

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P387018

Luminaire Tested: **GWC-SA2D-727-U-T4FT-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P387018  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-17)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GWC-SA2D-727-U-T4FT-HSS  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 2700K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 9616 lumens  
Efficiency: N/A  
Efficacy: 74.5 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

Input Watts (W): 129  
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: 28.75 FT



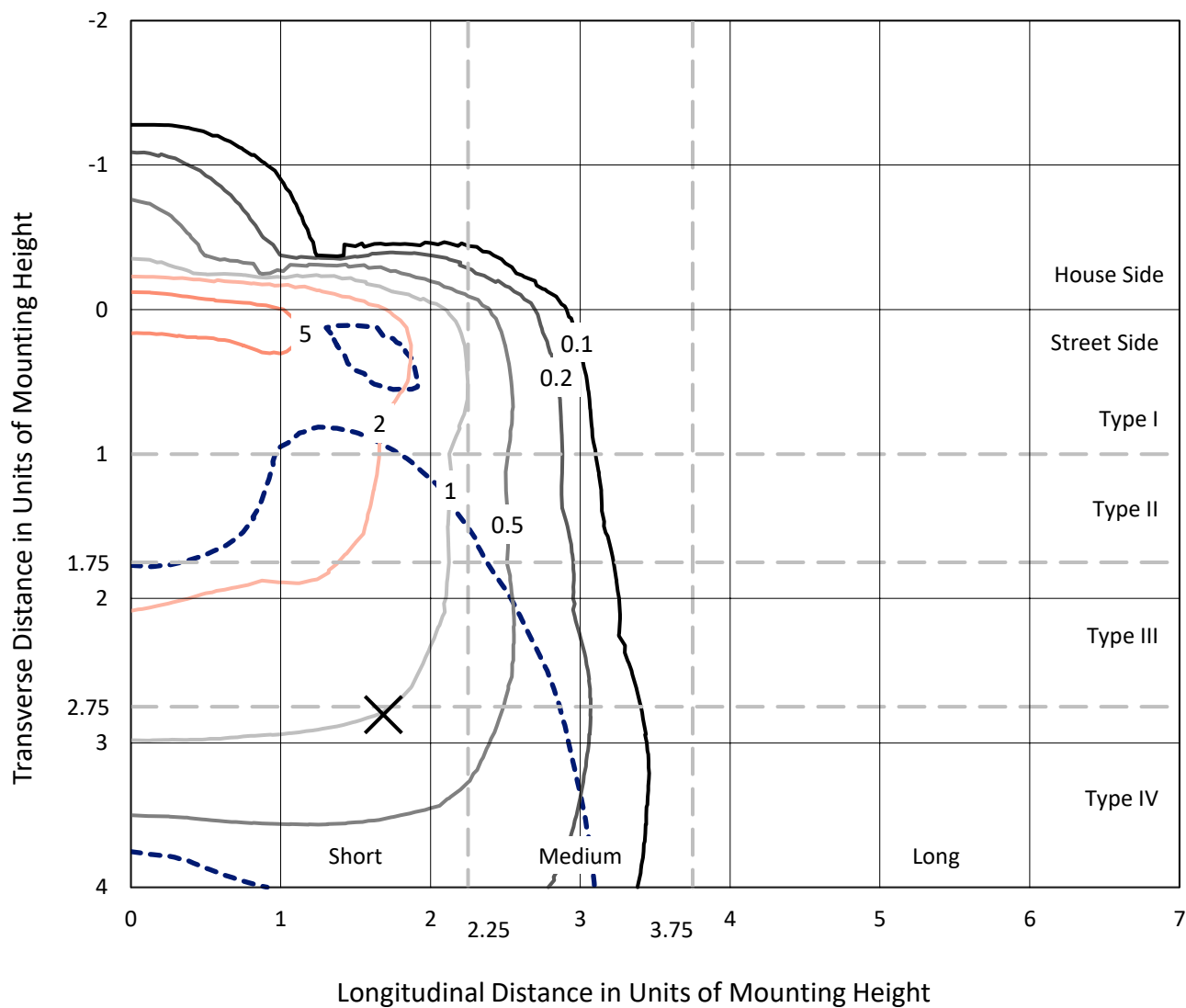
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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

