

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: P317738

Luminaire Tested: **GLEON-SA4D-730-U-T3R**

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-08  
Report Number: P317738  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-10)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA4D-730-U-T3R  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(4) 70 CRI, 3000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
ROADWAY OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 29143 lumens  
Efficiency: N/A  
Efficacy: 113.0 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type IV - Medium  
BUG Rating: B3 - U0 - G4

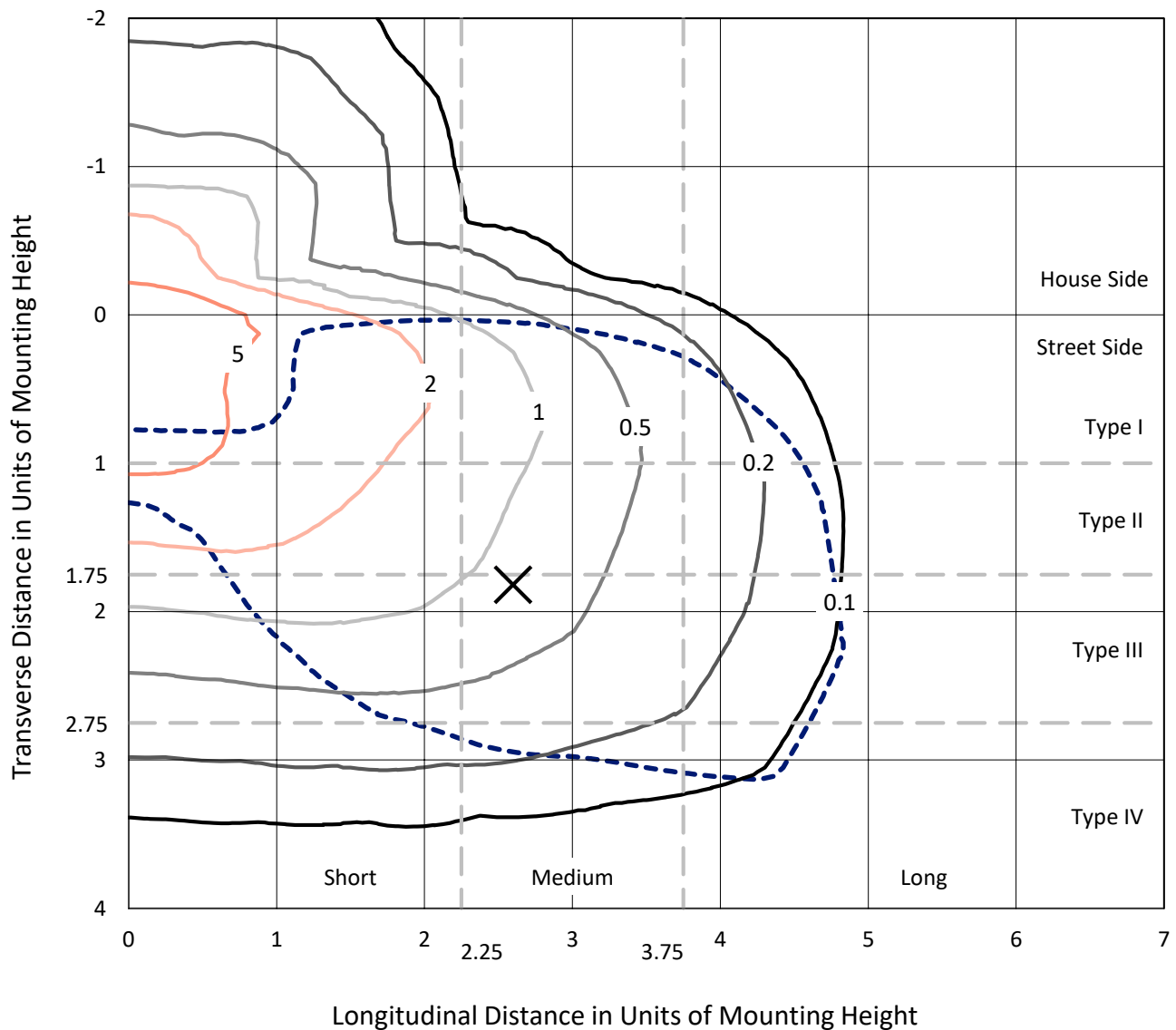
Input Watts (W): 258  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P317738  
 CATALOG NUMBER: GLEON-SA4D-730-U-T3R

## Iso-Footcandle Lines of Horizontal Illumination

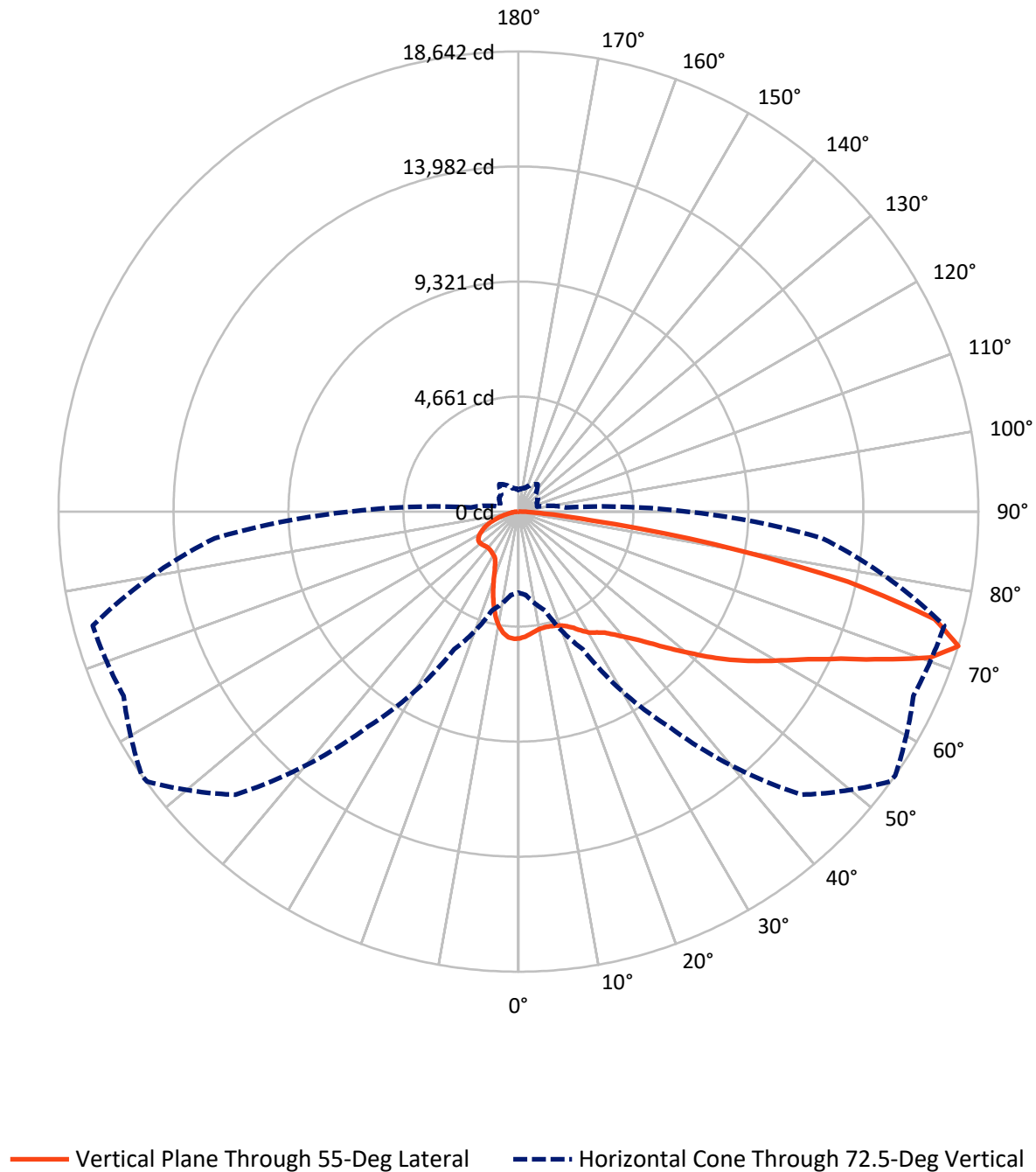
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 8.3 fc  
 Type IV - Medium - N/A

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## Luminous Intensity Polar Plot



