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: INVUE

Report Number: P869037

Luminaire Tested: **EMM2-HSN-SA2C-750-U-T4W**

Issue Date: 08/22/2024

Report Generated By 670245763

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: | P869037 |
| Test Lab: | INNOVATION CENTER(G3) |
| Issue Date: | 08/22/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | INVUE |
| Catalog Number: | EMM2-HSN-SA2C-750-U-T4W |
| Description: | EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 120W 70CRI 5000K FIXTURE w/ TYPE IV WIDE DISTRIBUTION OPTIC |
| Light Source: | (20) 5000K CCT, 70 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 13376 lumens |
| Efficiency: | N/A |
| Efficacy: | 132.4 lumens/watt |
| Luminous Opening: | Rectangular (W 0.67' x L: 0.33' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B2 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 101 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | 0.99 |
| Total Harmonic Distortion (THDi): | 9.45% |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 24 FT |

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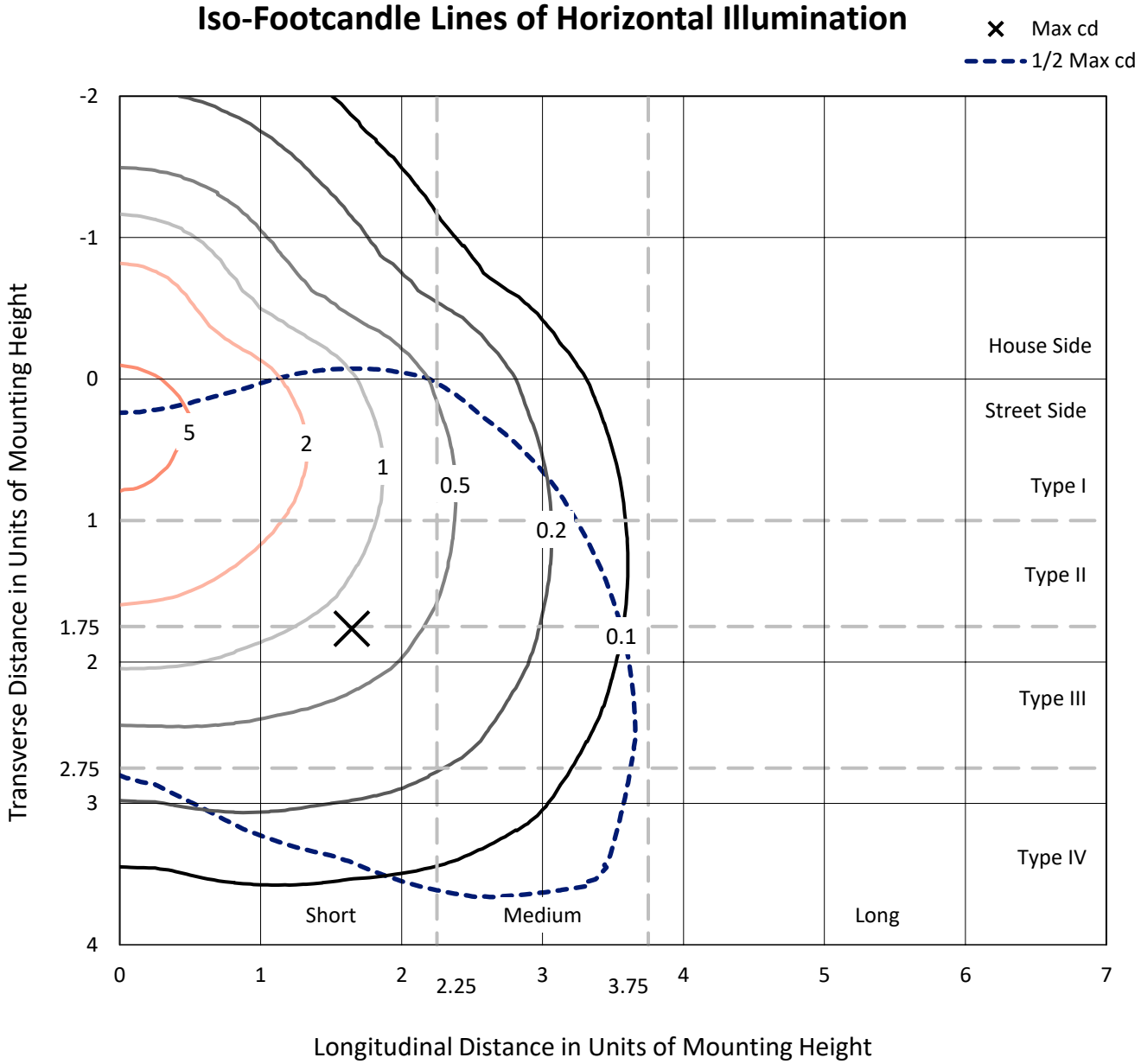
Scaled Data Report

REPORT NUMBER: P869037
CATALOG NUMBER: EMM2-HSN-SA2C-750-U-T4W

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 6.4 fc
Type IV - Short - N/A

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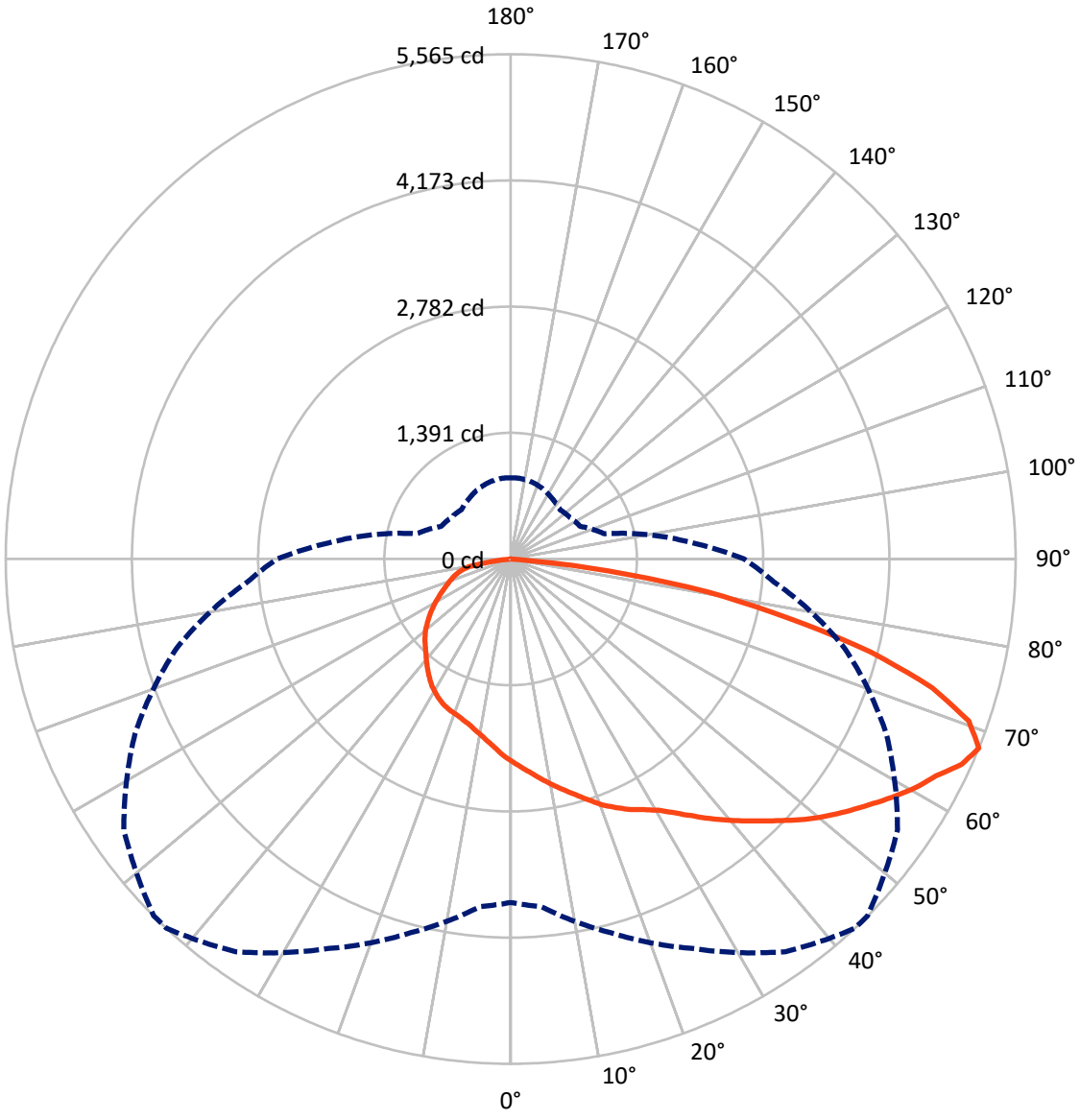
## Luminous Intensity Polar Plot



