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: P640447

Luminaire Tested: GWS-SA5D-830-U-RW-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: | P640447 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-51) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA5D-830-U-RW-W-GRSWH |
| Description: | GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND RECTANGULAR WIDE OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH |
| Light Source: | (80) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 21037.1 lumens |
| Efficiency: | N/A |
| Efficacy: | 102.8 lumens/watt |
| Luminous Opening: | Rectangular (W 1.5' x L: 1' x H: 0') |
| IES Classification: | Type V - Short |
| BUG Rating: | B4 - U0 - G1 |

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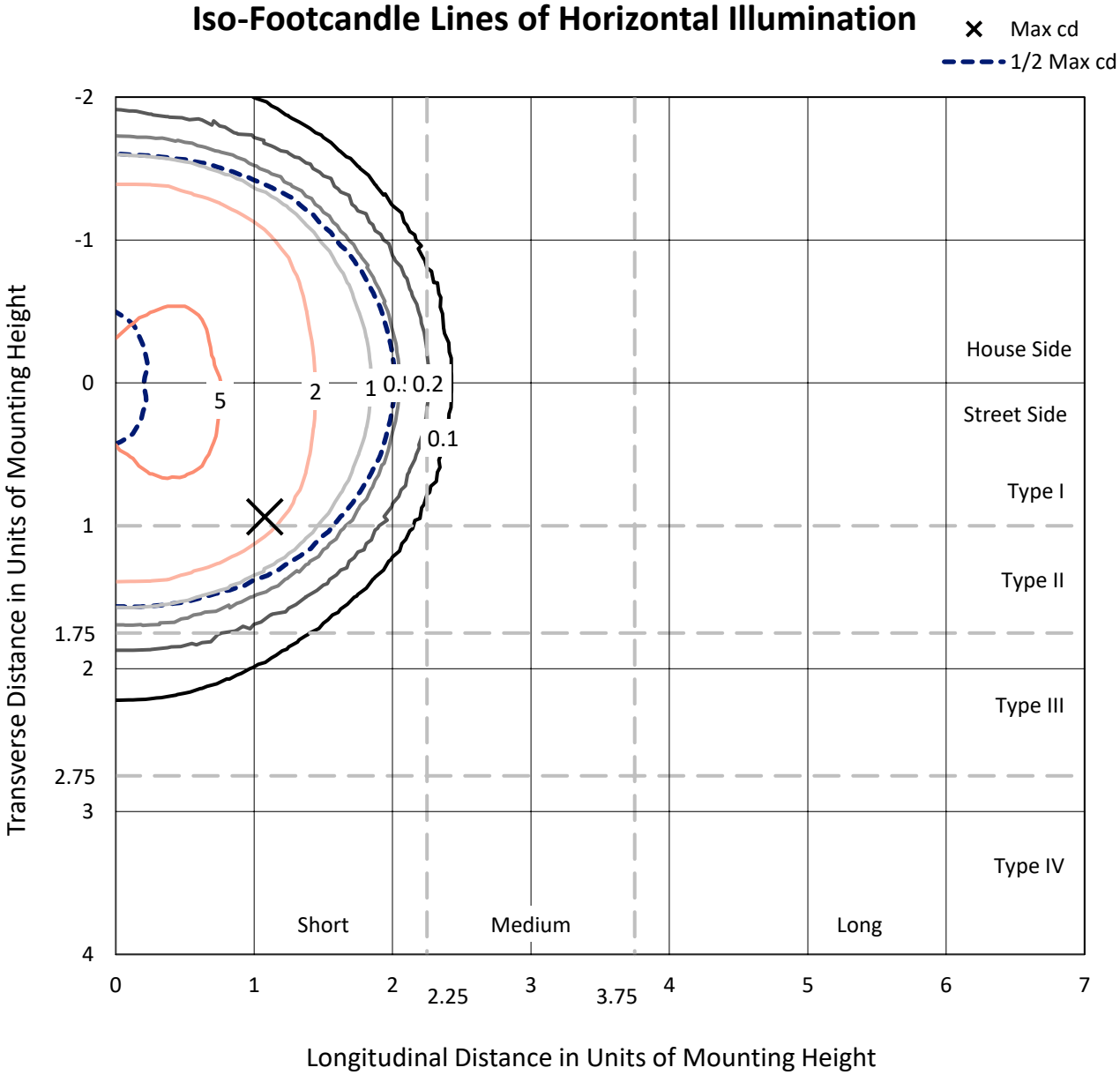
Scaled Data Report

REPORT NUMBER: P640447
CATALOG NUMBER: GWS-SA5D-830-U-RW-W-GRSWH

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 6.2 fc
Type V - Short - N/A

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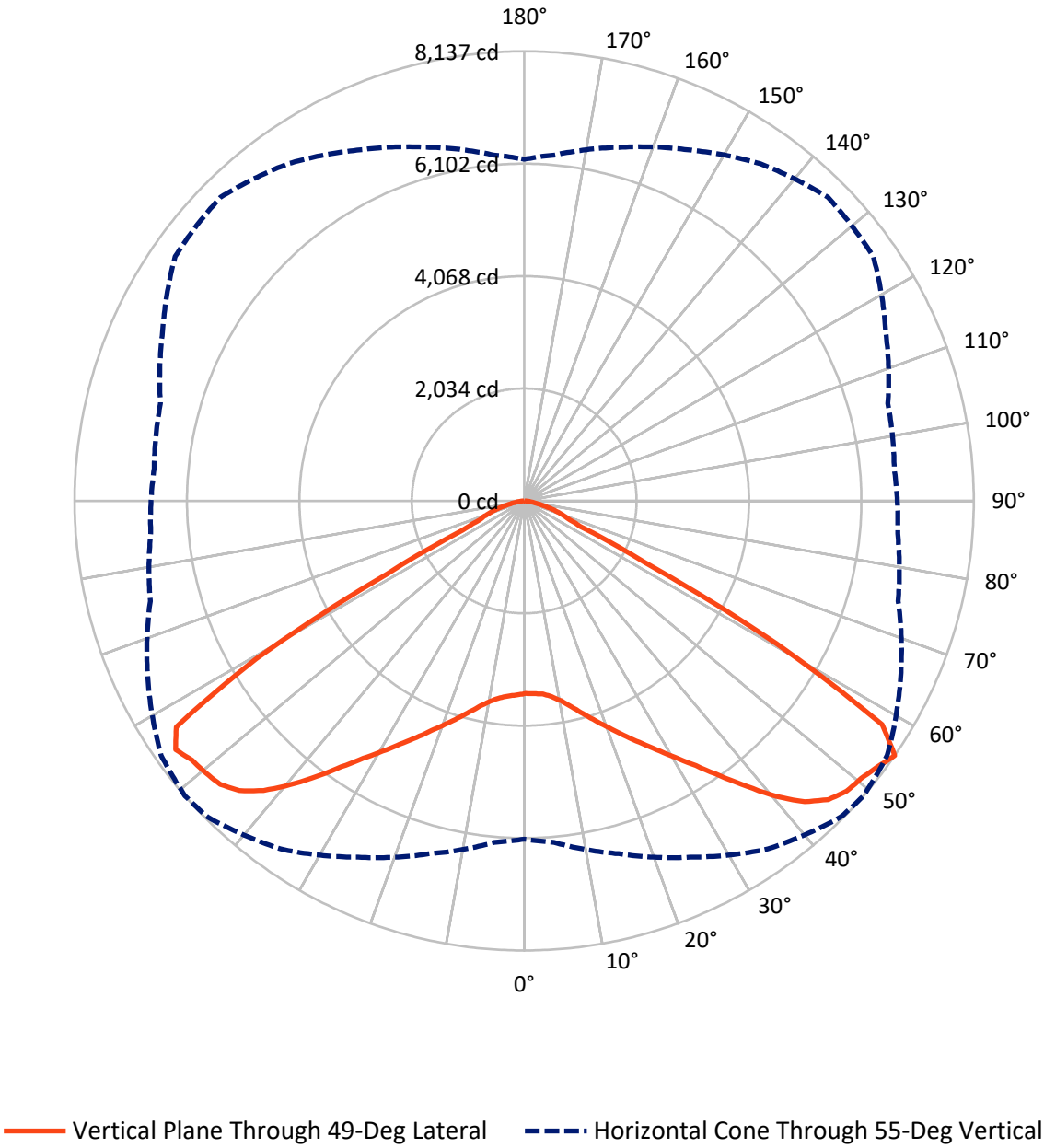
## Luminous Intensity Polar Plot