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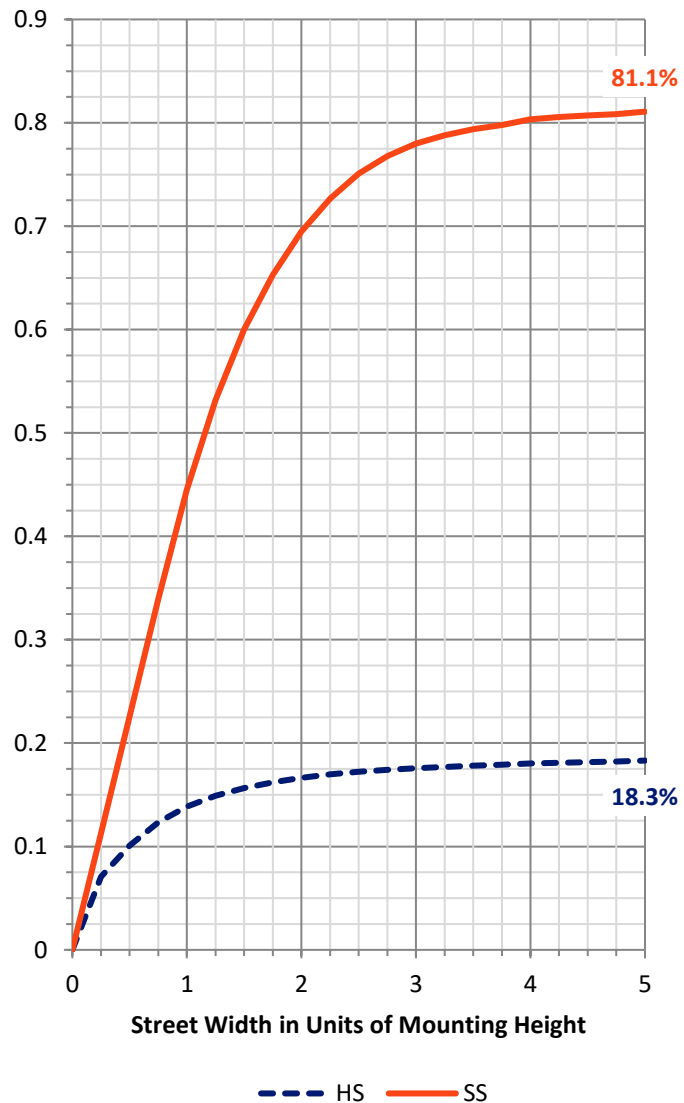
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 5416.7   | 0.0    | 5416.7  |
|                    | % Fixture | 18.6     | 0.0    | 18.6    |
| <b>Street Side</b> | Lumens    | 23726.3  | 0.0    | 23726.3 |
|                    | % Fixture | 81.4     | 0.0    | 81.4    |
| <b>Total</b>       | Lumens    | 29143.0  | 0.0    | 29143.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 465.1   | 1.6       |
| 10°-20°   | 1238.3  | 4.2       |
| 20°-30°   | 2041.7  | 7.0       |
| 30°-40°   | 3020.2  | 10.4      |
| 40°-50°   | 4215.6  | 14.5      |
| 50°-60°   | 5488.8  | 18.8      |
| 60°-70°   | 6745.6  | 23.1      |
| 70°-80°   | 5287.7  | 18.1      |
| 80°-90°   | 639.9   | 2.2       |
| 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°    | 29143.0 | 100.0     |
| 0°-180°   | 29143.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P317738

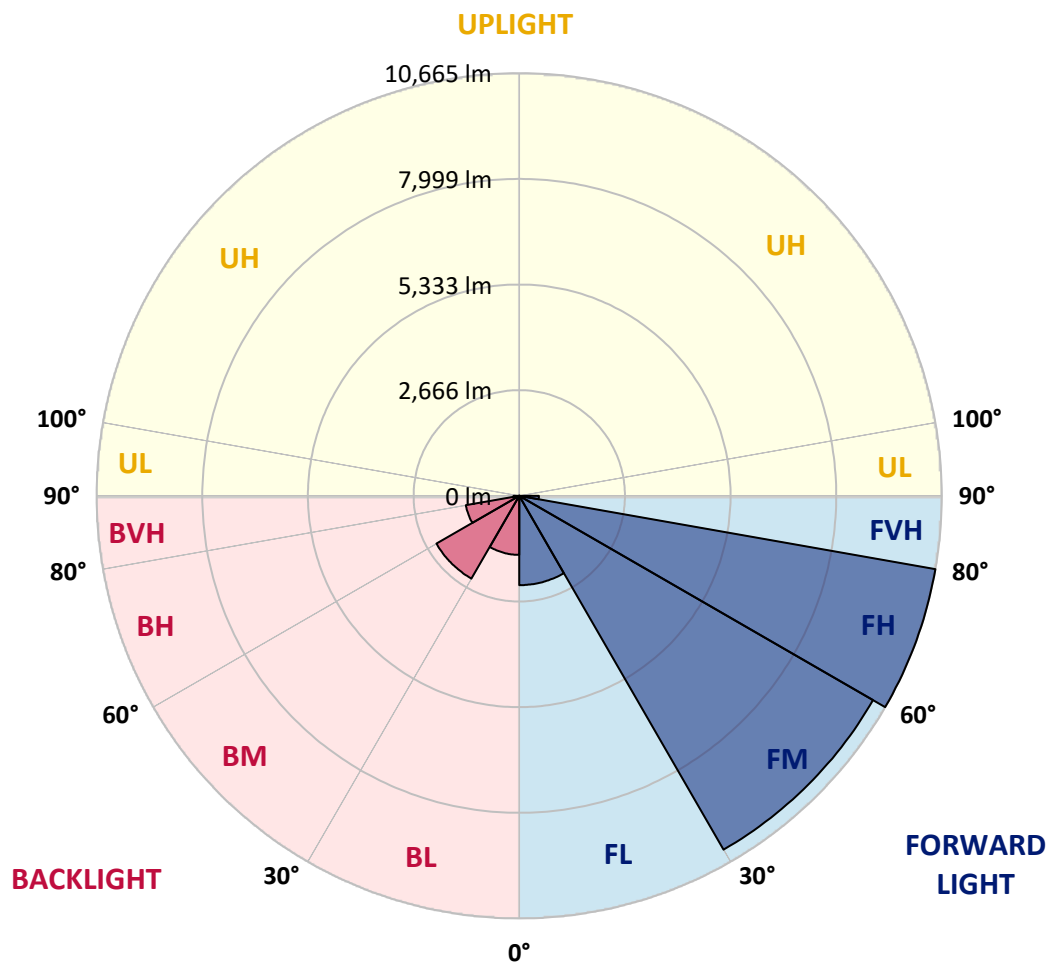
CATALOG NUMBER: GLEON-SA4D-730-U-T3R

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2254.8  | 7.7       |                         |      |          |
| FM   | (30°-60°)   | 10311.4 | 35.4      |                         |      |          |
| FH   | (60°-80°)   | 10665.3 | 36.6      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 494.7   | 1.7       |                         |      | G3/500   |
| BL   | (0°-30°)    | 1490.4  | 5.1       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 2413.2  | 8.3       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1368.0  | 4.7       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 145.2   | 0.5       |                         |      | G2/225   |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B3-U0-G4**

