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: P632037

Luminaire Tested: GWS-SA2B-830-U-SL2-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: | P632037 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-27) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA2B-830-U-SL2-W |
| Description: | GALLEON WALL SLIM LUMINAIRE. (2) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II SPILL LIGHT ELIMINATOR OPTICS |
| Light Source: | (32) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 5387.3 lumens |
| Efficiency: | N/A |
| Efficacy: | 116.1 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 0.5' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B1 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 46.4 |
| 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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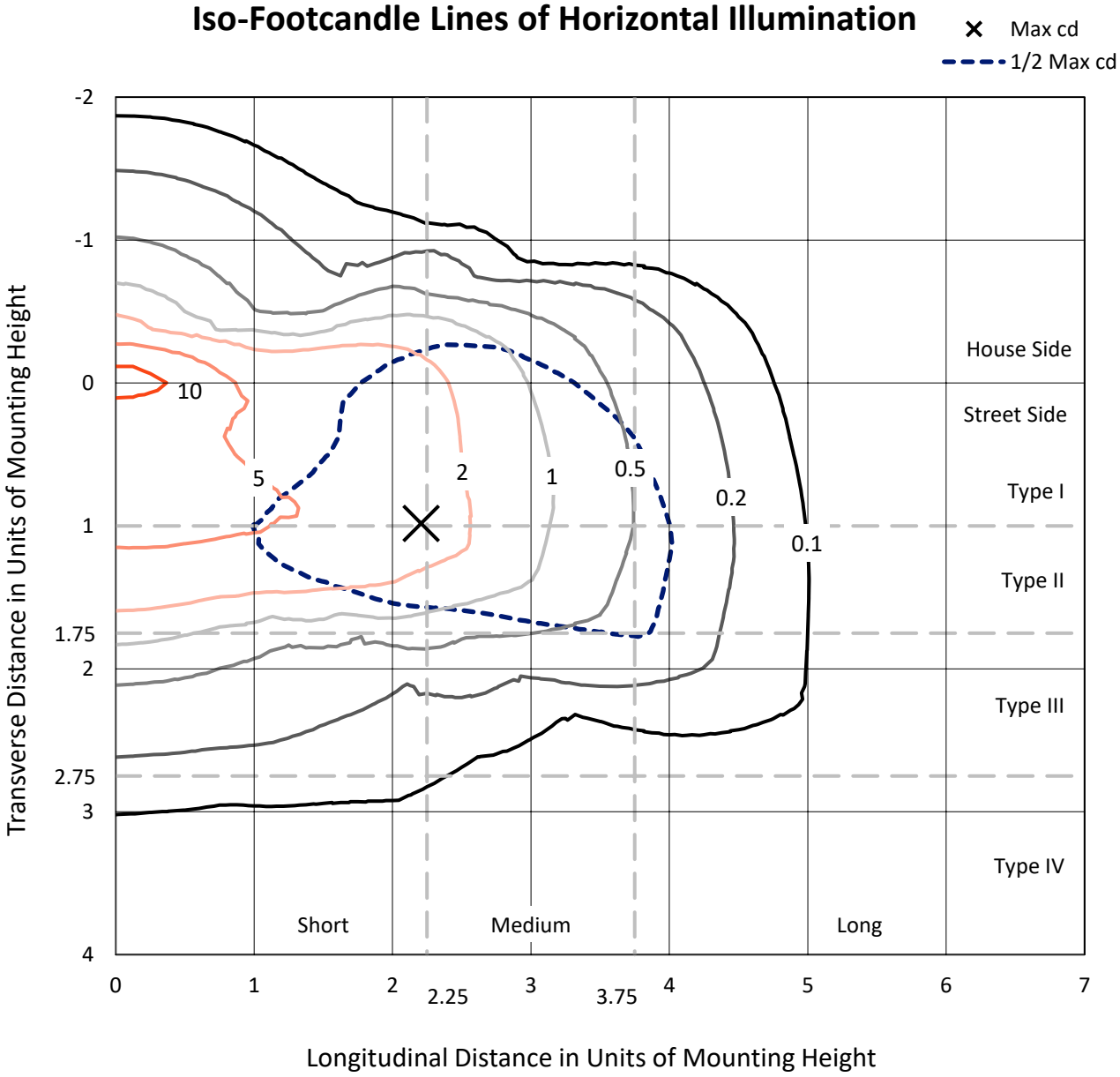
Scaled Data Report

REPORT NUMBER: P632037
CATALOG NUMBER: GWS-SA2B-830-U-SL2-W

## Iso-Footcandle Lines of Horizontal Illumination




Based on 10 foot mounting height. Maximum calculated value = 11.9 fc
Type II - Short - N/A

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REPORT NUMBER: P632037
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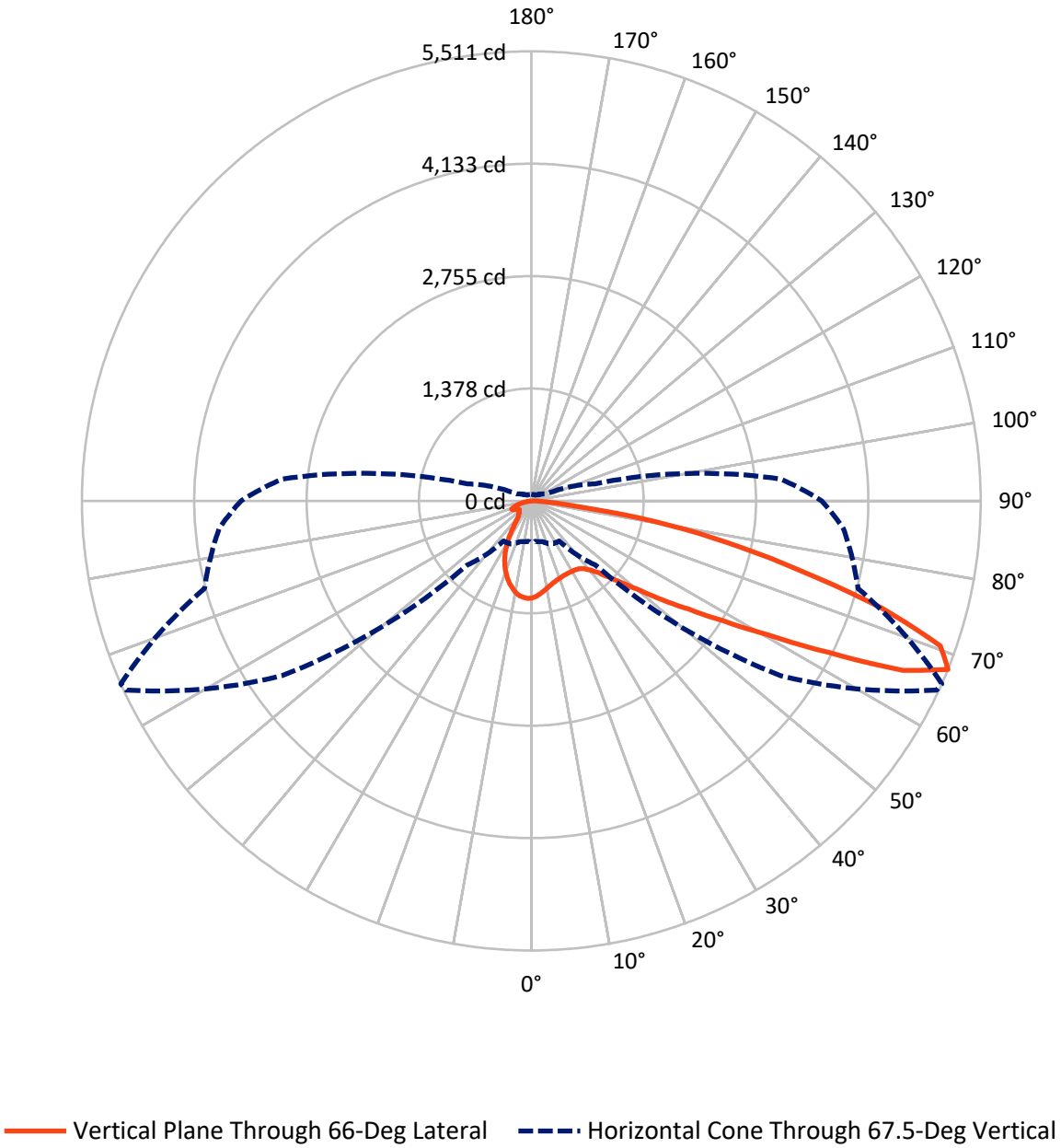
## Luminous Intensity Polar Plot



