

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: LUMARK

Report Number: P1067213

Luminaire Tested: **NAV-SA5A-727-U-T2BC**

Issue Date: 08/07/2025

**Test Information**

Test Method: LM-79-08  
Report Number: P1067213  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/07/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: LUMARK  
Catalog Number: NAV-SA5A-727-U-T2BC  
Description: Navion AREA AND ROADWAY LUMINAIRE 615mA 5xLight Square PACKAGE  
70CRI 2700K FIXTURE w/ TYPE II ANGLED BACKLIGHT CONTROL  
Light Source: (70) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 14599.7 lumens  
Efficiency: N/A  
Efficacy: 106.3 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B0 - U0 - G2

Input Watts (W): 137.4  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.97  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

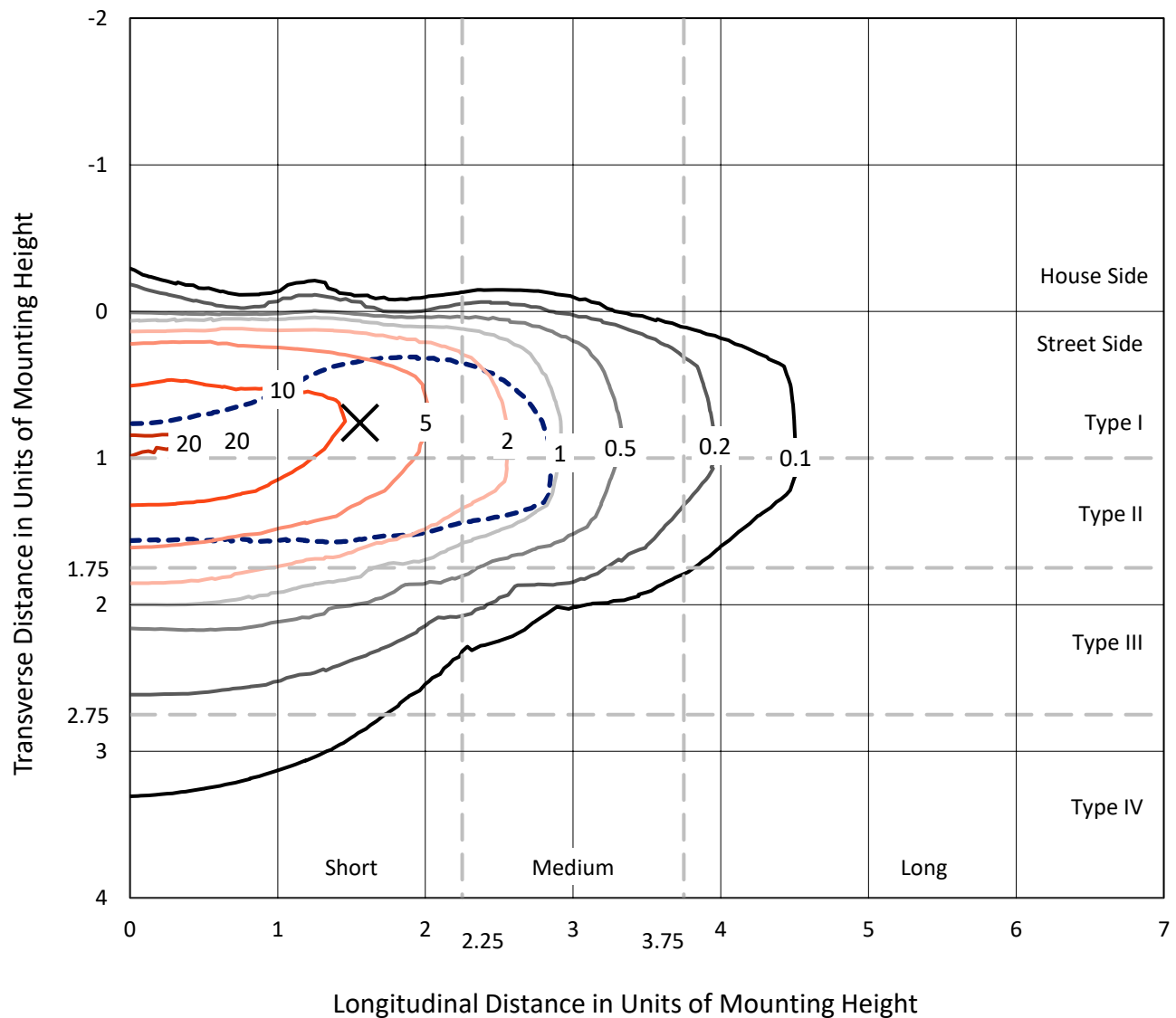


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

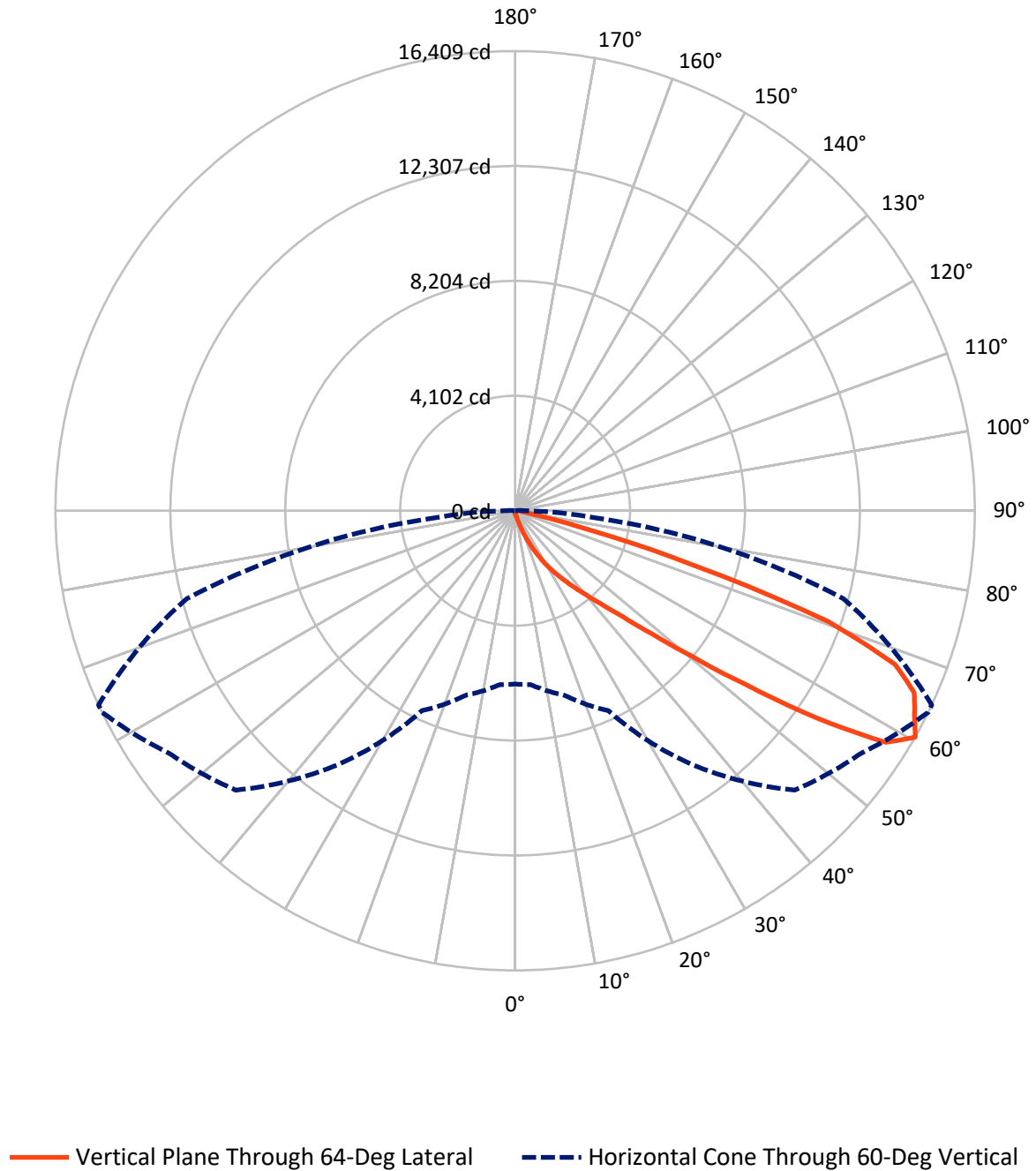


