

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: P1067281

Luminaire Tested: **NAV-SA4A-750-U-T2BC**

Issue Date: 08/07/2025

**Test Information**

Test Method: LM-79-08  
Report Number: P1067281  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/07/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: LUMARK  
Catalog Number: NAV-SA4A-750-U-T2BC  
Description: Navion AREA AND ROADWAY LUMINAIRE 615mA 4xLight Square PACKAGE  
70CRI 5000K FIXTURE w/ TYPE II ANGLED BACKLIGHT CONTROL  
Light Source: (56) 5000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 13938.9 lumens  
Efficiency: N/A  
Efficacy: 129.8 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B0 - U0 - G2

Input Watts (W): 107.4  
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



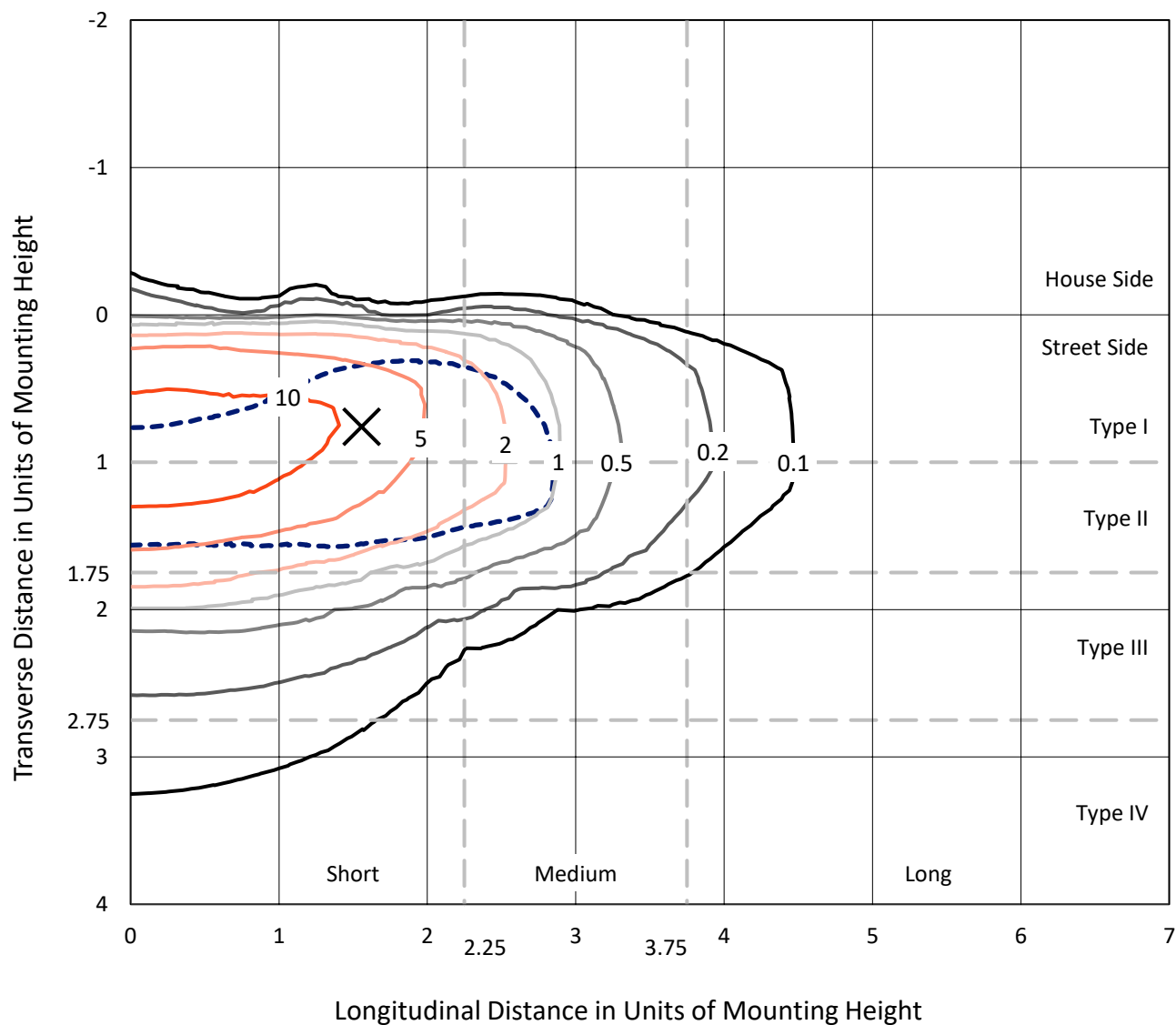
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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

