

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: P1067575

Luminaire Tested: **NAV-SA5C-827-U-T4BC**

Issue Date: 08/07/2025

**Test Information**

Test Method: LM-79-08  
Report Number: P1067575  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/07/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: LUMARK  
Catalog Number: NAV-SA5C-827-U-T4BC  
Description: Navion AREA AND ROADWAY LUMINAIRE 1050mA 5xLight Square PACKAGE  
80CRI 2700K FIXTURE w/ TYPE IV ANGLED BACKLIGHT CONTROL  
Light Source: (70) 2700K CCT, 80 CRI LEDs  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 20255.8 lumens  
Efficiency: N/A  
Efficacy: 85.8 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B0 - U0 - G4

Input Watts (W): 236  
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

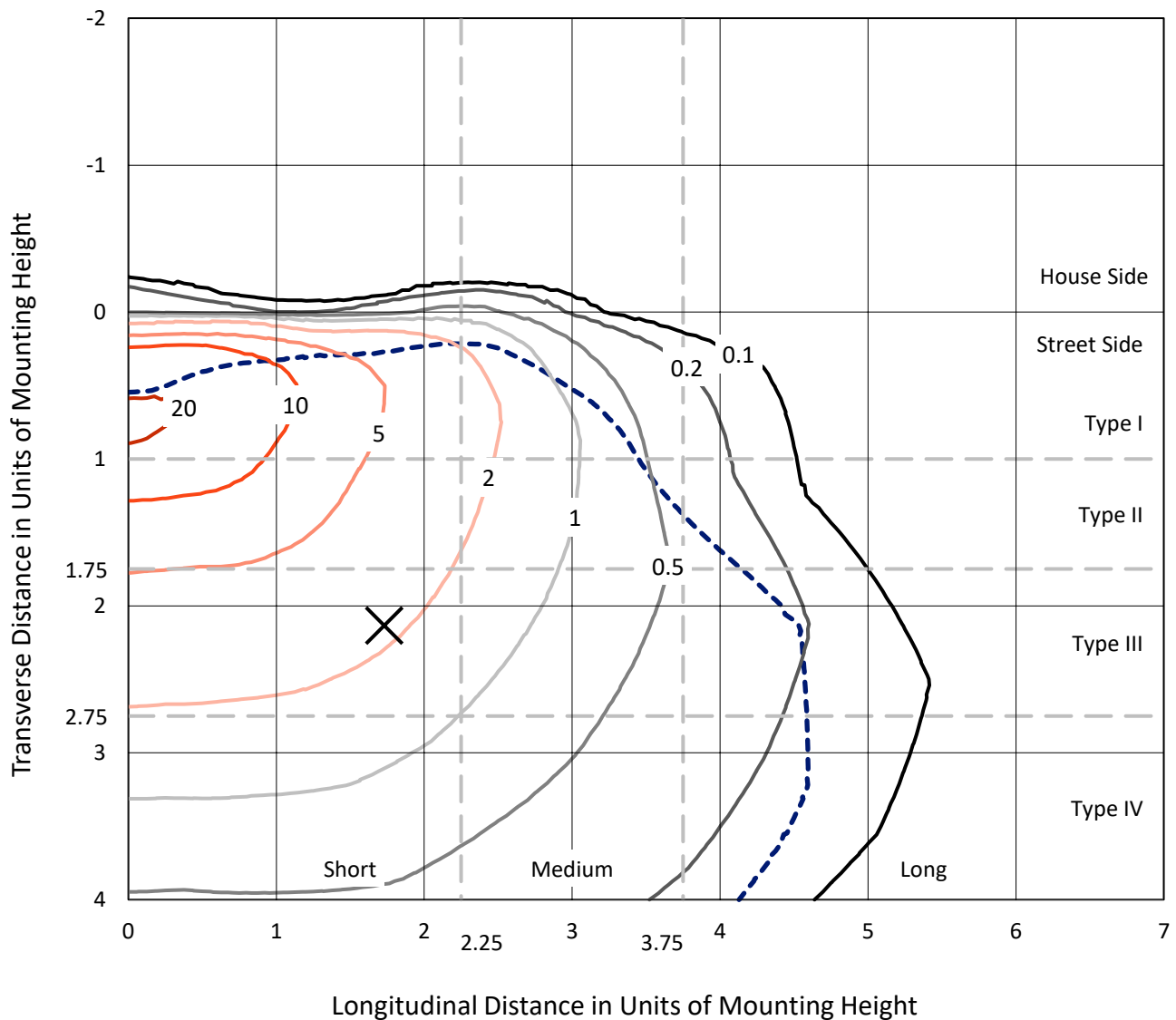


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

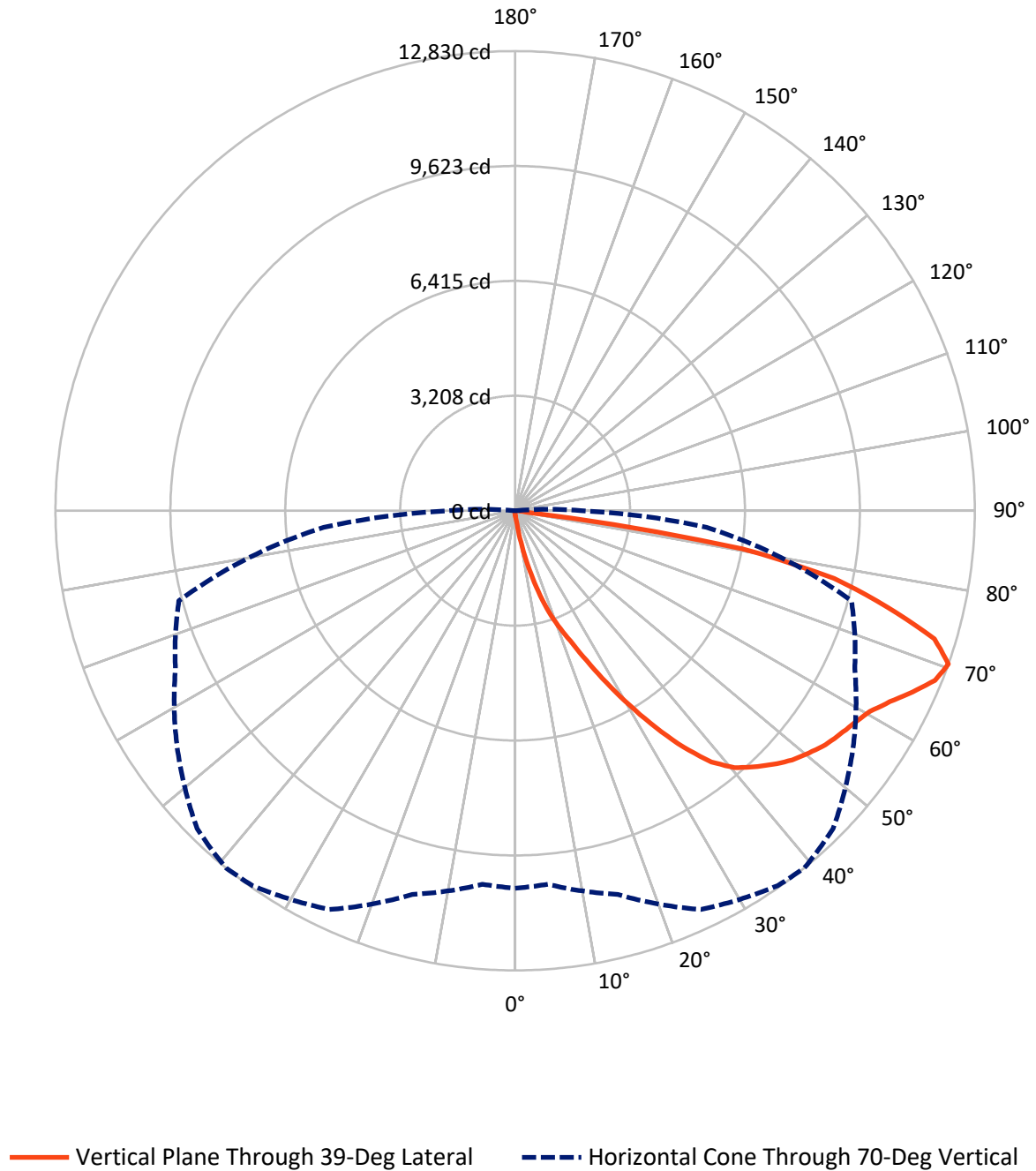


Based on 15 foot mounting height. Maximum calculated value = 22.1 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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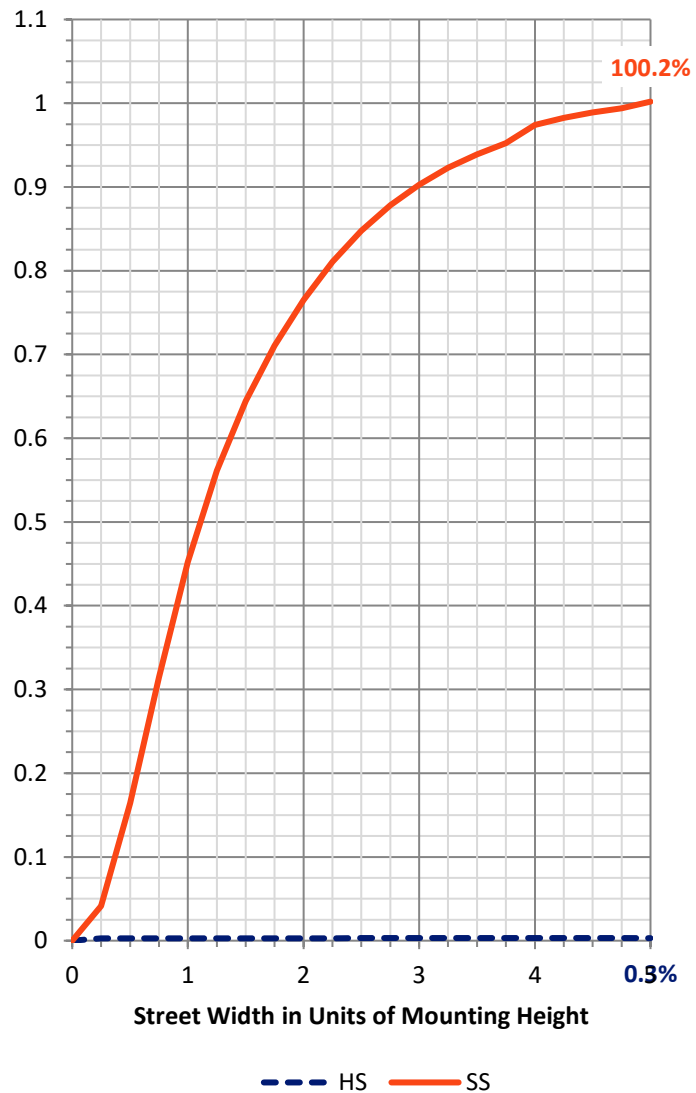
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 62.4     | 0.0    | 62.4    |
|                    | % Fixture | 0.3      | 0.0    | 0.3     |
| <b>Street Side</b> | Lumens    | 20193.4  | 0.0    | 20193.4 |
|                    | % Fixture | 99.7     | 0.0    | 99.7    |
| <b>Total</b>       | Lumens    | 20255.8  | 0.0    | 20255.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 21.3    | 0.1       |
| 10°-20°   | 249.0   | 1.2       |
| 20°-30°   | 845.0   | 4.2       |
| 30°-40°   | 1986.0  | 9.8       |
| 40°-50°   | 3224.9  | 15.9      |
| 50°-60°   | 4086.5  | 20.2      |
| 60°-70°   | 5191.0  | 25.6      |
| 70°-80°   | 4217.7  | 20.8      |
| 80°-90°   | 434.3   | 2.1       |
| 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°    | 20255.8 | 100.0     |
| 0°-180°   | 20255.8 | 100.0     |



