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: P319223

Luminaire Tested: **GLEON-SA9D-830-U-T4W**

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: | P319223 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-18) |
| 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-T4W |
| Description: | GALLEON AREA AND ROADWAY LUMINAIRE |
| | (9) 80 CRI, 3000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 54736 lumens |
| Efficiency: | N/A |
| Efficacy: | 95.2 lumens/watt |
| Luminous Opening: | Rectangular (W 2.5' x L: 1' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B4 - 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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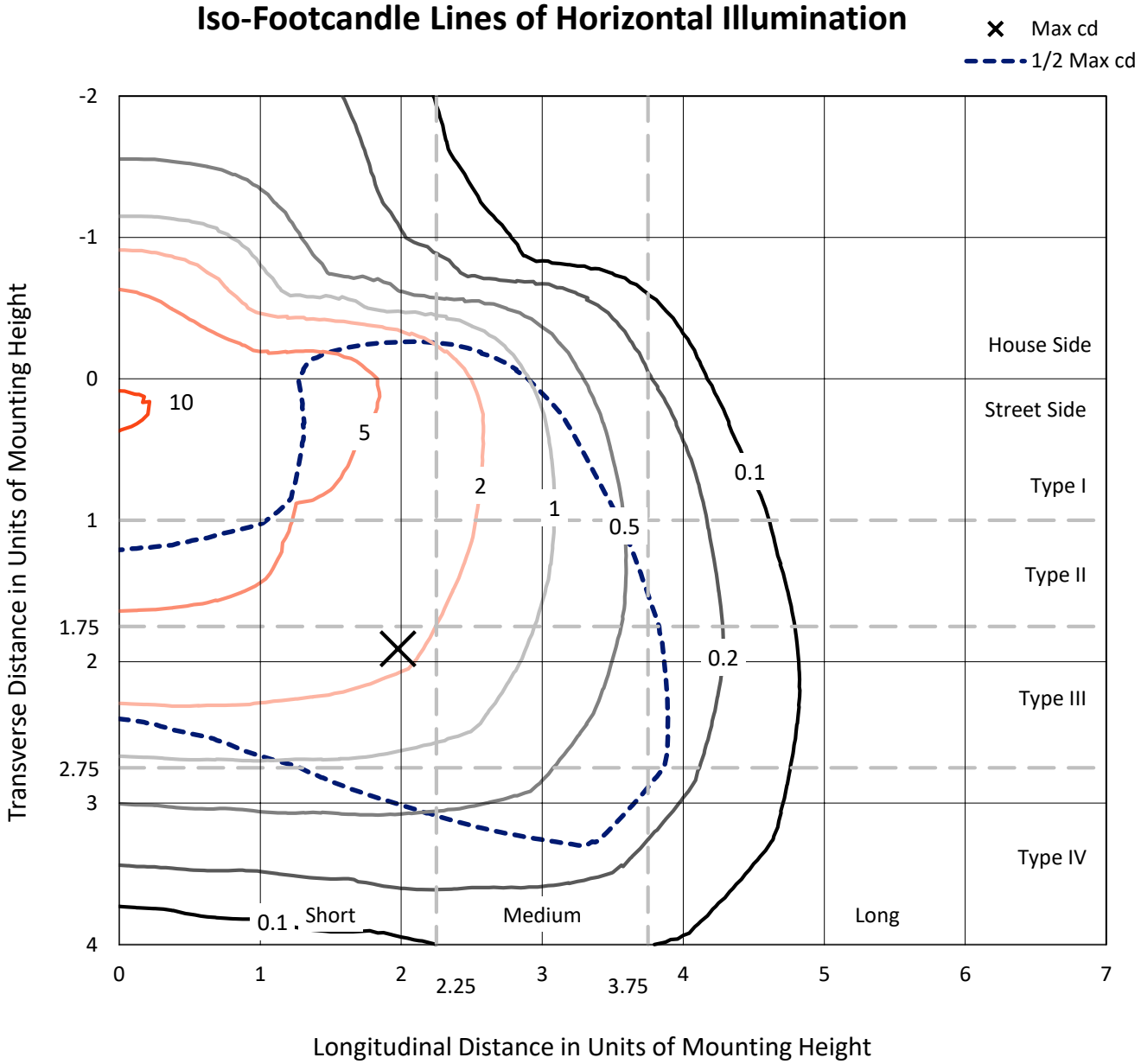
Scaled Data Report

REPORT NUMBER: P319223
CATALOG NUMBER: GLEON-SA9D-830-U-T4W

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 11.1 fc
Type IV - Short - N/A

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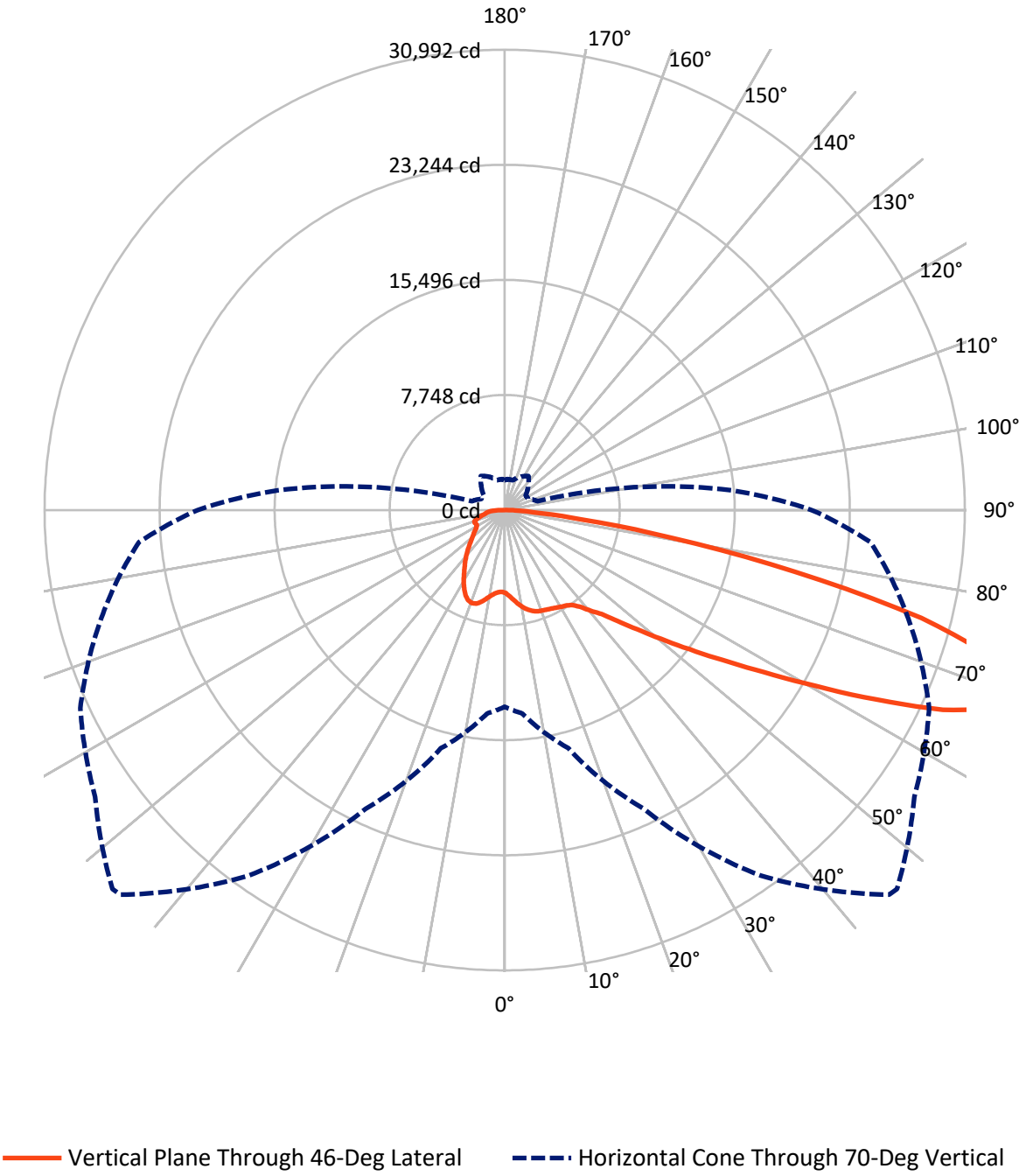
## Luminous Intensity Polar Plot



