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: P638093

Luminaire Tested: GWS-SA4E-727-U-SL4-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: | P638093 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-35) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA4E-727-U-SL4-W |
| Description: | GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV SPILL LIGHT ELIMINATOR OPTICS |
| Light Source: | (64) 2700K CCT, 70 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 24579.2 lumens |
| Efficiency: | N/A |
| Efficacy: | 121.3 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 1' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B2 - U0 - G4 |

| | |
|---|---|
| Input Watts (W): | 202.6 |
| 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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1121 Highway 74 South
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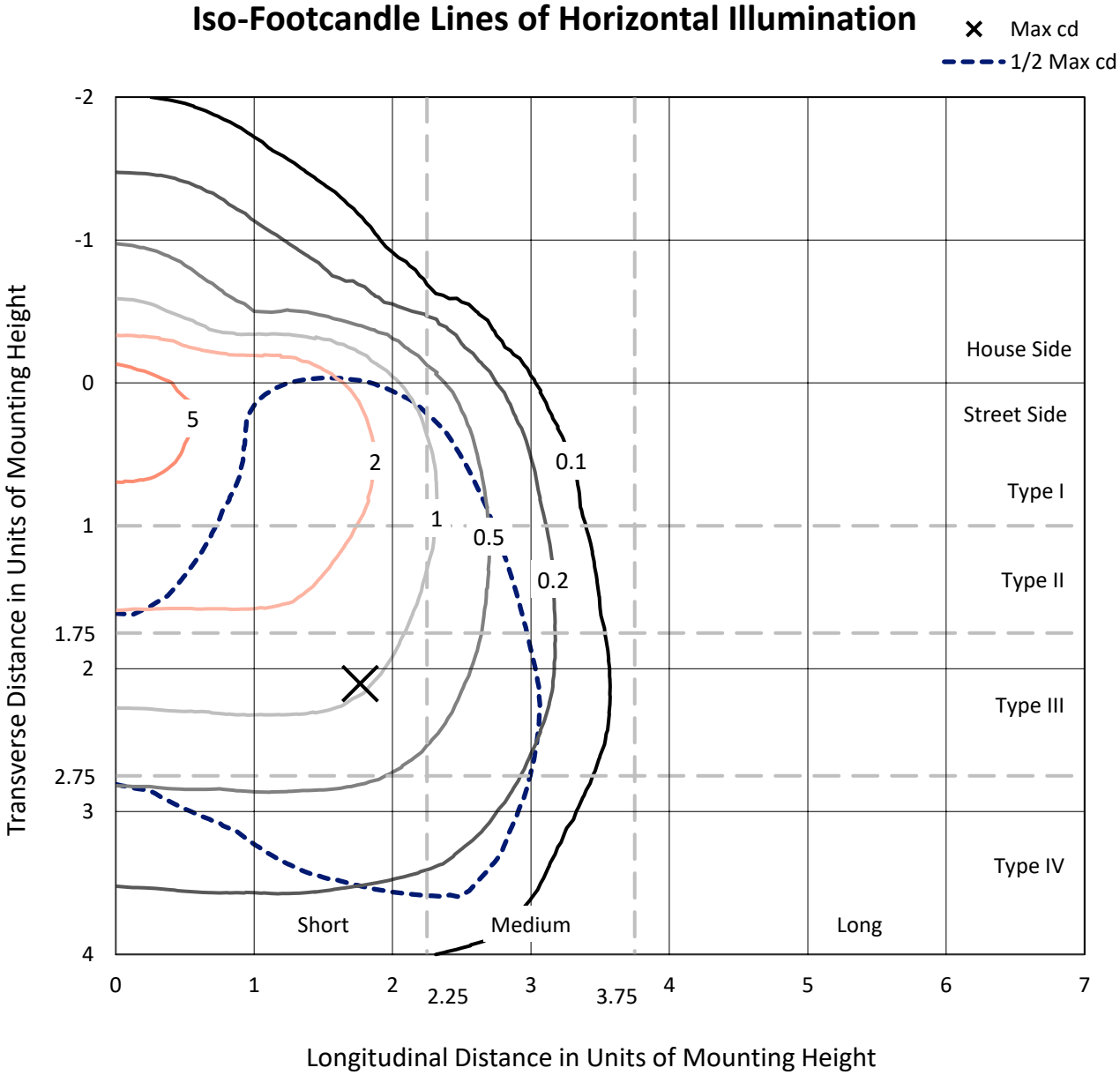
Scaled Data Report

REPORT NUMBER: P638093
CATALOG NUMBER: GWS-SA4E-727-U-SL4-W

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 6.7 fc
Type IV - Short - N/A

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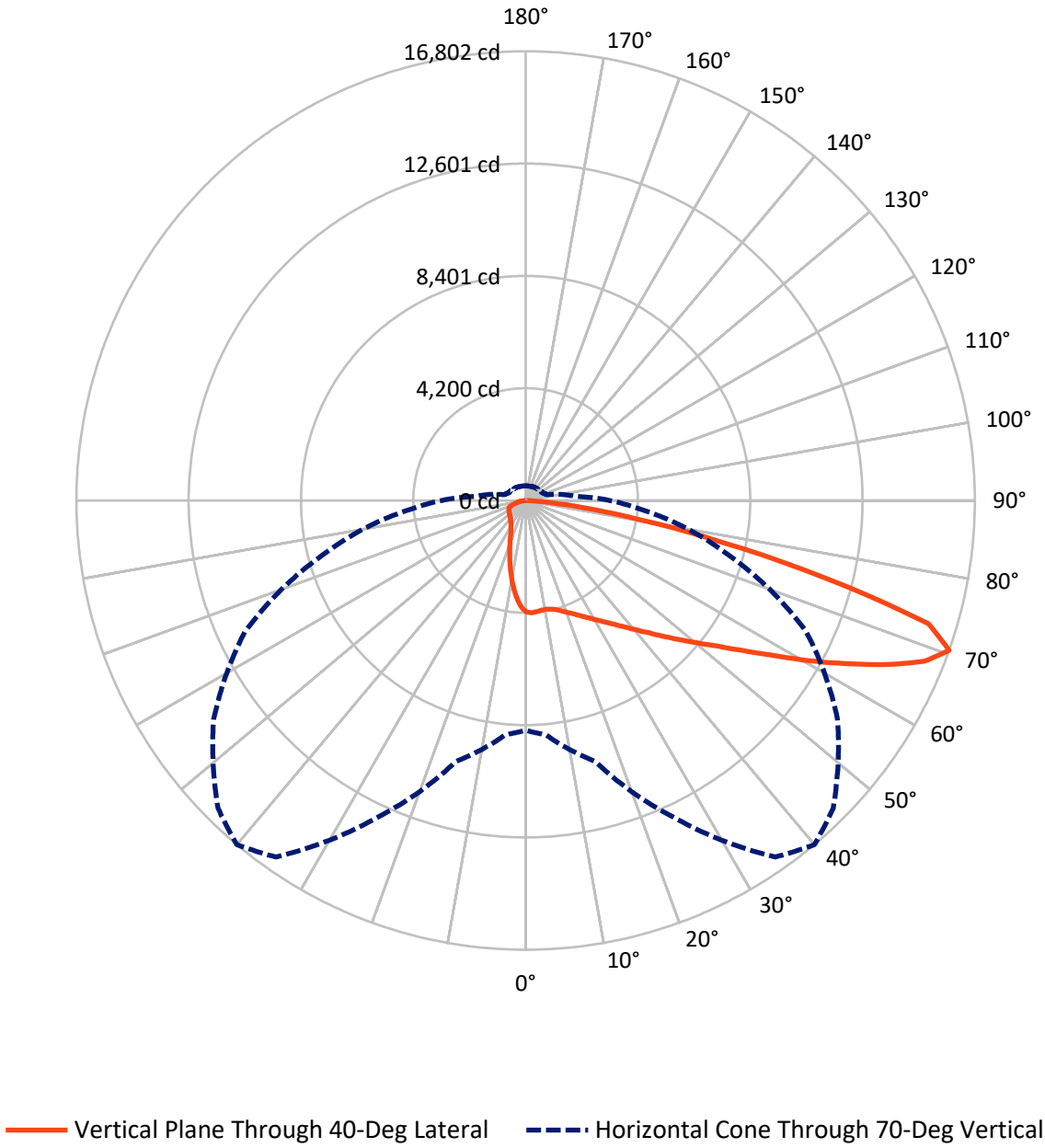
## Luminous Intensity Polar Plot



