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: P868967

Luminaire Tested: **EMM2-HSN-SA2C-750-U-T3**

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: | P868967 |
| 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-T3 |
| Description: | EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 120W 70CRI 5000K FIXTURE w/ TYPE III DISTRIBUTION OPTIC |
| Light Source: | (20) 5000K CCT, 70 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 13621.6 lumens |
| Efficiency: | N/A |
| Efficacy: | 134.9 lumens/watt |
| Luminous Opening: | Rectangular (W 0.67' x L: 0.33' x H: 0') |
| IES Classification: | Type III - Medium |
| 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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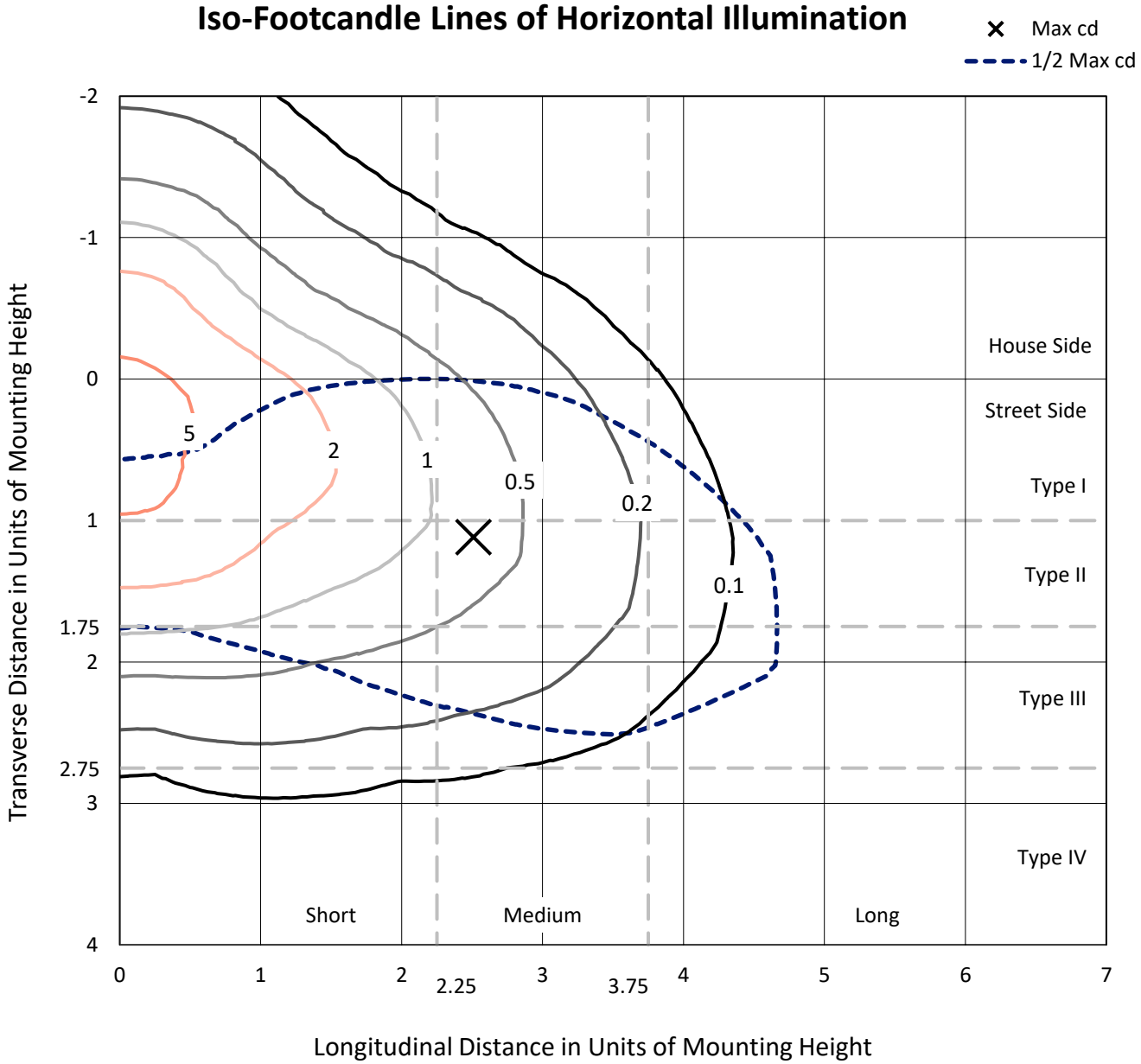
Scaled Data Report

REPORT NUMBER: P868967
CATALOG NUMBER: EMM2-HSN-SA2C-750-U-T3

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 6.3 fc
Type III - Medium - N/A

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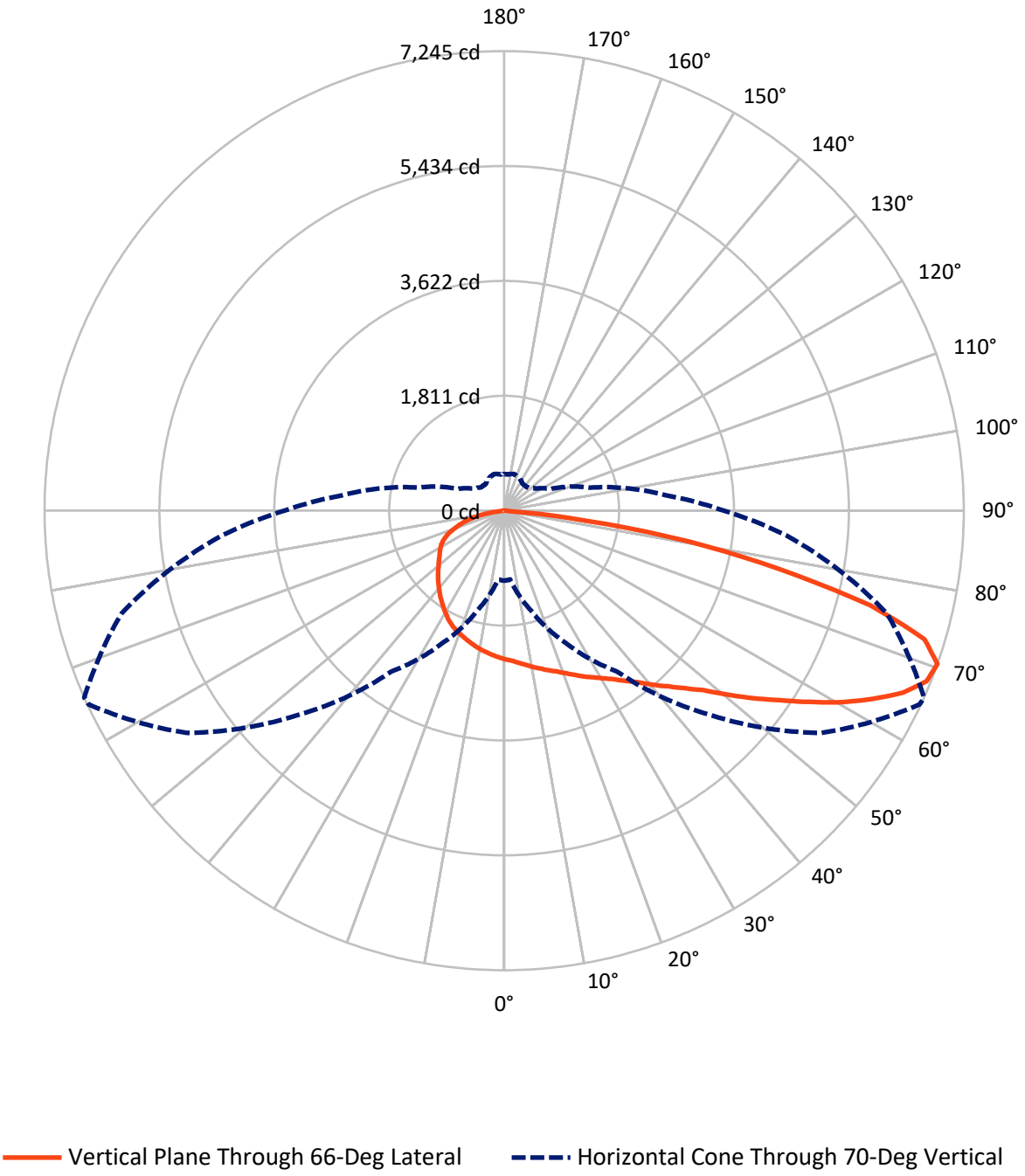
## Luminous Intensity Polar Plot



