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: P324023

Luminaire Tested: **GLEON-SA9D-830-U-SL4-HSS**

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: | P324023 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-25) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 3/3/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GLEON-SA9D-830-U-SL4-HSS |
| Description: | GALLEON AREA AND ROADWAY LUMINAIRE |
| | (9) 80 CRI, 3000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV |
| | SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 44737 lumens |
| Efficiency: | N/A |
| Efficacy: | 77.8 lumens/watt |
| Luminous Opening: | Rectangular (W 2.5' x L: 1' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B3 - U0 - G5 |

| | |
|---|---|
| Input Watts (W): | 575 |
| 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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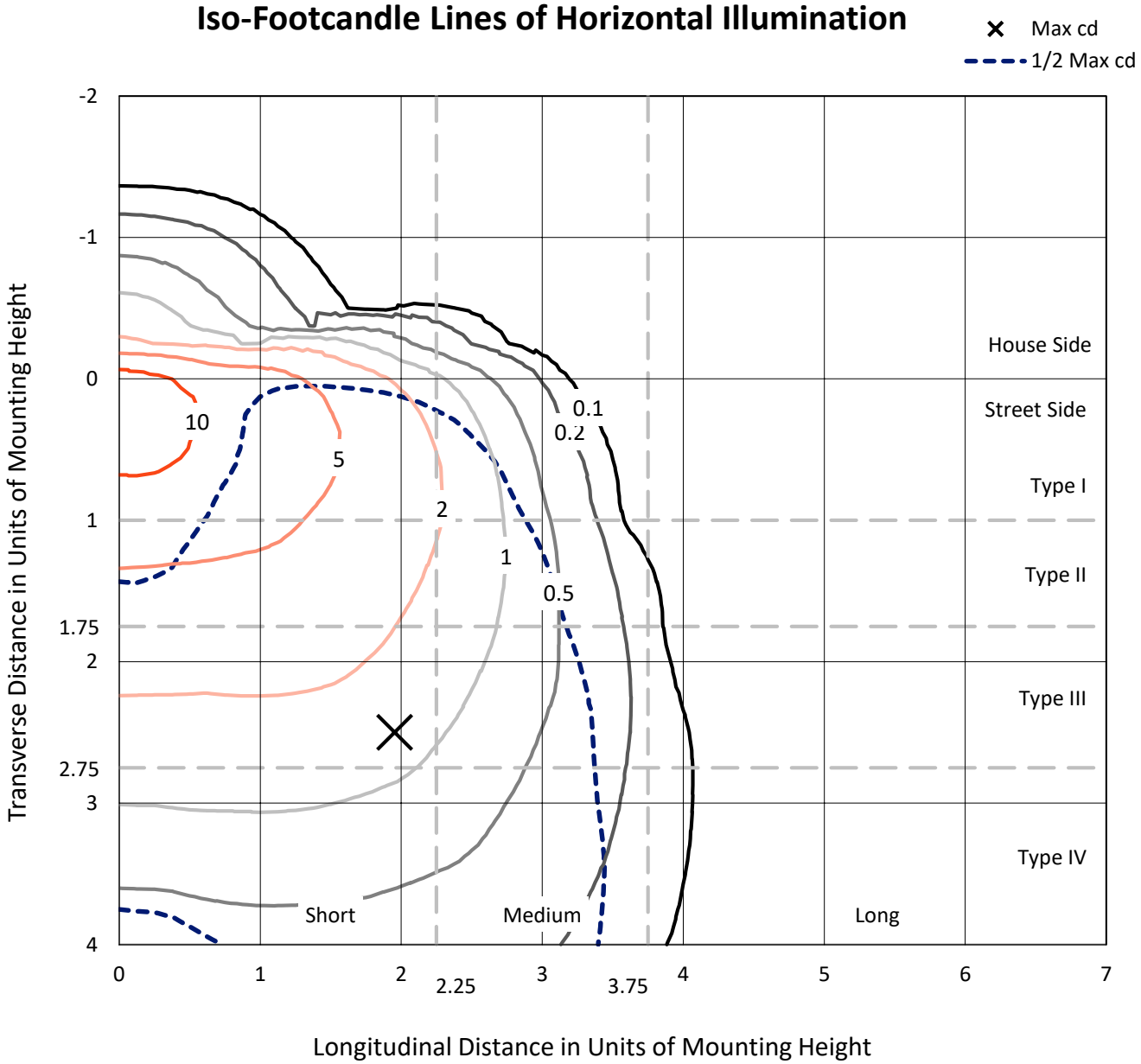
Scaled Data Report

REPORT NUMBER: P324023
CATALOG NUMBER: GLEON-SA9D-830-U-SL4-HSS

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 13.9 fc
Type IV - Short - N/A

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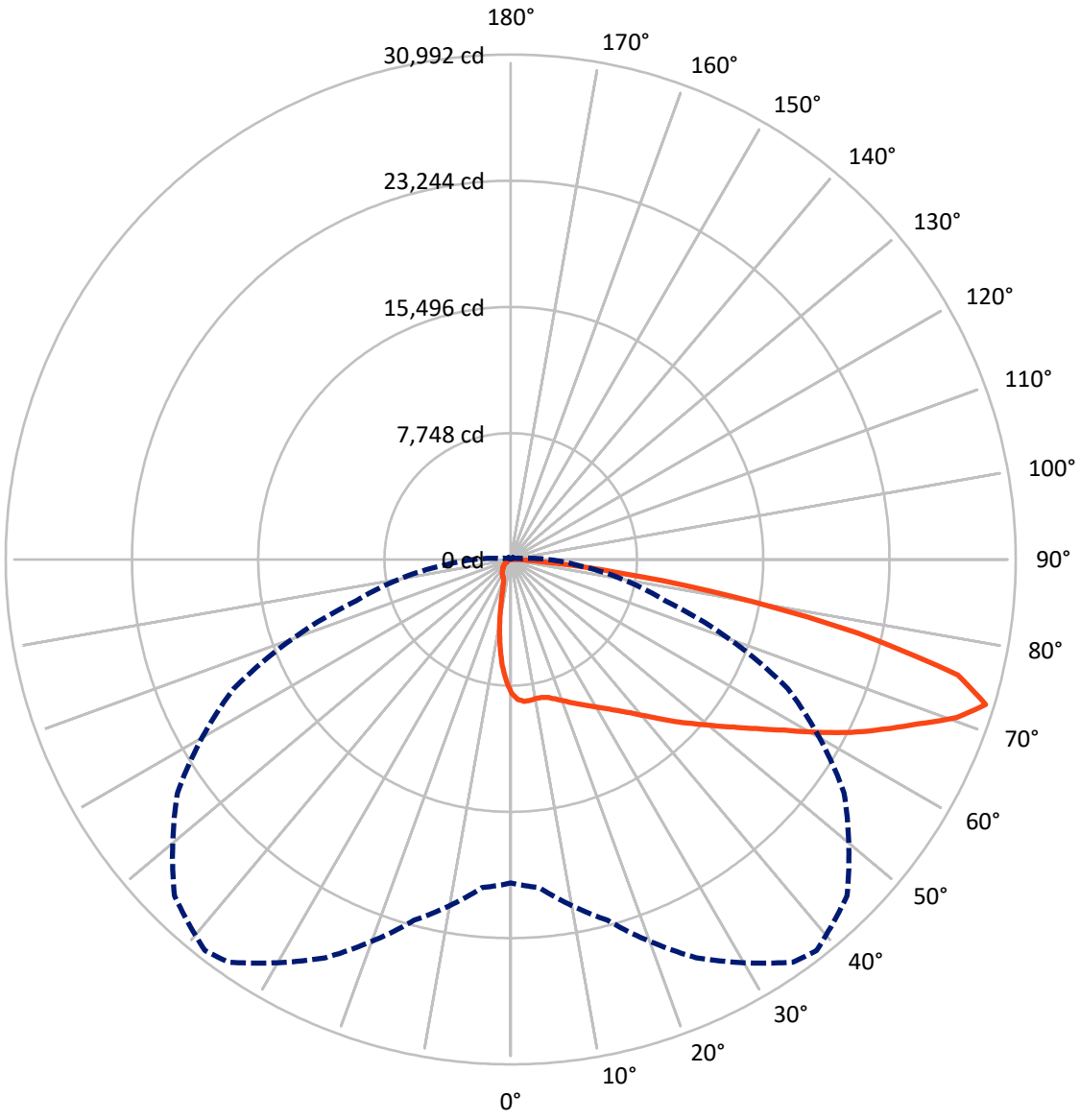
## Luminous Intensity Polar Plot



