

# LM-79

## Test Report

LM79-REVO-INGROUND-3000K-CRI80-DEG12x46

### General Discription

|                   |                    |
|-------------------|--------------------|
| Item number       | R-I-2-03-2         |
| Date and time     | 22-4-2016 10:54:52 |
| CCT (Kelvin)      | 3010 K             |
| Beam angle        | 30,5°              |
| Luminous flux     | 2265 lm            |
| Efficiency        | 118 lm/watt        |
| Weighted energy   | 19,3 kWh/1000h     |
| Power factor      | 0,94               |
| CRI (RA)          | 83,3               |
| Fidelity index Rf | Rf 84,5            |
| Gammut index Rg   | Rg 96,4            |



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| Beam details | 1m      | 2m      | 3m     | 4m     | 5m     |
|--------------|---------|---------|--------|--------|--------|
| Lux*         | 6307 lx | 1577 lx | 701 lx | 394 lx | 252 lx |

30,5°

\*measured at center of beam

|                    |           |           |          |          |          |
|--------------------|-----------|-----------|----------|----------|----------|
| Footcandles*       | 586,0 fcd | 146,5 fcd | 65,1 fcd | 36,6 fcd | 23,4 fcd |
| Beam width (meter) | 0,5 m     | 1,1 m     | 1,6 m    | 2,2 m    | 2,7 m    |
| Beam width (Feet)  | 1,8 ft    | 3,6 ft    | 5,4 ft   | 7,1 ft   | 8,9 ft   |

**Beam intensities**

| 1m     | 2m       | 3m      | 4m      | 5m      | 6m      | 7m    | 8m     | 9m     | 10m    | 11m    | 12m    | 13m    | 14m    | 15m    | 16m    | 17m    | 18m    | 19m    | 20m    |
|--------|----------|---------|---------|---------|---------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 6307lx | 1577lx   | 701lx   | 394lx   | 252lx   | 175lx   | 129lx | 99lx   | 78lx   | 63lx   | 52lx   | 44lx   | 37lx   | 32lx   | 28lx   | 25lx   | 22lx   | 19lx   | 17lx   | 16lx   |
| 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 |
| 586fcd | 146,5fcd | 65,1fcd | 36,6fcd | 23,4fcd | 16,3fcd | 12fcd | 9,2fcd | 7,2fcd | 5,9fcd | 4,8fcd | 4,1fcd | 3,5fcd | 3fcd   | 2,6fcd | 2,3fcd | 2fcd   | 1,8fcd | 1,6fcd | 1,5fcd |

**Intensities in 0° c-plane**

| 0°   | 2°   | 4°   | 6°   | 8°   | 10°  | 12°  | 14°  | 16°  | 18°  | 20°  | 22°  | 24°  | 26°  | 28°  | 30°  | 32°  | 34° | 36° | 38° |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| 6307 | 6284 | 6208 | 6043 | 5837 | 5594 | 5348 | 5094 | 4804 | 4463 | 4063 | 3616 | 3127 | 2624 | 2128 | 1678 | 1283 | 963 | 710 | 519 |
| 100% | 100% | 98%  | 96%  | 93%  | 89%  | 85%  | 81%  | 76%  | 71%  | 64%  | 57%  | 50%  | 42%  | 34%  | 27%  | 20%  | 15% | 11% | 8%  |

**Intensities in 90° c-plane**

| 0°   | 2°   | 4°   | 6°   | 8°   | 10°  | 12° | 14° | 16° | 18° | 20° | 22° | 24° | 26° | 28° | 30° | 32° | 34° | 36° | 38° |
|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 6307 | 6049 | 4810 | 3482 | 2358 | 1474 | 944 | 583 | 361 | 234 | 147 | 104 | 73  | 60  | 50  | 44  | 38  | 34  | 30  | 26  |
| 100% | 96%  | 76%  | 55%  | 37%  | 23%  | 15% | 9%  | 6%  | 4%  | 2%  | 2%  | 1%  | 1%  | 1%  | 1%  | 1%  | 1%  | 0%  | 0%  |

**Intensities in 180° c-plane**

| 0°   | 2°   | 4°   | 6°   | 8°   | 10°  | 12°  | 14°  | 16°  | 18°  | 20°  | 22°  | 24°  | 26°  | 28°  | 30°  | 32°  | 34° | 36° | 38° |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| 6307 | 6284 | 6208 | 6043 | 5837 | 5594 | 5348 | 5094 | 4804 | 4463 | 4063 | 3616 | 3127 | 2624 | 2128 | 1678 | 1283 | 963 | 710 | 519 |
| 100% | 100% | 98%  | 96%  | 93%  | 89%  | 85%  | 81%  | 76%  | 71%  | 64%  | 57%  | 50%  | 42%  | 34%  | 27%  | 20%  | 15% | 11% | 8%  |

