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

Scaled data based on original data using

LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P317616

Luminaire Tested: **GLEON-SA2D-830-U-T2R**

Issue Date: 3/3/2020

Report Generated By E0585644

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

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | P317616 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-8) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 3/3/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GLEON-SA2D-830-U-T2R |
| Description: | GALLEON AREA AND ROADWAY LUMINAIRE |
| | (2) 80 CRI, 3000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II ROADWAY OPTICS |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 13143 lumens |
| Efficiency: | N/A |
| Efficacy: | 101.9 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 1' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B2 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 129 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 24 FT |

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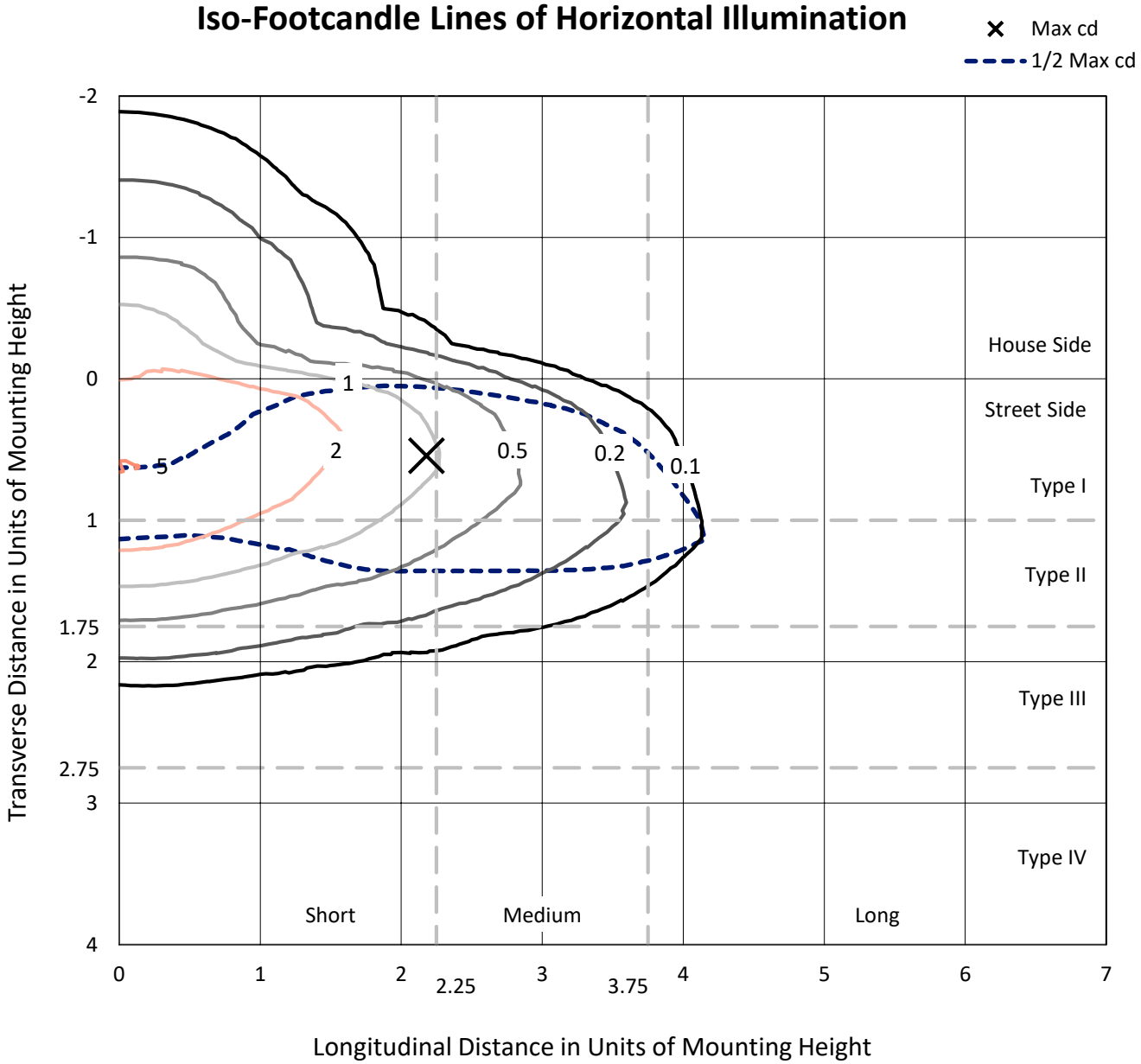
Scaled Data Report

REPORT NUMBER: P317616
CATALOG NUMBER: GLEON-SA2D-830-U-T2R

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 5.1 fc
Type II - Short - N/A

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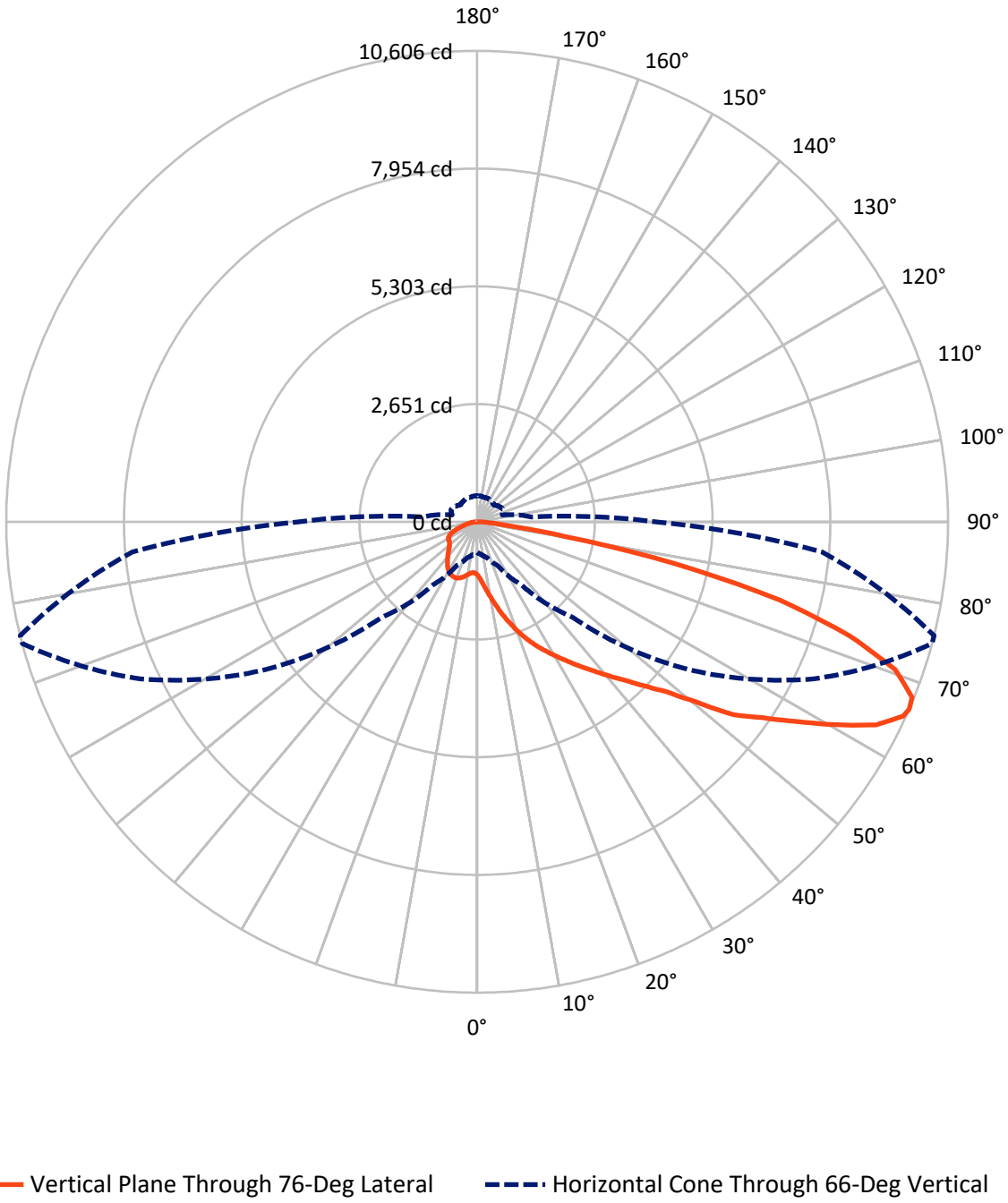
## Luminous Intensity Polar Plot