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REPORT NUMBER: P868967
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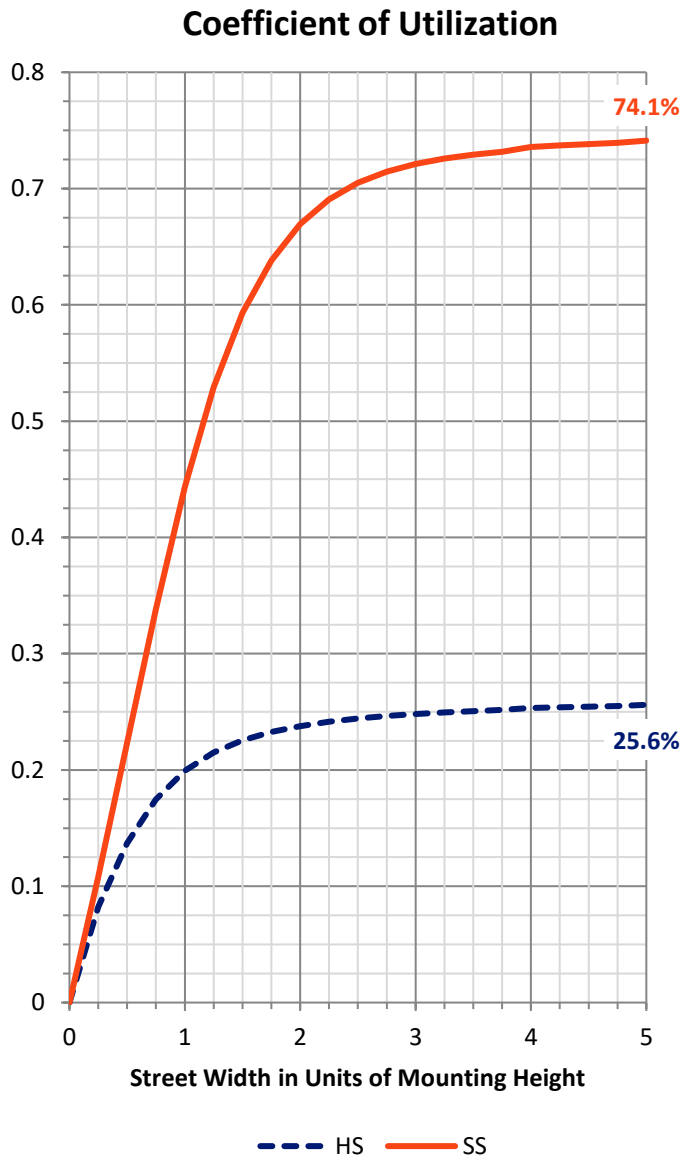
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 3510.4 | 0.0 | 3510.4 |
| | % Fixture | 25.8 | 0.0 | 25.8 |
| **Street Side** | Lumens | 10111.2 | 0.0 | 10111.2 |
| | % Fixture | 74.2 | 0.0 | 74.2 |
| **Total** | Lumens | 13621.6 | 0.0 | 13621.6 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 224.3 | 1.6 |
| 10°-20° | 668.1 | 4.9 |
| 20°-30° | 1122.1 | 8.2 |
| 30°-40° | 1690.5 | 12.4 |
| 40°-50° | 2295.1 | 16.8 |
| 50°-60° | 2727.3 | 20.0 |
| 60°-70° | 2783.4 | 20.4 |
| 70°-80° | 1861.7 | 13.7 |
| 80°-90° | 249.1 | 1.8 |
| 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° | 13621.6 | 100.0 |
| 0°-180° | 13621.6 | 100.0 |



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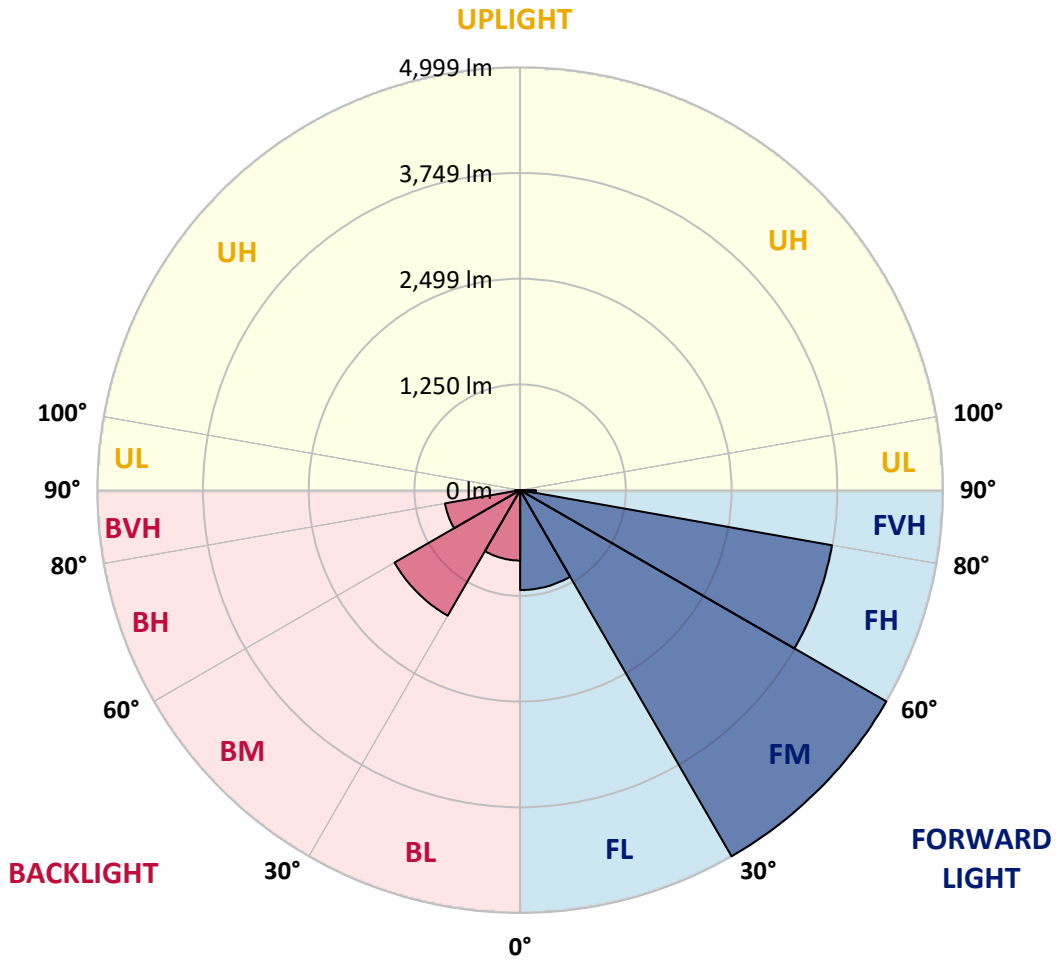
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1182.1 | 8.7 | | | |
| FM | (30°-60°) | 4998.9 | 36.7 | | | |
| FH | (60°-80°) | 3743.7 | 27.5 | | | G2/5000 |
| FVH | (80°-90°) | 186.5 | 1.4 | | | G2/225 |
| BL | (0°-30°) | 832.4 | 6.1 | B2/1000 | | |
| BM | (30°-60°) | 1714.1 | 12.6 | B2/2500 | | |
| BH | (60°-80°) | 901.4 | 6.6 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 62.5 | 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 III Medium



