Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled data based on original data using

LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P634508

Luminaire Tested: GWS-SA3B-830-U-RW-W

Issue Date: 1/10/2023

Report Generated By 670246102 / DESKTOP-G35701P

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | P634508 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-49) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA3B-830-U-RW-W |
| Description: | GALLEON WALL SLIM LUMINAIRE. (3) LIGHTSQUARES WITH 16 LEDS EACH AND RECTANGULAR WIDE OPTICS |
| Light Source: | (48) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 8506 lumens |
| Efficiency: | N/A |
| Efficacy: | 124.5 lumens/watt |
| Luminous Opening: | Rectangular (W 1.5' x L: 0.5' x H: 0') |
| IES Classification: | Type III - Short |
| BUG Rating: | B3 - U0 - G3 |

| | |
|---|---|
| Input Watts (W): | 68.3 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 0 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 28.75 FT |

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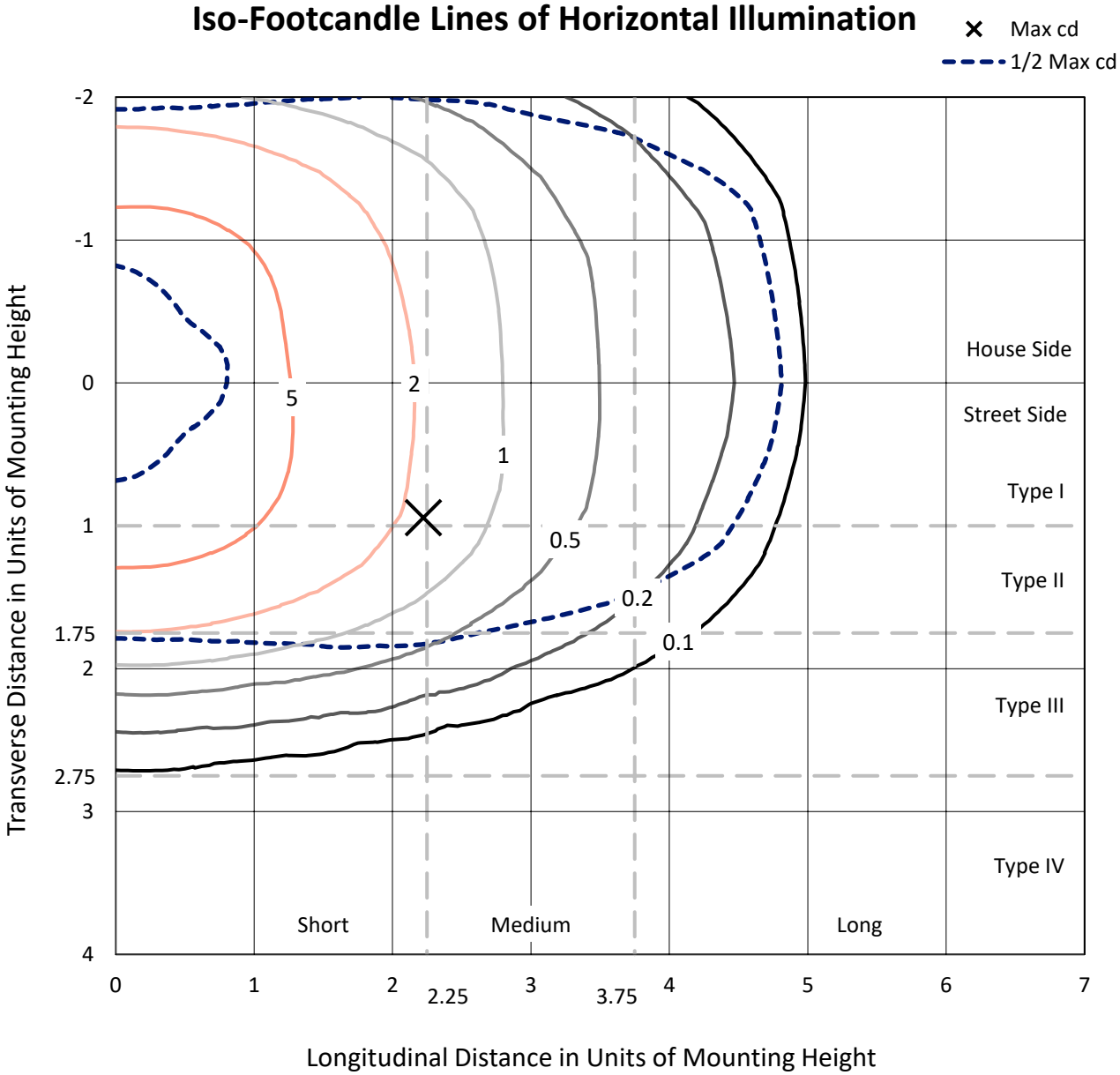
Scaled Data Report

REPORT NUMBER: P634508
CATALOG NUMBER: GWS-SA3B-830-U-RW-W

## Iso-Footcandle Lines of Horizontal Illumination




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

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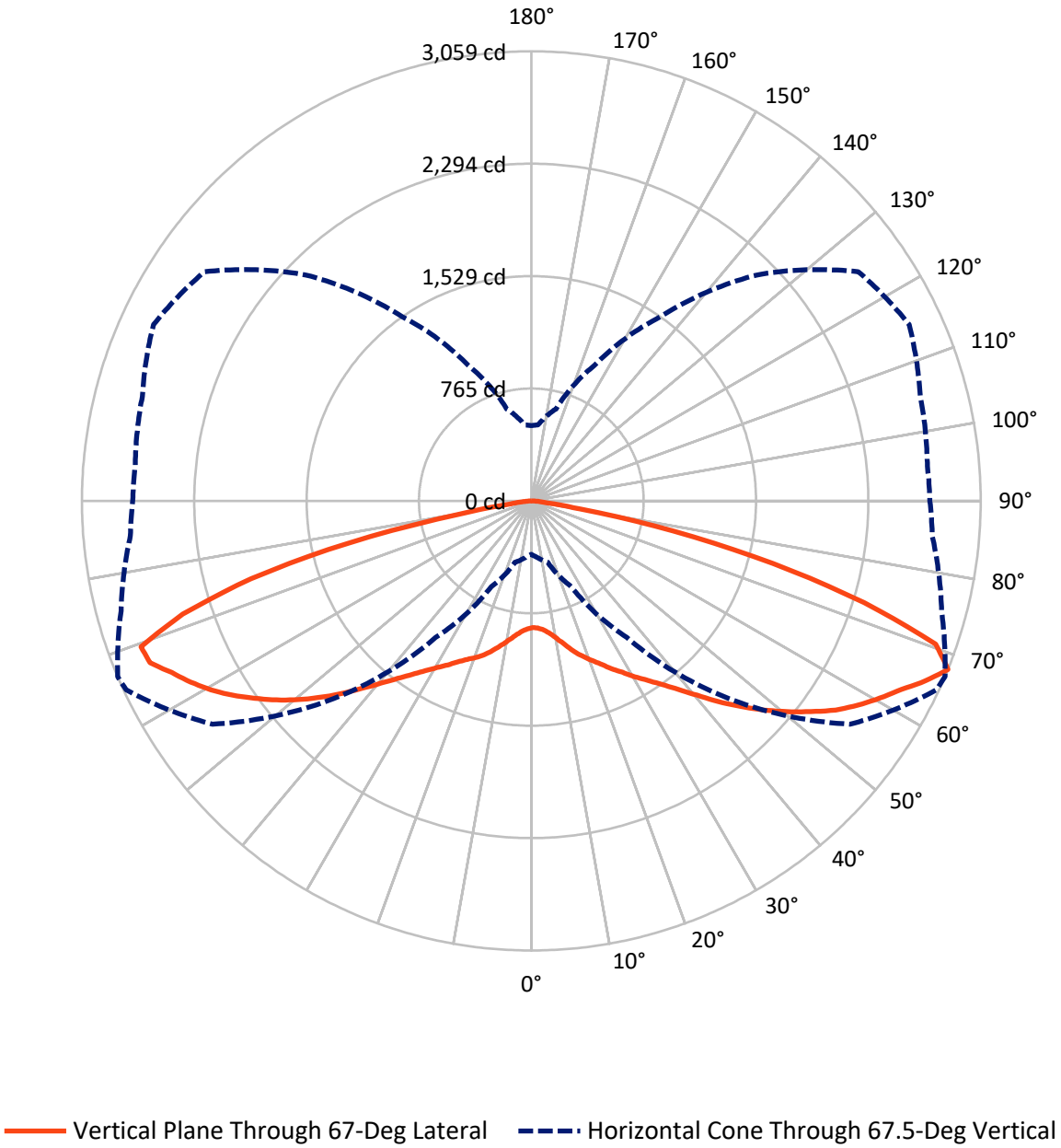
## Luminous Intensity Polar Plot



