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: STREETWORKS

Report Number: P868141

Luminaire Tested: **MEM2-HSN-SA-130-727-U-T4W-HSS**

Issue Date: 08/21/2024

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: | P868141 |
| Test Lab: | INNOVATION CENTER(G3) |
| Issue Date: | 08/21/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | STREETWORKS |
| Catalog Number: | MEM2-HSN-SA-130-727-U-T4W-HSS |
| Description: | EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 130W 70CRI 2700K FIXTURE w/ TYPE IV WIDE DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD |
| Light Source: | (30) 2700K CCT, 70 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 12455.4 lumens |
| Efficiency: | N/A |
| Efficacy: | 93.0 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 0.33' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B1 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 134 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | 0.99 |
| Total Harmonic Distortion (THDi): | 6.70% |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 24 FT |

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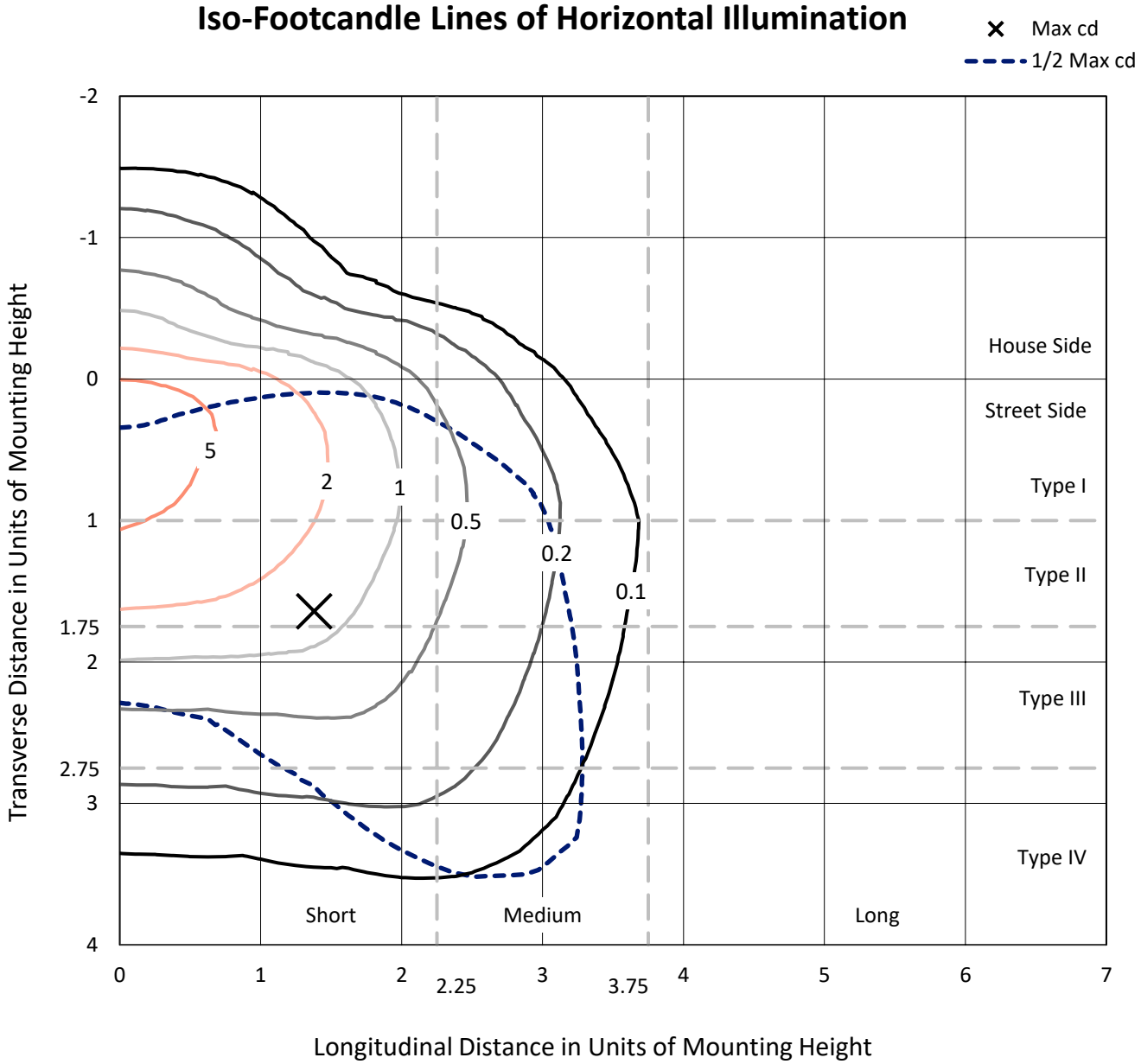
Scaled Data Report

