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: P640452

Luminaire Tested: GWS-SA5D-830-U-SL2-W

Issue Date: 1/10/2023

Report Generated By 670246102 / DESKTOP-G35701P

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | P640452 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-27) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA5D-830-U-SL2-W |
| Description: | GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II SPILL LIGHT ELIMINATOR OPTICS |
| Light Source: | (80) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 23451 lumens |
| Efficiency: | N/A |
| Efficacy: | 114.6 lumens/watt |
| Luminous Opening: | Rectangular (W 1.5' x L: 1' x H: 0') |
| IES Classification: | Type II - Short |
| 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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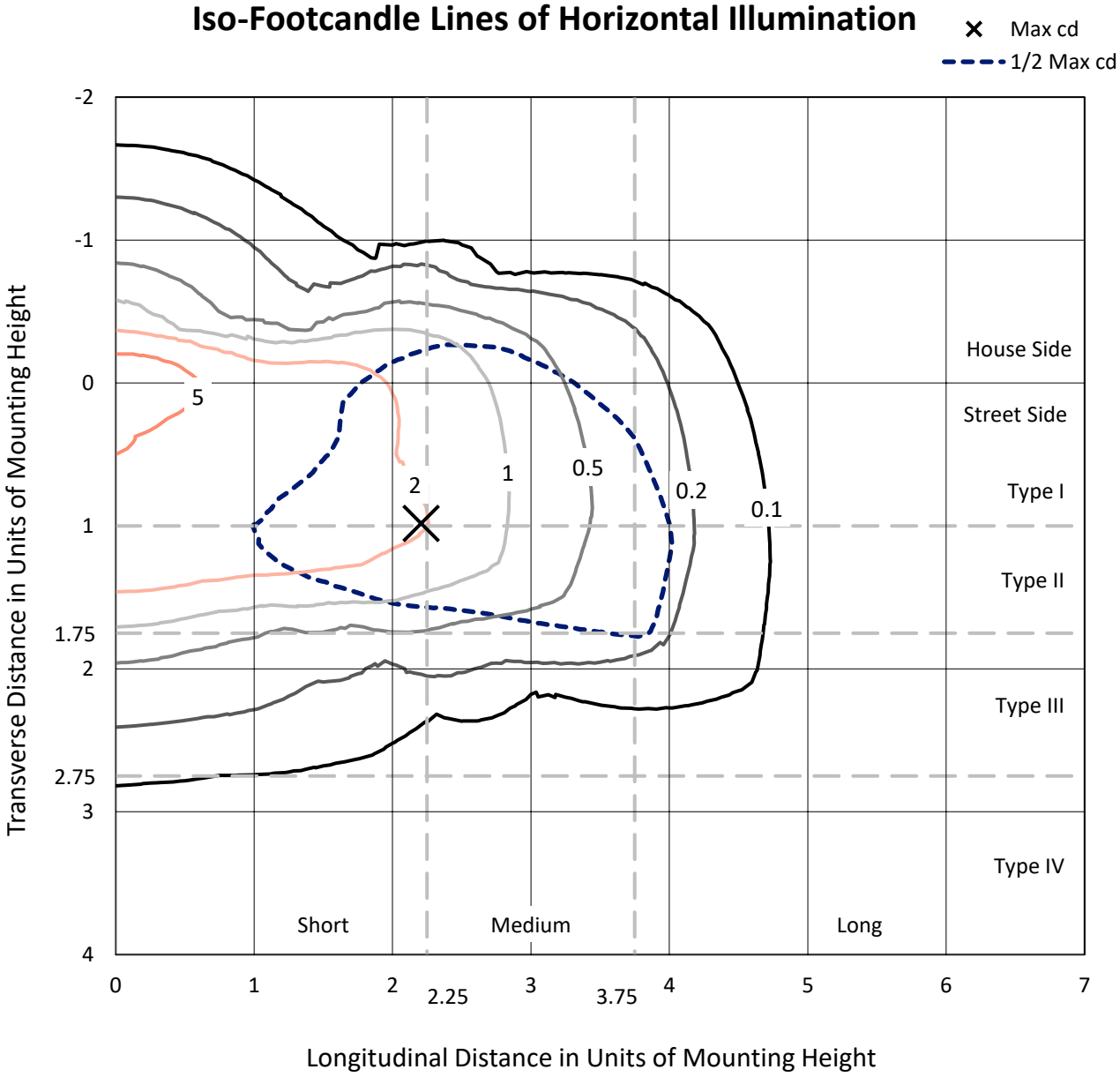
Scaled Data Report

REPORT NUMBER: P640452
CATALOG NUMBER: GWS-SA5D-830-U-SL2-W

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 8.3 fc
Type II - Short - N/A

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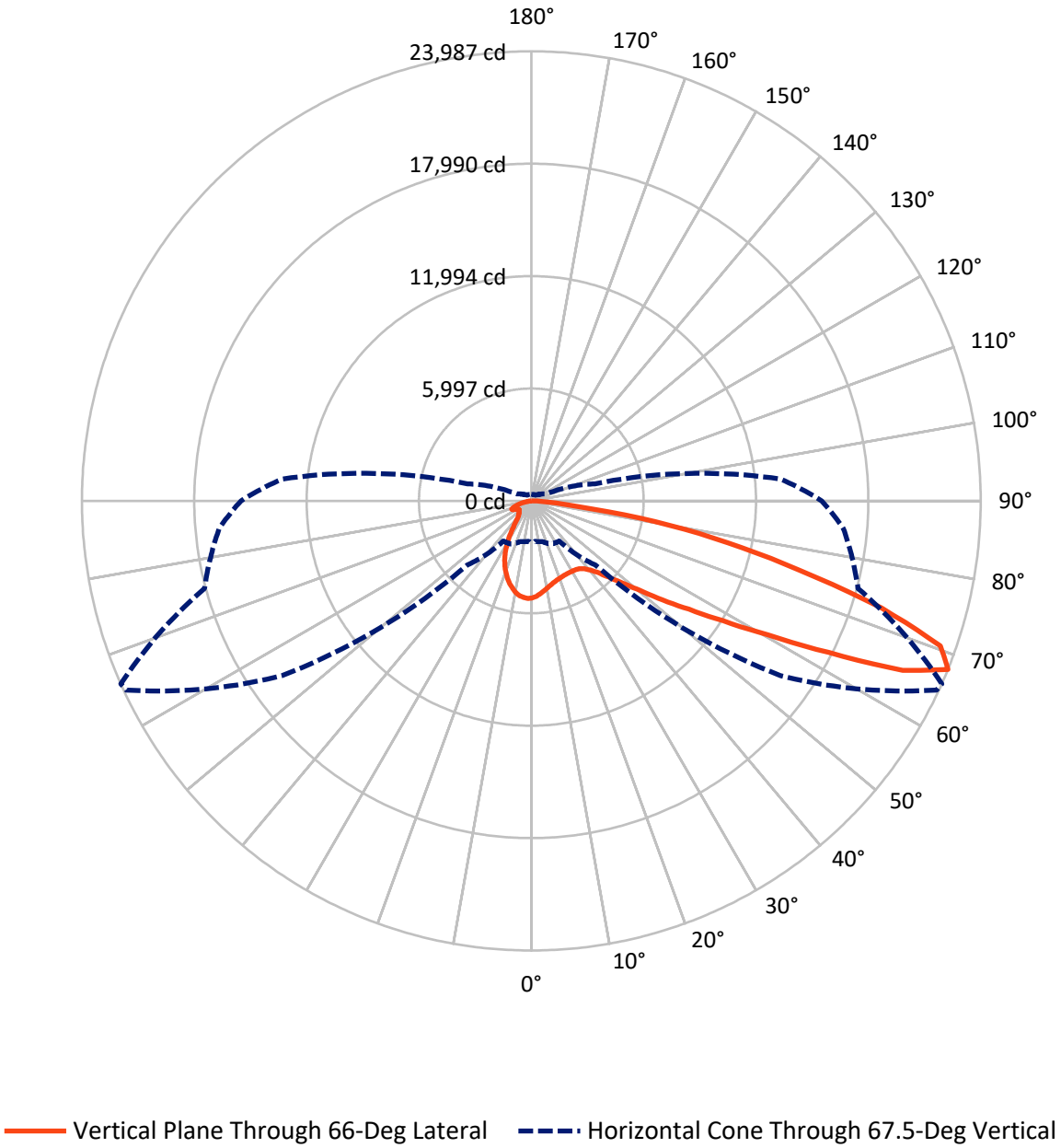
## Luminous Intensity Polar Plot