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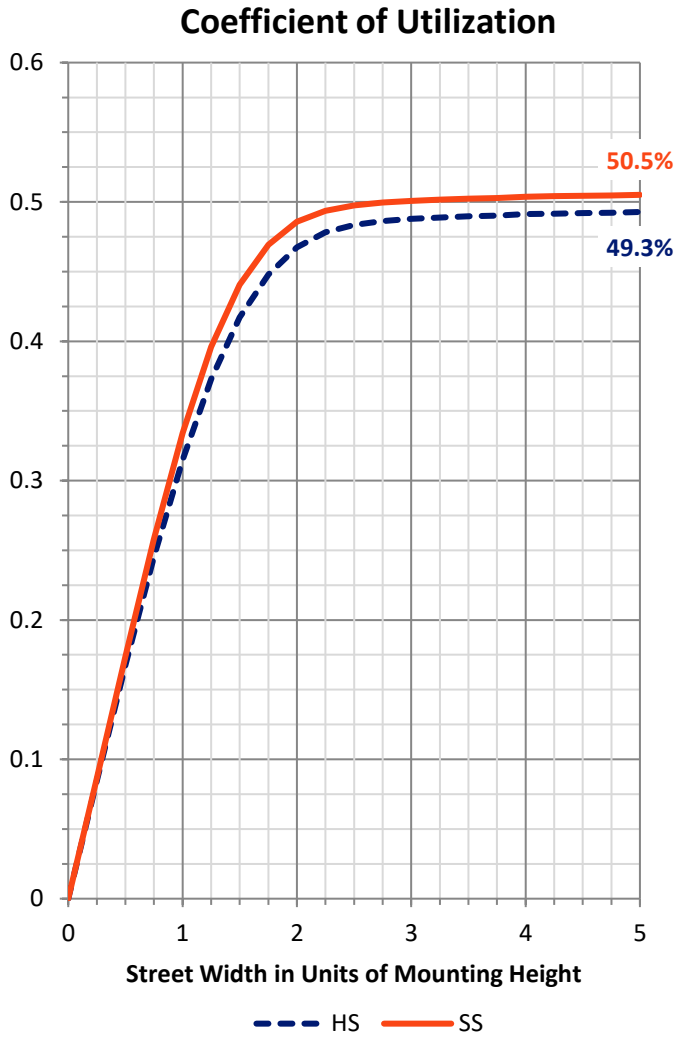
REPORT NUMBER: P634508
CATALOG NUMBER: GWS-SA3B-830-U-RW-W

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 4206.1 | 0.0 | 4206.1 |
| | % Fixture | 49.4 | 0.0 | 49.4 |
| **Street Side** | Lumens | 4299.9 | 0.0 | 4299.9 |
| | % Fixture | 50.6 | 0.0 | 50.6 |
| **Total** | Lumens | 8506.0 | 0.0 | 8506.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 84.5 | 1.0 |
| 10°-20° | 285.5 | 3.4 |
| 20°-30° | 560.1 | 6.6 |
| 30°-40° | 954.2 | 11.2 |
| 40°-50° | 1532.3 | 18.0 |
| 50°-60° | 2082.1 | 24.5 |
| 60°-70° | 1991.7 | 23.4 |
| 70°-80° | 946.9 | 11.1 |
| 80°-90° | 68.6 | 0.8 |
| 90°-100° | 0.0 | 0.0 |
| 100°-110° | 0.0 | 0.0 |
| 110°-120° | 0.0 | 0.0 |
| 120°-130° | 0.0 | 0.0 |
| 130°-140° | 0.0 | 0.0 |
| 140°-150° | 0.0 | 0.0 |
| 150°-160° | 0.0 | 0.0 |
| 160°-170° | 0.0 | 0.0 |
| 170°-180° | 0.0 | 0.0 |
| 0°-90° | 8506.0 | 100.0 |
| 0°-180° | 8506.0 | 100.0 |



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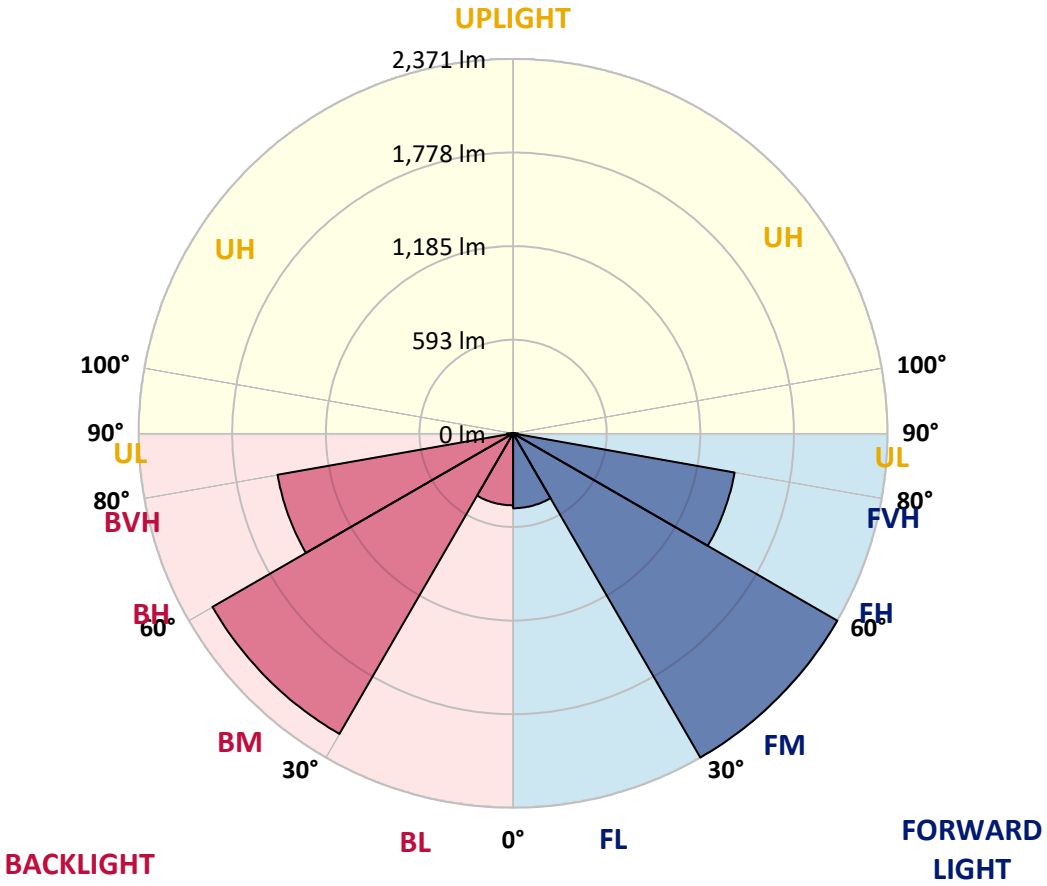
REPORT NUMBER: P634508
CATALOG NUMBER: GWS-SA3B-830-U-RW-W

