

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: McGRAW-EDISON

Report Number: P321145

Luminaire Tested: **GLEON-SA1A-722-U-AFL**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P321145  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-29)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA1A-722-U-AFL  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(1) 70 CRI, 2200K, 615mA LIGHTSQUARE WITH 16 LEDS AND AUTOMOTIVE  
FRONTLINE OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 3681 lumens  
Efficiency: N/A  
Efficacy: 108.3 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

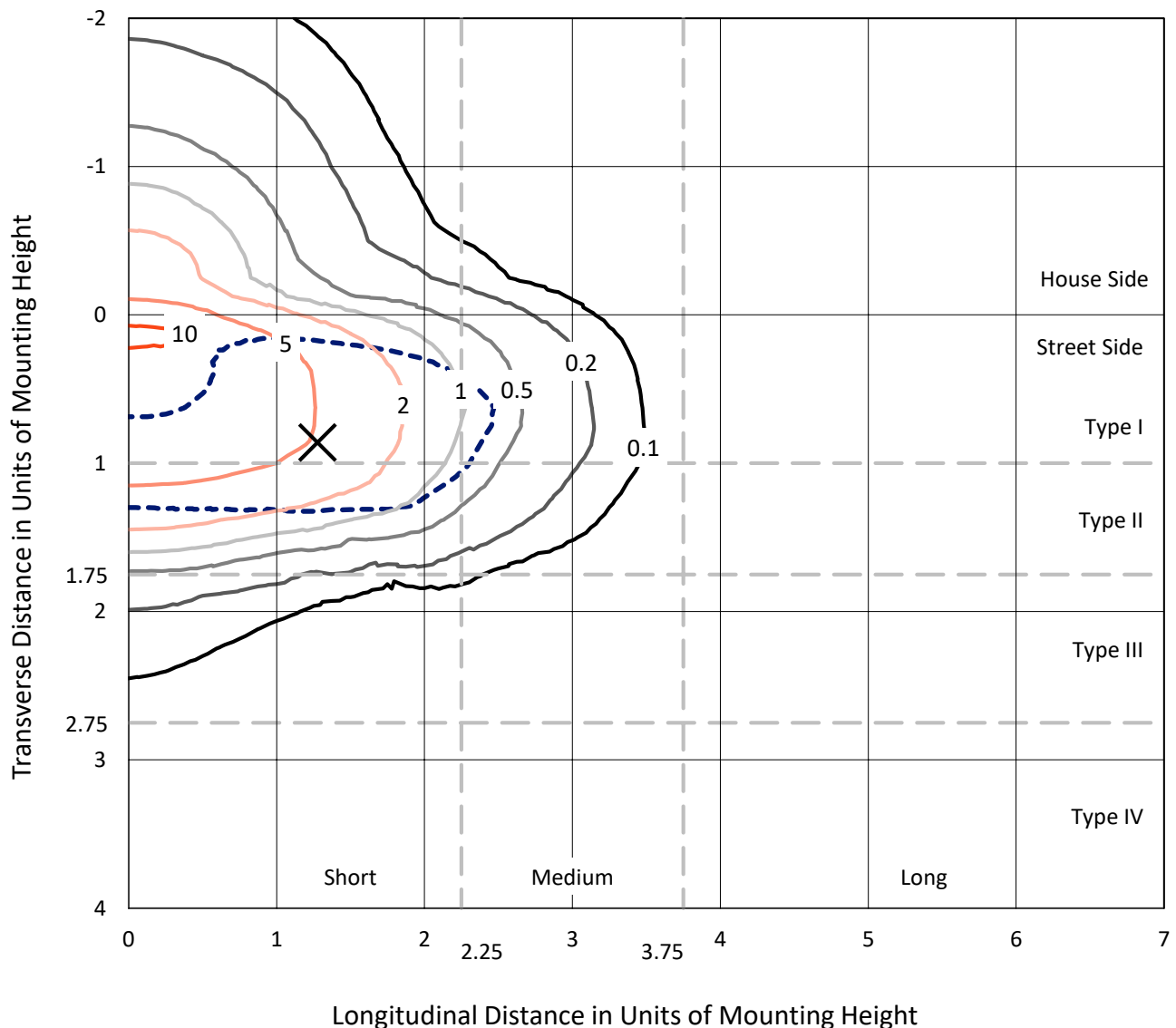
Input Watts (W): 34  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