REPORT NUMBER: P868141
CATALOG NUMBER: MEM2-HSN-SA-130-727-U-T4W-HSS

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 7.2 fc
Type IV - Short - N/A

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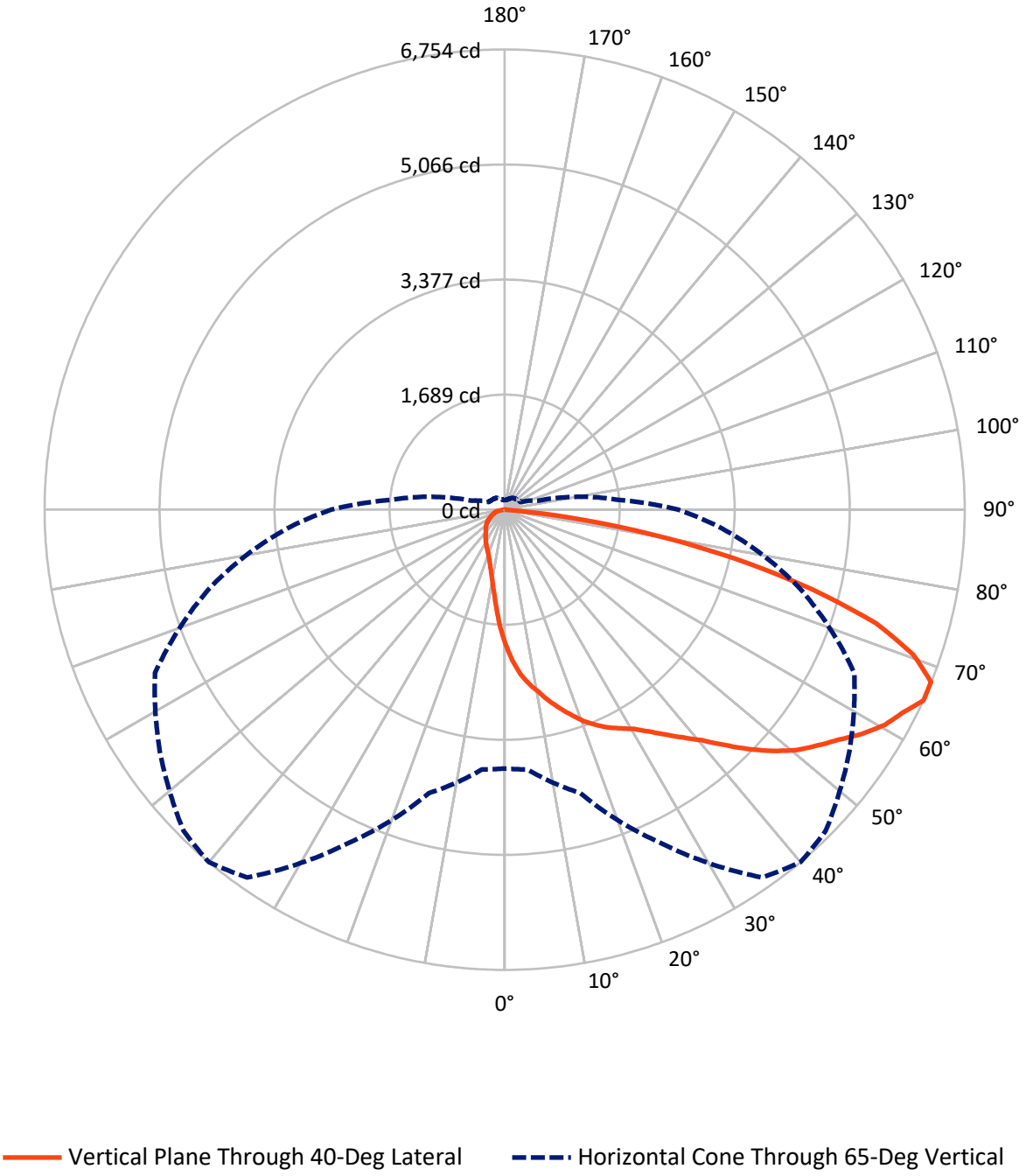
## Luminous Intensity Polar Plot