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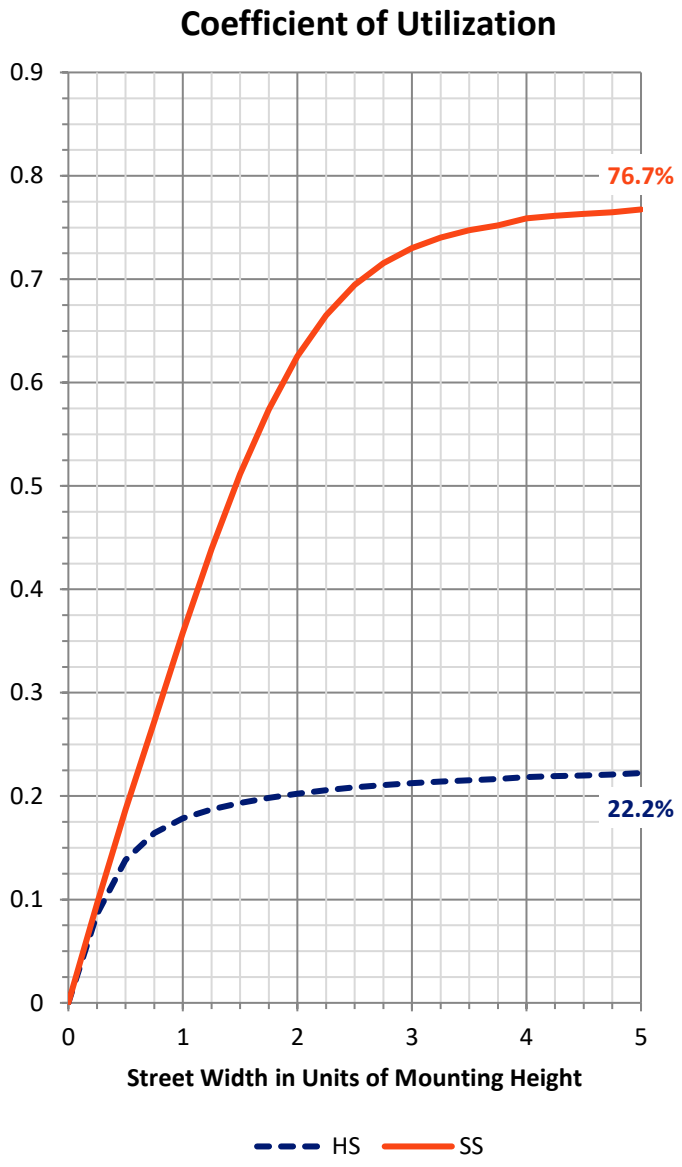
REPORT NUMBER: P319223
CATALOG NUMBER: GLEON-SA9D-830-U-T4W

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 12545.3 | 0.0 | 12545.3 |
| | % Fixture | 22.9 | 0.0 | 22.9 |
| **Street Side** | Lumens | 42190.7 | 0.0 | 42190.7 |
| | % Fixture | 77.1 | 0.0 | 77.1 |
| **Total** | Lumens | 54736.0 | 0.0 | 54736.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 568.5 | 1.0 |
| 10°-20° | 1894.0 | 3.5 |
| 20°-30° | 3158.1 | 5.8 |
| 30°-40° | 4481.5 | 8.2 |
| 40°-50° | 6592.0 | 12.0 |
| 50°-60° | 11163.6 | 20.4 |
| 60°-70° | 15846.5 | 29.0 |
| 70°-80° | 9626.9 | 17.6 |
| 80°-90° | 1404.9 | 2.6 |
| 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° | 54736.0 | 100.0 |
| 0°-180° | 54736.0 | 100.0 |



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REPORT NUMBER: P319223
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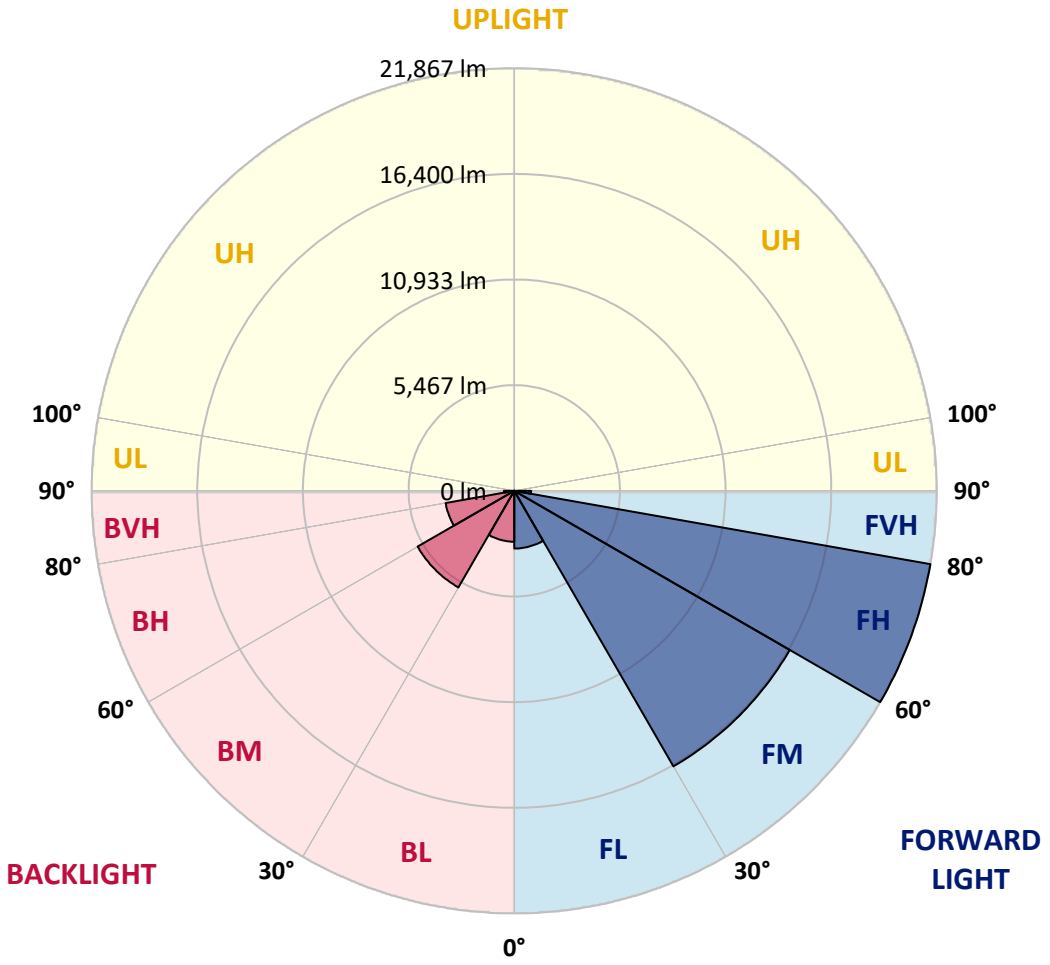
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 2986.6 | 5.5 | | | |
| FM | (30°-60°) | 16462.2 | 30.1 | | | |
| FH | (60°-80°) | 21866.7 | 39.9 | | | G5 |
| FVH | (80°-90°) | 875.2 | 1.6 | | | G5 |
| BL | (0°-30°) | 2633.9 | 4.8 | B4/5000 | | |
| BM | (30°-60°) | 5774.9 | 10.6 | B4/8500 | | |
| BH | (60°-80°) | 3606.7 | 6.6 | B4/5000 | | G4/5000 |
| BVH | (80°-90°) | 529.8 | 1.0 | | | G4/750 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B4-U0-G5**
Type IV Short