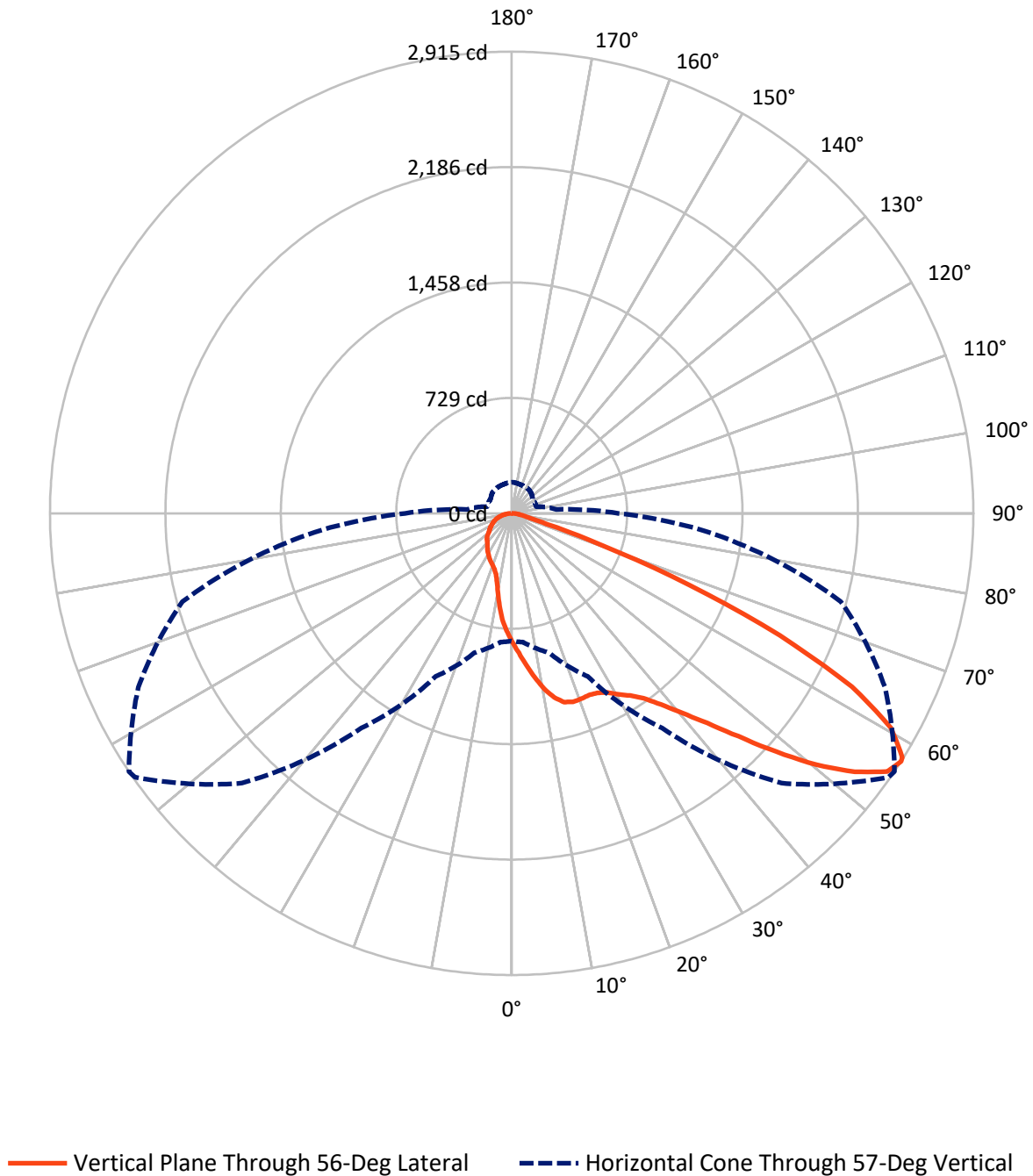
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 11.3 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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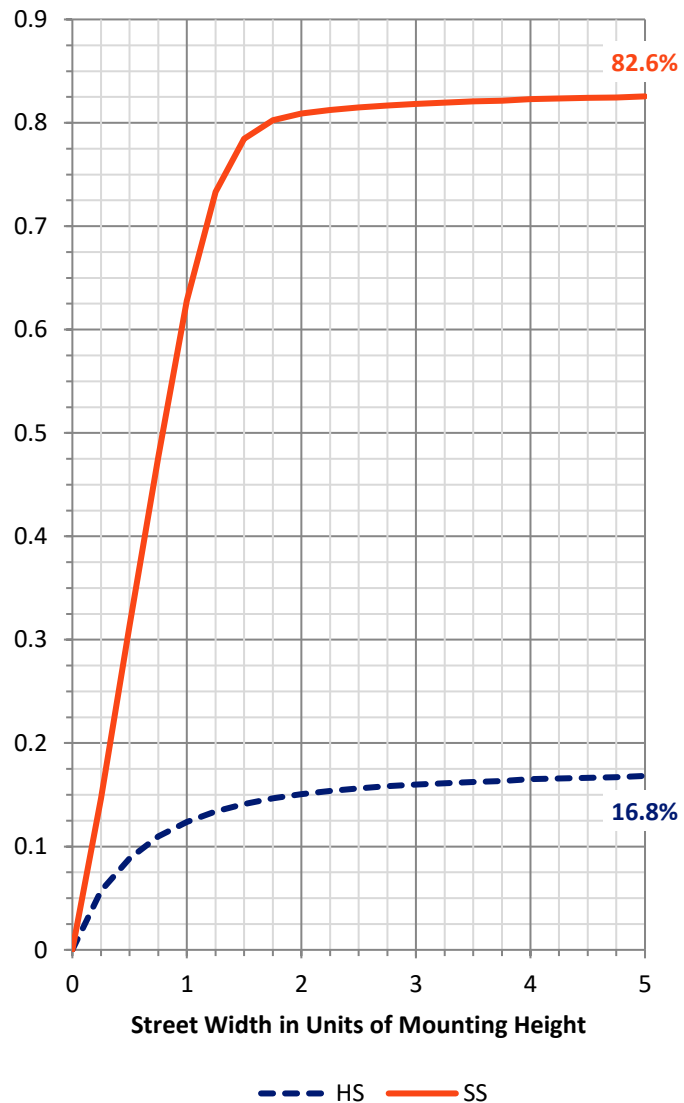
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 634.5    | 0.0    | 634.5  |
|                    | % Fixture | 17.2     | 0.0    | 17.2   |
| <b>Street Side</b> | Lumens    | 3046.5   | 0.0    | 3046.5 |
|                    | % Fixture | 82.8     | 0.0    | 82.8   |
| <b>Total</b>       | Lumens    | 3681.0   | 0.0    | 3681.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 78.0   | 2.1       |
| 10°-20°   | 220.5  | 6.0       |
| 20°-30°   | 359.2  | 9.8       |
| 30°-40°   | 536.9  | 14.6      |
| 40°-50°   | 814.4  | 22.1      |
| 50°-60°   | 912.7  | 24.8      |
| 60°-70°   | 539.1  | 14.6      |
| 70°-80°   | 176.6  | 4.8       |
| 80°-90°   | 43.6   | 1.2       |
| 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°    | 3681.0 | 100.0     |
| 0°-180°   | 3681.0 | 100.0     |

**Coefficient of Utilization**



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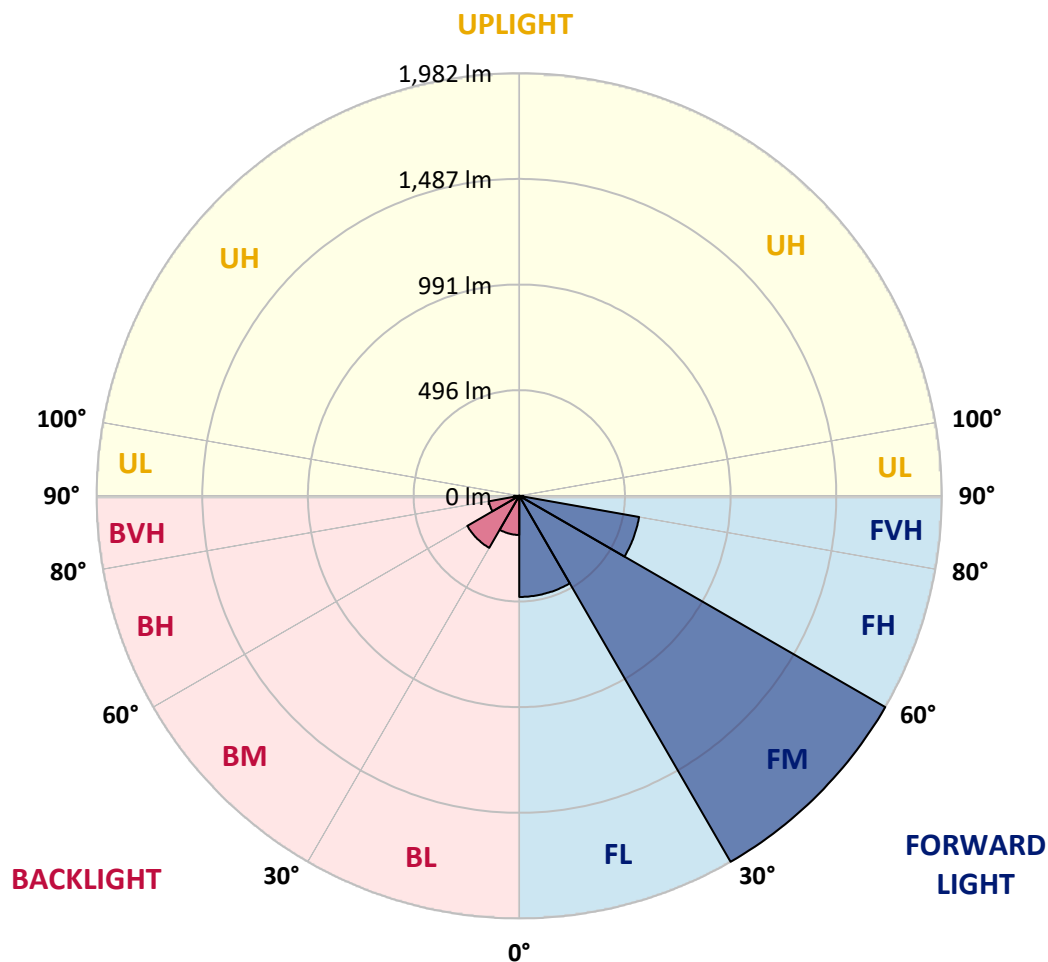
CATALOG NUMBER: GLEON-SA1A-722-U-AFL

