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: P638995

Luminaire Tested: GWS-SA4F-830-U-T3R-W-GRSBK

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: | P638995 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-16) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA4F-830-U-T3R-W-GRSBK |
| Description: | GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III ROADWAY OPTICS W/ FACTORY INSTALLED GLARE SHIELD, BK |
| Light Source: | (64) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 16952.2 lumens |
| Efficiency: | N/A |
| Efficacy: | 75.2 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 1' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B3 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 225.3 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 0 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 28.75 FT |

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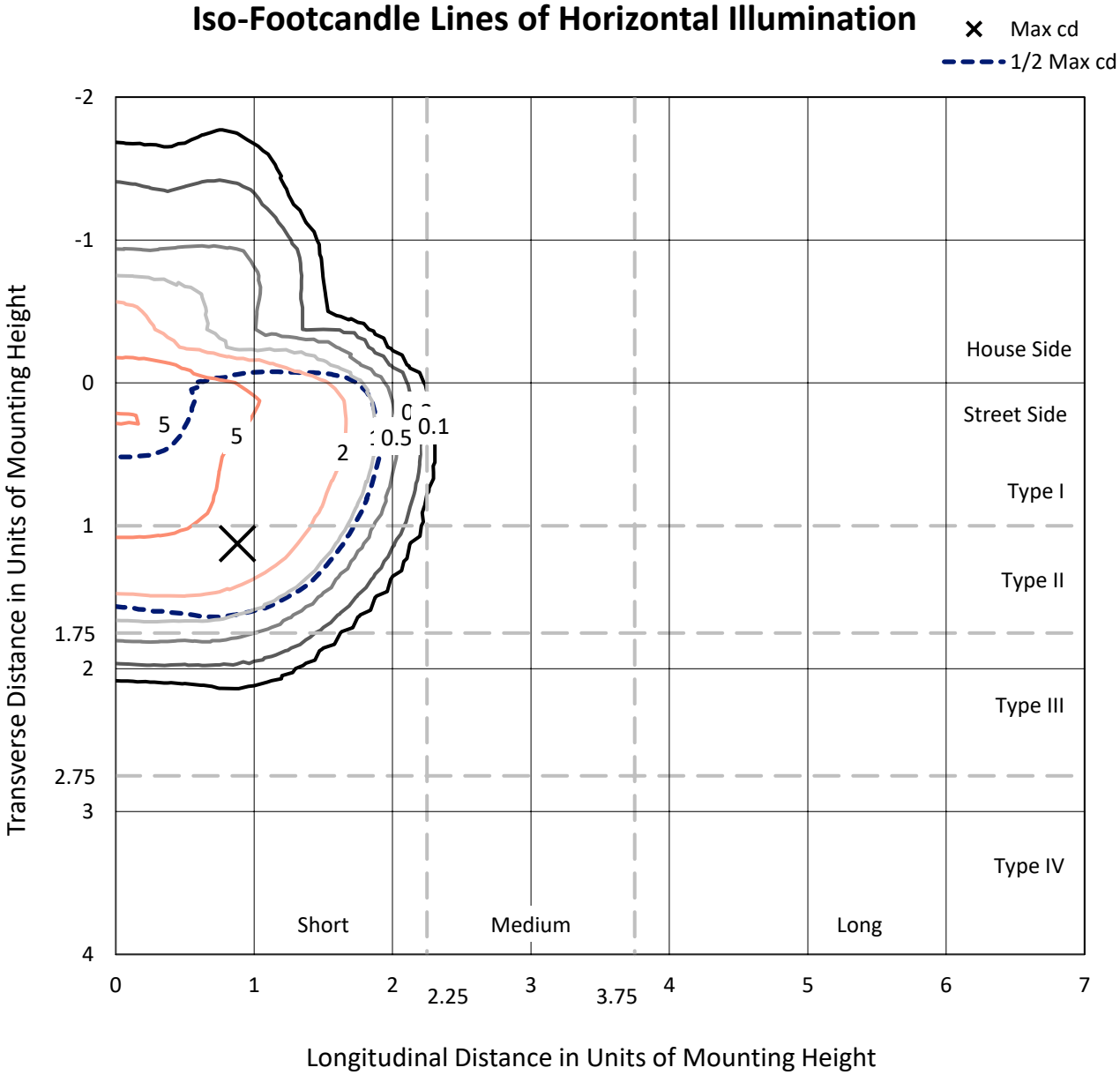
Scaled Data Report

REPORT NUMBER: P638995
CATALOG NUMBER: GWS-SA4F-830-U-T3R-W-GRSBK

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 6.8 fc
Type II - Short - N/A

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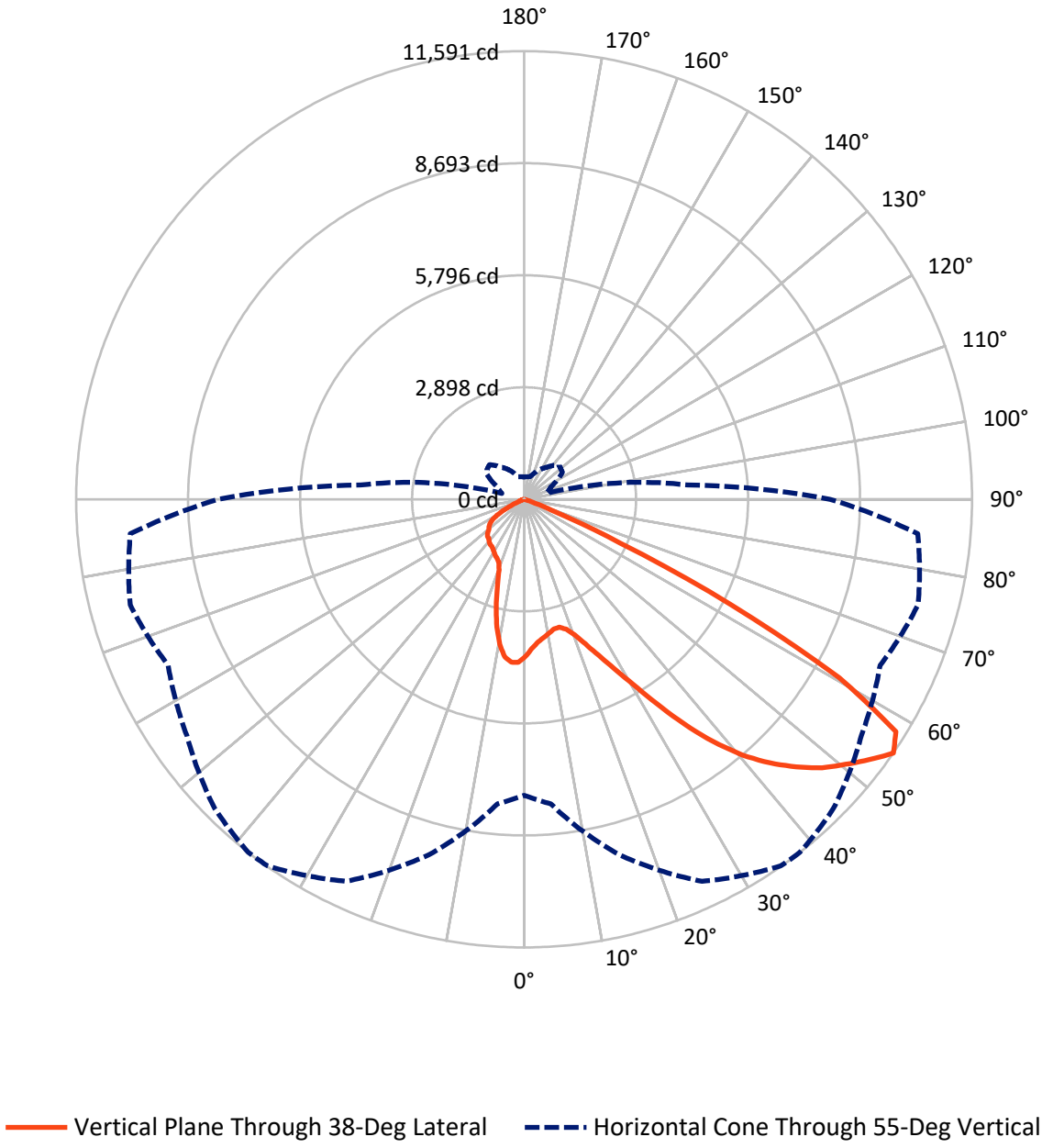
## Luminous Intensity Polar Plot