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Scaled Data Report

REPORT NUMBER: P319223
CATALOG NUMBER: GLEON-SA9D-830-U-T4W

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 46° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 5576.5 | 5576.5 | 5576.5 | 5576.5 | 5576.5 | 5576.5 | *5576.5* | 5576.5 | 5576.5 | 5576.5 | 5576.5 |
| 2.5° | 5855.6 | 5859.4 | 5866.9 | 5848.1 | 5795.7 | 5780.7 | *5775.1* | 5720.8 | 5685.2 | 5632.7 | 5587.8 |
| 5° | 6323.9 | 6327.7 | 6316.4 | 6264.0 | 6147.9 | 6061.7 | *6054.2* | 5930.6 | 5818.2 | 5698.3 | 5608.4 |
| 7.5° | 6812.8 | 6818.5 | 6782.9 | 6683.6 | 6520.6 | 6370.8 | *6361.4* | 6192.8 | 6022.3 | 5840.6 | 5705.8 |
| 10° | 7245.6 | 7223.1 | 7165.0 | 7026.4 | 6833.4 | 6649.9 | *6642.4* | 6466.3 | 6269.6 | 6050.4 | 5870.6 |
| 12.5° | 7534.0 | 7515.3 | 7440.4 | 7271.8 | 7060.1 | 6891.5 | *6876.5* | 6713.6 | 6522.5 | 6282.7 | 6067.3 |
| 15° | 7693.2 | 7706.4 | 7605.2 | 7414.1 | 7208.1 | 7065.7 | *7052.6* | 6936.5 | 6766.0 | 6524.4 | 6277.1 |
| 17.5° | 7713.9 | 7725.1 | 7627.7 | 7438.5 | 7269.9 | 7172.5 | *7166.9* | 7090.1 | 6966.4 | 6734.2 | 6475.7 |
| 20° | 7594.0 | 7601.5 | 7520.9 | 7365.4 | 7254.9 | 7224.9 | *7223.1* | 7189.4 | 7097.6 | 6891.5 | 6640.5 |
| 22.5° | 7419.8 | 7425.4 | 7367.3 | 7254.9 | 7217.5 | 7264.3 | *7277.4* | 7264.3 | 7198.7 | 7005.8 | 6769.8 |
| 25° | 7376.7 | 7372.9 | 7313.0 | 7198.7 | 7230.6 | 7329.8 | *7346.7* | 7352.3 | 7307.4 | 7138.8 | 6934.6 |
| 27.5° | 7584.6 | 7571.5 | 7457.2 | 7273.6 | 7294.3 | 7414.1 | *7436.6* | 7490.9 | 7462.8 | 7314.9 | 7121.9 |
| 30° | 8185.9 | 8163.4 | 7929.3 | 7558.4 | 7457.2 | 7519.0 | *7547.1* | 7633.3 | 7638.9 | 7515.3 | 7371.1 |
| 32.5° | 9201.2 | 9173.1 | 8753.5 | 8090.4 | 7732.6 | 7625.8 | *7652.0* | 7781.3 | 7850.6 | 7755.1 | 7599.6 |
| 35° | 10484.3 | 10452.5 | 9901.8 | 8995.1 | 8193.4 | 7830.0 | *7848.7* | 7951.7 | 8090.4 | 7955.5 | 7749.4 |
| 37.5° | 11821.8 | 11745.0 | 11214.9 | 10059.1 | 8925.8 | 8266.4 | *8266.4* | 8279.6 | 8345.1 | 8064.1 | 7925.5 |
| 40° | 13151.8 | 13075.0 | 12595.4 | 11310.4 | 9873.7 | 8953.9 | *8910.8* | 8620.5 | 8568.0 | 8326.4 | 8279.6 |
| 42.5° | 14388.1 | 14365.6 | 14082.7 | 12724.7 | 10986.3 | 9630.1 | *9570.2* | 9077.5 | 9088.8 | 8938.9 | 8940.8 |
| 45° | 15703.1 | 15703.1 | 15472.7 | 14152.1 | 12282.6 | 10716.6 | *10656.7* | 9931.7 | 10044.1 | 9974.8 | 10141.5 |
| 47.5° | 16776.4 | 16810.1 | 16778.3 | 15639.4 | 13790.5 | 12097.1 | *11988.5* | 11115.6 | 11430.3 | 11668.2 | 12153.3 |
| 50° | 17872.2 | 17924.7 | 17930.3 | 17270.9 | 15613.2 | 13738.1 | *13614.4* | 12687.2 | 13389.7 | 14071.5 | 15025.0 |
| 52.5° | 19462.6 | 19580.6 | 19110.4 | 18898.8 | 17846.0 | 15686.2 | *15564.4* | 14708.4 | 15881.0 | 16838.2 | 18481.0 |
| 55° | 20936.8 | 20833.8 | 20498.5 | 20629.6 | 20236.2 | 17904.1 | *17812.3* | 17061.1 | 18657.1 | 19900.9 | 22034.5 |
| 57.5° | 21734.8 | 21727.3 | 22064.5 | 22626.4 | 22813.7 | 20639.0 | *20562.2* | 19831.6 | 21787.2 | 22722.0 | 25370.7 |
| 60° | 22671.4 | 22684.5 | 23519.9 | 24795.6 | 25567.4 | 24044.4 | *24010.7* | 23456.3 | 24827.4 | 25355.7 | 27987.5 |
| 62.5° | 22802.5 | 23038.5 | 24477.2 | 26672.5 | 28144.9 | 28023.1 | *28098.1* | 26721.2 | 27547.3 | 27457.4 | 29941.3 |
| 65° | 21294.6 | 21605.5 | 24209.3 | 27240.1 | 30707.4 | 32374.6 | *32443.9* | 30005.0 | 29692.1 | 29253.8 | 30640.0 |
| 67.5° | 18203.8 | 18664.6 | 21493.1 | 26005.7 | 31552.2 | 35590.9 | *35688.3* | 32550.7 | 31471.7 | 29862.6 | 28957.9 |
| 70° | *13247.3* | *13758.7* | *16605.9* | *22210.6* | *30046.2* | *36619.3* | *36729.8* | *33676.5* | *31539.1* | *28129.9* | *24720.7* |
| 72.5° | 8002.3 | 8403.2 | 10750.3 | 16351.2 | 25359.4 | 34746.1 | *34942.7* | 32249.1 | 28794.9 | 23827.1 | 18254.4 |
| 75° | 3514.1 | 3776.4 | 5198.1 | 9422.2 | 18155.1 | 28748.1 | *28993.4* | 27603.5 | 23396.3 | 17315.9 | 10789.7 |
| 77.5° | 1496.7 | 1571.6 | 2131.7 | 4092.9 | 10263.3 | 19644.3 | *19981.5* | 20168.8 | 15873.5 | 9422.2 | 4559.4 |
| 80° | 932.9 | 962.8 | 1206.3 | 1852.6 | 4802.9 | 11033.2 | *11396.6* | 11866.7 | 7882.4 | 3463.6 | 1592.2 |
| 82.5° | 567.6 | 601.3 | 801.7 | 1120.2 | 2500.7 | 5001.5 | *5175.7* | 5507.2 | 3058.9 | 1496.7 | 824.2 |
| 85° | 340.9 | 365.3 | 490.8 | 708.1 | 1423.6 | 1966.9 | *1965.0* | 2172.9 | 1440.5 | 962.8 | 434.6 |
| 87.5° | 163.0 | 181.7 | 262.2 | 367.1 | 717.4 | 738.0 | *691.2* | 783.0 | 874.8 | 631.3 | 219.2 |
| 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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Scaled Data Report