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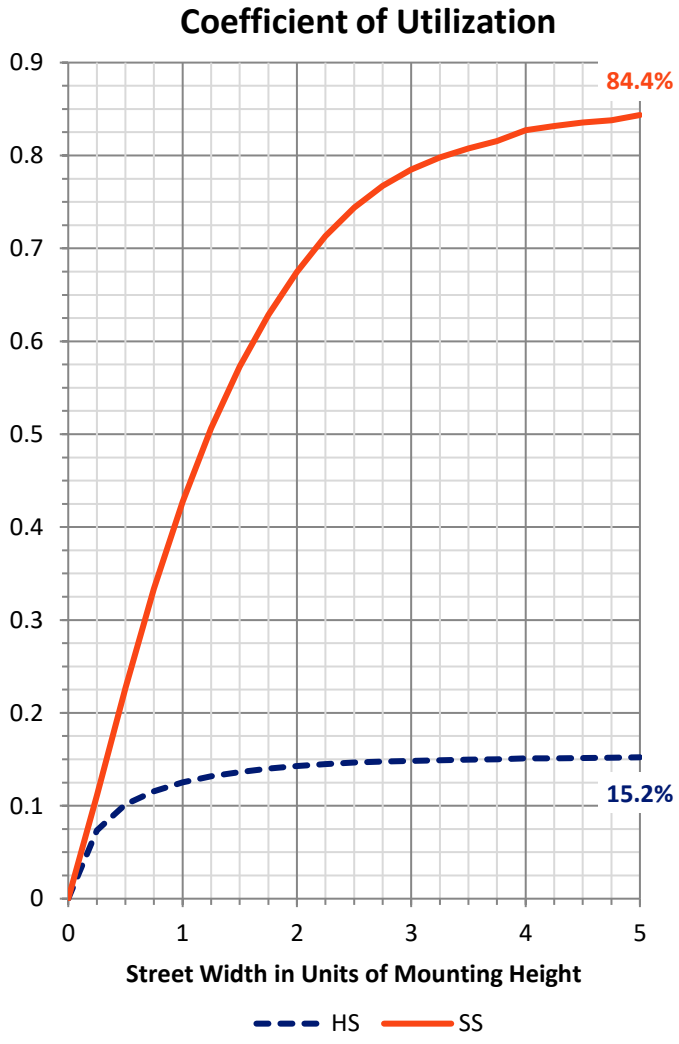
REPORT NUMBER: P638093
CATALOG NUMBER: GWS-SA4E-727-U-SL4-W

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 3785.8 | 0.0 | 3785.8 |
| | % Fixture | 15.4 | 0.0 | 15.4 |
| **Street Side** | Lumens | 20793.4 | 0.0 | 20793.4 |
| | % Fixture | 84.6 | 0.0 | 84.6 |
| **Total** | Lumens | 24579.2 | 0.0 | 24579.2 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 368.7 | 1.5 |
| 10°-20° | 961.1 | 3.9 |
| 20°-30° | 1509.1 | 6.1 |
| 30°-40° | 2269.0 | 9.2 |
| 40°-50° | 3502.2 | 14.2 |
| 50°-60° | 5201.1 | 21.2 |
| 60°-70° | 6555.9 | 26.7 |
| 70°-80° | 3791.2 | 15.4 |
| 80°-90° | 420.7 | 1.7 |
| 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° | 24579.2 | 100.0 |
| 0°-180° | 24579.2 | 100.0 |



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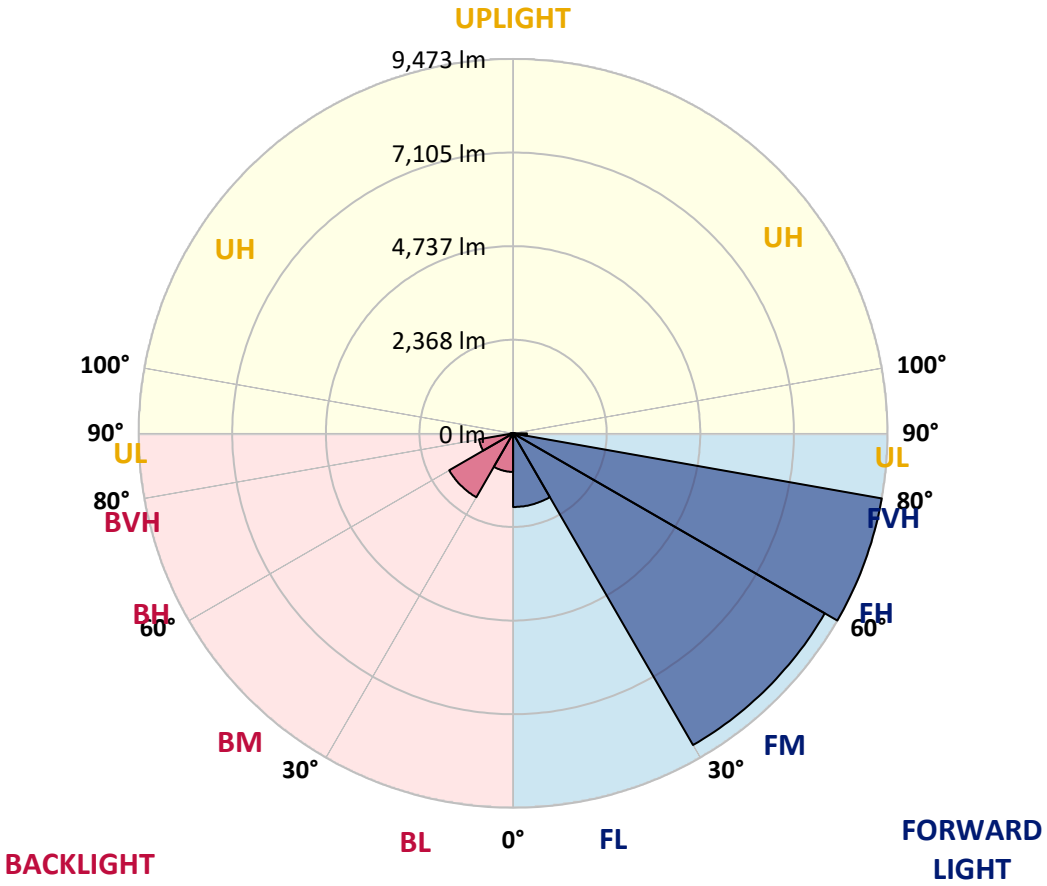
REPORT NUMBER: P638093
CATALOG NUMBER: GWS-SA4E-727-U-SL4-W

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1863.3 | 7.6 | | | |
| FM | (30°-60°) | 9106.3 | 37.0 | | | |
| FH | (60°-80°) | 9473.4 | 38.5 | | | G4/12000 |
| FVH | (80°-90°) | 350.4 | 1.4 | | | G3/500 |
| BL | (0°-30°) | 975.7 | 4.0 | B2/1000 | | |
| BM | (30°-60°) | 1866.1 | 7.6 | B2/2500 | | |
| BH | (60°-80°) | 873.8 | 3.6 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 70.3 | 0.3 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B2-U0-G4**
Type IV Short