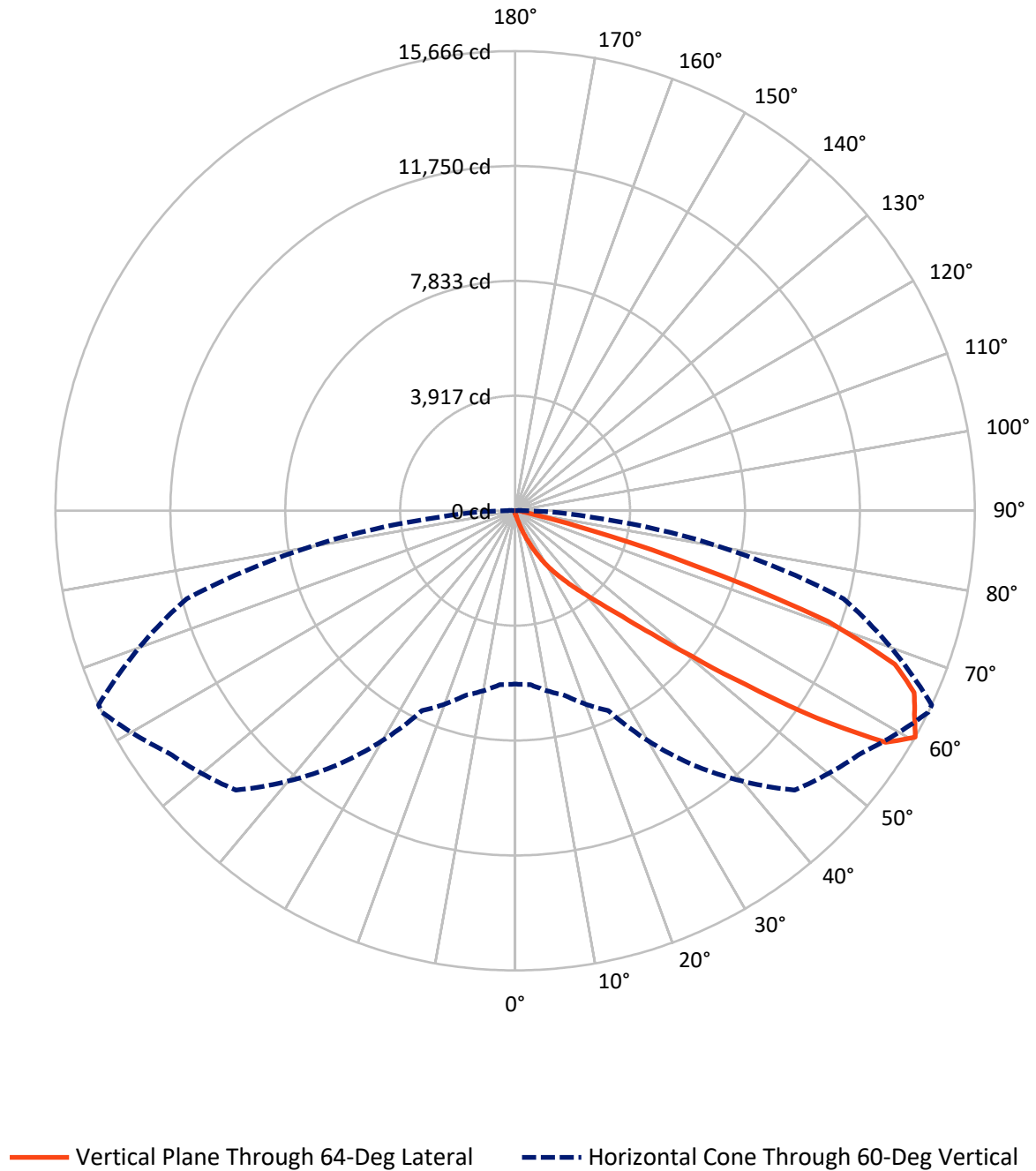


Based on 15 foot mounting height. Maximum calculated value = 20 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 56.5     | 0.0    | 56.5    |
|                    | % Fixture | 0.4      | 0.0    | 0.4     |
| <b>Street Side</b> | Lumens    | 13882.4  | 0.0    | 13882.4 |
|                    | % Fixture | 99.6     | 0.0    | 99.6    |
| <b>Total</b>       | Lumens    | 13938.9  | 0.0    | 13938.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 13.9    | 0.1       |
| 10°-20°   | 137.0   | 1.0       |
| 20°-30°   | 454.9   | 3.3       |
| 30°-40°   | 1213.9  | 8.7       |
| 40°-50°   | 3085.4  | 22.1      |
| 50°-60°   | 4497.9  | 32.3      |
| 60°-70°   | 3474.2  | 24.9      |
| 70°-80°   | 954.1   | 6.8       |
| 80°-90°   | 107.7   | 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°    | 13938.9 | 100.0     |
| 0°-180°   | 13938.9 | 100.0     |