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 474.2  | 12.9      |                         |      |        |
| FM   | (30°-60°)   | 1982.3 | 53.9      |                         |      |        |
| FH   | (60°-80°)   | 570.8  | 15.5      |                         |      | G0/660 |
| FVH  | (80°-90°)   | 19.2   | 0.5       |                         |      | G1/100 |
| BL   | (0°-30°)    | 183.5  | 5.0       | B1/500                  |      |        |
| BM   | (30°-60°)   | 281.6  | 7.7       | B1/1000                 |      |        |
| BH   | (60°-80°)   | 145.0  | 3.9       | B1/500                  |      | G1/500 |
| BVH  | (80°-90°)   | 24.4   | 0.7       |                         |      | 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 II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 56°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 816.4  | 816.4  | 816.4  | 816.4  | 816.4  | 816.4  | 816.4  | 816.4  | 816.4  | 816.4  | 816.4  |
| 2.5°  | 937.5  | 946.1  | 942.3  | 929.2  | 919.0  | 904.7  | 888.8  | 884.0  | 867.2  | 848.3  | 825.7  |
| 5°    | 1085.9 | 1081.6 | 1075.4 | 1054.9 | 1033.3 | 1008.1 | 968.1  | 961.8  | 924.4  | 881.7  | 836.7  |
| 7.5°  | 1170.4 | 1170.0 | 1166.4 | 1154.3 | 1134.6 | 1101.7 | 1053.5 | 1046.1 | 989.5  | 920.9  | 851.1  |
| 10°   | 1158.1 | 1157.2 | 1163.3 | 1175.8 | 1181.8 | 1175.0 | 1134.4 | 1126.9 | 1057.4 | 964.3  | 867.8  |
| 12.5° | 1088.4 | 1088.9 | 1098.7 | 1125.0 | 1160.8 | 1203.8 | 1197.2 | 1193.6 | 1127.9 | 1013.4 | 888.0  |
| 15°   | 1034.2 | 1035.3 | 1043.0 | 1065.9 | 1108.2 | 1186.2 | 1235.4 | 1236.7 | 1196.1 | 1067.6 | 911.7  |
| 17.5° | 1010.4 | 1012.8 | 1016.3 | 1032.4 | 1071.1 | 1151.2 | 1244.5 | 1251.4 | 1255.8 | 1123.7 | 934.5  |
| 20°   | 1018.0 | 1020.2 | 1021.3 | 1031.5 | 1063.3 | 1129.9 | 1238.2 | 1250.5 | 1301.6 | 1176.6 | 957.2  |
| 22.5° | 1052.0 | 1053.4 | 1054.0 | 1056.7 | 1081.3 | 1136.0 | 1234.0 | 1246.9 | 1334.7 | 1224.0 | 974.5  |
| 25°   | 1108.4 | 1107.4 | 1103.4 | 1099.9 | 1116.5 | 1160.0 | 1243.6 | 1255.9 | 1361.7 | 1267.1 | 985.7  |
| 27.5° | 1176.0 | 1174.7 | 1166.9 | 1157.5 | 1167.0 | 1197.5 | 1271.4 | 1281.1 | 1385.8 | 1307.3 | 991.4  |
| 30°   | 1257.1 | 1253.8 | 1239.0 | 1227.8 | 1231.5 | 1253.6 | 1317.0 | 1325.9 | 1423.2 | 1352.9 | 997.0  |
| 32.5° | 1350.8 | 1347.3 | 1325.9 | 1307.4 | 1307.4 | 1325.9 | 1364.1 | 1371.4 | 1454.8 | 1404.6 | 1006.0 |
| 35°   | 1468.2 | 1463.8 | 1435.9 | 1404.9 | 1396.2 | 1405.6 | 1428.2 | 1433.4 | 1511.7 | 1469.6 | 1022.3 |
| 37.5° | 1606.6 | 1600.6 | 1564.6 | 1523.1 | 1504.0 | 1503.5 | 1519.8 | 1530.4 | 1602.7 | 1555.0 | 1050.0 |
| 40°   | 1745.4 | 1741.2 | 1709.7 | 1677.0 | 1639.6 | 1627.6 | 1652.8 | 1656.0 | 1721.6 | 1661.0 | 1085.4 |
| 42.5° | 1852.6 | 1851.9 | 1846.1 | 1850.4 | 1812.0 | 1787.7 | 1807.5 | 1810.1 | 1866.8 | 1775.7 | 1123.1 |
| 45°   | 1909.3 | 1910.6 | 1938.8 | 2001.3 | 2015.4 | 1997.7 | 2007.5 | 2008.2 | 2032.8 | 1891.5 | 1157.6 |
| 47.5° | 1863.9 | 1870.5 | 1941.8 | 2081.6 | 2197.6 | 2256.4 | 2240.2 | 2249.6 | 2193.7 | 1990.9 | 1184.7 |
| 50°   | 1686.9 | 1695.0 | 1816.5 | 2045.8 | 2282.6 | 2506.8 | 2498.3 | 2496.2 | 2323.5 | 2063.8 | 1199.4 |
| 52.5° | 1467.7 | 1474.0 | 1574.2 | 1859.7 | 2220.3 | 2645.2 | 2723.0 | 2711.8 | 2438.8 | 2118.3 | 1202.2 |
| 55°   | 1133.8 | 1143.7 | 1239.7 | 1488.3 | 1968.0 | 2592.3 | 2888.2 | 2878.2 | 2544.0 | 2146.9 | 1198.9 |
| 57°   | 806.1  | 816.4  | 911.8  | 1135.9 | 1655.5 | 2409.2 | 2904.6 | 2915.3 | 2600.8 | 2151.7 | 1202.5 |
| 57.5° | 719.3  | 729.9  | 824.4  | 1042.0 | 1558.1 | 2343.1 | 2890.5 | 2908.2 | 2611.0 | 2150.9 | 1204.6 |
| 60°   | 362.2  | 366.2  | 426.4  | 581.7  | 985.0  | 1894.3 | 2705.6 | 2751.3 | 2620.3 | 2113.7 | 1213.3 |
| 62.5° | 225.2  | 222.3  | 220.4  | 267.9  | 479.2  | 1256.2 | 2324.2 | 2412.2 | 2443.5 | 2023.7 | 1192.2 |
| 65°   | 198.0  | 192.5  | 171.7  | 167.9  | 211.6  | 610.1  | 1750.3 | 1859.7 | 2065.9 | 1881.7 | 1141.8 |
| 67.5° | 186.0  | 180.6  | 157.1  | 142.9  | 143.1  | 241.9  | 1086.7 | 1209.9 | 1609.4 | 1641.8 | 1023.0 |
| 70°   | 173.6  | 168.8  | 146.7  | 130.0  | 121.8  | 134.0  | 499.9  | 593.4  | 1049.1 | 1290.5 | 855.0  |
| 72.5° | 157.6  | 154.3  | 133.5  | 116.3  | 107.5  | 100.3  | 191.4  | 226.1  | 607.3  | 866.7  | 593.8  |
| 75°   | 140.9  | 137.9  | 120.1  | 103.6  | 93.0   | 78.9   | 107.8  | 116.1  | 308.5  | 443.4  | 292.3  |
| 77.5° | 122.6  | 120.8  | 106.8  | 91.6   | 83.1   | 65.4   | 76.3   | 80.3   | 132.3  | 190.1  | 146.6  |
| 80°   | 97.5   | 100.9  | 93.4   | 81.6   | 73.8   | 52.4   | 54.0   | 56.7   | 77.0   | 92.9   | 83.2   |
| 82.5° | 63.5   | 69.5   | 73.1   | 66.3   | 60.7   | 41.2   | 38.8   | 40.0   | 50.2   | 56.7   | 36.2   |
| 85°   | 26.4   | 29.7   | 48.1   | 43.4   | 40.4   | 30.1   | 26.1   | 26.6   | 31.1   | 32.3   | 14.8   |
| 87.5° | 11.8   | 12.5   | 21.1   | 19.9   | 17.1   | 10.4   | 11.1   | 12.1   | 16.6   | 15.7   | 5.7    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P321145