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 474.3 | 5.6 | | | |
| FM | (30°-60°) | 2370.7 | 27.9 | | | |
| FH | (60°-80°) | 1424.1 | 16.7 | | | G1/1800 |
| FVH | (80°-90°) | 30.8 | 0.4 | | | G1/100 |
| BL | (0°-30°) | 455.8 | 5.4 | B1/500 | | |
| BM | (30°-60°) | 2198.0 | 25.8 | B2/2500 | | |
| BH | (60°-80°) | 1514.5 | 17.8 | B3/2500 | | G3/2500 |
| BVH | (80°-90°) | 37.8 | 0.4 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B3-U0-G3**
Type III Short



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Scaled Data Report

REPORT NUMBER: P634508
CATALOG NUMBER: GWS-SA3B-830-U-RW-W

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 67° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | *861.3* | 861.3 | 861.3 |
| 2.5° | 843.5 | 844.7 | 846.5 | 850.0 | 853.6 | 858.9 | 864.2 | 863.6 | *866.0* | 867.8 | 869.6 |
| 5° | 838.8 | 840.0 | 842.9 | 847.7 | 853.0 | 861.9 | 873.1 | 877.9 | *881.4* | 887.9 | 893.9 |
| 7.5° | 848.8 | 851.2 | 855.4 | 861.9 | 870.2 | 881.4 | 896.8 | 905.1 | *910.4* | 922.3 | 932.4 |
| 10° | 862.5 | 865.4 | 873.7 | 886.2 | 898.6 | 915.8 | 935.3 | 947.8 | *951.3* | 966.7 | 985.7 |
| 12.5° | 875.5 | 879.1 | 892.7 | 915.2 | 937.7 | 960.8 | 983.9 | 999.3 | *1000.5* | 1021.2 | 1042.5 |
| 15° | 896.2 | 899.2 | 917.6 | 946.6 | 980.9 | 1012.9 | 1041.4 | 1052.0 | *1056.8* | 1071.6 | 1098.2 |
| 17.5° | 941.8 | 945.4 | 969.1 | 1000.5 | 1036.6 | 1070.4 | 1098.8 | 1107.7 | *1107.7* | 1120.1 | 1142.1 |
| 20° | 991.0 | 994.6 | 1026.0 | 1066.2 | 1110.1 | 1144.4 | 1166.3 | 1158.0 | *1155.1* | 1158.6 | 1174.0 |
| 22.5° | 1046.1 | 1052.6 | 1082.8 | 1129.6 | 1183.5 | 1225.6 | 1236.8 | 1212.0 | *1203.7* | 1195.4 | 1198.9 |
| 25° | 1116.6 | 1124.3 | 1153.9 | 1203.7 | 1256.4 | 1300.8 | 1307.3 | 1268.8 | *1264.1* | 1235.1 | 1224.4 |
| 27.5° | 1197.7 | 1203.7 | 1240.4 | 1289.6 | 1338.7 | 1376.0 | 1383.1 | 1335.8 | *1319.8* | 1279.5 | 1254.6 |
| 30° | 1302.6 | 1307.9 | 1339.9 | 1388.5 | 1431.1 | 1457.2 | 1466.1 | 1400.9 | *1388.5* | 1326.9 | 1288.4 |
| 32.5° | 1416.9 | 1419.3 | 1451.9 | 1498.7 | 1536.6 | 1561.4 | 1549.0 | 1473.2 | *1454.8* | 1385.5 | 1332.8 |
| 35° | 1547.8 | 1547.8 | 1589.9 | 1627.8 | 1658.0 | 1665.1 | 1641.4 | 1554.9 | *1533.6* | 1458.4 | 1392.6 |
| 37.5° | 1676.4 | 1679.9 | 1719.0 | 1764.0 | 1790.7 | 1789.5 | 1746.3 | 1651.5 | *1627.2* | 1545.4 | 1472.6 |
| 40° | 1815.6 | 1823.3 | 1862.4 | 1912.7 | 1938.2 | 1934.6 | 1868.3 | 1762.8 | *1738.0* | 1641.4 | 1570.3 |
| 42.5° | 1943.5 | 1955.9 | 2001.6 | 2053.1 | 2080.9 | 2078.6 | 2009.3 | 1890.8 | *1866.5* | 1757.5 | 1686.4 |
| 45° | 2045.4 | 2058.4 | 2115.3 | 2187.0 | 2231.4 | 2227.2 | 2157.3 | 2023.5 | *1993.9* | 1879.5 | 1801.3 |
| 47.5° | 2134.8 | 2148.5 | 2211.8 | 2287.7 | 2358.2 | 2365.3 | 2301.3 | 2157.3 | *2126.0* | 2010.4 | 1922.2 |
| 50° | 2203.5 | 2210.1 | 2281.1 | 2364.1 | 2445.8 | 2485.5 | 2429.8 | 2291.8 | *2253.9* | 2139.6 | 2040.1 |
| 52.5° | 2198.2 | 2207.1 | 2294.8 | 2407.3 | 2516.9 | 2582.1 | 2543.6 | 2418.6 | *2381.8* | 2257.5 | 2160.3 |
| 55° | 2089.8 | 2098.7 | 2203.0 | 2367.0 | 2556.6 | 2652.6 | 2648.4 | 2539.4 | *2512.8* | 2377.7 | 2285.3 |
| 57.5° | 1931.7 | 1951.2 | 2054.9 | 2232.0 | 2504.5 | 2708.8 | 2725.4 | 2649.6 | *2621.8* | 2495.6 | 2409.1 |
| 60° | 1648.5 | 1674.6 | 1794.2 | 2024.1 | 2337.4 | 2689.9 | 2807.7 | 2742.6 | *2725.4* | 2605.2 | 2521.1 |
| 62.5° | 1197.7 | 1216.7 | 1376.0 | 1677.5 | 2089.8 | 2554.8 | 2877.1 | 2838.6 | *2825.5* | 2703.5 | 2622.3 |
| 65° | 717.3 | 760.6 | 888.5 | 1186.5 | 1685.8 | 2300.1 | 2839.1 | 2964.1 | *2950.5* | 2804.8 | 2708.8 |
| 67.5° | *363.1* | *382.7* | *433.0* | *643.3* | *1133.8* | *1903.2* | *2649.0* | *3042.3* | *3058.9* | *2891.3* | *2739.6* |
| 70° | 225.1 | 230.4 | 244.6 | 317.5 | 566.3 | 1250.5 | 2166.2 | 2838.6 | *2919.7* | 2877.6 | 2659.7 |
| 72.5° | 180.7 | 181.9 | 184.2 | 197.8 | 271.9 | 584.7 | 1369.5 | 2223.1 | *2369.4* | 2687.5 | 2545.3 |
| 75° | 149.9 | 150.5 | 151.0 | 155.2 | 169.4 | 238.7 | 666.4 | 1527.7 | *1698.9* | 2284.1 | 2359.9 |
| 77.5° | 120.2 | 117.3 | 119.7 | 121.4 | 125.0 | 133.3 | 229.8 | 815.1 | *988.6* | 1499.2 | 1825.0 |
| 80° | 78.2 | 77.0 | 81.7 | 83.5 | 87.1 | 92.4 | 122.6 | 276.6 | *335.9* | 545.6 | 580.5 |
| 82.5° | 42.1 | 39.7 | 49.8 | 48.0 | 49.8 | 53.9 | 72.3 | 101.3 | *113.7* | 164.7 | 139.2 |
| 85° | 13.0 | 13.0 | 13.6 | 16.0 | 19.5 | 19.0 | 31.4 | 49.8 | *55.1* | 70.5 | 52.1 |
| 87.5° | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 3.0 | 6.5 | 10.1 | *13.6* | 24.3 | 18.4 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 0.0 | 0.0 |