REPORT NUMBER: P319223
CATALOG NUMBER: GLEON-SA9D-830-U-T4W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 5576.5 | 5576.5 | 5576.5 | 5576.5 | 5576.5 | 5576.5 | 5576.5 | 5576.5 | 5576.5 | 5576.5 | 5576.5 |
| 2.5° | 5572.8 | 5565.3 | 5540.9 | 5522.2 | 5518.5 | 5507.2 | 5497.9 | 5503.5 | 5511.0 | 5512.8 | 5512.8 |
| 5° | 5570.9 | 5550.3 | 5518.5 | 5505.3 | 5522.2 | 5544.7 | 5572.8 | 5610.2 | 5632.7 | 5649.6 | 5660.8 |
| 7.5° | 5660.8 | 5621.5 | 5585.9 | 5578.4 | 5612.1 | 5672.1 | 5735.7 | 5814.4 | 5868.7 | 5906.2 | 5913.7 |
| 10° | 5810.7 | 5762.0 | 5726.4 | 5733.9 | 5793.8 | 5880.0 | 5969.9 | 6071.1 | 6153.5 | 6204.1 | 6207.8 |
| 12.5° | 5983.0 | 5936.2 | 5902.5 | 5934.3 | 6033.6 | 6138.5 | 6232.1 | 6320.2 | 6395.1 | 6445.7 | 6445.7 |
| 15° | 6181.6 | 6147.9 | 6108.5 | 6181.6 | 6316.4 | 6410.1 | 6449.4 | 6492.5 | 6533.7 | 6571.2 | 6563.7 |
| 17.5° | 6372.6 | 6340.8 | 6320.2 | 6406.4 | 6546.8 | 6589.9 | 6563.7 | 6531.9 | 6531.9 | 6552.5 | 6556.2 |
| 20° | 6537.5 | 6509.4 | 6522.5 | 6606.8 | 6679.8 | 6634.9 | 6537.5 | 6436.3 | 6395.1 | 6406.4 | 6417.6 |
| 22.5° | 6681.7 | 6668.6 | 6707.9 | 6747.3 | 6694.8 | 6537.5 | 6357.7 | 6220.9 | 6170.3 | 6166.6 | 6170.3 |
| 25° | 6850.3 | 6848.4 | 6897.1 | 6826.0 | 6593.7 | 6303.3 | 6061.7 | 5928.7 | 5900.6 | 5923.1 | 5960.5 |
| 27.5° | 7060.1 | 7080.7 | 7105.1 | 6844.7 | 6387.6 | 5949.3 | 5703.9 | 5612.1 | 5640.2 | 5694.5 | 5730.1 |
| 30° | 7328.0 | 7384.2 | 7331.7 | 6797.9 | 6091.7 | 5544.7 | 5310.5 | 5284.3 | 5361.1 | 5437.9 | 5475.4 |
| 32.5° | 7588.3 | 7676.4 | 7549.0 | 6676.1 | 5709.5 | 5115.7 | 4934.0 | 4926.5 | 5020.2 | 5095.1 | 5147.6 |
| 35° | 7798.1 | 7972.4 | 7712.0 | 6434.5 | 5267.4 | 4720.5 | 4587.5 | 4536.9 | 4570.6 | 4658.7 | 4718.6 |
| 37.5° | 8071.6 | 8362.0 | 7824.4 | 6065.4 | 4787.9 | 4394.5 | 4239.1 | 4122.9 | 4092.9 | 4128.5 | 4158.5 |
| 40° | 8571.8 | 8955.8 | 7876.8 | 5550.3 | 4319.6 | 4068.6 | 3911.2 | 3740.8 | 3622.8 | 3536.6 | 3538.5 |
| 42.5° | 9388.5 | 9729.4 | 7843.1 | 4924.7 | 3886.9 | 3750.2 | 3572.2 | 3375.5 | 3184.4 | 2989.6 | 2974.6 |
| 45° | 10714.7 | 10879.6 | 7742.0 | 4261.5 | 3506.6 | 3416.7 | 3250.0 | 3053.3 | 2798.6 | 2577.5 | 2556.9 |
| 47.5° | 12837.1 | 12471.8 | 7584.6 | 3682.7 | 3171.3 | 3133.9 | 2980.3 | 2753.6 | 2483.9 | 2305.9 | 2290.9 |
| 50° | 15731.2 | 14770.2 | 7507.8 | 3221.9 | 2875.4 | 2886.6 | 2761.1 | 2521.3 | 2266.6 | 2135.5 | 2120.5 |
| 52.5° | 19192.8 | 17447.0 | 7655.8 | 2866.0 | 2637.5 | 2676.8 | 2583.1 | 2358.4 | 2144.8 | 2041.8 | 2026.8 |
| 55° | 22783.8 | 20219.4 | 7815.0 | 2607.5 | 2412.7 | 2489.5 | 2457.6 | 2272.2 | 2079.3 | 1983.7 | 1970.6 |
| 57.5° | 25857.7 | 22289.2 | 7496.6 | 2397.7 | 2212.3 | 2332.1 | 2360.2 | 2217.9 | 2045.5 | 1959.4 | 1944.4 |
| 60° | 27792.7 | 23122.8 | 6661.1 | 2201.0 | 2053.0 | 2206.6 | 2304.0 | 2202.9 | 2058.7 | 2051.2 | 2039.9 |
| 62.5° | 28710.6 | 23049.8 | 5407.9 | 2045.5 | 1953.8 | 2152.3 | 2345.3 | 2287.2 | 2208.5 | 2275.9 | 2281.6 |
| 65° | 28298.5 | 21948.3 | 4027.4 | 1942.5 | 1882.6 | 2172.9 | 2468.9 | 2446.4 | 2251.6 | 2319.0 | 2328.4 |
| 67.5° | 25586.1 | 19320.2 | 2982.1 | 1852.6 | 1803.9 | 2231.0 | 2693.7 | 2498.9 | 2167.3 | 2216.0 | 2186.0 |
| 70° | *20680.2* | *15317.2* | *2300.3* | *1751.4* | *1723.3* | *2223.5* | *2794.8* | *2467.0* | *2075.5* | *2086.7* | *2006.2* |
| 72.5° | 14260.7 | 10445.0 | 1871.3 | 1657.8 | 1607.2 | 2026.8 | 2723.6 | 2388.3 | 1998.7 | 1912.5 | 1805.8 |
| 75° | 7755.1 | 5606.5 | 1590.3 | 1560.4 | 1403.0 | 1779.5 | 2592.5 | 2332.1 | 1929.4 | 1815.1 | 1755.2 |
| 77.5° | 3051.4 | 2326.5 | 1380.6 | 1427.4 | 1226.9 | 1571.6 | 2446.4 | 2225.4 | 1833.9 | 1684.0 | 1654.0 |
| 80° | 1245.7 | 1187.6 | 1144.5 | 1234.4 | 1054.6 | 1374.9 | 2270.3 | 2099.9 | 1719.6 | 1562.3 | 1502.3 |
| 82.5° | 706.2 | 738.0 | 889.8 | 974.1 | 856.1 | 1266.3 | 2186.0 | 1998.7 | 1582.9 | 1399.3 | 1328.1 |
| 85° | 361.5 | 432.7 | 620.0 | 698.7 | 629.4 | 1077.1 | 2013.7 | 1749.6 | 1270.0 | 1071.5 | 1077.1 |
| 87.5° | 174.2 | 241.6 | 391.5 | 438.3 | 408.4 | 779.3 | 1504.2 | 1268.2 | 989.1 | 783.0 | 758.6 |
| 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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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