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Scaled Data Report

REPORT NUMBER: P868967
CATALOG NUMBER: EMM2-HSN-SA2C-750-U-T3

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 66° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2343.7 | 2343.7 | 2343.7 | 2343.7 | 2343.7 | 2343.7 | 2343.7 | 2343.7 | *2343.7* | 2343.7 | 2343.7 |
| 2.5° | 2427.6 | 2416.7 | 2408.6 | 2414.0 | 2397.8 | 2403.2 | 2384.3 | 2370.7 | *2368.0* | 2362.6 | 2357.2 |
| 5° | 2503.3 | 2503.3 | 2489.8 | 2489.8 | 2470.9 | 2468.2 | 2441.1 | 2411.3 | *2411.3* | 2392.4 | 2370.7 |
| 7.5° | 2584.5 | 2579.1 | 2562.9 | 2560.2 | 2538.5 | 2533.1 | 2503.3 | 2457.3 | *2454.6* | 2419.4 | 2387.0 |
| 10° | 2641.4 | 2644.1 | 2633.2 | 2633.2 | 2617.0 | 2603.5 | 2560.2 | 2511.5 | *2506.0* | 2460.0 | 2408.6 |
| 12.5° | 2684.7 | 2690.1 | 2687.4 | 2687.4 | 2673.8 | 2673.8 | 2625.1 | 2560.2 | *2554.8* | 2495.2 | 2422.1 |
| 15° | 2730.7 | 2728.0 | 2736.1 | 2738.8 | 2733.4 | 2725.3 | 2690.1 | 2614.3 | *2611.6* | 2533.1 | 2441.1 |
| 17.5° | 2771.3 | 2768.6 | 2771.3 | 2784.8 | 2787.5 | 2787.5 | 2752.3 | 2673.8 | *2663.0* | 2579.1 | 2457.3 |
| 20° | 2795.6 | 2801.0 | 2811.9 | 2828.1 | 2836.2 | 2857.9 | 2828.1 | 2744.2 | *2733.4* | 2627.8 | 2492.5 |
| 22.5° | 2887.6 | 2871.4 | 2879.5 | 2890.3 | 2901.2 | 2930.9 | 2903.9 | 2817.3 | *2809.1* | 2700.9 | 2533.1 |
| 25° | 3044.6 | 3044.6 | 3025.7 | 3006.7 | 2993.2 | 3006.7 | 2985.1 | 2901.2 | *2895.7* | 2765.8 | 2579.1 |
| 27.5° | 3317.9 | 3317.9 | 3277.3 | 3207.0 | 3117.7 | 3093.3 | 3077.1 | 2990.5 | *2974.2* | 2836.2 | 2608.9 |
| 30° | 3664.3 | 3675.2 | 3602.1 | 3483.0 | 3317.9 | 3209.7 | 3169.1 | 3074.4 | *3066.2* | 2906.6 | 2654.9 |
| 32.5° | 4035.1 | 4056.8 | 4002.6 | 3829.4 | 3558.8 | 3347.7 | 3282.8 | 3185.3 | *3166.4* | 2990.5 | 2714.4 |
| 35° | 4368.0 | 4389.6 | 4316.6 | 4154.2 | 3807.8 | 3548.0 | 3418.1 | 3307.1 | *3296.3* | 3098.7 | 2803.7 |
| 37.5° | 4638.6 | 4644.0 | 4598.0 | 4400.5 | 4016.2 | 3715.8 | 3585.9 | 3453.2 | *3431.6* | 3228.6 | 2898.5 |
| 40° | 4925.5 | 4947.1 | 4901.1 | 4657.6 | 4205.6 | 3897.1 | 3753.6 | 3629.2 | *3610.2* | 3363.9 | 2987.8 |
| 42.5° | 5225.9 | 5223.2 | 5223.2 | 4879.5 | 4395.0 | 4048.6 | 3935.0 | 3797.0 | *3786.1* | 3502.0 | 3085.2 |
| 45° | 5409.9 | 5420.7 | 5391.0 | 5012.1 | 4673.8 | 4205.6 | 4110.9 | 4010.7 | *3991.8* | 3694.1 | 3212.4 |
| 47.5° | 5455.9 | 5431.6 | 5296.2 | 5114.9 | 4987.7 | 4368.0 | 4332.8 | 4273.3 | *4230.0* | 3905.2 | 3369.4 |
| 50° | 5393.7 | 5355.8 | 5277.3 | 5160.9 | 5104.1 | 4562.8 | 4557.4 | 4587.2 | *4557.4* | 4162.3 | 3550.7 |
| 52.5° | 5160.9 | 5155.5 | 5142.0 | 5169.0 | 5077.0 | 4717.1 | 4811.8 | 4914.7 | *4909.2* | 4424.8 | 3740.1 |
| 55° | 4671.1 | 4706.3 | 4868.6 | 5039.1 | 4974.2 | 4822.6 | 5096.0 | 5293.5 | *5271.9* | 4733.3 | 3935.0 |
| 57.5° | 4170.4 | 4205.6 | 4414.0 | 4819.9 | 4874.1 | 4936.3 | 5415.3 | 5723.8 | *5688.7* | 5068.9 | 4113.6 |
| 60° | 3734.7 | 3696.8 | 3905.2 | 4489.8 | 4733.3 | 5039.1 | 5732.0 | 6159.6 | *6129.8* | 5404.5 | 4297.6 |
| 62.5° | 3044.6 | 3082.5 | 3415.4 | 4008.0 | 4535.8 | 5104.1 | 5991.8 | 6554.7 | *6535.7* | 5713.0 | 4446.5 |
| 65° | 2408.6 | 2357.2 | 2857.9 | 3502.0 | 4194.8 | 5082.4 | 6216.4 | 6925.4 | *6911.9* | 6016.1 | 4560.1 |
| 67.5° | 1637.3 | 1602.1 | 2262.5 | 2998.6 | 3732.0 | 4909.2 | 6267.8 | 7174.4 | *7179.8* | 6194.7 | 4589.9 |
| 70° | *1104.2* | *1087.9* | *1626.5* | *2305.8* | *3090.6* | *4535.8* | *6108.1* | *7225.8* | *7244.8* | *6240.7* | *4457.3* |
| 72.5° | 814.6 | 811.9 | 1190.8 | 1645.4 | 2300.4 | 3829.4 | 5672.4 | 6890.3 | *6925.4* | 5916.0 | 4067.6 |
| 75° | 641.4 | 649.5 | 849.8 | 1169.1 | 1534.5 | 2833.5 | 4771.2 | 5907.9 | *5962.0* | 5109.5 | 3377.5 |
| 77.5° | 525.0 | 525.0 | 595.4 | 839.0 | 1025.7 | 1759.1 | 3431.6 | 4324.7 | *4432.9* | 3943.1 | 2600.8 |
| 80° | 424.9 | 433.0 | 441.1 | 584.6 | 679.3 | 1004.0 | 1997.3 | 2884.9 | *2963.4* | 2746.9 | 1878.2 |
| 82.5° | 232.7 | 249.0 | 240.9 | 303.1 | 341.0 | 465.5 | 792.9 | 1166.4 | *1285.5* | 1144.8 | 852.5 |
| 85° | 16.2 | 10.8 | 18.9 | 24.4 | 29.8 | 46.0 | 62.2 | 86.6 | *81.2* | 116.4 | 59.5 |
| 87.5° | 2.7 | 2.7 | 2.7 | 5.4 | 5.4 | 8.1 | 10.8 | 10.8 | *10.8* | 10.8 | 10.8 |
| 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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Scaled Data Report