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Scaled Data Report

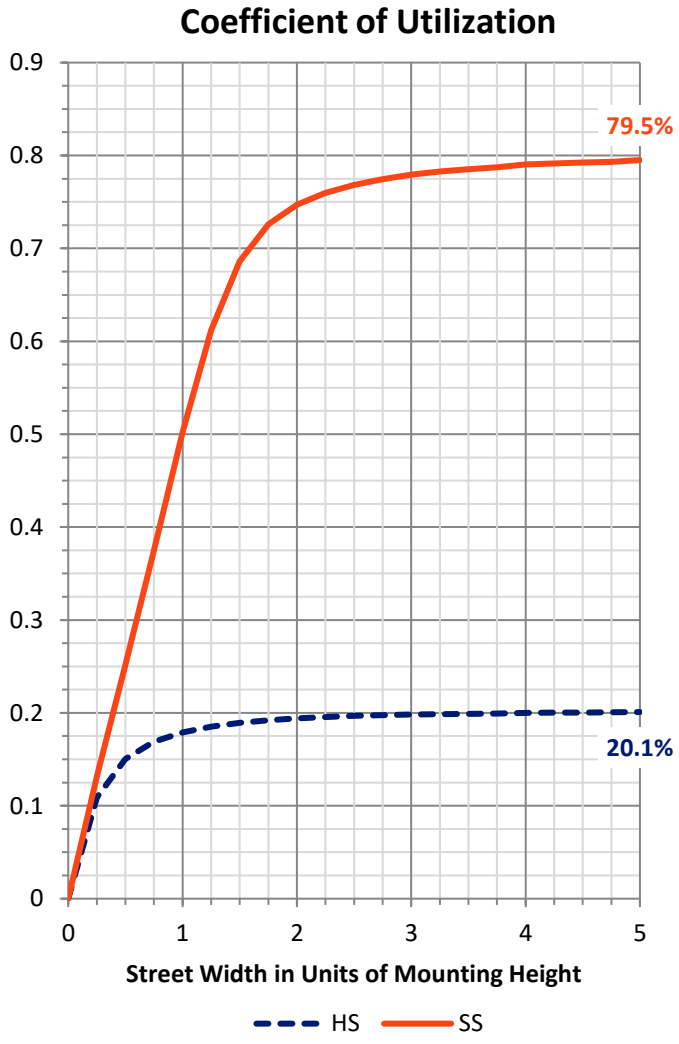
REPORT NUMBER: P632037
CATALOG NUMBER: GWS-SA2B-830-U-SL2-W

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1093.2 | 0.0 | 1093.2 |
| | % Fixture | 20.3 | 0.0 | 20.3 |
| **Street Side** | Lumens | 4294.1 | 0.0 | 4294.1 |
| | % Fixture | 79.7 | 0.0 | 79.7 |
| **Total** | Lumens | 5387.3 | 0.0 | 5387.3 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 104.5 | 1.9 |
| 10°-20° | 256.8 | 4.8 |
| 20°-30° | 352.9 | 6.6 |
| 30°-40° | 482.5 | 9.0 |
| 40°-50° | 731.1 | 13.6 |
| 50°-60° | 1136.6 | 21.1 |
| 60°-70° | 1383.7 | 25.7 |
| 70°-80° | 842.9 | 15.6 |
| 80°-90° | 96.3 | 1.8 |
| 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° | 5387.3 | 100.0 |
| 0°-180° | 5387.3 | 100.0 |



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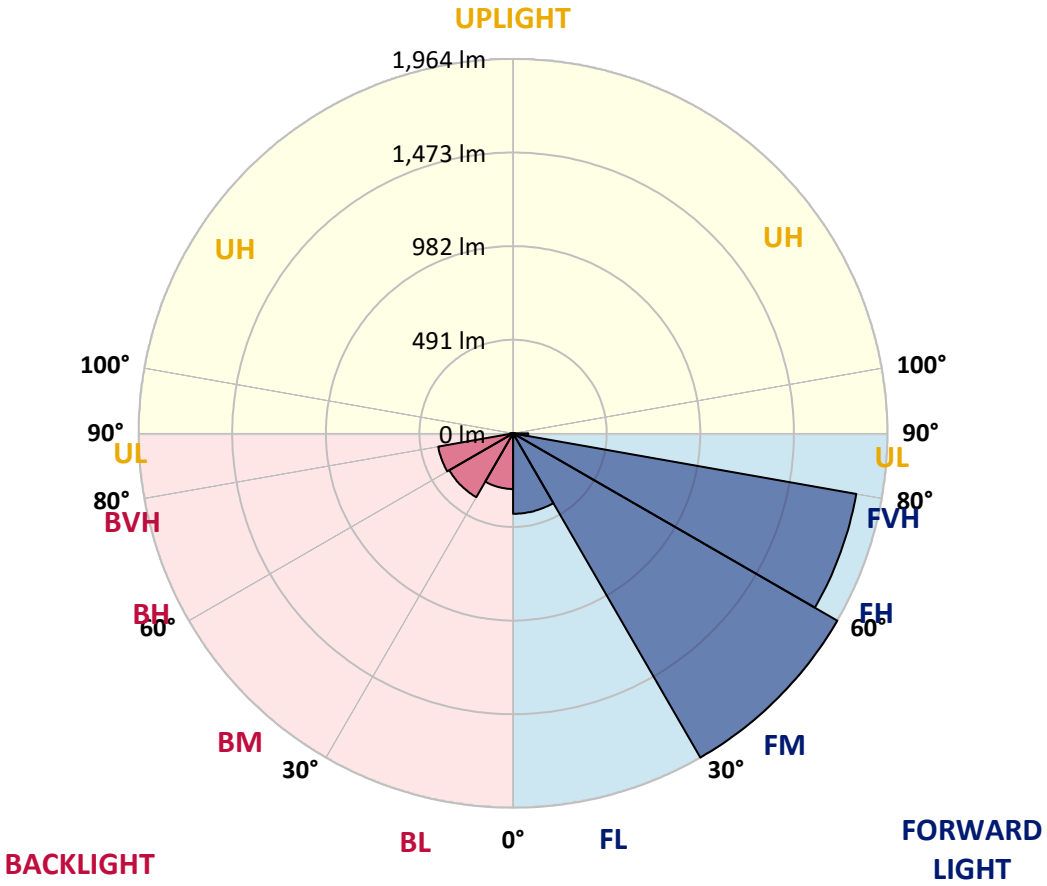
REPORT NUMBER: P632037
CATALOG NUMBER: GWS-SA2B-830-U-SL2-W