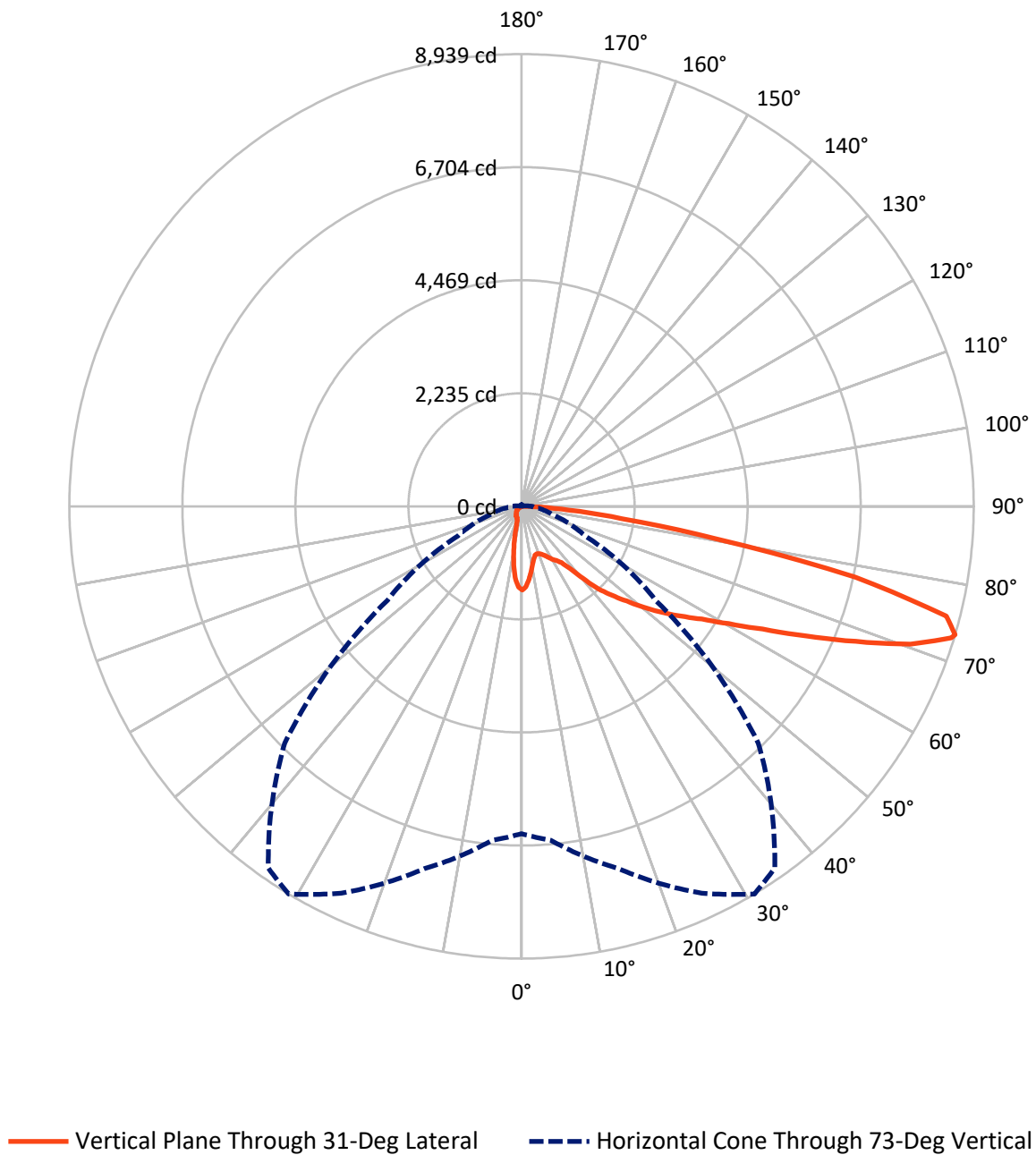


Based on 15 foot mounting height. Maximum calculated value = 7.4 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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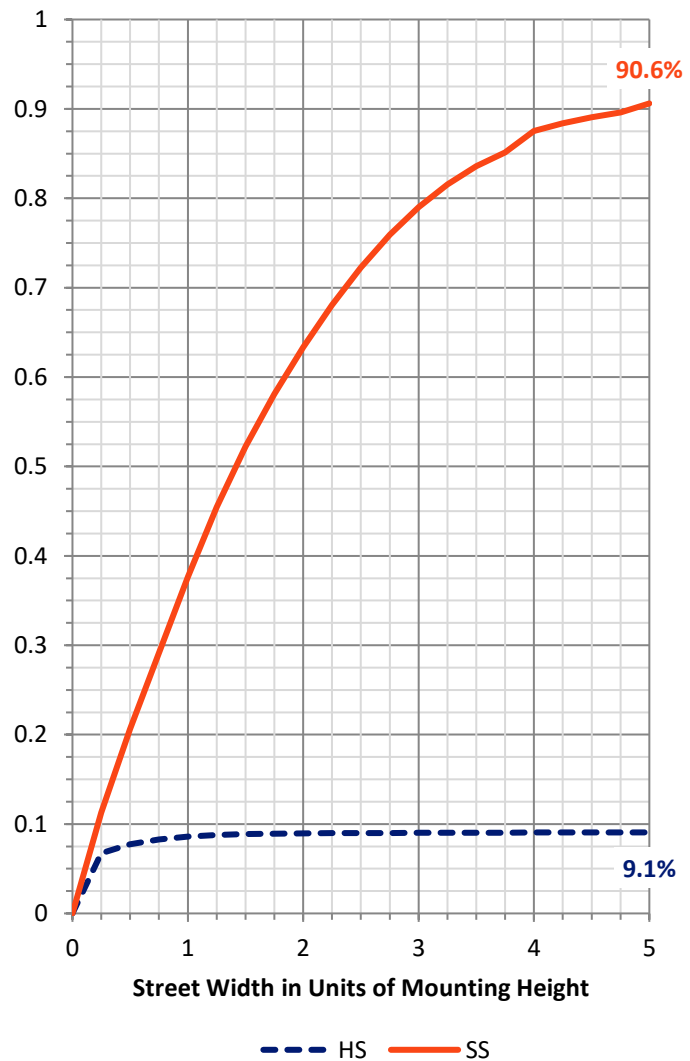
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 876.5    | 0.0    | 876.5  |
|                    | % Fixture | 9.1      | 0.0    | 9.1    |
| <b>Street Side</b> | Lumens    | 8739.5   | 0.0    | 8739.5 |
|                    | % Fixture | 90.9     | 0.0    | 90.9   |
| <b>Total</b>       | Lumens    | 9616.0   | 0.0    | 9616.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 137.2  | 1.4       |
| 10°-20°   | 297.8  | 3.1       |
| 20°-30°   | 446.3  | 4.6       |
| 30°-40°   | 710.0  | 7.4       |
| 40°-50°   | 1267.9 | 13.2      |
| 50°-60°   | 1967.4 | 20.5      |
| 60°-70°   | 2615.4 | 27.2      |
| 70°-80°   | 1967.3 | 20.5      |
| 80°-90°   | 206.7  | 2.1       |
| 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°    | 9616.0 | 100.0     |
| 0°-180°   | 9616.0 | 100.0     |