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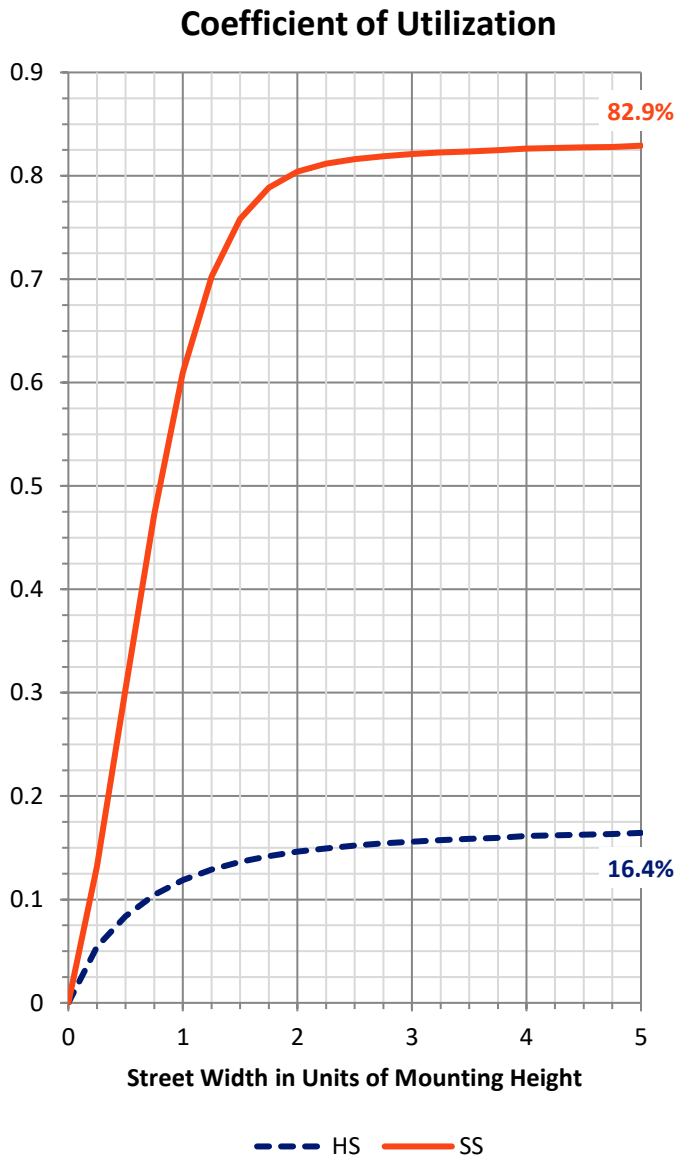
REPORT NUMBER: P317616
CATALOG NUMBER: GLEON-SA2D-830-U-T2R

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 2211.5 | 0.0 | 2211.5 |
| | % Fixture | 16.8 | 0.0 | 16.8 |
| **Street Side** | Lumens | 10931.5 | 0.0 | 10931.5 |
| | % Fixture | 83.2 | 0.0 | 83.2 |
| **Total** | Lumens | 13143.0 | 0.0 | 13143.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 145.1 | 1.1 |
| 10°-20° | 573.2 | 4.4 |
| 20°-30° | 1113.8 | 8.5 |
| 30°-40° | 1818.0 | 13.8 |
| 40°-50° | 2483.8 | 18.9 |
| 50°-60° | 2893.1 | 22.0 |
| 60°-70° | 2593.7 | 19.7 |
| 70°-80° | 1310.7 | 10.0 |
| 80°-90° | 211.7 | 1.6 |
| 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° | 13143.0 | 100.0 |
| 0°-180° | 13143.0 | 100.0 |



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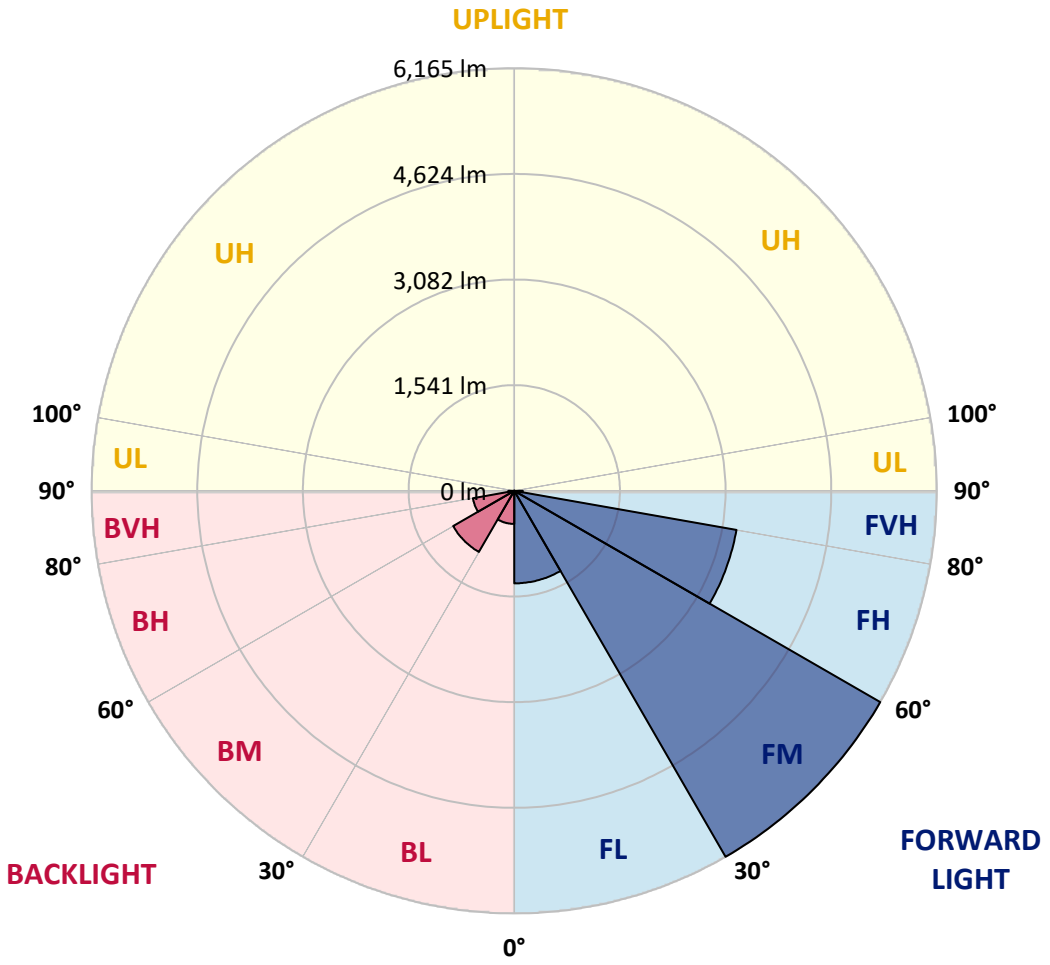
REPORT NUMBER: P317616
CATALOG NUMBER: GLEON-SA2D-830-U-T2R