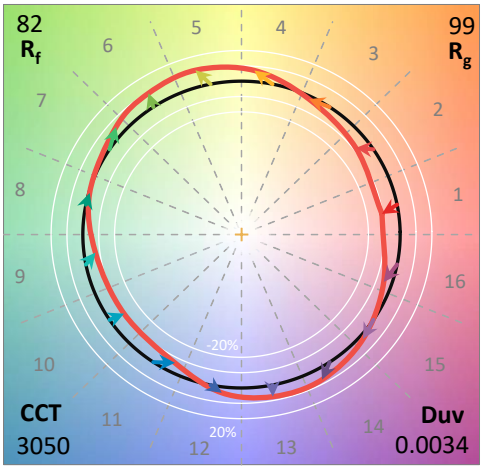
## Test Information

| | |
|---|---|
| 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 |

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| 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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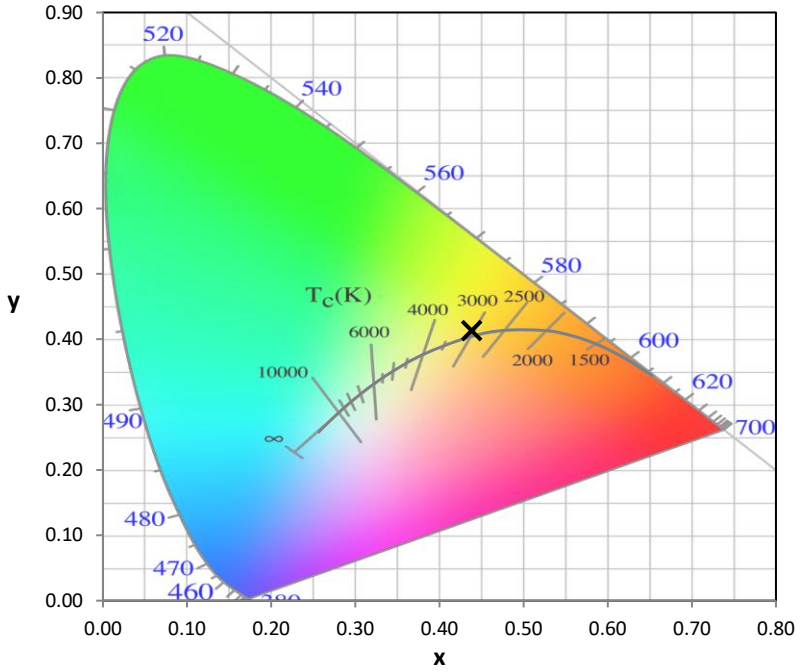
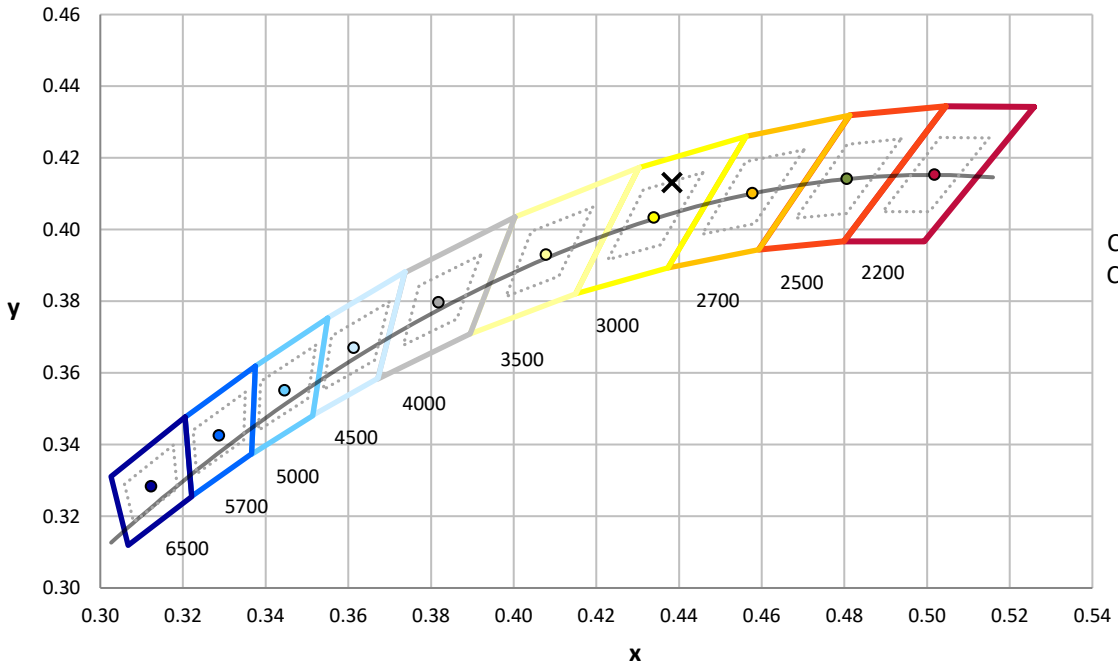
## CIE 1931 Chromaticity Diagram




