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: P637975

Luminaire Tested: GWS-SA4D-830-U-SL2-W-GRSWH

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: | P637975 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-29) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA4D-830-U-SL2-W-GRSWH |
| Description: | GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II SPILL LIGHT ELIMINATOR OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH |
| Light Source: | (64) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 16569 lumens |
| Efficiency: | N/A |
| Efficacy: | 102.2 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 1' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B3 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 162.1 |
| 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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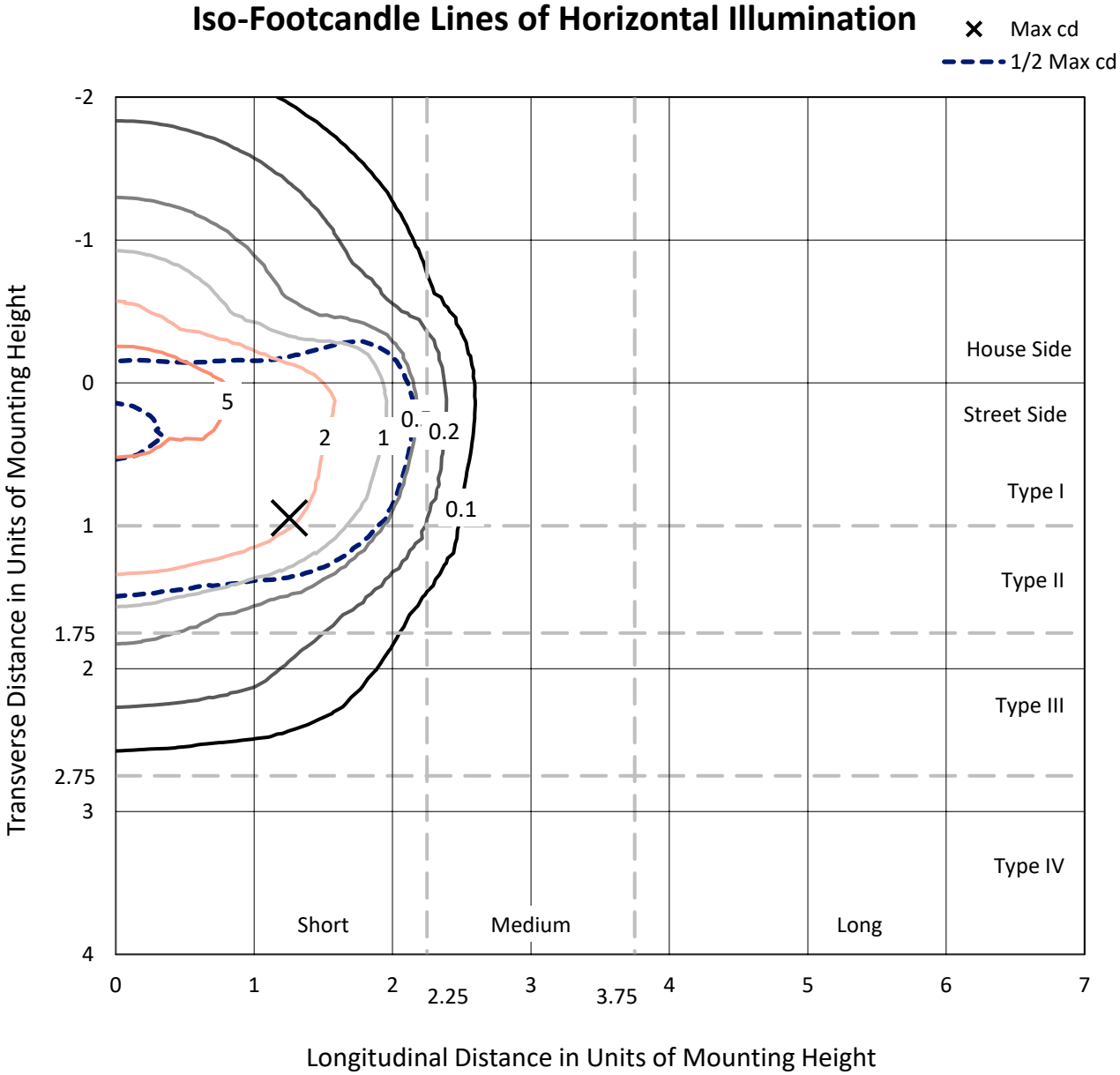
Scaled Data Report

REPORT NUMBER: P637975
CATALOG NUMBER: GWS-SA4D-830-U-SL2-W-GRSWH

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 8.5 fc
Type II - Short - N/A

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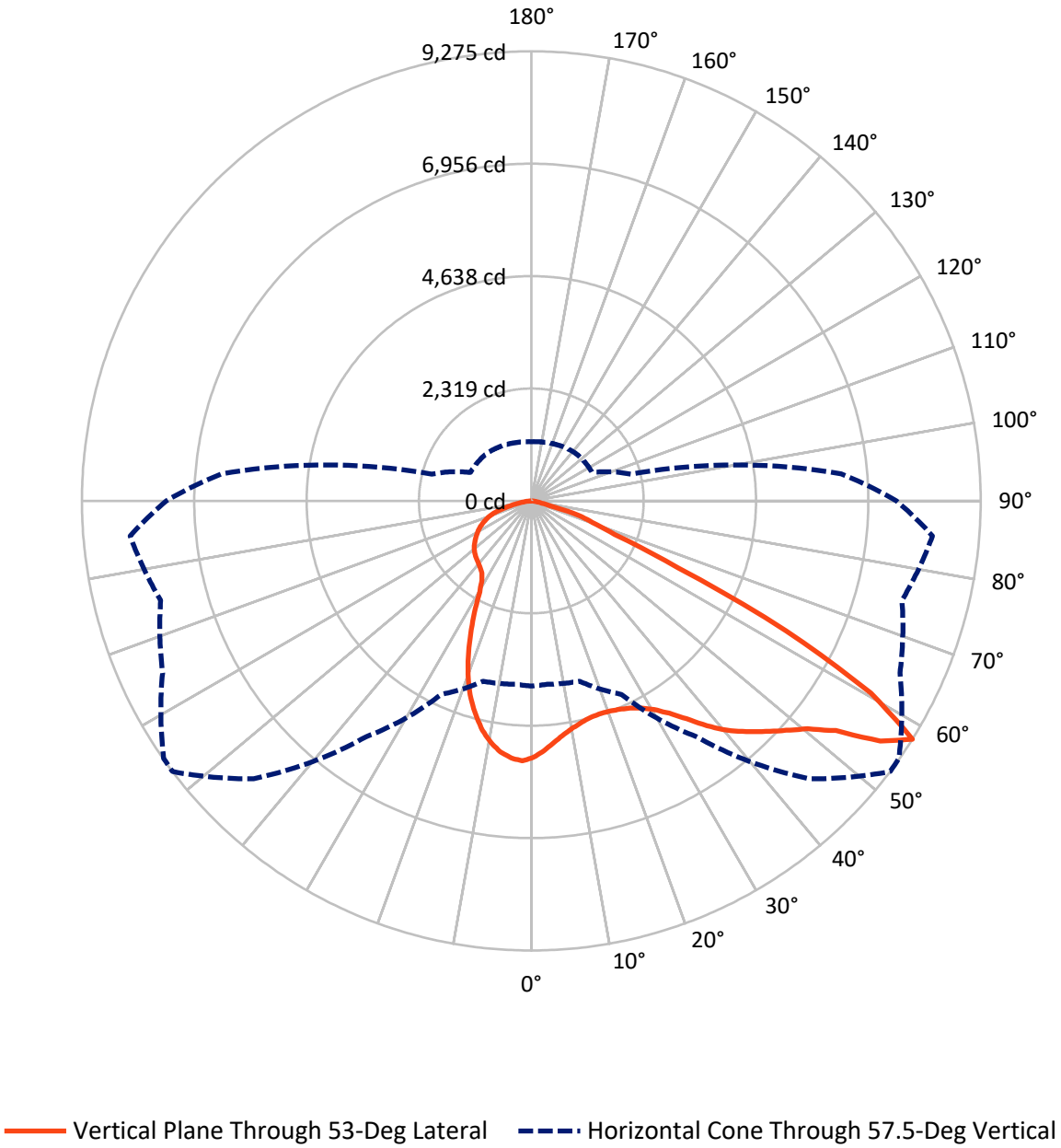
## Luminous Intensity Polar Plot