CATALOG NUMBER: GLEON-SA1A-722-U-AFL

**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 816.4 | 816.4 | 816.4 | 816.4 | 816.4 | 816.4 | 816.4 | 816.4 | 816.4 | 816.4 | 816.4 |
| 2.5°  | 817.2 | 806.6 | 788.4 | 768.3 | 751.8 | 738.6 | 725.4 | 716.3 | 705.6 | 699.9 | 697.0 |
| 5°    | 817.8 | 797.0 | 758.6 | 719.3 | 684.1 | 652.0 | 621.4 | 597.9 | 575.8 | 563.9 | 560.7 |
| 7.5°  | 820.5 | 789.1 | 727.1 | 662.4 | 599.9 | 542.8 | 498.8 | 471.2 | 451.4 | 442.5 | 440.0 |
| 10°   | 822.6 | 779.9 | 688.2 | 592.3 | 507.3 | 449.5 | 415.3 | 399.9 | 393.0 | 391.9 | 390.8 |
| 12.5° | 827.7 | 770.4 | 647.2 | 519.2 | 435.3 | 395.3 | 383.4 | 382.4 | 384.3 | 387.1 | 387.1 |
| 15°   | 835.7 | 761.0 | 600.4 | 456.4 | 389.5 | 375.5 | 377.9 | 383.4 | 388.6 | 392.9 | 393.6 |
| 17.5° | 841.5 | 749.5 | 550.0 | 406.2 | 365.1 | 368.9 | 377.5 | 385.3 | 390.6 | 394.8 | 395.2 |
| 20°   | 845.7 | 731.7 | 496.3 | 367.9 | 351.0 | 362.8 | 373.6 | 380.5 | 384.2 | 388.4 | 389.0 |
| 22.5° | 843.5 | 707.8 | 448.6 | 340.4 | 339.7 | 354.0 | 364.2 | 372.6 | 369.8 | 365.7 | 368.4 |
| 25°   | 833.1 | 674.9 | 399.5 | 319.9 | 327.6 | 342.1 | 354.7 | 349.1 | 339.8 | 338.0 | 339.0 |
| 27.5° | 814.7 | 632.9 | 354.1 | 301.0 | 313.7 | 331.1 | 330.3 | 324.7 | 321.4 | 319.2 | 320.6 |
| 30°   | 794.8 | 587.4 | 314.4 | 284.4 | 298.3 | 312.6 | 309.7 | 309.6 | 306.3 | 302.6 | 304.4 |
| 32.5° | 775.2 | 541.6 | 282.9 | 270.7 | 286.7 | 288.6 | 294.9 | 296.8 | 290.3 | 282.6 | 282.1 |
| 35°   | 758.1 | 498.3 | 259.0 | 258.3 | 272.6 | 272.9 | 282.1 | 279.4 | 263.4 | 255.4 | 255.4 |
| 37.5° | 745.4 | 455.2 | 240.7 | 247.2 | 254.1 | 260.7 | 265.4 | 254.4 | 251.7 | 247.3 | 247.2 |
| 40°   | 739.8 | 417.2 | 229.3 | 238.7 | 241.1 | 249.5 | 237.4 | 241.7 | 243.0 | 240.7 | 240.7 |
| 42.5° | 734.0 | 384.2 | 219.5 | 232.3 | 231.9 | 230.7 | 224.7 | 230.2 | 235.3 | 235.4 | 235.0 |
| 45°   | 728.2 | 355.7 | 210.8 | 218.5 | 223.8 | 211.5 | 212.7 | 218.6 | 225.7 | 228.2 | 228.2 |
| 47.5° | 721.7 | 333.2 | 202.8 | 203.9 | 212.1 | 203.9 | 203.0 | 207.6 | 215.9 | 220.0 | 220.9 |
| 50°   | 707.5 | 313.0 | 193.7 | 191.1 | 193.4 | 196.2 | 197.0 | 199.1 | 208.4 | 214.8 | 216.3 |
| 52.5° | 687.9 | 294.9 | 182.0 | 179.4 | 179.4 | 189.9 | 193.4 | 194.1 | 201.9 | 209.6 | 211.1 |
| 55°   | 671.6 | 283.4 | 170.0 | 169.5 | 169.0 | 183.2 | 189.2 | 190.3 | 195.7 | 201.8 | 202.5 |
| 57°   | 672.7 | 282.5 | 160.8 | 161.3 | 161.2 | 176.3 | 185.3 | 187.5 | 190.3 | 195.4 | 196.3 |
| 57.5° | 673.4 | 283.1 | 158.8 | 159.0 | 158.9 | 174.4 | 184.2 | 186.6 | 188.7 | 194.2 | 195.1 |
| 60°   | 682.9 | 284.8 | 150.5 | 147.8 | 148.4 | 164.3 | 177.7 | 180.8 | 182.2 | 189.4 | 190.5 |
| 62.5° | 668.8 | 277.4 | 144.0 | 137.3 | 137.3 | 153.7 | 168.8 | 173.6 | 175.7 | 185.5 | 187.4 |
| 65°   | 628.1 | 256.8 | 136.2 | 125.4 | 126.6 | 143.1 | 158.0 | 165.8 | 169.1 | 181.3 | 183.3 |
| 67.5° | 565.2 | 232.9 | 128.0 | 114.7 | 116.0 | 131.9 | 146.9 | 155.3 | 160.5 | 176.7 | 178.4 |
| 70°   | 483.4 | 203.7 | 116.9 | 103.5 | 105.0 | 119.8 | 133.7 | 143.3 | 151.0 | 172.4 | 172.9 |
| 72.5° | 356.4 | 167.0 | 101.3 | 91.1  | 92.7  | 105.6 | 120.4 | 131.6 | 141.9 | 161.7 | 161.4 |
| 75°   | 211.9 | 130.6 | 84.1  | 78.6  | 79.7  | 91.7  | 108.4 | 121.9 | 137.5 | 157.5 | 159.9 |
| 77.5° | 128.5 | 98.3  | 68.6  | 65.8  | 67.2  | 79.4  | 99.8  | 114.2 | 135.6 | 148.5 | 147.8 |
| 80°   | 77.7  | 70.2  | 54.8  | 53.0  | 54.4  | 67.9  | 92.3  | 108.4 | 118.5 | 126.9 | 126.9 |
| 82.5° | 40.6  | 42.9  | 40.2  | 38.8  | 40.7  | 55.2  | 84.0  | 94.6  | 104.7 | 89.9  | 84.0  |
| 85°   | 16.6  | 22.4  | 24.4  | 24.3  | 25.4  | 38.2  | 72.5  | 81.0  | 67.6  | 64.1  | 65.7  |
| 87.5° | 5.6   | 9.5   | 11.9  | 10.2  | 10.8  | 24.0  | 50.2  | 39.1  | 46.4  | 32.4  | 30.7  |
| 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: SP1-1908-441-10-R4

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

Data in this report applies to families of products SA1C-722-U-5WQ.

