

Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P629953

Luminaire Tested: GWS-SA1C-760-U-SL4-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P629953  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-35)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1C-760-U-SL4-W  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE IV SPILL LIGHT ELIMINATOR OPTICS  
Light Source: (16) 5700K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4657.3 lumens  
Efficiency: N/A  
Efficacy: 136.6 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G1

Input Watts (W): 34.1  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



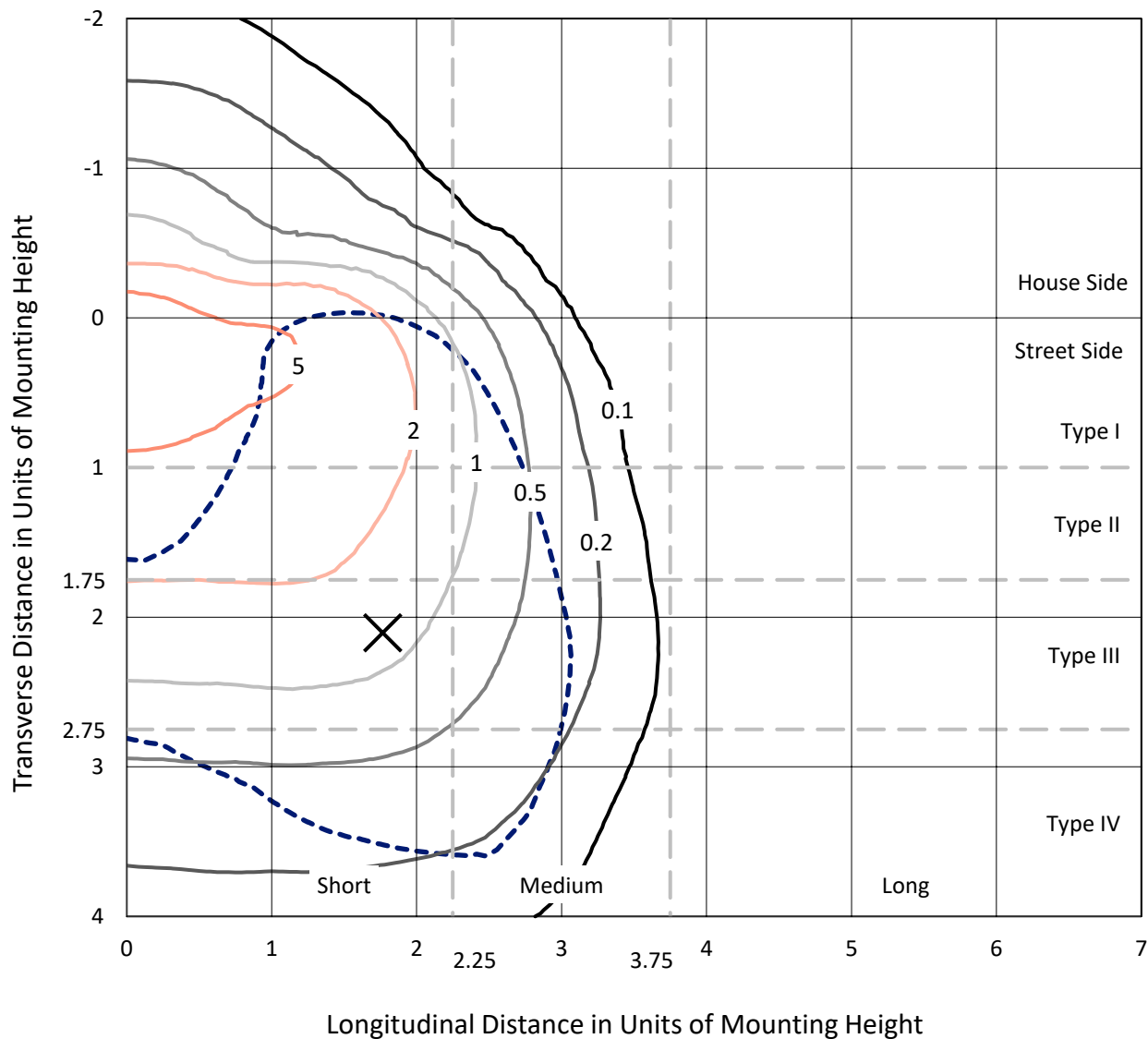
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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

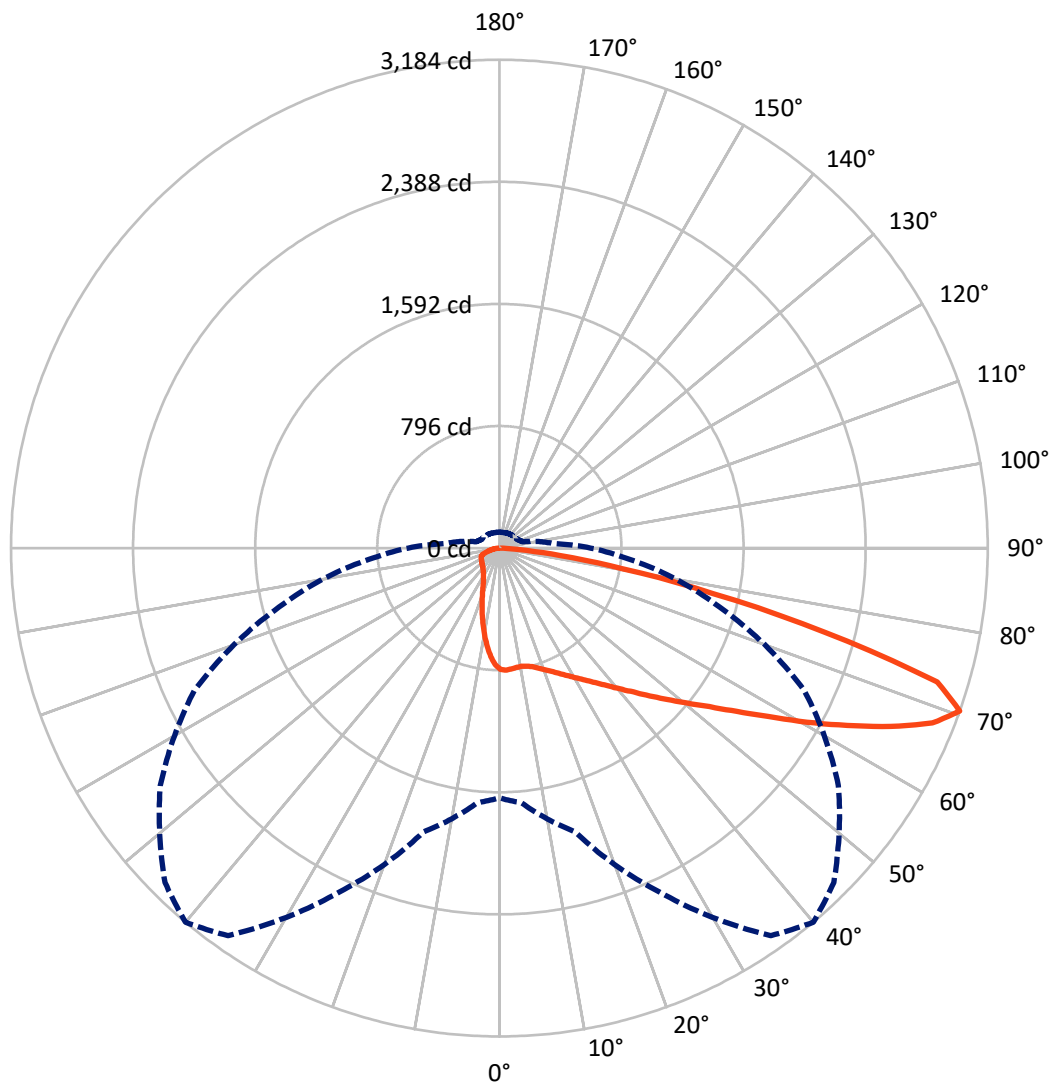


Based on 10 foot mounting height. Maximum calculated value = 7.9 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 40-Deg Lateral    - - - Horizontal Cone Through 70-Deg Vertical