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REPORT NUMBER: P638093
CATALOG NUMBER: GWS-SA4E-727-U-SL4-W

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 40° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 |
| 2.5° | 4199.5 | 4206.9 | 4212.4 | 4219.7 | 4216.0 | 4205.0 | 4214.2 | 4214.2 | 4194.0 | 4172.0 | 4151.8 |
| 5° | 4205.0 | 4214.2 | 4212.4 | 4210.5 | 4195.8 | 4177.5 | 4177.5 | 4166.5 | 4131.6 | 4096.8 | 4063.8 |
| 7.5° | 4194.0 | 4192.2 | 4190.3 | 4184.8 | 4168.3 | 4148.1 | 4144.5 | 4122.5 | 4076.6 | 4028.9 | 3981.2 |
| 10° | 4144.5 | 4142.6 | 4148.1 | 4161.0 | 4157.3 | 4139.0 | 4139.0 | 4118.8 | 4065.6 | 4006.9 | 3944.5 |
| 12.5° | 4104.1 | 4104.1 | 4126.1 | 4161.0 | 4173.8 | 4166.5 | 4168.3 | 4153.6 | 4093.1 | 4023.4 | 3950.0 |
| 15° | 4109.6 | 4111.5 | 4159.2 | 4216.0 | 4239.9 | 4234.4 | 4236.2 | 4219.7 | 4151.8 | 4082.1 | 3983.0 |
| 17.5° | 4146.3 | 4155.5 | 4238.0 | 4316.9 | 4348.1 | 4340.8 | 4327.9 | 4300.4 | 4223.4 | 4144.5 | 4023.4 |
| 20° | 4223.4 | 4238.0 | 4344.5 | 4443.5 | 4480.2 | 4463.7 | 4441.7 | 4386.6 | 4302.3 | 4216.0 | 4067.4 |
| 22.5° | 4375.6 | 4384.8 | 4502.2 | 4599.5 | 4628.8 | 4608.6 | 4564.6 | 4485.7 | 4388.5 | 4298.6 | 4120.6 |
| 25° | 4590.3 | 4601.3 | 4713.2 | 4803.1 | 4795.8 | 4771.9 | 4711.4 | 4614.1 | 4498.6 | 4403.2 | 4197.7 |
| 27.5° | 4845.3 | 4863.7 | 4973.7 | 5045.3 | 4997.6 | 4962.7 | 4894.8 | 4777.4 | 4647.2 | 4560.9 | 4315.1 |
| 30° | 5124.2 | 5131.5 | 5225.1 | 5296.6 | 5223.3 | 5175.5 | 5093.0 | 4966.4 | 4849.0 | 4784.8 | 4491.2 |
| 32.5° | 5393.9 | 5401.2 | 5481.9 | 5522.3 | 5445.2 | 5410.4 | 5338.8 | 5204.9 | 5122.3 | 5087.5 | 4753.6 |
| 35° | 5678.2 | 5676.4 | 5742.5 | 5777.3 | 5698.4 | 5683.7 | 5610.4 | 5507.6 | 5492.9 | 5538.8 | 5137.0 |
| 37.5° | 5962.6 | 5946.1 | 5981.0 | 6026.8 | 5982.8 | 5997.5 | 5949.8 | 5914.9 | 5971.8 | 6091.0 | 5647.1 |
| 40° | 6190.1 | 6190.1 | 6226.8 | 6283.7 | 6298.4 | 6362.6 | 6335.0 | 6380.9 | 6564.4 | 6848.8 | 6278.2 |
| 42.5° | 6391.9 | 6393.8 | 6470.8 | 6558.9 | 6665.3 | 6764.4 | 6786.4 | 6905.6 | 7285.4 | 7731.2 | 7070.7 |
| 45° | 6602.9 | 6604.7 | 6709.3 | 6837.7 | 7063.4 | 7252.4 | 7296.4 | 7564.3 | 8107.3 | 8650.4 | 7931.2 |
| 47.5° | 6846.9 | 6826.7 | 6971.7 | 7186.3 | 7507.4 | 7778.9 | 7892.7 | 8272.4 | 8958.6 | 9626.4 | 8742.1 |
| 50° | 7122.1 | 7079.9 | 7241.4 | 7612.0 | 8008.2 | 8380.7 | 8571.5 | 9006.3 | 9872.3 | 10527.2 | 9505.3 |
| 52.5° | 7432.2 | 7408.3 | 7577.1 | 8028.4 | 8633.9 | 9063.2 | 9321.9 | 9892.4 | 10760.2 | 11424.4 | 10110.8 |
| 55° | 7817.4 | 7760.6 | 8004.6 | 8578.8 | 9367.7 | 9914.5 | 10220.8 | 10769.4 | 11730.8 | 12239.0 | 10573.1 |
| 57.5° | 8239.4 | 8177.0 | 8503.6 | 9266.8 | 10321.7 | 10921.7 | 11305.1 | 11756.4 | 12644.4 | 12862.7 | 10844.6 |
| 60° | 8694.4 | 8674.2 | 9061.3 | 10074.1 | 11459.2 | 12156.4 | 12433.4 | 12842.6 | 13438.8 | 13224.2 | 10776.7 |
| 62.5° | 9110.9 | 9103.5 | 9666.8 | 10949.2 | 12664.6 | 13431.5 | 13651.6 | 13759.9 | 14011.2 | 13200.3 | 10237.4 |
| 65° | 9549.4 | 9611.7 | 10373.1 | 11963.8 | 14046.1 | 14798.3 | 14890.0 | 14614.8 | 14203.9 | 12574.7 | 9132.9 |
| 67.5° | 9604.4 | 9725.5 | 10817.1 | 12914.1 | 15356.0 | 16066.0 | 15992.6 | 14939.6 | 13635.1 | 10833.6 | 7158.8 |
| 70° | 8589.8 | 8800.8 | 10108.9 | 13059.0 | 16278.9 | 16801.7 | 16271.5 | 14240.6 | 11571.1 | 7848.6 | 4502.2 |
| 72.5° | 7177.2 | 7358.8 | 8514.6 | 11136.3 | 15088.2 | 15754.1 | 15036.8 | 12053.7 | 8177.0 | 4502.2 | 2293.3 |
| 75° | 5586.5 | 5797.5 | 6863.4 | 8852.2 | 11295.9 | 11562.0 | 11202.4 | 8406.4 | 4494.9 | 1856.7 | 1042.1 |
| 77.5° | 3408.8 | 3561.1 | 4390.3 | 5997.5 | 7903.7 | 7505.6 | 6360.7 | 4713.2 | 1972.2 | 889.8 | 644.0 |
| 80° | 1508.1 | 1601.6 | 2163.1 | 3221.6 | 4566.4 | 4316.9 | 3403.3 | 2012.6 | 1078.8 | 565.1 | 449.5 |
| 82.5° | 809.1 | 869.6 | 1065.9 | 1275.1 | 2005.3 | 2097.0 | 1700.7 | 1159.5 | 579.7 | 322.9 | 256.9 |
| 85° | 355.9 | 390.8 | 484.3 | 462.3 | 658.6 | 647.6 | 653.1 | 796.2 | 277.0 | 148.6 | 167.0 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 1.8 | 20.2 | 106.4 | 27.5 | 44.0 | 38.5 |
| 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: P638093
CATALOG NUMBER: GWS-SA4E-727-U-SL4-W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 | 4173.8 |
| 2.5° | 4129.8 | 4096.8 | 4087.6 | 4076.6 | 4056.4 | 4021.6 | 3995.9 | 3966.5 | 3953.7 | 3939.0 | 3940.8 |
| 5° | 4027.1 | 3986.7 | 3948.2 | 3898.6 | 3836.3 | 3766.5 | 3718.8 | 3663.8 | 3634.4 | 3606.9 | 3614.3 |
| 7.5° | 3939.0 | 3876.6 | 3797.7 | 3693.2 | 3581.2 | 3456.5 | 3355.6 | 3276.7 | 3223.5 | 3186.8 | 3205.1 |
| 10° | 3884.0 | 3810.6 | 3673.0 | 3502.3 | 3313.4 | 3122.6 | 2977.6 | 2841.9 | 2757.5 | 2691.4 | 2687.8 |
| 12.5° | 3872.9 | 3777.5 | 3577.6 | 3329.9 | 3056.5 | 2801.5 | 2588.7 | 2405.2 | 2293.3 | 2210.8 | 2241.9 |
| 15° | 3884.0 | 3762.9 | 3495.0 | 3170.3 | 2825.4 | 2480.4 | 2216.3 | 2005.3 | 1871.3 | 1796.1 | 1790.6 |
| 17.5° | 3896.8 | 3748.2 | 3401.4 | 2997.8 | 2583.2 | 2188.7 | 1882.4 | 1658.5 | 1520.9 | 1445.7 | 1447.5 |
| 20° | 3907.8 | 3726.2 | 3291.4 | 2808.8 | 2337.3 | 1917.2 | 1599.8 | 1387.0 | 1264.1 | 1209.0 | 1218.2 |
| 22.5° | 3926.2 | 3704.2 | 3173.9 | 2607.0 | 2086.0 | 1654.9 | 1376.0 | 1203.5 | 1130.1 | 1093.5 | 1095.3 |
| 25° | 3961.0 | 3691.3 | 3052.9 | 2386.9 | 1838.3 | 1445.7 | 1221.9 | 1106.3 | 1060.4 | 1038.4 | 1036.6 |
| 27.5° | 4032.6 | 3702.3 | 2926.3 | 2174.1 | 1614.5 | 1286.1 | 1122.8 | 1047.6 | 1016.4 | 1001.7 | 999.9 |
| 30° | 4151.8 | 3746.4 | 2816.2 | 1957.6 | 1421.9 | 1161.3 | 1054.9 | 1009.1 | 990.7 | 977.9 | 976.0 |
| 32.5° | 4333.4 | 3828.9 | 2696.9 | 1755.8 | 1265.9 | 1069.6 | 1001.7 | 977.9 | 965.0 | 957.7 | 957.7 |
| 35° | 4608.6 | 3979.4 | 2579.5 | 1579.6 | 1144.8 | 998.0 | 959.5 | 950.3 | 939.3 | 935.7 | 939.3 |
| 37.5° | 5004.9 | 4219.7 | 2473.1 | 1425.5 | 1058.6 | 943.0 | 913.7 | 917.3 | 908.2 | 913.7 | 919.2 |
| 40° | 5507.6 | 4540.8 | 2383.2 | 1298.9 | 994.4 | 902.6 | 873.3 | 886.1 | 880.6 | 886.1 | 895.3 |
| 42.5° | 6144.2 | 4938.9 | 2315.3 | 1199.9 | 948.5 | 869.6 | 842.1 | 854.9 | 851.3 | 858.6 | 867.8 |
| 45° | 6854.3 | 5463.6 | 2284.1 | 1130.1 | 915.5 | 845.8 | 816.4 | 825.6 | 821.9 | 827.4 | 836.6 |
| 47.5° | 7534.9 | 5940.6 | 2311.7 | 1089.8 | 888.0 | 825.6 | 794.4 | 798.1 | 796.2 | 794.4 | 799.9 |
| 50° | 8122.0 | 6320.4 | 2390.5 | 1076.9 | 869.6 | 805.4 | 776.1 | 777.9 | 772.4 | 761.4 | 765.0 |
| 52.5° | 8600.8 | 6624.9 | 2438.3 | 1076.9 | 860.5 | 783.4 | 755.9 | 757.7 | 746.7 | 732.0 | 733.9 |
| 55° | 8916.4 | 6747.8 | 2399.7 | 1075.1 | 856.8 | 765.0 | 735.7 | 737.5 | 726.5 | 708.2 | 710.0 |
| 57.5° | 9006.3 | 6628.6 | 2238.3 | 1054.9 | 853.1 | 750.4 | 715.5 | 719.2 | 711.8 | 691.7 | 691.7 |
| 60° | 8755.0 | 6191.9 | 1942.9 | 1009.1 | 843.9 | 741.2 | 700.8 | 706.3 | 702.7 | 682.5 | 682.5 |
| 62.5° | 8096.3 | 5415.9 | 1590.6 | 939.3 | 818.3 | 730.2 | 688.0 | 699.0 | 708.2 | 697.2 | 695.3 |
| 65° | 6863.4 | 4338.9 | 1293.4 | 862.3 | 785.2 | 711.8 | 669.6 | 697.2 | 717.3 | 732.0 | 732.0 |
| 67.5° | 5149.9 | 3106.1 | 1054.9 | 781.6 | 735.7 | 675.2 | 645.8 | 671.5 | 686.2 | 695.3 | 700.8 |
| 70° | *3139.1* | *1827.3* | *831.1* | *688.0* | *664.1* | *620.1* | *598.1* | *572.4* | *552.2* | *548.6* | *550.4* |
| 72.5° | 1535.6 | 1045.8 | 675.2 | 585.3 | 566.9 | 526.5 | 477.0 | 466.0 | 456.8 | 451.3 | 449.5 |
| 75° | 845.8 | 728.4 | 557.7 | 486.2 | 453.2 | 403.6 | 392.6 | 374.3 | 370.6 | 363.3 | 365.1 |
| 77.5° | 598.1 | 574.2 | 460.5 | 394.4 | 344.9 | 319.2 | 324.7 | 311.9 | 311.9 | 306.4 | 304.6 |
| 80° | 449.5 | 451.3 | 354.1 | 288.0 | 255.0 | 245.8 | 251.3 | 251.3 | 247.7 | 245.8 | 244.0 |
| 82.5° | 284.4 | 321.1 | 238.5 | 185.3 | 181.6 | 183.5 | 181.6 | 179.8 | 183.5 | 178.0 | 176.1 |
| 85° | 196.3 | 231.2 | 144.9 | 110.1 | 110.1 | 108.2 | 111.9 | 110.1 | 113.7 | 108.2 | 108.2 |
| 87.5° | 44.0 | 102.7 | 53.2 | 33.0 | 34.9 | 33.0 | 34.9 | 36.7 | 40.4 | 42.2 | 42.2 |
| 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-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-1-R4

