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: P868559

Luminaire Tested: **EMM2-HTN-SA2A-727-U-T3-HSS**

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: | P868559 |
| Test Lab: | INNOVATION CENTER(G3) |
| Issue Date: | 08/22/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | INVUE |
| Catalog Number: | EMM2-HTN-SA2A-727-U-T3-HSS |
| Description: | EPIC MODERN TALL HOUSING DISCRETE LED ARRAYS 70W 70CRI 2700K FIXTURE w/ TYPE III DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD |
| Light Source: | (20) 2700K CCT, 70 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 6024.1 lumens |
| Efficiency: | N/A |
| Efficacy: | 98.8 lumens/watt |
| Luminous Opening: | Rectangular (W 0.67' x L: 0.33' x H: 0') |
| IES Classification: | Type III - Short |
| BUG Rating: | B1 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 61 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | 0.99 |
| Total Harmonic Distortion (THDi): | 9.89% |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 24 FT |

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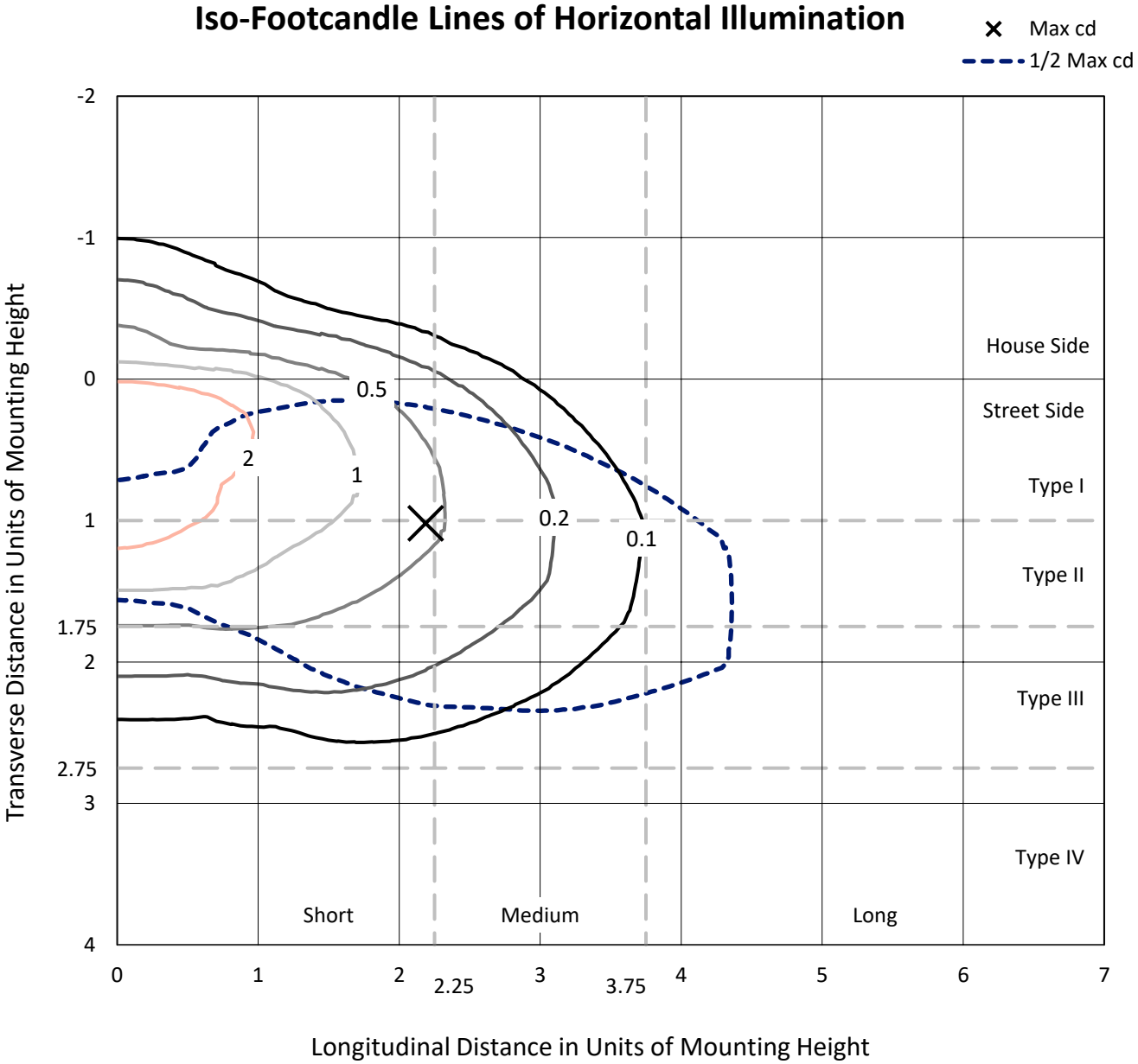
Scaled Data Report

REPORT NUMBER: P868559
CATALOG NUMBER: EMM2-HTN-SA2A-727-U-T3-HSS

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 3.4 fc
Type III - Short - N/A

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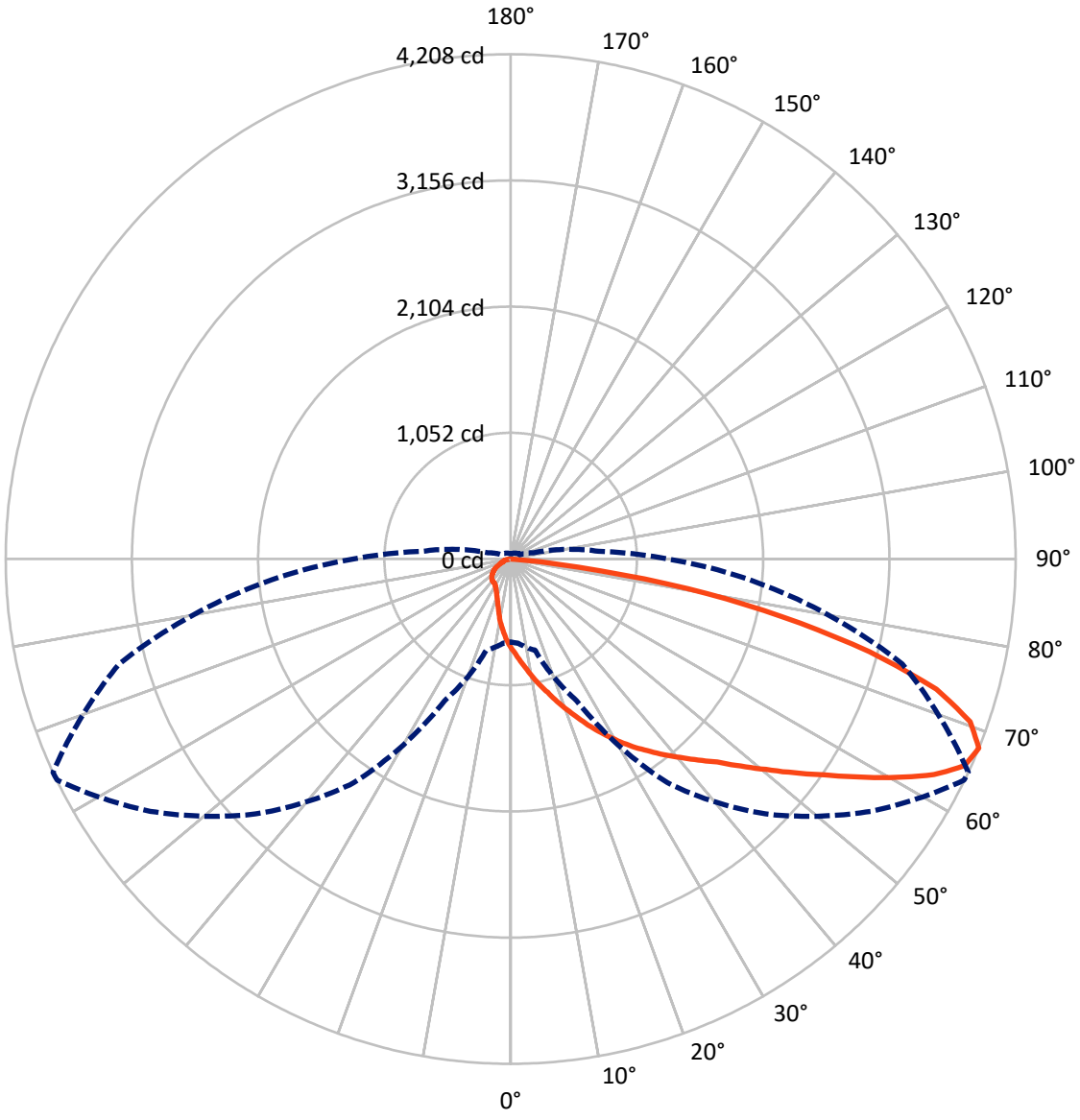
## Luminous Intensity Polar Plot