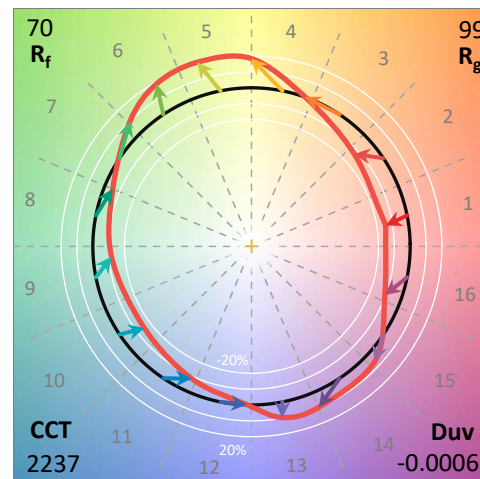
### Test Information

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-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-722-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):                  | 2237    | CRI (Ra): | 72.0 |      |       |
| CIE u':                   | 0.2876  | R1:       | 68.9 | R9:  | -17.4 |
| CIE v':                   | 0.5346  | R2:       | 83.0 | R10: | 61.3  |
| Duv:                      | -0.0006 | R3:       | 95.2 | R11: | 59.8  |
| CIE x:                    | 0.5005  | R4:       | 66.2 | R12: | 50.5  |
| CIE y:                    | 0.4134  | R5:       | 65.9 | R13: | 71.1  |
| CIE z:                    | 0.0860  | R6:       | 76.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 603     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.8 |      |       |
| Purity:                   | 74.5    |           |      |      |       |
| Rf:                       | 69.8    |           |      |      |       |
| Rg:                       | 99.2    |           |      |      |       |



### Test Conditions

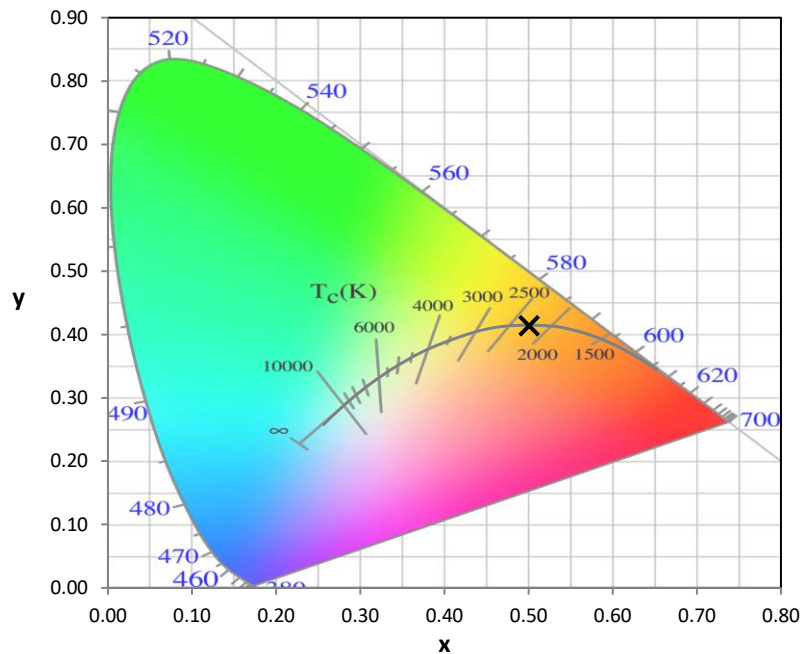
Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

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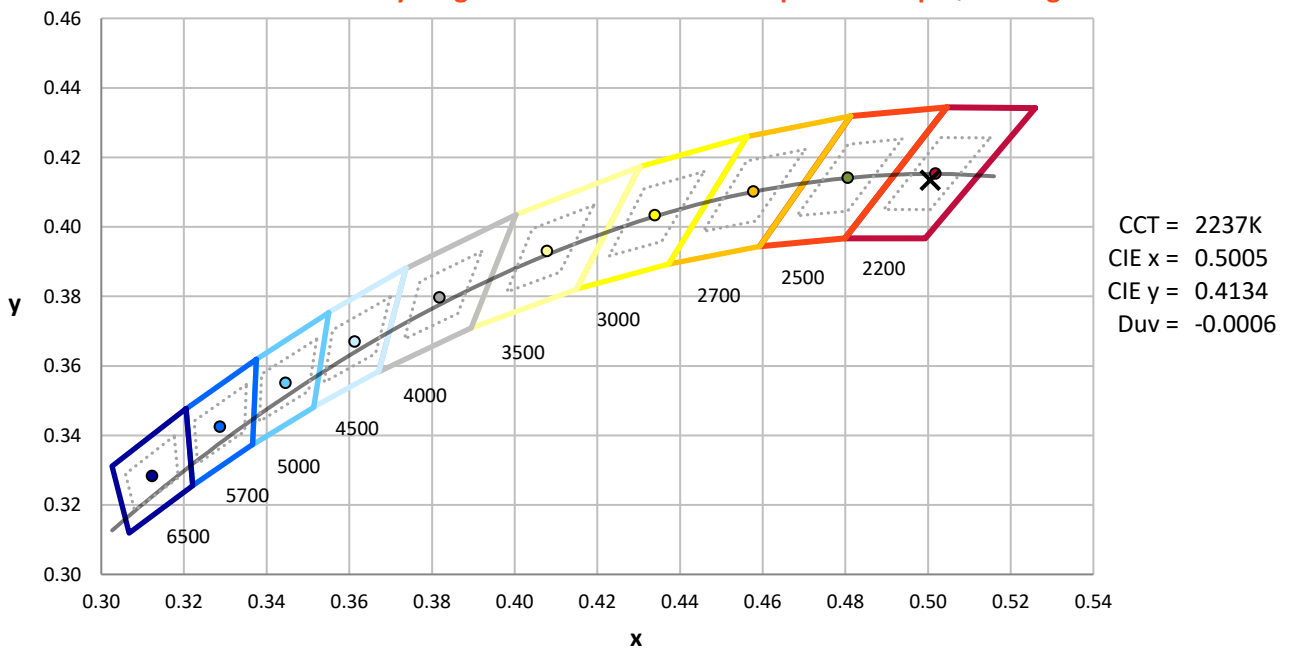
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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