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

Report Generated By FNC07603 / LDUCLS01DT446
Version: v6.13

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

## Test Information

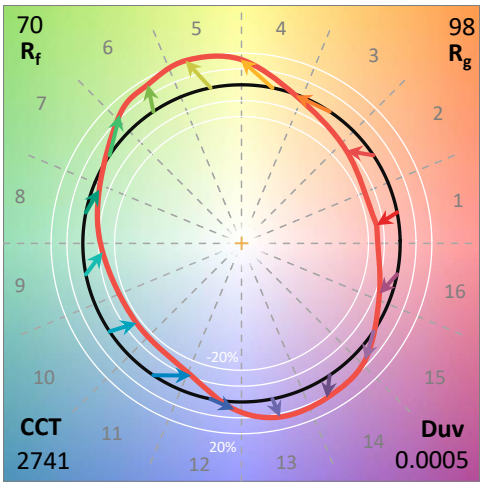
| | |
|---|---|
| Test Method: | LM-79-2008 |
| Report Number: | SP1-1908-441-1-R4 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 10/28/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | **SA1C-727-U-5WQ** |
| Description: | McGRAW EDISON ROADWAY AND AREA LUMINAIRE |

***THIS IS A REVISION OF SP1-1908-441-1-R3. TO UPDATE THE CATALOG NUMBER.***TESTED IN SITU. (1) 70 CRI, 2700K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 2741 | CRI (Ra): | 71.5 | | |
| CIE u': | 0.2605 | R1: | 69.2 | R9: | -16.1 |
| CIE v': | 0.5272 | R2: | 79.4 | R10: | 51.4 |
| Duv: | 0.0005 | R3: | 87.8 | R11: | 63.1 |
| CIE x: | 0.4573 | R4: | 69.4 | R12: | 42.0 |
| CIE y: | 0.4113 | R5: | 66.4 | R13: | 70.2 |
| CIE z: | 0.1313 | R6: | 69.8 | R14: | 92.4 |
| Peak Wavelength (nm): | 602 | R7: | 79.8 | | |
| Dominant Wavelength (nm): | 583 | R8: | 50.1 | | |
| Purity: | 61.2 | | | | |

| | |
|---|---|
| Rf: | 69.9 |
| Rg: | 98.3 |




## Test Conditions

| | |
|---|---|
| Stabilization Time: | 56M |
| Operation Time: | 12H |
| Room Temperature (°C) / RH%: | 25.3./42% |
| Sphere Temperature (°C): | 25.7 |

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

REPORT NUMBER: SP1-1908-441-1-R4

| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/28/2019 | 12/28/2019 |
| Power Meter | IN0071 | 12/5/2018 | 12/5/2019 |
| AC Power Source | IN0063 | 12/5/2018 | 12/5/2019 |
| DC Power Source | IN0208 | 12/5/2018 | 12/5/2019 |
| Sphere Thermometer | IN0085 | 12/5/2018 | 12/5/2019 |
| Room Thermometer | IN0046 | 12/5/2018 | 12/5/2019 |

