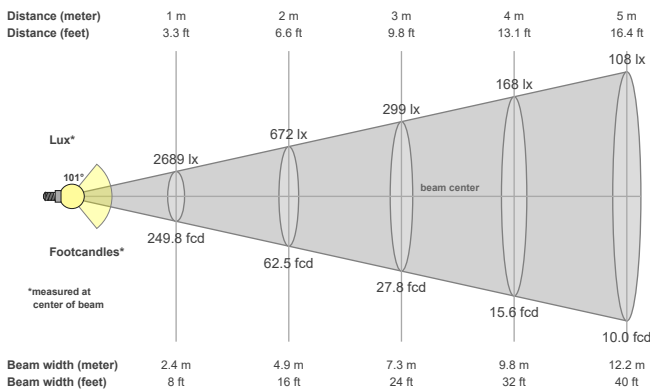


### Spectral distribution



| Dominant Wavelength | Color coordinate cie 1931 | Color coordinate cie 1931 | Color coordinate | Color coordinate |
|---------------------|---------------------------|---------------------------|------------------|------------------|
| nm                  | x                         | y                         | u                | v                |
| 619                 | 0.736                     | 0.308                     | 0.564            | 0.354            |

### Beam details



### Beam angles

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| 101.3°         | 158.7°          | 173.4°            |

### Beam intensities

| Peak intensity | Int. ratio in 120° cone | Int. ratio in 90° cone |
|----------------|-------------------------|------------------------|
| 2690 cd        | 80.0%                   | 56.2%                  |

### Beam Intensities from 1-20m

| M  | 1     | 2    | 3    | 4    | 5    | 6    | 7   | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|----|-------|------|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| FT | 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 |
| LX | 2689  | 672  | 299  | 168  | 108  | 75   | 55  | 42   | 33   | 27   | 22   | 19   | 16   | 14   | 12   | 11   | 9    | 8    | 7    | 7    |
| FC | 249.8 | 62.5 | 27.8 | 15.6 | 10   | 6.9  | 5.1 | 3.9  | 3.1  | 2.5  | 2.1  | 1.7  | 1.5  | 1.3  | 1.1  | 1    | 0.9  | 0.8  | 0.7  | 0.6  |

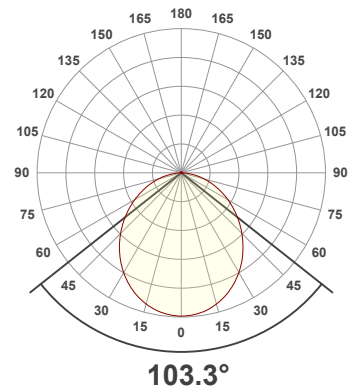
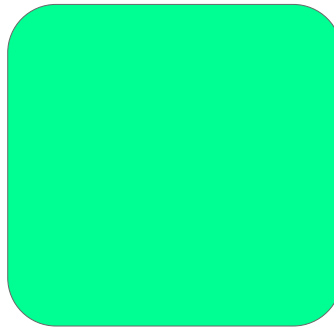
**Total Lumen Output: 13290 lm**

**Voltage: 119 V, Current: 2.13 A**

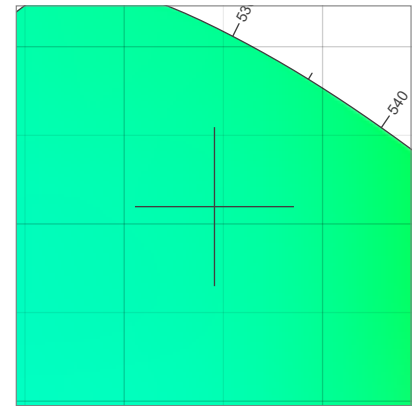
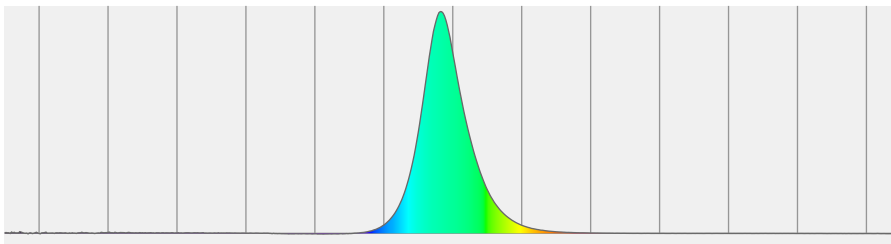
**Power: 255 W**

**Efficacy: 52 Lumen/Watt**

**Measurement Date: 3/24/2022**

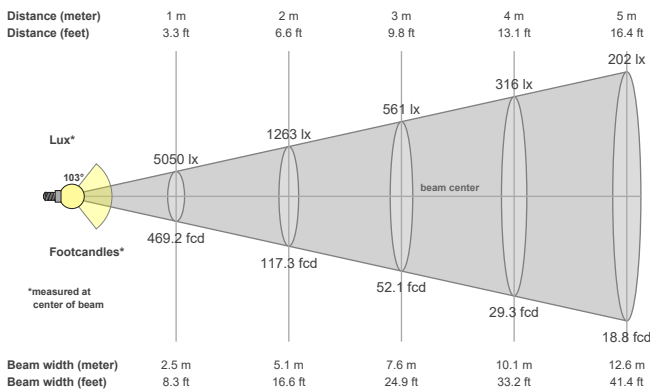


**Spectral distribution**



| Dominant Wavelength | Color coordinate cie 1931 | Color coordinate cie 1931 | Color coordinate | Color coordinate |
|---------------------|---------------------------|---------------------------|------------------|------------------|
| nm                  | x                         | y                         | u                | v                |
| 522                 | 0.146                     | 0.710                     | 0.052            | 0.379            |

**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| 103.3°         | 160.2°          | 174.5°            |

**Beam intensities**

| Peak intensity | Int. ratio in 120° cone | Int. ratio in 90° cone |
|----------------|-------------------------|------------------------|
| 5052 cd        | 79.1%                   | 55.3%                  |

**Beam Intensities from 1-20m**

| M  | 1     | 2     | 3    | 4    | 5    | 6    | 7   | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|----|-------|-------|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| FT | 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 |
| LX | 5050  | 1263  | 561  | 316  | 202  | 140  | 103 | 79   | 62   | 51   | 42   | 35   | 30   | 26   | 22   | 20   | 17   | 16   | 14   | 13   |
| FC | 469.2 | 117.3 | 52.1 | 29.3 | 18.8 | 13   | 9.6 | 7.3  | 5.8  | 4.7  | 3.9  | 3.3  | 2.8  | 2.4  | 2.1  | 1.8  | 1.6  | 1.4  | 1.3  | 1.2  |

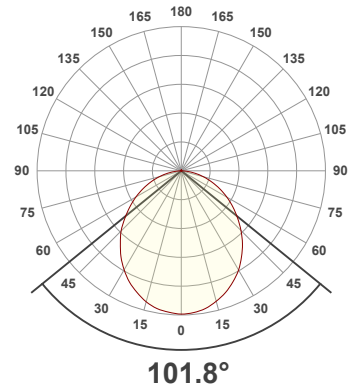
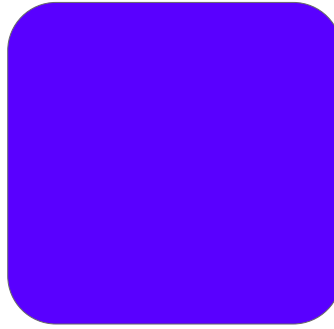
**Total Lumen Output: 3234 lm**

**Voltage: 120 V, Current: 2.02 A**

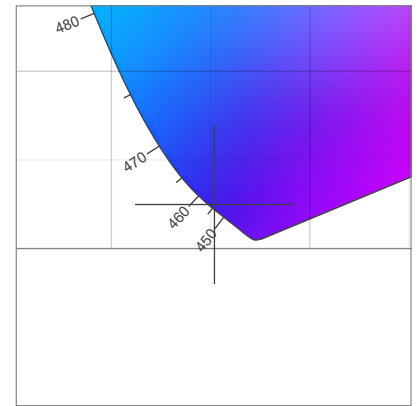
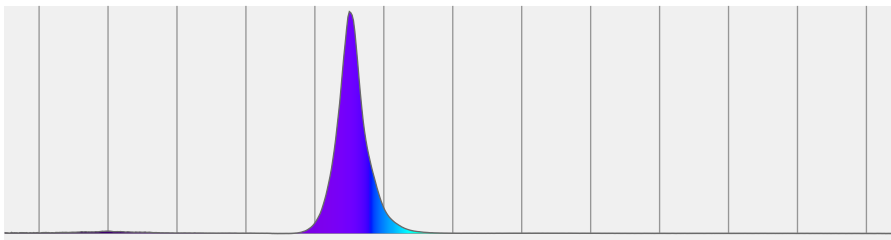
**Power: 242.1 W**

**Efficacy: 13 Lumen/Watt**

**Measurement Date: 3/24/2022**

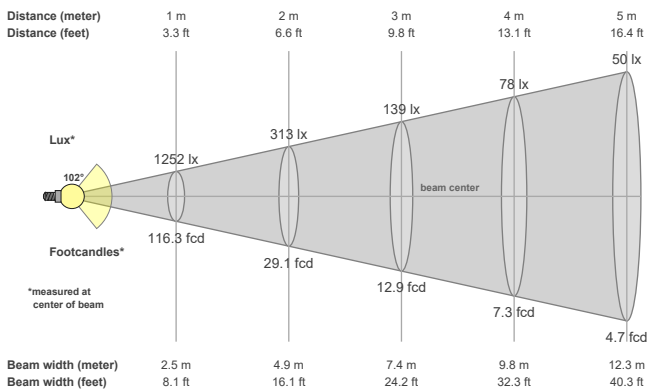


**Spectral distribution**



| Dominant Wavelength | Color coordinate cie 1931 | Color coordinate cie 1931 | Color coordinate | Color coordinate |
|---------------------|---------------------------|---------------------------|------------------|------------------|
| nm                  | x                         | y                         | u                | v                |
| 455                 | 0.152                     | 0.025                     | 0.203            | 0.050            |

**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>101.8°</b>  | <b>159.4°</b>   | <b>173.9°</b>     |

**Beam intensities**

| Peak intensity | Int. ratio in 120° cone | Int. ratio in 90° cone |
|----------------|-------------------------|------------------------|
| <b>1252 cd</b> | <b>79.7%</b>            | <b>55.8%</b>           |

**Beam Intensities from 1-20m**

| M         | 1     | 2    | 3    | 4    | 5    | 6    | 7   | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|-------|------|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 1252  | 313  | 139  | 78   | 50   | 35   | 26  | 20   | 15   | 13   | 10   | 9    | 7    | 6    | 6    | 5    | 4    | 4    | 3    | 3    |
| <b>FC</b> | 116.3 | 29.1 | 12.9 | 7.3  | 4.7  | 3.2  | 2.4 | 1.8  | 1.4  | 1.2  | 1    | 0.8  | 0.7  | 0.6  | 0.5  | 0.5  | 0.4  | 0.4  | 0.3  | 0.3  |

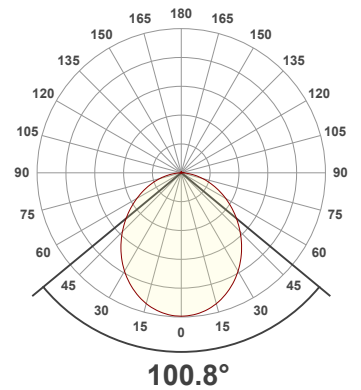
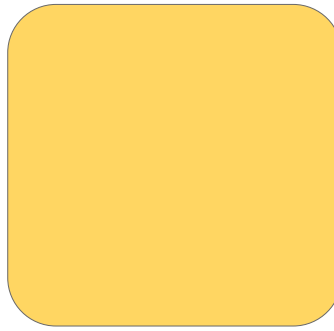
**Total Lumen Output: 21976 lm**

**Voltage: 119 V, Current: 2.05 A**

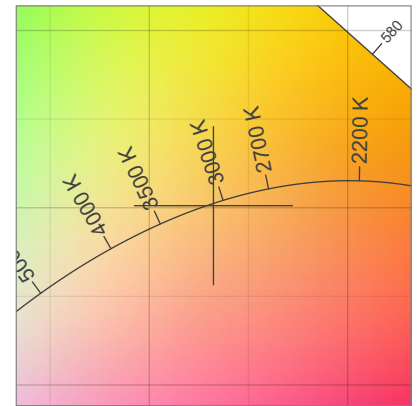
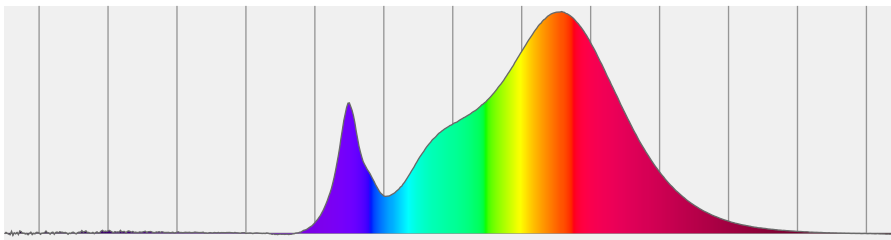
**Power: 244.9 W**

**Efficacy: 90 Lumen/Watt**

**Measurement Date: 3/24/2022**

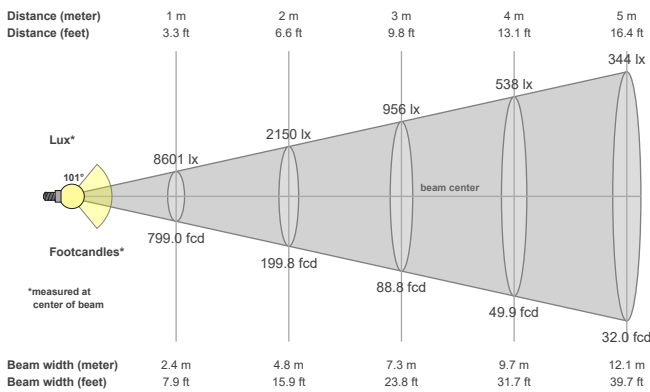


**Spectral distribution**



| Dominant Wavelength | Color coordinate cie 1931 | Color coordinate cie 1931 | Color coordinate | Color coordinate |
|---------------------|---------------------------|---------------------------|------------------|------------------|
| nm                  | x                         | y                         | u                | v                |
| 584                 | 0.432                     | 0.401                     | 0.249            | 0.346            |

**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>100.8°</b>  | <b>159.1°</b>   | <b>173.4°</b>     |

**Beam intensities**

| Peak intensity | Int. ratio in 120° cone | Int. ratio in 90° cone |
|----------------|-------------------------|------------------------|
| <b>8606 cd</b> | <b>79.9%</b>            | <b>56.2%</b>           |

**Beam Intensities from 1-20m**

| M         | 1    | 2     | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 8601 | 2150  | 956  | 538  | 344  | 239  | 176  | 134  | 106  | 86   | 71   | 60   | 51   | 44   | 38   | 34   | 30   | 27   | 24   | 22   |
| <b>FC</b> | 799  | 199.8 | 88.8 | 49.9 | 32   | 22.2 | 16.3 | 12.5 | 9.9  | 8    | 6.6  | 5.5  | 4.7  | 4.1  | 3.6  | 3.1  | 2.8  | 2.5  | 2.2  | 2    |



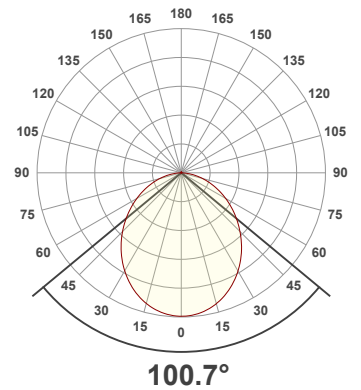
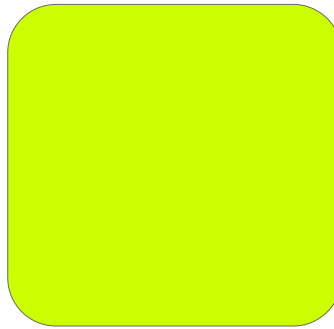
**Total Lumen Output: 30150 lm**

**Voltage: 119 V, Current: 1.93 A**

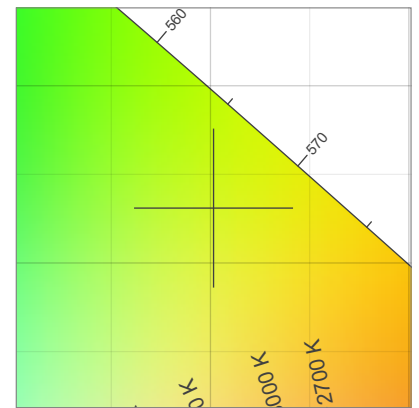
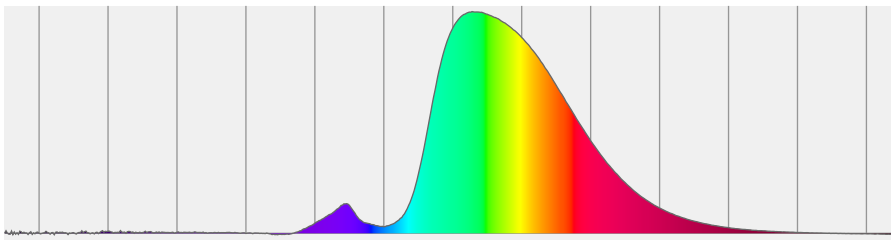
**Power: 230 W**

**Efficacy: 131 Lumen/Watt**

**Measurement Date: 3/24/2022**

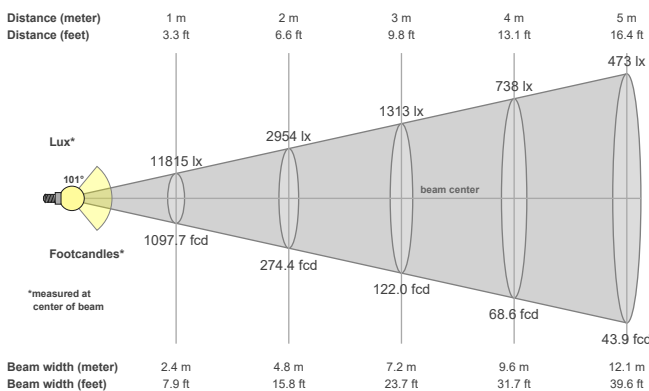


### Spectral distribution



| Dominant Wavelength | Color coordinate cie 1931 | Color coordinate cie 1931 | Color coordinate | Color coordinate |
|---------------------|---------------------------|---------------------------|------------------|------------------|
| nm                  | x                         | y                         | u                | v                |
| 567                 | 0.402                     | 0.531                     | 0.187            | 0.372            |

### Beam details



### Beam angles

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| 100.7°         | 159.1°          | 173.2°            |