REPORT NUMBER: SP1-1908-441-10-R4

**CIE 1931 Chromaticity Diagram**



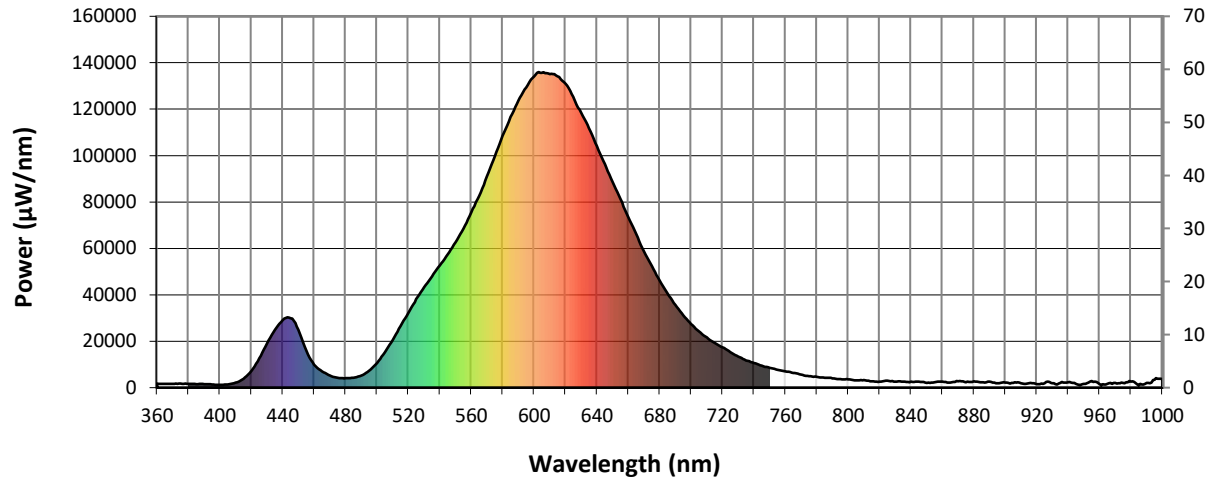
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2200K 4-step quadrangle

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**Photopic Flux vs. Wavelength**

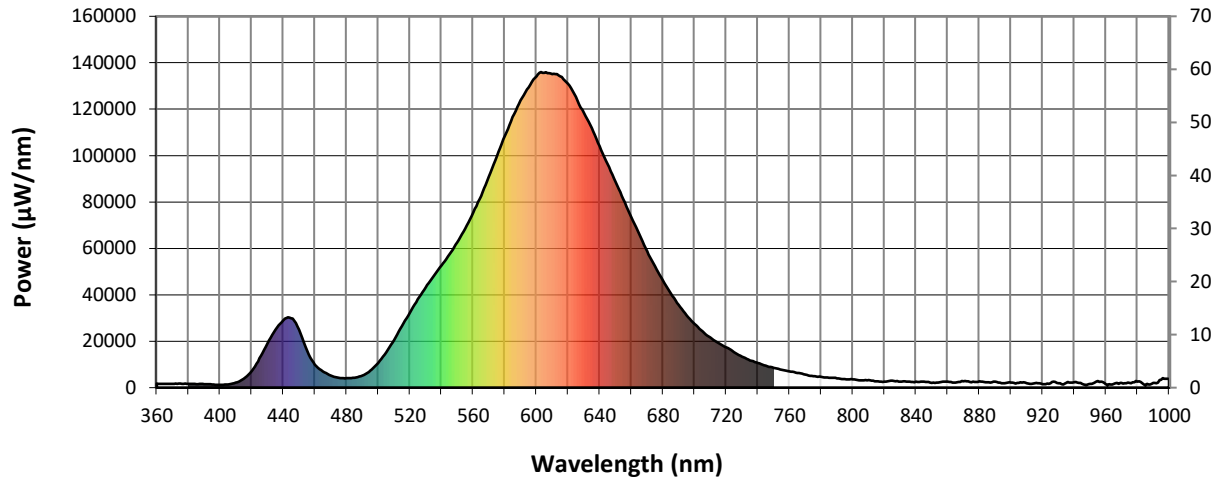


#####

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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**Scotopic Flux vs. Wavelength**



