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: P640978

Luminaire Tested: GWS-SA5E-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: | P640978 |
| | 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-SA5E-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: | 30316.7 lumens |
| Efficiency: | N/A |
| Efficacy: | 112.5 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): | 269.6 |
| 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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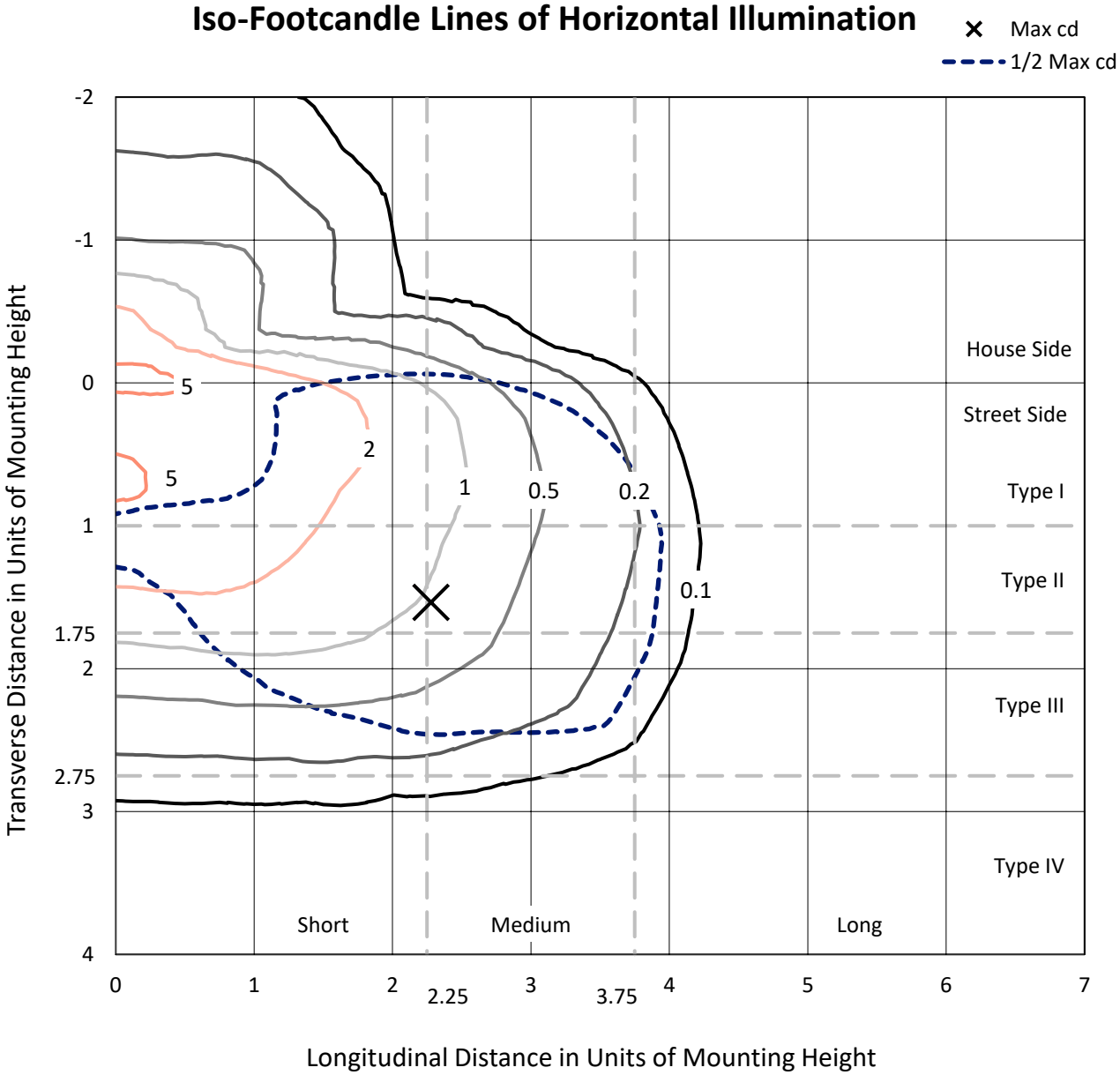
Scaled Data Report

REPORT NUMBER: P640978
CATALOG NUMBER: GWS-SA5E-830-U-T3R-W

## Iso-Footcandle Lines of Horizontal Illumination




Based on 30 foot mounting height. Maximum calculated value = 5.6 fc
Type III - Medium - N/A

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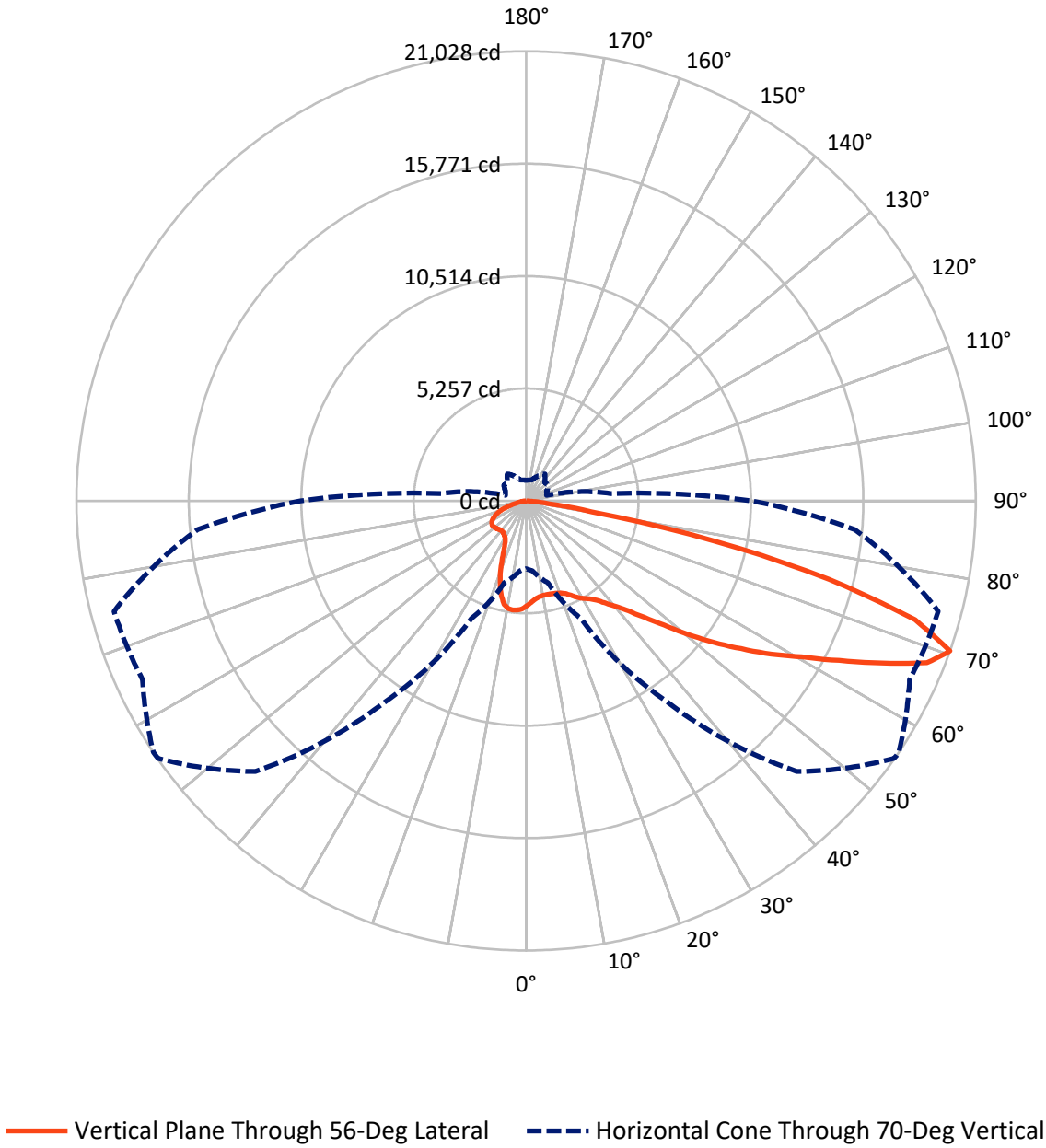
## Luminous Intensity Polar Plot