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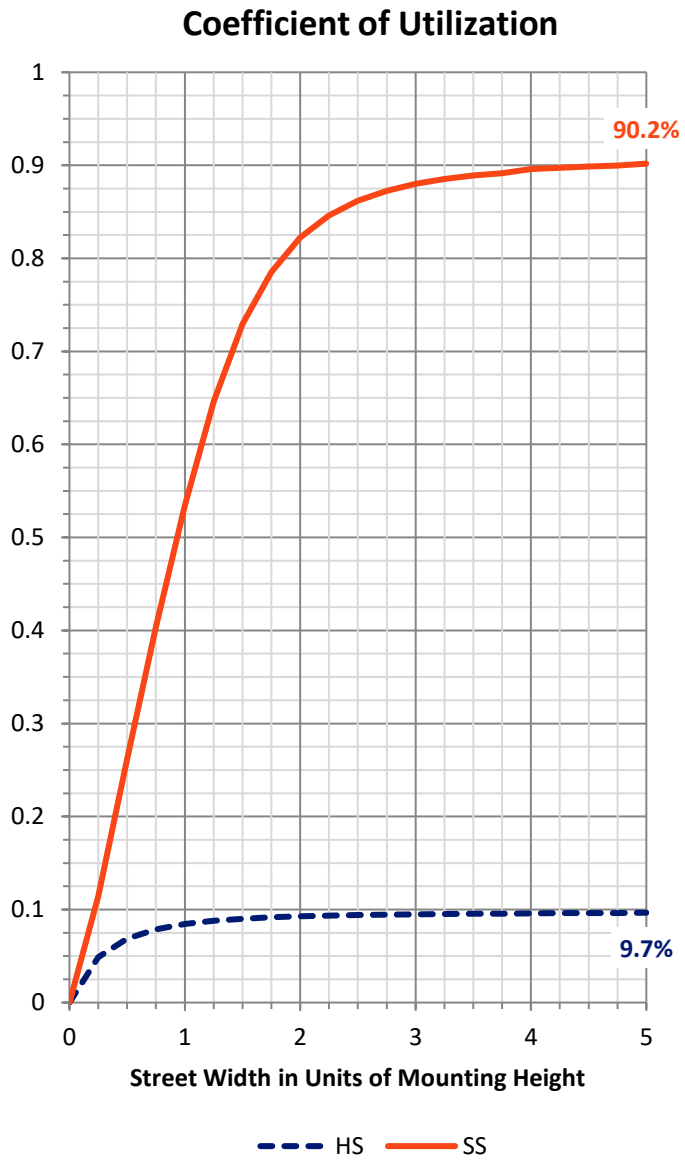
REPORT NUMBER: P868559
CATALOG NUMBER: EMM2-HTN-SA2A-727-U-T3-HSS

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 586.3 | 0.0 | 586.3 |
| | % Fixture | 9.7 | 0.0 | 9.7 |
| **Street Side** | Lumens | 5437.7 | 0.0 | 5437.7 |
| | % Fixture | 90.3 | 0.0 | 90.3 |
| **Total** | Lumens | 6024.1 | 0.0 | 6024.1 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 72.8 | 1.2 |
| 10°-20° | 241.7 | 4.0 |
| 20°-30° | 439.9 | 7.3 |
| 30°-40° | 680.9 | 11.3 |
| 40°-50° | 1029.2 | 17.1 |
| 50°-60° | 1339.0 | 22.2 |
| 60°-70° | 1320.9 | 21.9 |
| 70°-80° | 804.0 | 13.3 |
| 80°-90° | 95.6 | 1.6 |
| 90°-100° | 0.0 | 0.0 |
| 100°-110° | 0.0 | 0.0 |
| 110°-120° | 0.0 | 0.0 |
| 120°-130° | 0.0 | 0.0 |
| 130°-140° | 0.0 | 0.0 |
| 140°-150° | 0.0 | 0.0 |
| 150°-160° | 0.0 | 0.0 |
| 160°-170° | 0.0 | 0.0 |
| 170°-180° | 0.0 | 0.0 |
| 0°-90° | 6024.1 | 100.0 |
| 0°-180° | 6024.1 | 100.0 |



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REPORT NUMBER: P868559
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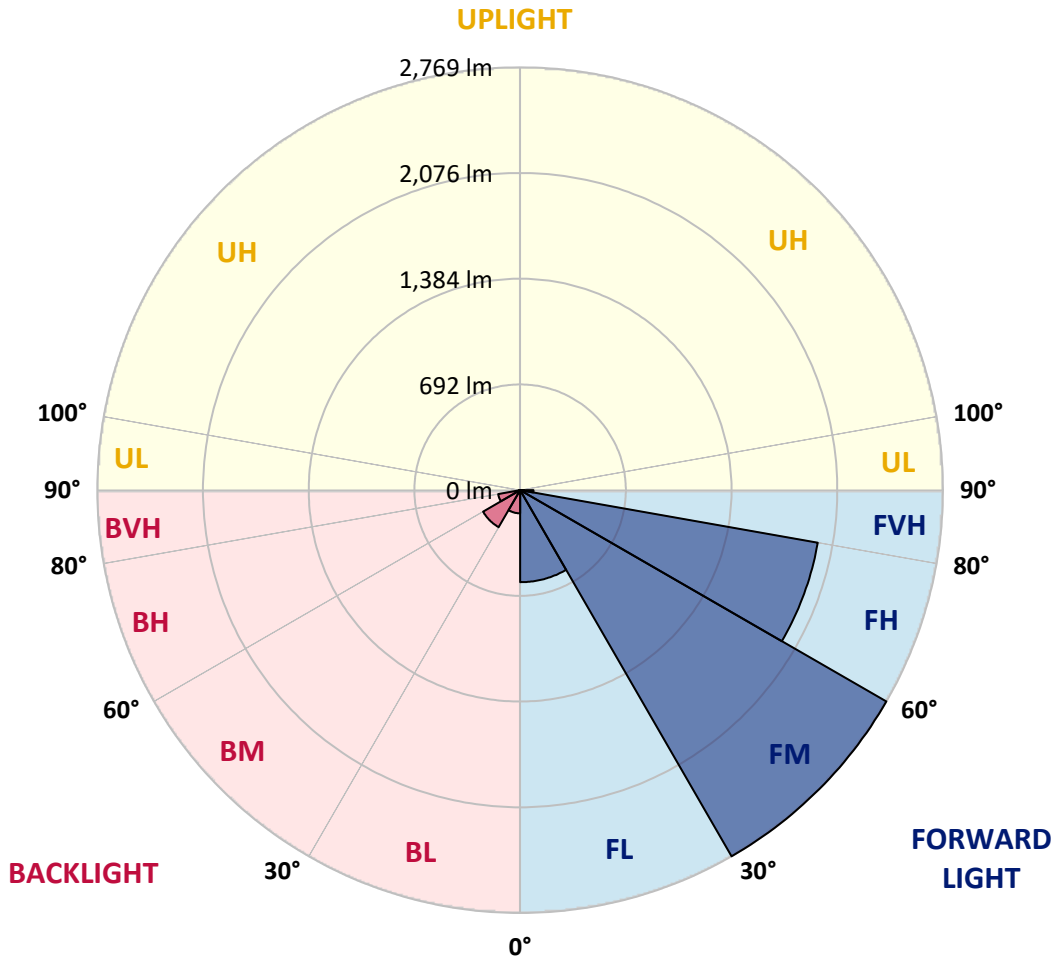
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 602.8 | 10.0 | | | |
| FM | (30°-60°) | 2768.7 | 46.0 | | | |
| FH | (60°-80°) | 1978.9 | 32.9 | | | G2/5000 |
| FVH | (80°-90°) | 87.4 | 1.5 | | | G1/100 |
| BL | (0°-30°) | 151.7 | 2.5 | B1/500 | | |
| BM | (30°-60°) | 280.4 | 4.7 | B1/1000 | | |
| BH | (60°-80°) | 146.0 | 2.4 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 8.2 | 0.1 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B1-U0-G2**
Type III Short