Based on 15 foot mounting height. Maximum calculated value = 20.9 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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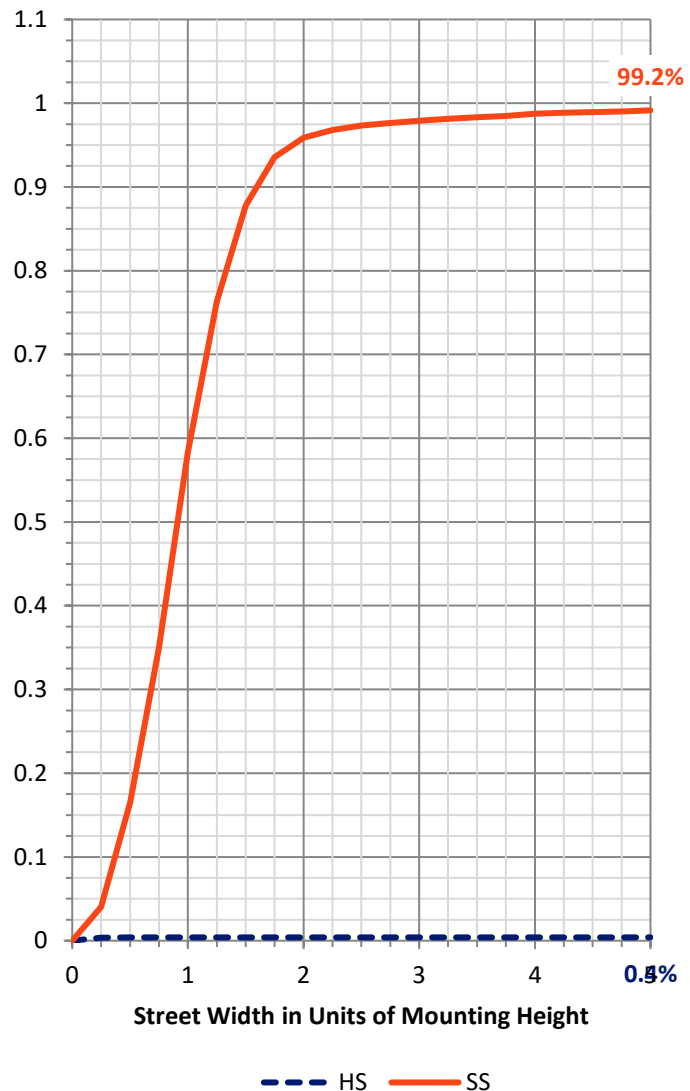
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 59.2     | 0.0    | 59.2    |
|                    | % Fixture | 0.4      | 0.0    | 0.4     |
| <b>Street Side</b> | Lumens    | 14540.5  | 0.0    | 14540.5 |
|                    | % Fixture | 99.6     | 0.0    | 99.6    |
| <b>Total</b>       | Lumens    | 14599.7  | 0.0    | 14599.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 14.5    | 0.1       |
| 10°-20°   | 143.5   | 1.0       |
| 20°-30°   | 476.5   | 3.3       |
| 30°-40°   | 1271.4  | 8.7       |
| 40°-50°   | 3231.7  | 22.1      |
| 50°-60°   | 4711.1  | 32.3      |
| 60°-70°   | 3638.9  | 24.9      |
| 70°-80°   | 999.3   | 6.8       |
| 80°-90°   | 112.8   | 0.8       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 14599.7 | 100.0     |
| 0°-180°   | 14599.7 | 100.0     |