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REPORT NUMBER: P640978
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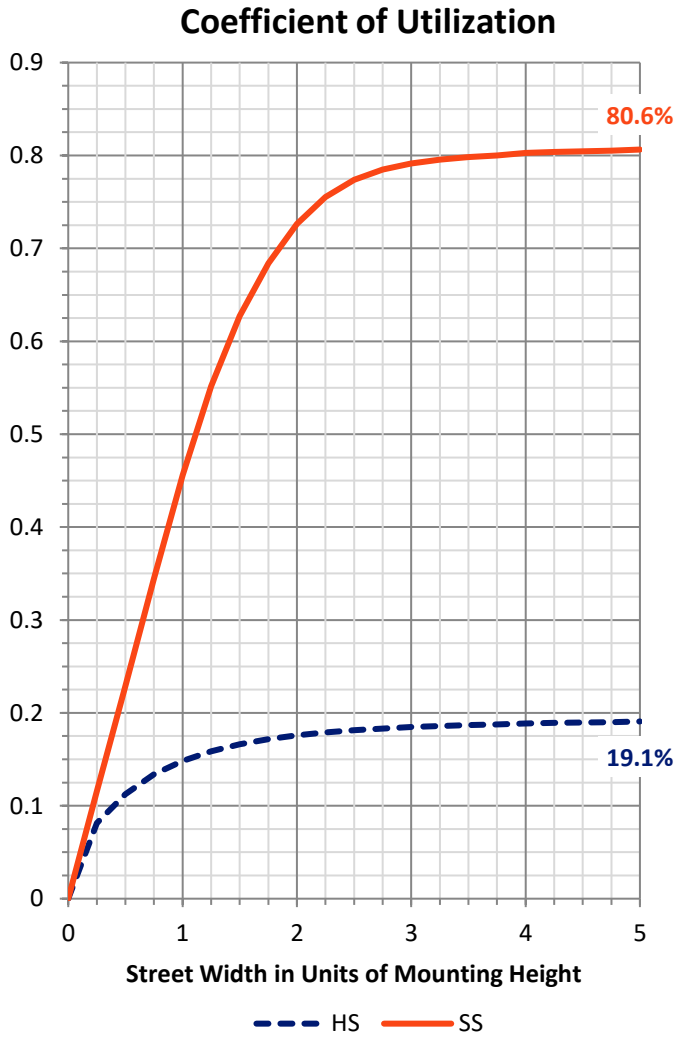
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 5828.4 | 0.0 | 5828.4 |
| | % Fixture | 19.2 | 0.0 | 19.2 |
| **Street Side** | Lumens | 24488.3 | 0.0 | 24488.3 |
| | % Fixture | 80.8 | 0.0 | 80.8 |
| **Total** | Lumens | 30316.7 | 0.0 | 30316.7 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 452.8 | 1.5 |
| 10°-20° | 1227.0 | 4.0 |
| 20°-30° | 2028.6 | 6.7 |
| 30°-40° | 3033.0 | 10.0 |
| 40°-50° | 4513.5 | 14.9 |
| 50°-60° | 6416.9 | 21.2 |
| 60°-70° | 7947.5 | 26.2 |
| 70°-80° | 4388.4 | 14.5 |
| 80°-90° | 309.1 | 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° | 30316.7 | 100.0 |
| 0°-180° | 30316.7 | 100.0 |



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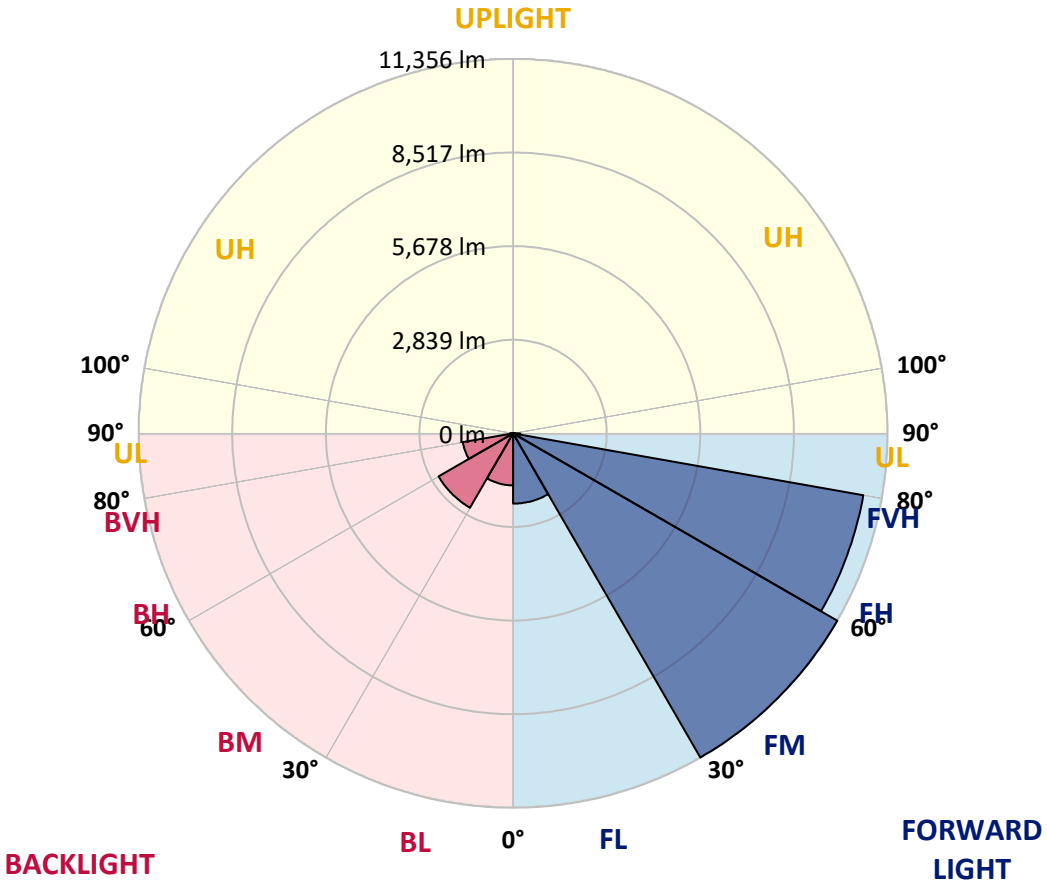
REPORT NUMBER: P640978
CATALOG NUMBER: GWS-SA5E-830-U-T3R-W