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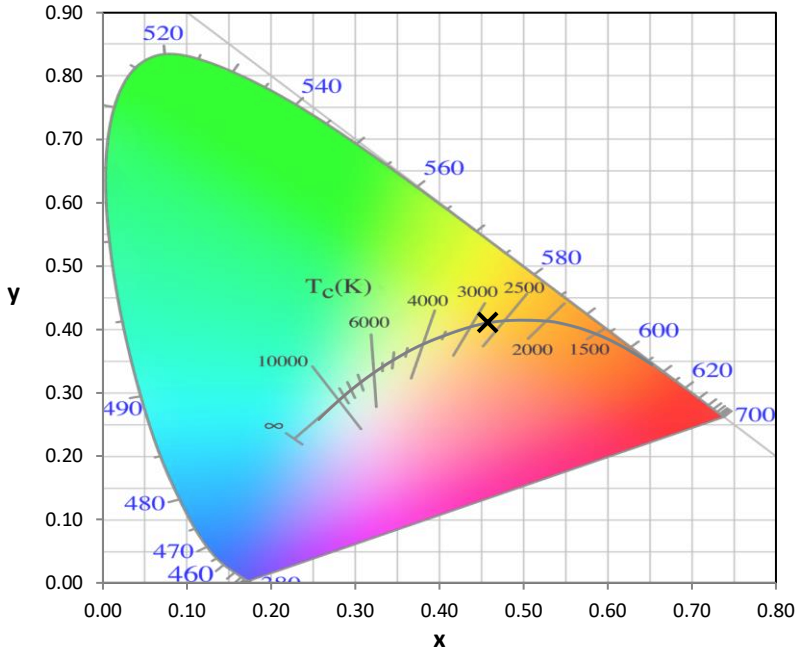
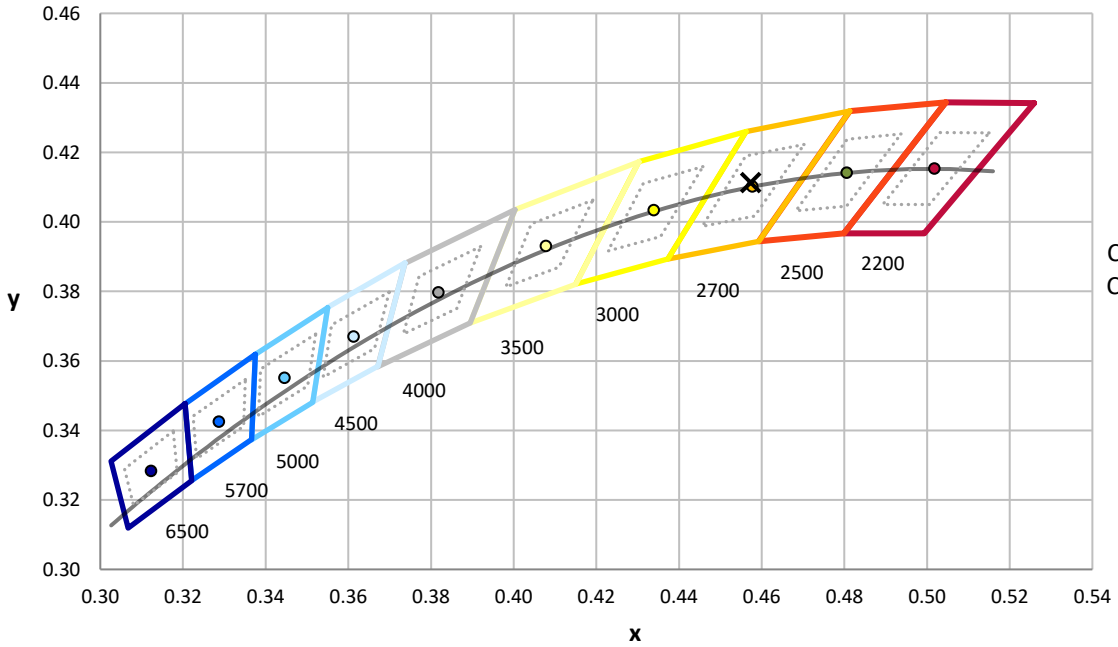
## CIE 1931 Chromaticity Diagram




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




CCT = 2741K
CIE x = 0.4573
CIE y = 0.4113
Duv = 0.0005

Point lies inside the ANSI 2700K 4-step quadrangle

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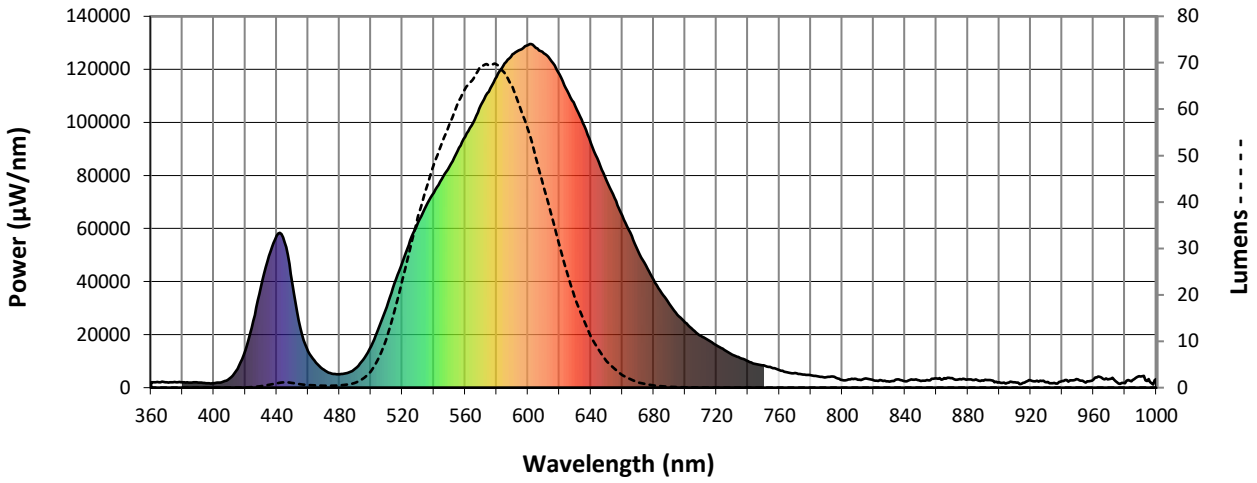
## Photopic Flux vs. Wavelength




**Photopic Lumens: 6211.7**

| λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 2044 | 0.0 | 490 | 7179 | 1.0 | 620 | 118034 | 30.7 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 1.9 | 625 | 111884 | 24.7 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 3.4 | 630 | 106119 | 19.2 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 6.3 | 635 | 99706 | 15.0 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 10.4 | 640 | 92142 | 11.0 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 16.3 | 645 | 84987 | 8.2 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 22.9 | 650 | 78016 | 5.7 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 29.7 | 655 | 71541 | 4.1 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 36.7 | 660 | 64863 | 2.7 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.0 | 535 | 68520 | 42.5 | 665 | 58485 | 1.9 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.0 | 540 | 73435 | 47.8 | 670 | 51641 | 1.1 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.0 | 545 | 78677 | 52.4 | 675 | 46030 | 0.8 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 0.0 | 550 | 83331 | 56.6 | 680 | 40590 | 0.5 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 0.1 | 555 | 89120 | 60.9 | 685 | 35691 | 0.3 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 0.3 | 560 | 94613 | 64.3 | 690 | 31631 | 0.2 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 0.6 | 565 | 99818 | 66.4 | 695 | 27437 | 0.1 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 0.9 | 570 | 106526 | 69.3 | 700 | 24589 | 0.1 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 1.1 | 575 | 111610 | 69.4 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 1.0 | 580 | 117163 | 69.6 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 0.8 | 585 | 122201 | 67.9 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 0.6 | 590 | 125662 | 65.0 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 0.5 | 595 | 127415 | 60.4 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 0.4 | 600 | 129155 | 55.7 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 0.4 | 605 | 128057 | 49.6 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 0.5 | 610 | 126031 | 43.3 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 0.7 | 615 | 123059 | 37.1 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