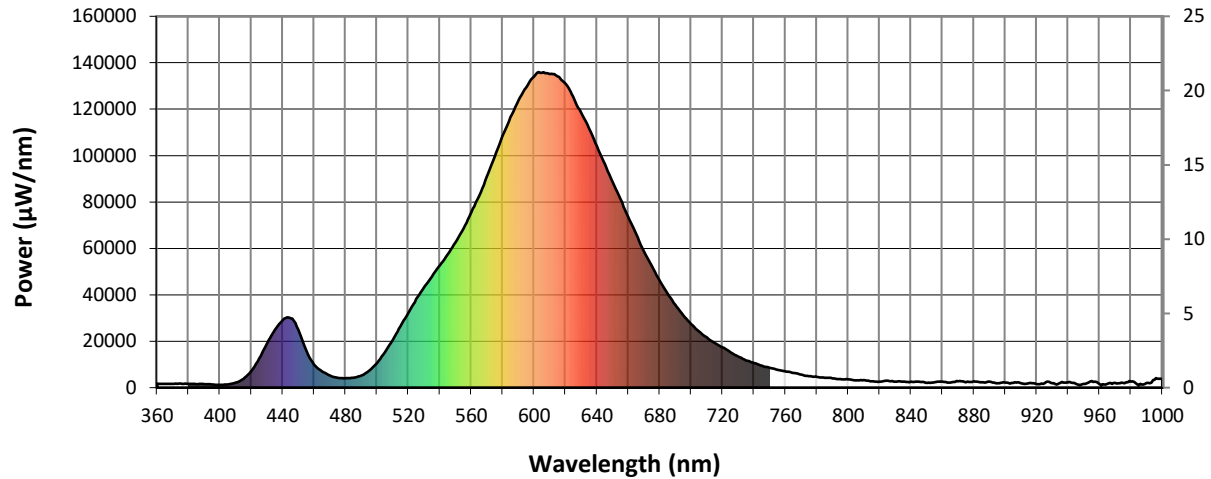
**Scotopic Lumens: 4696.9**

**S/P: 0.85**

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8 M/P: 0.27**

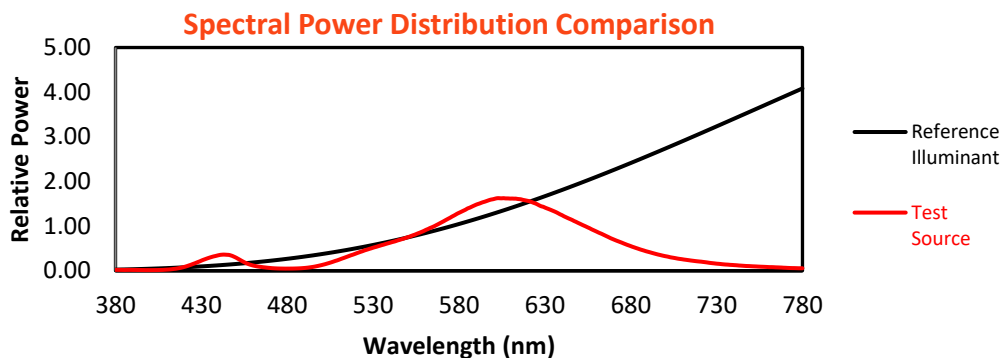
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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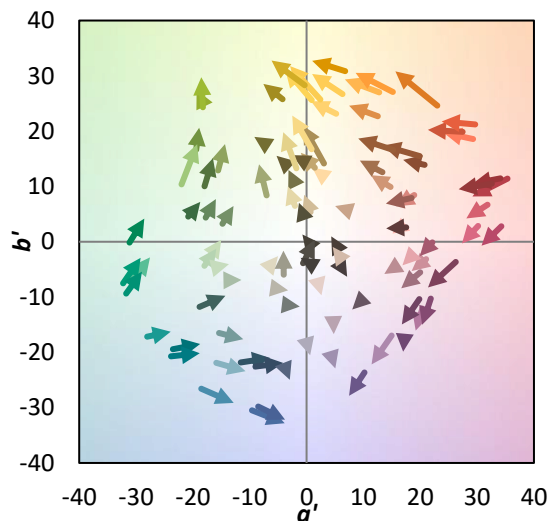
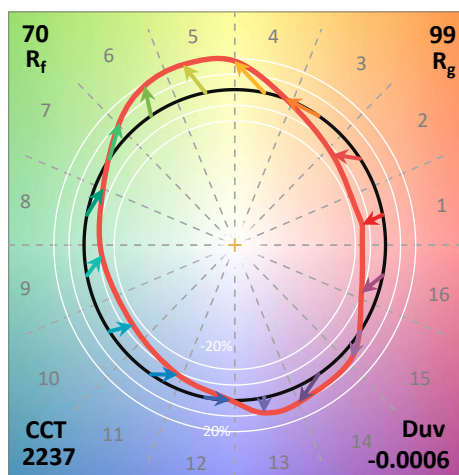
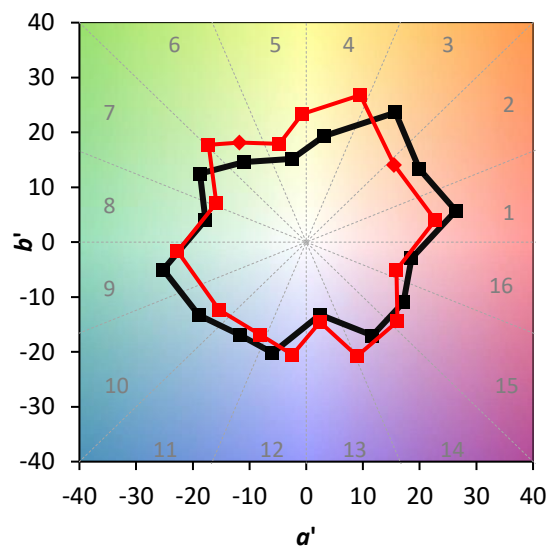
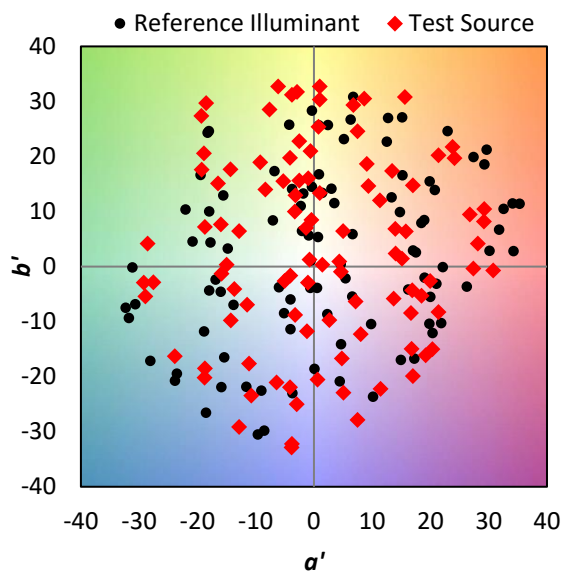
**TM-30-18**