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 2130.6 | 7.0 | | | |
| FM | (30°-60°) | 11356.2 | 37.5 | | | |
| FH | (60°-80°) | 10786.7 | 35.6 | | | G4/12000 |
| FVH | (80°-90°) | 214.8 | 0.7 | | | G2/225 |
| BL | (0°-30°) | 1577.8 | 5.2 | B3/2500 | | |
| BM | (30°-60°) | 2607.2 | 8.6 | B3/5000 | | |
| BH | (60°-80°) | 1549.2 | 5.1 | B3/2500 | | G3/2500 |
| BVH | (80°-90°) | 94.3 | 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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Scaled Data Report

REPORT NUMBER: P640978
CATALOG NUMBER: GWS-SA5E-830-U-T3R-W

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 56° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 |
| 2.5° | 4579.3 | 4553.7 | 4583.6 | 4598.6 | 4637.0 | 4692.6 | 4741.8 | 4743.9 | 4769.6 | 4831.6 | 4891.4 |
| 5° | 4371.9 | 4359.1 | 4367.7 | 4412.6 | 4453.2 | 4523.7 | 4598.6 | 4605.0 | 4677.7 | 4799.5 | 4919.2 |
| 7.5° | 4211.6 | 4194.5 | 4226.6 | 4284.3 | 4335.6 | 4414.7 | 4513.0 | 4521.6 | 4624.2 | 4808.1 | 4991.9 |
| 10° | 3980.7 | 3967.9 | 4027.7 | 4104.7 | 4215.9 | 4346.3 | 4476.7 | 4487.4 | 4622.1 | 4863.7 | 5120.2 |
| 12.5° | 3880.2 | 3880.2 | 3905.9 | 3978.6 | 4100.4 | 4273.6 | 4470.3 | 4487.4 | 4656.3 | 4949.2 | 5284.8 |
| 15° | 4036.3 | 4047.0 | 4025.6 | 4021.3 | 4070.5 | 4235.1 | 4478.8 | 4504.5 | 4720.4 | 5036.8 | 5447.3 |
| 17.5° | 4350.6 | 4361.3 | 4305.7 | 4218.0 | 4168.8 | 4271.5 | 4510.9 | 4538.7 | 4788.8 | 5133.0 | 5622.6 |
| 20° | 4791.0 | 4803.8 | 4681.9 | 4547.2 | 4378.4 | 4376.2 | 4572.9 | 4598.6 | 4876.5 | 5237.8 | 5808.6 |
| 22.5° | 5306.2 | 5314.7 | 5160.8 | 4947.0 | 4688.3 | 4570.8 | 4679.8 | 4705.4 | 4989.8 | 5383.2 | 6009.5 |
| 25° | 5902.7 | 5928.3 | 5742.3 | 5432.3 | 5081.7 | 4838.0 | 4857.2 | 4887.2 | 5192.9 | 5577.7 | 6246.9 |
| 27.5° | 6539.7 | 6571.8 | 6358.0 | 6016.0 | 5532.8 | 5133.0 | 5086.0 | 5111.6 | 5408.8 | 5697.4 | 6373.0 |
| 30° | 7191.8 | 7215.3 | 7001.5 | 6610.3 | 6018.1 | 5466.5 | 5278.4 | 5293.4 | 5502.9 | 5755.1 | 6501.3 |
| 32.5° | 7916.5 | 7897.3 | 7692.1 | 7241.0 | 6578.2 | 5866.3 | 5458.0 | 5453.7 | 5607.6 | 5870.6 | 6685.1 |
| 35° | 8596.4 | 8624.2 | 8406.1 | 7908.0 | 7193.9 | 6360.2 | 5727.4 | 5710.2 | 5830.0 | 6058.7 | 6943.8 |
| 37.5° | 9419.4 | 9410.9 | 9150.1 | 8611.3 | 7811.8 | 6832.6 | 6105.8 | 6075.8 | 6118.6 | 6351.6 | 7305.1 |
| 40° | 10007.4 | 10067.2 | 9898.3 | 9395.9 | 8534.4 | 7414.1 | 6548.3 | 6482.0 | 6492.7 | 6712.9 | 7788.3 |
| 42.5° | 10488.4 | 10544.0 | 10561.1 | 10240.4 | 9361.7 | 8132.5 | 7099.9 | 7033.6 | 7040.0 | 7352.1 | 8382.6 |
| 45° | 10858.2 | 10933.1 | 11174.6 | 11080.6 | 10293.8 | 8961.9 | 7846.0 | 7777.6 | 7781.8 | 8128.2 | 9100.9 |
| 47.5° | 11010.0 | 11091.3 | 11580.8 | 11805.3 | 11283.7 | 9953.9 | 8773.8 | 8673.3 | 8688.3 | 9071.0 | 9921.8 |
| 50° | 10960.9 | 11069.9 | 11732.6 | 12363.3 | 12113.2 | 10963.0 | 9883.4 | 9812.8 | 9755.1 | 10310.9 | 10813.3 |
| 52.5° | 10537.6 | 10657.3 | 11717.7 | 12718.2 | 12790.9 | 11916.5 | 11029.3 | 10988.6 | 10975.8 | 11627.9 | 11809.6 |
| 55° | 9291.2 | 9492.1 | 11202.4 | 12812.2 | 13321.1 | 12814.4 | 12271.4 | 12203.0 | 12269.2 | 13038.9 | 12816.5 |
| 57.5° | 8600.6 | 8750.3 | 10193.4 | 12707.5 | 13755.0 | 13669.5 | 13511.3 | 13517.7 | 13592.6 | 14571.7 | 14037.2 |
| 60° | 8207.3 | 8382.6 | 9633.2 | 12421.0 | 14171.9 | 14708.5 | 14809.0 | 14809.0 | 14943.7 | 16224.3 | 15277.2 |
| 62.5° | 7685.6 | 7863.1 | 9109.5 | 11869.4 | 14556.7 | 15931.4 | 16440.2 | 16433.8 | 16487.2 | 17996.6 | 16489.4 |
| 65° | 6627.4 | 6792.0 | 8057.6 | 10999.3 | 14744.9 | 17278.3 | 18293.7 | 18274.5 | 18167.6 | 19574.3 | 17291.1 |
| 67.5° | 4812.3 | 4968.4 | 6172.0 | 9344.6 | 14067.2 | 18364.3 | 20202.9 | 20211.4 | 19572.2 | 20568.4 | 17333.8 |
| 70° | 3172.6 | 3279.5 | 3967.9 | 6069.4 | 11439.7 | 17896.1 | 21002.4 | 21028.1 | 19788.1 | 19948.5 | 15426.9 |
| 72.5° | 1979.7 | 2054.5 | 2477.8 | 3619.4 | 6759.9 | 14165.5 | 18950.1 | 19020.6 | 17802.0 | 17530.5 | 12675.4 |
| 75° | 1314.8 | 1366.1 | 1648.3 | 2110.1 | 3127.7 | 7666.4 | 14405.0 | 14631.6 | 14268.1 | 13742.2 | 8831.5 |
| 77.5° | 791.0 | 833.8 | 1049.7 | 1340.4 | 1385.3 | 2995.2 | 8408.2 | 8994.0 | 9045.3 | 7174.7 | 3698.5 |
| 80° | 361.3 | 410.5 | 579.4 | 765.4 | 737.6 | 1043.3 | 2965.2 | 3102.0 | 3660.0 | 2279.0 | 1167.3 |