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 422.1 | 7.8 | | | |
| FM | (30°-60°) | 1963.9 | 36.5 | | | |
| FH | (60°-80°) | 1828.0 | 33.9 | | | G2/5000 |
| FVH | (80°-90°) | 80.0 | 1.5 | | | G1/100 |
| BL | (0°-30°) | 292.0 | 5.4 | B1/500 | | |
| BM | (30°-60°) | 386.3 | 7.2 | B1/1000 | | |
| BH | (60°-80°) | 398.6 | 7.4 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 16.2 | 0.3 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B1-U0-G2**
Type II Short



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Scaled Data Report

REPORT NUMBER: P632037
CATALOG NUMBER: GWS-SA2B-830-U-SL2-W

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 66° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1190.4 | 1190.4 | 1190.4 | 1190.4 | 1190.4 | 1190.4 | 1190.4 | 1190.4 | *1190.4* | 1190.4 | 1190.4 |
| 2.5° | 1115.0 | 1118.9 | 1116.6 | 1131.5 | 1132.3 | 1151.1 | 1161.8 | 1170.8 | *1171.6* | 1183.4 | 1191.2 |
| 5° | 1038.7 | 1041.1 | 1041.1 | 1055.2 | 1064.7 | 1089.8 | 1114.2 | 1140.1 | *1142.1* | 1170.4 | 1192.0 |
| 7.5° | 977.0 | 979.4 | 977.8 | 996.7 | 1008.9 | 1036.8 | 1067.8 | 1107.5 | *1111.4* | 1157.0 | 1194.8 |
| 10° | 928.7 | 927.9 | 931.8 | 949.1 | 964.9 | 998.3 | 1032.8 | 1078.0 | *1083.9* | 1141.7 | 1197.9 |
| 12.5° | 895.7 | 896.5 | 898.8 | 916.9 | 933.8 | 966.8 | 1002.6 | 1051.7 | *1058.0* | 1124.0 | 1196.3 |
| 15° | 880.0 | 878.4 | 880.4 | 896.9 | 913.0 | 942.1 | 979.0 | 1029.7 | *1036.0* | 1108.3 | 1196.7 |
| 17.5° | 876.4 | 875.2 | 874.8 | 886.6 | 898.8 | 925.9 | 961.3 | 1012.8 | *1019.5* | 1098.1 | 1199.1 |
| 20° | 887.4 | 885.9 | 881.5 | 886.6 | 891.7 | 914.5 | 948.7 | 1000.6 | *1008.1* | 1091.4 | 1203.8 |
| 22.5° | 917.7 | 914.9 | 908.3 | 902.0 | 895.3 | 909.0 | 940.9 | 991.6 | *999.0* | 1087.1 | 1208.5 |
| 25° | 963.7 | 961.3 | 954.2 | 940.1 | 915.7 | 913.4 | 939.3 | 987.6 | *995.1* | 1083.9 | 1210.5 |
| 27.5° | 1026.9 | 1023.4 | 1016.3 | 995.9 | 956.2 | 929.5 | 945.2 | 987.3 | *994.3* | 1080.4 | 1208.5 |
| 30° | 1102.0 | 1099.7 | 1095.7 | 1071.0 | 1017.9 | 963.7 | 958.6 | 990.4 | *995.9* | 1078.4 | 1204.6 |
| 32.5° | 1178.3 | 1175.9 | 1179.0 | 1167.3 | 1102.0 | 1020.3 | 987.6 | 999.0 | *1003.0* | 1078.0 | 1201.1 |
| 35° | 1245.5 | 1248.2 | 1271.0 | 1273.0 | 1208.9 | 1096.9 | 1033.6 | 1019.1 | *1019.9* | 1085.9 | 1202.6 |
| 37.5° | 1315.8 | 1326.4 | 1356.3 | 1381.8 | 1328.4 | 1198.3 | 1102.0 | 1056.8 | *1056.0* | 1105.9 | 1212.4 |
| 40° | 1409.0 | 1413.7 | 1451.8 | 1499.7 | 1466.3 | 1337.4 | 1199.1 | 1118.5 | *1113.0* | 1146.8 | 1238.8 |
| 42.5° | 1499.7 | 1511.1 | 1572.1 | 1627.1 | 1616.1 | 1494.2 | 1321.3 | 1210.9 | *1201.1* | 1219.1 | 1293.0 |
| 45° | 1615.3 | 1626.3 | 1694.7 | 1765.4 | 1785.5 | 1671.5 | 1477.7 | 1342.1 | *1332.3* | 1328.0 | 1392.4 |
| 47.5° | 1730.8 | 1742.2 | 1803.5 | 1905.7 | 1976.1 | 1893.1 | 1681.3 | 1515.5 | *1499.3* | 1482.4 | 1542.6 |
| 50° | 1808.7 | 1822.0 | 1880.6 | 2003.2 | 2168.3 | 2169.8 | 1922.6 | 1742.6 | *1722.2* | 1695.5 | 1754.0 |
| 52.5° | 1805.9 | 1814.5 | 1870.4 | 2011.8 | 2306.6 | 2487.8 | 2245.7 | 2031.9 | *2015.4* | 1957.2 | 2008.3 |
| 55° | 1664.0 | 1677.0 | 1733.2 | 1910.0 | 2321.5 | 2789.2 | 2720.4 | 2373.0 | *2343.5* | 2239.4 | 2295.6 |
| 57.5° | 1379.1 | 1390.1 | 1446.7 | 1664.8 | 2189.1 | 2943.7 | 3323.3 | 2807.7 | *2767.2* | 2546.7 | 2611.6 |
| 60° | 1041.1 | 1027.7 | 1054.5 | 1245.5 | 1872.3 | 2947.6 | 3855.5 | 3397.2 | *3329.6* | 2875.3 | 2929.5 |
| 62.5° | 781.3 | 767.9 | 773.8 | 827.7 | 1269.4 | 2709.4 | 4158.9 | 4203.7 | *4092.1* | 3246.3 | 3235.7 |
| 65° | 617.4 | 610.0 | 626.9 | 663.8 | 740.0 | 2063.3 | 4161.2 | 5075.8 | *5005.4* | 3676.3 | 3549.7 |
| 67.5° | *503.1* | *498.3* | *515.6* | *584.0* | *600.1* | *1108.7* | *3731.3* | *5482.9* | *5510.5* | *4147.1* | *3840.9* |
| 70° | 405.2 | 398.1 | 425.2 | 515.2 | 558.1 | 670.9 | 2672.9 | 5275.4 | *5319.8* | 4427.7 | 3758.8 |
| 72.5° | 279.8 | 280.2 | 294.0 | 417.4 | 538.8 | 579.3 | 1511.9 | 4392.7 | *4489.0* | 4173.4 | 3304.5 |
| 75° | 188.6 | 190.2 | 194.1 | 275.5 | 496.4 | 562.0 | 805.7 | 3325.7 | *3393.7* | 3449.5 | 2731.4 |
| 77.5° | 114.0 | 114.8 | 123.8 | 166.6 | 342.3 | 524.7 | 545.9 | 2410.7 | *2464.2* | 2274.0 | 1693.1 |