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1349.8 | 10.3 | | | |
| FM | (30°-60°) | 6165.0 | 46.9 | | | |
| FH | (60°-80°) | 3291.8 | 25.0 | | | G2/5000 |
| FVH | (80°-90°) | 125.0 | 1.0 | | | G2/225 |
| BL | (0°-30°) | 482.3 | 3.7 | B1/500 | | |
| BM | (30°-60°) | 1029.8 | 7.8 | B2/2500 | | |
| BH | (60°-80°) | 612.7 | 4.7 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 86.7 | 0.7 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B2-U0-G2**
Type II Short



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Scaled Data Report

REPORT NUMBER: P317616
CATALOG NUMBER: GLEON-SA2D-830-U-T2R

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 76° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1200.3 | 1200.3 | 1200.3 | 1200.3 | 1200.3 | 1200.3 | 1200.3 | 1200.3 | 1200.3 | *1200.3* | 1200.3 |
| 2.5° | 1593.3 | 1569.3 | 1567.0 | 1531.8 | 1523.7 | 1456.4 | 1406.8 | 1355.1 | 1296.2 | *1284.6* | 1238.2 |
| 5° | 2046.7 | 2044.4 | 2013.7 | 1956.1 | 1911.0 | 1795.9 | 1682.1 | 1561.7 | 1429.6 | *1408.2* | 1303.8 |
| 7.5° | 2454.5 | 2450.9 | 2427.3 | 2365.3 | 2300.1 | 2158.7 | 1996.3 | 1811.5 | 1597.4 | *1565.7* | 1392.6 |
| 10° | 2764.1 | 2762.8 | 2754.8 | 2709.3 | 2653.9 | 2518.3 | 2338.9 | 2086.8 | 1792.3 | *1749.1* | 1503.7 |
| 12.5° | 3003.3 | 3006.0 | 3011.3 | 2995.3 | 2969.0 | 2853.4 | 2669.6 | 2378.6 | 2000.3 | *1957.4* | 1627.3 |
| 15° | 3165.3 | 3173.3 | 3201.0 | 3223.7 | 3237.6 | 3166.6 | 2988.6 | 2677.1 | 2233.2 | *2181.9* | 1764.2 |
| 17.5° | 3246.9 | 3255.9 | 3303.6 | 3372.3 | 3435.7 | 3428.5 | 3287.1 | 2961.8 | 2456.7 | *2407.2* | 1911.5 |
| 20° | 3317.4 | 3324.1 | 3377.7 | 3460.2 | 3572.2 | 3621.7 | 3542.3 | 3235.8 | 2701.7 | *2642.8* | 2067.6 |
| 22.5° | 3521.8 | 3530.3 | 3546.3 | 3593.2 | 3692.2 | 3783.2 | 3744.9 | 3495.0 | 2926.1 | *2871.2* | 2215.8 |
| 25° | 3916.2 | 3926.5 | 3891.7 | 3852.0 | 3870.7 | 3934.1 | 3941.2 | 3731.5 | 3153.7 | *3091.7* | 2375.1 |
| 27.5° | 4391.4 | 4406.1 | 4346.8 | 4244.6 | 4155.4 | 4130.8 | 4122.4 | 3925.1 | 3371.0 | *3299.1* | 2532.6 |
| 30° | 4856.8 | 4882.2 | 4805.0 | 4672.5 | 4508.8 | 4393.6 | 4308.4 | 4114.8 | 3585.1 | *3516.4* | 2681.2 |
| 32.5° | 5311.5 | 5301.2 | 5189.2 | 5059.8 | 4867.9 | 4723.8 | 4517.7 | 4318.2 | 3826.1 | *3747.1* | 2828.8 |
| 35° | 5622.9 | 5626.5 | 5522.5 | 5369.0 | 5186.1 | 5075.4 | 4797.9 | 4537.8 | 4071.9 | *3999.2* | 2996.6 |
| 37.5° | 5887.9 | 5871.4 | 5753.6 | 5610.4 | 5452.9 | 5405.6 | 5125.8 | 4779.6 | 4338.3 | *4258.9* | 3175.1 |
| 40° | 5976.3 | 5957.1 | 5879.9 | 5776.8 | 5650.6 | 5646.5 | 5487.7 | 5053.6 | 4639.5 | *4561.0* | 3376.3 |
| 42.5° | 5922.7 | 5898.2 | 5866.5 | 5838.4 | 5799.6 | 5817.4 | 5827.7 | 5374.8 | 4970.6 | *4882.7* | 3609.2 |
| 45° | 5725.1 | 5688.0 | 5710.3 | 5771.5 | 5855.8 | 5956.6 | 6134.7 | 5730.4 | 5341.3 | *5267.7* | 3882.7 |
| 47.5° | 5421.2 | 5387.7 | 5457.4 | 5588.1 | 5817.4 | 6072.7 | 6425.1 | 6123.1 | 5784.0 | *5710.8* | 4272.3 |
| 50° | 4993.8 | 5003.6 | 5103.1 | 5340.9 | 5687.6 | 6126.2 | 6783.0 | 6642.9 | 6427.4 | *6359.1* | 4803.7 |
| 52.5° | 4292.4 | 4294.1 | 4574.3 | 4964.8 | 5457.4 | 6098.5 | 6981.5 | 7307.3 | 7305.9 | *7223.4* | 5309.7 |
| 55° | 3640.9 | 3680.6 | 3902.4 | 4421.3 | 5084.3 | 5987.9 | 7120.3 | 7630.3 | 7882.8 | *7786.0* | 5781.3 |
| 57.5° | 3004.6 | 3027.8 | 3238.0 | 3759.2 | 4552.0 | 5692.9 | 7262.6 | 8018.0 | 8547.7 | *8486.5* | 6367.6 |
| 60° | 2280.9 | 2316.6 | 2533.9 | 3015.4 | 3871.1 | 5169.6 | 7276.0 | 8422.7 | 9342.3 | *9280.8* | 7022.1 |
| 62.5° | 1480.5 | 1542.0 | 1745.5 | 2196.6 | 3047.5 | 4416.8 | 6965.5 | 8687.3 | 10095.5 | *10073.6* | 7603.1 |
| 65° | 850.9 | 897.3 | 1038.7 | 1386.8 | 2102.4 | 3471.8 | 6227.0 | 8585.6 | 10559.1 | *10546.6* | 7820.4 |
| 66° | *695.2* | *724.2* | *832.6* | *1083.8* | *1734.8* | *3048.8* | *5797.8* | *8371.0* | *10605.1* | *10605.5* | *7795.4* |
| 67.5° | 556.0 | 568.9 | 617.5 | 775.9 | 1280.1 | 2416.6 | 5030.8 | 7897.6 | 10547.9 | *10563.6* | 7634.3 |
| 70° | 460.0 | 466.7 | 481.9 | 520.3 | 698.7 | 1457.3 | 3570.9 | 6667.4 | 9974.6 | *9986.6* | 7005.6 |
| 72.5° | 412.7 | 416.7 | 422.5 | 427.9 | 493.0 | 814.3 | 2181.0 | 5333.8 | 8745.3 | *8760.9* | 6047.7 |
| 75° | 373.9 | 376.1 | 375.2 | 375.7 | 413.6 | 518.9 | 1127.1 | 3982.2 | 7071.2 | *7040.0* | 4632.8 |
| 77.5° | 328.4 | 330.6 | 326.2 | 327.1 | 365.9 | 398.9 | 560.9 | 2787.8 | 4772.0 | *4551.6* | 2610.2 |
| 80° | 277.5 | 279.3 | 277.5 | 280.7 | 318.6 | 301.2 | 326.2 | 1568.4 | 2110.0 | *1995.8* | 928.1 |
| 82.5° | 209.7 | 217.3 | 222.6 | 235.1 | 262.4 | 214.2 | 218.2 | 610.8 | 642.5 | *611.7* | 284.7 |
| 85° | 91.9 | 112.0 | 167.8 | 179.8 | 197.2 | 128.5 | 143.2 | 249.0 | 261.5 | *253.4* | 103.5 |
| 87.5° | 24.1 | 26.3 | 83.0 | 104.4 | 109.3 | 58.0 | 74.5 | 113.3 | 119.6 | *113.3* | 34.4 |
| 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: P317616
CATALOG NUMBER: GLEON-SA2D-830-U-T2R