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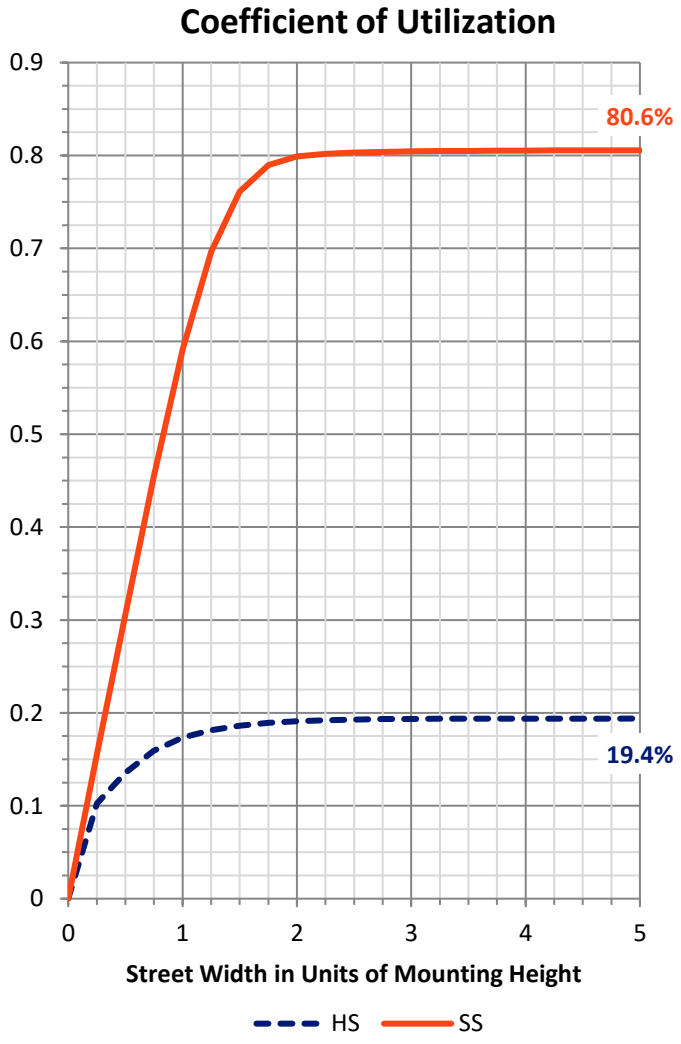
REPORT NUMBER: P638995
CATALOG NUMBER: GWS-SA4F-830-U-T3R-W-GRSBK

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 3302.8 | 0.0 | 3302.8 |
| | % Fixture | 19.5 | 0.0 | 19.5 |
| **Street Side** | Lumens | 13649.4 | 0.0 | 13649.4 |
| | % Fixture | 80.5 | 0.0 | 80.5 |
| **Total** | Lumens | 16952.2 | 0.0 | 16952.2 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 375.9 | 2.2 |
| 10°-20° | 1011.9 | 6.0 |
| 20°-30° | 1736.5 | 10.2 |
| 30°-40° | 2880.2 | 17.0 |
| 40°-50° | 4234.0 | 25.0 |
| 50°-60° | 4947.5 | 29.2 |
| 60°-70° | 1677.1 | 9.9 |
| 70°-80° | 85.7 | 0.5 |
| 80°-90° | 3.4 | 0.0 |
| 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° | 16952.2 | 100.0 |
| 0°-180° | 16952.2 | 100.0 |



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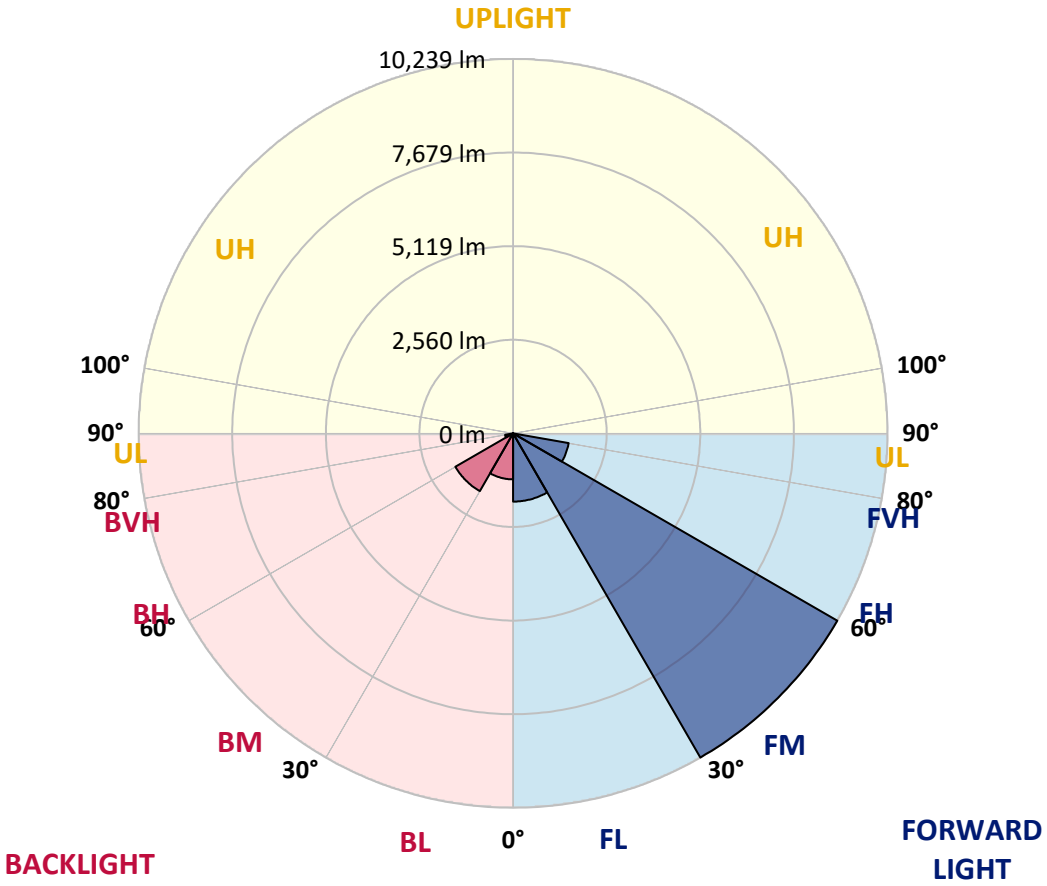
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1866.0 | 11.0 | | | |
| FM | (30°-60°) | 10238.7 | 60.4 | | | |
| FH | (60°-80°) | 1542.9 | 9.1 | | | G1/1800 |
| FVH | (80°-90°) | 1.8 | 0.0 | | | G0/10 |
| BL | (0°-30°) | 1258.3 | 7.4 | B3/2500 | | |
| BM | (30°-60°) | 1823.0 | 10.8 | B2/2500 | | |
| BH | (60°-80°) | 219.9 | 1.3 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 1.6 | 0.0 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B3-U0-G1**
Type II Short