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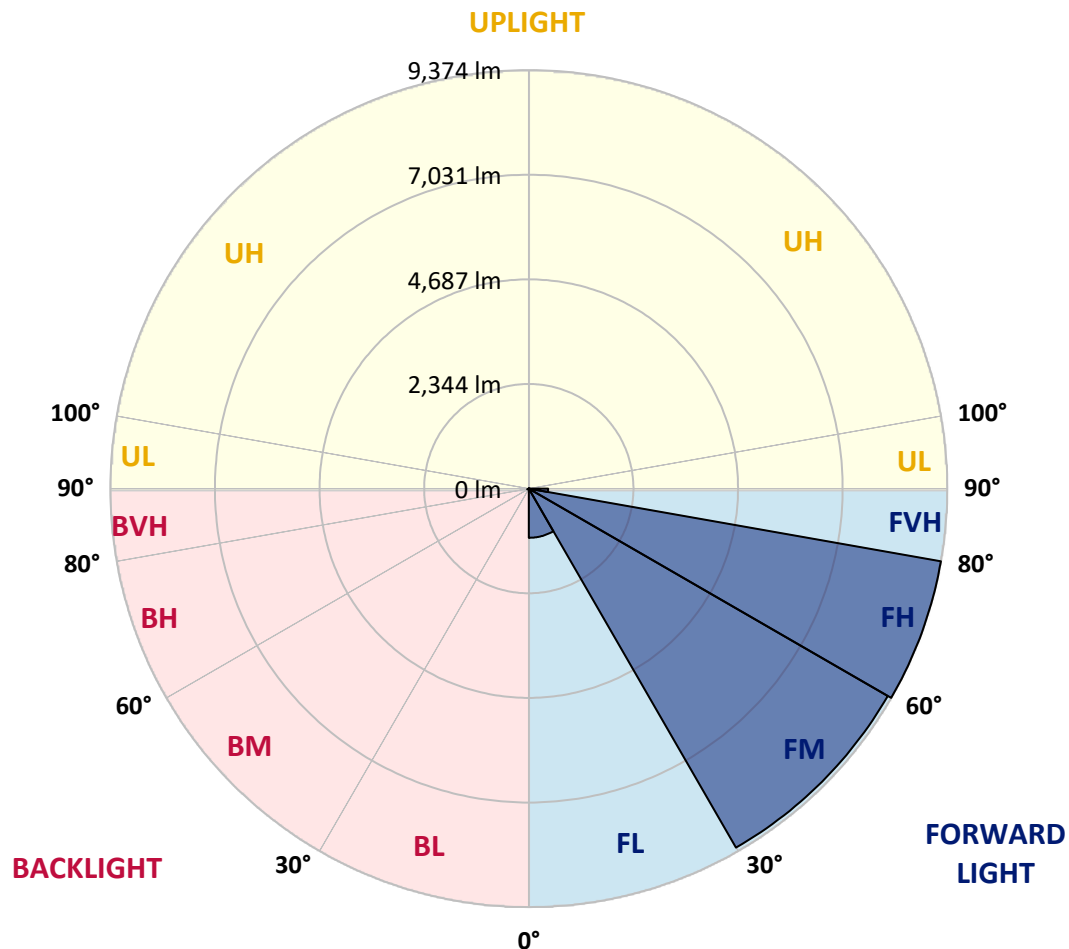
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1101.9 | 5.4       |                         |      |          |
| FM   | (30°-60°)   | 9285.4 | 45.8      |                         |      |          |
| FH   | (60°-80°)   | 9374.4 | 46.3      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 431.7  | 2.1       |                         |      | G3/500   |
| BL   | (0°-30°)    | 13.5   | 0.1       | B0/110                  |      |          |
| BM   | (30°-60°)   | 12.0   | 0.1       | B0/220                  |      |          |
| BH   | (60°-80°)   | 34.3   | 0.2       | B0/110                  |      | G0/110   |
| BVH  | (80°-90°)   | 2.6    | 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-G4**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 39°     | 45°     | 55°     | 65°     | 75°     | 85°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| 0°    | 110.0   | 110.0   | 110.0   | 110.0   | 110.0   | 110.0   | 110.0   | 110.0   | 110.0   | 110.0   | 110.0  |
| 2.5°  | 143.0   | 143.0   | 143.0   | 137.5   | 137.5   | 132.0   | 132.0   | 126.5   | 121.0   | 121.0   | 115.5  |
| 5°    | 269.5   | 275.0   | 258.5   | 225.5   | 203.5   | 192.5   | 181.5   | 154.0   | 137.5   | 126.5   | 115.5  |
| 7.5°  | 736.9   | 714.9   | 681.9   | 571.9   | 439.9   | 374.0   | 319.0   | 225.5   | 165.0   | 132.0   | 115.5  |
| 10°   | 1550.8  | 1490.3  | 1396.8  | 1248.4  | 989.9   | 885.4   | 687.4   | 412.5   | 231.0   | 148.5   | 115.5  |
| 12.5° | 2276.7  | 2287.7  | 2172.3  | 2029.3  | 1715.8  | 1539.8  | 1270.4  | 775.4   | 363.0   | 176.0   | 115.5  |
| 15°   | 2826.7  | 2815.7  | 2771.7  | 2656.2  | 2375.7  | 2205.2  | 1963.3  | 1303.4  | 610.4   | 220.0   | 121.0  |
| 17.5° | 3261.1  | 3217.1  | 3200.6  | 3151.1  | 2969.7  | 2876.2  | 2612.2  | 1919.3  | 967.9   | 297.0   | 126.5  |
| 20°   | 3695.6  | 3684.6  | 3668.1  | 3613.1  | 3492.1  | 3426.1  | 3222.6  | 2540.7  | 1440.8  | 423.5   | 137.5  |
| 22.5° | 4328.0  | 4267.5  | 4278.5  | 4157.5  | 4058.5  | 3943.0  | 3778.1  | 3200.6  | 1985.3  | 604.9   | 154.0  |
| 25°   | 5070.4  | 5064.9  | 4976.9  | 4921.9  | 4757.0  | 4630.5  | 4410.5  | 3838.6  | 2590.2  | 874.4   | 170.5  |
| 27.5° | 5944.8  | 5884.3  | 5845.8  | 5752.3  | 5581.9  | 5438.9  | 5136.4  | 4471.0  | 3244.6  | 1176.9  | 192.5  |
| 30°   | 6857.7  | 6857.7  | 6786.2  | 6643.2  | 6478.3  | 6302.3  | 5994.3  | 5136.4  | 3893.6  | 1561.8  | 220.0  |
| 32.5° | 7924.6  | 7946.6  | 7770.6  | 7556.1  | 7341.7  | 7220.7  | 6819.2  | 5889.8  | 4515.0  | 2001.8  | 253.0  |
| 35°   | 8958.5  | 8931.0  | 8639.5  | 8403.0  | 8243.6  | 8111.6  | 7770.6  | 6714.7  | 5218.9  | 2513.2  | 297.0  |
| 37.5° | 9948.4  | 9876.9  | 9392.9  | 9057.5  | 8986.0  | 8898.0  | 8557.0  | 7539.6  | 5917.3  | 3079.6  | 352.0  |
| 40°   | 10657.8 | 10547.8 | 10047.3 | 9585.4  | 9480.9  | 9431.4  | 9167.4  | 8287.5  | 6654.2  | 3712.1  | 423.5  |
| 42.5° | 10965.7 | 10839.3 | 10492.8 | 10118.8 | 9887.9  | 9772.4  | 9541.4  | 8898.0  | 7391.2  | 4416.0  | 527.9  |
| 45°   | 11026.2 | 10927.2 | 10679.8 | 10591.8 | 10278.3 | 10102.3 | 9788.9  | 9332.4  | 8078.6  | 5114.4  | 670.9  |
| 47.5° | 10806.3 | 10762.3 | 10613.8 | 10800.8 | 10641.3 | 10399.3 | 10019.8 | 9656.9  | 8689.0  | 5961.3  | 868.9  |
| 50°   | 10267.3 | 10234.3 | 10305.8 | 10795.3 | 10905.2 | 10630.3 | 10272.8 | 9909.9  | 9216.9  | 6835.7  | 1149.4 |
| 52.5° | 9541.4  | 9535.9  | 9871.4  | 10652.3 | 11020.7 | 10850.3 | 10520.3 | 10162.8 | 9634.9  | 7682.6  | 1545.3 |
| 55°   | 8749.5  | 8843.0  | 9431.4  | 10520.3 | 11086.7 | 11009.7 | 10762.3 | 10388.3 | 10008.9 | 8469.0  | 2183.2 |
| 57.5° | 8683.5  | 8645.0  | 9211.4  | 10465.3 | 11125.2 | 11169.2 | 11004.2 | 10624.8 | 10327.8 | 9112.5  | 3035.7 |
| 60°   | 9343.4  | 9255.4  | 9469.9  | 10580.8 | 11295.7 | 11372.7 | 11246.2 | 10806.3 | 10646.8 | 9618.4  | 4157.5 |
| 62.5° | 10107.8 | 10025.3 | 10135.3 | 11026.2 | 11631.2 | 11741.2 | 11581.7 | 10993.2 | 10905.2 | 9970.4  | 5361.9 |
| 65°   | 10718.3 | 10652.3 | 10861.3 | 11691.7 | 12098.6 | 12192.1 | 12082.1 | 11339.7 | 11020.7 | 10256.3 | 6340.8 |
| 67.5° | 10817.3 | 10734.8 | 11169.2 | 12137.1 | 12571.6 | 12637.5 | 12549.6 | 11675.2 | 10982.2 | 10278.3 | 6566.2 |