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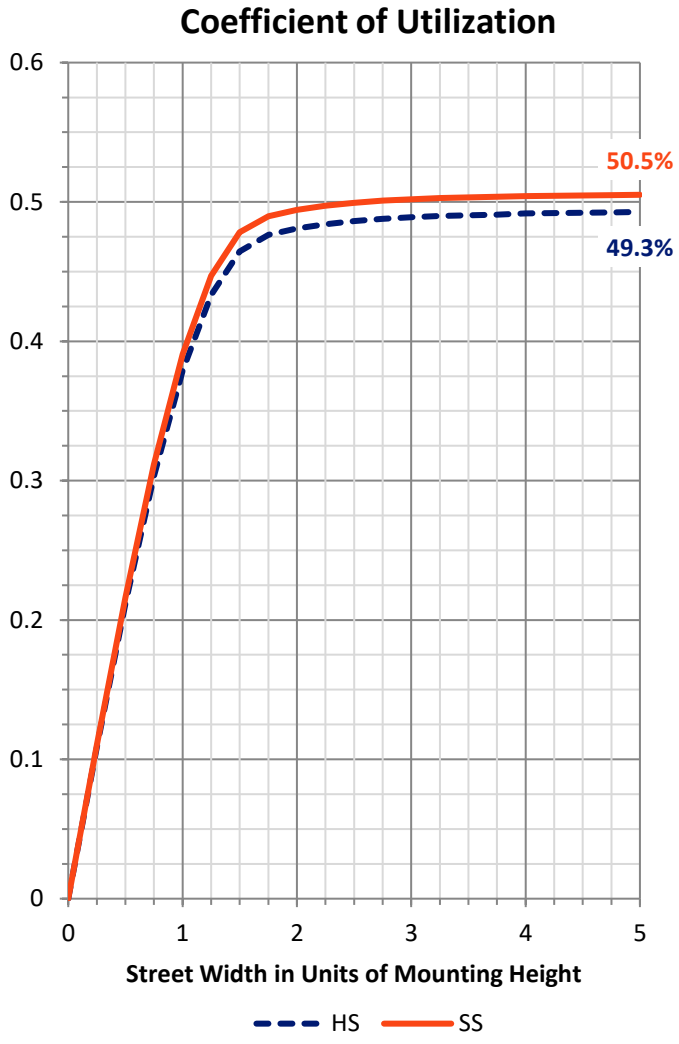
REPORT NUMBER: P640447
CATALOG NUMBER: GWS-SA5D-830-U-RW-W-GRSWH

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 10415.4 | 0.0 | 10415.4 |
| | % Fixture | 49.5 | 0.0 | 49.5 |
| **Street Side** | Lumens | 10621.7 | 0.0 | 10621.7 |
| | % Fixture | 50.5 | 0.0 | 50.5 |
| **Total** | Lumens | 21037.1 | 0.0 | 21037.1 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 339.9 | 1.6 |
| 10°-20° | 1121.3 | 5.3 |
| 20°-30° | 2135.8 | 10.2 |
| 30°-40° | 3620.6 | 17.2 |
| 40°-50° | 5448.8 | 25.9 |
| 50°-60° | 5964.2 | 28.4 |
| 60°-70° | 1885.9 | 9.0 |
| 70°-80° | 452.6 | 2.2 |
| 80°-90° | 67.9 | 0.3 |
| 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° | 21037.1 | 100.0 |
| 0°-180° | 21037.1 | 100.0 |



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REPORT NUMBER: P640447
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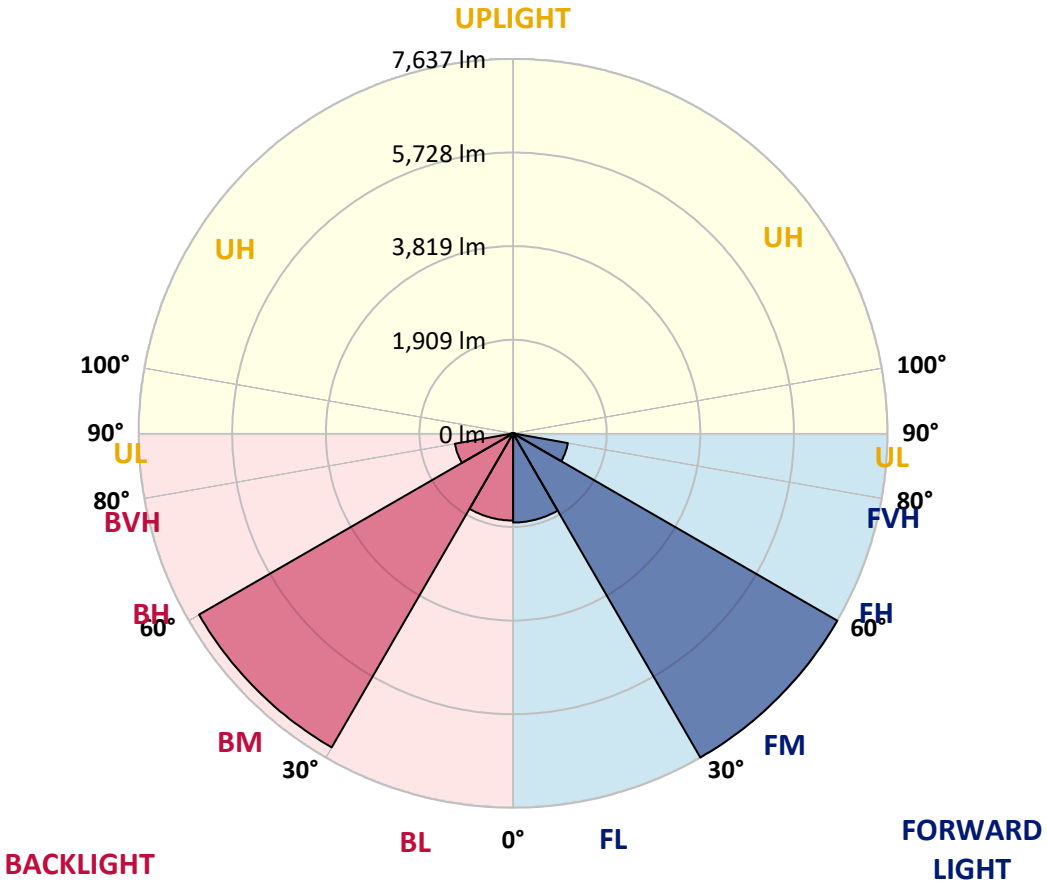
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1818.8 | 8.6 | | | |
| FM | (30°-60°) | 7637.1 | 36.3 | | | |
| FH | (60°-80°) | 1134.4 | 5.4 | | | G1/1800 |
| FVH | (80°-90°) | 31.4 | 0.1 | | | G1/100 |
| BL | (0°-30°) | 1778.2 | 8.5 | B3/2500 | | |
| BM | (30°-60°) | 7396.5 | 35.2 | B4/8500 | | |
| BH | (60°-80°) | 1204.1 | 5.7 | B3/2500 | | G1/1800 |
| BVH | (80°-90°) | 36.5 | 0.2 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B4-U0-G1**
Type V Short