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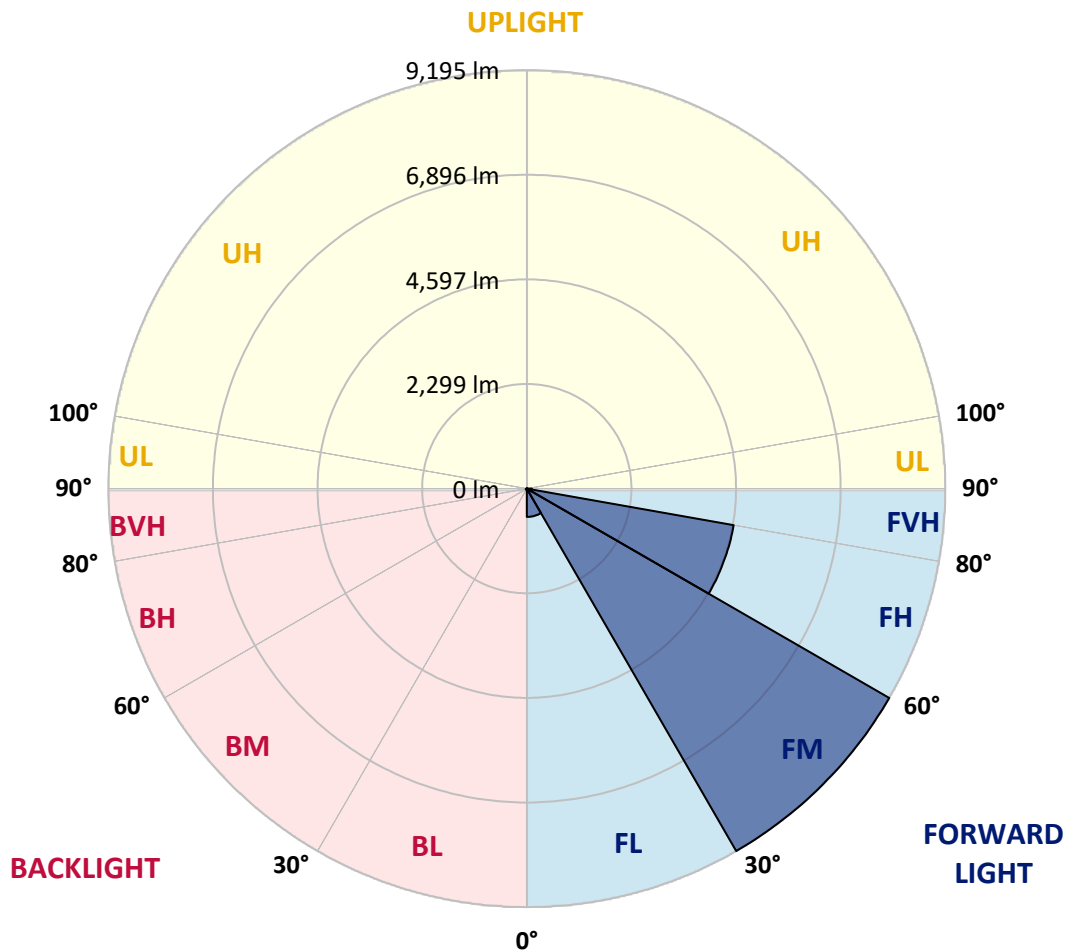
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 621.2  | 4.3       |                         |      |         |
| FM   | (30°-60°)   | 9194.6 | 63.0      |                         |      |         |
| FH   | (60°-80°)   | 4614.6 | 31.6      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 110.1  | 0.8       |                         |      | G2/225  |
| BL   | (0°-30°)    | 13.3   | 0.1       | B0/110                  |      |         |
| BM   | (30°-60°)   | 19.6   | 0.1       | B0/220                  |      |         |
| BH   | (60°-80°)   | 23.6   | 0.2       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 2.7    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B0-U0-G2**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 64°     | 65°     | 75°     | 85°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| 0°    | 96.5    | 96.5    | 96.5    | 96.5    | 96.5    | 96.5    | 96.5    | 96.5    | 96.5    | 96.5    | 96.5   |
| 2.5°  | 128.6   | 128.6   | 128.6   | 124.6   | 120.6   | 120.6   | 116.5   | 112.5   | 112.5   | 104.5   | 100.5  |
| 5°    | 196.9   | 196.9   | 188.9   | 180.8   | 168.8   | 152.7   | 136.6   | 124.6   | 124.6   | 112.5   | 104.5  |
| 7.5°  | 385.8   | 397.9   | 361.7   | 317.5   | 257.2   | 217.0   | 172.8   | 144.7   | 140.7   | 120.6   | 104.5  |
| 10°   | 835.9   | 827.9   | 771.6   | 663.1   | 522.4   | 377.8   | 241.1   | 176.8   | 168.8   | 128.6   | 104.5  |
| 12.5° | 1257.9  | 1269.9  | 1209.7  | 1089.1  | 920.3   | 671.1   | 413.9   | 229.1   | 221.0   | 140.7   | 104.5  |
| 15°   | 1619.6  | 1619.6  | 1579.4  | 1519.1  | 1334.2  | 1073.0  | 667.1   | 341.6   | 313.5   | 152.7   | 100.5  |
| 17.5° | 1868.7  | 1864.7  | 1848.6  | 1832.6  | 1724.1  | 1454.8  | 1020.8  | 546.6   | 482.3   | 180.8   | 100.5  |
| 20°   | 2150.0  | 2138.0  | 2158.1  | 2125.9  | 2041.5  | 1828.5  | 1394.5  | 811.8   | 751.5   | 229.1   | 100.5  |
| 22.5° | 2443.4  | 2455.5  | 2471.5  | 2439.4  | 2347.0  | 2162.1  | 1788.4  | 1153.4  | 1089.1  | 317.5   | 104.5  |
| 25°   | 2817.2  | 2809.1  | 2845.3  | 2817.2  | 2700.6  | 2483.6  | 2158.1  | 1527.1  | 1434.7  | 442.1   | 112.5  |
| 27.5° | 3275.3  | 3259.2  | 3283.3  | 3211.0  | 3058.3  | 2837.3  | 2487.6  | 1908.9  | 1800.4  | 635.0   | 128.6  |
| 30°   | 3882.1  | 3894.2  | 3785.7  | 3701.3  | 3484.3  | 3190.9  | 2853.3  | 2318.8  | 2206.3  | 864.0   | 144.7  |
| 32.5° | 4838.6  | 4754.2  | 4585.4  | 4243.8  | 3958.5  | 3584.7  | 3219.0  | 2676.5  | 2576.0  | 1157.4  | 168.8  |
| 35°   | 6329.6  | 6345.6  | 5975.9  | 5132.0  | 4513.1  | 4079.1  | 3620.9  | 3070.3  | 2998.0  | 1491.0  | 200.9  |
| 37.5° | 8146.1  | 8101.8  | 7776.3  | 6711.4  | 5324.9  | 4693.9  | 4079.1  | 3500.4  | 3395.9  | 1852.7  | 241.1  |
| 40°   | 10203.7 | 10018.8 | 9829.9  | 9106.5  | 7016.8  | 5465.5  | 4657.8  | 3998.7  | 3918.3  | 2270.6  | 305.4  |
| 42.5° | 11851.4 | 11803.1 | 11835.3 | 11533.9 | 9838.0  | 6779.7  | 5425.3  | 4609.5  | 4513.1  | 2789.0  | 418.0  |
| 45°   | 12663.2 | 12594.8 | 12787.7 | 13012.8 | 12578.8 | 9576.7  | 6663.1  | 5389.2  | 5260.6  | 3399.9  | 590.8  |
| 47.5° | 12446.1 | 12397.9 | 12811.9 | 13253.9 | 13832.6 | 12819.9 | 8684.6  | 6554.6  | 6333.6  | 4183.5  | 848.0  |
| 50°   | 11377.1 | 11381.2 | 12060.3 | 12884.2 | 13800.5 | 14463.6 | 11678.6 | 8150.1  | 7872.8  | 5224.4  | 1249.8 |
| 52.5° | 10336.3 | 10368.4 | 11087.8 | 12289.4 | 13322.2 | 14656.5 | 14306.8 | 10300.1 | 9850.0  | 6450.1  | 1724.1 |
| 55°   | 9267.3  | 9283.4  | 9918.3  | 11610.2 | 13097.2 | 14081.8 | 15657.1 | 13069.1 | 12590.8 | 7977.3  | 2186.2 |
| 57.5° | 8238.5  | 8238.5  | 8475.6  | 9978.6  | 12852.0 | 14029.5 | 15496.4 | 15600.9 | 15211.1 | 9721.4  | 2527.8 |
| 60°   | 6188.9  | 6229.1  | 6819.9  | 7872.8  | 11083.8 | 14105.9 | 15086.5 | 16408.7 | 16408.7 | 12140.7 | 2789.0 |
| 62.5° | 3126.6  | 3186.9  | 3922.3  | 4947.1  | 7603.5  | 13053.0 | 15150.8 | 16002.8 | 16067.1 | 14274.7 | 3383.8 |
| 65°   | 1466.9  | 1535.2  | 1929.0  | 2652.4  | 4091.1  | 9186.9  | 14483.7 | 15657.1 | 15637.0 | 13868.8 | 4637.7 |
| 67.5° | 1052.9  | 1073.0  | 1205.6  | 1547.2  | 2202.3  | 4026.8  | 11055.6 | 14624.3 | 14632.4 | 11783.0 | 5332.9 |
| 70°   | 944.4   | 944.4   | 976.6   | 1077.0  | 1326.2  | 1800.4  | 5373.1  | 11843.3 | 12418.0 | 9098.5  | 4943.1 |
| 72.5° | 932.4   | 924.3   | 916.3   | 920.3   | 896.2   | 904.2   | 1844.6  | 6687.2  | 7507.1  | 6365.7  | 3942.4 |
| 75°   | 908.2   | 908.2   | 900.2   | 872.1   | 715.3   | 582.7   | 635.0   | 2704.6  | 3126.6  | 4251.9  | 2925.7 |
| 77.5° | 719.4   | 791.7   | 876.1   | 823.8   | 655.1   | 438.0   | 369.7   | 783.7   | 988.6   | 2608.2  | 2121.9 |
| 80°   | 333.6   | 337.6   | 333.6   | 349.6   | 418.0   | 313.5   | 273.3   | 381.8   | 385.8   | 1446.8  | 1314.1 |
| 82.5° | 241.1   | 245.1   | 233.1   | 209.0   | 184.9   | 168.8   | 225.1   | 281.3   | 301.4   | 663.1   | 490.3  |
| 85°   | 72.3    | 68.3    | 80.4    | 108.5   | 128.6   | 148.7   | 188.9   | 237.1   | 249.2   | 245.1   | 72.3   |
| 87.5° | 32.2    | 32.2    | 40.2    | 56.3    | 76.4    | 112.5   | 164.8   | 217.0   | 221.0   | 253.2   | 20.1   |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0    |



