

Light efficiency:

128 Lumen/Watt

Output: 20848 lm

Light quality:

CRI: 83.7

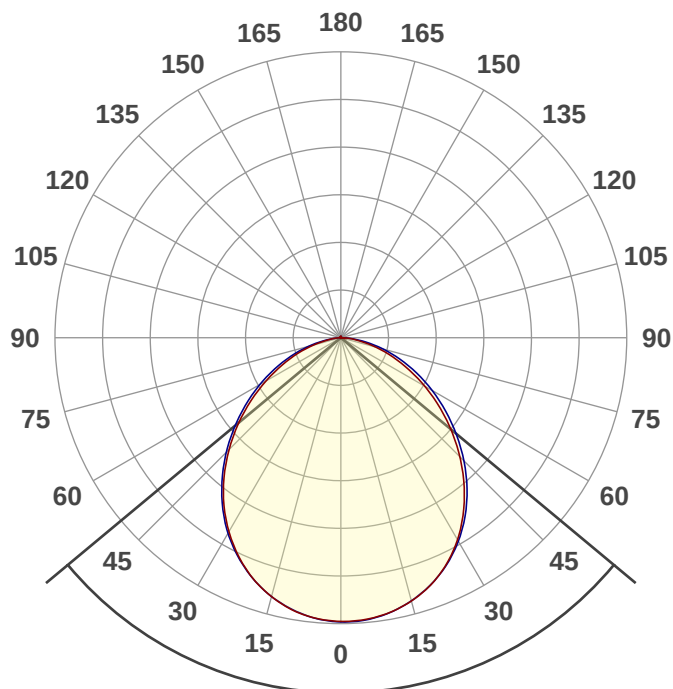
Peak: 8334 cd

Color temperature:

5379 K

Power: 162.6 W

PF: 1.0



Product name:

**LHBD2-50K2-165W-H**

Date and time:

**5/26/2020 1:07:07 PM**

Beam angle

**100.5°**

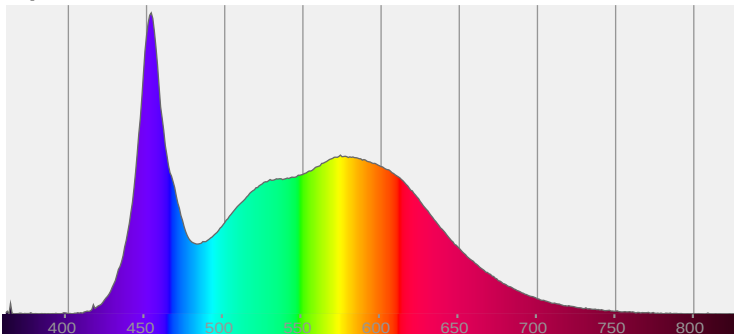


CIE 1931

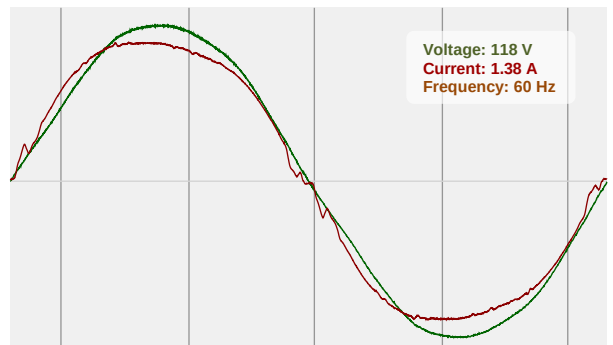
x: 0.335

y: 0.342

Spectra



Power



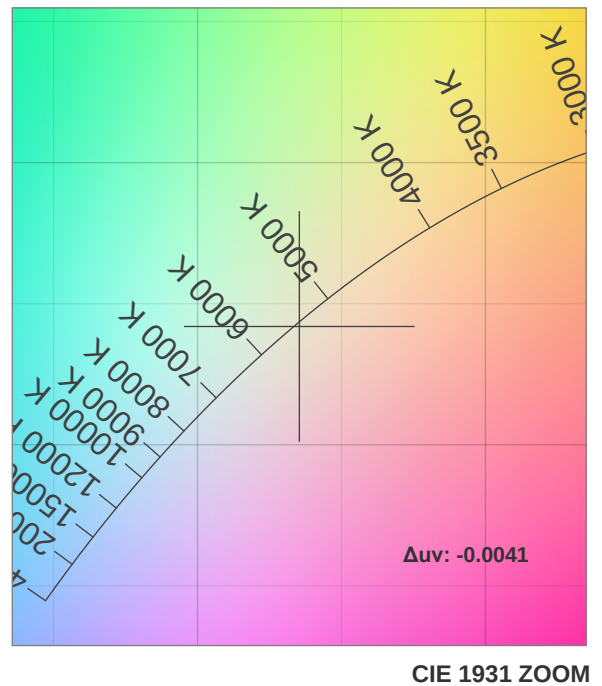
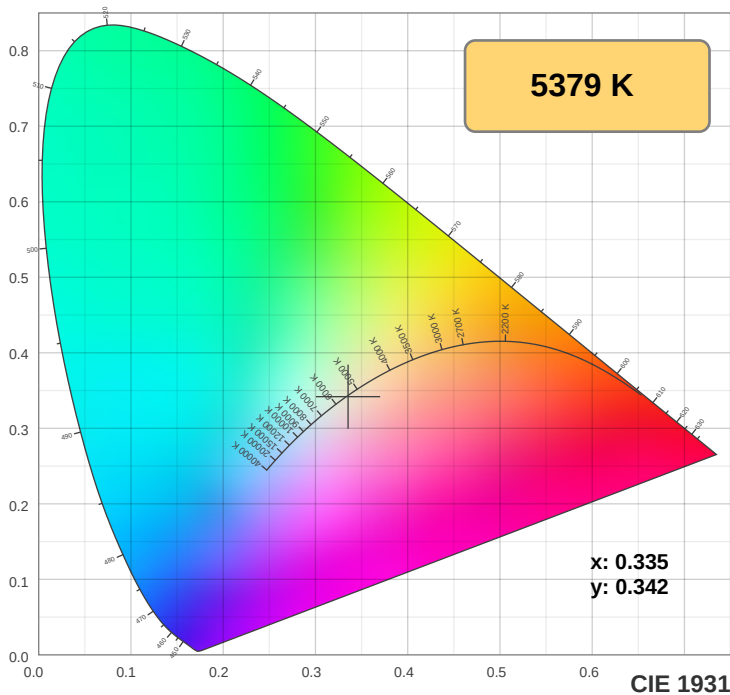
T 314.743.3067