| 70°   | 10536.8 | 10465.3 | 11086.7 | 12280.1 | 12775.0 | 12830.0 | 12549.6 | 11515.7 | 10459.8 | 9717.4  | 5367.4 |
| 72.5° | 9673.4  | 9728.4  | 10531.3 | 11933.6 | 12494.6 | 12241.6 | 11647.7 | 10712.8 | 9783.4  | 8238.1  | 3767.1 |
| 75°   | 8331.5  | 8392.0  | 9458.9  | 10982.2 | 11026.2 | 10718.3 | 10399.3 | 9854.9  | 8755.0  | 5427.9  | 2612.2 |
| 77.5° | 5922.8  | 5708.3  | 7303.2  | 9068.5  | 8909.0  | 9107.0  | 9134.5  | 8199.6  | 7330.7  | 2826.7  | 1748.8 |
| 80°   | 582.9   | 494.9   | 918.4   | 2601.2  | 5746.8  | 6423.3  | 6687.2  | 6318.8  | 5405.9  | 1264.9  | 918.4  |
| 82.5° | 126.5   | 126.5   | 137.5   | 148.5   | 231.0   | 346.5   | 1589.3  | 3893.6  | 3492.1  | 643.4   | 297.0  |
| 85°   | 71.5    | 71.5    | 88.0    | 104.5   | 137.5   | 154.0   | 181.5   | 242.0   | 940.4   | 231.0   | 55.0   |
| 87.5° | 55.0    | 60.5    | 71.5    | 88.0    | 115.5   | 126.5   | 154.0   | 192.5   | 236.5   | 214.5   | 16.5   |
| 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°    | 110.0  | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 | 110.0 |
| 2.5°  | 115.5  | 110.0 | 104.5 | 99.0  | 93.5  | 93.5  | 88.0  | 88.0  | 88.0  | 88.0  | 88.0  |
| 5°    | 110.0  | 104.5 | 99.0  | 88.0  | 82.5  | 77.0  | 71.5  | 71.5  | 71.5  | 71.5  | 71.5  |
| 7.5°  | 110.0  | 104.5 | 93.5  | 82.5  | 71.5  | 66.0  | 60.5  | 55.0  | 55.0  | 60.5  | 60.5  |
| 10°   | 110.0  | 99.0  | 82.5  | 71.5  | 60.5  | 55.0  | 49.5  | 44.0  | 44.0  | 44.0  | 44.0  |
| 12.5° | 104.5  | 93.5  | 77.0  | 66.0  | 55.0  | 44.0  | 33.0  | 27.5  | 27.5  | 27.5  | 27.5  |
| 15°   | 99.0   | 88.0  | 71.5  | 55.0  | 38.5  | 27.5  | 22.0  | 16.5  | 16.5  | 16.5  | 16.5  |
| 17.5° | 99.0   | 82.5  | 66.0  | 49.5  | 27.5  | 16.5  | 11.0  | 5.5   | 5.5   | 5.5   | 11.0  |
| 20°   | 99.0   | 82.5  | 60.5  | 38.5  | 16.5  | 11.0  | 11.0  | 5.5   | 0.0   | 5.5   | 5.5   |
| 22.5° | 99.0   | 77.0  | 49.5  | 27.5  | 16.5  | 11.0  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   |
| 25°   | 104.5  | 77.0  | 44.0  | 22.0  | 11.0  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 27.5° | 104.5  | 71.5  | 38.5  | 16.5  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 30°   | 110.0  | 71.5  | 33.0  | 11.0  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 32.5° | 110.0  | 66.0  | 22.0  | 11.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 35°   | 110.0  | 60.5  | 16.5  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 37.5° | 110.0  | 55.0  | 16.5  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 40°   | 115.5  | 49.5  | 11.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 42.5° | 121.0  | 44.0  | 11.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 45°   | 126.5  | 38.5  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 47.5° | 143.0  | 38.5  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 50°   | 165.0  | 38.5  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 52.5° | 198.0  | 38.5  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 55°   | 258.5  | 33.0  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 57.5° | 374.0  | 33.0  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 60°   | 626.9  | 33.0  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 62.5° | 1099.9 | 33.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 65°   | 1858.8 | 33.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 67.5° | 2425.2 | 38.5  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 70°   | 1842.3 | 33.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 72.5° | 879.9  | 22.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 75°   | 390.5  | 22.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 77.5° | 170.5  | 16.5  | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 66.0   | 11.0  | 5.5   | 5.5   | 5.5   | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 27.5   | 11.0  | 5.5   | 5.5   | 5.5   | 5.5   | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 16.5   | 11.0  | 11.0  | 11.0  | 5.5   | 5.5   | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 11.0   | 11.0  | 11.0  | 11.0  | 11.0  | 5.5   | 5.5   | 0.0   | 0.0   | 0.0   | 0.0   |
| 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: SP1-2407-184-8