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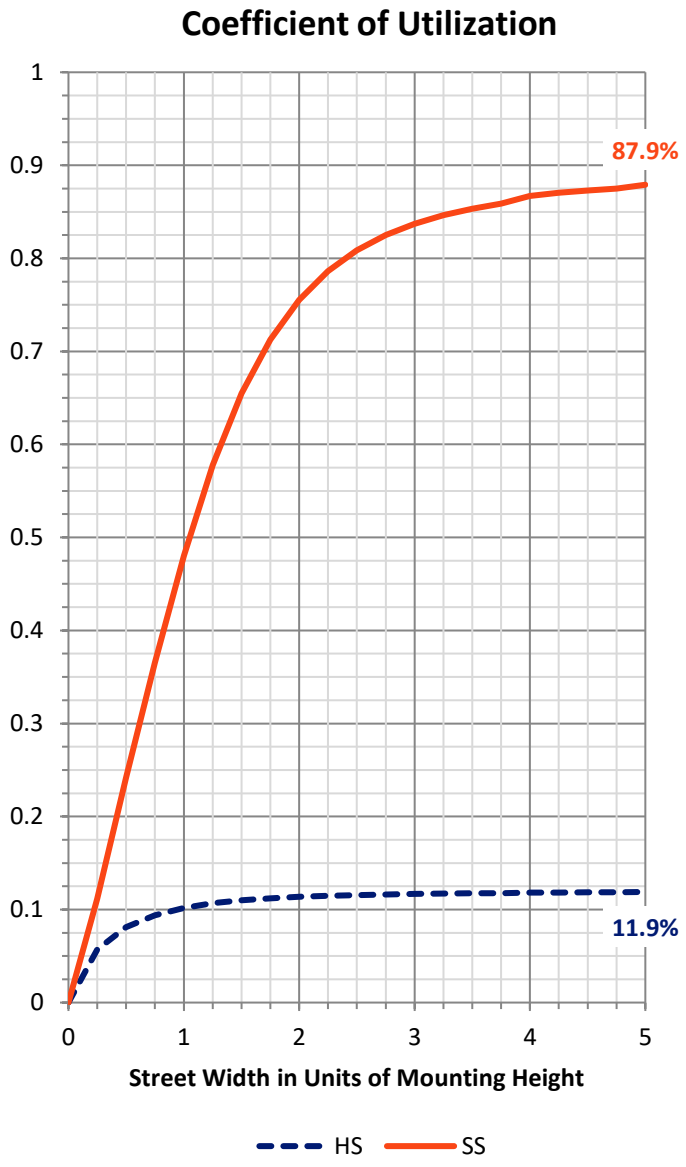
REPORT NUMBER: P868141
CATALOG NUMBER: MEM2-HSN-SA-130-727-U-T4W-HSS

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1491.2 | 0.0 | 1491.2 |
| | % Fixture | 12.0 | 0.0 | 12.0 |
| **Street Side** | Lumens | 10964.2 | 0.0 | 10964.2 |
| | % Fixture | 88.0 | 0.0 | 88.0 |
| **Total** | Lumens | 12455.4 | 0.0 | 12455.4 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 185.3 | 1.5 |
| 10°-20° | 557.3 | 4.5 |
| 20°-30° | 958.6 | 7.7 |
| 30°-40° | 1449.1 | 11.6 |
| 40°-50° | 2118.9 | 17.0 |
| 50°-60° | 2706.3 | 21.7 |
| 60°-70° | 2700.9 | 21.7 |
| 70°-80° | 1583.8 | 12.7 |
| 80°-90° | 195.1 | 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° | 12455.4 | 100.0 |
| 0°-180° | 12455.4 | 100.0 |