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REPORT NUMBER: P640447
CATALOG NUMBER: GWS-SA5D-830-U-RW-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 49° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 |
| 2.5° | 3433.6 | 3437.0 | 3443.9 | 3455.8 | 3467.8 | 3484.9 | 3491.8 | 3500.3 | 3498.6 | 3508.9 | 3508.9 |
| 5° | 3416.5 | 3421.6 | 3431.9 | 3449.0 | 3469.5 | 3502.0 | 3510.6 | 3531.1 | 3551.6 | 3577.3 | 3585.9 |
| 7.5° | 3437.0 | 3443.9 | 3455.8 | 3483.2 | 3514.0 | 3556.8 | 3573.9 | 3608.1 | 3647.5 | 3693.6 | 3712.5 |
| 10° | 3476.4 | 3484.9 | 3505.5 | 3549.9 | 3599.5 | 3664.6 | 3680.0 | 3722.7 | 3786.0 | 3849.3 | 3887.0 |
| 12.5° | 3520.9 | 3534.5 | 3572.2 | 3642.3 | 3715.9 | 3801.4 | 3825.4 | 3878.4 | 3946.8 | 4029.0 | 4080.3 |
| 15° | 3572.2 | 3584.2 | 3642.3 | 3741.5 | 3856.2 | 3969.1 | 3996.5 | 4047.8 | 4124.8 | 4205.2 | 4277.0 |
| 17.5° | 3680.0 | 3700.5 | 3768.9 | 3883.5 | 4017.0 | 4150.4 | 4181.2 | 4239.4 | 4301.0 | 4364.3 | 4432.7 |
| 20° | 3827.1 | 3844.2 | 3931.4 | 4073.4 | 4230.8 | 4352.3 | 4383.1 | 4434.4 | 4463.5 | 4496.0 | 4554.2 |
| 22.5° | 3974.2 | 3998.2 | 4097.4 | 4265.1 | 4449.8 | 4581.6 | 4605.5 | 4653.4 | 4632.9 | 4622.6 | 4660.3 |
| 25° | 4157.3 | 4189.8 | 4287.3 | 4470.4 | 4658.5 | 4821.1 | 4839.9 | 4880.9 | 4846.7 | 4793.7 | 4792.0 |
| 27.5° | 4384.8 | 4413.9 | 4514.8 | 4703.0 | 4889.5 | 5058.9 | 5094.8 | 5149.5 | 5074.3 | 5009.3 | 4963.1 |
| 30° | 4655.1 | 4673.9 | 4785.1 | 4985.3 | 5176.9 | 5337.7 | 5383.9 | 5438.7 | 5382.2 | 5274.4 | 5228.2 |
| 32.5° | 4969.9 | 4995.6 | 5123.9 | 5334.3 | 5505.4 | 5666.2 | 5712.4 | 5780.8 | 5719.2 | 5597.8 | 5539.6 |
| 35° | 5348.0 | 5373.7 | 5508.8 | 5738.1 | 5912.6 | 6078.5 | 6111.0 | 6167.5 | 6090.5 | 5950.2 | 5904.0 |
| 37.5° | 5758.6 | 5791.1 | 5962.2 | 6179.5 | 6362.5 | 6555.8 | 6557.5 | 6574.6 | 6465.2 | 6290.7 | 6239.3 |
| 40° | 6220.5 | 6263.3 | 6434.4 | 6660.2 | 6880.9 | 7038.3 | 7036.6 | 6988.7 | 6803.9 | 6533.6 | 6454.9 |
| 42.5° | 6677.3 | 6711.5 | 6884.3 | 7117.0 | 7337.7 | 7486.5 | 7442.0 | 7325.7 | 7058.8 | 6691.0 | 6586.6 |
| 45° | 7007.5 | 7033.1 | 7214.5 | 7476.2 | 7700.4 | 7792.7 | 7712.3 | 7572.1 | 7211.1 | 6790.2 | 6636.2 |
| 47.5° | 7163.2 | 7197.4 | 7380.4 | 7640.5 | 7893.7 | 7946.7 | 7850.9 | 7719.2 | 7300.0 | 6882.6 | 6675.6 |
| 50° | 7079.3 | 7123.8 | 7330.8 | 7572.1 | 7857.8 | 7967.2 | 7898.8 | 7767.1 | 7394.1 | 6973.3 | 6745.7 |
| 52.5° | 6862.1 | 6904.8 | 7166.6 | 7459.1 | 7782.5 | 7999.8 | 7998.0 | 7890.3 | 7501.9 | 6998.9 | 6749.2 |
| 55° | 6119.6 | 6203.4 | 6610.6 | 7115.3 | 7690.1 | 8095.6 | 8136.6 | 8022.0 | 7519.0 | 7005.8 | 6785.1 |
| 57.5° | 3982.8 | 4129.9 | 4516.5 | 5173.5 | 6326.6 | 7363.3 | 7640.5 | 7667.9 | 7395.8 | 6976.7 | 6791.9 |
| 60° | 1662.9 | 1781.0 | 2087.2 | 2523.4 | 3476.4 | 4709.9 | 5247.1 | 5786.0 | 6436.1 | 6672.2 | 6728.6 |
| 62.5° | 1033.3 | 1043.6 | 1074.4 | 1173.6 | 1491.8 | 2094.0 | 2439.6 | 2944.3 | 3910.9 | 4733.8 | 5113.6 |
| 65° | 932.4 | 937.5 | 944.4 | 937.5 | 952.9 | 1026.5 | 1118.9 | 1295.1 | 1688.6 | 2097.5 | 2583.3 |
| 67.5° | 821.2 | 828.0 | 833.2 | 828.0 | 833.2 | 836.6 | 846.9 | 862.2 | 934.1 | 992.3 | 1036.8 |
| 70° | 663.8 | 674.1 | 682.6 | 679.2 | 699.7 | 699.7 | 710.0 | 722.0 | 757.9 | 800.7 | 831.5 |
| 72.5° | 506.4 | 497.8 | 508.1 | 511.5 | 530.4 | 540.6 | 556.0 | 569.7 | 610.8 | 636.4 | 675.8 |
| 75° | 328.5 | 319.9 | 335.3 | 343.9 | 369.5 | 383.2 | 396.9 | 410.6 | 439.7 | 456.8 | 494.4 |
| 77.5° | 177.9 | 176.2 | 191.6 | 203.6 | 231.0 | 248.1 | 258.3 | 268.6 | 292.5 | 297.7 | 321.6 |
| 80° | 102.6 | 102.6 | 112.9 | 121.5 | 138.6 | 157.4 | 167.7 | 176.2 | 193.3 | 198.5 | 208.7 |
| 82.5° | 56.5 | 56.5 | 61.6 | 66.7 | 80.4 | 90.7 | 99.2 | 106.1 | 121.5 | 126.6 | 131.7 |
| 85° | 27.4 | 25.7 | 29.1 | 32.5 | 37.6 | 42.8 | 47.9 | 51.3 | 63.3 | 66.7 | 73.6 |
| 87.5° | 3.4 | 3.4 | 3.4 | 5.1 | 6.8 | 10.3 | 12.0 | 12.0 | 18.8 | 22.2 | 25.7 |
| 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: P640447