**Intensities in 270° c-plane**

| 0°   | 2°   | 4°   | 6°   | 8°   | 10°  | 12° | 14° | 16° | 18° | 20° | 22° | 24° | 26° | 28° | 30° | 32° | 34° | 36° | 38° |
|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 6307 | 6049 | 4810 | 3482 | 2358 | 1474 | 944 | 583 | 361 | 234 | 147 | 104 | 73  | 60  | 50  | 44  | 38  | 34  | 30  | 26  |
| 100% | 96%  | 76%  | 55%  | 37%  | 23%  | 15% | 9%  | 6%  | 4%  | 2%  | 2%  | 1%  | 1%  | 1%  | 1%  | 1%  | 1%  | 0%  | 0%  |

|                |                 |                   |                              |                             |
|----------------|-----------------|-------------------|------------------------------|-----------------------------|
| Beam angle 50% | Field angle 10% | Cutoff angle 2,5% | Intensity ratio in 120° cone | Intensity ratio in 90° cone |
| 30,5°          | 50,5°           | {C_ANG}°          | 98,9%                        | 96,8%                       |



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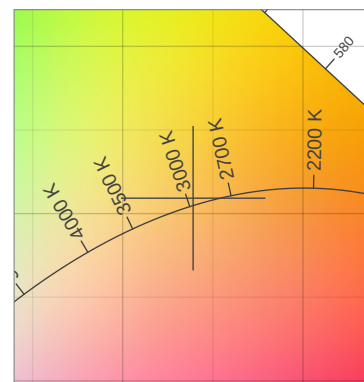
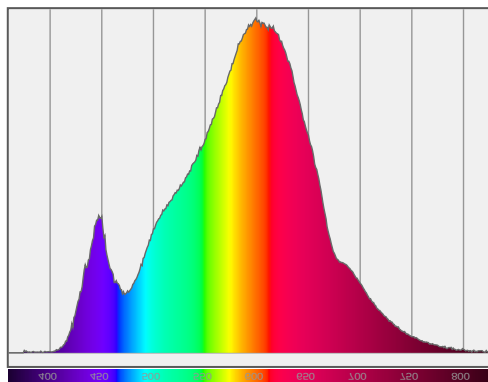
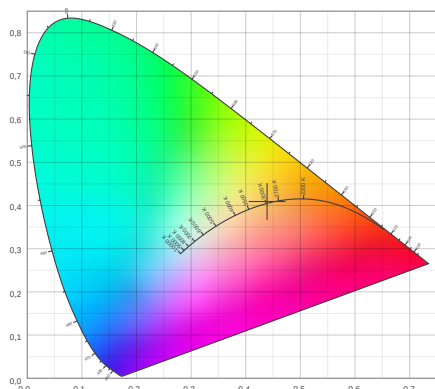
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## Color details



CIE 1931

x: 0,439

3010 K

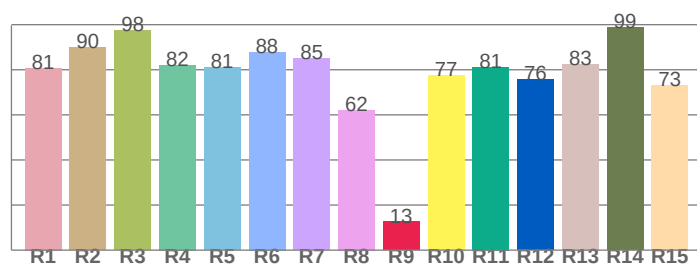
y: 0,409

Spectra

CIE 1931 ZOOM

 $\Delta uv: 0,0018$ 

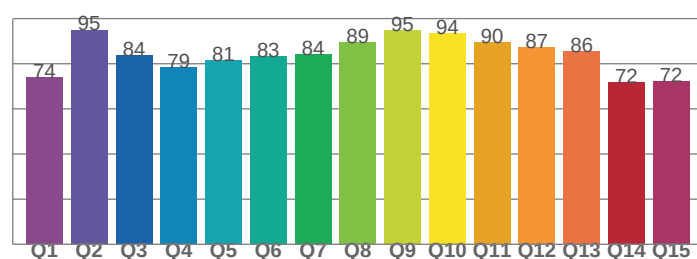
CRI: 83,3 (R1-R8)