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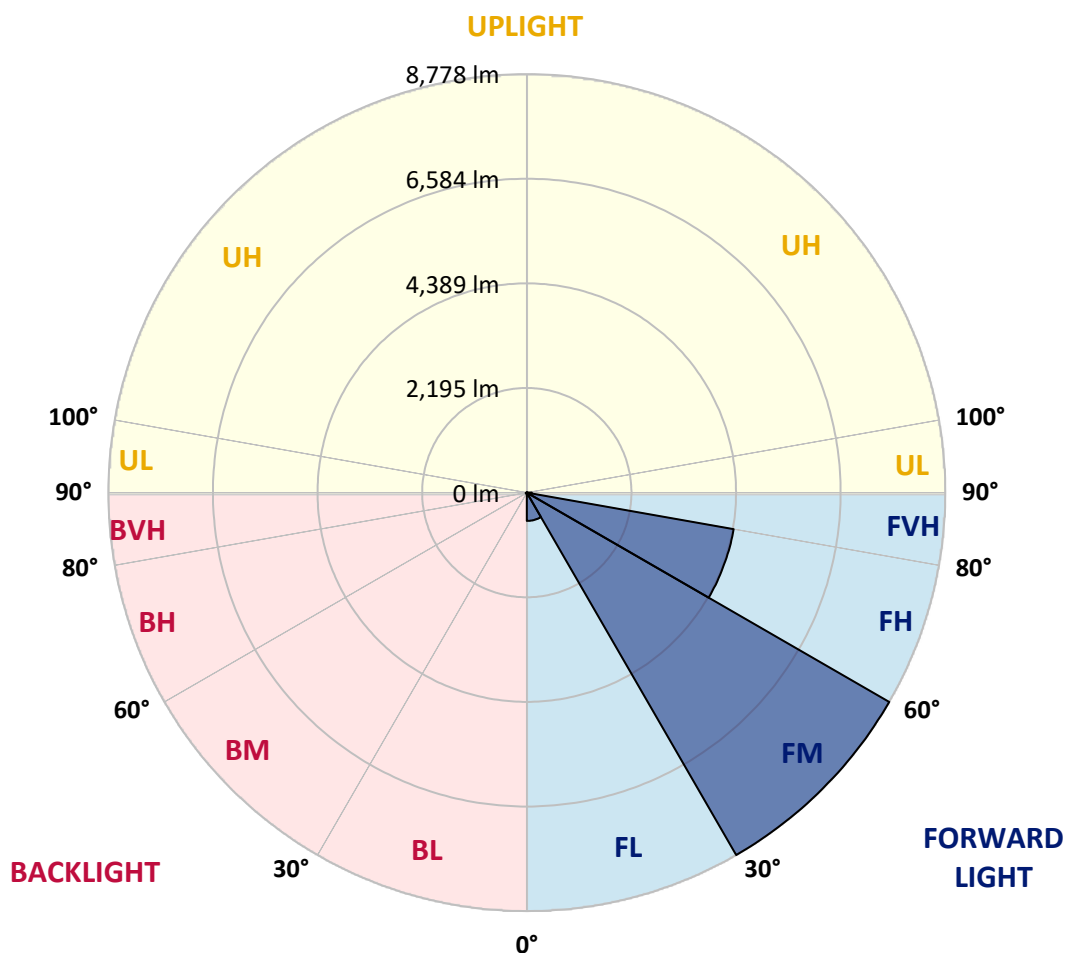
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 593.1  | 4.3       |                         |      |         |
| FM   | (30°-60°)   | 8778.5 | 63.0      |                         |      |         |
| FH   | (60°-80°)   | 4405.7 | 31.6      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 105.1  | 0.8       |                         |      | G2/225  |
| BL   | (0°-30°)    | 12.7   | 0.1       | B0/110                  |      |         |
| BM   | (30°-60°)   | 18.7   | 0.1       | B0/220                  |      |         |
| BH   | (60°-80°)   | 22.5   | 0.2       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 2.5    | 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°    | 92.1    | 92.1    | 92.1    | 92.1    | 92.1    | 92.1    | 92.1    | 92.1    | 92.1    | 92.1    | 92.1   |
| 2.5°  | 122.8   | 122.8   | 122.8   | 118.9   | 115.1   | 115.1   | 111.3   | 107.4   | 107.4   | 99.8    | 95.9   |
| 5°    | 188.0   | 188.0   | 180.3   | 172.7   | 161.1   | 145.8   | 130.5   | 118.9   | 118.9   | 107.4   | 99.8   |
| 7.5°  | 368.3   | 379.9   | 345.3   | 303.1   | 245.6   | 207.2   | 165.0   | 138.1   | 134.3   | 115.1   | 99.8   |
| 10°   | 798.1   | 790.4   | 736.7   | 633.1   | 498.8   | 360.7   | 230.2   | 168.8   | 161.1   | 122.8   | 99.8   |
| 12.5° | 1200.9  | 1212.5  | 1154.9  | 1039.8  | 878.6   | 640.8   | 395.2   | 218.7   | 211.0   | 134.3   | 99.8   |
| 15°   | 1546.3  | 1546.3  | 1507.9  | 1450.3  | 1273.8  | 1024.4  | 636.9   | 326.1   | 299.3   | 145.8   | 95.9   |
| 17.5° | 1784.2  | 1780.3  | 1765.0  | 1749.6  | 1646.0  | 1389.0  | 974.6   | 521.8   | 460.4   | 172.7   | 95.9   |
| 20°   | 2052.7  | 2041.2  | 2060.4  | 2029.7  | 1949.1  | 1745.8  | 1331.4  | 775.1   | 717.5   | 218.7   | 95.9   |
| 22.5° | 2332.8  | 2344.3  | 2359.7  | 2329.0  | 2240.7  | 2064.2  | 1707.4  | 1101.2  | 1039.8  | 303.1   | 99.8   |
| 25°   | 2689.7  | 2682.0  | 2716.5  | 2689.7  | 2578.4  | 2371.2  | 2060.4  | 1458.0  | 1369.8  | 422.1   | 107.4  |
| 27.5° | 3127.1  | 3111.7  | 3134.7  | 3065.7  | 2919.9  | 2708.8  | 2375.0  | 1822.5  | 1718.9  | 606.2   | 122.8  |
| 30°   | 3706.4  | 3717.9  | 3614.4  | 3533.8  | 3326.6  | 3046.5  | 2724.2  | 2213.9  | 2106.5  | 824.9   | 138.1  |
| 32.5° | 4619.6  | 4539.0  | 4377.9  | 4051.8  | 3779.3  | 3422.5  | 3073.3  | 2555.4  | 2459.4  | 1105.0  | 161.1  |
| 35°   | 6043.1  | 6058.5  | 5705.5  | 4899.7  | 4308.8  | 3894.4  | 3457.0  | 2931.4  | 2862.3  | 1423.5  | 191.8  |
| 37.5° | 7777.4  | 7735.2  | 7424.4  | 6407.6  | 5083.9  | 4481.5  | 3894.4  | 3341.9  | 3242.2  | 1768.8  | 230.2  |
| 40°   | 9741.9  | 9565.4  | 9385.0  | 8694.4  | 6699.2  | 5218.2  | 4447.0  | 3817.7  | 3741.0  | 2167.8  | 291.6  |
| 42.5° | 11315.0 | 11268.9 | 11299.6 | 11011.9 | 9392.7  | 6472.8  | 5179.8  | 4400.9  | 4308.8  | 2662.8  | 399.0  |
| 45°   | 12090.0 | 12024.8 | 12209.0 | 12423.9 | 12009.5 | 9143.3  | 6361.6  | 5145.3  | 5022.5  | 3246.0  | 564.0  |
| 47.5° | 11882.9 | 11836.8 | 12232.0 | 12654.1 | 13206.6 | 12239.7 | 8291.5  | 6258.0  | 6046.9  | 3994.2  | 809.6  |
| 50°   | 10862.2 | 10866.1 | 11514.5 | 12301.1 | 13175.9 | 13809.0 | 11150.0 | 7781.2  | 7516.5  | 4988.0  | 1193.3 |
| 52.5° | 9868.5  | 9899.2  | 10586.0 | 11733.2 | 12719.3 | 13993.1 | 13659.3 | 9834.0  | 9404.2  | 6158.2  | 1646.0 |
| 55°   | 8847.9  | 8863.2  | 9469.4  | 11084.8 | 12504.4 | 13444.5 | 14948.5 | 12477.6 | 12021.0 | 7616.2  | 2087.3 |
| 57.5° | 7865.6  | 7865.6  | 8092.0  | 9527.0  | 12270.4 | 13394.6 | 14795.1 | 14894.8 | 14522.6 | 9281.4  | 2413.4 |
| 60°   | 5908.8  | 5947.2  | 6511.2  | 7516.5  | 10582.1 | 13467.5 | 14403.7 | 15666.0 | 15666.0 | 11591.2 | 2662.8 |
| 62.5° | 2985.1  | 3042.7  | 3744.8  | 4723.2  | 7259.4  | 12462.2 | 14465.1 | 15278.5 | 15339.9 | 13628.6 | 3230.7 |
| 65°   | 1400.5  | 1465.7  | 1841.7  | 2532.3  | 3906.0  | 8771.1  | 13828.2 | 14948.5 | 14929.3 | 13241.1 | 4427.8 |
| 67.5° | 1005.3  | 1024.4  | 1151.1  | 1477.2  | 2102.6  | 3844.6  | 10555.3 | 13962.4 | 13970.1 | 11249.8 | 5091.6 |