F 314.972.6202

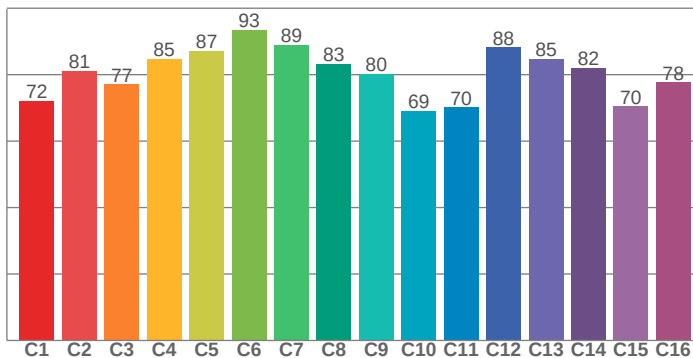
email: [commercial-sales@superbrightleds.com](mailto:commercial-sales@superbrightleds.com)

[www.superbrightleds.com/](http://www.superbrightleds.com/)

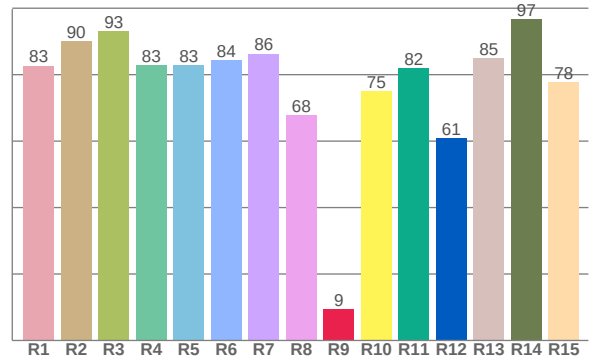
## Color Specifications



**TM30: 80.6**



**CRI: 83.7 (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  |
|------|------|------|------|------|------|------|------|-----|------|------|------|------|------|------|
| 82.7 | 90.0 | 93.2 | 82.8 | 82.9 | 84.3 | 86.3 | 67.7 | 9.5 | 75.1 | 82.0 | 60.9 | 85.0 | 96.6 | 77.7 |

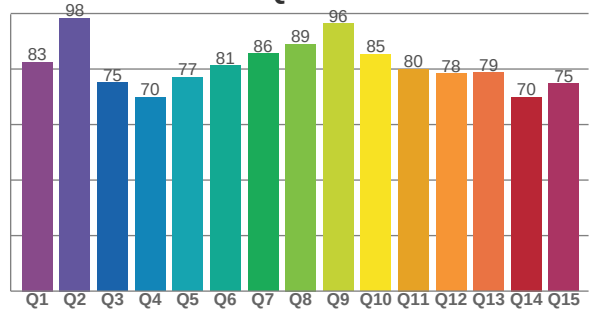
**TM30 C values, 16 binned values out of total of 99 C values**

| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   | C9   | C10  | C11  | C12  | C13  | C14  | C15  | C16  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 72.2 | 81.2 | 77.1 | 84.9 | 87.1 | 93.5 | 88.9 | 83.2 | 80.3 | 69.2 | 70.2 | 88.2 | 84.7 | 82.1 | 70.5 | 77.7 |

**CQS Q values**

| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   | Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 82.6 | 98.4 | 75.1 | 69.8 | 77.0 | 81.2 | 85.5 | 89.0 | 96.4 | 85.4 | 80.0 | 78.3 | 78.8 | 69.9 | 74.7 |

**CQS: 79.8**



## 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 deviation from black body |
|-------------------|-----------------------|---------------|----------------|-------------|---------------------|---------------------------|---------------------------|------------------|------------------|---------------------------------|
| CCT               | CRI                   | CRI R9        | TM30 Rf        | TM30 Rg     | CQS                 | x                         | y                         | u                | v                | Δuv                             |
| 5379 K            | 83.7                  | 9.5           | 80.6           | 94.2        | 79.8                | 0.335                     | 0.342                     | 0.209            | 0.319            | -0.0041                         |