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1200.3 | 1200.3 | 1200.3 | 1200.3 | 1200.3 | 1200.3 | 1200.3 | 1200.3 | 1200.3 | 1200.3 | 1200.3 |
| 2.5° | 1213.6 | 1191.8 | 1152.5 | 1117.7 | 1091.4 | 1073.5 | 1055.7 | 1046.8 | 1041.4 | 1036.1 | 1036.9 |
| 5° | 1252.5 | 1208.3 | 1140.9 | 1093.2 | 1066.4 | 1049.4 | 1040.5 | 1036.9 | 1034.7 | 1029.4 | 1029.4 |
| 7.5° | 1310.9 | 1248.4 | 1155.6 | 1106.6 | 1085.6 | 1072.6 | 1067.3 | 1065.5 | 1062.8 | 1056.6 | 1057.5 |
| 10° | 1384.5 | 1297.1 | 1186.4 | 1138.7 | 1119.5 | 1105.2 | 1097.6 | 1095.0 | 1090.0 | 1082.9 | 1083.8 |
| 12.5° | 1471.1 | 1357.3 | 1227.0 | 1177.1 | 1153.8 | 1134.7 | 1122.2 | 1114.6 | 1106.1 | 1096.7 | 1097.2 |
| 15° | 1565.7 | 1422.9 | 1270.8 | 1211.4 | 1179.7 | 1153.0 | 1132.9 | 1119.9 | 1106.6 | 1095.0 | 1094.5 |
| 17.5° | 1661.6 | 1486.3 | 1304.2 | 1230.1 | 1187.3 | 1152.1 | 1124.8 | 1104.8 | 1088.3 | 1074.0 | 1072.6 |
| 20° | 1765.1 | 1543.4 | 1323.0 | 1228.4 | 1173.0 | 1131.1 | 1095.0 | 1070.0 | 1051.7 | 1037.4 | 1035.2 |
| 22.5° | 1870.4 | 1596.9 | 1326.1 | 1210.1 | 1141.4 | 1090.0 | 1052.1 | 1024.5 | 1005.7 | 991.0 | 985.6 |
| 25° | 1966.8 | 1638.4 | 1313.1 | 1174.8 | 1097.2 | 1041.9 | 1004.8 | 976.7 | 961.5 | 944.1 | 938.8 |
| 27.5° | 2054.7 | 1667.4 | 1287.3 | 1129.8 | 1047.7 | 993.2 | 958.4 | 934.3 | 917.8 | 904.4 | 900.0 |
| 30° | 2133.7 | 1683.0 | 1244.9 | 1076.2 | 996.8 | 947.3 | 917.8 | 901.3 | 887.0 | 870.1 | 866.9 |
| 32.5° | 2208.6 | 1683.0 | 1190.4 | 1017.8 | 946.4 | 906.7 | 889.3 | 879.0 | 862.9 | 846.4 | 842.0 |
| 35° | 2283.6 | 1672.8 | 1126.2 | 956.6 | 900.0 | 877.7 | 876.8 | 864.7 | 840.2 | 817.9 | 812.1 |
| 37.5° | 2362.6 | 1651.8 | 1053.9 | 899.5 | 862.0 | 864.7 | 872.3 | 845.5 | 810.7 | 779.0 | 770.6 |
| 40° | 2451.8 | 1622.8 | 978.9 | 850.0 | 830.4 | 858.9 | 860.3 | 817.9 | 750.0 | 721.0 | 713.5 |
| 42.5° | 2556.7 | 1593.8 | 909.3 | 806.3 | 805.4 | 841.5 | 837.5 | 758.1 | 717.5 | 702.7 | 698.7 |
| 45° | 2694.5 | 1577.3 | 843.3 | 764.8 | 785.7 | 813.4 | 798.7 | 725.1 | 708.1 | 699.6 | 696.1 |
| 47.5° | 2911.8 | 1585.8 | 782.6 | 731.8 | 766.1 | 785.3 | 726.4 | 711.7 | 699.6 | 689.4 | 685.8 |
| 50° | 3184.0 | 1580.9 | 733.5 | 709.0 | 743.8 | 755.8 | 693.8 | 694.3 | 688.0 | 676.4 | 671.1 |
| 52.5° | 3388.8 | 1542.5 | 701.9 | 696.1 | 724.2 | 703.6 | 673.3 | 677.3 | 674.2 | 657.2 | 651.4 |
| 55° | 3586.5 | 1509.5 | 685.8 | 691.1 | 709.9 | 638.5 | 649.2 | 659.0 | 655.9 | 639.4 | 636.7 |
| 57.5° | 3832.3 | 1503.2 | 676.0 | 692.5 | 697.8 | 605.9 | 626.0 | 638.9 | 636.7 | 629.6 | 628.2 |
| 60° | 4133.5 | 1505.0 | 667.1 | 694.7 | 684.5 | 581.8 | 604.1 | 620.7 | 622.0 | 620.7 | 619.8 |
| 62.5° | 4299.0 | 1456.4 | 644.7 | 688.5 | 660.8 | 560.9 | 581.4 | 605.5 | 605.9 | 608.6 | 608.2 |
| 65° | 4158.5 | 1310.9 | 603.2 | 666.6 | 621.1 | 543.5 | 561.8 | 588.1 | 581.4 | 593.4 | 593.4 |
| 66° | *4022.0* | *1227.0* | *582.7* | *652.3* | *604.1* | *536.8* | *555.5* | *579.2* | *570.7* | *587.2* | *587.2* |
| 67.5° | 3743.1 | 1085.6 | 545.7 | 622.0 | 580.0 | 527.4 | 548.4 | 564.4 | 552.8 | 577.4 | 575.6 |
| 70° | 3233.5 | 839.7 | 471.2 | 553.3 | 540.3 | 513.6 | 538.6 | 535.0 | 518.0 | 555.5 | 548.4 |
| 72.5° | 2726.2 | 638.1 | 378.4 | 463.1 | 480.1 | 496.2 | 524.7 | 497.5 | 476.1 | 502.4 | 486.8 |
| 75° | 2115.4 | 479.7 | 298.9 | 360.1 | 405.6 | 468.9 | 508.2 | 454.2 | 423.4 | 420.8 | 412.3 |
| 77.5° | 1143.6 | 329.3 | 236.9 | 274.9 | 322.1 | 435.0 | 497.1 | 407.8 | 361.4 | 350.7 | 344.0 |
| 80° | 452.9 | 214.2 | 172.2 | 208.4 | 225.3 | 386.0 | 470.3 | 353.8 | 298.1 | 287.3 | 277.1 |
| 82.5° | 187.0 | 126.7 | 111.1 | 139.7 | 146.8 | 330.2 | 422.1 | 290.0 | 230.2 | 318.6 | 338.2 |
| 85° | 80.3 | 69.6 | 66.0 | 72.3 | 83.0 | 231.6 | 336.0 | 221.3 | 248.5 | 221.8 | 176.2 |
| 87.5° | 24.1 | 29.4 | 28.1 | 27.7 | 30.3 | 55.3 | 178.9 | 123.1 | 182.5 | 69.2 | 51.8 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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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