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REPORT NUMBER: P637975
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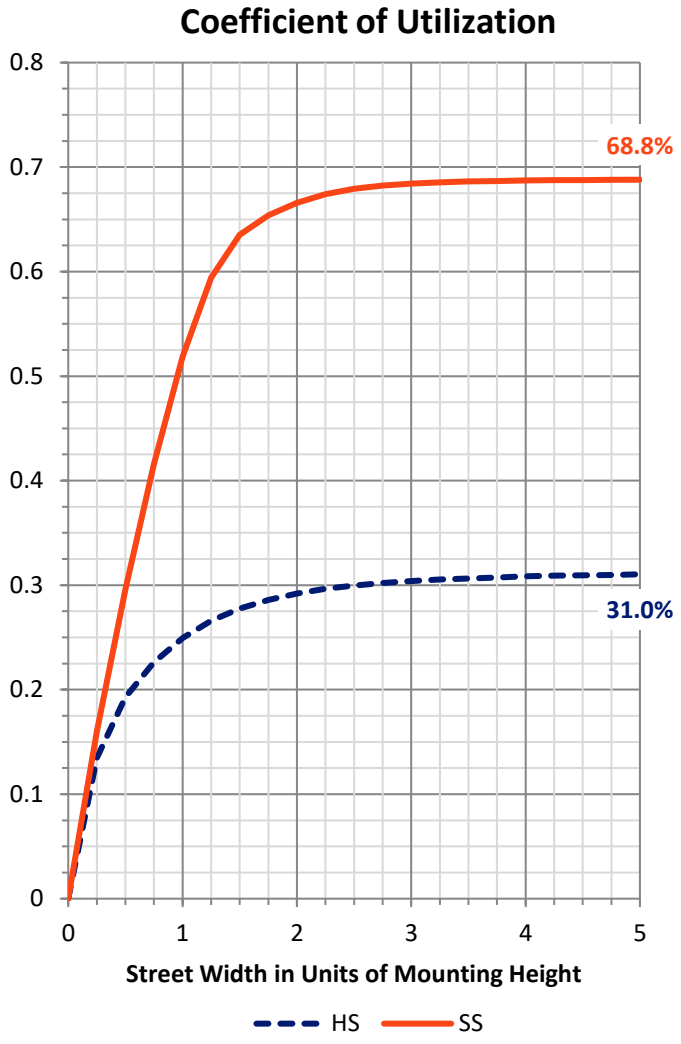
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 5180.5 | 0.0 | 5180.5 |
| | % Fixture | 31.3 | 0.0 | 31.3 |
| **Street Side** | Lumens | 11388.5 | 0.0 | 11388.5 |
| | % Fixture | 68.7 | 0.0 | 68.7 |
| **Total** | Lumens | 16569.0 | 0.0 | 16569.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 478.5 | 2.9 |
| 10°-20° | 1255.3 | 7.6 |
| 20°-30° | 1849.4 | 11.2 |
| 30°-40° | 2588.7 | 15.6 |
| 40°-50° | 3403.1 | 20.5 |
| 50°-60° | 3990.1 | 24.1 |
| 60°-70° | 2350.6 | 14.2 |
| 70°-80° | 584.7 | 3.5 |
| 80°-90° | 68.6 | 0.4 |
| 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° | 16569.0 | 100.0 |
| 0°-180° | 16569.0 | 100.0 |



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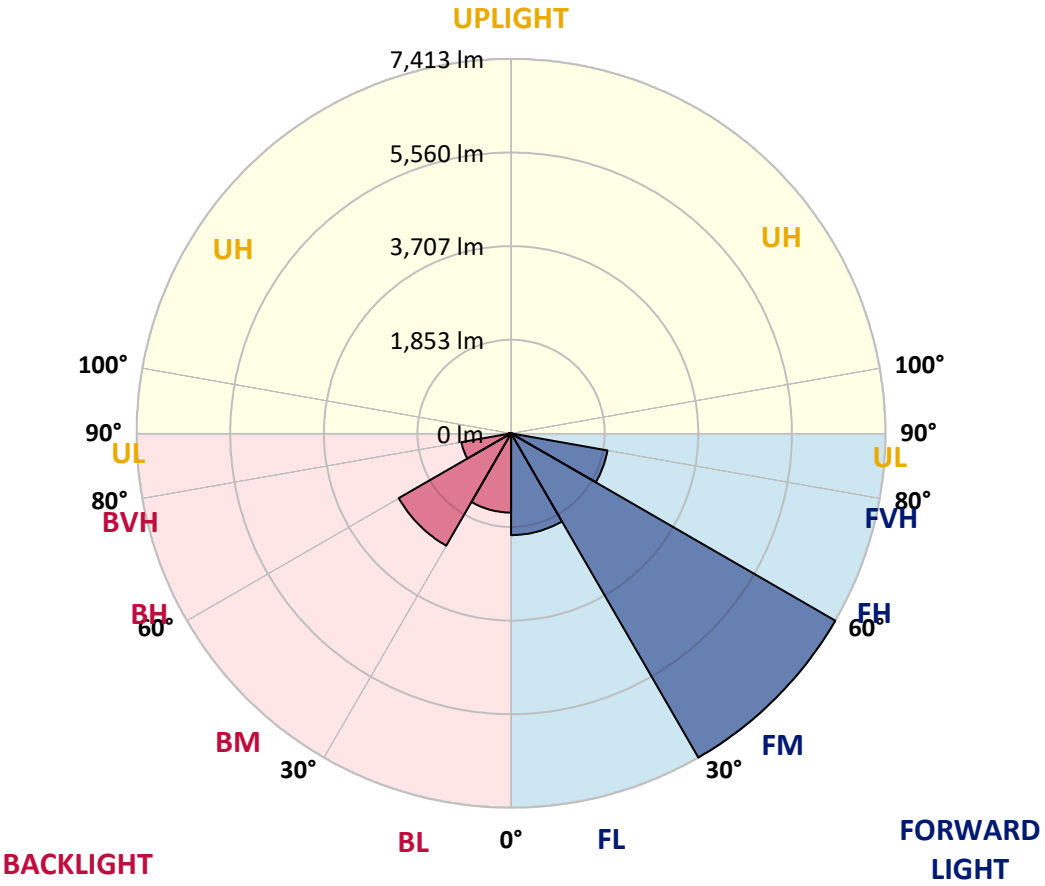
REPORT NUMBER: P637975
CATALOG NUMBER: GWS-SA4D-830-U-SL2-W-GRSWH