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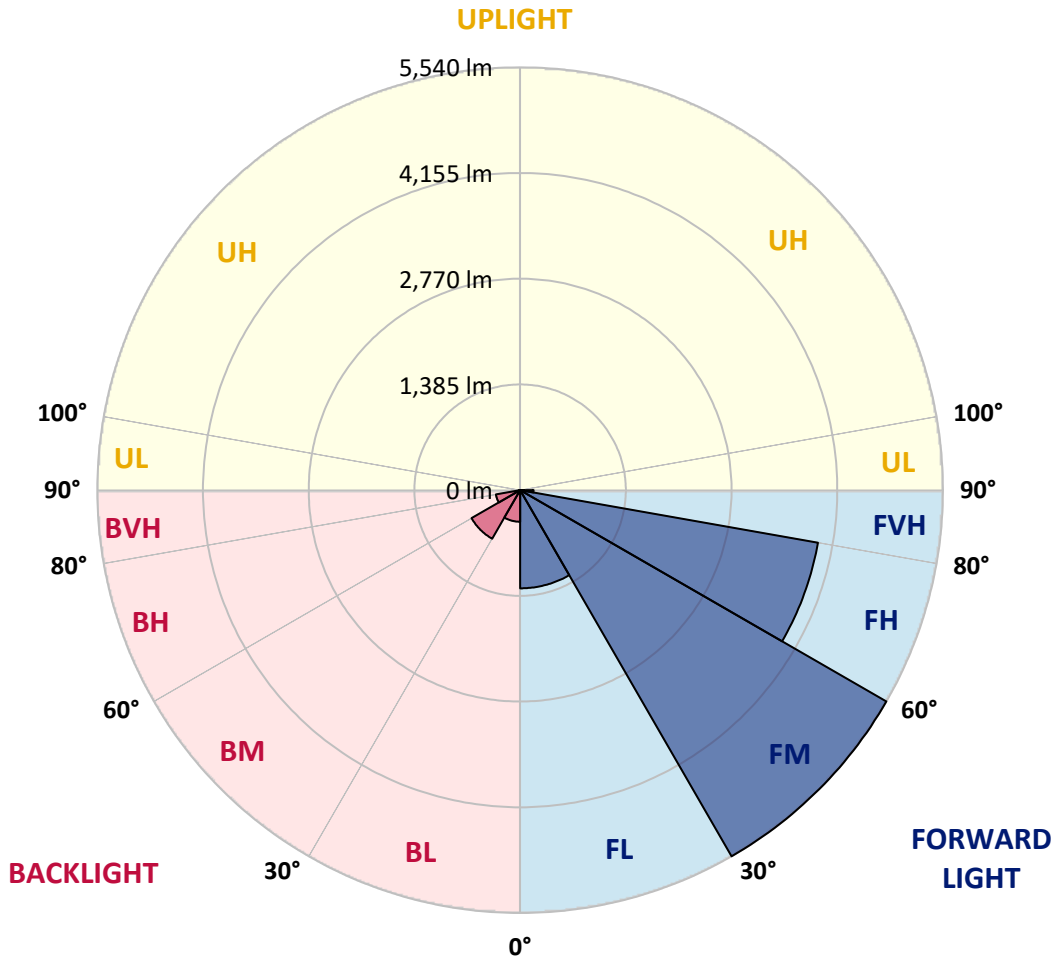
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1286.5 | 10.3 | | | |
| FM | (30°-60°) | 5539.6 | 44.5 | | | |
| FH | (60°-80°) | 3961.9 | 31.8 | | | G2/5000 |
| FVH | (80°-90°) | 176.3 | 1.4 | | | G2/225 |
| BL | (0°-30°) | 414.8 | 3.3 | B1/500 | | |
| BM | (30°-60°) | 734.8 | 5.9 | B1/1000 | | |
| BH | (60°-80°) | 322.9 | 2.6 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 18.8 | 0.2 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