| 82.5° | 213.8 | 235.2 | 384.8 | 380.5 | 314.3 | 506.7 | 1066.8 | 1094.6 | 930.0 | 833.8 | 498.1 |
| 85° | 85.5 | 100.5 | 162.5 | 143.2 | 115.4 | 164.6 | 401.9 | 421.2 | 404.1 | 363.4 | 183.9 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 4.3 | 36.3 | 38.5 | 55.6 | 100.5 | 55.6 |
| 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: P640978
CATALOG NUMBER: GWS-SA5E-830-U-T3R-W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 | 4893.6 |
| 2.5° | 4929.9 | 4917.1 | 4981.2 | 5030.4 | 5051.8 | 5073.2 | 5053.9 | 5047.5 | 5047.5 | 5004.8 | 4983.4 |
| 5° | 4983.4 | 4989.8 | 5077.4 | 5118.1 | 5118.1 | 5101.0 | 5049.6 | 5013.3 | 5000.5 | 4944.9 | 4929.9 |
| 7.5° | 5083.9 | 5111.6 | 5192.9 | 5190.7 | 5130.9 | 5036.8 | 4908.5 | 4810.2 | 4720.4 | 4681.9 | 4658.4 |
| 10° | 5248.5 | 5284.8 | 5340.4 | 5250.6 | 5083.9 | 4835.9 | 4564.3 | 4350.6 | 4222.3 | 4119.7 | 4119.7 |
| 12.5° | 5436.6 | 5470.8 | 5460.1 | 5252.7 | 4908.5 | 4444.6 | 4053.4 | 3807.5 | 3628.0 | 3533.9 | 3533.9 |
| 15° | 5624.7 | 5652.5 | 5537.1 | 5154.4 | 4543.0 | 3925.1 | 3497.6 | 3202.5 | 3046.5 | 2958.8 | 2958.8 |
| 17.5° | 5815.0 | 5812.9 | 5569.1 | 4927.8 | 4066.2 | 3350.0 | 2931.0 | 2702.3 | 2648.8 | 2633.9 | 2631.7 |
| 20° | 5998.9 | 5949.7 | 5528.5 | 4549.4 | 3512.5 | 2770.7 | 2505.6 | 2520.5 | 2599.6 | 2633.9 | 2638.1 |
| 22.5° | 6206.2 | 6084.4 | 5408.8 | 4066.2 | 2884.0 | 2368.8 | 2385.9 | 2509.9 | 2625.3 | 2676.6 | 2683.0 |
| 25° | 6417.9 | 6199.8 | 5207.8 | 3499.7 | 2358.1 | 2221.2 | 2353.8 | 2492.8 | 2623.2 | 2689.4 | 2695.9 |
| 27.5° | 6503.4 | 6199.8 | 4865.8 | 2843.4 | 2078.0 | 2159.2 | 2304.6 | 2439.3 | 2576.1 | 2653.1 | 2668.1 |
| 30° | 6573.9 | 6146.4 | 4386.9 | 2251.2 | 1962.6 | 2099.4 | 2225.5 | 2349.5 | 2484.2 | 2578.3 | 2595.4 |
| 32.5° | 6672.3 | 6099.3 | 3807.5 | 1892.0 | 1909.1 | 2041.7 | 2129.3 | 2234.1 | 2355.9 | 2417.9 | 2411.5 |
| 35° | 6787.7 | 6026.7 | 3108.5 | 1721.0 | 1864.2 | 1992.5 | 2054.5 | 2116.5 | 2060.9 | 2058.8 | 2065.2 |
| 37.5° | 6952.3 | 5962.5 | 2499.2 | 1644.0 | 1834.3 | 1958.3 | 2009.6 | 1877.0 | 1800.1 | 1768.0 | 1755.2 |
| 40° | 7189.7 | 5936.9 | 1971.1 | 1599.1 | 1830.0 | 1956.1 | 1919.8 | 1714.6 | 1609.8 | 1498.6 | 1496.5 |
| 42.5° | 7489.0 | 5917.6 | 1629.1 | 1577.7 | 1845.0 | 2005.3 | 1795.8 | 1607.7 | 1391.8 | 1342.6 | 1338.3 |
| 45° | 7873.8 | 5887.7 | 1458.0 | 1573.5 | 1881.3 | 2043.8 | 1783.0 | 1460.2 | 1312.7 | 1291.3 | 1291.3 |
| 47.5° | 8337.7 | 5840.7 | 1381.1 | 1573.5 | 1921.9 | 2026.7 | 1744.5 | 1428.1 | 1276.3 | 1299.8 | 1314.8 |
| 50° | 8870.0 | 5780.8 | 1340.4 | 1569.2 | 1962.6 | 2026.7 | 1663.3 | 1421.7 | 1267.8 | 1389.6 | 1438.8 |
| 52.5° | 9438.7 | 5712.4 | 1312.7 | 1552.1 | 1990.4 | 2028.8 | 1667.5 | 1443.1 | 1276.3 | 1411.0 | 1451.6 |
| 55° | 10067.2 | 5701.7 | 1274.2 | 1515.7 | 1998.9 | 1973.3 | 1678.2 | 1490.1 | 1289.1 | 1278.4 | 1280.6 |
| 57.5° | 10860.4 | 5830.0 | 1246.4 | 1462.3 | 1964.7 | 1859.9 | 1699.6 | 1524.3 | 1274.2 | 1276.3 | 1291.3 |
| 60° | 11689.9 | 6071.5 | 1269.9 | 1411.0 | 1894.2 | 1753.1 | 1714.6 | 1507.2 | 1201.5 | 1167.3 | 1171.6 |
| 62.5° | 12395.4 | 6255.4 | 1289.1 | 1387.5 | 1791.5 | 1659.0 | 1699.6 | 1468.7 | 1160.9 | 1152.3 | 1171.6 |
| 65° | 12690.4 | 6103.6 | 1242.1 | 1338.3 | 1641.9 | 1543.5 | 1667.5 | 1419.5 | 1126.7 | 1094.6 | 1096.7 |
| 67.5° | 12363.3 | 5391.7 | 1150.2 | 1229.3 | 1473.0 | 1396.0 | 1616.2 | 1355.4 | 1079.6 | 1041.1 | 1032.6 |
| 70° | *10561.1* | *3961.5* | *992.0* | *1056.1* | *1267.8* | *1222.9* | *1537.1* | *1272.0* | *1004.8* | *977.0* | *957.8* |
| 72.5° | 8510.9 | 2804.9 | 823.1 | 840.2 | 994.1 | 1030.5 | 1400.3 | 1167.3 | 919.3 | 840.2 | 812.4 |
| 75° | 5924.0 | 1761.6 | 686.3 | 669.2 | 718.3 | 786.7 | 1092.5 | 968.5 | 793.1 | 709.8 | 684.1 |
| 77.5° | 2548.3 | 904.3 | 536.6 | 528.1 | 478.9 | 545.2 | 838.0 | 808.1 | 664.9 | 568.7 | 553.7 |
| 80° | 853.0 | 523.8 | 387.0 | 372.0 | 318.5 | 382.7 | 590.1 | 645.6 | 521.6 | 421.2 | 395.5 |
| 82.5° | 427.6 | 303.6 | 245.9 | 222.3 | 213.8 | 241.6 | 348.5 | 401.9 | 361.3 | 290.8 | 245.9 |
| 85° | 209.5 | 173.2 | 134.7 | 132.5 | 111.2 | 104.8 | 145.4 | 171.0 | 162.5 | 119.7 | 113.3 |
| 87.5° | 77.0 | 68.4 | 42.8 | 34.2 | 21.4 | 15.0 | 8.6 | 8.6 | 6.4 | 6.4 | 6.4 |
| 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