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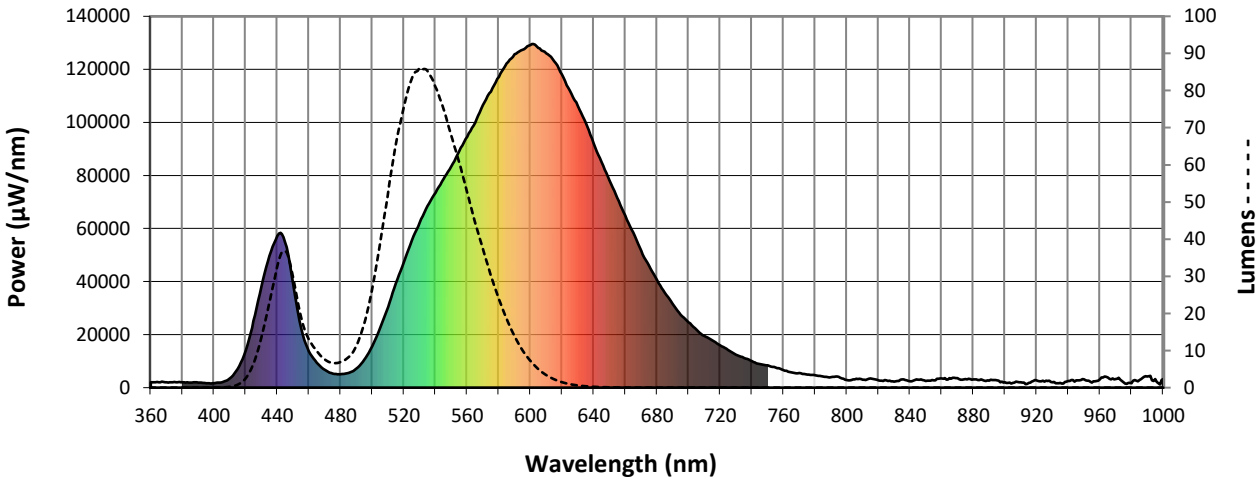
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: 6474.3** **S/P: 1.04**

| λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 2044 | 0.0 | 490 | 7179 | 6.0 | 620 | 118034 | 0.1 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 8.6 | 625 | 111884 | 0.1 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 12.5 | 630 | 106119 | 0.0 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 17.3 | 635 | 99706 | 0.0 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 21.8 | 640 | 92142 | 0.0 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 25.7 | 645 | 84987 | 0.0 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 27.5 | 650 | 78016 | 0.0 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 28.1 | 655 | 71541 | 0.0 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 27.0 | 660 | 64863 | 0.0 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.0 | 535 | 68520 | 24.7 | 665 | 58485 | 0.0 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.1 | 540 | 73435 | 21.5 | 670 | 51641 | 0.0 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.5 | 545 | 78677 | 18.3 | 675 | 46030 | 0.0 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 1.6 | 550 | 83331 | 15.0 | 680 | 40590 | 0.0 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 3.9 | 555 | 89120 | 12.0 | 685 | 35691 | 0.0 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 8.1 | 560 | 94613 | 9.3 | 690 | 31631 | 0.0 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 13.3 | 565 | 99818 | 7.0 | 695 | 27437 | 0.0 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 19.1 | 570 | 106526 | 5.2 | 700 | 24589 | 0.0 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 21.6 | 575 | 111610 | 3.7 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 18.1 | 580 | 117163 | 2.6 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 11.8 | 585 | 122201 | 1.8 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 8.1 | 590 | 125662 | 1.2 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 6.2 | 595 | 127415 | 0.8 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 4.8 | 600 | 129155 | 0.5 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 4.1 | 605 | 128057 | 0.4 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 4.1 | 610 | 126031 | 0.2 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 4.6 | 615 | 123059 | 0.1 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

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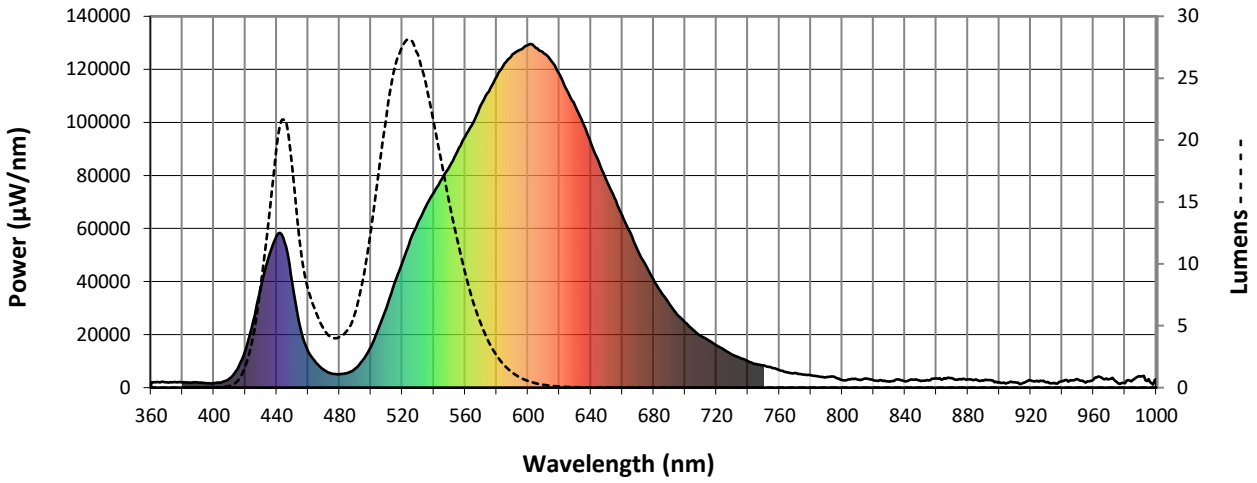
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: 2145.7** **M/P: 0.35**

| λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 2044 | 0.0 | 490 | 7179 | 11.1 | 620 | 118034 | 1.5 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 16.9 | 625 | 111884 | 0.9 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 26.0 | 630 | 106119 | 0.6 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 38.2 | 635 | 99706 | 0.4 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 51.6 | 640 | 92142 | 0.2 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 65.1 | 645 | 84987 | 0.1 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 75.2 | 650 | 78016 | 0.1 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 82.9 | 655 | 71541 | 0.1 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 86.0 | 660 | 64863 | 0.0 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.1 | 535 | 68520 | 85.4 | 665 | 58485 | 0.0 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.2 | 540 | 73435 | 81.1 | 670 | 51641 | 0.0 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.7 | 545 | 78677 | 75.4 | 675 | 46030 | 0.0 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 2.3 | 550 | 83331 | 68.1 | 680 | 40590 | 0.0 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 6.2 | 555 | 89120 | 60.9 | 685 | 35691 | 0.0 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 13.0 | 560 | 94613 | 52.9 | 690 | 31631 | 0.0 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 22.2 | 565 | 99818 | 44.8 | 695 | 27437 | 0.0 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 32.0 | 570 | 106526 | 37.6 | 700 | 24589 | 0.0 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 36.7 | 575 | 111610 | 30.4 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 30.4 | 580 | 117163 | 24.1 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 19.7 | 585 | 122201 | 18.7 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 13.2 | 590 | 125662 | 14.0 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 10.0 | 595 | 127415 | 10.2 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 7.7 | 600 | 129155 | 7.3 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 6.7 | 605 | 128057 | 5.0 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 6.9 | 610 | 126031 | 3.4 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 8.1 | 615 | 123059 | 2.3 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

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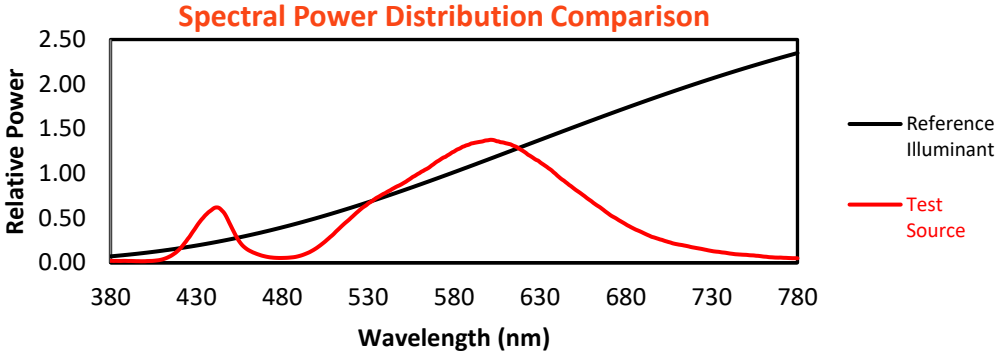
# TM-30-18