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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|-------|------|------|------|------|------|------|------|------|------|
| 0°    | 96.5   | 96.5  | 96.5 | 96.5 | 96.5 | 96.5 | 96.5 | 96.5 | 96.5 | 96.5 | 96.5 |
| 2.5°  | 100.5  | 96.5  | 92.4 | 88.4 | 84.4 | 80.4 | 76.4 | 76.4 | 80.4 | 80.4 | 80.4 |
| 5°    | 96.5   | 92.4  | 84.4 | 76.4 | 72.3 | 68.3 | 64.3 | 64.3 | 68.3 | 68.3 | 68.3 |
| 7.5°  | 96.5   | 88.4  | 80.4 | 72.3 | 64.3 | 60.3 | 56.3 | 56.3 | 56.3 | 60.3 | 60.3 |
| 10°   | 96.5   | 88.4  | 76.4 | 64.3 | 56.3 | 52.2 | 48.2 | 44.2 | 48.2 | 48.2 | 48.2 |
| 12.5° | 92.4   | 84.4  | 72.3 | 60.3 | 48.2 | 40.2 | 36.2 | 36.2 | 36.2 | 36.2 | 36.2 |
| 15°   | 88.4   | 80.4  | 68.3 | 52.2 | 40.2 | 32.2 | 24.1 | 24.1 | 24.1 | 28.1 | 28.1 |
| 17.5° | 84.4   | 76.4  | 60.3 | 40.2 | 28.1 | 20.1 | 16.1 | 16.1 | 16.1 | 20.1 | 20.1 |
| 20°   | 84.4   | 72.3  | 52.2 | 32.2 | 20.1 | 12.1 | 8.0  | 8.0  | 8.0  | 12.1 | 16.1 |
| 22.5° | 84.4   | 72.3  | 48.2 | 24.1 | 12.1 | 8.0  | 4.0  | 4.0  | 4.0  | 4.0  | 4.0  |
| 25°   | 84.4   | 68.3  | 44.2 | 20.1 | 8.0  | 4.0  | 0.0  | 0.0  | 4.0  | 8.0  | 12.1 |
| 27.5° | 84.4   | 64.3  | 36.2 | 12.1 | 8.0  | 4.0  | 0.0  | 4.0  | 8.0  | 8.0  | 8.0  |
| 30°   | 84.4   | 64.3  | 32.2 | 12.1 | 4.0  | 0.0  | 0.0  | 4.0  | 8.0  | 8.0  | 12.1 |
| 32.5° | 88.4   | 60.3  | 28.1 | 8.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 35°   | 92.4   | 56.3  | 24.1 | 8.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 37.5° | 100.5  | 56.3  | 16.1 | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 40°   | 112.5  | 60.3  | 16.1 | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 42.5° | 140.7  | 64.3  | 12.1 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 45°   | 196.9  | 80.4  | 12.1 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 47.5° | 289.4  | 120.6 | 12.1 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 50°   | 422.0  | 164.8 | 8.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 52.5° | 518.4  | 164.8 | 8.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 55°   | 514.4  | 104.5 | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 57.5° | 393.8  | 72.3  | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 60°   | 333.6  | 52.2  | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 62.5° | 401.9  | 40.2  | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 65°   | 715.3  | 36.2  | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 67.5° | 1149.4 | 36.2  | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 70°   | 1286.0 | 36.2  | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 72.5° | 1004.7 | 32.2  | 4.0  | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 75°   | 550.6  | 28.1  | 4.0  | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 77.5° | 277.3  | 20.1  | 8.0  | 4.0  | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 80°   | 116.5  | 16.1  | 8.0  | 4.0  | 4.0  | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 82.5° | 40.2   | 16.1  | 8.0  | 8.0  | 4.0  | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 85°   | 20.1   | 12.1  | 12.1 | 8.0  | 8.0  | 4.0  | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 87.5° | 12.1   | 12.1  | 12.1 | 8.0  | 8.0  | 4.0  | 4.0  | 0.0  | 0.0  | 0.0  | 4.0  |
| 90°   | 0.0    | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |

LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGraw-Edison

Report Number: SP1-2407-184-3

Test Date: 10/09/2024

Luminaire Tested: GSS-SB1A-727-U-5WQ

Data in this report applies to families of products including GSS-SB1A-727-U-5WQ

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-184-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/15/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGraw-Edison  
 Catalog Number: **GSS-SB1A-727-U-5WQ**  
 Description: GALLEON II SITE SLIM 1SQ 350MA 5WQ HIGH DENSITY LIGHTSQUARE WITH 70 CRI  
 2700K CCT 26 LEDS

### Spectral Parameters

|                           |          |           |      |      |       |
|---------------------------|----------|-----------|------|------|-------|
| CCT (K):                  | 2672     | CRI (Ra): | 71.1 |      |       |
| CIE u':                   | 0.2638   | R1:       | 68.3 | R9:  | -27.8 |
| CIE v':                   | 0.5276   | R2:       | 79.8 | R10: | 54.4  |
| Duv:                      | -0.0002  | R3:       | 91.2 | R11: | 65.8  |
| CIE x:                    | 0.4619   | R4:       | 69.4 | R12: | 45.6  |
| CIE y:                    | 0.4106   | R5:       | 66.5 | R13: | 69.8  |
| CIE z:                    | 0.1275   | R6:       | 72.6 | R14: | 94.5  |
| Peak Wavelength (nm):     | 601      | R7:       | 77.0 | R15: | 60.1  |
| Dominant Wavelength (nm): | 584      | R8:       | 44.1 |      |       |
| Purity:                   | 61.88407 |           |      |      |       |
| Rf:                       | 67.9     |           |      |      |       |
| Rg:                       | 98.6     |           |      |      |       |



### Test Conditions

Stabilization Time: 21M  
 Operation Time: 1H 21M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-184-3