REPORT NUMBER: P868967
CATALOG NUMBER: EMM2-HSN-SA2C-750-U-T3

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2343.7 | 2343.7 | 2343.7 | 2343.7 | 2343.7 | 2343.7 | 2343.7 | 2343.7 | 2343.7 | 2343.7 | 2343.7 |
| 2.5° | 2354.5 | 2341.0 | 2319.3 | 2313.9 | 2305.8 | 2294.9 | 2284.1 | 2267.9 | 2262.5 | 2267.9 | 2273.3 |
| 5° | 2357.2 | 2338.3 | 2303.1 | 2281.4 | 2259.8 | 2240.8 | 2219.2 | 2197.5 | 2184.0 | 2186.7 | 2197.5 |
| 7.5° | 2365.3 | 2338.3 | 2284.1 | 2248.9 | 2213.8 | 2184.0 | 2148.8 | 2124.5 | 2108.2 | 2110.9 | 2119.0 |
| 10° | 2376.1 | 2338.3 | 2273.3 | 2213.8 | 2165.0 | 2121.7 | 2086.6 | 2056.8 | 2040.6 | 2037.9 | 2040.6 |
| 12.5° | 2378.8 | 2335.5 | 2248.9 | 2175.9 | 2116.3 | 2059.5 | 2021.6 | 1994.5 | 1978.3 | 1970.2 | 1975.6 |
| 15° | 2387.0 | 2327.4 | 2224.6 | 2135.3 | 2062.2 | 2002.7 | 1956.7 | 1924.2 | 1913.4 | 1907.9 | 1905.2 |
| 17.5° | 2397.8 | 2324.7 | 2202.9 | 2094.7 | 2008.1 | 1940.4 | 1899.8 | 1867.4 | 1853.8 | 1848.4 | 1853.8 |
| 20° | 2414.0 | 2327.4 | 2178.6 | 2054.1 | 1959.4 | 1891.7 | 1845.7 | 1813.2 | 1802.4 | 1799.7 | 1797.0 |
| 22.5° | 2435.7 | 2332.8 | 2159.6 | 2016.2 | 1905.2 | 1837.6 | 1791.6 | 1769.9 | 1761.8 | 1764.5 | 1764.5 |
| 25° | 2457.3 | 2338.3 | 2132.6 | 1964.8 | 1848.4 | 1778.0 | 1745.6 | 1729.3 | 1734.7 | 1745.6 | 1745.6 |
| 27.5° | 2476.3 | 2335.5 | 2094.7 | 1910.7 | 1780.8 | 1715.8 | 1691.4 | 1694.1 | 1707.7 | 1726.6 | 1729.3 |
| 30° | 2500.6 | 2335.5 | 2054.1 | 1843.0 | 1705.0 | 1642.7 | 1637.3 | 1659.0 | 1680.6 | 1699.6 | 1699.6 |
| 32.5° | 2538.5 | 2351.8 | 2021.6 | 1775.3 | 1626.5 | 1577.8 | 1602.1 | 1631.9 | 1656.3 | 1675.2 | 1680.6 |
| 35° | 2603.5 | 2387.0 | 2000.0 | 1707.7 | 1550.7 | 1515.5 | 1561.5 | 1610.3 | 1626.5 | 1640.0 | 1642.7 |
| 37.5° | 2665.7 | 2419.4 | 1972.9 | 1642.7 | 1472.2 | 1458.7 | 1520.9 | 1572.4 | 1575.1 | 1583.2 | 1583.2 |
| 40° | 2725.3 | 2443.8 | 1937.7 | 1572.4 | 1396.5 | 1396.5 | 1469.5 | 1512.8 | 1507.4 | 1499.3 | 1502.0 |
| 42.5° | 2790.2 | 2457.3 | 1897.1 | 1507.4 | 1334.2 | 1334.2 | 1393.7 | 1431.6 | 1428.9 | 1439.8 | 1447.9 |
| 45° | 2868.7 | 2484.4 | 1843.0 | 1447.9 | 1269.3 | 1258.4 | 1307.1 | 1339.6 | 1380.2 | 1428.9 | 1442.5 |
| 47.5° | 2976.9 | 2522.3 | 1799.7 | 1382.9 | 1215.1 | 1177.2 | 1196.2 | 1263.8 | 1309.9 | 1350.4 | 1355.9 |
| 50° | 3090.6 | 2576.4 | 1761.8 | 1315.3 | 1150.2 | 1082.5 | 1098.8 | 1174.5 | 1201.6 | 1217.8 | 1226.0 |
| 52.5° | 3212.4 | 2619.7 | 1729.3 | 1258.4 | 1082.5 | 985.1 | 1006.7 | 1079.8 | 1098.8 | 1112.3 | 1115.0 |
| 55° | 3317.9 | 2654.9 | 1688.7 | 1204.3 | 1009.5 | 893.1 | 920.1 | 990.5 | 1009.5 | 1025.7 | 1025.7 |
| 57.5° | 3428.9 | 2687.4 | 1661.7 | 1158.3 | 931.0 | 817.3 | 836.2 | 906.6 | 933.7 | 939.1 | 947.2 |
| 60° | 3520.9 | 2717.1 | 1637.3 | 1115.0 | 857.9 | 749.6 | 763.2 | 825.4 | 857.9 | 860.6 | 866.0 |
| 62.5° | 3585.9 | 2736.1 | 1623.8 | 1060.9 | 784.8 | 682.0 | 692.8 | 755.1 | 792.9 | 801.1 | 803.8 |
| 65° | 3626.5 | 2746.9 | 1599.4 | 990.5 | 722.6 | 625.2 | 625.2 | 687.4 | 725.3 | 744.2 | 749.6 |
| 67.5° | 3607.5 | 2728.0 | 1534.5 | 909.3 | 665.8 | 568.3 | 565.6 | 627.9 | 660.3 | 671.2 | 673.9 |
| 70° | *3461.4* | *2617.0* | *1401.9* | *809.2* | *606.2* | *516.9* | *511.5* | *568.3* | *598.1* | *573.7* | *576.4* |
| 72.5° | 3163.7 | 2365.3 | 1220.5 | 709.1 | 544.0 | 468.2 | 462.8 | 511.5 | 514.2 | 514.2 | 511.5 |
| 75° | 2665.7 | 1932.3 | 974.3 | 603.5 | 479.0 | 416.8 | 419.5 | 457.4 | 460.1 | 473.6 | 465.5 |
| 77.5° | 2043.3 | 1431.6 | 760.5 | 481.7 | 405.9 | 370.8 | 384.3 | 397.8 | 416.8 | 435.7 | 416.8 |
| 80° | 1485.8 | 987.8 | 527.7 | 359.9 | 313.9 | 313.9 | 319.3 | 332.9 | 359.9 | 378.9 | 359.9 |
| 82.5° | 636.0 | 435.7 | 243.6 | 178.6 | 154.3 | 151.6 | 154.3 | 154.3 | 189.4 | 194.9 | 170.5 |
| 85° | 48.7 | 40.6 | 29.8 | 29.8 | 24.4 | 13.5 | 13.5 | 10.8 | 8.1 | 8.1 | 8.1 |
| 87.5° | 10.8 | 8.1 | 8.1 | 8.1 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Cooper Lighting Solutions Photometric Lab
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# 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