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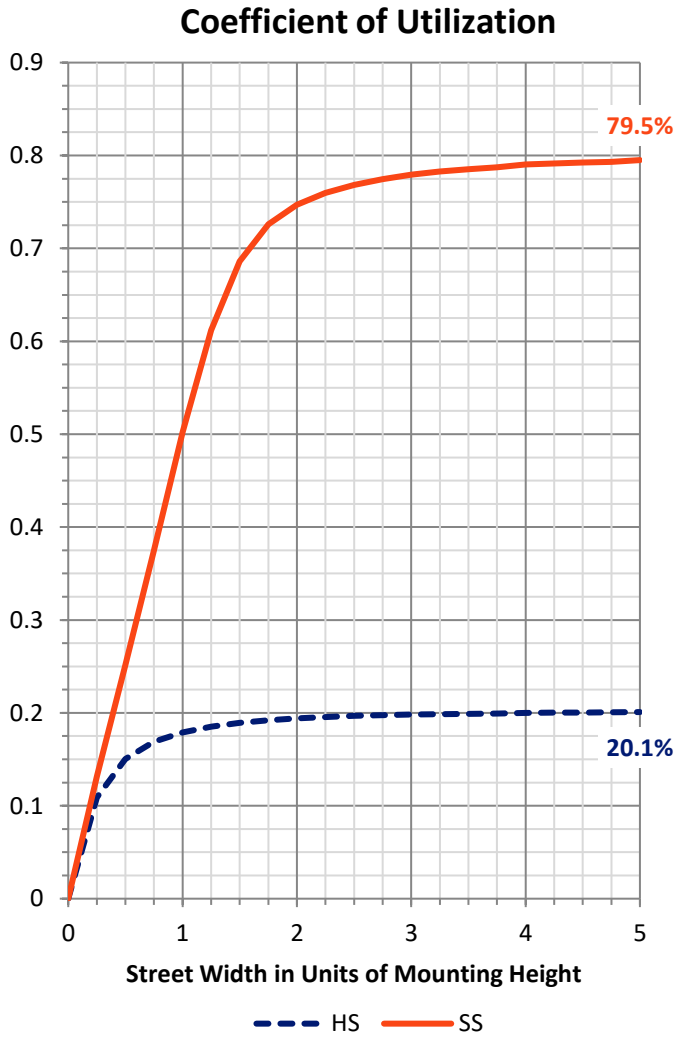
REPORT NUMBER: P640452
CATALOG NUMBER: GWS-SA5D-830-U-SL2-W

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 4758.7 | 0.0 | 4758.7 |
| | % Fixture | 20.3 | 0.0 | 20.3 |
| **Street Side** | Lumens | 18692.2 | 0.0 | 18692.2 |
| | % Fixture | 79.7 | 0.0 | 79.7 |
| **Total** | Lumens | 23451.0 | 0.0 | 23451.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 454.8 | 1.9 |
| 10°-20° | 1117.7 | 4.8 |
| 20°-30° | 1536.3 | 6.6 |
| 30°-40° | 2100.4 | 9.0 |
| 40°-50° | 3182.6 | 13.6 |
| 50°-60° | 4947.5 | 21.1 |
| 60°-70° | 6023.4 | 25.7 |
| 70°-80° | 3669.2 | 15.6 |
| 80°-90° | 419.1 | 1.8 |
| 90°-100° | 0.0 | 0.0 |
| 100°-110° | 0.0 | 0.0 |
| 110°-120° | 0.0 | 0.0 |
| 120°-130° | 0.0 | 0.0 |
| 130°-140° | 0.0 | 0.0 |
| 140°-150° | 0.0 | 0.0 |
| 150°-160° | 0.0 | 0.0 |
| 160°-170° | 0.0 | 0.0 |
| 170°-180° | 0.0 | 0.0 |
| 0°-90° | 23451.0 | 100.0 |
| 0°-180° | 23451.0 | 100.0 |



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REPORT NUMBER: P640452
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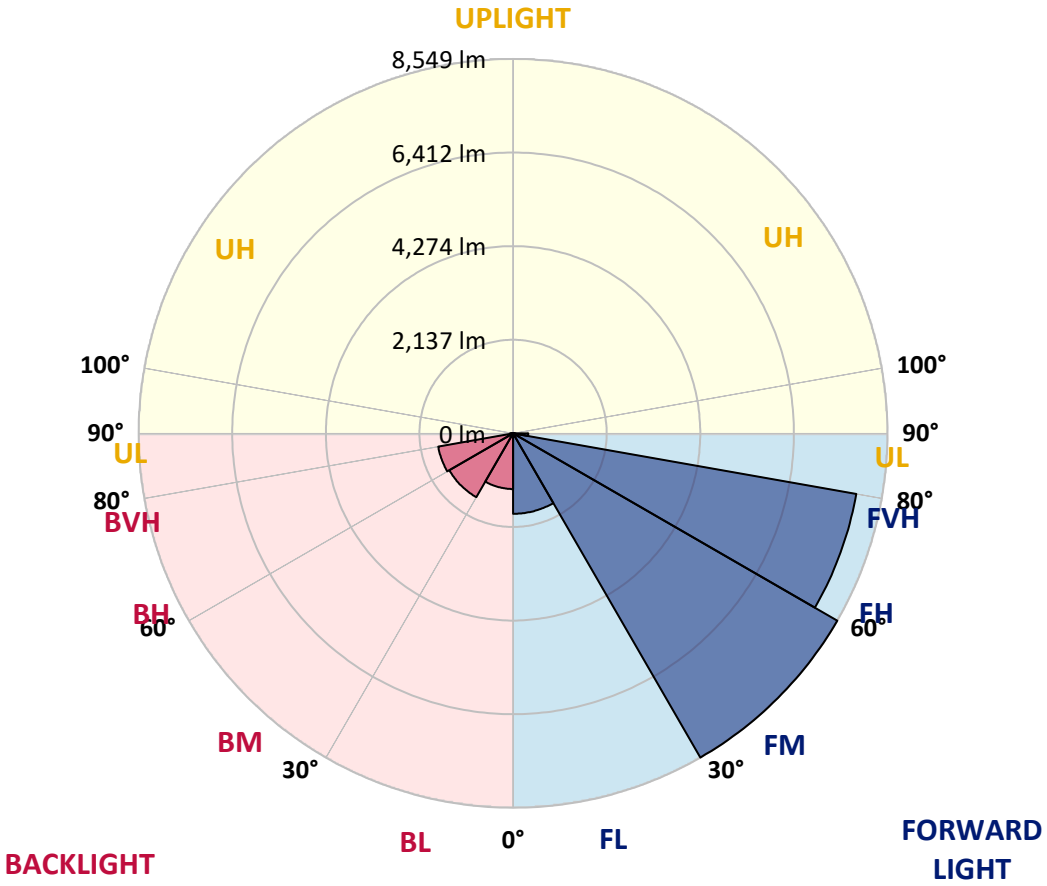
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1837.5 | 7.8 | | | |
| FM | (30°-60°) | 8548.8 | 36.5 | | | |
| FH | (60°-80°) | 7957.5 | 33.9 | | | G4/12000 |
| FVH | (80°-90°) | 348.5 | 1.5 | | | G3/500 |
| BL | (0°-30°) | 1271.3 | 5.4 | B3/2500 | | |
| BM | (30°-60°) | 1681.7 | 7.2 | B2/2500 | | |
| BH | (60°-80°) | 1735.1 | 7.4 | B3/2500 | | G3/2500 |
| BVH | (80°-90°) | 70.7 | 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 II Short