CATALOG NUMBER: GWS-SA5D-830-U-RW-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 | 3484.9 |
| 2.5° | 3519.1 | 3496.9 | 3510.6 | 3515.7 | 3515.7 | 3510.6 | 3488.3 | 3481.5 | 3471.2 | 3455.8 | 3455.8 |
| 5° | 3597.8 | 3580.7 | 3584.2 | 3575.6 | 3555.1 | 3529.4 | 3488.3 | 3467.8 | 3450.7 | 3431.9 | 3430.2 |
| 7.5° | 3733.0 | 3710.8 | 3707.3 | 3674.8 | 3620.1 | 3565.3 | 3503.7 | 3466.1 | 3440.4 | 3416.5 | 3414.8 |
| 10° | 3909.2 | 3888.7 | 3863.0 | 3798.0 | 3717.6 | 3637.2 | 3553.4 | 3502.0 | 3464.4 | 3430.2 | 3428.5 |
| 12.5° | 4105.9 | 4082.0 | 4034.1 | 3938.3 | 3837.4 | 3758.7 | 3662.8 | 3584.2 | 3527.7 | 3481.5 | 3472.9 |
| 15° | 4319.8 | 4285.6 | 4203.5 | 4090.6 | 3991.3 | 3907.5 | 3804.8 | 3691.9 | 3606.4 | 3532.8 | 3524.3 |
| 17.5° | 4484.0 | 4439.6 | 4350.6 | 4244.5 | 4162.4 | 4078.6 | 3945.1 | 3803.1 | 3680.0 | 3587.6 | 3573.9 |
| 20° | 4597.0 | 4561.0 | 4460.1 | 4381.4 | 4333.5 | 4259.9 | 4104.2 | 3943.4 | 3804.8 | 3688.5 | 3681.7 |
| 22.5° | 4701.3 | 4658.5 | 4559.3 | 4513.1 | 4513.1 | 4463.5 | 4314.7 | 4124.8 | 3962.2 | 3827.1 | 3810.0 |
| 25° | 4819.4 | 4773.2 | 4697.9 | 4692.8 | 4716.7 | 4694.5 | 4514.8 | 4311.2 | 4121.3 | 3969.1 | 3941.7 |
| 27.5° | 4983.6 | 4932.3 | 4887.8 | 4918.6 | 4952.8 | 4928.8 | 4728.7 | 4492.6 | 4292.4 | 4138.5 | 4114.5 |
| 30° | 5245.3 | 5182.0 | 5141.0 | 5178.6 | 5245.3 | 5175.2 | 4957.9 | 4708.2 | 4506.3 | 4336.9 | 4324.9 |
| 32.5° | 5549.9 | 5478.0 | 5435.2 | 5495.1 | 5555.0 | 5445.5 | 5230.0 | 4990.4 | 4778.3 | 4600.4 | 4579.8 |
| 35° | 5916.0 | 5825.3 | 5762.0 | 5842.4 | 5904.0 | 5796.2 | 5582.4 | 5354.8 | 5118.7 | 4934.0 | 4906.6 |
| 37.5° | 6241.0 | 6131.5 | 6088.8 | 6201.7 | 6283.8 | 6213.7 | 5981.0 | 5767.1 | 5508.8 | 5306.9 | 5295.0 |
| 40° | 6477.1 | 6369.4 | 6338.6 | 6525.0 | 6668.7 | 6651.6 | 6442.9 | 6198.3 | 5955.3 | 5722.7 | 5700.4 |
| 42.5° | 6579.8 | 6504.5 | 6511.3 | 6762.8 | 6985.2 | 7094.7 | 6908.3 | 6646.5 | 6412.1 | 6170.9 | 6155.5 |
| 45° | 6602.0 | 6555.8 | 6610.6 | 6925.4 | 7217.9 | 7442.0 | 7282.9 | 7063.9 | 6798.8 | 6566.1 | 6559.3 |
| 47.5° | 6626.0 | 6600.3 | 6684.1 | 7017.7 | 7365.0 | 7625.1 | 7536.1 | 7310.3 | 7041.7 | 6814.2 | 6797.1 |
| 50° | 6682.4 | 6672.2 | 6766.3 | 7082.8 | 7435.2 | 7674.7 | 7573.8 | 7349.6 | 7074.2 | 6850.1 | 6809.0 |
| 52.5° | 6699.5 | 6682.4 | 6817.6 | 7183.7 | 7551.5 | 7673.0 | 7455.7 | 7163.2 | 6886.0 | 6636.2 | 6593.5 |
| 55° | *6752.6* | *6721.8* | *6814.2* | *7221.3* | *7712.3* | *7772.2* | *7448.9* | *7010.9* | *6624.3* | *6283.8* | *6182.9* |
| 57.5° | 6766.3 | 6732.0 | 6791.9 | 7159.7 | 7537.8 | 7484.8 | 6547.3 | 5657.7 | 4928.8 | 4550.8 | 4593.5 |
| 60° | 6692.7 | 6703.0 | 6600.3 | 6559.3 | 6046.0 | 5337.7 | 4008.4 | 3204.4 | 2516.6 | 2225.8 | 2289.1 |
| 62.5° | 5094.8 | 5137.6 | 4786.9 | 4162.4 | 3200.9 | 2537.1 | 1678.3 | 1303.6 | 1103.5 | 1052.1 | 1060.7 |
| 65° | 2571.3 | 2629.5 | 2265.1 | 1873.3 | 1392.6 | 1125.7 | 973.5 | 942.7 | 932.4 | 920.4 | 920.4 |
| 67.5° | 1017.9 | 1035.0 | 1021.4 | 956.3 | 889.6 | 865.7 | 858.8 | 855.4 | 843.4 | 836.6 | 838.3 |
| 70° | 817.8 | 831.5 | 810.9 | 769.9 | 742.5 | 740.8 | 737.4 | 730.5 | 722.0 | 722.0 | 727.1 |
| 72.5° | 667.2 | 680.9 | 651.8 | 626.2 | 605.6 | 590.2 | 581.7 | 576.5 | 564.6 | 564.6 | 569.7 |
| 75° | 491.0 | 499.6 | 475.6 | 472.2 | 449.9 | 434.5 | 420.9 | 414.0 | 398.6 | 391.8 | 396.9 |
| 77.5° | 326.8 | 325.1 | 313.1 | 313.1 | 304.5 | 285.7 | 270.3 | 254.9 | 234.4 | 220.7 | 224.1 |
| 80° | 212.1 | 212.1 | 207.0 | 207.0 | 198.5 | 183.1 | 164.2 | 148.8 | 136.9 | 126.6 | 126.6 |
| 82.5° | 135.2 | 133.4 | 131.7 | 130.0 | 126.6 | 111.2 | 97.5 | 87.3 | 78.7 | 71.9 | 73.6 |
| 85° | 75.3 | 75.3 | 71.9 | 71.9 | 65.0 | 56.5 | 49.6 | 42.8 | 37.6 | 35.9 | 35.9 |
| 87.5° | 25.7 | 25.7 | 24.0 | 24.0 | 20.5 | 15.4 | 12.0 | 10.3 | 8.6 | 6.8 | 8.6 |
| 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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# 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