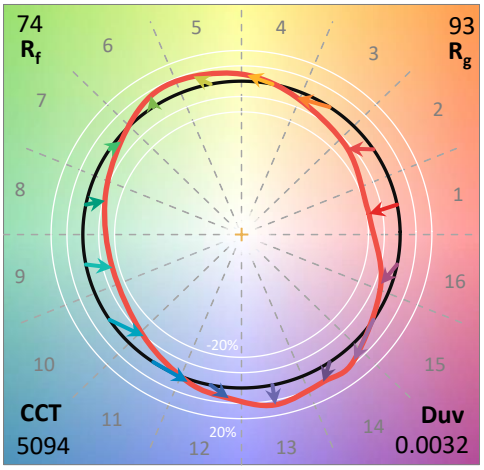
## Test Information

| | |
|---|---|
| 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 |
| CIE u': | 0.2082 |
| CIE v': | 0.4867 |
| Duv: | 0.0032 |
| CIE x: | 0.3430 |
| CIE y: | 0.3564 |
| CIE z: | 0.3006 |
| Peak Wavelength (nm): | 451 |
| Dominant Wavelength (nm): | 568 |
| Purity: | 9.86439 |
| Rf: | 73.7 |
| Rg: | 93 |

| | |
|---|---|
| CRI (Ra): | 72.0 |
| R1: | 68.6 |
| R2: | 78.1 |
| R3: | 84.6 |
| R4: | 71.6 |
| R5: | 69.6 |
| R6: | 69.4 |
| R7: | 80.9 |
| R8: | 53.1 |
| R9: | -39.6 |
| R10: | 47.6 |
| R11: | 68.2 |
| R12: | 41.4 |
| R13: | 70.4 |
| R14: | 91.4 |
| R15: | 61.4 |




## 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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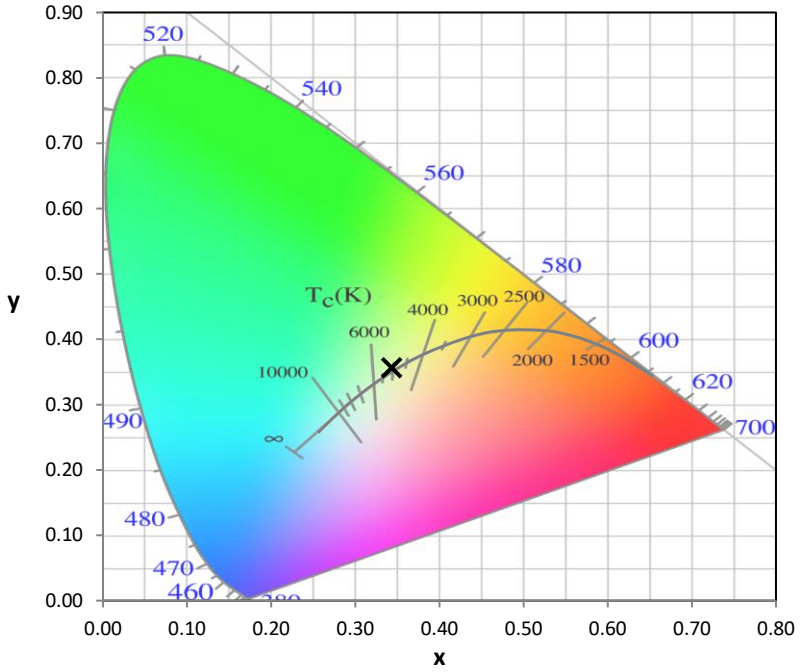
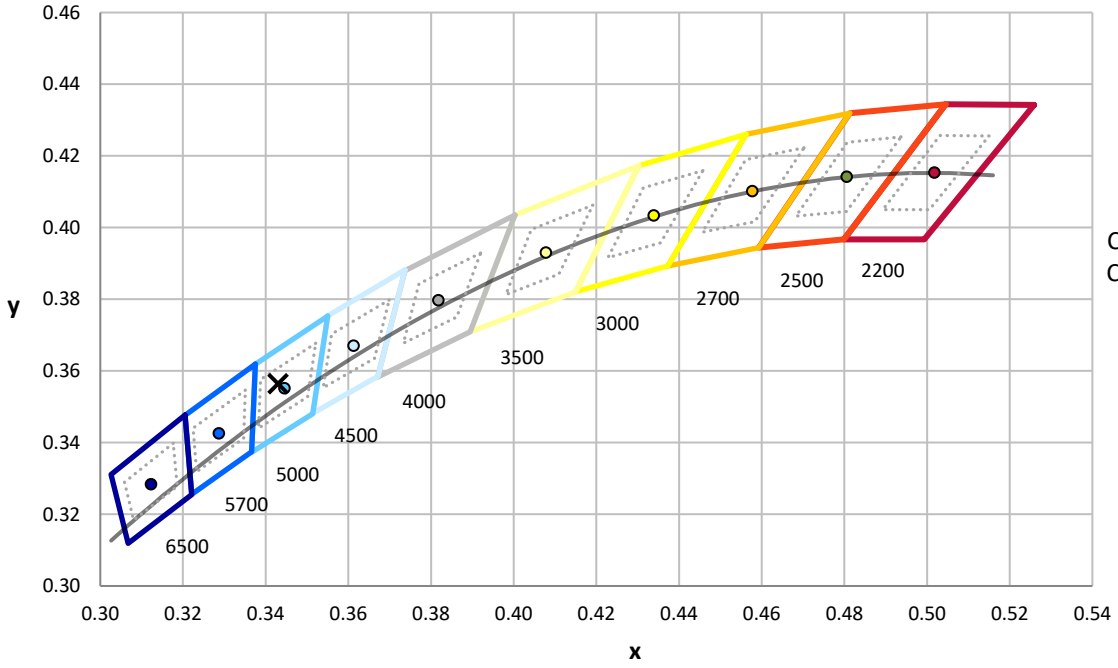
## CIE 1931 Chromaticity Diagram