### Beam intensities

| Peak intensity | Int. ratio in 120° cone | Int. ratio in 90° cone |
|----------------|-------------------------|------------------------|
| 11820 cd       | 79.9%                   | 56.2%                  |

### Beam Intensities from 1-20m

| M  | 1      | 2     | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|----|--------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| FT | 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 |
| LX | 11815  | 2954  | 1313 | 738  | 473  | 328  | 241  | 185  | 146  | 118  | 98   | 82   | 70   | 60   | 53   | 46   | 41   | 36   | 33   | 30   |
| FC | 1097.7 | 274.4 | 122  | 68.6 | 43.9 | 30.5 | 22.4 | 17.2 | 13.6 | 11   | 9.1  | 7.6  | 6.5  | 5.6  | 4.9  | 4.3  | 3.8  | 3.4  | 3    | 2.7  |

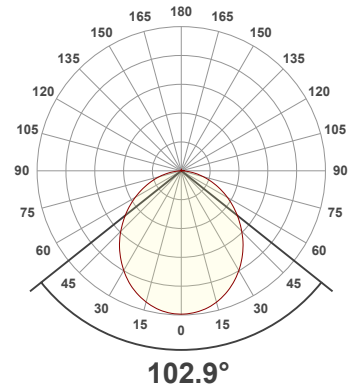
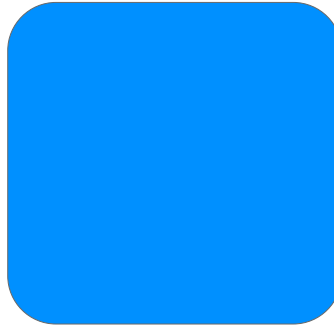
**Total Lumen Output: 6276 lm**

**Voltage: 117 V, Current: 2.08 A**

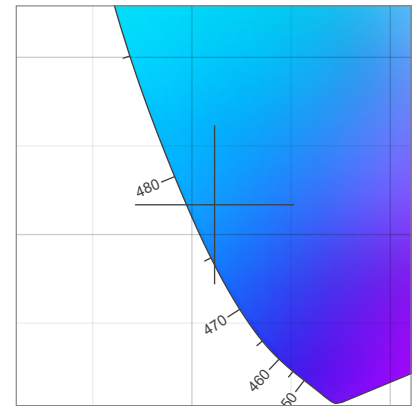
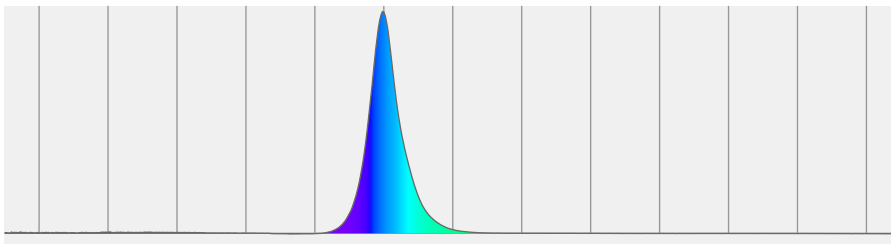
**Power: 243 W**

**Efficacy: 26 Lumen/Watt**

**Measurement Date: 3/25/2022**

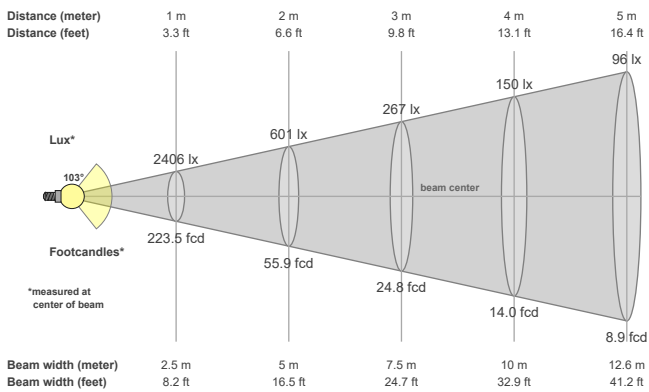


### Spectral distribution



| Dominant Wavelength | Color coordinate cie 1931 | Color coordinate cie 1931 | Color coordinate | Color coordinate |
|---------------------|---------------------------|---------------------------|------------------|------------------|
| nm                  | x                         | y                         | u                | v                |
| 477                 | 0.111                     | 0.117                     | 0.107            | 0.168            |

### Beam details



### Beam angles

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>102.9°</b>  | <b>159.4°</b>   | <b>173.4°</b>     |

### Beam intensities

| Peak intensity | Int. ratio in 120° cone | Int. ratio in 90° cone |
|----------------|-------------------------|------------------------|
| <b>2407 cd</b> | <b>79.7%</b>            | <b>55.8%</b>           |

### Beam Intensities from 1-20m

| M         | 1     | 2    | 3    | 4    | 5    | 6    | 7   | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|-------|------|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 2406  | 601  | 267  | 150  | 96   | 67   | 49  | 38   | 30   | 24   | 20   | 17   | 14   | 12   | 11   | 9    | 8    | 7    | 7    | 6    |
| <b>FC</b> | 223.5 | 55.9 | 24.8 | 14   | 8.9  | 6.2  | 4.6 | 3.5  | 2.8  | 2.2  | 1.8  | 1.6  | 1.3  | 1.1  | 1    | 0.9  | 0.8  | 0.7  | 0.6  | 0.6  |

**Total Lumen Output: 43729 lm**

**Color Temperature: 2669 K**

**CRI: 94.9**

**TLCI: 83**

**TM30: 91.8**

**CQS: 90.8**

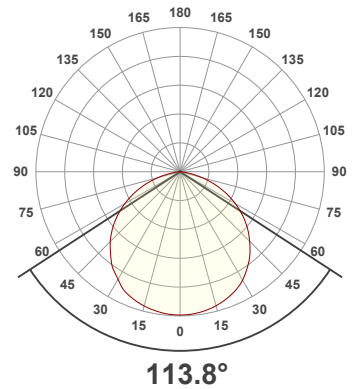
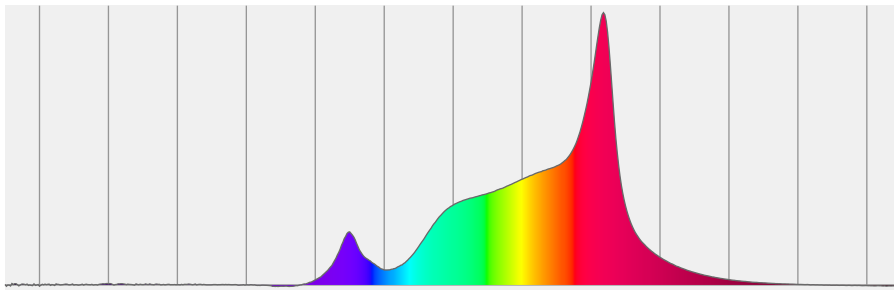
**Measurement Date: 3/25/2022**

**Voltage: 120 V, Current: 3.86 A**

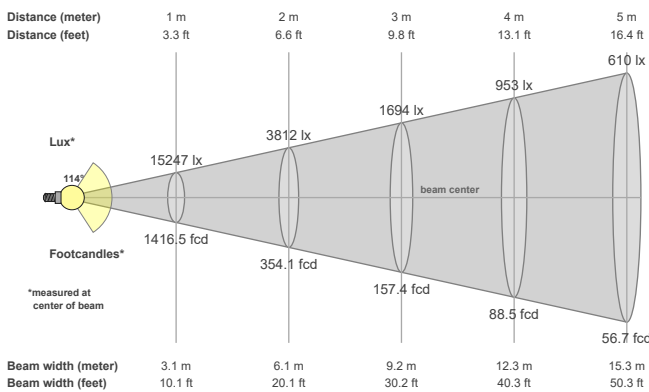
**Power: 463 W**

**Efficacy: 94 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 584



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>113.8°</b>  | <b>157.1°</b>   | <b>168.4°</b>     |

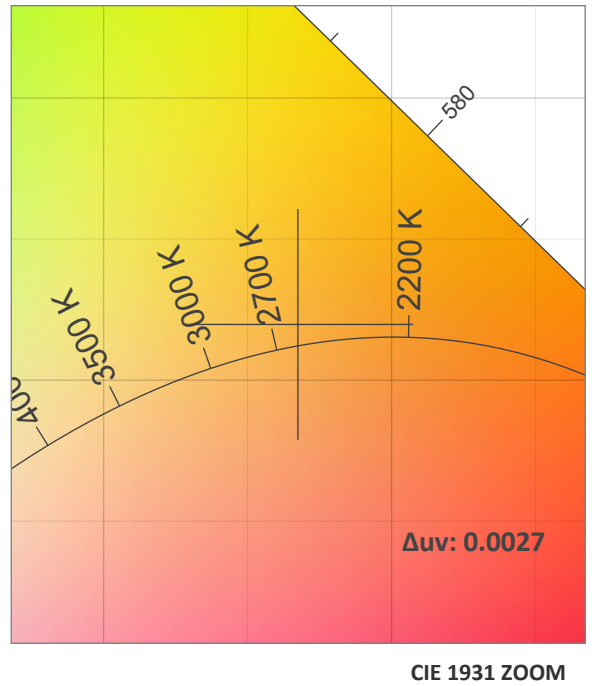
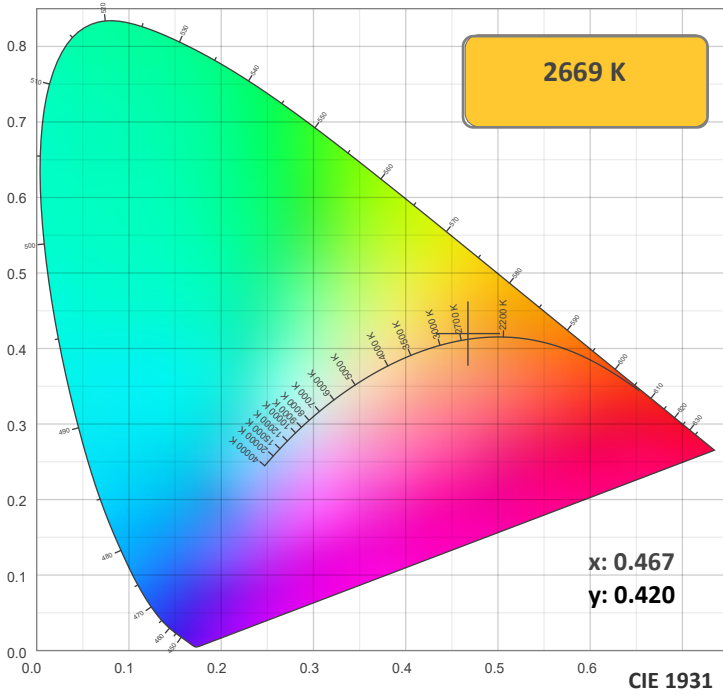
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>15253 cd</b> | <b>80.4%</b>            | <b>54.7%</b>           |

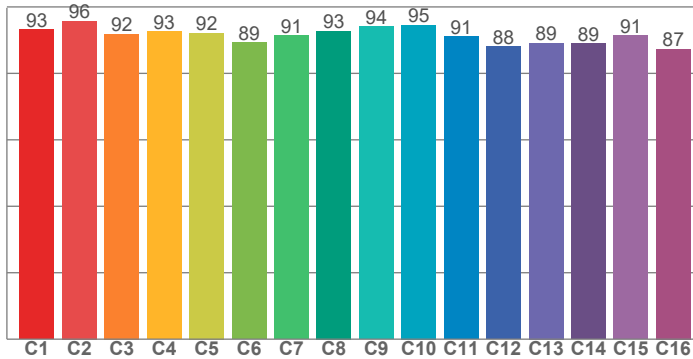
**Beam Intensities from 1-20m**

| M         | 1      | 2     | 3     | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 15247  | 3812  | 1694  | 953  | 610  | 424  | 311  | 238  | 188  | 152  | 126  | 106  | 90   | 78   | 68   | 60   | 53   | 47   | 42   | 38   |
| <b>FC</b> | 1416.5 | 354.1 | 157.4 | 88.5 | 56.7 | 39.3 | 28.9 | 22.1 | 17.5 | 14.2 | 11.7 | 9.8  | 8.4  | 7.2  | 6.3  | 5.5  | 4.9  | 4.4  | 3.9  | 3.5  |

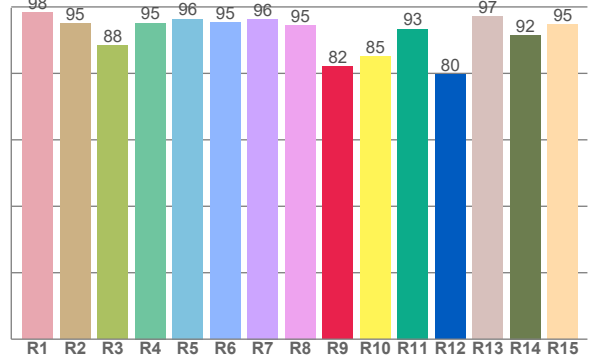
### Color Details



TM30: 91.8



CRI: 94.9 (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  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 98.4 | 95.0 | 88.5 | 95.2 | 96.4 | 95.2 | 96.4 | 94.5 | 82.0 | 85.1 | 93.4 | 79.7 | 97.0 | 91.6 | 94.8 |

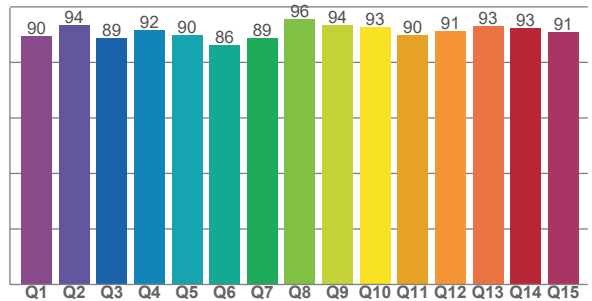
TM30 C Values, 16 binned values out of total of 99 C values

| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 93.2 | 95.8 | 91.8 | 92.6 | 92.2 | 89.2 | 91.4 | 92.7 | 94.0 | 94.6 | 91.1 | 88.0 | 89.1 | 89.0 | 91.5 | 87.4 |

CQS Q Values

| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 89.6 | 93.5 | 88.8 | 91.6 | 89.9 | 86.2 | 88.8 | 95.5 | 93.5 | 92.6 | 89.8 | 91.4 | 93.2 | 92.5 | 90.9 |

CQS: 90.8



### Color Parameters

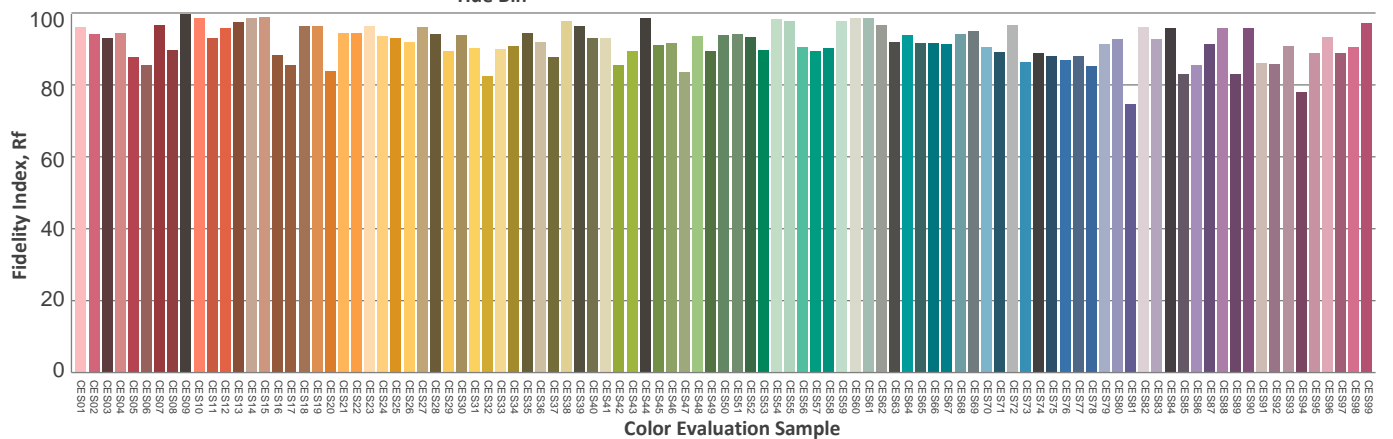
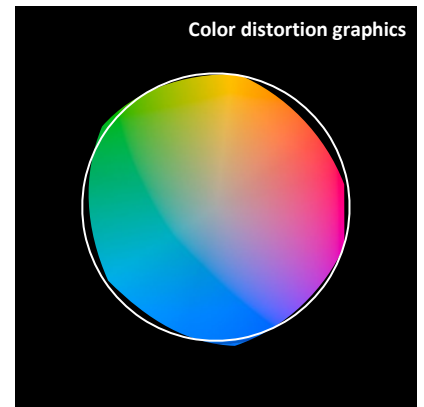
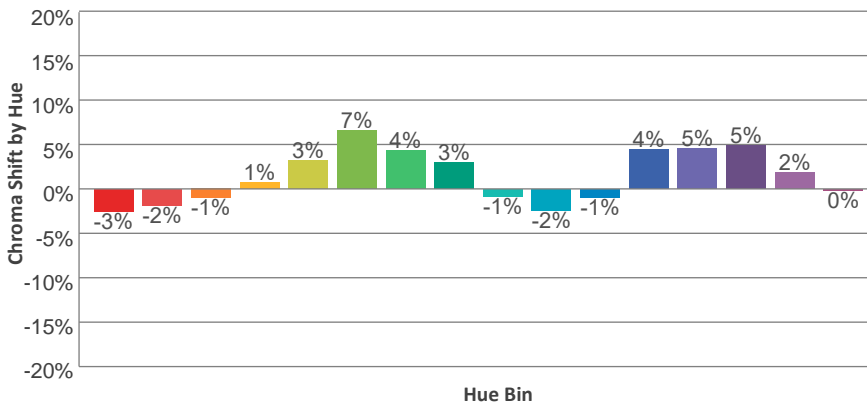
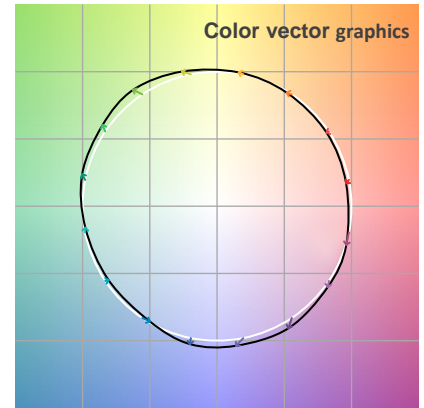
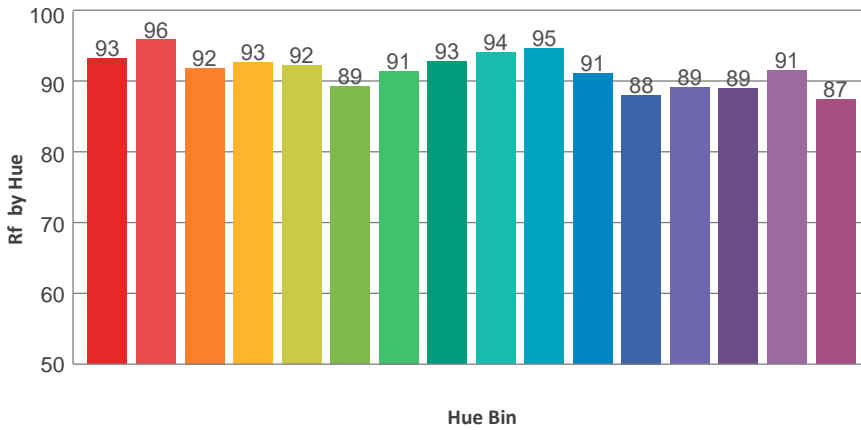
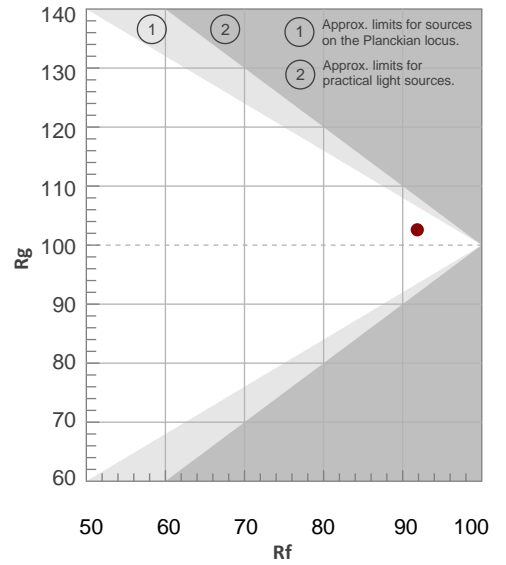
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 2669 K            | 94.9                  | 82.0          | 91.8           | 102.6       | 90.8                | 0.467                     | 0.420                     | 0.263            | 0.355            | 0.0027                     |