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 2014.5 | 12.2 | | | |
| FM | (30°-60°) | 7413.1 | 44.7 | | | |
| FH | (60°-80°) | 1937.9 | 11.7 | | | G2/5000 |
| FVH | (80°-90°) | 23.0 | 0.1 | | | G1/100 |
| BL | (0°-30°) | 1568.7 | 9.5 | B3/2500 | | |
| BM | (30°-60°) | 2568.8 | 15.5 | B3/5000 | | |
| BH | (60°-80°) | 997.4 | 6.0 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 45.6 | 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-G2**
Type II Short



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Scaled Data Report

REPORT NUMBER: P637975
CATALOG NUMBER: GWS-SA4D-830-U-SL2-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 53° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 |
| 2.5° | 4986.9 | 5000.9 | 5003.7 | 5046.9 | 5049.7 | 5112.4 | 5154.3 | 5145.9 | 5189.1 | 5242.1 | 5284.0 |
| 5° | 4748.4 | 4749.8 | 4763.8 | 4815.4 | 4843.3 | 4925.6 | 4995.3 | 4995.3 | 5079.0 | 5187.7 | 5281.2 |
| 7.5° | 4551.8 | 4550.4 | 4563.0 | 4620.1 | 4666.2 | 4765.2 | 4860.0 | 4871.2 | 4988.3 | 5147.3 | 5299.3 |
| 10° | 4369.1 | 4378.9 | 4392.8 | 4462.6 | 4521.1 | 4643.9 | 4756.8 | 4774.9 | 4922.8 | 5119.4 | 5324.4 |
| 12.5° | 4252.0 | 4253.4 | 4274.3 | 4352.4 | 4427.7 | 4558.8 | 4677.3 | 4699.6 | 4869.8 | 5092.9 | 5342.5 |
| 15° | 4176.7 | 4178.1 | 4200.4 | 4286.9 | 4374.7 | 4507.2 | 4628.5 | 4653.6 | 4839.1 | 5088.7 | 5377.4 |
| 17.5° | 4143.2 | 4141.8 | 4162.7 | 4249.2 | 4345.4 | 4483.5 | 4613.2 | 4643.9 | 4853.0 | 5120.8 | 5438.8 |
| 20° | 4143.2 | 4144.6 | 4155.8 | 4233.9 | 4331.5 | 4477.9 | 4628.5 | 4666.2 | 4907.4 | 5193.3 | 5533.6 |
| 22.5° | 4201.8 | 4207.4 | 4212.9 | 4265.9 | 4342.6 | 4486.3 | 4669.0 | 4719.2 | 5024.6 | 5314.6 | 5657.7 |
| 25° | 4316.1 | 4317.5 | 4323.1 | 4366.3 | 4401.2 | 4510.0 | 4735.9 | 4811.2 | 5207.3 | 5491.7 | 5813.9 |
| 27.5° | 4469.5 | 4489.1 | 4494.6 | 4522.5 | 4522.5 | 4568.6 | 4840.5 | 4949.3 | 5454.1 | 5746.9 | 6013.3 |
| 30° | 4684.3 | 4691.3 | 4701.0 | 4731.7 | 4698.2 | 4678.7 | 4993.9 | 5133.3 | 5740.0 | 6055.1 | 6253.2 |
| 32.5° | 4872.6 | 4887.9 | 4940.9 | 4991.1 | 4931.1 | 4869.8 | 5219.8 | 5384.4 | 6014.7 | 6375.9 | 6508.4 |
| 35° | 5032.9 | 5070.6 | 5172.4 | 5284.0 | 5242.1 | 5180.8 | 5519.6 | 5691.2 | 6240.6 | 6606.0 | 6734.3 |
| 37.5° | 5226.8 | 5256.1 | 5395.5 | 5576.8 | 5614.5 | 5585.2 | 5885.0 | 6007.7 | 6391.2 | 6664.6 | 6857.0 |
| 40° | 5423.4 | 5468.0 | 5647.9 | 5899.0 | 6042.6 | 6063.5 | 6222.5 | 6304.8 | 6442.8 | 6550.2 | 6833.3 |
| 42.5° | 5624.2 | 5700.9 | 5947.8 | 6240.6 | 6495.8 | 6543.2 | 6507.0 | 6541.8 | 6426.1 | 6392.6 | 6723.1 |
| 45° | 5869.7 | 5960.3 | 6239.2 | 6613.0 | 6949.1 | 7023.0 | 6785.9 | 6753.8 | 6423.3 | 6332.7 | 6654.8 |
| 47.5° | 6159.7 | 6250.4 | 6516.7 | 6951.8 | 7381.4 | 7435.7 | 7071.8 | 7013.2 | 6520.9 | 6424.7 | 6746.8 |
| 50° | 6416.3 | 6479.1 | 6717.6 | 7204.3 | 7784.4 | 7816.5 | 7386.9 | 7315.8 | 6763.6 | 6679.9 | 7034.1 |
| 52.5° | 6155.6 | 6148.6 | 6399.6 | 6999.3 | 7993.6 | 8379.9 | 7872.2 | 7803.9 | 7232.1 | 7103.8 | 7479.0 |
| 55° | 5222.6 | 5143.1 | 5367.6 | 5957.5 | 7409.3 | 8880.5 | 8742.4 | 8605.8 | 7856.9 | 7530.6 | 7896.0 |
| 57.5° | 3818.3 | 3796.0 | 3850.4 | 4404.0 | 5935.2 | 8105.1 | 9275.2 | 9262.6 | 8396.6 | 7921.1 | 8311.5 |
| 60° | 2985.7 | 2952.3 | 2807.2 | 2822.6 | 4045.6 | 6331.3 | 8049.4 | 8418.9 | 8731.3 | 8155.3 | 8601.6 |
| 62.5° | 2651.0 | 2625.9 | 2550.6 | 2342.8 | 2409.8 | 4245.0 | 5900.3 | 6239.2 | 7629.6 | 7202.9 | 7388.3 |
| 65° | 2195.0 | 2188.1 | 2250.8 | 2242.4 | 2019.3 | 2344.2 | 3330.2 | 3671.9 | 4797.3 | 4857.2 | 4797.3 |
| 67.5° | 1595.4 | 1582.8 | 1741.8 | 2055.6 | 1944.0 | 1769.7 | 1856.1 | 1974.7 | 2460.0 | 2209.0 | 1988.6 |
| 70° | 1037.5 | 1019.4 | 1111.5 | 1485.2 | 1740.4 | 1542.4 | 1337.4 | 1317.9 | 1352.7 | 840.9 | 909.2 |
| 72.5° | 695.9 | 675.0 | 673.6 | 817.2 | 1051.5 | 1038.9 | 1036.2 | 1026.4 | 916.2 | 663.8 | 736.3 |
| 75° | 387.7 | 371.0 | 366.8 | 352.8 | 376.5 | 383.5 | 408.6 | 422.5 | 457.4 | 503.4 | 557.8 |
| 77.5° | 65.5 | 64.1 | 80.9 | 103.2 | 142.2 | 182.7 | 225.9 | 238.5 | 294.3 | 348.6 | 383.5 |
| 80° | 36.3 | 37.7 | 48.8 | 60.0 | 79.5 | 108.8 | 139.5 | 147.8 | 181.3 | 210.6 | 238.5 |
| 82.5° | 19.5 | 19.5 | 25.1 | 32.1 | 43.2 | 57.2 | 75.3 | 82.3 | 104.6 | 122.7 | 142.2 |
| 85° | 7.0 | 7.0 | 9.8 | 12.6 | 18.1 | 23.7 | 29.3 | 33.5 | 46.0 | 62.8 | 71.1 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 2.8 | 5.6 | 5.6 | 7.0 | 12.6 | 18.1 |
| 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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Scaled Data Report