## 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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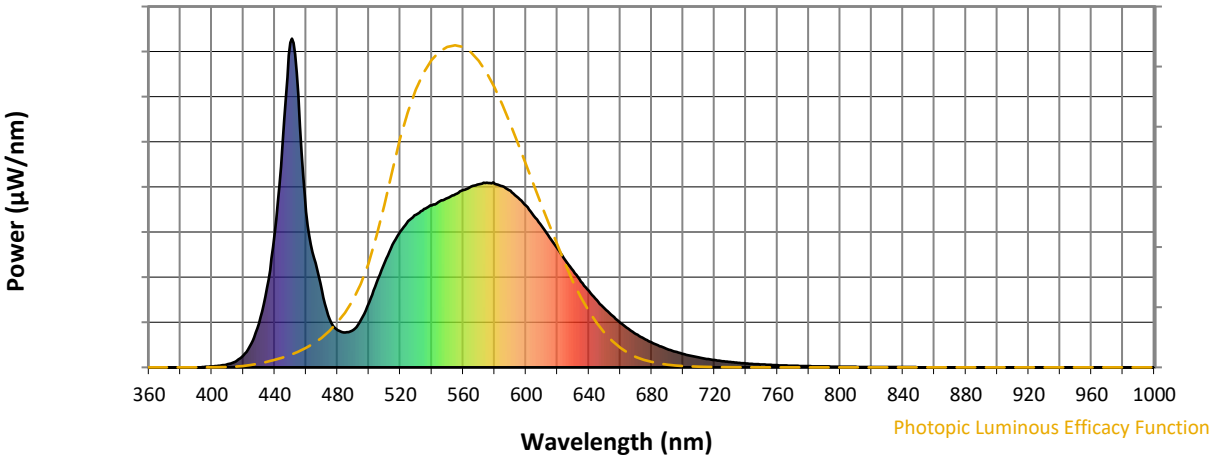
## Photopic Flux vs. Wavelength




## 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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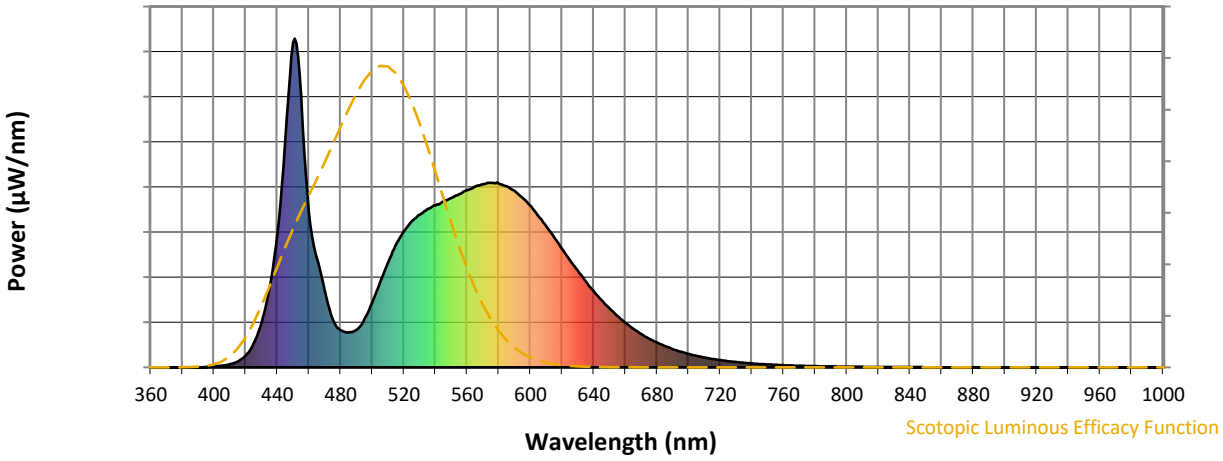
## Scotopic Flux vs. Wavelength




**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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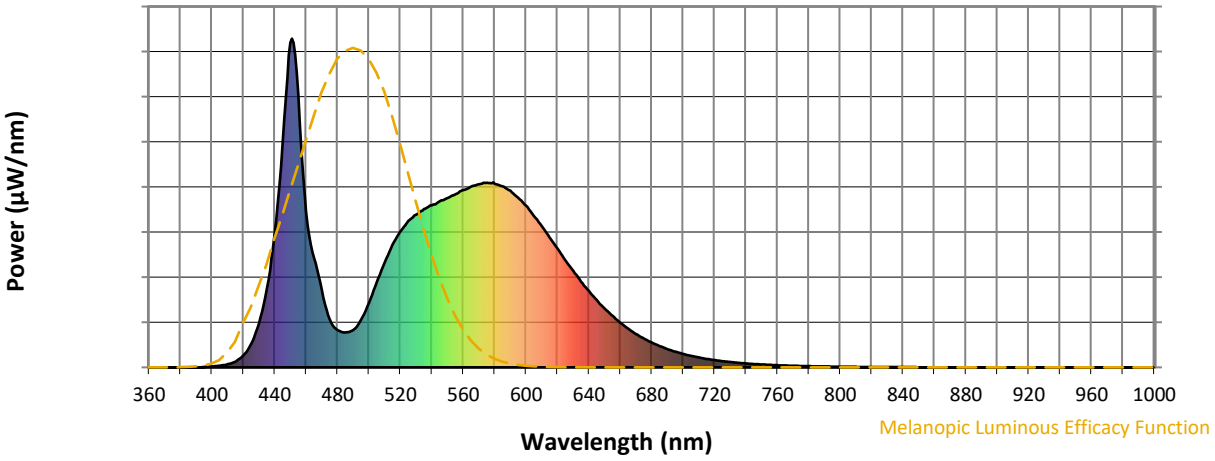
## Melanopic Flux vs. Wavelength




**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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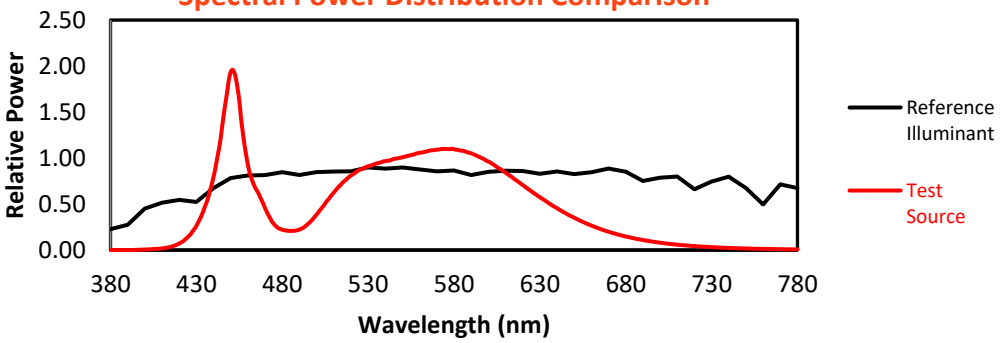
# TM-30-18