TM30 Details

**Rf 91.8**  
Fidelity Index Rf

**Rg 102.6**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |     |
|---------|----------------|--------------------|-----|
|         |                | Chroma             | Hue |
| 1       | 93             | -3%                | -2% |
| 2       | 96             | -2%                | 0%  |
| 3       | 92             | -1%                | 4%  |
| 4       | 93             | 1%                 | 4%  |
| 5       | 92             | 3%                 | 6%  |
| 6       | 89             | 7%                 | 4%  |
| 7       | 91             | 4%                 | -3% |
| 8       | 93             | 3%                 | -4% |
| 9       | 94             | -1%                | -3% |
| 10      | 95             | -2%                | 1%  |
| 11      | 91             | -1%                | 6%  |
| 12      | 88             | 4%                 | 0%  |
| 13      | 89             | 5%                 | -6% |
| 14      | 89             | 5%                 | -6% |
| 15      | 91             | 2%                 | -4% |
| 16      | 87             | 0%                 | -9% |



**Total Lumen Output: 32946 lm**

**Color Temperature: 3215 K**

**CRI: 93.0**

**TLCI: 84**

**TM30: 91.3**

**CQS: 91.4**

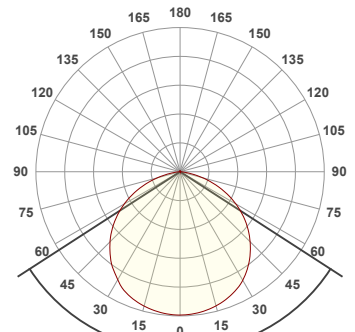
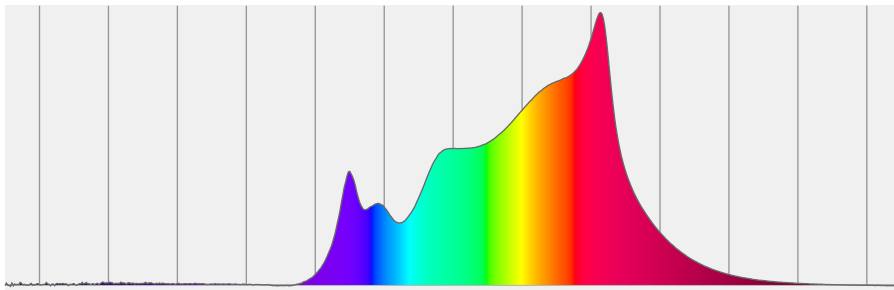
**Measurement Date: 3/25/2022**

**Voltage: 120 V, Current: 2.84 A**

**Power: 341 W**

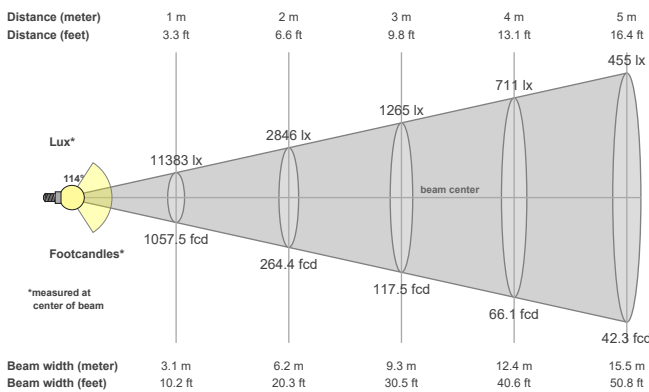
**Efficacy: 97 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 582



**114.2°**

**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>114.2°</b>  | <b>157.4°</b>   | <b>169.4°</b>     |

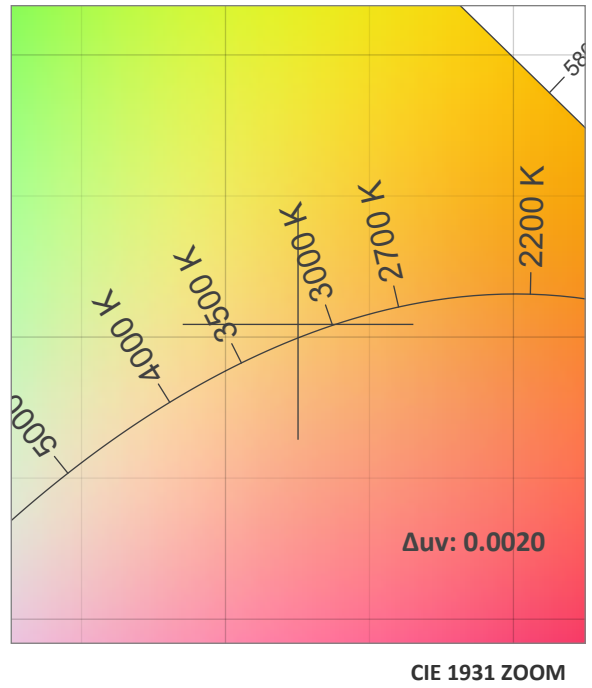
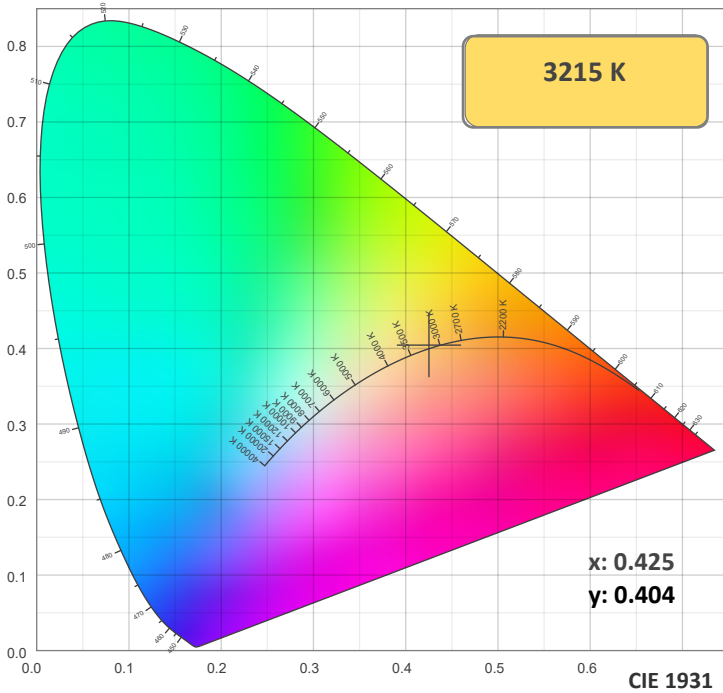
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>11390 cd</b> | <b>80.0%</b>            | <b>54.3%</b>           |

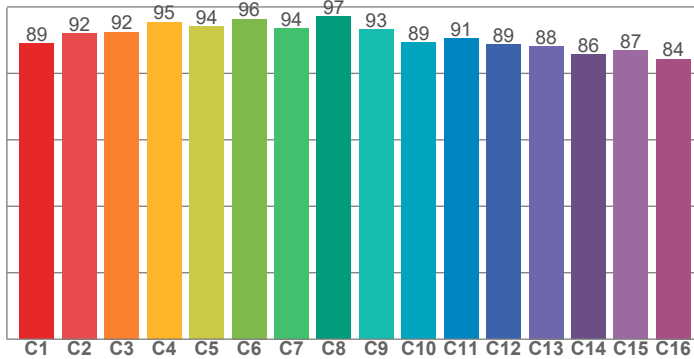
**Beam Intensities from 1-20m**

| M         | 1      | 2     | 3     | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 11383  | 2846  | 1265  | 711  | 455  | 316  | 232  | 178  | 141  | 114  | 94   | 79   | 67   | 58   | 51   | 44   | 39   | 35   | 32   | 28   |
| <b>FC</b> | 1057.5 | 264.4 | 117.5 | 66.1 | 42.3 | 29.4 | 21.6 | 16.5 | 13.1 | 10.6 | 8.7  | 7.3  | 6.3  | 5.4  | 4.7  | 4.1  | 3.7  | 3.3  | 2.9  | 2.6  |

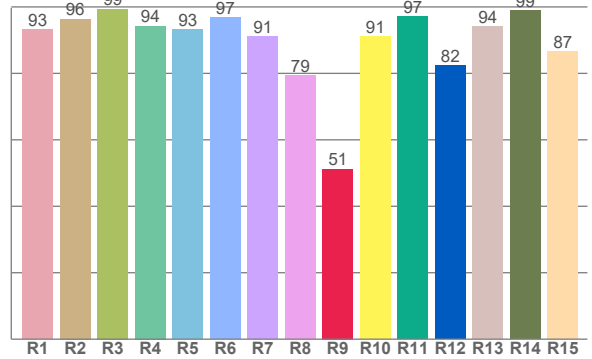
### Color Details



**TM30: 91.3**



**CRI: 93.0 (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  |
| 93.2 | 96.4 | 99.4 | 94.3 | 93.2 | 96.8 | 91.0 | 79.4 | 51.3 | 91.2 | 97.0 | 82.3 | 94.2 | 99.0 | 86.5 |

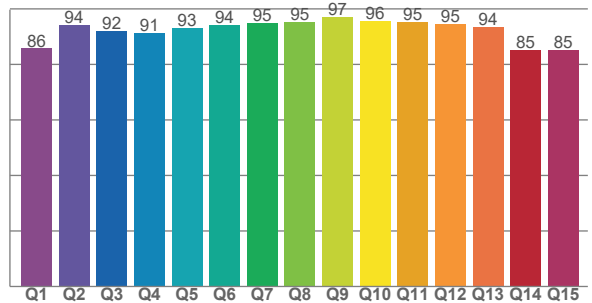
**TM30 C Values, 16 binned values out of total of 99 C values**

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
| 88.9 | 92.1 | 92.4 | 95.4 | 94.2 | 96.4 | 93.6 | 97.1 | 93.3 | 89.3 | 90.6 | 88.6 | 88.2 | 85.7 | 86.8 | 84.3 |

**CQS Q Values**

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
| 85.8 | 94.2 | 92.0 | 91.3 | 93.2 | 94.2 | 94.8 | 95.2 | 97.1 | 95.7 | 95.4 | 94.6 | 93.5 | 85.2 | 85.2 |

**CQS: 91.4**



### Color Parameters

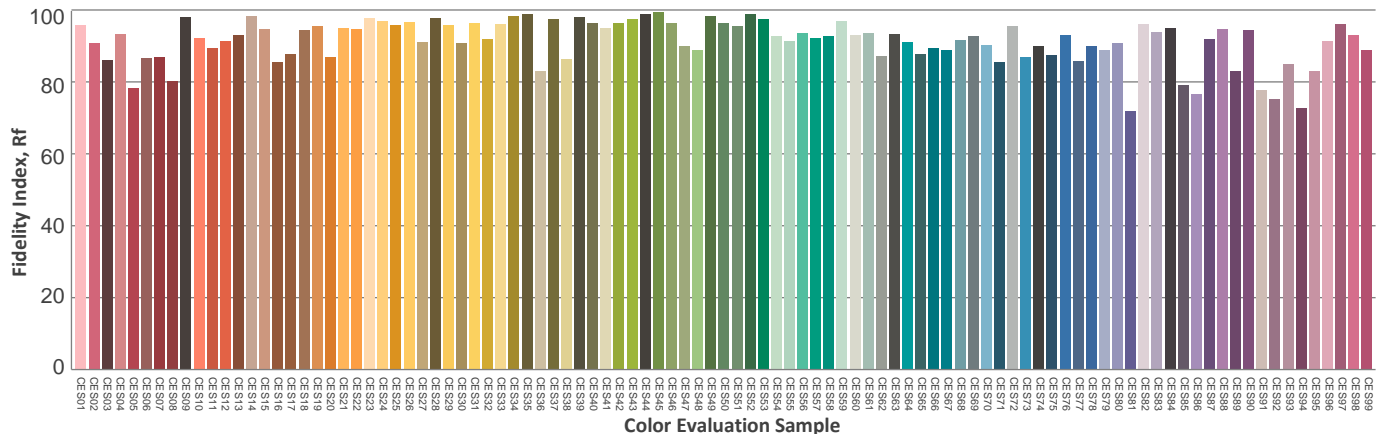
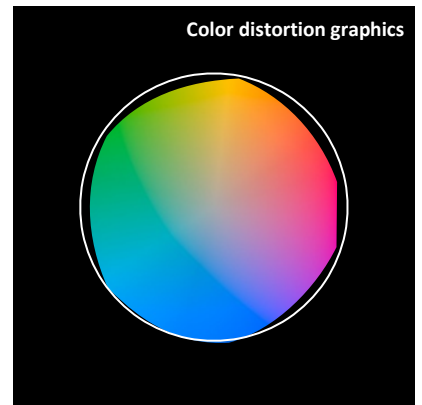
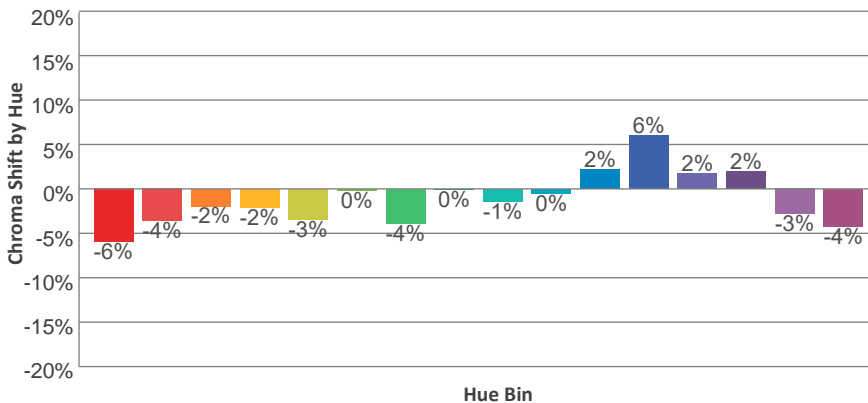
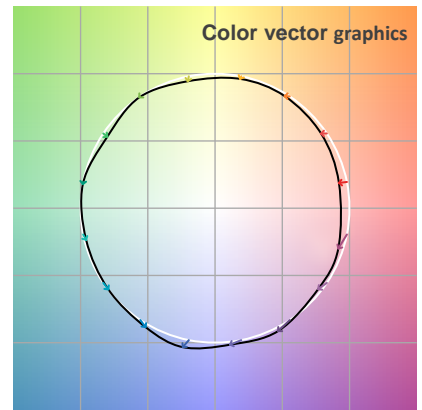
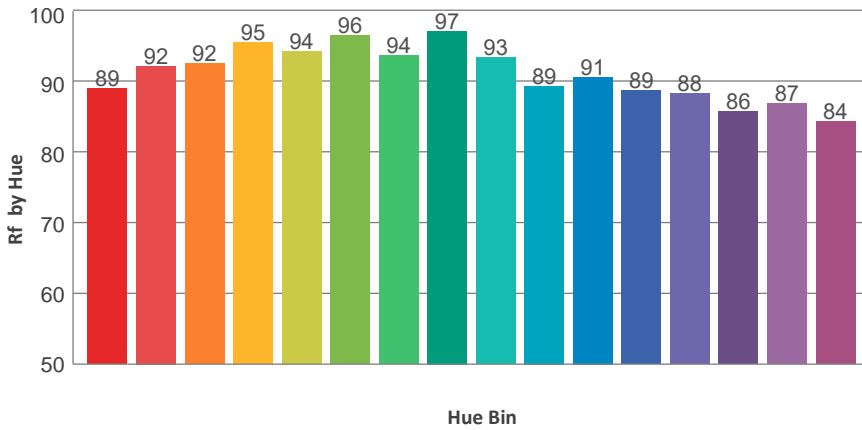
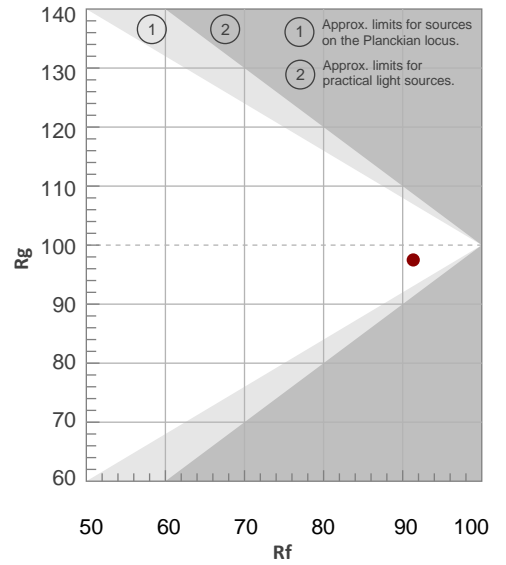
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 3215 K            | 93.0                  | 51.3          | 91.3           | 97.5        | 91.4                | 0.425                     | 0.404                     | 0.243            | 0.347            | 0.0020                     |