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REPORT NUMBER: P640452
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 66° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 5182.0 | 5182.0 | 5182.0 | 5182.0 | 5182.0 | 5182.0 | 5182.0 | 5182.0 | *5182.0* | 5182.0 | 5182.0 |
| 2.5° | 4853.5 | 4870.6 | 4860.4 | 4925.4 | 4928.8 | 5010.9 | 5057.1 | 5096.5 | *5099.9* | 5151.2 | 5185.4 |
| 5° | 4521.6 | 4531.9 | 4531.9 | 4593.5 | 4634.6 | 4744.0 | 4850.1 | 4963.0 | *4971.6* | 5094.8 | 5188.8 |
| 7.5° | 4253.0 | 4263.3 | 4256.5 | 4338.6 | 4391.6 | 4513.1 | 4648.2 | 4821.0 | *4838.1* | 5036.6 | 5200.8 |
| 10° | 4042.6 | 4039.2 | 4056.3 | 4131.6 | 4200.0 | 4345.4 | 4496.0 | 4692.7 | *4718.4* | 4969.9 | 5214.5 |
| 12.5° | 3898.9 | 3902.3 | 3912.6 | 3991.3 | 4064.9 | 4208.6 | 4364.2 | 4578.1 | *4605.5* | 4892.9 | 5207.7 |
| 15° | 3830.5 | 3823.6 | 3832.2 | 3904.0 | 3974.2 | 4100.8 | 4261.6 | 4482.3 | *4509.7* | 4824.4 | 5209.4 |
| 17.5° | 3815.1 | 3809.9 | 3808.2 | 3859.6 | 3912.6 | 4030.6 | 4184.6 | 4408.7 | *4437.8* | 4780.0 | 5219.6 |
| 20° | 3863.0 | 3856.1 | 3837.3 | 3859.6 | 3881.8 | 3981.0 | 4129.9 | 4355.7 | *4388.2* | 4750.9 | 5240.2 |
| 22.5° | 3994.7 | 3982.7 | 3953.7 | 3926.3 | 3897.2 | 3957.1 | 4095.6 | 4316.3 | *4348.8* | 4732.1 | 5260.7 |
| 25° | 4194.9 | 4184.6 | 4153.8 | 4092.2 | 3986.2 | 3975.9 | 4088.8 | 4299.2 | *4331.7* | 4718.4 | 5269.3 |
| 27.5° | 4470.3 | 4454.9 | 4424.1 | 4335.2 | 4162.4 | 4046.0 | 4114.5 | 4297.5 | *4328.3* | 4703.0 | 5260.7 |
| 30° | 4797.1 | 4786.8 | 4769.7 | 4661.9 | 4431.0 | 4194.9 | 4172.6 | 4311.2 | *4335.2* | 4694.4 | 5243.6 |
| 32.5° | 5129.0 | 5118.7 | 5132.4 | 5081.1 | 4797.1 | 4441.2 | 4299.2 | 4348.8 | *4366.0* | 4692.7 | 5228.2 |
| 35° | 5421.5 | 5433.5 | 5532.7 | 5541.3 | 5262.4 | 4774.8 | 4499.4 | 4436.1 | *4439.5* | 4726.9 | 5235.0 |
| 37.5° | 5727.7 | 5773.9 | 5904.0 | 6015.2 | 5782.5 | 5216.2 | 4797.1 | 4600.3 | *4596.9* | 4814.2 | 5277.8 |
| 40° | 6133.2 | 6153.7 | 6319.7 | 6528.4 | 6383.0 | 5821.8 | 5219.6 | 4868.9 | *4845.0* | 4992.1 | 5392.4 |
| 42.5° | 6528.4 | 6578.0 | 6843.2 | 7082.7 | 7034.8 | 6504.5 | 5751.7 | 5271.0 | *5228.2* | 5306.9 | 5628.5 |
| 45° | 7031.4 | 7079.3 | 7377.0 | 7684.9 | 7772.2 | 7276.0 | 6432.6 | 5842.4 | *5799.6* | 5780.8 | 6061.4 |
| 47.5° | 7534.4 | 7584.0 | 7850.8 | 8295.7 | 8601.9 | 8240.9 | 7318.8 | 6596.8 | *6526.7* | 6453.1 | 6714.9 |
| 50° | 7873.1 | 7931.3 | 8186.2 | 8719.9 | 9438.5 | 9445.3 | 8369.2 | 7585.7 | *7496.7* | 7380.4 | 7635.3 |
| 52.5° | 7861.1 | 7898.8 | 8141.7 | 8757.6 | 10040.7 | 10829.3 | 9775.5 | 8844.8 | *8773.0* | 8519.8 | 8742.2 |
| 55° | 7243.5 | 7300.0 | 7544.6 | 8314.5 | 10105.7 | 12141.5 | 11842.1 | 10329.8 | *10201.5* | 9748.1 | 9992.8 |
| 57.5° | 6003.2 | 6051.1 | 6297.4 | 7246.9 | 9529.1 | 12813.9 | 14466.5 | 12221.9 | *12045.7* | 11086.0 | 11368.2 |
| 60° | 4531.9 | 4473.7 | 4590.1 | 5421.5 | 8150.2 | 12831.0 | 16782.9 | 14788.1 | *14493.9* | 12516.2 | 12752.3 |
| 62.5° | 3401.1 | 3342.9 | 3368.6 | 3602.9 | 5525.9 | 11794.2 | 18103.7 | 18298.7 | *17812.8* | 14131.2 | 14085.0 |
| 65° | 2687.7 | 2655.2 | 2728.7 | 2889.5 | 3221.4 | 8981.7 | 18113.9 | 22094.9 | *21788.7* | 16002.8 | 15451.9 |
| 67.5° | *2189.8* | *2169.3* | *2244.6* | *2542.2* | *2612.4* | *4826.2* | *16242.3* | *23867.3* | *23987.1* | *18052.3* | *16719.6* |
| 70° | 1763.8 | 1733.0 | 1851.1 | 2242.9 | 2429.3 | 2920.3 | 11635.1 | 22964.0 | *23157.4* | 19273.8 | 16362.1 |
| 72.5° | 1218.1 | 1219.8 | 1279.7 | 1816.9 | 2345.5 | 2521.7 | 6581.4 | 19121.6 | *19540.7* | 18167.0 | 14384.4 |
| 75° | 821.2 | 828.0 | 845.1 | 1199.3 | 2160.7 | 2446.4 | 3507.1 | 14476.8 | *14772.7* | 15015.7 | 11890.0 |
| 77.5° | 496.1 | 499.6 | 538.9 | 725.4 | 1490.1 | 2283.9 | 2376.3 | 10494.0 | *10726.7* | 9898.7 | 7370.1 |
| 80° | 287.4 | 299.4 | 335.3 | 485.9 | 1005.9 | 1715.9 | 1839.1 | 6434.3 | *6697.8* | 4400.2 | 2342.1 |
| 82.5° | 126.6 | 135.2 | 183.1 | 282.3 | 586.8 | 1459.3 | 1435.4 | 2542.2 | *2504.6* | 1226.6 | 812.6 |