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REPORT NUMBER: P638995
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 38° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 |
| 2.5° | 3786.2 | 3778.5 | 3794.0 | 3825.0 | 3854.1 | 3863.7 | 3892.8 | 3933.5 | 3958.7 | 4018.8 | 4067.2 |
| 5° | 3615.7 | 3611.8 | 3627.4 | 3654.5 | 3693.2 | 3706.8 | 3751.4 | 3819.2 | 3887.0 | 3991.6 | 4094.3 |
| 7.5° | 3460.7 | 3458.8 | 3482.0 | 3542.1 | 3598.3 | 3615.7 | 3670.0 | 3753.3 | 3844.4 | 4005.2 | 4156.3 |
| 10° | 3257.3 | 3259.2 | 3303.8 | 3389.0 | 3491.7 | 3526.6 | 3613.8 | 3733.9 | 3852.1 | 4059.5 | 4268.7 |
| 12.5° | 3191.4 | 3195.2 | 3218.5 | 3284.4 | 3396.8 | 3441.3 | 3563.4 | 3745.5 | 3896.7 | 4137.0 | 4414.1 |
| 15° | 3352.2 | 3352.2 | 3332.8 | 3340.6 | 3391.0 | 3431.6 | 3559.5 | 3784.3 | 3972.3 | 4230.0 | 4557.4 |
| 17.5° | 3664.2 | 3652.5 | 3604.1 | 3538.2 | 3520.8 | 3534.3 | 3637.0 | 3867.6 | 4078.8 | 4338.5 | 4720.2 |
| 20° | 4086.6 | 4090.5 | 3995.5 | 3857.9 | 3747.5 | 3745.5 | 3807.6 | 4014.9 | 4231.9 | 4468.3 | 4896.5 |
| 22.5° | 4598.1 | 4582.6 | 4456.7 | 4268.7 | 4076.9 | 4061.4 | 4086.6 | 4239.7 | 4452.8 | 4673.7 | 5113.6 |
| 25° | 5191.1 | 5183.3 | 5005.0 | 4753.1 | 4499.3 | 4462.5 | 4462.5 | 4613.6 | 4768.6 | 4966.3 | 5373.2 |
| 27.5° | 5811.1 | 5811.1 | 5638.7 | 5348.0 | 5010.9 | 4945.0 | 4935.3 | 5113.6 | 5216.3 | 5255.0 | 5592.2 |
| 30° | 6448.6 | 6440.9 | 6270.4 | 5972.0 | 5611.5 | 5543.7 | 5516.6 | 5648.4 | 5722.0 | 5605.7 | 5865.4 |
| 32.5° | 7095.8 | 7109.4 | 6936.9 | 6659.8 | 6338.2 | 6293.6 | 6210.3 | 6210.3 | 6270.4 | 6107.6 | 6295.5 |
| 35° | 7791.4 | 7787.6 | 7651.9 | 7464.0 | 7188.8 | 7138.4 | 7000.9 | 6785.8 | 6876.9 | 6805.2 | 6890.4 |
| 37.5° | 8405.7 | 8434.8 | 8368.9 | 8229.4 | 8006.5 | 7956.1 | 7729.4 | 7340.0 | 7409.7 | 7522.1 | 7597.7 |
| 40° | 9029.6 | 9052.9 | 9118.8 | 9074.2 | 8793.2 | 8700.2 | 8297.2 | 7657.7 | 7735.2 | 8120.8 | 8337.9 |
| 42.5° | 9641.9 | 9653.6 | 9787.3 | 9860.9 | 9485.0 | 9322.2 | 8727.3 | 7851.5 | 7932.9 | 8589.8 | 8969.6 |
| 45° | 10031.4 | 10056.6 | 10277.5 | 10502.3 | 10095.3 | 9872.5 | 9101.3 | 8099.5 | 8134.4 | 8915.3 | 9436.5 |
| 47.5° | 10015.9 | 10074.0 | 10488.7 | 10897.6 | 10620.5 | 10380.2 | 9550.9 | 8496.8 | 8438.6 | 9221.5 | 9744.6 |
| 50° | 9703.9 | 9773.7 | 10368.6 | 11017.7 | 10998.3 | 10775.5 | 10050.8 | 9072.3 | 8890.1 | 9492.7 | 9783.4 |
| 52.5° | 9056.7 | 9258.3 | 10157.4 | 11033.2 | 11302.5 | 11190.1 | 10668.9 | 9847.3 | 9500.5 | 9882.2 | 9845.4 |
| 55° | 7657.7 | 7905.8 | 9516.0 | 10901.4 | 11577.7 | 11591.2 | 11318.0 | 10655.3 | 10163.2 | 10552.6 | 10227.1 |
| 57.5° | 5813.1 | 6010.7 | 7324.5 | 9703.9 | 11122.3 | 11345.2 | 11569.9 | 11081.6 | 10572.0 | 11009.9 | 10316.2 |
| 60° | 3503.3 | 3732.0 | 4586.5 | 7121.0 | 8983.1 | 9362.9 | 10244.6 | 10149.6 | 9535.4 | 9723.3 | 8459.9 |
| 62.5° | 1420.3 | 1540.5 | 2117.9 | 3923.8 | 5654.2 | 6008.8 | 6853.6 | 6997.0 | 6845.8 | 6654.0 | 5131.0 |
| 65° | 519.3 | 567.7 | 848.7 | 1621.8 | 2600.4 | 2730.2 | 3175.9 | 3429.7 | 3639.0 | 3098.4 | 1908.6 |
| 67.5° | 321.7 | 352.7 | 552.2 | 833.2 | 945.6 | 879.7 | 895.2 | 1067.7 | 1019.2 | 629.7 | 341.0 |
| 70° | 238.3 | 263.5 | 432.1 | 577.4 | 381.7 | 294.5 | 199.6 | 213.1 | 191.8 | 168.6 | 166.6 |
| 72.5° | 164.7 | 188.0 | 323.6 | 341.0 | 147.3 | 104.6 | 73.6 | 102.7 | 116.3 | 114.3 | 118.2 |
| 75° | 108.5 | 125.9 | 203.5 | 133.7 | 36.8 | 29.1 | 25.2 | 54.3 | 69.8 | 69.8 | 71.7 |
| 77.5° | 63.9 | 73.6 | 71.7 | 27.1 | 7.8 | 7.8 | 5.8 | 9.7 | 15.5 | 17.4 | 21.3 |
| 80° | 7.8 | 5.8 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 5.8 | 5.8 | 5.8 |
| 82.5° | 1.9 | 1.9 | 1.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 5.8 | 5.8 |
| 85° | 0.0 | 0.0 | 1.9 | 1.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 5.8 | 5.8 |
| 87.5° | 0.0 | 0.0 | 1.9 | 1.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 5.8 | 5.8 |
| 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: P638995
CATALOG NUMBER: GWS-SA4F-830-U-T3R-W-GRSBK