TM30 Details

**Rf 91.3**  
Fidelity Index Rf

**Rg 97.5**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 89             | -6%                | 0%   |
| 2       | 92             | -4%                | 2%   |
| 3       | 92             | -2%                | 3%   |
| 4       | 95             | -2%                | 0%   |
| 5       | 94             | -3%                | 2%   |
| 6       | 96             | 0%                 | 1%   |
| 7       | 94             | -4%                | 0%   |
| 8       | 97             | 0%                 | 2%   |
| 9       | 93             | -1%                | 4%   |
| 10      | 89             | 0%                 | 6%   |
| 11      | 91             | 2%                 | 6%   |
| 12      | 89             | 6%                 | -3%  |
| 13      | 88             | 2%                 | -9%  |
| 14      | 86             | 2%                 | -12% |
| 15      | 87             | -3%                | -7%  |
| 16      | 84             | -4%                | -11% |





**Total Lumen Output: 32535 lm**

**Color Temperature: 4066 K**

**CRI: 93.4**

**TLCI: 86**

**TM30: 89.6**

**CQS: 92.7**

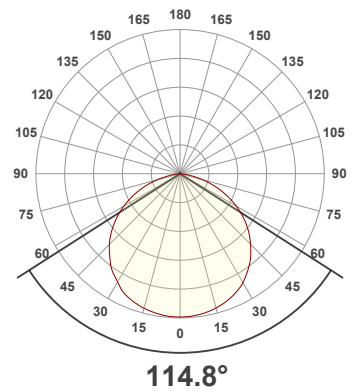
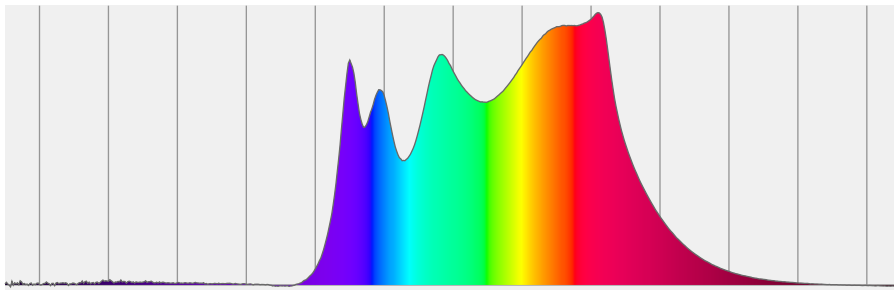
**Measurement Date: 3/25/2022**

**Voltage: 120 V, Current: 3.03 A**

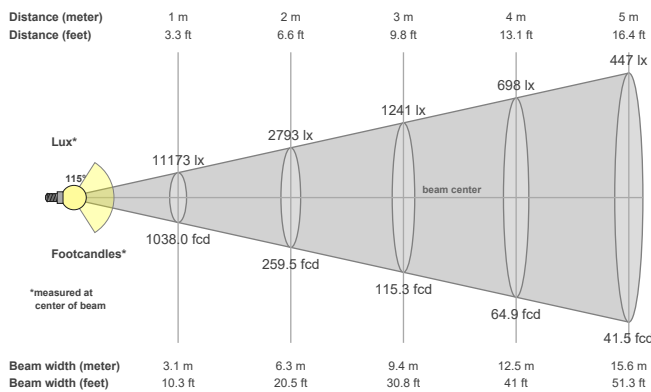
**Power: 362 W**

**Efficacy: 90 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 580



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>114.8°</b>  | <b>157.6°</b>   | <b>168.8°</b>     |

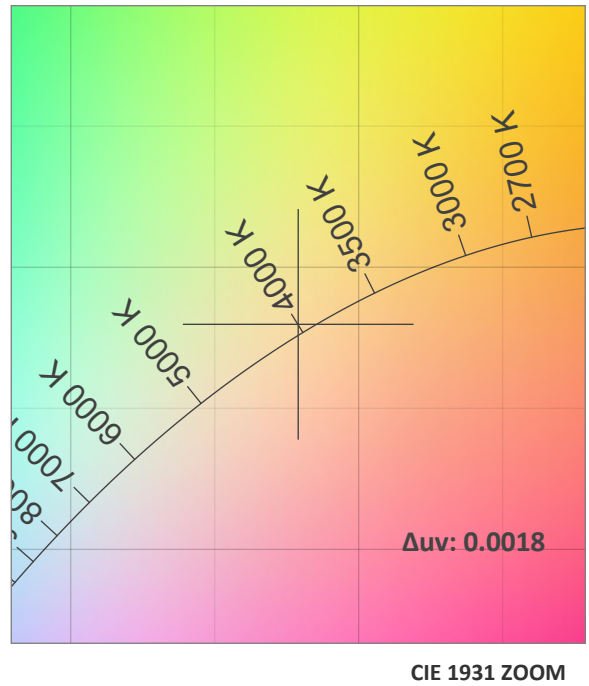
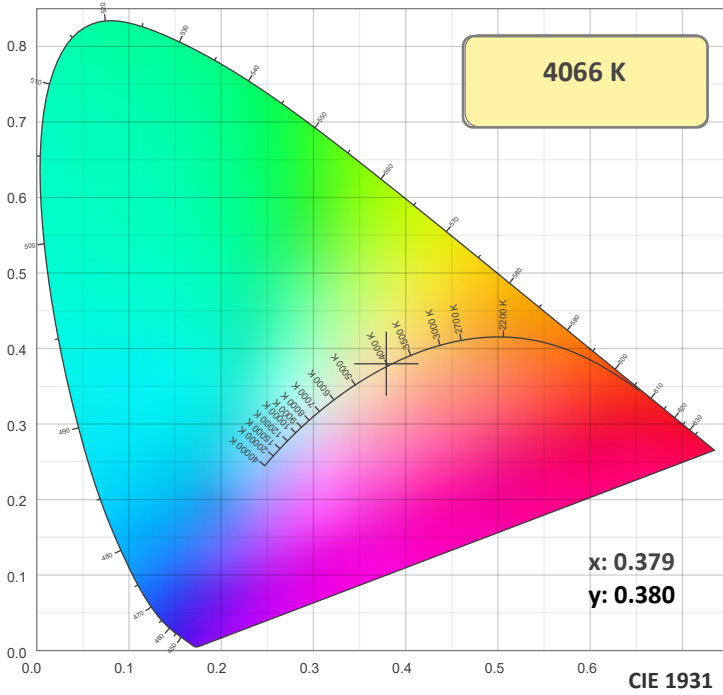
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>11177 cd</b> | <b>79.9%</b>            | <b>54.2%</b>           |

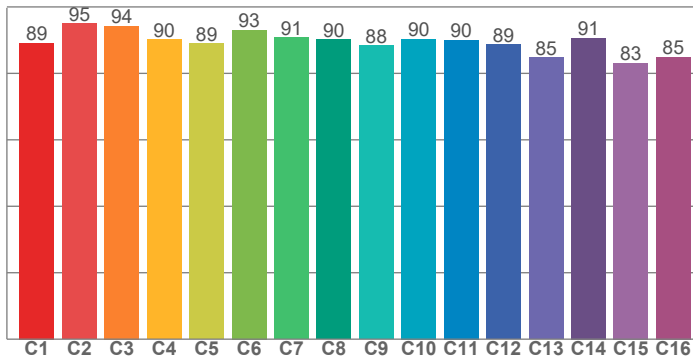
**Beam Intensities from 1-20m**

| M         | 1     | 2     | 3     | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|-------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 11173 | 2793  | 1241  | 698  | 447  | 310  | 228  | 175  | 138  | 112  | 92   | 78   | 66   | 57   | 50   | 44   | 39   | 34   | 31   | 28   |
| <b>FC</b> | 1038  | 259.5 | 115.3 | 64.9 | 41.5 | 28.8 | 21.2 | 16.2 | 12.8 | 10.4 | 8.6  | 7.2  | 6.1  | 5.3  | 4.6  | 4.1  | 3.6  | 3.2  | 2.9  | 2.6  |

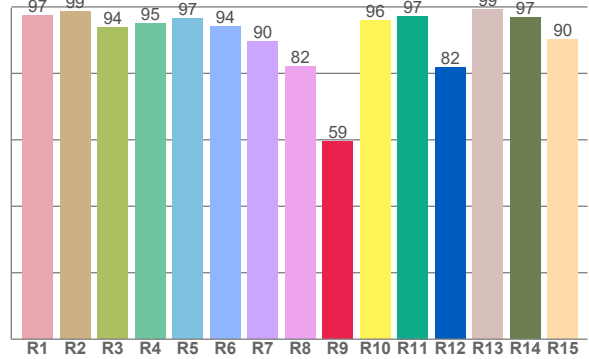
### Color Details



**TM30: 89.6**



**CRI: 93.4 (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  |
| 97.4 | 98.6 | 93.8 | 94.9 | 96.5 | 94.0 | 89.6 | 82.0 | 59.4 | 96.0 | 97.2 | 81.7 | 99.3 | 96.8 | 90.2 |

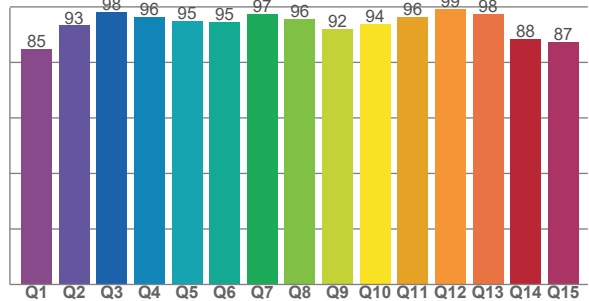
**TM30 C Values, 16 binned values out of total of 99 C values**

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
| 89.1 | 95.0 | 94.2 | 90.2 | 89.0 | 93.0 | 90.8 | 90.3 | 88.4 | 90.3 | 90.0 | 88.7 | 84.7 | 90.6 | 83.2 | 84.9 |

**CQS Q Values**

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
| 84.8 | 93.3 | 98.3 | 96.3 | 95.0 | 94.5 | 97.3 | 95.7 | 92.2 | 93.8 | 96.4 | 99.2 | 97.5 | 88.4 | 87.3 |

**CQS: 92.7**



### Color Parameters

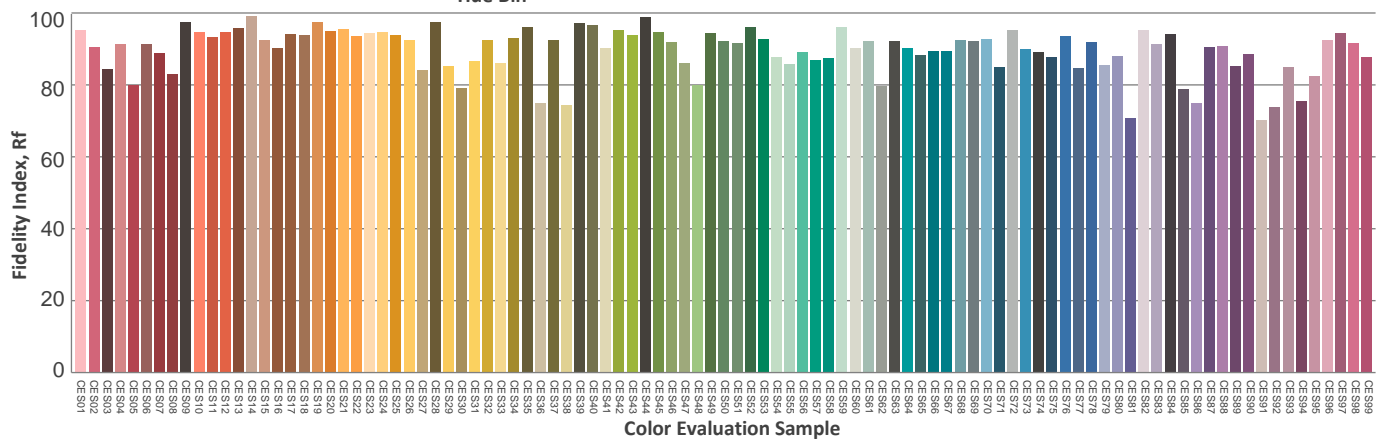
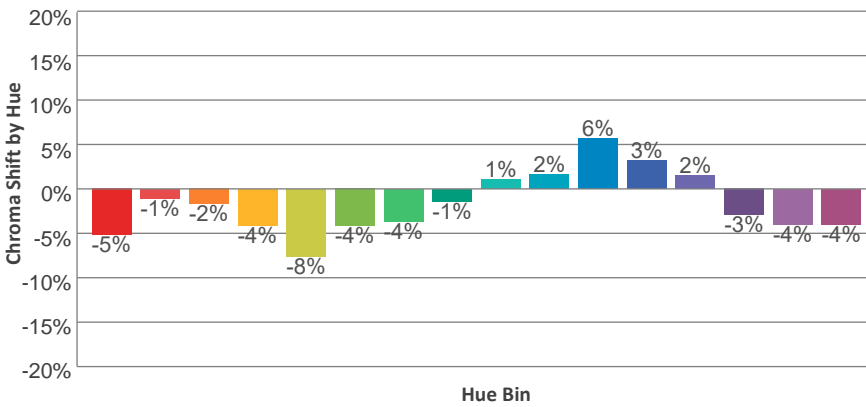
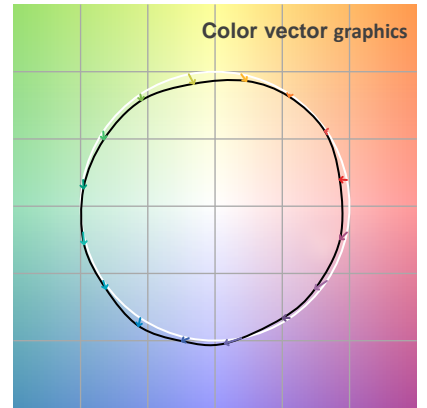
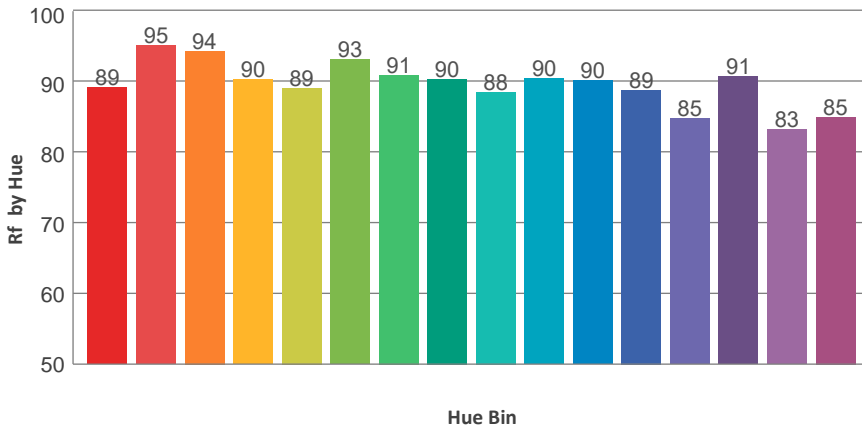
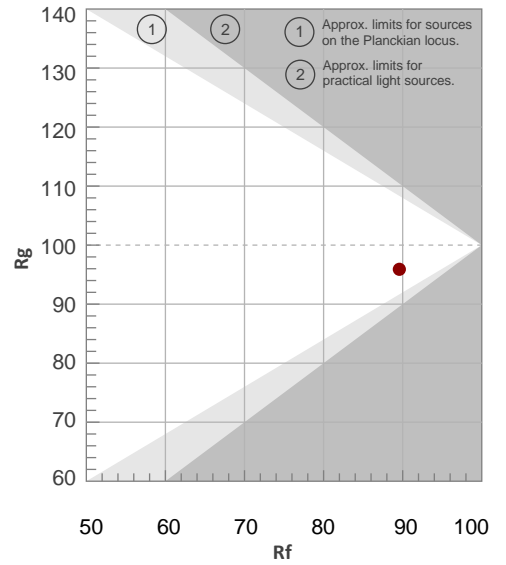
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 4066 K            | 93.4                  | 59.4          | 89.6           | 95.9        | 92.7                | 0.379                     | 0.380                     | 0.223            | 0.335            | 0.0018                     |

TM30 Details

**Rf 89.6**  
Fidelity Index Rf

**Rg 95.9**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 89             | -5%                | 1%   |
| 2       | 95             | -1%                | 1%   |
| 3       | 94             | -2%                | -1%  |
| 4       | 90             | -4%                | -5%  |
| 5       | 89             | -8%                | -2%  |
| 6       | 93             | -4%                | 2%   |
| 7       | 91             | -4%                | 5%   |
| 8       | 90             | -1%                | 6%   |
| 9       | 88             | 1%                 | 9%   |
| 10      | 90             | 2%                 | 6%   |
| 11      | 90             | 6%                 | 2%   |
| 12      | 89             | 3%                 | -5%  |
| 13      | 85             | 2%                 | -13% |
| 14      | 91             | -3%                | -4%  |
| 15      | 83             | -4%                | -10% |
| 16      | 85             | -4%                | -6%  |



**Total Lumen Output: 34920 lm**

**Color Temperature: 4542 K**

**CRI: 93.2**

**TLCI: 89**

**TM30: 90.2**

**CQS: 92.8**

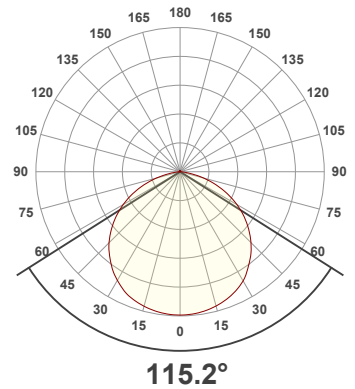
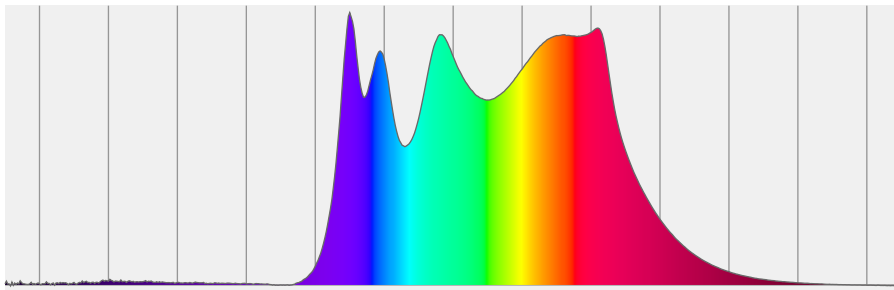
**Measurement Date: 3/25/2022**