| 85° | 22.2 | 27.4 | 39.3 | 89.0 | 215.6 | 769.9 | 1113.7 | 1122.3 | *1055.6* | 465.3 | 337.0 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.1 | 167.7 | 301.1 | *299.4* | 131.7 | 116.3 |
| 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: P640452
CATALOG NUMBER: GWS-SA5D-830-U-SL2-W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 5182.0 | 5182.0 | 5182.0 | 5182.0 | 5182.0 | 5182.0 | 5182.0 | 5182.0 | 5182.0 | 5182.0 | 5182.0 |
| 2.5° | 5207.7 | 5161.5 | 5202.5 | 5207.7 | 5199.1 | 5192.3 | 5140.9 | 5096.5 | 5091.3 | 5043.4 | 5043.4 |
| 5° | 5226.5 | 5183.7 | 5204.2 | 5164.9 | 5103.3 | 5040.0 | 4930.5 | 4855.2 | 4821.0 | 4759.4 | 4759.4 |
| 7.5° | 5252.1 | 5207.7 | 5183.7 | 5086.2 | 4942.5 | 4803.9 | 4627.7 | 4480.6 | 4420.7 | 4333.4 | 4330.0 |
| 10° | 5276.1 | 5219.6 | 5137.5 | 4947.6 | 4718.4 | 4497.7 | 4241.1 | 4032.3 | 3890.4 | 3786.0 | 3786.0 |
| 12.5° | 5274.4 | 5200.8 | 5038.3 | 4757.7 | 4441.2 | 4121.3 | 3779.2 | 3464.4 | 3276.2 | 3113.7 | 3103.4 |
| 15° | 5271.0 | 5170.0 | 4911.7 | 4537.0 | 4117.9 | 3674.8 | 3209.5 | 2798.9 | 2520.0 | 2360.9 | 2347.2 |
| 17.5° | 5267.5 | 5130.7 | 4769.7 | 4285.5 | 3724.4 | 3120.5 | 2506.3 | 2061.5 | 1828.8 | 1731.3 | 1734.7 |
| 20° | 5267.5 | 5086.2 | 4617.4 | 3996.4 | 3271.0 | 2456.7 | 1839.1 | 1515.8 | 1457.6 | 1462.7 | 1467.9 |
| 22.5° | 5252.1 | 5031.5 | 4448.1 | 3681.6 | 2766.4 | 1806.6 | 1356.7 | 1247.2 | 1278.0 | 1325.9 | 1332.7 |
| 25° | 5216.2 | 4940.8 | 4251.3 | 3332.6 | 2165.9 | 1315.6 | 1106.9 | 1086.4 | 1142.8 | 1202.7 | 1219.8 |
| 27.5° | 5159.8 | 4836.4 | 4030.6 | 2923.8 | 1594.5 | 1057.3 | 973.4 | 971.7 | 1016.2 | 1060.7 | 1076.1 |
| 30° | 5099.9 | 4720.1 | 3798.0 | 2468.7 | 1154.8 | 920.4 | 887.9 | 887.9 | 910.1 | 937.5 | 934.1 |
| 32.5° | 5029.7 | 4602.0 | 3548.2 | 1994.8 | 940.9 | 843.4 | 833.2 | 828.0 | 831.4 | 841.7 | 841.7 |
| 35° | 4969.9 | 4497.7 | 3291.6 | 1493.5 | 843.4 | 800.7 | 790.4 | 778.4 | 773.3 | 766.4 | 769.9 |
| 37.5° | 4947.6 | 4415.6 | 3026.4 | 1125.7 | 795.5 | 769.9 | 752.8 | 735.6 | 723.7 | 720.2 | 718.5 |
| 40° | 4983.6 | 4381.4 | 2761.2 | 927.3 | 761.3 | 737.4 | 718.5 | 696.3 | 686.0 | 686.0 | 686.0 |
| 42.5° | 5123.8 | 4407.0 | 2490.9 | 838.3 | 737.4 | 710.0 | 682.6 | 662.1 | 658.7 | 662.1 | 663.8 |
| 45° | 5380.5 | 4506.2 | 2210.4 | 793.8 | 716.8 | 682.6 | 650.1 | 634.7 | 634.7 | 638.1 | 638.1 |
| 47.5° | 5839.0 | 4766.3 | 1933.2 | 766.4 | 696.3 | 660.4 | 626.2 | 610.8 | 609.0 | 612.5 | 612.5 |
| 50° | 6632.8 | 5235.0 | 1683.4 | 747.6 | 680.9 | 643.3 | 609.0 | 588.5 | 583.4 | 581.7 | 581.7 |
| 52.5° | 7633.6 | 6047.7 | 1524.3 | 733.9 | 662.1 | 624.4 | 590.2 | 562.9 | 552.6 | 547.5 | 547.5 |
| 55° | 8843.1 | 7130.6 | 1524.3 | 723.7 | 638.1 | 602.2 | 562.9 | 535.5 | 520.1 | 513.2 | 513.2 |
| 57.5° | 10213.5 | 8391.5 | 1787.8 | 715.1 | 619.3 | 576.5 | 533.8 | 506.4 | 489.3 | 479.0 | 479.0 |
| 60° | 11607.8 | 9724.2 | 2439.6 | 703.1 | 602.2 | 544.0 | 501.3 | 475.6 | 453.4 | 441.4 | 439.7 |
| 62.5° | 13053.4 | 11192.0 | 3298.4 | 710.0 | 590.2 | 513.2 | 467.0 | 438.0 | 419.1 | 407.2 | 405.5 |
| 65° | 14377.5 | 12589.8 | 4049.5 | 763.0 | 591.9 | 485.9 | 427.7 | 402.0 | 386.6 | 371.2 | 369.5 |
| 67.5° | *15501.5* | *13361.3* | *3522.5* | *870.8* | *627.9* | *453.4* | *388.4* | *362.7* | *349.0* | *338.7* | *337.0* |
| 70° | 14714.6 | 12184.3 | 1998.2 | 937.5 | 677.5 | 419.1 | 343.9 | 326.8 | 313.1 | 306.2 | 304.5 |
| 72.5° | 12582.9 | 10316.1 | 1336.1 | 828.0 | 617.6 | 374.7 | 302.8 | 289.1 | 278.9 | 270.3 | 268.6 |
| 75° | 10192.9 | 8181.0 | 1021.3 | 679.2 | 480.7 | 304.5 | 260.0 | 249.8 | 239.5 | 231.0 | 229.2 |
| 77.5° | 6030.6 | 4726.9 | 752.8 | 537.2 | 338.7 | 237.8 | 215.6 | 207.0 | 196.7 | 189.9 | 188.2 |
| 80° | 1924.6 | 1642.4 | 477.3 | 369.5 | 224.1 | 183.1 | 165.9 | 159.1 | 148.8 | 140.3 | 138.6 |
| 82.5° | 733.9 | 634.7 | 253.2 | 188.2 | 148.8 | 124.9 | 111.2 | 104.4 | 97.5 | 89.0 | 87.3 |
| 85° | 325.1 | 304.5 | 140.3 | 100.9 | 80.4 | 61.6 | 54.7 | 51.3 | 42.8 | 35.9 | 34.2 |
| 87.5° | 114.6 | 114.6 | 59.9 | 29.1 | 17.1 | 8.6 | 5.1 | 1.7 | 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