| 70°   | 901.7   | 901.7   | 932.4   | 1028.3  | 1266.2  | 1718.9  | 5129.9  | 11307.3 | 11856.0 | 8686.7  | 4719.4 |
| 72.5° | 890.2   | 882.5   | 874.8   | 878.6   | 855.6   | 863.3   | 1761.1  | 6384.6  | 7167.3  | 6077.6  | 3764.0 |
| 75°   | 867.1   | 867.1   | 859.5   | 832.6   | 683.0   | 556.3   | 606.2   | 2582.2  | 2985.1  | 4059.4  | 2793.3 |
| 77.5° | 686.8   | 755.9   | 836.4   | 786.6   | 625.4   | 418.2   | 353.0   | 748.2   | 943.9   | 2490.1  | 2025.9 |
| 80°   | 318.5   | 322.3   | 318.5   | 333.8   | 399.0   | 299.3   | 260.9   | 364.5   | 368.3   | 1381.3  | 1254.7 |
| 82.5° | 230.2   | 234.1   | 222.5   | 199.5   | 176.5   | 161.1   | 214.9   | 268.6   | 287.8   | 633.1   | 468.1  |
| 85°   | 69.1    | 65.2    | 76.7    | 103.6   | 122.8   | 142.0   | 180.3   | 226.4   | 237.9   | 234.1   | 69.1   |
| 87.5° | 30.7    | 30.7    | 38.4    | 53.7    | 72.9    | 107.4   | 157.3   | 207.2   | 211.0   | 241.7   | 19.2   |
| 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°    | 92.1   | 92.1  | 92.1 | 92.1 | 92.1 | 92.1 | 92.1 | 92.1 | 92.1 | 92.1 | 92.1 |
| 2.5°  | 95.9   | 92.1  | 88.2 | 84.4 | 80.6 | 76.7 | 72.9 | 72.9 | 76.7 | 76.7 | 76.7 |
| 5°    | 92.1   | 88.2  | 80.6 | 72.9 | 69.1 | 65.2 | 61.4 | 61.4 | 65.2 | 65.2 | 65.2 |
| 7.5°  | 92.1   | 84.4  | 76.7 | 69.1 | 61.4 | 57.6 | 53.7 | 53.7 | 53.7 | 57.6 | 57.6 |
| 10°   | 92.1   | 84.4  | 72.9 | 61.4 | 53.7 | 49.9 | 46.0 | 42.2 | 46.0 | 46.0 | 46.0 |
| 12.5° | 88.2   | 80.6  | 69.1 | 57.6 | 46.0 | 38.4 | 34.5 | 34.5 | 34.5 | 34.5 | 34.5 |
| 15°   | 84.4   | 76.7  | 65.2 | 49.9 | 38.4 | 30.7 | 23.0 | 23.0 | 23.0 | 26.9 | 26.9 |
| 17.5° | 80.6   | 72.9  | 57.6 | 38.4 | 26.9 | 19.2 | 15.3 | 15.3 | 15.3 | 19.2 | 19.2 |
| 20°   | 80.6   | 69.1  | 49.9 | 30.7 | 19.2 | 11.5 | 7.7  | 7.7  | 7.7  | 11.5 | 15.3 |
| 22.5° | 80.6   | 69.1  | 46.0 | 23.0 | 11.5 | 7.7  | 3.8  | 3.8  | 3.8  | 3.8  | 3.8  |
| 25°   | 80.6   | 65.2  | 42.2 | 19.2 | 7.7  | 3.8  | 0.0  | 0.0  | 3.8  | 7.7  | 11.5 |
| 27.5° | 80.6   | 61.4  | 34.5 | 11.5 | 7.7  | 3.8  | 0.0  | 3.8  | 7.7  | 7.7  | 7.7  |
| 30°   | 80.6   | 61.4  | 30.7 | 11.5 | 3.8  | 0.0  | 0.0  | 3.8  | 7.7  | 7.7  | 11.5 |
| 32.5° | 84.4   | 57.6  | 26.9 | 7.7  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 35°   | 88.2   | 53.7  | 23.0 | 7.7  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 37.5° | 95.9   | 53.7  | 15.3 | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 40°   | 107.4  | 57.6  | 15.3 | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 42.5° | 134.3  | 61.4  | 11.5 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 45°   | 188.0  | 76.7  | 11.5 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 47.5° | 276.3  | 115.1 | 11.5 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 50°   | 402.9  | 157.3 | 7.7  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 52.5° | 495.0  | 157.3 | 7.7  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 55°   | 491.1  | 99.8  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 57.5° | 376.0  | 69.1  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 60°   | 318.5  | 49.9  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 62.5° | 383.7  | 38.4  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 65°   | 683.0  | 34.5  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 67.5° | 1097.4 | 34.5  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 70°   | 1227.8 | 34.5  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 72.5° | 959.2  | 30.7  | 3.8  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 75°   | 525.7  | 26.9  | 3.8  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 77.5° | 264.7  | 19.2  | 7.7  | 3.8  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 80°   | 111.3  | 15.3  | 7.7  | 3.8  | 3.8  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 82.5° | 38.4   | 15.3  | 7.7  | 7.7  | 3.8  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 85°   | 19.2   | 11.5  | 11.5 | 7.7  | 7.7  | 3.8  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  |
| 87.5° | 11.5   | 11.5  | 11.5 | 7.7  | 7.7  | 3.8  | 3.8  | 0.0  | 0.0  | 0.0  | 3.8  |
| 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: SP1-2407-184-6