| 80° | 66.0 | 68.8 | 77.0 | 111.6 | 231.1 | 394.2 | 422.5 | 1478.1 | *1538.7* | 1010.8 | 538.0 |
| 82.5° | 29.1 | 31.0 | 42.1 | 64.8 | 134.8 | 335.2 | 329.7 | 584.0 | *575.4* | 281.8 | 186.7 |
| 85° | 5.1 | 6.3 | 9.0 | 20.4 | 49.5 | 176.9 | 255.9 | 257.8 | *242.5* | 106.9 | 77.4 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 38.5 | 69.2 | *68.8* | 30.3 | 26.7 |
| 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: P632037
CATALOG NUMBER: GWS-SA2B-830-U-SL2-W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1190.4 | 1190.4 | 1190.4 | 1190.4 | 1190.4 | 1190.4 | 1190.4 | 1190.4 | 1190.4 | 1190.4 | 1190.4 |
| 2.5° | 1196.3 | 1185.7 | 1195.2 | 1196.3 | 1194.4 | 1192.8 | 1181.0 | 1170.8 | 1169.6 | 1158.6 | 1158.6 |
| 5° | 1200.7 | 1190.8 | 1195.5 | 1186.5 | 1172.4 | 1157.8 | 1132.7 | 1115.4 | 1107.5 | 1093.4 | 1093.4 |
| 7.5° | 1206.6 | 1196.3 | 1190.8 | 1168.4 | 1135.4 | 1103.6 | 1063.1 | 1029.3 | 1015.5 | 995.5 | 994.7 |
| 10° | 1212.1 | 1199.1 | 1180.2 | 1136.6 | 1083.9 | 1033.2 | 974.3 | 926.3 | 893.7 | 869.7 | 869.7 |
| 12.5° | 1211.7 | 1194.8 | 1157.4 | 1093.0 | 1020.3 | 946.8 | 868.2 | 795.9 | 752.6 | 715.3 | 712.9 |
| 15° | 1210.9 | 1187.7 | 1128.3 | 1042.3 | 946.0 | 844.2 | 737.3 | 643.0 | 578.9 | 542.4 | 539.2 |
| 17.5° | 1210.1 | 1178.6 | 1095.7 | 984.5 | 855.6 | 716.9 | 575.8 | 473.6 | 420.1 | 397.7 | 398.5 |
| 20° | 1210.1 | 1168.4 | 1060.7 | 918.1 | 751.4 | 564.4 | 422.5 | 348.2 | 334.8 | 336.0 | 337.2 |
| 22.5° | 1206.6 | 1155.9 | 1021.8 | 845.8 | 635.5 | 415.0 | 311.7 | 286.5 | 293.6 | 304.6 | 306.2 |
| 25° | 1198.3 | 1135.0 | 976.6 | 765.6 | 497.6 | 302.2 | 254.3 | 249.6 | 262.5 | 276.3 | 280.2 |
| 27.5° | 1185.3 | 1111.1 | 925.9 | 671.7 | 366.3 | 242.9 | 223.6 | 223.2 | 233.5 | 243.7 | 247.2 |
| 30° | 1171.6 | 1084.3 | 872.5 | 567.1 | 265.3 | 211.4 | 204.0 | 204.0 | 209.1 | 215.4 | 214.6 |
| 32.5° | 1155.5 | 1057.2 | 815.1 | 458.3 | 216.2 | 193.8 | 191.4 | 190.2 | 191.0 | 193.4 | 193.4 |
| 35° | 1141.7 | 1033.2 | 756.2 | 343.1 | 193.8 | 183.9 | 181.6 | 178.8 | 177.6 | 176.1 | 176.9 |
| 37.5° | 1136.6 | 1014.4 | 695.2 | 258.6 | 182.8 | 176.9 | 172.9 | 169.0 | 166.2 | 165.5 | 165.1 |
| 40° | 1144.9 | 1006.5 | 634.3 | 213.0 | 174.9 | 169.4 | 165.1 | 160.0 | 157.6 | 157.6 | 157.6 |
| 42.5° | 1177.1 | 1012.4 | 572.2 | 192.6 | 169.4 | 163.1 | 156.8 | 152.1 | 151.3 | 152.1 | 152.5 |
| 45° | 1236.0 | 1035.2 | 507.8 | 182.4 | 164.7 | 156.8 | 149.3 | 145.8 | 145.8 | 146.6 | 146.6 |
| 47.5° | 1341.4 | 1094.9 | 444.1 | 176.1 | 160.0 | 151.7 | 143.8 | 140.3 | 139.9 | 140.7 | 140.7 |
| 50° | 1523.7 | 1202.6 | 386.7 | 171.7 | 156.4 | 147.8 | 139.9 | 135.2 | 134.0 | 133.6 | 133.6 |
| 52.5° | 1753.6 | 1389.3 | 350.2 | 168.6 | 152.1 | 143.5 | 135.6 | 129.3 | 126.9 | 125.8 | 125.8 |
| 55° | 2031.5 | 1638.1 | 350.2 | 166.2 | 146.6 | 138.3 | 129.3 | 123.0 | 119.5 | 117.9 | 117.9 |
| 57.5° | 2346.3 | 1927.7 | 410.7 | 164.3 | 142.3 | 132.4 | 122.6 | 116.3 | 112.4 | 110.0 | 110.0 |
| 60° | 2666.6 | 2233.9 | 560.4 | 161.5 | 138.3 | 125.0 | 115.2 | 109.3 | 104.1 | 101.4 | 101.0 |
| 62.5° | 2998.7 | 2571.1 | 757.7 | 163.1 | 135.6 | 117.9 | 107.3 | 100.6 | 96.3 | 93.5 | 93.1 |
| 65° | 3302.9 | 2892.2 | 930.3 | 175.3 | 136.0 | 111.6 | 98.3 | 92.4 | 88.8 | 85.3 | 84.9 |
| 67.5° | *3561.1* | *3069.4* | *809.2* | *200.0* | *144.2* | *104.1* | *89.2* | *83.3* | *80.2* | *77.8* | *77.4* |
| 70° | 3380.3 | 2799.0 | 459.0 | 215.4 | 155.6 | 96.3 | 79.0 | 75.1 | 71.9 | 70.3 | 70.0 |
| 72.5° | 2890.6 | 2369.9 | 306.9 | 190.2 | 141.9 | 86.1 | 69.6 | 66.4 | 64.1 | 62.1 | 61.7 |
| 75° | 2341.6 | 1879.4 | 234.6 | 156.0 | 110.4 | 70.0 | 59.7 | 57.4 | 55.0 | 53.1 | 52.7 |
| 77.5° | 1385.4 | 1085.9 | 172.9 | 123.4 | 77.8 | 54.6 | 49.5 | 47.6 | 45.2 | 43.6 | 43.2 |
| 80° | 442.1 | 377.3 | 109.7 | 84.9 | 51.5 | 42.1 | 38.1 | 36.6 | 34.2 | 32.2 | 31.8 |
| 82.5° | 168.6 | 145.8 | 58.2 | 43.2 | 34.2 | 28.7 | 25.5 | 24.0 | 22.4 | 20.4 | 20.0 |
| 85° | 74.7 | 70.0 | 32.2 | 23.2 | 18.5 | 14.1 | 12.6 | 11.8 | 9.8 | 8.3 | 7.9 |
| 87.5° | 26.3 | 26.3 | 13.8 | 6.7 | 3.9 | 2.0 | 1.2 | 0.4 | 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 |