**Coefficient of Utilization**



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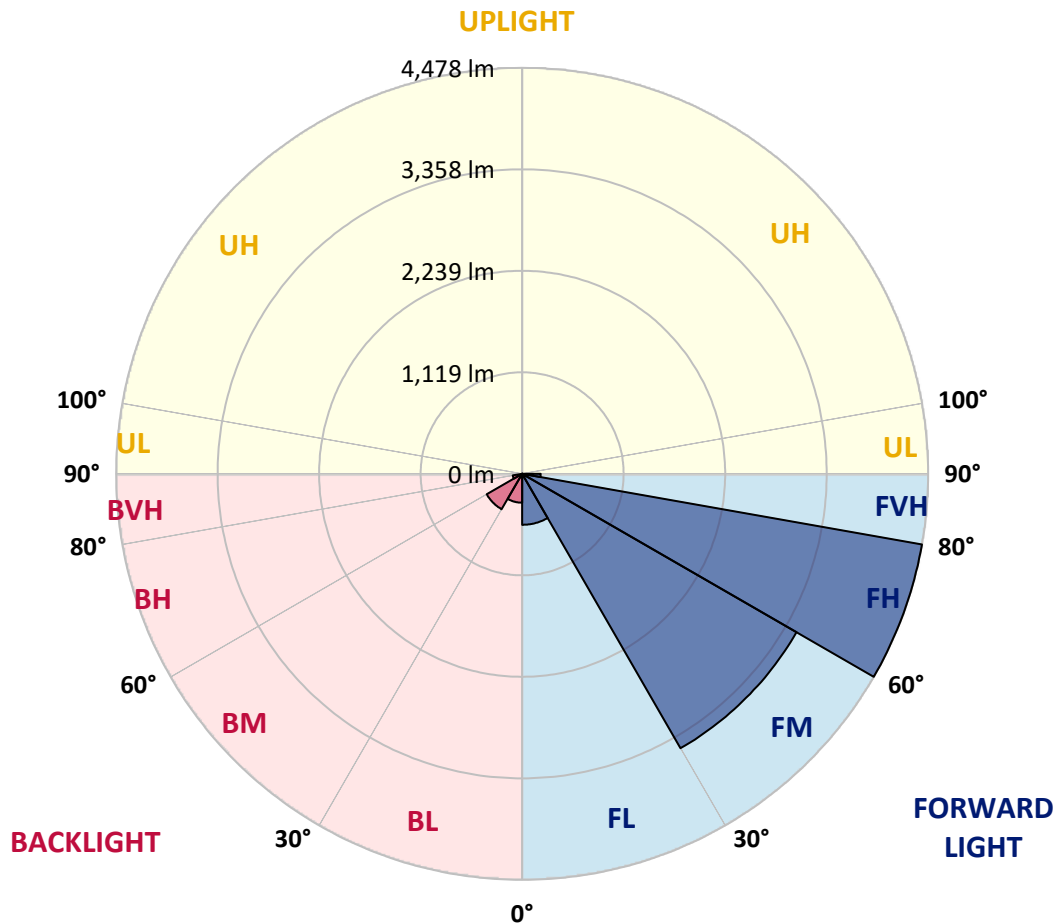
CATALOG NUMBER: GWC-SA2D-727-U-T4FT-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 562.5  | 5.9       |                         |      |         |
| FM   | (30°-60°)   | 3494.1 | 36.3      |                         |      |         |
| FH   | (60°-80°)   | 4477.8 | 46.6      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 205.0  | 2.1       |                         |      | G2/225  |
| BL   | (0°-30°)    | 318.7  | 3.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 451.2  | 4.7       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 104.9  | 1.1       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 1.7    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 31°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 |
| 2.5°  | 1567.9 | 1574.5 | 1581.5 | 1582.9 | 1594.7 | 1595.2 | 1612.1 | 1624.8 | 1637.5 | 1649.7 | 1654.0 |
| 5°    | 1406.9 | 1417.8 | 1430.5 | 1443.2 | 1468.1 | 1478.0 | 1519.4 | 1561.8 | 1602.2 | 1640.8 | 1659.6 |
| 7.5°  | 1235.2 | 1247.4 | 1265.3 | 1296.8 | 1324.6 | 1343.9 | 1409.3 | 1484.6 | 1559.9 | 1630.9 | 1671.9 |
| 10°   | 1078.5 | 1089.8 | 1108.6 | 1142.0 | 1184.8 | 1211.2 | 1299.2 | 1403.6 | 1514.2 | 1622.0 | 1690.2 |
| 12.5° | 978.7  | 984.9  | 995.2  | 1031.0 | 1069.6 | 1099.2 | 1202.7 | 1332.1 | 1476.6 | 1621.5 | 1719.9 |
| 15°   | 960.4  | 962.3  | 953.8  | 969.8  | 999.9  | 1028.6 | 1133.6 | 1274.2 | 1447.9 | 1629.0 | 1758.4 |
| 17.5° | 989.6  | 988.6  | 960.4  | 958.5  | 982.5  | 1006.0 | 1099.7 | 1234.3 | 1427.6 | 1646.5 | 1808.3 |
| 20°   | 1033.8 | 1030.5 | 981.6  | 972.6  | 998.0  | 1020.2 | 1097.3 | 1219.2 | 1420.1 | 1675.6 | 1869.0 |
| 22.5° | 1092.6 | 1087.0 | 1010.3 | 1000.9 | 1028.2 | 1051.2 | 1126.5 | 1233.8 | 1426.7 | 1714.7 | 1939.6 |
| 25°   | 1165.6 | 1157.1 | 1059.7 | 1049.3 | 1077.1 | 1100.1 | 1178.7 | 1275.7 | 1446.5 | 1762.2 | 2029.0 |
| 27.5° | 1247.9 | 1235.7 | 1138.7 | 1111.9 | 1143.4 | 1167.4 | 1248.4 | 1339.7 | 1477.5 | 1812.6 | 2138.6 |
| 30°   | 1325.5 | 1309.5 | 1222.0 | 1177.8 | 1216.4 | 1243.2 | 1323.7 | 1415.9 | 1527.4 | 1890.2 | 2288.8 |
| 32.5° | 1403.6 | 1385.8 | 1296.4 | 1243.7 | 1278.5 | 1307.7 | 1401.3 | 1520.8 | 1621.0 | 2008.8 | 2488.3 |
| 35°   | 1583.4 | 1564.6 | 1454.9 | 1367.9 | 1367.4 | 1383.9 | 1510.0 | 1664.3 | 1744.8 | 2173.9 | 2726.4 |
| 37.5° | 1886.0 | 1875.1 | 1770.7 | 1605.5 | 1561.3 | 1542.9 | 1658.2 | 1835.6 | 1922.7 | 2401.2 | 2995.0 |
| 40°   | 2217.2 | 2207.8 | 2090.7 | 1941.0 | 1873.7 | 1828.6 | 1870.9 | 2074.2 | 2173.9 | 2678.8 | 3269.4 |
| 42.5° | 2591.3 | 2546.6 | 2337.7 | 2293.0 | 2232.8 | 2198.4 | 2160.3 | 2368.3 | 2482.6 | 2980.9 | 3541.4 |
| 45°   | 2931.1 | 2855.8 | 2584.7 | 2517.0 | 2503.3 | 2511.8 | 2533.0 | 2763.5 | 2829.9 | 3340.0 | 3812.4 |
| 47.5° | 3133.4 | 3074.1 | 2866.1 | 2801.2 | 2797.4 | 2853.4 | 3013.4 | 3210.1 | 3175.7 | 3652.9 | 4051.0 |
| 50°   | 3325.8 | 3272.2 | 3099.5 | 3115.5 | 3132.9 | 3209.1 | 3558.8 | 3669.3 | 3491.5 | 3936.6 | 4269.8 |
| 52.5° | 3481.6 | 3399.7 | 3309.4 | 3399.3 | 3484.9 | 3607.7 | 4121.5 | 4081.5 | 3715.5 | 4162.5 | 4457.0 |
| 55°   | 3571.5 | 3534.3 | 3578.1 | 3668.4 | 3829.3 | 4028.8 | 4652.8 | 4424.6 | 3879.2 | 4368.6 | 4581.7 |
| 57.5° | 3900.9 | 3827.9 | 3915.0 | 3993.1 | 4202.9 | 4482.0 | 5107.8 | 4680.1 | 3997.3 | 4496.1 | 4610.4 |
| 60°   | 4299.4 | 4240.6 | 4291.9 | 4421.8 | 4705.0 | 5033.0 | 5533.2 | 4888.5 | 4059.0 | 4578.0 | 4536.1 |
| 62.5° | 4933.7 | 4856.1 | 4824.1 | 4969.5 | 5345.0 | 5703.1 | 5856.0 | 5033.0 | 4045.3 | 4541.7 | 4281.1 |
| 65°   | 5783.5 | 5703.1 | 5560.0 | 5691.8 | 6169.4 | 6422.1 | 6216.9 | 5063.6 | 3951.2 | 4248.6 | 3636.4 |
| 67.5° | 6654.0 | 6595.7 | 6473.4 | 6695.5 | 7126.5 | 7207.9 | 6598.5 | 4989.2 | 3648.2 | 3444.9 | 2569.2 |
| 70°   | 7229.1 | 7204.1 | 7283.6 | 7774.9 | 8159.3 | 8135.8 | 6948.6 | 4589.7 | 2843.5 | 2118.4 | 1271.0 |
| 72.5° | 6814.5 | 6934.0 | 7521.3 | 8412.0 | 8881.6 | 8689.6 | 6768.9 | 3524.4 | 1625.3 | 815.0  | 367.5  |
| 73°   | 6471.0 | 6623.9 | 7414.5 | 8436.0 | 8938.6 | 8728.2 | 6617.8 | 3235.0 | 1385.3 | 643.2  | 278.6  |
| 75°   | 4501.7 | 4689.5 | 6138.3 | 7856.8 | 8672.2 | 8316.0 | 5516.3 | 1980.1 | 641.8  | 285.2  | 112.5  |
| 77.5° | 2185.7 | 2324.5 | 3380.0 | 5676.7 | 6744.4 | 6497.3 | 3434.1 | 737.8  | 289.9  | 178.3  | 51.8   |
| 80°   | 815.9  | 907.2  | 1467.2 | 2889.2 | 3897.6 | 3999.7 | 1510.5 | 279.0  | 192.9  | 143.5  | 26.4   |
| 82.5° | 213.6  | 238.1  | 541.1  | 1288.4 | 1997.5 | 2090.7 | 476.2  | 140.7  | 141.2  | 118.1  | 16.0   |
| 85°   | 68.2   | 78.1   | 168.9  | 578.3  | 941.1  | 826.3  | 124.2  | 68.2   | 102.6  | 88.0   | 8.9    |
| 87.5° | 8.5    | 10.8   | 53.6   | 136.0  | 207.5  | 115.3  | 19.3   | 20.2   | 43.8   | 48.9   | 5.2    |
| 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: P387018