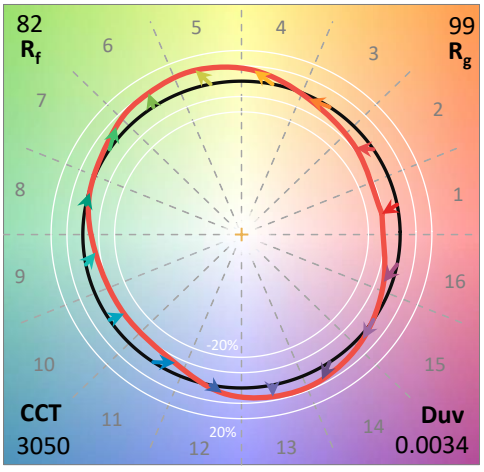
## Test Information

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

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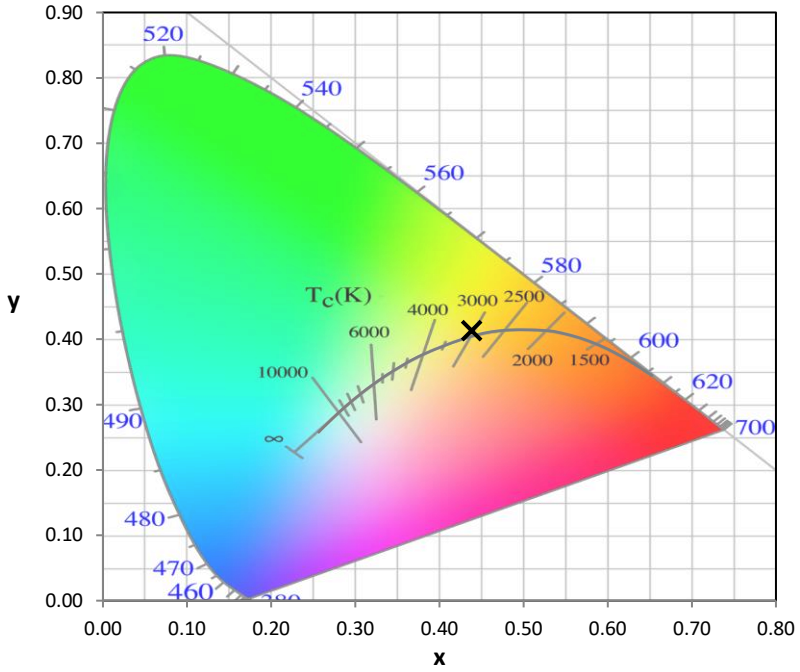
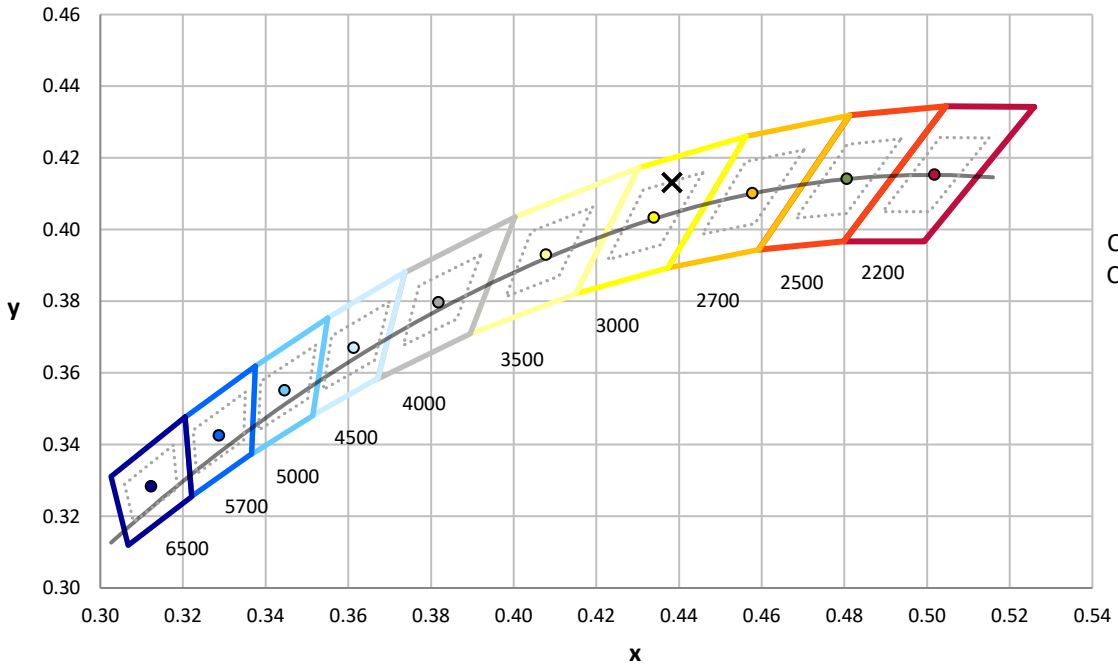
## CIE 1931 Chromaticity Diagram