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# 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

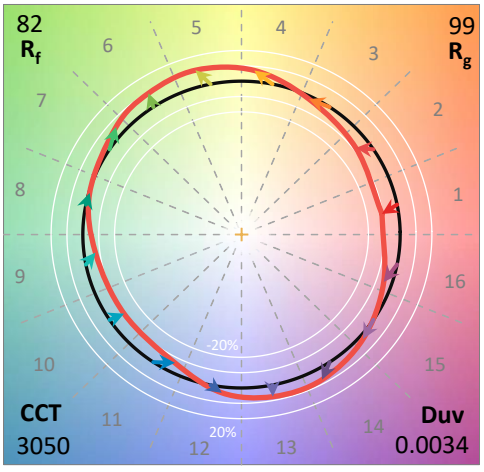
## Test Information

| | |
|---|---|
| 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

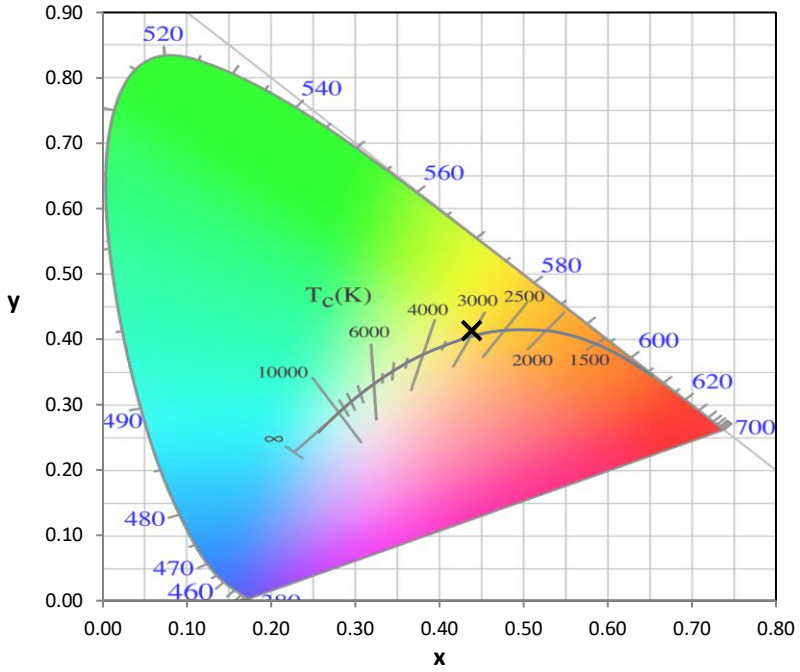
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

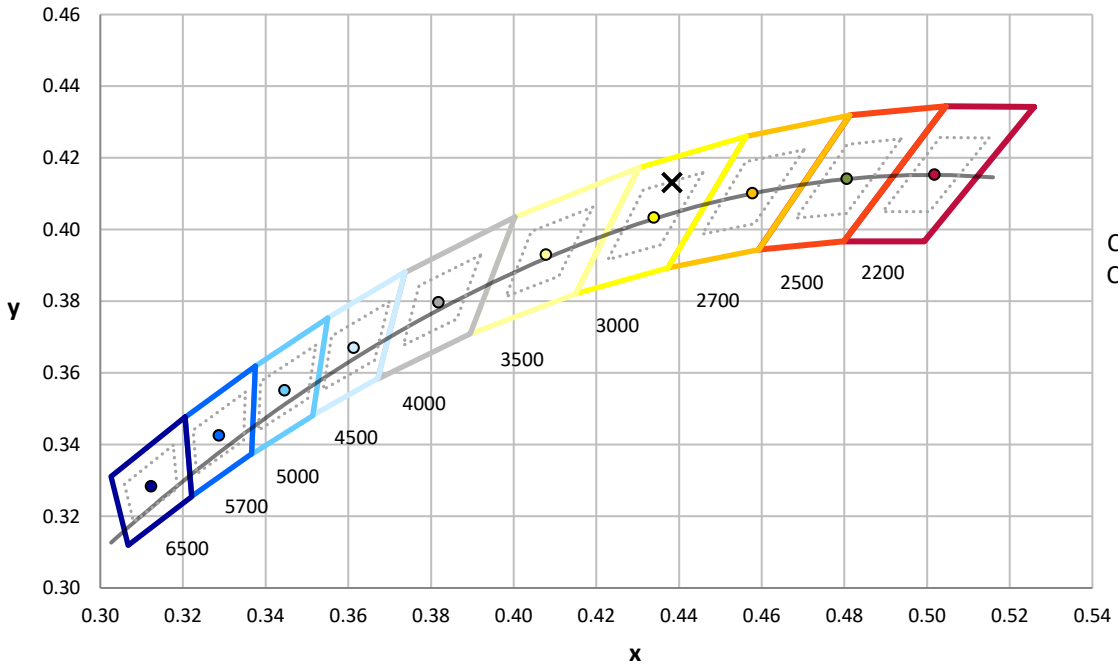
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

