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: P640483

Luminaire Tested: GWS-SA5D-830-U-T3R-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: | P640483 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-15) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA5D-830-U-T3R-W |
| Description: | GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III ROADWAY OPTICS |
| Light Source: | (80) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 24260.2 lumens |
| Efficiency: | N/A |
| Efficacy: | 118.6 lumens/watt |
| Luminous Opening: | Rectangular (W 1.5' x L: 1' x H: 0') |
| IES Classification: | Type III - Medium |
| BUG Rating: | B3 - U0 - G4 |

| | |
|---|---|
| Input Watts (W): | 204.6 |
| 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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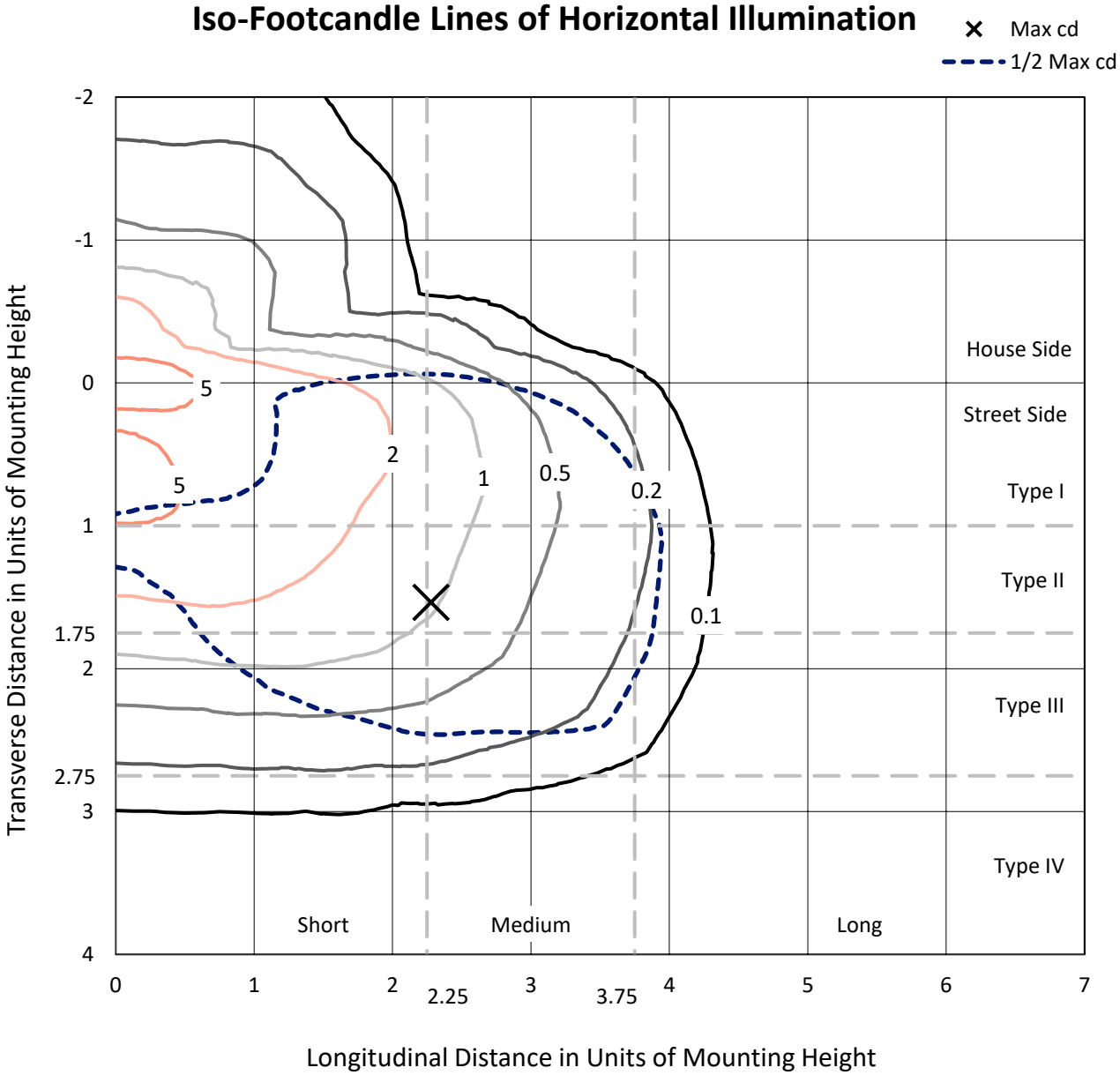
Scaled Data Report

REPORT NUMBER: P640483
CATALOG NUMBER: GWS-SA5D-830-U-T3R-W

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 6.5 fc
Type III - Medium - N/A

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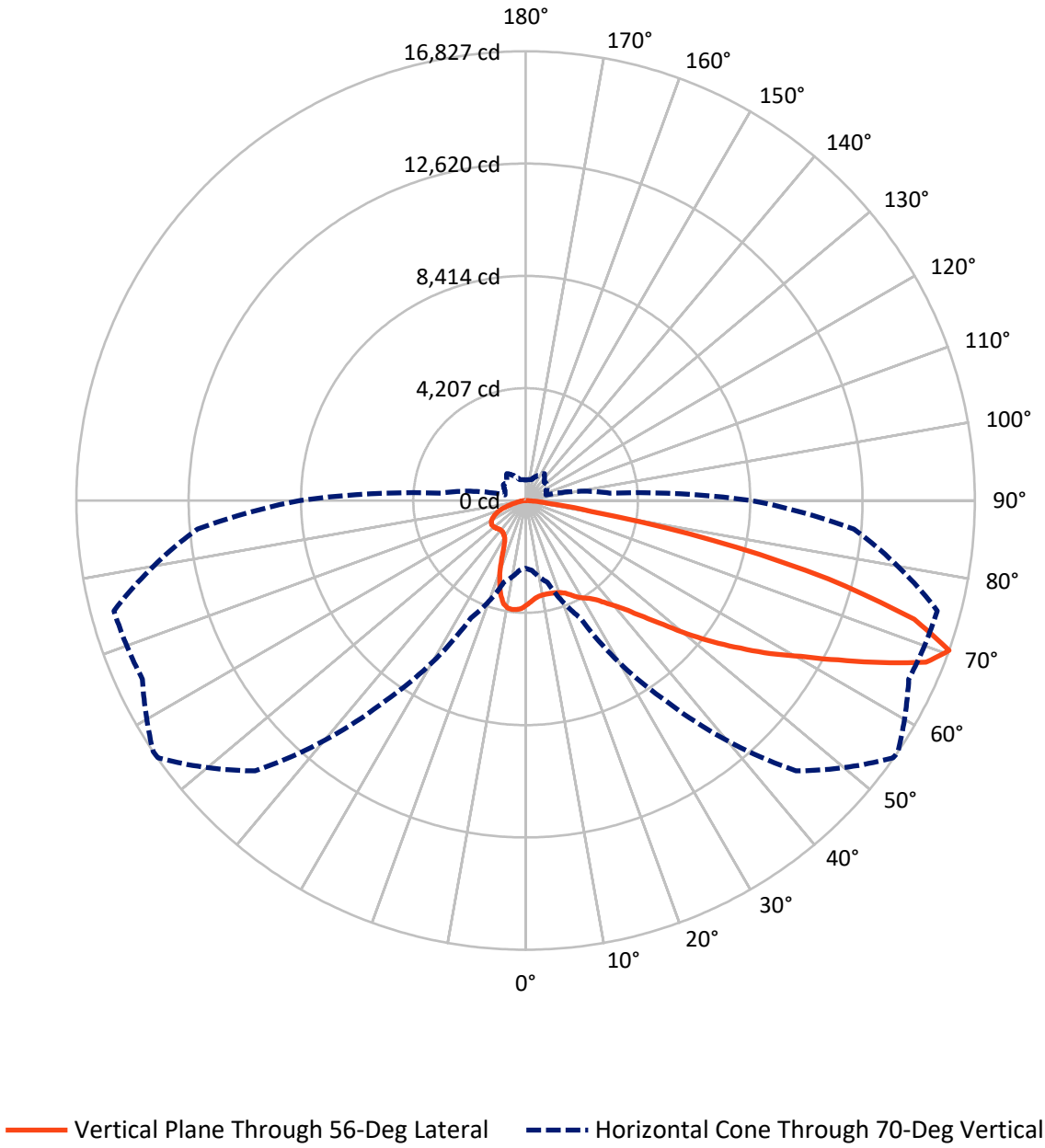
## Luminous Intensity Polar Plot