REPORT NUMBER: P637975
CATALOG NUMBER: GWS-SA4D-830-U-SL2-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 | 5290.9 |
| 2.5° | 5318.8 | 5281.2 | 5332.8 | 5356.5 | 5364.8 | 5370.4 | 5334.2 | 5309.1 | 5300.7 | 5274.2 | 5258.9 |
| 5° | 5338.3 | 5313.2 | 5362.1 | 5362.1 | 5327.2 | 5290.9 | 5217.0 | 5165.4 | 5129.2 | 5085.9 | 5079.0 |
| 7.5° | 5371.8 | 5353.7 | 5380.2 | 5325.8 | 5237.9 | 5140.3 | 5012.0 | 4911.6 | 4830.7 | 4777.7 | 4779.1 |
| 10° | 5416.4 | 5394.1 | 5373.2 | 5251.9 | 5091.5 | 4911.6 | 4715.0 | 4568.6 | 4434.7 | 4373.3 | 4339.8 |
| 12.5° | 5445.7 | 5413.6 | 5325.8 | 5125.0 | 4889.3 | 4648.0 | 4370.5 | 4153.0 | 3959.1 | 3871.3 | 3864.3 |
| 15° | 5482.0 | 5423.4 | 5247.7 | 4960.4 | 4632.7 | 4303.6 | 3946.6 | 3644.0 | 3381.8 | 3245.1 | 3238.1 |
| 17.5° | 5529.4 | 5433.2 | 5154.3 | 4772.2 | 4362.2 | 3876.9 | 3427.8 | 3047.1 | 2768.2 | 2662.2 | 2680.3 |
| 20° | 5596.3 | 5444.3 | 5048.3 | 4563.0 | 4026.1 | 3391.5 | 2832.3 | 2482.3 | 2374.9 | 2367.9 | 2354.0 |
| 22.5° | 5671.6 | 5451.3 | 4931.1 | 4328.7 | 3618.9 | 2874.2 | 2340.1 | 2190.8 | 2189.4 | 2224.3 | 2232.7 |
| 25° | 5756.7 | 5456.9 | 4798.7 | 4055.4 | 3178.2 | 2358.2 | 2069.5 | 2024.9 | 2059.8 | 2125.3 | 2133.7 |
| 27.5° | 5865.5 | 5468.0 | 4638.3 | 3755.5 | 2709.6 | 2037.4 | 1920.3 | 1909.1 | 1951.0 | 2012.3 | 2009.5 |
| 30° | 6025.9 | 5508.5 | 4468.1 | 3411.1 | 2228.5 | 1885.4 | 1829.7 | 1831.0 | 1847.8 | 1877.1 | 1881.3 |
| 32.5° | 6189.0 | 5571.2 | 4302.2 | 3023.4 | 1952.4 | 1799.0 | 1773.9 | 1771.1 | 1771.1 | 1783.6 | 1786.4 |
| 35° | 6343.8 | 5642.4 | 4122.3 | 2619.0 | 1818.5 | 1748.8 | 1732.0 | 1723.7 | 1719.5 | 1716.7 | 1712.5 |
| 37.5° | 6430.3 | 5677.2 | 3946.6 | 2220.1 | 1747.4 | 1715.3 | 1698.6 | 1687.4 | 1672.1 | 1660.9 | 1658.1 |
| 40° | 6392.6 | 5636.8 | 3743.0 | 1921.7 | 1704.1 | 1683.2 | 1663.7 | 1648.4 | 1627.4 | 1617.7 | 1612.1 |
| 42.5° | 6267.1 | 5511.3 | 3521.2 | 1780.8 | 1669.3 | 1648.4 | 1624.7 | 1599.6 | 1585.6 | 1577.2 | 1575.8 |
| 45° | 6134.6 | 5359.3 | 3253.5 | 1698.6 | 1635.8 | 1610.7 | 1582.8 | 1554.9 | 1539.6 | 1535.4 | 1534.0 |
| 47.5° | 6130.4 | 5284.0 | 2969.0 | 1633.0 | 1595.4 | 1570.3 | 1535.4 | 1507.5 | 1490.8 | 1485.2 | 1479.6 |
| 50° | 6314.5 | 5360.7 | 2648.3 | 1575.8 | 1553.5 | 1527.0 | 1488.0 | 1457.3 | 1436.4 | 1429.4 | 1428.0 |
| 52.5° | 6696.6 | 5649.3 | 2361.0 | 1518.7 | 1497.7 | 1467.1 | 1435.0 | 1404.3 | 1379.2 | 1366.7 | 1365.3 |
| 55° | 7109.4 | 6016.1 | 2182.5 | 1460.1 | 1432.2 | 1405.7 | 1376.4 | 1343.0 | 1315.1 | 1295.5 | 1292.7 |
| 57.5° | *7536.2* | *6416.3* | *2128.1* | *1386.2* | *1365.3* | *1347.1* | *1312.3* | *1276.0* | *1243.9* | *1225.8* | *1221.6* |
| 60° | 7887.6 | 6760.8 | 2229.9 | 1308.1 | 1296.9 | 1273.2 | 1241.2 | 1206.3 | 1184.0 | 1170.0 | 1167.2 |
| 62.5° | 6603.2 | 5504.3 | 1800.4 | 1223.0 | 1223.0 | 1197.9 | 1161.7 | 1136.6 | 1121.2 | 1111.5 | 1108.7 |
| 65° | 4190.6 | 3408.3 | 1228.6 | 1138.0 | 1136.6 | 1103.1 | 1072.4 | 1055.7 | 1048.7 | 1033.4 | 1030.6 |
| 67.5° | 1825.5 | 1557.7 | 1050.1 | 1051.5 | 1045.9 | 1009.7 | 979.0 | 966.4 | 952.5 | 935.7 | 934.3 |
| 70° | 946.9 | 965.0 | 939.9 | 955.3 | 945.5 | 902.3 | 873.0 | 853.5 | 824.2 | 807.4 | 808.8 |
| 72.5° | 764.2 | 783.7 | 811.6 | 835.3 | 814.4 | 779.6 | 733.5 | 709.8 | 672.2 | 654.0 | 655.4 |
| 75° | 582.9 | 603.8 | 630.3 | 655.4 | 638.7 | 595.5 | 566.2 | 542.5 | 499.2 | 478.3 | 482.5 |
| 77.5° | 401.6 | 412.8 | 444.9 | 443.5 | 437.9 | 425.3 | 382.1 | 354.2 | 309.6 | 284.5 | 287.3 |
| 80° | 249.6 | 256.6 | 271.9 | 278.9 | 276.1 | 259.4 | 224.5 | 203.6 | 177.1 | 161.8 | 163.2 |
| 82.5° | 150.6 | 154.8 | 168.7 | 170.1 | 168.7 | 156.2 | 129.7 | 114.4 | 97.6 | 89.3 | 89.3 |
| 85° | 76.7 | 79.5 | 87.9 | 87.9 | 79.5 | 66.9 | 60.0 | 53.0 | 43.2 | 39.0 | 39.0 |
| 87.5° | 20.9 | 20.9 | 26.5 | 22.3 | 18.1 | 16.7 | 8.4 | 7.0 | 2.8 | 1.4 | 1.4 |
| 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