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 | 4065.3 |
| 2.5° | 4104.0 | 4090.5 | 4146.7 | 4187.3 | 4220.3 | 4235.8 | 4214.5 | 4212.5 | 4212.5 | 4169.9 | 4158.3 |
| 5° | 4152.5 | 4158.3 | 4237.7 | 4272.6 | 4278.4 | 4259.0 | 4210.6 | 4177.7 | 4158.3 | 4113.7 | 4088.5 |
| 7.5° | 4245.5 | 4264.8 | 4340.4 | 4334.6 | 4282.3 | 4193.2 | 4065.3 | 3966.4 | 3902.5 | 3832.7 | 3790.1 |
| 10° | 4379.2 | 4416.0 | 4462.5 | 4381.1 | 4214.5 | 3987.8 | 3724.2 | 3536.3 | 3423.9 | 3344.4 | 3296.0 |
| 12.5° | 4541.9 | 4578.8 | 4563.3 | 4371.4 | 4024.6 | 3619.6 | 3280.5 | 3009.2 | 2879.4 | 2807.7 | 2757.3 |
| 15° | 4706.6 | 4729.9 | 4629.1 | 4255.2 | 3689.4 | 3144.9 | 2767.0 | 2497.7 | 2338.8 | 2280.7 | 2238.0 |
| 17.5° | 4875.2 | 4869.4 | 4640.8 | 4026.5 | 3241.8 | 2610.1 | 2238.0 | 2053.9 | 2009.4 | 1999.7 | 1995.8 |
| 20° | 5051.6 | 4999.2 | 4594.3 | 3699.0 | 2703.1 | 2081.1 | 1869.9 | 1881.5 | 1962.9 | 2001.6 | 2009.4 |
| 22.5° | 5253.1 | 5121.3 | 4478.0 | 3255.3 | 2152.8 | 1734.2 | 1755.5 | 1869.9 | 1980.3 | 2032.6 | 2040.4 |
| 25° | 5468.2 | 5233.7 | 4284.2 | 2685.6 | 1697.4 | 1594.7 | 1720.7 | 1852.4 | 1970.6 | 2034.6 | 2042.3 |
| 27.5° | 5609.6 | 5260.8 | 3966.4 | 2112.1 | 1457.1 | 1540.5 | 1674.2 | 1800.1 | 1922.2 | 1991.9 | 2001.6 |
| 30° | 5762.7 | 5249.2 | 3534.3 | 1627.7 | 1375.8 | 1494.0 | 1610.2 | 1724.5 | 1836.9 | 1914.4 | 1922.2 |
| 32.5° | 5987.5 | 5241.4 | 3007.3 | 1321.5 | 1342.8 | 1457.1 | 1542.4 | 1637.3 | 1714.9 | 1759.4 | 1753.6 |
| 35° | 6282.0 | 5231.8 | 2393.0 | 1191.7 | 1323.4 | 1428.1 | 1495.9 | 1540.5 | 1455.2 | 1428.1 | 1433.9 |
| 37.5° | 6659.8 | 5255.0 | 1875.7 | 1137.4 | 1317.6 | 1420.3 | 1478.5 | 1350.6 | 1218.8 | 1168.4 | 1160.7 |
| 40° | 7078.4 | 5315.1 | 1430.0 | 1116.1 | 1337.0 | 1439.7 | 1412.6 | 1201.4 | 1038.6 | 939.8 | 918.5 |
| 42.5° | 7498.8 | 5381.0 | 1131.6 | 1108.4 | 1369.9 | 1494.0 | 1304.1 | 1092.9 | 848.7 | 792.5 | 784.8 |
| 45° | 7810.8 | 5369.3 | 978.5 | 1094.8 | 1399.0 | 1525.0 | 1275.0 | 937.8 | 757.6 | 732.4 | 734.4 |
| 47.5° | 7967.8 | 5241.4 | 895.2 | 1063.8 | 1410.6 | 1494.0 | 1203.3 | 873.9 | 695.6 | 722.8 | 746.0 |
| 50° | 7884.4 | 4910.1 | 817.7 | 1003.7 | 1385.4 | 1453.3 | 1089.0 | 825.5 | 664.6 | 777.0 | 829.3 |
| 52.5° | 7783.7 | 4503.2 | 732.4 | 910.7 | 1325.4 | 1397.1 | 1044.4 | 811.9 | 645.2 | 749.9 | 788.6 |
| 55° | *7917.4* | *4245.5* | *592.9* | *767.3* | *1207.2* | *1265.3* | *1009.5* | *810.0* | *600.7* | *583.2* | *577.4* |
| 57.5° | 7729.4 | 3732.0 | 424.4 | 552.2 | 926.2 | 1001.8 | 984.3 | 796.4 | 532.9 | 530.9 | 538.7 |
| 60° | 5973.9 | 2276.8 | 290.7 | 350.7 | 567.7 | 639.4 | 893.3 | 761.5 | 459.2 | 422.4 | 424.4 |
| 62.5° | 3394.8 | 968.8 | 199.6 | 217.0 | 290.7 | 344.9 | 682.1 | 691.8 | 424.4 | 403.0 | 424.4 |
| 65° | 1182.0 | 346.8 | 155.0 | 145.3 | 160.8 | 184.1 | 391.4 | 534.8 | 385.6 | 348.8 | 352.7 |
| 67.5° | 244.1 | 172.5 | 137.6 | 120.1 | 120.1 | 120.1 | 199.6 | 333.3 | 317.8 | 277.1 | 281.0 |
| 70° | 155.0 | 147.3 | 120.1 | 102.7 | 98.8 | 91.1 | 114.3 | 184.1 | 219.0 | 201.5 | 203.5 |
| 72.5° | 114.3 | 112.4 | 94.9 | 83.3 | 73.6 | 65.9 | 71.7 | 91.1 | 112.4 | 116.3 | 118.2 |
| 75° | 69.8 | 71.7 | 62.0 | 52.3 | 46.5 | 40.7 | 42.6 | 42.6 | 42.6 | 38.8 | 42.6 |
| 77.5° | 21.3 | 23.3 | 19.4 | 15.5 | 13.6 | 13.6 | 13.6 | 11.6 | 9.7 | 5.8 | 5.8 |
| 80° | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | 3.9 | 3.9 | 1.9 | 1.9 | 0.0 | 0.0 |
| 82.5° | 5.8 | 5.8 | 5.8 | 5.8 | 3.9 | 3.9 | 1.9 | 1.9 | 0.0 | 0.0 | 0.0 |
| 85° | 5.8 | 5.8 | 5.8 | 5.8 | 3.9 | 3.9 | 1.9 | 1.9 | 0.0 | 0.0 | 0.0 |
| 87.5° | 5.8 | 5.8 | 5.8 | 5.8 | 3.9 | 3.9 | 1.9 | 1.9 | 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