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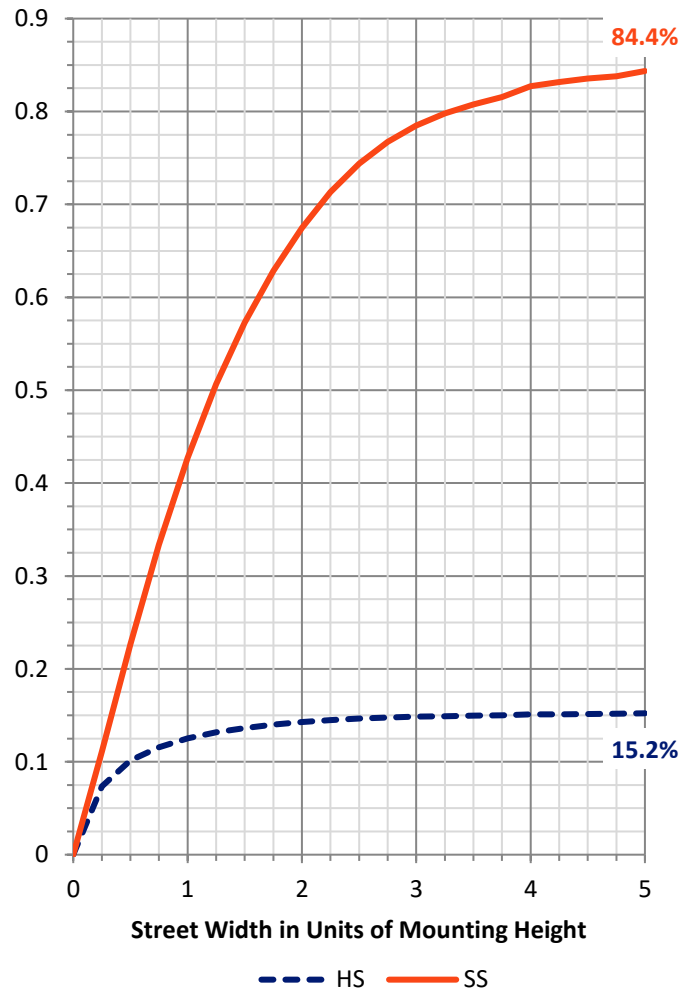
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 717.3    | 0.0    | 717.3  |
|                    | % Fixture | 15.4     | 0.0    | 15.4   |
| <b>Street Side</b> | Lumens    | 3940.0   | 0.0    | 3940.0 |
|                    | % Fixture | 84.6     | 0.0    | 84.6   |
| <b>Total</b>       | Lumens    | 4657.3   | 0.0    | 4657.3 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 69.9   | 1.5       |
| 10°-20°   | 182.1  | 3.9       |
| 20°-30°   | 285.9  | 6.1       |
| 30°-40°   | 429.9  | 9.2       |
| 40°-50°   | 663.6  | 14.2      |
| 50°-60°   | 985.5  | 21.2      |
| 60°-70°   | 1242.2 | 26.7      |
| 70°-80°   | 718.4  | 15.4      |
| 80°-90°   | 79.7   | 1.7       |
| 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°    | 4657.3 | 100.0     |
| 0°-180°   | 4657.3 | 100.0     |

**Coefficient of Utilization**



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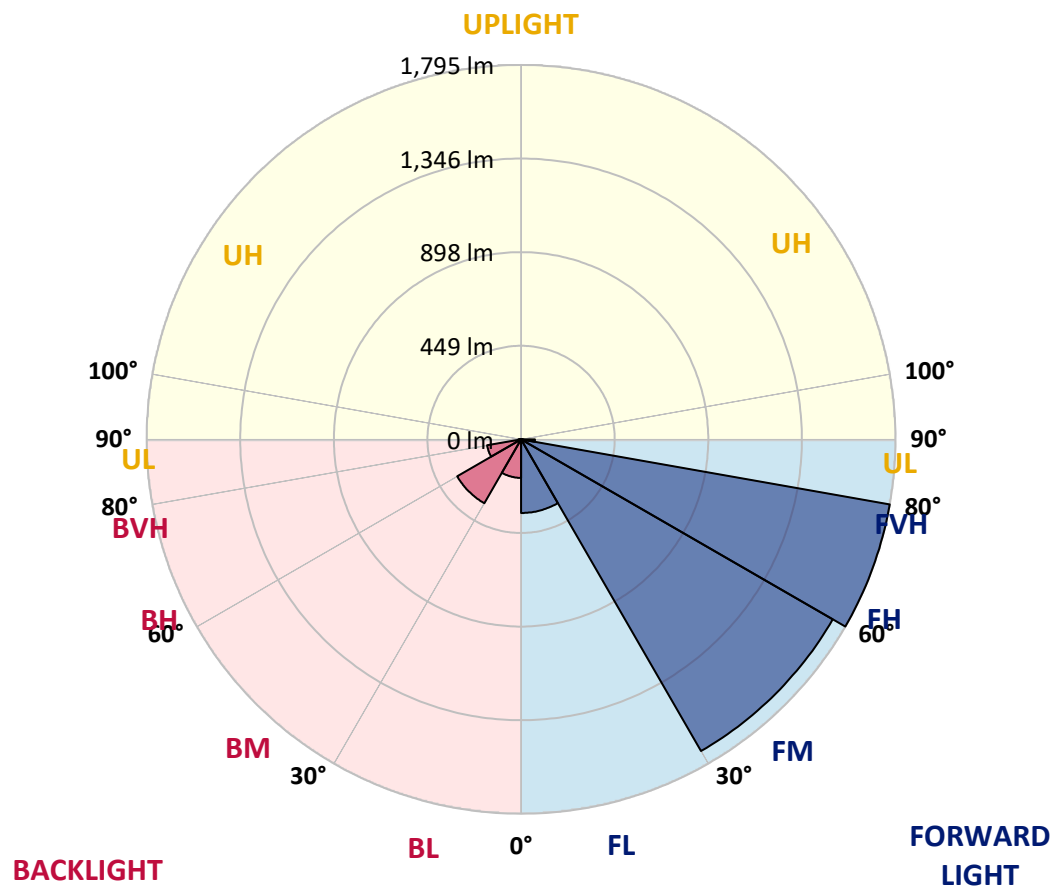
CATALOG NUMBER: GWS-SA1C-760-U-SL4-W