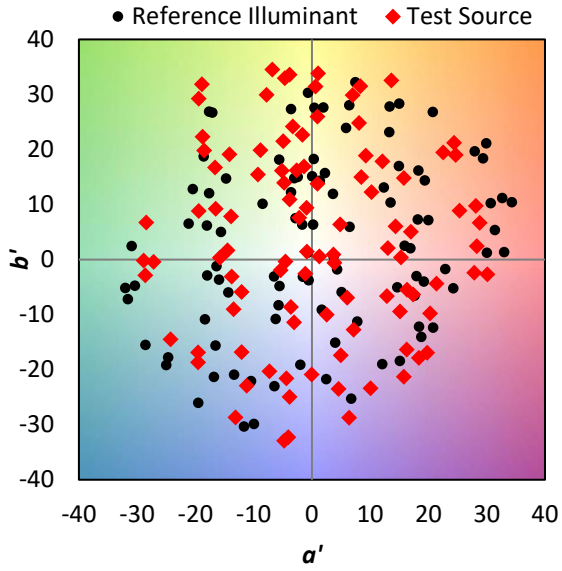
## Summary

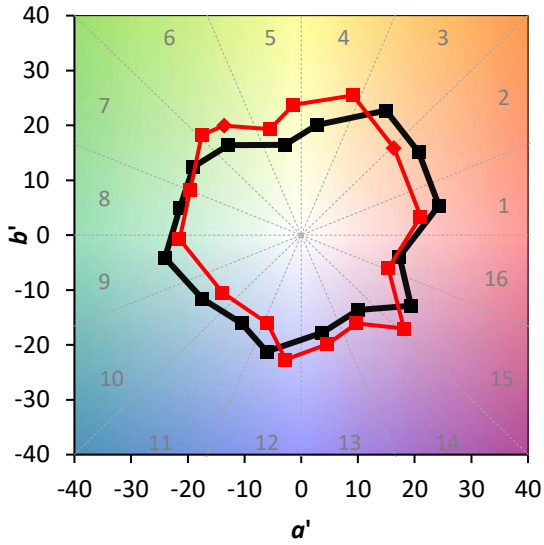
$R_f$ = 69.9
$R_g$ = 98.3
CIE $R_a$ = 71.5
$R_9$ = -16.1

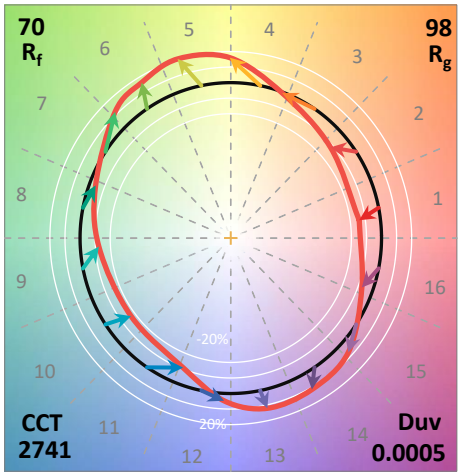
## Spectral Power Distribution Comparison

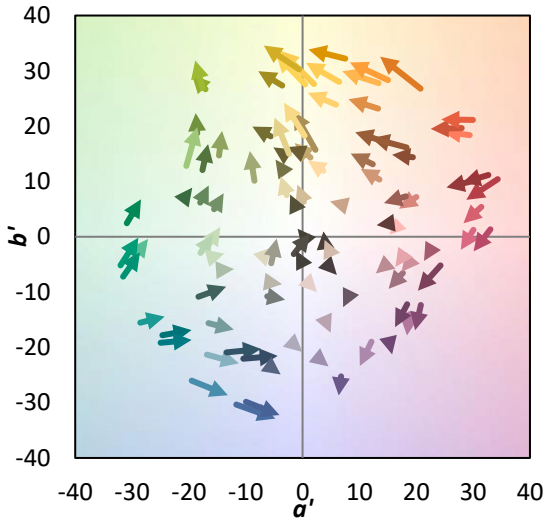



## Color Vector Graphics



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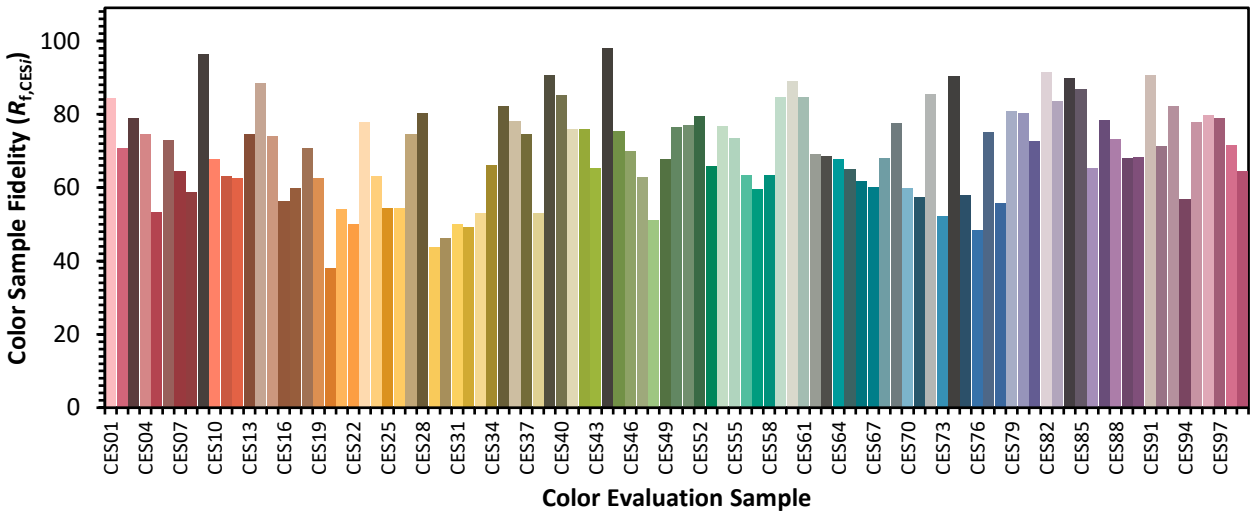
## TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 77 | CES79 = 81 |
| CES05 = 50 | CES30 = 46 | CES55 = 74 | CES80 = 80 |
| CES06 = 52 | CES31 = 50 | CES56 = 63 | CES81 = 73 |
| CES07 = 42 | CES32 = 49 | CES57 = 60 | CES82 = 91 |
| CES08 = 41 | CES33 = 53 | CES58 = 63 | CES83 = 84 |
| CES09 = 29 | CES34 = 66 | CES59 = 85 | CES84 = 90 |
| CES10 = 77 | CES35 = 82 | CES60 = 89 | CES85 = 87 |
| CES11 = 60 | CES36 = 78 | CES61 = 85 | CES86 = 65 |
| CES12 = 66 | CES37 = 75 | CES62 = 69 | CES87 = 78 |
| CES13 = 43 | CES38 = 53 | CES63 = 68 | CES88 = 73 |
| CES14 = 74 | CES39 = 91 | CES64 = 68 | CES89 = 68 |
| CES15 = 71 | CES40 = 85 | CES65 = 65 | CES90 = 68 |
| CES16 = 48 | CES41 = 76 | CES66 = 62 | CES91 = 91 |
| CES17 = 50 | CES42 = 76 | CES67 = 60 | CES92 = 71 |
| CES18 = 57 | CES43 = 65 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 57 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 78 |
| CES21 = 88 | CES46 = 70 | CES71 = 57 | CES96 = 80 |
| CES22 = 80 | CES47 = 63 | CES72 = 86 | CES97 = 79 |
| CES23 = 92 | CES48 = 51 | CES73 = 52 | CES98 = 71 |
| CES24 = 91 | CES49 = 68 | CES74 = 90 | CES99 = 64 |
| CES25 = 73 | CES50 = 77 | CES75 = 58 | |