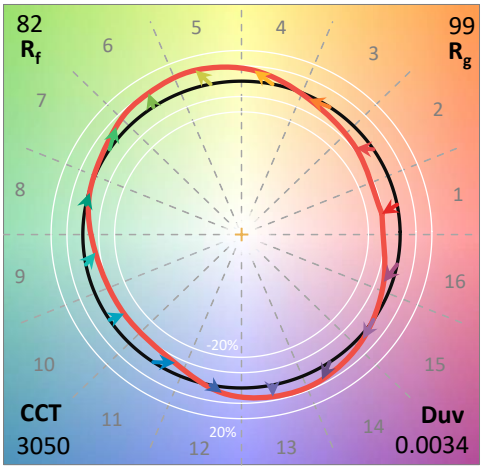
## Test Information

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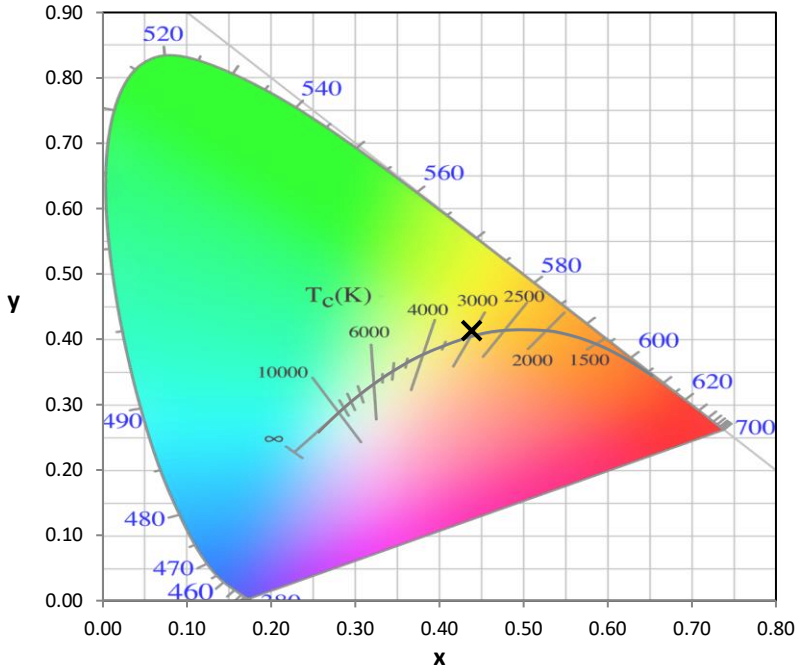
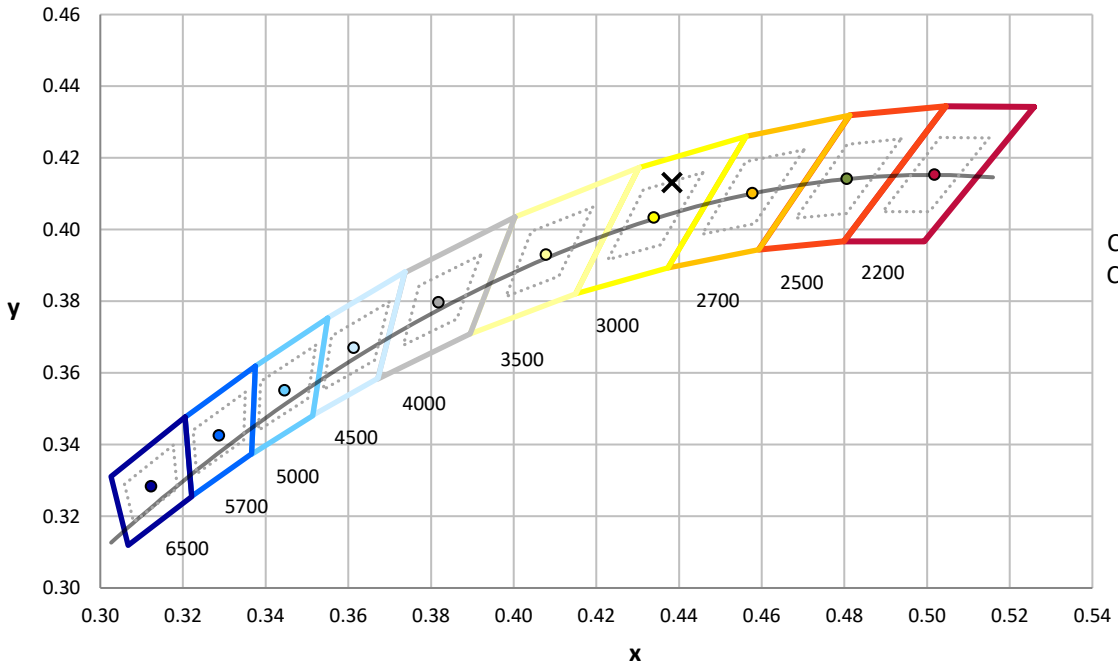
## CIE 1931 Chromaticity Diagram