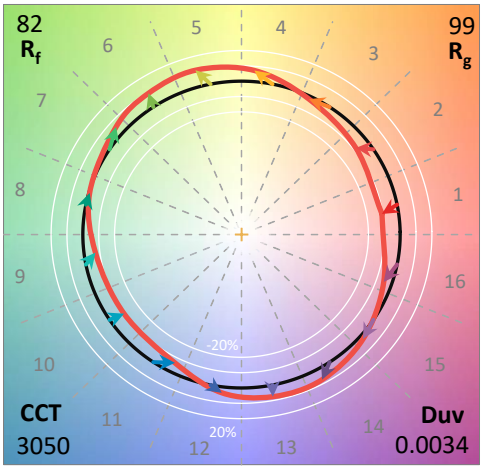
## Test Information

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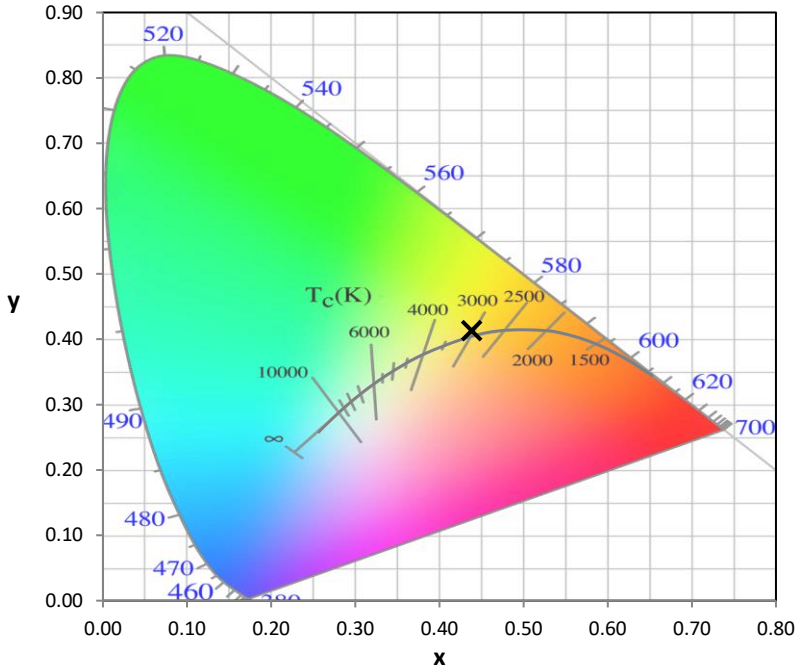
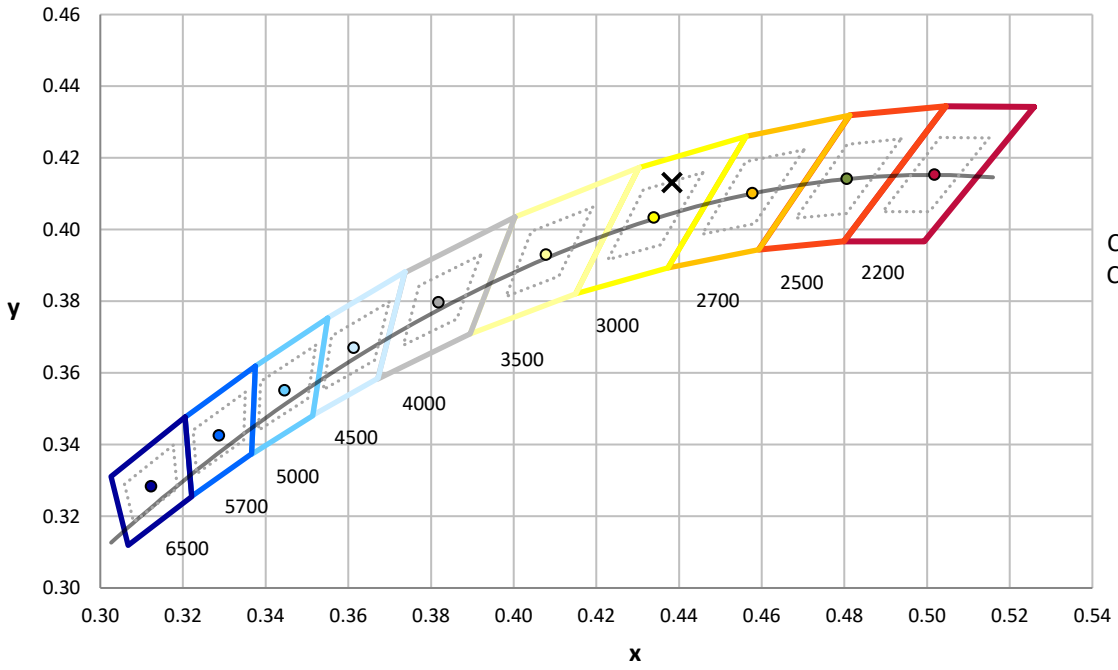
## CIE 1931 Chromaticity Diagram




