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: P640469

Luminaire Tested: GWS-SA5D-830-U-T2-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: | P640469 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-21) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA5D-830-U-T2-W-GRSWH |
| Description: | GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS W/ FACTORY INSLLED GLARE SHIELD, WH |
| Light Source: | (80) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 19896.1 lumens |
| Efficiency: | N/A |
| Efficacy: | 97.2 lumens/watt |
| Luminous Opening: | Rectangular (W 1.5' x L: 1' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B3 - U0 - G3 |

| | |
|---|---|
| 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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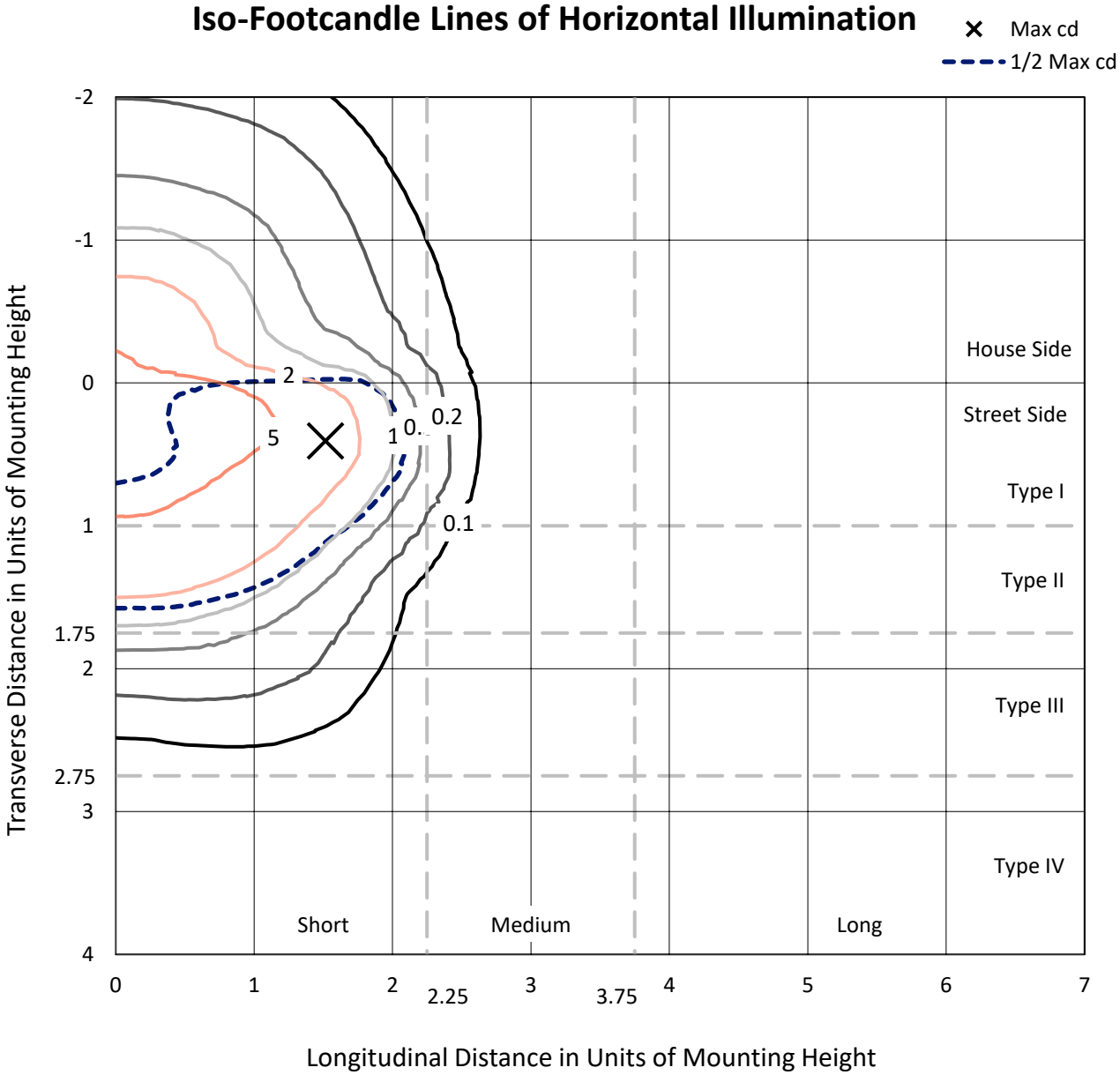
Scaled Data Report

REPORT NUMBER: P640469
CATALOG NUMBER: GWS-SA5D-830-U-T2-W-GRSWH

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 8.4 fc
Type II - Short - N/A

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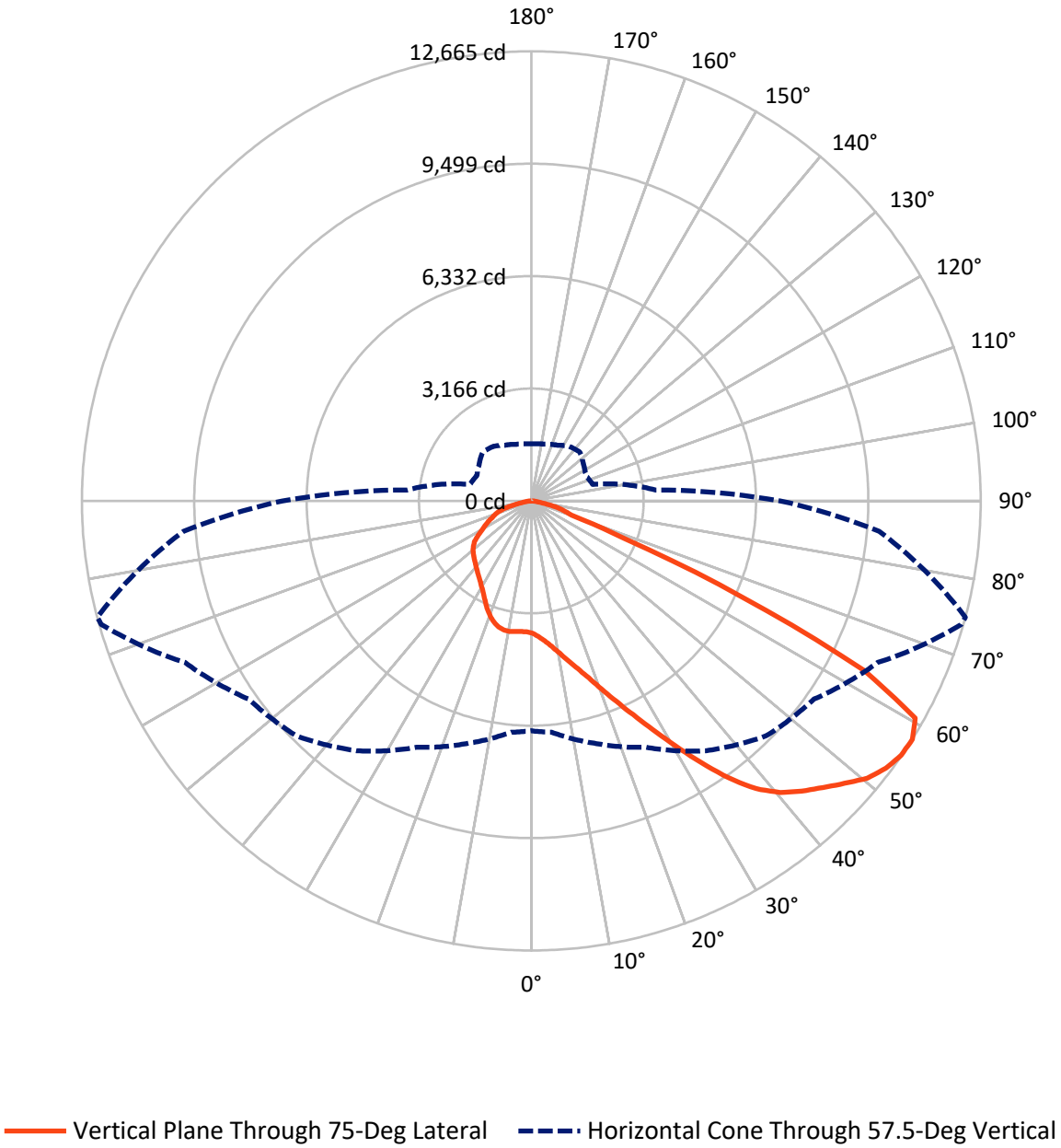
## Luminous Intensity Polar Plot