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 353.1  | 7.6       |                         |      |         |
| FM   | (30°-60°)   | 1725.5 | 37.0      |                         |      |         |
| FH   | (60°-80°)   | 1795.0 | 38.5      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 66.4   | 1.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 184.9  | 4.0       | B1/500                  |      |         |
| BM   | (30°-60°)   | 353.6  | 7.6       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 165.6  | 3.6       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 13.3   | 0.3       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 40°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 790.9  | 790.9  | 790.9  | 790.9  | 790.9  | 790.9  | 790.9  | 790.9  | 790.9  | 790.9  | 790.9  |
| 2.5°  | 795.7  | 797.1  | 798.2  | 799.6  | 798.9  | 796.8  | 798.5  | 798.5  | 794.7  | 790.5  | 786.7  |
| 5°    | 796.8  | 798.5  | 798.2  | 797.8  | 795.0  | 791.6  | 791.6  | 789.5  | 782.9  | 776.3  | 770.0  |
| 7.5°  | 794.7  | 794.3  | 794.0  | 792.9  | 789.8  | 786.0  | 785.3  | 781.1  | 772.4  | 763.4  | 754.4  |
| 10°   | 785.3  | 785.0  | 786.0  | 788.4  | 787.7  | 784.3  | 784.3  | 780.4  | 770.4  | 759.2  | 747.4  |
| 12.5° | 777.7  | 777.7  | 781.8  | 788.4  | 790.9  | 789.5  | 789.8  | 787.0  | 775.6  | 762.4  | 748.5  |
| 15°   | 778.7  | 779.0  | 788.1  | 798.9  | 803.4  | 802.3  | 802.7  | 799.6  | 786.7  | 773.5  | 754.7  |
| 17.5° | 785.6  | 787.4  | 803.0  | 818.0  | 823.9  | 822.5  | 820.1  | 814.8  | 800.2  | 785.3  | 762.4  |
| 20°   | 800.2  | 803.0  | 823.2  | 842.0  | 848.9  | 845.8  | 841.6  | 831.2  | 815.2  | 798.9  | 770.7  |
| 22.5° | 829.1  | 830.8  | 853.1  | 871.5  | 877.1  | 873.3  | 864.9  | 850.0  | 831.5  | 814.5  | 780.8  |
| 25°   | 869.8  | 871.9  | 893.1  | 910.1  | 908.7  | 904.2  | 892.7  | 874.3  | 852.4  | 834.3  | 795.4  |
| 27.5° | 918.1  | 921.6  | 942.4  | 956.0  | 946.9  | 940.3  | 927.5  | 905.2  | 880.6  | 864.2  | 817.6  |
| 30°   | 970.9  | 972.3  | 990.1  | 1003.6 | 989.7  | 980.7  | 965.0  | 941.0  | 918.8  | 906.6  | 851.0  |
| 32.5° | 1022.0 | 1023.4 | 1038.7 | 1046.4 | 1031.8 | 1025.2 | 1011.6 | 986.2  | 970.6  | 964.0  | 900.7  |
| 35°   | 1075.9 | 1075.6 | 1088.1 | 1094.7 | 1079.7 | 1077.0 | 1063.1 | 1043.6 | 1040.8 | 1049.5 | 973.4  |
| 37.5° | 1129.8 | 1126.7 | 1133.3 | 1142.0 | 1133.6 | 1136.4 | 1127.4 | 1120.8 | 1131.5 | 1154.1 | 1070.0 |
| 40°   | 1172.9 | 1172.9 | 1179.9 | 1190.6 | 1193.4 | 1205.6 | 1200.4 | 1209.1 | 1243.8 | 1297.7 | 1189.6 |
| 42.5° | 1211.2 | 1211.5 | 1226.1 | 1242.8 | 1262.9 | 1281.7 | 1285.9 | 1308.5 | 1380.4 | 1464.9 | 1339.8 |
| 45°   | 1251.1 | 1251.5 | 1271.3 | 1295.6 | 1338.4 | 1374.2 | 1382.5 | 1433.3 | 1536.2 | 1639.1 | 1502.8 |
| 47.5° | 1297.4 | 1293.5 | 1321.0 | 1361.7 | 1422.5 | 1474.0 | 1495.5 | 1567.5 | 1697.5 | 1824.0 | 1656.5 |
| 50°   | 1349.5 | 1341.5 | 1372.1 | 1442.3 | 1517.4 | 1588.0 | 1624.1 | 1706.5 | 1870.6 | 1994.7 | 1801.1 |
| 52.5° | 1408.3 | 1403.7 | 1435.7 | 1521.2 | 1636.0 | 1717.3 | 1766.3 | 1874.4 | 2038.9 | 2164.7 | 1915.8 |
| 55°   | 1481.3 | 1470.5 | 1516.7 | 1625.5 | 1775.0 | 1878.6 | 1936.7 | 2040.6 | 2222.8 | 2319.1 | 2003.4 |
| 57.5° | 1561.2 | 1549.4 | 1611.3 | 1755.9 | 1955.8 | 2069.5 | 2142.1 | 2227.6 | 2395.9 | 2437.2 | 2054.9 |
| 60°   | 1647.4 | 1643.6 | 1717.0 | 1908.8 | 2171.3 | 2303.4 | 2355.9 | 2433.4 | 2546.4 | 2505.7 | 2042.0 |
| 62.5° | 1726.3 | 1725.0 | 1831.7 | 2074.7 | 2399.7 | 2545.0 | 2586.7 | 2607.2 | 2654.9 | 2501.2 | 1939.8 |
| 65°   | 1809.4 | 1821.2 | 1965.5 | 2266.9 | 2661.5 | 2804.0 | 2821.4 | 2769.2 | 2691.4 | 2382.7 | 1730.5 |
| 67.5° | 1819.9 | 1842.8 | 2049.6 | 2447.0 | 2909.7 | 3044.2 | 3030.3 | 2830.8 | 2583.6 | 2052.8 | 1356.5 |
| 70°   | 1627.6 | 1667.6 | 1915.5 | 2474.4 | 3084.5 | 3183.6 | 3083.1 | 2698.3 | 2192.5 | 1487.2 | 853.1  |
| 72.5° | 1359.9 | 1394.4 | 1613.4 | 2110.1 | 2858.9 | 2985.1 | 2849.2 | 2283.9 | 1549.4 | 853.1  | 434.5  |
| 75°   | 1058.5 | 1098.5 | 1300.5 | 1677.3 | 2140.4 | 2190.8 | 2122.6 | 1592.9 | 851.7  | 351.8  | 197.5  |
| 77.5° | 645.9  | 674.8  | 831.9  | 1136.4 | 1497.6 | 1422.2 | 1205.2 | 893.1  | 373.7  | 168.6  | 122.0  |
| 80°   | 285.8  | 303.5  | 409.9  | 610.4  | 865.3  | 818.0  | 644.9  | 381.4  | 204.4  | 107.1  | 85.2   |
| 82.5° | 153.3  | 164.8  | 202.0  | 241.6  | 380.0  | 397.3  | 322.3  | 219.7  | 109.9  | 61.2   | 48.7   |
| 85°   | 67.4   | 74.0   | 91.8   | 87.6   | 124.8  | 122.7  | 123.8  | 150.9  | 52.5   | 28.2   | 31.6   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.3    | 0.3    | 3.8    | 20.2   | 5.2    | 8.3    | 7.3    |
| 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: GWS-SA1C-760-U-SL4-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 790.9  | 790.9  | 790.9 | 790.9 | 790.9 | 790.9 | 790.9 | 790.9 | 790.9 | 790.9 | 790.9 |
| 2.5°  | 782.5  | 776.3  | 774.5 | 772.4 | 768.6 | 762.0 | 757.1 | 751.6 | 749.1 | 746.4 | 746.7 |
| 5°    | 763.1  | 755.4  | 748.1 | 738.7 | 726.9 | 713.7 | 704.7 | 694.2 | 688.7 | 683.4 | 684.8 |
| 7.5°  | 746.4  | 734.5  | 719.6 | 699.8 | 678.6 | 654.9 | 635.8 | 620.9 | 610.8 | 603.8 | 607.3 |
| 10°   | 735.9  | 722.0  | 696.0 | 663.6 | 627.8 | 591.7 | 564.2 | 538.5 | 522.5 | 510.0 | 509.3 |
| 12.5° | 733.9  | 715.8  | 677.9 | 631.0 | 579.2 | 530.8 | 490.5 | 455.7 | 434.5 | 418.9 | 424.8 |
| 15°   | 735.9  | 713.0  | 662.2 | 600.7 | 535.4 | 470.0 | 419.9 | 380.0 | 354.6 | 340.3 | 339.3 |
| 17.5° | 738.4  | 710.2  | 644.5 | 568.0 | 489.5 | 414.7 | 356.7 | 314.3 | 288.2 | 273.9 | 274.3 |
| 20°   | 740.5  | 706.0  | 623.7 | 532.2 | 442.9 | 363.3 | 303.1 | 262.8 | 239.5 | 229.1 | 230.8 |
| 22.5° | 743.9  | 701.9  | 601.4 | 494.0 | 395.3 | 313.6 | 260.7 | 228.0 | 214.1 | 207.2 | 207.5 |
| 25°   | 750.5  | 699.4  | 578.5 | 452.3 | 348.3 | 273.9 | 231.5 | 209.6 | 200.9 | 196.8 | 196.4 |
| 27.5° | 764.1  | 701.5  | 554.5 | 411.9 | 305.9 | 243.7 | 212.8 | 198.5 | 192.6 | 189.8 | 189.5 |
| 30°   | 786.7  | 709.9  | 533.6 | 370.9 | 269.4 | 220.1 | 199.9 | 191.2 | 187.7 | 185.3 | 184.9 |
| 32.5° | 821.1  | 725.5  | 511.0 | 332.7 | 239.9 | 202.7 | 189.8 | 185.3 | 182.9 | 181.5 | 181.5 |
| 35°   | 873.3  | 754.0  | 488.8 | 299.3 | 216.9 | 189.1 | 181.8 | 180.1 | 178.0 | 177.3 | 178.0 |
| 37.5° | 948.3  | 799.6  | 468.6 | 270.1 | 200.6 | 178.7 | 173.1 | 173.8 | 172.1 | 173.1 | 174.2 |
| 40°   | 1043.6 | 860.4  | 451.6 | 246.1 | 188.4 | 171.0 | 165.5 | 167.9 | 166.9 | 167.9 | 169.6 |
| 42.5° | 1164.2 | 935.8  | 438.7 | 227.4 | 179.7 | 164.8 | 159.6 | 162.0 | 161.3 | 162.7 | 164.4 |
| 45°   | 1298.8 | 1035.2 | 432.8 | 214.1 | 173.5 | 160.3 | 154.7 | 156.4 | 155.7 | 156.8 | 158.5 |
| 47.5° | 1427.7 | 1125.6 | 438.0 | 206.5 | 168.3 | 156.4 | 150.5 | 151.2 | 150.9 | 150.5 | 151.6 |
| 50°   | 1539.0 | 1197.6 | 453.0 | 204.1 | 164.8 | 152.6 | 147.0 | 147.4 | 146.4 | 144.3 | 145.0 |
| 52.5° | 1629.7 | 1255.3 | 462.0 | 204.1 | 163.0 | 148.4 | 143.2 | 143.6 | 141.5 | 138.7 | 139.1 |
| 55°   | 1689.5 | 1278.6 | 454.7 | 203.7 | 162.3 | 145.0 | 139.4 | 139.7 | 137.7 | 134.2 | 134.5 |
| 57.5° | 1706.5 | 1256.0 | 424.1 | 199.9 | 161.6 | 142.2 | 135.6 | 136.3 | 134.9 | 131.1 | 131.1 |
| 60°   | 1658.9 | 1173.3 | 368.1 | 191.2 | 159.9 | 140.4 | 132.8 | 133.8 | 133.1 | 129.3 | 129.3 |
| 62.5° | 1534.1 | 1026.2 | 301.4 | 178.0 | 155.0 | 138.4 | 130.4 | 132.4 | 134.2 | 132.1 | 131.8 |
| 65°   | 1300.5 | 822.1  | 245.1 | 163.4 | 148.8 | 134.9 | 126.9 | 132.1 | 135.9 | 138.7 | 138.7 |
| 67.5° | 975.8  | 588.5  | 199.9 | 148.1 | 139.4 | 127.9 | 122.4 | 127.2 | 130.0 | 131.8 | 132.8 |
| 70°   | 594.8  | 346.2  | 157.5 | 130.4 | 125.8 | 117.5 | 113.3 | 108.5 | 104.6 | 103.9 | 104.3 |
| 72.5° | 291.0  | 198.2  | 127.9 | 110.9 | 107.4 | 99.8  | 90.4  | 88.3  | 86.6  | 85.5  | 85.2  |
| 75°   | 160.3  | 138.0  | 105.7 | 92.1  | 85.9  | 76.5  | 74.4  | 70.9  | 70.2  | 68.8  | 69.2  |
| 77.5° | 113.3  | 108.8  | 87.3  | 74.7  | 65.4  | 60.5  | 61.5  | 59.1  | 59.1  | 58.1  | 57.7  |
| 80°   | 85.2   | 85.5   | 67.1  | 54.6  | 48.3  | 46.6  | 47.6  | 47.6  | 46.9  | 46.6  | 46.2  |
| 82.5° | 53.9   | 60.8   | 45.2  | 35.1  | 34.4  | 34.8  | 34.4  | 34.1  | 34.8  | 33.7  | 33.4  |
| 85°   | 37.2   | 43.8   | 27.5  | 20.9  | 20.9  | 20.5  | 21.2  | 20.9  | 21.6  | 20.5  | 20.5  |
| 87.5° | 8.3    | 19.5   | 10.1  | 6.3   | 6.6   | 6.3   | 6.6   | 7.0   | 7.6   | 8.0   | 8.0   |
| 90°   | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-9-R4