Type IV Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°     | 25°     | 35°     | 45°     | 54°     | 55°     | 65°     | 75°     | 85°     |
|-------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 5140.2 | 5140.2 | 5140.2  | 5140.2  | 5140.2  | 5140.2  | 5140.2  | 5140.2  | 5140.2  | 5140.2  | 5140.2  |
| 2.5°  | 4972.9 | 4961.0 | 4975.8  | 4996.5  | 5019.1  | 5049.6  | 5067.4  | 5075.2  | 5105.7  | 5117.6  | 5143.2  |
| 5°    | 4742.5 | 4736.6 | 4761.2  | 4796.7  | 4846.9  | 4917.7  | 4974.8  | 4985.7  | 5066.4  | 5123.5  | 5175.6  |
| 7.5°  | 4575.2 | 4575.2 | 4603.7  | 4646.1  | 4702.2  | 4797.6  | 4878.4  | 4893.1  | 5030.0  | 5153.0  | 5249.5  |
| 10°   | 4442.3 | 4447.2 | 4480.7  | 4530.9  | 4596.8  | 4698.2  | 4805.5  | 4822.3  | 5020.1  | 5221.9  | 5375.5  |
| 12.5° | 4353.7 | 4365.5 | 4396.0  | 4441.3  | 4523.0  | 4646.1  | 4781.9  | 4804.5  | 5040.8  | 5320.3  | 5527.0  |
| 15°   | 4409.8 | 4429.5 | 4432.5  | 4451.2  | 4496.4  | 4630.3  | 4795.7  | 4819.3  | 5085.1  | 5420.7  | 5699.3  |
| 17.5° | 4655.9 | 4662.8 | 4632.3  | 4592.9  | 4571.3  | 4656.9  | 4837.0  | 4861.6  | 5138.2  | 5520.2  | 5864.7  |
| 20°   | 5030.0 | 5026.0 | 4960.1  | 4853.8  | 4743.5  | 4757.3  | 4904.9  | 4930.5  | 5210.1  | 5607.8  | 6030.0  |
| 22.5° | 5502.4 | 5488.7 | 5387.3  | 5191.4  | 5003.4  | 4924.6  | 5024.0  | 5045.7  | 5318.4  | 5732.8  | 6207.2  |
| 25°   | 6075.3 | 6044.8 | 5910.9  | 5648.1  | 5371.5  | 5168.7  | 5203.2  | 5223.9  | 5475.9  | 5872.5  | 6369.6  |
| 27.5° | 6679.7 | 6649.2 | 6478.9  | 6161.0  | 5792.8  | 5476.8  | 5450.3  | 5468.0  | 5655.0  | 5975.9  | 6489.7  |
| 30°   | 7311.6 | 7279.2 | 7123.6  | 6767.3  | 6239.7  | 5795.8  | 5680.6  | 5687.5  | 5781.0  | 6032.0  | 6588.2  |
| 32.5° | 7946.5 | 7916.0 | 7741.8  | 7328.4  | 6725.0  | 6138.3  | 5847.0  | 5838.1  | 5856.8  | 6090.1  | 6699.4  |
| 35°   | 8590.3 | 8602.1 | 8398.3  | 7940.6  | 7262.4  | 6519.3  | 6043.8  | 6025.1  | 5983.8  | 6209.2  | 6856.9  |
| 37.5° | 9279.3 | 9271.5 | 9007.7  | 8529.3  | 7824.5  | 6932.7  | 6326.3  | 6323.4  | 6180.6  | 6434.6  | 7103.9  |
| 40°   | 9740.0 | 9744.9 | 9584.5  | 9131.7  | 8392.4  | 7390.4  | 6688.6  | 6681.7  | 6494.6  | 6772.2  | 7427.8  |
| 42.5° | 9920.1 | 9952.6 | 9994.0  | 9706.5  | 8987.0  | 7920.9  | 7120.7  | 7110.8  | 6932.7  | 7256.5  | 7808.7  |
| 45°   | 9932.9 | 9997.9 | 10253.8 | 10217.4 | 9589.4  | 8528.3  | 7672.9  | 7645.3  | 7517.4  | 7900.3  | 8263.5  |
| 47.5° | 9822.7 | 9889.6 | 10314.8 | 10521.6 | 10127.8 | 9169.1  | 8318.6  | 8297.0  | 8186.7  | 8705.5  | 8755.7  |
| 50°   | 9581.5 | 9645.5 | 10188.9 | 10670.2 | 10570.8 | 9785.3  | 9062.8  | 9005.7  | 8946.6  | 9635.7  | 9318.7  |
| 52.5° | 9129.7 | 9252.8 | 10020.5 | 10705.6 | 10835.6 | 10332.6 | 9845.3  | 9807.9  | 9840.4  | 10617.0 | 9882.7  |
| 55°   | 8059.7 | 8197.5 | 9586.4  | 10676.1 | 11031.4 | 10792.3 | 10627.9 | 10625.9 | 10794.2 | 11646.7 | 10488.1 |
| 57.5° | 7460.3 | 7557.7 | 8702.5  | 10625.9 | 11263.7 | 11249.0 | 11402.5 | 11421.2 | 11749.0 | 12767.8 | 11122.0 |
| 60°   | 7121.7 | 7224.0 | 8254.6  | 10439.9 | 11624.0 | 11839.6 | 12193.0 | 12230.4 | 12719.6 | 14009.1 | 11884.9 |
| 62.5° | 6813.6 | 6925.8 | 7977.1  | 10060.9 | 12048.3 | 12684.1 | 13139.9 | 13173.4 | 13747.2 | 15284.8 | 12622.1 |
| 65°   | 6286.9 | 6413.9 | 7570.5  | 9811.9  | 12434.1 | 13785.6 | 14343.7 | 14366.4 | 14927.4 | 16621.5 | 13186.2 |
| 67.5° | 5542.8 | 5658.9 | 6803.7  | 9261.6  | 12719.6 | 15123.3 | 15944.3 | 15957.1 | 16097.8 | 17565.5 | 13474.6 |
| 70°   | 4673.6 | 4717.9 | 5711.1  | 8125.7  | 12382.0 | 16374.4 | 17698.3 | 17701.3 | 17164.8 | 18169.8 | 13427.3 |
| 72.5° | 3283.7 | 3388.1 | 4146.0  | 6151.1  | 10640.7 | 16221.8 | 18608.9 | 18642.3 | 17660.9 | 17864.7 | 12354.4 |
| 75°   | 2013.9 | 2124.2 | 2600.6  | 3727.7  | 6750.6  | 12758.0 | 17193.4 | 17425.7 | 16730.7 | 15928.5 | 10092.4 |
| 77.5° | 1346.6 | 1387.9 | 1697.0  | 2173.4  | 3058.3  | 7340.2  | 13218.6 | 13655.7 | 13898.8 | 11616.1 | 6454.3  |
| 80°   | 751.0  | 829.8  | 1125.1  | 1350.5  | 1360.4  | 2916.6  | 7925.9  | 8028.2  | 7732.9  | 4625.4  | 1991.3  |
| 82.5° | 397.7  | 441.0  | 751.0   | 793.4   | 742.2   | 976.5   | 2954.0  | 2956.9  | 2470.7  | 1240.3  | 591.6   |
| 85°   | 308.1  | 344.5  | 514.8   | 484.3   | 379.0   | 433.1   | 974.5   | 1027.6  | 840.6   | 507.9   | 192.9   |
| 87.5° | 153.6  | 191.0  | 349.4   | 307.1   | 148.6   | 124.0   | 348.5   | 372.1   | 331.7   | 198.8   | 69.9    |
| 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: P317738

CATALOG NUMBER: GLEON-SA4D-730-U-T3R

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 5140.2 | 5140.2 | 5140.2 | 5140.2 | 5140.2 | 5140.2 | 5140.2 | 5140.2 | 5140.2 | 5140.2 | 5140.2 |
| 2.5°  | 5153.0 | 5161.9 | 5172.7 | 5160.9 | 5156.9 | 5141.2 | 5114.6 | 5108.7 | 5094.9 | 5095.9 | 5103.8 |
| 5°    | 5198.3 | 5213.0 | 5207.1 | 5161.9 | 5107.7 | 5031.9 | 4953.2 | 4886.2 | 4841.9 | 4839.0 | 4836.0 |
| 7.5°  | 5284.9 | 5294.7 | 5248.5 | 5119.5 | 4967.9 | 4792.7 | 4627.4 | 4482.7 | 4395.1 | 4373.4 | 4368.5 |
| 10°   | 5420.7 | 5418.8 | 5291.8 | 5031.9 | 4729.7 | 4416.7 | 4150.9 | 3950.1 | 3833.0 | 3798.5 | 3789.7 |
| 12.5° | 5572.3 | 5549.7 | 5306.6 | 4872.5 | 4393.1 | 3959.0 | 3622.4 | 3398.9 | 3276.9 | 3237.5 | 3227.6 |
| 15°   | 5728.8 | 5672.7 | 5270.1 | 4634.2 | 3979.7 | 3465.8 | 3112.5 | 2905.8 | 2839.8 | 2818.2 | 2814.2 |
| 17.5° | 5874.5 | 5766.2 | 5165.8 | 4311.4 | 3508.2 | 2974.7 | 2699.0 | 2616.4 | 2632.1 | 2660.7 | 2661.6 |
| 20°   | 6017.2 | 5829.2 | 4998.5 | 3903.9 | 3011.1 | 2570.1 | 2476.6 | 2537.6 | 2612.4 | 2670.5 | 2678.4 |
| 22.5° | 6158.0 | 5873.5 | 4782.9 | 3433.4 | 2566.2 | 2342.7 | 2408.7 | 2519.9 | 2605.5 | 2668.5 | 2679.4 |
| 25°   | 6276.1 | 5884.4 | 4485.6 | 2931.4 | 2257.1 | 2257.1 | 2376.2 | 2481.5 | 2566.2 | 2628.2 | 2639.0 |
| 27.5° | 6319.4 | 5811.5 | 4066.3 | 2466.7 | 2101.6 | 2217.7 | 2330.9 | 2418.5 | 2490.4 | 2556.3 | 2568.1 |
| 30°   | 6336.2 | 5676.7 | 3582.0 | 2093.7 | 2037.6 | 2175.4 | 2269.9 | 2344.7 | 2412.6 | 2474.6 | 2485.4 |
| 32.5° | 6339.1 | 5514.2 | 3068.2 | 1882.0 | 1993.3 | 2131.1 | 2194.1 | 2260.0 | 2332.9 | 2357.5 | 2361.4 |
| 35°   | 6357.8 | 5322.3 | 2526.8 | 1773.8 | 1951.9 | 2089.7 | 2139.9 | 2187.2 | 2069.1 | 2077.9 | 2085.8 |
| 37.5° | 6412.0 | 5132.3 | 2074.0 | 1712.7 | 1925.4 | 2068.1 | 2128.1 | 1956.9 | 1864.3 | 1842.7 | 1839.7 |
| 40°   | 6513.3 | 4929.6 | 1738.3 | 1663.5 | 1915.5 | 2078.9 | 2052.3 | 1826.9 | 1667.5 | 1548.4 | 1530.6 |
| 42.5° | 6654.1 | 4711.0 | 1523.8 | 1631.0 | 1922.4 | 2131.1 | 1947.0 | 1701.9 | 1437.1 | 1360.4 | 1350.5 |
| 45°   | 6812.6 | 4481.7 | 1407.6 | 1608.4 | 1946.0 | 2171.4 | 1925.4 | 1535.6 | 1329.8 | 1271.8 | 1266.8 |
| 47.5° | 6966.1 | 4201.1 | 1347.6 | 1598.6 | 1978.5 | 2139.0 | 1833.8 | 1484.4 | 1278.7 | 1248.1 | 1251.1 |
| 50°   | 7142.3 | 3948.2 | 1311.1 | 1587.7 | 2007.1 | 2118.3 | 1730.5 | 1457.8 | 1259.0 | 1296.4 | 1335.7 |
| 52.5° | 7291.0 | 3686.3 | 1278.7 | 1566.1 | 2017.9 | 2081.9 | 1703.9 | 1462.7 | 1259.0 | 1330.8 | 1368.2 |
| 55°   | 7467.2 | 3488.5 | 1241.2 | 1520.8 | 1997.2 | 1978.5 | 1685.2 | 1492.3 | 1273.7 | 1228.5 | 1232.4 |
| 57.5° | 7694.5 | 3423.5 | 1199.9 | 1449.9 | 1928.3 | 1827.9 | 1676.3 | 1520.8 | 1264.9 | 1236.3 | 1246.2 |
| 60°   | 8009.5 | 3492.4 | 1183.2 | 1357.4 | 1821.0 | 1709.8 | 1677.3 | 1506.0 | 1202.9 | 1153.6 | 1154.6 |
| 62.5° | 8309.8 | 3569.2 | 1182.2 | 1299.3 | 1689.1 | 1604.5 | 1654.7 | 1457.8 | 1171.4 | 1142.8 | 1153.6 |
| 65°   | 8408.2 | 3491.4 | 1134.9 | 1234.4 | 1540.5 | 1478.5 | 1613.3 | 1406.6 | 1147.7 | 1104.4 | 1102.5 |
| 67.5° | 8276.3 | 3250.3 | 1039.5 | 1129.0 | 1370.2 | 1331.8 | 1559.2 | 1345.6 | 1110.3 | 1074.9 | 1069.0 |
| 70°   | 7884.5 | 2711.8 | 921.3  | 990.2  | 1176.3 | 1166.4 | 1473.5 | 1274.7 | 1060.1 | 1029.6 | 1004.0 |
| 72.5° | 6830.3 | 1932.2 | 776.6  | 823.9  | 957.8  | 989.3  | 1355.4 | 1182.2 | 989.3  | 923.3  | 883.9  |
| 75°   | 5609.7 | 1430.2 | 637.8  | 647.7  | 727.4  | 813.1  | 1193.0 | 1073.9 | 905.6  | 793.4  | 762.9  |
| 77.5° | 3435.3 | 875.1  | 507.9  | 511.9  | 521.7  | 648.7  | 982.4  | 952.8  | 799.3  | 661.5  | 639.8  |
| 80°   | 1112.3 | 477.4  | 367.2  | 385.9  | 356.3  | 475.4  | 759.9  | 811.1  | 686.1  | 553.2  | 529.6  |
| 82.5° | 423.3  | 278.6  | 248.1  | 260.8  | 247.1  | 318.9  | 554.2  | 649.7  | 562.1  | 454.8  | 370.1  |
| 85°   | 204.7  | 157.5  | 146.7  | 164.4  | 152.6  | 163.4  | 354.4  | 478.4  | 426.2  | 296.3  | 275.6  |
| 87.5° | 72.8   | 69.9   | 56.1   | 75.8   | 65.0   | 58.1   | 108.3  | 241.2  | 281.5  | 203.8  | 182.1  |
| 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: SP1-1908-441-2-R4