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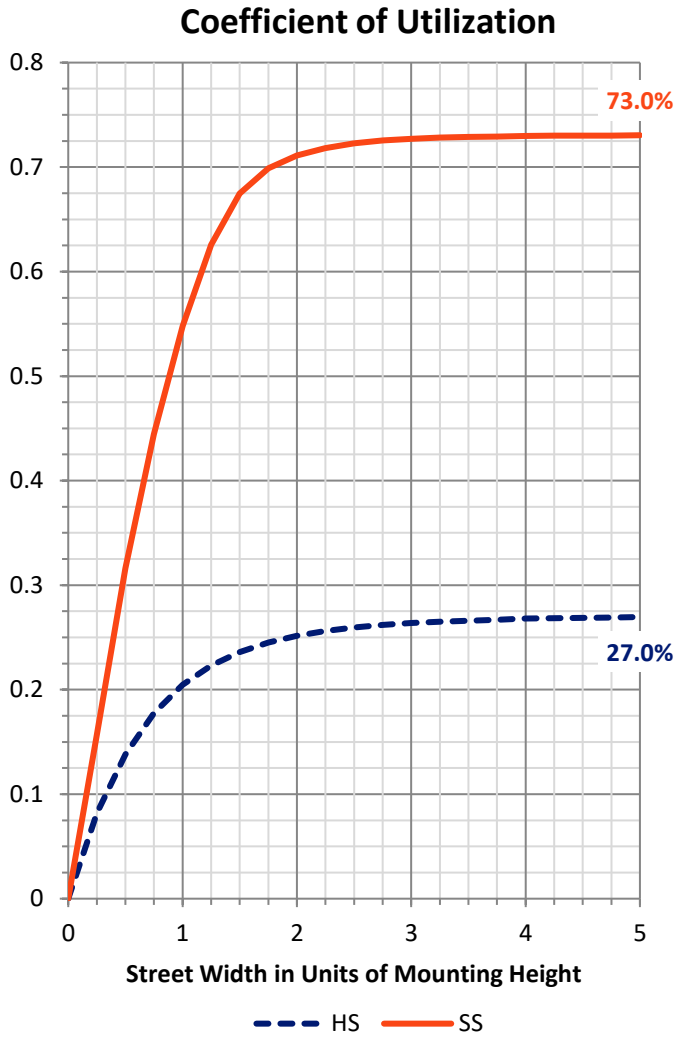
REPORT NUMBER: P640469
CATALOG NUMBER: GWS-SA5D-830-U-T2-W-GRSWH

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 5382.3 | 0.0 | 5382.3 |
| | % Fixture | 27.1 | 0.0 | 27.1 |
| **Street Side** | Lumens | 14513.8 | 0.0 | 14513.8 |
| | % Fixture | 72.9 | 0.0 | 72.9 |
| **Total** | Lumens | 19896.1 | 0.0 | 19896.1 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 372.9 | 1.9 |
| 10°-20° | 1187.1 | 6.0 |
| 20°-30° | 2105.3 | 10.6 |
| 30°-40° | 3222.9 | 16.2 |
| 40°-50° | 4487.6 | 22.6 |
| 50°-60° | 5142.0 | 25.8 |
| 60°-70° | 2642.0 | 13.3 |
| 70°-80° | 665.1 | 3.3 |
| 80°-90° | 71.1 | 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° | 19896.1 | 100.0 |
| 0°-180° | 19896.1 | 100.0 |



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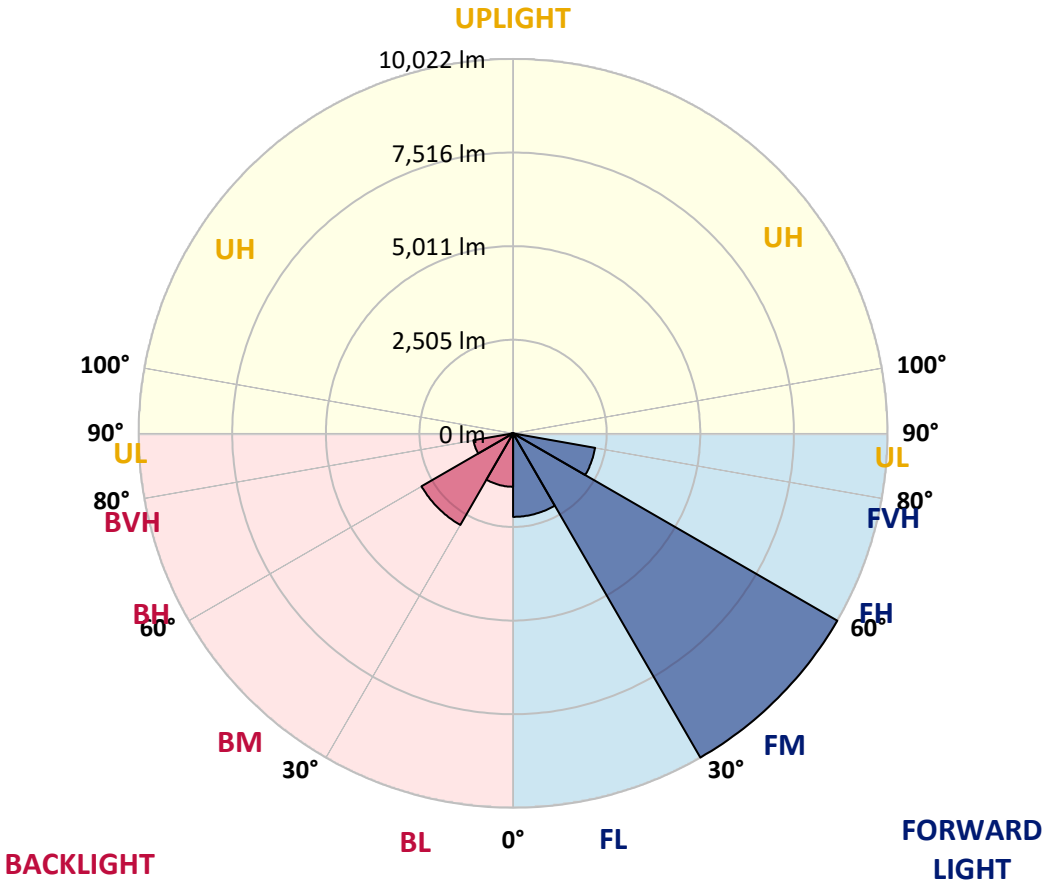
REPORT NUMBER: P640469
CATALOG NUMBER: GWS-SA5D-830-U-T2-W-GRSWH