## 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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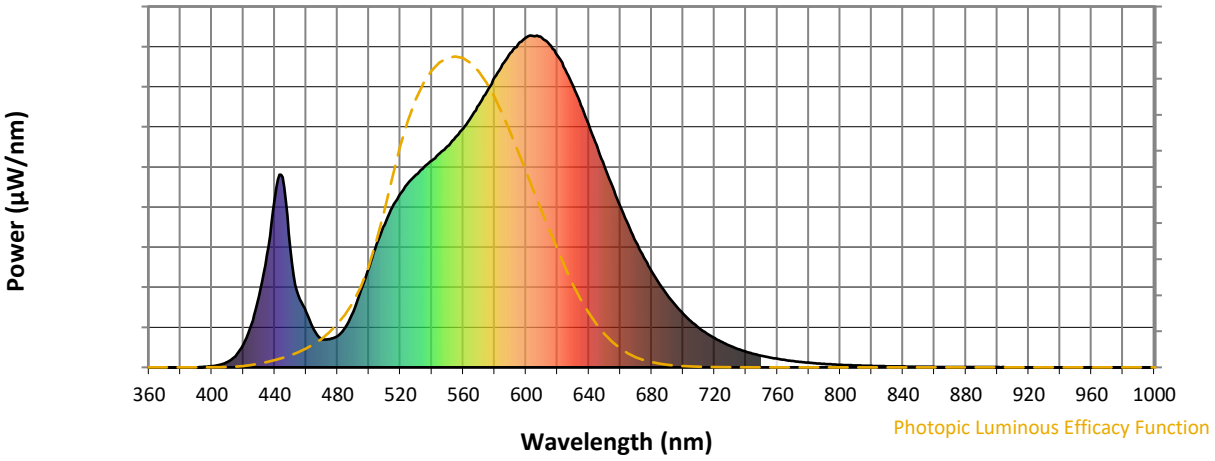
## Photopic Flux vs. Wavelength




## 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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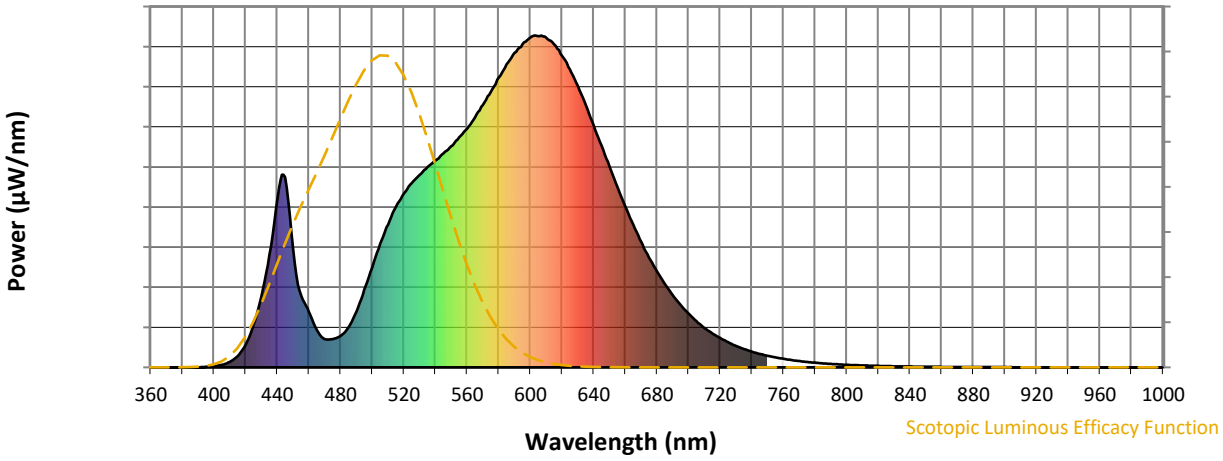
## Scotopic Flux vs. Wavelength




**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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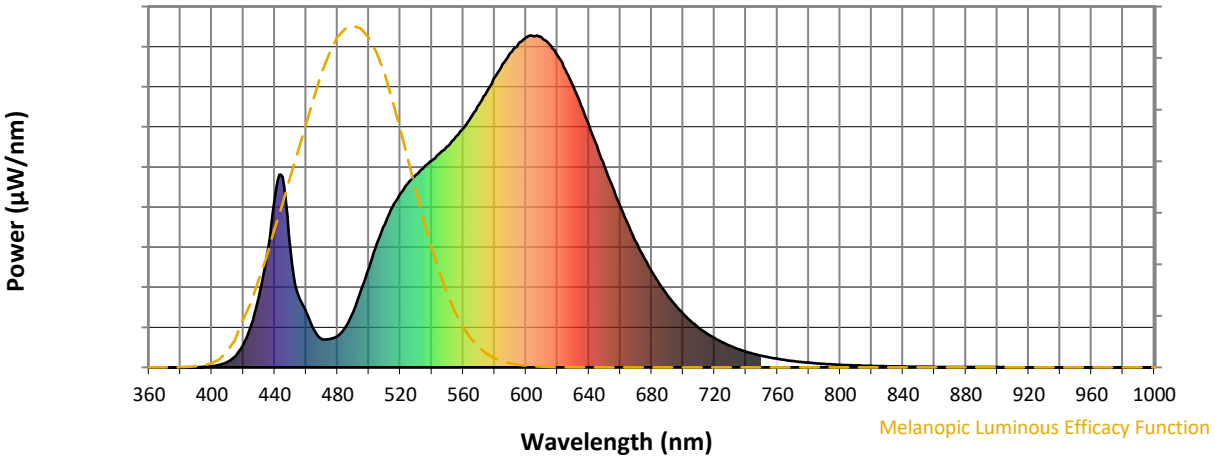
## Melanopic Flux vs. Wavelength




**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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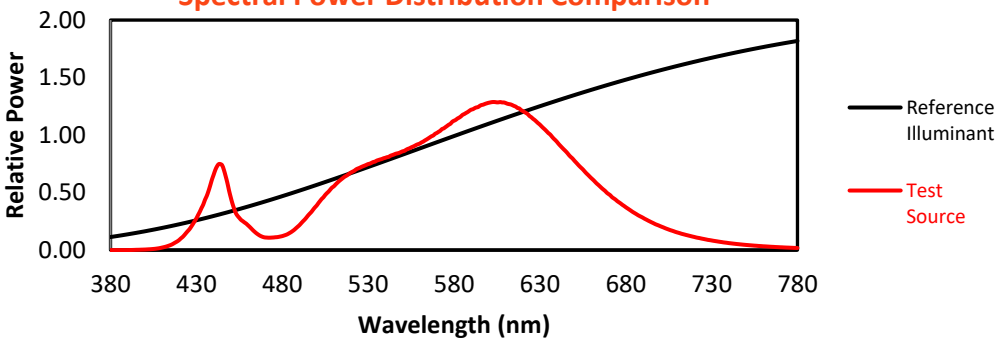
# TM-30-18