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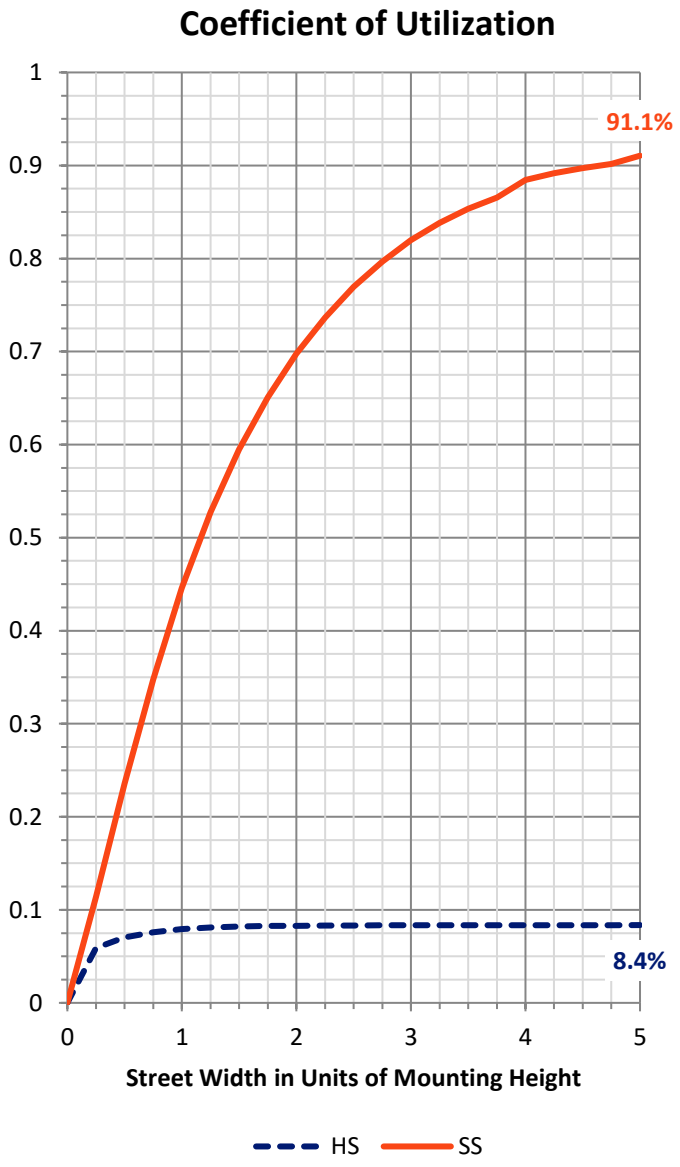
REPORT NUMBER: P324023
CATALOG NUMBER: GLEON-SA9D-830-U-SL4-HSS

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 3764.8 | 0.0 | 3764.8 |
| | % Fixture | 8.4 | 0.0 | 8.4 |
| **Street Side** | Lumens | 40972.2 | 0.0 | 40972.2 |
| | % Fixture | 91.6 | 0.0 | 91.6 |
| **Total** | Lumens | 44737.0 | 0.0 | 44737.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 701.1 | 1.6 |
| 10°-20° | 1714.3 | 3.8 |
| 20°-30° | 2726.6 | 6.1 |
| 30°-40° | 4099.2 | 9.2 |
| 40°-50° | 6253.6 | 14.0 |
| 50°-60° | 8838.4 | 19.8 |
| 60°-70° | 11086.4 | 24.8 |
| 70°-80° | 8289.5 | 18.5 |
| 80°-90° | 1027.9 | 2.3 |
| 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° | 44737.0 | 100.0 |
| 0°-180° | 44737.0 | 100.0 |



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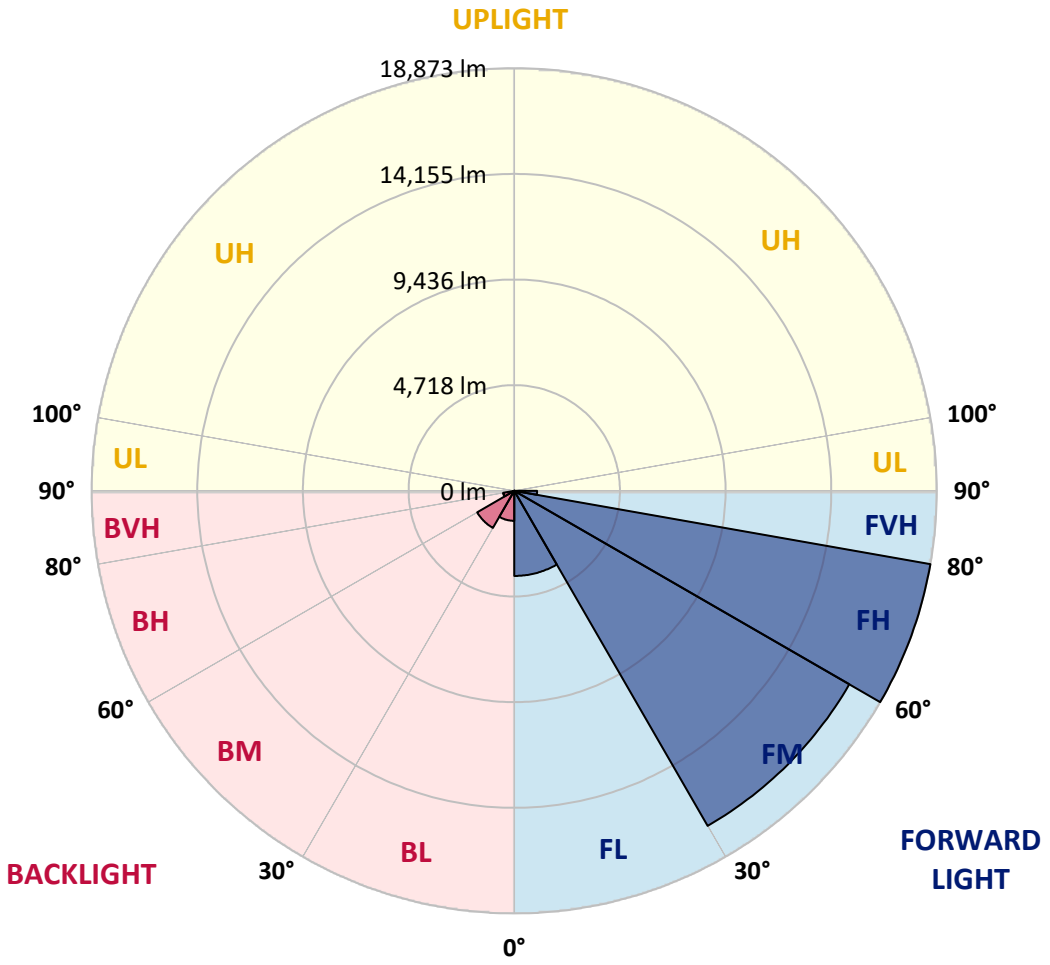
Scaled Data Report