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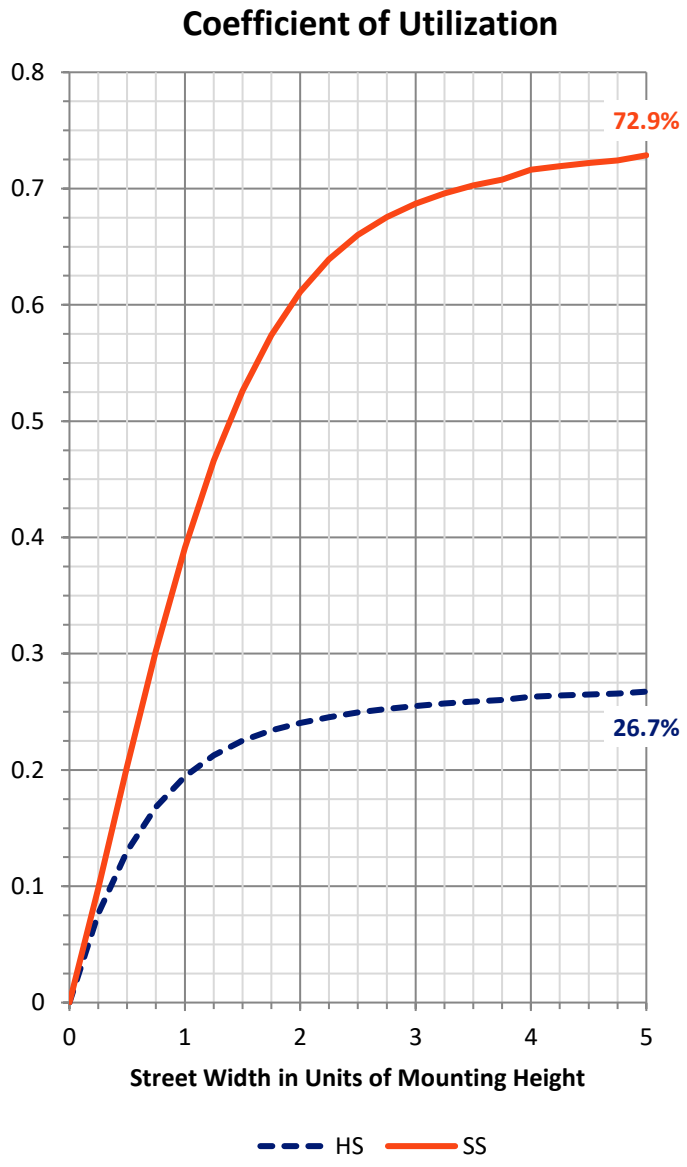
REPORT NUMBER: P869037
CATALOG NUMBER: EMM2-HSN-SA2C-750-U-T4W

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 3598.2 | 0.0 | 3598.2 |
| | % Fixture | 26.9 | 0.0 | 26.9 |
| **Street Side** | Lumens | 9777.8 | 0.0 | 9777.8 |
| | % Fixture | 73.1 | 0.0 | 73.1 |
| **Total** | Lumens | 13376.0 | 0.0 | 13376.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 213.7 | 1.6 |
| 10°-20° | 652.6 | 4.9 |
| 20°-30° | 1113.4 | 8.3 |
| 30°-40° | 1623.9 | 12.1 |
| 40°-50° | 2181.5 | 16.3 |
| 50°-60° | 2670.5 | 20.0 |
| 60°-70° | 2810.5 | 21.0 |
| 70°-80° | 1834.8 | 13.7 |
| 80°-90° | 275.2 | 2.1 |
| 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° | 13376.0 | 100.0 |
| 0°-180° | 13376.0 | 100.0 |



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REPORT NUMBER: P869037
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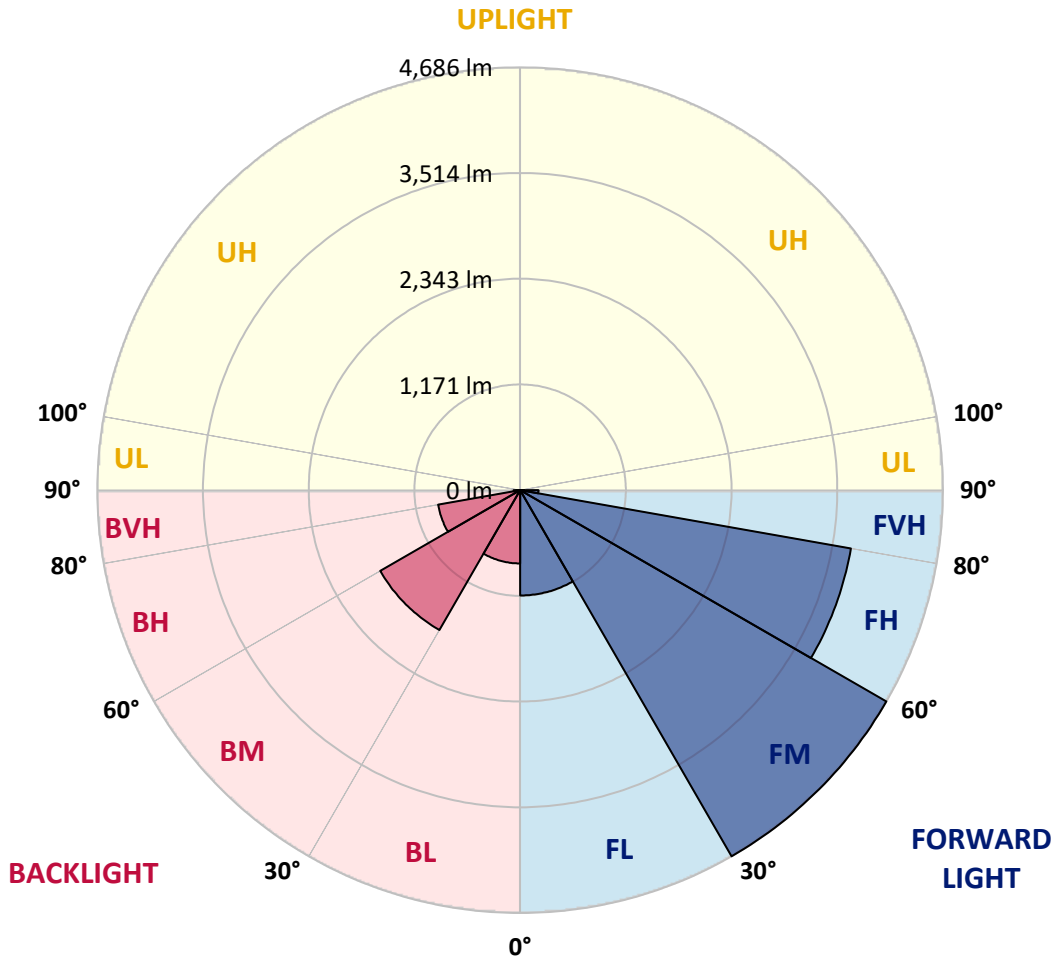
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1167.3 | 8.7 | | | |
| FM | (30°-60°) | 4685.5 | 35.0 | | | |
| FH | (60°-80°) | 3721.9 | 27.8 | | | G2/5000 |
| FVH | (80°-90°) | 203.1 | 1.5 | | | G2/225 |
| BL | (0°-30°) | 812.3 | 6.1 | B2/1000 | | |
| BM | (30°-60°) | 1790.3 | 13.4 | B2/2500 | | |
| BH | (60°-80°) | 923.4 | 6.9 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 72.2 | 0.5 | | | 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 IV Short