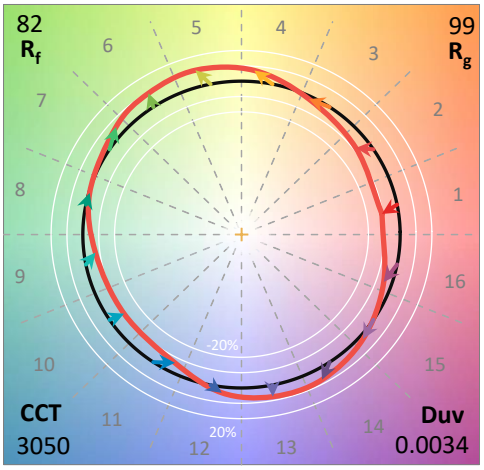
## Test Information

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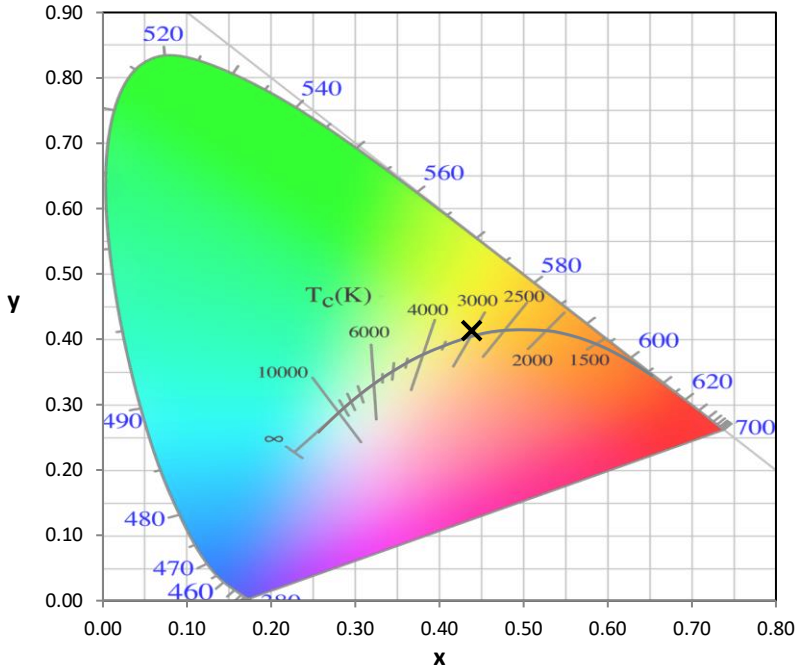
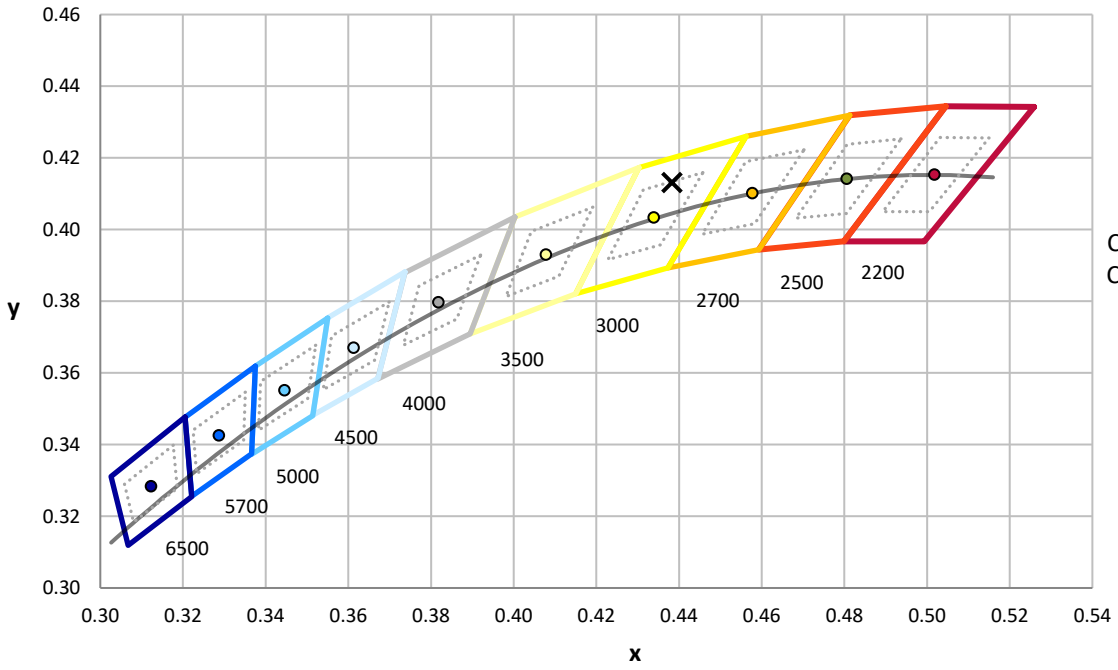
## CIE 1931 Chromaticity Diagram