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

| R1   | R2   | R3   | R4   | R5   | R6   | R7   | R8   |
|------|------|------|------|------|------|------|------|
| 80,8 | 89,8 | 97,6 | 82,1 | 81,2 | 87,9 | 84,9 | 62,2 |
| R9   | R10  | R11  | R12  | R13  | R14  | R15  |      |
| 12,5 | 77,4 | 81,3 | 75,7 | 82,6 | 98,8 | 73,3 |      |

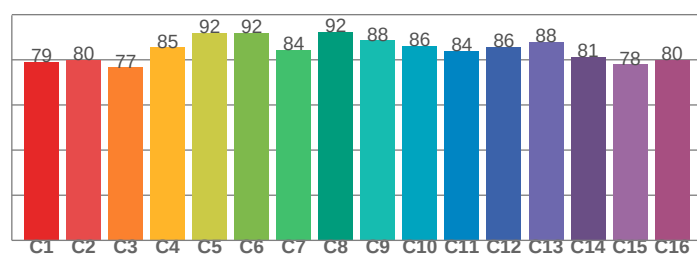
CQS: 82,5



CQS values

| Q1   | Q2   | Q3   | Q4   | Q5   | Q6   | Q7   | Q8   |
|------|------|------|------|------|------|------|------|
| 73,9 | 95,0 | 83,9 | 78,6 | 81,4 | 83,4 | 84,2 | 89,3 |
| Q9   | Q10  | Q11  | Q12  | Q13  | Q14  | Q15  |      |
| 94,8 | 93,6 | 89,5 | 87,4 | 85,5 | 72,0 | 72,4 |      |

TM30: 84,5



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

| C1   | C2   | C3   | C4   | C5   | C6   | C7   | C8   |
|------|------|------|------|------|------|------|------|
| 79,0 | 80,0 | 76,5 | 85,5 | 92,0 | 92,0 | 84,3 | 92,3 |
| C9   | C10  | C11  | C12  | C13  | C14  | C15  |      |
| 88,5 | 86,1 | 83,8 | 85,8 | 88,0 | 81,3 | 78,0 |      |

## 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                | $\Delta uv$                     |
| 3010 K            | 83,3                  | 12,5          | 84,5           | 96,4        | 82,5                | 0,439                     | 0,409                     | 0,250            | 0,349            | 0,0018                          |