## 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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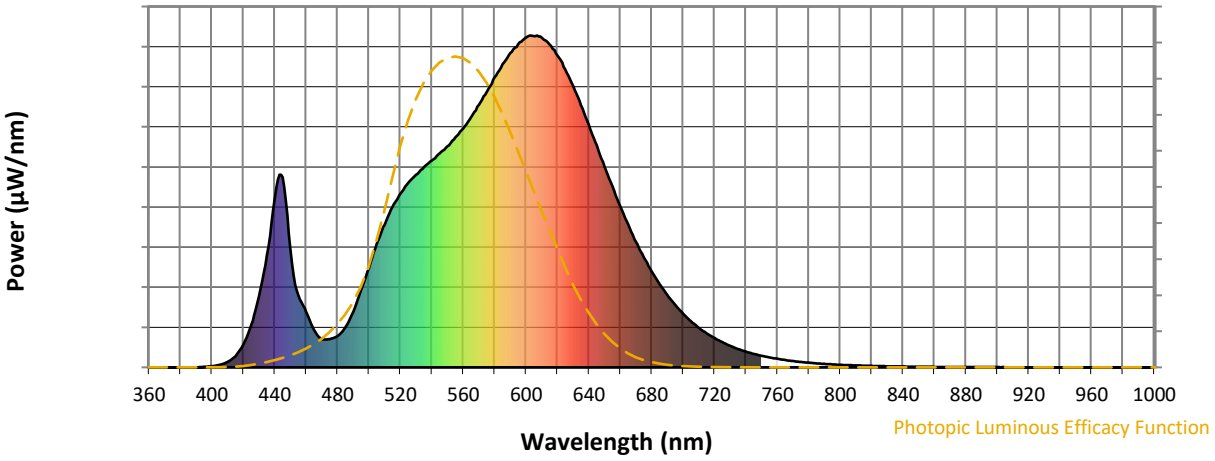
## Photopic Flux vs. Wavelength




## 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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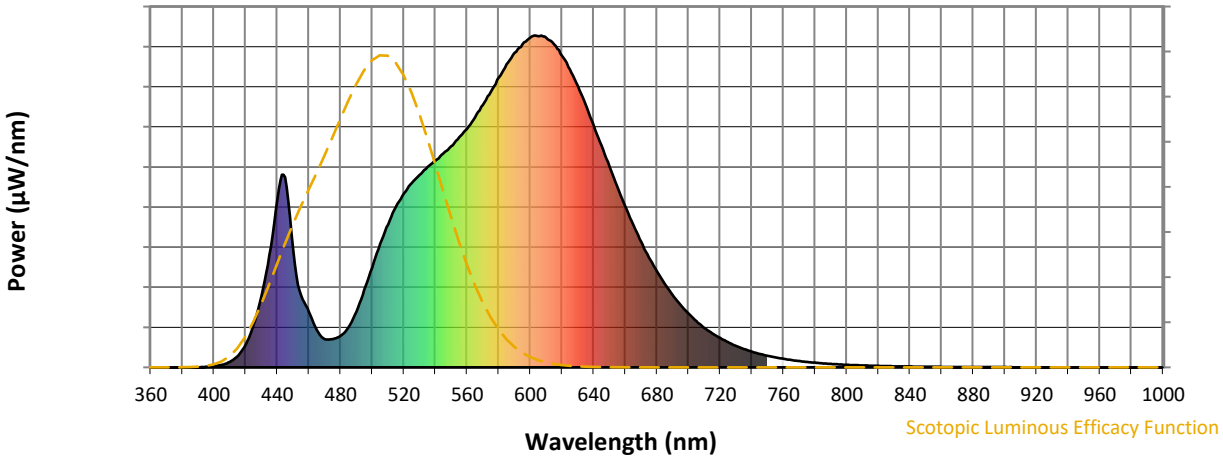
## Scotopic Flux vs. Wavelength




**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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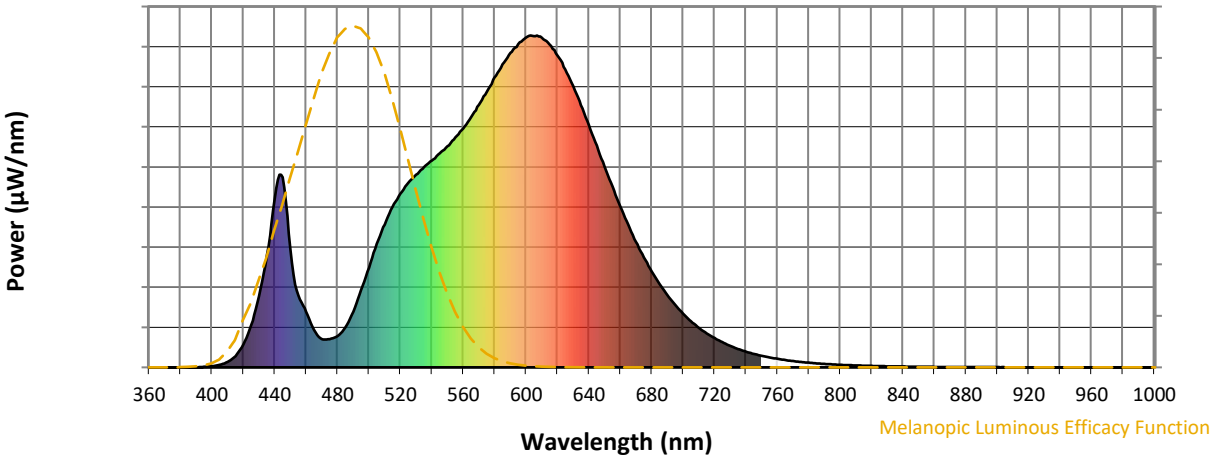
## Melanopic Flux vs. Wavelength




**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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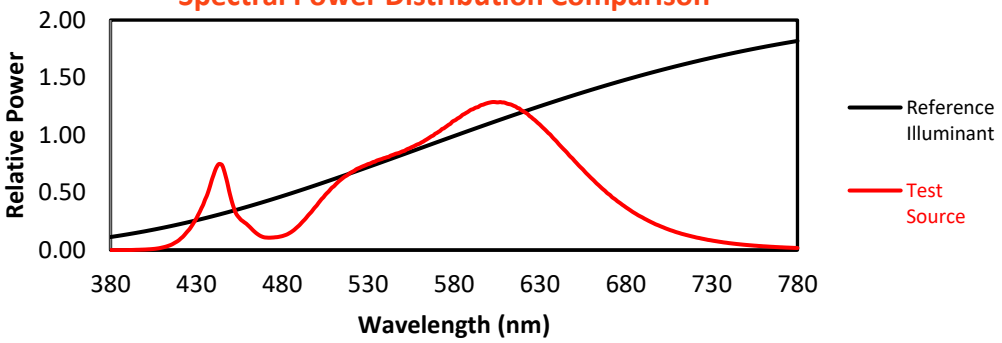
# TM-30-18