Test Date: 10/10/2024

Luminaire Tested: GSS-SB1A-750-U-5WQ

Data in this report applies to families of products including GSS-SB1A-750-U-5WQ

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-184-6  
 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-750-U-5WQ**  
 Description: GALLEON II SITE SLIM 1SQ 350MA 5WQ HIGH DENSITY LIGHTSQUARE WITH 70 CRI  
 5000K CCT 26 LEDS

### Spectral Parameters

|                           |          |           |      |      |       |
|---------------------------|----------|-----------|------|------|-------|
| CCT (K):                  | 4896     | CRI (Ra): | 70.2 |      |       |
| CIE u':                   | 0.2101   | R1:       | 68.1 | R9:  | -35.1 |
| CIE v':                   | 0.4901   | R2:       | 73.9 | R10: | 39.3  |
| Duv:                      | 0.0035   | R3:       | 79.4 | R11: | 71.1  |
| CIE x:                    | 0.3489   | R4:       | 72.1 | R12: | 43.8  |
| CIE y:                    | 0.3618   | R5:       | 69.2 | R13: | 68.1  |
| CIE z:                    | 0.2893   | R6:       | 65.7 | R14: | 88.4  |
| Peak Wavelength (nm):     | 443      | R7:       | 78.1 | R15: | 59.7  |
| Dominant Wavelength (nm): | 570      | R8:       | 55.3 |      |       |
| Purity:                   | 13.25435 |           |      |      |       |
| Rf:                       | 70.7     |           |      |      |       |
| Rg:                       | 96.8     |           |      |      |       |



### Test Conditions

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

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| 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 5000K 4-step quadrangle

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### Photopic Flux vs. Wavelength



