

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: STREETWORKS

Report Number: P1065964

Luminaire Tested: **NVN-SA4D-740-U-T2BC**

Issue Date: 08/07/2025

**Test Information**

Test Method: LM-79-08  
Report Number: P1065964  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/07/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: NVN-SA4D-740-U-T2BC  
Description: Navion AREA AND ROADWAY LUMINAIRE 1200mA 4xLight Square PACKAGE  
70CRI 4000K FIXTURE w/ TYPE II ANGLED BACKLIGHT CONTROL  
Light Source: (56) 4000K CCT, 70 CRI LEDs  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 23882.5 lumens  
Efficiency: N/A  
Efficacy: 109.1 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B0 - U0 - G4

Input Watts (W): 218.9  
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



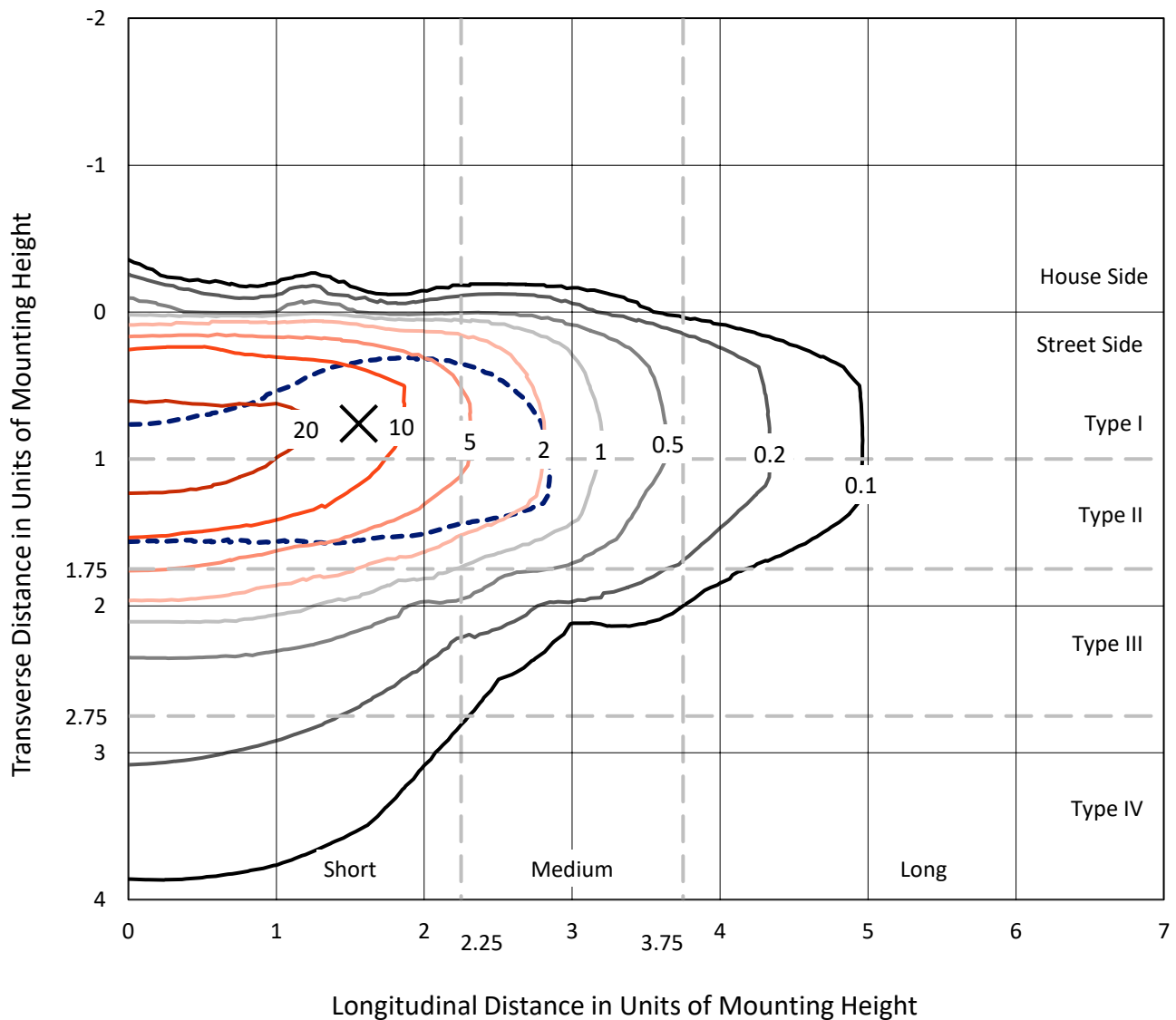
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CATALOG NUMBER: NVN-SA4D-740-U-T2BC