**Voltage: 121 V, Current: 3.22 A**

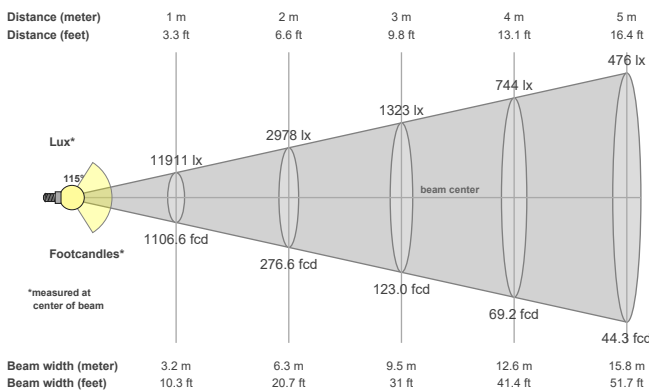
**Power: 389 W**

**Efficacy: 90 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 580



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>115.2°</b>  | <b>157.8°</b>   | <b>169.6°</b>     |

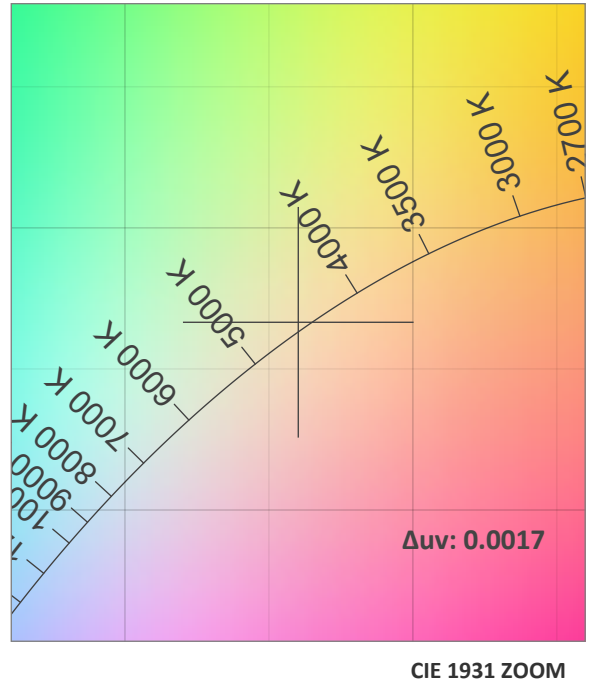
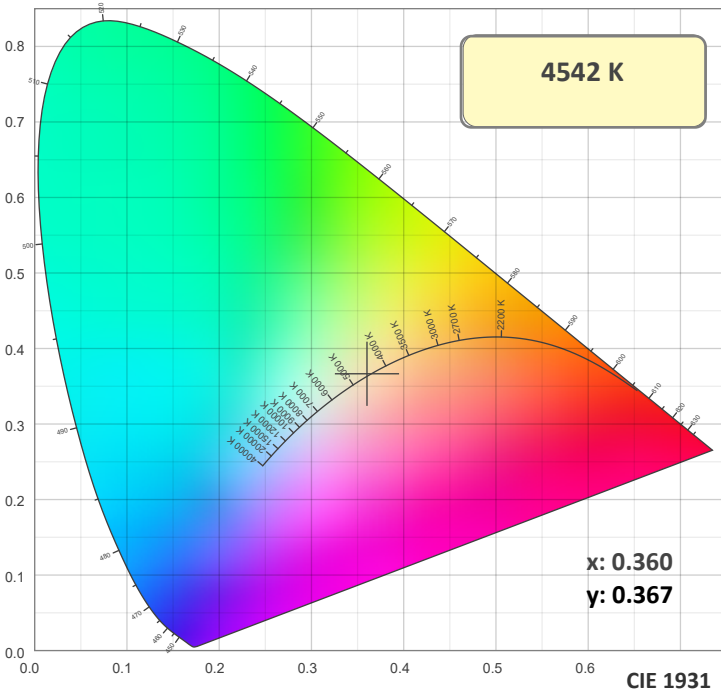
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>11915 cd</b> | <b>79.6%</b>            | <b>53.9%</b>           |

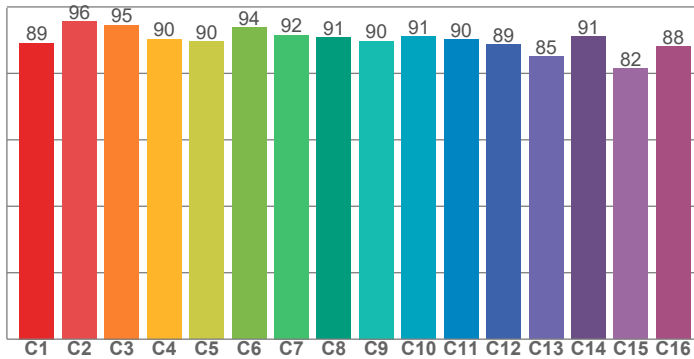
**Beam Intensities from 1-20m**

| M         | 1      | 2     | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 11911  | 2978  | 1323 | 744  | 476  | 331  | 243  | 186  | 147  | 119  | 98   | 83   | 70   | 61   | 53   | 47   | 41   | 37   | 33   | 30   |
| <b>FC</b> | 1106.6 | 276.6 | 123  | 69.2 | 44.3 | 30.7 | 22.6 | 17.3 | 13.7 | 11.1 | 9.1  | 7.7  | 6.5  | 5.6  | 4.9  | 4.3  | 3.8  | 3.4  | 3.1  | 2.8  |

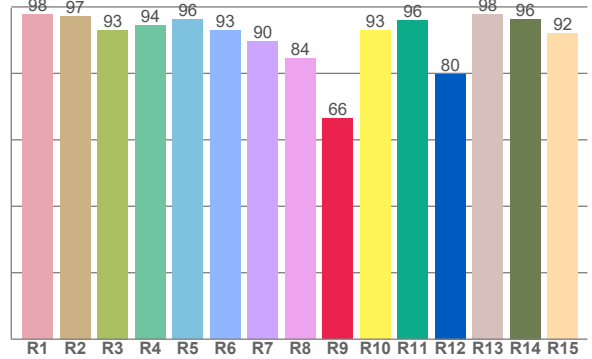
### Color Details



#### TM30: 90.2



#### CRI: 93.2 (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  |
| 97.6 | 97.3 | 93.0 | 94.4 | 96.2 | 93.0 | 89.7 | 84.5 | 66.3 | 93.0 | 95.9 | 79.8 | 97.9 | 96.3 | 92.2 |

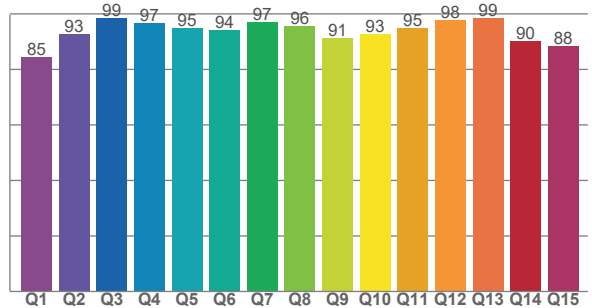
#### TM30 C Values, 16 binned values out of total of 99 C values

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
| 89.1 | 95.7 | 94.5 | 90.4 | 89.5 | 93.8 | 91.6 | 90.8 | 89.7 | 91.1 | 90.2 | 88.8 | 85.0 | 91.1 | 81.5 | 88.1 |

#### CQS Q Values

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
| 84.6 | 92.7 | 98.7 | 96.7 | 94.9 | 94.1 | 97.2 | 95.8 | 91.4 | 92.8 | 94.9 | 97.8 | 98.5 | 90.2 | 88.4 |

#### CQS: 92.8



### Color Parameters

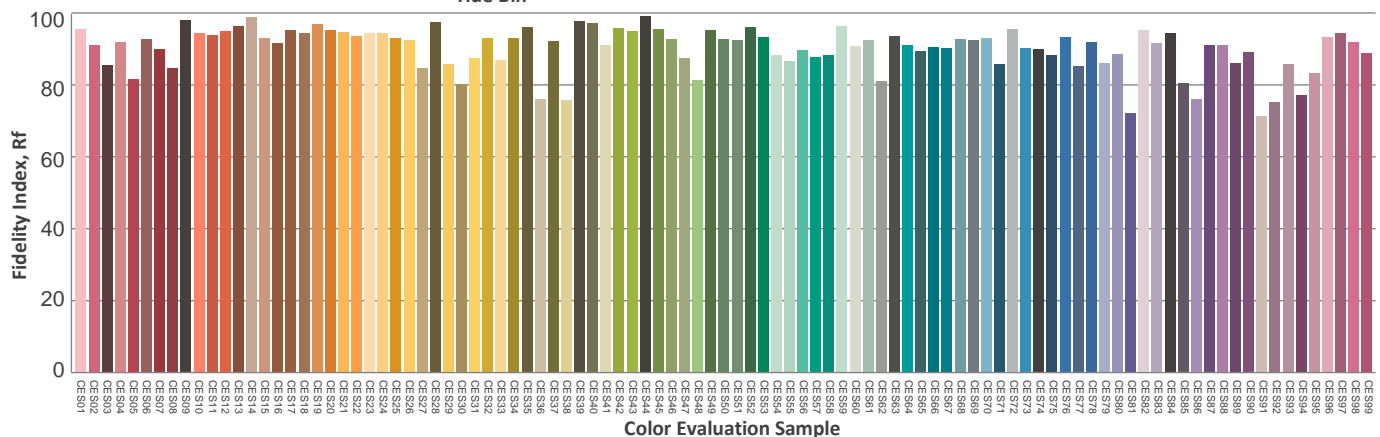
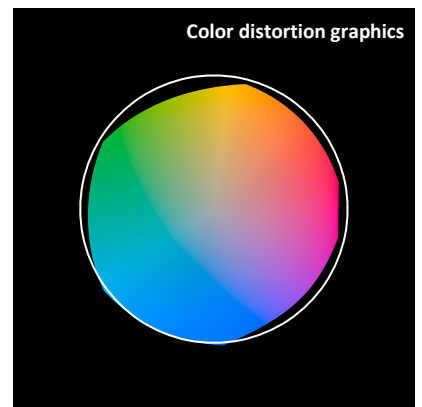
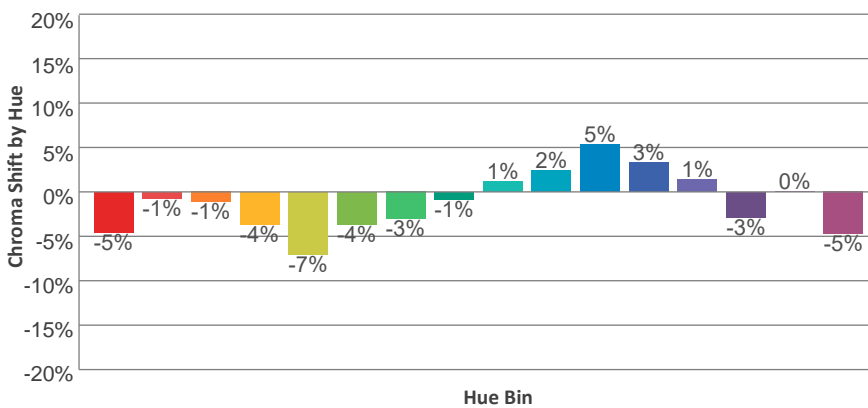
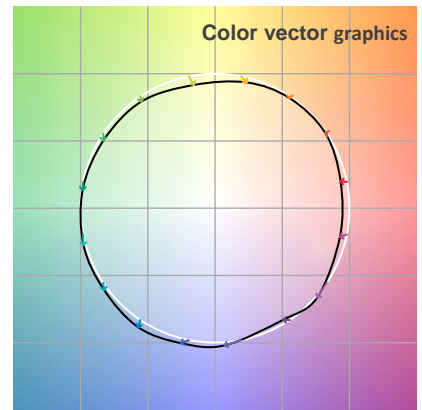
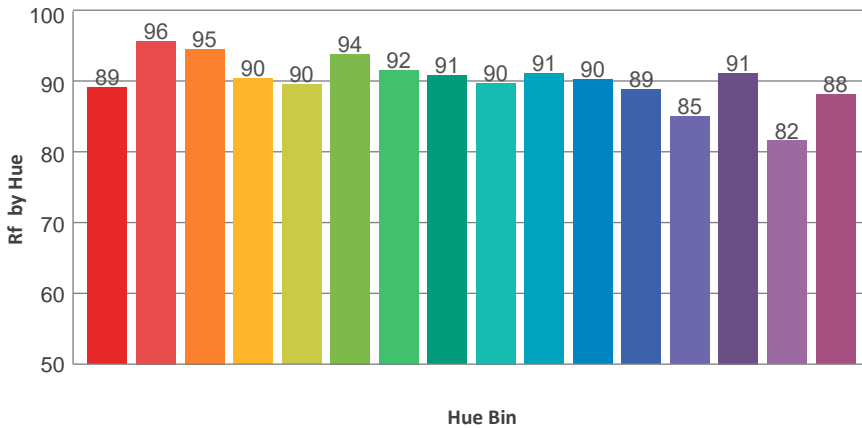
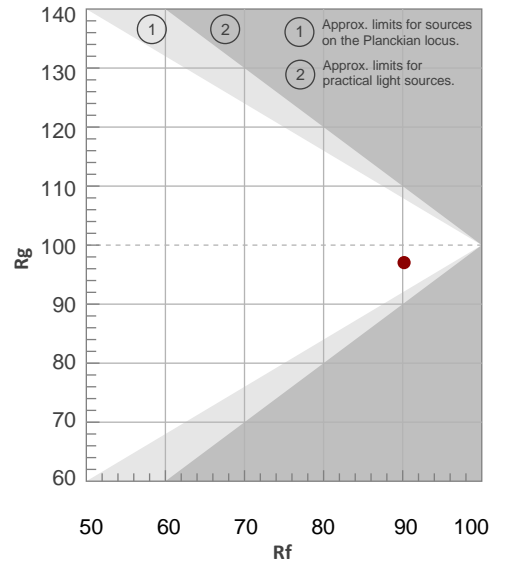
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 4542 K            | 93.2                  | 66.3          | 90.2           | 97.0        | 92.8                | 0.360                     | 0.367                     | 0.216            | 0.329            | 0.0017                     |

TM30 Details

**Rf 90.2**  
Fidelity Index Rf

**Rg 97.0**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 89             | -5%                | 1%   |
| 2       | 96             | -1%                | 1%   |
| 3       | 95             | -1%                | -1%  |
| 4       | 90             | -4%                | -5%  |
| 5       | 90             | -7%                | -2%  |
| 6       | 94             | -4%                | 1%   |
| 7       | 92             | -3%                | 4%   |
| 8       | 91             | -1%                | 6%   |
| 9       | 90             | 1%                 | 8%   |
| 10      | 91             | 2%                 | 5%   |
| 11      | 90             | 5%                 | 2%   |
| 12      | 89             | 3%                 | -5%  |
| 13      | 85             | 1%                 | -13% |
| 14      | 91             | -3%                | -4%  |
| 15      | 82             | 0%                 | -13% |
| 16      | 88             | -5%                | -3%  |



**Total Lumen Output: 38764 lm**

**Color Temperature: 5568 K**

**CRI: 93.4**

**TLCI: 93**

**TM30: 90.5**

**CQS: 93.9**

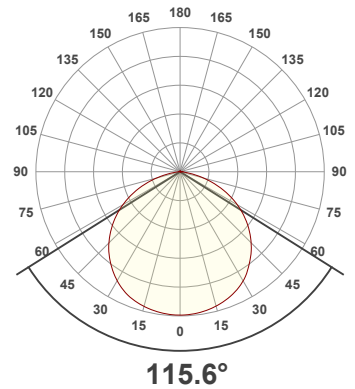
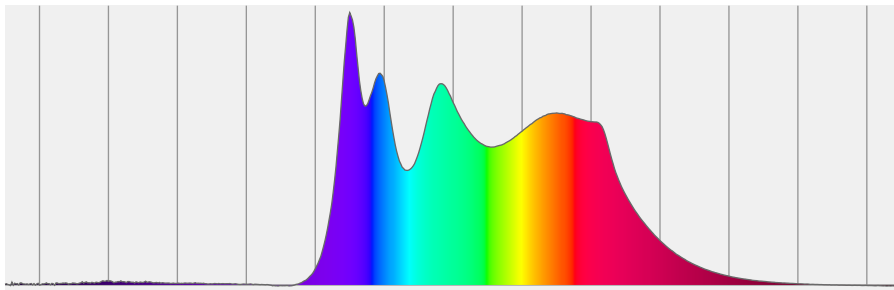
**Measurement Date: 3/25/2022**

**Voltage: 120 V, Current: 3.79 A**

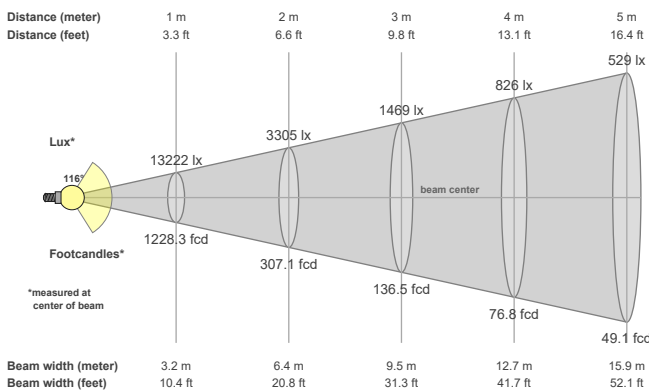
**Power: 456.1 W**

**Efficacy: 85 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 580



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>115.6°</b>  | <b>157.9°</b>   | <b>169.7°</b>     |

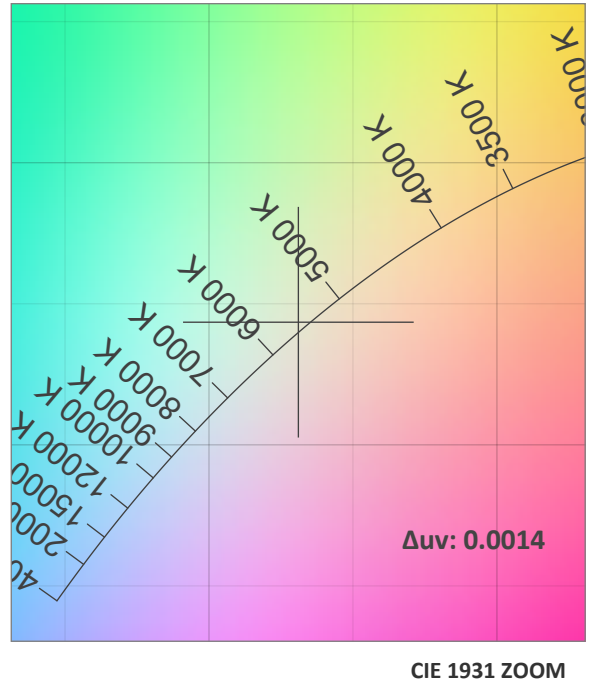
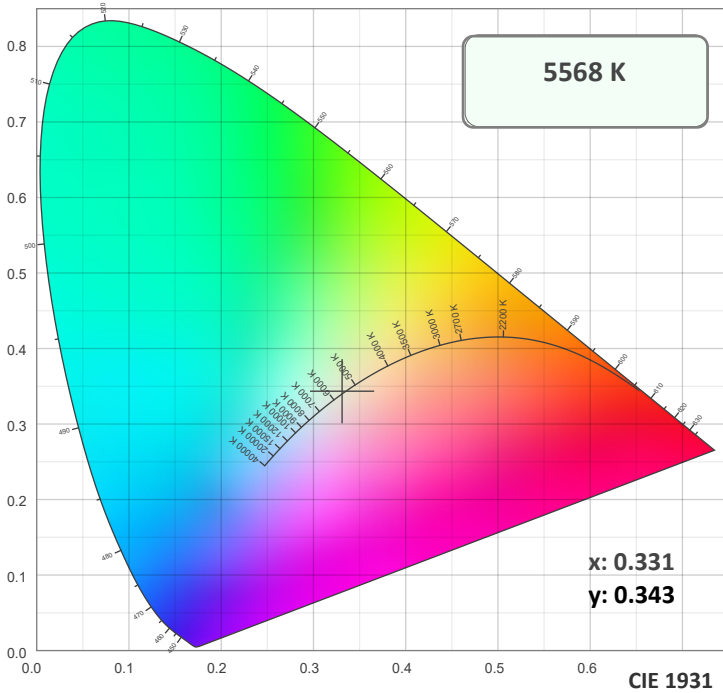
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>13224 cd</b> | <b>79.9%</b>            | <b>54.0%</b>           |