REPORT NUMBER: P324023
CATALOG NUMBER: GLEON-SA9D-830-U-SL4-HSS

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 3801.6 | 8.5 | | | |
| FM | (30°-60°) | 17279.4 | 38.6 | | | |
| FH | (60°-80°) | 18873.0 | 42.2 | | | G5 |
| FVH | (80°-90°) | 1018.3 | 2.3 | | | G5 |
| BL | (0°-30°) | 1340.5 | 3.0 | B3/2500 | | |
| BM | (30°-60°) | 1911.8 | 4.3 | B2/2500 | | |
| BH | (60°-80°) | 502.9 | 1.1 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 9.6 | 0.0 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B3-U0-G5**
Type IV Short



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REPORT NUMBER: P324023
CATALOG NUMBER: GLEON-SA9D-830-U-SL4-HSS

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 38° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 8227.0 | 8227.0 | 8227.0 | 8227.0 | 8227.0 | *8227.0* | 8227.0 | 8227.0 | 8227.0 | 8227.0 | 8227.0 |
| 2.5° | 8732.3 | 8734.2 | 8713.8 | 8680.3 | 8637.6 | *8615.3* | 8578.1 | 8518.7 | 8455.5 | 8342.2 | 8219.6 |
| 5° | 8910.7 | 8910.7 | 8884.7 | 8840.1 | 8771.4 | *8750.9* | 8680.3 | 8585.6 | 8455.5 | 8271.6 | 8065.3 |
| 7.5° | 8892.1 | 8895.8 | 8860.5 | 8814.1 | 8745.4 | *8726.8* | 8641.3 | 8535.4 | 8373.8 | 8150.8 | 7887.0 |
| 10° | 8795.5 | 8804.8 | 8776.9 | 8754.6 | 8691.5 | *8671.0* | 8591.1 | 8485.2 | 8323.6 | 8085.8 | 7782.9 |
| 12.5° | 8697.0 | 8706.3 | 8715.6 | 8736.1 | 8697.0 | *8689.6* | 8626.4 | 8537.3 | 8383.1 | 8135.9 | 7794.1 |
| 15° | 8633.9 | 8652.5 | 8719.3 | 8799.2 | 8808.5 | *8801.1* | 8760.2 | 8676.6 | 8520.5 | 8264.1 | 7874.0 |
| 17.5° | 8633.9 | 8663.6 | 8803.0 | 8955.3 | 9009.2 | *9014.8* | 8979.5 | 8862.4 | 8676.6 | 8401.6 | 7948.3 |
| 20° | 8706.3 | 8747.2 | 8964.6 | 9180.1 | 9269.3 | *9269.3* | 9200.6 | 9037.1 | 8819.7 | 8526.1 | 7998.5 |
| 22.5° | 8892.1 | 8946.0 | 9219.1 | 9468.1 | 9562.9 | *9542.4* | 9449.5 | 9211.7 | 8968.3 | 8667.3 | 8061.6 |
| 25° | 9258.1 | 9299.0 | 9583.3 | 9834.1 | 9891.7 | *9845.3* | 9728.2 | 9423.5 | 9157.8 | 8858.7 | 8176.8 |
| 27.5° | 9730.1 | 9735.6 | 10029.2 | 10241.0 | 10205.7 | *10174.1* | 10027.3 | 9689.2 | 9430.9 | 9131.8 | 8375.6 |
| 30° | 10248.4 | 10248.4 | 10506.7 | 10668.3 | 10560.6 | *10534.6* | 10387.8 | 10010.6 | 9780.2 | 9503.4 | 8658.0 |
| 32.5° | 10750.1 | 10772.4 | 10982.3 | 11084.5 | 10963.7 | *10937.7* | 10794.7 | 10417.5 | 10244.7 | 10070.1 | 9098.4 |
| 35° | 11235.0 | 11251.7 | 11450.5 | 11506.3 | 11391.1 | *11398.5* | 11296.3 | 10976.7 | 10911.7 | 10889.4 | 9761.7 |
| 37.5° | 11705.1 | 11708.8 | 11911.3 | 11946.6 | 11889.0 | *11952.2* | 11961.5 | 11679.1 | 11799.8 | 11980.0 | 10696.2 |
| 40° | 12134.2 | 12138.0 | 12338.6 | 12429.7 | 12528.1 | *12609.9* | 12682.3 | 12531.8 | 12931.3 | 13349.3 | 11809.1 |
| 42.5° | 12478.0 | 12517.0 | 12771.5 | 12944.3 | 13204.4 | *13360.5* | 13557.4 | 13550.0 | 14278.3 | 14906.3 | 13154.3 |
| 45° | 12780.8 | 12847.7 | 13202.6 | 13505.4 | 13951.3 | *14200.3* | 14508.7 | 14750.2 | 15794.4 | 16639.8 | 14516.1 |
| 47.5° | 13180.3 | 13243.4 | 13648.5 | 14144.5 | 14739.1 | *15066.1* | 15577.0 | 16099.1 | 17461.0 | 18341.6 | 15846.4 |
| 50° | 13743.2 | 13715.4 | 14114.8 | 14826.4 | 15590.0 | *16019.2* | 16747.5 | 17529.7 | 19114.6 | 19824.3 | 16628.6 |
| 52.5° | 14343.3 | 14332.2 | 14627.6 | 15567.7 | 16593.3 | *17095.0* | 18057.4 | 19008.7 | 20695.7 | 20846.2 | 16987.2 |
| 55° | 15086.5 | 15006.6 | 15255.6 | 16413.1 | 17784.3 | *18323.1* | 19456.4 | 20472.7 | 21955.4 | 21422.1 | 17167.4 |
| 57.5° | 15865.0 | 15733.1 | 15970.9 | 17355.1 | 19127.6 | *19764.8* | 21005.9 | 21899.6 | 22793.3 | 21816.0 | 17165.6 |
| 60° | 16669.5 | 16513.4 | 16795.8 | 18533.0 | 20796.0 | *21533.6* | 22685.5 | 22863.9 | 23575.5 | 22014.8 | 17039.2 |
| 62.5° | 17342.1 | 17249.2 | 17669.1 | 19792.7 | 22659.5 | *23384.1* | 23954.5 | 23740.8 | 24235.1 | 22169.0 | 16743.8 |
| 65° | 18053.7 | 18059.2 | 18737.4 | 21262.3 | 24640.1 | *25128.7* | 25177.0 | 24877.9 | 24786.9 | 22137.4 | 15744.2 |
| 67.5° | 19016.1 | 19105.3 | 20236.8 | 23257.8 | 26566.8 | *26943.9* | 26940.2 | 26109.7 | 25190.0 | 20881.5 | 13527.7 |
| 70° | 20034.2 | 20244.2 | 21964.6 | 25541.2 | 28670.0 | *29052.7* | 28855.8 | 26893.8 | 23718.5 | 16885.0 | 9574.0 |
| 72.5° | *19863.3* | *20227.5* | *22925.2* | *26981.1* | *30180.5* | *30472.2* | *29192.1* | *24967.1* | *18746.7* | *9813.7* | *4076.3* |
| 75° | 15324.3 | 15746.1 | 21020.8 | 25554.2 | 28595.7 | *28333.7* | 25082.3 | 19428.5 | 10244.7 | 2738.6 | 917.8 |