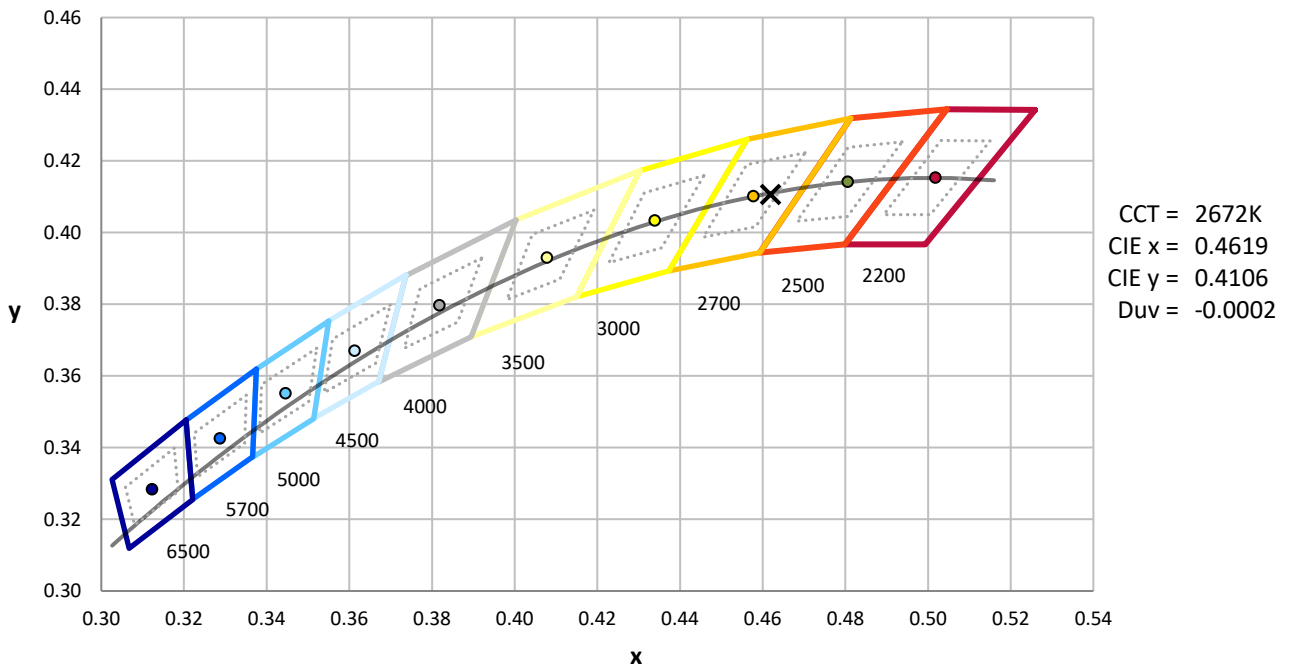
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

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**CIE 1931 Chromaticity Diagram**



**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength



### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 52                                   | NR                             | 620               | 888                                  | NR                             | 750               | 27                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 87                                   | NR                             | 625               | 834                                  | NR                             | 755               | 23                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 135                                  | NR                             | 630               | 776                                  | NR                             | 760               | 20                                   | NR                             | 890               | 1                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 196                                  | NR                             | 635               | 712                                  | NR                             | 765               | 17                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 258                                  | NR                             | 640               | 648                                  | NR                             | 770               | 15                                   | NR                             | 900               | 0                                    | NR                             |
| 385               | 1                                    | NR                             | 515               | 317                                  | NR                             | 645               | 583                                  | NR                             | 775               | 12                                   | NR                             | 905               | 0                                    | NR                             |
| 390               | 2                                    | NR                             | 520               | 368                                  | NR                             | 650               | 523                                  | NR                             | 780               | 11                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 4                                    | NR                             | 525               | 408                                  | NR                             | 655               | 465                                  | NR                             | 785               | 9                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 6                                    | NR                             | 530               | 443                                  | NR                             | 660               | 410                                  | NR                             | 790               | 8                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 11                                   | NR                             | 535               | 473                                  | NR                             | 665               | 360                                  | NR                             | 795               | 7                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 23                                   | NR                             | 540               | 498                                  | NR                             | 670               | 313                                  | NR                             | 800               | 6                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 51                                   | NR                             | 545               | 530                                  | NR                             | 675               | 272                                  | NR                             | 805               | 5                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 111                                  | NR                             | 550               | 563                                  | NR                             | 680               | 236                                  | NR                             | 810               | 4                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 214                                  | NR                             | 555               | 605                                  | NR                             | 685               | 203                                  | NR                             | 815               | 4                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 339                                  | NR                             | 560               | 651                                  | NR                             | 690               | 175                                  | NR                             | 820               | 3                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 467                                  | NR                             | 565               | 705                                  | NR                             | 695               | 150                                  | NR                             | 825               | 3                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 535                                  | NR                             | 570               | 765                                  | NR                             | 700               | 128                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 372                                  | NR                             | 575               | 824                                  | NR                             | 705               | 110                                  | NR                             | 835               | 2                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 160                                  | NR                             | 580               | 882                                  | NR                             | 710               | 94                                   | NR                             | 840               | 2                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 89                                   | NR                             | 585               | 930                                  | NR                             | 715               | 80                                   | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 53                                   | NR                             | 590               | 968                                  | NR                             | 720               | 69                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 31                                   | NR                             | 595               | 991                                  | NR                             | 725               | 59                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 23                                   | NR                             | 600               | 999                                  | NR                             | 730               | 50                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 21                                   | NR                             | 605               | 992                                  | NR                             | 735               | 43                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 23                                   | NR                             | 610               | 969                                  | NR                             | 740               | 36                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 32                                   | NR                             | 615               | 935                                  | NR                             | 745               | 31                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