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Scaled Data Report

REPORT NUMBER: P634508
CATALOG NUMBER: GWS-SA3B-830-U-RW-W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 |
| 2.5° | 873.1 | 867.8 | 870.8 | 872.5 | 871.9 | 870.8 | 864.8 | 863.6 | 860.7 | 855.9 | 854.8 |
| 5° | 899.2 | 893.3 | 893.9 | 892.1 | 886.2 | 878.5 | 865.4 | 858.9 | 853.6 | 847.7 | 847.1 |
| 7.5° | 940.1 | 933.5 | 931.8 | 923.5 | 906.9 | 889.1 | 868.4 | 856.5 | 847.7 | 840.0 | 838.8 |
| 10° | 992.2 | 985.7 | 979.8 | 960.2 | 933.0 | 909.3 | 882.0 | 864.8 | 851.8 | 842.3 | 840.5 |
| 12.5° | 1050.2 | 1044.9 | 1030.1 | 1001.7 | 969.1 | 941.2 | 913.4 | 892.1 | 873.1 | 858.9 | 857.1 |
| 15° | 1114.8 | 1103.0 | 1080.5 | 1043.7 | 1012.9 | 990.4 | 956.6 | 927.6 | 897.4 | 878.5 | 874.3 |
| 17.5° | 1159.8 | 1149.8 | 1123.1 | 1087.6 | 1063.3 | 1043.7 | 1004.0 | 962.6 | 921.7 | 893.9 | 887.9 |
| 20° | 1191.8 | 1181.2 | 1150.9 | 1124.9 | 1117.2 | 1100.6 | 1054.4 | 1006.4 | 959.0 | 924.7 | 917.0 |
| 22.5° | 1214.9 | 1203.7 | 1172.9 | 1159.8 | 1170.5 | 1167.5 | 1122.5 | 1068.0 | 1011.7 | 970.9 | 961.4 |
| 25° | 1236.8 | 1226.2 | 1198.9 | 1203.7 | 1232.1 | 1241.0 | 1192.4 | 1129.0 | 1065.0 | 1017.1 | 1005.8 |
| 27.5° | 1257.6 | 1243.9 | 1231.5 | 1257.6 | 1297.8 | 1314.4 | 1262.9 | 1191.2 | 1121.9 | 1072.7 | 1063.9 |
| 30° | 1289.6 | 1273.6 | 1271.8 | 1309.7 | 1373.7 | 1387.9 | 1331.0 | 1259.3 | 1190.6 | 1140.9 | 1129.6 |
| 32.5° | 1329.8 | 1315.0 | 1316.2 | 1373.1 | 1447.1 | 1459.0 | 1410.4 | 1343.5 | 1274.7 | 1225.0 | 1209.6 |
| 35° | 1384.3 | 1366.0 | 1376.0 | 1445.9 | 1520.6 | 1542.5 | 1503.4 | 1447.7 | 1380.8 | 1329.8 | 1312.7 |
| 37.5° | 1459.6 | 1432.9 | 1453.6 | 1527.1 | 1602.3 | 1634.9 | 1604.7 | 1563.2 | 1496.9 | 1445.3 | 1429.3 |
| 40° | 1555.5 | 1533.6 | 1541.9 | 1623.0 | 1700.6 | 1739.7 | 1720.8 | 1679.9 | 1614.2 | 1560.3 | 1541.9 |
| 42.5° | 1669.2 | 1647.3 | 1644.4 | 1730.9 | 1808.5 | 1867.7 | 1849.3 | 1812.0 | 1743.9 | 1682.3 | 1664.5 |
| 45° | 1780.6 | 1760.5 | 1764.6 | 1852.9 | 1940.0 | 2004.5 | 1986.2 | 1942.3 | 1868.3 | 1797.2 | 1783.0 |
| 47.5° | 1896.7 | 1880.1 | 1883.7 | 1977.3 | 2073.2 | 2137.8 | 2114.7 | 2061.4 | 1974.9 | 1899.1 | 1881.9 |
| 50° | 2015.8 | 1996.8 | 2002.2 | 2100.5 | 2204.1 | 2265.2 | 2229.6 | 2150.8 | 2055.5 | 1981.4 | 1966.6 |
| 52.5° | 2134.2 | 2111.7 | 2125.4 | 2218.4 | 2325.6 | 2374.1 | 2308.4 | 2213.0 | 2120.6 | 2047.2 | 2030.6 |
| 55° | 2270.5 | 2246.8 | 2232.0 | 2331.5 | 2437.5 | 2457.7 | 2367.6 | 2256.3 | 2146.7 | 2063.2 | 2053.1 |
| 57.5° | 2394.9 | 2374.7 | 2346.9 | 2446.4 | 2524.6 | 2509.8 | 2413.2 | 2244.4 | 2083.3 | 1976.1 | 1961.9 |
| 60° | 2506.2 | 2489.1 | 2464.8 | 2549.5 | 2585.0 | 2551.9 | 2376.5 | 2104.0 | 1926.9 | 1815.0 | 1808.5 |
| 62.5° | 2608.7 | 2590.4 | 2567.8 | 2640.1 | 2635.4 | 2558.4 | 2209.5 | 1888.4 | 1651.5 | 1531.2 | 1520.6 |
| 65° | 2689.9 | 2673.3 | 2666.8 | 2723.6 | 2715.9 | 2431.0 | 1949.4 | 1535.4 | 1206.6 | 1071.0 | 1066.8 |
| 67.5° | *2713.0* | *2706.5* | *2741.4* | *2838.0* | *2717.7* | *2175.1* | *1528.9* | *1018.3* | *648.0* | *519.5* | *511.8* |
| 70° | 2626.5 | 2625.9 | 2726.0 | 2864.0 | 2471.3 | 1661.5 | 902.2 | 459.1 | 325.8 | 289.1 | 284.3 |
| 72.5° | 2513.9 | 2512.2 | 2591.5 | 2470.7 | 1832.7 | 909.3 | 379.7 | 245.8 | 203.8 | 193.7 | 193.7 |
| 75° | 2329.1 | 2324.4 | 2384.2 | 1879.5 | 1030.7 | 342.4 | 201.4 | 168.8 | 159.9 | 158.2 | 158.2 |
| 77.5° | 1898.5 | 1858.8 | 1764.6 | 1161.6 | 359.6 | 168.2 | 133.3 | 132.7 | 127.4 | 126.8 | 126.8 |
| 80° | 624.3 | 624.3 | 725.6 | 443.1 | 158.8 | 103.7 | 94.2 | 98.9 | 93.6 | 90.0 | 89.4 |
| 82.5° | 101.9 | 140.4 | 199.6 | 126.8 | 85.9 | 64.6 | 58.1 | 61.6 | 64.6 | 51.5 | 51.5 |
| 85° | 40.3 | 52.7 | 77.0 | 59.2 | 39.7 | 26.1 | 27.8 | 30.8 | 27.2 | 23.7 | 23.1 |
| 87.5° | 15.4 | 19.0 | 27.2 | 14.2 | 8.3 | 4.7 | 3.0 | 3.0 | 2.4 | 2.4 | 2.4 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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Peachtree City, GA 30269

# LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

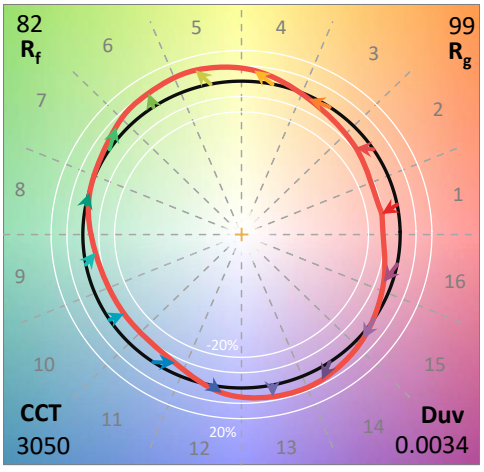
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2408-195-9 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 08/07/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | MCGRAW EDISON |
| Catalog Number: | **GALN-SB1A-830-U-5WQ** |
| Description: | GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3050 | CRI (Ra): | 81.0 | | |
| CIE u': | 0.2476 | R1: | 79.6 | R9: | 7.1 |
| CIE v': | 0.5251 | R2: | 85.6 | R10: | 67.0 |
| Duv: | 0.0034 | R3: | 92.0 | R11: | 82.7 |
| CIE x: | 0.4383 | R4: | 82.6 | R12: | 63.2 |
| CIE y: | 0.4131 | R5: | 78.9 | R13: | 80.3 |
| CIE z: | 0.1487 | R6: | 81.7 | R14: | 95.0 |
| Peak Wavelength (nm): | 603 | R7: | 85.2 | R15: | 71.7 |
| Dominant Wavelength (nm): | 581 | R8: | 62.0 | | |
| Purity: | 55.55201 | | | | |

| | |
|---|---|
| Rf: | 81.5 |
| Rg: | 99.2 |




## Test Conditions

| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC Power Source | IN0208 | 10/24/2023 | 10/24/2024 |
| Sphere Thermometer | IN0085 | 10/24/2023 | 10/24/2024 |
| Room Thermometer | IN0046 | 10/24/2023 | 10/24/2024 |

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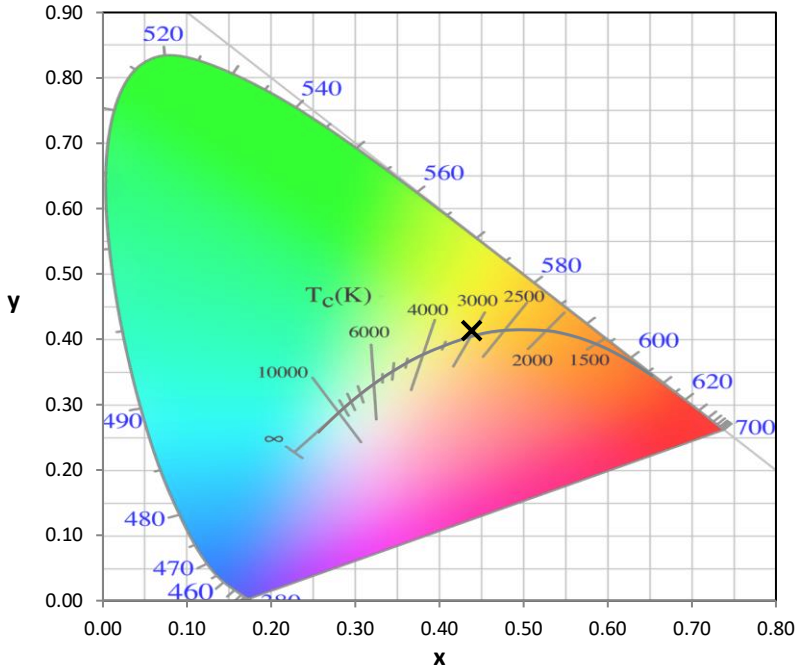
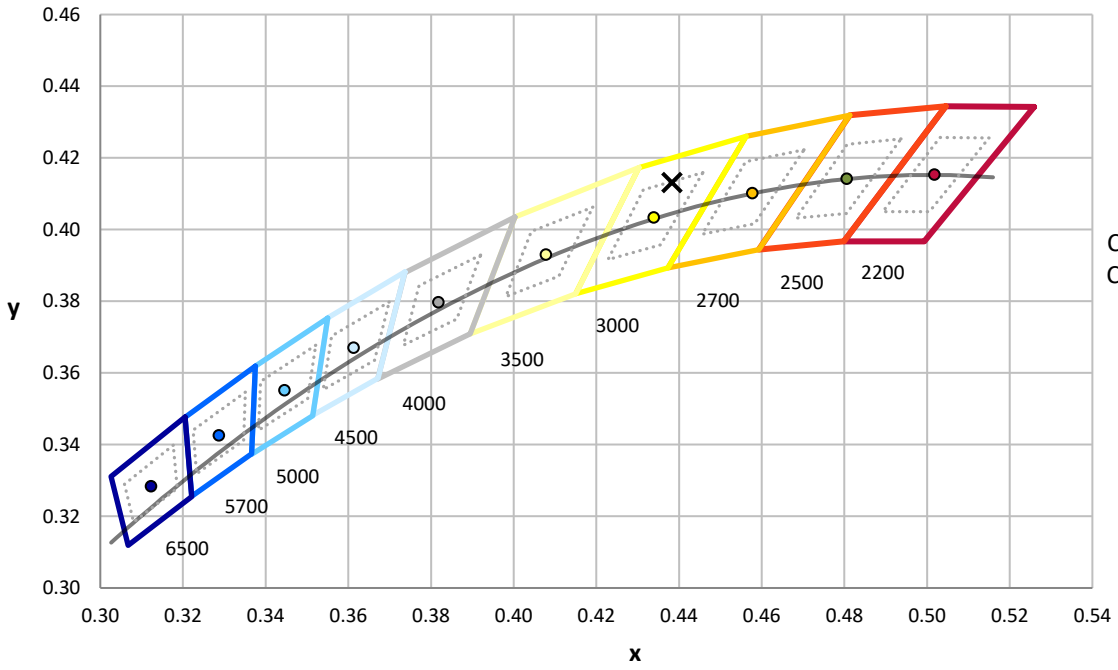
## CIE 1931 Chromaticity Diagram