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 2235.4 | 11.2 | | | |
| FM | (30°-60°) | 10021.9 | 50.4 | | | |
| FH | (60°-80°) | 2230.1 | 11.2 | | | G2/5000 |
| FVH | (80°-90°) | 26.3 | 0.1 | | | G1/100 |
| BL | (0°-30°) | 1429.9 | 7.2 | B3/2500 | | |
| BM | (30°-60°) | 2830.6 | 14.2 | B3/5000 | | |
| BH | (60°-80°) | 1077.0 | 5.4 | B3/2500 | | G3/2500 |
| BVH | (80°-90°) | 44.8 | 0.2 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B3-U0-G3**
Type II Short



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REPORT NUMBER: P640469
CATALOG NUMBER: GWS-SA5D-830-U-T2-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 74° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 3726.1 | 3726.1 | 3726.1 | 3726.1 | 3726.1 | 3726.1 | 3726.1 | 3726.1 | 3726.1 | *3726.1* | 3726.1 |
| 2.5° | 4003.2 | 4013.5 | 4003.2 | 4020.3 | 3986.1 | 3970.7 | 3933.1 | 3876.6 | 3832.1 | *3825.3* | 3775.7 |
| 5° | 4314.6 | 4336.8 | 4323.1 | 4316.3 | 4270.1 | 4235.9 | 4179.4 | 4066.5 | 3974.1 | *3960.4* | 3862.9 |
| 7.5° | 4514.7 | 4530.1 | 4530.1 | 4535.3 | 4518.1 | 4478.8 | 4418.9 | 4285.5 | 4155.5 | *4134.9* | 3987.8 |
| 10° | 4581.4 | 4593.4 | 4615.7 | 4658.4 | 4692.6 | 4704.6 | 4665.3 | 4537.0 | 4377.9 | *4357.3* | 4152.0 |
| 12.5° | 4596.8 | 4610.5 | 4644.7 | 4723.4 | 4817.5 | 4903.1 | 4909.9 | 4815.8 | 4637.9 | *4615.7* | 4341.9 |
| 15° | 4625.9 | 4639.6 | 4685.8 | 4783.3 | 4921.9 | 5086.1 | 5187.1 | 5122.1 | 4925.3 | *4901.4* | 4557.5 |
| 17.5° | 4622.5 | 4637.9 | 4706.3 | 4836.4 | 5022.8 | 5260.6 | 5455.7 | 5483.0 | 5279.4 | *5238.4* | 4802.1 |
| 20° | 4614.0 | 4627.6 | 4701.2 | 4860.3 | 5091.3 | 5418.0 | 5770.4 | 5912.4 | 5693.4 | *5655.8* | 5087.8 |
| 22.5° | 4682.4 | 4697.8 | 4754.2 | 4886.0 | 5127.2 | 5539.5 | 6061.3 | 6403.4 | 6184.4 | *6131.4* | 5416.3 |
| 25° | 4836.4 | 4858.6 | 4892.8 | 4983.5 | 5192.2 | 5647.3 | 6358.9 | 6959.4 | 6735.3 | *6672.0* | 5773.9 |
| 27.5° | 5074.2 | 5101.5 | 5149.4 | 5192.2 | 5337.6 | 5784.1 | 6654.9 | 7582.1 | 7358.0 | *7291.3* | 6151.9 |
| 30° | 5365.0 | 5400.9 | 5462.5 | 5491.6 | 5590.8 | 5986.0 | 6976.5 | 8223.7 | 8093.7 | *8001.3* | 6577.9 |
| 32.5° | 5767.0 | 5816.6 | 5874.8 | 5883.3 | 5943.2 | 6292.2 | 7294.7 | 8860.1 | 8858.4 | *8793.4* | 7062.1 |
| 35° | 6290.5 | 6343.5 | 6355.5 | 6367.5 | 6396.6 | 6713.1 | 7679.7 | 9440.0 | 9664.2 | *9588.9* | 7589.0 |
| 37.5° | 6861.9 | 6938.9 | 6957.7 | 6904.7 | 6945.7 | 7219.5 | 8112.5 | 9905.4 | 10365.6 | *10285.2* | 8098.8 |
| 40° | 7472.7 | 7503.4 | 7554.8 | 7470.9 | 7522.3 | 7799.4 | 8536.8 | 10203.0 | 10889.1 | *10803.5* | 8500.8 |
| 42.5° | 7910.6 | 7967.1 | 8044.1 | 8013.3 | 8042.3 | 8295.5 | 8834.4 | 10346.8 | 11262.0 | *11176.5* | 8789.9 |
| 45° | 8386.2 | 8403.3 | 8452.9 | 8446.1 | 8463.2 | 8699.3 | 9048.3 | 10410.0 | 11595.6 | *11518.6* | 9036.3 |
| 47.5° | 8800.2 | 8825.9 | 8858.4 | 8820.7 | 8783.1 | 8937.1 | 9222.8 | 10464.8 | 11980.5 | *11888.2* | 9294.6 |
| 50° | 9198.8 | 9221.1 | 9260.4 | 9150.9 | 9010.6 | 9050.0 | 9308.3 | 10540.1 | 12341.5 | *12276.5* | 9498.2 |
| 52.5° | 9272.4 | 9296.3 | 9481.1 | 9503.3 | 9323.7 | 9185.1 | 9458.9 | 10706.0 | 12553.6 | *12512.6* | 9571.8 |
| 55° | 8346.9 | 8389.6 | 8757.4 | 9180.0 | 9623.1 | 9578.6 | 9700.1 | 10793.3 | 12637.5 | *12647.7* | 9703.5 |
| 57.5° | *6478.7* | *6540.3* | *7077.5* | *7657.4* | *8589.8* | *9361.3* | *9730.9* | *10771.0* | *12608.4* | *12664.8* | *9838.7* |
| 60° | 4249.6 | 4285.5 | 4921.9 | 5572.0 | 6538.6 | 7606.1 | 8709.5 | 10370.7 | 12350.1 | *12430.5* | 9804.4 |
| 62.5° | 2566.2 | 2607.2 | 3118.7 | 3611.4 | 4181.1 | 4894.5 | 5907.3 | 8334.9 | 10351.9 | *10531.5* | 7852.4 |
| 65° | 1791.2 | 1845.9 | 2294.1 | 2699.6 | 2896.3 | 2749.2 | 2992.1 | 4655.0 | 6449.6 | *6524.9* | 4798.7 |
| 67.5° | 1298.5 | 1336.1 | 1703.9 | 2186.4 | 2403.6 | 1941.7 | 1479.8 | 2061.5 | 2809.1 | *2836.5* | 1979.4 |
| 70° | 850.3 | 893.0 | 1226.6 | 1664.6 | 1962.3 | 1573.9 | 1106.9 | 1115.4 | 1182.1 | *1195.8* | 1149.6 |
| 72.5° | 467.0 | 492.7 | 757.9 | 1105.2 | 1159.9 | 940.9 | 863.9 | 927.2 | 973.4 | *973.4* | 985.4 |
| 75° | 241.2 | 263.5 | 309.6 | 364.4 | 439.7 | 514.9 | 622.7 | 716.8 | 766.4 | *769.8* | 764.7 |
| 77.5° | 123.2 | 131.7 | 165.9 | 179.6 | 196.7 | 229.2 | 297.7 | 381.5 | 426.0 | *443.1* | 439.7 |
| 80° | 58.2 | 61.6 | 70.1 | 82.1 | 100.9 | 128.3 | 160.8 | 191.6 | 219.0 | *222.4* | 241.2 |
| 82.5° | 30.8 | 34.2 | 37.6 | 44.5 | 54.7 | 68.4 | 94.1 | 112.9 | 130.0 | *133.4* | 148.8 |
| 85° | 12.0 | 13.7 | 15.4 | 17.1 | 24.0 | 29.1 | 39.3 | 53.0 | 65.0 | *65.0* | 77.0 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 1.7 | 3.4 | 6.8 | 8.6 | 12.0 | *12.0* | 20.5 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 0.0 |