## TM30 Report

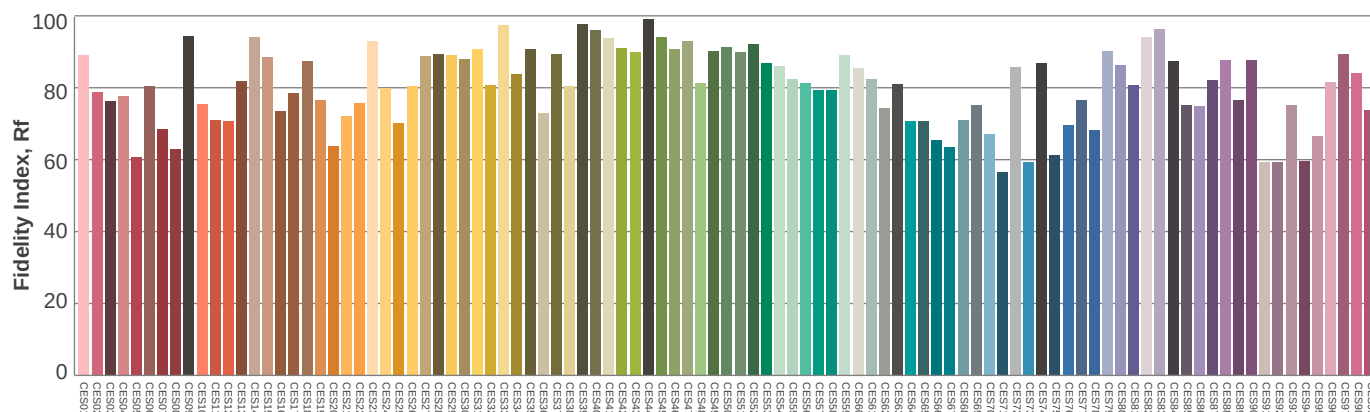
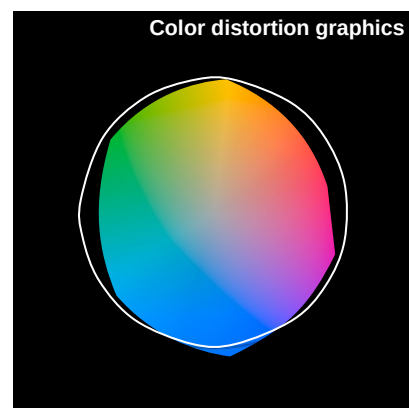
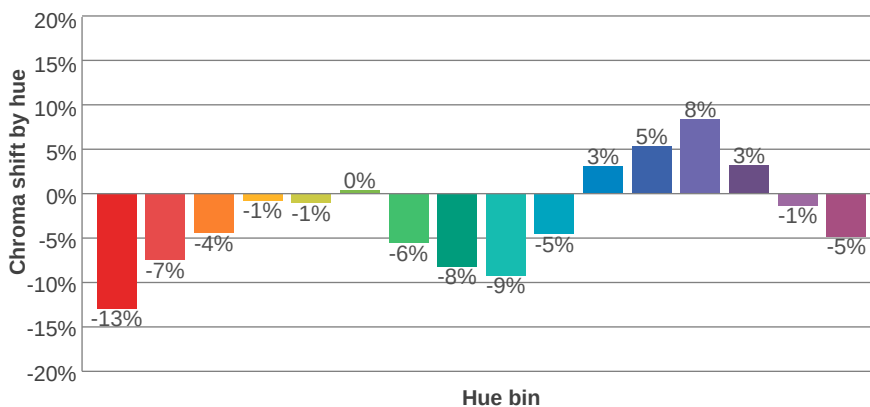
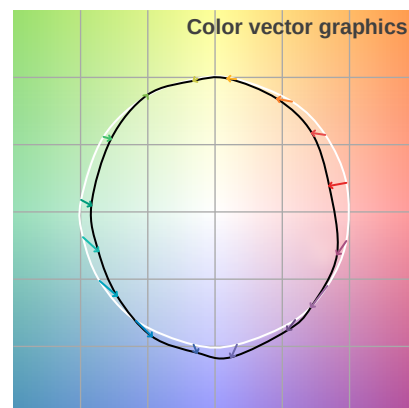
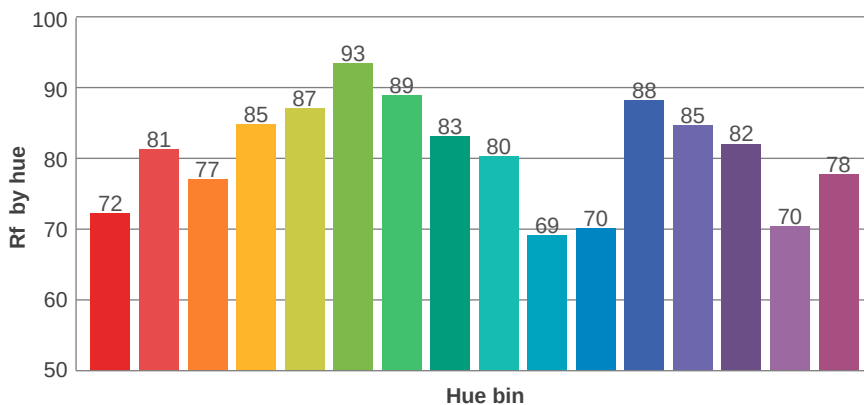
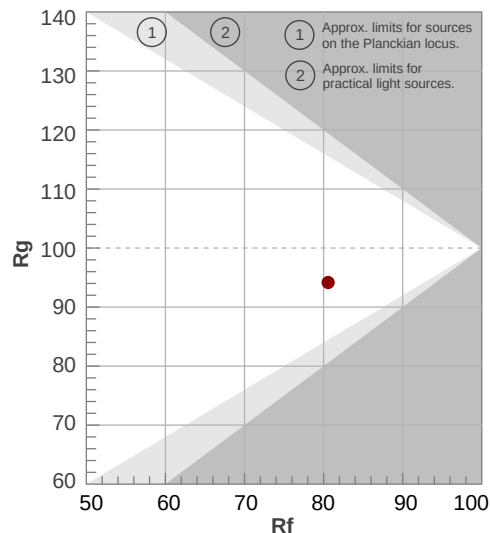
**Rf 80.6**