## 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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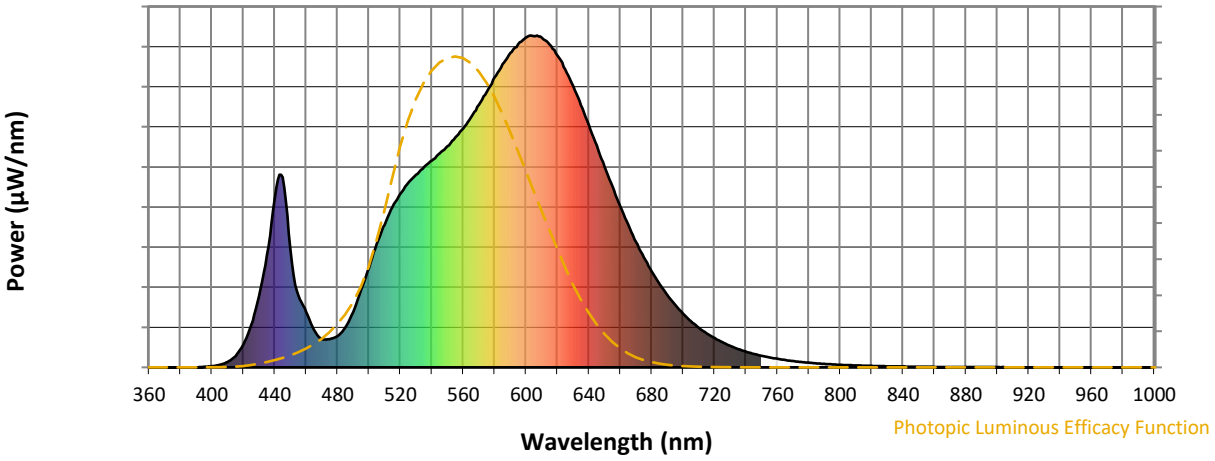
## Photopic Flux vs. Wavelength




## 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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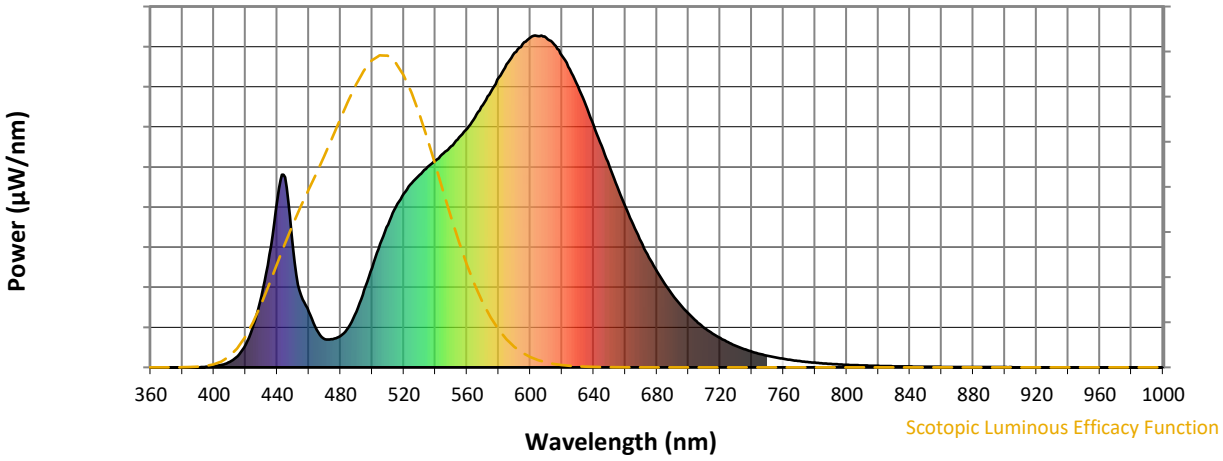
## Scotopic Flux vs. Wavelength




**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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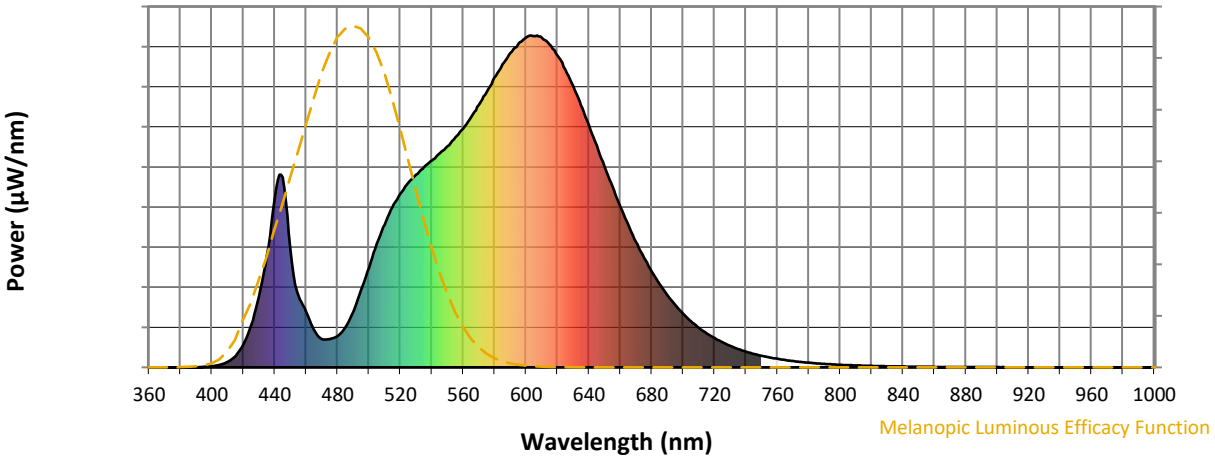
## Melanopic Flux vs. Wavelength




**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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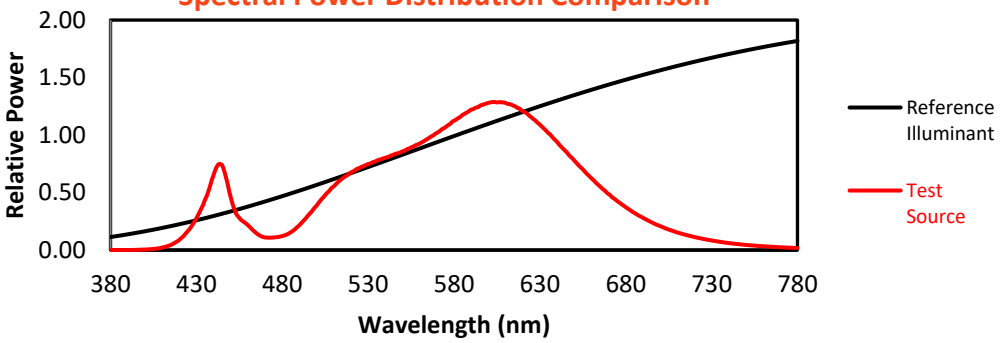
# TM-30-18