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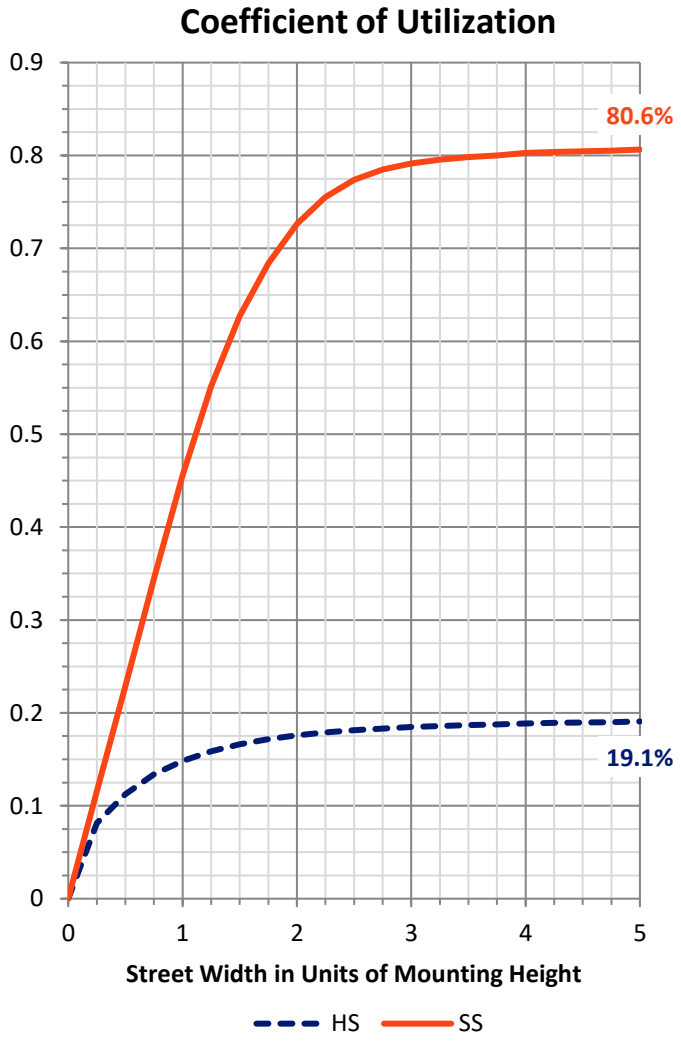
REPORT NUMBER: P640483
CATALOG NUMBER: GWS-SA5D-830-U-T3R-W

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 4664.1 | 0.0 | 4664.1 |
| | % Fixture | 19.2 | 0.0 | 19.2 |
| **Street Side** | Lumens | 19596.1 | 0.0 | 19596.1 |
| | % Fixture | 80.8 | 0.0 | 80.8 |
| **Total** | Lumens | 24260.2 | 0.0 | 24260.2 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 362.4 | 1.5 |
| 10°-20° | 981.9 | 4.0 |
| 20°-30° | 1623.3 | 6.7 |
| 30°-40° | 2427.1 | 10.0 |
| 40°-50° | 3611.8 | 14.9 |
| 50°-60° | 5134.9 | 21.2 |
| 60°-70° | 6359.8 | 26.2 |
| 70°-80° | 3511.7 | 14.5 |
| 80°-90° | 247.3 | 1.0 |
| 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° | 24260.2 | 100.0 |
| 0°-180° | 24260.2 | 100.0 |



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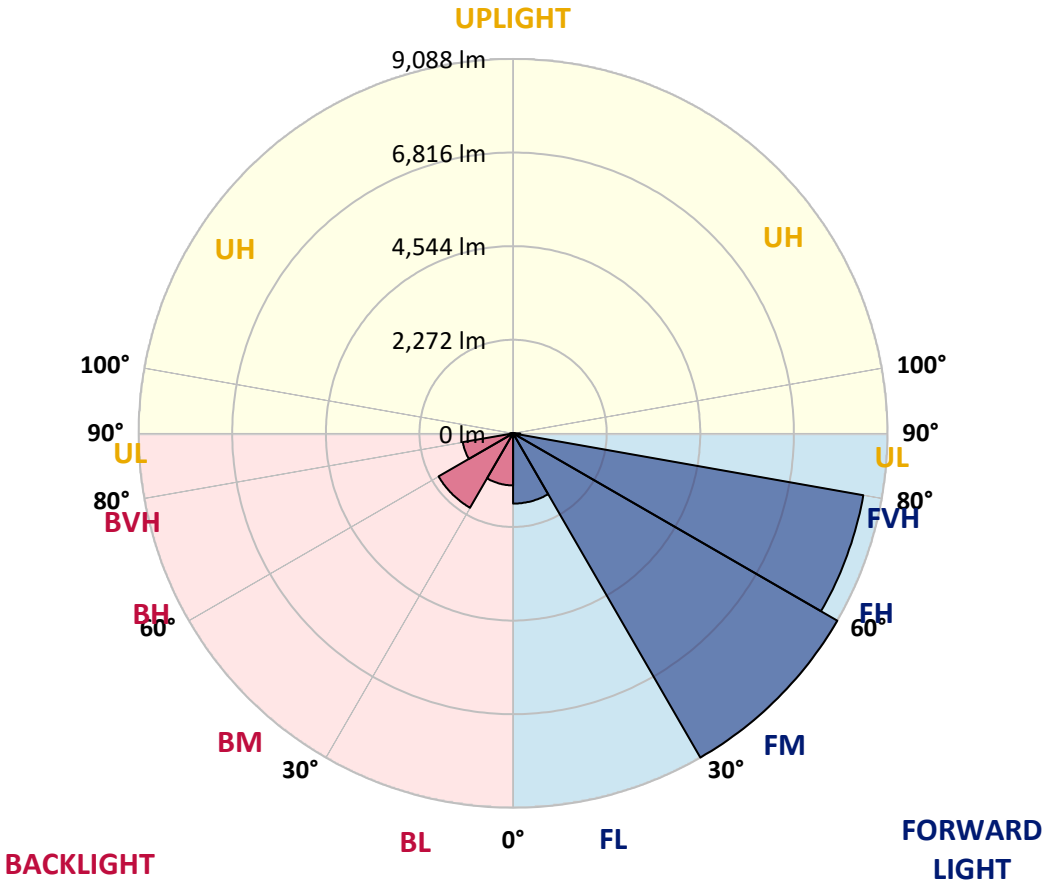
REPORT NUMBER: P640483
CATALOG NUMBER: GWS-SA5D-830-U-T3R-W