Test Date: 10/23/2019

Luminaire Tested: SA1C-760-U-5WQ

Data in this report applies to families of products SA1C-760-U-5WQ .

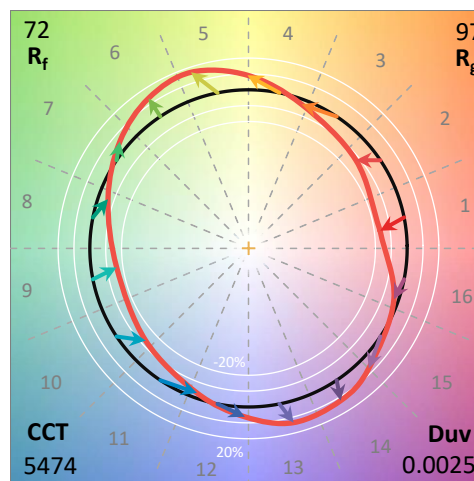
### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-9-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-760-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 5474   | CRI (Ra): | 71.7 |      |       |
| CIE u':                   | 0.2052 | R1:       | 70.6 | R9:  | -27.1 |
| CIE v':                   | 0.4804 | R2:       | 74.6 | R10: | 40.8  |
| Duv:                      | 0.0025 | R3:       | 78.3 | R11: | 74.6  |
| CIE x:                    | 0.3330 | R4:       | 73.8 | R12: | 50.4  |
| CIE y:                    | 0.3466 | R5:       | 72.4 | R13: | 70.0  |
| CIE z:                    | 0.3204 | R6:       | 67.5 | R14: | 87.8  |
| Peak Wavelength (nm):     | 442    | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 554    | R8:       | 58.9 |      |       |
| Purity:                   | 4.1    |           |      |      |       |
| Rf:                       | 72.1   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



### Test Conditions

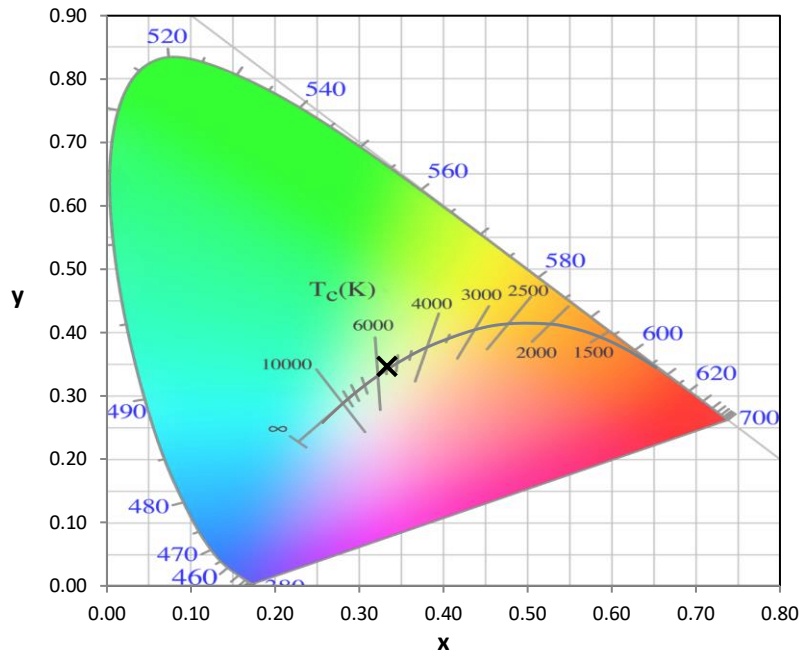
Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.6/31%  
 Sphere Temperature (°C): 25.9

REPORT NUMBER: SP1-1908-441-9-R4

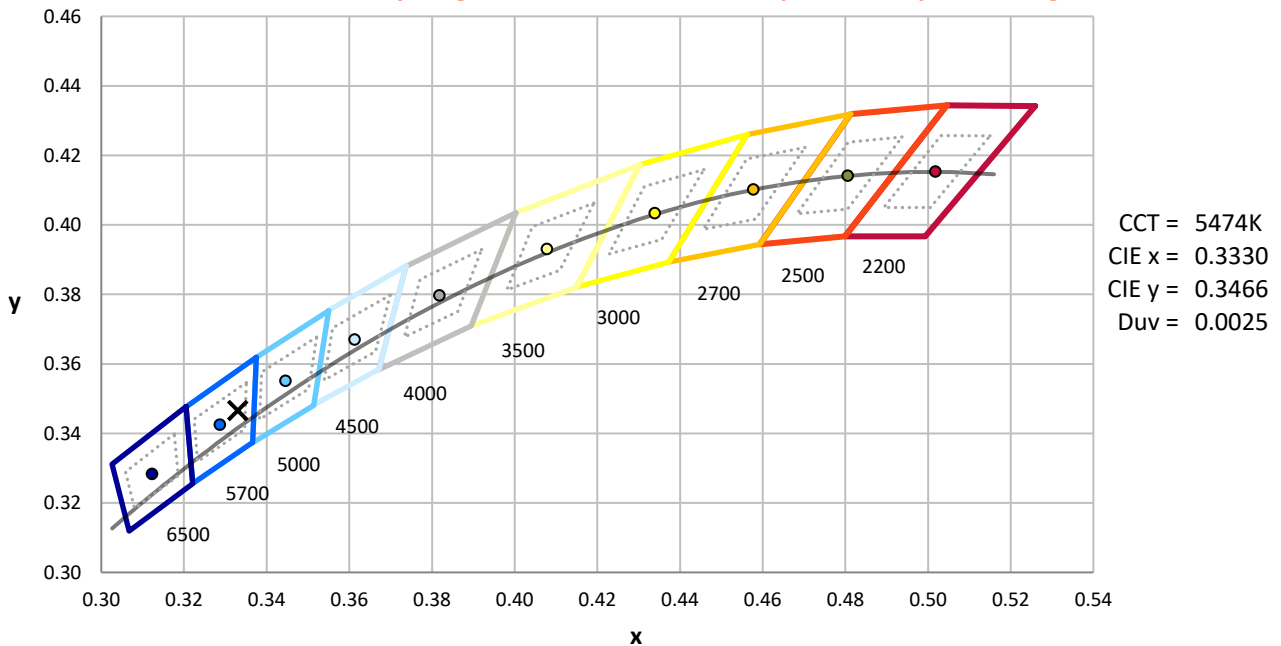
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

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CIE 1931 Chromaticity Diagram