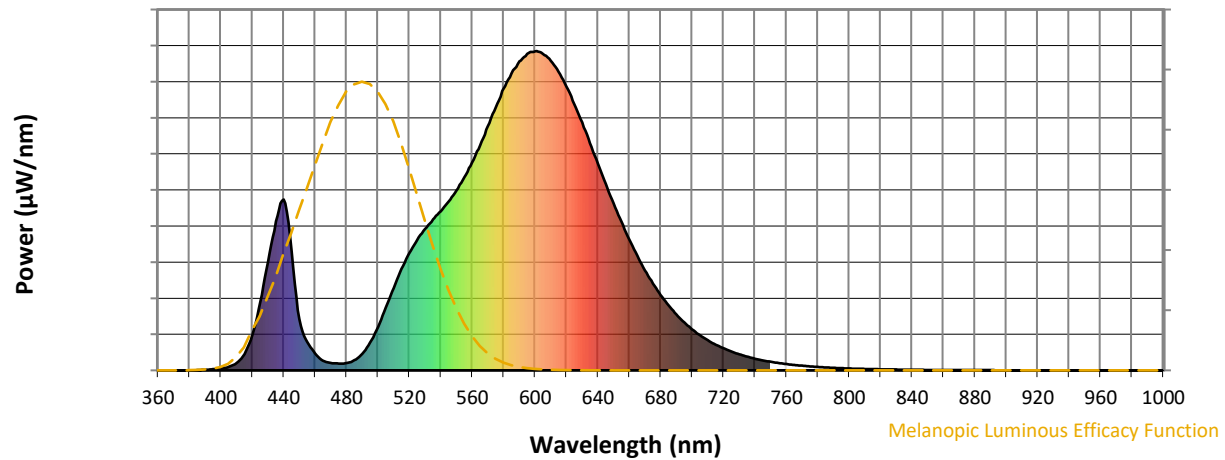
Scotopic Lumens: NR

S/P: 1.02

| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 52                          | NR               | 620       | 888                         | NR               | 750       | 27                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 87                          | NR               | 625       | 834                         | NR               | 755       | 23                          | NR               | 885       | 1                           | NR               |
| 370       | 0                           | NR               | 500       | 135                         | NR               | 630       | 776                         | NR               | 760       | 20                          | NR               | 890       | 1                           | NR               |
| 375       | 0                           | NR               | 505       | 196                         | NR               | 635       | 712                         | NR               | 765       | 17                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 258                         | NR               | 640       | 648                         | NR               | 770       | 15                          | NR               | 900       | 0                           | NR               |
| 385       | 1                           | NR               | 515       | 317                         | NR               | 645       | 583                         | NR               | 775       | 12                          | NR               | 905       | 0                           | NR               |
| 390       | 2                           | NR               | 520       | 368                         | NR               | 650       | 523                         | NR               | 780       | 11                          | NR               | 910       | 0                           | NR               |
| 395       | 4                           | NR               | 525       | 408                         | NR               | 655       | 465                         | NR               | 785       | 9                           | NR               | 915       | 0                           | NR               |
| 400       | 6                           | NR               | 530       | 443                         | NR               | 660       | 410                         | NR               | 790       | 8                           | NR               | 920       | 0                           | NR               |
| 405       | 11                          | NR               | 535       | 473                         | NR               | 665       | 360                         | NR               | 795       | 7                           | NR               | 925       | 0                           | NR               |
| 410       | 23                          | NR               | 540       | 498                         | NR               | 670       | 313                         | NR               | 800       | 6                           | NR               | 930       | 0                           | NR               |
| 415       | 51                          | NR               | 545       | 530                         | NR               | 675       | 272                         | NR               | 805       | 5                           | NR               | 935       | 0                           | NR               |
| 420       | 111                         | NR               | 550       | 563                         | NR               | 680       | 236                         | NR               | 810       | 4                           | NR               | 940       | 0                           | NR               |
| 425       | 214                         | NR               | 555       | 605                         | NR               | 685       | 203                         | NR               | 815       | 4                           | NR               | 945       | 0                           | NR               |
| 430       | 339                         | NR               | 560       | 651                         | NR               | 690       | 175                         | NR               | 820       | 3                           | NR               | 950       | 0                           | NR               |
| 435       | 467                         | NR               | 565       | 705                         | NR               | 695       | 150                         | NR               | 825       | 3                           | NR               | 955       | 0                           | NR               |
| 440       | 535                         | NR               | 570       | 765                         | NR               | 700       | 128                         | NR               | 830       | 3                           | NR               | 960       | 0                           | NR               |
| 445       | 372                         | NR               | 575       | 824                         | NR               | 705       | 110                         | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 160                         | NR               | 580       | 882                         | NR               | 710       | 94                          | NR               | 840       | 2                           | NR               | 970       | 0                           | NR               |
| 455       | 89                          | NR               | 585       | 930                         | NR               | 715       | 80                          | NR               | 845       | 2                           | NR               | 975       | 0                           | NR               |
| 460       | 53                          | NR               | 590       | 968                         | NR               | 720       | 69                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 31                          | NR               | 595       | 991                         | NR               | 725       | 59                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 23                          | NR               | 600       | 999                         | NR               | 730       | 50                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 21                          | NR               | 605       | 992                         | NR               | 735       | 43                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 23                          | NR               | 610       | 969                         | NR               | 740       | 36                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 32                          | NR               | 615       | 935                         | NR               | 745       | 31                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 1.71