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REPORT NUMBER: P868559
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 64° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 744.4 | 744.4 | 744.4 | 744.4 | 744.4 | 744.4 | 744.4 | 744.4 | *744.4* | 744.4 | 744.4 |
| 2.5° | 869.9 | 863.0 | 868.2 | 856.1 | 842.4 | 832.1 | 811.4 | 794.2 | *792.5* | 775.3 | 756.4 |
| 5° | 1036.6 | 1014.3 | 1016.0 | 991.9 | 962.7 | 931.8 | 899.1 | 856.1 | *856.1* | 814.9 | 771.9 |
| 7.5° | 1186.2 | 1182.8 | 1167.3 | 1129.5 | 1095.1 | 1046.9 | 986.8 | 931.8 | *919.7* | 856.1 | 789.1 |
| 10° | 1330.6 | 1325.4 | 1311.7 | 1282.5 | 1224.0 | 1170.7 | 1095.1 | 1012.6 | *997.1* | 906.0 | 809.7 |
| 12.5° | 1445.8 | 1447.5 | 1432.0 | 1408.0 | 1356.4 | 1292.8 | 1193.1 | 1089.9 | *1076.2* | 954.1 | 830.3 |
| 15° | 1547.2 | 1545.5 | 1542.1 | 1521.4 | 1471.6 | 1413.1 | 1296.2 | 1175.9 | *1153.5* | 1005.7 | 851.0 |
| 17.5° | 1624.6 | 1621.1 | 1614.3 | 1597.1 | 1573.0 | 1516.3 | 1404.5 | 1267.0 | *1248.1* | 1065.9 | 875.0 |
| 20° | 1646.9 | 1645.2 | 1645.2 | 1657.2 | 1646.9 | 1612.5 | 1512.8 | 1361.5 | *1340.9* | 1129.5 | 907.7 |
| 22.5° | 1688.2 | 1686.5 | 1684.7 | 1696.8 | 1703.6 | 1700.2 | 1614.3 | 1457.8 | *1438.9* | 1203.4 | 949.0 |
| 25° | 1741.5 | 1738.0 | 1732.9 | 1744.9 | 1753.5 | 1774.1 | 1715.7 | 1571.3 | *1548.9* | 1289.3 | 990.2 |
| 27.5° | 1812.0 | 1815.4 | 1808.5 | 1806.8 | 1806.8 | 1818.8 | 1805.1 | 1672.7 | *1652.1* | 1371.9 | 1038.3 |
| 30° | 1904.8 | 1909.9 | 1897.9 | 1889.3 | 1873.8 | 1872.1 | 1875.6 | 1786.2 | *1756.9* | 1461.3 | 1088.2 |
| 32.5° | 1995.9 | 2001.1 | 1994.2 | 1982.1 | 1942.6 | 1927.1 | 1940.9 | 1882.4 | *1863.5* | 1559.2 | 1151.8 |
| 35° | 2069.8 | 2081.9 | 2081.9 | 2057.8 | 2002.8 | 1994.2 | 2016.5 | 1977.0 | *1963.2* | 1674.4 | 1227.5 |
| 37.5° | 2169.5 | 2176.4 | 2169.5 | 2124.8 | 2056.1 | 2066.4 | 2100.8 | 2076.7 | *2068.1* | 1798.2 | 1316.8 |
| 40° | 2382.7 | 2391.3 | 2346.6 | 2240.0 | 2130.0 | 2142.0 | 2202.2 | 2188.4 | *2174.7* | 1920.3 | 1399.4 |
| 42.5° | 2680.1 | 2659.5 | 2650.9 | 2413.6 | 2243.5 | 2236.6 | 2312.2 | 2293.3 | *2291.6* | 2044.0 | 1475.0 |
| 45° | 2876.1 | 2883.0 | 2840.0 | 2614.8 | 2482.4 | 2353.5 | 2434.3 | 2427.4 | *2413.6* | 2169.5 | 1566.1 |
| 47.5° | 3011.9 | 2996.4 | 2889.8 | 2781.5 | 2807.3 | 2506.5 | 2570.1 | 2587.3 | *2578.7* | 2312.2 | 1677.9 |
| 50° | 3068.6 | 3053.2 | 2982.7 | 2910.5 | 2941.4 | 2681.8 | 2709.3 | 2766.1 | *2757.5* | 2456.6 | 1772.4 |
| 52.5° | 2998.1 | 2979.2 | 2984.4 | 3003.3 | 2987.8 | 2819.4 | 2881.2 | 2970.6 | *2960.3* | 2625.1 | 1882.4 |
| 55° | 2549.5 | 2599.3 | 2791.9 | 2984.4 | 2979.2 | 2924.2 | 3065.2 | 3195.8 | *3175.2* | 2800.4 | 1977.0 |
| 57.5° | 2056.1 | 2083.6 | 2327.7 | 2848.6 | 2951.7 | 3011.9 | 3274.9 | 3436.5 | *3429.6* | 2975.8 | 2062.9 |
| 60° | 1634.9 | 1664.1 | 1849.8 | 2566.6 | 2888.1 | 3103.0 | 3489.8 | 3703.0 | *3696.1* | 3152.9 | 2124.8 |
| 62.5° | 1299.7 | 1299.7 | 1464.7 | 2160.9 | 2766.1 | 3156.3 | 3660.0 | 3971.2 | *3959.1* | 3295.6 | 2140.3 |
| 65° | 935.2 | 947.2 | 1071.0 | 1738.0 | 2568.4 | 3142.6 | 3742.5 | 4162.0 | *4155.1* | 3376.4 | 2107.6 |
| 67.5° | *691.1* | *704.8* | *787.4* | *1303.1* | *2276.1* | *3005.0* | *3666.9* | *4205.0* | *4208.4* | *3378.1* | *2001.1* |
| 70° | 539.8 | 543.2 | 605.1 | 906.0 | 1865.2 | 2699.0 | 3383.2 | 4062.3 | *4062.3* | 3293.8 | 1842.9 |
| 72.5° | 410.9 | 414.3 | 467.6 | 617.2 | 1373.6 | 2231.4 | 2958.6 | 3684.1 | *3709.9* | 3070.3 | 1609.1 |
| 75° | 318.0 | 324.9 | 361.0 | 443.5 | 861.3 | 1586.7 | 2430.8 | 3017.1 | *3087.5* | 2637.1 | 1325.4 |
| 77.5° | 245.8 | 252.7 | 281.9 | 324.9 | 502.0 | 978.2 | 1708.8 | 2255.5 | *2319.1* | 2076.7 | 1022.9 |
| 80° | 197.7 | 201.1 | 220.0 | 244.1 | 304.3 | 503.7 | 1043.5 | 1481.9 | *1500.8* | 1411.4 | 677.3 |
| 82.5° | 91.1 | 98.0 | 118.6 | 134.1 | 151.3 | 233.8 | 445.3 | 548.4 | *572.5* | 560.4 | 278.5 |
| 85° | 10.3 | 10.3 | 12.0 | 13.8 | 15.5 | 24.1 | 30.9 | 27.5 | *27.5* | 32.7 | 29.2 |
| 87.5° | 0.0 | 0.0 | 0.0 | 1.7 | 3.4 | 3.4 | 5.2 | 5.2 | *5.2* | 5.2 | 5.2 |
| 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: P868559
CATALOG NUMBER: EMM2-HTN-SA2A-727-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 744.4 | 744.4 | 744.4 | 744.4 | 744.4 | 744.4 | 744.4 | 744.4 | 744.4 | 744.4 | 744.4 |
| 2.5° | 746.1 | 734.1 | 711.7 | 692.8 | 675.6 | 658.4 | 649.8 | 629.2 | 624.0 | 627.5 | 615.4 |
| 5° | 749.5 | 725.5 | 679.1 | 636.1 | 600.0 | 565.6 | 536.4 | 505.4 | 498.5 | 488.2 | 483.1 |
| 7.5° | 754.7 | 718.6 | 646.4 | 579.3 | 524.3 | 474.5 | 438.4 | 414.3 | 395.4 | 390.2 | 388.5 |
| 10° | 761.6 | 710.0 | 610.3 | 526.1 | 450.4 | 398.8 | 366.2 | 349.0 | 342.1 | 336.9 | 338.7 |
| 12.5° | 766.7 | 701.4 | 575.9 | 465.9 | 392.0 | 345.5 | 330.1 | 316.3 | 312.9 | 311.2 | 311.2 |
| 15° | 773.6 | 692.8 | 534.6 | 412.6 | 342.1 | 314.6 | 299.1 | 294.0 | 294.0 | 292.3 | 292.3 |
| 17.5° | 782.2 | 685.9 | 500.3 | 371.3 | 312.9 | 287.1 | 280.2 | 273.3 | 273.3 | 273.3 | 271.6 |
| 20° | 799.4 | 682.5 | 469.3 | 336.9 | 287.1 | 269.9 | 259.6 | 254.4 | 252.7 | 251.0 | 251.0 |
| 22.5° | 816.6 | 682.5 | 434.9 | 311.2 | 269.9 | 251.0 | 240.7 | 235.5 | 233.8 | 233.8 | 233.8 |
| 25° | 840.6 | 680.8 | 407.4 | 288.8 | 254.4 | 232.1 | 221.8 | 216.6 | 213.2 | 213.2 | 211.5 |
| 27.5° | 868.2 | 680.8 | 383.4 | 271.6 | 237.2 | 214.9 | 202.9 | 197.7 | 192.5 | 192.5 | 190.8 |
| 30° | 895.7 | 684.2 | 362.7 | 257.9 | 220.0 | 199.4 | 183.9 | 177.1 | 173.6 | 171.9 | 171.9 |
| 32.5° | 931.8 | 694.5 | 349.0 | 247.6 | 204.6 | 183.9 | 168.5 | 161.6 | 158.2 | 156.4 | 156.4 |
| 35° | 986.8 | 720.3 | 350.7 | 242.4 | 194.3 | 170.2 | 154.7 | 146.1 | 144.4 | 144.4 | 142.7 |
| 37.5° | 1045.2 | 744.4 | 355.9 | 239.0 | 183.9 | 159.9 | 144.4 | 135.8 | 134.1 | 134.1 | 134.1 |
| 40° | 1095.1 | 765.0 | 362.7 | 237.2 | 175.4 | 149.6 | 135.8 | 128.9 | 125.5 | 125.5 | 125.5 |
| 42.5° | 1144.9 | 777.0 | 364.5 | 232.1 | 170.2 | 141.0 | 128.9 | 122.1 | 118.6 | 120.3 | 120.3 |
| 45° | 1194.8 | 785.6 | 359.3 | 225.2 | 165.0 | 134.1 | 122.1 | 115.2 | 111.7 | 111.7 | 111.7 |
| 47.5° | 1255.0 | 804.5 | 350.7 | 214.9 | 161.6 | 128.9 | 115.2 | 108.3 | 106.6 | 106.6 | 106.6 |
| 50° | 1315.1 | 820.0 | 343.8 | 202.9 | 153.0 | 122.1 | 110.0 | 101.4 | 99.7 | 99.7 | 99.7 |
| 52.5° | 1365.0 | 826.9 | 335.2 | 187.4 | 144.4 | 115.2 | 103.1 | 94.6 | 91.1 | 91.1 | 91.1 |
| 55° | 1402.8 | 828.6 | 323.2 | 175.4 | 132.4 | 108.3 | 96.3 | 87.7 | 84.2 | 82.5 | 82.5 |
| 57.5° | 1433.7 | 826.9 | 311.2 | 163.3 | 122.1 | 99.7 | 87.7 | 80.8 | 75.6 | 73.9 | 73.9 |
| 60° | 1450.9 | 821.7 | 294.0 | 147.8 | 108.3 | 91.1 | 80.8 | 72.2 | 68.8 | 67.0 | 67.0 |
| 62.5° | 1440.6 | 808.0 | 269.9 | 123.8 | 98.0 | 82.5 | 73.9 | 67.0 | 61.9 | 60.2 | 60.2 |
| 65° | 1392.5 | 780.5 | 239.0 | 101.4 | 87.7 | 73.9 | 67.0 | 60.2 | 53.3 | 51.6 | 51.6 |
| 67.5° | *1308.3* | *734.1* | *197.7* | *86.0* | *80.8* | *67.0* | *60.2* | *53.3* | *48.1* | *44.7* | *44.7* |
| 70° | 1191.4 | 672.2 | 154.7 | 73.9 | 72.2 | 61.9 | 55.0 | 48.1 | 43.0 | 39.5 | 39.5 |
| 72.5° | 1024.6 | 570.7 | 115.2 | 63.6 | 63.6 | 56.7 | 49.9 | 44.7 | 39.5 | 36.1 | 36.1 |
| 75° | 828.6 | 431.5 | 87.7 | 58.5 | 56.7 | 51.6 | 44.7 | 39.5 | 36.1 | 32.7 | 32.7 |
| 77.5° | 605.1 | 287.1 | 72.2 | 53.3 | 53.3 | 46.4 | 41.3 | 36.1 | 32.7 | 30.9 | 30.9 |
| 80° | 367.9 | 165.0 | 51.6 | 41.3 | 41.3 | 39.5 | 34.4 | 30.9 | 29.2 | 25.8 | 24.1 |
| 82.5° | 149.6 | 63.6 | 27.5 | 20.6 | 20.6 | 18.9 | 12.0 | 10.3 | 10.3 | 10.3 | 8.6 |
| 85° | 15.5 | 10.3 | 6.9 | 5.2 | 5.2 | 5.2 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| 87.5° | 5.2 | 5.2 | 3.4 | 3.4 | 3.4 | 3.4 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 |
| 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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# LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-157-3