Test Date: 10/10/2024

Luminaire Tested: GSS-SB1A-827-U-5WQ

Data in this report applies to families of products including GSS-SB1A-827-U-5WQ

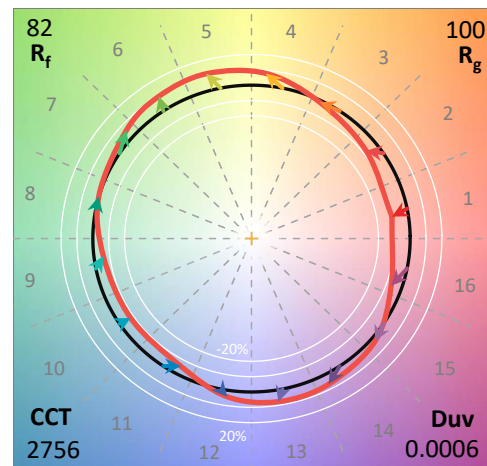
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-184-8  
 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-827-U-5WQ**  
 Description: GALLEON II SITE SLIM 1SQ 350MA 5WQ HIGH DENSITY LIGHTSQUARE WITH 80 CRI  
 2700K CCT 26 LEDS

### Spectral Parameters

CCT (K): 2756  
 CIE  $u'$ : 0.2599  
 CIE  $v'$ : 0.5271  
 Duv: 0.0006  
 CIE x: 0.4563  
 CIE y: 0.4112  
 CIE z: 0.1325  
 Peak Wavelength (nm): 609  
 Dominant Wavelength (nm): 583  
 Purity: 60.41121  
 R<sub>f</sub>: 82.2  
 R<sub>g</sub>: 99.9

CRI (Ra): 82.9  
 R1: 81.6  
 R2: 88.8  
 R3: 96.0  
 R4: 83.4  
 R5: 81.4  
 R6: 87.0  
 R7: 84.0  
 R8: 60.8  
 R9: 10.8  
 R10: 74.8  
 R11: 84.3  
 R12: 72.1  
 R13: 82.9  
 R14: 97.3  
 R15: 73.7



### Test Conditions

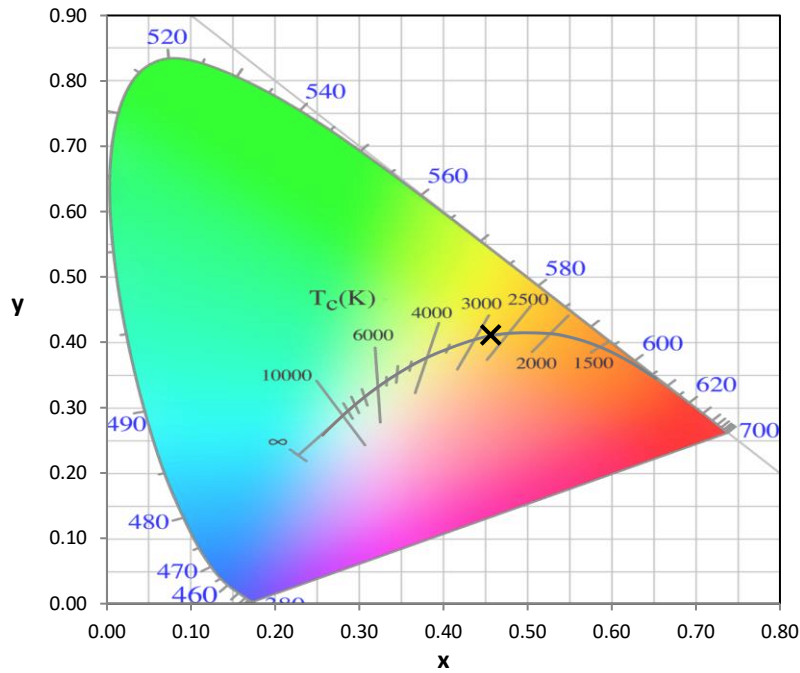
Stabilization Time: 29M  
 Operation Time: 1H 29M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-184-8

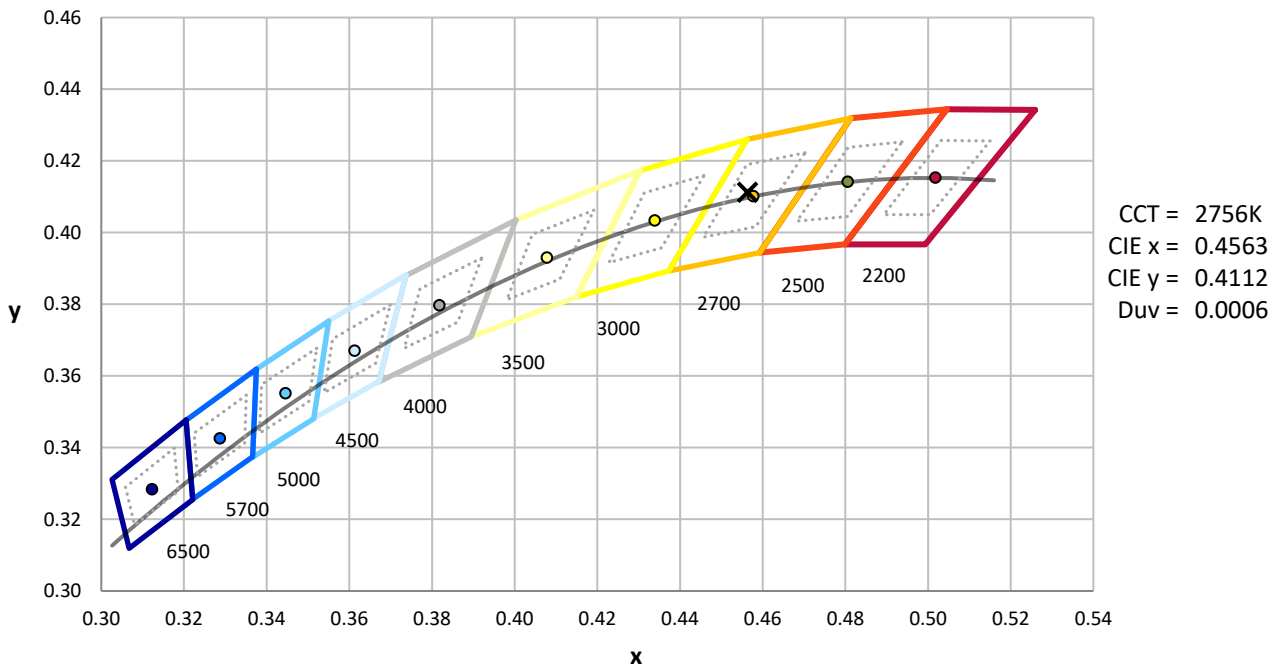
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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**