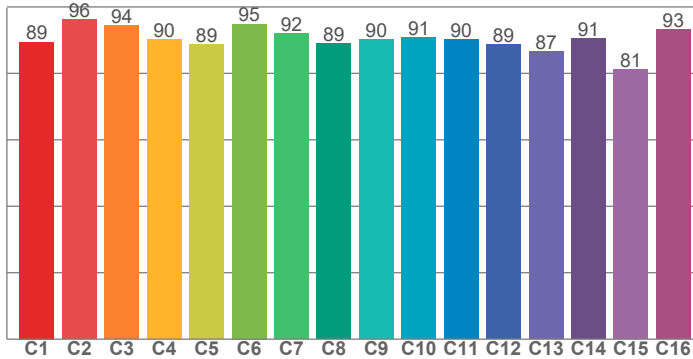
**Beam Intensities from 1-20m**

| M         | 1      | 2     | 3     | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 13222  | 3305  | 1469  | 826  | 529  | 367  | 270  | 207  | 163  | 132  | 109  | 92   | 78   | 67   | 59   | 52   | 46   | 41   | 37   | 33   |
| <b>FC</b> | 1228.3 | 307.1 | 136.5 | 76.8 | 49.1 | 34.1 | 25.1 | 19.2 | 15.2 | 12.3 | 10.2 | 8.5  | 7.3  | 6.3  | 5.5  | 4.8  | 4.3  | 3.8  | 3.4  | 3.1  |

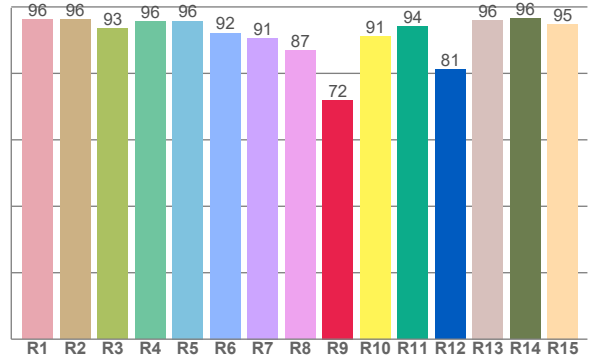
### Color Details



#### TM30: 90.5



#### CRI: 93.4 (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  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 96.2 | 96.3 | 93.4 | 95.6 | 95.8 | 92.2 | 90.6 | 86.9 | 71.9 | 91.2 | 94.1 | 81.1 | 96.0 | 96.5 | 94.8 |

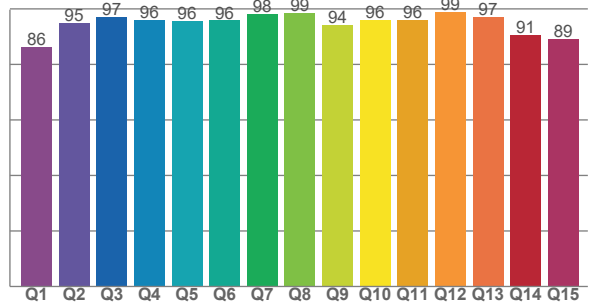
#### TM30 C Values, 16 binned values out of total of 99 C values

| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 89.4 | 96.2 | 94.5 | 90.1 | 88.7 | 94.9 | 91.9 | 89.0 | 90.2 | 90.7 | 90.1 | 88.7 | 86.6 | 90.6 | 81.1 | 93.2 |

#### CQS Q Values

| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 86.4 | 94.8 | 97.2 | 96.2 | 95.7 | 95.8 | 98.2 | 98.5 | 94.1 | 96.0 | 96.2 | 98.8 | 97.0 | 90.6 | 89.2 |

#### CQS: 93.9



#### 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 Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 5568 K            | 93.4                  | 71.9          | 90.5           | 97.7        | 93.9                | 0.331                     | 0.343                     | 0.205            | 0.319            | 0.0014                     |

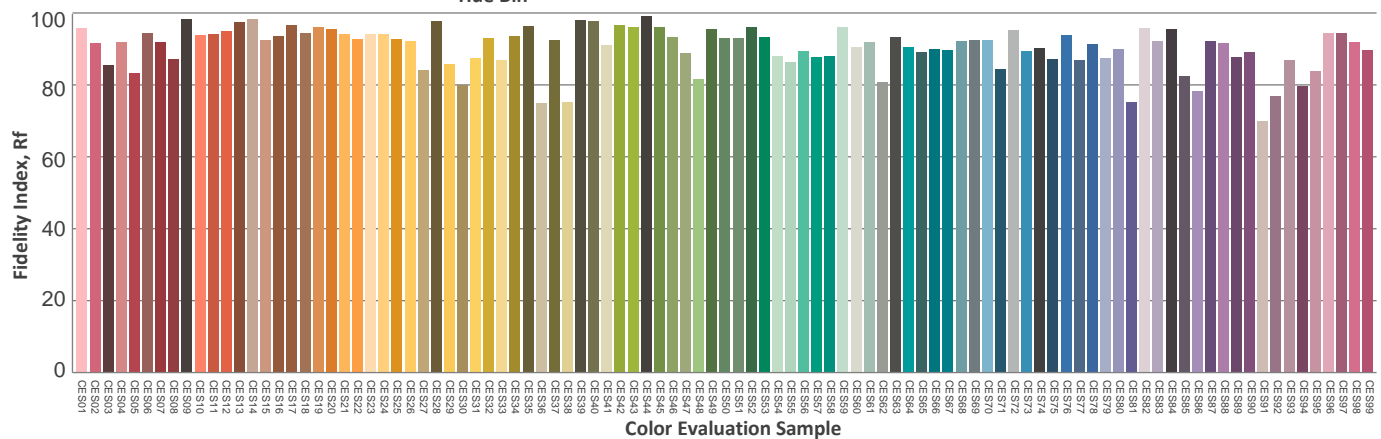
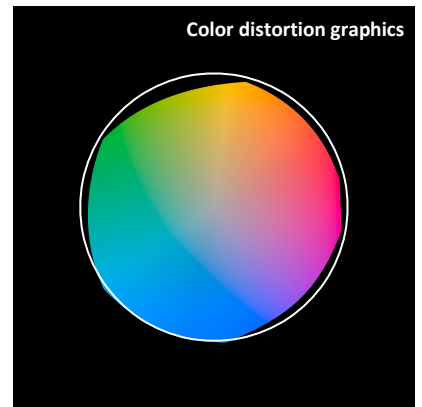
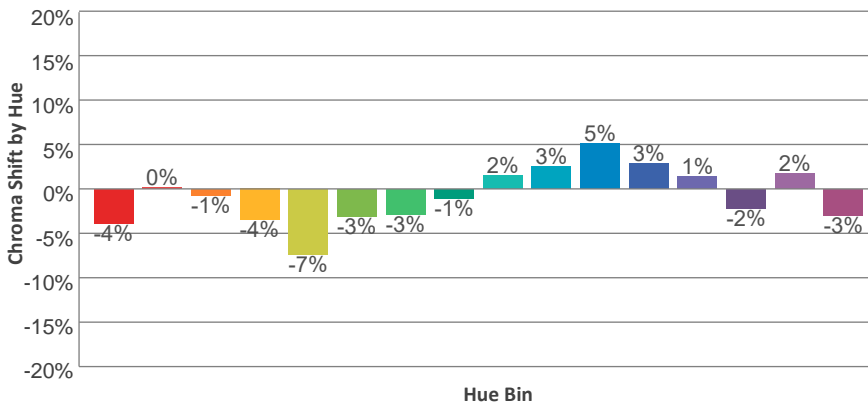
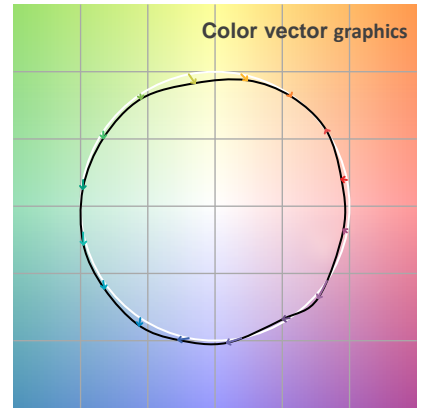
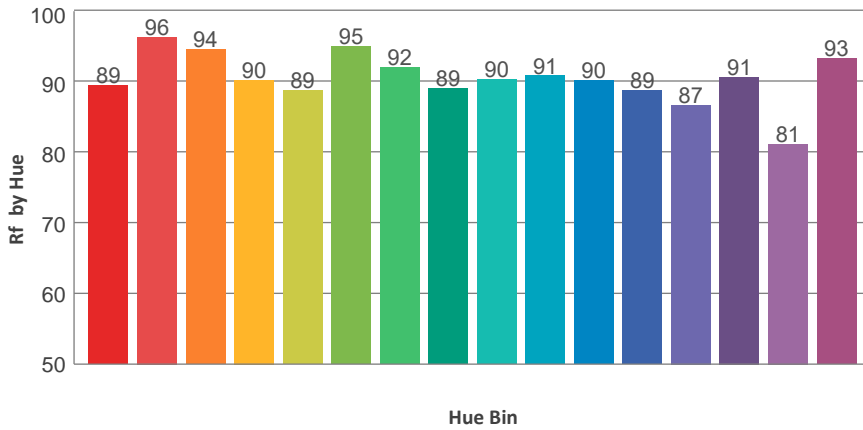
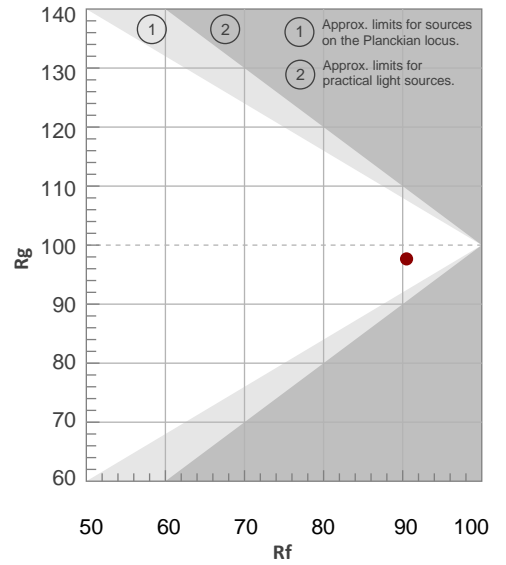


TM30 Details

**Rf 90.5**  
Fidelity Index Rf

**Rg 97.7**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 89             | -4%                | 1%   |
| 2       | 96             | 0%                 | 2%   |
| 3       | 94             | -1%                | -2%  |
| 4       | 90             | -4%                | -5%  |
| 5       | 89             | -7%                | -3%  |
| 6       | 95             | -3%                | 1%   |
| 7       | 92             | -3%                | 4%   |
| 8       | 89             | -1%                | 7%   |
| 9       | 90             | 2%                 | 9%   |
| 10      | 91             | 3%                 | 5%   |
| 11      | 90             | 5%                 | 2%   |
| 12      | 89             | 3%                 | -7%  |
| 13      | 87             | 1%                 | -11% |
| 14      | 91             | -2%                | -5%  |
| 15      | 81             | 2%                 | -14% |
| 16      | 93             | -3%                | 2%   |



**Total Lumen Output: 40230 lm**

**Color Temperature: 6022 K**

**CRI: 93.3**

**TLCI: 93**

**TM30: 90.2**

**CQS: 93.9**

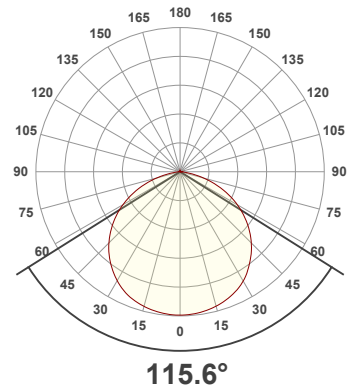
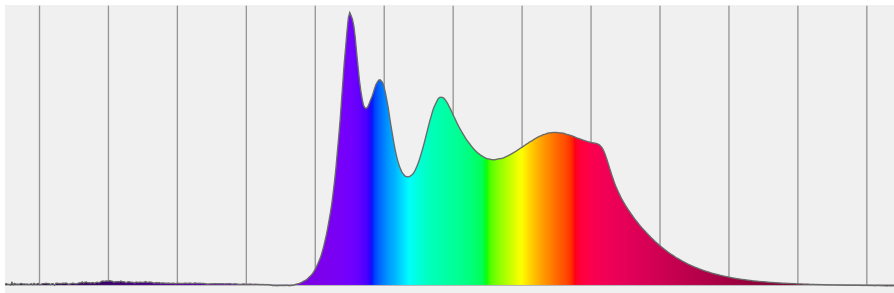
**Measurement Date: 3/25/2022**

**Voltage: 120 V, Current: 3.98 A**

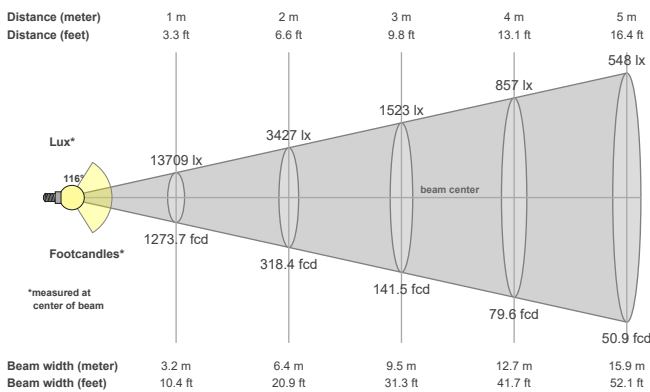
**Power: 480 W**

**Efficacy: 84 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 582



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>115.6°</b>  | <b>158°</b>     | <b>169.8°</b>     |

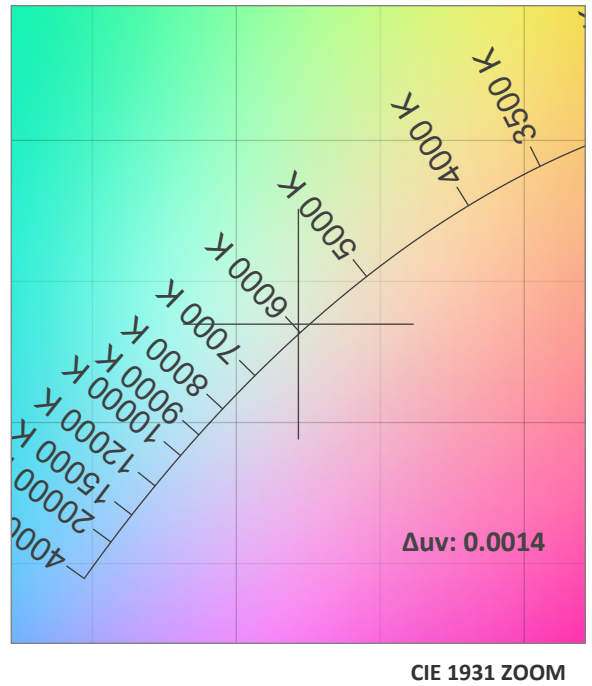
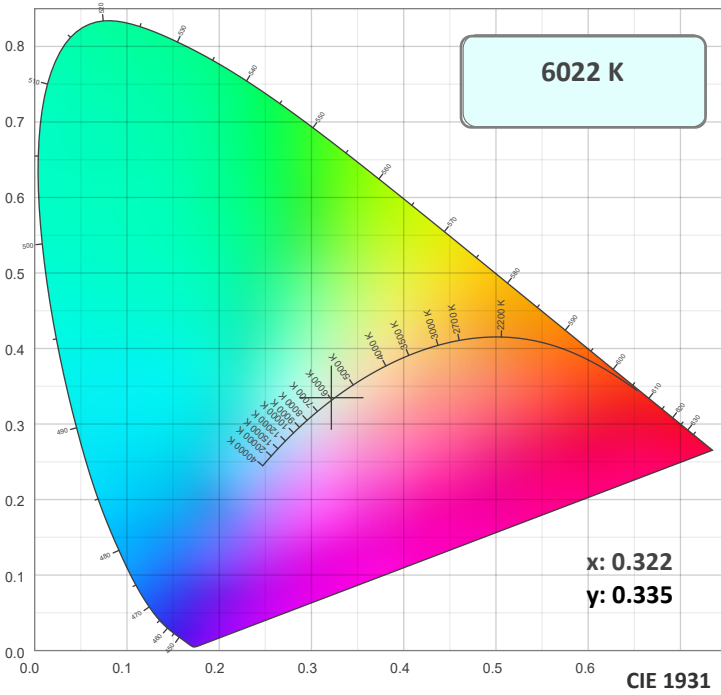
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>13710 cd</b> | <b>79.9%</b>            | <b>54.0%</b>           |

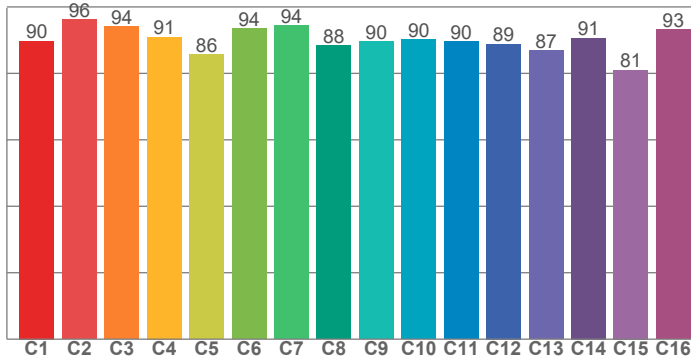
**Beam Intensities from 1-20m**

| M         | 1      | 2     | 3     | 4    | 5    | 6    | 7   | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|-------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 13709  | 3427  | 1523  | 857  | 548  | 381  | 280 | 214  | 169  | 137  | 113  | 95   | 81   | 70   | 61   | 54   | 47   | 42   | 38   | 34   |
| <b>FC</b> | 1273.7 | 318.4 | 141.5 | 79.6 | 50.9 | 35.4 | 26  | 19.9 | 15.7 | 12.7 | 10.5 | 8.8  | 7.5  | 6.5  | 5.7  | 5    | 4.4  | 3.9  | 3.5  | 3.2  |