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-40-727-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-40-727-U-5WQ-2

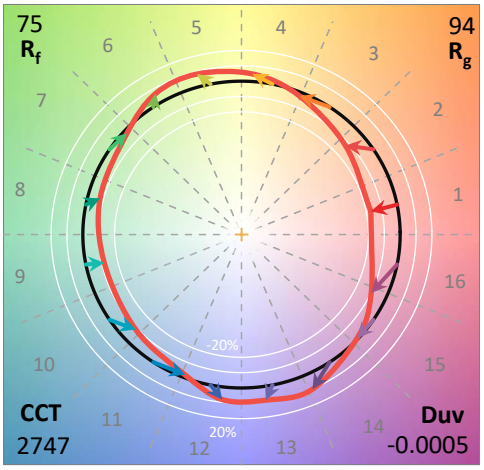
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-157-3 |
| 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-40-727-U-5WQ-2** |
| Description: | Epic Modern Light Square 40W 5WQ Optic and Flare Trim |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 2747 | CRI (Ra): | 71.7 | | |
| CIE u': | 0.2606 | R1: | 68.1 | R9: | -35.3 |
| CIE v': | 0.5257 | R2: | 83.9 | R10: | 64.2 |
| Duv: | -0.0005 | R3: | 94.7 | R11: | 61.7 |
| CIE x: | 0.4552 | R4: | 66.3 | R12: | 53.9 |
| CIE y: | 0.4082 | R5: | 67.4 | R13: | 71.2 |
| CIE z: | 0.1366 | R6: | 78.7 | R14: | 97.6 |
| Peak Wavelength (nm): | 597 | R7: | 75.0 | R15: | 59.3 |
| Dominant Wavelength (nm): | 584 | R8: | 39.4 | | |
| Purity: | 59.16856 | | | | |
| Rf: | 75.5 | | | | |
| Rg: | 93.6 | | | | |