| 77.5° | 8095.1 | 8319.9 | 13886.3 | 19467.6 | 22297.2 | *21749.1* | 17669.1 | 10777.9 | 3123.2 | 678.2 | 412.5 |
| 80° | 4239.8 | 4291.9 | 6051.3 | 11045.5 | 13761.8 | *13765.5* | 10471.4 | 4734.0 | 1287.6 | 347.4 | 276.8 |
| 82.5° | 2270.4 | 2315.0 | 3197.5 | 5103.8 | 7210.7 | *6536.3* | 4009.4 | 2604.8 | 748.8 | 196.9 | 265.7 |
| 85° | 546.2 | 555.5 | 1813.4 | 2331.7 | 2835.2 | *2025.2* | 1190.9 | 2186.8 | 202.5 | 115.2 | 215.5 |
| 87.5° | 209.9 | 213.7 | 672.6 | 1008.9 | 722.7 | *468.2* | 557.4 | 815.6 | 26.0 | 44.6 | 33.4 |
| 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: P324023
CATALOG NUMBER: GLEON-SA9D-830-U-SL4-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 8227.0 | 8227.0 | 8227.0 | 8227.0 | 8227.0 | 8227.0 | 8227.0 | 8227.0 | 8227.0 | 8227.0 | 8227.0 |
| 2.5° | 8145.2 | 8096.9 | 7978.0 | 7827.5 | 7693.8 | 7597.1 | 7452.2 | 7357.5 | 7294.3 | 7292.4 | 7268.3 |
| 5° | 7939.0 | 7840.5 | 7584.1 | 7279.4 | 7002.6 | 6753.6 | 6460.1 | 6227.8 | 6055.0 | 6027.2 | 5967.7 |
| 7.5° | 7717.9 | 7556.3 | 7162.4 | 6686.7 | 6222.3 | 5750.3 | 5202.3 | 4862.2 | 4570.5 | 4431.2 | 4416.3 |
| 10° | 7582.3 | 7355.6 | 6796.4 | 6108.9 | 5380.6 | 4613.3 | 3896.1 | 3400.0 | 3041.5 | 2939.3 | 2863.1 |
| 12.5° | 7554.4 | 7255.3 | 6514.0 | 5566.4 | 4526.0 | 3511.5 | 2718.2 | 2190.5 | 1904.4 | 1813.4 | 1789.2 |
| 15° | 7582.3 | 7208.8 | 6276.1 | 5029.5 | 3660.2 | 2491.5 | 1824.5 | 1517.9 | 1410.2 | 1384.2 | 1382.3 |
| 17.5° | 7599.0 | 7153.1 | 6006.7 | 4433.1 | 2820.4 | 1779.9 | 1397.2 | 1308.0 | 1291.3 | 1289.4 | 1293.1 |
| 20° | 7597.1 | 7067.6 | 5685.3 | 3767.9 | 2097.6 | 1399.0 | 1263.4 | 1244.8 | 1241.1 | 1243.0 | 1241.1 |
| 22.5° | 7584.1 | 6967.3 | 5332.3 | 3082.3 | 1584.8 | 1250.4 | 1205.8 | 1194.7 | 1192.8 | 1192.8 | 1192.8 |
| 25° | 7608.3 | 6887.4 | 4944.0 | 2426.5 | 1306.1 | 1181.7 | 1153.8 | 1144.5 | 1142.6 | 1142.6 | 1138.9 |
| 27.5° | 7695.6 | 6842.8 | 4518.5 | 1867.2 | 1179.8 | 1120.3 | 1098.0 | 1096.2 | 1090.6 | 1088.8 | 1092.5 |
| 30° | 7836.8 | 6842.8 | 4052.2 | 1452.9 | 1103.6 | 1057.2 | 1040.5 | 1036.7 | 1034.9 | 1033.0 | 1034.9 |
| 32.5° | 8085.8 | 6894.8 | 3543.1 | 1207.7 | 1031.2 | 986.6 | 975.4 | 981.0 | 975.4 | 975.4 | 975.4 |
| 35° | 8535.4 | 7050.9 | 3009.9 | 1053.5 | 955.0 | 917.8 | 906.7 | 914.1 | 910.4 | 910.4 | 908.5 |
| 37.5° | 9191.3 | 7340.7 | 2472.9 | 960.6 | 888.1 | 849.1 | 834.2 | 845.4 | 841.6 | 841.6 | 839.8 |
| 40° | 9990.2 | 7762.5 | 1962.0 | 890.0 | 823.1 | 782.2 | 769.2 | 774.8 | 765.5 | 765.5 | 769.2 |
| 42.5° | 10976.7 | 8297.6 | 1516.1 | 821.2 | 758.0 | 719.0 | 711.6 | 706.0 | 689.3 | 680.0 | 681.9 |
| 45° | 12072.9 | 8855.0 | 1181.7 | 754.3 | 696.7 | 665.1 | 654.0 | 639.1 | 611.3 | 592.7 | 594.5 |
| 47.5° | 13052.1 | 9284.2 | 960.6 | 689.3 | 641.0 | 616.8 | 600.1 | 572.2 | 531.4 | 509.1 | 510.9 |
| 50° | 13566.7 | 9349.2 | 817.5 | 624.3 | 589.0 | 564.8 | 540.7 | 497.9 | 449.6 | 425.5 | 423.6 |
| 52.5° | 13698.6 | 9044.5 | 711.6 | 564.8 | 536.9 | 509.1 | 477.5 | 419.9 | 366.0 | 340.0 | 336.3 |
| 55° | 13746.9 | 8580.0 | 616.8 | 509.1 | 481.2 | 449.6 | 408.7 | 343.7 | 293.6 | 267.5 | 265.7 |
| 57.5° | 13587.2 | 7887.0 | 542.5 | 458.9 | 425.5 | 386.5 | 336.3 | 275.0 | 226.7 | 206.2 | 206.2 |
| 60° | 13232.3 | 6948.7 | 484.9 | 405.0 | 367.9 | 323.3 | 271.3 | 213.7 | 169.1 | 152.4 | 152.4 |
| 62.5° | 12524.4 | 5733.6 | 431.0 | 349.3 | 314.0 | 267.5 | 219.2 | 161.6 | 118.9 | 109.6 | 111.5 |
| 65° | 11188.6 | 4349.5 | 377.2 | 299.1 | 267.5 | 221.1 | 170.9 | 115.2 | 79.9 | 79.9 | 83.6 |
| 67.5° | 9124.4 | 3021.0 | 321.4 | 254.5 | 230.4 | 180.2 | 130.1 | 79.9 | 55.7 | 63.2 | 70.6 |
| 70° | 6040.2 | 1694.4 | 275.0 | 209.9 | 196.9 | 143.1 | 96.6 | 53.9 | 44.6 | 59.5 | 72.5 |
| 72.5° | *2279.7* | *659.6* | *230.4* | *169.1* | *170.9* | *109.6* | *68.7* | *40.9* | *40.9* | *65.0* | *85.5* |
| 75° | 635.4 | 323.3 | 165.4 | 124.5 | 133.8 | 79.9 | 50.2 | 35.3 | 39.0 | 74.3 | 100.3 |
| 77.5° | 373.4 | 237.8 | 107.8 | 72.5 | 91.0 | 55.7 | 33.4 | 27.9 | 33.4 | 63.2 | 96.6 |
| 80° | 301.0 | 126.3 | 63.2 | 37.2 | 50.2 | 31.6 | 22.3 | 16.7 | 9.3 | 24.2 | 50.2 |
| 82.5° | 301.0 | 76.2 | 29.7 | 26.0 | 26.0 | 16.7 | 11.1 | 7.4 | 1.9 | 0.0 | 13.0 |
| 85° | 202.5 | 31.6 | 18.6 | 16.7 | 13.0 | 5.6 | 3.7 | 1.9 | 0.0 | 0.0 | 0.0 |
| 87.5° | 33.4 | 13.0 | 7.4 | 3.7 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