CATALOG NUMBER: GWC-SA2D-727-U-T4FT-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 | 1654.5 |
| 2.5°  | 1658.2 | 1655.9 | 1656.3 | 1644.1 | 1636.1 | 1620.1 | 1603.6 | 1596.1 | 1588.1 | 1584.8 | 1588.1 |
| 5°    | 1666.7 | 1662.5 | 1650.2 | 1612.6 | 1572.6 | 1520.8 | 1472.3 | 1435.6 | 1389.5 | 1376.8 | 1390.0 |
| 7.5°  | 1679.9 | 1671.4 | 1635.6 | 1558.9 | 1470.0 | 1371.2 | 1260.1 | 1179.2 | 1112.8 | 1070.0 | 1085.6 |
| 10°   | 1699.2 | 1683.2 | 1611.2 | 1480.8 | 1321.8 | 1146.7 | 989.1  | 866.3  | 779.2  | 743.5  | 742.1  |
| 12.5° | 1731.6 | 1701.5 | 1581.0 | 1379.2 | 1140.6 | 907.2  | 700.6  | 567.5  | 496.9  | 451.3  | 450.3  |
| 15°   | 1767.4 | 1723.2 | 1542.9 | 1257.3 | 929.8  | 649.8  | 451.3  | 350.1  | 304.4  | 289.9  | 288.0  |
| 17.5° | 1811.1 | 1748.1 | 1493.5 | 1107.2 | 709.1  | 430.6  | 294.6  | 265.4  | 263.5  | 262.1  | 262.1  |
| 20°   | 1866.2 | 1777.7 | 1430.0 | 935.5  | 503.0  | 287.5  | 250.3  | 252.2  | 253.2  | 251.3  | 251.7  |
| 22.5° | 1930.2 | 1807.9 | 1354.2 | 751.0  | 340.2  | 240.5  | 239.5  | 241.9  | 242.8  | 241.9  | 242.3  |
| 25°   | 2004.5 | 1842.7 | 1262.0 | 557.6  | 245.6  | 228.2  | 230.6  | 233.9  | 236.2  | 236.2  | 236.2  |
| 27.5° | 2096.8 | 1885.0 | 1151.0 | 389.1  | 212.2  | 215.5  | 222.1  | 228.2  | 231.5  | 232.5  | 232.5  |
| 30°   | 2216.8 | 1937.7 | 1017.8 | 266.8  | 192.9  | 198.6  | 210.8  | 222.6  | 228.7  | 229.6  | 230.1  |
| 32.5° | 2368.3 | 1997.0 | 863.5  | 197.2  | 176.5  | 180.7  | 193.9  | 213.6  | 225.4  | 227.3  | 227.3  |
| 35°   | 2541.9 | 2065.7 | 697.4  | 171.8  | 164.7  | 166.1  | 176.5  | 199.0  | 219.7  | 224.9  | 225.4  |
| 37.5° | 2732.0 | 2133.5 | 530.3  | 160.5  | 154.8  | 154.8  | 162.3  | 181.6  | 206.1  | 222.1  | 224.0  |
| 40°   | 2909.4 | 2174.4 | 371.7  | 151.5  | 145.9  | 145.9  | 152.5  | 166.6  | 189.6  | 213.6  | 218.8  |
| 42.5° | 3073.2 | 2188.5 | 258.8  | 143.0  | 137.4  | 138.8  | 144.5  | 155.8  | 173.2  | 197.2  | 201.9  |
| 45°   | 3241.6 | 2186.2 | 188.7  | 133.2  | 128.9  | 133.2  | 137.4  | 145.9  | 158.6  | 172.2  | 173.2  |
| 47.5° | 3368.7 | 2166.4 | 149.6  | 123.8  | 120.9  | 126.6  | 130.3  | 136.0  | 143.0  | 142.1  | 142.1  |
| 50°   | 3487.7 | 2118.4 | 120.5  | 111.0  | 112.9  | 119.5  | 121.4  | 123.3  | 123.8  | 114.8  | 113.9  |
| 52.5° | 3578.1 | 2043.6 | 96.5   | 97.4   | 104.9  | 111.5  | 109.6  | 106.8  | 102.1  | 91.3   | 89.4   |
| 55°   | 3608.2 | 1899.6 | 75.8   | 80.5   | 93.2   | 101.6  | 94.6   | 88.5   | 79.5   | 70.6   | 68.7   |
| 57.5° | 3553.6 | 1713.7 | 61.6   | 62.6   | 78.6   | 85.6   | 77.6   | 70.6   | 60.7   | 53.2   | 51.8   |
| 60°   | 3437.8 | 1507.2 | 50.8   | 47.1   | 60.7   | 66.8   | 61.6   | 54.6   | 45.6   | 40.0   | 39.5   |
| 62.5° | 3208.2 | 1287.0 | 41.9   | 36.7   | 46.1   | 51.3   | 48.0   | 42.8   | 35.3   | 31.5   | 31.1   |
| 65°   | 2725.4 | 1029.6 | 33.9   | 29.6   | 35.8   | 40.0   | 37.2   | 33.4   | 27.8   | 24.9   | 24.5   |
| 67.5° | 1902.4 | 695.9  | 27.8   | 24.5   | 28.2   | 31.5   | 29.2   | 27.3   | 22.1   | 21.6   | 22.1   |
| 70°   | 917.6  | 335.5  | 23.1   | 19.8   | 22.1   | 24.5   | 23.5   | 22.1   | 21.2   | 24.5   | 28.2   |
| 72.5° | 263.0  | 112.5  | 18.4   | 16.5   | 17.9   | 19.3   | 20.2   | 19.8   | 23.1   | 29.6   | 34.4   |
| 73°   | 202.3  | 90.8   | 17.4   | 15.5   | 16.9   | 18.8   | 19.8   | 19.3   | 23.5   | 30.1   | 34.4   |
| 75°   | 86.6   | 43.8   | 13.2   | 12.7   | 14.1   | 16.5   | 17.4   | 17.4   | 23.5   | 30.6   | 32.9   |
| 77.5° | 39.1   | 23.5   | 8.5    | 9.9    | 12.2   | 13.2   | 14.6   | 14.6   | 18.8   | 23.5   | 23.5   |
| 80°   | 22.1   | 12.7   | 6.6    | 7.5    | 8.9    | 8.9    | 8.9    | 8.0    | 8.5    | 9.4    | 10.4   |
| 82.5° | 14.1   | 8.5    | 5.2    | 6.1    | 5.6    | 4.7    | 3.8    | 3.8    | 3.3    | 3.8    | 4.7    |
| 85°   | 8.0    | 4.7    | 4.7    | 3.8    | 2.4    | 1.9    | 2.4    | 1.9    | 0.5    | 0.0    | 0.5    |
| 87.5° | 4.7    | 2.8    | 1.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2012-088-8-R2

Luminaire Tested: CCW-SA1B-727-U-SL4

Test Date: 01/20/2021

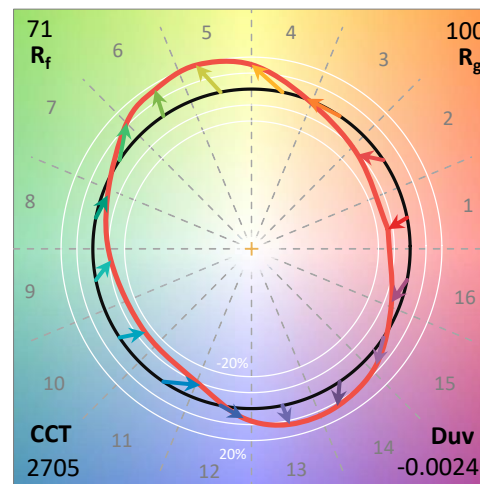
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-8-R2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/20/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA1B-727-U-SL4**  
 Description: INVUE WALL PACK

\*\*\*THIS IS A REVISION OF SP1-2012-088-8. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. INVUE WALL PACK LIGHT SQUARE SL4 OPTICS 1-SQUARE

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 2705    | CRI (Ra): | 73.8 |      |      |
| CIE u':                   | 0.2629  | R1:       | 72.2 | R9:  | -7.6 |
| CIE v':                   | 0.5237  | R2:       | 81.9 | R10: | 56.9 |
| Duv:                      | -0.0024 | R3:       | 89.3 | R11: | 66.0 |
| CIE x:                    | 0.4552  | R4:       | 71.3 | R12: | 47.9 |
| CIE y:                    | 0.4030  | R5:       | 69.5 | R13: | 73.4 |
| CIE z:                    | 0.1418  | R6:       | 73.6 | R14: | 93.2 |
| Peak Wavelength (nm):     | 603     | R7:       | 80.1 |      |      |
| Dominant Wavelength (nm): | 585     | R8:       | 52.8 |      |      |
| Purity:                   | 57.7    |           |      |      |      |
| Rf:                       | 71.2    |           |      |      |      |
| Rg:                       | 100.1   |           |      |      |      |



### Test Conditions

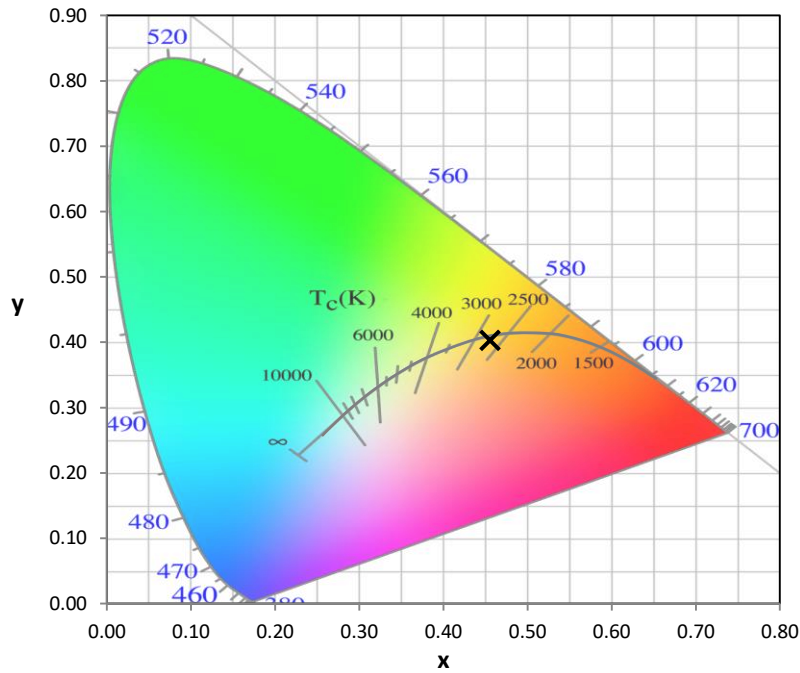
Stabilization Time: 177M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/34%  
 Sphere Temperature (°C): 24.7