## Test Conditions

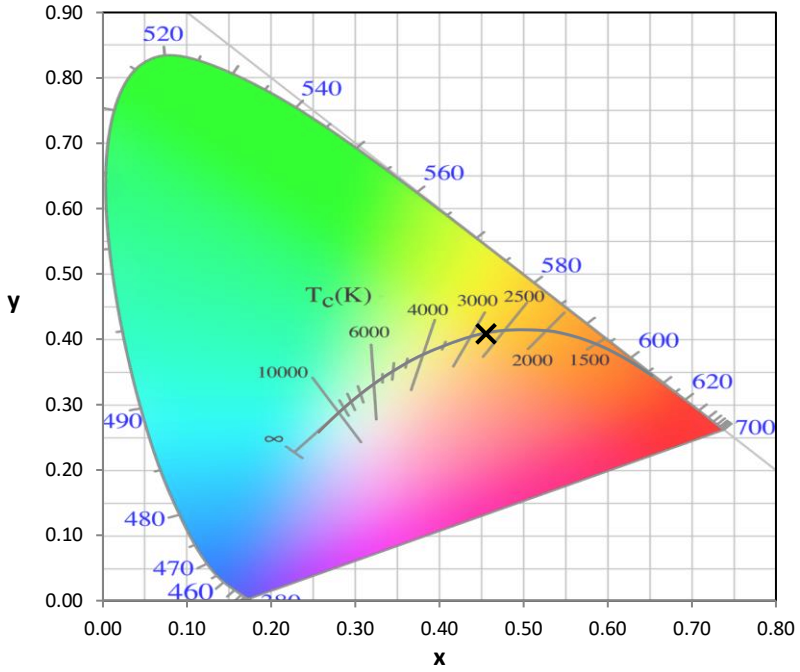
| | |
|---|---|
| Stabilization Time: | 22M |
| Operation Time: | 1H 22M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2407-157-3

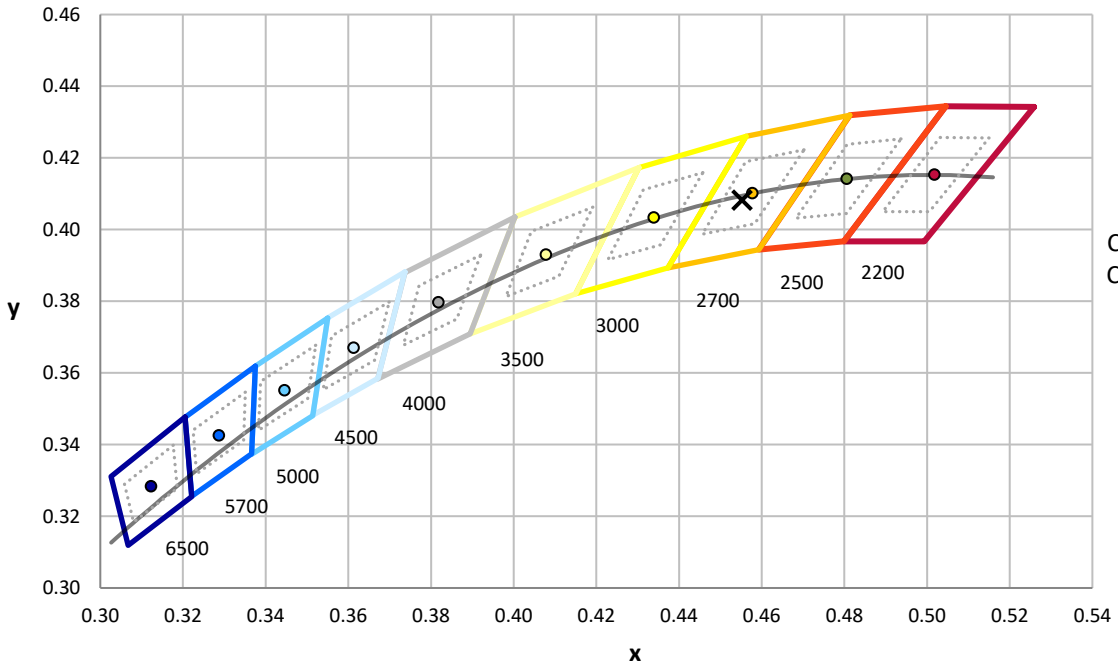
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

REPORT NUMBER: SP1-2407-157-3

**CIE 1931 Chromaticity Diagram**




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




CCT = 2747K
CIE x = 0.4552
CIE y = 0.4082
Duv = -0.0005

Point lies inside the ANSI 2700K 4-step quadrangle

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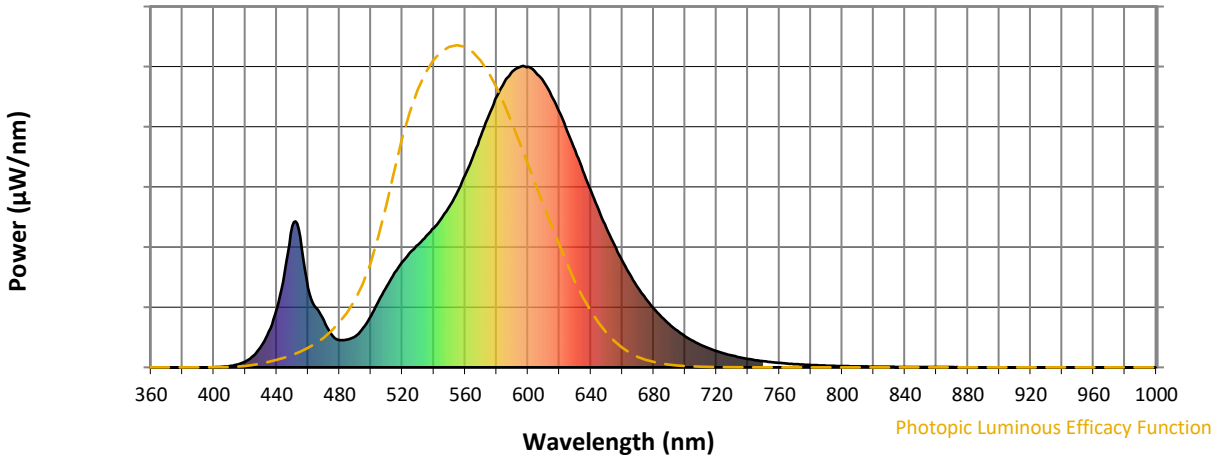
## Photopic Flux vs. Wavelength




## 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 | 103 | NR | 620 | 846 | NR | 750 | 20 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 130 | NR | 625 | 784 | NR | 755 | 17 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 171 | NR | 630 | 720 | NR | 760 | 15 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 221 | NR | 635 | 652 | NR | 765 | 13 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 268 | NR | 640 | 587 | NR | 770 | 11 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 313 | NR | 645 | 521 | NR | 775 | 9 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 350 | NR | 650 | 461 | NR | 780 | 8 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 381 | NR | 655 | 406 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 0 | NR | 530 | 407 | NR | 660 | 353 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 2 | NR | 535 | 435 | NR | 665 | 307 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 4 | NR | 540 | 462 | NR | 670 | 264 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 9 | NR | 545 | 496 | NR | 675 | 227 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 20 | NR | 550 | 534 | NR | 680 | 196 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 38 | NR | 555 | 582 | NR | 685 | 167 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 69 | NR | 560 | 638 | NR | 690 | 144 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 120 | NR | 565 | 700 | NR | 695 | 122 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 193 | NR | 570 | 767 | NR | 700 | 103 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 316 | NR | 575 | 836 | NR | 705 | 88 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 469 | NR | 580 | 898 | NR | 710 | 74 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 431 | NR | 585 | 947 | NR | 715 | 63 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 264 | NR | 590 | 982 | NR | 720 | 54 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 197 | NR | 595 | 997 | NR | 725 | 46 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 155 | NR | 600 | 997 | NR | 730 | 39 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 108 | NR | 605 | 978 | NR | 735 | 33 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 90 | NR | 610 | 947 | NR | 740 | 28 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 92 | NR | 615 | 900 | NR | 745 | 24 | NR | 875 | 1 | NR | | | |