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Scaled Data Report

REPORT NUMBER: P869037
CATALOG NUMBER: EMM2-HSN-SA2C-750-U-T4W

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 43° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 |
| 2.5° | 2335.7 | 2333.0 | 2324.9 | 2319.5 | 2303.2 | 2300.5 | 2300.5 | 2284.3 | 2265.3 | 2254.5 | 2243.7 |
| 5° | 2441.3 | 2427.7 | 2422.3 | 2411.5 | 2384.4 | 2368.2 | 2373.6 | 2343.8 | 2305.9 | 2278.9 | 2249.1 |
| 7.5° | 2536.0 | 2530.6 | 2511.6 | 2498.1 | 2465.6 | 2449.4 | 2444.0 | 2397.9 | 2349.2 | 2308.6 | 2259.9 |
| 10° | 2649.7 | 2636.1 | 2625.3 | 2598.2 | 2554.9 | 2530.6 | 2522.4 | 2462.9 | 2400.7 | 2346.5 | 2281.6 |
| 12.5° | 2752.5 | 2736.3 | 2722.7 | 2695.7 | 2652.4 | 2611.8 | 2600.9 | 2533.3 | 2454.8 | 2381.7 | 2300.5 |
| 15° | 2831.0 | 2833.7 | 2820.2 | 2795.8 | 2747.1 | 2698.4 | 2690.2 | 2600.9 | 2506.2 | 2416.9 | 2319.5 |
| 17.5° | 2904.1 | 2914.9 | 2906.8 | 2890.5 | 2841.8 | 2793.1 | 2785.0 | 2684.8 | 2571.2 | 2457.5 | 2341.1 |
| 20° | 2974.4 | 2974.4 | 2971.7 | 2960.9 | 2925.7 | 2893.2 | 2877.0 | 2776.9 | 2633.4 | 2500.8 | 2370.9 |
| 22.5° | 3015.0 | 3025.9 | 3025.9 | 3025.9 | 3004.2 | 2977.1 | 2971.7 | 2874.3 | 2717.3 | 2554.9 | 2397.9 |
| 25° | 3077.3 | 3090.8 | 3090.8 | 3085.4 | 3066.5 | 3058.3 | 3050.2 | 2958.2 | 2798.5 | 2617.2 | 2427.7 |
| 27.5° | 3209.9 | 3207.2 | 3185.5 | 3158.5 | 3131.4 | 3128.7 | 3117.9 | 3052.9 | 2893.2 | 2684.8 | 2468.3 |
| 30° | 3393.9 | 3399.3 | 3372.3 | 3288.4 | 3226.1 | 3212.6 | 3215.3 | 3158.5 | 3004.2 | 2763.3 | 2514.3 |
| 32.5° | 3675.4 | 3675.4 | 3569.9 | 3461.6 | 3372.3 | 3337.1 | 3329.0 | 3280.3 | 3117.9 | 2849.9 | 2565.8 |
| 35° | 3886.5 | 3878.4 | 3818.9 | 3691.7 | 3580.7 | 3480.5 | 3467.0 | 3402.1 | 3245.1 | 2947.4 | 2622.6 |
| 37.5° | 4046.2 | 4062.4 | 4016.4 | 3919.0 | 3810.7 | 3637.5 | 3610.5 | 3518.4 | 3361.5 | 3042.1 | 2679.4 |
| 40° | 4354.7 | 4314.1 | 4203.2 | 4113.9 | 3984.0 | 3791.8 | 3767.4 | 3653.8 | 3480.5 | 3147.6 | 2749.8 |
| 42.5° | 4579.4 | 4522.5 | 4395.3 | 4276.3 | 4113.9 | 3946.1 | 3924.4 | 3799.9 | 3618.6 | 3266.7 | 2822.9 |
| 45° | 4901.5 | 4774.2 | 4598.3 | 4492.8 | 4262.7 | 4113.9 | 4086.8 | 3951.5 | 3762.0 | 3393.9 | 2914.9 |
| 47.5° | 5212.7 | 4990.8 | 4804.0 | 4755.3 | 4425.1 | 4295.2 | 4273.5 | 4116.6 | 3916.3 | 3532.0 | 3004.2 |
| 50° | 5172.1 | 5025.9 | 4963.7 | 4917.7 | 4565.8 | 4465.7 | 4444.1 | 4284.4 | 4073.3 | 3678.1 | 3093.5 |
| 52.5° | 5069.3 | 5082.8 | 5085.5 | 4974.5 | 4698.5 | 4625.4 | 4603.7 | 4465.7 | 4235.7 | 3805.3 | 3180.1 |
| 55° | 5177.5 | 5193.8 | 5191.0 | 5023.2 | 4852.7 | 4785.1 | 4771.5 | 4649.7 | 4392.6 | 3924.4 | 3242.4 |
| 57.5° | 5342.6 | 5288.5 | 5280.4 | 5145.0 | 5017.8 | 4955.6 | 4939.3 | 4833.8 | 4525.2 | 4011.0 | 3291.1 |
| 60° | 5372.4 | 5264.1 | 5299.3 | 5172.1 | 5142.3 | 5123.4 | 5118.0 | 4993.5 | 4649.7 | 4081.4 | 3310.0 |
| 62.5° | 5039.5 | 5020.5 | 5158.6 | 5107.1 | 5207.3 | 5261.4 | 5264.1 | 5107.1 | 4717.4 | 4108.4 | 3291.1 |
| 65° | 4471.1 | 4546.9 | 4844.6 | 4993.5 | 5304.7 | 5459.0 | 5453.6 | 5174.8 | 4709.3 | 4030.0 | 3174.7 |
| 67.5° | 3786.4 | 3845.9 | 4265.4 | 4736.4 | 5283.1 | 5564.5 | 5561.8 | 5204.6 | 4568.6 | 3813.4 | 2912.2 |
| 70° | 2871.6 | 3058.3 | 3653.8 | 4273.5 | 4990.8 | 5356.1 | 5402.2 | 5036.8 | 4246.5 | 3418.3 | 2514.3 |
| 72.5° | 2184.1 | 2213.9 | 2933.8 | 3583.4 | 4468.4 | 4860.9 | 4852.7 | 4500.9 | 3707.9 | 2879.7 | 2094.8 |
| 75° | 1550.8 | 1615.8 | 2208.5 | 2776.9 | 3661.9 | 4097.6 | 4078.7 | 3691.7 | 2958.2 | 2241.0 | 1602.2 |
| 77.5° | 1155.7 | 1180.0 | 1615.8 | 2059.6 | 2739.0 | 3131.4 | 3123.3 | 2728.1 | 2176.0 | 1645.5 | 1193.6 |
| 80° | 844.4 | 885.0 | 1163.8 | 1437.1 | 1856.7 | 2195.0 | 2184.1 | 1810.6 | 1396.5 | 1150.3 | 871.5 |
| 82.5° | 473.6 | 503.4 | 676.6 | 868.8 | 979.7 | 1085.3 | 1039.3 | 868.8 | 636.0 | 495.3 | 427.6 |
| 85° | 13.5 | 16.2 | 24.4 | 29.8 | 51.4 | 86.6 | 94.7 | 83.9 | 100.1 | 62.2 | 67.7 |
| 87.5° | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 |
| 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: P869037
CATALOG NUMBER: EMM2-HSN-SA2C-750-U-T4W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 | 2232.9 |
| 2.5° | 2238.3 | 2227.4 | 2205.8 | 2192.3 | 2184.1 | 2173.3 | 2157.1 | 2146.2 | 2138.1 | 2149.0 | 2146.2 |
| 5° | 2235.6 | 2213.9 | 2176.0 | 2149.0 | 2121.9 | 2100.2 | 2075.9 | 2056.9 | 2046.1 | 2051.5 | 2048.8 |
| 7.5° | 2235.6 | 2208.5 | 2149.0 | 2105.6 | 2065.1 | 2032.6 | 2005.5 | 1981.1 | 1970.3 | 1973.0 | 1970.3 |
| 10° | 2246.4 | 2208.5 | 2130.0 | 2067.8 | 2013.6 | 1975.7 | 1946.0 | 1924.3 | 1916.2 | 1924.3 | 1927.0 |
| 12.5° | 2257.2 | 2208.5 | 2113.8 | 2035.3 | 1964.9 | 1924.3 | 1897.2 | 1883.7 | 1889.1 | 1891.8 | 1894.5 |
| 15° | 2262.6 | 2205.8 | 2097.5 | 1997.4 | 1918.9 | 1875.6 | 1859.4 | 1856.7 | 1870.2 | 1883.7 | 1886.4 |
| 17.5° | 2276.2 | 2203.1 | 2073.2 | 1959.5 | 1878.3 | 1843.1 | 1835.0 | 1845.8 | 1872.9 | 1891.8 | 1897.2 |
| 20° | 2292.4 | 2208.5 | 2046.1 | 1913.5 | 1837.7 | 1810.6 | 1824.2 | 1848.5 | 1881.0 | 1908.1 | 1913.5 |
| 22.5° | 2308.6 | 2211.2 | 2021.7 | 1872.9 | 1794.4 | 1789.0 | 1818.8 | 1853.9 | 1891.8 | 1918.9 | 1924.3 |
| 25° | 2327.6 | 2211.2 | 1989.3 | 1821.5 | 1751.1 | 1759.2 | 1805.2 | 1851.2 | 1886.4 | 1921.6 | 1927.0 |
| 27.5° | 2346.5 | 2216.6 | 1954.1 | 1764.6 | 1697.0 | 1721.3 | 1778.2 | 1835.0 | 1872.9 | 1908.1 | 1916.2 |
| 30° | 2379.0 | 2227.4 | 1924.3 | 1715.9 | 1642.8 | 1675.3 | 1743.0 | 1807.9 | 1848.5 | 1886.4 | 1894.5 |
| 32.5° | 2411.5 | 2243.7 | 1900.0 | 1664.5 | 1588.7 | 1626.6 | 1702.4 | 1775.5 | 1818.8 | 1853.9 | 1859.4 |
| 35° | 2454.8 | 2265.3 | 1881.0 | 1613.1 | 1534.6 | 1564.4 | 1645.5 | 1726.7 | 1775.5 | 1802.5 | 1816.1 |
| 37.5° | 2500.8 | 2295.1 | 1864.8 | 1567.1 | 1475.0 | 1502.1 | 1588.7 | 1675.3 | 1726.7 | 1753.8 | 1759.2 |
| 40° | 2557.6 | 2335.7 | 1853.9 | 1523.8 | 1418.2 | 1439.9 | 1526.5 | 1621.2 | 1669.9 | 1688.8 | 1699.7 |
| 42.5° | 2619.9 | 2379.0 | 1845.8 | 1480.4 | 1356.0 | 1377.6 | 1469.6 | 1561.6 | 1610.4 | 1626.6 | 1634.7 |
| 45° | 2698.4 | 2435.8 | 1840.4 | 1434.4 | 1304.5 | 1323.5 | 1415.5 | 1507.5 | 1548.1 | 1569.8 | 1577.9 |
| 47.5° | 2771.4 | 2492.7 | 1824.2 | 1380.3 | 1247.7 | 1274.8 | 1358.7 | 1439.9 | 1485.9 | 1499.4 | 1507.5 |
| 50° | 2844.5 | 2541.4 | 1791.7 | 1320.8 | 1196.3 | 1220.6 | 1296.4 | 1356.0 | 1391.1 | 1407.4 | 1412.8 |
| 52.5° | 2914.9 | 2576.6 | 1740.3 | 1258.5 | 1142.1 | 1158.4 | 1220.6 | 1277.5 | 1301.8 | 1307.2 | 1323.5 |
| 55° | 2960.9 | 2595.5 | 1667.2 | 1185.4 | 1088.0 | 1093.4 | 1139.4 | 1190.9 | 1204.4 | 1207.1 | 1207.1 |
| 57.5° | 2993.4 | 2584.7 | 1580.6 | 1112.4 | 1033.9 | 1033.9 | 1060.9 | 1101.5 | 1107.0 | 1109.7 | 1115.1 |
| 60° | 2998.8 | 2546.8 | 1469.6 | 1044.7 | 974.3 | 966.2 | 993.3 | 1017.6 | 1020.3 | 1025.8 | 1031.2 |
| 62.5° | 2958.2 | 2462.9 | 1350.5 | 979.7 | 917.5 | 898.6 | 922.9 | 947.3 | 960.8 | 968.9 | 974.3 |
| 65° | 2833.7 | 2292.4 | 1215.2 | 914.8 | 863.4 | 830.9 | 860.7 | 901.3 | 928.3 | 931.0 | 931.0 |
| 67.5° | *2573.9* | *2016.3* | *1071.8* | *847.1* | *798.4* | *768.6* | *806.5* | *849.8* | *882.3* | *895.8* | *893.1* |
| 70° | 2181.4 | 1710.5 | 939.2 | 776.8 | 733.5 | 714.5 | 755.1 | 803.8 | 830.9 | 841.7 | 847.1 |
| 72.5° | 1756.5 | 1369.5 | 822.8 | 706.4 | 676.6 | 665.8 | 706.4 | 755.1 | 793.0 | 809.2 | 811.9 |
| 75° | 1366.8 | 1077.2 | 725.3 | 633.3 | 609.0 | 611.7 | 655.0 | 703.7 | 744.3 | 752.4 | 728.0 |
| 77.5° | 1060.9 | 858.0 | 633.3 | 546.7 | 533.2 | 552.1 | 595.4 | 646.9 | 671.2 | 679.3 | 663.1 |
| 80° | 765.9 | 657.7 | 511.5 | 430.3 | 430.3 | 460.1 | 498.0 | 557.5 | 565.7 | 554.8 | 560.2 |
| 82.5° | 362.7 | 319.4 | 251.7 | 208.4 | 194.9 | 216.5 | 230.1 | 249.0 | 270.6 | 276.1 | 262.5 |
| 85° | 48.7 | 32.5 | 24.4 | 27.1 | 24.4 | 16.2 | 10.8 | 10.8 | 10.8 | 8.1 | 8.1 |
| 87.5° | 8.1 | 8.1 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 2.7 | 2.7 | 2.7 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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Peachtree City, GA 30269