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



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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 40° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1979.9 | 1979.9 | 1979.9 | 1979.9 | 1979.9 | *1979.9* | 1979.9 | 1979.9 | 1979.9 | 1979.9 | 1979.9 |
| 2.5° | 2309.9 | 2299.3 | 2278.3 | 2260.7 | 2236.1 | *2215.1* | 2194.0 | 2155.4 | 2106.3 | 2064.1 | 2011.5 |
| 5° | 2538.0 | 2520.5 | 2506.5 | 2485.4 | 2443.3 | *2425.7* | 2411.7 | 2330.9 | 2246.7 | 2158.9 | 2043.1 |
| 7.5° | 2699.5 | 2713.6 | 2685.5 | 2653.9 | 2601.2 | *2580.2* | 2559.1 | 2478.4 | 2373.1 | 2246.7 | 2081.7 |
| 10° | 2885.6 | 2889.1 | 2854.0 | 2815.4 | 2759.2 | *2717.1* | 2689.0 | 2590.7 | 2474.9 | 2334.4 | 2123.8 |
| 12.5° | 3064.6 | 3064.6 | 3043.5 | 2987.4 | 2913.7 | *2875.0* | 2825.9 | 2713.6 | 2573.2 | 2408.2 | 2173.0 |
| 15° | 3208.5 | 3215.6 | 3198.0 | 3155.9 | 3075.1 | *3022.5* | 2973.3 | 2843.5 | 2664.4 | 2492.4 | 2211.6 |
| 17.5° | 3338.4 | 3334.9 | 3324.4 | 3285.8 | 3208.5 | *3166.4* | 3117.3 | 2973.3 | 2769.7 | 2559.1 | 2271.3 |
| 20° | 3426.2 | 3426.2 | 3422.7 | 3401.6 | 3345.4 | *3313.9* | 3254.2 | 3103.2 | 2885.6 | 2657.4 | 2334.4 |
| 22.5° | 3492.9 | 3489.4 | 3489.4 | 3492.9 | 3461.3 | *3429.7* | 3405.1 | 3254.2 | 3004.9 | 2741.7 | 2397.6 |
| 25° | 3549.1 | 3545.5 | 3556.1 | 3563.1 | 3549.1 | *3542.0* | 3513.9 | 3398.1 | 3152.4 | 2839.9 | 2460.8 |
| 27.5° | 3622.8 | 3633.3 | 3629.8 | 3629.8 | 3626.3 | *3633.3* | 3629.8 | 3531.5 | 3296.3 | 2945.3 | 2527.5 |
| 30° | 3738.6 | 3756.2 | 3745.6 | 3731.6 | 3731.6 | *3735.1* | 3752.7 | 3689.5 | 3464.8 | 3075.1 | 2601.2 |
| 32.5° | 4008.9 | 3991.4 | 3917.6 | 3868.5 | 3875.5 | *3879.0* | 3896.6 | 3861.5 | 3633.3 | 3222.6 | 2678.5 |
| 35° | 4317.8 | 4296.8 | 4216.0 | 4103.7 | 4065.1 | *4051.0* | 4047.5 | 4026.5 | 3815.8 | 3380.6 | 2769.7 |
| 37.5° | 4718.0 | 4725.0 | 4605.7 | 4444.2 | 4328.4 | *4240.6* | 4223.1 | 4177.4 | 3973.8 | 3524.5 | 2864.5 |
| 40° | 5125.2 | 5097.2 | 4995.4 | 4837.4 | 4609.2 | *4447.7* | 4395.1 | 4331.9 | 4152.8 | 3675.4 | 2955.8 |