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




CCT = 3050K
CIE x = 0.4383
CIE y = 0.4131
Duv = 0.0034

Point lies inside the ANSI 3000K 4-step quadrangle

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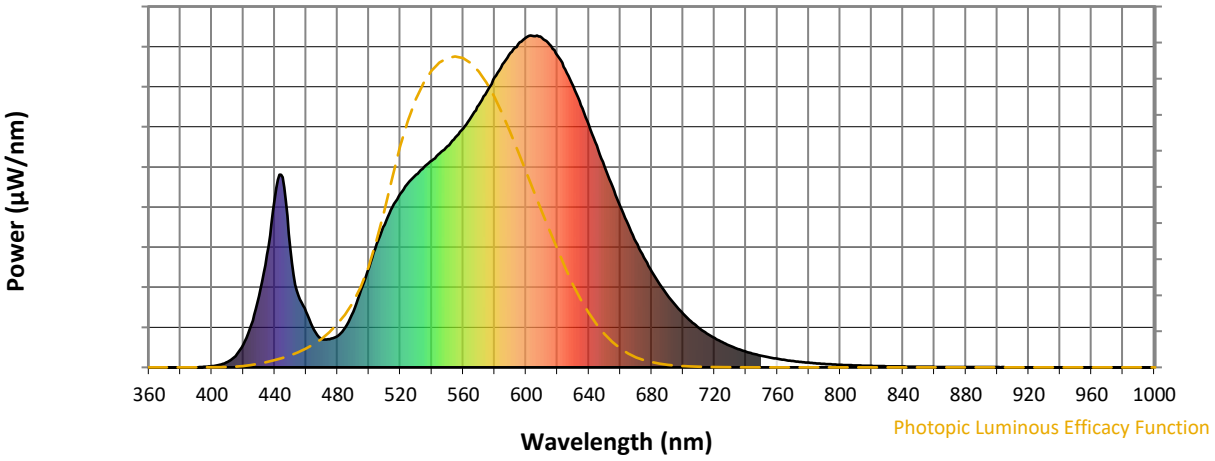
## Photopic Flux vs. Wavelength




## Photopic Lumens: NR

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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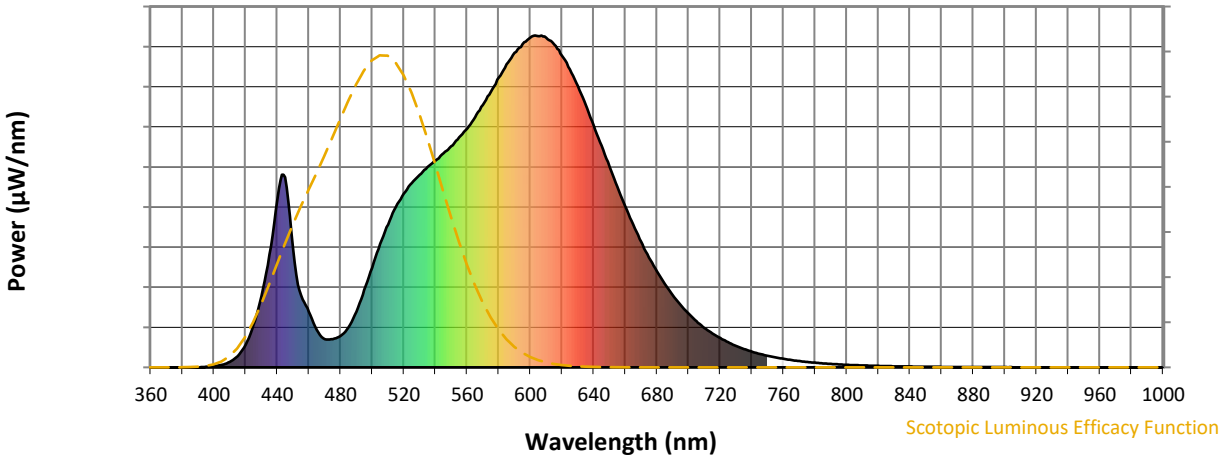
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.27**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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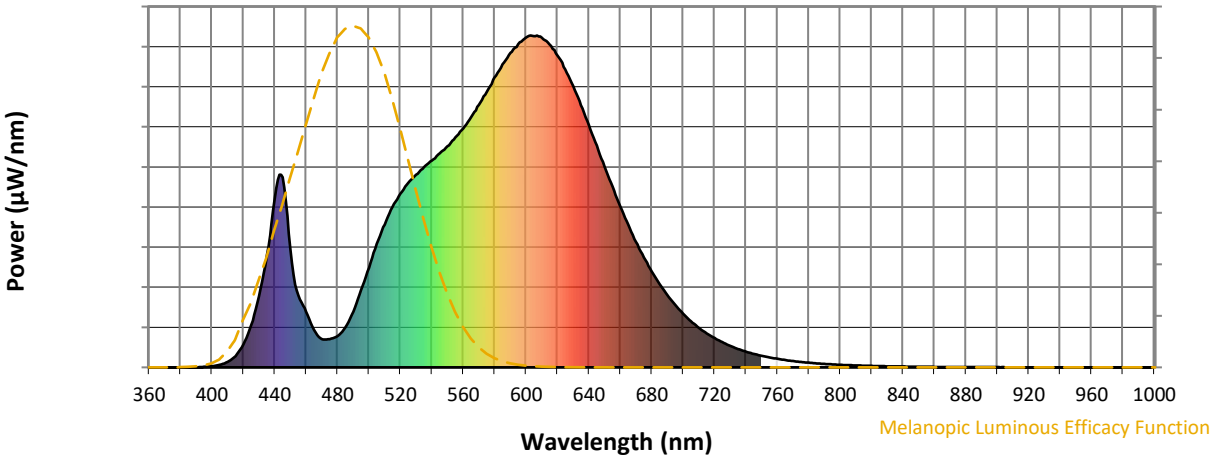
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.32**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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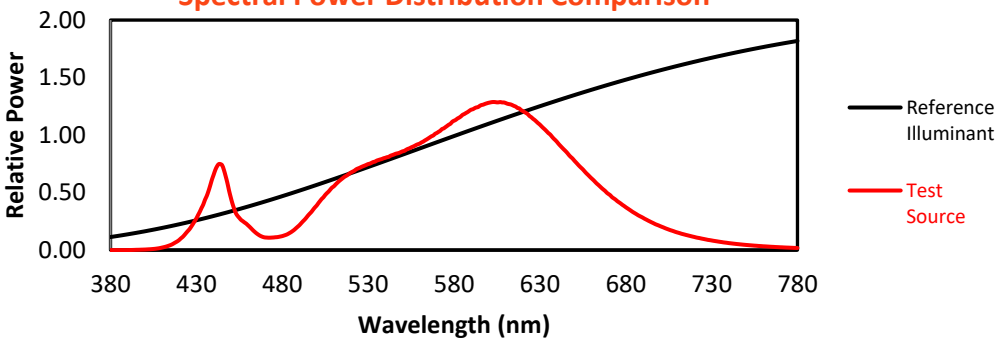
# TM-30-18

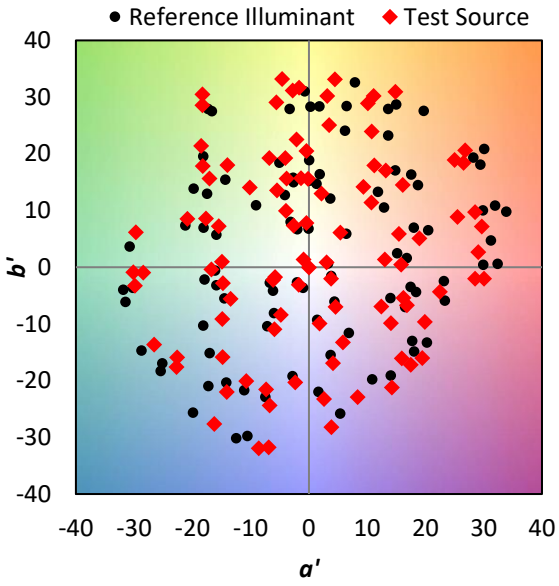
## Summary

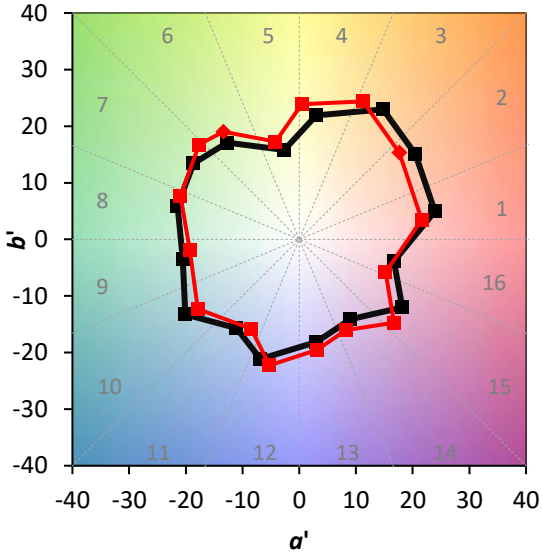
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