## 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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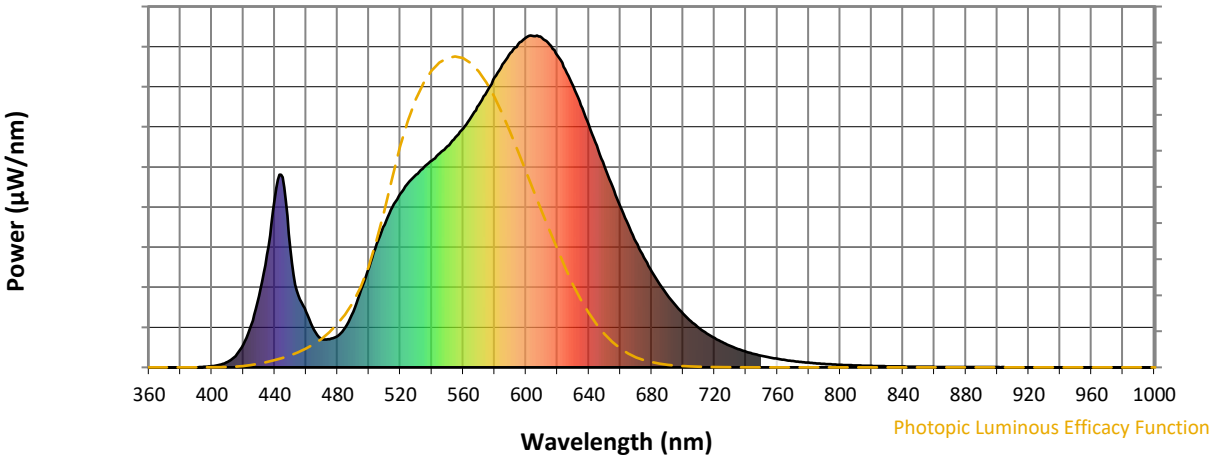
## Photopic Flux vs. Wavelength




## 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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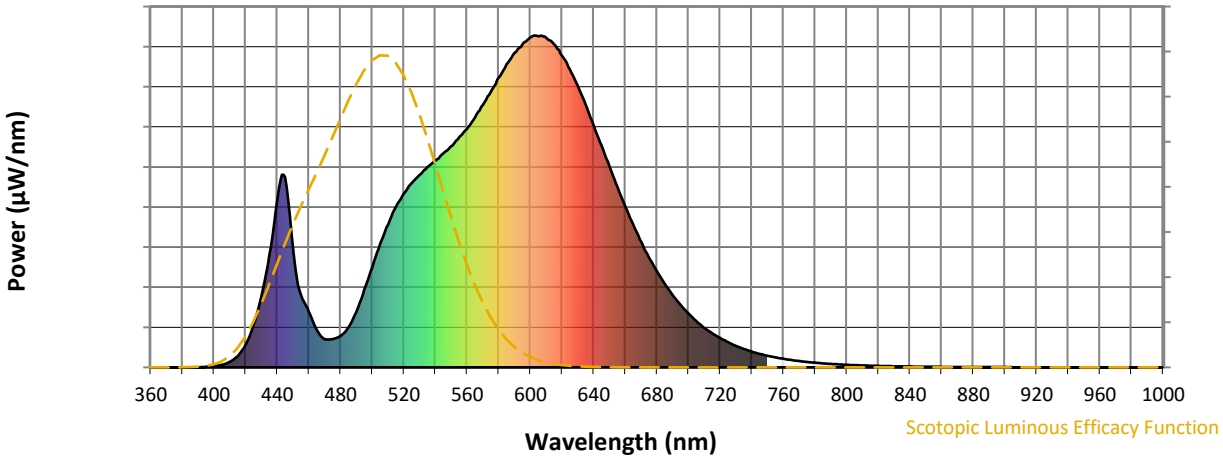
## Scotopic Flux vs. Wavelength




**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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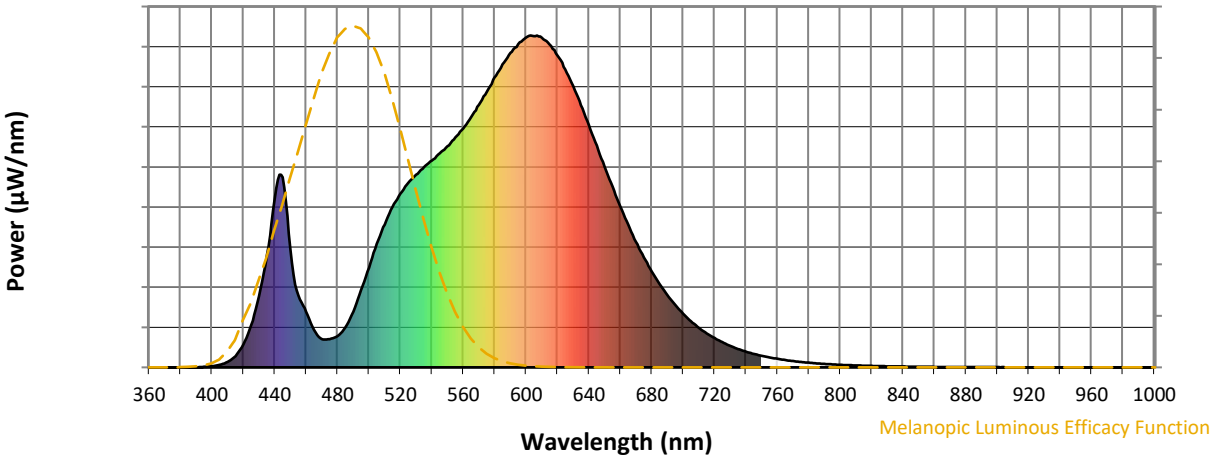
## Melanopic Flux vs. Wavelength




**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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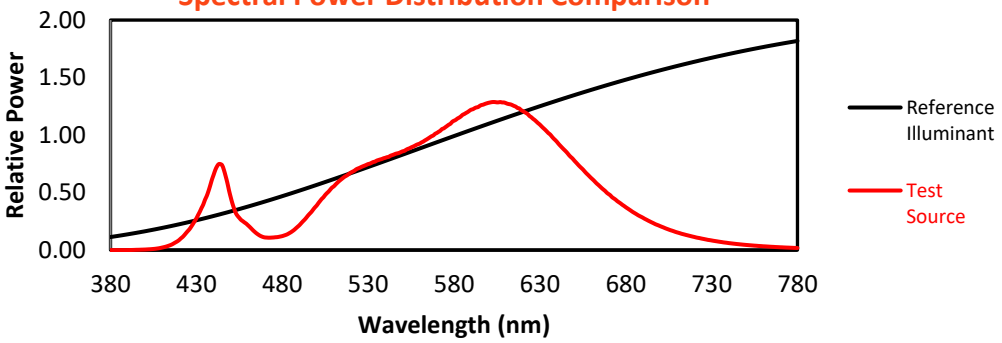
# TM-30-18