REPORT NUMBER: SP1-2012-088-8-R2

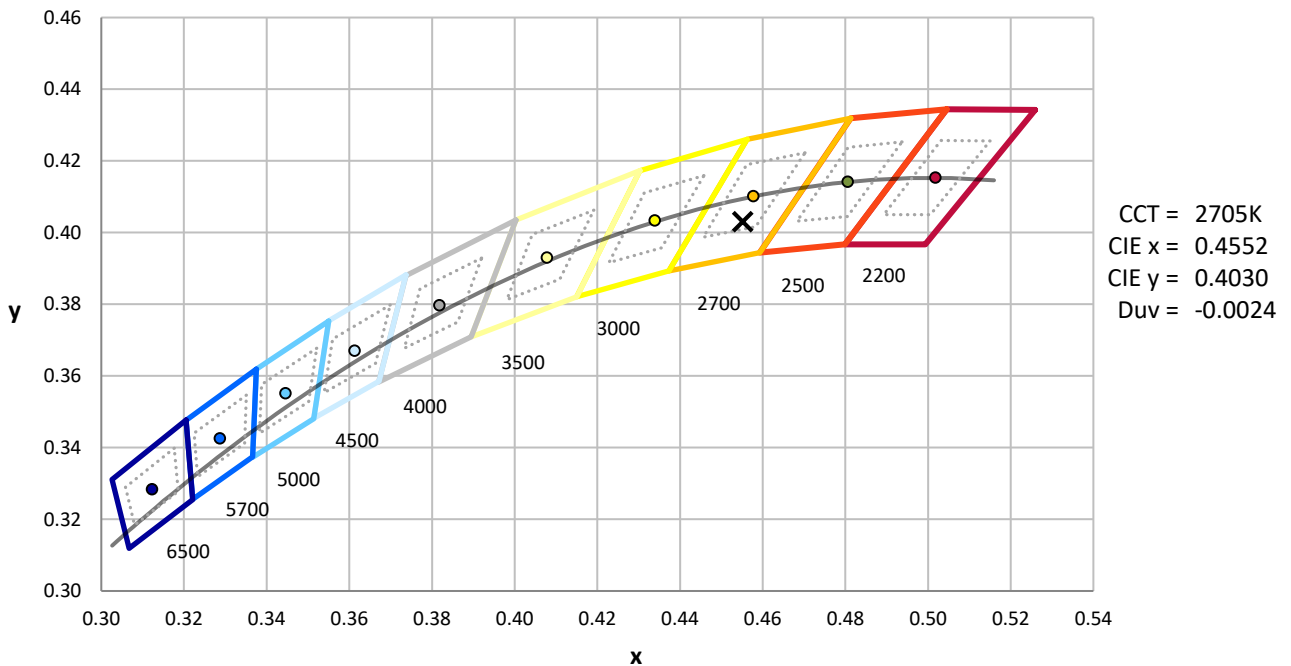
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 7/29/2020        | 1/29/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

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**CIE 1931 Chromaticity Diagram**



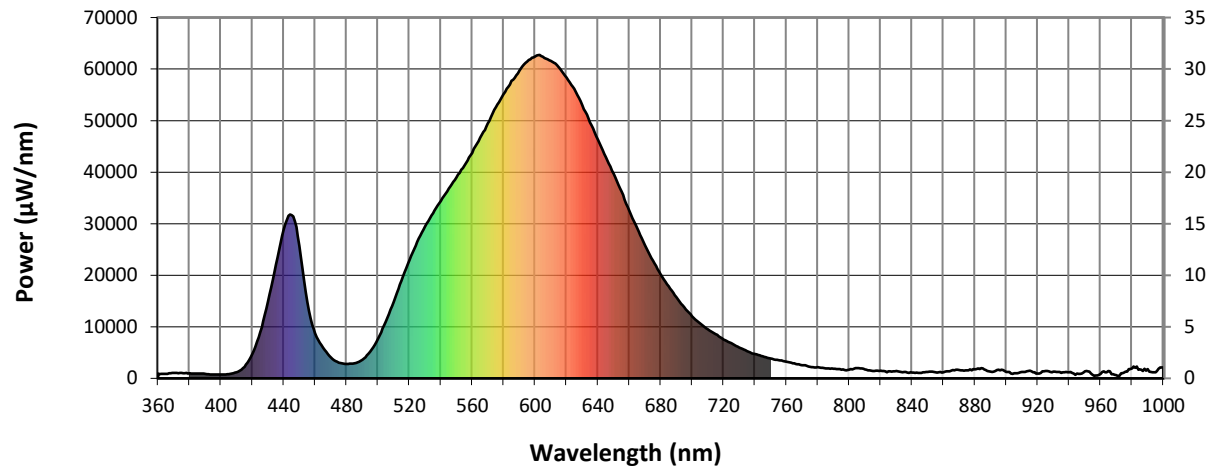
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength

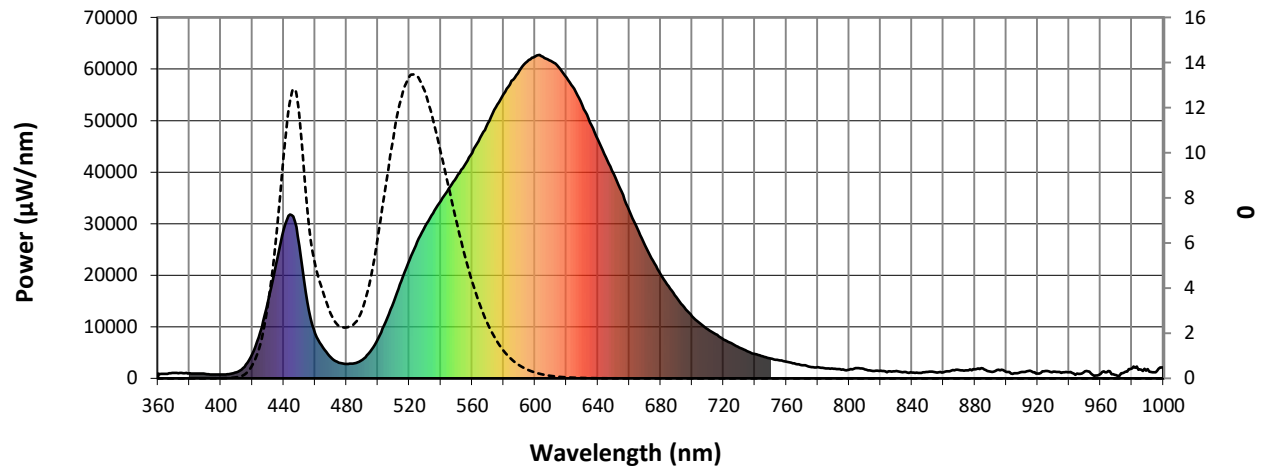


#####

| 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       | 926              | 0.0              | 490       | 3601             | 0.5              | 620       | 58340            | 15.2             | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 0.9              | 625       | 56180            | 12.4             | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 1.7              | 630       | 53018            | 9.6              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 3.1              | 635       | 49683            | 7.5              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 5.1              | 640       | 46308            | 5.5              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 7.9              | 645       | 42927            | 4.1              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 11.1             | 650       | 39728            | 2.9              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 14.2             | 655       | 36260            | 2.1              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 17.4             | 660       | 32543            | 1.4              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 19.9             | 665       | 29105            | 0.9              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.0              | 540       | 34386            | 22.4             | 670       | 25817            | 0.6              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.0              | 545       | 36784            | 24.5             | 675       | 22832            | 0.4              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.0              | 550       | 39017            | 26.5             | 680       | 20201            | 0.2              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 0.0              | 555       | 41253            | 28.2             | 685       | 17863            | 0.2              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 0.1              | 560       | 43733            | 29.7             | 690       | 15761            | 0.1              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 0.3              | 565       | 46694            | 31.0             | 695       | 13762            | 0.1              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 0.5              | 570       | 49493            | 32.2             | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 0.7              | 575       | 52587            | 32.7             | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 0.7              | 580       | 55129            | 32.8             | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 0.5              | 585       | 57737            | 32.1             | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 0.4              | 590       | 59688            | 30.9             | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 0.3              | 595       | 61458            | 29.1             | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 0.3              | 600       | 62443            | 26.9             | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 0.2              | 605       | 62403            | 24.2             | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 0.3              | 610       | 61581            | 21.2             | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 0.3              | 615       | 60386            | 18.2             | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