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1705.0 | 7.0 | | | |
| FM | (30°-60°) | 9087.5 | 37.5 | | | |
| FH | (60°-80°) | 8631.8 | 35.6 | | | G4/12000 |
| FVH | (80°-90°) | 171.9 | 0.7 | | | G2/225 |
| BL | (0°-30°) | 1262.6 | 5.2 | B3/2500 | | |
| BM | (30°-60°) | 2086.3 | 8.6 | B2/2500 | | |
| BH | (60°-80°) | 1239.7 | 5.1 | B3/2500 | | G3/2500 |
| BVH | (80°-90°) | 75.5 | 0.3 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B3-U0-G4**
Type III Medium



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REPORT NUMBER: P640483
CATALOG NUMBER: GWS-SA5D-830-U-T3R-W

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 56° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 |
| 2.5° | 3664.5 | 3644.0 | 3667.9 | 3679.9 | 3710.7 | 3755.2 | 3794.5 | 3796.2 | 3816.7 | 3866.4 | 3914.3 |
| 5° | 3498.5 | 3488.3 | 3495.1 | 3531.0 | 3563.5 | 3620.0 | 3679.9 | 3685.0 | 3743.2 | 3840.7 | 3936.5 |
| 7.5° | 3370.2 | 3356.5 | 3382.2 | 3428.4 | 3469.5 | 3532.8 | 3611.5 | 3618.3 | 3700.4 | 3847.5 | 3994.7 |
| 10° | 3185.5 | 3175.2 | 3223.1 | 3284.7 | 3373.7 | 3478.0 | 3582.4 | 3590.9 | 3698.7 | 3892.0 | 4097.3 |
| 12.5° | 3105.1 | 3105.1 | 3125.6 | 3183.8 | 3281.3 | 3419.8 | 3577.2 | 3590.9 | 3726.1 | 3960.4 | 4229.0 |
| 15° | 3229.9 | 3238.5 | 3221.4 | 3218.0 | 3257.3 | 3389.0 | 3584.1 | 3604.6 | 3777.4 | 4030.6 | 4359.1 |
| 17.5° | 3481.4 | 3490.0 | 3445.5 | 3375.4 | 3336.0 | 3418.1 | 3609.7 | 3632.0 | 3832.1 | 4107.6 | 4499.3 |
| 20° | 3833.9 | 3844.1 | 3746.6 | 3638.8 | 3503.7 | 3502.0 | 3659.4 | 3679.9 | 3902.3 | 4191.4 | 4648.2 |
| 22.5° | 4246.1 | 4253.0 | 4129.8 | 3958.7 | 3751.7 | 3657.6 | 3744.9 | 3765.4 | 3993.0 | 4307.7 | 4809.0 |
| 25° | 4723.5 | 4744.0 | 4595.1 | 4347.1 | 4066.5 | 3871.5 | 3886.9 | 3910.8 | 4155.5 | 4463.4 | 4998.9 |
| 27.5° | 5233.3 | 5258.9 | 5087.9 | 4814.1 | 4427.5 | 4107.6 | 4069.9 | 4090.5 | 4328.3 | 4559.2 | 5099.8 |
| 30° | 5755.1 | 5773.9 | 5602.8 | 5289.7 | 4815.8 | 4374.5 | 4223.9 | 4235.9 | 4403.5 | 4605.4 | 5202.5 |
| 32.5° | 6335.0 | 6319.6 | 6155.4 | 5794.4 | 5264.1 | 4694.4 | 4367.6 | 4364.2 | 4487.4 | 4697.8 | 5349.6 |
| 35° | 6879.0 | 6901.3 | 6726.8 | 6328.2 | 5756.8 | 5089.6 | 4583.2 | 4569.5 | 4665.3 | 4848.3 | 5556.6 |
| 37.5° | 7537.7 | 7530.8 | 7322.1 | 6891.0 | 6251.2 | 5467.6 | 4886.0 | 4862.0 | 4896.2 | 5082.7 | 5845.7 |
| 40° | 8008.1 | 8056.1 | 7920.9 | 7518.9 | 6829.4 | 5933.0 | 5240.1 | 5187.1 | 5195.6 | 5371.8 | 6232.4 |
| 42.5° | 8393.1 | 8437.6 | 8451.2 | 8194.6 | 7491.5 | 6507.8 | 5681.5 | 5628.5 | 5633.6 | 5883.4 | 6708.0 |
| 45° | 8689.0 | 8748.9 | 8942.2 | 8867.0 | 8237.4 | 7171.6 | 6278.6 | 6223.8 | 6227.2 | 6504.4 | 7282.8 |
| 47.5° | 8810.5 | 8875.5 | 9267.3 | 9446.9 | 9029.5 | 7965.4 | 7021.0 | 6940.6 | 6952.6 | 7258.8 | 7939.7 |
| 50° | 8771.2 | 8858.4 | 9388.7 | 9893.4 | 9693.3 | 8772.9 | 7908.9 | 7852.5 | 7806.3 | 8251.1 | 8653.1 |
| 52.5° | 8432.4 | 8528.2 | 9376.8 | 10177.4 | 10235.6 | 9535.9 | 8825.9 | 8793.4 | 8783.1 | 9304.9 | 9450.3 |
| 55° | 7435.0 | 7595.9 | 8964.5 | 10252.7 | 10659.9 | 10254.4 | 9819.9 | 9765.1 | 9818.2 | 10434.0 | 10256.1 |
| 57.5° | 6882.5 | 7002.2 | 8157.0 | 10168.9 | 11007.1 | 10938.7 | 10812.1 | 10817.2 | 10877.1 | 11660.7 | 11233.0 |
| 60° | 6567.7 | 6708.0 | 7708.8 | 9939.6 | 11340.7 | 11770.1 | 11850.6 | 11850.6 | 11958.3 | 12983.1 | 12225.2 |
| 62.5° | 6150.2 | 6292.2 | 7289.6 | 9498.2 | 11648.7 | 12748.7 | 13155.9 | 13150.7 | 13193.5 | 14401.3 | 13195.2 |
| 65° | 5303.4 | 5435.1 | 6447.9 | 8801.9 | 11799.2 | 13826.5 | 14639.1 | 14623.7 | 14538.2 | 15663.9 | 13836.8 |
| 67.5° | 3851.0 | 3975.8 | 4939.0 | 7477.8 | 11256.9 | 14695.6 | 16166.8 | 16173.7 | 15662.2 | 16459.4 | 13871.0 |
| 70° | 2538.8 | 2624.3 | 3175.2 | 4856.9 | 9154.4 | 14320.9 | 16806.7 | 16827.2 | 15835.0 | 15963.3 | 12345.0 |
| 72.5° | 1584.2 | 1644.1 | 1982.8 | 2896.3 | 5409.5 | 11335.6 | 15164.3 | 15220.8 | 14245.6 | 14028.4 | 10143.2 |
| 75° | 1052.1 | 1093.2 | 1319.0 | 1688.5 | 2502.9 | 6134.8 | 11527.2 | 11708.6 | 11417.7 | 10996.9 | 7067.2 |
| 77.5° | 633.0 | 667.2 | 840.0 | 1072.7 | 1108.6 | 2396.8 | 6728.5 | 7197.2 | 7238.3 | 5741.4 | 2959.6 |
| 80° | 289.1 | 328.5 | 463.6 | 612.5 | 590.2 | 834.9 | 2372.8 | 2482.3 | 2928.9 | 1823.7 | 934.1 |