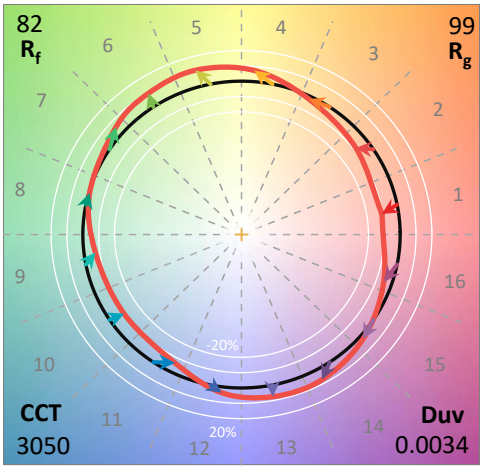
## Test Information

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

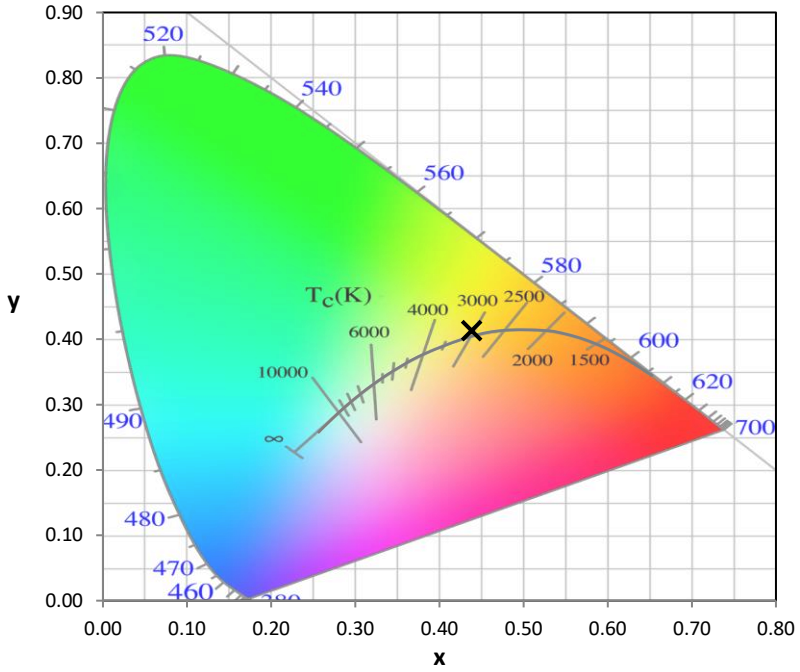
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

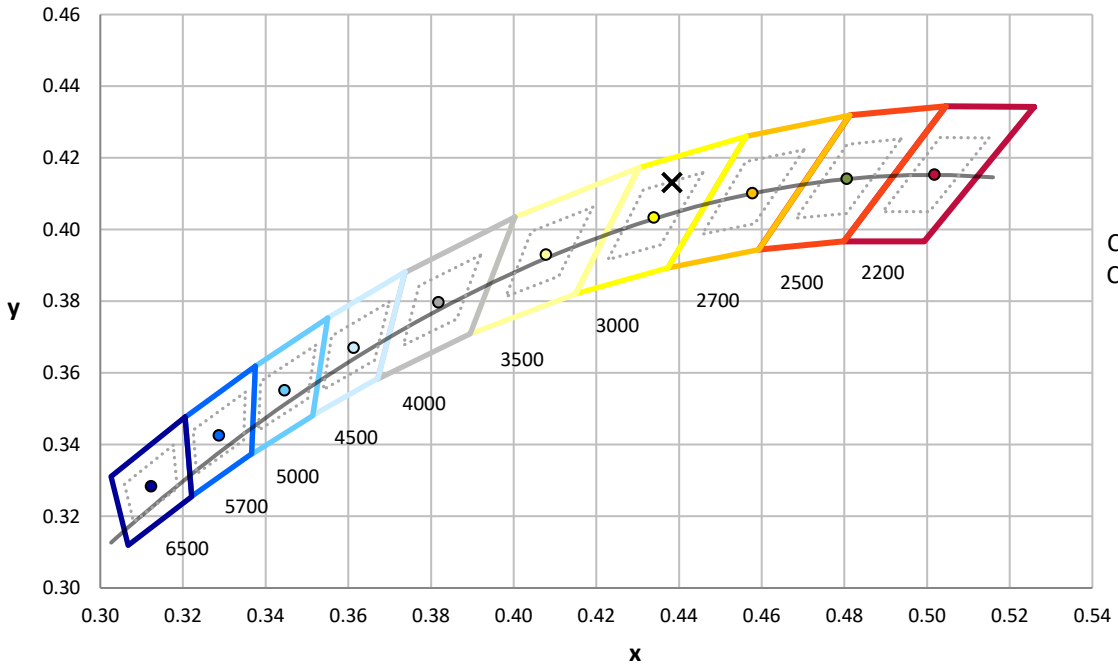
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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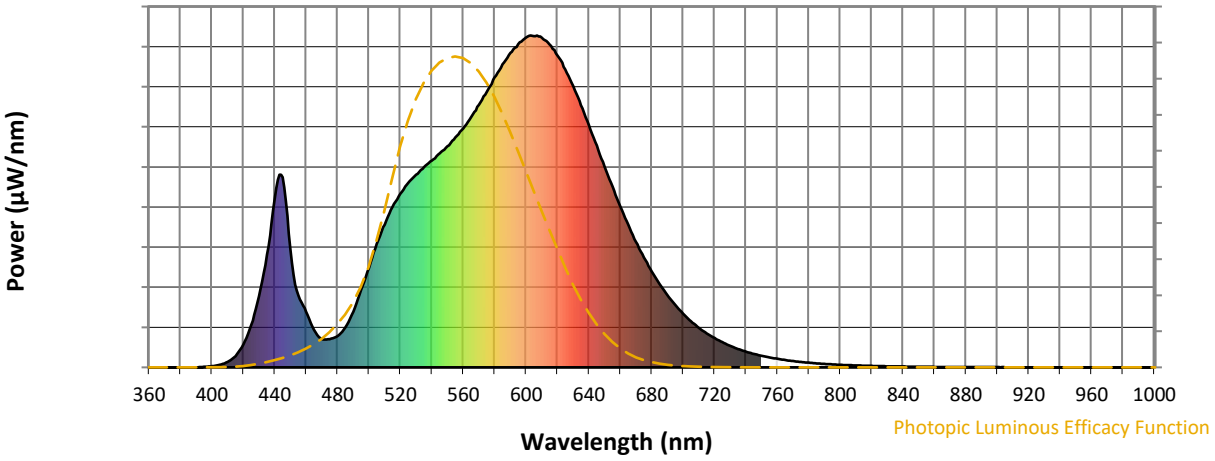
## Photopic Flux vs. Wavelength