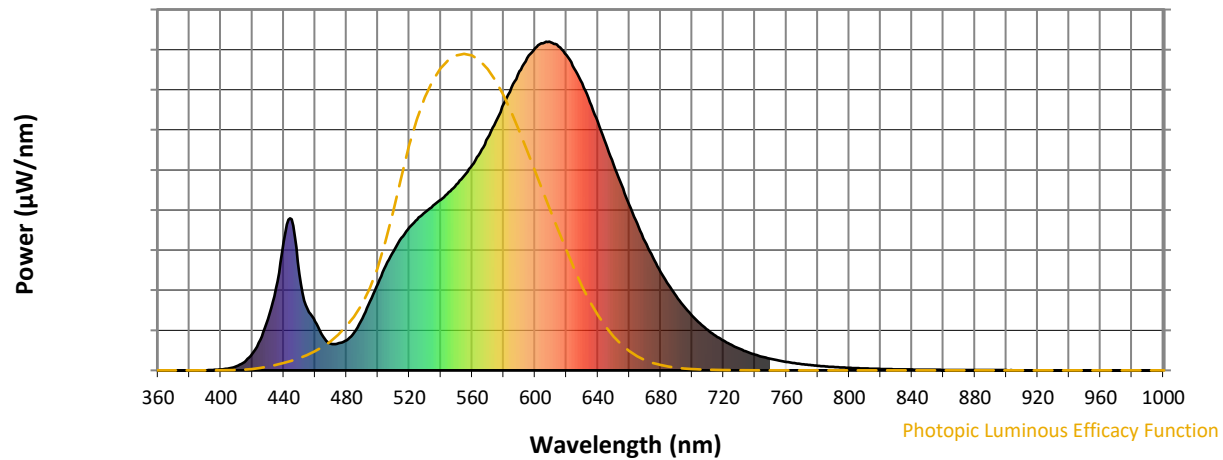
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength

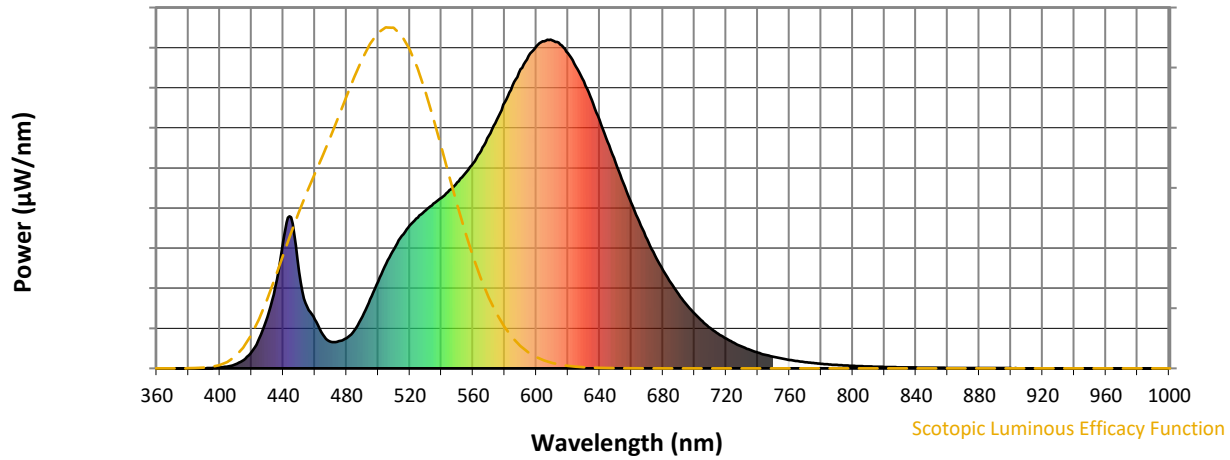


### Photopic Lumens: NR

| $\lambda$<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               | 158                                    | NR                             | 620               | 959                                    | NR                             | 750               | 35                                     | NR                             | 880               | 1                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 211                                    | NR                             | 625               | 918                                    | NR                             | 755               | 30                                     | NR                             | 885               | 1                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 264                                    | NR                             | 630               | 873                                    | NR                             | 760               | 26                                     | NR                             | 890               | 1                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 318                                    | NR                             | 635               | 816                                    | NR                             | 765               | 22                                     | NR                             | 895               | 1                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 363                                    | NR                             | 640               | 755                                    | NR                             | 770               | 19                                     | NR                             | 900               | 1                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 403                                    | NR                             | 645               | 689                                    | NR                             | 775               | 16                                     | NR                             | 905               | 1                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 435                                    | NR                             | 650               | 626                                    | NR                             | 780               | 14                                     | NR                             | 910               | 0                                      | NR                             |
| 395               | 1                                      | NR                             | 525               | 459                                    | NR                             | 655               | 564                                    | NR                             | 785               | 12                                     | NR                             | 915               | 0                                      | NR                             |
| 400               | 3                                      | NR                             | 530               | 481                                    | NR                             | 660               | 503                                    | NR                             | 790               | 10                                     | NR                             | 920               | 0                                      | NR                             |
| 405               | 6                                      | NR                             | 535               | 501                                    | NR                             | 665               | 447                                    | NR                             | 795               | 9                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 13                                     | NR                             | 540               | 519                                    | NR                             | 670               | 392                                    | NR                             | 800               | 8                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 26                                     | NR                             | 545               | 542                                    | NR                             | 675               | 343                                    | NR                             | 805               | 7                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 51                                     | NR                             | 550               | 565                                    | NR                             | 680               | 299                                    | NR                             | 810               | 6                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 93                                     | NR                             | 555               | 593                                    | NR                             | 685               | 260                                    | NR                             | 815               | 5                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 156                                    | NR                             | 560               | 624                                    | NR                             | 690               | 225                                    | NR                             | 820               | 4                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 250                                    | NR                             | 565               | 662                                    | NR                             | 695               | 194                                    | NR                             | 825               | 4                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 391                                    | NR                             | 570               | 707                                    | NR                             | 700               | 166                                    | NR                             | 830               | 3                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 460                                    | NR                             | 575               | 756                                    | NR                             | 705               | 143                                    | NR                             | 835               | 3                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 293                                    | NR                             | 580               | 810                                    | NR                             | 710               | 122                                    | NR                             | 840               | 2                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 188                                    | NR                             | 585               | 860                                    | NR                             | 715               | 105                                    | NR                             | 845               | 2                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 149                                    | NR                             | 590               | 910                                    | NR                             | 720               | 90                                     | NR                             | 850               | 2                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 103                                    | NR                             | 595               | 950                                    | NR                             | 725               | 77                                     | NR                             | 855               | 2                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 80                                     | NR                             | 600               | 980                                    | NR                             | 730               | 66                                     | NR                             | 860               | 1                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 82                                     | NR                             | 605               | 995                                    | NR                             | 735               | 56                                     | NR                             | 865               | 1                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 92                                     | NR                             | 610               | 998                                    | NR                             | 740               | 48                                     | NR                             | 870               | 1                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 116                                    | NR                             | 615               | 985                                    | NR                             | 745               | 41                                     | NR                             | 875               | 1                                      | NR                             |                   |                                        |                                |

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### Scotopic Flux vs. Wavelength