| 82.5° | 171.1 | 188.2 | 307.9 | 304.5 | 251.5 | 405.5 | 853.7 | 875.9 | 744.2 | 667.2 | 398.6 |
| 85° | 68.4 | 80.4 | 130.0 | 114.6 | 92.4 | 131.7 | 321.6 | 337.0 | 323.3 | 290.8 | 147.1 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 1.7 | 3.4 | 29.1 | 30.8 | 44.5 | 80.4 | 44.5 |
| 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: P640483
CATALOG NUMBER: GWS-SA5D-830-U-T3R-W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 | 3916.0 |
| 2.5° | 3945.1 | 3934.8 | 3986.1 | 4025.5 | 4042.6 | 4059.7 | 4044.3 | 4039.1 | 4039.1 | 4004.9 | 3987.8 |
| 5° | 3987.8 | 3993.0 | 4063.1 | 4095.6 | 4095.6 | 4081.9 | 4040.9 | 4011.8 | 4001.5 | 3957.0 | 3945.1 |
| 7.5° | 4068.2 | 4090.5 | 4155.5 | 4153.8 | 4105.9 | 4030.6 | 3927.9 | 3849.2 | 3777.4 | 3746.6 | 3727.8 |
| 10° | 4200.0 | 4229.0 | 4273.5 | 4201.7 | 4068.2 | 3869.8 | 3652.5 | 3481.4 | 3378.8 | 3296.7 | 3296.7 |
| 12.5° | 4350.5 | 4377.9 | 4369.3 | 4203.4 | 3927.9 | 3556.7 | 3243.6 | 3046.9 | 2903.2 | 2827.9 | 2827.9 |
| 15° | 4501.1 | 4523.3 | 4430.9 | 4124.7 | 3635.4 | 3141.0 | 2798.8 | 2562.7 | 2437.9 | 2367.7 | 2367.7 |
| 17.5° | 4653.3 | 4651.6 | 4456.6 | 3943.3 | 3253.9 | 2680.8 | 2345.5 | 2162.4 | 2119.7 | 2107.7 | 2106.0 |
| 20° | 4800.4 | 4761.1 | 4424.1 | 3640.5 | 2810.8 | 2217.2 | 2005.0 | 2017.0 | 2080.3 | 2107.7 | 2111.1 |
| 22.5° | 4966.4 | 4868.9 | 4328.3 | 3253.9 | 2307.8 | 1895.5 | 1909.2 | 2008.5 | 2100.8 | 2141.9 | 2147.0 |
| 25° | 5135.8 | 4961.3 | 4167.5 | 2800.5 | 1887.0 | 1777.5 | 1883.6 | 1994.8 | 2099.1 | 2152.2 | 2157.3 |
| 27.5° | 5204.2 | 4961.3 | 3893.7 | 2275.3 | 1662.9 | 1727.9 | 1844.2 | 1952.0 | 2061.5 | 2123.1 | 2135.1 |
| 30° | 5260.6 | 4918.5 | 3510.5 | 1801.4 | 1570.5 | 1680.0 | 1780.9 | 1880.1 | 1987.9 | 2063.2 | 2076.9 |
| 32.5° | 5339.3 | 4880.8 | 3046.9 | 1514.0 | 1527.7 | 1633.8 | 1703.9 | 1787.8 | 1885.3 | 1934.9 | 1929.8 |
| 35° | 5431.7 | 4822.7 | 2487.5 | 1377.2 | 1491.8 | 1594.4 | 1644.1 | 1693.7 | 1649.2 | 1647.5 | 1652.6 |
| 37.5° | 5563.4 | 4771.4 | 1999.9 | 1315.6 | 1467.8 | 1567.1 | 1608.1 | 1502.1 | 1440.5 | 1414.8 | 1404.5 |
| 40° | 5753.3 | 4750.8 | 1577.3 | 1279.7 | 1464.4 | 1565.4 | 1536.3 | 1372.0 | 1288.2 | 1199.3 | 1197.5 |
| 42.5° | 5992.9 | 4735.4 | 1303.6 | 1262.6 | 1476.4 | 1604.7 | 1437.1 | 1286.5 | 1113.7 | 1074.4 | 1070.9 |
| 45° | 6300.8 | 4711.5 | 1166.8 | 1259.1 | 1505.5 | 1635.5 | 1426.8 | 1168.5 | 1050.4 | 1033.3 | 1033.3 |
| 47.5° | 6672.0 | 4673.8 | 1105.2 | 1259.1 | 1538.0 | 1621.8 | 1396.0 | 1142.8 | 1021.3 | 1040.2 | 1052.1 |
| 50° | 7098.0 | 4625.9 | 1072.7 | 1255.7 | 1570.5 | 1621.8 | 1331.0 | 1137.7 | 1014.5 | 1112.0 | 1151.4 |
| 52.5° | 7553.1 | 4571.2 | 1050.4 | 1242.0 | 1592.7 | 1623.5 | 1334.4 | 1154.8 | 1021.3 | 1129.1 | 1161.6 |
| 55° | 8056.1 | 4562.6 | 1019.6 | 1212.9 | 1599.6 | 1579.0 | 1343.0 | 1192.4 | 1031.6 | 1023.0 | 1024.8 |
| 57.5° | 8690.7 | 4665.3 | 997.4 | 1170.2 | 1572.2 | 1488.4 | 1360.1 | 1219.8 | 1019.6 | 1021.3 | 1033.3 |
| 60° | 9354.5 | 4858.6 | 1016.2 | 1129.1 | 1515.7 | 1402.8 | 1372.0 | 1206.1 | 961.5 | 934.1 | 937.5 |
| 62.5° | 9919.1 | 5005.7 | 1031.6 | 1110.3 | 1433.6 | 1327.6 | 1360.1 | 1175.3 | 929.0 | 922.1 | 937.5 |
| 65° | 10155.2 | 4884.3 | 994.0 | 1070.9 | 1313.9 | 1235.2 | 1334.4 | 1136.0 | 901.6 | 875.9 | 877.6 |
| 67.5° | 9893.4 | 4314.6 | 920.4 | 983.7 | 1178.7 | 1117.1 | 1293.3 | 1084.6 | 863.9 | 833.1 | 826.3 |
| 70° | *8451.2* | *3170.1* | *793.8* | *845.1* | *1014.5* | *978.6* | *1230.0* | *1017.9* | *804.1* | *781.8* | *766.4* |
| 72.5° | 6810.6 | 2244.5 | 658.6 | 672.3 | 795.5 | 824.6 | 1120.6 | 934.1 | 735.6 | 672.3 | 650.1 |
| 75° | 4740.6 | 1409.7 | 549.2 | 535.5 | 574.8 | 629.6 | 874.2 | 775.0 | 634.7 | 568.0 | 547.4 |
| 77.5° | 2039.2 | 723.7 | 429.4 | 422.6 | 383.2 | 436.2 | 670.6 | 646.7 | 532.1 | 455.1 | 443.1 |
| 80° | 682.6 | 419.1 | 309.7 | 297.7 | 254.9 | 306.2 | 472.2 | 516.7 | 417.4 | 337.0 | 316.5 |
| 82.5° | 342.2 | 242.9 | 196.7 | 177.9 | 171.1 | 193.3 | 278.9 | 321.6 | 289.1 | 232.7 | 196.7 |
| 85° | 167.7 | 138.6 | 107.8 | 106.1 | 89.0 | 83.8 | 116.3 | 136.9 | 130.0 | 95.8 | 90.7 |
| 87.5° | 61.6 | 54.7 | 34.2 | 27.4 | 17.1 | 12.0 | 6.8 | 6.8 | 5.1 | 5.1 | 5.1 |
| 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