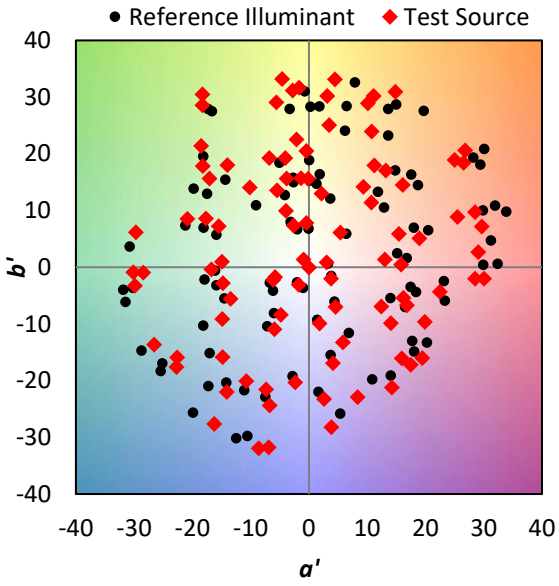
## Summary

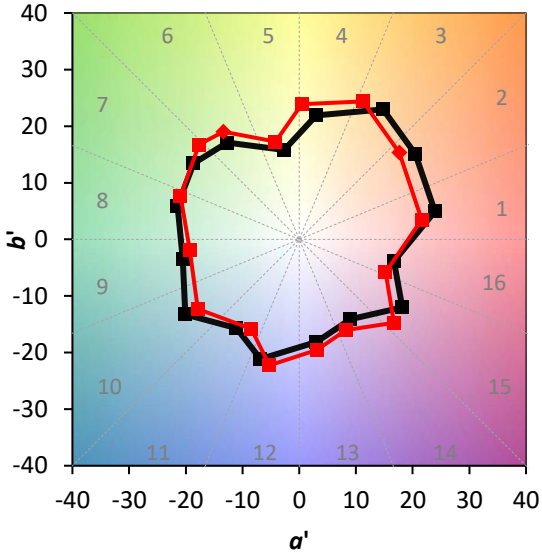
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

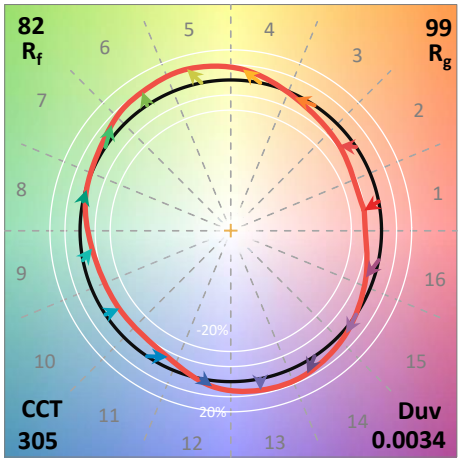
## Spectral Power Distribution Comparison

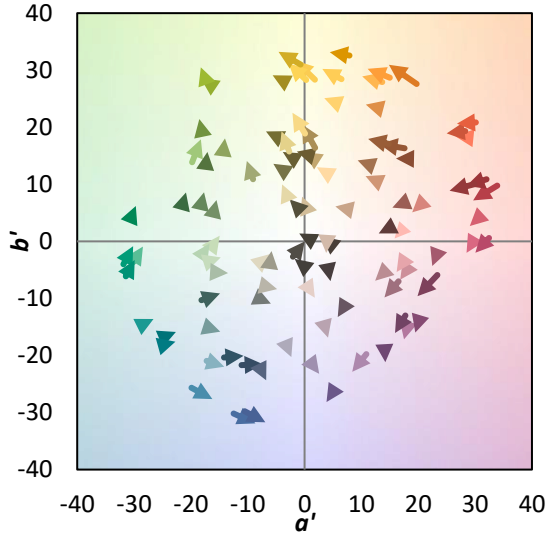



## Color Vector Graphics



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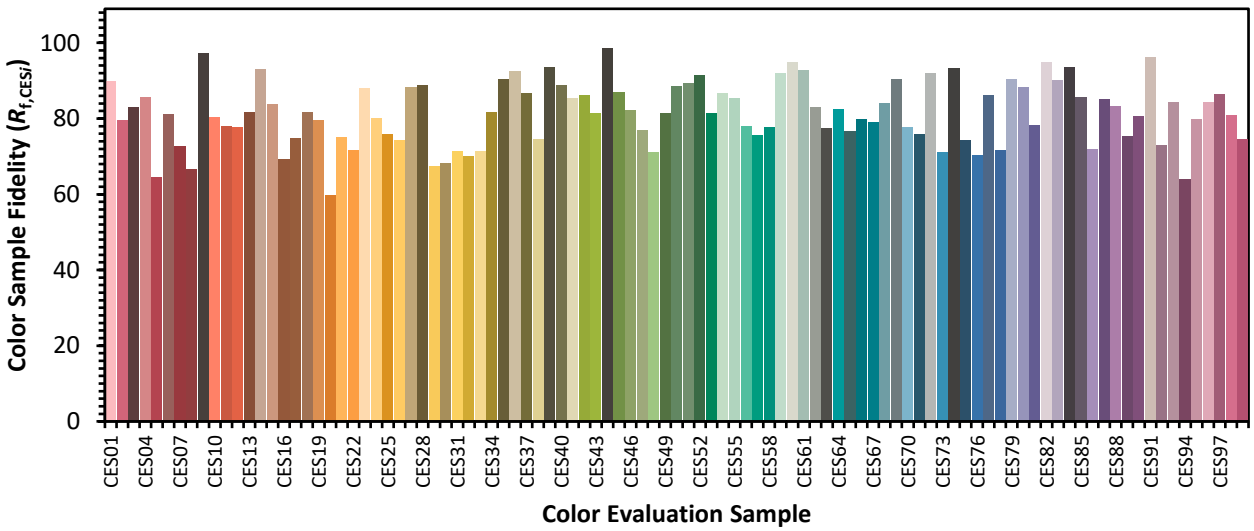
**Individual Sample Fidelity Index ($R_{f,i}$)**