## 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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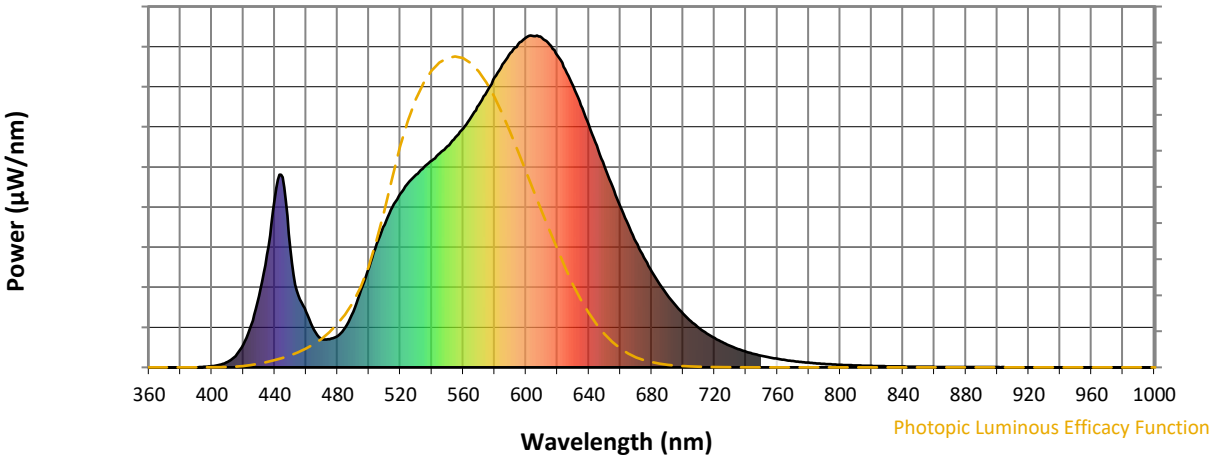
## Photopic Flux vs. Wavelength




## 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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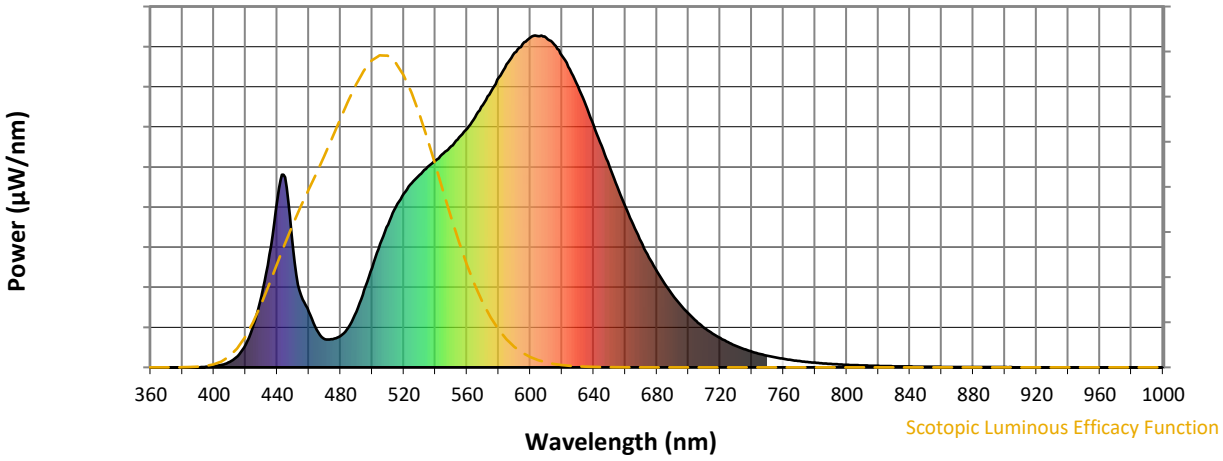
## Scotopic Flux vs. Wavelength




**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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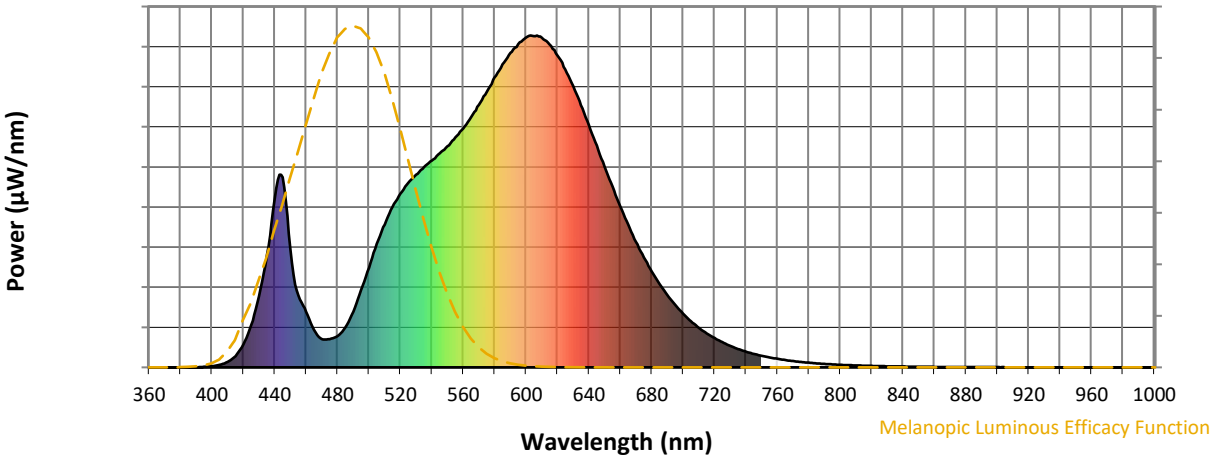
## Melanopic Flux vs. Wavelength




**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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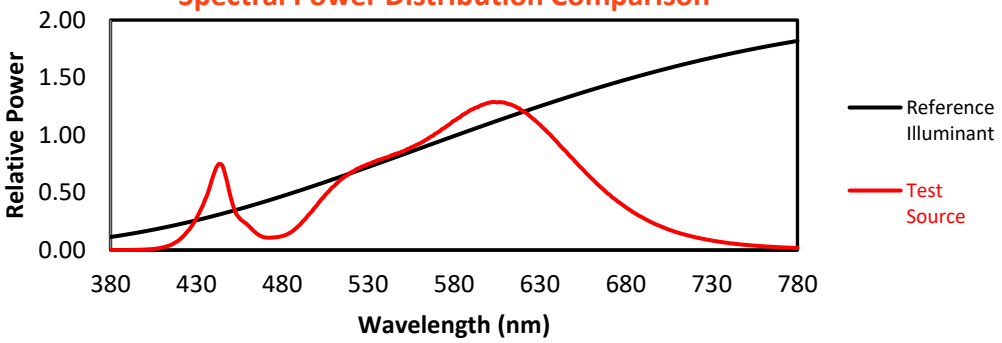
# TM-30-18