### Photopic Lumens: NR

| λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 118                      | NR            | 620    | 401                      | NR            | 750    | 12                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 168                      | NR            | 625    | 365                      | NR            | 755    | 10                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 230                      | NR            | 630    | 331                      | NR            | 760    | 9                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 299                      | NR            | 635    | 298                      | NR            | 765    | 8                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 362                      | NR            | 640    | 266                      | NR            | 770    | 6                        | NR            | 900    | 0                        | NR            |
| 385    | 2                        | NR            | 515    | 418                      | NR            | 645    | 236                      | NR            | 775    | 6                        | NR            | 905    | 0                        | NR            |
| 390    | 4                        | NR            | 520    | 461                      | NR            | 650    | 209                      | NR            | 780    | 5                        | NR            | 910    | 0                        | NR            |
| 395    | 6                        | NR            | 525    | 491                      | NR            | 655    | 184                      | NR            | 785    | 4                        | NR            | 915    | 0                        | NR            |
| 400    | 9                        | NR            | 530    | 514                      | NR            | 660    | 160                      | NR            | 790    | 4                        | NR            | 920    | 0                        | NR            |
| 405    | 14                       | NR            | 535    | 530                      | NR            | 665    | 140                      | NR            | 795    | 3                        | NR            | 925    | 0                        | NR            |
| 410    | 27                       | NR            | 540    | 539                      | NR            | 670    | 122                      | NR            | 800    | 3                        | NR            | 930    | 0                        | NR            |
| 415    | 55                       | NR            | 545    | 549                      | NR            | 675    | 106                      | NR            | 805    | 2                        | NR            | 935    | 0                        | NR            |
| 420    | 115                      | NR            | 550    | 557                      | NR            | 680    | 92                       | NR            | 810    | 2                        | NR            | 940    | 0                        | NR            |
| 425    | 226                      | NR            | 555    | 565                      | NR            | 685    | 79                       | NR            | 815    | 2                        | NR            | 945    | 0                        | NR            |
| 430    | 395                      | NR            | 560    | 572                      | NR            | 690    | 68                       | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 648                      | NR            | 565    | 580                      | NR            | 695    | 59                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 937                      | NR            | 570    | 586                      | NR            | 700    | 51                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 953                      | NR            | 575    | 588                      | NR            | 705    | 44                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 591                      | NR            | 580    | 588                      | NR            | 710    | 38                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 334                      | NR            | 585    | 580                      | NR            | 715    | 32                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 221                      | NR            | 590    | 568                      | NR            | 720    | 28                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 140                      | NR            | 595    | 550                      | NR            | 725    | 24                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 93                       | NR            | 600    | 527                      | NR            | 730    | 21                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 79                       | NR            | 605    | 499                      | NR            | 735    | 18                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 76                       | NR            | 610    | 469                      | NR            | 740    | 15                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 87                       | NR            | 615    | 435                      | NR            | 745    | 13                       | NR            | 875    | 0                        | NR            |        |                          |               |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.7

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 118                      | NR            | 620    | 401                      | NR            | 750    | 12                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 168                      | NR            | 625    | 365                      | NR            | 755    | 10                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 230                      | NR            | 630    | 331                      | NR            | 760    | 9                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 299                      | NR            | 635    | 298                      | NR            | 765    | 8                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 362                      | NR            | 640    | 266                      | NR            | 770    | 6                        | NR            | 900    | 0                        | NR            |
| 385    | 2                        | NR            | 515    | 418                      | NR            | 645    | 236                      | NR            | 775    | 6                        | NR            | 905    | 0                        | NR            |
| 390    | 4                        | NR            | 520    | 461                      | NR            | 650    | 209                      | NR            | 780    | 5                        | NR            | 910    | 0                        | NR            |
| 395    | 6                        | NR            | 525    | 491                      | NR            | 655    | 184                      | NR            | 785    | 4                        | NR            | 915    | 0                        | NR            |
| 400    | 9                        | NR            | 530    | 514                      | NR            | 660    | 160                      | NR            | 790    | 4                        | NR            | 920    | 0                        | NR            |
| 405    | 14                       | NR            | 535    | 530                      | NR            | 665    | 140                      | NR            | 795    | 3                        | NR            | 925    | 0                        | NR            |
| 410    | 27                       | NR            | 540    | 539                      | NR            | 670    | 122                      | NR            | 800    | 3                        | NR            | 930    | 0                        | NR            |
| 415    | 55                       | NR            | 545    | 549                      | NR            | 675    | 106                      | NR            | 805    | 2                        | NR            | 935    | 0                        | NR            |
| 420    | 115                      | NR            | 550    | 557                      | NR            | 680    | 92                       | NR            | 810    | 2                        | NR            | 940    | 0                        | NR            |
| 425    | 226                      | NR            | 555    | 565                      | NR            | 685    | 79                       | NR            | 815    | 2                        | NR            | 945    | 0                        | NR            |
| 430    | 395                      | NR            | 560    | 572                      | NR            | 690    | 68                       | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 648                      | NR            | 565    | 580                      | NR            | 695    | 59                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 937                      | NR            | 570    | 586                      | NR            | 700    | 51                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 953                      | NR            | 575    | 588                      | NR            | 705    | 44                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 591                      | NR            | 580    | 588                      | NR            | 710    | 38                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 334                      | NR            | 585    | 580                      | NR            | 715    | 32                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 221                      | NR            | 590    | 568                      | NR            | 720    | 28                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 140                      | NR            | 595    | 550                      | NR            | 725    | 24                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 93                       | NR            | 600    | 527                      | NR            | 730    | 21                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 79                       | NR            | 605    | 499                      | NR            | 735    | 18                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 76                       | NR            | 610    | 469                      | NR            | 740    | 15                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 87                       | NR            | 615    | 435                      | NR            | 745    | 13                       | NR            | 875    | 0                        | NR            |        |                          |               |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 3.37