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

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

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

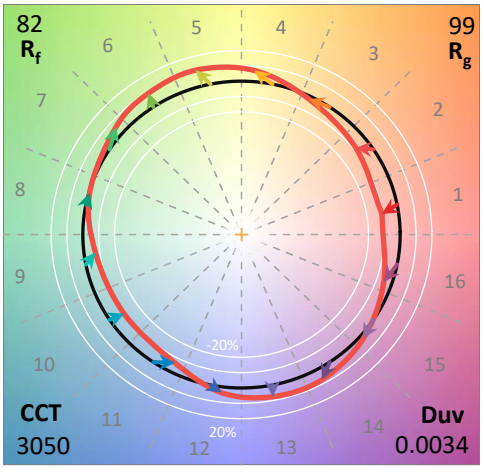
## Test Information

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

## Spectral Parameters

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

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




## Test Conditions

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

REPORT NUMBER: SP1-2408-195-9

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

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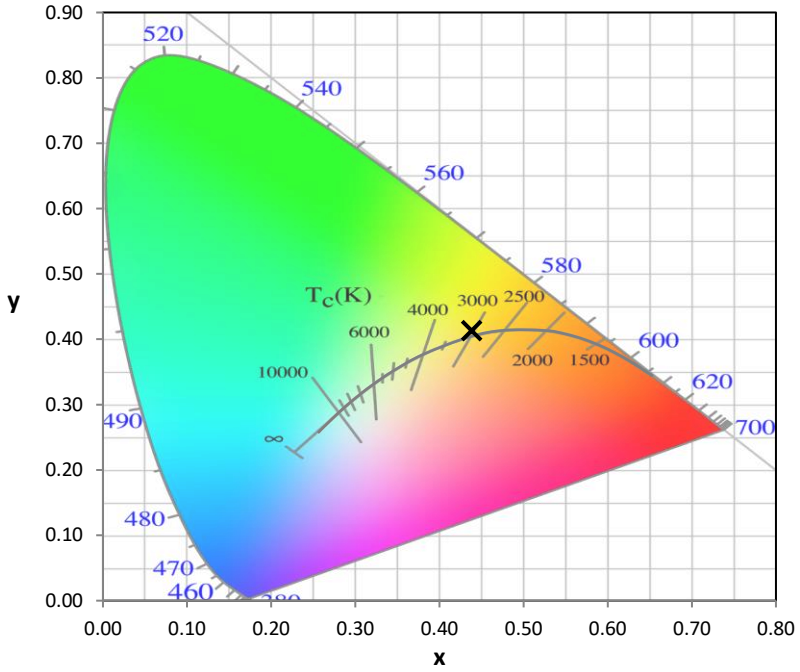
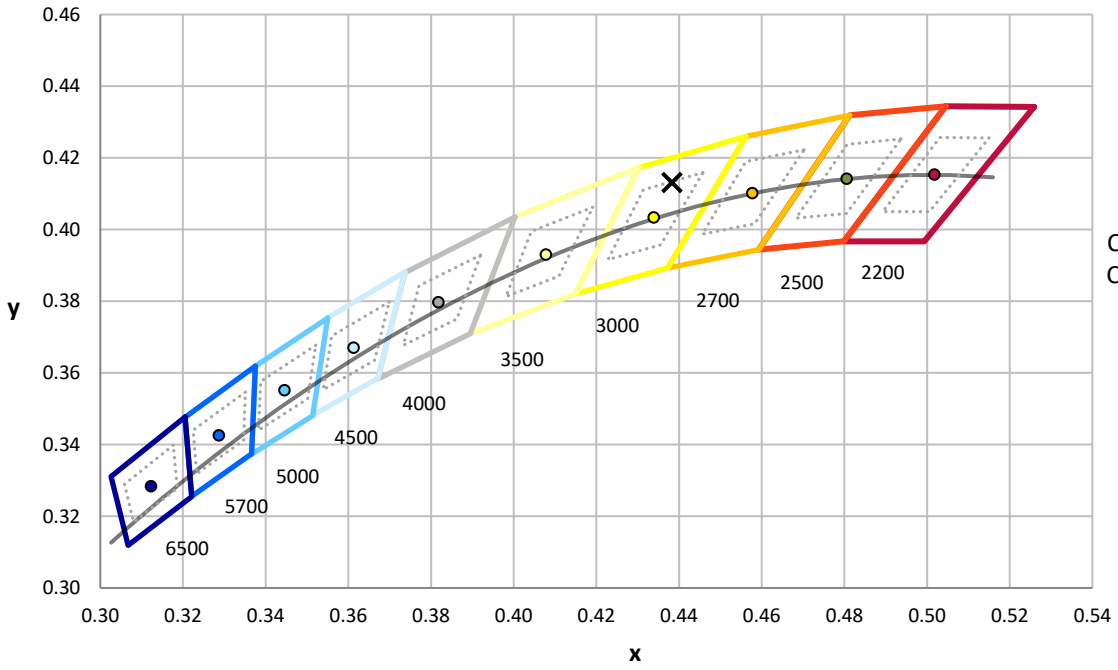
## CIE 1931 Chromaticity Diagram