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 52                                   | NR                             | 620               | 888                                  | NR                             | 750               | 27                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 87                                   | NR                             | 625               | 834                                  | NR                             | 755               | 23                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 135                                  | NR                             | 630               | 776                                  | NR                             | 760               | 20                                   | NR                             | 890               | 1                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 196                                  | NR                             | 635               | 712                                  | NR                             | 765               | 17                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 258                                  | NR                             | 640               | 648                                  | NR                             | 770               | 15                                   | NR                             | 900               | 0                                    | NR                             |
| 385               | 1                                    | NR                             | 515               | 317                                  | NR                             | 645               | 583                                  | NR                             | 775               | 12                                   | NR                             | 905               | 0                                    | NR                             |
| 390               | 2                                    | NR                             | 520               | 368                                  | NR                             | 650               | 523                                  | NR                             | 780               | 11                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 4                                    | NR                             | 525               | 408                                  | NR                             | 655               | 465                                  | NR                             | 785               | 9                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 6                                    | NR                             | 530               | 443                                  | NR                             | 660               | 410                                  | NR                             | 790               | 8                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 11                                   | NR                             | 535               | 473                                  | NR                             | 665               | 360                                  | NR                             | 795               | 7                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 23                                   | NR                             | 540               | 498                                  | NR                             | 670               | 313                                  | NR                             | 800               | 6                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 51                                   | NR                             | 545               | 530                                  | NR                             | 675               | 272                                  | NR                             | 805               | 5                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 111                                  | NR                             | 550               | 563                                  | NR                             | 680               | 236                                  | NR                             | 810               | 4                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 214                                  | NR                             | 555               | 605                                  | NR                             | 685               | 203                                  | NR                             | 815               | 4                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 339                                  | NR                             | 560               | 651                                  | NR                             | 690               | 175                                  | NR                             | 820               | 3                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 467                                  | NR                             | 565               | 705                                  | NR                             | 695               | 150                                  | NR                             | 825               | 3                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 535                                  | NR                             | 570               | 765                                  | NR                             | 700               | 128                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 372                                  | NR                             | 575               | 824                                  | NR                             | 705               | 110                                  | NR                             | 835               | 2                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 160                                  | NR                             | 580               | 882                                  | NR                             | 710               | 94                                   | NR                             | 840               | 2                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 89                                   | NR                             | 585               | 930                                  | NR                             | 715               | 80                                   | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 53                                   | NR                             | 590               | 968                                  | NR                             | 720               | 69                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 31                                   | NR                             | 595               | 991                                  | NR                             | 725               | 59                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 23                                   | NR                             | 600               | 999                                  | NR                             | 730               | 50                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 21                                   | NR                             | 605               | 992                                  | NR                             | 735               | 43                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 23                                   | NR                             | 610               | 969                                  | NR                             | 740               | 36                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 32                                   | NR                             | 615               | 935                                  | NR                             | 745               | 31                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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TM-30-18

### Summary

$R_f = 67.9$   
 $R_g = 98.6$   
 $CIE R_a = 71.1$   
 $R_g = -27.8$

### Spectral Power Distribution Comparison



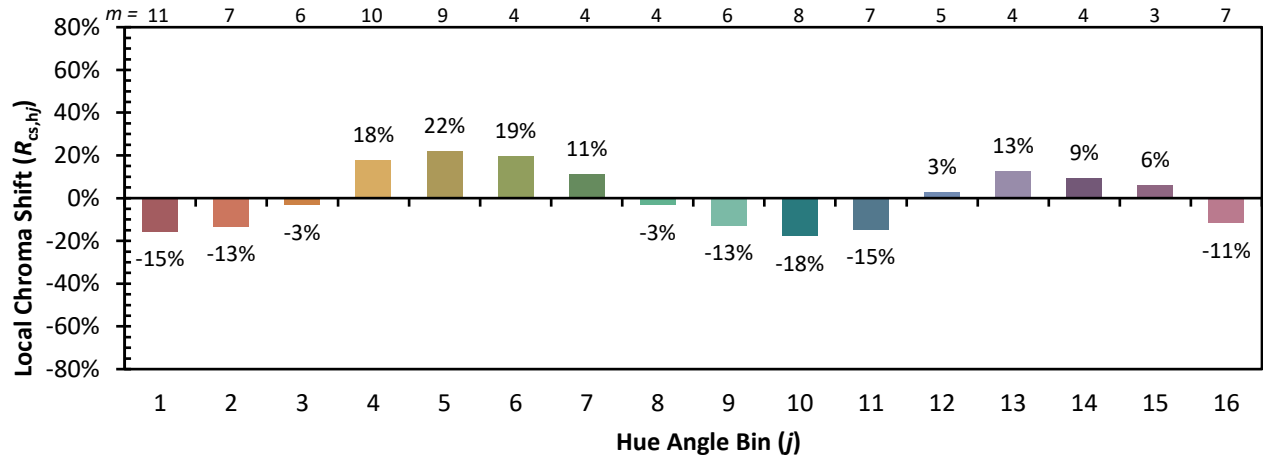
### Color Vector Graphics



**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 53 | CES51 = 75 | CES76 = 51 |
| CES02 = 63 | CES27 = 70 | CES52 = 80 | CES77 = 79 |
| CES03 = 31 | CES28 = 81 | CES53 = 64 | CES78 = 58 |
| CES04 = 71 | CES29 = 37 | CES54 = 73 | CES79 = 82 |
| CES05 = 50 | CES30 = 33 | CES55 = 69 | CES80 = 82 |
| CES06 = 52 | CES31 = 44 | CES56 = 60 | CES81 = 69 |
| CES07 = 42 | CES32 = 47 | CES57 = 54 | CES82 = 92 |
| CES08 = 41 | CES33 = 45 | CES58 = 59 | CES83 = 82 |
| CES09 = 29 | CES34 = 67 | CES59 = 85 | CES84 = 92 |
| CES10 = 77 | CES35 = 84 | CES60 = 86 | CES85 = 87 |
| CES11 = 60 | CES36 = 68 | CES61 = 86 | CES86 = 60 |
| CES12 = 66 | CES37 = 77 | CES62 = 59 | CES87 = 79 |
| CES13 = 44 | CES38 = 40 | CES63 = 66 | CES88 = 70 |
| CES14 = 74 | CES39 = 88 | CES64 = 69 | CES89 = 66 |
| CES15 = 72 | CES40 = 82 | CES65 = 64 | CES90 = 64 |
| CES16 = 48 | CES41 = 70 | CES66 = 65 | CES91 = 81 |
| CES17 = 51 | CES42 = 76 | CES67 = 64 | CES92 = 69 |
| CES18 = 57 | CES43 = 63 | CES68 = 73 | CES93 = 81 |
| CES19 = 73 | CES44 = 97 | CES69 = 83 | CES94 = 53 |
| CES20 = 67 | CES45 = 74 | CES70 = 64 | CES95 = 77 |
| CES21 = 88 | CES46 = 67 | CES71 = 60 | CES96 = 79 |
| CES22 = 80 | CES47 = 55 | CES72 = 87 | CES97 = 78 |
| CES23 = 92 | CES48 = 42 | CES73 = 57 | CES98 = 69 |
| CES24 = 92 | CES49 = 65 | CES74 = 84 | CES99 = 60 |
| CES25 = 73 | CES50 = 74 | CES75 = 60 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)