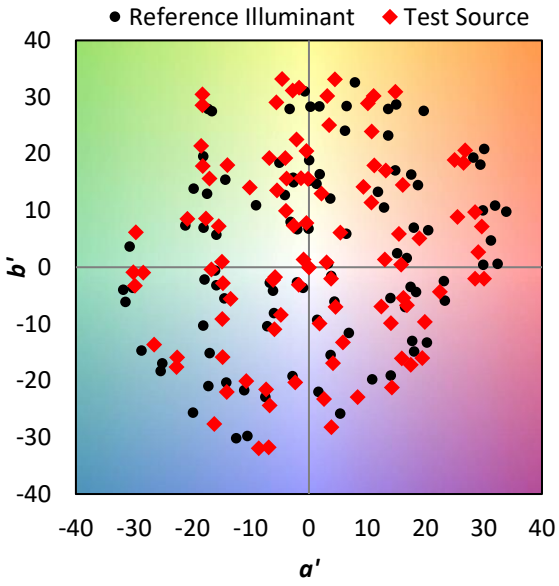
## Summary

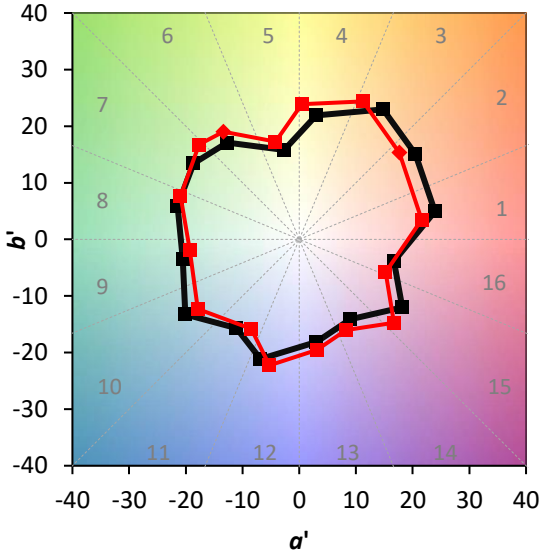
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

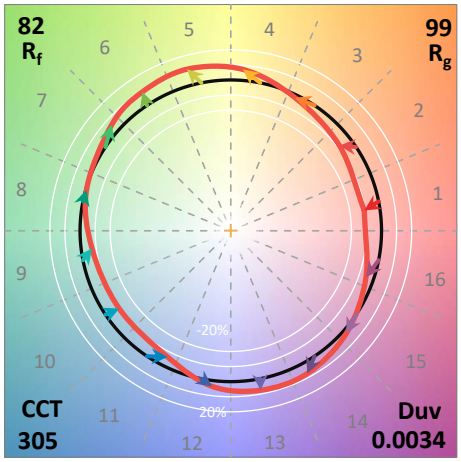
## Spectral Power Distribution Comparison

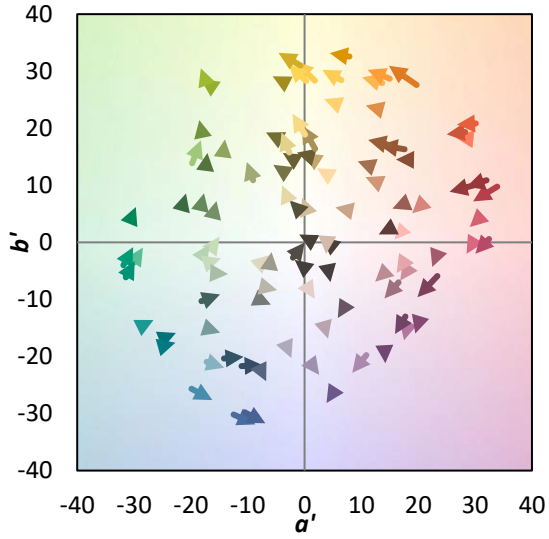



## Color Vector Graphics



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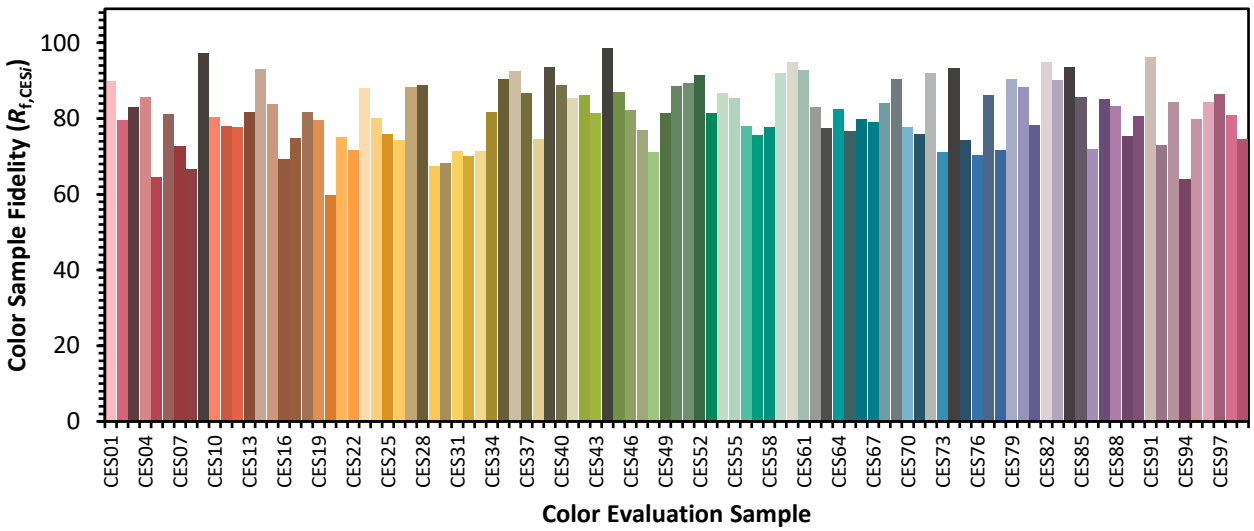
## Individual Sample Fidelity Index ($R_{f,i}$)