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

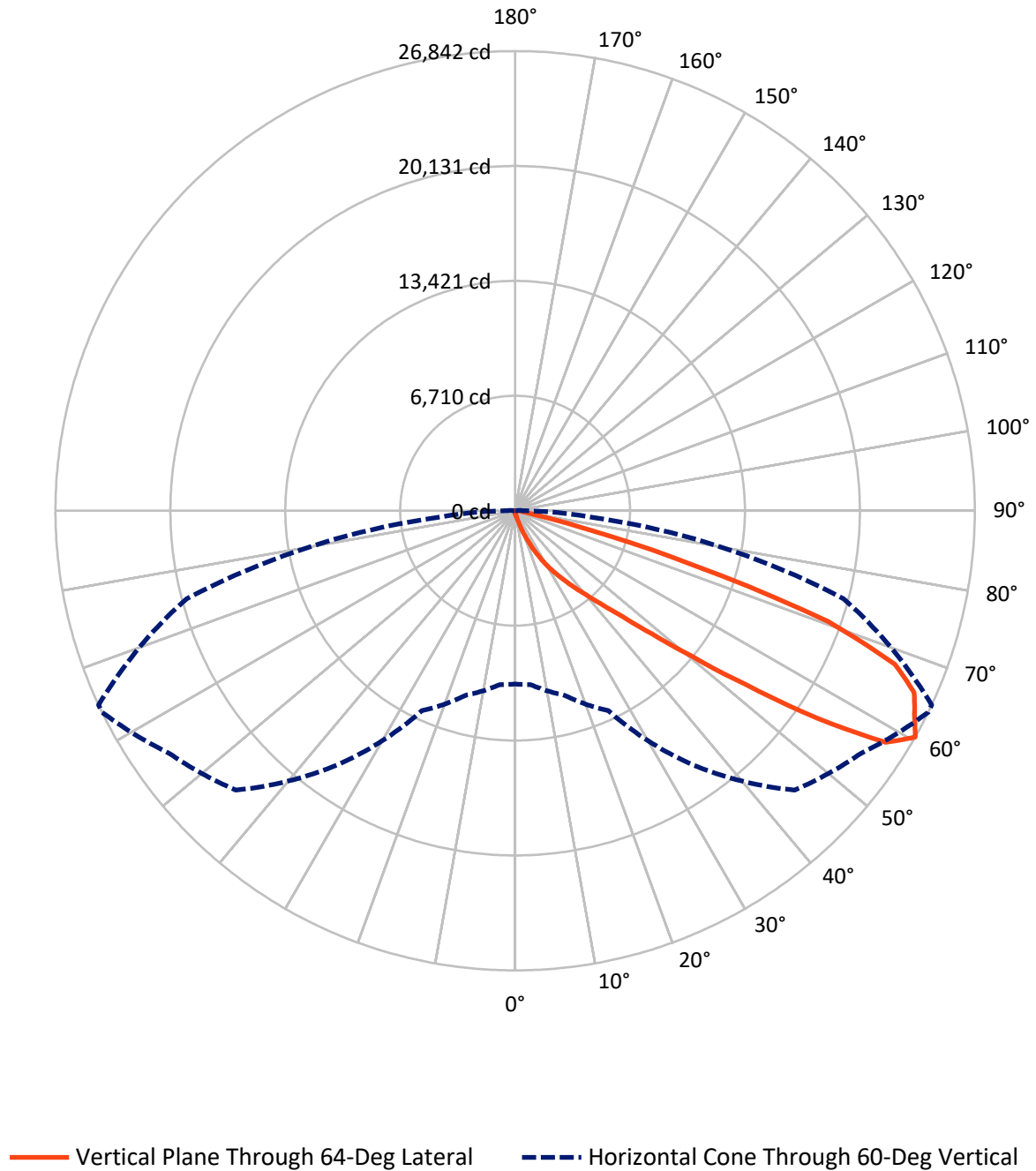


Based on 15 foot mounting height. Maximum calculated value = 34.3 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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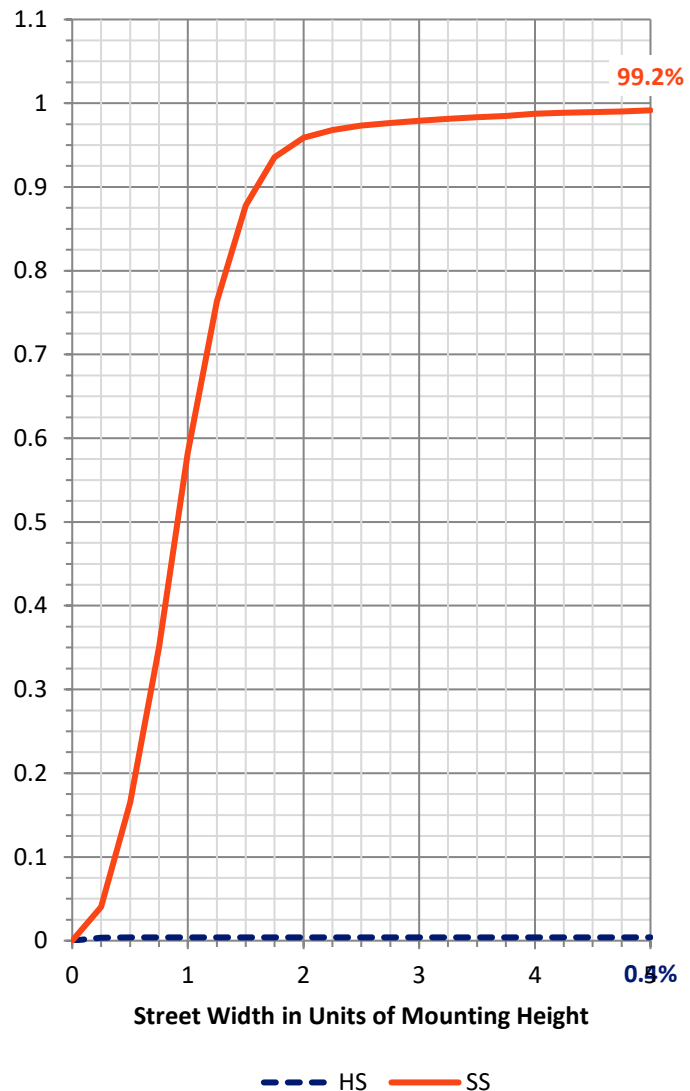
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 96.8     | 0.0    | 96.8    |
|                    | % Fixture | 0.4      | 0.0    | 0.4     |
| <b>Street Side</b> | Lumens    | 23785.7  | 0.0    | 23785.7 |
|                    | % Fixture | 99.6     | 0.0    | 99.6    |
| <b>Total</b>       | Lumens    | 23882.5  | 0.0    | 23882.5 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 23.8    | 0.1       |
| 10°-20°   | 234.7   | 1.0       |
| 20°-30°   | 779.5   | 3.3       |
| 30°-40°   | 2079.9  | 8.7       |
| 40°-50°   | 5286.5  | 22.1      |
| 50°-60°   | 7706.5  | 32.3      |
| 60°-70°   | 5952.5  | 24.9      |
| 70°-80°   | 1634.7  | 6.8       |
| 80°-90°   | 184.5   | 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°    | 23882.5 | 100.0     |
| 0°-180°   | 23882.5 | 100.0     |