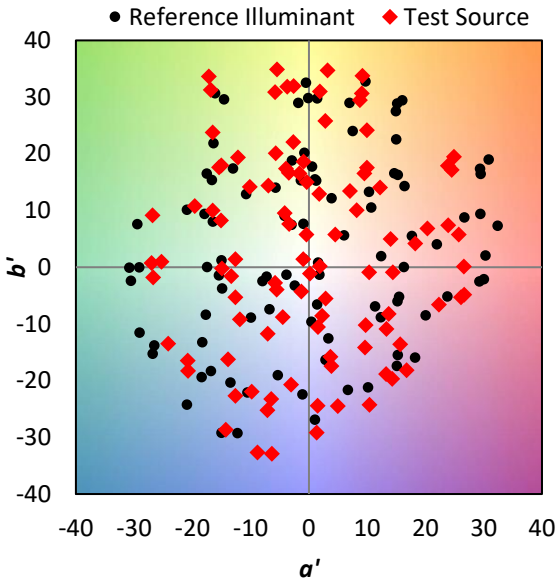
## Summary

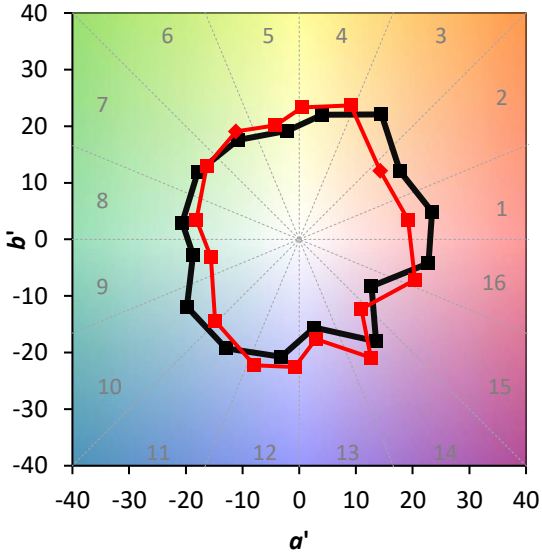
$R_f$ = 73.7
$R_g$ = 93
CIE $R_a$ = 72.0
$R_9$ = -39.6

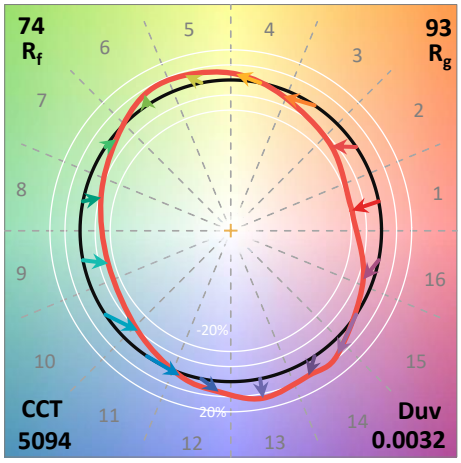
## Spectral Power Distribution Comparison

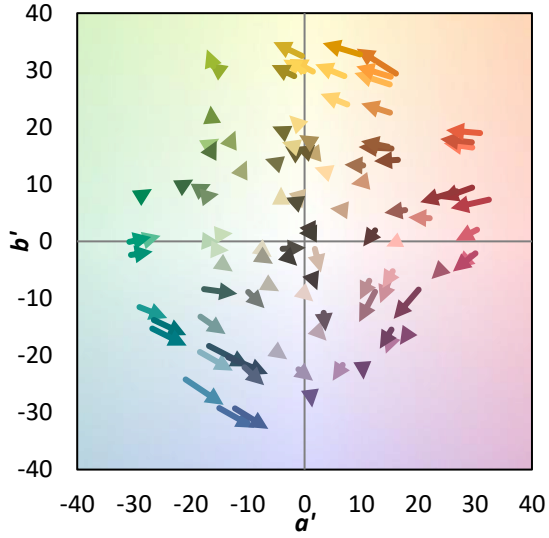



## Color Vector Graphics



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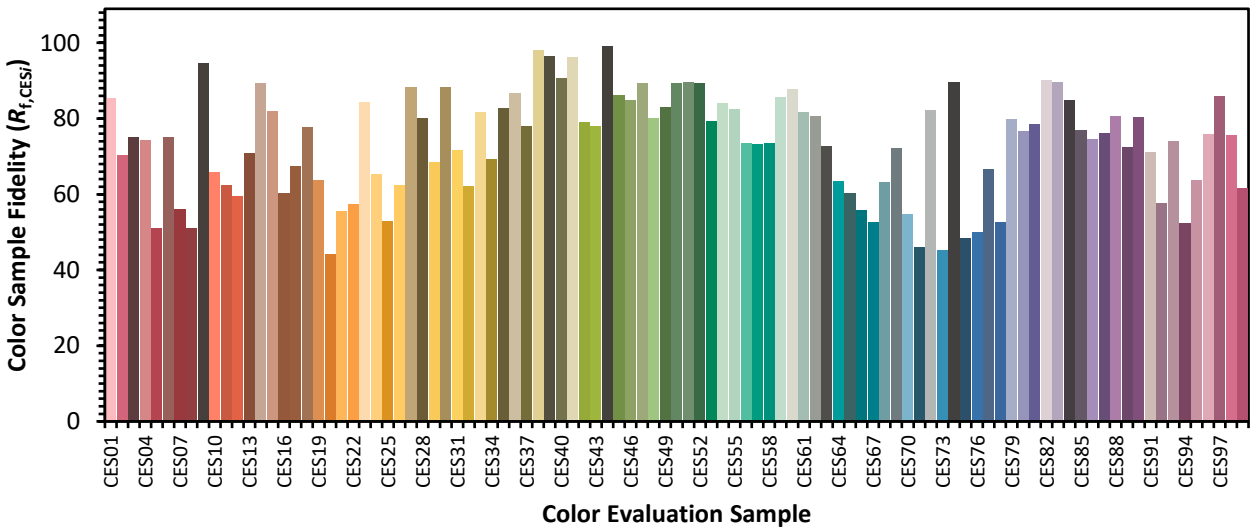
# TM-30-18