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Scaled Data Report

REPORT NUMBER: P640469
CATALOG NUMBER: GWS-SA5D-830-U-T2-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 3726.1 | 3726.1 | 3726.1 | 3726.1 | 3726.1 | 3726.1 | 3726.1 | 3726.1 | 3726.1 | 3726.1 | 3726.1 |
| 2.5° | 3763.7 | 3714.1 | 3691.8 | 3655.9 | 3626.8 | 3594.3 | 3568.7 | 3549.9 | 3537.9 | 3531.0 | 3524.2 |
| 5° | 3825.3 | 3750.0 | 3690.1 | 3618.3 | 3568.7 | 3520.8 | 3481.4 | 3454.0 | 3440.4 | 3430.1 | 3423.3 |
| 7.5° | 3921.1 | 3820.2 | 3707.2 | 3596.0 | 3508.8 | 3431.8 | 3382.2 | 3353.1 | 3334.3 | 3327.5 | 3322.3 |
| 10° | 4052.8 | 3912.5 | 3726.1 | 3549.9 | 3419.8 | 3336.0 | 3301.8 | 3288.1 | 3289.8 | 3286.4 | 3284.7 |
| 12.5° | 4201.7 | 4010.1 | 3720.9 | 3467.7 | 3324.0 | 3274.4 | 3276.1 | 3298.4 | 3324.0 | 3330.9 | 3332.6 |
| 15° | 4362.5 | 4105.9 | 3671.3 | 3361.7 | 3248.8 | 3253.9 | 3298.4 | 3351.4 | 3399.3 | 3418.1 | 3421.5 |
| 17.5° | 4537.0 | 4186.3 | 3580.6 | 3245.3 | 3187.2 | 3241.9 | 3324.0 | 3411.3 | 3481.4 | 3512.2 | 3520.8 |
| 20° | 4732.0 | 4254.7 | 3452.3 | 3130.7 | 3129.0 | 3219.7 | 3339.4 | 3454.0 | 3543.0 | 3584.1 | 3590.9 |
| 22.5° | 4939.0 | 4297.5 | 3294.9 | 3024.6 | 3069.1 | 3190.6 | 3327.5 | 3447.2 | 3541.3 | 3582.4 | 3590.9 |
| 25° | 5147.7 | 4311.1 | 3122.2 | 2927.1 | 3007.5 | 3144.4 | 3269.3 | 3365.1 | 3454.0 | 3490.0 | 3496.8 |
| 27.5° | 5342.7 | 4271.8 | 2957.9 | 2843.3 | 2951.1 | 3076.0 | 3159.8 | 3211.1 | 3272.7 | 3300.1 | 3305.2 |
| 30° | 5541.2 | 4193.1 | 2819.4 | 2776.6 | 2887.8 | 2981.9 | 3019.5 | 3022.9 | 3046.9 | 3046.9 | 3050.3 |
| 32.5° | 5741.4 | 4076.8 | 2697.9 | 2711.6 | 2809.1 | 2870.7 | 2875.8 | 2836.5 | 2807.4 | 2759.5 | 2757.8 |
| 35° | 5972.3 | 3958.7 | 2598.7 | 2638.0 | 2716.7 | 2754.3 | 2738.9 | 2663.7 | 2593.5 | 2514.8 | 2511.4 |
| 37.5° | 6186.2 | 3837.3 | 2514.8 | 2562.7 | 2612.3 | 2639.7 | 2603.8 | 2513.1 | 2455.0 | 2374.6 | 2362.6 |
| 40° | 6362.4 | 3727.8 | 2434.4 | 2484.0 | 2508.0 | 2531.9 | 2473.8 | 2400.2 | 2408.8 | 2364.3 | 2362.6 |
| 42.5° | 6465.0 | 3621.7 | 2359.2 | 2396.8 | 2412.2 | 2429.3 | 2378.0 | 2323.2 | 2369.4 | 2335.2 | 2336.9 |
| 45° | 6540.3 | 3529.3 | 2290.7 | 2304.4 | 2342.0 | 2367.7 | 2319.8 | 2258.2 | 2268.5 | 2136.8 | 2106.0 |
| 47.5° | 6625.8 | 3478.0 | 2225.7 | 2212.0 | 2278.7 | 2323.2 | 2249.7 | 2160.7 | 2099.1 | 1969.1 | 1957.1 |
| 50° | 6716.5 | 3459.2 | 2157.3 | 2119.6 | 2200.1 | 2242.8 | 2157.3 | 2046.1 | 1965.7 | 1895.5 | 1888.7 |
| 52.5° | 6747.3 | 3457.5 | 2071.7 | 2008.4 | 2088.9 | 2148.7 | 2076.9 | 1964.0 | 1868.2 | 1799.7 | 1796.3 |
| 55° | 6868.8 | 3507.1 | 1962.3 | 1856.2 | 1931.5 | 2054.6 | 2001.6 | 1839.1 | 1762.1 | 1731.3 | 1727.9 |
| 57.5° | *7010.7* | *3515.6* | *1789.5* | *1690.2* | *1794.6* | *1940.0* | *1873.3* | *1733.0* | *1649.2* | *1611.5* | *1608.1* |
| 60° | 6952.6 | 3305.2 | 1604.7 | 1563.6 | 1678.3 | 1832.2 | 1770.6 | 1649.2 | 1551.7 | 1515.7 | 1512.3 |
| 62.5° | 5298.3 | 2333.5 | 1469.6 | 1454.2 | 1553.4 | 1676.6 | 1664.6 | 1538.0 | 1445.6 | 1419.9 | 1416.5 |
| 65° | 3187.2 | 1638.9 | 1339.5 | 1337.8 | 1408.0 | 1526.0 | 1541.4 | 1438.8 | 1341.2 | 1305.3 | 1305.3 |
| 67.5° | 1575.6 | 1254.0 | 1192.4 | 1183.9 | 1228.3 | 1312.2 | 1377.2 | 1293.3 | 1211.2 | 1177.0 | 1171.9 |
| 70° | 1113.7 | 1105.2 | 1084.6 | 1060.7 | 1069.2 | 1103.4 | 1130.8 | 1060.7 | 973.4 | 939.2 | 932.4 |
| 72.5° | 963.2 | 964.9 | 951.2 | 932.4 | 925.5 | 901.6 | 877.6 | 826.3 | 773.3 | 737.3 | 740.8 |
| 75° | 747.6 | 751.0 | 759.6 | 752.7 | 733.9 | 708.3 | 682.6 | 617.6 | 574.8 | 540.6 | 533.8 |
| 77.5° | 436.2 | 453.4 | 480.7 | 473.9 | 477.3 | 441.4 | 431.1 | 367.8 | 328.5 | 304.5 | 299.4 |
| 80° | 246.4 | 256.6 | 268.6 | 277.1 | 266.9 | 251.5 | 229.2 | 195.0 | 183.1 | 165.9 | 162.5 |
| 82.5° | 148.8 | 159.1 | 164.2 | 171.1 | 167.7 | 147.1 | 130.0 | 107.8 | 97.5 | 89.0 | 87.2 |
| 85° | 75.3 | 82.1 | 87.2 | 90.7 | 80.4 | 66.7 | 59.9 | 47.9 | 41.1 | 35.9 | 35.9 |
| 87.5° | 18.8 | 20.5 | 24.0 | 20.5 | 18.8 | 8.6 | 6.8 | 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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Peachtree City, GA 30269

# LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

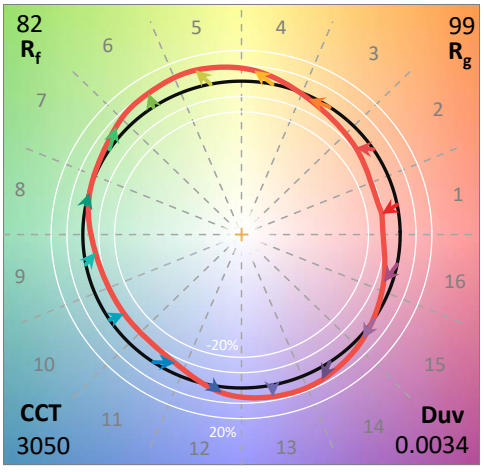
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2408-195-9 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 08/07/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | MCGRAW EDISON |
| Catalog Number: | **GALN-SB1A-830-U-5WQ** |
| Description: | GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3050 | CRI (Ra): | 81.0 | | |
| CIE u': | 0.2476 | R1: | 79.6 | R9: | 7.1 |
| CIE v': | 0.5251 | R2: | 85.6 | R10: | 67.0 |
| Duv: | 0.0034 | R3: | 92.0 | R11: | 82.7 |
| CIE x: | 0.4383 | R4: | 82.6 | R12: | 63.2 |
| CIE y: | 0.4131 | R5: | 78.9 | R13: | 80.3 |
| CIE z: | 0.1487 | R6: | 81.7 | R14: | 95.0 |
| Peak Wavelength (nm): | 603 | R7: | 85.2 | R15: | 71.7 |
| Dominant Wavelength (nm): | 581 | R8: | 62.0 | | |
| Purity: | 55.55201 | | | | |

| | |
|---|---|
| Rf: | 81.5 |
| Rg: | 99.2 |




## Test Conditions

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

REPORT NUMBER: SP1-2408-195-9

| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC Power Source | IN0208 | 10/24/2023 | 10/24/2024 |
| Sphere Thermometer | IN0085 | 10/24/2023 | 10/24/2024 |
| Room Thermometer | IN0046 | 10/24/2023 | 10/24/2024 |

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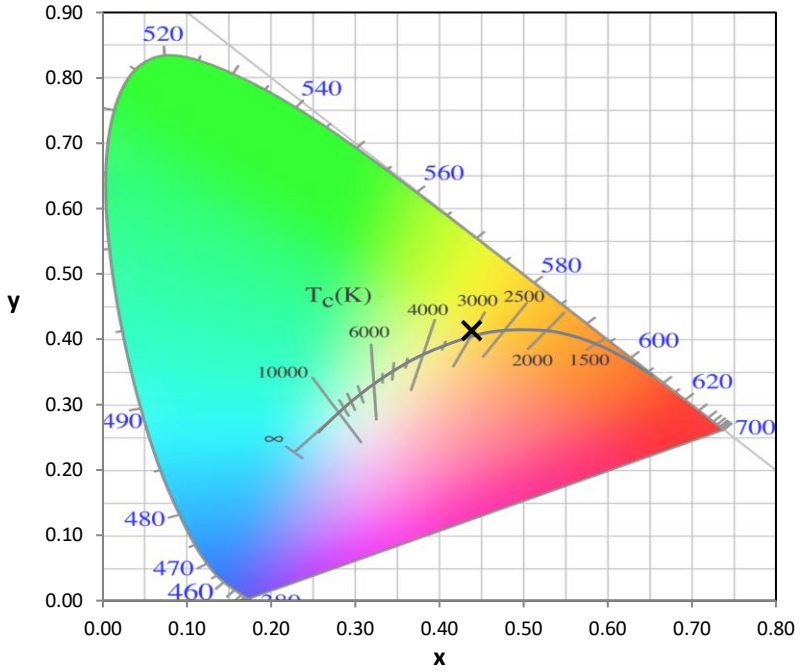
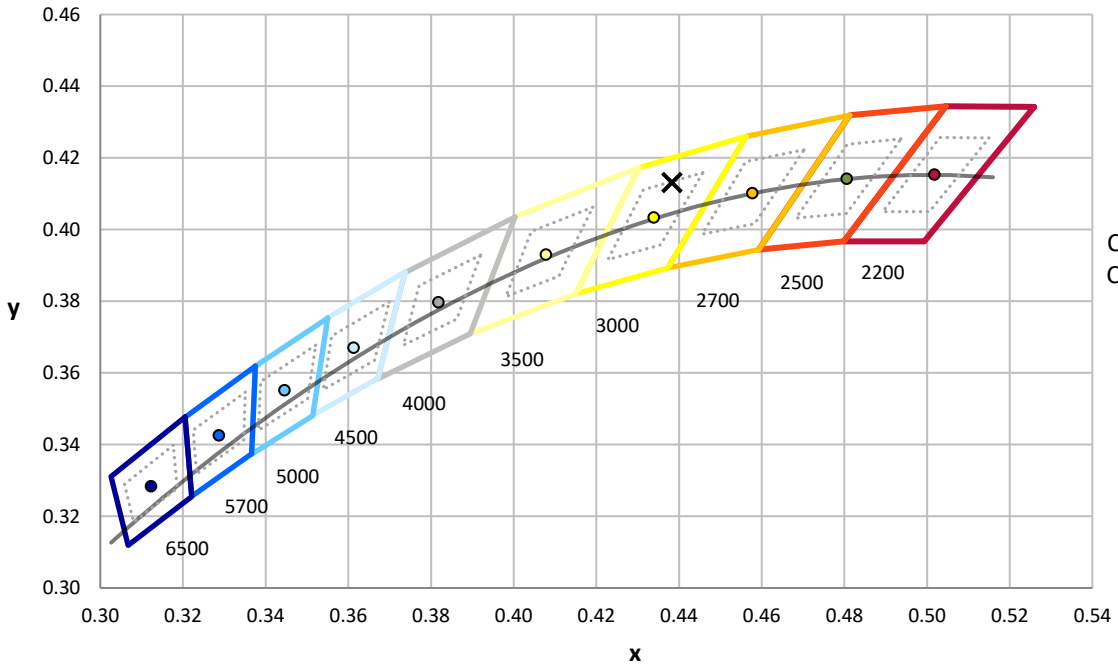
## CIE 1931 Chromaticity Diagram




## CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles




CCT = 3050K
CIE x = 0.4383
CIE y = 0.4131
Duv = 0.0034

Point lies inside the ANSI 3000K 4-step quadrangle

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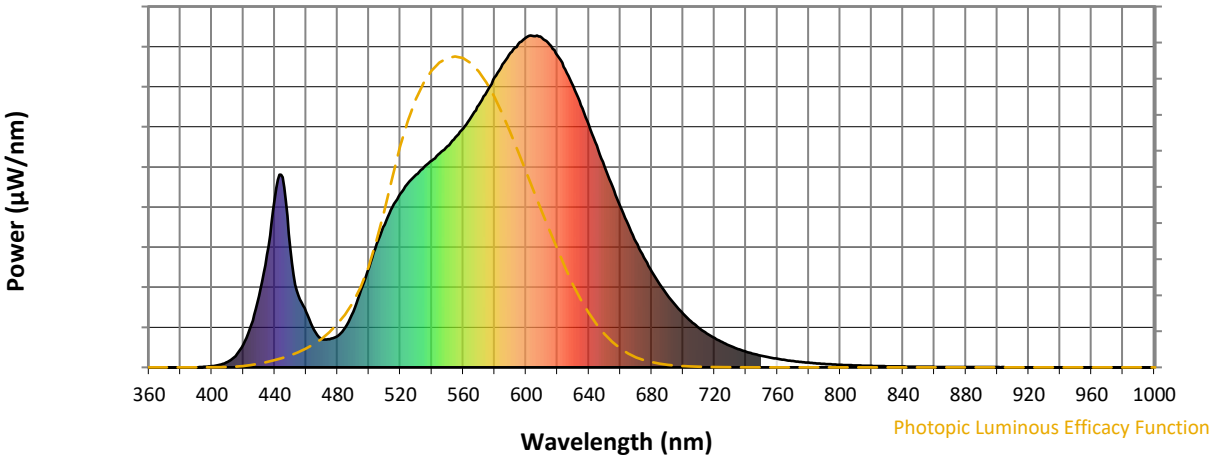
## Photopic Flux vs. Wavelength




## Photopic Lumens: NR

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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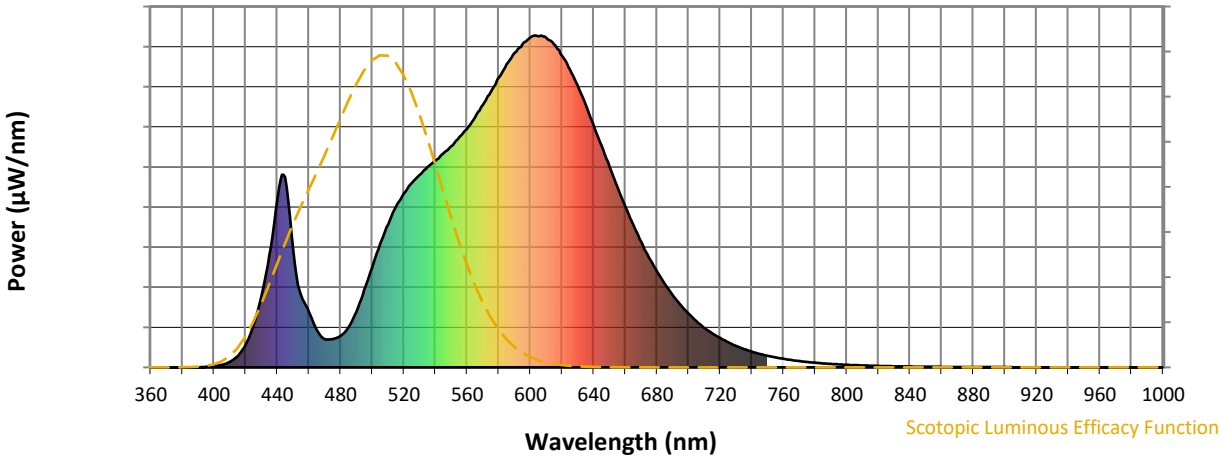
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.27**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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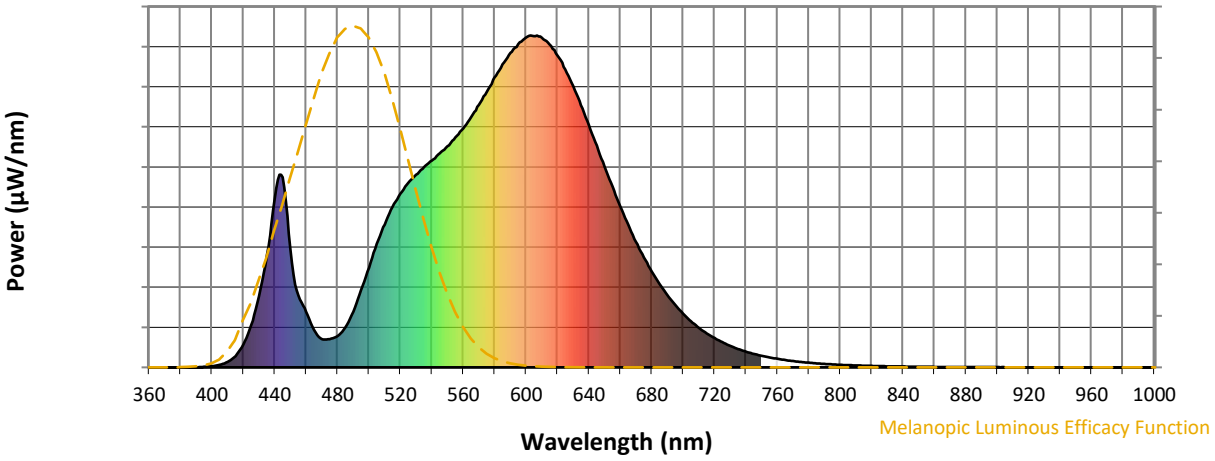
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.32**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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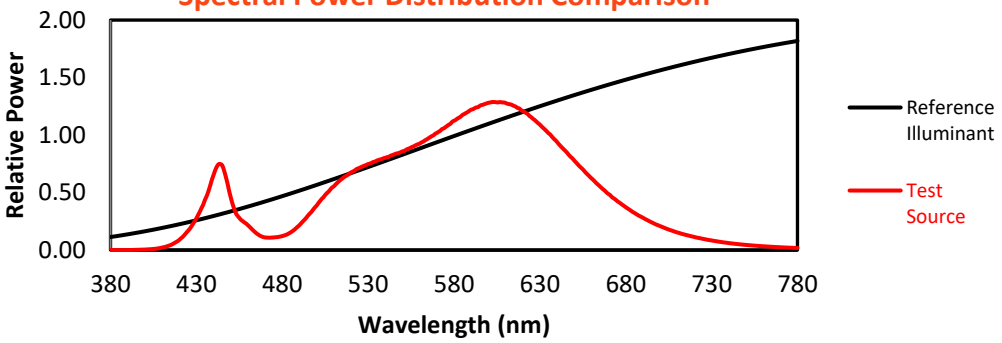
# TM-30-18

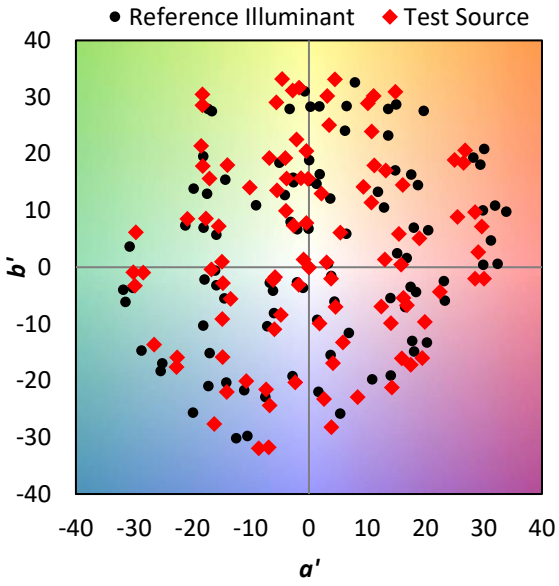
## Summary

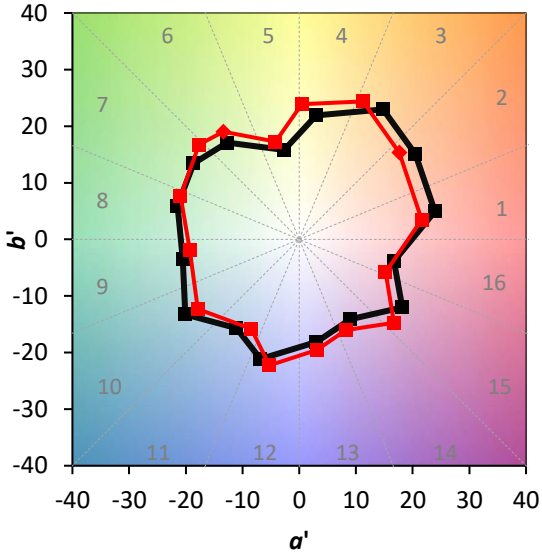
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