## 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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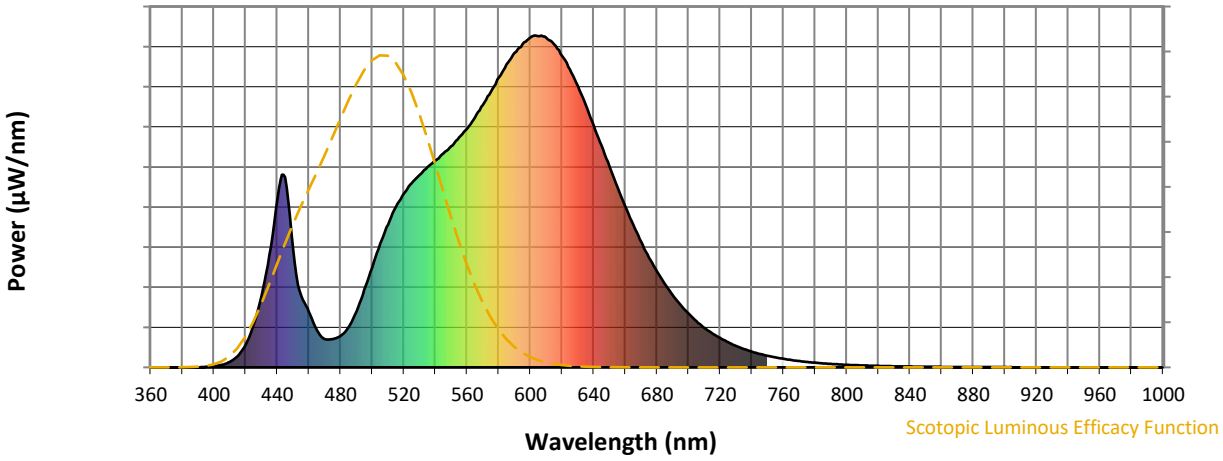
## Scotopic Flux vs. Wavelength




**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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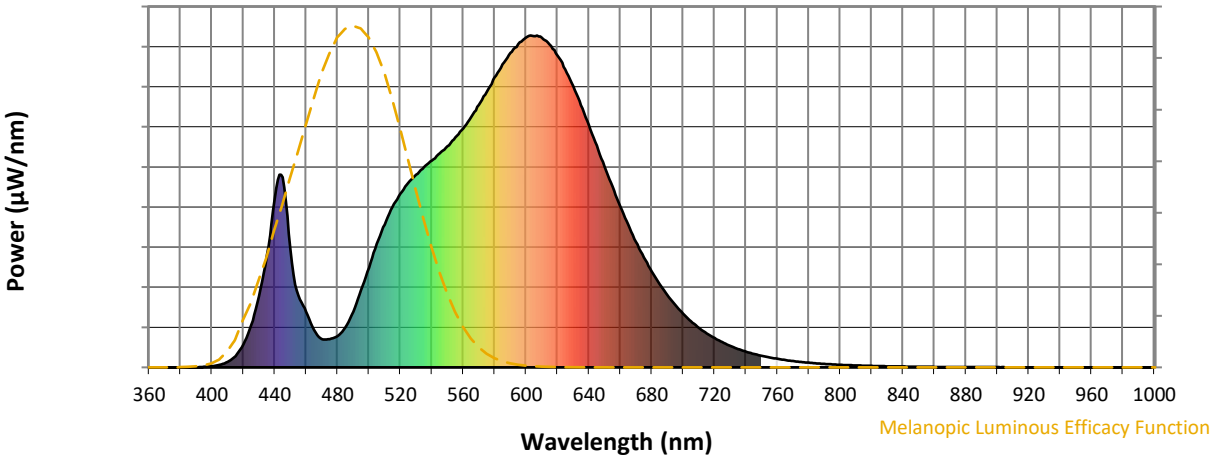
## Melanopic Flux vs. Wavelength




**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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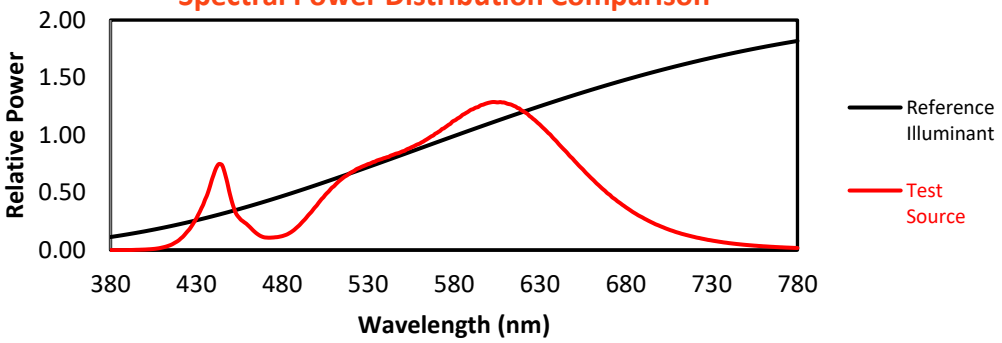
# TM-30-18