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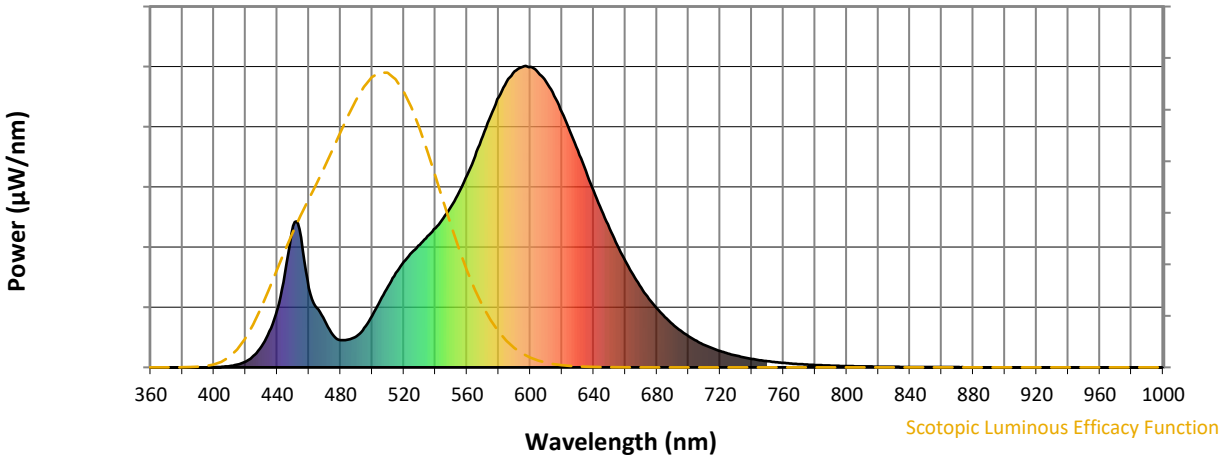
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.13**

| 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 | 103 | NR | 620 | 846 | NR | 750 | 20 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 130 | NR | 625 | 784 | NR | 755 | 17 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 171 | NR | 630 | 720 | NR | 760 | 15 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 221 | NR | 635 | 652 | NR | 765 | 13 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 268 | NR | 640 | 587 | NR | 770 | 11 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 313 | NR | 645 | 521 | NR | 775 | 9 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 350 | NR | 650 | 461 | NR | 780 | 8 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 381 | NR | 655 | 406 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 0 | NR | 530 | 407 | NR | 660 | 353 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 2 | NR | 535 | 435 | NR | 665 | 307 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 4 | NR | 540 | 462 | NR | 670 | 264 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 9 | NR | 545 | 496 | NR | 675 | 227 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 20 | NR | 550 | 534 | NR | 680 | 196 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 38 | NR | 555 | 582 | NR | 685 | 167 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 69 | NR | 560 | 638 | NR | 690 | 144 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 120 | NR | 565 | 700 | NR | 695 | 122 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 193 | NR | 570 | 767 | NR | 700 | 103 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 316 | NR | 575 | 836 | NR | 705 | 88 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 469 | NR | 580 | 898 | NR | 710 | 74 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 431 | NR | 585 | 947 | NR | 715 | 63 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 264 | NR | 590 | 982 | NR | 720 | 54 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 197 | NR | 595 | 997 | NR | 725 | 46 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 155 | NR | 600 | 997 | NR | 730 | 39 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 108 | NR | 605 | 978 | NR | 735 | 33 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 90 | NR | 610 | 947 | NR | 740 | 28 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 92 | NR | 615 | 900 | NR | 745 | 24 | NR | 875 | 1 | NR | | | |

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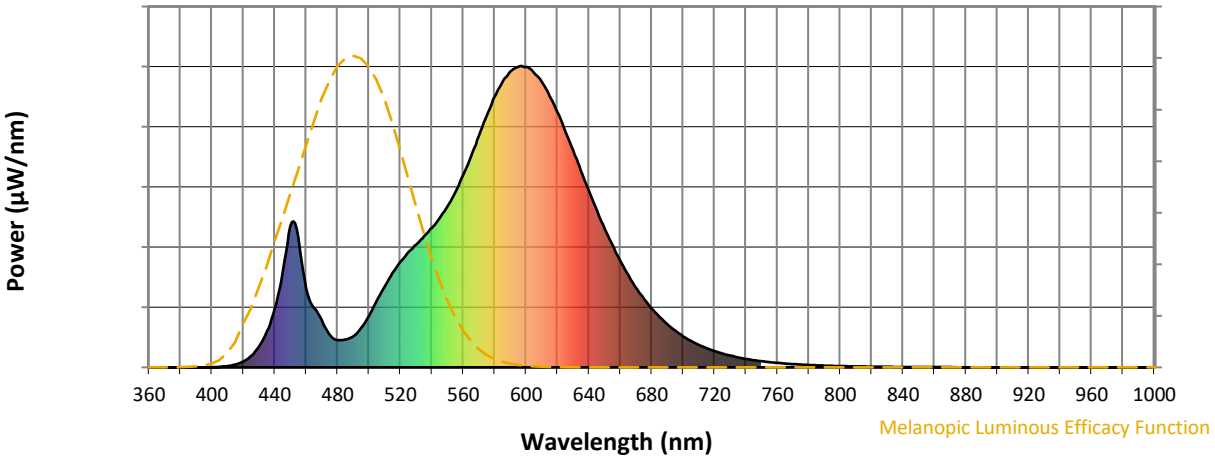
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.04**

| 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 | 103 | NR | 620 | 846 | NR | 750 | 20 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 130 | NR | 625 | 784 | NR | 755 | 17 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 171 | NR | 630 | 720 | NR | 760 | 15 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 221 | NR | 635 | 652 | NR | 765 | 13 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 268 | NR | 640 | 587 | NR | 770 | 11 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 313 | NR | 645 | 521 | NR | 775 | 9 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 350 | NR | 650 | 461 | NR | 780 | 8 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 381 | NR | 655 | 406 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 0 | NR | 530 | 407 | NR | 660 | 353 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 2 | NR | 535 | 435 | NR | 665 | 307 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 4 | NR | 540 | 462 | NR | 670 | 264 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 9 | NR | 545 | 496 | NR | 675 | 227 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 20 | NR | 550 | 534 | NR | 680 | 196 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 38 | NR | 555 | 582 | NR | 685 | 167 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 69 | NR | 560 | 638 | NR | 690 | 144 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 120 | NR | 565 | 700 | NR | 695 | 122 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 193 | NR | 570 | 767 | NR | 700 | 103 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 316 | NR | 575 | 836 | NR | 705 | 88 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 469 | NR | 580 | 898 | NR | 710 | 74 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 431 | NR | 585 | 947 | NR | 715 | 63 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 264 | NR | 590 | 982 | NR | 720 | 54 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 197 | NR | 595 | 997 | NR | 725 | 46 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 155 | NR | 600 | 997 | NR | 730 | 39 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 108 | NR | 605 | 978 | NR | 735 | 33 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 90 | NR | 610 | 947 | NR | 740 | 28 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 92 | NR | 615 | 900 | NR | 745 | 24 | NR | 875 | 1 | NR | | | |

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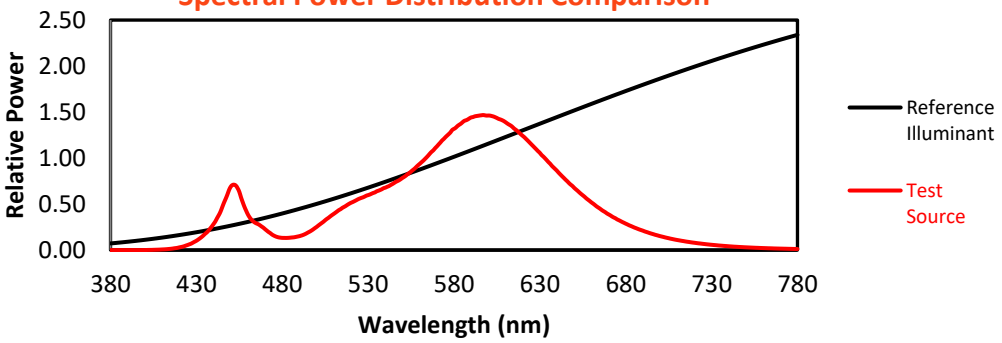
# TM-30-18