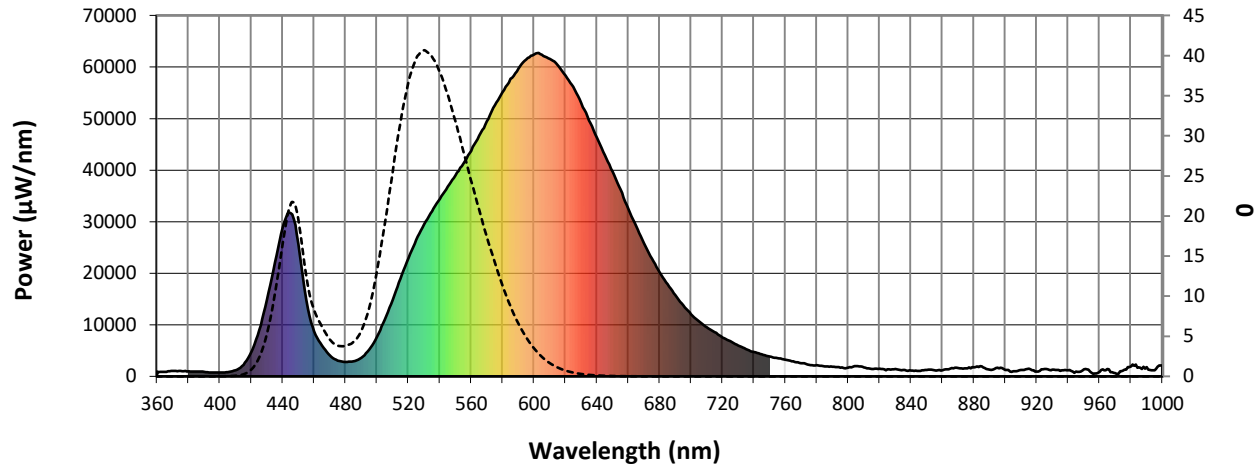
Scotopic Lumens: 1073.3

S/P: 0.36

| 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       | 926              | 0.0              | 490       | 3601             | 5.5              | 620       | 58340            | 0.7              | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 8.3              | 625       | 56180            | 0.5              | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 12.9             | 630       | 53018            | 0.3              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 18.7             | 635       | 49683            | 0.2              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 25.1             | 640       | 46308            | 0.1              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 31.4             | 645       | 42927            | 0.1              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 36.5             | 650       | 39728            | 0.0              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 39.6             | 655       | 36260            | 0.0              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 40.7             | 660       | 32543            | 0.0              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 39.9             | 665       | 29105            | 0.0              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.1              | 540       | 34386            | 38.0             | 670       | 25817            | 0.0              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.2              | 545       | 36784            | 35.3             | 675       | 22832            | 0.0              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.8              | 550       | 39017            | 31.9             | 680       | 20201            | 0.0              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 2.2              | 555       | 41253            | 28.2             | 685       | 17863            | 0.0              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 5.1              | 560       | 43733            | 24.4             | 690       | 15761            | 0.0              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 9.9              | 565       | 46694            | 20.9             | 695       | 13762            | 0.0              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 16.1             | 570       | 49493            | 17.5             | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 21.2             | 575       | 52587            | 14.3             | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 19.9             | 580       | 55129            | 11.4             | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 12.9             | 585       | 57737            | 8.8              | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 8.5              | 590       | 59688            | 6.6              | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 6.3              | 595       | 61458            | 4.9              | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 4.7              | 600       | 62443            | 3.5              | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 3.8              | 605       | 62403            | 2.5              | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 3.8              | 610       | 61581            | 1.7              | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 4.2              | 615       | 60386            | 1.1              | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength

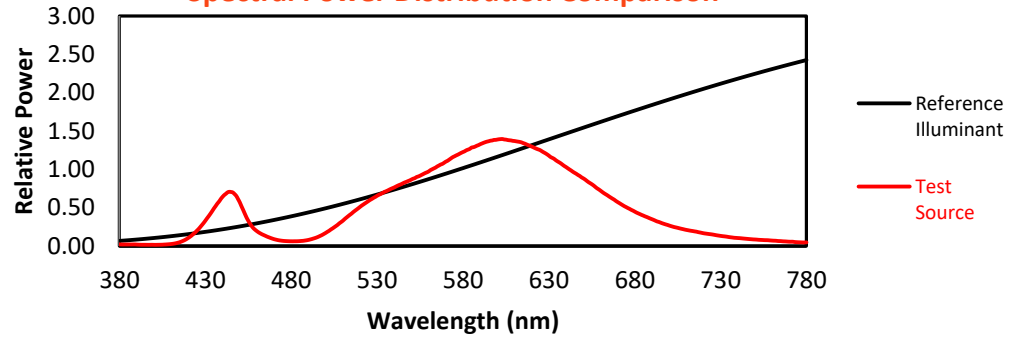

**Melanopic Lumens: 3157.6**
**S/P: 1.07**

| 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       | 926              | 0.0              | 490       | 3601             | 3.0              | 620       | 58340            | 0.0              | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 4.2              | 625       | 56180            | 0.0              | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 6.2              | 630       | 53018            | 0.0              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 8.5              | 635       | 49683            | 0.0              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 10.6             | 640       | 46308            | 0.0              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 12.4             | 645       | 42927            | 0.0              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 13.4             | 650       | 39728            | 0.0              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 13.4             | 655       | 36260            | 0.0              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 12.7             | 660       | 32543            | 0.0              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 11.5             | 665       | 29105            | 0.0              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.0              | 540       | 34386            | 10.1             | 670       | 25817            | 0.0              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.1              | 545       | 36784            | 8.5              | 675       | 22832            | 0.0              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.5              | 550       | 39017            | 7.0              | 680       | 20201            | 0.0              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 1.4              | 555       | 41253            | 5.6              | 685       | 17863            | 0.0              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 3.1              | 560       | 43733            | 4.3              | 690       | 15761            | 0.0              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 5.9              | 565       | 46694            | 3.3              | 695       | 13762            | 0.0              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 9.6              | 570       | 49493            | 2.4              | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 12.5             | 575       | 52587            | 1.8              | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 11.8             | 580       | 55129            | 1.2              | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 7.8              | 585       | 57737            | 0.9              | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 5.2              | 590       | 59688            | 0.6              | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 3.9              | 595       | 61458            | 0.4              | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 2.9              | 600       | 62443            | 0.3              | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 2.3              | 605       | 62403            | 0.2              | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 2.3              | 610       | 61581            | 0.1              | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 2.4              | 615       | 60386            | 0.1              | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