**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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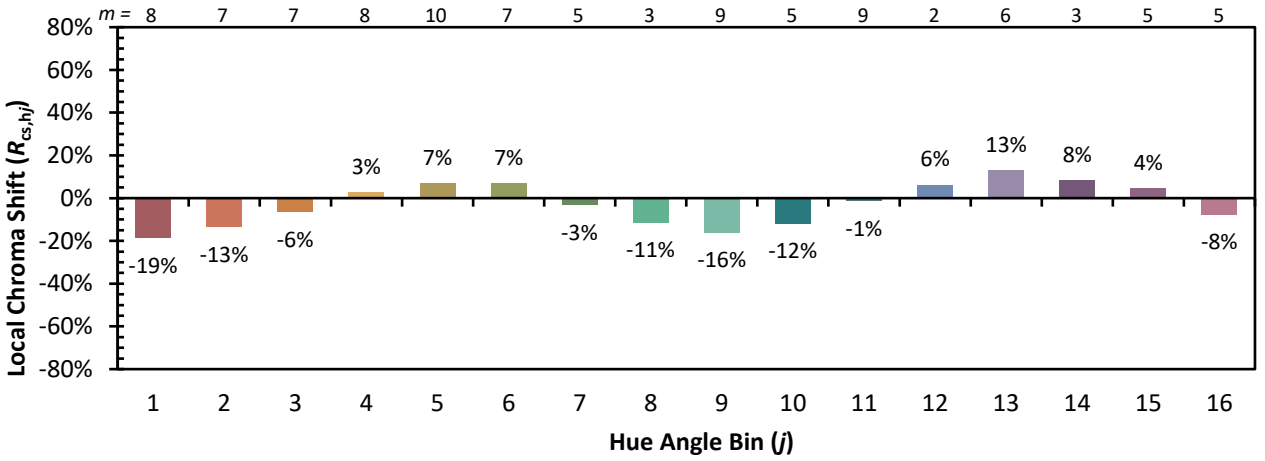
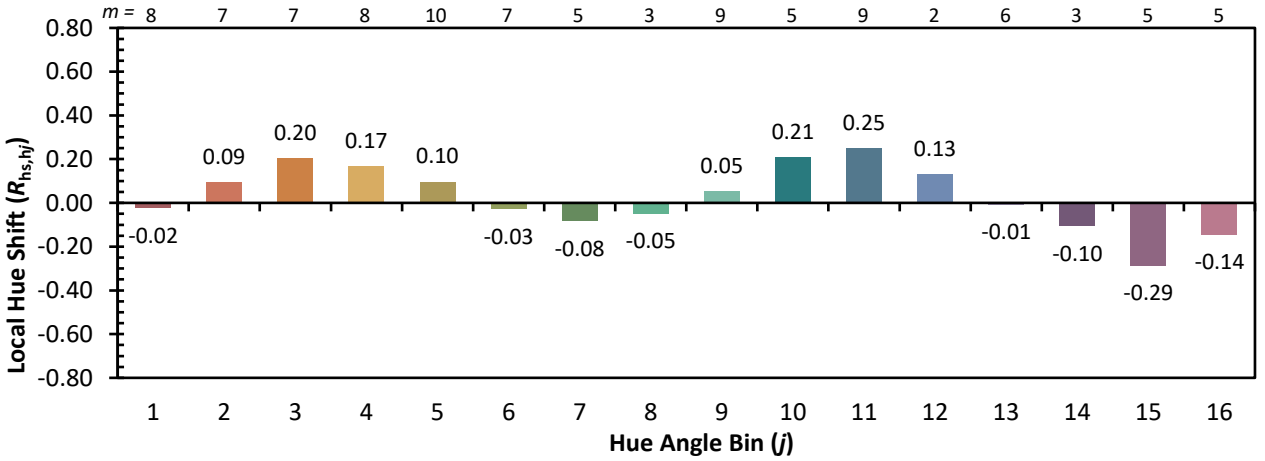
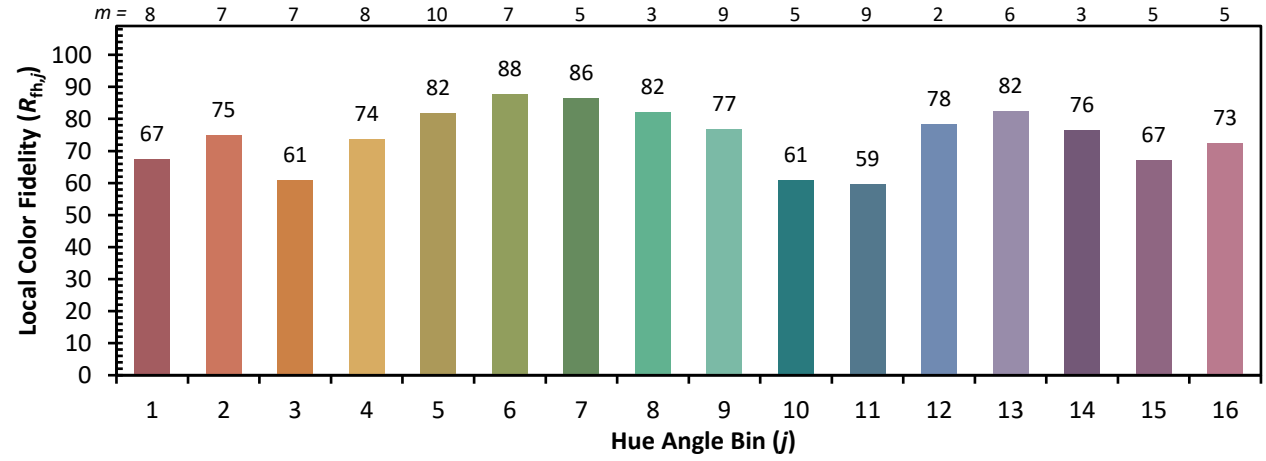
## Color Rendition by Hue-Angle Bin



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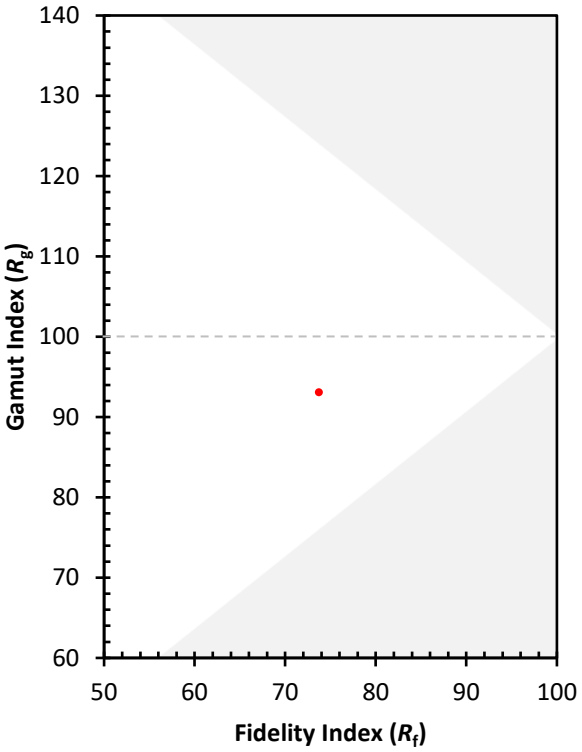
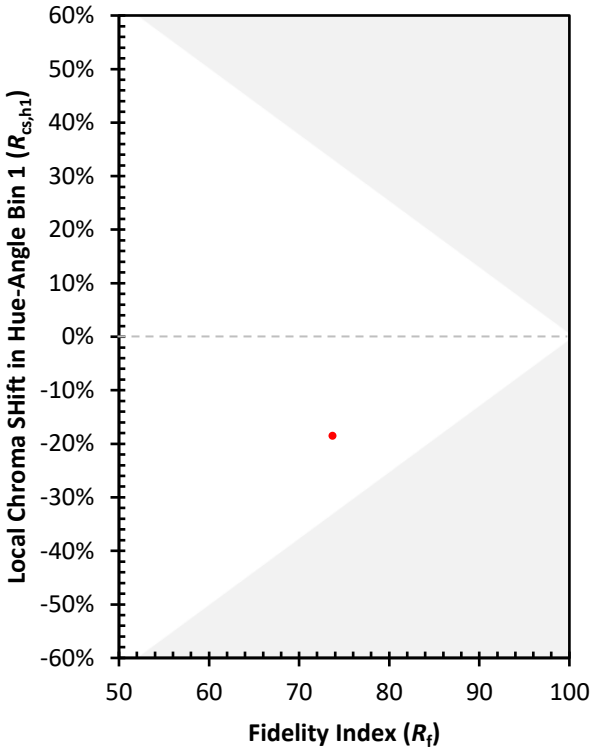
## TM-30-18

### Measure Comparisons

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