| | | | |
|---|---|---|---|
| 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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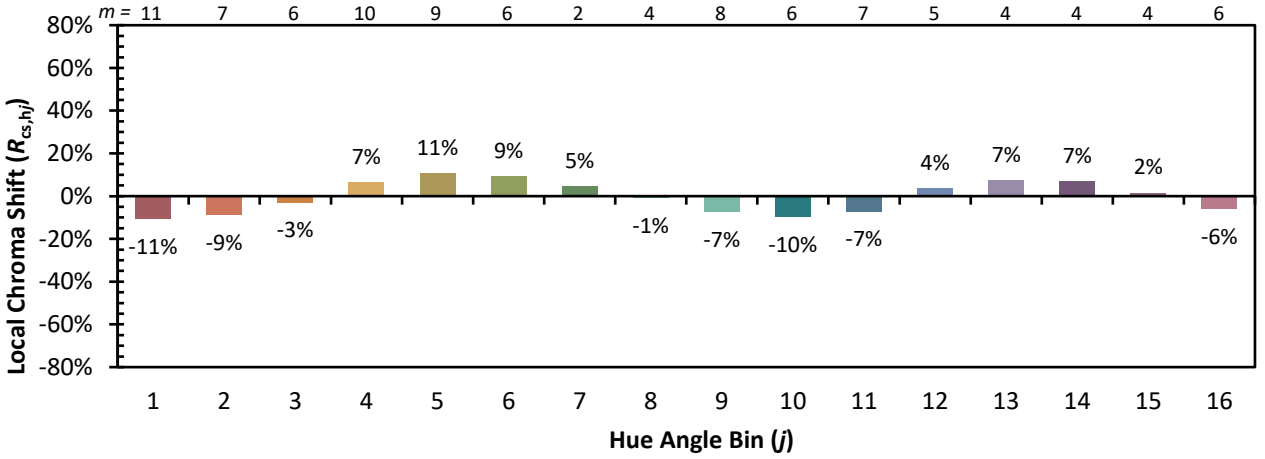
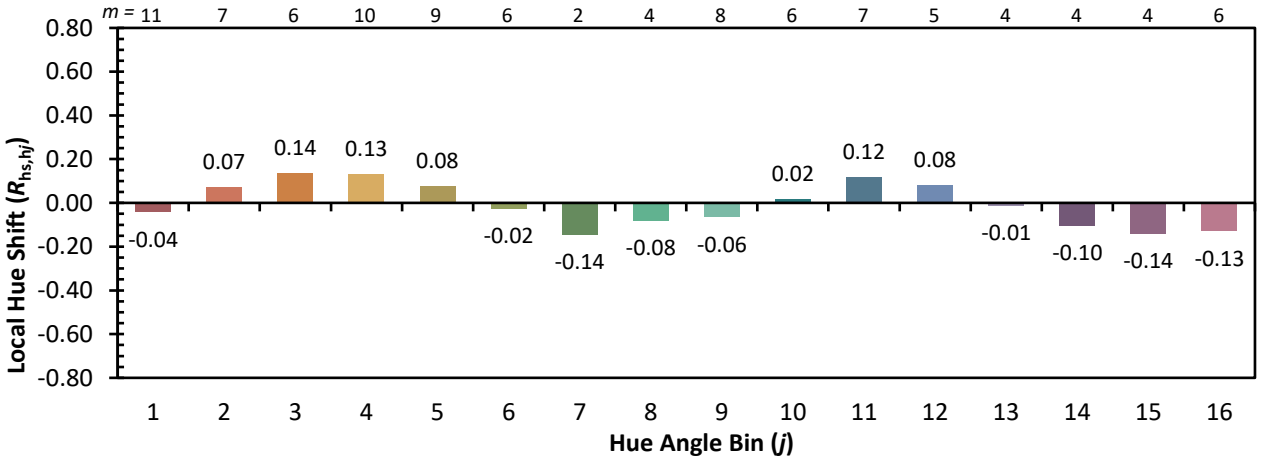
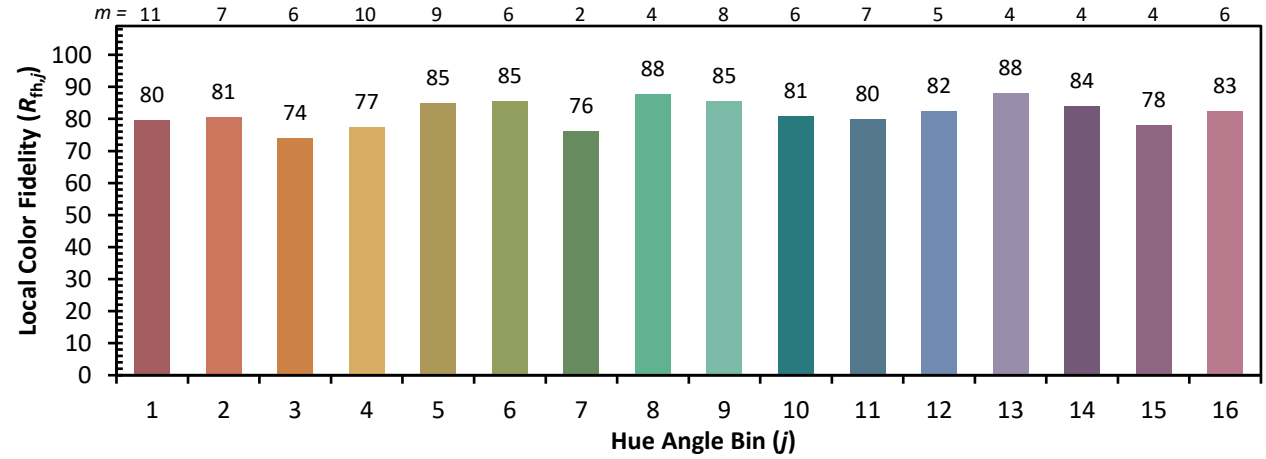
# TM-30-18

## Color Rendition by Hue-Angle Bin



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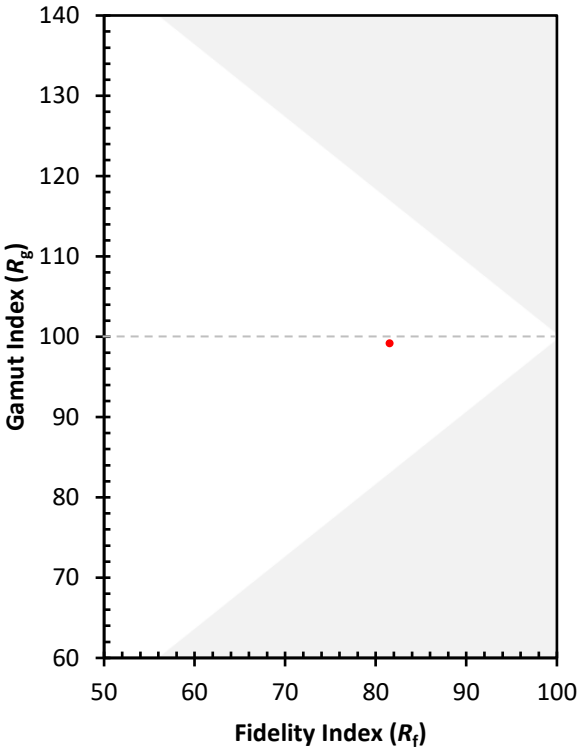
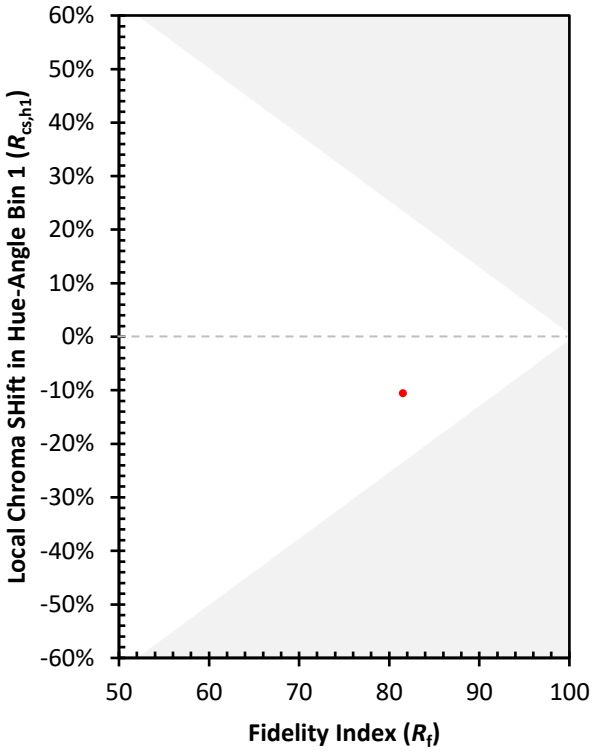
## Measure Comparisons




(END OF REPORT)