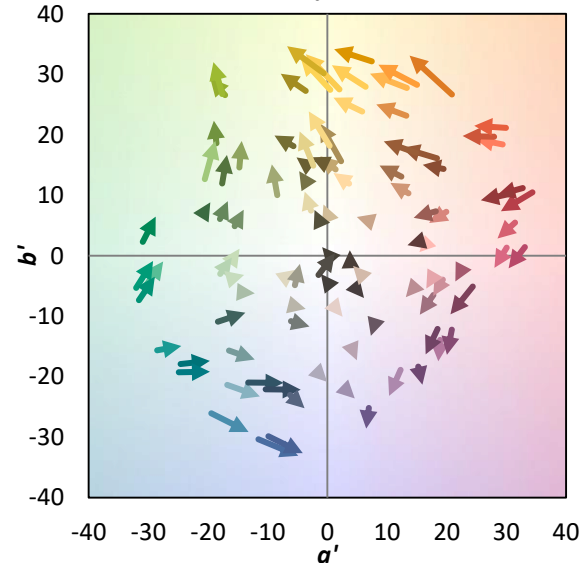
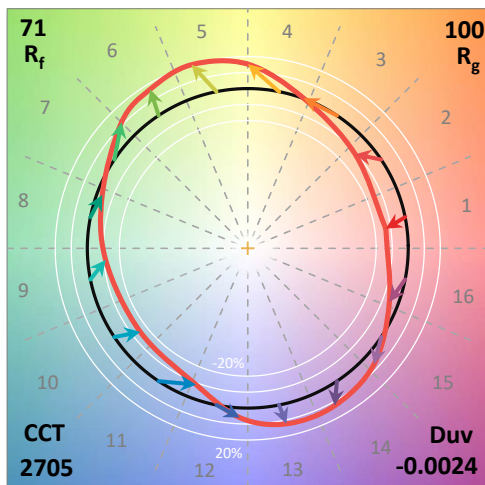
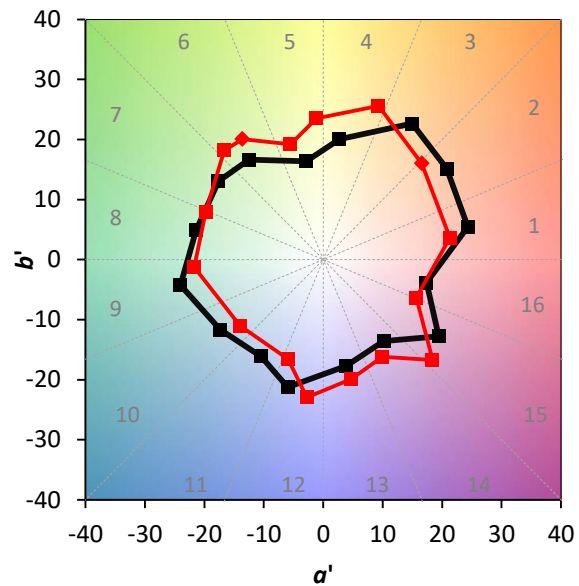
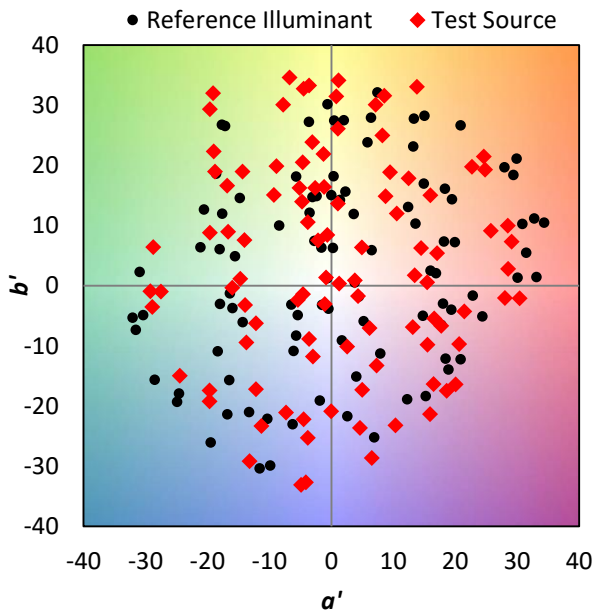
### Summary