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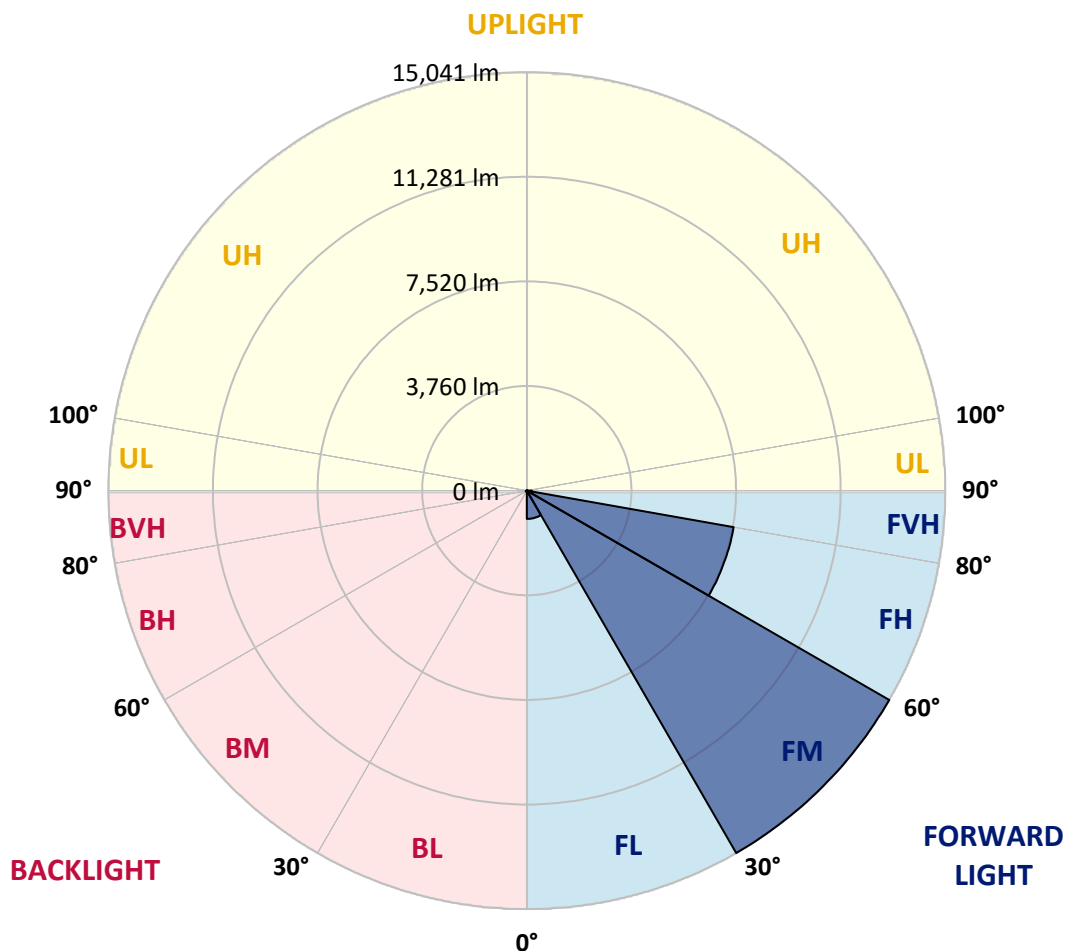
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1016.2  | 4.3       |                         |      |          |
| FM   | (30°-60°)   | 15040.8 | 63.0      |                         |      |          |
| FH   | (60°-80°)   | 7548.6  | 31.6      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 180.2   | 0.8       |                         |      | G2/225   |
| BL   | (0°-30°)    | 21.7    | 0.1       | B0/110                  |      |          |
| BM   | (30°-60°)   | 32.1    | 0.1       | B0/220                  |      |          |
| BH   | (60°-80°)   | 38.6    | 0.2       | B0/110                  |      | G0/110   |
| BVH  | (80°-90°)   | 4.4     | 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 II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 64°     | 65°     | 75°     | 85°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| 0°    | 157.8   | 157.8   | 157.8   | 157.8   | 157.8   | 157.8   | 157.8   | 157.8   | 157.8   | 157.8   | 157.8  |
| 2.5°  | 210.4   | 210.4   | 210.4   | 203.8   | 197.2   | 197.2   | 190.6   | 184.1   | 184.1   | 170.9   | 164.4  |
| 5°    | 322.1   | 322.1   | 309.0   | 295.8   | 276.1   | 249.8   | 223.5   | 203.8   | 203.8   | 184.1   | 170.9  |
| 7.5°  | 631.1   | 650.8   | 591.7   | 519.3   | 420.7   | 355.0   | 282.7   | 236.7   | 230.1   | 197.2   | 170.9  |
| 10°   | 1367.4  | 1354.2  | 1262.2  | 1084.7  | 854.6   | 618.0   | 394.4   | 289.3   | 276.1   | 210.4   | 170.9  |
| 12.5° | 2057.7  | 2077.4  | 1978.8  | 1781.6  | 1505.4  | 1097.9  | 677.1   | 374.7   | 361.6   | 230.1   | 170.9  |
| 15°   | 2649.3  | 2649.3  | 2583.6  | 2485.0  | 2182.6  | 1755.3  | 1091.3  | 558.8   | 512.8   | 249.8   | 164.4  |
| 17.5° | 3056.9  | 3050.3  | 3024.0  | 2997.7  | 2820.2  | 2379.8  | 1669.8  | 894.1   | 788.9   | 295.8   | 164.4  |
| 20°   | 3517.1  | 3497.4  | 3530.2  | 3477.6  | 3339.6  | 2991.2  | 2281.2  | 1327.9  | 1229.3  | 374.7   | 164.4  |
| 22.5° | 3997.0  | 4016.7  | 4043.0  | 3990.4  | 3839.2  | 3536.8  | 2925.4  | 1886.7  | 1781.6  | 519.3   | 170.9  |
| 25°   | 4608.4  | 4595.2  | 4654.4  | 4608.4  | 4417.7  | 4062.7  | 3530.2  | 2498.1  | 2346.9  | 723.1   | 184.1  |
| 27.5° | 5357.8  | 5331.5  | 5371.0  | 5252.6  | 5002.8  | 4641.2  | 4069.3  | 3122.7  | 2945.2  | 1038.7  | 210.4  |
| 30°   | 6350.5  | 6370.2  | 6192.7  | 6054.7  | 5699.7  | 5219.8  | 4667.5  | 3793.2  | 3609.1  | 1413.4  | 236.7  |
| 32.5° | 7915.1  | 7777.0  | 7500.9  | 6942.1  | 6475.4  | 5864.0  | 5265.8  | 4378.3  | 4213.9  | 1893.3  | 276.1  |
| 35°   | 10354.1 | 10380.4 | 9775.5  | 8395.0  | 7382.6  | 6672.6  | 5923.2  | 5022.5  | 4904.2  | 2439.0  | 328.7  |
| 37.5° | 13325.5 | 13253.2 | 12720.7 | 10978.6 | 8710.6  | 7678.4  | 6672.6  | 5726.0  | 5555.0  | 3030.6  | 394.4  |
| 40°   | 16691.4 | 16389.0 | 16080.0 | 14896.7 | 11478.2 | 8940.6  | 7619.3  | 6541.1  | 6409.7  | 3714.3  | 499.6  |
| 42.5° | 19386.7 | 19307.9 | 19360.4 | 18867.4 | 16093.2 | 11090.3 | 8874.9  | 7540.4  | 7382.6  | 4562.4  | 683.7  |
| 45°   | 20714.7 | 20602.9 | 20918.5 | 21286.6 | 20576.6 | 15665.9 | 10899.7 | 8815.7  | 8605.4  | 5561.6  | 966.4  |
| 47.5° | 20359.7 | 20280.8 | 20957.9 | 21681.1 | 22627.7 | 20971.1 | 14206.4 | 10722.2 | 10360.6 | 6843.5  | 1387.1 |
| 50°   | 18611.0 | 18617.6 | 19728.6 | 21076.3 | 22575.1 | 23659.8 | 19104.1 | 13332.1 | 12878.5 | 8546.2  | 2044.5 |
| 52.5° | 16908.3 | 16960.9 | 18137.7 | 20103.3 | 21792.8 | 23975.4 | 23403.5 | 16849.2 | 16112.9 | 10551.3 | 2820.2 |
| 55°   | 15159.7 | 15186.0 | 16224.6 | 18992.3 | 21424.7 | 23035.3 | 25612.3 | 21378.7 | 20596.4 | 13049.4 | 3576.3 |
| 57.5° | 13476.7 | 13476.7 | 13864.6 | 16323.3 | 21023.7 | 22949.9 | 25349.4 | 25520.3 | 24882.6 | 15902.5 | 4135.0 |
| 60°   | 10124.0 | 10189.7 | 11156.1 | 12878.5 | 18131.1 | 23074.8 | 24678.8 | 26841.7 | 26841.7 | 19860.1 | 4562.4 |
| 62.5° | 5114.6  | 5213.2  | 6416.2  | 8092.6  | 12438.0 | 21352.4 | 24784.0 | 26177.7 | 26282.9 | 23350.9 | 5535.3 |
| 65°   | 2399.5  | 2511.3  | 3155.5  | 4338.8  | 6692.3  | 15028.2 | 23692.7 | 25612.3 | 25579.5 | 22686.9 | 7586.4 |
| 67.5° | 1722.4  | 1755.3  | 1972.2  | 2531.0  | 3602.6  | 6587.2  | 18085.1 | 23922.8 | 23936.0 | 19275.0 | 8723.7 |
| 70°   | 1544.9  | 1544.9  | 1597.5  | 1761.8  | 2169.4  | 2945.2  | 8789.4  | 19373.6 | 20313.7 | 14883.5 | 8086.0 |