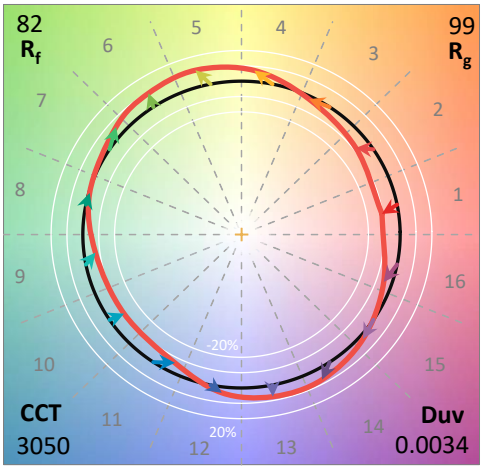
## Test Information

| | |
|---|---|
| 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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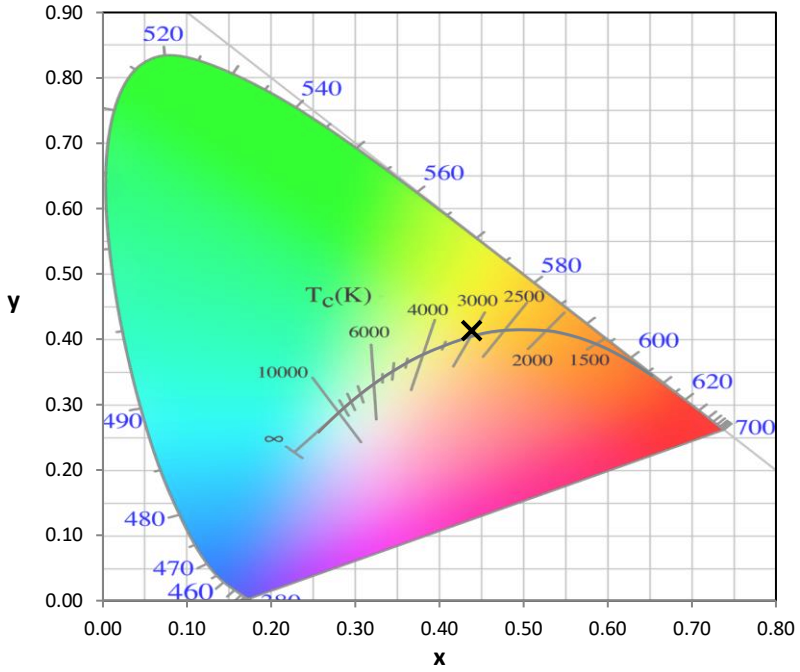
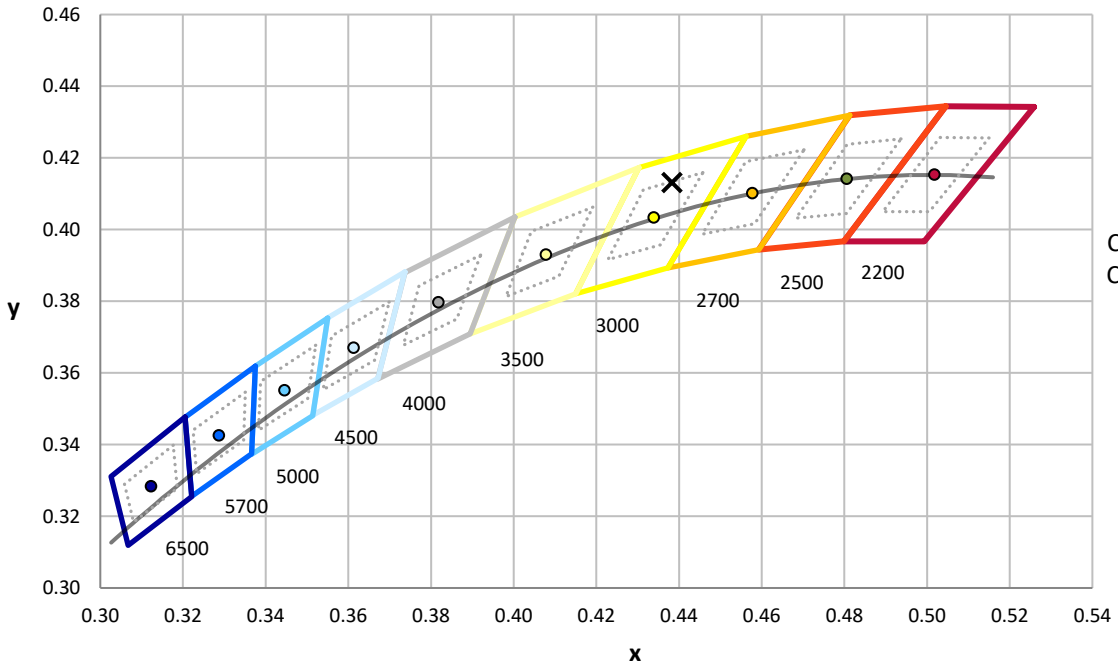
## CIE 1931 Chromaticity Diagram