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### TM30 details

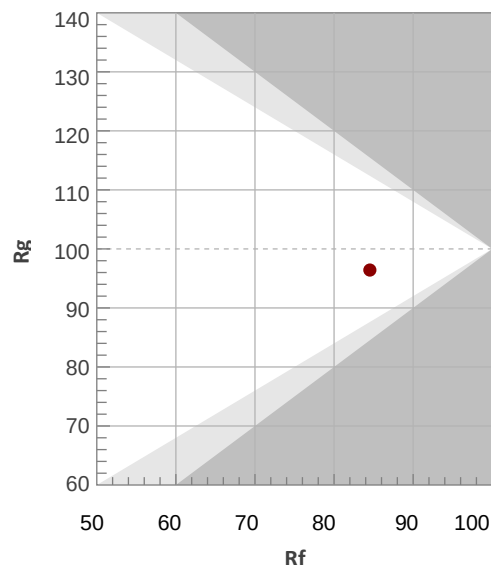
Rf 84,5

Fidelity index Rf

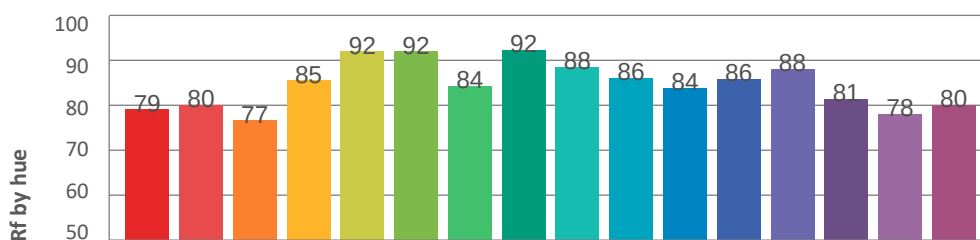
Rg 96,4

Gamut index Rg

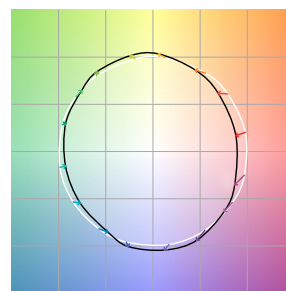
| Hue Bin | R <sub>f</sub> | Graphic shifts (%) |      |
|---------|----------------|--------------------|------|
|         |                | Chroma             | Hue  |
| 1       | 79             | -11%               | -2%  |
| 2       | 80             | -8%                | 6%   |
| 3       | 77             | -3%                | 11%  |
| 4       | 85             | 3%                 | 8%   |
| 5       | 92             | 4%                 | 4%   |
| 6       | 92             | 3%                 | -2%  |
| 7       | 84             | -1%                | -9%  |
| 8       | 92             | -3%                | -3%  |
| 9       | 88             | -6%                | 0%   |
| 10      | 86             | -6%                | 5%   |
| 11      | 84             | -3%                | 10%  |
| 12      | 86             | 4%                 | 3%   |
| 13      | 88             | 5%                 | -6%  |
| 14      | 81             | 4%                 | -13% |
| 15      | 78             | -2%                | -13% |
| 16      | 80             | -8%                | -12% |



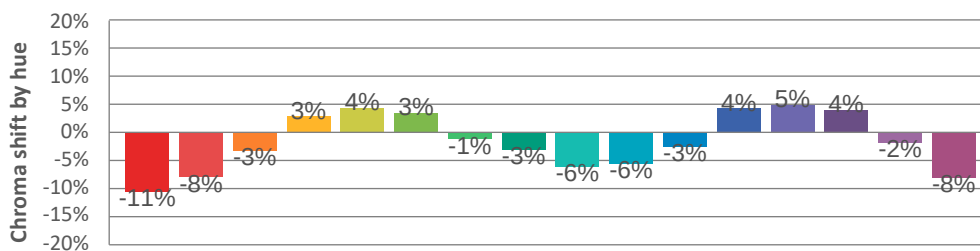
### Hue binH



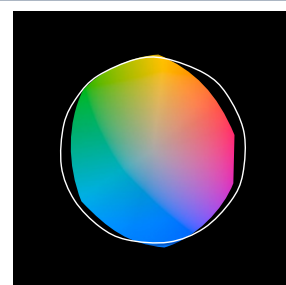
### Color vector graphics



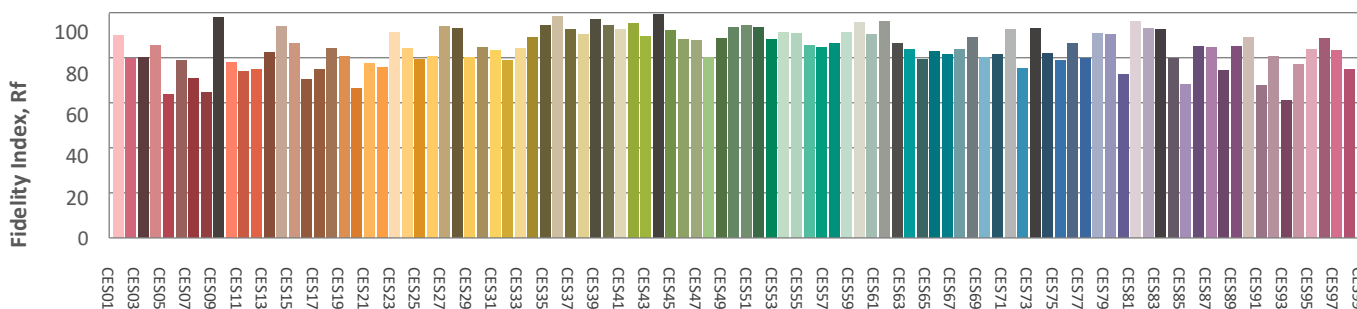
### Hue bin



### Color distortion graphics



### Color Evaluation Sample



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## Glare Evaluation According to UGR