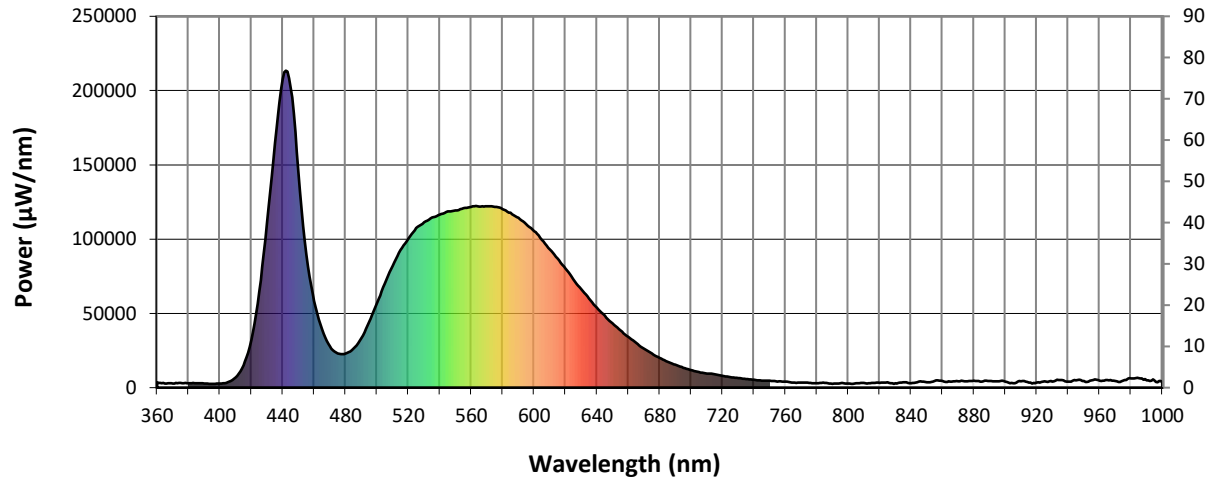
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 5700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**

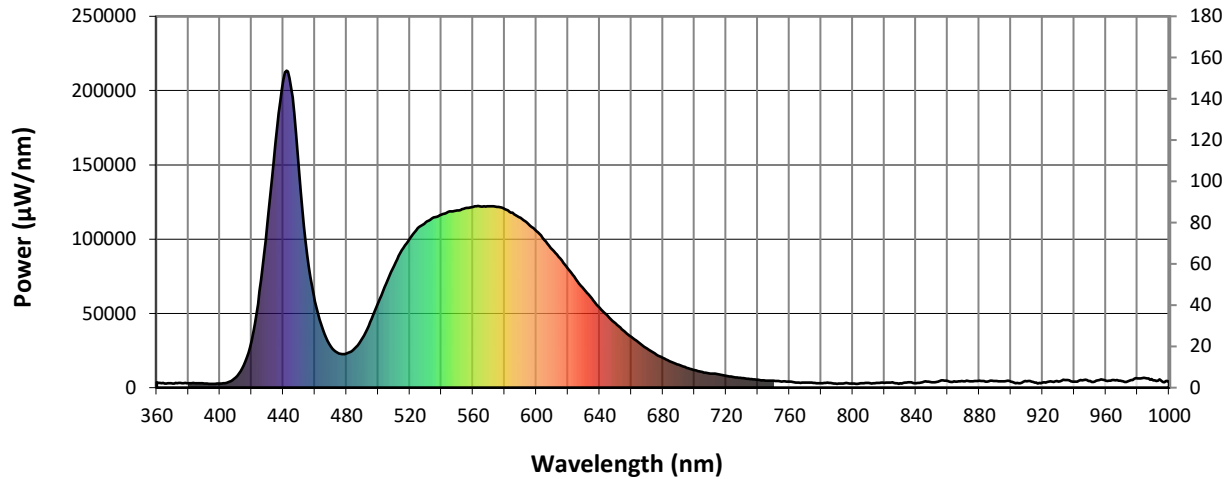


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 3540             | NR               | 490       | 33363            | NR               | 620       | 80193            | NR               | 750       | 4663             | NR               | 880       | 4678             | NR               |
| 365       | 2862             | NR               | 495       | 44177            | NR               | 625       | 73091            | NR               | 755       | 4147             | NR               | 885       | 4128             | NR               |
| 370       | 2865             | NR               | 500       | 57019            | NR               | 630       | 66269            | NR               | 760       | 4040             | NR               | 890       | 4504             | NR               |
| 375       | 3254             | NR               | 505       | 70030            | NR               | 635       | 60012            | NR               | 765       | 3474             | NR               | 895       | 4371             | NR               |
| 380       | 3076             | NR               | 510       | 81972            | NR               | 640       | 53914            | NR               | 770       | 3469             | NR               | 900       | 4082             | NR               |
| 385       | 2904             | NR               | 515       | 92590            | NR               | 645       | 48385            | NR               | 775       | 3181             | NR               | 905       | 2982             | NR               |
| 390       | 2689             | NR               | 520       | 100305           | NR               | 650       | 43219            | NR               | 780       | 2969             | NR               | 910       | 4351             | NR               |
| 395       | 2619             | NR               | 525       | 107452           | NR               | 655       | 38562            | NR               | 785       | 3132             | NR               | 915       | 3365             | NR               |
| 400       | 2679             | NR               | 530       | 111373           | NR               | 660       | 34110            | NR               | 790       | 2507             | NR               | 920       | 3430             | NR               |
| 405       | 3515             | NR               | 535       | 114505           | NR               | 665       | 30085            | NR               | 795       | 2968             | NR               | 925       | 4264             | NR               |
| 410       | 6934             | NR               | 540       | 116408           | NR               | 670       | 26205            | NR               | 800       | 2758             | NR               | 930       | 4095             | NR               |
| 415       | 14943            | NR               | 545       | 118700           | NR               | 675       | 22906            | NR               | 805       | 2872             | NR               | 935       | 5048             | NR               |
| 420       | 31939            | NR               | 550       | 119209           | NR               | 680       | 20058            | NR               | 810       | 3094             | NR               | 940       | 4074             | NR               |
| 425       | 64701            | NR               | 555       | 120742           | NR               | 685       | 17413            | NR               | 815       | 3222             | NR               | 945       | 4949             | NR               |
| 430       | 110939           | NR               | 560       | 121594           | NR               | 690       | 15447            | NR               | 820       | 3238             | NR               | 950       | 4387             | NR               |
| 435       | 164597           | NR               | 565       | 121913           | NR               | 695       | 13398            | NR               | 825       | 3524             | NR               | 955       | 4978             | NR               |
| 440       | 207696           | NR               | 570       | 122147           | NR               | 700       | 11777            | NR               | 830       | 2921             | NR               | 960       | 4706             | NR               |
| 445       | 201830           | NR               | 575       | 121605           | NR               | 705       | 10412            | NR               | 835       | 3595             | NR               | 965       | 5083             | NR               |
| 450       | 145410           | NR               | 580       | 120248           | NR               | 710       | 9544             | NR               | 840       | 3016             | NR               | 970       | 4522             | NR               |
| 455       | 89594            | NR               | 585       | 117717           | NR               | 715       | 8940             | NR               | 845       | 4032             | NR               | 975       | 4740             | NR               |
| 460       | 58321            | NR               | 590       | 114359           | NR               | 720       | 7897             | NR               | 850       | 3579             | NR               | 980       | 6122             | NR               |
| 465       | 39318            | NR               | 595       | 109974           | NR               | 725       | 7045             | NR               | 855       | 4571             | NR               | 985       | 6450             | NR               |
| 470       | 27693            | NR               | 600       | 105269           | NR               | 730       | 6483             | NR               | 860       | 4485             | NR               | 990       | 4875             | NR               |
| 475       | 23081            | NR               | 605       | 99453            | NR               | 735       | 5838             | NR               | 865       | 3978             | NR               | 995       | 4764             | NR               |
| 480       | 23002            | NR               | 610       | 92921            | NR               | 740       | 5261             | NR               | 870       | 4298             | NR               | 1000      | 3640             | NR               |
| 485       | 26201            | NR               | 615       | 86989            | NR               | 745       | 4760             | NR               | 875       | 4356             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