REPORT NUMBER: SP1-2408-195-9

## 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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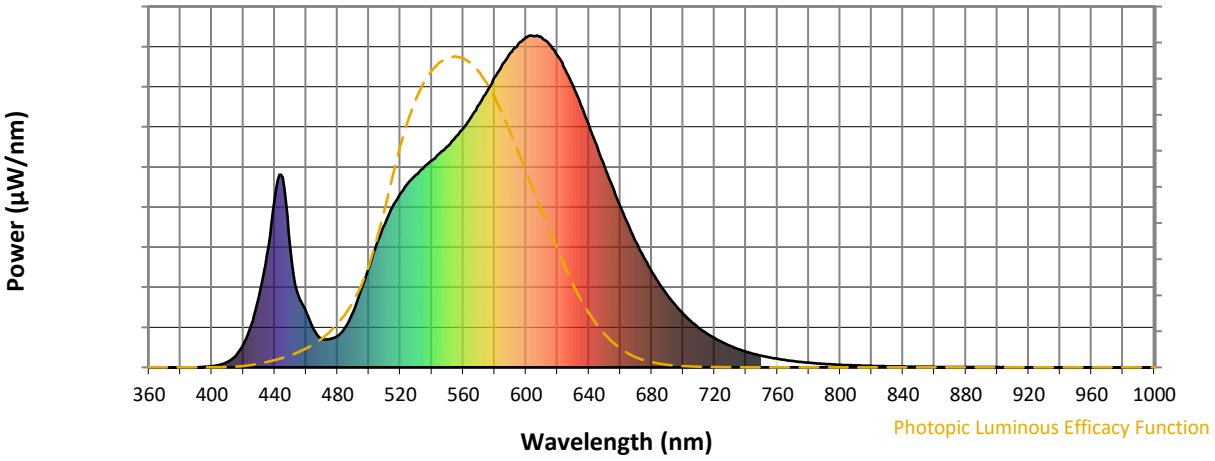
## Photopic Flux vs. Wavelength




## 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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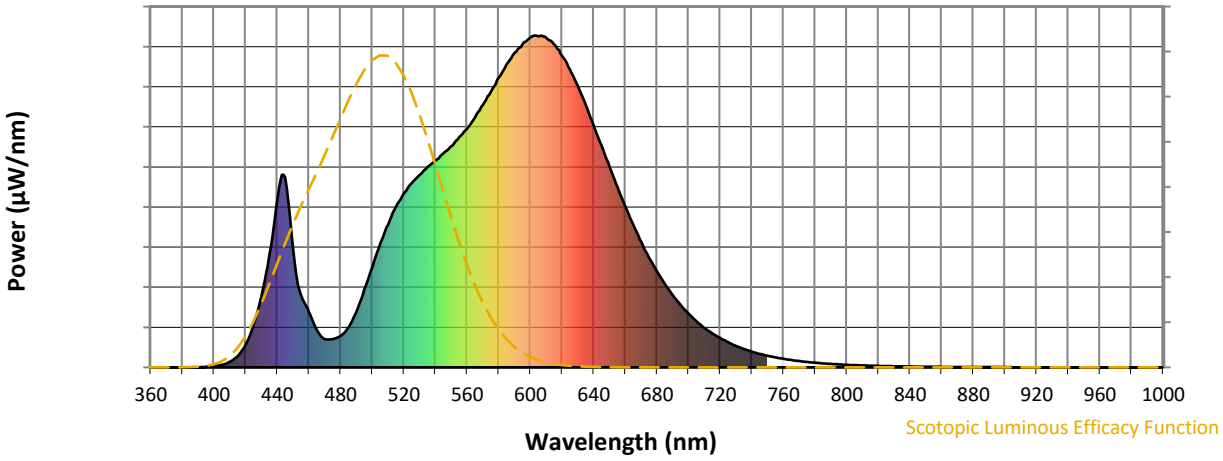
## Scotopic Flux vs. Wavelength




**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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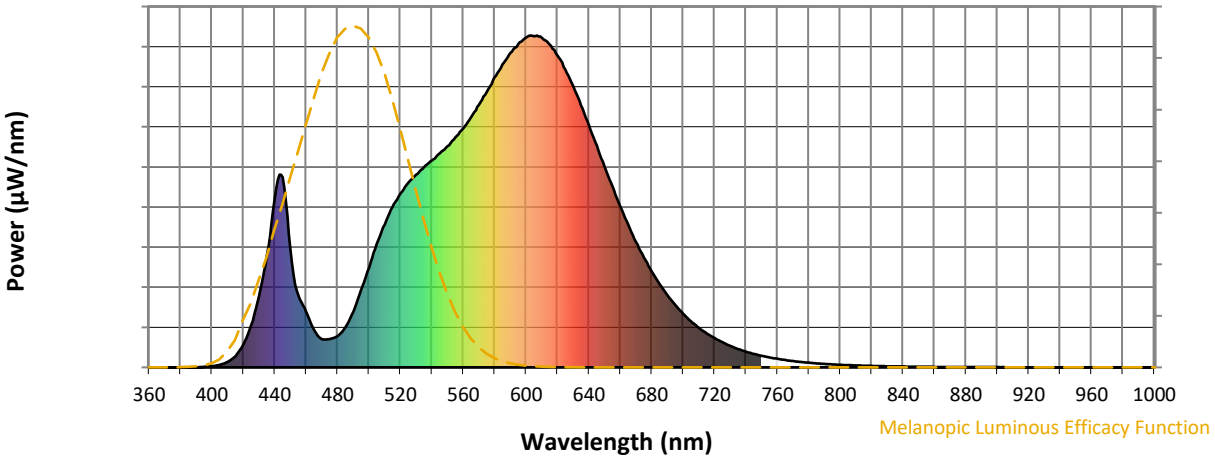
## Melanopic Flux vs. Wavelength




**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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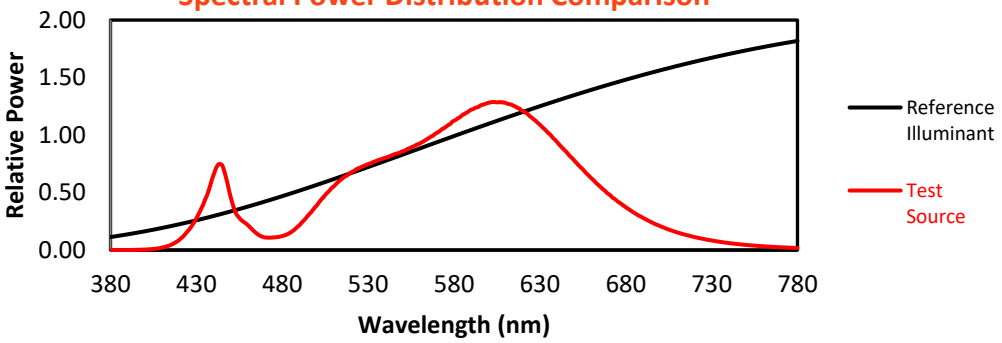
# TM-30-18