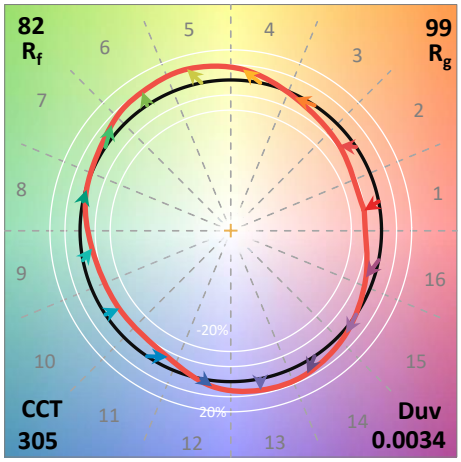
## Spectral Power Distribution Comparison

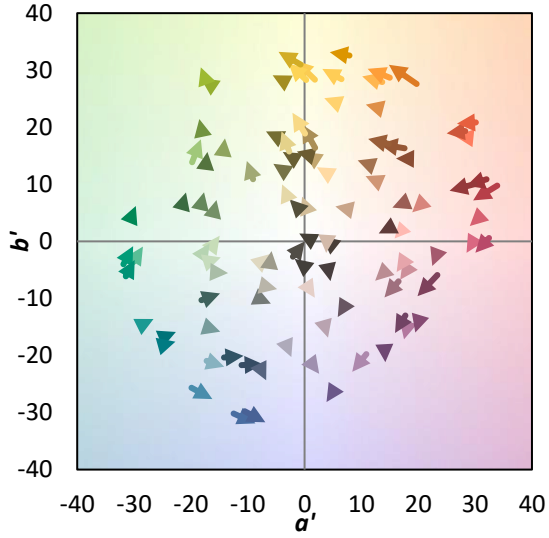



## Color Vector Graphics



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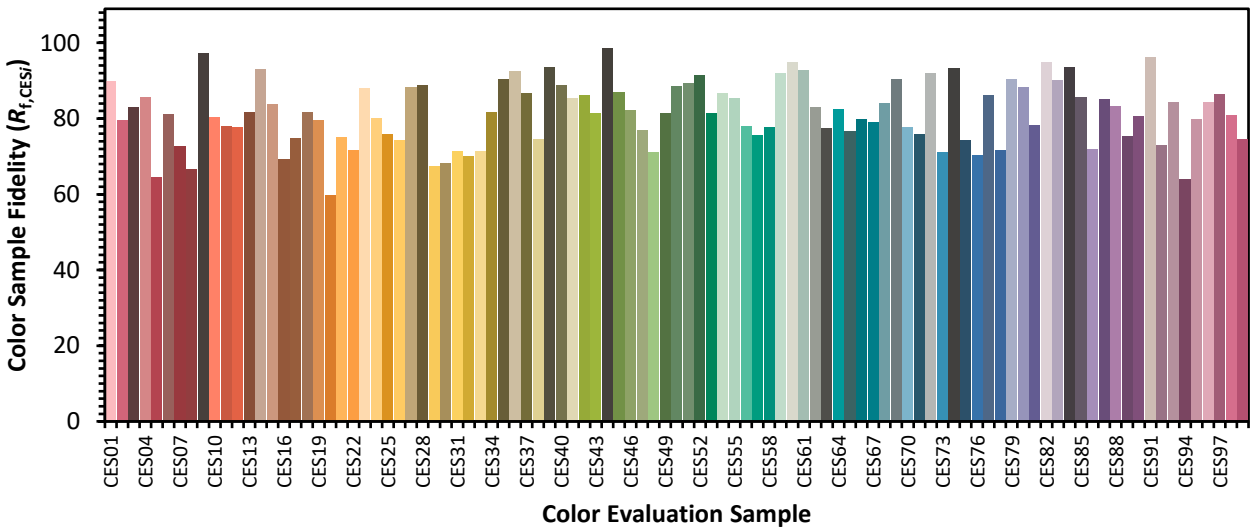
**Individual Sample Fidelity Index ($R_{f,i}$)**

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 51 | CES31 = 71 | CES56 = 78 | CES81 = 78 |
| CES07 = 42 | CES32 = 70 | CES57 = 76 | CES82 = 95 |
| CES08 = 41 | CES33 = 71 | CES58 = 78 | CES83 = 90 |
| CES09 = 29 | CES34 = 82 | CES59 = 92 | CES84 = 94 |
| CES10 = 76 | CES35 = 90 | CES60 = 95 | CES85 = 86 |
| CES11 = 59 | CES36 = 93 | CES61 = 93 | CES86 = 72 |
| CES12 = 65 | CES37 = 87 | CES62 = 83 | CES87 = 85 |
| CES13 = 43 | CES38 = 75 | CES63 = 77 | CES88 = 83 |
| CES14 = 74 | CES39 = 94 | CES64 = 83 | CES89 = 75 |
| CES15 = 71 | CES40 = 89 | CES65 = 77 | CES90 = 81 |
| CES16 = 47 | CES41 = 85 | CES66 = 80 | CES91 = 96 |
| CES17 = 50 | CES42 = 86 | CES67 = 79 | CES92 = 73 |
| CES18 = 56 | CES43 = 81 | CES68 = 84 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 91 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 78 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 76 | CES96 = 84 |
| CES22 = 79 | CES47 = 77 | CES72 = 92 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 71 | CES98 = 81 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 74 |
| CES25 = 72 | CES50 = 89 | CES75 = 74 | |