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

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-157-6

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-40-750-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-40-750-U-5WQ-2

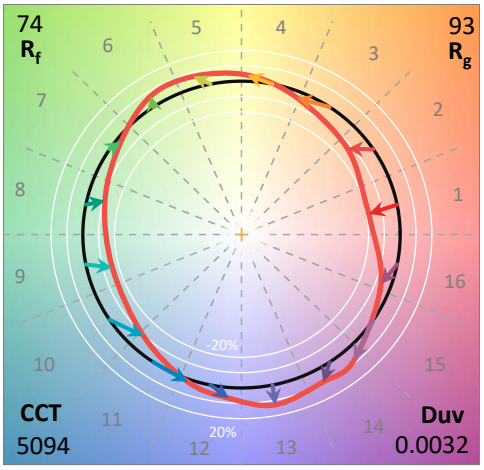
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-157-6 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 08/20/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | Streetworks |
| Catalog Number: | **MEM2-HTN-SA-40-750-U-5WQ-2** |
| Description: | Epic Modern Light Square 40W 5WQ Optic and Flare Trim |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 5094 | CRI (Ra): | 72.0 | | |
| CIE u': | 0.2082 | R1: | 68.6 | R9: | -39.6 |
| CIE v': | 0.4867 | R2: | 78.1 | R10: | 47.6 |
| Duv: | 0.0032 | R3: | 84.6 | R11: | 68.2 |
| CIE x: | 0.3430 | R4: | 71.6 | R12: | 41.4 |
| CIE y: | 0.3564 | R5: | 69.6 | R13: | 70.4 |
| CIE z: | 0.3006 | R6: | 69.4 | R14: | 91.4 |
| Peak Wavelength (nm): | 451 | R7: | 80.9 | R15: | 61.4 |
| Dominant Wavelength (nm): | 568 | R8: | 53.1 | | |
| Purity: | 9.86439 | | | | |
| Rf: | 73.7 | | | | |
| Rg: | 93 | | | | |