Test Date: 10/03/2019

Luminaire Tested: SA1C-730-U-5WQ

Data in this report applies to families of products SA1C-730-U-5WQ .

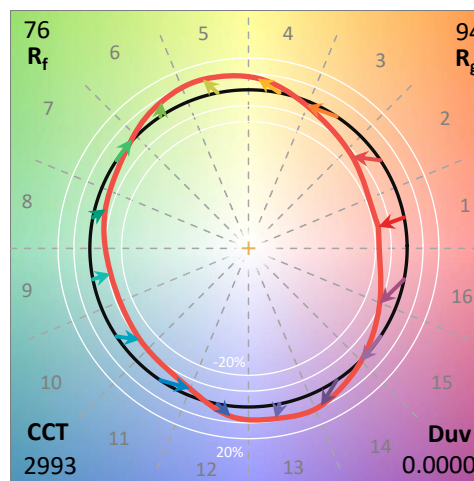
### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-2-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-730-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-2-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. (1) 70 CRI, 3000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2993   | CRI (Ra): | 71.8 |      |       |
| CIE u':                   | 0.2508 | R1:       | 67.5 | R9:  | -38.3 |
| CIE v':                   | 0.5215 | R2:       | 82.9 | R10: | 62.5  |
| Duv:                      | 0.0000 | R3:       | 94.7 | R11: | 63.7  |
| CIE x:                    | 0.4374 | R4:       | 67.7 | R12: | 57.8  |
| CIE y:                    | 0.4043 | R5:       | 67.9 | R13: | 70.4  |
| CIE z:                    | 0.1583 | R6:       | 77.6 | R14: | 97.3  |
| Peak Wavelength (nm):     | 593    | R7:       | 76.0 |      |       |
| Dominant Wavelength (nm): | 582    | R8:       | 40.5 |      |       |
| Purity:                   | 53     |           |      |      |       |
| Rf:                       | 75.7   |           |      |      |       |
| Rg:                       | 93.9   |           |      |      |       |



### Test Conditions

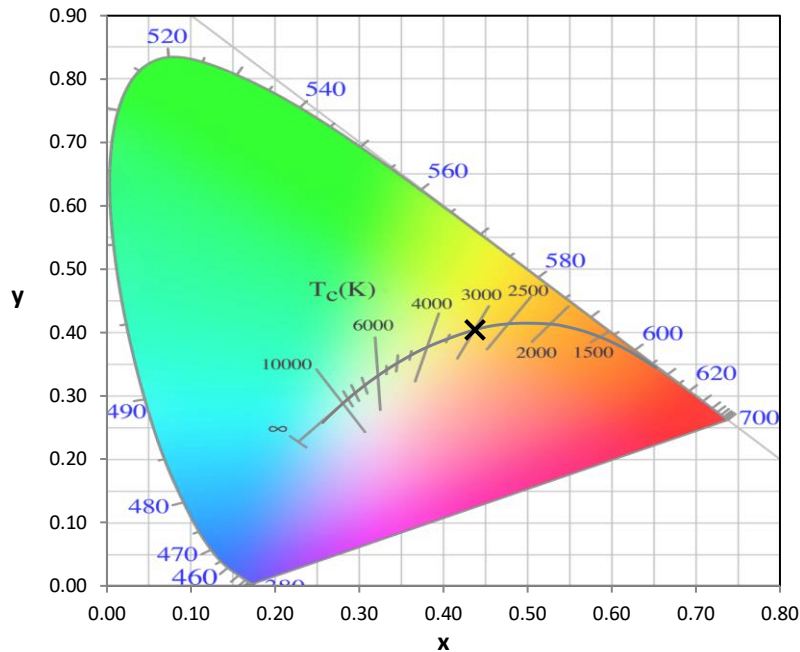
Stabilization Time: 53M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0./44%  
 Sphere Temperature (°C): 25.7

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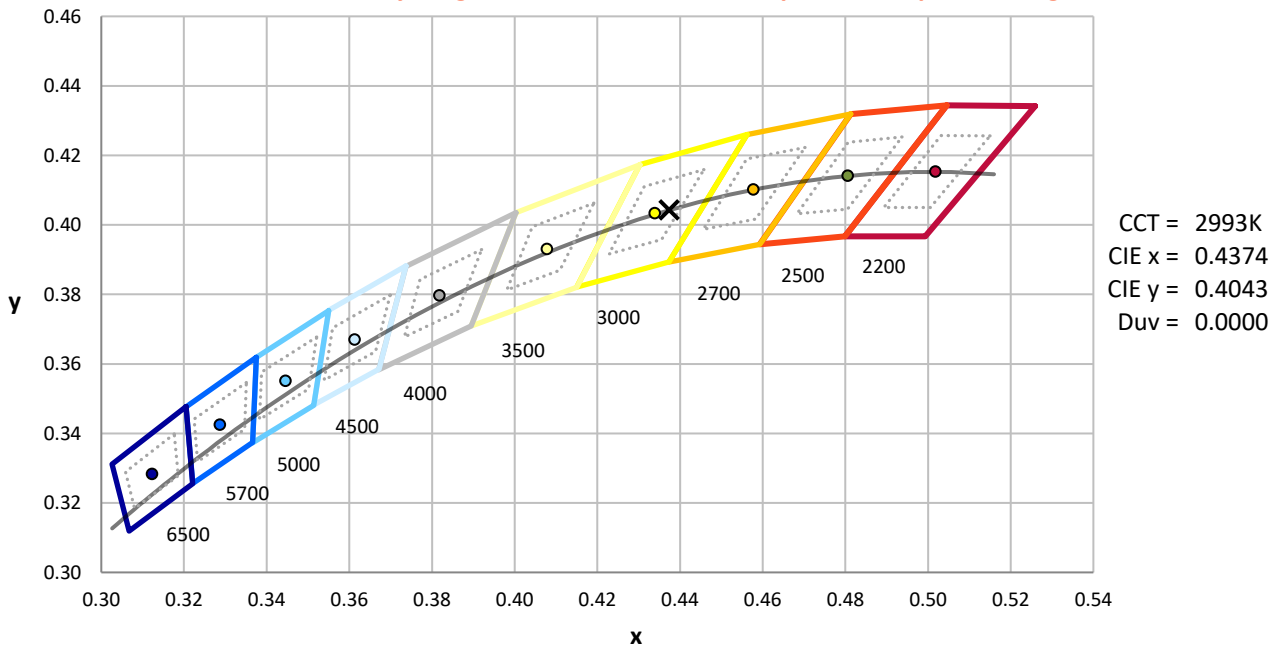
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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