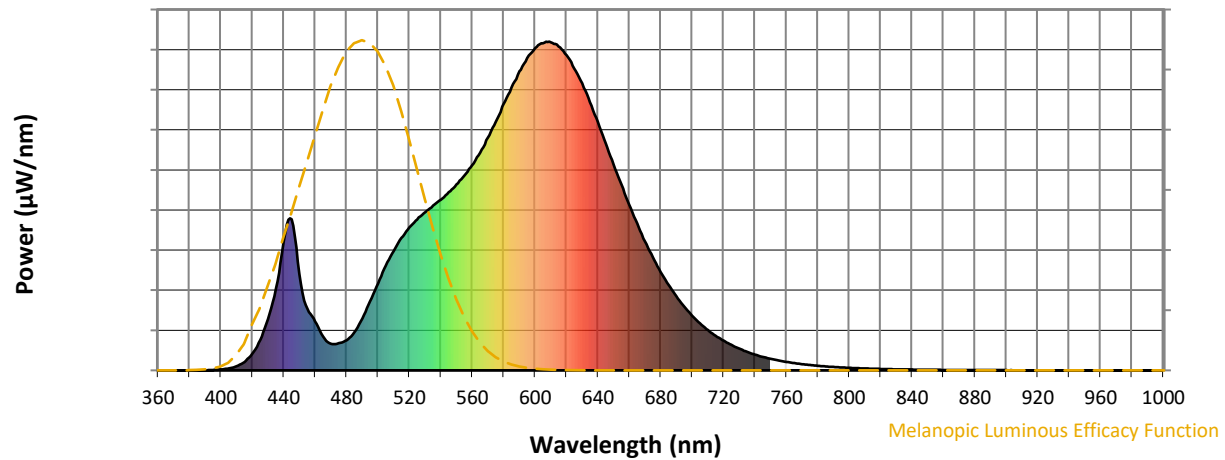
Scotopic Lumens: NR

S/P: 1.2

| λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 158                         | NR               | 620       | 959                         | NR               | 750       | 35                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 211                         | NR               | 625       | 918                         | NR               | 755       | 30                          | NR               | 885       | 1                           | NR               |
| 370       | 0                           | NR               | 500       | 264                         | NR               | 630       | 873                         | NR               | 760       | 26                          | NR               | 890       | 1                           | NR               |
| 375       | 0                           | NR               | 505       | 318                         | NR               | 635       | 816                         | NR               | 765       | 22                          | NR               | 895       | 1                           | NR               |
| 380       | 0                           | NR               | 510       | 363                         | NR               | 640       | 755                         | NR               | 770       | 19                          | NR               | 900       | 1                           | NR               |
| 385       | 0                           | NR               | 515       | 403                         | NR               | 645       | 689                         | NR               | 775       | 16                          | NR               | 905       | 1                           | NR               |
| 390       | 0                           | NR               | 520       | 435                         | NR               | 650       | 626                         | NR               | 780       | 14                          | NR               | 910       | 0                           | NR               |
| 395       | 1                           | NR               | 525       | 459                         | NR               | 655       | 564                         | NR               | 785       | 12                          | NR               | 915       | 0                           | NR               |
| 400       | 3                           | NR               | 530       | 481                         | NR               | 660       | 503                         | NR               | 790       | 10                          | NR               | 920       | 0                           | NR               |
| 405       | 6                           | NR               | 535       | 501                         | NR               | 665       | 447                         | NR               | 795       | 9                           | NR               | 925       | 0                           | NR               |
| 410       | 13                          | NR               | 540       | 519                         | NR               | 670       | 392                         | NR               | 800       | 8                           | NR               | 930       | 0                           | NR               |
| 415       | 26                          | NR               | 545       | 542                         | NR               | 675       | 343                         | NR               | 805       | 7                           | NR               | 935       | 0                           | NR               |
| 420       | 51                          | NR               | 550       | 565                         | NR               | 680       | 299                         | NR               | 810       | 6                           | NR               | 940       | 0                           | NR               |
| 425       | 93                          | NR               | 555       | 593                         | NR               | 685       | 260                         | NR               | 815       | 5                           | NR               | 945       | 0                           | NR               |
| 430       | 156                         | NR               | 560       | 624                         | NR               | 690       | 225                         | NR               | 820       | 4                           | NR               | 950       | 0                           | NR               |
| 435       | 250                         | NR               | 565       | 662                         | NR               | 695       | 194                         | NR               | 825       | 4                           | NR               | 955       | 0                           | NR               |
| 440       | 391                         | NR               | 570       | 707                         | NR               | 700       | 166                         | NR               | 830       | 3                           | NR               | 960       | 0                           | NR               |
| 445       | 460                         | NR               | 575       | 756                         | NR               | 705       | 143                         | NR               | 835       | 3                           | NR               | 965       | 0                           | NR               |
| 450       | 293                         | NR               | 580       | 810                         | NR               | 710       | 122                         | NR               | 840       | 2                           | NR               | 970       | 0                           | NR               |
| 455       | 188                         | NR               | 585       | 860                         | NR               | 715       | 105                         | NR               | 845       | 2                           | NR               | 975       | 0                           | NR               |
| 460       | 149                         | NR               | 590       | 910                         | NR               | 720       | 90                          | NR               | 850       | 2                           | NR               | 980       | 0                           | NR               |
| 465       | 103                         | NR               | 595       | 950                         | NR               | 725       | 77                          | NR               | 855       | 2                           | NR               | 985       | 0                           | NR               |
| 470       | 80                          | NR               | 600       | 980                         | NR               | 730       | 66                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 82                          | NR               | 605       | 995                         | NR               | 735       | 56                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 92                          | NR               | 610       | 998                         | NR               | 740       | 48                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 116                         | NR               | 615       | 985                         | NR               | 745       | 41                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength

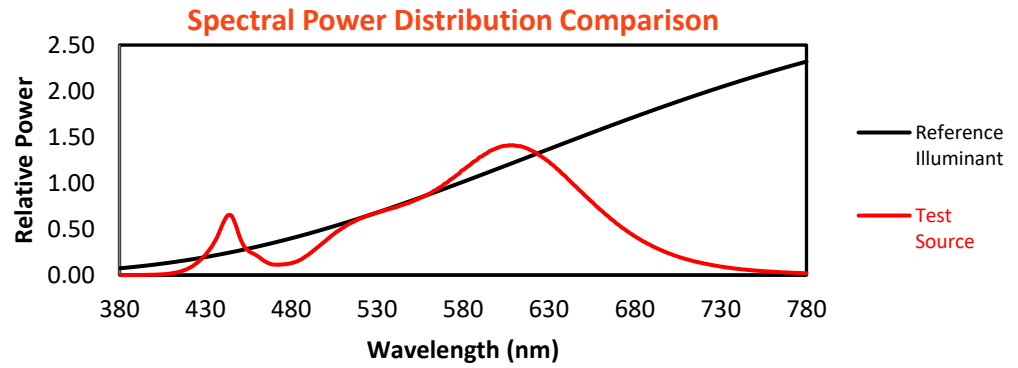
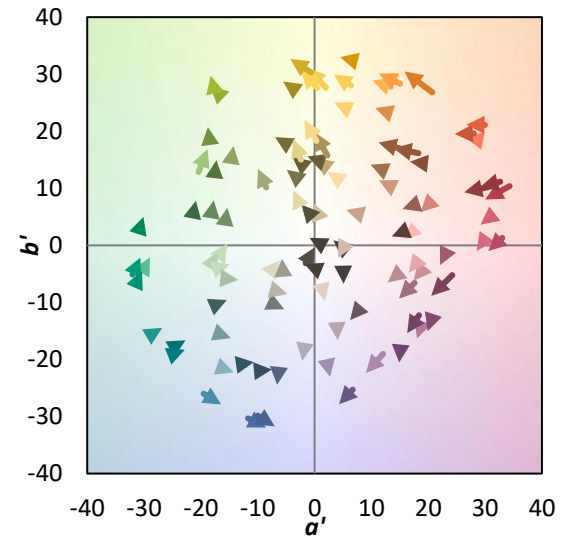
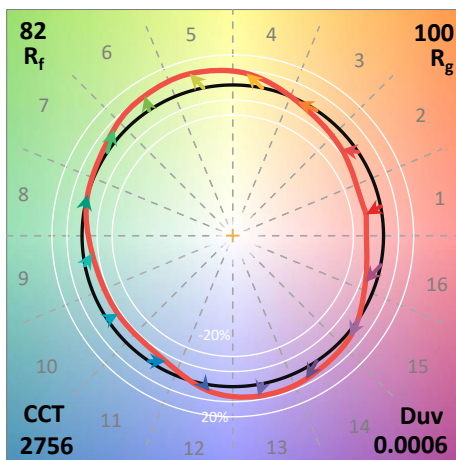
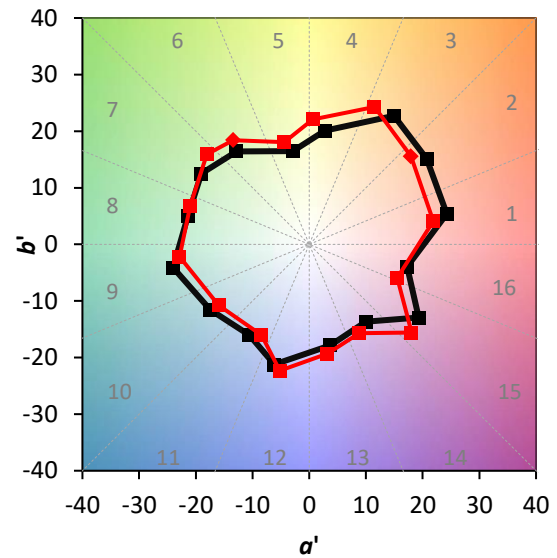
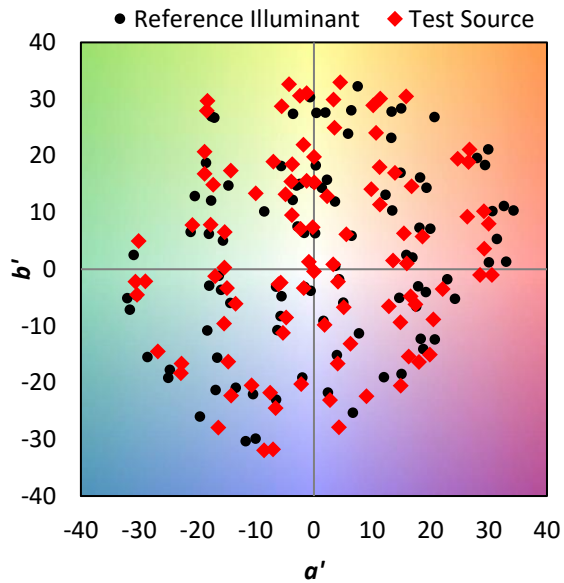