| 72.5° | 1525.2  | 1512.0  | 1498.9  | 1505.4  | 1466.0  | 1479.2  | 3017.5  | 10939.1 | 12280.2 | 10413.2 | 6449.1 |
| 75°   | 1485.7  | 1485.7  | 1472.6  | 1426.6  | 1170.2  | 953.2   | 1038.7  | 4424.3  | 5114.6  | 6955.3  | 4785.9 |
| 77.5° | 1176.7  | 1295.1  | 1433.1  | 1347.7  | 1071.6  | 716.6   | 604.8   | 1281.9  | 1617.2  | 4266.5  | 3471.1 |
| 80°   | 545.6   | 552.2   | 545.6   | 571.9   | 683.7   | 512.8   | 447.0   | 624.5   | 631.1   | 2366.6  | 2149.7 |
| 82.5° | 394.4   | 401.0   | 381.3   | 341.8   | 302.4   | 276.1   | 368.1   | 460.2   | 493.1   | 1084.7  | 802.0  |
| 85°   | 118.3   | 111.8   | 131.5   | 177.5   | 210.4   | 243.2   | 309.0   | 387.9   | 407.6   | 401.0   | 118.3  |
| 87.5° | 52.6    | 52.6    | 65.7    | 92.0    | 124.9   | 184.1   | 269.5   | 355.0   | 361.6   | 414.2   | 32.9   |
| 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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CATALOG NUMBER: NVN-SA4D-740-U-T2BC

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 157.8  | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 |
| 2.5°  | 164.4  | 157.8 | 151.2 | 144.6 | 138.1 | 131.5 | 124.9 | 124.9 | 131.5 | 131.5 | 131.5 |
| 5°    | 157.8  | 151.2 | 138.1 | 124.9 | 118.3 | 111.8 | 105.2 | 105.2 | 111.8 | 111.8 | 111.8 |
| 7.5°  | 157.8  | 144.6 | 131.5 | 118.3 | 105.2 | 98.6  | 92.0  | 92.0  | 92.0  | 98.6  | 98.6  |
| 10°   | 157.8  | 144.6 | 124.9 | 105.2 | 92.0  | 85.5  | 78.9  | 72.3  | 78.9  | 78.9  | 78.9  |
| 12.5° | 151.2  | 138.1 | 118.3 | 98.6  | 78.9  | 65.7  | 59.2  | 59.2  | 59.2  | 59.2  | 59.2  |
| 15°   | 144.6  | 131.5 | 111.8 | 85.5  | 65.7  | 52.6  | 39.4  | 39.4  | 39.4  | 46.0  | 46.0  |
| 17.5° | 138.1  | 124.9 | 98.6  | 65.7  | 46.0  | 32.9  | 26.3  | 26.3  | 26.3  | 32.9  | 32.9  |
| 20°   | 138.1  | 118.3 | 85.5  | 52.6  | 32.9  | 19.7  | 13.1  | 13.1  | 13.1  | 19.7  | 26.3  |
| 22.5° | 138.1  | 118.3 | 78.9  | 39.4  | 19.7  | 13.1  | 6.6   | 6.6   | 6.6   | 6.6   | 6.6   |
| 25°   | 138.1  | 111.8 | 72.3  | 32.9  | 13.1  | 6.6   | 0.0   | 0.0   | 6.6   | 13.1  | 19.7  |
| 27.5° | 138.1  | 105.2 | 59.2  | 19.7  | 13.1  | 6.6   | 0.0   | 6.6   | 13.1  | 13.1  | 13.1  |
| 30°   | 138.1  | 105.2 | 52.6  | 19.7  | 6.6   | 0.0   | 0.0   | 6.6   | 13.1  | 13.1  | 19.7  |
| 32.5° | 144.6  | 98.6  | 46.0  | 13.1  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 35°   | 151.2  | 92.0  | 39.4  | 13.1  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 37.5° | 164.4  | 92.0  | 26.3  | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 40°   | 184.1  | 98.6  | 26.3  | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 42.5° | 230.1  | 105.2 | 19.7  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 45°   | 322.1  | 131.5 | 19.7  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 47.5° | 473.3  | 197.2 | 19.7  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 50°   | 690.3  | 269.5 | 13.1  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 52.5° | 848.0  | 269.5 | 13.1  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 55°   | 841.5  | 170.9 | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 57.5° | 644.3  | 118.3 | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 60°   | 545.6  | 85.5  | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 62.5° | 657.4  | 65.7  | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 65°   | 1170.2 | 59.2  | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 67.5° | 1880.2 | 59.2  | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 70°   | 2103.7 | 59.2  | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 72.5° | 1643.5 | 52.6  | 6.6   | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 75°   | 900.6  | 46.0  | 6.6   | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 77.5° | 453.6  | 32.9  | 13.1  | 6.6   | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 190.6  | 26.3  | 13.1  | 6.6   | 6.6   | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 65.7   | 26.3  | 13.1  | 13.1  | 6.6   | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 32.9   | 19.7  | 19.7  | 13.1  | 13.1  | 6.6   | 6.6   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 19.7   | 19.7  | 19.7  | 13.1  | 13.1  | 6.6   | 6.6   | 0.0   | 0.0   | 0.0   | 6.6   |
| 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: SP1-2407-184-1