$R_f = 71.2$   
 $R_g = 100.1$   
 CIE  $R_a = 73.8$   
 $R_g = -7.6$

### Spectral Power Distribution Comparison

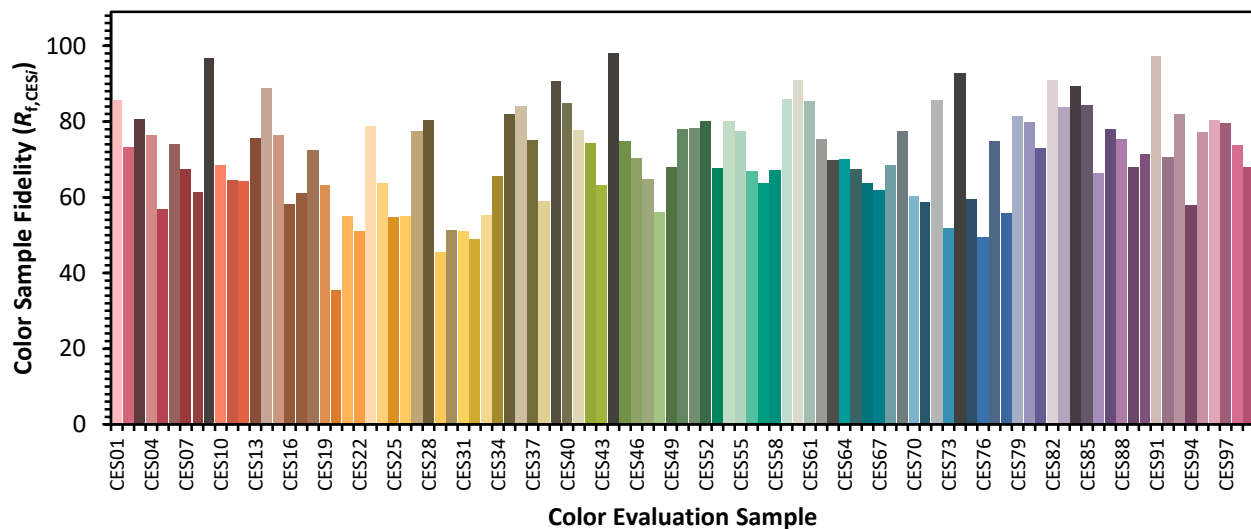


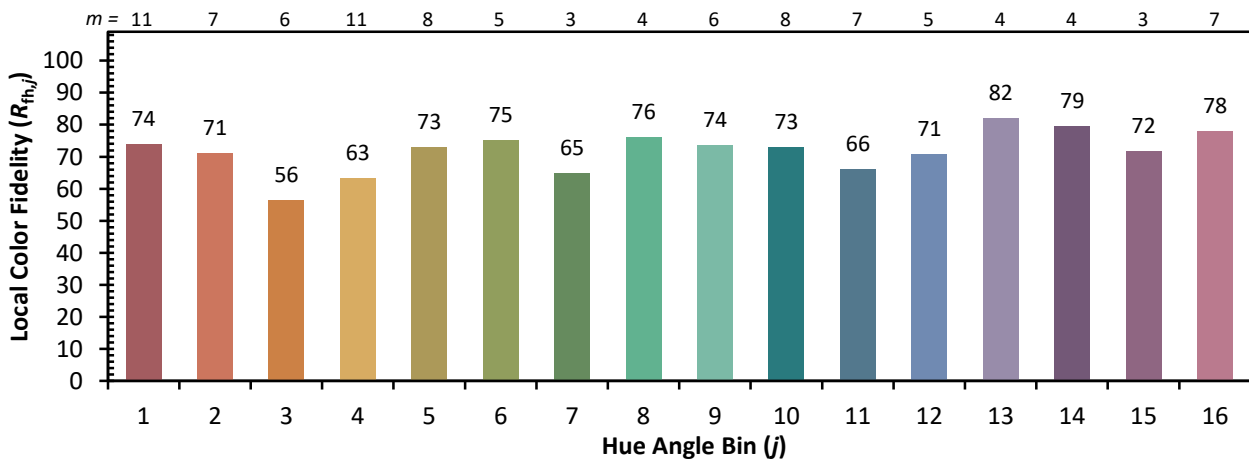
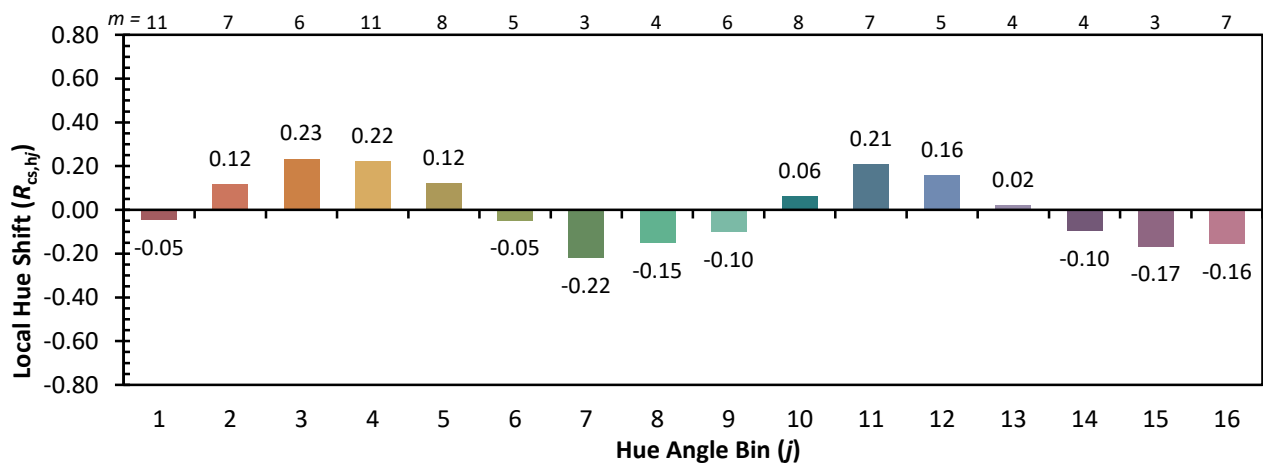
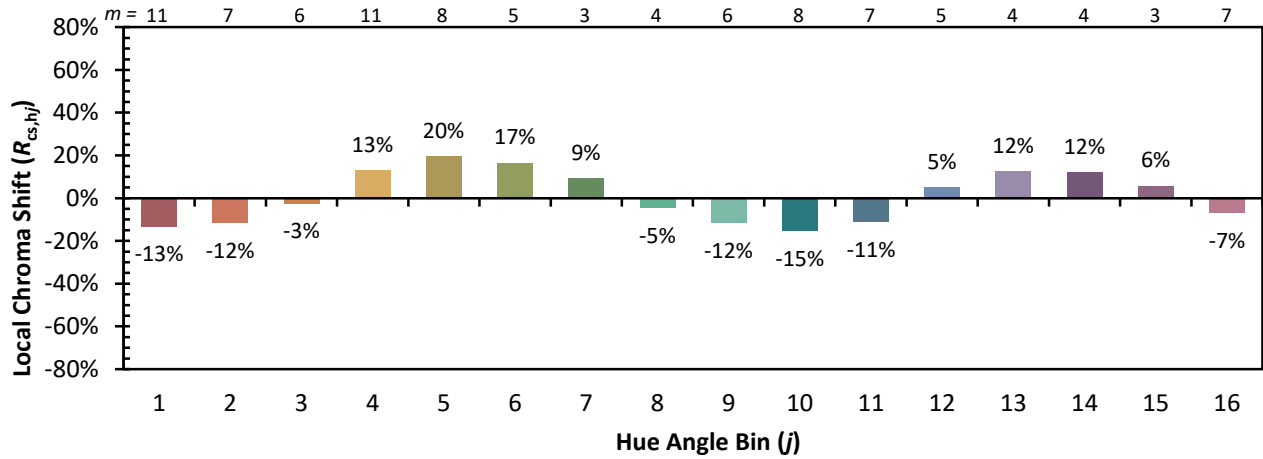
### Color Vector Graphics

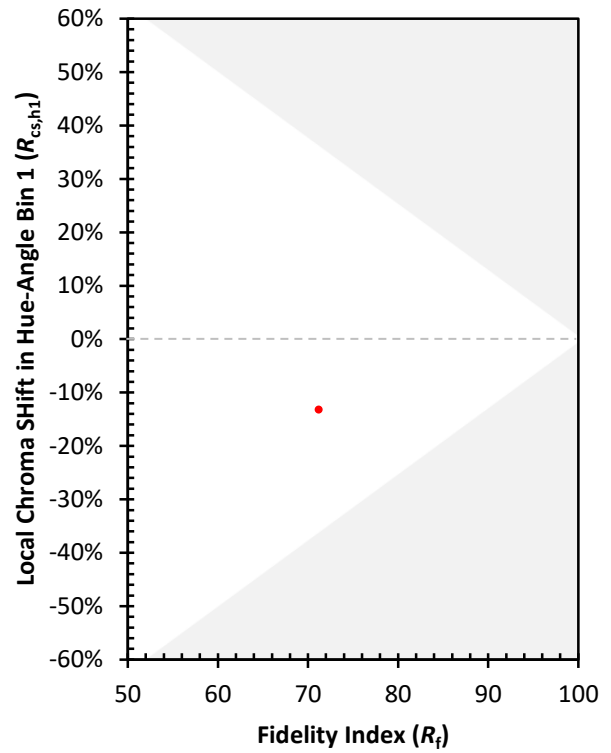
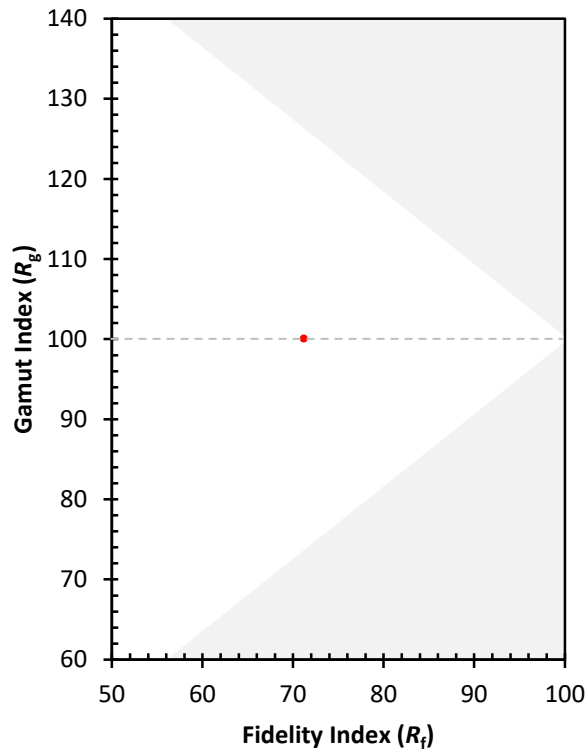


**Individual Sample Fidelity Index ( $R_{fi}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 55 | CES51 = 78 | CES76 = 50 |
| CES02 = 63 | CES27 = 77 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 68 | CES78 = 56 |
| CES04 = 71 | CES29 = 46 | CES54 = 80 | CES79 = 81 |
| CES05 = 50 | CES30 = 51 | CES55 = 78 | CES80 = 80 |
| CES06 = 52 | CES31 = 51 | CES56 = 67 | CES81 = 73 |
| CES07 = 43 | CES32 = 49 | CES57 = 64 | CES82 = 91 |
| CES08 = 41 | CES33 = 55 | CES58 = 67 | CES83 = 84 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 89 |
| CES10 = 77 | CES35 = 82 | CES60 = 91 | CES85 = 84 |
| CES11 = 60 | CES36 = 84 | CES61 = 85 | CES86 = 66 |
| CES12 = 66 | CES37 = 75 | CES62 = 75 | CES87 = 78 |
| CES13 = 44 | CES38 = 59 | CES63 = 70 | CES88 = 75 |
| CES14 = 74 | CES39 = 91 | CES64 = 70 | CES89 = 68 |
| CES15 = 72 | CES40 = 85 | CES65 = 67 | CES90 = 71 |
| CES16 = 48 | CES41 = 78 | CES66 = 64 | CES91 = 97 |
| CES17 = 51 | CES42 = 74 | CES67 = 62 | CES92 = 71 |
| CES18 = 57 | CES43 = 63 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 58 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 77 |
| CES21 = 88 | CES46 = 70 | CES71 = 59 | CES96 = 80 |
| CES22 = 80 | CES47 = 65 | CES72 = 86 | CES97 = 80 |
| CES23 = 92 | CES48 = 56 | CES73 = 52 | CES98 = 74 |
| CES24 = 91 | CES49 = 68 | CES74 = 93 | CES99 = 68 |
| CES25 = 73 | CES50 = 78 | CES75 = 59 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**


(END OF REPORT)