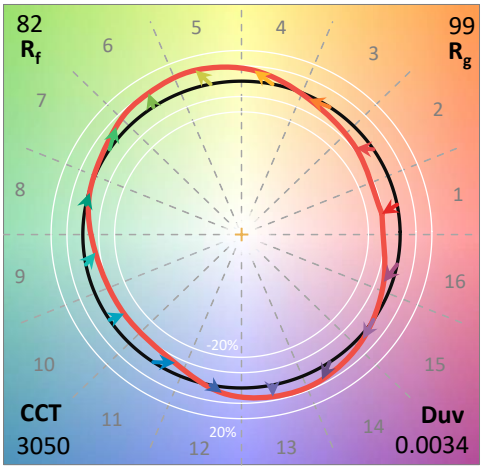
## Test Information

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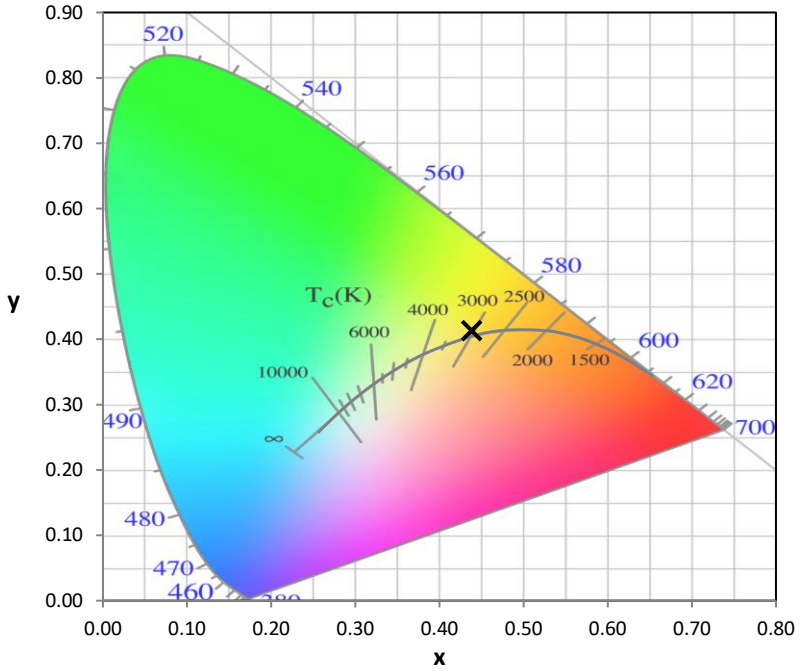
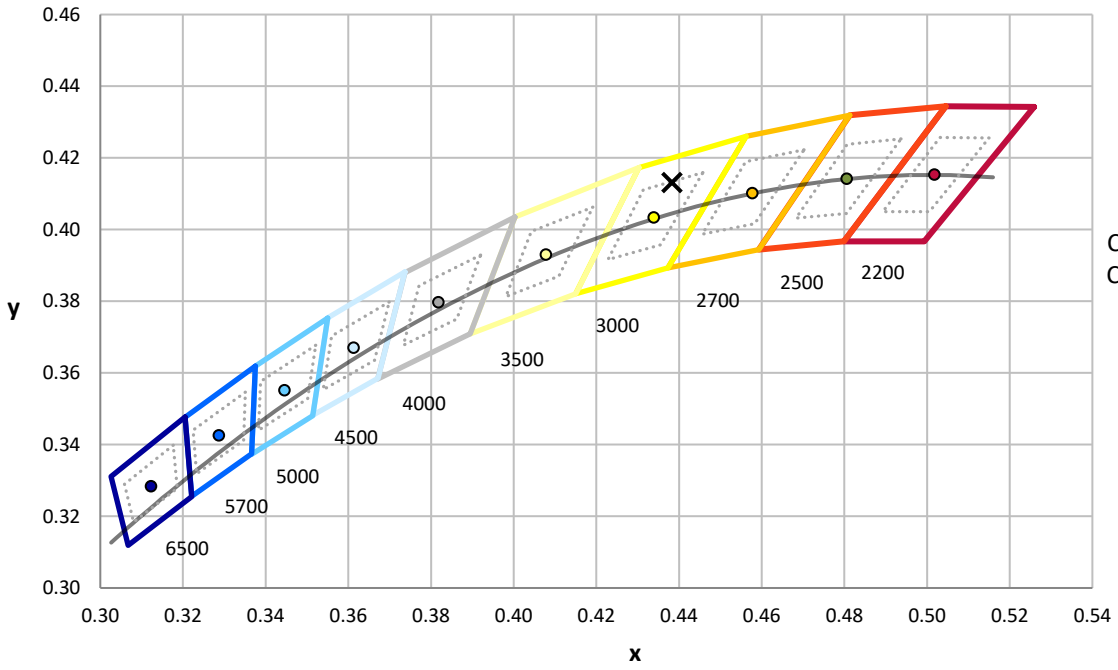
## CIE 1931 Chromaticity Diagram