| $\lambda$<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               | 118                                    | NR                             | 620               | 401                                    | NR                             | 750               | 12                                     | NR                             | 880               | 0                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 168                                    | NR                             | 625               | 365                                    | NR                             | 755               | 10                                     | NR                             | 885               | 0                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 230                                    | NR                             | 630               | 331                                    | NR                             | 760               | 9                                      | NR                             | 890               | 0                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 299                                    | NR                             | 635               | 298                                    | NR                             | 765               | 8                                      | NR                             | 895               | 0                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 362                                    | NR                             | 640               | 266                                    | NR                             | 770               | 6                                      | NR                             | 900               | 0                                      | NR                             |
| 385               | 2                                      | NR                             | 515               | 418                                    | NR                             | 645               | 236                                    | NR                             | 775               | 6                                      | NR                             | 905               | 0                                      | NR                             |
| 390               | 4                                      | NR                             | 520               | 461                                    | NR                             | 650               | 209                                    | NR                             | 780               | 5                                      | NR                             | 910               | 0                                      | NR                             |
| 395               | 6                                      | NR                             | 525               | 491                                    | NR                             | 655               | 184                                    | NR                             | 785               | 4                                      | NR                             | 915               | 0                                      | NR                             |
| 400               | 9                                      | NR                             | 530               | 514                                    | NR                             | 660               | 160                                    | NR                             | 790               | 4                                      | NR                             | 920               | 0                                      | NR                             |
| 405               | 14                                     | NR                             | 535               | 530                                    | NR                             | 665               | 140                                    | NR                             | 795               | 3                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 27                                     | NR                             | 540               | 539                                    | NR                             | 670               | 122                                    | NR                             | 800               | 3                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 55                                     | NR                             | 545               | 549                                    | NR                             | 675               | 106                                    | NR                             | 805               | 2                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 115                                    | NR                             | 550               | 557                                    | NR                             | 680               | 92                                     | NR                             | 810               | 2                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 226                                    | NR                             | 555               | 565                                    | NR                             | 685               | 79                                     | NR                             | 815               | 2                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 395                                    | NR                             | 560               | 572                                    | NR                             | 690               | 68                                     | NR                             | 820               | 2                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 648                                    | NR                             | 565               | 580                                    | NR                             | 695               | 59                                     | NR                             | 825               | 1                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 937                                    | NR                             | 570               | 586                                    | NR                             | 700               | 51                                     | NR                             | 830               | 1                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 953                                    | NR                             | 575               | 588                                    | NR                             | 705               | 44                                     | NR                             | 835               | 1                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 591                                    | NR                             | 580               | 588                                    | NR                             | 710               | 38                                     | NR                             | 840               | 1                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 334                                    | NR                             | 585               | 580                                    | NR                             | 715               | 32                                     | NR                             | 845               | 1                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 221                                    | NR                             | 590               | 568                                    | NR                             | 720               | 28                                     | NR                             | 850               | 1                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 140                                    | NR                             | 595               | 550                                    | NR                             | 725               | 24                                     | NR                             | 855               | 1                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 93                                     | NR                             | 600               | 527                                    | NR                             | 730               | 21                                     | NR                             | 860               | 1                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 79                                     | NR                             | 605               | 499                                    | NR                             | 735               | 18                                     | NR                             | 865               | 0                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 76                                     | NR                             | 610               | 469                                    | NR                             | 740               | 15                                     | NR                             | 870               | 0                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 87                                     | NR                             | 615               | 435                                    | NR                             | 745               | 13                                     | NR                             | 875               | 0                                      | NR                             |                   |                                        |                                |