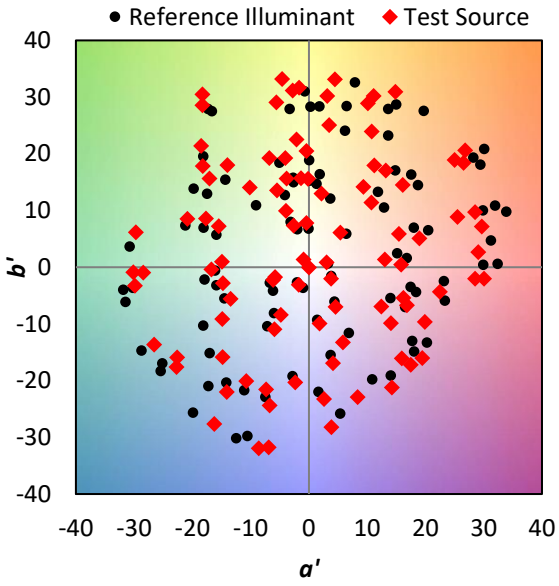
## Summary

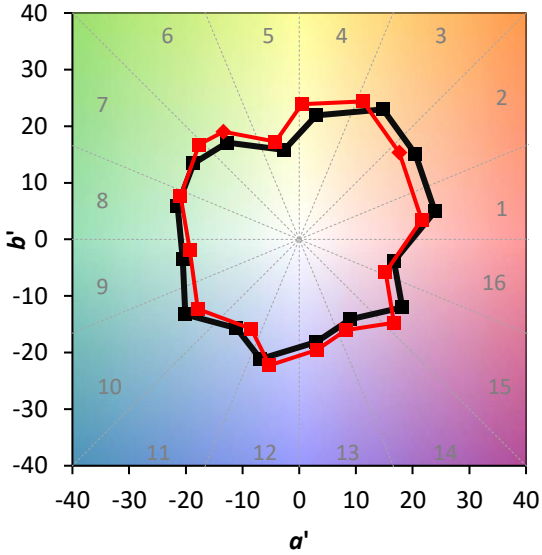
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

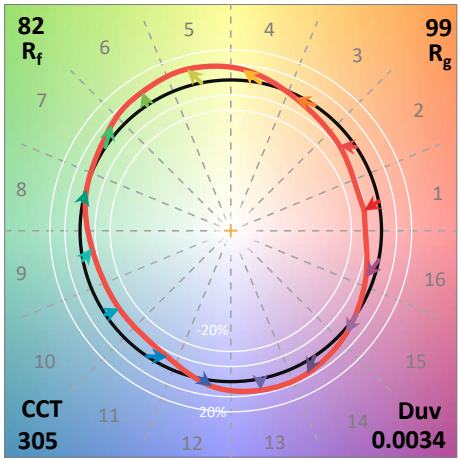
## Spectral Power Distribution Comparison

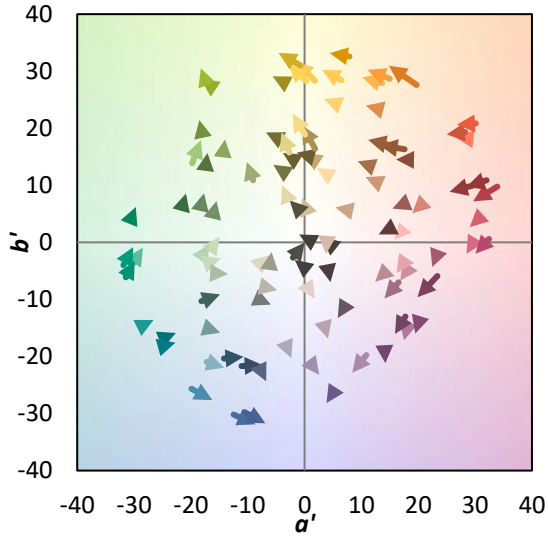



## Color Vector Graphics



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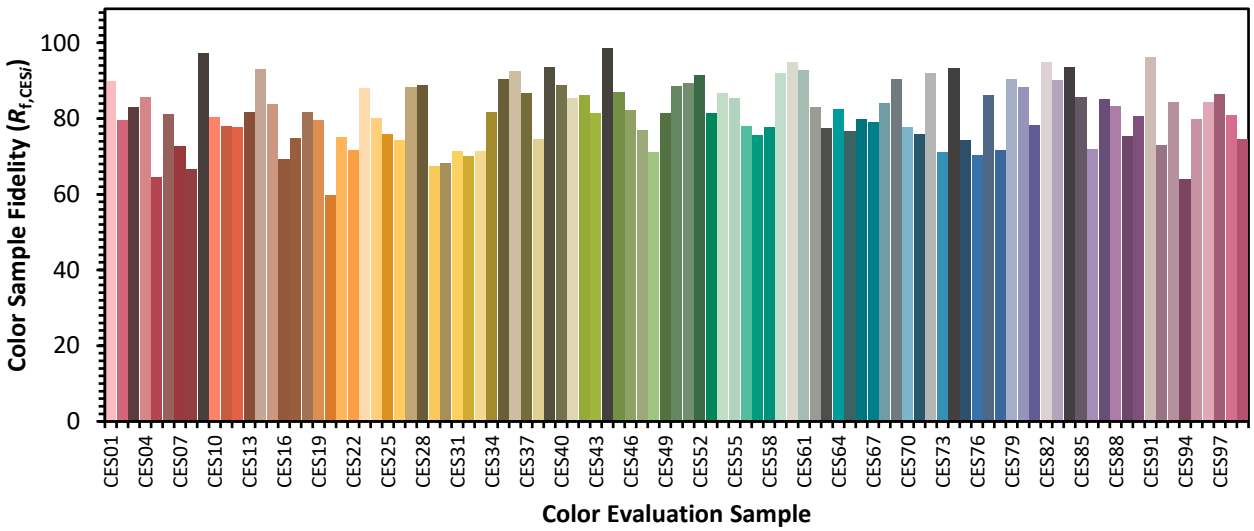
**Individual Sample Fidelity Index ($R_{f,i}$)**