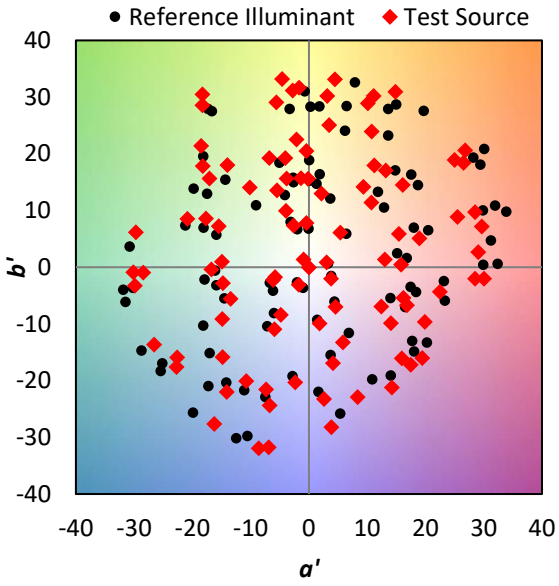
## Summary

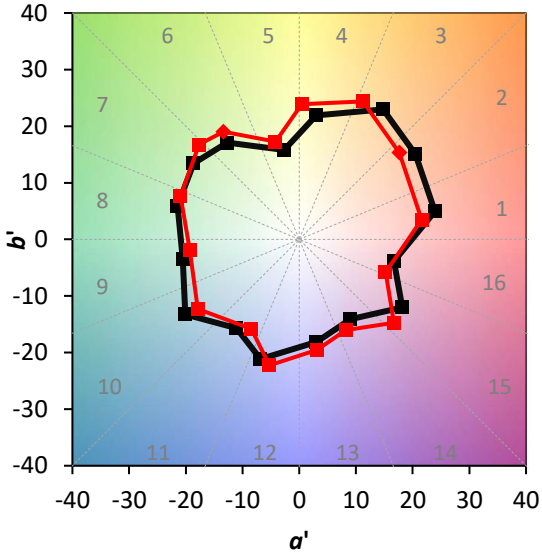
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

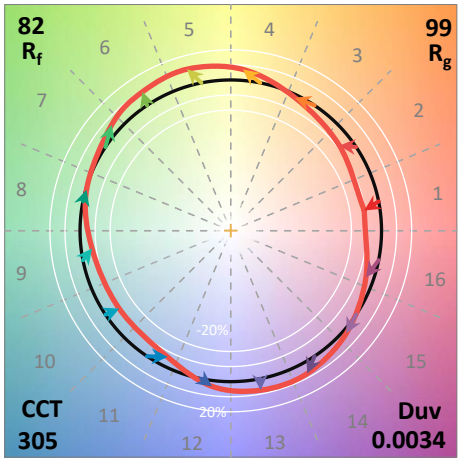
## Spectral Power Distribution Comparison

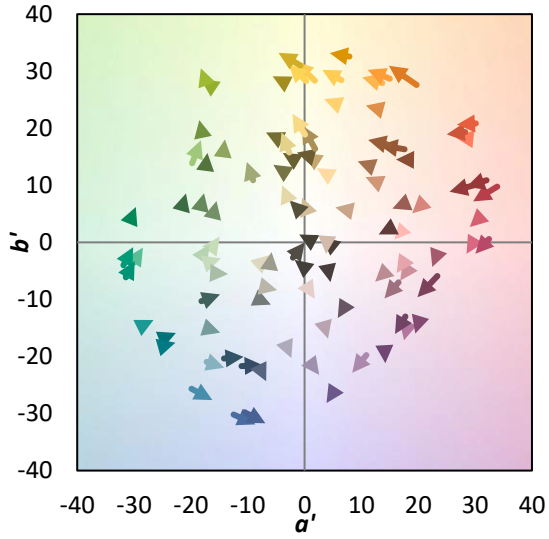



## Color Vector Graphics



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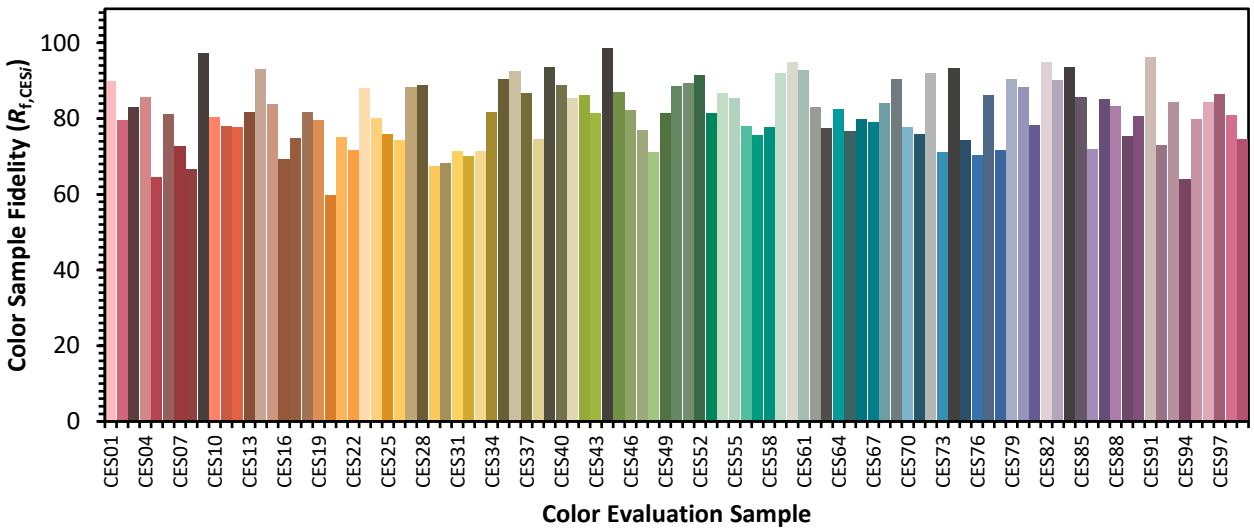
## Individual Sample Fidelity Index ($R_{f,i}$)