| 42.5° | 5518.4 | 5465.8 | 5332.4 | 5160.3 | 4893.5 | *4718.0* | 4598.7 | 4517.9 | 4317.8 | 3840.4 | 3043.5 |
| 45° | 6030.9 | 5880.0 | 5641.3 | 5486.8 | 5153.3 | *5009.4* | 4900.6 | 4721.5 | 4514.4 | 4005.4 | 3148.9 |
| 47.5° | 6434.6 | 6143.3 | 5925.6 | 5858.9 | 5423.6 | *5290.2* | 5191.9 | 4942.7 | 4714.5 | 4191.5 | 3257.7 |
| 50° | 6360.9 | 6181.9 | 6129.2 | 6069.5 | 5627.2 | *5546.5* | 5455.2 | 5195.4 | 4918.1 | 4388.0 | 3363.0 |
| 52.5° | 6171.3 | 6192.4 | 6259.1 | 6157.3 | 5806.3 | *5750.1* | 5690.4 | 5465.8 | 5121.7 | 4549.5 | 3457.8 |
| 55° | 6020.4 | 6062.5 | 6241.6 | 6210.0 | 6020.4 | *5957.2* | 5915.1 | 5732.5 | 5318.3 | 4697.0 | 3538.5 |
| 57.5° | 5746.6 | 5711.5 | 5936.1 | 6301.2 | 6248.6 | *6199.4* | 6157.3 | 6013.4 | 5518.4 | 4802.3 | 3591.2 |
| 60° | 5314.8 | 5184.9 | 5486.8 | 6188.9 | 6406.5 | *6413.6* | 6389.0 | 6224.0 | 5679.9 | 4802.3 | 3563.1 |
| 62.5° | 4707.5 | 4584.6 | 4956.7 | 5813.3 | 6490.8 | *6557.5* | 6543.5 | 6297.7 | 5750.1 | 4697.0 | 3454.3 |
| 65° | *3798.3* | *3826.4* | *4307.3* | *5388.5* | *6589.1* | *6754.1* | *6666.3* | *6178.4* | *5662.3* | *4493.4* | *3208.5* |
| 67.5° | 3033.0 | 3117.3 | 3549.1 | 4837.4 | 6543.5 | *6750.6* | 6627.7 | 5841.4 | 5286.7 | 4209.0 | 2832.9 |
| 70° | 2394.1 | 2450.3 | 2808.4 | 4093.2 | 6143.3 | *6360.9* | 6206.5 | 5325.3 | 4651.3 | 3770.2 | 2355.5 |
| 72.5° | 1871.1 | 1923.7 | 2229.1 | 3275.2 | 5448.2 | *5701.0* | 5507.9 | 4630.3 | 3858.0 | 3198.0 | 1871.1 |
| 75° | 1421.7 | 1460.3 | 1688.5 | 2524.0 | 4338.9 | *4654.8* | 4514.4 | 3707.0 | 3012.0 | 2531.0 | 1432.3 |
| 77.5° | 916.2 | 968.9 | 1225.1 | 1769.3 | 3064.6 | *3443.7* | 3461.3 | 2769.7 | 2165.9 | 1828.9 | 1053.1 |
| 80° | 607.3 | 628.4 | 786.3 | 1151.4 | 1885.1 | *2180.0* | 2281.8 | 1871.1 | 1383.1 | 1165.5 | 758.3 |
| 82.5° | 252.8 | 280.8 | 375.6 | 579.2 | 944.3 | *947.8* | 1084.7 | 789.8 | 561.7 | 495.0 | 319.4 |
| 85° | 7.0 | 14.0 | 10.5 | 28.1 | 24.6 | *38.6* | 45.6 | 63.2 | 45.6 | 49.1 | 49.1 |
| 87.5° | 0.0 | 0.0 | 3.5 | 3.5 | 7.0 | *7.0* | 7.0 | 7.0 | 7.0 | 10.5 | 7.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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Scaled Data Report