Fidelity index Rf

**Rg 94.2**

Gamut index Rg

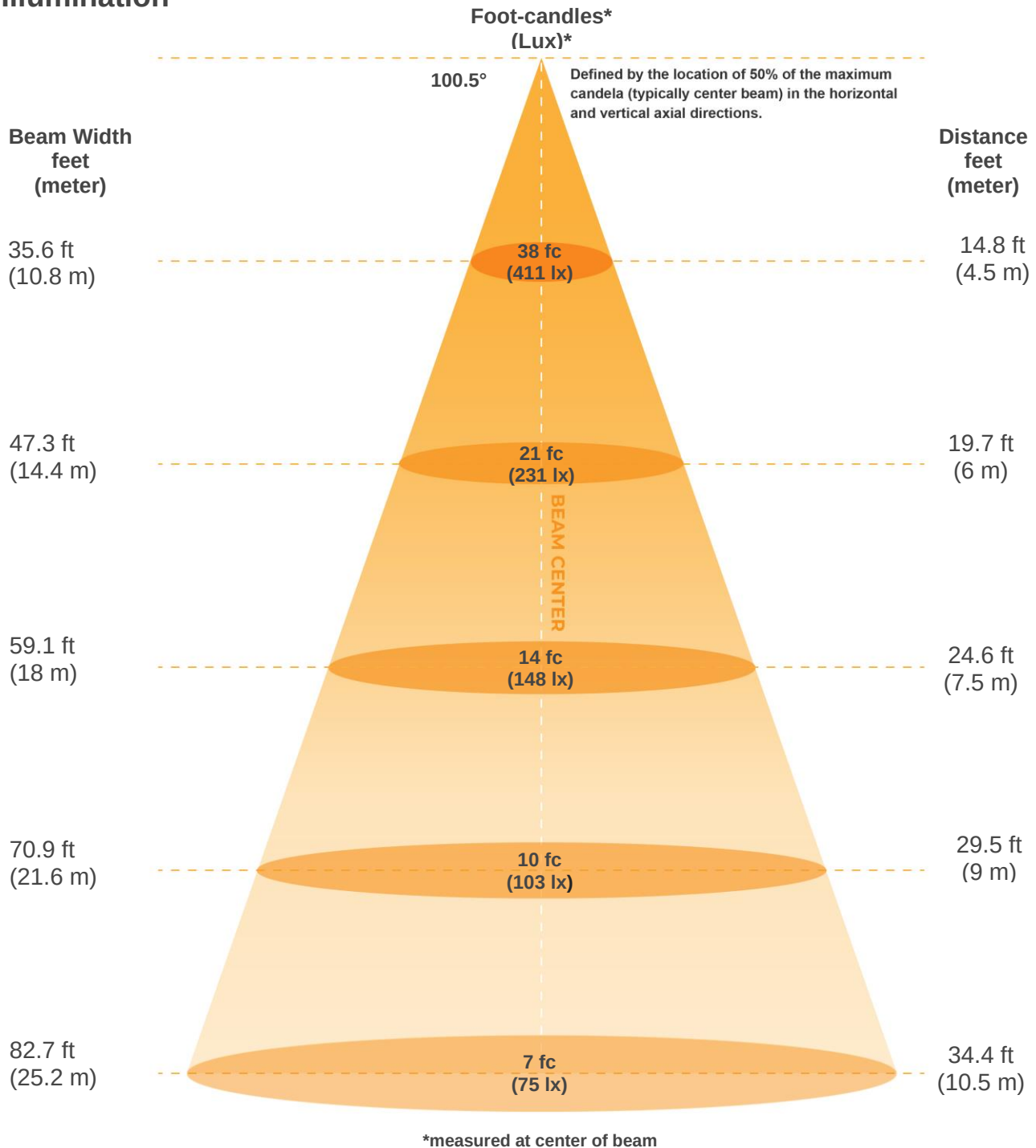
| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 72             | -13%               | 0%   |
| 2       | 81             | -7%                | 7%   |
| 3       | 77             | -4%                | 10%  |
| 4       | 85             | -1%                | 7%   |
| 5       | 87             | -1%                | 3%   |
| 6       | 93             | 0%                 | -1%  |
| 7       | 89             | -6%                | -2%  |
| 8       | 83             | -8%                | 3%   |
| 9       | 80             | -9%                | 12%  |
| 10      | 69             | -5%                | 16%  |
| 11      | 70             | 3%                 | 16%  |
| 12      | 88             | 5%                 | 4%   |
| 13      | 85             | 8%                 | -6%  |
| 14      | 82             | 3%                 | -9%  |
| 15      | 70             | -1%                | -20% |
| 16      | 78             | -5%                | -11% |