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**CIE 1931 Chromaticity Diagram**



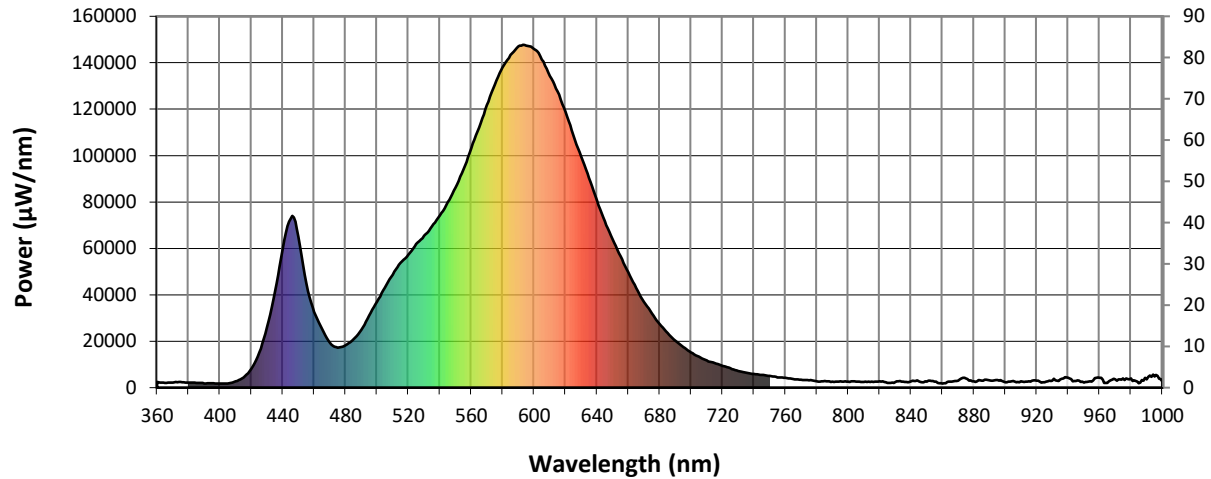
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**

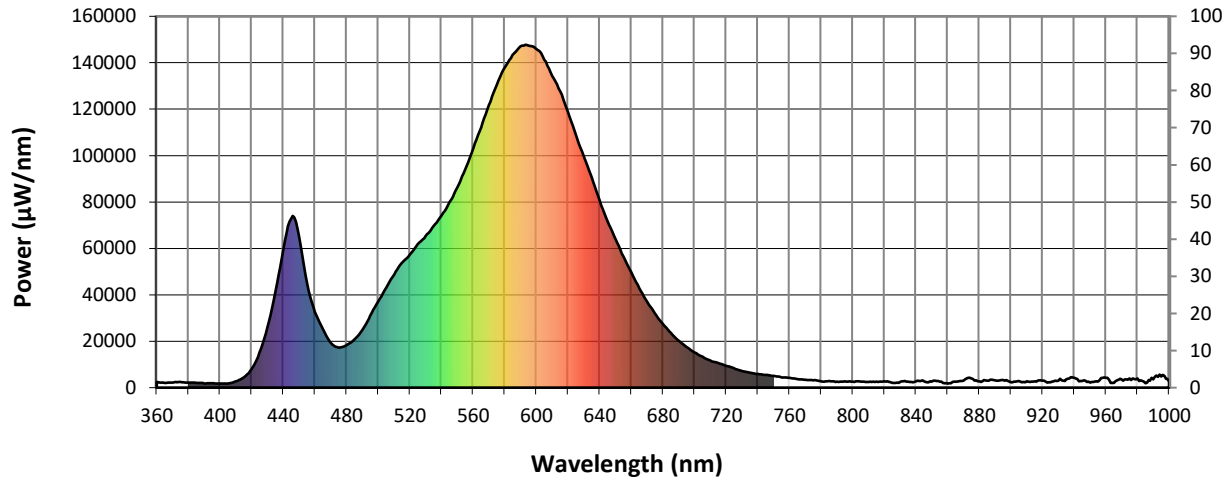


#####

| 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       | 2397             | NR               | 490       | 24908            | NR               | 620       | 118784           | NR               | 750       | 5037             | NR               | 880       | 2677             | NR               |
| 365       | 2084             | NR               | 495       | 30998            | NR               | 625       | 108951           | NR               | 755       | 4413             | NR               | 885       | 2940             | NR               |
| 370       | 2143             | NR               | 500       | 37103            | NR               | 630       | 99573            | NR               | 760       | 4189             | NR               | 890       | 3116             | NR               |
| 375       | 2413             | NR               | 505       | 42987            | NR               | 635       | 90444            | NR               | 765       | 3677             | NR               | 895       | 3345             | NR               |
| 380       | 2172             | NR               | 510       | 48702            | NR               | 640       | 80749            | NR               | 770       | 3366             | NR               | 900       | 2312             | NR               |
| 385       | 1997             | NR               | 515       | 53741            | NR               | 645       | 71664            | NR               | 775       | 3211             | NR               | 905       | 2829             | NR               |
| 390       | 1830             | NR               | 520       | 57283            | NR               | 650       | 63936            | NR               | 780       | 2682             | NR               | 910       | 2783             | NR               |
| 395       | 1861             | NR               | 525       | 61876            | NR               | 655       | 56611            | NR               | 785       | 2804             | NR               | 915       | 2662             | NR               |
| 400       | 1717             | NR               | 530       | 65398            | NR               | 660       | 49763            | NR               | 790       | 2581             | NR               | 920       | 3047             | NR               |
| 405       | 1761             | NR               | 535       | 69597            | NR               | 665       | 42891            | NR               | 795       | 2711             | NR               | 925       | 2256             | NR               |
| 410       | 2680             | NR               | 540       | 74214            | NR               | 670       | 36939            | NR               | 800       | 2609             | NR               | 930       | 2976             | NR               |
| 415       | 4374             | NR               | 545       | 79911            | NR               | 675       | 31946            | NR               | 805       | 2581             | NR               | 935       | 3503             | NR               |
| 420       | 8071             | NR               | 550       | 86153            | NR               | 680       | 27385            | NR               | 810       | 2404             | NR               | 940       | 4226             | NR               |
| 425       | 15169            | NR               | 555       | 93952            | NR               | 685       | 23504            | NR               | 815       | 2556             | NR               | 945       | 2930             | NR               |
| 430       | 26038            | NR               | 560       | 102904           | NR               | 690       | 20210            | NR               | 820       | 2742             | NR               | 950       | 2115             | NR               |
| 435       | 41316            | NR               | 565       | 112009           | NR               | 695       | 17459            | NR               | 825       | 2014             | NR               | 955       | 2634             | NR               |
| 440       | 59674            | NR               | 570       | 121662           | NR               | 700       | 15207            | NR               | 830       | 2488             | NR               | 960       | 4200             | NR               |
| 445       | 72751            | NR               | 575       | 130476           | NR               | 705       | 13322            | NR               | 835       | 2625             | NR               | 965       | 1982             | NR               |
| 450       | 65091            | NR               | 580       | 137926           | NR               | 710       | 11676            | NR               | 840       | 2754             | NR               | 970       | 3613             | NR               |
| 455       | 44894            | NR               | 585       | 143406           | NR               | 715       | 10626            | NR               | 845       | 2708             | NR               | 975       | 4034             | NR               |
| 460       | 32712            | NR               | 590       | 147039           | NR               | 720       | 9416             | NR               | 850       | 2608             | NR               | 980       | 3922             | NR               |
| 465       | 25296            | NR               | 595       | 147365           | NR               | 725       | 8333             | NR               | 855       | 2605             | NR               | 985       | 1909             | NR               |
| 470       | 19318            | NR               | 600       | 145800           | NR               | 730       | 7134             | NR               | 860       | 1765             | NR               | 990       | 3617             | NR               |
| 475       | 17265            | NR               | 605       | 141363           | NR               | 735       | 6437             | NR               | 865       | 2581             | NR               | 995       | 4767             | NR               |
| 480       | 18260            | NR               | 610       | 134199           | NR               | 740       | 5834             | NR               | 870       | 3016             | NR               | 1000      | 2528             | NR               |
| 485       | 20845            | NR               | 615       | 127683           | NR               | 745       | 5500             | NR               | 875       | 3952             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