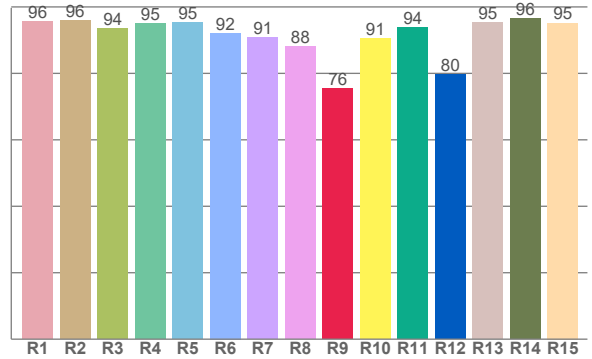
### Color Details



#### TM30: 90.2



#### CRI: 93.3 (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  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 95.6 | 95.9 | 93.6 | 95.1 | 95.3 | 92.2 | 90.8 | 88.0 | 75.5 | 90.5 | 93.9 | 79.7 | 95.3 | 96.5 | 95.2 |

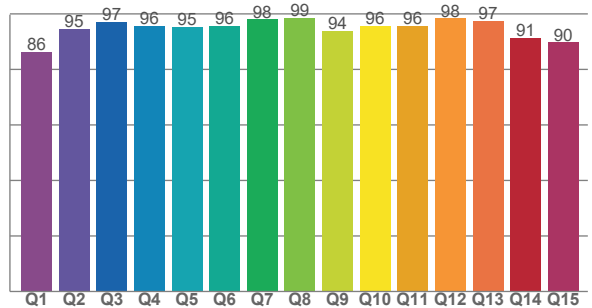
#### TM30 C Values, 16 binned values out of total of 99 C values

| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 89.7 | 96.3 | 94.2 | 90.9 | 85.8 | 93.6 | 94.3 | 88.4 | 89.6 | 90.2 | 89.7 | 88.8 | 86.8 | 90.7 | 81.0 | 93.2 |

#### CQS Q Values

| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 86.3 | 94.7 | 97.0 | 95.8 | 95.4 | 95.5 | 98.0 | 98.7 | 94.0 | 95.6 | 95.7 | 98.4 | 97.4 | 91.5 | 89.7 |

#### CQS: 93.9



### Color Parameters

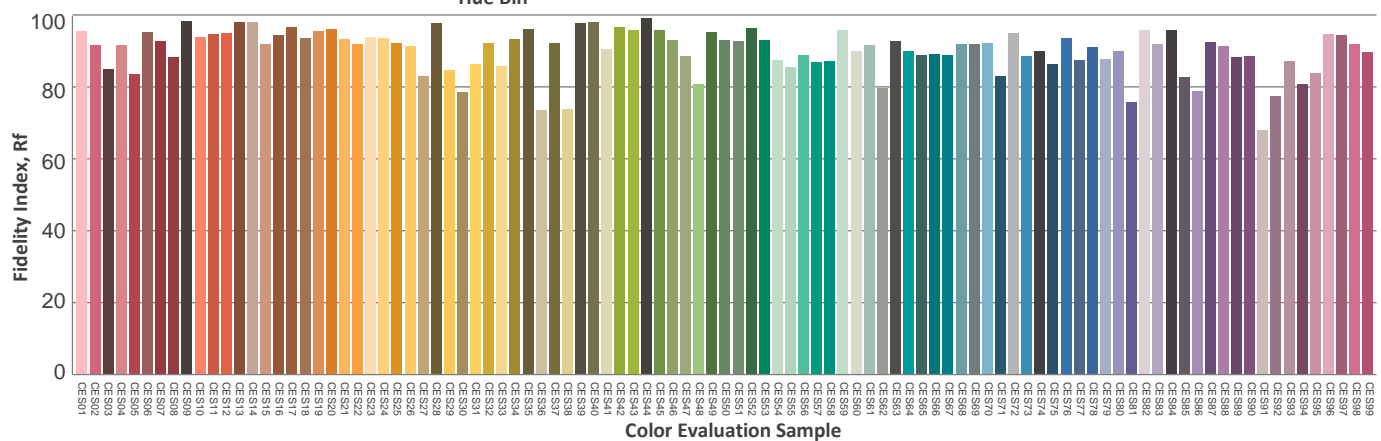
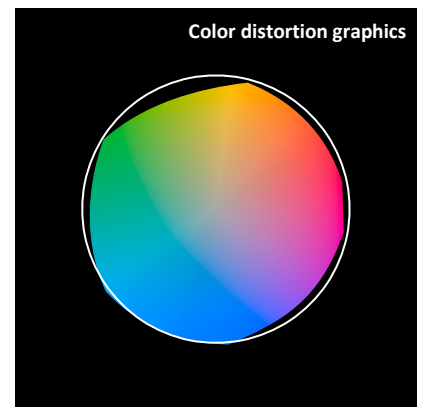
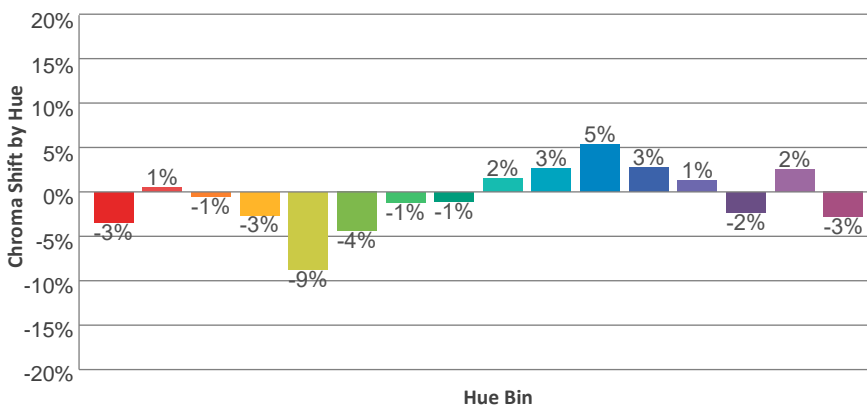
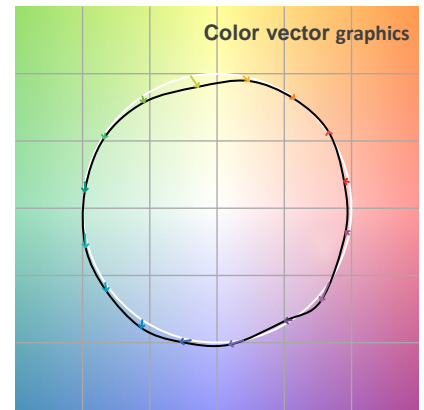
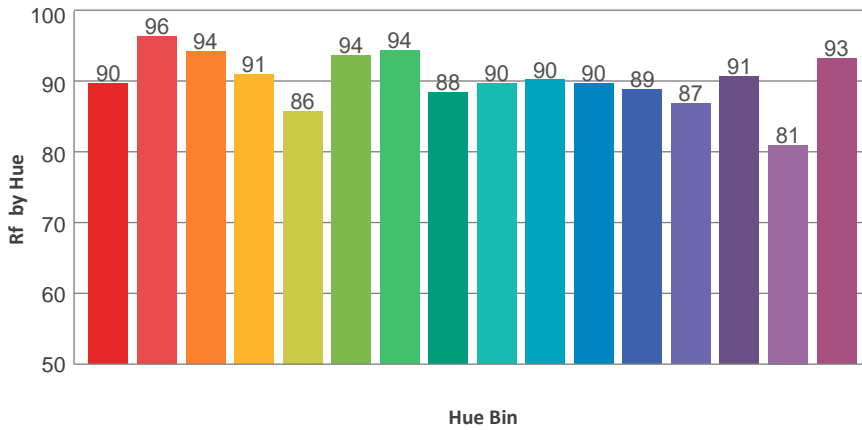
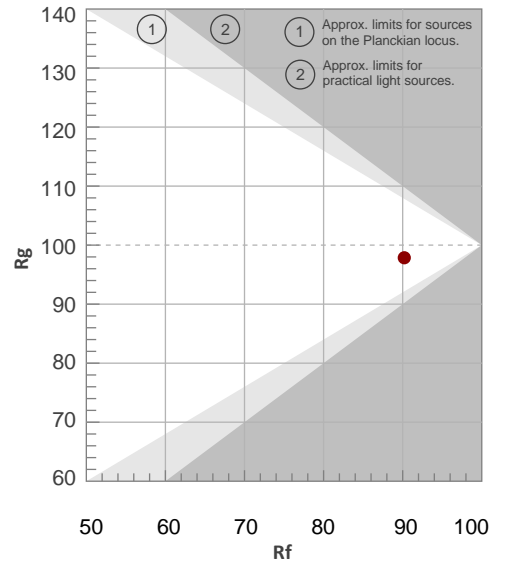
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 6022 K            | 93.3                  | 75.5          | 90.2           | 97.9        | 93.9                | 0.322                     | 0.335                     | 0.202            | 0.315            | 0.0014                     |

TM30 Details

**Rf 90.2**  
Fidelity Index Rf

**Rg 97.9**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 90             | -3%                | 1%   |
| 2       | 96             | 1%                 | 1%   |
| 3       | 94             | -1%                | -2%  |
| 4       | 91             | -3%                | -5%  |
| 5       | 86             | -9%                | -4%  |
| 6       | 94             | -4%                | 1%   |
| 7       | 94             | -1%                | 3%   |
| 8       | 88             | -1%                | 7%   |
| 9       | 90             | 2%                 | 9%   |
| 10      | 90             | 3%                 | 5%   |
| 11      | 90             | 5%                 | 3%   |
| 12      | 89             | 3%                 | -7%  |
| 13      | 87             | 1%                 | -11% |
| 14      | 91             | -2%                | -5%  |
| 15      | 81             | 2%                 | -14% |
| 16      | 93             | -3%                | 2%   |



**Total Lumen Output: 40653 lm**

**Color Temperature: 6504 K**

**CRI: 92.9**

**TLCI: 92**

**TM30: 89.6**

**CQS: 93.7**

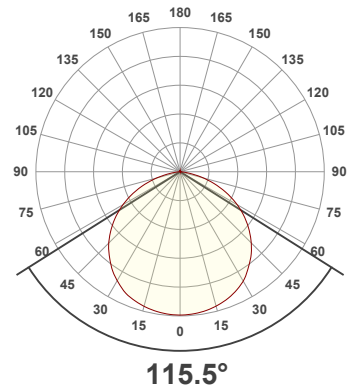
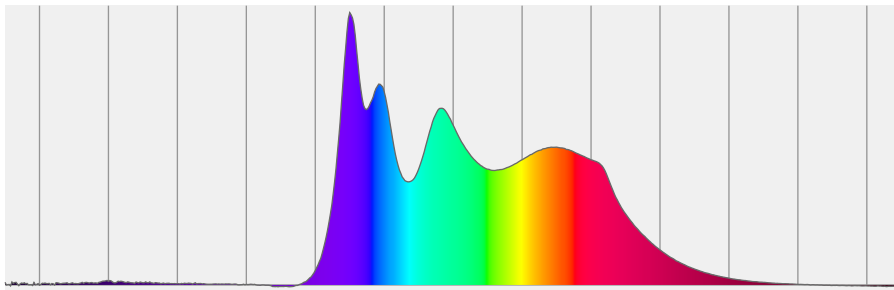
**Measurement Date: 3/25/2022**

**Voltage: 119 V, Current: 4.23 A**

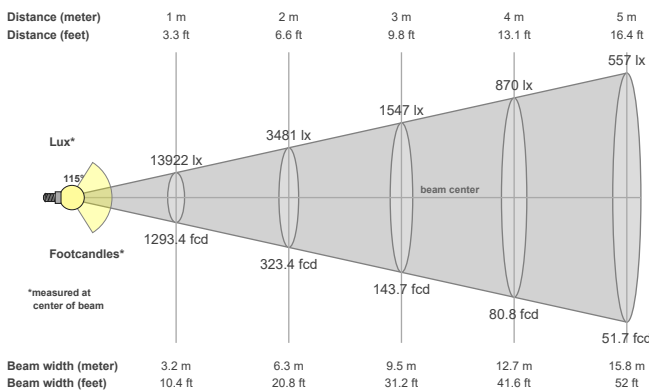
**Power: 505 W**

**Efficacy: 80 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 360



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>115.5°</b>  | <b>157.6°</b>   | <b>168.6°</b>     |

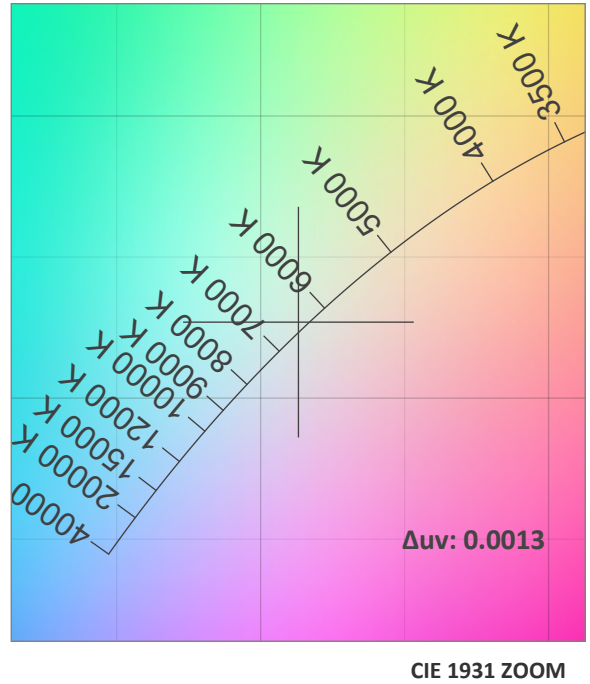
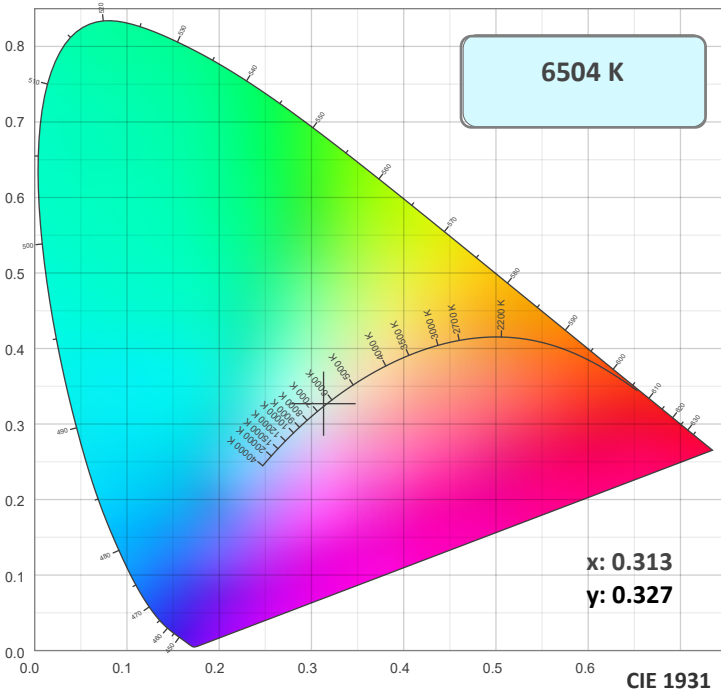
**Beam intensities**

| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>13927 cd</b> | <b>80.1%</b>            | <b>54.2%</b>           |

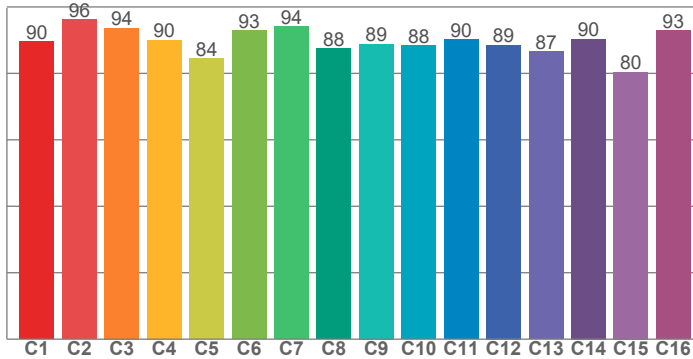
**Beam Intensities from 1-20m**

| M         | 1      | 2     | 3     | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 13922  | 3481  | 1547  | 870  | 557  | 387  | 284  | 218  | 172  | 139  | 115  | 97   | 82   | 71   | 62   | 54   | 48   | 43   | 39   | 35   |
| <b>FC</b> | 1293.4 | 323.4 | 143.7 | 80.8 | 51.7 | 35.9 | 26.4 | 20.2 | 16   | 12.9 | 10.7 | 9    | 7.7  | 6.6  | 5.7  | 5.1  | 4.5  | 4    | 3.6  | 3.2  |

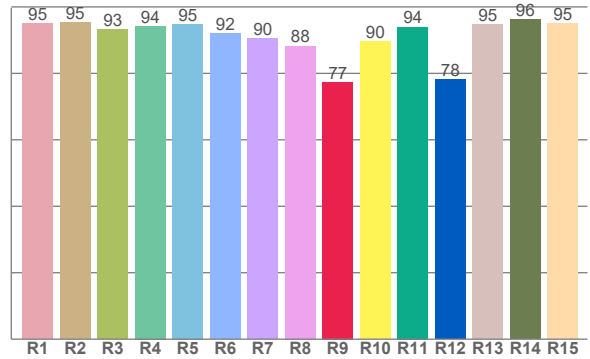
### Color Details



**TM30: 89.6**



**CRI: 92.9 (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  |
| 95.0 | 95.4 | 93.3 | 94.3 | 94.9 | 92.0 | 90.5 | 88.3 | 77.4 | 89.5 | 94.0 | 78.1 | 94.7 | 96.2 | 94.9 |

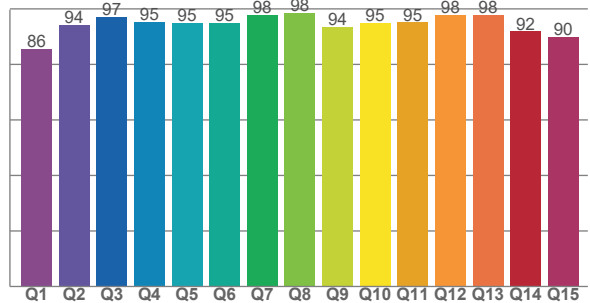
**TM30 C Values, 16 binned values out of total of 99 C values**