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TM-30-18

### Summary

$R_f = 70.7$   
 $R_g = 96.8$   
 $CIE R_a = 70.2$   
 $R_g = -35.1$



### Color Vector Graphics

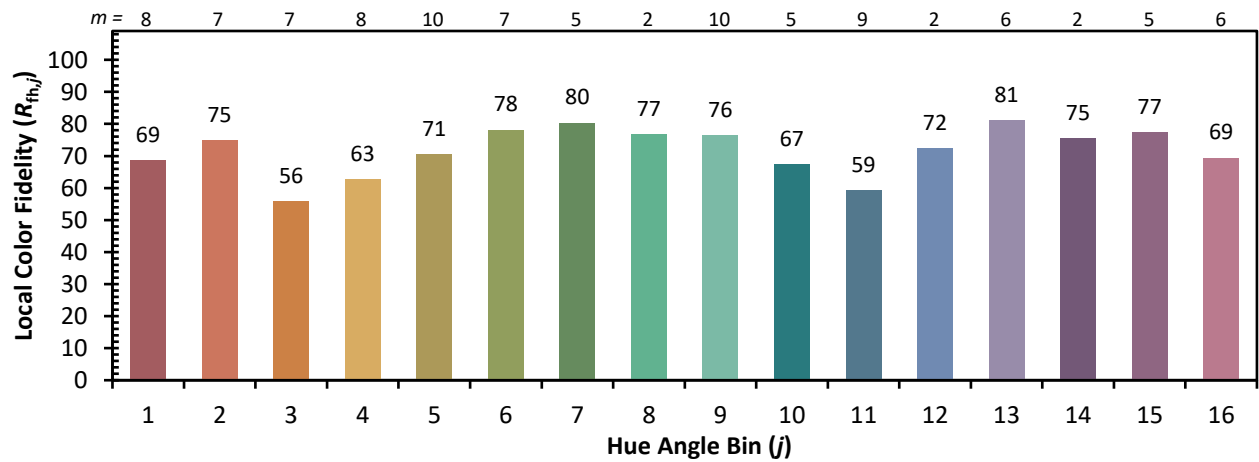
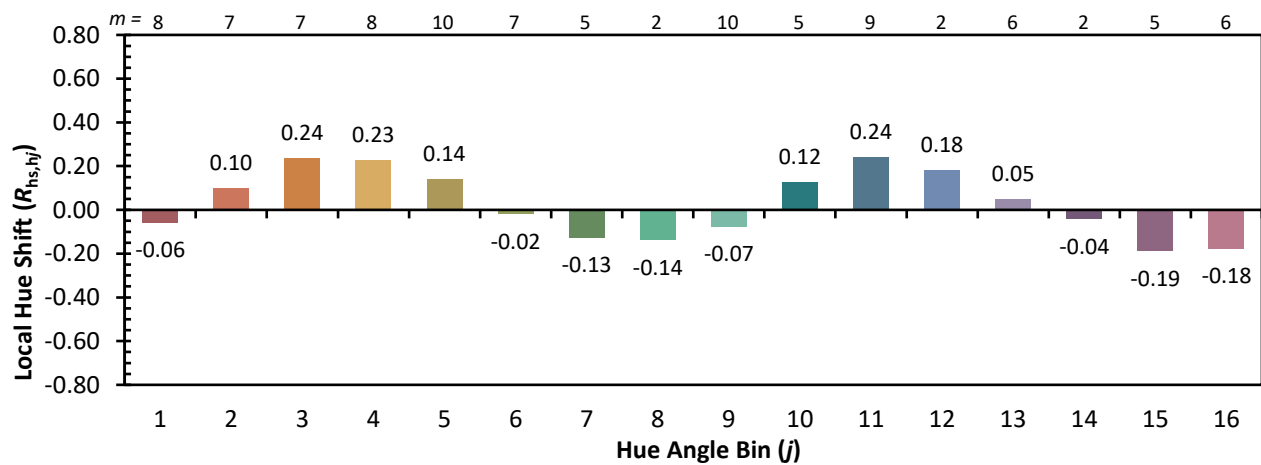
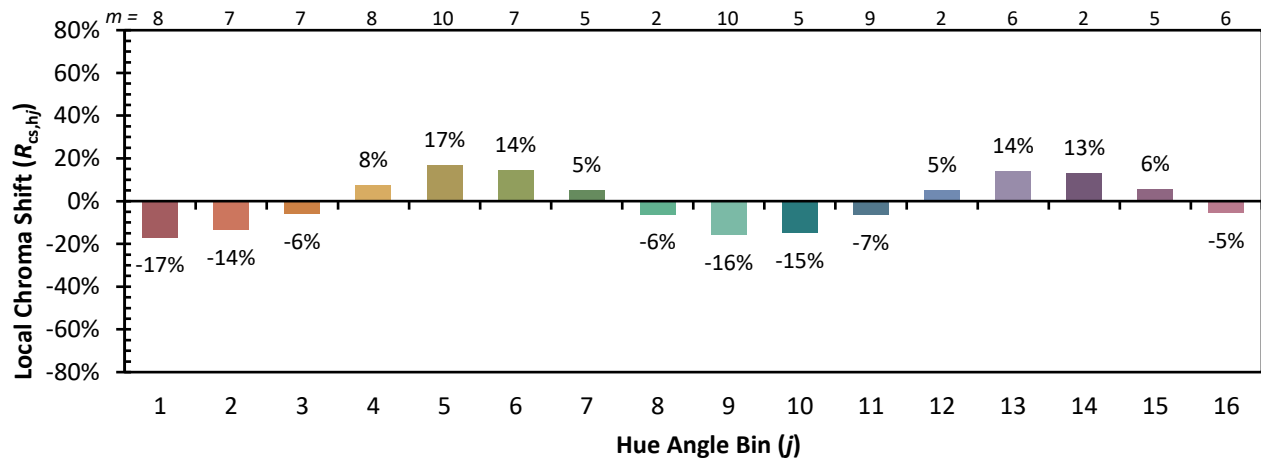


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 53 | CES51 = 87 | CES76 = 42 |
| CES02 = 59 | CES27 = 78 | CES52 = 88 | CES77 = 64 |
| CES03 = 30 | CES28 = 76 | CES53 = 74 | CES78 = 45 |
| CES04 = 69 | CES29 = 48 | CES54 = 80 | CES79 = 74 |
| CES05 = 46 | CES30 = 56 | CES55 = 79 | CES80 = 71 |
| CES06 = 50 | CES31 = 54 | CES56 = 68 | CES81 = 72 |
| CES07 = 39 | CES32 = 50 | CES57 = 65 | CES82 = 88 |
| CES08 = 38 | CES33 = 60 | CES58 = 67 | CES83 = 82 |
| CES09 = 29 | CES34 = 62 | CES59 = 87 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 91 | CES85 = 84 |
| CES11 = 56 | CES36 = 90 | CES61 = 87 | CES86 = 74 |
| CES12 = 61 | CES37 = 72 | CES62 = 79 | CES87 = 75 |
| CES13 = 41 | CES38 = 66 | CES63 = 72 | CES88 = 76 |
| CES14 = 74 | CES39 = 91 | CES64 = 70 | CES89 = 74 |
| CES15 = 70 | CES40 = 83 | CES65 = 63 | CES90 = 73 |
| CES16 = 46 | CES41 = 83 | CES66 = 64 | CES91 = 92 |
| CES17 = 49 | CES42 = 70 | CES67 = 62 | CES92 = 67 |
| CES18 = 55 | CES43 = 68 | CES68 = 69 | CES93 = 81 |
| CES19 = 71 | CES44 = 98 | CES69 = 80 | CES94 = 56 |
| CES20 = 64 | CES45 = 78 | CES70 = 56 | CES95 = 71 |
| CES21 = 85 | CES46 = 77 | CES71 = 53 | CES96 = 77 |
| CES22 = 77 | CES47 = 73 | CES72 = 84 | CES97 = 82 |
| CES23 = 91 | CES48 = 65 | CES73 = 46 | CES98 = 71 |
| CES24 = 90 | CES49 = 76 | CES74 = 94 | CES99 = 59 |
| CES25 = 71 | CES50 = 85 | CES75 = 49 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)