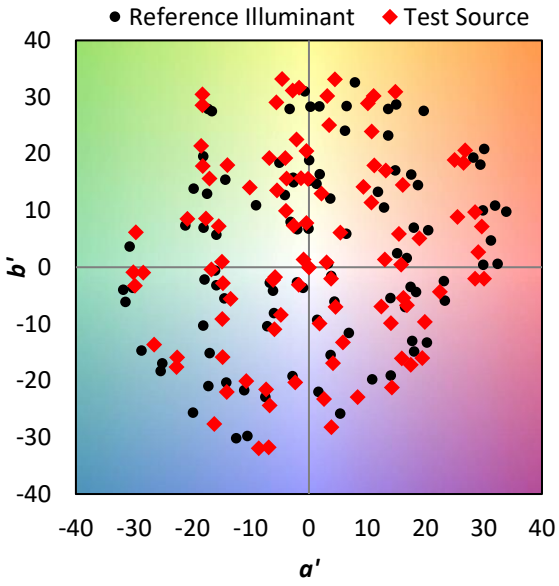
## Summary

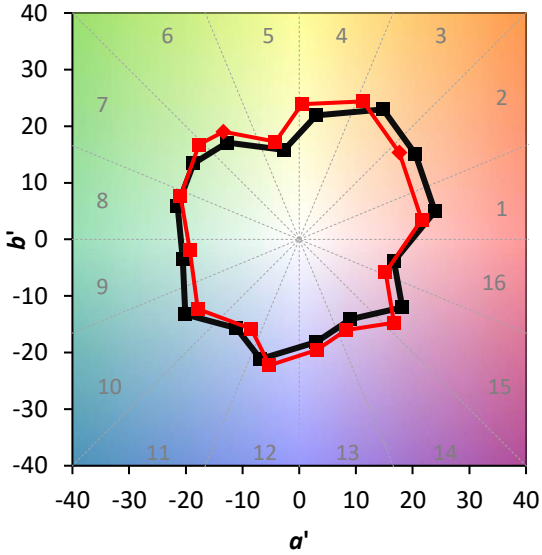
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

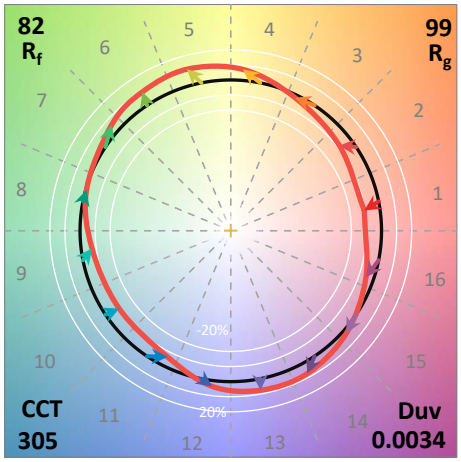
## Spectral Power Distribution Comparison

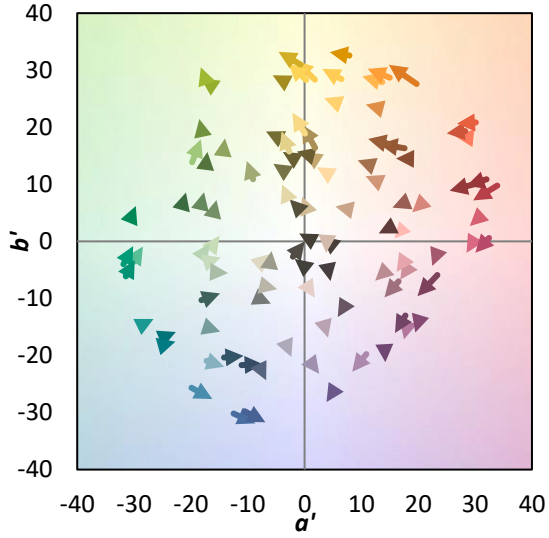



## Color Vector Graphics



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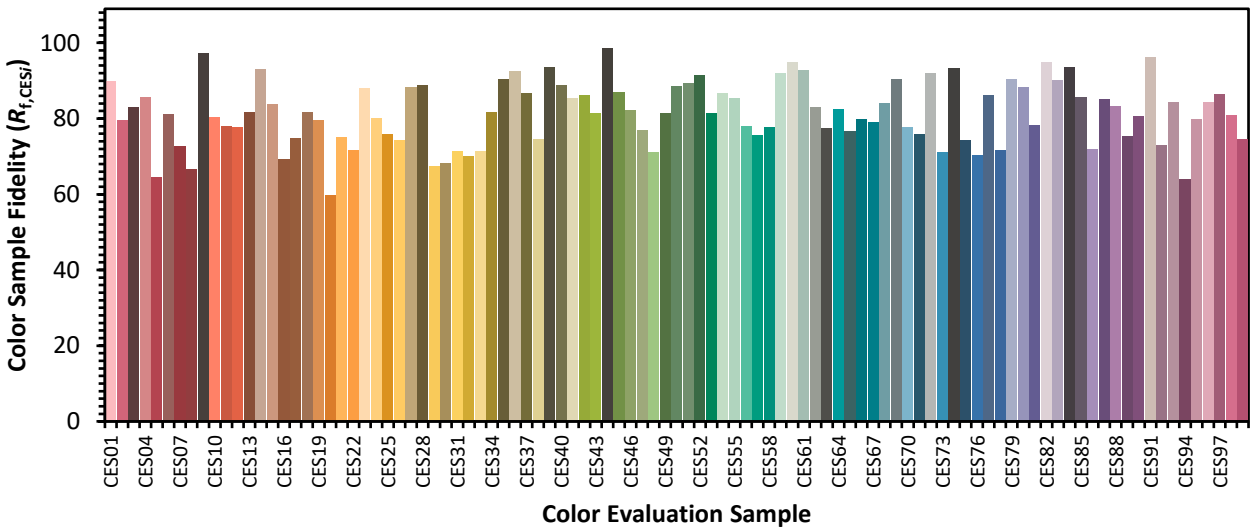
# TM-30-18