Melanopic Lumens: NR

M/P: 2.16

| $\lambda$<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               | 158                                    | NR                             | 620               | 959                                    | NR                             | 750               | 35                                     | NR                             | 880               | 1                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 211                                    | NR                             | 625               | 918                                    | NR                             | 755               | 30                                     | NR                             | 885               | 1                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 264                                    | NR                             | 630               | 873                                    | NR                             | 760               | 26                                     | NR                             | 890               | 1                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 318                                    | NR                             | 635               | 816                                    | NR                             | 765               | 22                                     | NR                             | 895               | 1                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 363                                    | NR                             | 640               | 755                                    | NR                             | 770               | 19                                     | NR                             | 900               | 1                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 403                                    | NR                             | 645               | 689                                    | NR                             | 775               | 16                                     | NR                             | 905               | 1                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 435                                    | NR                             | 650               | 626                                    | NR                             | 780               | 14                                     | NR                             | 910               | 0                                      | NR                             |
| 395               | 1                                      | NR                             | 525               | 459                                    | NR                             | 655               | 564                                    | NR                             | 785               | 12                                     | NR                             | 915               | 0                                      | NR                             |
| 400               | 3                                      | NR                             | 530               | 481                                    | NR                             | 660               | 503                                    | NR                             | 790               | 10                                     | NR                             | 920               | 0                                      | NR                             |
| 405               | 6                                      | NR                             | 535               | 501                                    | NR                             | 665               | 447                                    | NR                             | 795               | 9                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 13                                     | NR                             | 540               | 519                                    | NR                             | 670               | 392                                    | NR                             | 800               | 8                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 26                                     | NR                             | 545               | 542                                    | NR                             | 675               | 343                                    | NR                             | 805               | 7                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 51                                     | NR                             | 550               | 565                                    | NR                             | 680               | 299                                    | NR                             | 810               | 6                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 93                                     | NR                             | 555               | 593                                    | NR                             | 685               | 260                                    | NR                             | 815               | 5                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 156                                    | NR                             | 560               | 624                                    | NR                             | 690               | 225                                    | NR                             | 820               | 4                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 250                                    | NR                             | 565               | 662                                    | NR                             | 695               | 194                                    | NR                             | 825               | 4                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 391                                    | NR                             | 570               | 707                                    | NR                             | 700               | 166                                    | NR                             | 830               | 3                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 460                                    | NR                             | 575               | 756                                    | NR                             | 705               | 143                                    | NR                             | 835               | 3                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 293                                    | NR                             | 580               | 810                                    | NR                             | 710               | 122                                    | NR                             | 840               | 2                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 188                                    | NR                             | 585               | 860                                    | NR                             | 715               | 105                                    | NR                             | 845               | 2                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 149                                    | NR                             | 590               | 910                                    | NR                             | 720               | 90                                     | NR                             | 850               | 2                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 103                                    | NR                             | 595               | 950                                    | NR                             | 725               | 77                                     | NR                             | 855               | 2                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 80                                     | NR                             | 600               | 980                                    | NR                             | 730               | 66                                     | NR                             | 860               | 1                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 82                                     | NR                             | 605               | 995                                    | NR                             | 735               | 56                                     | NR                             | 865               | 1                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 92                                     | NR                             | 610               | 998                                    | NR                             | 740               | 48                                     | NR                             | 870               | 1                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 116                                    | NR                             | 615               | 985                                    | NR                             | 745               | 41                                     | NR                             | 875               | 1                                      | NR                             |                   |                                        |                                |