| | | | |
|---|---|---|---|
| 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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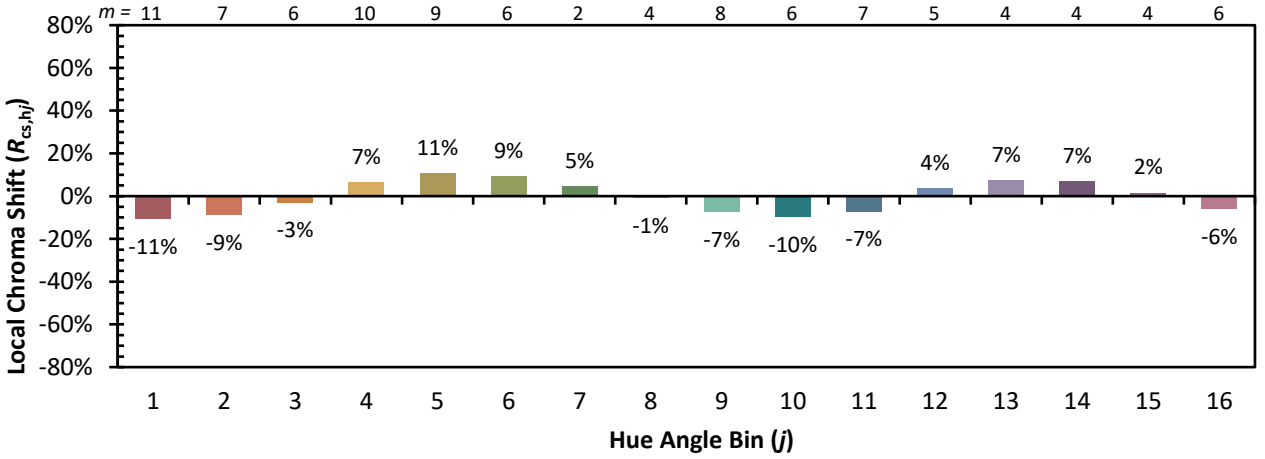
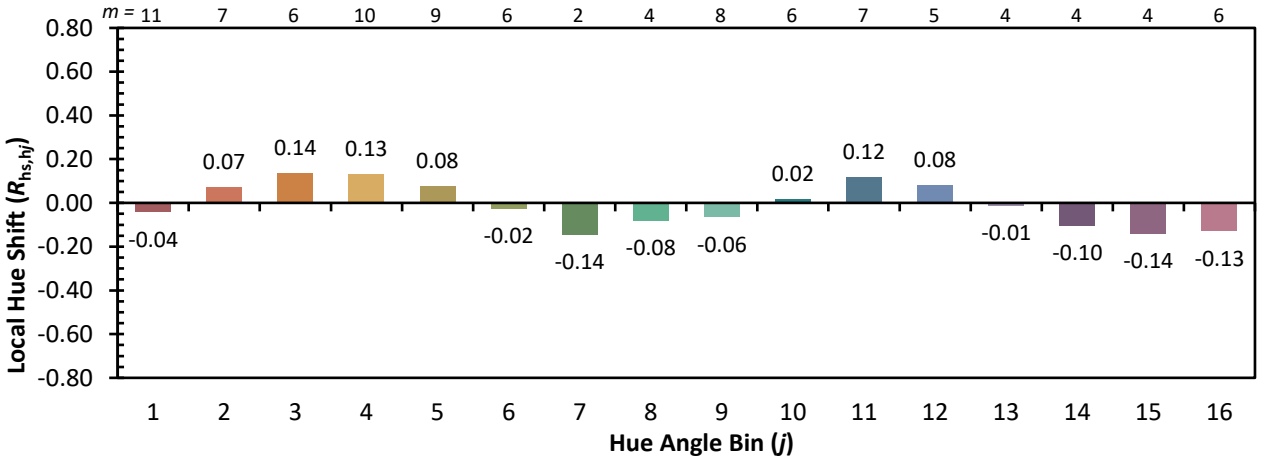
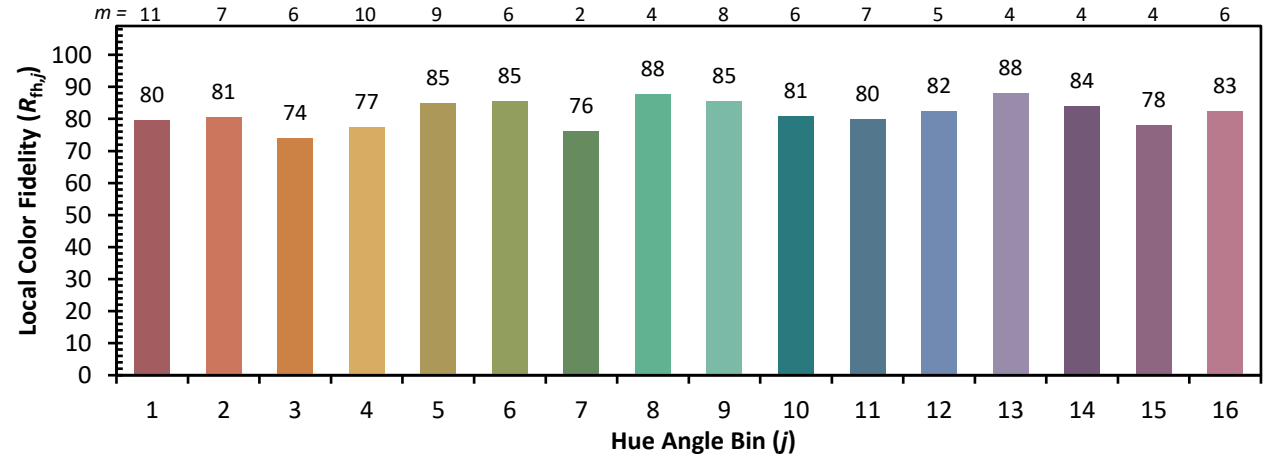
## Color Rendition by Hue-Angle Bin



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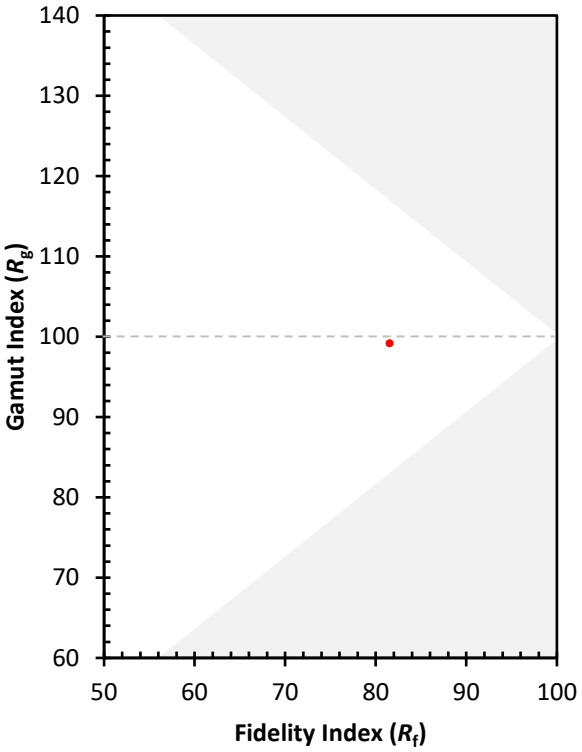
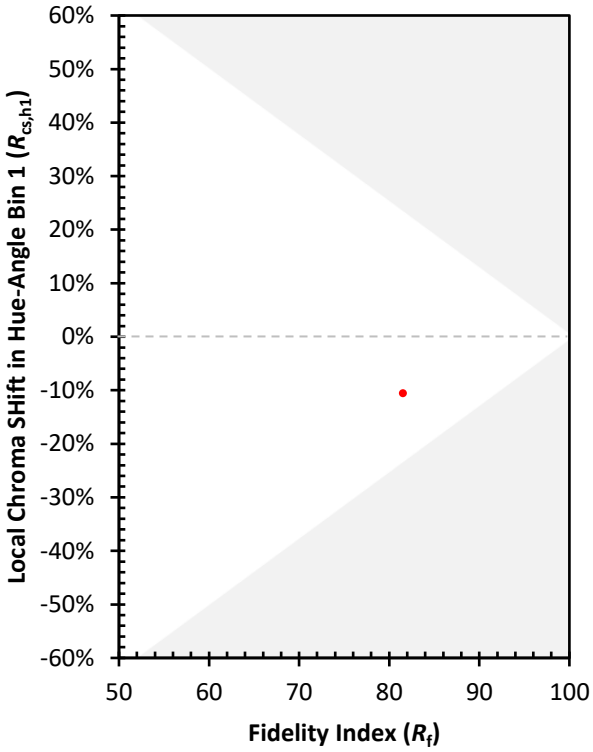
## Measure Comparisons




(END OF REPORT)