## 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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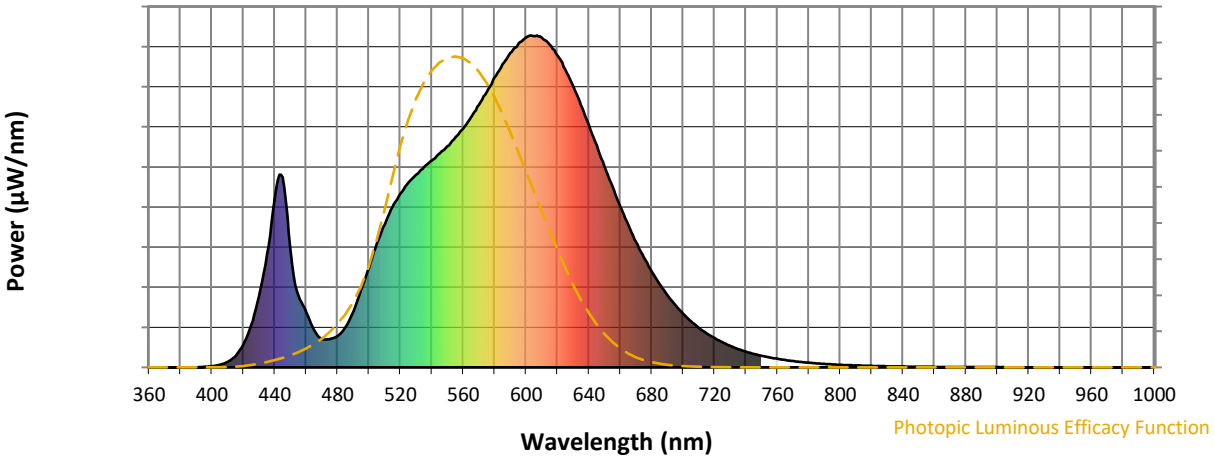
## Photopic Flux vs. Wavelength




## 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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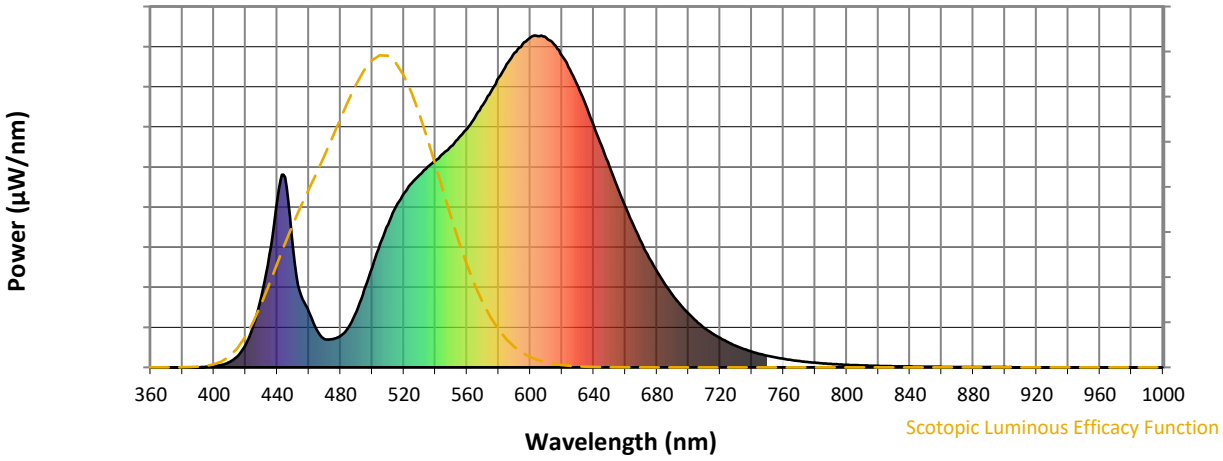
## Scotopic Flux vs. Wavelength




**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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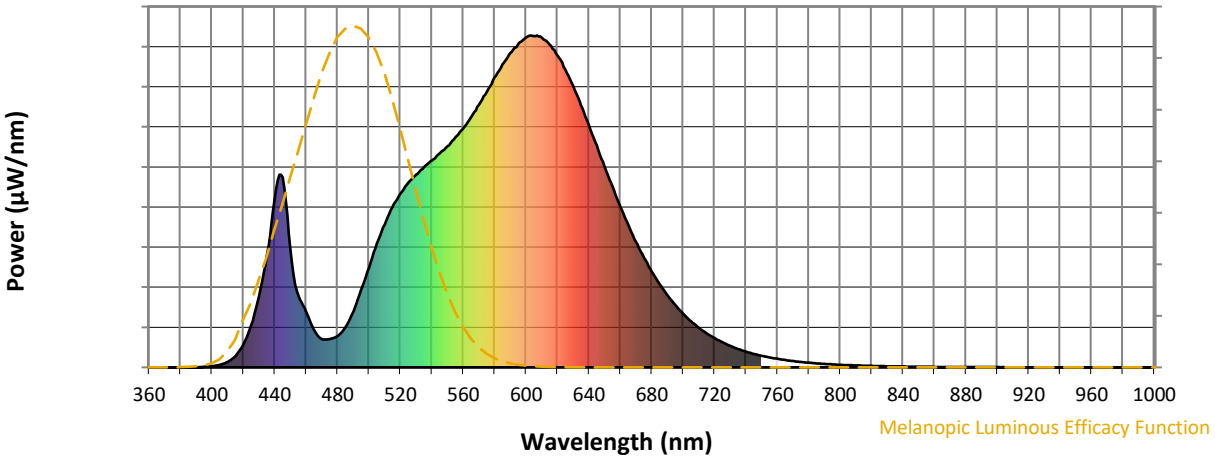
## Melanopic Flux vs. Wavelength




**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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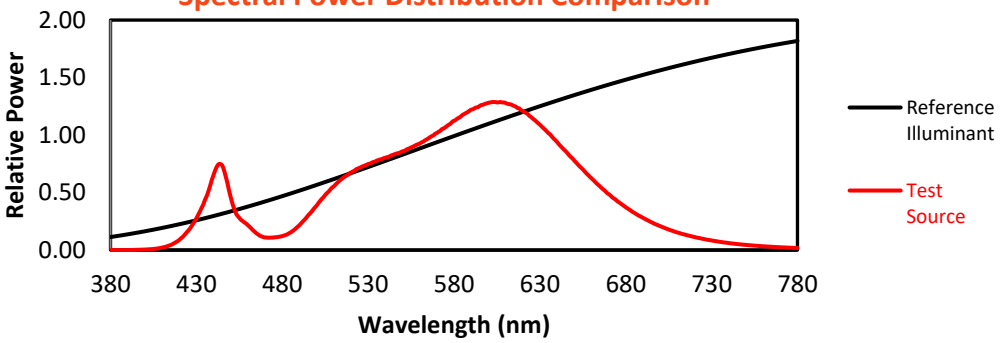
# TM-30-18