## 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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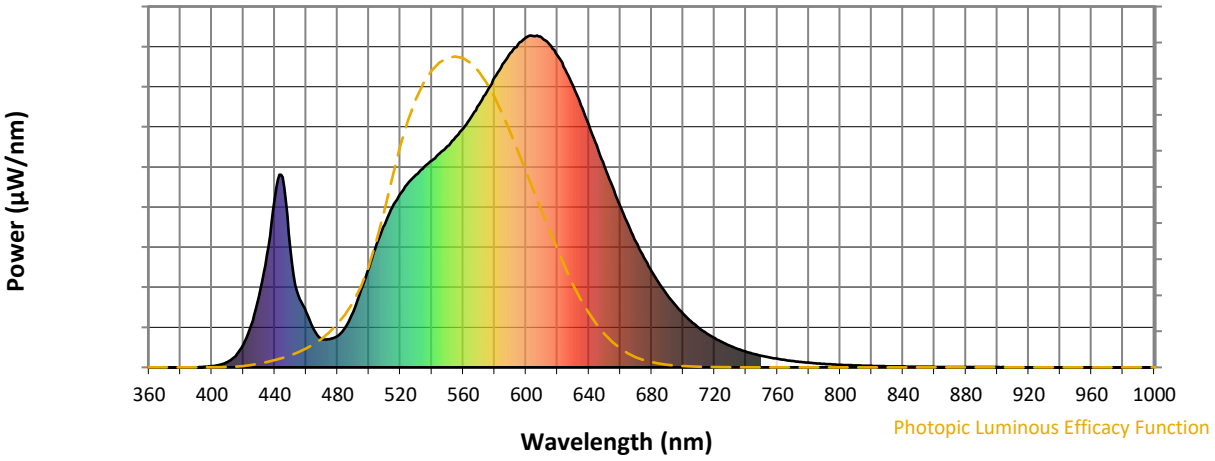
## Photopic Flux vs. Wavelength




## 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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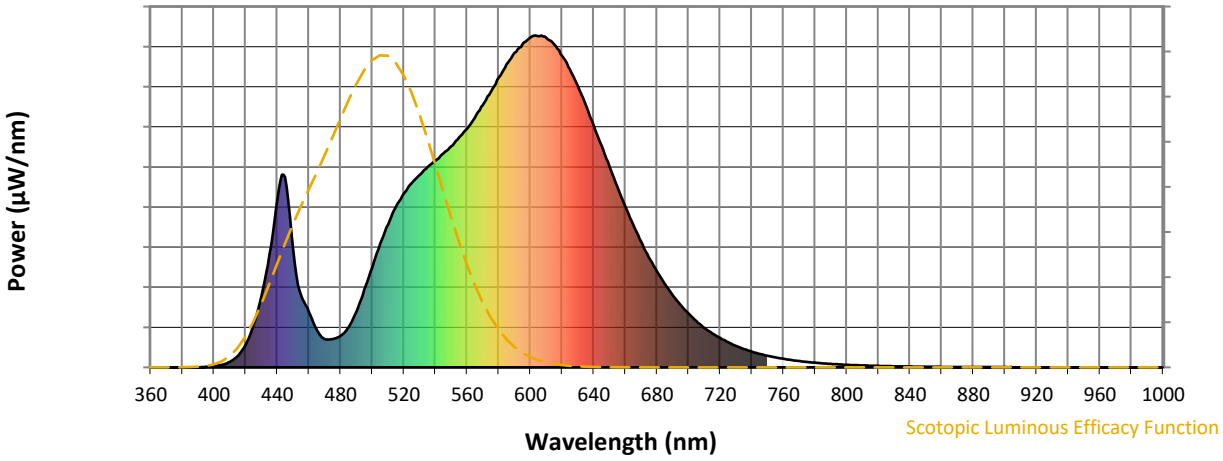
## Scotopic Flux vs. Wavelength




**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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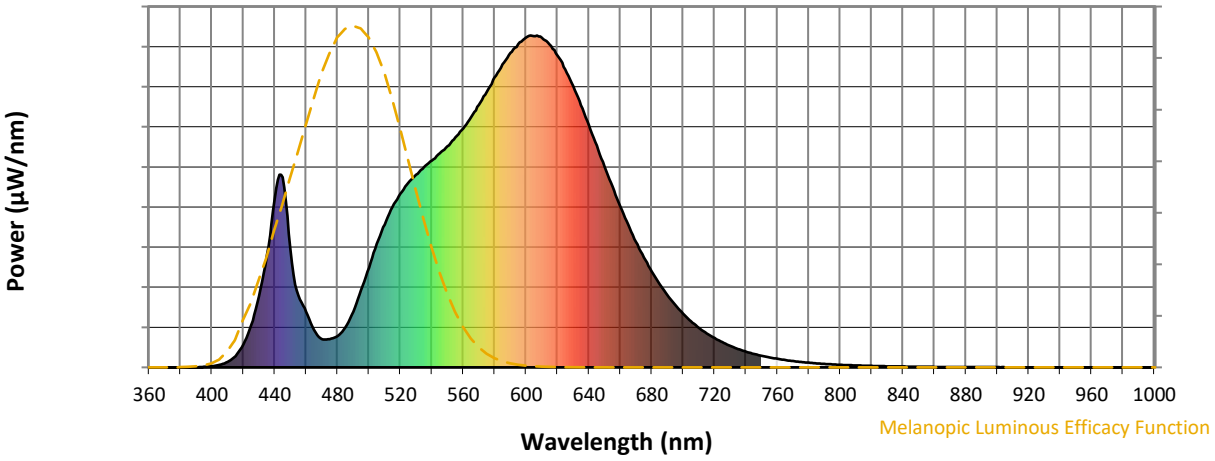
## Melanopic Flux vs. Wavelength




**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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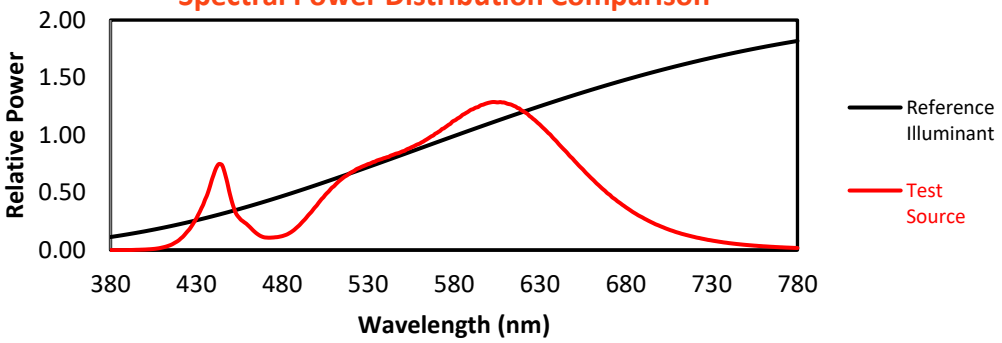
# TM-30-18