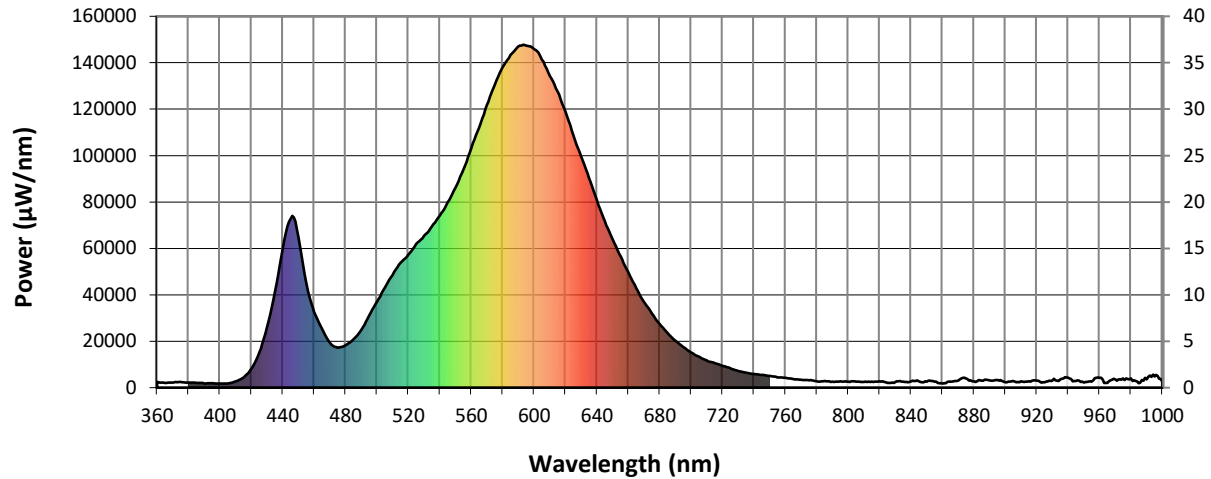
Scotopic Lumens: 8494.8

S/P: 1.23

| 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       | 2397             | NR               | 490       | 24908            | NR               | 620       | 118784           | NR               | 750       | 5037             | NR               | 880       | 2677             | NR               |
| 365       | 2084             | NR               | 495       | 30998            | NR               | 625       | 108951           | NR               | 755       | 4413             | NR               | 885       | 2940             | NR               |
| 370       | 2143             | NR               | 500       | 37103            | NR               | 630       | 99573            | NR               | 760       | 4189             | NR               | 890       | 3116             | NR               |
| 375       | 2413             | NR               | 505       | 42987            | NR               | 635       | 90444            | NR               | 765       | 3677             | NR               | 895       | 3345             | NR               |
| 380       | 2172             | NR               | 510       | 48702            | NR               | 640       | 80749            | NR               | 770       | 3366             | NR               | 900       | 2312             | NR               |
| 385       | 1997             | NR               | 515       | 53741            | NR               | 645       | 71664            | NR               | 775       | 3211             | NR               | 905       | 2829             | NR               |
| 390       | 1830             | NR               | 520       | 57283            | NR               | 650       | 63936            | NR               | 780       | 2682             | NR               | 910       | 2783             | NR               |
| 395       | 1861             | NR               | 525       | 61876            | NR               | 655       | 56611            | NR               | 785       | 2804             | NR               | 915       | 2662             | NR               |
| 400       | 1717             | NR               | 530       | 65398            | NR               | 660       | 49763            | NR               | 790       | 2581             | NR               | 920       | 3047             | NR               |
| 405       | 1761             | NR               | 535       | 69597            | NR               | 665       | 42891            | NR               | 795       | 2711             | NR               | 925       | 2256             | NR               |
| 410       | 2680             | NR               | 540       | 74214            | NR               | 670       | 36939            | NR               | 800       | 2609             | NR               | 930       | 2976             | NR               |
| 415       | 4374             | NR               | 545       | 79911            | NR               | 675       | 31946            | NR               | 805       | 2581             | NR               | 935       | 3503             | NR               |
| 420       | 8071             | NR               | 550       | 86153            | NR               | 680       | 27385            | NR               | 810       | 2404             | NR               | 940       | 4226             | NR               |
| 425       | 15169            | NR               | 555       | 93952            | NR               | 685       | 23504            | NR               | 815       | 2556             | NR               | 945       | 2930             | NR               |
| 430       | 26038            | NR               | 560       | 102904           | NR               | 690       | 20210            | NR               | 820       | 2742             | NR               | 950       | 2115             | NR               |
| 435       | 41316            | NR               | 565       | 112009           | NR               | 695       | 17459            | NR               | 825       | 2014             | NR               | 955       | 2634             | NR               |
| 440       | 59674            | NR               | 570       | 121662           | NR               | 700       | 15207            | NR               | 830       | 2488             | NR               | 960       | 4200             | NR               |
| 445       | 72751            | NR               | 575       | 130476           | NR               | 705       | 13322            | NR               | 835       | 2625             | NR               | 965       | 1982             | NR               |
| 450       | 65091            | NR               | 580       | 137926           | NR               | 710       | 11676            | NR               | 840       | 2754             | NR               | 970       | 3613             | NR               |
| 455       | 44894            | NR               | 585       | 143406           | NR               | 715       | 10626            | NR               | 845       | 2708             | NR               | 975       | 4034             | NR               |
| 460       | 32712            | NR               | 590       | 147039           | NR               | 720       | 9416             | NR               | 850       | 2608             | NR               | 980       | 3922             | NR               |
| 465       | 25296            | NR               | 595       | 147365           | NR               | 725       | 8333             | NR               | 855       | 2605             | NR               | 985       | 1909             | NR               |
| 470       | 19318            | NR               | 600       | 145800           | NR               | 730       | 7134             | NR               | 860       | 1765             | NR               | 990       | 3617             | NR               |
| 475       | 17265            | NR               | 605       | 141363           | NR               | 735       | 6437             | NR               | 865       | 2581             | NR               | 995       | 4767             | NR               |
| 480       | 18260            | NR               | 610       | 134199           | NR               | 740       | 5834             | NR               | 870       | 3016             | NR               | 1000      | 2528             | NR               |
| 485       | 20845            | NR               | 615       | 127683           | NR               | 745       | 5500             | NR               | 875       | 3952             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 3101.5 M/P: 0.45**

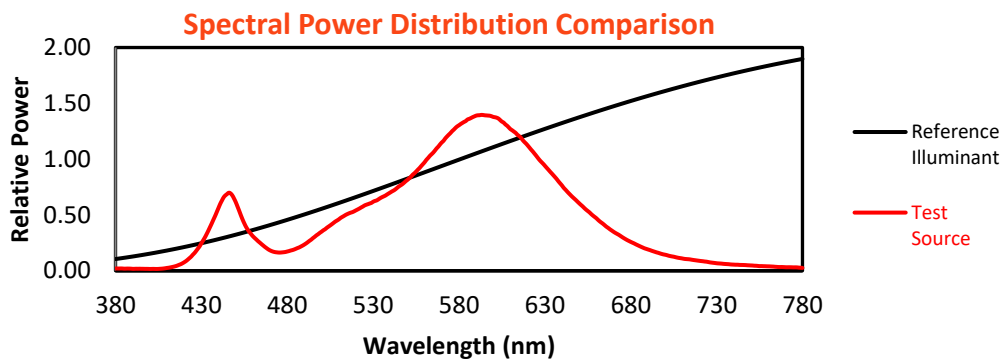
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2397             | NR               | 490       | 24908            | NR               | 620       | 118784           | NR               | 750       | 5037             | NR               | 880       | 2677             | NR               |
| 365       | 2084             | NR               | 495       | 30998            | NR               | 625       | 108951           | NR               | 755       | 4413             | NR               | 885       | 2940             | NR               |
| 370       | 2143             | NR               | 500       | 37103            | NR               | 630       | 99573            | NR               | 760       | 4189             | NR               | 890       | 3116             | NR               |
| 375       | 2413             | NR               | 505       | 42987            | NR               | 635       | 90444            | NR               | 765       | 3677             | NR               | 895       | 3345             | NR               |
| 380       | 2172             | NR               | 510       | 48702            | NR               | 640       | 80749            | NR               | 770       | 3366             | NR               | 900       | 2312             | NR               |
| 385       | 1997             | NR               | 515       | 53741            | NR               | 645       | 71664            | NR               | 775       | 3211             | NR               | 905       | 2829             | NR               |
| 390       | 1830             | NR               | 520       | 57283            | NR               | 650       | 63936            | NR               | 780       | 2682             | NR               | 910       | 2783             | NR               |
| 395       | 1861             | NR               | 525       | 61876            | NR               | 655       | 56611            | NR               | 785       | 2804             | NR               | 915       | 2662             | NR               |
| 400       | 1717             | NR               | 530       | 65398            | NR               | 660       | 49763            | NR               | 790       | 2581             | NR               | 920       | 3047             | NR               |
| 405       | 1761             | NR               | 535       | 69597            | NR               | 665       | 42891            | NR               | 795       | 2711             | NR               | 925       | 2256             | NR               |
| 410       | 2680             | NR               | 540       | 74214            | NR               | 670       | 36939            | NR               | 800       | 2609             | NR               | 930       | 2976             | NR               |
| 415       | 4374             | NR               | 545       | 79911            | NR               | 675       | 31946            | NR               | 805       | 2581             | NR               | 935       | 3503             | NR               |
| 420       | 8071             | NR               | 550       | 86153            | NR               | 680       | 27385            | NR               | 810       | 2404             | NR               | 940       | 4226             | NR               |
| 425       | 15169            | NR               | 555       | 93952            | NR               | 685       | 23504            | NR               | 815       | 2556             | NR               | 945       | 2930             | NR               |
| 430       | 26038            | NR               | 560       | 102904           | NR               | 690       | 20210            | NR               | 820       | 2742             | NR               | 950       | 2115             | NR               |
| 435       | 41316            | NR               | 565       | 112009           | NR               | 695       | 17459            | NR               | 825       | 2014             | NR               | 955       | 2634             | NR               |
| 440       | 59674            | NR               | 570       | 121662           | NR               | 700       | 15207            | NR               | 830       | 2488             | NR               | 960       | 4200             | NR               |
| 445       | 72751            | NR               | 575       | 130476           | NR               | 705       | 13322            | NR               | 835       | 2625             | NR               | 965       | 1982             | NR               |
| 450       | 65091            | NR               | 580       | 137926           | NR               | 710       | 11676            | NR               | 840       | 2754             | NR               | 970       | 3613             | NR               |
| 455       | 44894            | NR               | 585       | 143406           | NR               | 715       | 10626            | NR               | 845       | 2708             | NR               | 975       | 4034             | NR               |
| 460       | 32712            | NR               | 590       | 147039           | NR               | 720       | 9416             | NR               | 850       | 2608             | NR               | 980       | 3922             | NR               |
| 465       | 25296            | NR               | 595       | 147365           | NR               | 725       | 8333             | NR               | 855       | 2605             | NR               | 985       | 1909             | NR               |
| 470       | 19318            | NR               | 600       | 145800           | NR               | 730       | 7134             | NR               | 860       | 1765             | NR               | 990       | 3617             | NR               |
| 475       | 17265            | NR               | 605       | 141363           | NR               | 735       | 6437             | NR               | 865       | 2581             | NR               | 995       | 4767             | NR               |
| 480       | 18260            | NR               | 610       | 134199           | NR               | 740       | 5834             | NR               | 870       | 3016             | NR               | 1000      | 2528             | NR               |
| 485       | 20845            | NR               | 615       | 127683           | NR               | 745       | 5500             | NR               | 875       | 3952             | NR               |           |                  |                  |