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
| 89.6 | 96.2 | 93.7 | 90.0 | 84.5 | 93.0 | 94.0 | 87.6 | 88.9 | 88.3 | 90.1 | 88.6 | 86.6 | 90.3 | 80.4 | 92.9 |

**CQS Q Values**

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
| 85.7 | 94.2 | 97.0 | 95.3 | 94.8 | 95.0 | 97.8 | 98.4 | 93.5 | 94.9 | 95.1 | 97.9 | 97.7 | 91.9 | 89.7 |

**CQS: 93.7**



### Color Parameters

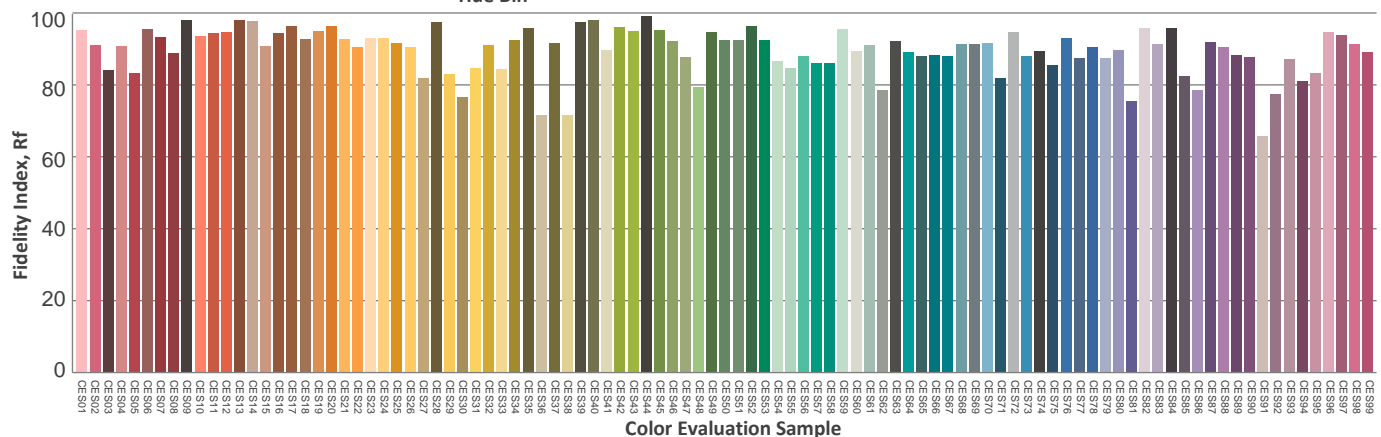
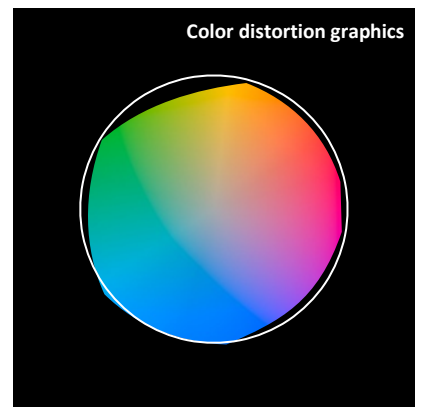
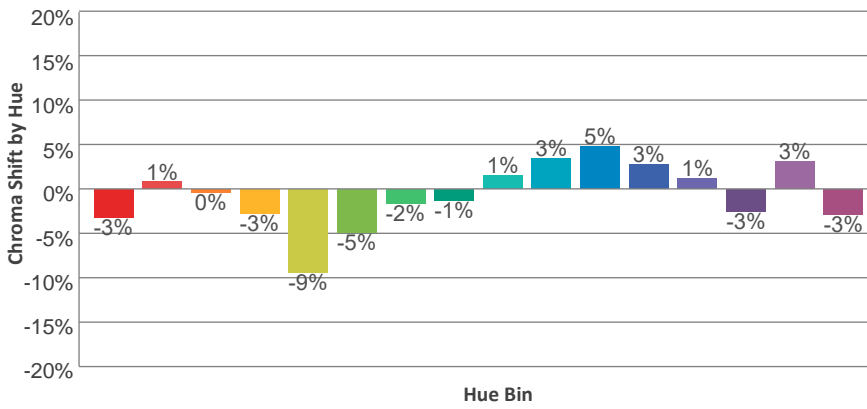
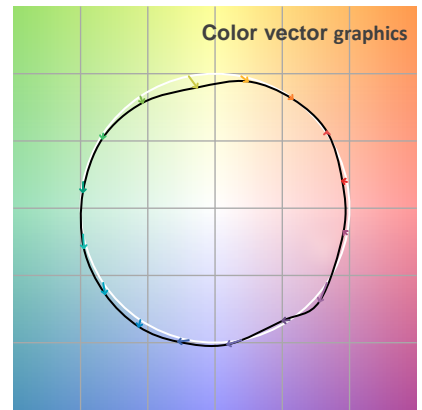
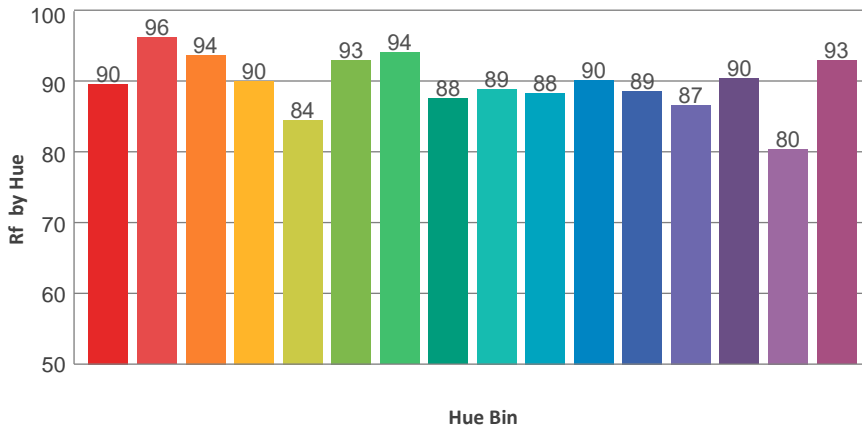
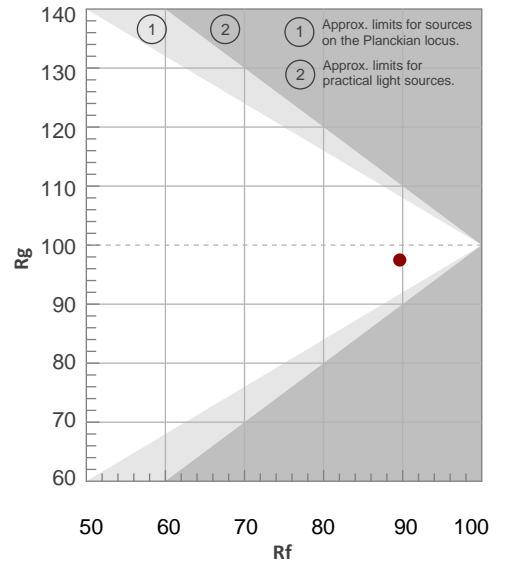
| Color Temperature | Color Rendering Index | Red Component | Color Fidelity | Color Gamut | Color Quality Scale | Color Coordinate CIE 1931 | Color Coordinate CIE 1931 | Color Coordinate | Color Coordinate | Color Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 6504 K            | 92.9                  | 77.4          | 89.6           | 97.5        | 93.7                | 0.313                     | 0.327                     | 0.199            | 0.312            | 0.0013                     |

TM30 Details

**Rf 89.6**  
Fidelity Index Rf

**Rg 97.5**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 90             | -3%                | 2%   |
| 2       | 96             | 1%                 | 1%   |
| 3       | 94             | 0%                 | -3%  |
| 4       | 90             | -3%                | -5%  |
| 5       | 84             | -9%                | -4%  |
| 6       | 93             | -5%                | 1%   |
| 7       | 94             | -2%                | 3%   |
| 8       | 88             | -1%                | 7%   |
| 9       | 89             | 1%                 | 10%  |
| 10      | 88             | 3%                 | 8%   |
| 11      | 90             | 5%                 | 2%   |
| 12      | 89             | 3%                 | -7%  |
| 13      | 87             | 1%                 | -11% |
| 14      | 90             | -3%                | -5%  |
| 15      | 80             | 3%                 | -14% |
| 16      | 93             | -3%                | 2%   |



**Total Lumen Output: 42186 lm**

**Color Temperature: 7965 K**

**CRI: 92.3**

**TLCI: 91**

**TM30: 88.8**

**CQS: 93.4**

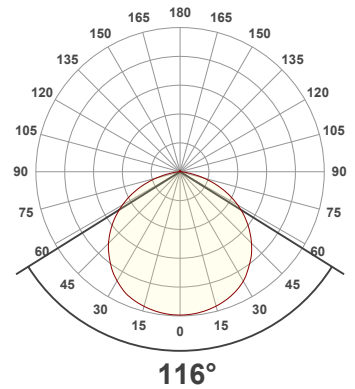
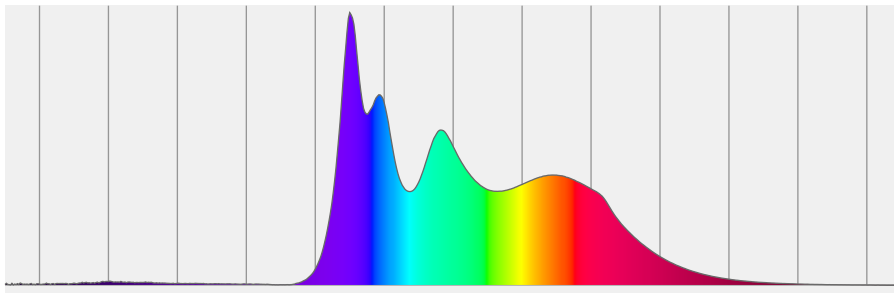
**Measurement Date: 3/25/2022**

**Voltage: 120 V, Current: 4.42 A**

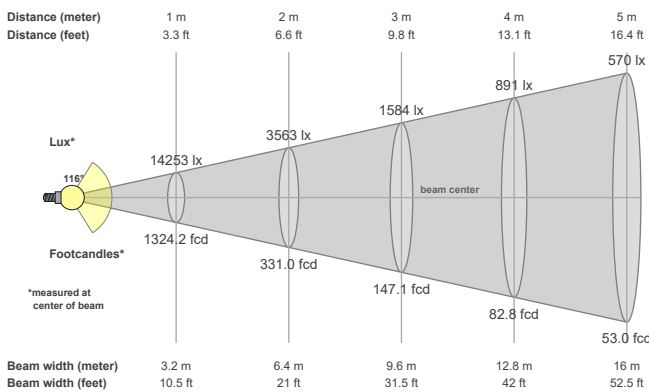
**Power: 530 W**

**Efficacy: 80 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 475



**Beam details**



**Beam angles**

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% |
|----------------|-----------------|-------------------|
| <b>116°</b>    | <b>158.2°</b>   | <b>169.6°</b>     |

**Beam intensities**

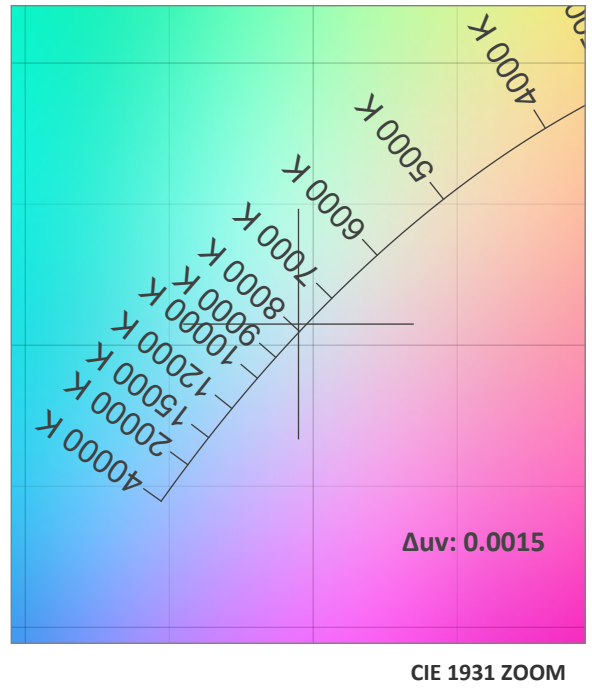
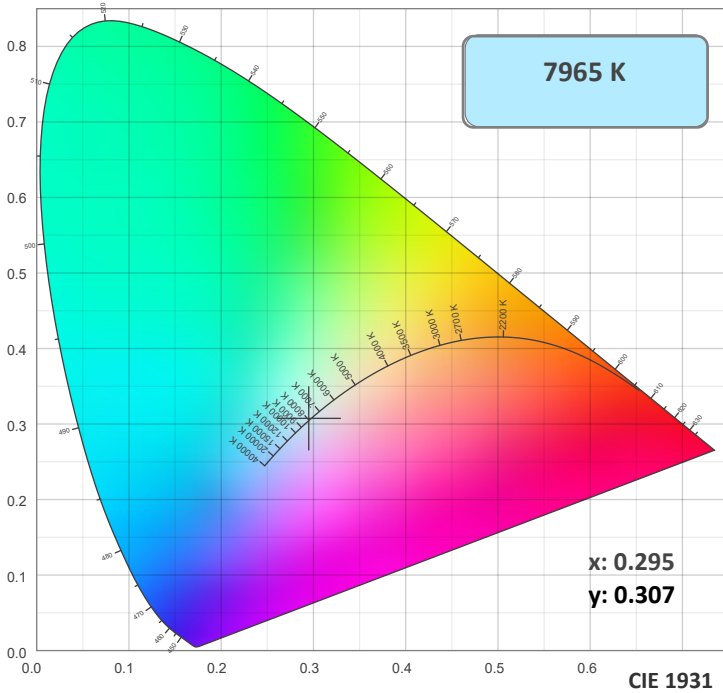
| Peak intensity  | Int. ratio in 120° cone | Int. ratio in 90° cone |
|-----------------|-------------------------|------------------------|
| <b>14257 cd</b> | <b>79.3%</b>            | <b>53.6%</b>           |

**Beam Intensities from 1-20m**

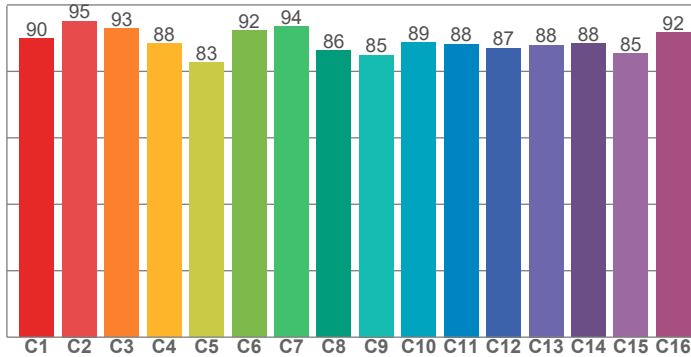
| M         | 1      | 2    | 3     | 4    | 5    | 6    | 7   | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
|-----------|--------|------|-------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>FT</b> | 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 |
| <b>LX</b> | 14253  | 3563 | 1584  | 891  | 570  | 396  | 291 | 223  | 176  | 143  | 118  | 99   | 84   | 73   | 63   | 56   | 49   | 44   | 39   | 36   |
| <b>FC</b> | 1324.2 | 331  | 147.1 | 82.8 | 53   | 36.8 | 27  | 20.7 | 16.3 | 13.2 | 10.9 | 9.2  | 7.8  | 6.8  | 5.9  | 5.2  | 4.6  | 4.1  | 3.7  | 3.3  |



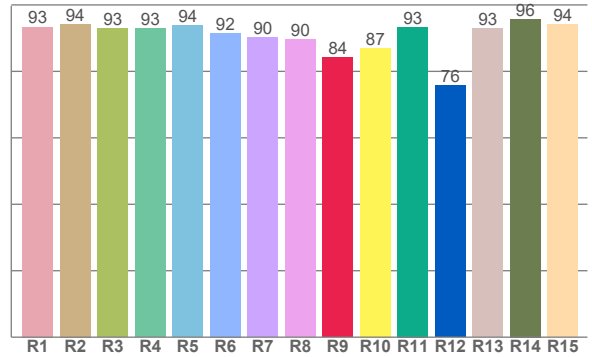
### Color Details



TM30: 88.8



CRI: 92.3 (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  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 93.4 | 94.2 | 92.9 | 92.9 | 93.7 | 91.6 | 90.2 | 89.6 | 84.2 | 87.0 | 93.3 | 75.8 | 92.9 | 95.8 | 94.0 |

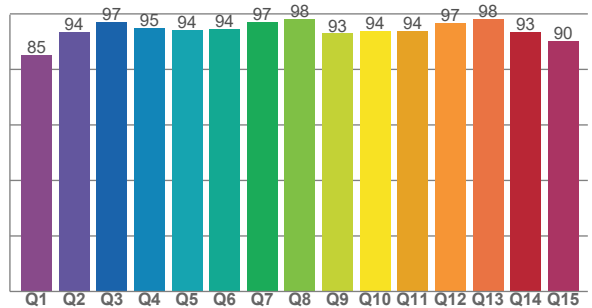
TM30 C Values, 16 binned values out of total of 99 C values

| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 89.9 | 95.2 | 92.9 | 88.4 | 82.6 | 92.4 | 93.6 | 86.2 | 84.9 | 88.6 | 88.3 | 87.1 | 87.9 | 88.4 | 85.5 | 91.8 |

CQS Q Values

| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 85.1 | 93.6 | 97.0 | 94.9 | 94.2 | 94.4 | 97.2 | 98.3 | 93.0 | 93.7 | 93.8 | 96.6 | 98.1 | 93.3 | 90.3 |

CQS: 93.4



### 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 Diviation from Black |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|----------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                        |
| 7965 K            | 92.3                  | 84.2          | 88.8           | 97.2        | 93.4                | 0.295                     | 0.307                     | 0.193            | 0.302            | 0.0015                     |

TM30 Details

**Rf 88.8**  
Fidelity Index Rf

**Rg 97.2**  
Gamut Index Rg

| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 90             | -2%                | 2%   |
| 2       | 95             | 2%                 | 1%   |
| 3       | 93             | 0%                 | -4%  |
| 4       | 88             | -3%                | -6%  |
| 5       | 83             | -10%               | -5%  |
| 6       | 92             | -5%                | 1%   |
| 7       | 94             | -2%                | 4%   |
| 8       | 86             | -1%                | 8%   |
| 9       | 85             | 0%                 | 17%  |
| 10      | 89             | 4%                 | 7%   |
| 11      | 88             | 5%                 | 2%   |
| 12      | 87             | 3%                 | -9%  |
| 13      | 88             | 2%                 | -8%  |
| 14      | 88             | -5%                | -3%  |
| 15      | 85             | 2%                 | -13% |
| 16      | 92             | -3%                | 4%   |