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




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

Point lies inside the ANSI 3000K 4-step quadrangle

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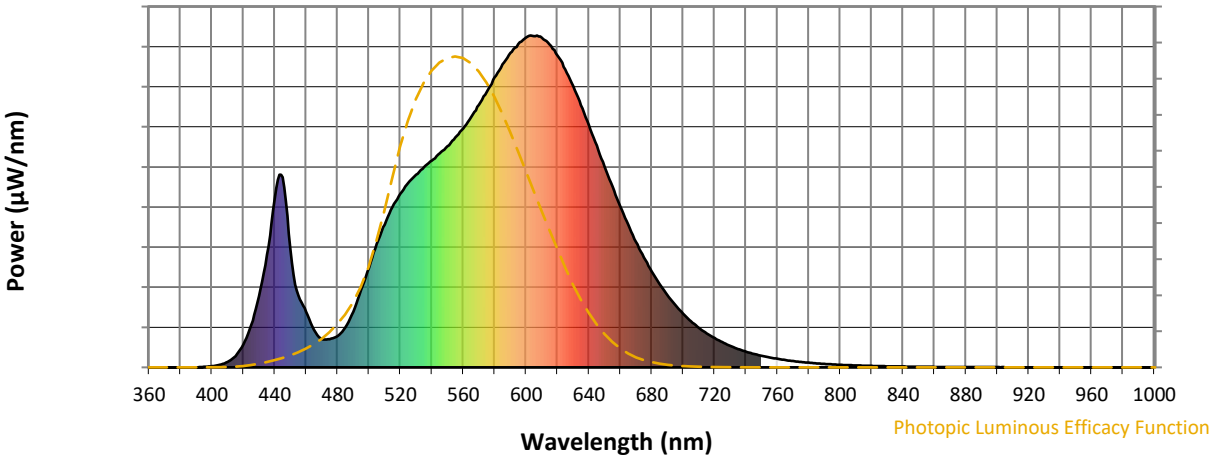
## Photopic Flux vs. Wavelength




## Photopic Lumens: NR

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

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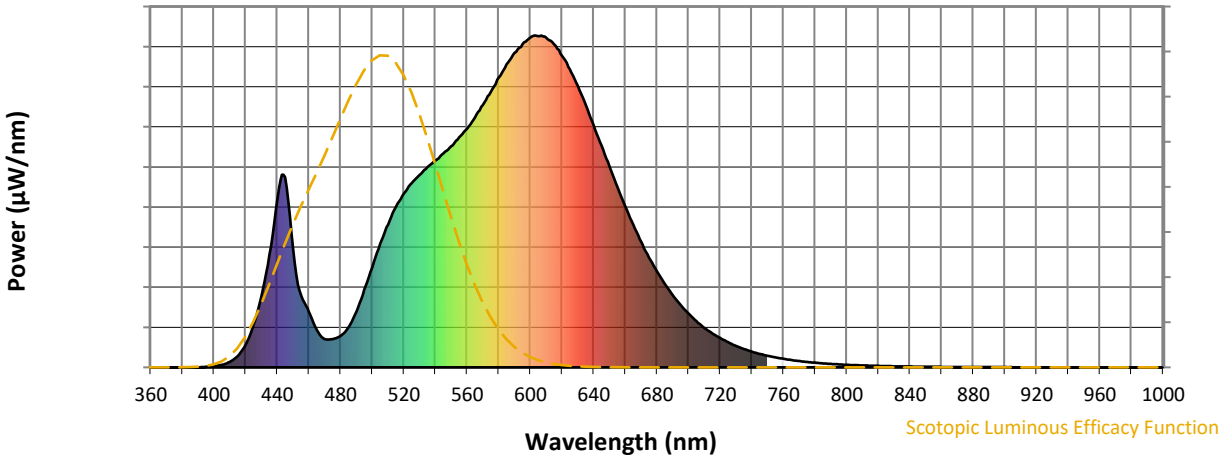
## Scotopic Flux vs. Wavelength




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

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

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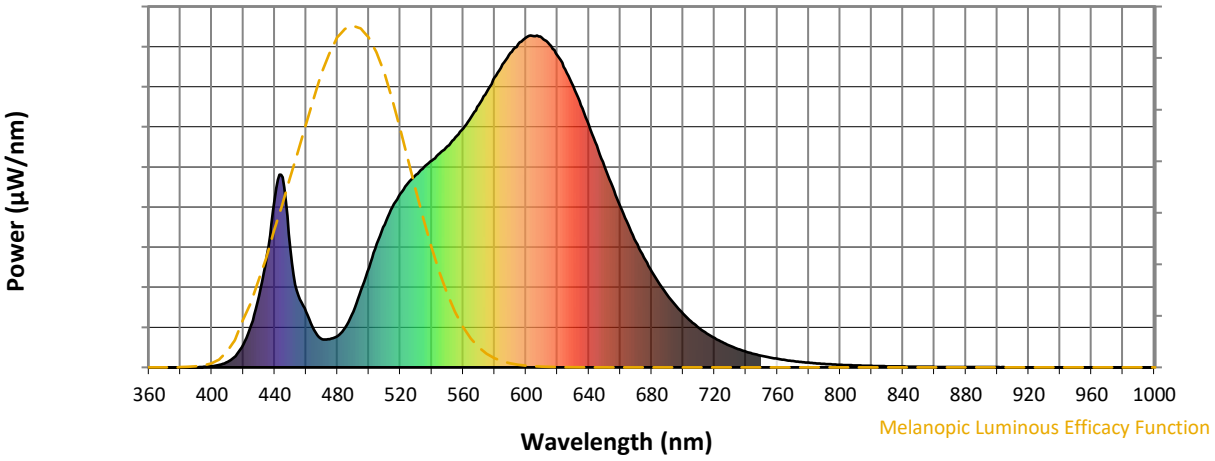
## Melanopic Flux vs. Wavelength




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

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

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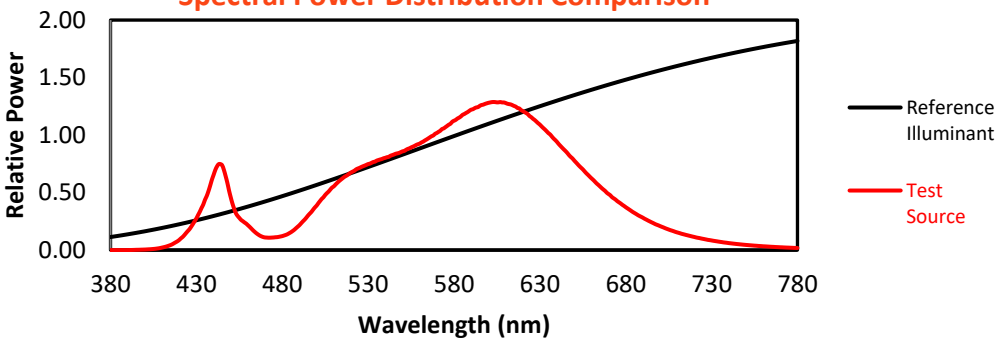
# TM-30-18