REPORT NUMBER: P868141
CATALOG NUMBER: MEM2-HSN-SA-130-727-U-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1979.9 | 1979.9 | 1979.9 | 1979.9 | 1979.9 | 1979.9 | 1979.9 | 1979.9 | 1979.9 | 1979.9 | 1979.9 |
| 2.5° | 1986.9 | 1955.3 | 1892.1 | 1843.0 | 1790.3 | 1751.7 | 1716.6 | 1678.0 | 1653.4 | 1656.9 | 1632.4 |
| 5° | 1986.9 | 1927.2 | 1800.9 | 1688.5 | 1586.7 | 1513.0 | 1432.3 | 1369.1 | 1323.4 | 1316.4 | 1337.5 |
| 7.5° | 1997.4 | 1899.1 | 1709.6 | 1541.1 | 1400.7 | 1284.8 | 1200.6 | 1137.4 | 1105.8 | 1084.7 | 1081.2 |
| 10° | 2008.0 | 1878.1 | 1625.3 | 1411.2 | 1235.7 | 1109.3 | 1035.6 | 965.4 | 930.3 | 926.8 | 916.2 |
| 12.5° | 2015.0 | 1853.5 | 1548.1 | 1281.3 | 1098.8 | 979.4 | 905.7 | 849.5 | 821.4 | 821.4 | 817.9 |
| 15° | 2039.6 | 1846.5 | 1467.4 | 1183.0 | 993.5 | 877.6 | 814.4 | 768.8 | 751.2 | 740.7 | 737.2 |
| 17.5° | 2060.6 | 1832.4 | 1397.2 | 1084.7 | 898.7 | 796.9 | 737.2 | 705.6 | 688.0 | 681.0 | 677.5 |
| 20° | 2092.2 | 1825.4 | 1330.5 | 1004.0 | 828.5 | 730.2 | 684.5 | 656.5 | 645.9 | 638.9 | 638.9 |
| 22.5° | 2123.8 | 1818.4 | 1263.8 | 933.8 | 768.8 | 681.0 | 638.9 | 614.3 | 603.8 | 600.3 | 596.8 |
| 25° | 2162.4 | 1814.9 | 1207.6 | 874.1 | 716.1 | 642.4 | 603.8 | 582.7 | 568.7 | 561.7 | 561.7 |
| 27.5° | 2201.0 | 1818.4 | 1151.4 | 814.4 | 670.5 | 607.3 | 568.7 | 544.1 | 533.6 | 519.5 | 523.1 |
| 30° | 2253.7 | 1821.9 | 1105.8 | 765.3 | 631.9 | 572.2 | 537.1 | 505.5 | 491.5 | 484.4 | 484.4 |
| 32.5° | 2306.4 | 1836.0 | 1060.2 | 719.6 | 593.3 | 544.1 | 502.0 | 473.9 | 456.4 | 452.8 | 449.3 |
| 35° | 2362.5 | 1846.5 | 1018.0 | 681.0 | 561.7 | 512.5 | 470.4 | 442.3 | 428.3 | 424.8 | 424.8 |
| 37.5° | 2425.7 | 1864.0 | 986.4 | 645.9 | 530.1 | 480.9 | 442.3 | 414.2 | 403.7 | 400.2 | 400.2 |
| 40° | 2492.4 | 1892.1 | 961.9 | 614.3 | 505.5 | 452.8 | 417.7 | 393.2 | 386.1 | 382.6 | 382.6 |
| 42.5° | 2559.1 | 1916.7 | 940.8 | 589.8 | 480.9 | 428.3 | 400.2 | 375.6 | 365.1 | 365.1 | 365.1 |
| 45° | 2622.3 | 1934.3 | 919.7 | 565.2 | 456.4 | 410.7 | 379.1 | 358.1 | 347.5 | 347.5 | 347.5 |
| 47.5° | 2678.5 | 1951.8 | 888.1 | 540.6 | 431.8 | 386.1 | 361.6 | 340.5 | 330.0 | 330.0 | 330.0 |
| 50° | 2738.1 | 1962.3 | 853.0 | 509.0 | 407.2 | 368.6 | 344.0 | 319.4 | 312.4 | 308.9 | 308.9 |
| 52.5° | 2787.3 | 1962.3 | 807.4 | 477.4 | 379.1 | 344.0 | 323.0 | 301.9 | 291.4 | 284.3 | 284.3 |
| 55° | 2822.4 | 1962.3 | 758.3 | 438.8 | 351.0 | 323.0 | 301.9 | 280.8 | 266.8 | 256.3 | 256.3 |
| 57.5° | 2843.5 | 1951.8 | 702.1 | 393.2 | 323.0 | 294.9 | 280.8 | 256.3 | 228.2 | 207.1 | 200.1 |
| 60° | 2825.9 | 1920.2 | 642.4 | 344.0 | 291.4 | 270.3 | 259.8 | 228.2 | 189.6 | 179.0 | 179.0 |
| 62.5° | 2752.2 | 1846.5 | 582.7 | 301.9 | 266.8 | 245.7 | 235.2 | 200.1 | 172.0 | 161.5 | 161.5 |
| 65° | *2545.1* | *1667.5* | *509.0* | *263.3* | *238.7* | *224.7* | *210.6* | *179.0* | *154.5* | *140.4* | *140.4* |
| 67.5° | 2243.2 | 1439.3 | 424.8 | 231.7 | 214.1 | 203.6 | 193.1 | 161.5 | 136.9 | 122.9 | 122.9 |
| 70° | 1818.4 | 1162.0 | 361.6 | 203.6 | 189.6 | 182.5 | 172.0 | 147.4 | 119.4 | 108.8 | 108.8 |
| 72.5° | 1428.7 | 912.7 | 301.9 | 182.5 | 175.5 | 161.5 | 154.5 | 129.9 | 108.8 | 98.3 | 98.3 |
| 75° | 1063.7 | 681.0 | 266.8 | 161.5 | 161.5 | 143.9 | 140.4 | 115.8 | 94.8 | 87.8 | 87.8 |
| 77.5° | 782.8 | 505.5 | 231.7 | 140.4 | 140.4 | 126.4 | 119.4 | 101.8 | 87.8 | 80.7 | 80.7 |
| 80° | 530.1 | 344.0 | 172.0 | 105.3 | 105.3 | 101.8 | 94.8 | 87.8 | 73.7 | 66.7 | 63.2 |
| 82.5° | 224.7 | 143.9 | 84.3 | 52.7 | 49.1 | 38.6 | 31.6 | 24.6 | 24.6 | 21.1 | 21.1 |
| 85° | 38.6 | 17.6 | 17.6 | 14.0 | 10.5 | 10.5 | 10.5 | 7.0 | 7.0 | 7.0 | 7.0 |
| 87.5° | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| 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: SP1-2407-157-3