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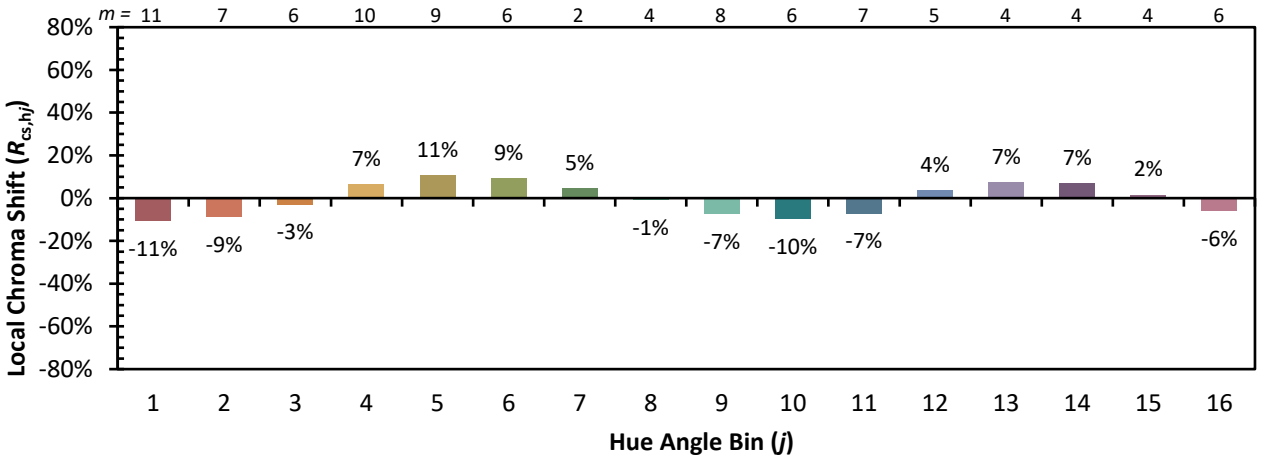
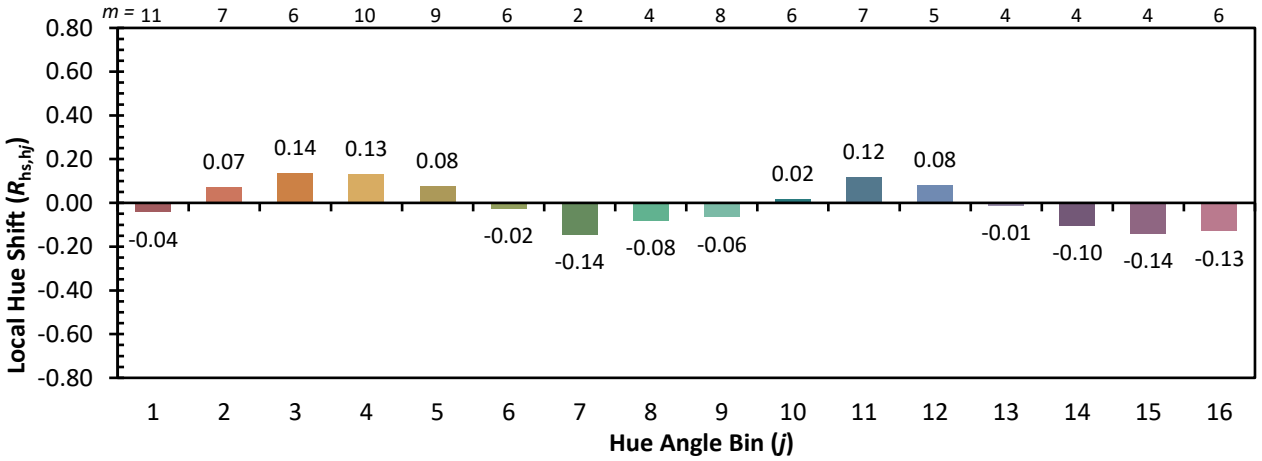
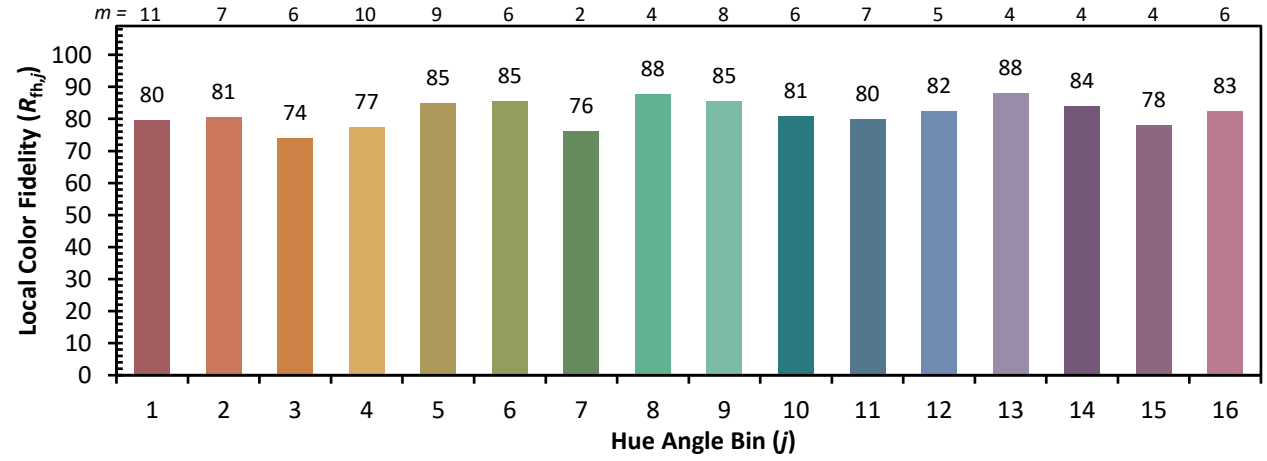
## Color Rendition by Hue-Angle Bin



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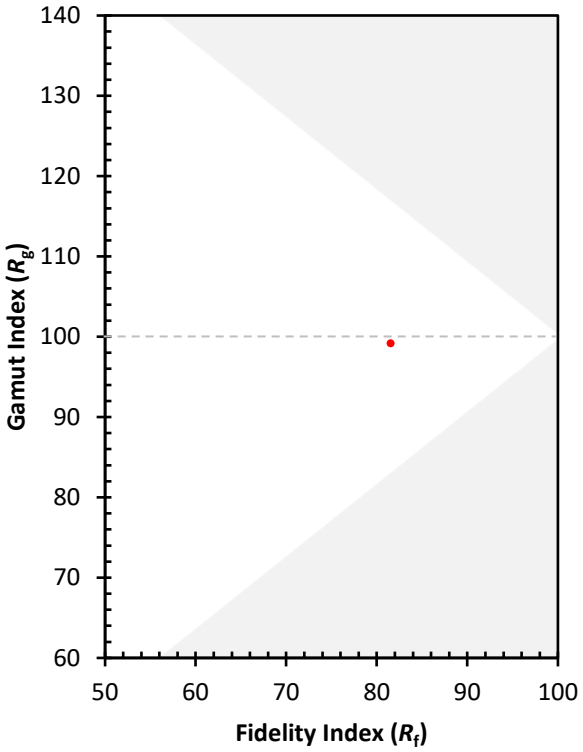
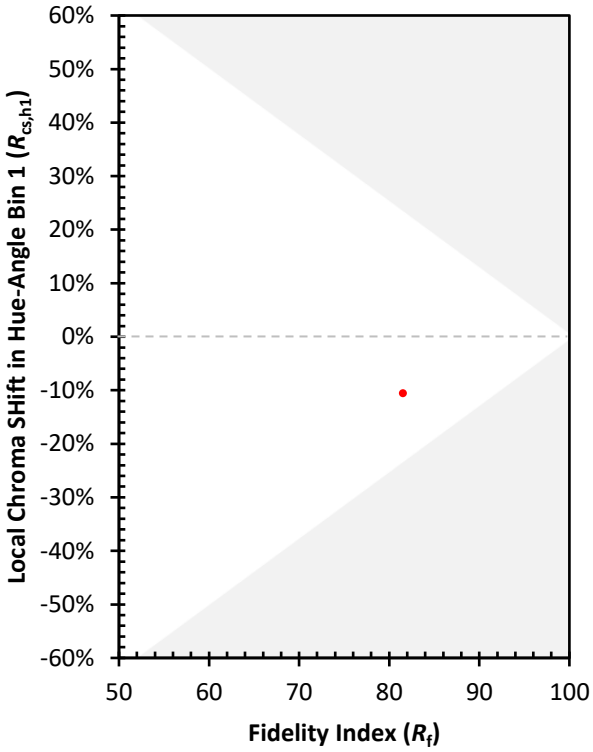
## TM-30-18

### Measure Comparisons




(END OF REPORT)