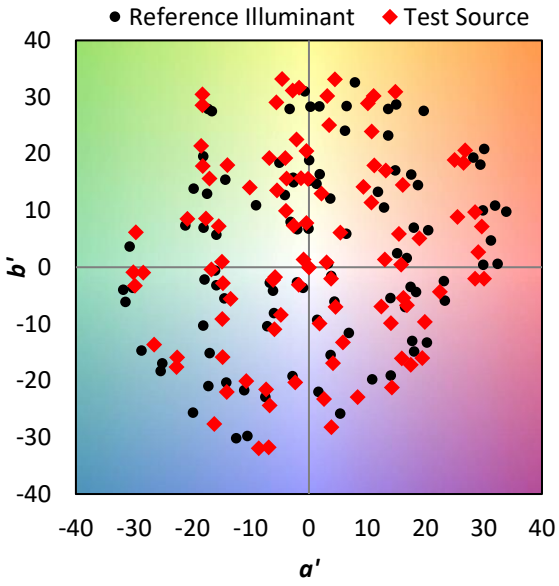
## Summary

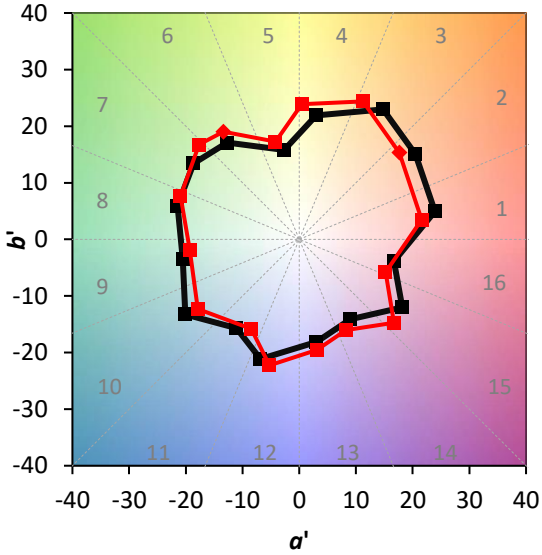
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

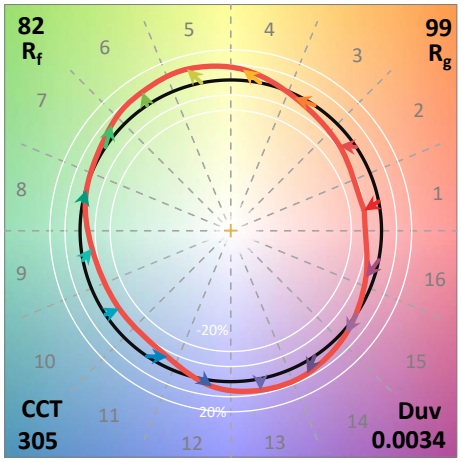
## Spectral Power Distribution Comparison

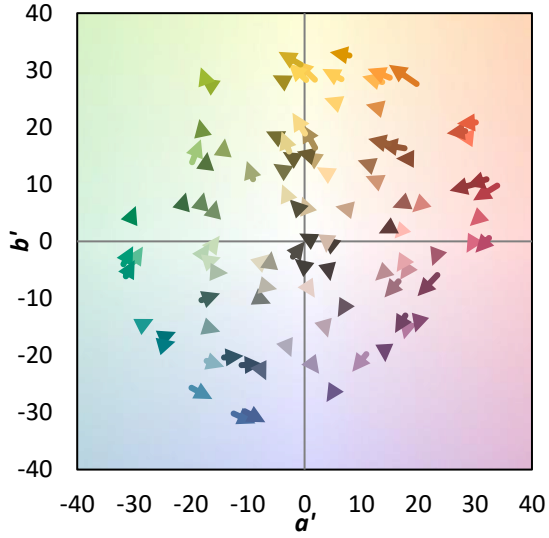



## Color Vector Graphics



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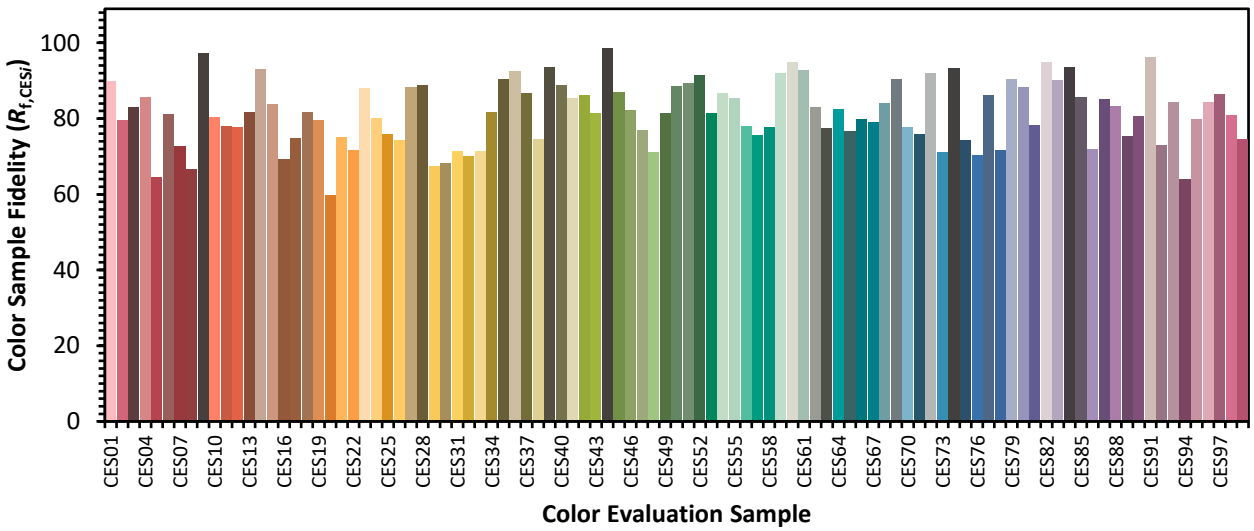
# TM-30-18