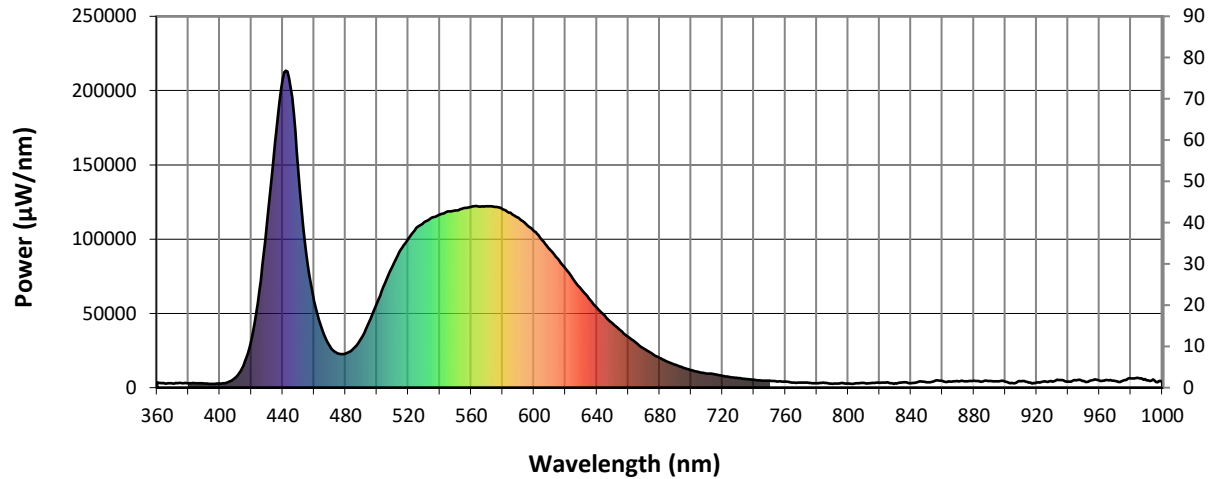
Scotopic Lumens: 13759.3

S/P: 1.85

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 3540             | NR               | 490       | 33363            | NR               | 620       | 80193            | NR               | 750       | 4663             | NR               | 880       | 4678             | NR               |
| 365       | 2862             | NR               | 495       | 44177            | NR               | 625       | 73091            | NR               | 755       | 4147             | NR               | 885       | 4128             | NR               |
| 370       | 2865             | NR               | 500       | 57019            | NR               | 630       | 66269            | NR               | 760       | 4040             | NR               | 890       | 4504             | NR               |
| 375       | 3254             | NR               | 505       | 70030            | NR               | 635       | 60012            | NR               | 765       | 3474             | NR               | 895       | 4371             | NR               |
| 380       | 3076             | NR               | 510       | 81972            | NR               | 640       | 53914            | NR               | 770       | 3469             | NR               | 900       | 4082             | NR               |
| 385       | 2904             | NR               | 515       | 92590            | NR               | 645       | 48385            | NR               | 775       | 3181             | NR               | 905       | 2982             | NR               |
| 390       | 2689             | NR               | 520       | 100305           | NR               | 650       | 43219            | NR               | 780       | 2969             | NR               | 910       | 4351             | NR               |
| 395       | 2619             | NR               | 525       | 107452           | NR               | 655       | 38562            | NR               | 785       | 3132             | NR               | 915       | 3365             | NR               |
| 400       | 2679             | NR               | 530       | 111373           | NR               | 660       | 34110            | NR               | 790       | 2507             | NR               | 920       | 3430             | NR               |
| 405       | 3515             | NR               | 535       | 114505           | NR               | 665       | 30085            | NR               | 795       | 2968             | NR               | 925       | 4264             | NR               |
| 410       | 6934             | NR               | 540       | 116408           | NR               | 670       | 26205            | NR               | 800       | 2758             | NR               | 930       | 4095             | NR               |
| 415       | 14943            | NR               | 545       | 118700           | NR               | 675       | 22906            | NR               | 805       | 2872             | NR               | 935       | 5048             | NR               |
| 420       | 31939            | NR               | 550       | 119209           | NR               | 680       | 20058            | NR               | 810       | 3094             | NR               | 940       | 4074             | NR               |
| 425       | 64701            | NR               | 555       | 120742           | NR               | 685       | 17413            | NR               | 815       | 3222             | NR               | 945       | 4949             | NR               |
| 430       | 110939           | NR               | 560       | 121594           | NR               | 690       | 15447            | NR               | 820       | 3238             | NR               | 950       | 4387             | NR               |
| 435       | 164597           | NR               | 565       | 121913           | NR               | 695       | 13398            | NR               | 825       | 3524             | NR               | 955       | 4978             | NR               |
| 440       | 207696           | NR               | 570       | 122147           | NR               | 700       | 11777            | NR               | 830       | 2921             | NR               | 960       | 4706             | NR               |
| 445       | 201830           | NR               | 575       | 121605           | NR               | 705       | 10412            | NR               | 835       | 3595             | NR               | 965       | 5083             | NR               |
| 450       | 145410           | NR               | 580       | 120248           | NR               | 710       | 9544             | NR               | 840       | 3016             | NR               | 970       | 4522             | NR               |
| 455       | 89594            | NR               | 585       | 117717           | NR               | 715       | 8940             | NR               | 845       | 4032             | NR               | 975       | 4740             | NR               |
| 460       | 58321            | NR               | 590       | 114359           | NR               | 720       | 7897             | NR               | 850       | 3579             | NR               | 980       | 6122             | NR               |
| 465       | 39318            | NR               | 595       | 109974           | NR               | 725       | 7045             | NR               | 855       | 4571             | NR               | 985       | 6450             | NR               |
| 470       | 27693            | NR               | 600       | 105269           | NR               | 730       | 6483             | NR               | 860       | 4485             | NR               | 990       | 4875             | NR               |
| 475       | 23081            | NR               | 605       | 99453            | NR               | 735       | 5838             | NR               | 865       | 3978             | NR               | 995       | 4764             | NR               |
| 480       | 23002            | NR               | 610       | 92921            | NR               | 740       | 5261             | NR               | 870       | 4298             | NR               | 1000      | 3640             | NR               |
| 485       | 26201            | NR               | 615       | 86989            | NR               | 745       | 4760             | NR               | 875       | 4356             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5527.6 M/P: 0.74**

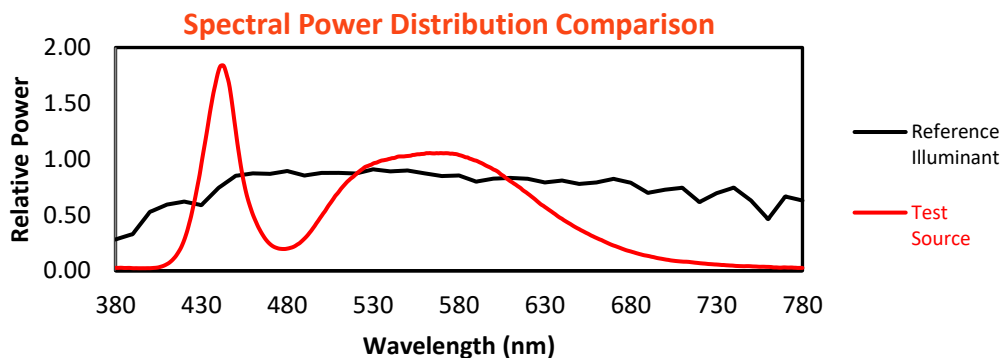
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 3540             | NR               | 490       | 33363            | NR               | 620       | 80193            | NR               | 750       | 4663             | NR               | 880       | 4678             | NR               |
| 365       | 2862             | NR               | 495       | 44177            | NR               | 625       | 73091            | NR               | 755       | 4147             | NR               | 885       | 4128             | NR               |
| 370       | 2865             | NR               | 500       | 57019            | NR               | 630       | 66269            | NR               | 760       | 4040             | NR               | 890       | 4504             | NR               |
| 375       | 3254             | NR               | 505       | 70030            | NR               | 635       | 60012            | NR               | 765       | 3474             | NR               | 895       | 4371             | NR               |
| 380       | 3076             | NR               | 510       | 81972            | NR               | 640       | 53914            | NR               | 770       | 3469             | NR               | 900       | 4082             | NR               |
| 385       | 2904             | NR               | 515       | 92590            | NR               | 645       | 48385            | NR               | 775       | 3181             | NR               | 905       | 2982             | NR               |
| 390       | 2689             | NR               | 520       | 100305           | NR               | 650       | 43219            | NR               | 780       | 2969             | NR               | 910       | 4351             | NR               |
| 395       | 2619             | NR               | 525       | 107452           | NR               | 655       | 38562            | NR               | 785       | 3132             | NR               | 915       | 3365             | NR               |
| 400       | 2679             | NR               | 530       | 111373           | NR               | 660       | 34110            | NR               | 790       | 2507             | NR               | 920       | 3430             | NR               |
| 405       | 3515             | NR               | 535       | 114505           | NR               | 665       | 30085            | NR               | 795       | 2968             | NR               | 925       | 4264             | NR               |
| 410       | 6934             | NR               | 540       | 116408           | NR               | 670       | 26205            | NR               | 800       | 2758             | NR               | 930       | 4095             | NR               |
| 415       | 14943            | NR               | 545       | 118700           | NR               | 675       | 22906            | NR               | 805       | 2872             | NR               | 935       | 5048             | NR               |
| 420       | 31939            | NR               | 550       | 119209           | NR               | 680       | 20058            | NR               | 810       | 3094             | NR               | 940       | 4074             | NR               |
| 425       | 64701            | NR               | 555       | 120742           | NR               | 685       | 17413            | NR               | 815       | 3222             | NR               | 945       | 4949             | NR               |
| 430       | 110939           | NR               | 560       | 121594           | NR               | 690       | 15447            | NR               | 820       | 3238             | NR               | 950       | 4387             | NR               |
| 435       | 164597           | NR               | 565       | 121913           | NR               | 695       | 13398            | NR               | 825       | 3524             | NR               | 955       | 4978             | NR               |
| 440       | 207696           | NR               | 570       | 122147           | NR               | 700       | 11777            | NR               | 830       | 2921             | NR               | 960       | 4706             | NR               |
| 445       | 201830           | NR               | 575       | 121605           | NR               | 705       | 10412            | NR               | 835       | 3595             | NR               | 965       | 5083             | NR               |
| 450       | 145410           | NR               | 580       | 120248           | NR               | 710       | 9544             | NR               | 840       | 3016             | NR               | 970       | 4522             | NR               |
| 455       | 89594            | NR               | 585       | 117717           | NR               | 715       | 8940             | NR               | 845       | 4032             | NR               | 975       | 4740             | NR               |
| 460       | 58321            | NR               | 590       | 114359           | NR               | 720       | 7897             | NR               | 850       | 3579             | NR               | 980       | 6122             | NR               |
| 465       | 39318            | NR               | 595       | 109974           | NR               | 725       | 7045             | NR               | 855       | 4571             | NR               | 985       | 6450             | NR               |
| 470       | 27693            | NR               | 600       | 105269           | NR               | 730       | 6483             | NR               | 860       | 4485             | NR               | 990       | 4875             | NR               |
| 475       | 23081            | NR               | 605       | 99453            | NR               | 735       | 5838             | NR               | 865       | 3978             | NR               | 995       | 4764             | NR               |
| 480       | 23002            | NR               | 610       | 92921            | NR               | 740       | 5261             | NR               | 870       | 4298             | NR               | 1000      | 3640             | NR               |
| 485       | 26201            | NR               | 615       | 86989            | NR               | 745       | 4760             | NR               | 875       | 4356             | NR               |           |                  |                  |