## Test Conditions

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

REPORT NUMBER: SP1-2407-157-6

| 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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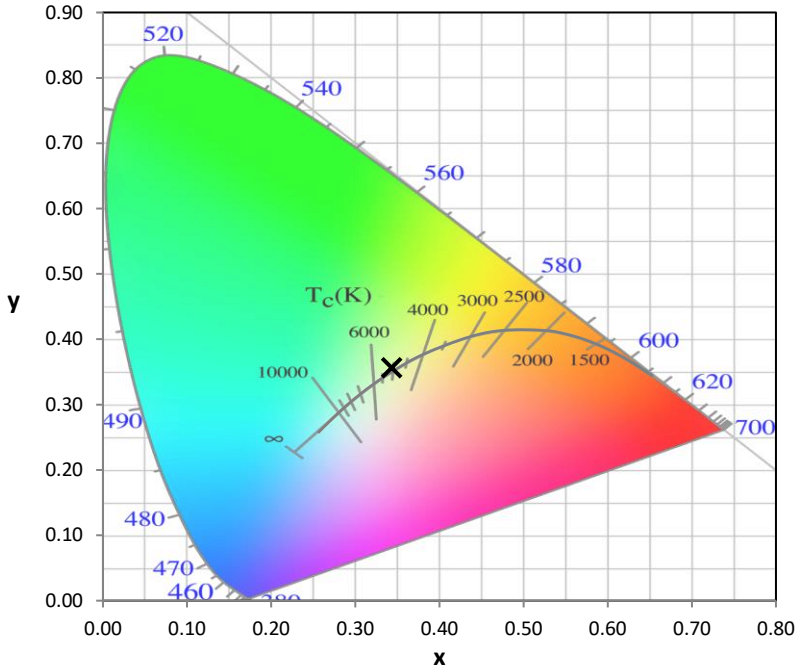
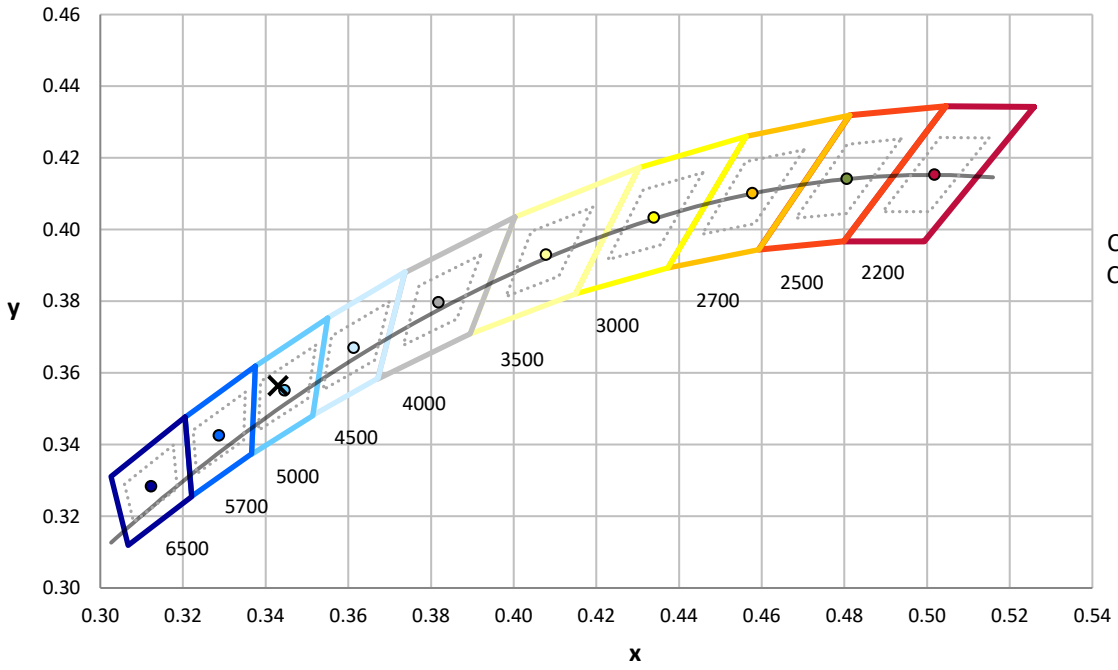
## CIE 1931 Chromaticity Diagram




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




CCT = 5094K
CIE x = 0.3430
CIE y = 0.3564
Duv = 0.0032

Point lies inside the ANSI 5000K 4-step quadrangle

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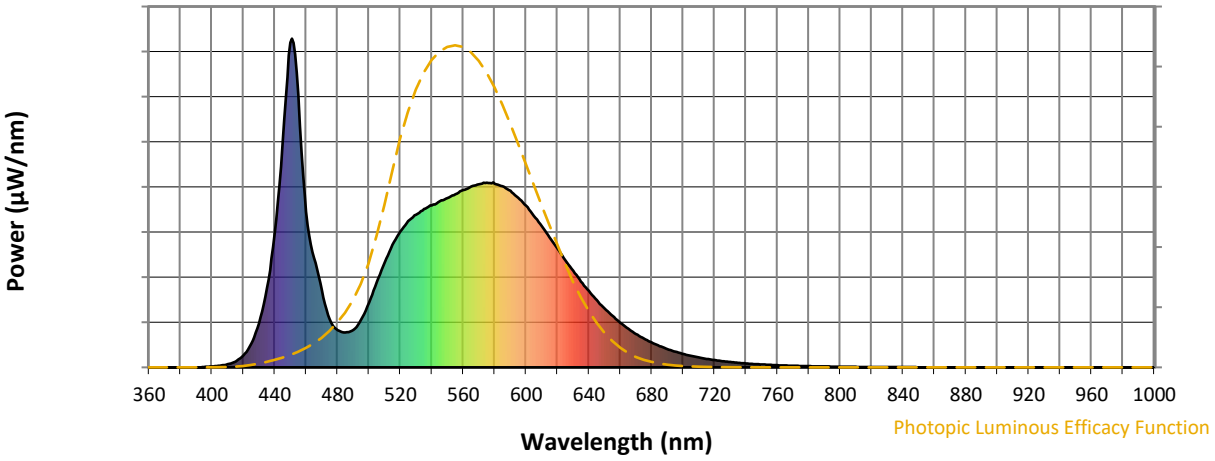
## Photopic Flux vs. Wavelength




## 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 | 114 | NR | 620 | 361 | NR | 750 | 9 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 145 | NR | 625 | 326 | NR | 755 | 8 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 197 | NR | 630 | 294 | NR | 760 | 7 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 259 | NR | 635 | 261 | NR | 765 | 6 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 319 | NR | 640 | 232 | NR | 770 | 5 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 373 | NR | 645 | 204 | NR | 775 | 4 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 414 | NR | 650 | 179 | NR | 780 | 4 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 445 | NR | 655 | 157 | NR | 785 | 3 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 465 | NR | 660 | 136 | NR | 790 | 3 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 482 | NR | 665 | 118 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 9 | NR | 540 | 493 | NR | 670 | 102 | NR | 800 | 2 | NR | 930 | 0 | NR |
| 415 | 18 | NR | 545 | 505 | NR | 675 | 87 | NR | 805 | 2 | NR | 935 | 0 | NR |
| 420 | 36 | NR | 550 | 515 | NR | 680 | 75 | NR | 810 | 2 | NR | 940 | 0 | NR |
| 425 | 72 | NR | 555 | 527 | NR | 685 | 65 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 134 | NR | 560 | 540 | NR | 690 | 56 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 242 | NR | 565 | 550 | NR | 695 | 48 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 407 | NR | 570 | 557 | NR | 700 | 41 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 684 | NR | 575 | 561 | NR | 705 | 35 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 988 | NR | 580 | 559 | NR | 710 | 30 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 828 | NR | 585 | 551 | NR | 715 | 26 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 473 | NR | 590 | 537 | NR | 720 | 22 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 333 | NR | 595 | 516 | NR | 725 | 19 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 232 | NR | 600 | 491 | NR | 730 | 16 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 146 | NR | 605 | 461 | NR | 735 | 14 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 113 | NR | 610 | 429 | NR | 740 | 12 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 106 | NR | 615 | 395 | NR | 745 | 10 | NR | 875 | 0 | NR | | | |

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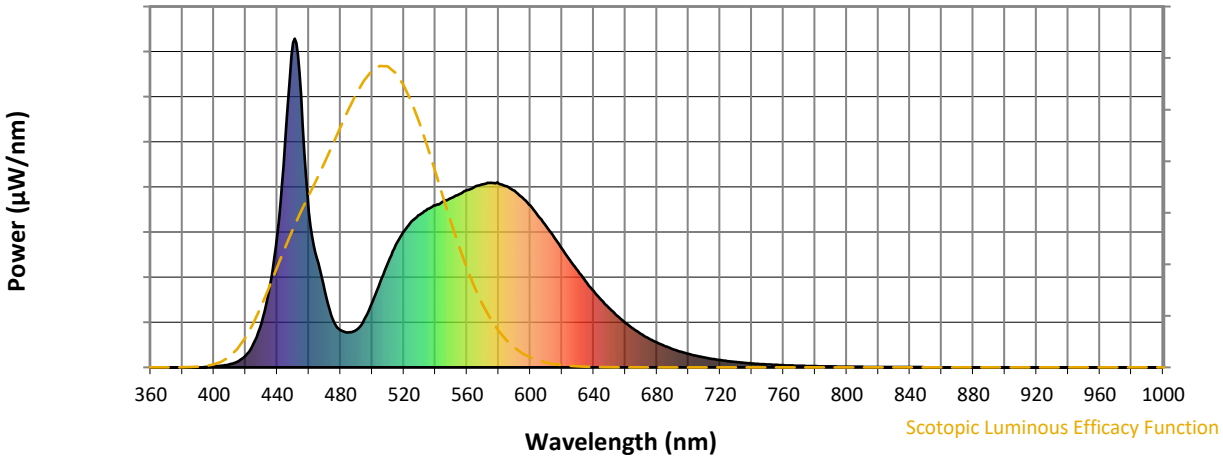
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.81**