Color Evaluation Sample



## Illumination



### Beam intensities from 1-20m

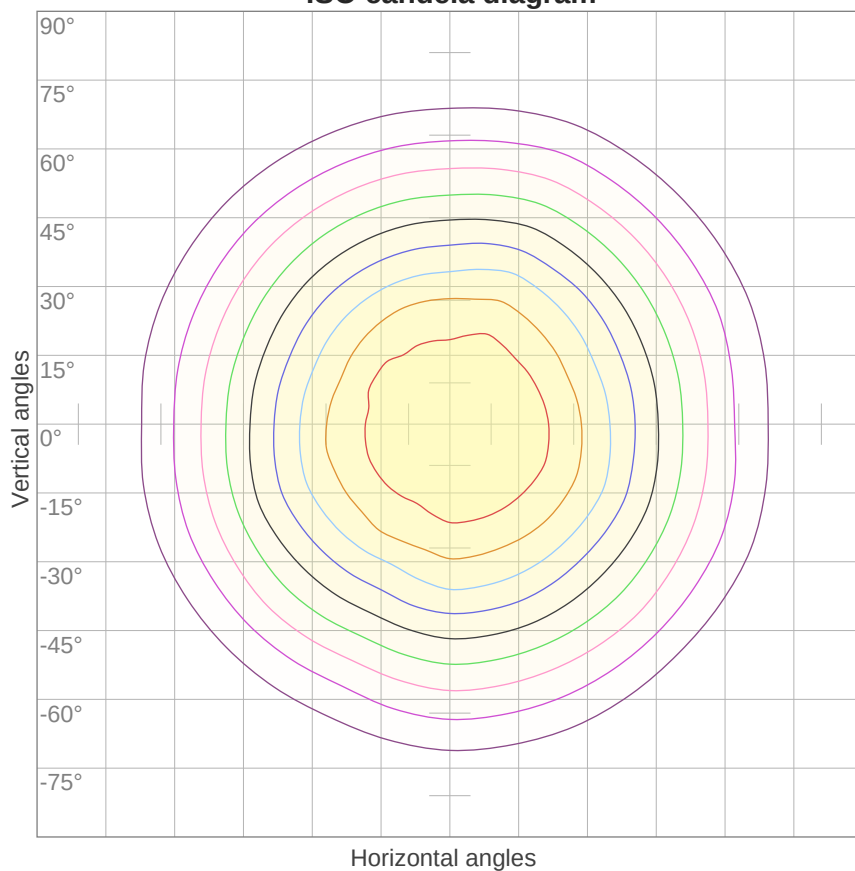
| 1m      | 2m      | 3m      | 4m      | 5m      | 6m      | 7m      | 8m      | 9m     | 10m    | 11m    | 12m    | 13m    | 14m    | 15m    | 16m    | 17m    | 18m    | 19m    | 20m    |
|---------|---------|---------|---------|---------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 3.3ft   | 6.6ft   | 9.8ft   | 13.1ft  | 16.4ft  | 19.7ft  | 23ft    | 26.2ft  | 29.5ft | 32.8ft | 36.1ft | 39.4ft | 42.7ft | 45.9ft | 49.2ft | 52.5ft | 55.8ft | 59.1ft | 62.3ft | 65.6ft |
| 8320lx  | 2080lx  | 924lx   | 520lx   | 333lx   | 231lx   | 170lx   | 130lx   | 103lx  | 83lx   | 69lx   | 58lx   | 49lx   | 42lx   | 37lx   | 32lx   | 29lx   | 26lx   | 23lx   | 21lx   |
| 772.9fc | 193.2fc | 85.9fcd | 48.3fcd | 30.9fcd | 21.5fcd | 15.8fcd | 12.1fcd | 9.5fcd | 7.7fcd | 6.4fcd | 5.4fcd | 4.6fcd | 3.9fcd | 3.4fcd | 3fcd   | 2.7fcd | 2.4fcd | 2.1fcd | 1.9fcd |

| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% | Intensity ratio in 120° cone | Intensity ratio in 90° cone |
|----------------|-----------------|-------------------|------------------------------|-----------------------------|
| 100.5°         | 155.2°          | 171.4°            | 81.9%                        | 58.0%                       |



## ISO Diagrams

ISO candela diagram



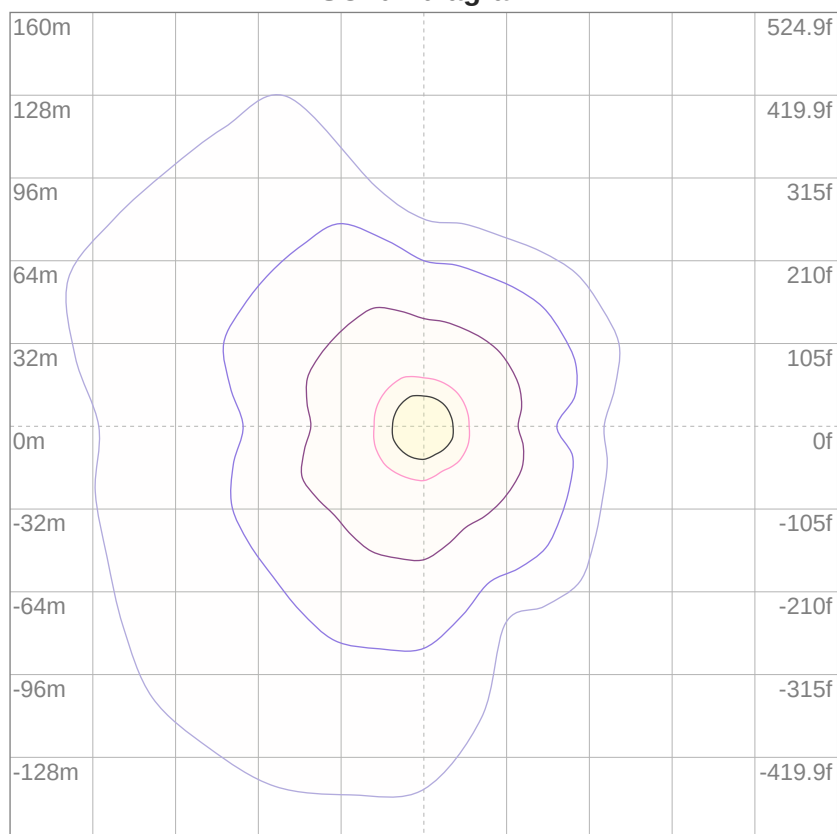
|     |         |
|-----|---------|
| 10% | 832 cd  |
| 20% | 1664 cd |
| 30% | 2496 cd |
| 40% | 3328 cd |
| 50% | 4160 cd |
| 60% | 4992 cd |
| 70% | 5824 cd |
| 80% | 6656 cd |
| 90% | 7488 cd |