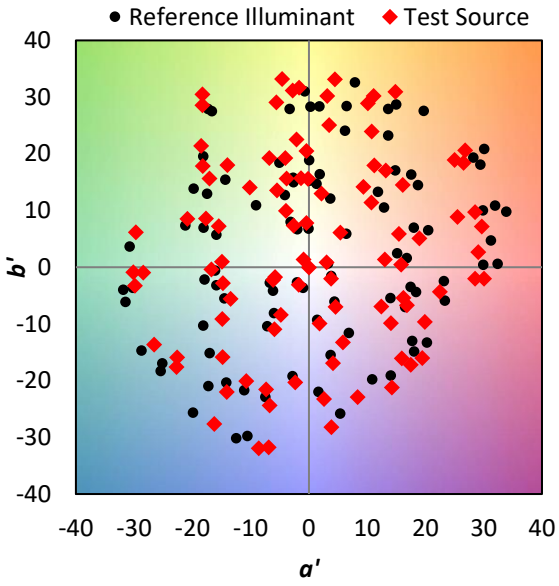
## Summary

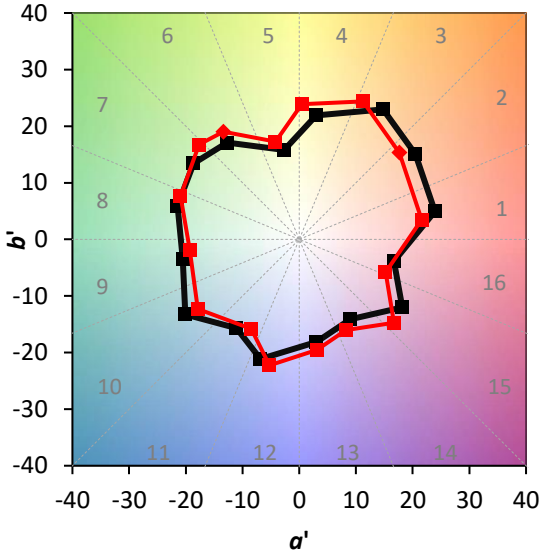
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

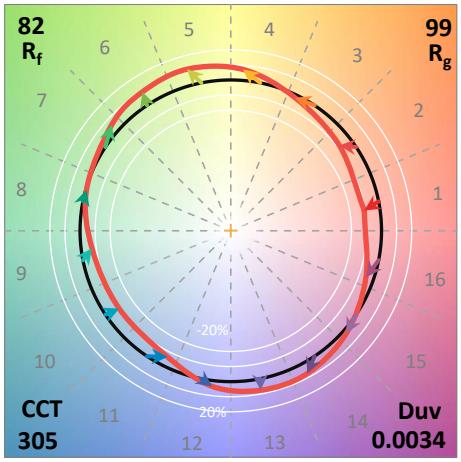
## Spectral Power Distribution Comparison

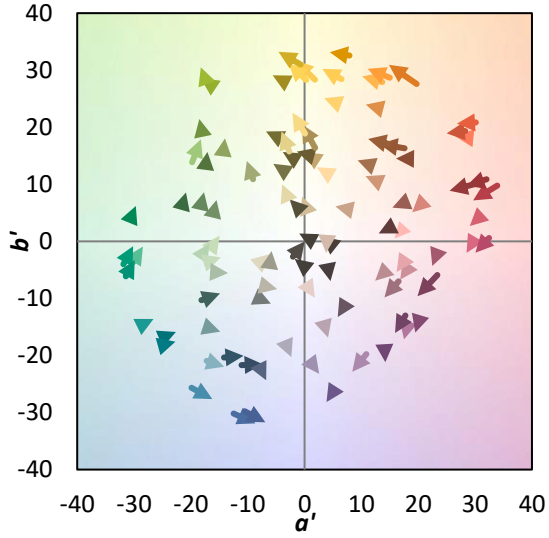



## Color Vector Graphics



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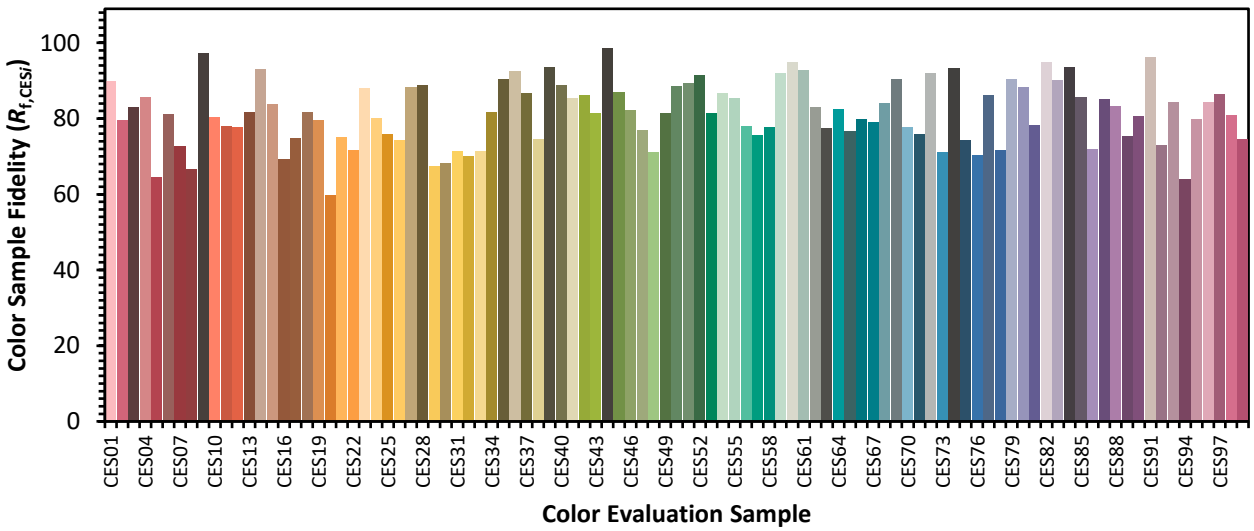
# TM-30-18