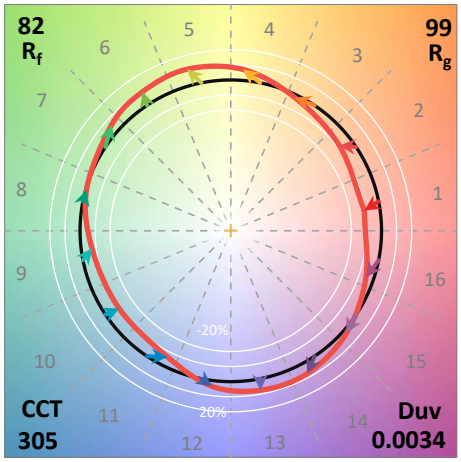
## Spectral Power Distribution Comparison

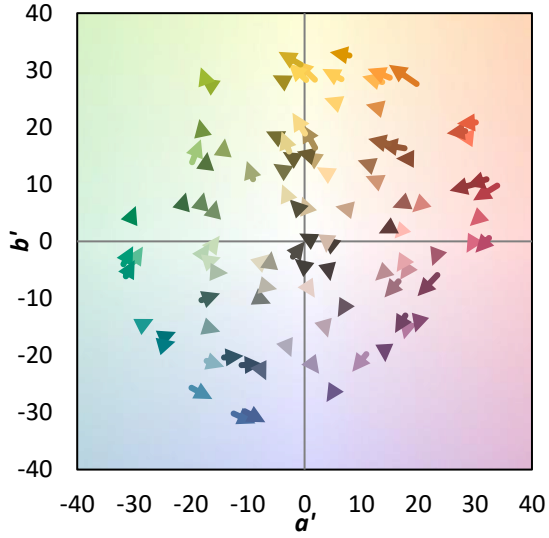



## Color Vector Graphics



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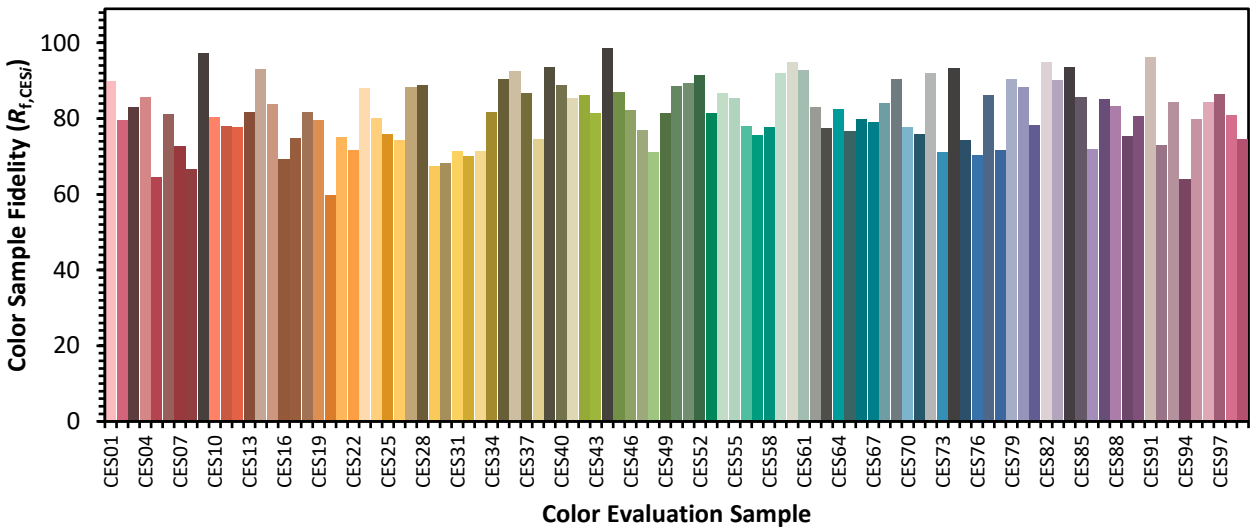
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 51 | CES31 = 71 | CES56 = 78 | CES81 = 78 |
| CES07 = 42 | CES32 = 70 | CES57 = 76 | CES82 = 95 |
| CES08 = 41 | CES33 = 71 | CES58 = 78 | CES83 = 90 |
| CES09 = 29 | CES34 = 82 | CES59 = 92 | CES84 = 94 |
| CES10 = 76 | CES35 = 90 | CES60 = 95 | CES85 = 86 |
| CES11 = 59 | CES36 = 93 | CES61 = 93 | CES86 = 72 |
| CES12 = 65 | CES37 = 87 | CES62 = 83 | CES87 = 85 |
| CES13 = 43 | CES38 = 75 | CES63 = 77 | CES88 = 83 |
| CES14 = 74 | CES39 = 94 | CES64 = 83 | CES89 = 75 |
| CES15 = 71 | CES40 = 89 | CES65 = 77 | CES90 = 81 |
| CES16 = 47 | CES41 = 85 | CES66 = 80 | CES91 = 96 |
| CES17 = 50 | CES42 = 86 | CES67 = 79 | CES92 = 73 |
| CES18 = 56 | CES43 = 81 | CES68 = 84 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 91 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 78 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 76 | CES96 = 84 |
| CES22 = 79 | CES47 = 77 | CES72 = 92 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 71 | CES98 = 81 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 74 |
| CES25 = 72 | CES50 = 89 | CES75 = 74 | |