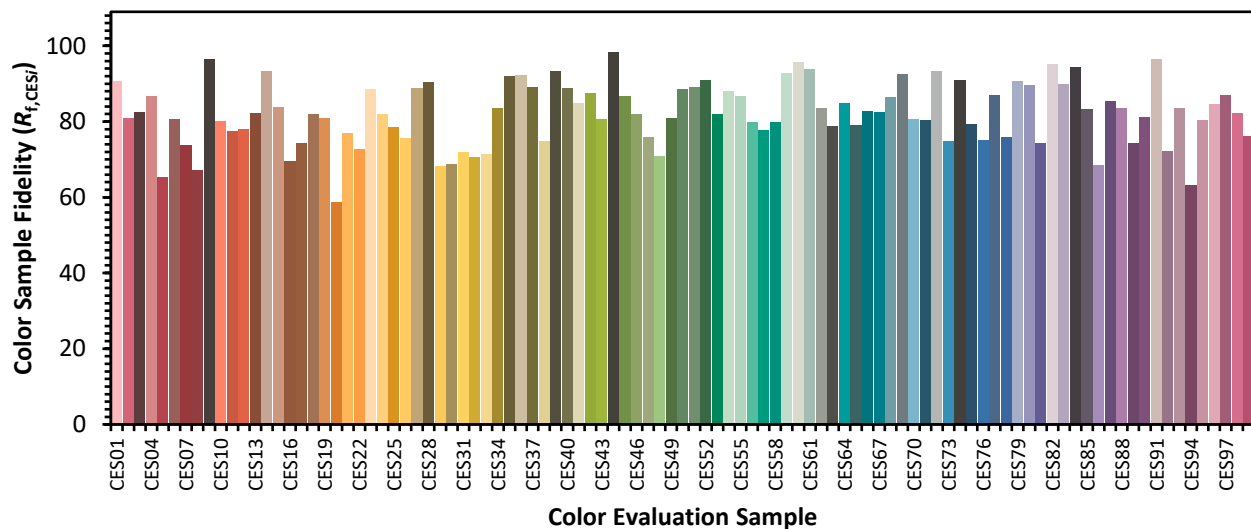
REPORT NUMBER: SP1-2407-184-8

**TM-30-18**
**Summary**
 $R_f = 82.2$   
 $R_g = 99.9$   
 CIE  $R_a = 82.9$   
 $R_9 = 10.8$ 

**Color Vector Graphics**


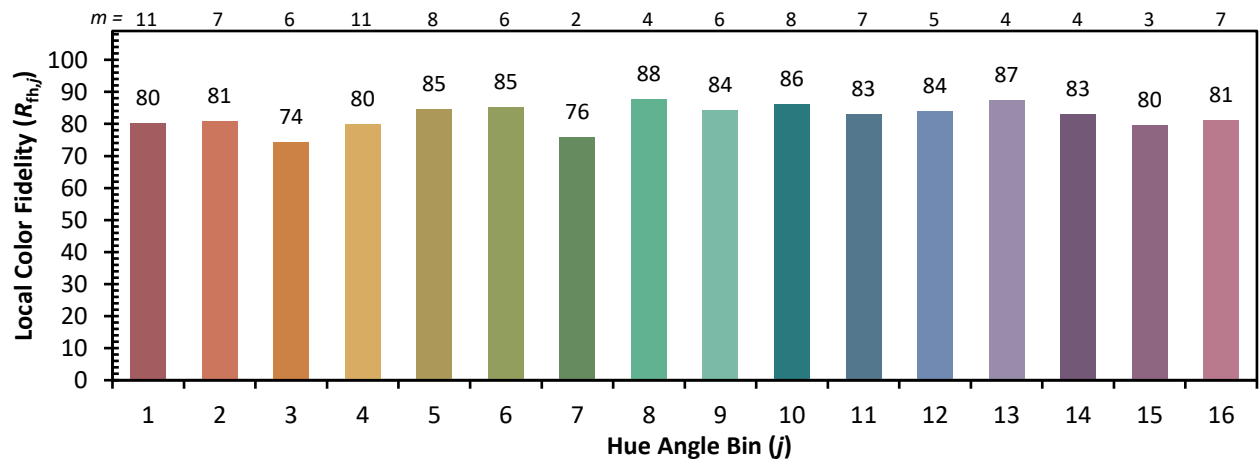
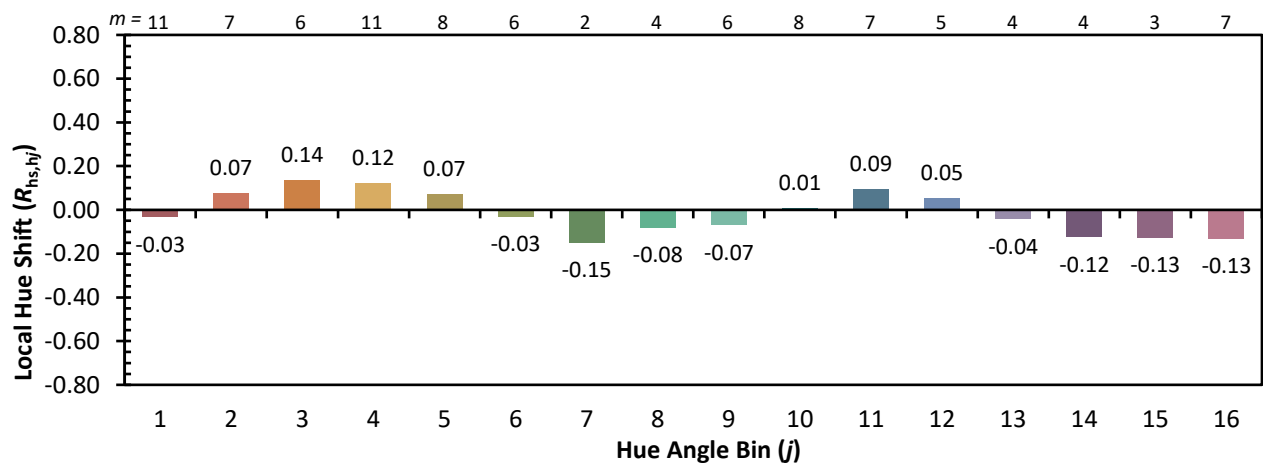
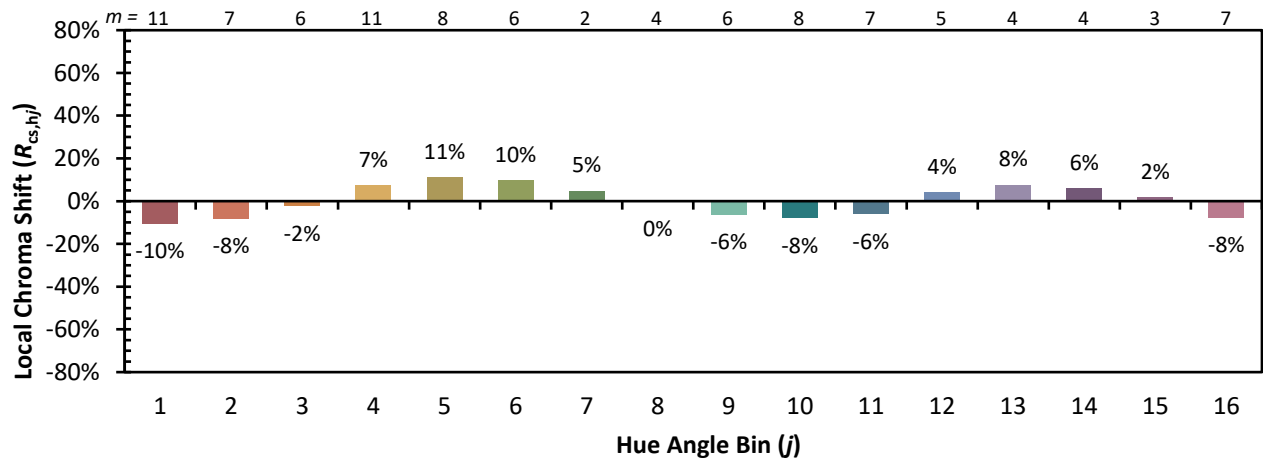


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

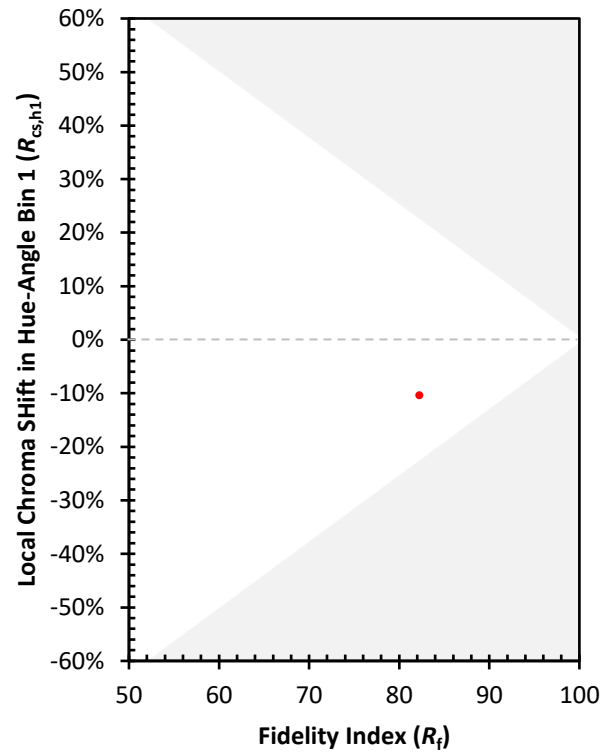
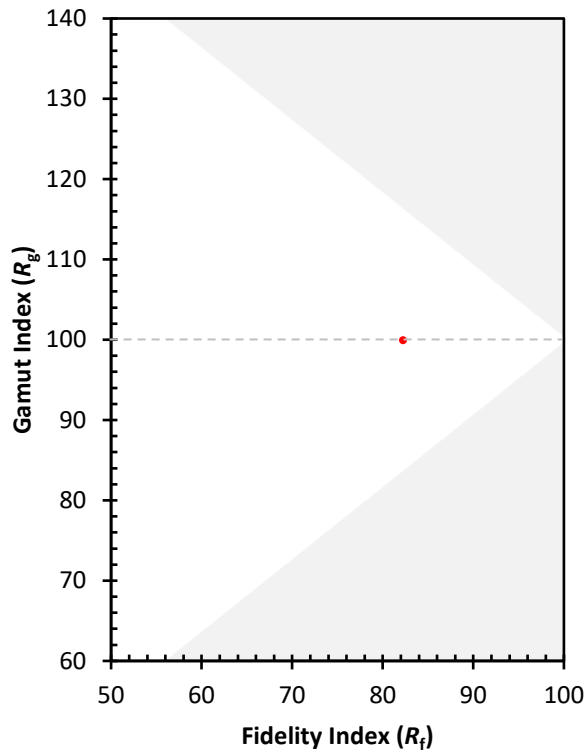
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 76 | CES51 = 89 | CES76 = 75 |
| CES02 = 63 | CES27 = 89 | CES52 = 91 | CES77 = 87 |
| CES03 = 31 | CES28 = 90 | CES53 = 82 | CES78 = 76 |
| CES04 = 71 | CES29 = 68 | CES54 = 88 | CES79 = 91 |
| CES05 = 50 | CES30 = 69 | CES55 = 87 | CES80 = 90 |
| CES06 = 52 | CES31 = 72 | CES56 = 80 | CES81 = 74 |
| CES07 = 43 | CES32 = 71 | CES57 = 78 | CES82 = 95 |
| CES08 = 42 | CES33 = 71 | CES58 = 80 | CES83 = 90 |
| CES09 = 29 | CES34 = 84 | CES59 = 93 | CES84 = 94 |
| CES10 = 77 | CES35 = 92 | CES60 = 96 | CES85 = 83 |
| CES11 = 59 | CES36 = 92 | CES61 = 94 | CES86 = 69 |
| CES12 = 66 | CES37 = 89 | CES62 = 84 | CES87 = 85 |
| CES13 = 44 | CES38 = 75 | CES63 = 79 | CES88 = 84 |
| CES14 = 74 | CES39 = 93 | CES64 = 85 | CES89 = 74 |
| CES15 = 72 | CES40 = 89 | CES65 = 79 | CES90 = 81 |
| CES16 = 48 | CES41 = 85 | CES66 = 83 | CES91 = 96 |
| CES17 = 50 | CES42 = 88 | CES67 = 82 | CES92 = 72 |
| CES18 = 57 | CES43 = 81 | CES68 = 86 | CES93 = 84 |
| CES19 = 73 | CES44 = 98 | CES69 = 92 | CES94 = 63 |
| CES20 = 67 | CES45 = 87 | CES70 = 81 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 81 | CES96 = 85 |
| CES22 = 79 | CES47 = 76 | CES72 = 93 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 75 | CES98 = 82 |
| CES24 = 91 | CES49 = 81 | CES74 = 91 | CES99 = 76 |
| CES25 = 72 | CES50 = 88 | CES75 = 79 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)