|                                                                 |     |                                                |      |      |      |      |                                         |      |      |      |      |
|-----------------------------------------------------------------|-----|------------------------------------------------|------|------|------|------|-----------------------------------------|------|------|------|------|
| p Ceiling                                                       |     | 70                                             | 70   | 50   | 50   | 30   | 70                                      | 70   | 50   | 50   | 30   |
| p Walls                                                         |     | 50                                             | 30   | 50   | 30   | 30   | 50                                      | 30   | 50   | 30   | 30   |
| p Floor                                                         |     | 20                                             | 20   | 20   | 20   | 20   | 20                                      | 20   | 20   | 20   | 20   |
| Room size<br>X      Y                                           |     | Viewing direction at right angles to lamp axis |      |      |      |      | Viewing direction parallel to lamp axis |      |      |      |      |
| 2H                                                              | 2H  | 20,4                                           | 21,1 | 20,7 | 21,3 | 21,5 | 12,8                                    | 13,5 | 13,1 | 13,7 | 13,9 |
|                                                                 | 3H  | 20,3                                           | 21,0 | 20,6 | 21,2 | 21,4 | 12,9                                    | 13,5 | 13,2 | 13,8 | 14,0 |
|                                                                 | 4H  | 20,3                                           | 20,9 | 20,6 | 21,1 | 21,4 | 12,9                                    | 13,5 | 13,2 | 13,8 | 14,0 |
|                                                                 | 6H  | 20,2                                           | 20,8 | 20,6 | 21,1 | 21,3 | 12,9                                    | 13,4 | 13,2 | 13,7 | 14,0 |
|                                                                 | 8H  | 20,2                                           | 20,7 | 20,5 | 21,0 | 21,3 | 12,9                                    | 13,4 | 13,2 | 13,7 | 14,0 |
|                                                                 | 12H | 20,2                                           | 20,7 | 20,5 | 21,0 | 21,3 | 12,9                                    | 13,3 | 13,2 | 13,6 | 14,0 |
| 4H                                                              | 2H  | 20,2                                           | 20,8 | 20,5 | 21,1 | 21,3 | 12,8                                    | 13,4 | 13,1 | 13,7 | 13,9 |
|                                                                 | 3H  | 20,2                                           | 20,7 | 20,5 | 21,0 | 21,3 | 13,0                                    | 13,5 | 13,4 | 13,8 | 14,1 |
|                                                                 | 4H  | 20,1                                           | 20,5 | 20,5 | 20,9 | 21,2 | 13,1                                    | 13,5 | 13,5 | 13,8 | 14,2 |
|                                                                 | 6H  | 20,1                                           | 20,4 | 20,5 | 20,8 | 21,2 | 13,1                                    | 13,4 | 13,5 | 13,8 | 14,2 |
|                                                                 | 8H  | 20,0                                           | 20,4 | 20,5 | 20,7 | 21,1 | 13,1                                    | 13,4 | 13,5 | 13,8 | 14,2 |
|                                                                 | 12H | 20,0                                           | 20,3 | 20,4 | 20,7 | 21,1 | 13,0                                    | 13,3 | 13,5 | 13,7 | 14,1 |
| 8H                                                              | 4H  | 20,0                                           | 20,3 | 20,4 | 20,7 | 21,1 | 13,1                                    | 13,4 | 13,5 | 13,8 | 14,2 |
|                                                                 | 6H  | 20,0                                           | 20,2 | 20,4 | 20,6 | 21,1 | 13,1                                    | 13,3 | 13,6 | 13,8 | 14,2 |
|                                                                 | 8H  | 19,9                                           | 20,1 | 20,4 | 20,6 | 21,0 | 13,1                                    | 13,3 | 13,6 | 13,7 | 14,2 |
|                                                                 | 12H | 19,9                                           | 20,0 | 20,4 | 20,5 | 21,0 | 13,1                                    | 13,2 | 13,5 | 13,7 | 14,2 |
| 12H                                                             | 4H  | 20,0                                           | 20,3 | 20,4 | 20,7 | 21,1 | 13,1                                    | 13,3 | 13,5 | 13,7 | 14,2 |
|                                                                 | 6H  | 19,9                                           | 20,1 | 20,4 | 20,6 | 21,0 | 13,1                                    | 13,3 | 13,5 | 13,7 | 14,2 |
|                                                                 | 8H  | 19,9                                           | 20,0 | 20,4 | 20,5 | 21,0 | 13,1                                    | 13,2 | 13,5 | 13,7 | 14,2 |
| Variation of the observer position for the luminaire distance S |     |                                                |      |      |      |      |                                         |      |      |      |      |
| S = 1,0H                                                        |     | +5,4 / -7,7                                    |      |      |      |      | +4,3 / -3,7                             |      |      |      |      |
| S = 1,5H                                                        |     | +8,2 / -8,8                                    |      |      |      |      | +5,9 / -4,6                             |      |      |      |      |
| S = 2,0H                                                        |     | +10,2 / -9,5                                   |      |      |      |      | +7,8 / -4,9                             |      |      |      |      |
| Standard table                                                  |     | BK00                                           |      |      |      |      | BK01                                    |      |      |      |      |
| Correction summand                                              |     | 1,8                                            |      |      |      |      | -5,0                                    |      |      |      |      |
| Corrected glare indices referring to 2265lm total luminous flux |     |                                                |      |      |      |      |                                         |      |      |      |      |