Test Date: 10/09/2024

Luminaire Tested: GSS-SB1A-740-U-5WQ

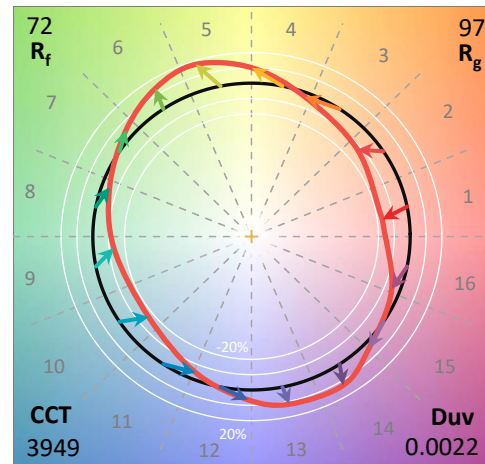
Data in this report applies to families of products including GSS-SB1A-740-U-5WQ

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-184-1  
 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-740-U-5WQ**  
 Description: GALLEON II SITE SLIM 1SQ 350MA 5WQ HIGH DENSITY LIGHTSQUARE WITH 70 CRI  
 4000K CCT 26 LEDS

### Spectral Parameters

|                           |          |           |      |      |       |
|---------------------------|----------|-----------|------|------|-------|
| CCT (K):                  | 3949     | CRI (Ra): | 70.7 |      |       |
| CIE u':                   | 0.2248   | R1:       | 68.0 | R9:  | -36.7 |
| CIE v':                   | 0.5053   | R2:       | 76.0 | R10: | 45.1  |
| Duv:                      | 0.0022   | R3:       | 84.3 | R11: | 70.7  |
| CIE x:                    | 0.3844   | R4:       | 72.0 | R12: | 47.1  |
| CIE y:                    | 0.3840   | R5:       | 68.6 | R13: | 68.5  |
| CIE z:                    | 0.2316   | R6:       | 68.3 | R14: | 91.1  |
| Peak Wavelength (nm):     | 440      | R7:       | 77.9 | R15: | 58.7  |
| Dominant Wavelength (nm): | 578      | R8:       | 50.3 |      |       |
| Purity:                   | 30.60026 |           |      |      |       |
| Rf:                       | 71.8     |           |      |      |       |
| Rg:                       | 96.5     |           |      |      |       |



### Test Conditions

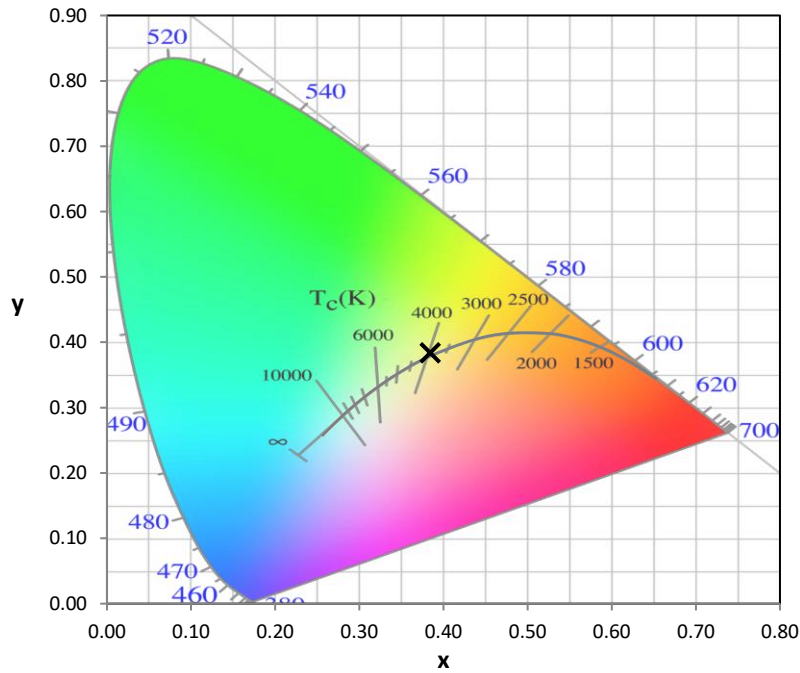
Stabilization Time: 34M  
 Operation Time: 1H 34M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-184-1

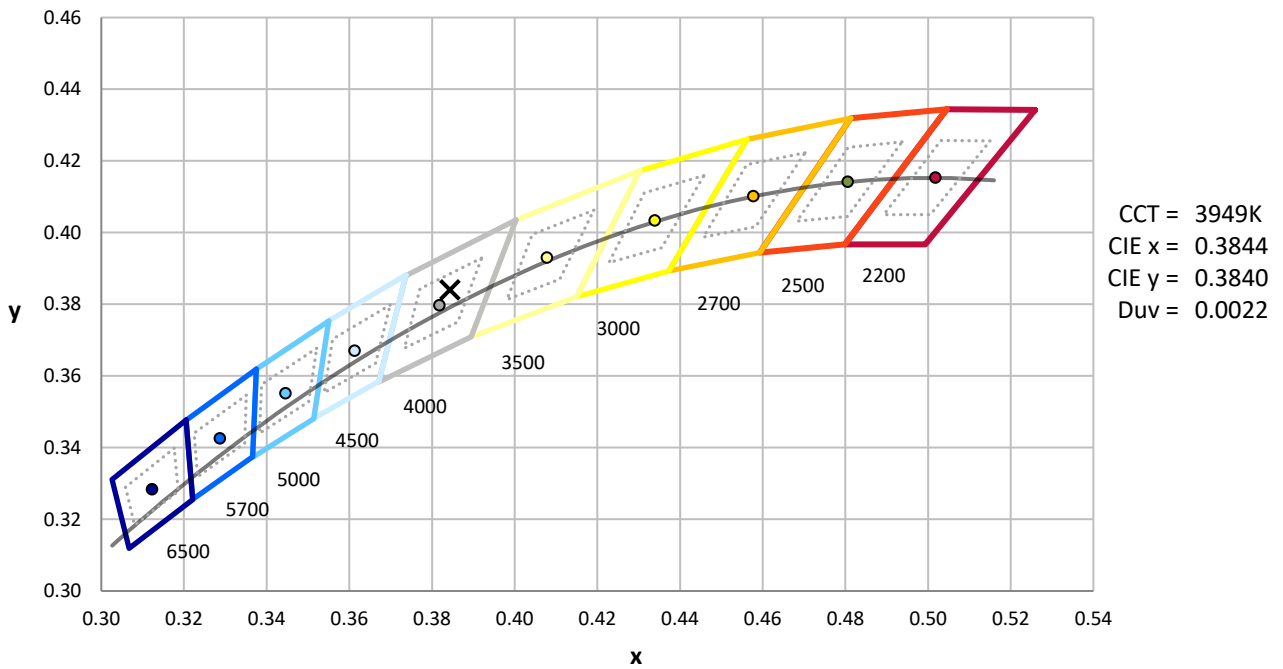
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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