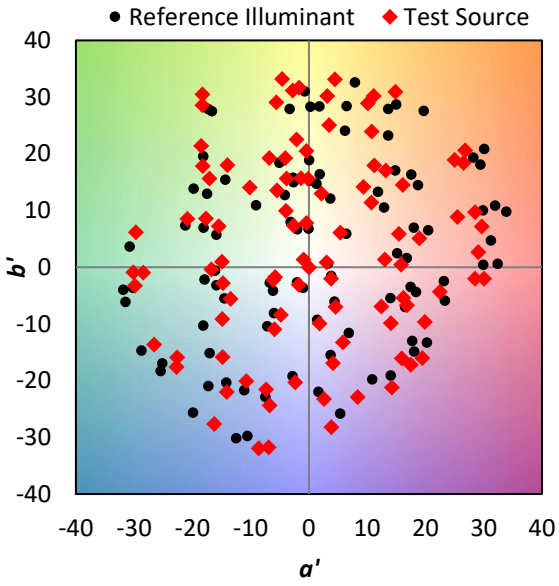
## Summary

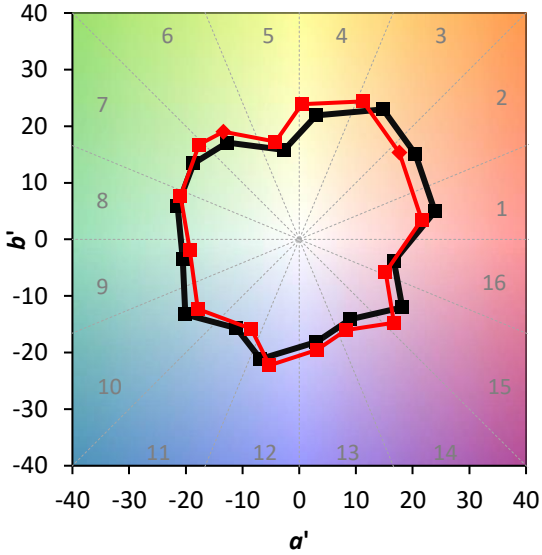
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

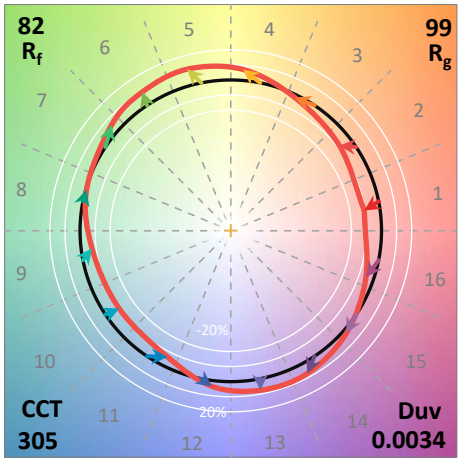
## Spectral Power Distribution Comparison

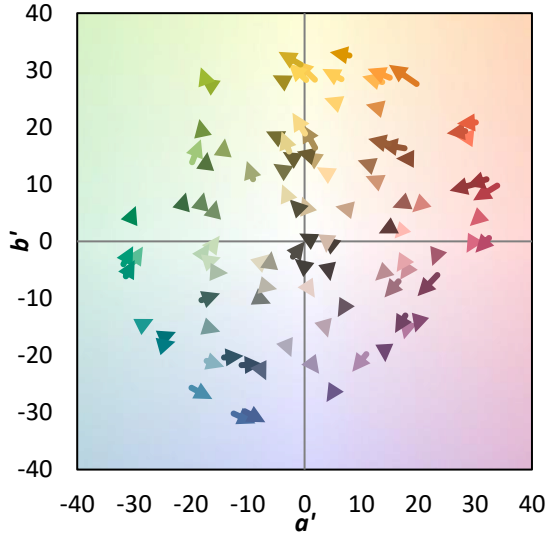



## Color Vector Graphics



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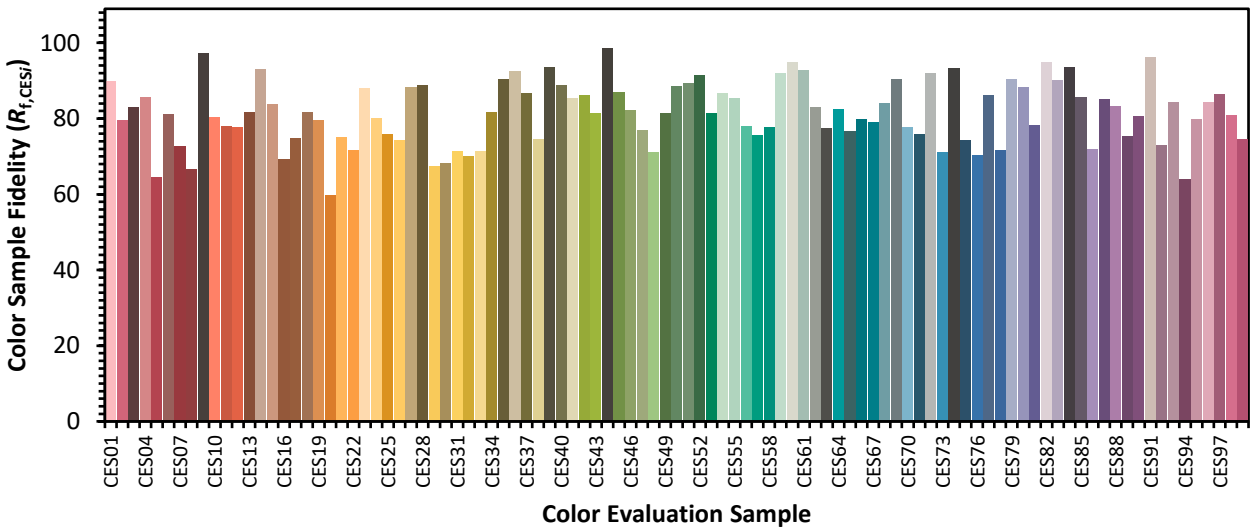
# TM-30-18