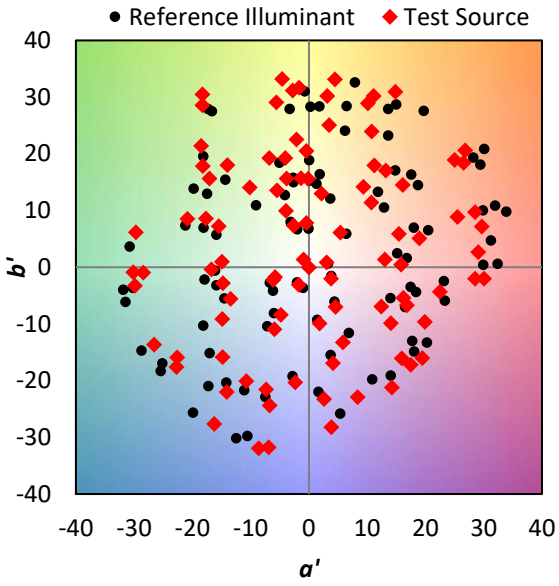
## Summary

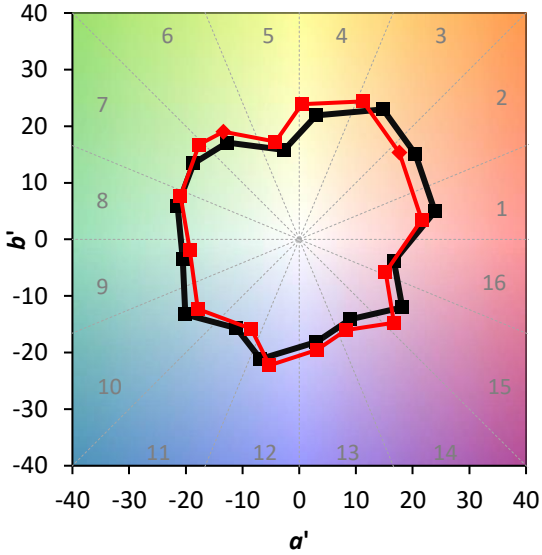
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

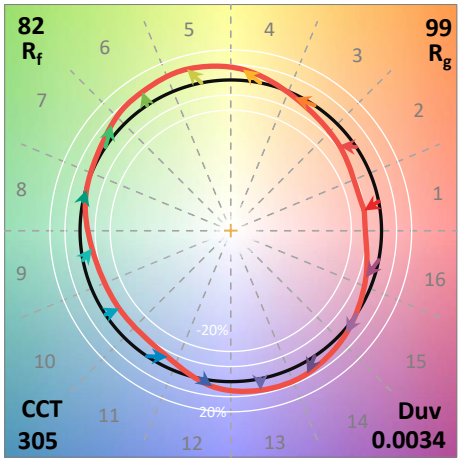
## Spectral Power Distribution Comparison

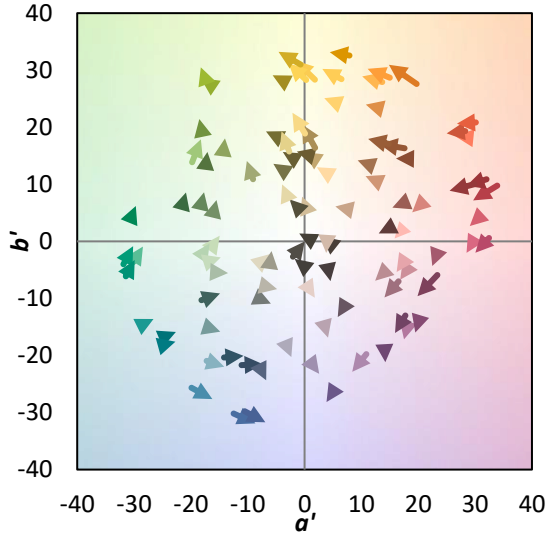



## Color Vector Graphics



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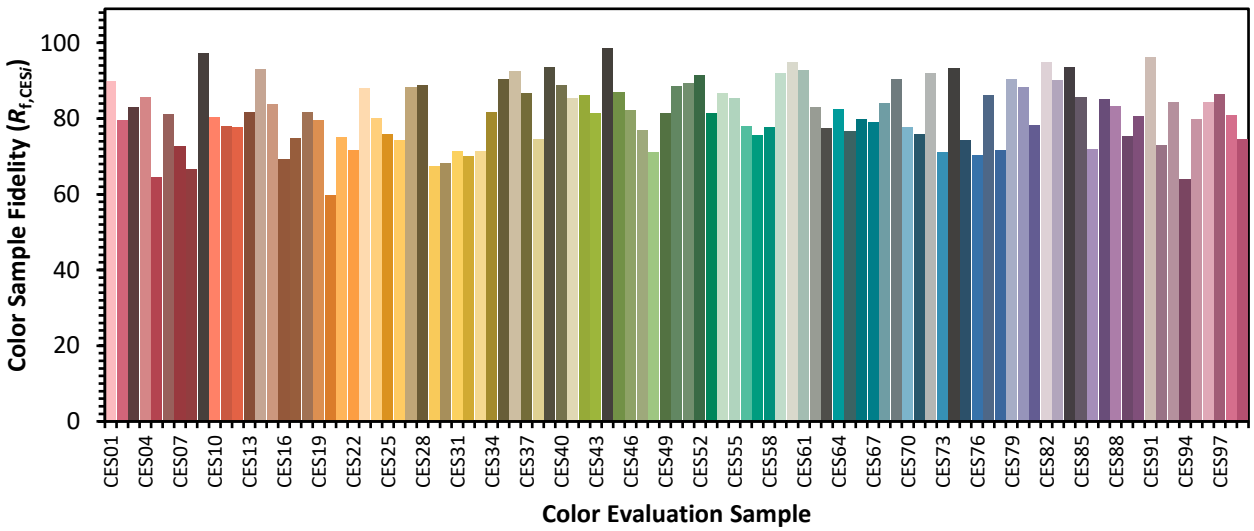
**Individual Sample Fidelity Index ($R_{f,i}$)**