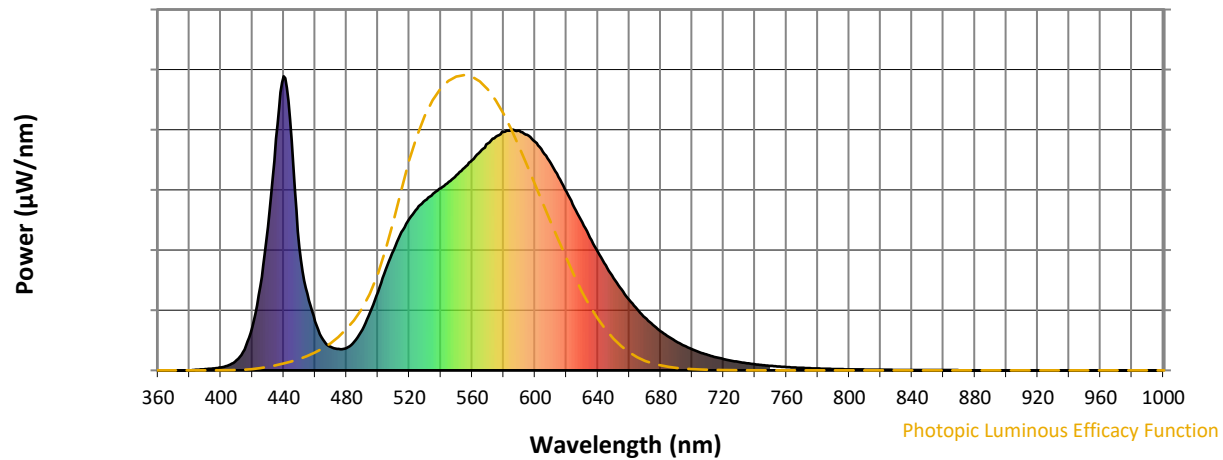
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 4000K 4-step quadrangle

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### Photopic Flux vs. Wavelength

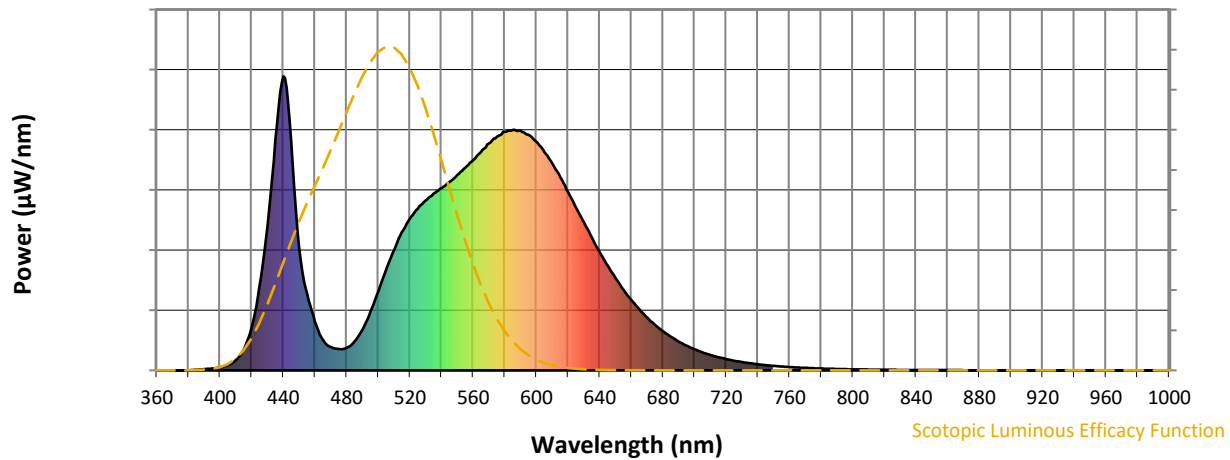


### Photopic Lumens: NR

| $\lambda$<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               | 139                                  | NR                             | 620               | 607                                  | NR                             | 750               | 15                                   | NR                             | 880               | 0                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 198                                  | NR                             | 625               | 554                                  | NR                             | 755               | 13                                   | NR                             | 885               | 0                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 267                                  | NR                             | 630               | 504                                  | NR                             | 760               | 11                                   | NR                             | 890               | 0                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 343                                  | NR                             | 635               | 452                                  | NR                             | 765               | 10                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 410                                  | NR                             | 640               | 403                                  | NR                             | 770               | 8                                    | NR                             | 900               | 0                                    | NR                             |
| 385               | 2                                    | NR                             | 515               | 470                                  | NR                             | 645               | 357                                  | NR                             | 775               | 7                                    | NR                             | 905               | 0                                    | NR                             |
| 390               | 4                                    | NR                             | 520               | 516                                  | NR                             | 650               | 314                                  | NR                             | 780               | 6                                    | NR                             | 910               | 0                                    | NR                             |
| 395               | 7                                    | NR                             | 525               | 550                                  | NR                             | 655               | 275                                  | NR                             | 785               | 5                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 10                                   | NR                             | 530               | 578                                  | NR                             | 660               | 240                                  | NR                             | 790               | 5                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 17                                   | NR                             | 535               | 601                                  | NR                             | 665               | 208                                  | NR                             | 795               | 4                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 35                                   | NR                             | 540               | 620                                  | NR                             | 670               | 179                                  | NR                             | 800               | 4                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 70                                   | NR                             | 545               | 641                                  | NR                             | 675               | 155                                  | NR                             | 805               | 3                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 147                                  | NR                             | 550               | 664                                  | NR                             | 680               | 133                                  | NR                             | 810               | 3                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 285                                  | NR                             | 555               | 689                                  | NR                             | 685               | 114                                  | NR                             | 815               | 2                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 487                                  | NR                             | 560               | 715                                  | NR                             | 690               | 98                                   | NR                             | 820               | 2                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 787                                  | NR                             | 565               | 743                                  | NR                             | 695               | 84                                   | NR                             | 825               | 2                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 1000                                 | NR                             | 570               | 771                                  | NR                             | 700               | 72                                   | NR                             | 830               | 2                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 783                                  | NR                             | 575               | 794                                  | NR                             | 705               | 61                                   | NR                             | 835               | 1                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 417                                  | NR                             | 580               | 811                                  | NR                             | 710               | 52                                   | NR                             | 840               | 1                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 261                                  | NR                             | 585               | 817                                  | NR                             | 715               | 45                                   | NR                             | 845               | 1                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 167                                  | NR                             | 590               | 815                                  | NR                             | 720               | 39                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 104                                  | NR                             | 595               | 801                                  | NR                             | 725               | 33                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 79                                   | NR                             | 600               | 777                                  | NR                             | 730               | 28                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 73                                   | NR                             | 605               | 744                                  | NR                             | 735               | 24                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 76                                   | NR                             | 610               | 704                                  | NR                             | 740               | 21                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 98                                   | NR                             | 615               | 657                                  | NR                             | 745               | 18                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