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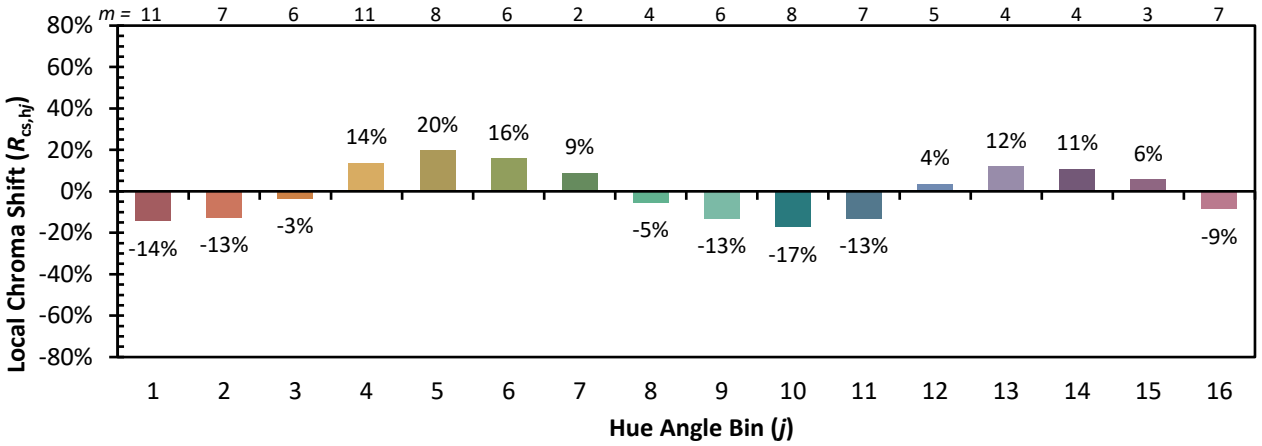
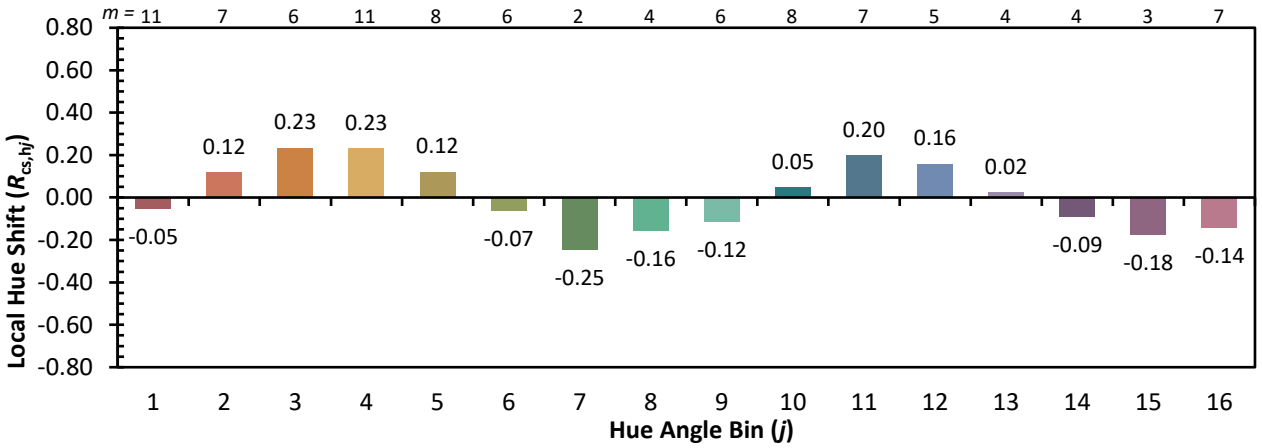
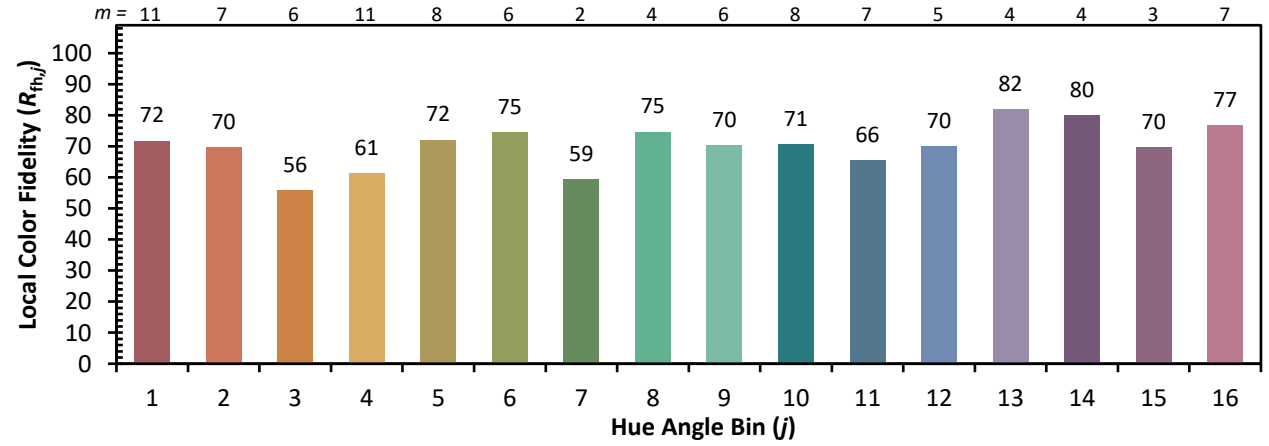
## TM-30-18

### Color Rendition by Hue-Angle Bin



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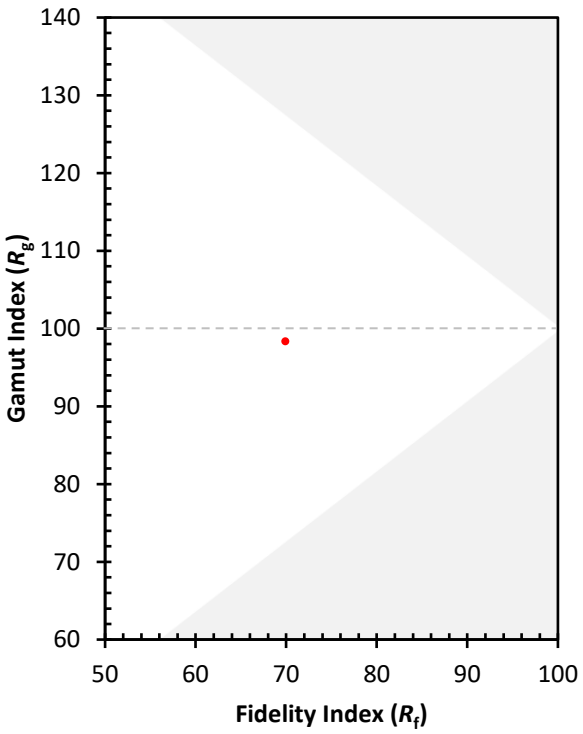
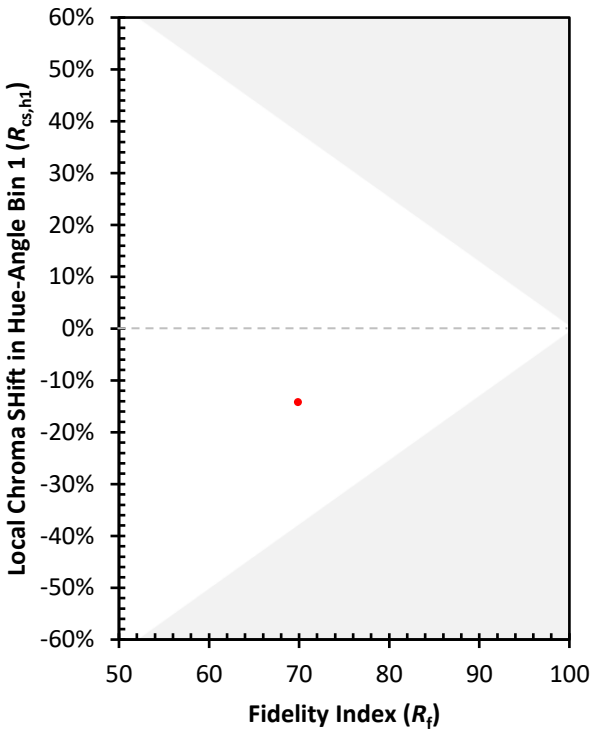
**TM-30-18**

## Measure Comparisons




(END OF REPORT)