| 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 | 114 | NR | 620 | 361 | NR | 750 | 9 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 145 | NR | 625 | 326 | NR | 755 | 8 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 197 | NR | 630 | 294 | NR | 760 | 7 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 259 | NR | 635 | 261 | NR | 765 | 6 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 319 | NR | 640 | 232 | NR | 770 | 5 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 373 | NR | 645 | 204 | NR | 775 | 4 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 414 | NR | 650 | 179 | NR | 780 | 4 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 445 | NR | 655 | 157 | NR | 785 | 3 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 465 | NR | 660 | 136 | NR | 790 | 3 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 482 | NR | 665 | 118 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 9 | NR | 540 | 493 | NR | 670 | 102 | NR | 800 | 2 | NR | 930 | 0 | NR |
| 415 | 18 | NR | 545 | 505 | NR | 675 | 87 | NR | 805 | 2 | NR | 935 | 0 | NR |
| 420 | 36 | NR | 550 | 515 | NR | 680 | 75 | NR | 810 | 2 | NR | 940 | 0 | NR |
| 425 | 72 | NR | 555 | 527 | NR | 685 | 65 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 134 | NR | 560 | 540 | NR | 690 | 56 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 242 | NR | 565 | 550 | NR | 695 | 48 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 407 | NR | 570 | 557 | NR | 700 | 41 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 684 | NR | 575 | 561 | NR | 705 | 35 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 988 | NR | 580 | 559 | NR | 710 | 30 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 828 | NR | 585 | 551 | NR | 715 | 26 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 473 | NR | 590 | 537 | NR | 720 | 22 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 333 | NR | 595 | 516 | NR | 725 | 19 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 232 | NR | 600 | 491 | NR | 730 | 16 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 146 | NR | 605 | 461 | NR | 735 | 14 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 113 | NR | 610 | 429 | NR | 740 | 12 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 106 | NR | 615 | 395 | NR | 745 | 10 | NR | 875 | 0 | NR | | | |

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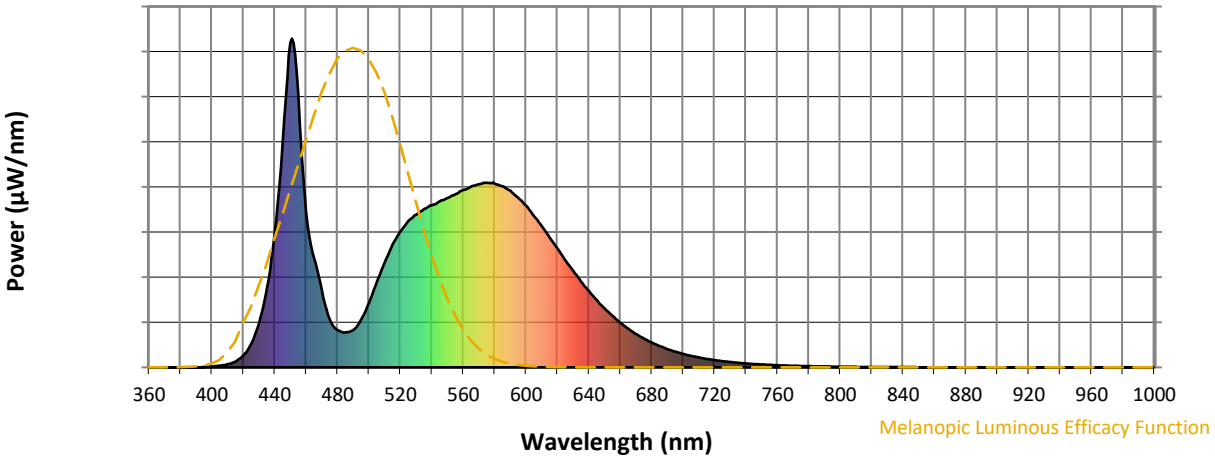
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 3.73**

| 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 | 114 | NR | 620 | 361 | NR | 750 | 9 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 145 | NR | 625 | 326 | NR | 755 | 8 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 197 | NR | 630 | 294 | NR | 760 | 7 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 259 | NR | 635 | 261 | NR | 765 | 6 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 319 | NR | 640 | 232 | NR | 770 | 5 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 373 | NR | 645 | 204 | NR | 775 | 4 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 414 | NR | 650 | 179 | NR | 780 | 4 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 445 | NR | 655 | 157 | NR | 785 | 3 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 465 | NR | 660 | 136 | NR | 790 | 3 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 482 | NR | 665 | 118 | NR | 795 | 2 | NR | 925 | 0 | NR |
| 410 | 9 | NR | 540 | 493 | NR | 670 | 102 | NR | 800 | 2 | NR | 930 | 0 | NR |
| 415 | 18 | NR | 545 | 505 | NR | 675 | 87 | NR | 805 | 2 | NR | 935 | 0 | NR |
| 420 | 36 | NR | 550 | 515 | NR | 680 | 75 | NR | 810 | 2 | NR | 940 | 0 | NR |
| 425 | 72 | NR | 555 | 527 | NR | 685 | 65 | NR | 815 | 1 | NR | 945 | 0 | NR |
| 430 | 134 | NR | 560 | 540 | NR | 690 | 56 | NR | 820 | 1 | NR | 950 | 0 | NR |
| 435 | 242 | NR | 565 | 550 | NR | 695 | 48 | NR | 825 | 1 | NR | 955 | 0 | NR |
| 440 | 407 | NR | 570 | 557 | NR | 700 | 41 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 684 | NR | 575 | 561 | NR | 705 | 35 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 988 | NR | 580 | 559 | NR | 710 | 30 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 828 | NR | 585 | 551 | NR | 715 | 26 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 473 | NR | 590 | 537 | NR | 720 | 22 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 333 | NR | 595 | 516 | NR | 725 | 19 | NR | 855 | 0 | NR | 985 | 0 | NR |
| 470 | 232 | NR | 600 | 491 | NR | 730 | 16 | NR | 860 | 0 | NR | 990 | 0 | NR |
| 475 | 146 | NR | 605 | 461 | NR | 735 | 14 | NR | 865 | 0 | NR | 995 | 0 | NR |
| 480 | 113 | NR | 610 | 429 | NR | 740 | 12 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 106 | NR | 615 | 395 | NR | 745 | 10 | NR | 875 | 0 | NR | | | |

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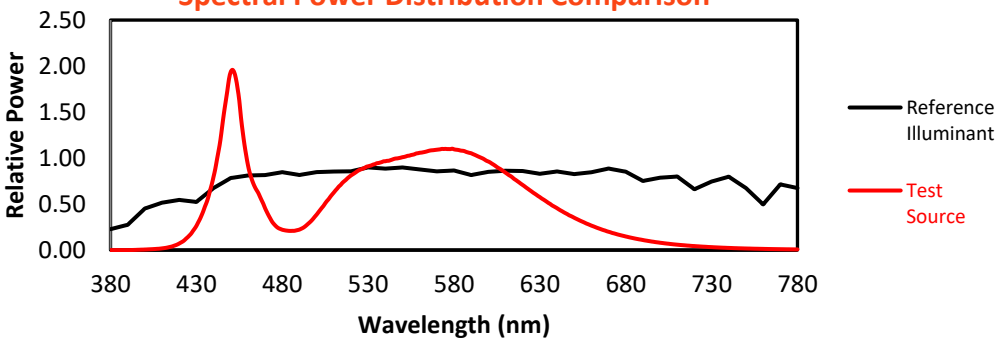
# TM-30-18