**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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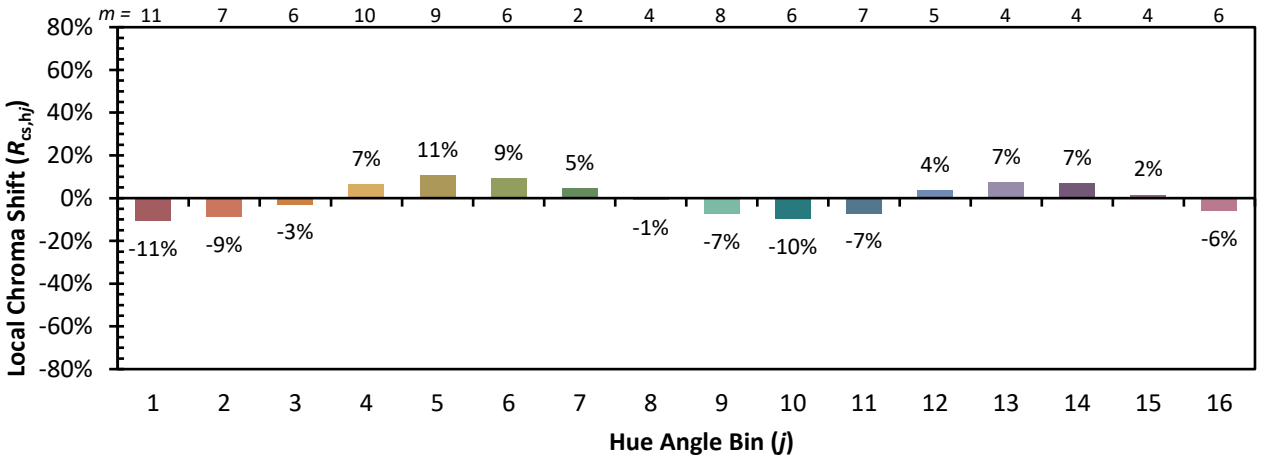
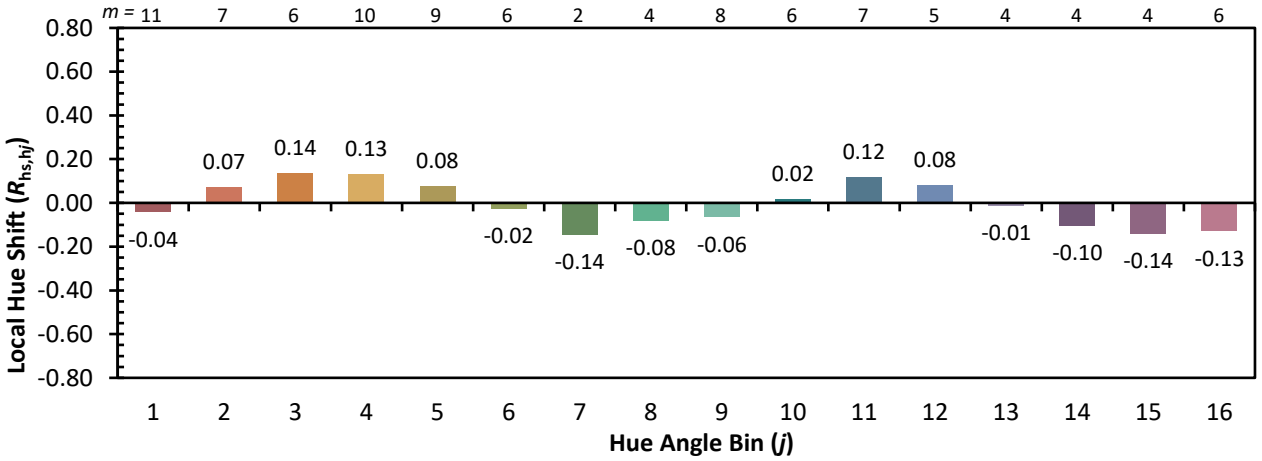
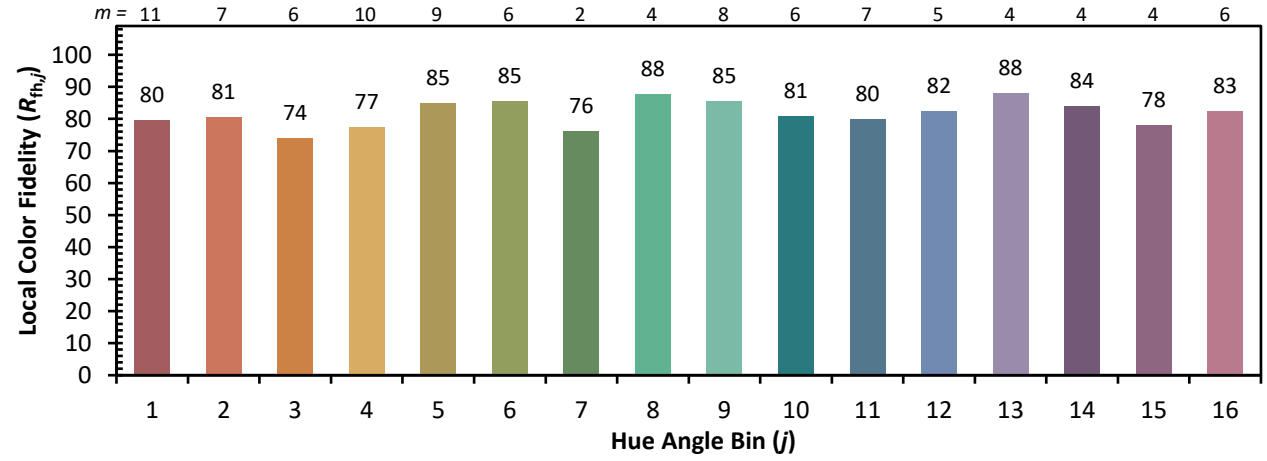
# TM-30-18

## Color Rendition by Hue-Angle Bin



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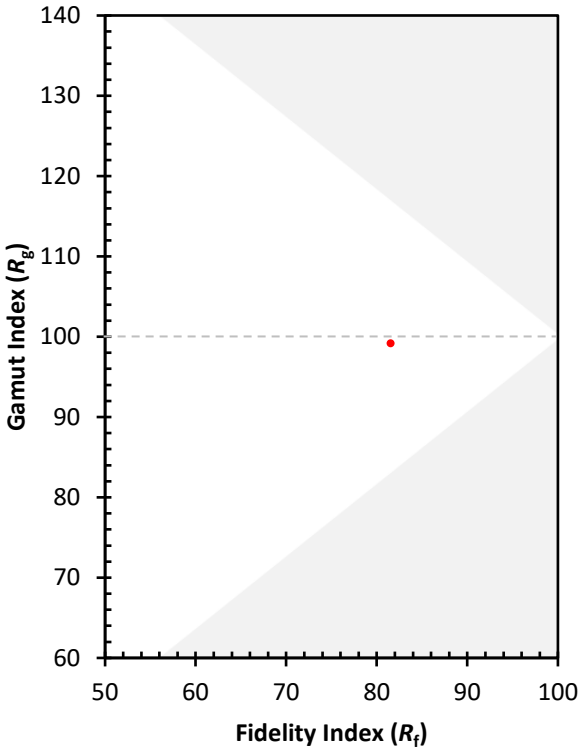
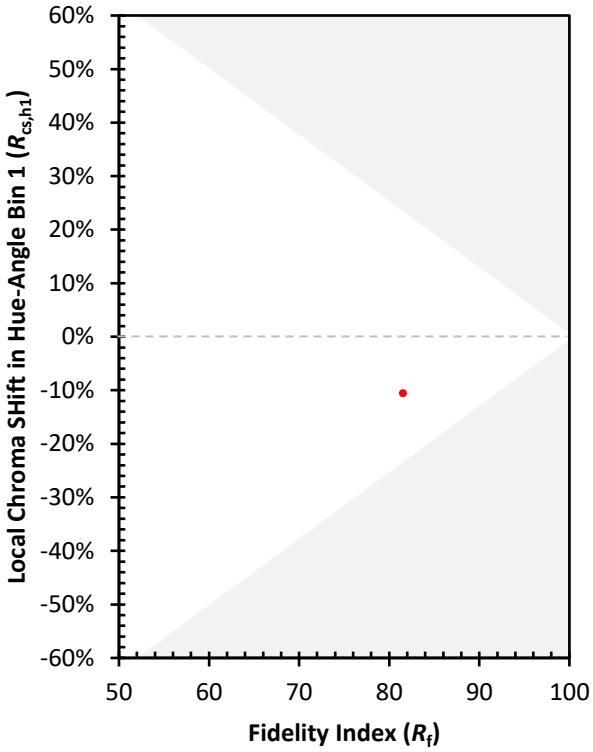
## TM-30-18

### Measure Comparisons




(END OF REPORT)