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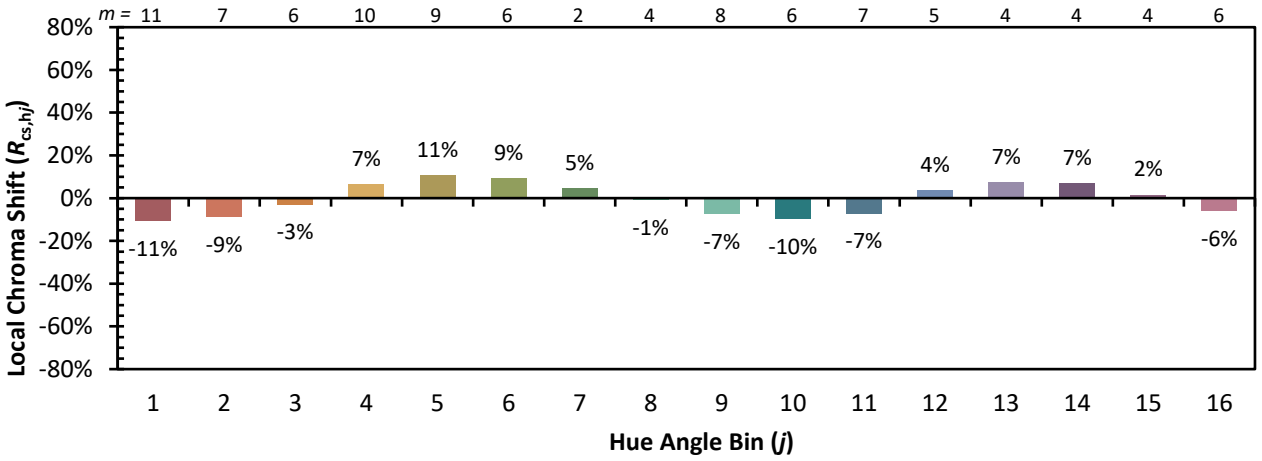
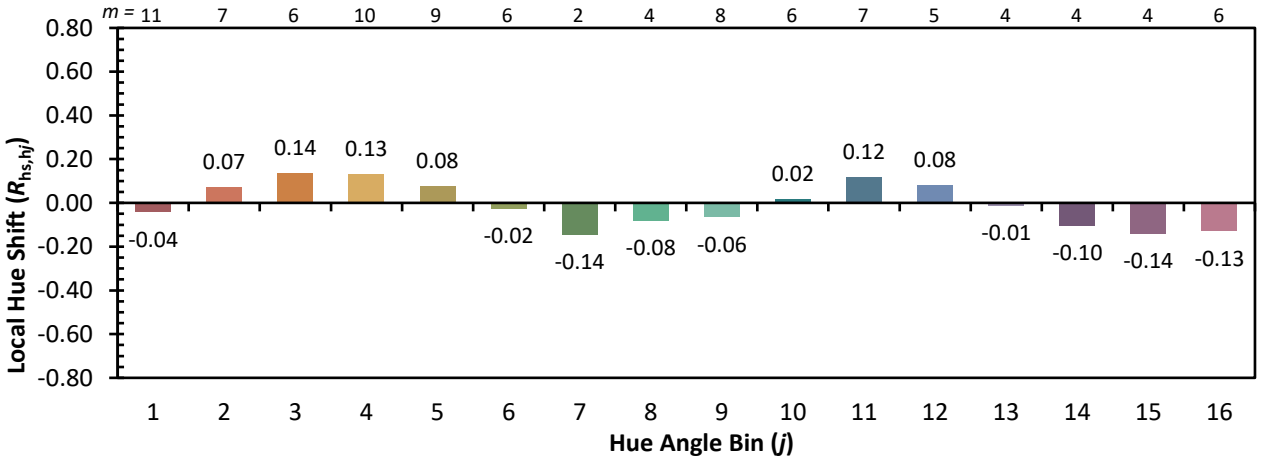
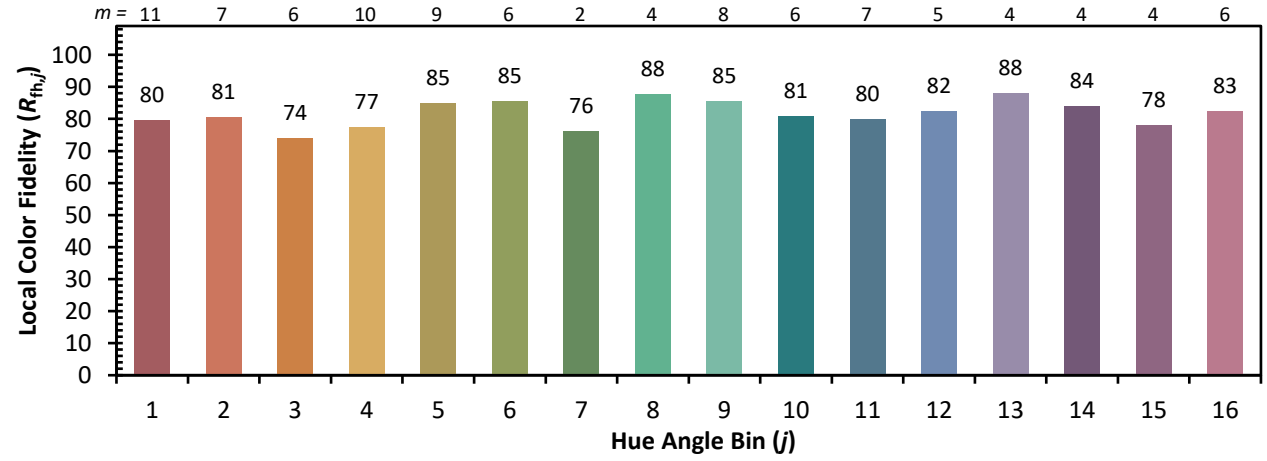
# TM-30-18

## Color Rendition by Hue-Angle Bin



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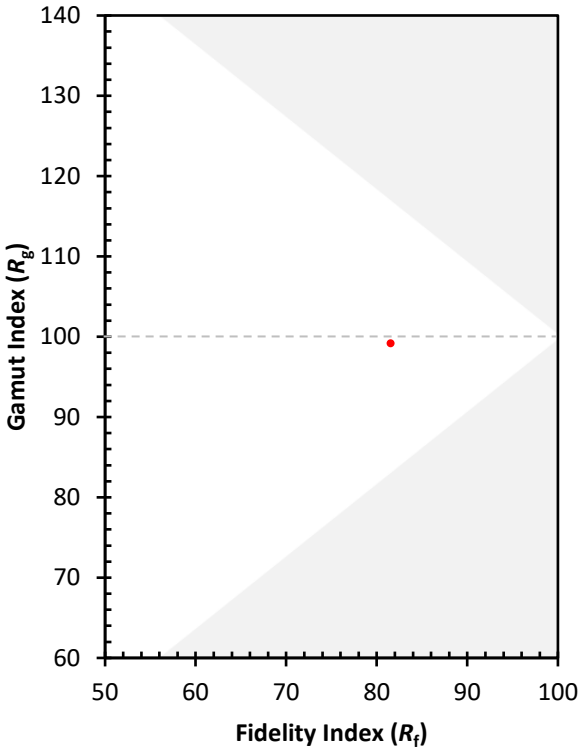
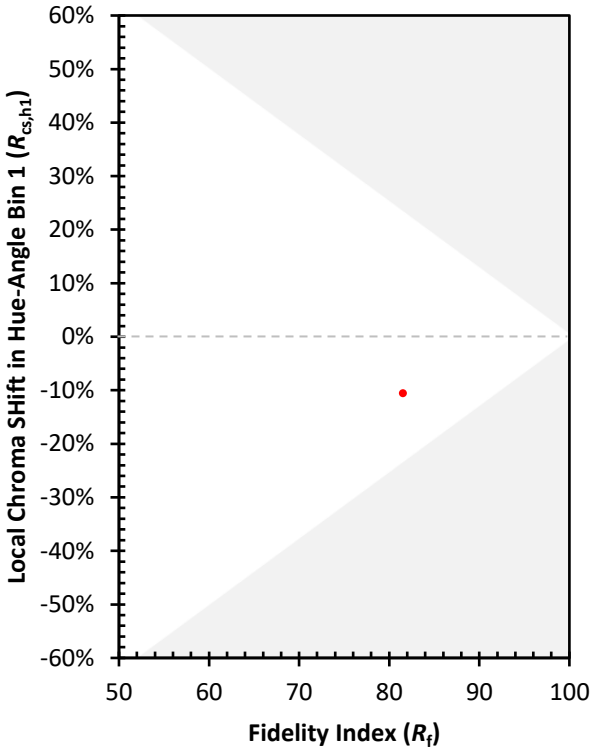
## TM-30-18

### Measure Comparisons




(END OF REPORT)