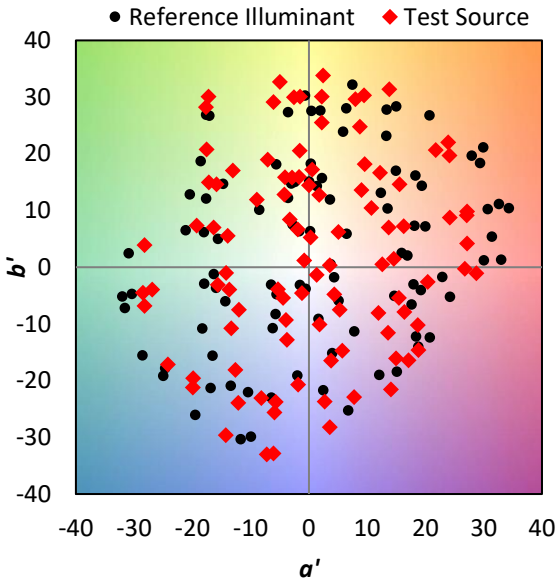
## Summary

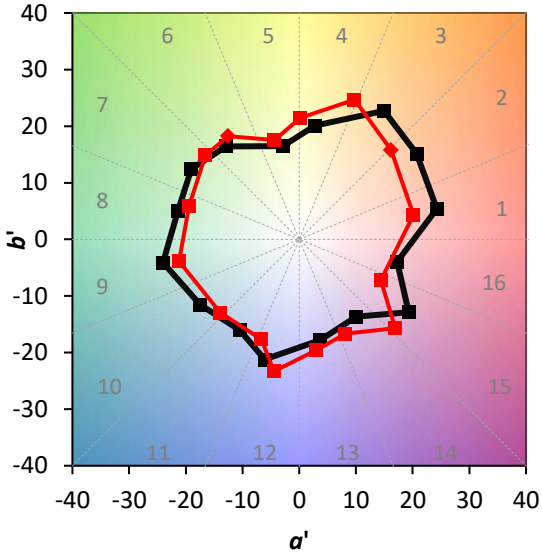
$R_f$ = 75.5
$R_g$ = 93.6
CIE $R_a$ = 71.7
$R_9$ = -35.3

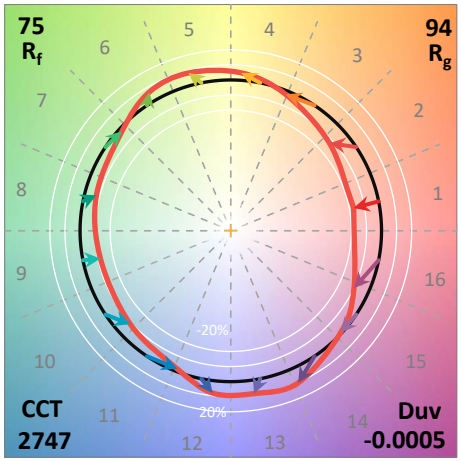
## Spectral Power Distribution Comparison

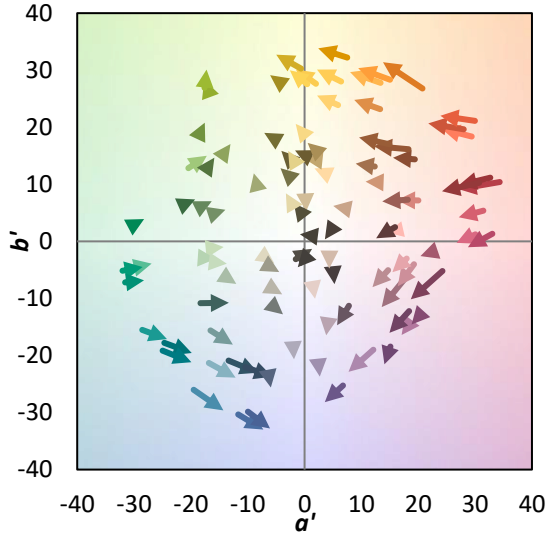



## Color Vector Graphics



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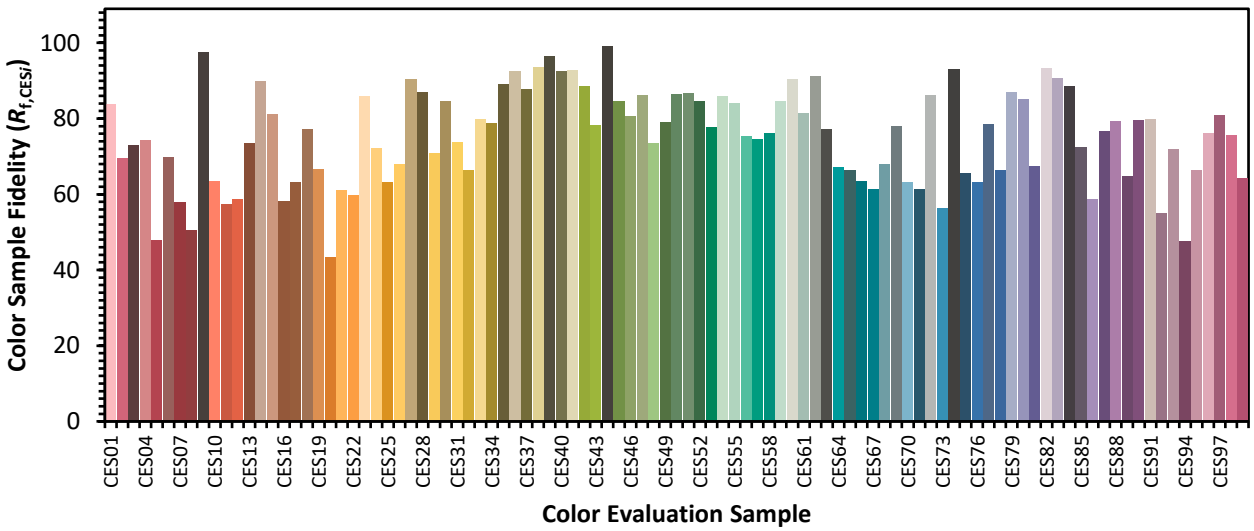
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 68 | CES51 = 87 | CES76 = 63 |
| CES02 = 63 | CES27 = 90 | CES52 = 85 | CES77 = 79 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 66 |
| CES04 = 71 | CES29 = 71 | CES54 = 86 | CES79 = 87 |
| CES05 = 50 | CES30 = 85 | CES55 = 84 | CES80 = 85 |
| CES06 = 52 | CES31 = 74 | CES56 = 75 | CES81 = 67 |
| CES07 = 42 | CES32 = 66 | CES57 = 75 | CES82 = 93 |
| CES08 = 41 | CES33 = 80 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 79 | CES59 = 85 | CES84 = 89 |
| CES10 = 77 | CES35 = 89 | CES60 = 90 | CES85 = 72 |
| CES11 = 60 | CES36 = 93 | CES61 = 81 | CES86 = 59 |
| CES12 = 66 | CES37 = 88 | CES62 = 91 | CES87 = 77 |
| CES13 = 43 | CES38 = 93 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 97 | CES64 = 67 | CES89 = 65 |
| CES15 = 72 | CES40 = 93 | CES65 = 66 | CES90 = 80 |
| CES16 = 48 | CES41 = 93 | CES66 = 63 | CES91 = 80 |
| CES17 = 51 | CES42 = 89 | CES67 = 61 | CES92 = 55 |
| CES18 = 57 | CES43 = 78 | CES68 = 68 | CES93 = 72 |
| CES19 = 73 | CES44 = 99 | CES69 = 78 | CES94 = 48 |
| CES20 = 67 | CES45 = 85 | CES70 = 63 | CES95 = 66 |
| CES21 = 88 | CES46 = 81 | CES71 = 61 | CES96 = 76 |
| CES22 = 80 | CES47 = 86 | CES72 = 86 | CES97 = 81 |
| CES23 = 92 | CES48 = 74 | CES73 = 56 | CES98 = 76 |
| CES24 = 91 | CES49 = 79 | CES74 = 93 | CES99 = 64 |
| CES25 = 73 | CES50 = 86 | CES75 = 66 | |