### Conditions:

Number of c-planes: 16

Candela at center: 8320 cd

ISO lux diagram



|     |         |
|-----|---------|
| 3%  | 2.50 lx |
| 5%  | 4.16 lx |
| 10% | 8.32 lx |
| 30% | 25.0 lx |
| 50% | 41.6 lx |

### Conditions:

Number of c-planes: 16

Lux at center: 83.2 lx

*Lux distribution on a surface when lamp is mounted at 10 meters from the surface.*



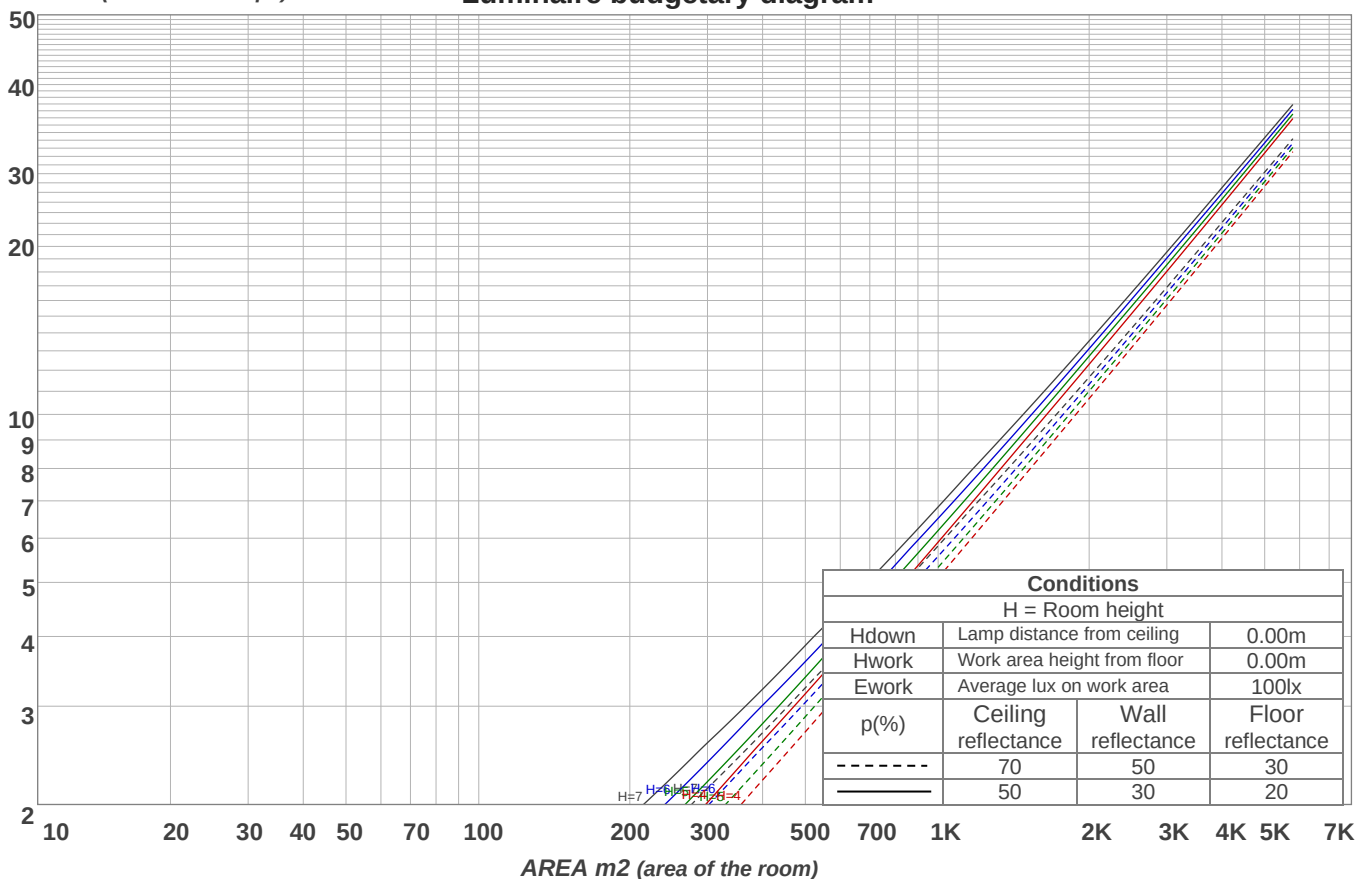
## Light Planning

### Coefficients of Utilization

| Ceiling reflectance | 80                                                                                                       |     |     |     | 70  |     |     |     | 50  |     |     | 30  |     |     | 10  |     |     | 0  |
|---------------------|----------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| Wall reflectance    | 70                                                                                                       | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 0  |
| Floor reflectance   | 20                                                                                                       | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 20  | 0  |
| RCR                 | (RCR: Room Cavity Ratio) Room Values are expressed as percentage of Lumens delivered to the task surface |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 0                   | 119                                                                                                      | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 99 |
| 1                   | 109                                                                                                      | 105 | 101 | 97  | 106 | 102 | 99  | 95  | 98  | 95  | 92  | 94  | 92  | 89  | 90  | 88  | 87  | 85 |
| 2                   | 100                                                                                                      | 92  | 85  | 80  | 97  | 90  | 84  | 79  | 86  | 81  | 77  | 83  | 79  | 75  | 80  | 77  | 73  | 71 |
| 3                   | 91                                                                                                       | 81  | 73  | 67  | 89  | 80  | 72  | 67  | 77  | 70  | 65  | 74  | 69  | 64  | 71  | 67  | 63  | 61 |
| 4                   | 84                                                                                                       | 72  | 64  | 57  | 82  | 71  | 63  | 57  | 68  | 62  | 56  | 66  | 60  | 55  | 64  | 59  | 54  | 52 |
| 5                   | 77                                                                                                       | 65  | 56  | 50  | 75  | 64  | 56  | 49  | 62  | 54  | 49  | 60  | 53  | 48  | 58  | 52  | 48  | 46 |
| 6                   | 72                                                                                                       | 59  | 50  | 44  | 70  | 58  | 49  | 43  | 56  | 48  | 43  | 54  | 48  | 43  | 52  | 47  | 42  | 40 |
| 7                   | 66                                                                                                       | 53  | 45  | 39  | 65  | 52  | 44  | 39  | 51  | 44  | 38  | 49  | 43  | 38  | 48  | 42  | 38  | 36 |
| 8                   | 62                                                                                                       | 49  | 40  | 35  | 60  | 48  | 40  | 35  | 47  | 39  | 34  | 45  | 39  | 34  | 44  | 38  | 34  | 32 |
| 9                   | 58                                                                                                       | 45  | 37  | 31  | 57  | 44  | 37  | 31  | 43  | 36  | 31  | 42  | 35  | 31  | 41  | 35  | 31  | 29 |
| 10                  | 54                                                                                                       | 41  | 34  | 29  | 53  | 41  | 33  | 28  | 40  | 33  | 28  | 39  | 33  | 28  | 38  | 32  | 28  | 26 |

LAMPS (number of lamps)

### Luminaire budgetary diagram



### Zonal Lumen Summary

| 0°-10°   | 10°-20°   | 20°-30°   | 30°-40°   | 40°-50°   | 50°-60°   | 60°-70°   | 70°-80°   | 80°-90°   |
|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 785 lm   | 2231 lm   | 3314 lm   | 3845 lm   | 3757 lm   | 3139 lm   | 2198 lm   | 1161 lm   | 303 lm    |
| 90°-100° | 100°-110° | 110°-120° | 120°-130° | 130°-140° | 140°-150° | 150°-160° | 160°-170° | 170°-180° |
| 15.9 lm  | 13.6 lm   | 15.1 lm   | 15.9 lm   | 15.9 lm   | 14.9 lm   | 12.1 lm   | 8.07 lm   | 2.79 lm   |