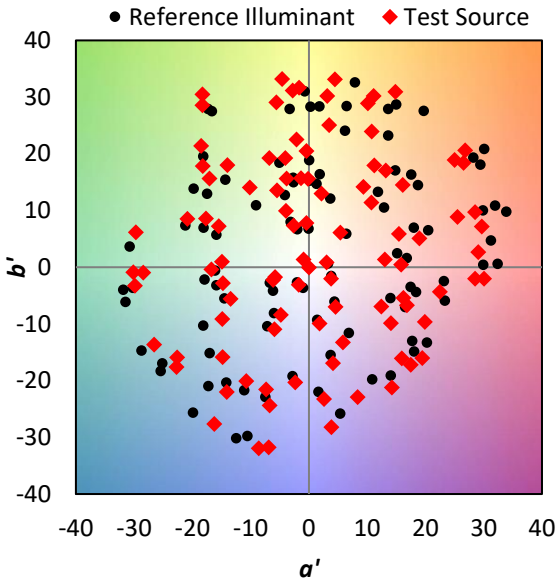
## Summary

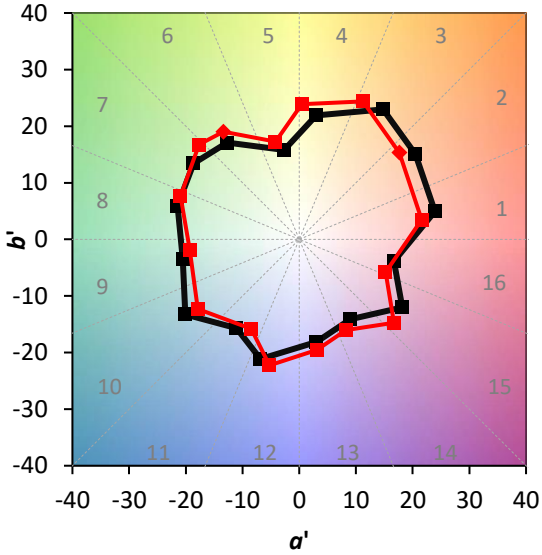
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

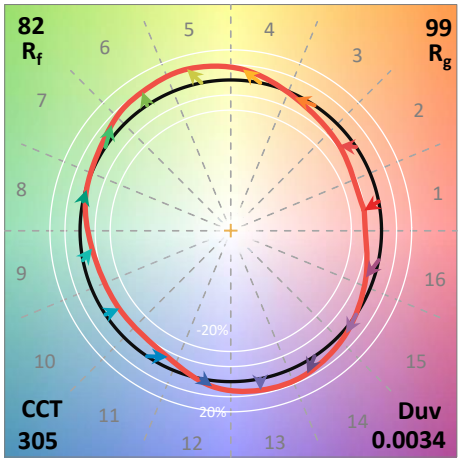
## Spectral Power Distribution Comparison

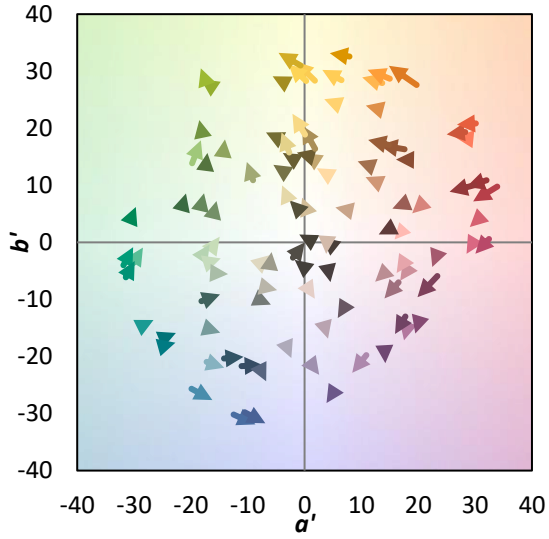



## Color Vector Graphics



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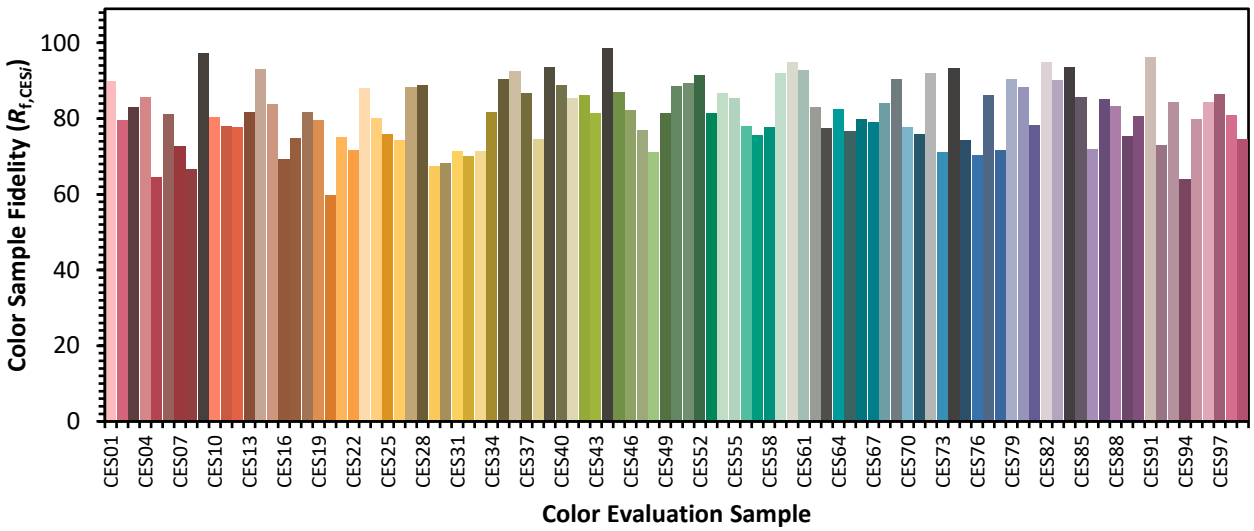
# TM-30-18