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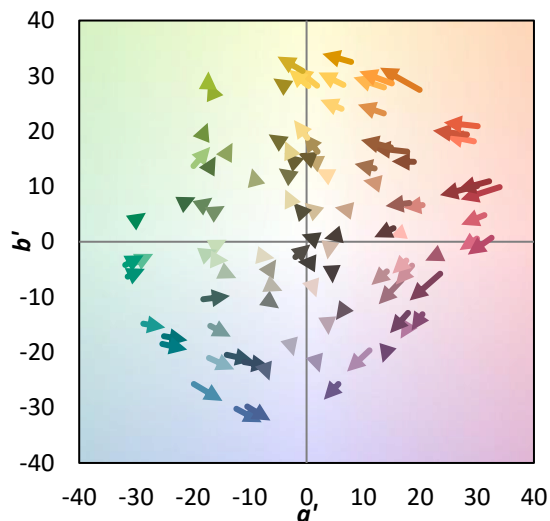
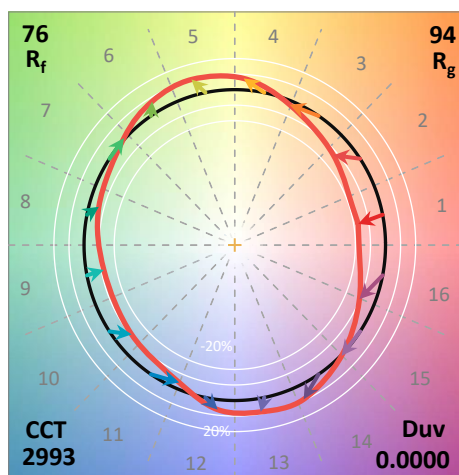
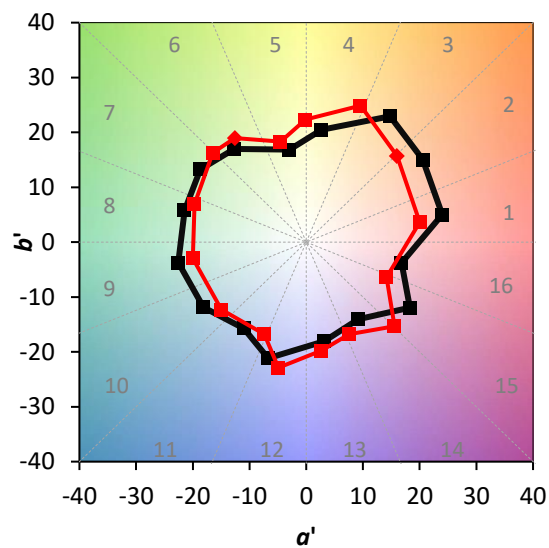
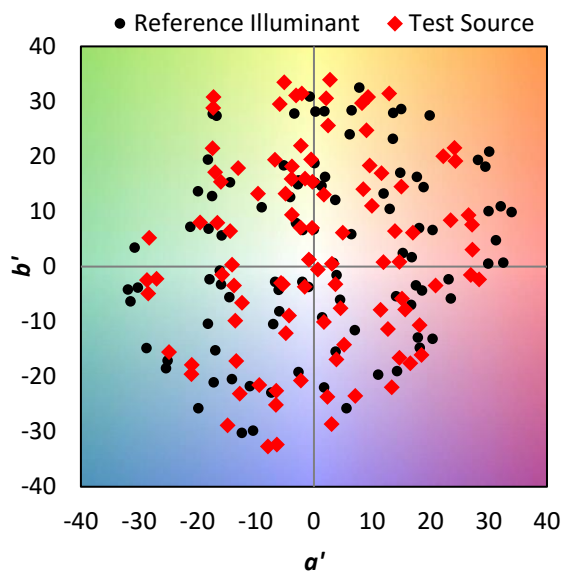
**TM-30-18**