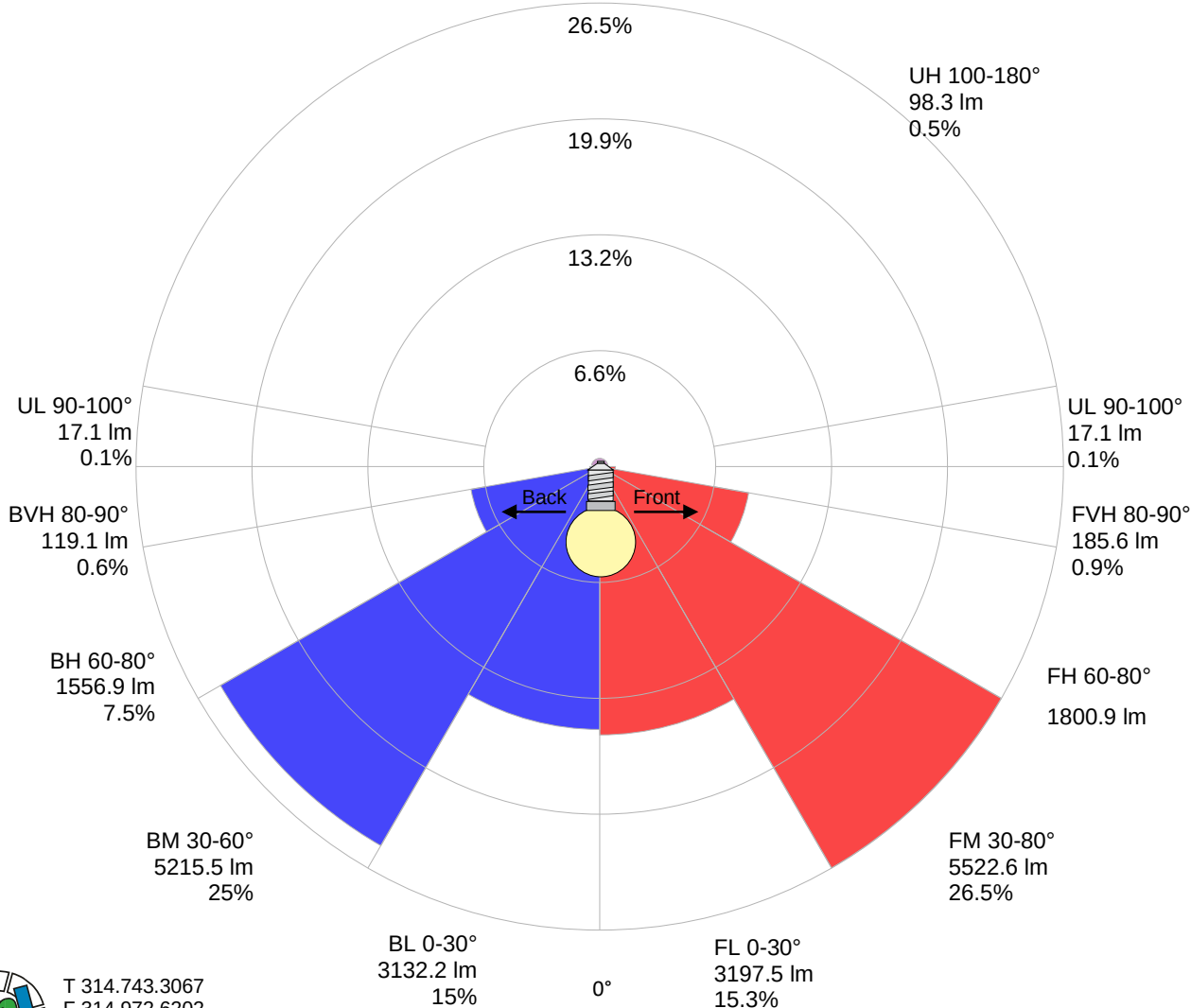


## Road Report

LCS table

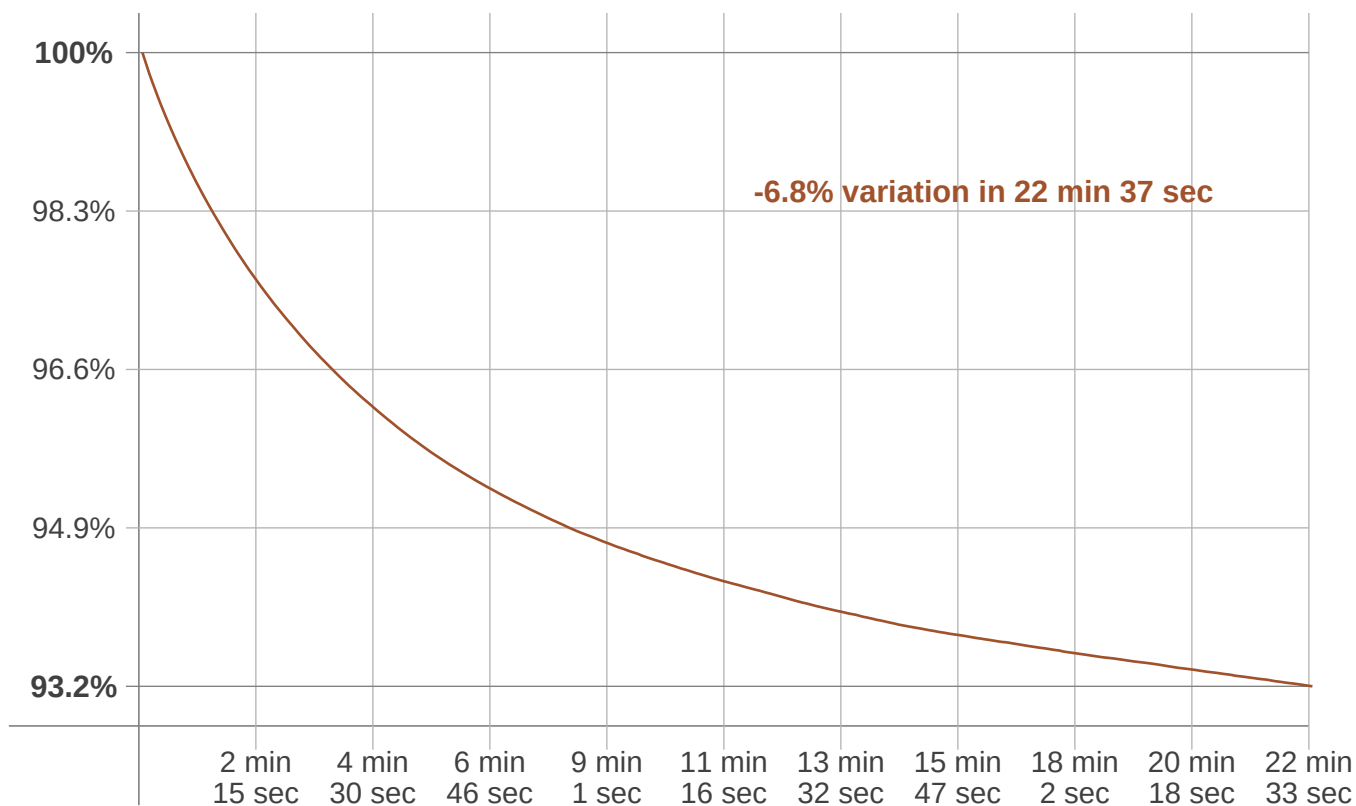
| BUG rating:       | B4 U3 G3 |          |
|-------------------|----------|----------|
| Forward light     | Lumens   | Lumens % |
| Low(0-30):        | 3197.5   | 15.3%    |
| Medium(30-60):    | 5522.6   | 26.5%    |
| High(60-80):      | 1800.9   | 8.6%     |
| Very high(80-90): | 185.6    | 0.9%     |
| Back light        |          |          |
| Low(0-30):        | 3132.2   | 15%      |
| Medium(30-60):    | 5215.5   | 25%      |
| High(60-80):      | 1556.9   | 7.5%     |
| Very high(80-90): | 119.1    | 0.6%     |
| Uplight           |          |          |
| Low(90-100):      | 17.1     | 0.1%     |
| High(100-180):    | 98.3     | 0.5%     |

LCS graph



## Stabilization

### Warmup curve



### Warmup result

|                  |               |
|------------------|---------------|
| Warmup time:     | 22 min 37 sec |
| Warmup variation | -6.9%         |

### Warmup conditions

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

### Color temperature change

| CCT start | CCT change | CCT end |
|-----------|------------|---------|
| 5221 K    | +158 K     | 5379 K  |

### Output change

| Output start | Output change | Output end |
|--------------|---------------|------------|
| 22310 lm     | -1462 lm      | 20848 lm   |