**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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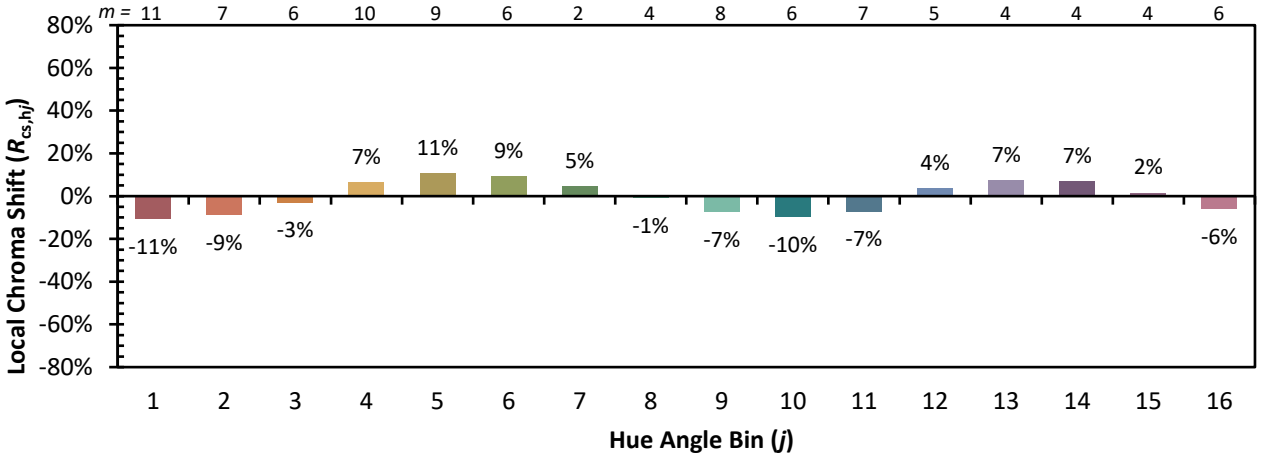
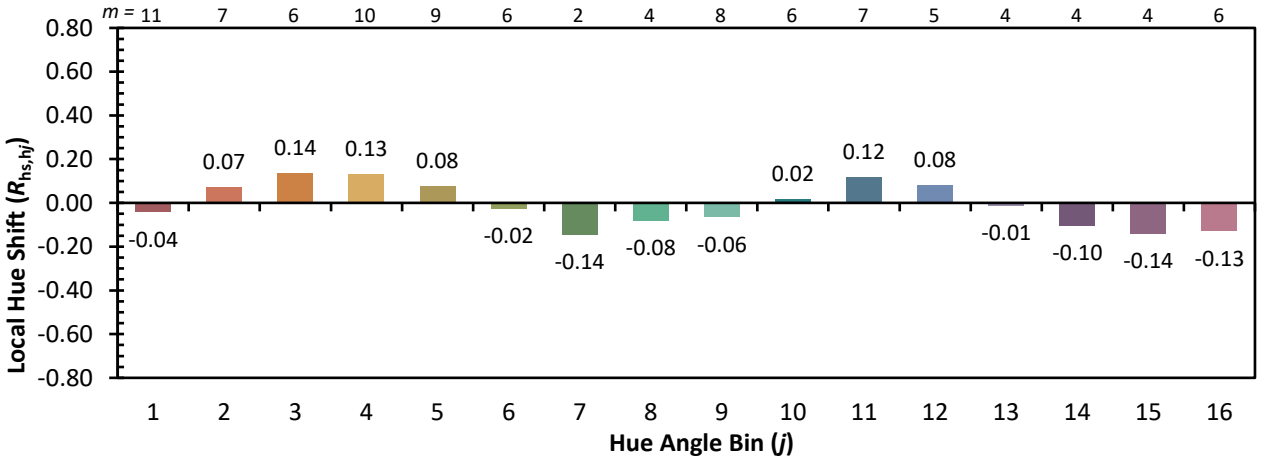
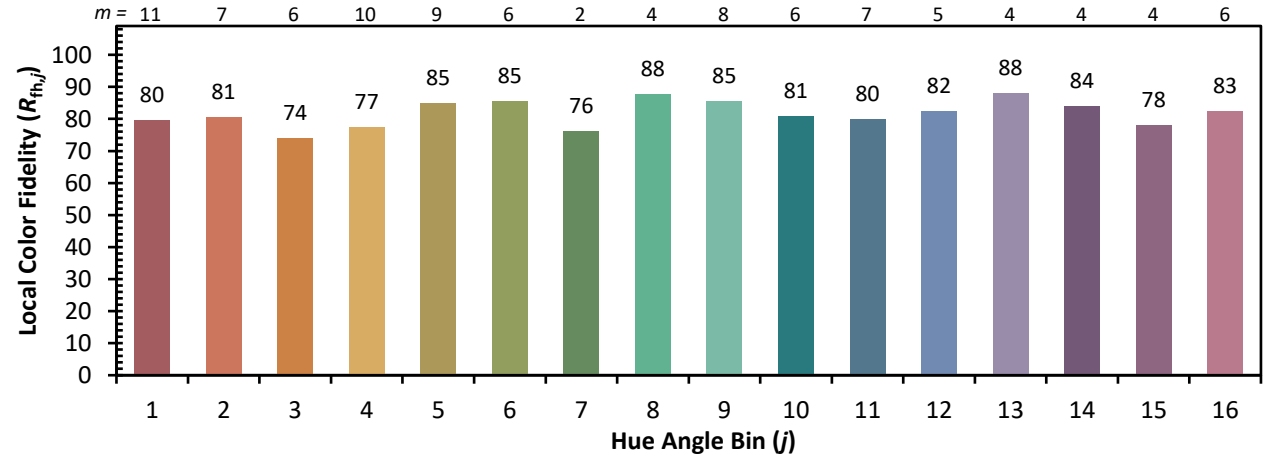
# TM-30-18

## Color Rendition by Hue-Angle Bin



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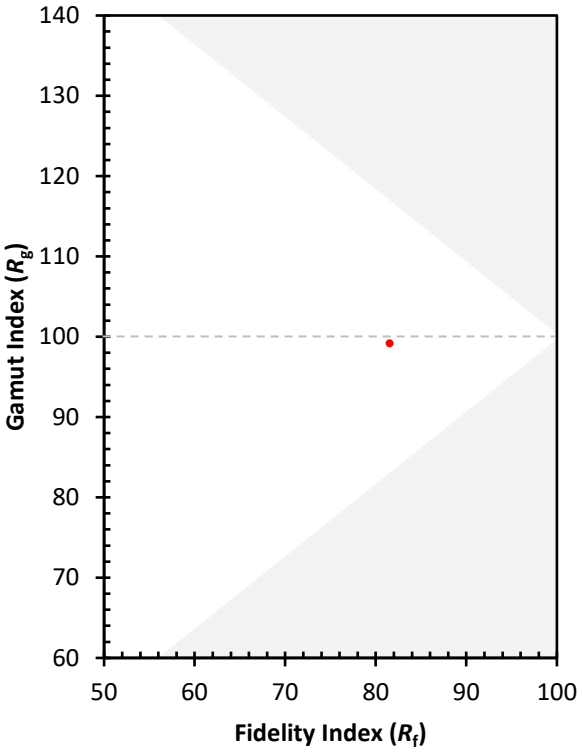
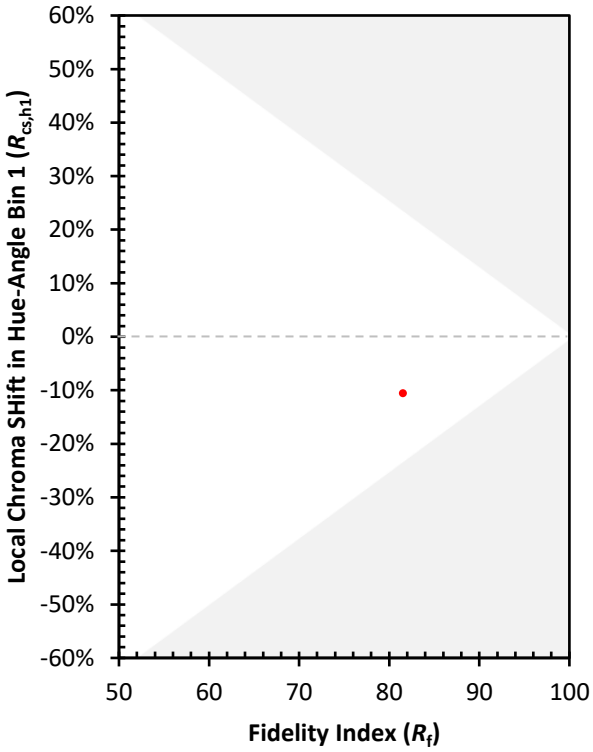
## Measure Comparisons




(END OF REPORT)