### Summary

$R_f = 75.7$   
 $R_g = 93.9$   
 CIE  $R_a = 71.8$   
 $R_g = -38.3$



### Color Vector Graphics



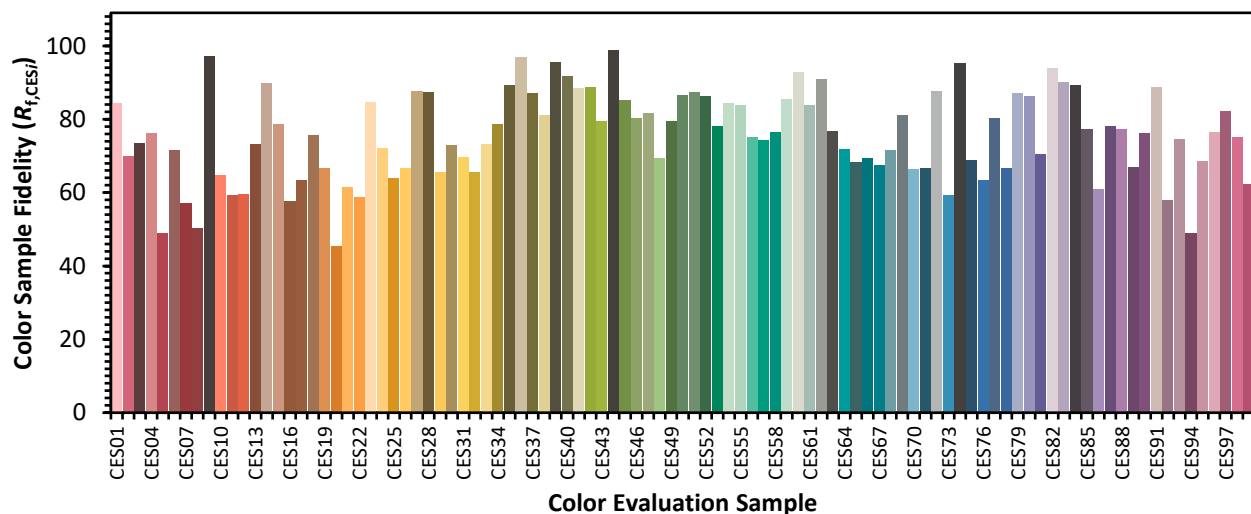


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

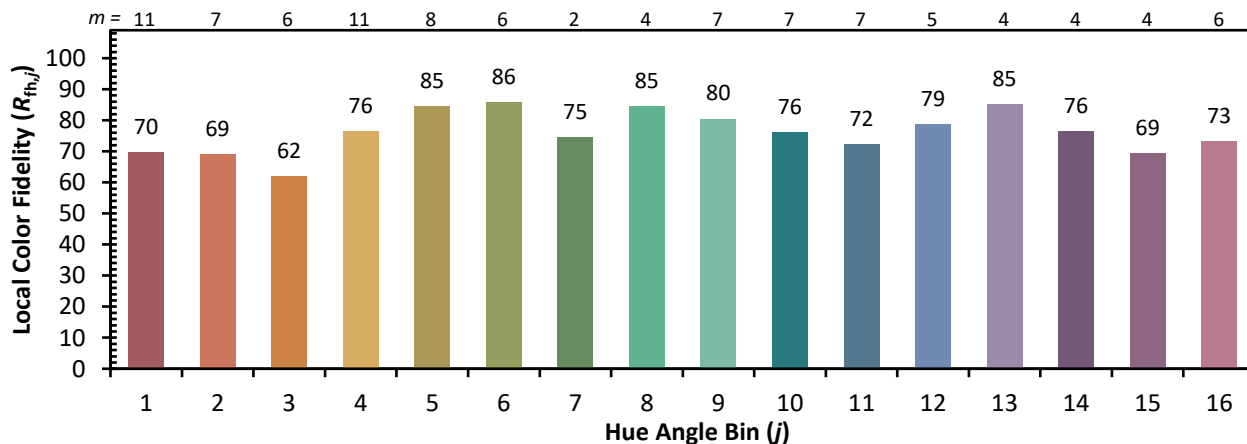
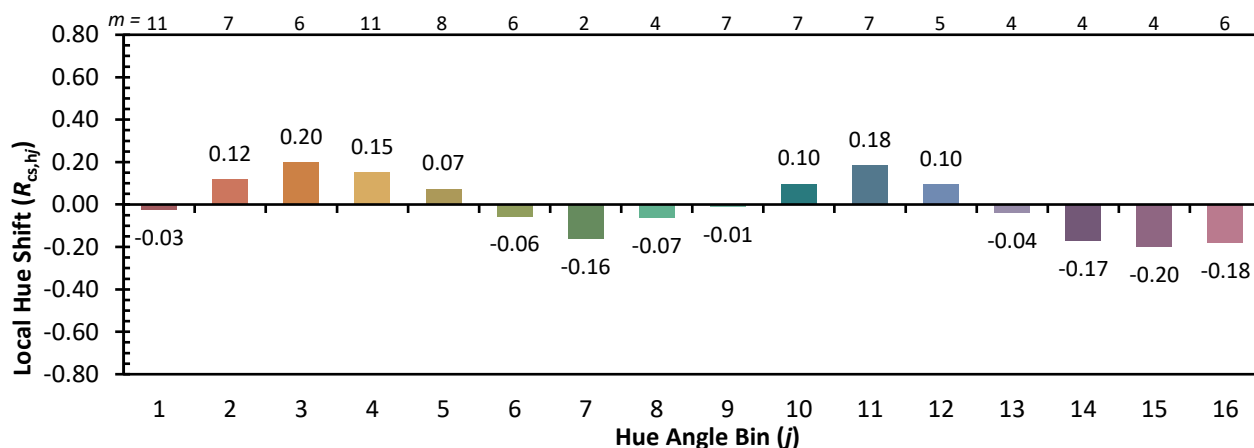
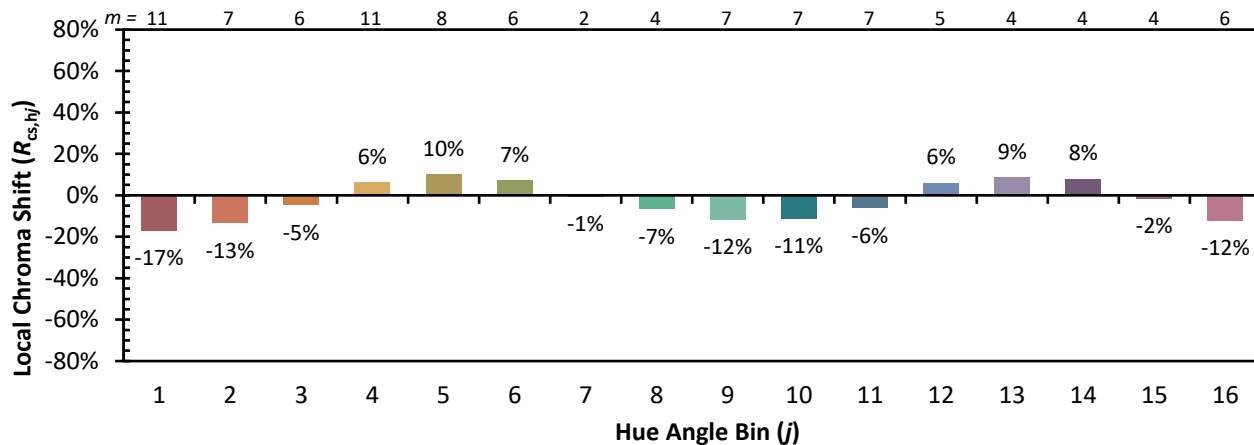
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 67 | CES51 = 87 | CES76 = 63 |
| CES02 = 63 | CES27 = 88 | CES52 = 86 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 67 |
| CES04 = 71 | CES29 = 66 | CES54 = 84 | CES79 = 87 |
| CES05 = 49 | CES30 = 73 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 70 | CES56 = 75 | CES81 = 71 |
| CES07 = 41 | CES32 = 65 | CES57 = 74 | CES82 = 94 |
| CES08 = 40 | CES33 = 73 | CES58 = 76 | CES83 = 90 |
| CES09 = 29 | CES34 = 79 | CES59 = 85 | CES84 = 89 |
| CES10 = 76 | CES35 = 89 | CES60 = 93 | CES85 = 77 |
| CES11 = 59 | CES36 = 97 | CES61 = 84 | CES86 = 61 |
| CES12 = 65 | CES37 = 87 | CES62 = 91 | CES87 = 78 |
| CES13 = 43 | CES38 = 81 | CES63 = 77 | CES88 = 77 |
| CES14 = 74 | CES39 = 95 | CES64 = 72 | CES89 = 67 |
| CES15 = 71 | CES40 = 92 | CES65 = 68 | CES90 = 76 |
| CES16 = 47 | CES41 = 88 | CES66 = 69 | CES91 = 89 |
| CES17 = 50 | CES42 = 89 | CES67 = 67 | CES92 = 58 |
| CES18 = 56 | CES43 = 79 | CES68 = 72 | CES93 = 74 |
| CES19 = 73 | CES44 = 99 | CES69 = 81 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 66 | CES95 = 68 |
| CES21 = 87 | CES46 = 80 | CES71 = 67 | CES96 = 76 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 82 |
| CES23 = 92 | CES48 = 69 | CES73 = 59 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 95 | CES99 = 62 |
| CES25 = 73 | CES50 = 87 | CES75 = 69 |            |



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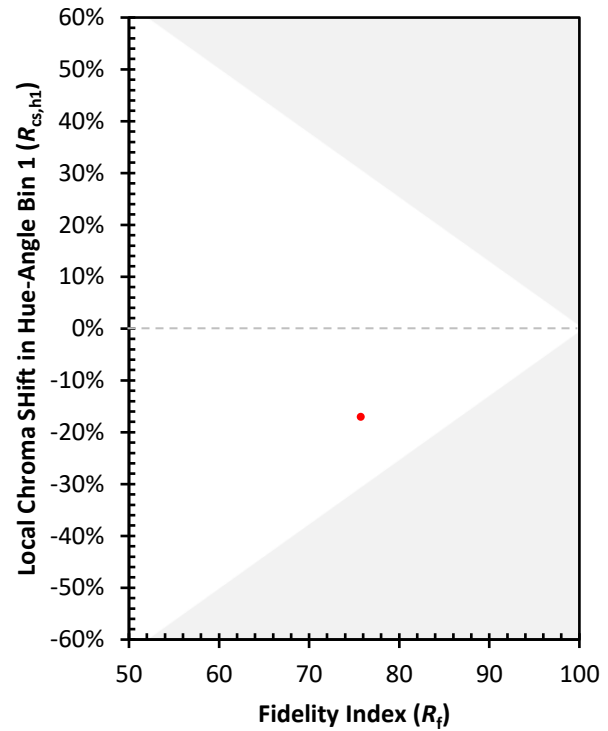
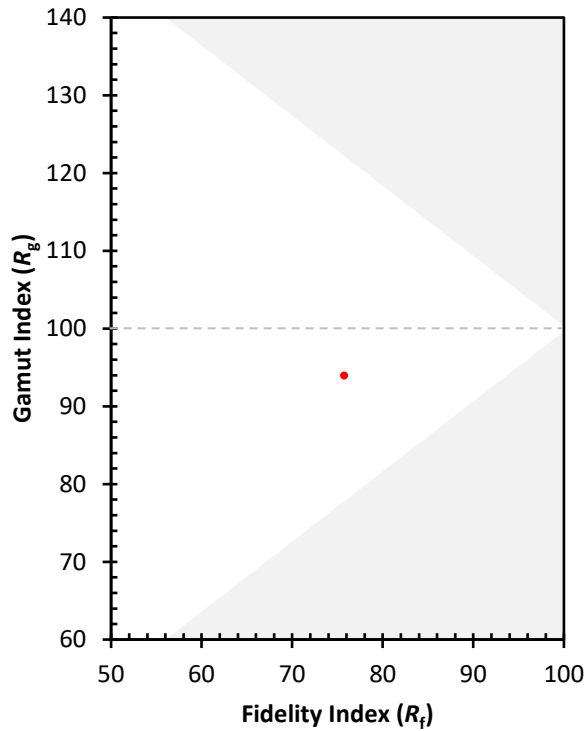
**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)