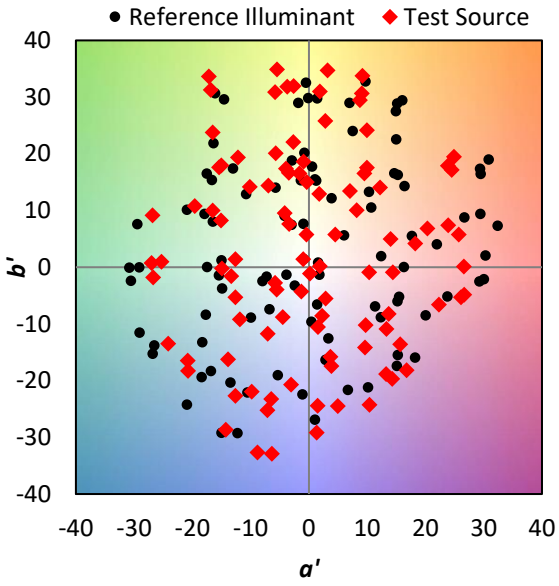
## Summary

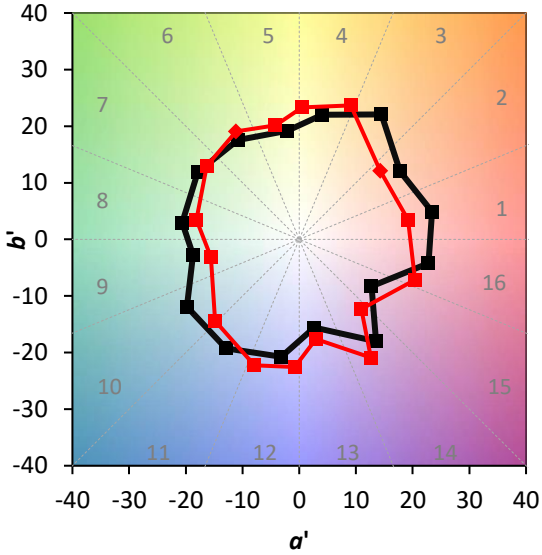
$R_f$ = 73.7
$R_g$ = 93
CIE $R_a$ = 72.0
$R_9$ = -39.6

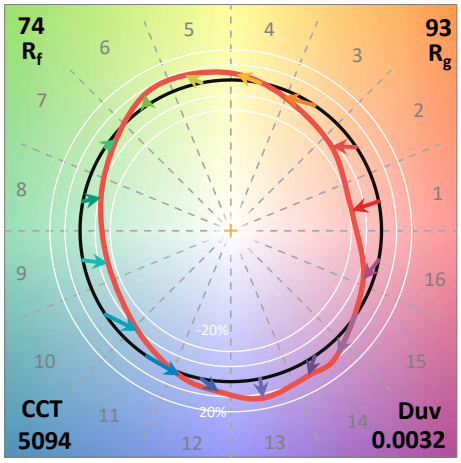
## Spectral Power Distribution Comparison

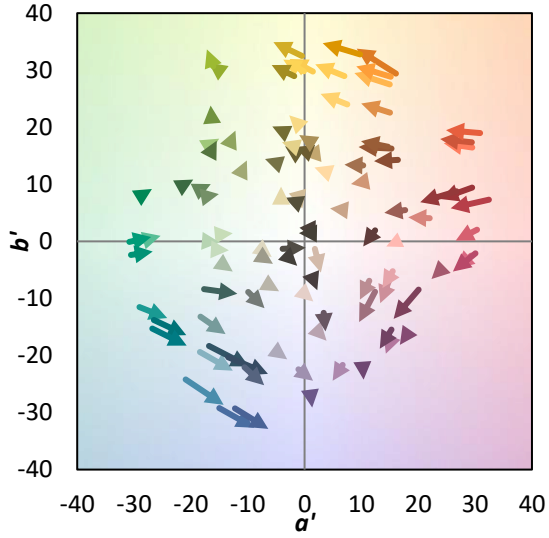



## Color Vector Graphics



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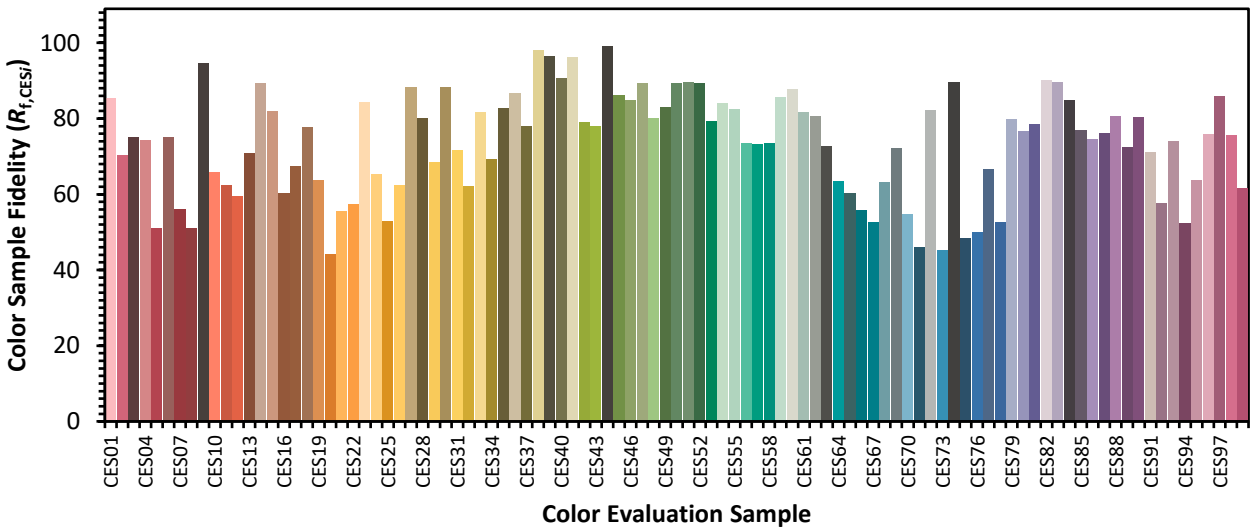
## TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 85 | CES26 = 62 | CES51 = 90 | CES76 = 50 |
| CES02 = 59 | CES27 = 88 | CES52 = 89 | CES77 = 67 |
| CES03 = 30 | CES28 = 80 | CES53 = 79 | CES78 = 53 |
| CES04 = 69 | CES29 = 69 | CES54 = 84 | CES79 = 80 |
| CES05 = 46 | CES30 = 88 | CES55 = 83 | CES80 = 77 |
| CES06 = 50 | CES31 = 72 | CES56 = 74 | CES81 = 78 |
| CES07 = 38 | CES32 = 62 | CES57 = 73 | CES82 = 90 |
| CES08 = 38 | CES33 = 82 | CES58 = 73 | CES83 = 90 |
| CES09 = 29 | CES34 = 69 | CES59 = 86 | CES84 = 85 |
| CES10 = 72 | CES35 = 83 | CES60 = 88 | CES85 = 77 |
| CES11 = 56 | CES36 = 87 | CES61 = 82 | CES86 = 75 |
| CES12 = 61 | CES37 = 78 | CES62 = 81 | CES87 = 76 |
| CES13 = 41 | CES38 = 98 | CES63 = 73 | CES88 = 81 |
| CES14 = 74 | CES39 = 96 | CES64 = 63 | CES89 = 72 |
| CES15 = 70 | CES40 = 91 | CES65 = 60 | CES90 = 80 |
| CES16 = 46 | CES41 = 96 | CES66 = 56 | CES91 = 71 |
| CES17 = 49 | CES42 = 79 | CES67 = 53 | CES92 = 58 |
| CES18 = 55 | CES43 = 78 | CES68 = 63 | CES93 = 74 |
| CES19 = 71 | CES44 = 99 | CES69 = 72 | CES94 = 52 |
| CES20 = 63 | CES45 = 86 | CES70 = 55 | CES95 = 64 |
| CES21 = 85 | CES46 = 85 | CES71 = 46 | CES96 = 76 |
| CES22 = 77 | CES47 = 89 | CES72 = 82 | CES97 = 86 |
| CES23 = 91 | CES48 = 80 | CES73 = 45 | CES98 = 76 |
| CES24 = 90 | CES49 = 83 | CES74 = 90 | CES99 = 62 |
| CES25 = 71 | CES50 = 89 | CES75 = 48 | |