**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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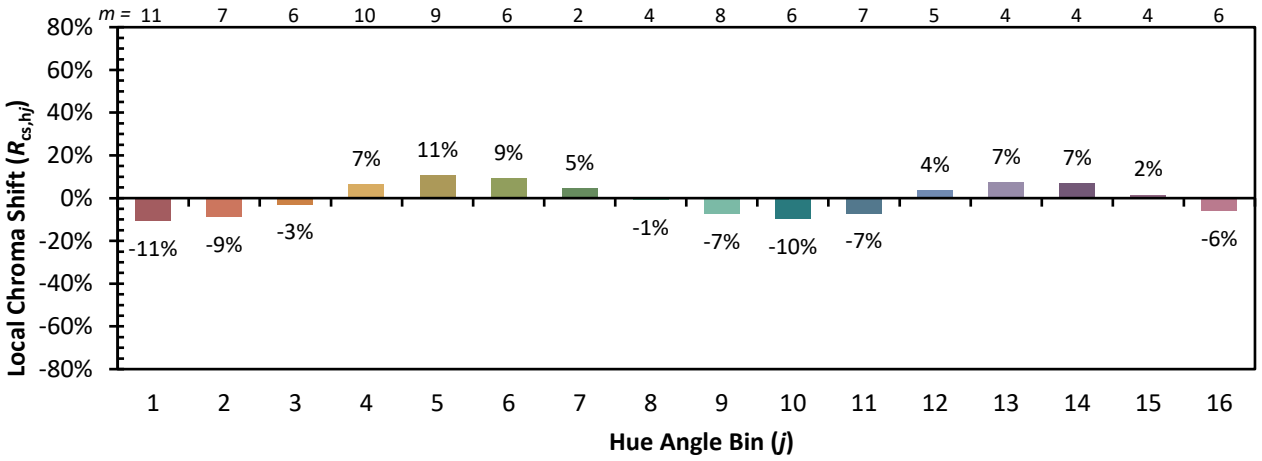
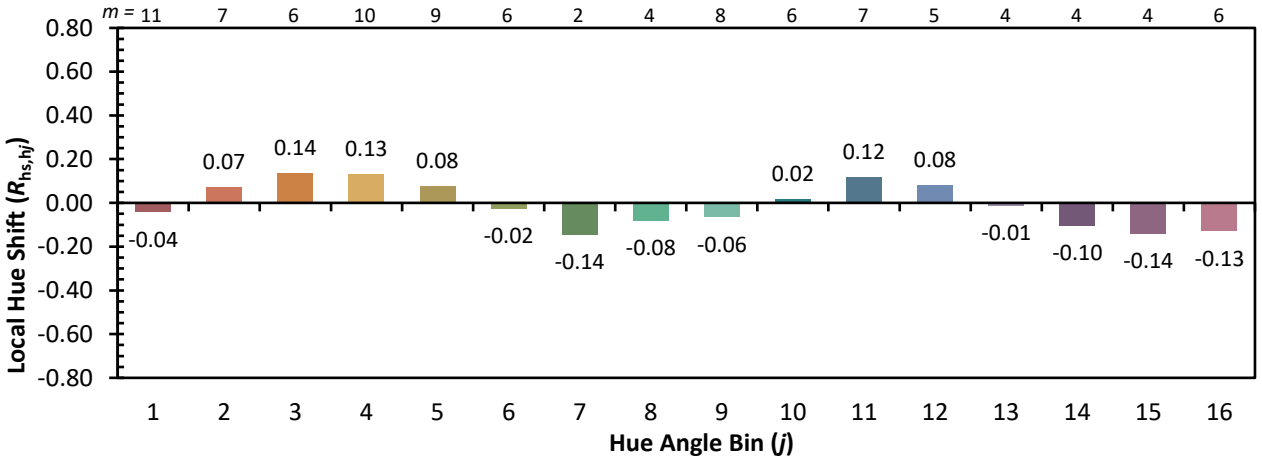
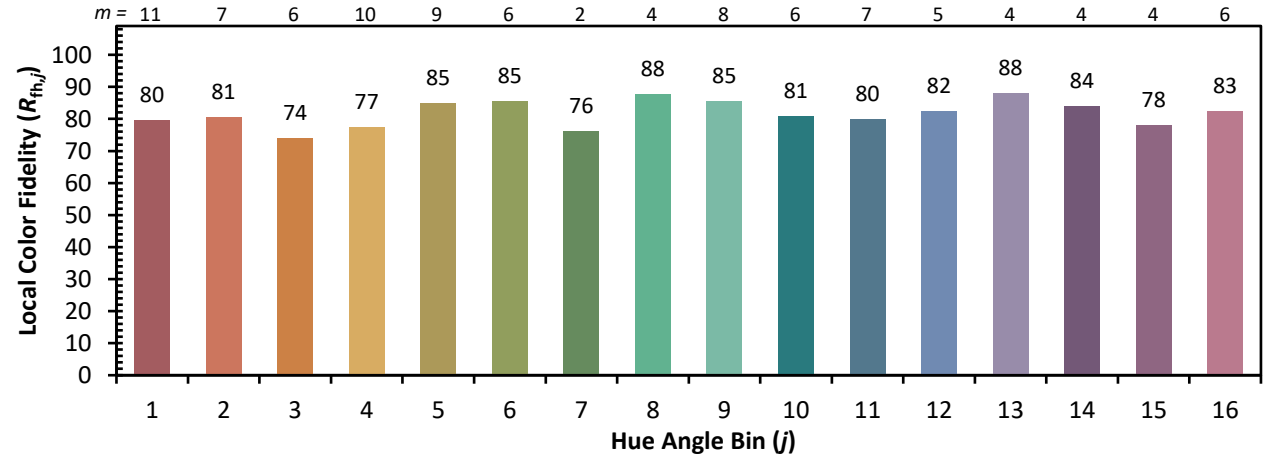
## Color Rendition by Hue-Angle Bin



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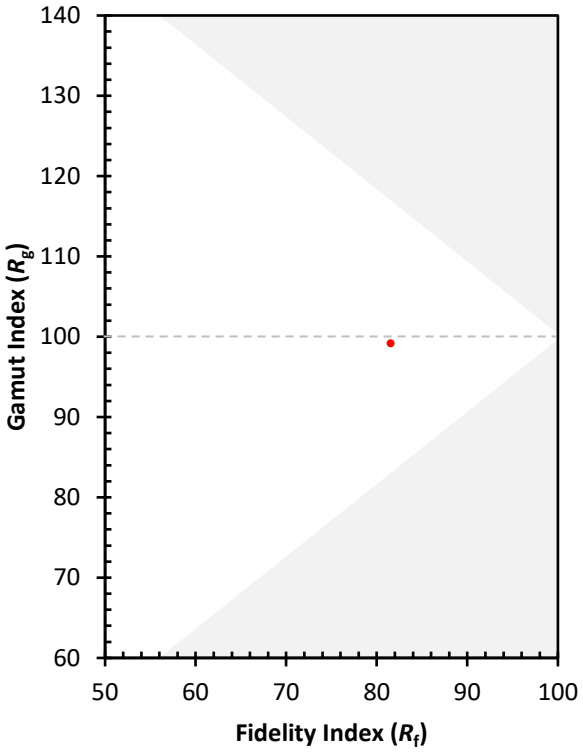
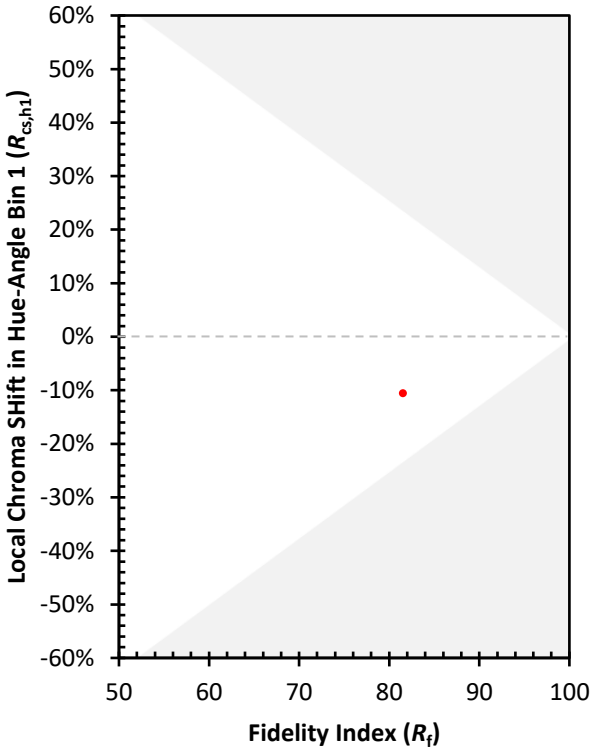
## TM-30-18

### Measure Comparisons

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