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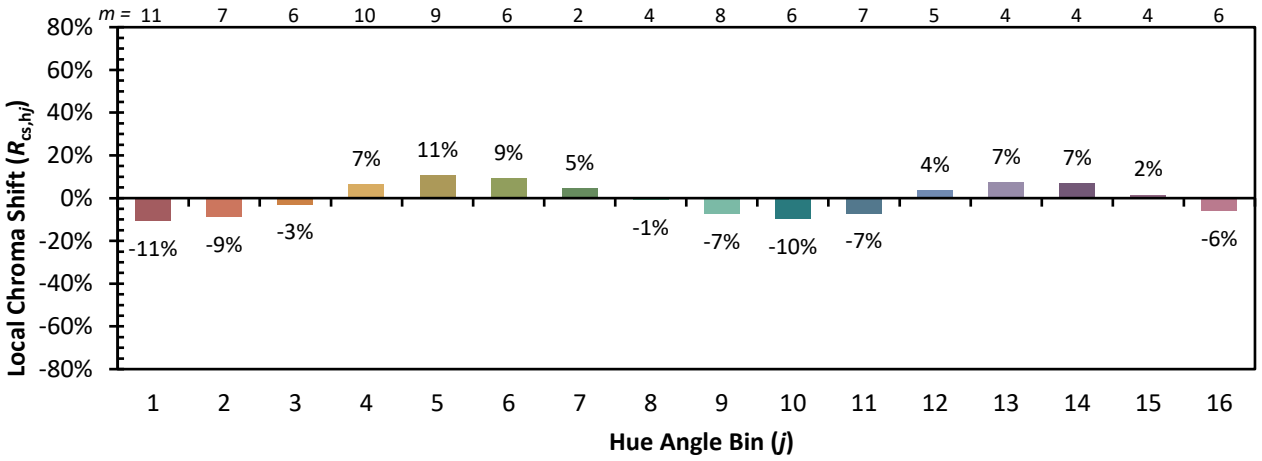
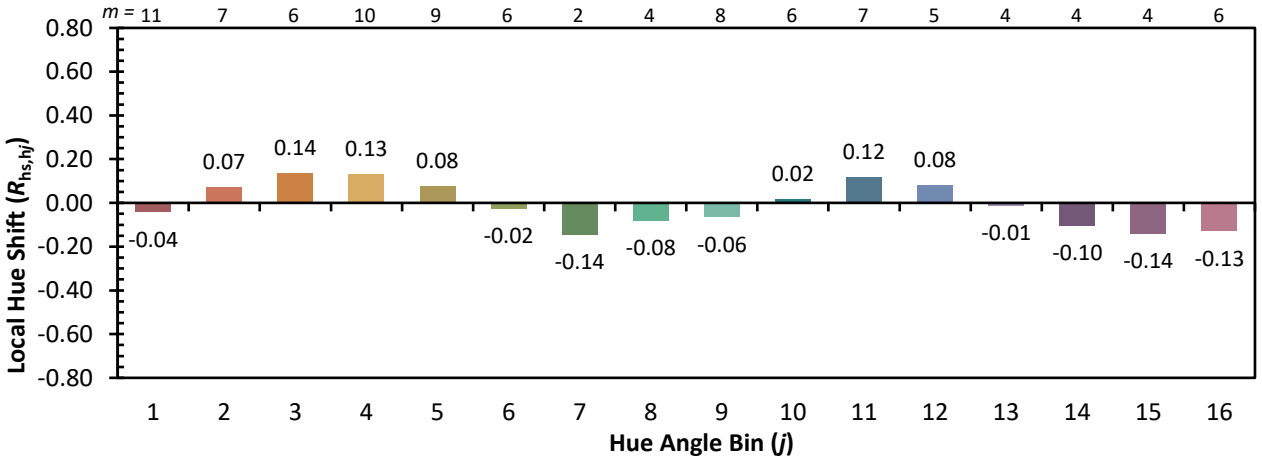
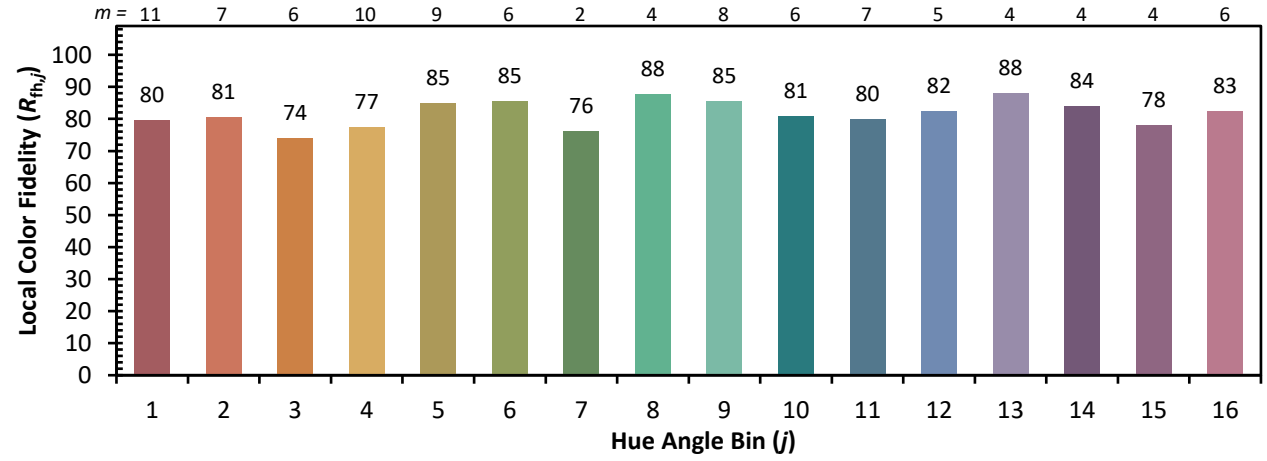
# TM-30-18

## Color Rendition by Hue-Angle Bin



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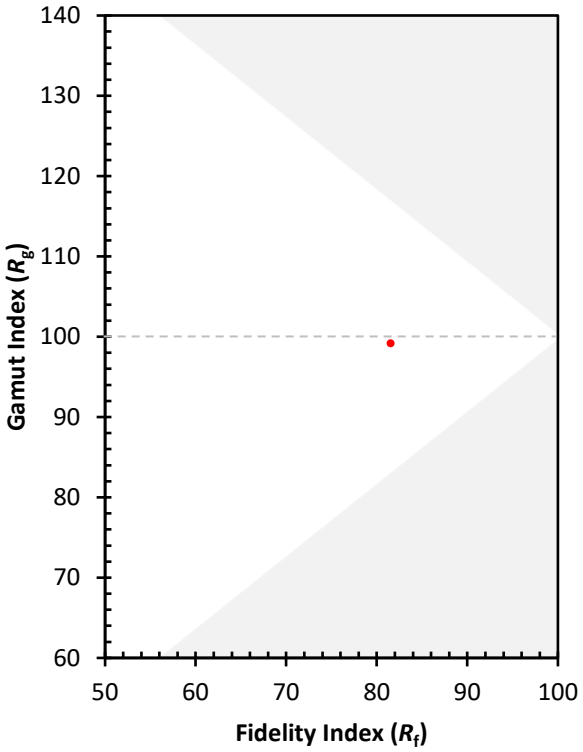
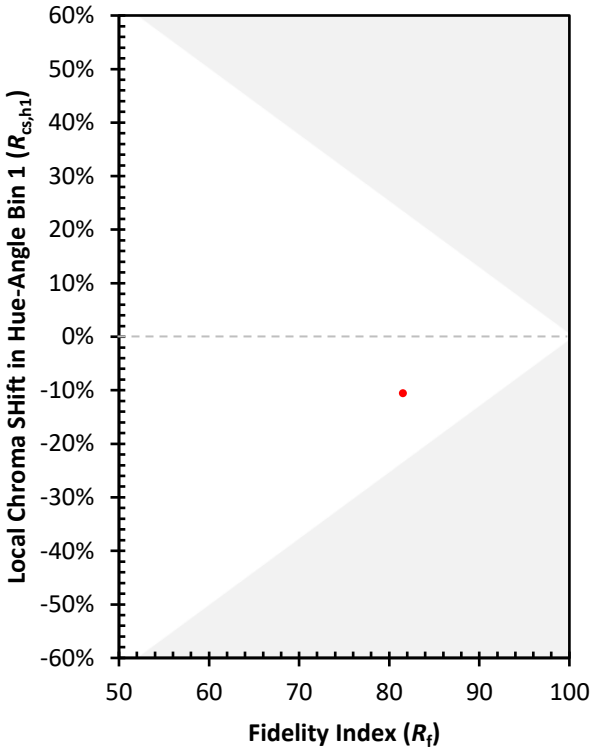
## TM-30-18

### Measure Comparisons




(END OF REPORT)