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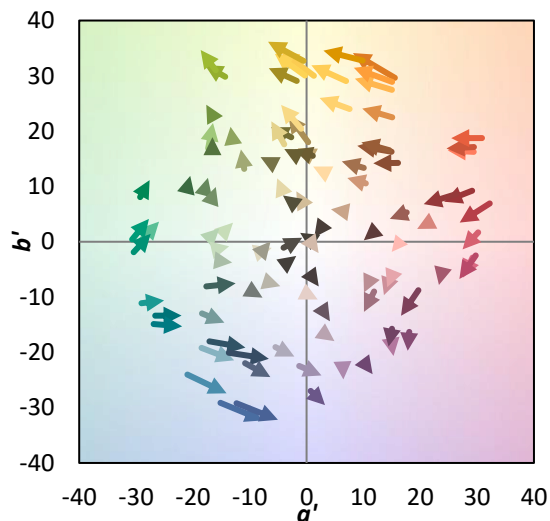
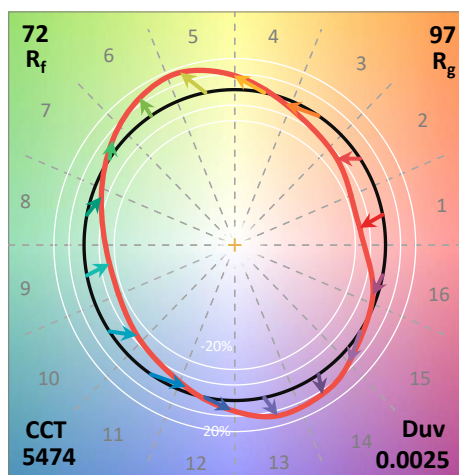
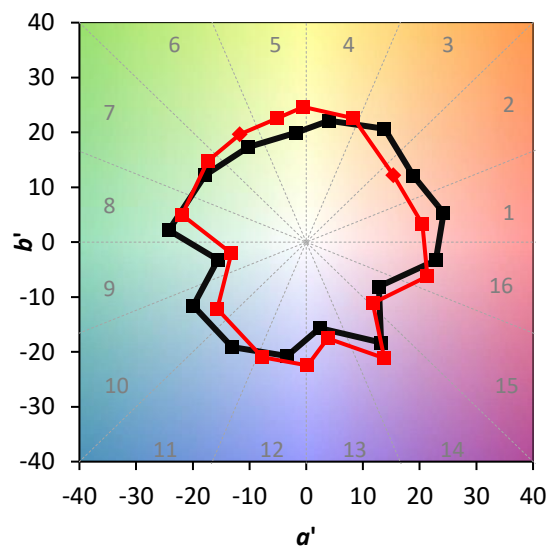
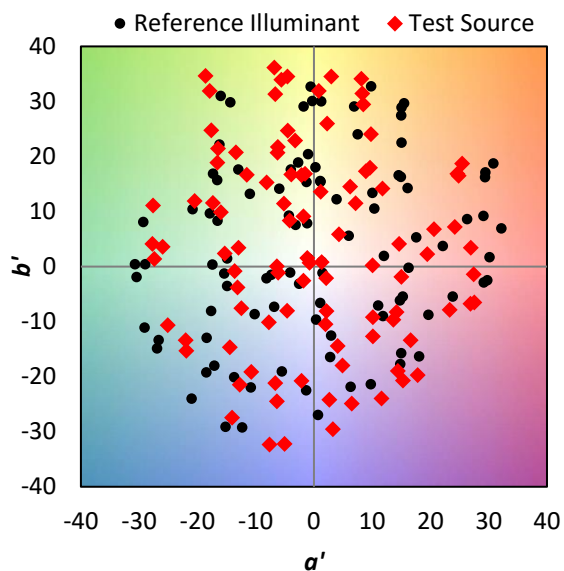
**TM-30-18**