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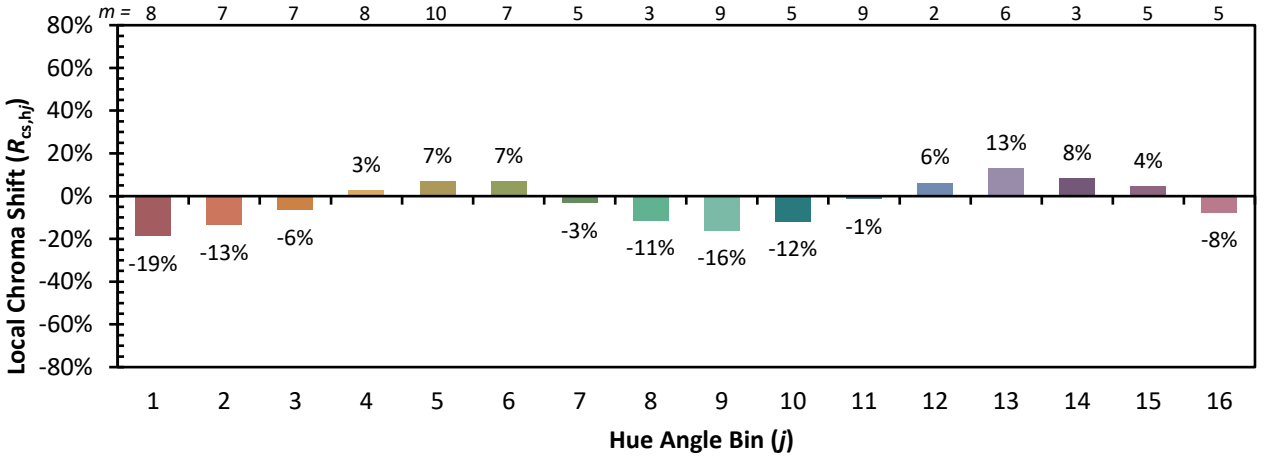
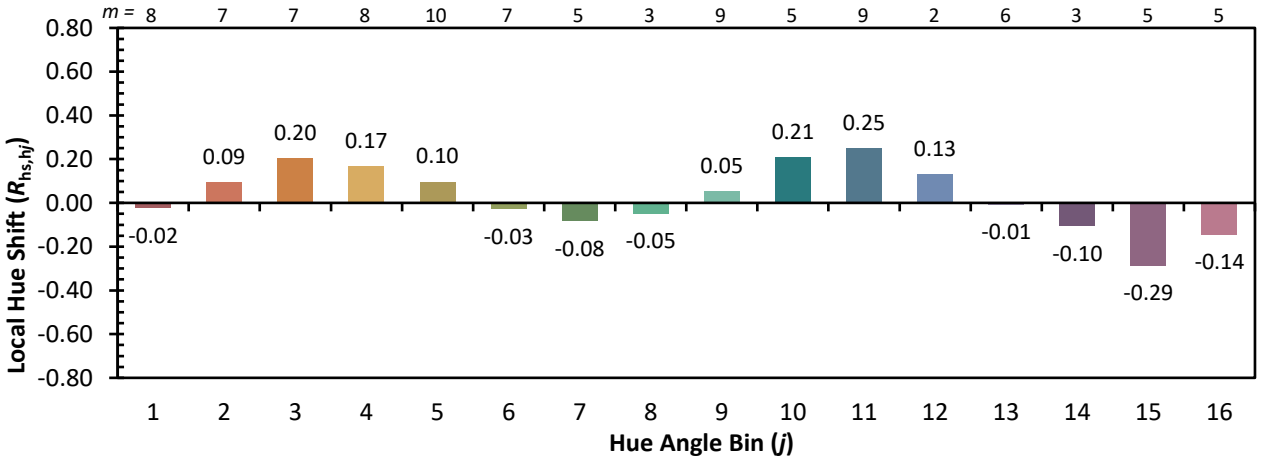
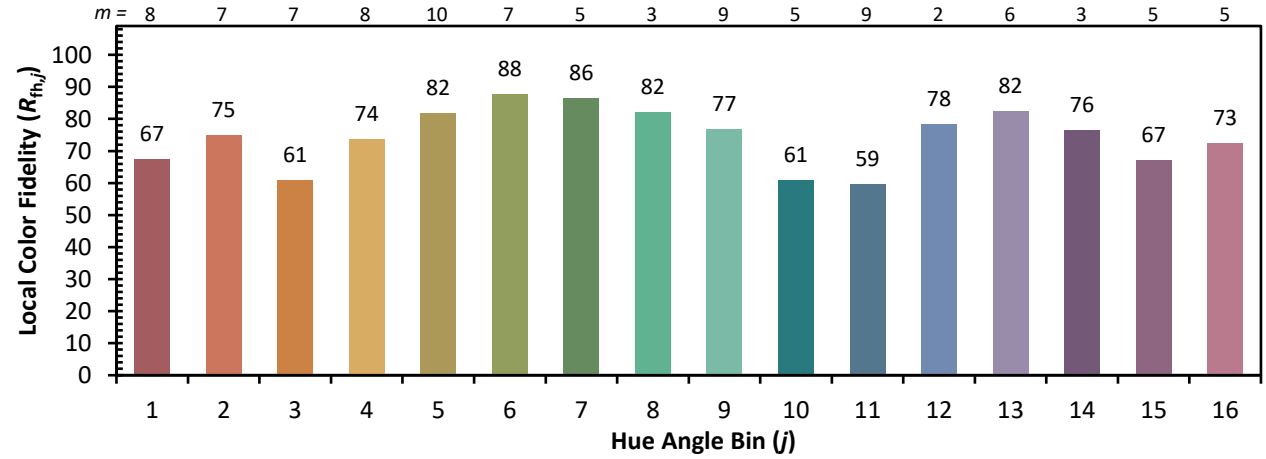
**TM-30-18**

## Color Rendition by Hue-Angle Bin



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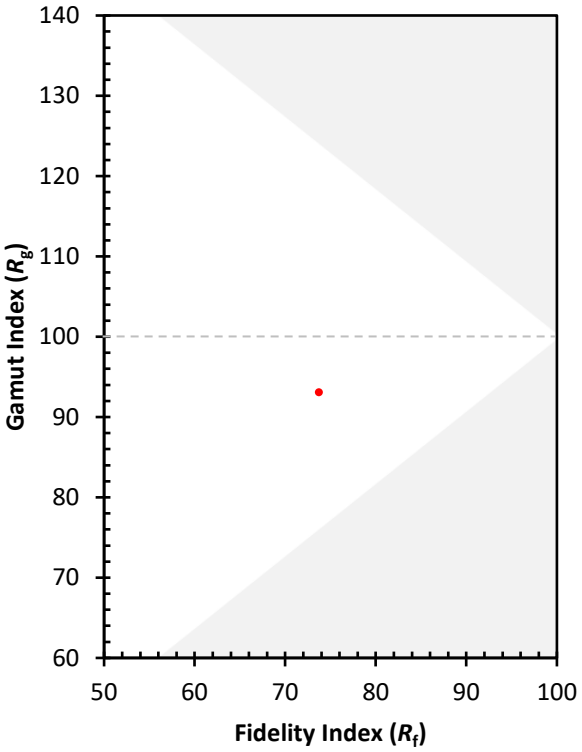
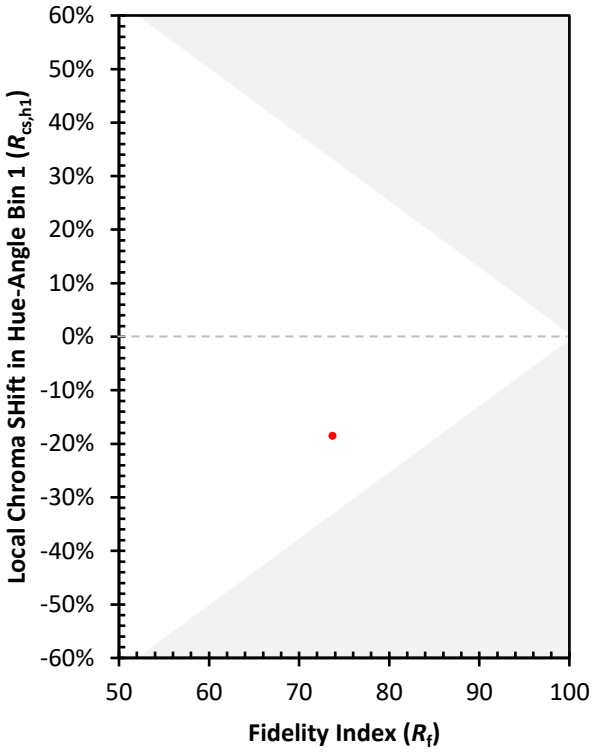
## Measure Comparisons




(END OF REPORT)