### Summary

$R_f = 69.8$   
 $R_g = 99.2$   
 CIE  $R_a = 72.0$   
 $R_g = -17.4$



### Color Vector Graphics



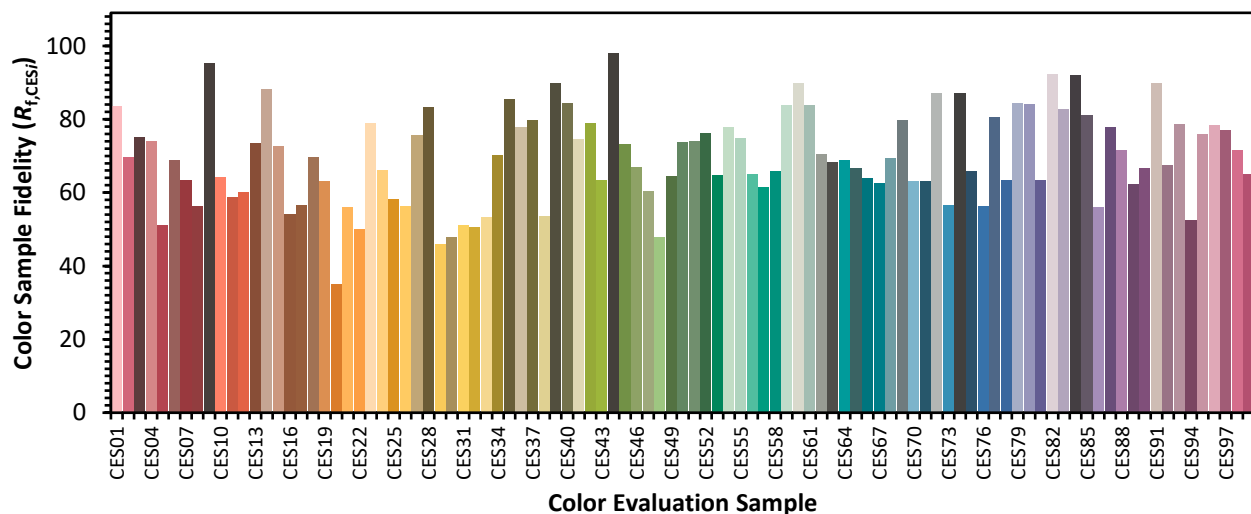


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

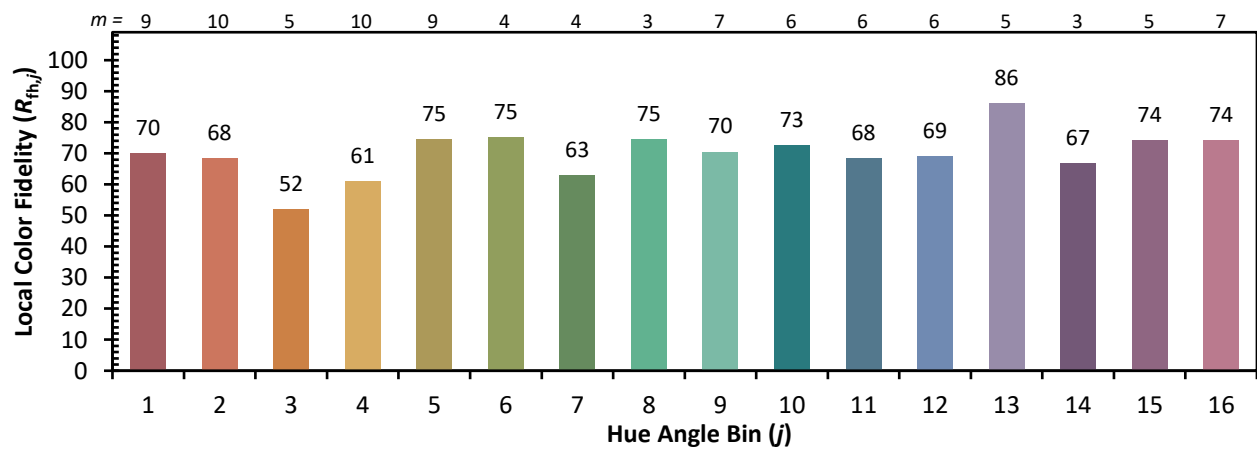
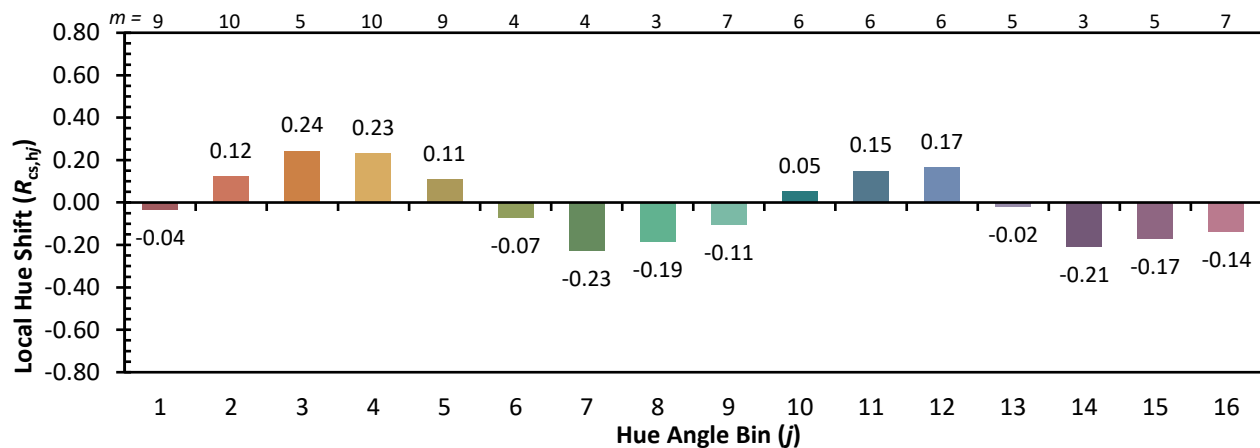
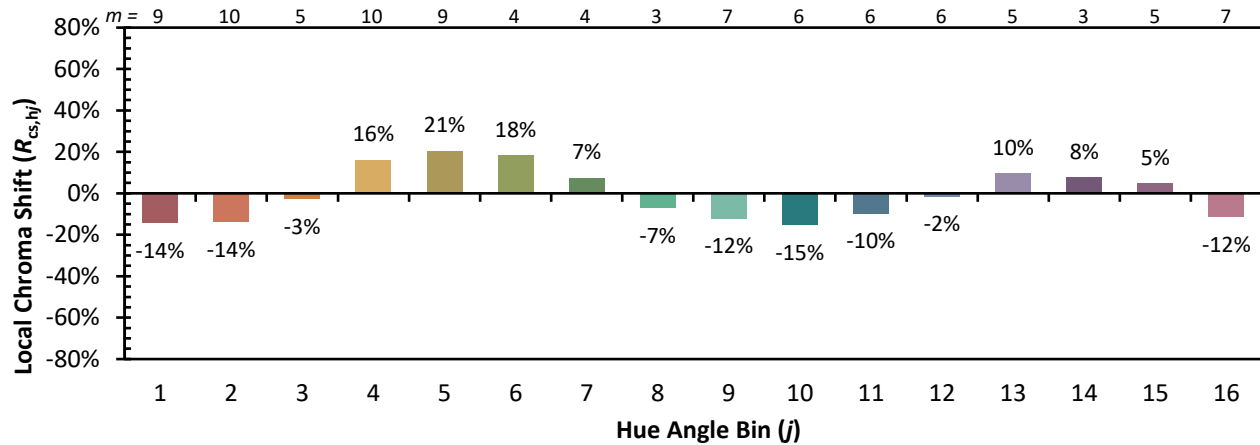
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 84 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 51 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 42 | CES33 = 53 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 70 | CES59 = 84 | CES84 = 92 |
| CES10 = 78 | CES35 = 85 | CES60 = 90 | CES85 = 81 |
| CES11 = 61 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 70 | CES87 = 78 |
| CES13 = 45 | CES38 = 53 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 84 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 69 | CES93 = 79 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 63 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 63 | CES96 = 78 |
| CES22 = 81 | CES47 = 60 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 56 | CES98 = 71 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



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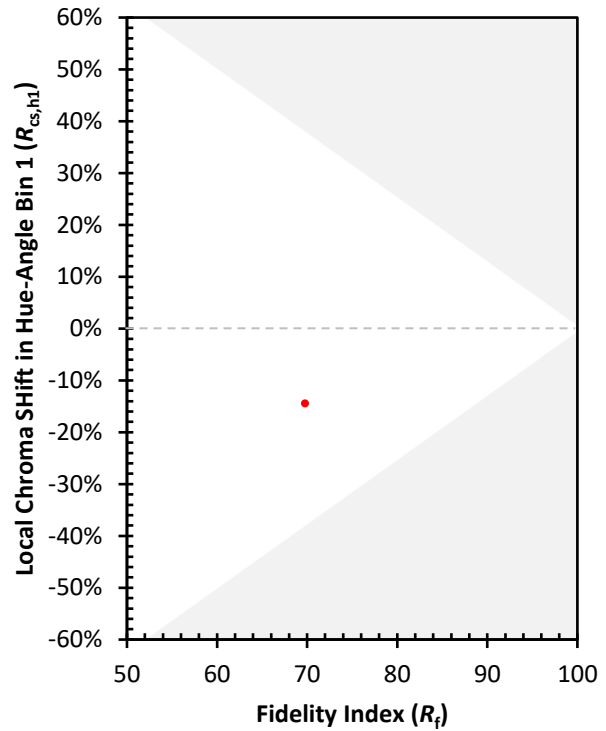
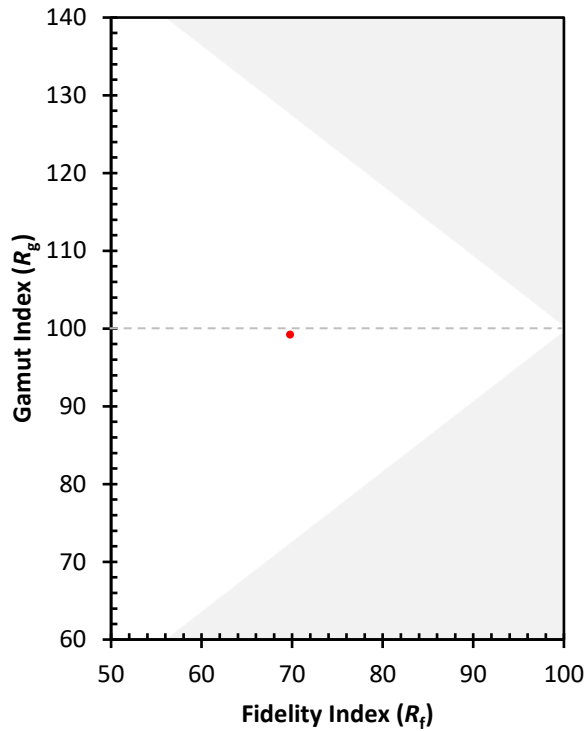
Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)