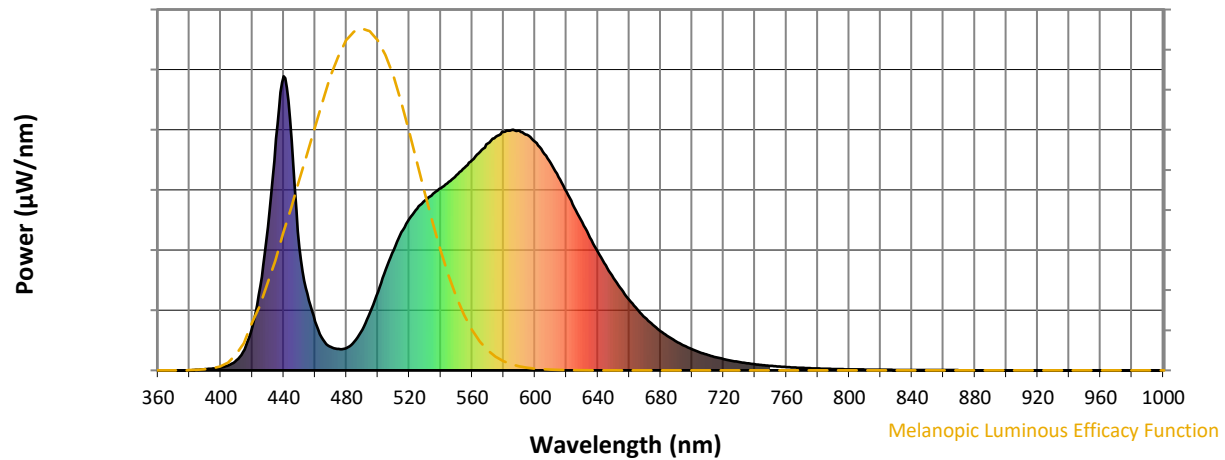
Scotopic Lumens: NR

S/P: 1.47

| 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    | 139                      | NR            | 620    | 607                      | NR            | 750    | 15                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 198                      | NR            | 625    | 554                      | NR            | 755    | 13                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 267                      | NR            | 630    | 504                      | NR            | 760    | 11                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 343                      | NR            | 635    | 452                      | NR            | 765    | 10                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 410                      | NR            | 640    | 403                      | NR            | 770    | 8                        | NR            | 900    | 0                        | NR            |
| 385    | 2                        | NR            | 515    | 470                      | NR            | 645    | 357                      | NR            | 775    | 7                        | NR            | 905    | 0                        | NR            |
| 390    | 4                        | NR            | 520    | 516                      | NR            | 650    | 314                      | NR            | 780    | 6                        | NR            | 910    | 0                        | NR            |
| 395    | 7                        | NR            | 525    | 550                      | NR            | 655    | 275                      | NR            | 785    | 5                        | NR            | 915    | 0                        | NR            |
| 400    | 10                       | NR            | 530    | 578                      | NR            | 660    | 240                      | NR            | 790    | 5                        | NR            | 920    | 0                        | NR            |
| 405    | 17                       | NR            | 535    | 601                      | NR            | 665    | 208                      | NR            | 795    | 4                        | NR            | 925    | 0                        | NR            |
| 410    | 35                       | NR            | 540    | 620                      | NR            | 670    | 179                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 70                       | NR            | 545    | 641                      | NR            | 675    | 155                      | NR            | 805    | 3                        | NR            | 935    | 0                        | NR            |
| 420    | 147                      | NR            | 550    | 664                      | NR            | 680    | 133                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 285                      | NR            | 555    | 689                      | NR            | 685    | 114                      | NR            | 815    | 2                        | NR            | 945    | 0                        | NR            |
| 430    | 487                      | NR            | 560    | 715                      | NR            | 690    | 98                       | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 787                      | NR            | 565    | 743                      | NR            | 695    | 84                       | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 1000                     | NR            | 570    | 771                      | NR            | 700    | 72                       | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 783                      | NR            | 575    | 794                      | NR            | 705    | 61                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 417                      | NR            | 580    | 811                      | NR            | 710    | 52                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 261                      | NR            | 585    | 817                      | NR            | 715    | 45                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 167                      | NR            | 590    | 815                      | NR            | 720    | 39                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 104                      | NR            | 595    | 801                      | NR            | 725    | 33                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 79                       | NR            | 600    | 777                      | NR            | 730    | 28                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 73                       | NR            | 605    | 744                      | NR            | 735    | 24                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 76                       | NR            | 610    | 704                      | NR            | 740    | 21                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 98                       | NR            | 615    | 657                      | NR            | 745    | 18                       | NR            | 875    | 1                        | NR            |        |                          |               |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.78

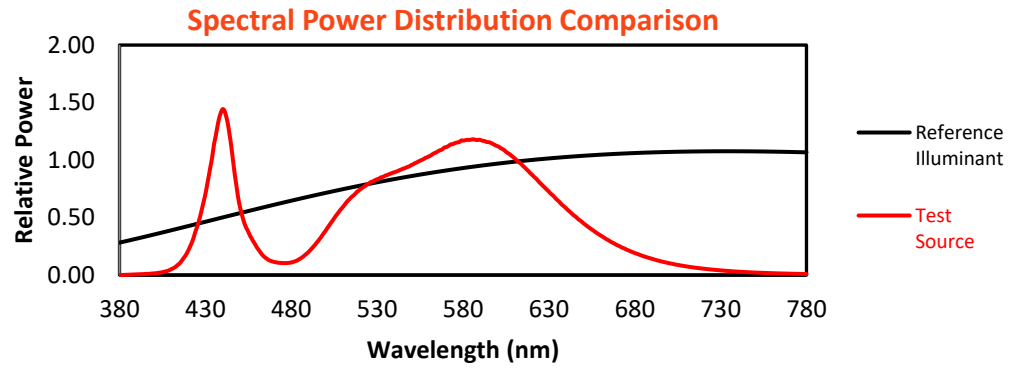
| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 139                         | NR               | 620       | 607                         | NR               | 750       | 15                          | NR               | 880       | 0                           | NR               |
| 365       | 0                           | NR               | 495       | 198                         | NR               | 625       | 554                         | NR               | 755       | 13                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 267                         | NR               | 630       | 504                         | NR               | 760       | 11                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 343                         | NR               | 635       | 452                         | NR               | 765       | 10                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 410                         | NR               | 640       | 403                         | NR               | 770       | 8                           | NR               | 900       | 0                           | NR               |
| 385       | 2                           | NR               | 515       | 470                         | NR               | 645       | 357                         | NR               | 775       | 7                           | NR               | 905       | 0                           | NR               |
| 390       | 4                           | NR               | 520       | 516                         | NR               | 650       | 314                         | NR               | 780       | 6                           | NR               | 910       | 0                           | NR               |
| 395       | 7                           | NR               | 525       | 550                         | NR               | 655       | 275                         | NR               | 785       | 5                           | NR               | 915       | 0                           | NR               |
| 400       | 10                          | NR               | 530       | 578                         | NR               | 660       | 240                         | NR               | 790       | 5                           | NR               | 920       | 0                           | NR               |
| 405       | 17                          | NR               | 535       | 601                         | NR               | 665       | 208                         | NR               | 795       | 4                           | NR               | 925       | 0                           | NR               |
| 410       | 35                          | NR               | 540       | 620                         | NR               | 670       | 179                         | NR               | 800       | 4                           | NR               | 930       | 0                           | NR               |
| 415       | 70                          | NR               | 545       | 641                         | NR               | 675       | 155                         | NR               | 805       | 3                           | NR               | 935       | 0                           | NR               |
| 420       | 147                         | NR               | 550       | 664                         | NR               | 680       | 133                         | NR               | 810       | 3                           | NR               | 940       | 0                           | NR               |
| 425       | 285                         | NR               | 555       | 689                         | NR               | 685       | 114                         | NR               | 815       | 2                           | NR               | 945       | 0                           | NR               |
| 430       | 487                         | NR               | 560       | 715                         | NR               | 690       | 98                          | NR               | 820       | 2                           | NR               | 950       | 0                           | NR               |
| 435       | 787                         | NR               | 565       | 743                         | NR               | 695       | 84                          | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 1000                        | NR               | 570       | 771                         | NR               | 700       | 72                          | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 783                         | NR               | 575       | 794                         | NR               | 705       | 61                          | NR               | 835       | 1                           | NR               | 965       | 0                           | NR               |
| 450       | 417                         | NR               | 580       | 811                         | NR               | 710       | 52                          | NR               | 840       | 1                           | NR               | 970       | 0                           | NR               |
| 455       | 261                         | NR               | 585       | 817                         | NR               | 715       | 45                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 167                         | NR               | 590       | 815                         | NR               | 720       | 39                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 104                         | NR               | 595       | 801                         | NR               | 725       | 33                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 79                          | NR               | 600       | 777                         | NR               | 730       | 28                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 73                          | NR               | 605       | 744                         | NR               | 735       | 24                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 76                          | NR               | 610       | 704                         | NR               | 740       | 21                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 98                          | NR               | 615       | 657                         | NR               | 745       | 18                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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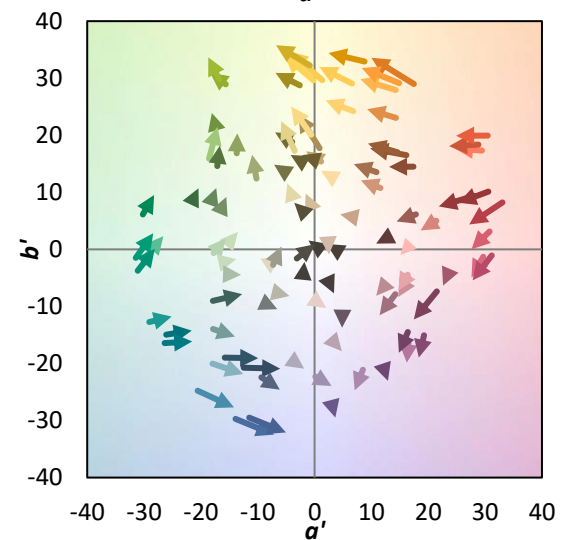
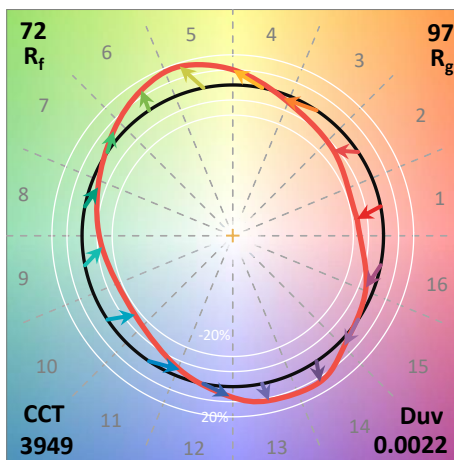
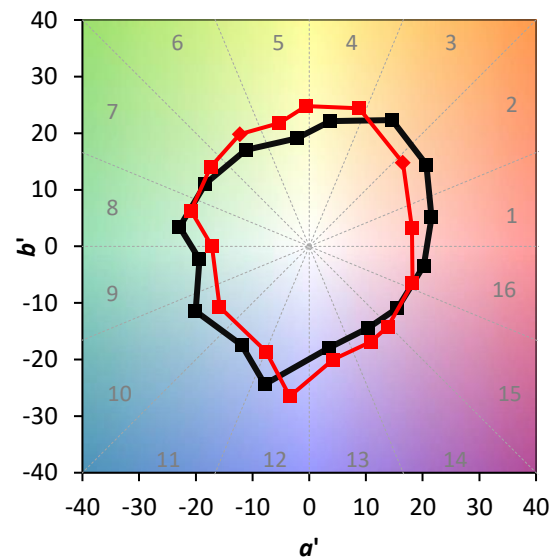
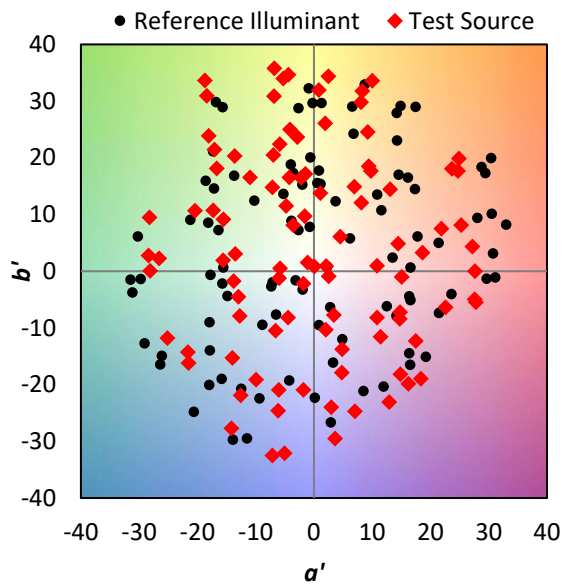
TM-30-18