**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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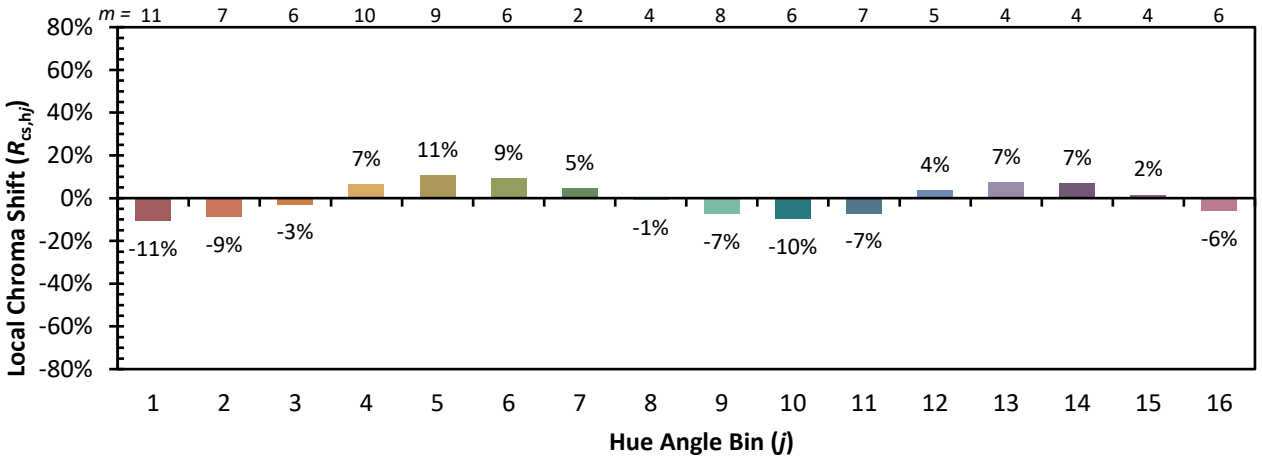
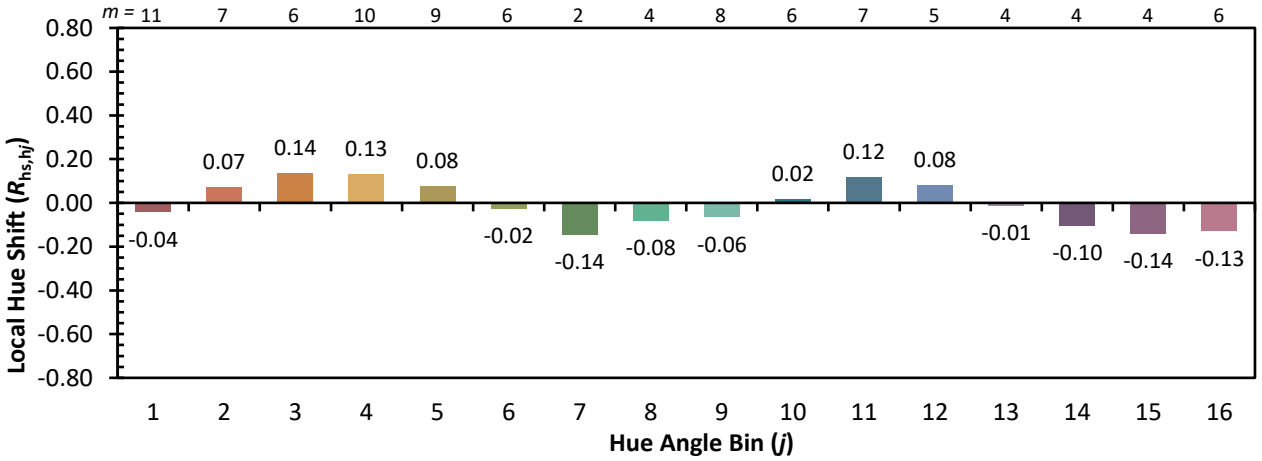
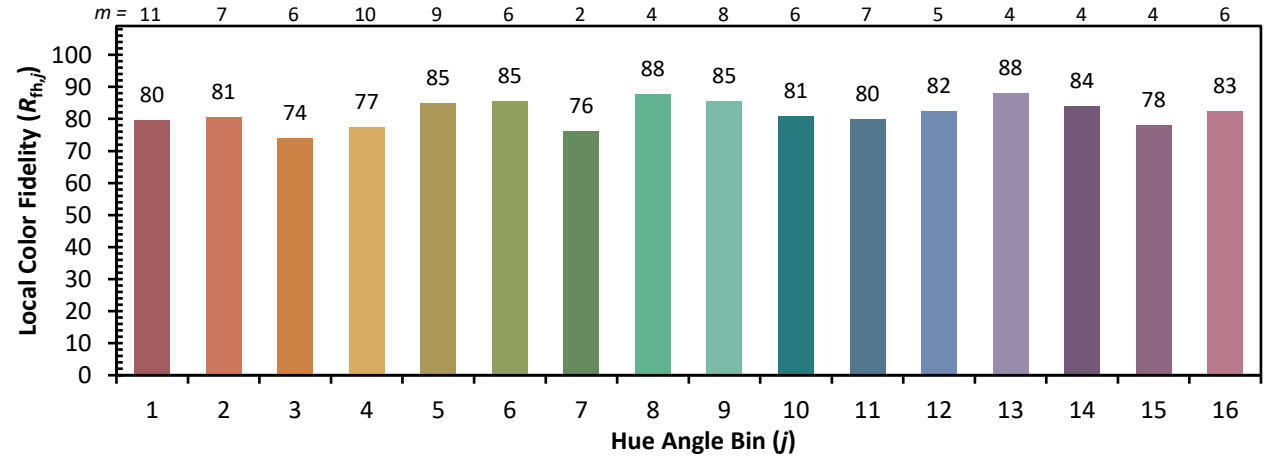
# TM-30-18

## Color Rendition by Hue-Angle Bin



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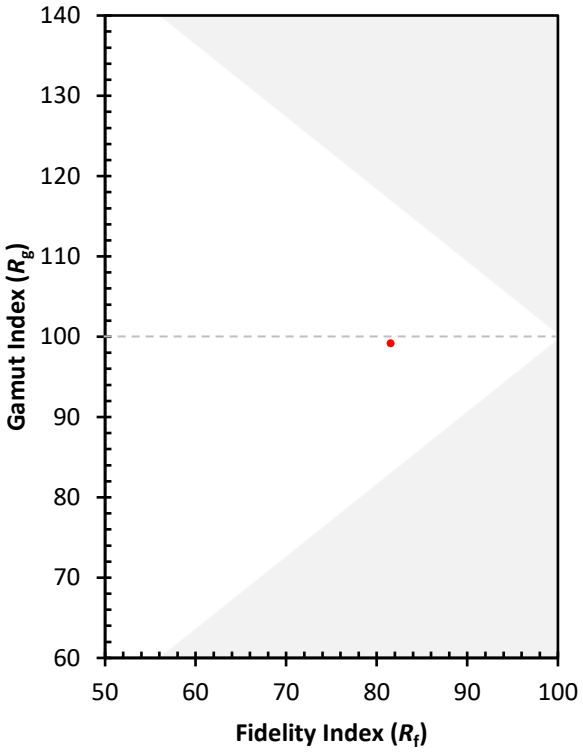
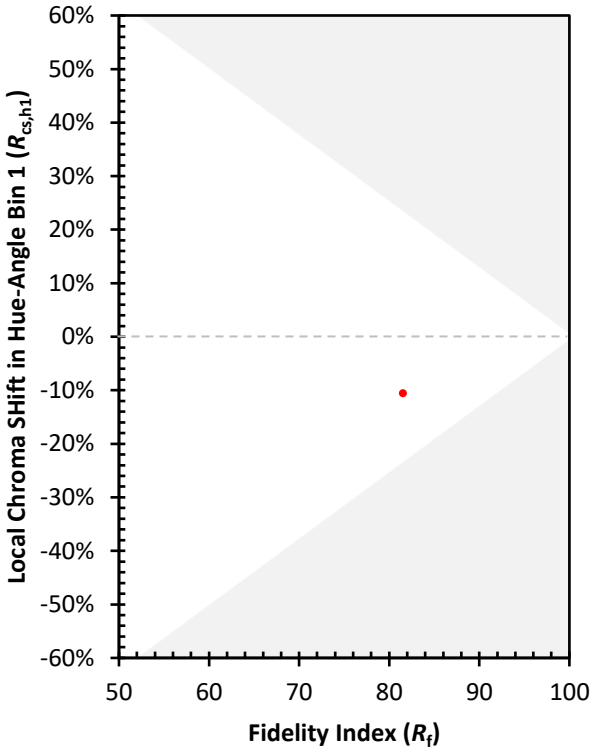
## TM-30-18

### Measure Comparisons

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