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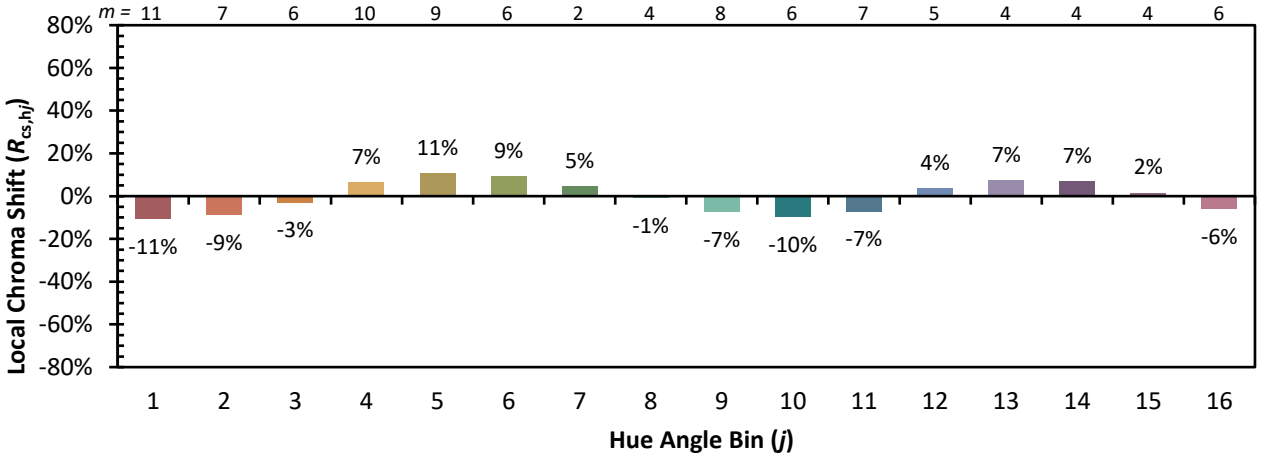
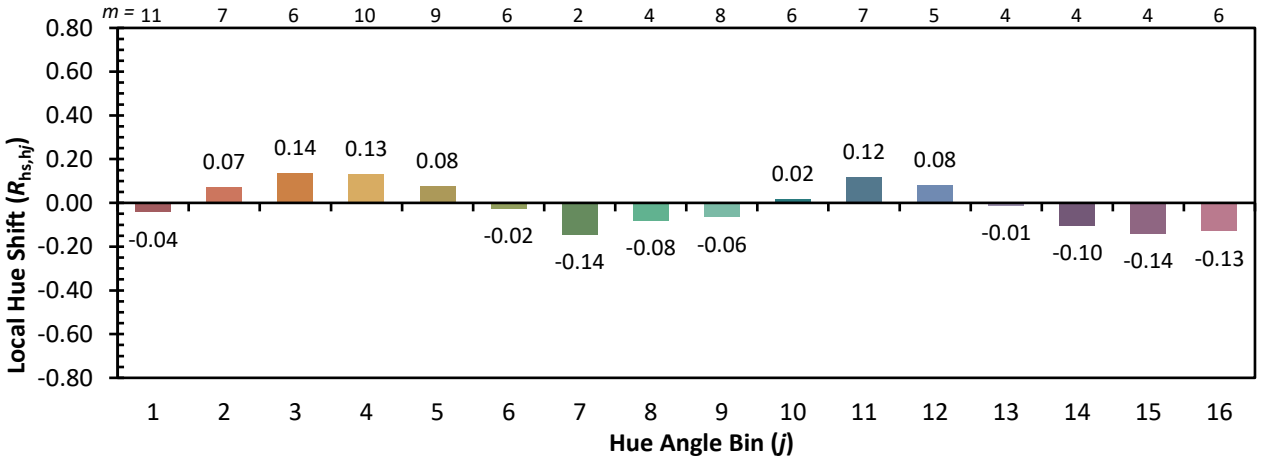
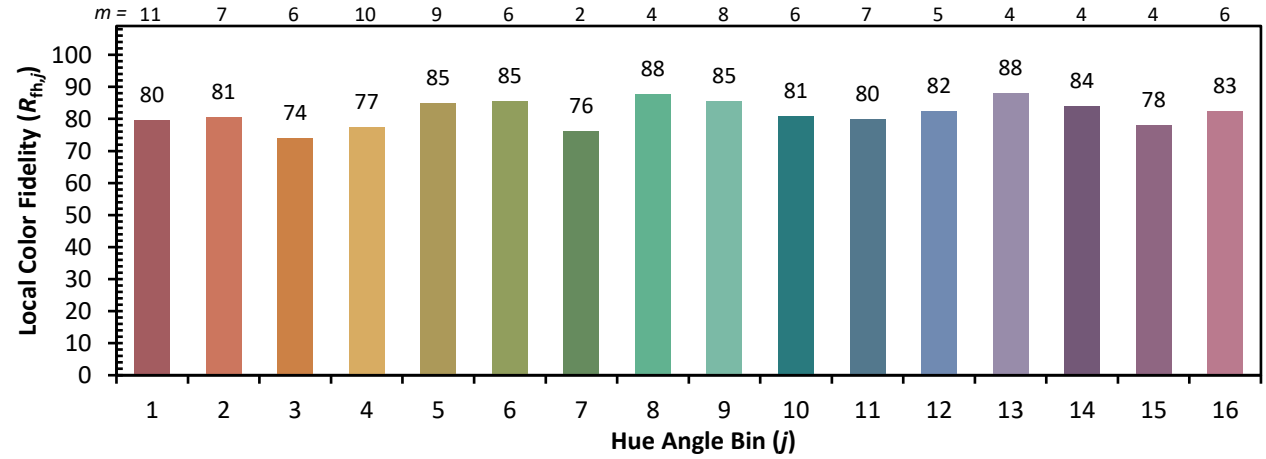
## Color Rendition by Hue-Angle Bin



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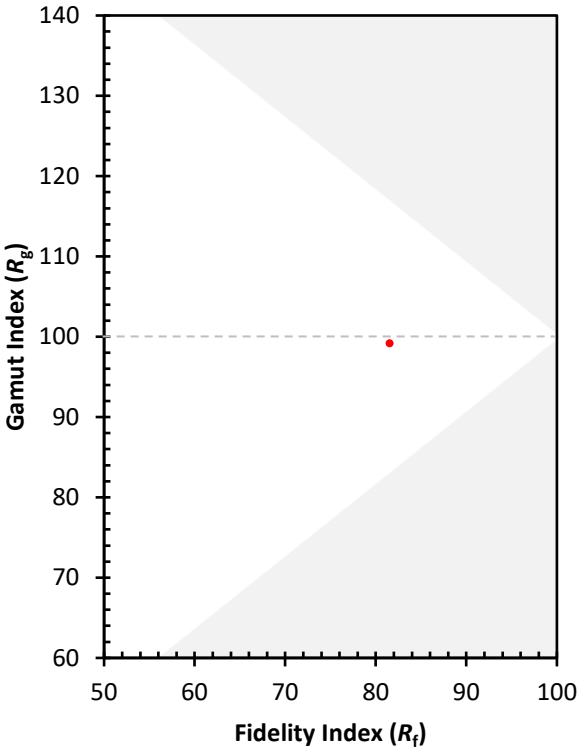
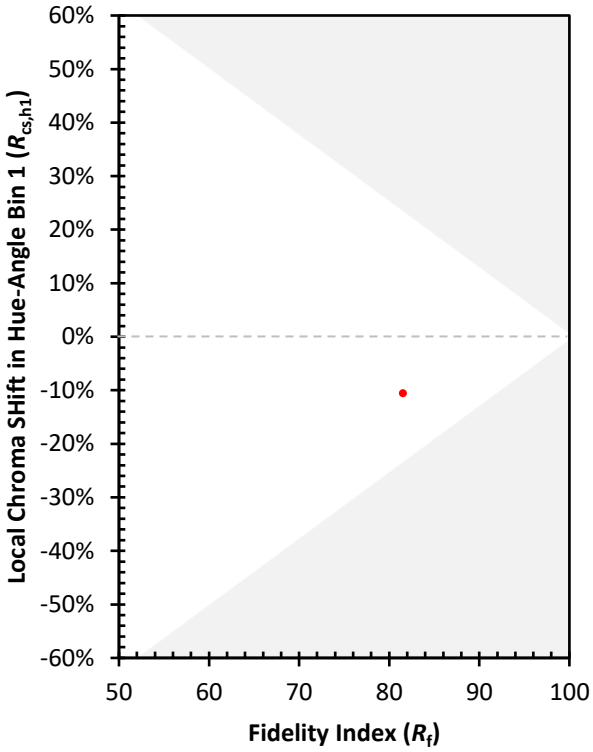
## Measure Comparisons




(END OF REPORT)