| | | | |
|---|---|---|---|
| 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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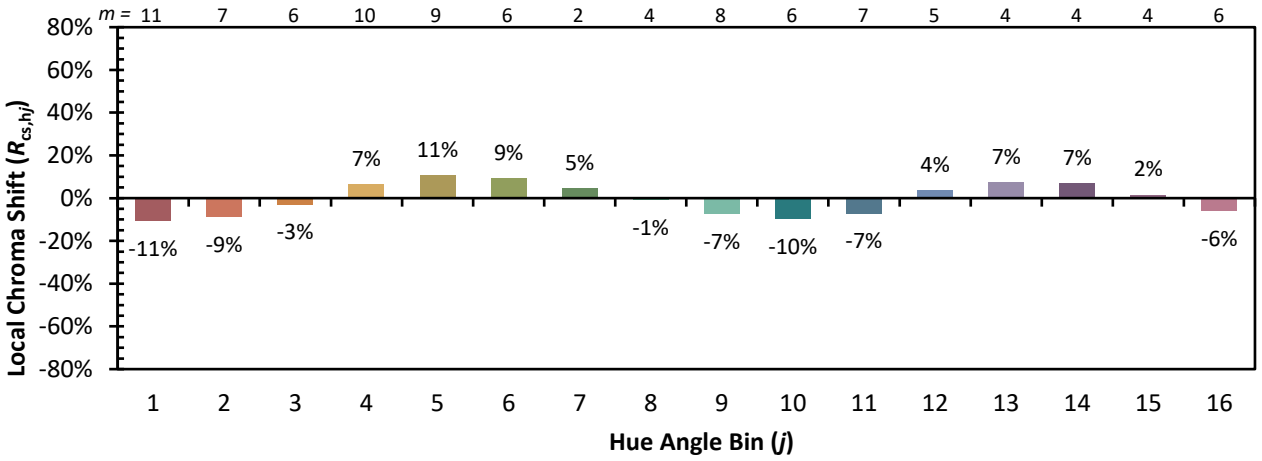
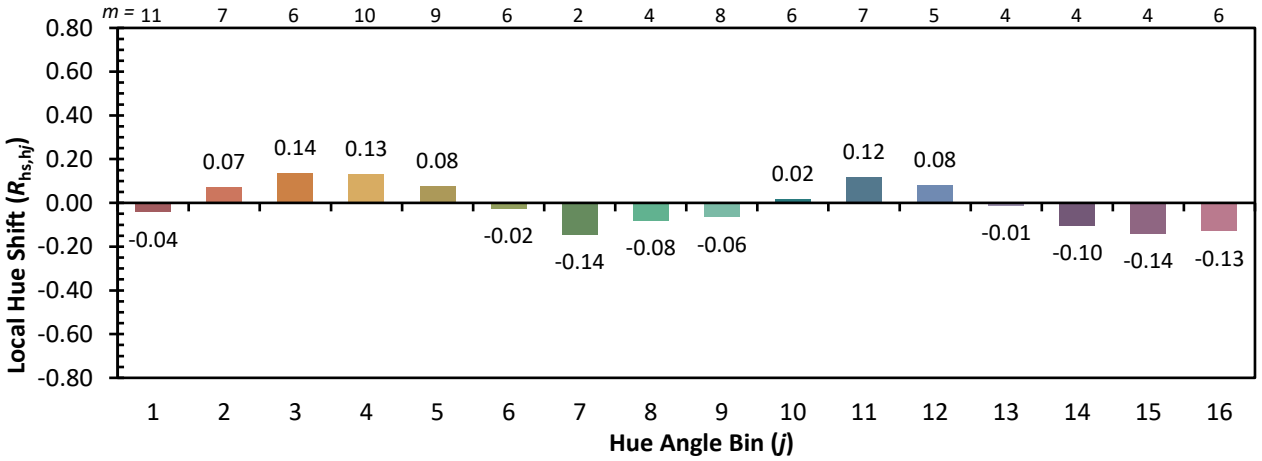
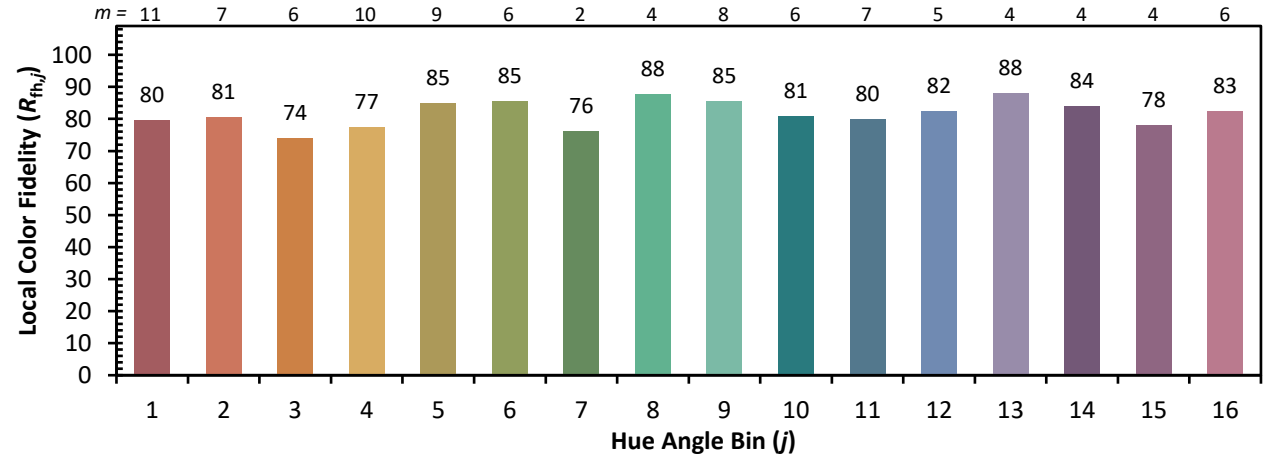
# TM-30-18

## Color Rendition by Hue-Angle Bin



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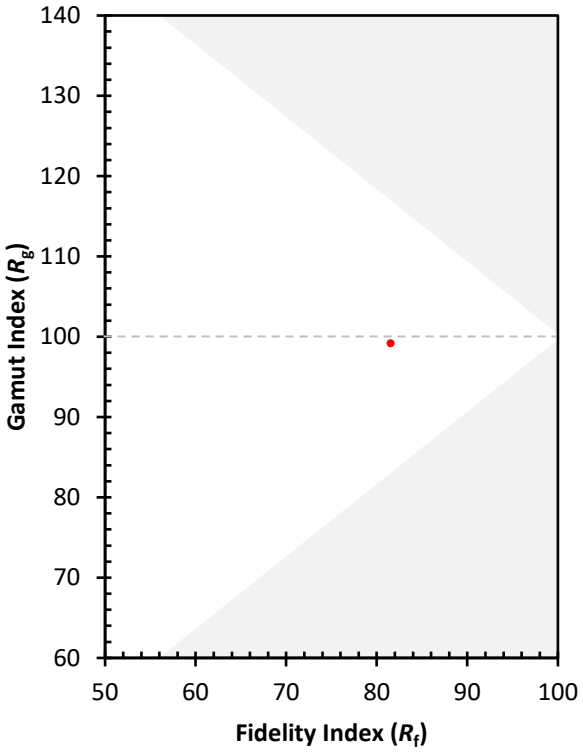
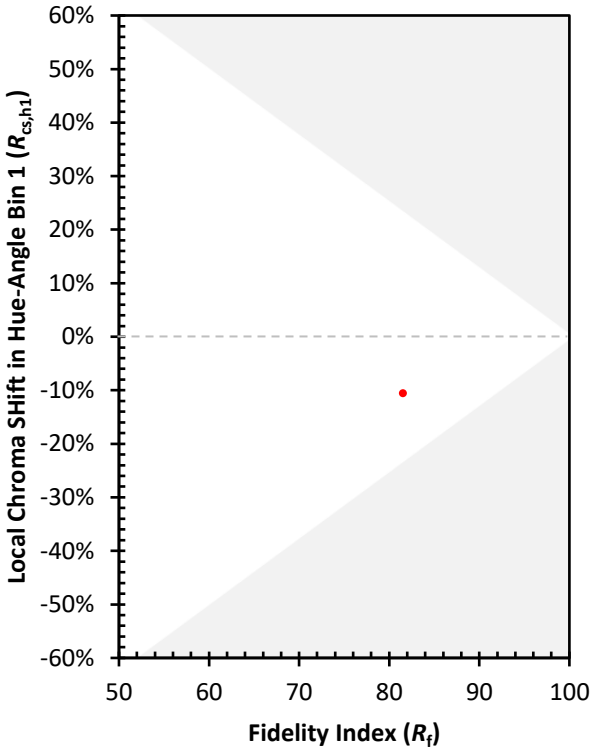
## TM-30-18

### Measure Comparisons




(END OF REPORT)