**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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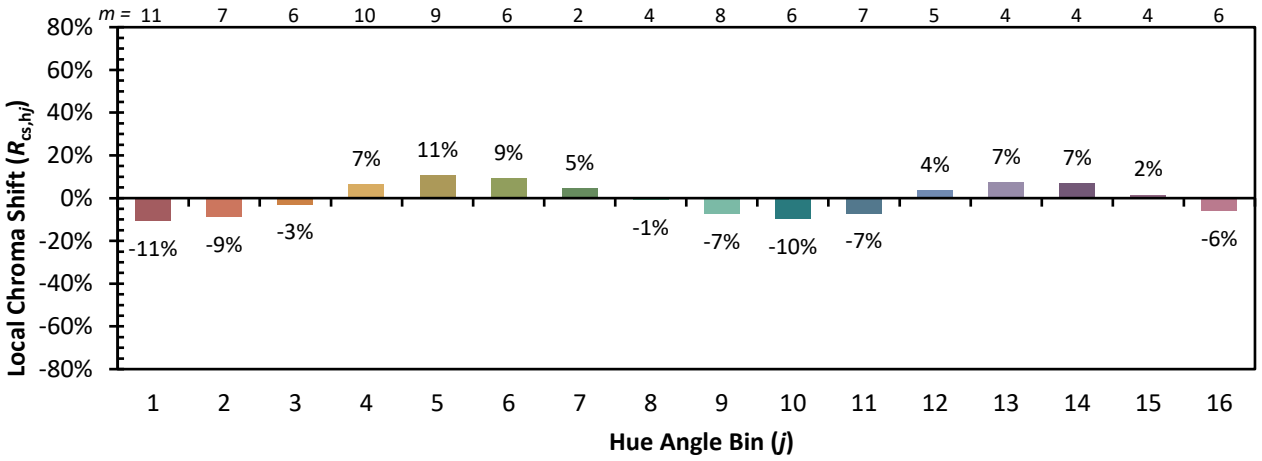
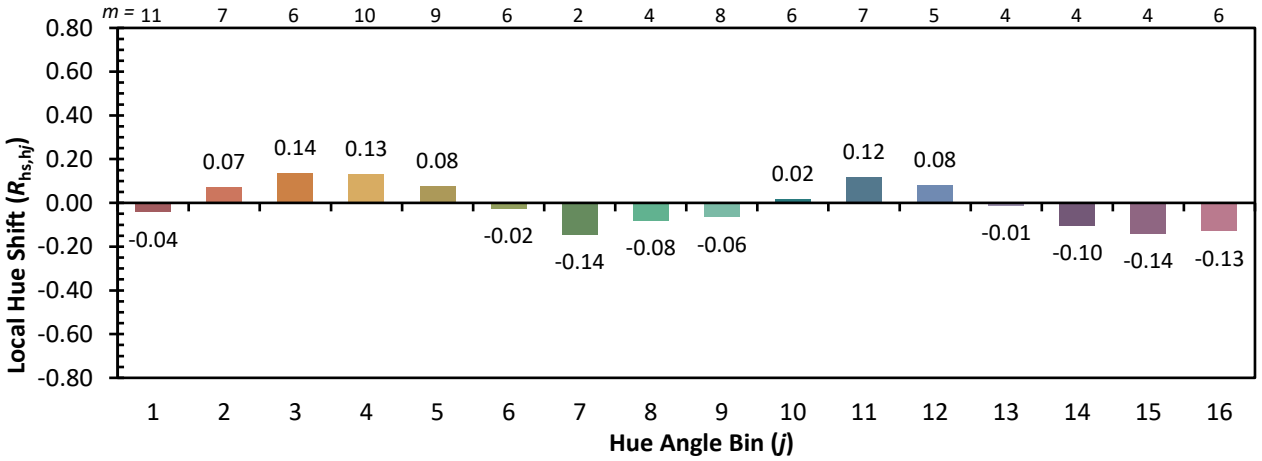
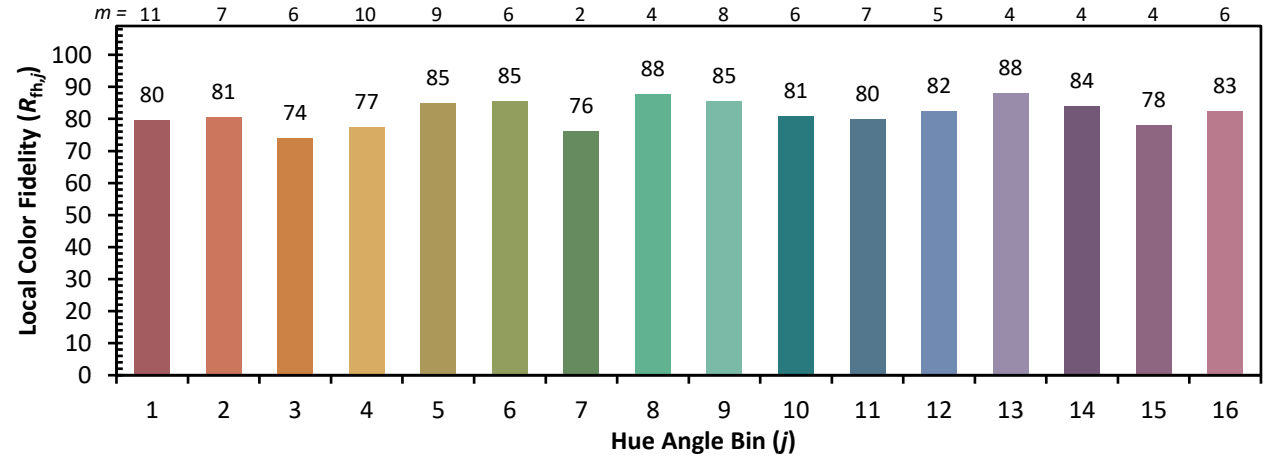
# TM-30-18

## Color Rendition by Hue-Angle Bin



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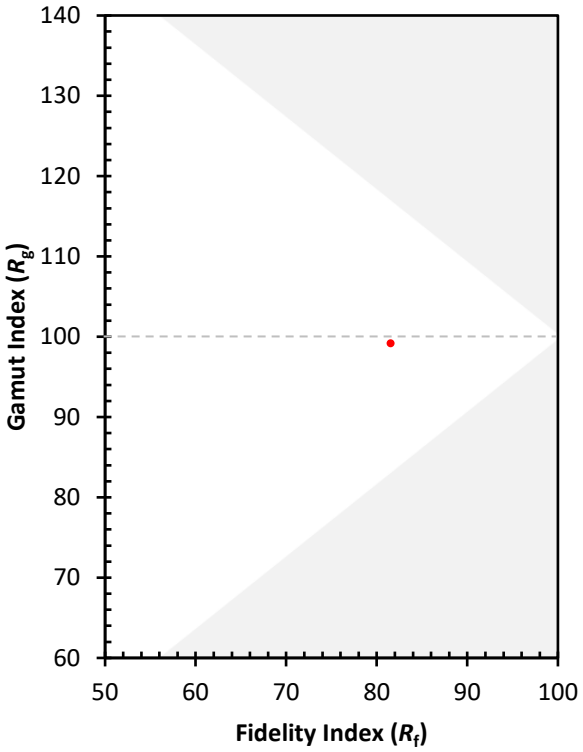
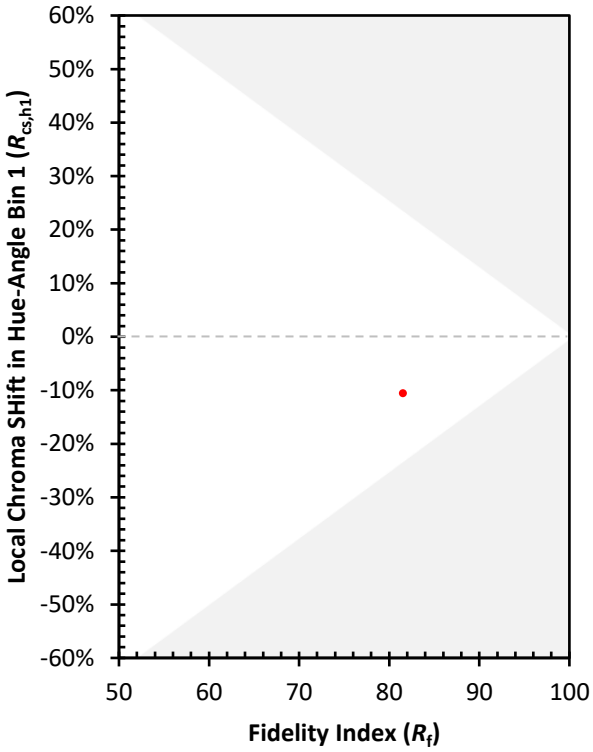
## TM-30-18

### Measure Comparisons




(END OF REPORT)