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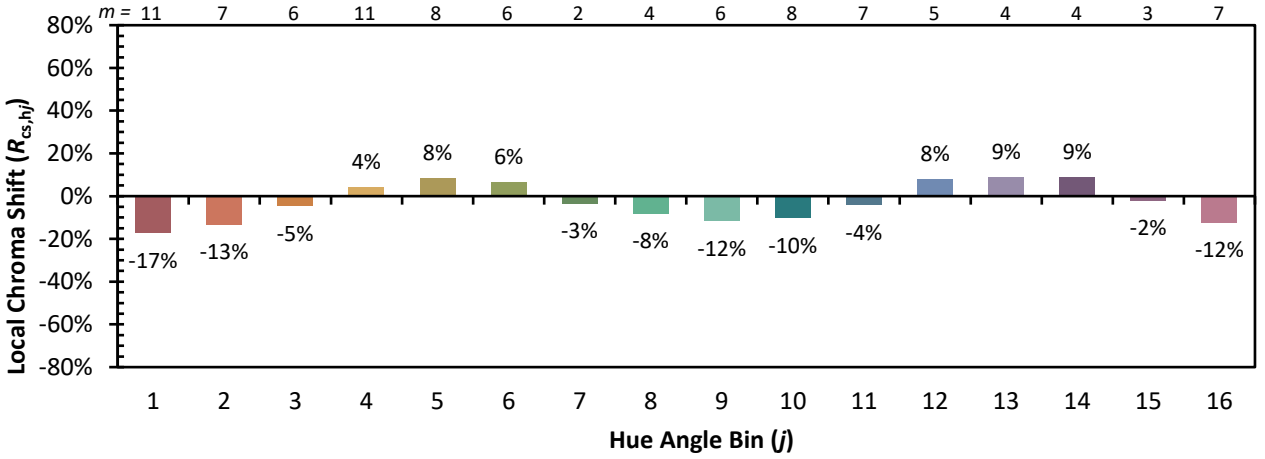
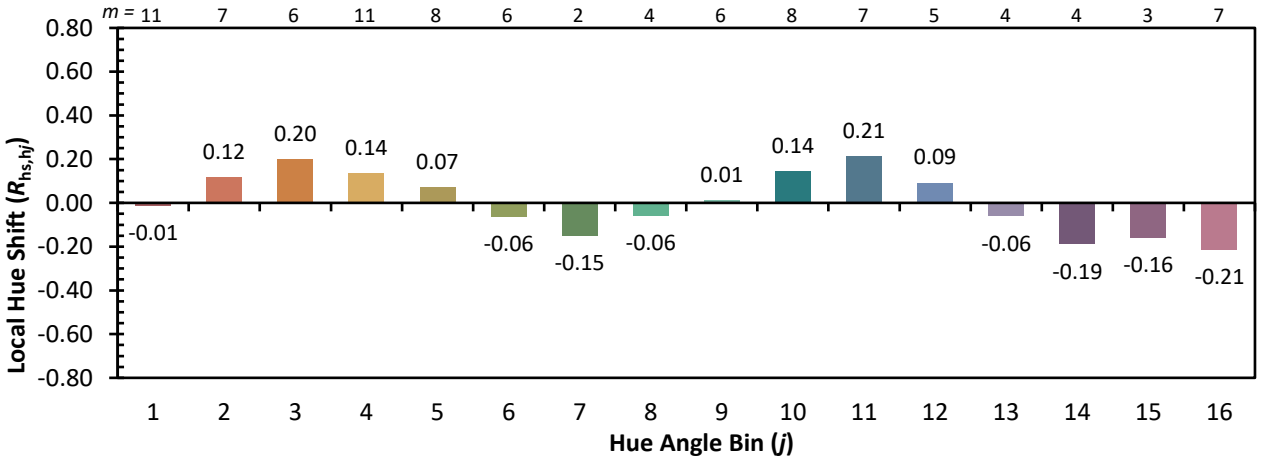
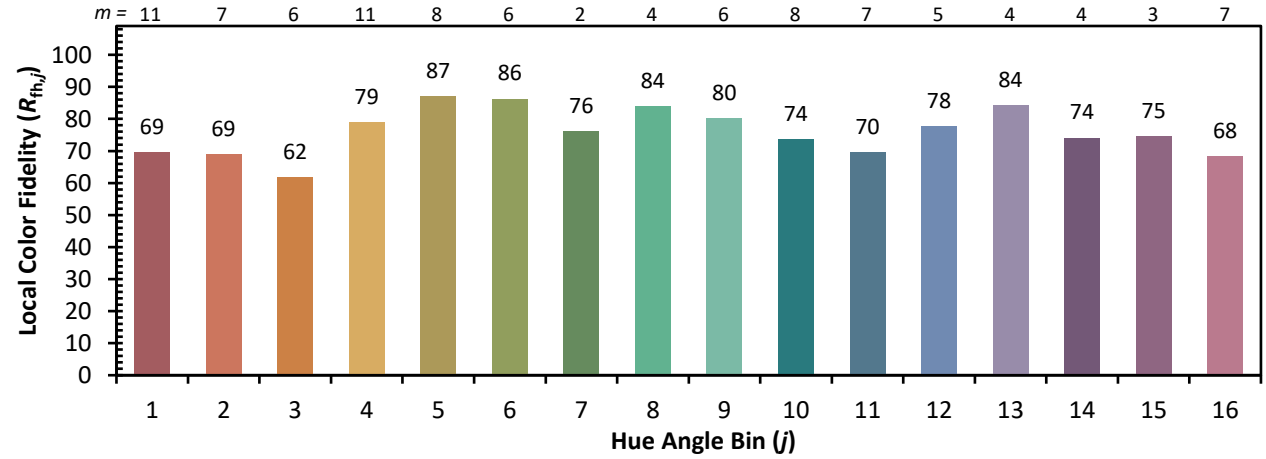
**TM-30-18**

## Color Rendition by Hue-Angle Bin



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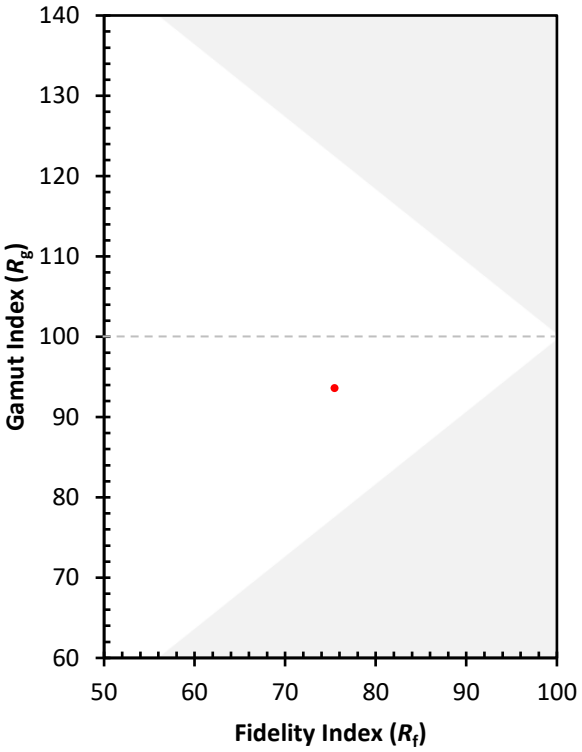
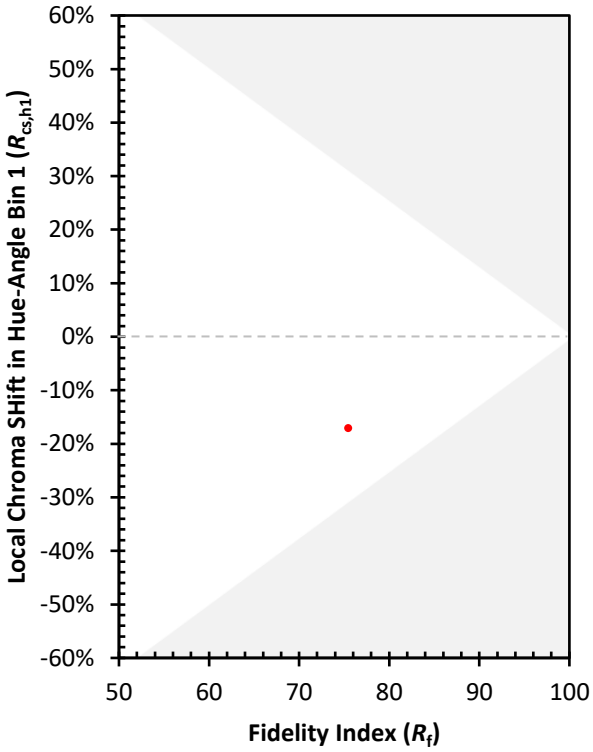
# TM-30-18

## Measure Comparisons




(END OF REPORT)