**Summary**

$R_f = 72.1$   
 $R_g = 97.2$   
 CIE  $R_a = 71.7$   
 $R_g = -27.1$



**Color Vector Graphics**



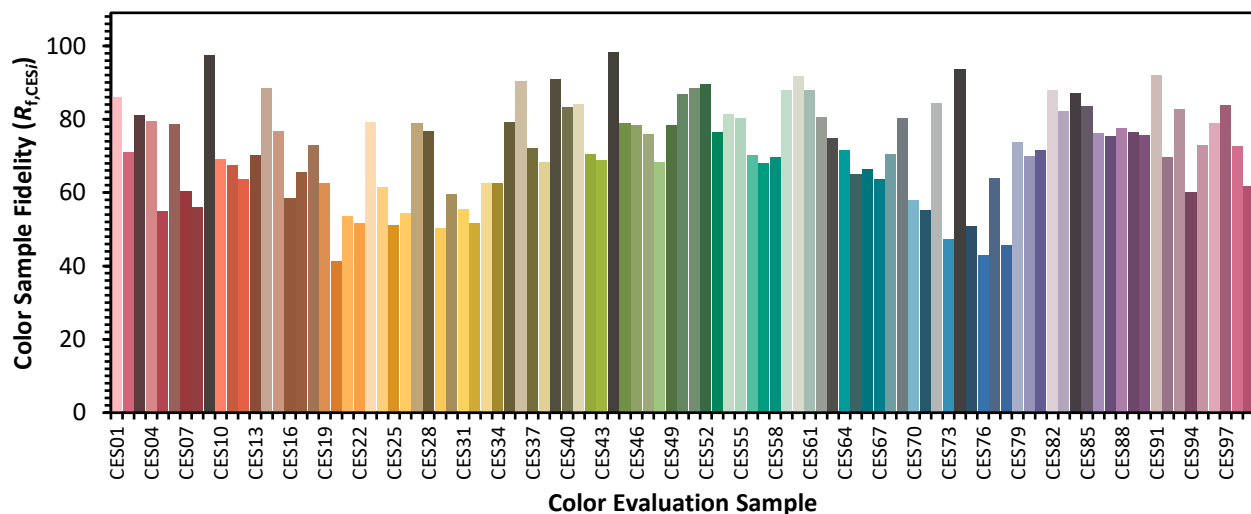


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

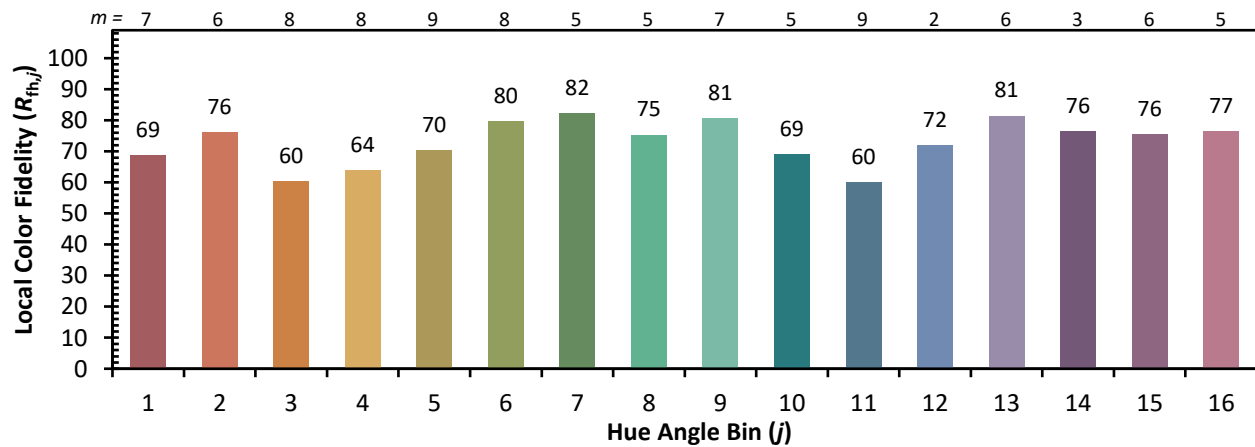
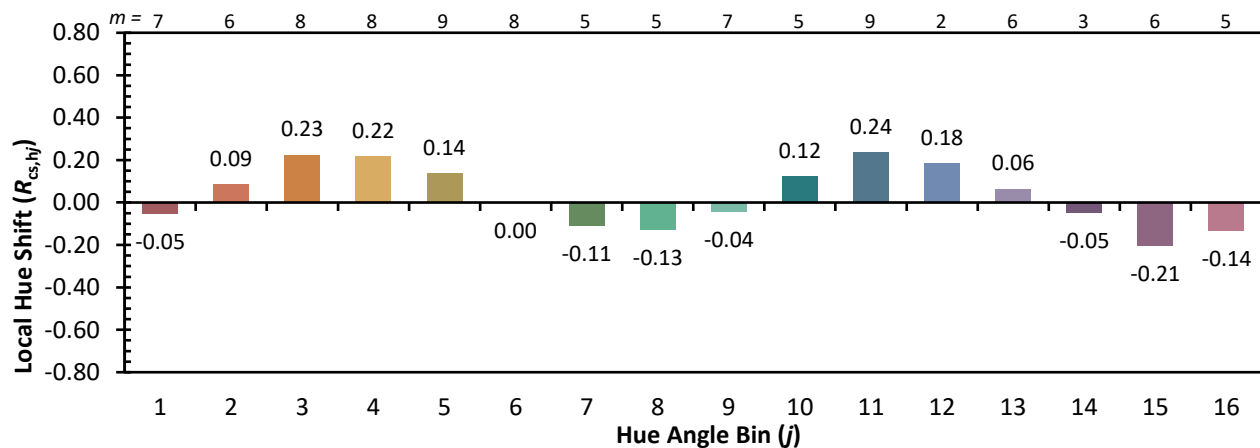
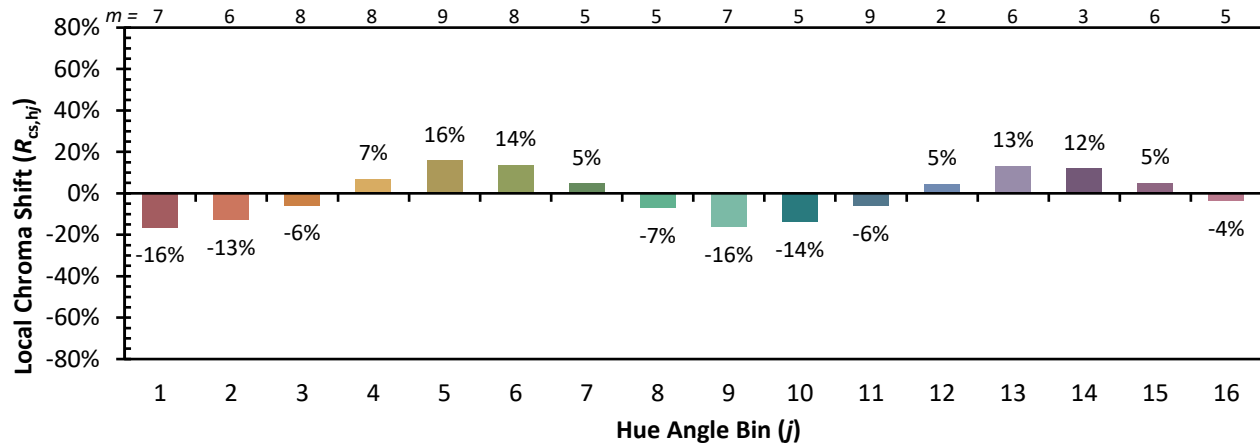
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|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 88 | CES76 = 43 |
| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 81 | CES79 = 74 |
| CES05 = 46 | CES30 = 59 | CES55 = 80 | CES80 = 70 |
| CES06 = 50 | CES31 = 55 | CES56 = 70 | CES81 = 71 |
| CES07 = 38 | CES32 = 52 | CES57 = 68 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 82 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 84 |
| CES11 = 55 | CES36 = 90 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 72 | CES62 = 81 | CES87 = 75 |
| CES13 = 41 | CES38 = 68 | CES63 = 75 | CES88 = 77 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 84 | CES66 = 66 | CES91 = 92 |
| CES17 = 48 | CES42 = 70 | CES67 = 64 | CES92 = 70 |
| CES18 = 55 | CES43 = 69 | CES68 = 71 | CES93 = 83 |
| CES19 = 70 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 73 |
| CES21 = 85 | CES46 = 78 | CES71 = 55 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 68 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 78 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



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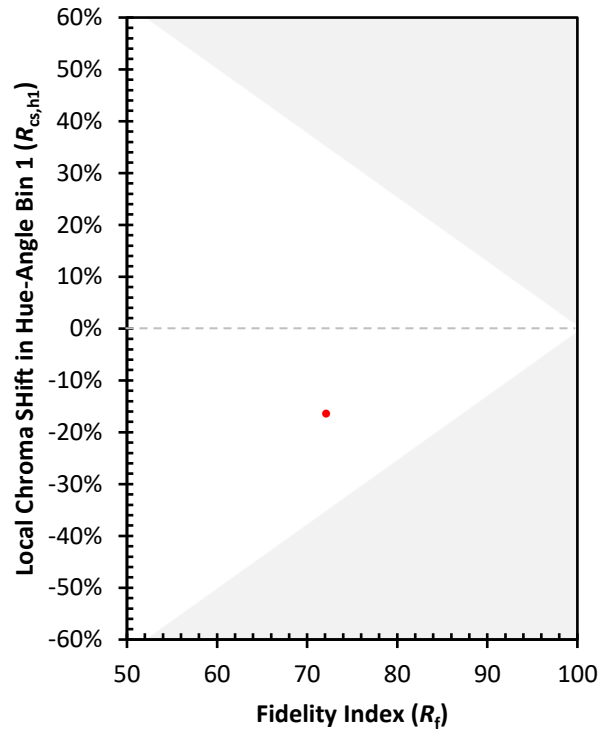
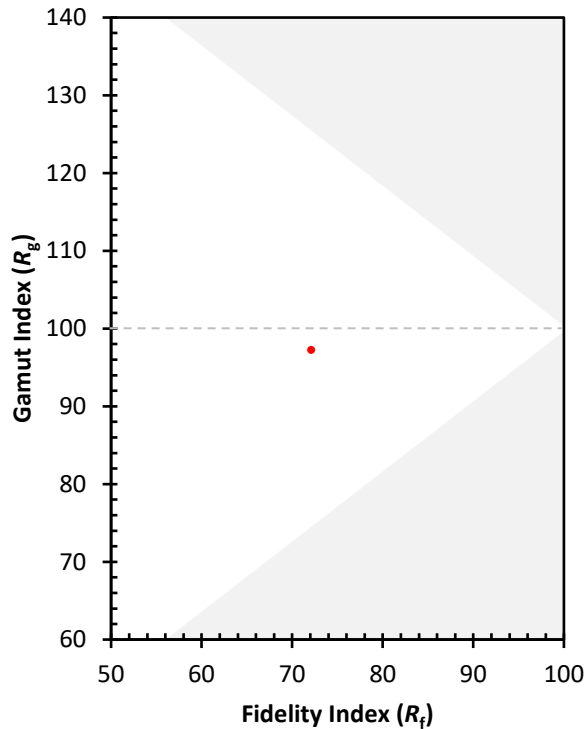
Color Rendition by Hue-Angle Bin



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**TM-30-18**

**Measure Comparisons**



(END OF REPORT)