### Summary

$R_f = 71.8$   
 $R_g = 96.5$   
 CIE  $R_a = 70.7$   
 $R_g = -36.7$



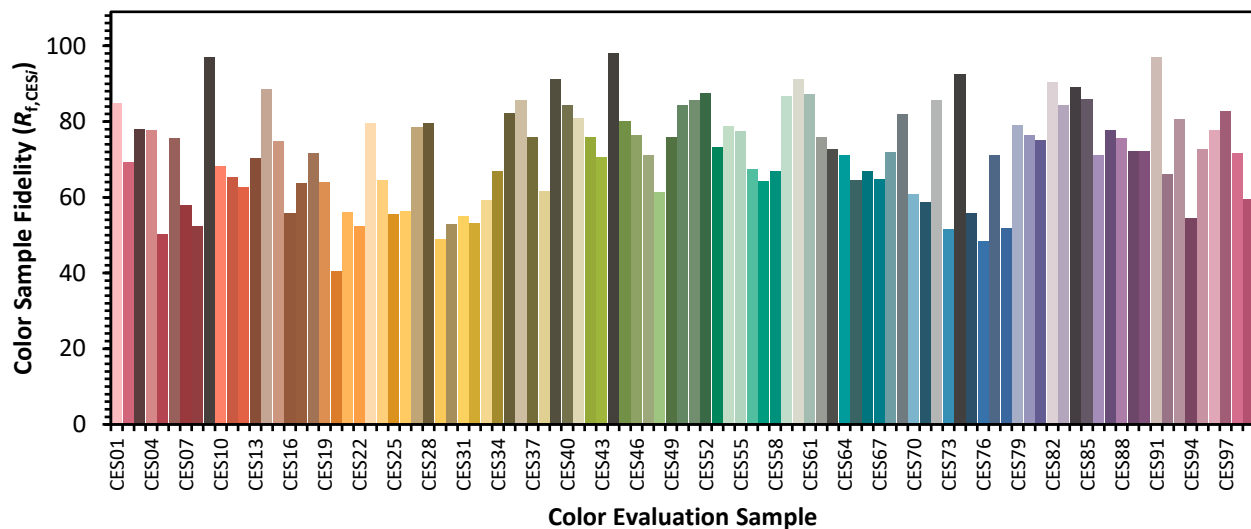
### Color Vector Graphics



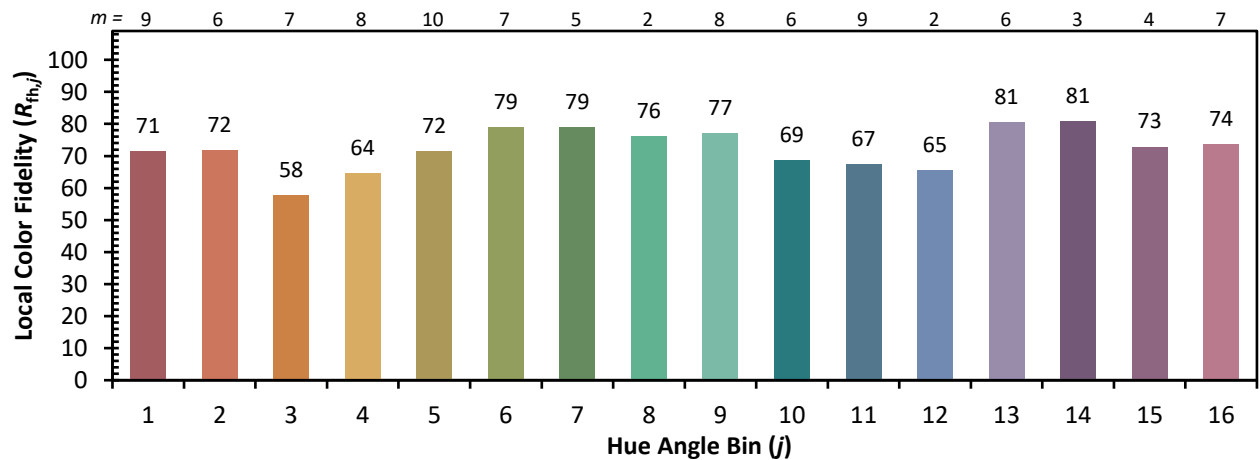
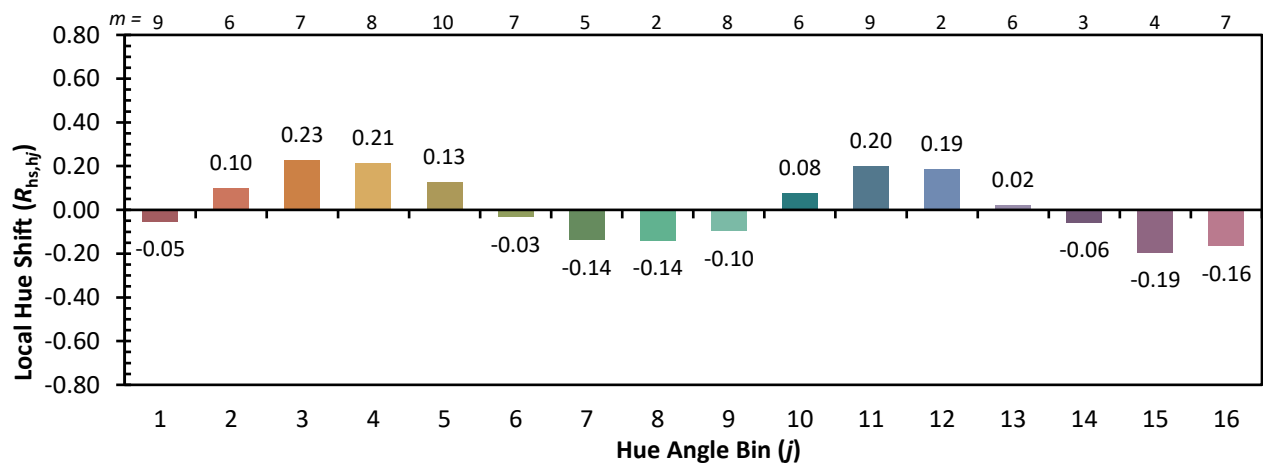
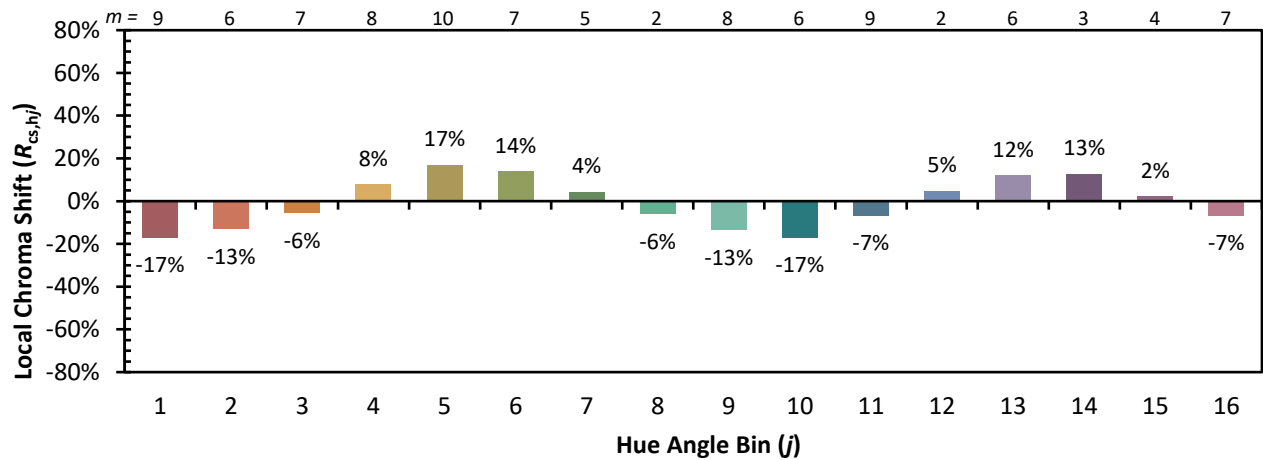


Individual Sample Fidelity Index ( $R_{f,i}$ )

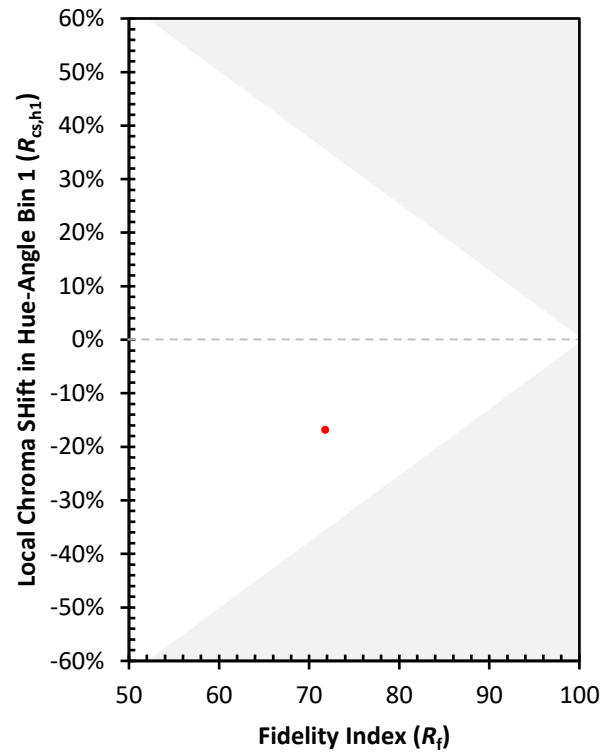
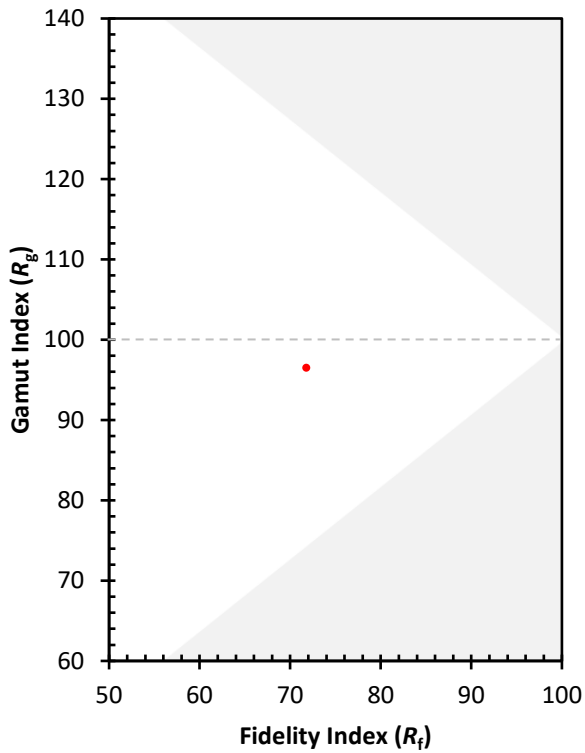
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 56 | CES51 = 86 | CES76 = 48 |
| CES02 = 61 | CES27 = 79 | CES52 = 88 | CES77 = 71 |
| CES03 = 30 | CES28 = 80 | CES53 = 73 | CES78 = 52 |
| CES04 = 70 | CES29 = 49 | CES54 = 79 | CES79 = 79 |
| CES05 = 47 | CES30 = 53 | CES55 = 77 | CES80 = 77 |
| CES06 = 50 | CES31 = 55 | CES56 = 67 | CES81 = 75 |
| CES07 = 40 | CES32 = 53 | CES57 = 64 | CES82 = 90 |
| CES08 = 39 | CES33 = 59 | CES58 = 67 | CES83 = 84 |
| CES09 = 29 | CES34 = 67 | CES59 = 87 | CES84 = 89 |
| CES10 = 74 | CES35 = 82 | CES60 = 91 | CES85 = 86 |
| CES11 = 57 | CES36 = 86 | CES61 = 87 | CES86 = 71 |
| CES12 = 63 | CES37 = 76 | CES62 = 76 | CES87 = 78 |
| CES13 = 42 | CES38 = 62 | CES63 = 73 | CES88 = 76 |
| CES14 = 74 | CES39 = 91 | CES64 = 71 | CES89 = 72 |
| CES15 = 71 | CES40 = 84 | CES65 = 64 | CES90 = 72 |
| CES16 = 46 | CES41 = 81 | CES66 = 67 | CES91 = 97 |
| CES17 = 49 | CES42 = 76 | CES67 = 65 | CES92 = 66 |
| CES18 = 56 | CES43 = 71 | CES68 = 72 | CES93 = 81 |
| CES19 = 72 | CES44 = 98 | CES69 = 82 | CES94 = 55 |
| CES20 = 65 | CES45 = 80 | CES70 = 61 | CES95 = 73 |
| CES21 = 86 | CES46 = 76 | CES71 = 59 | CES96 = 78 |
| CES22 = 78 | CES47 = 71 | CES72 = 86 | CES97 = 83 |
| CES23 = 92 | CES48 = 61 | CES73 = 52 | CES98 = 72 |
| CES24 = 91 | CES49 = 76 | CES74 = 93 | CES99 = 60 |
| CES25 = 72 | CES50 = 84 | CES75 = 56 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)