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-30-727-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-30-727-U-5WQ-2

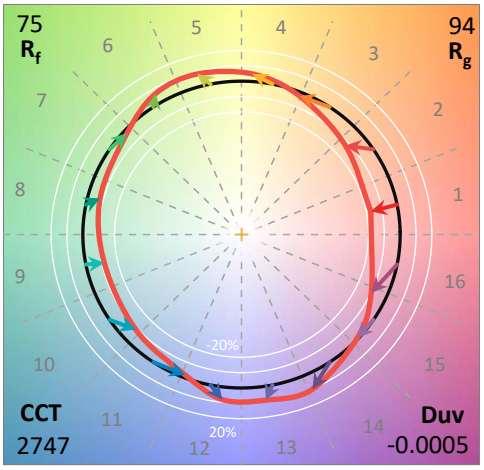
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## 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-30-727-U-5WQ-2** |
| Description: | Epic Modern Light Square 30W 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

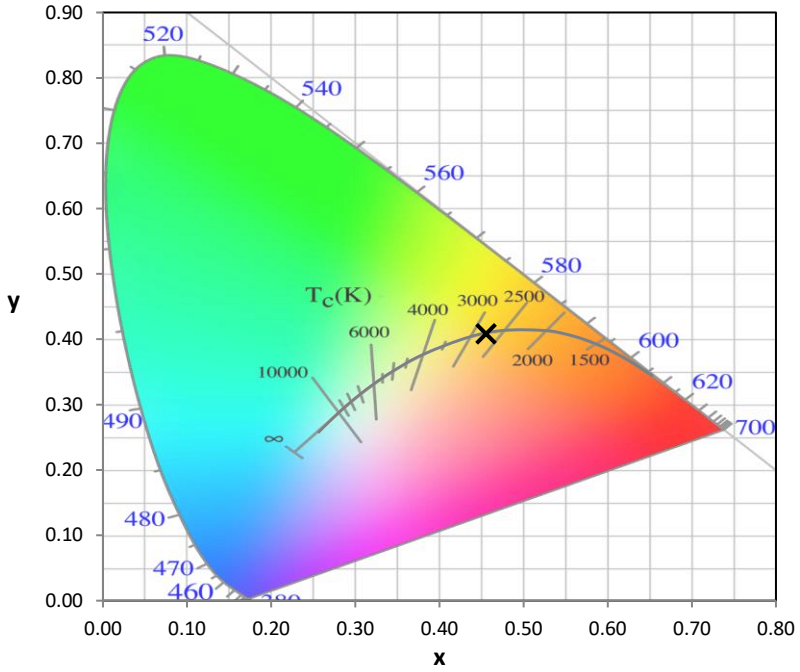
| | |
|---|---|
| Stabilization Time: | 22M |
| Operation Time: | 1H 22M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2407-157-3

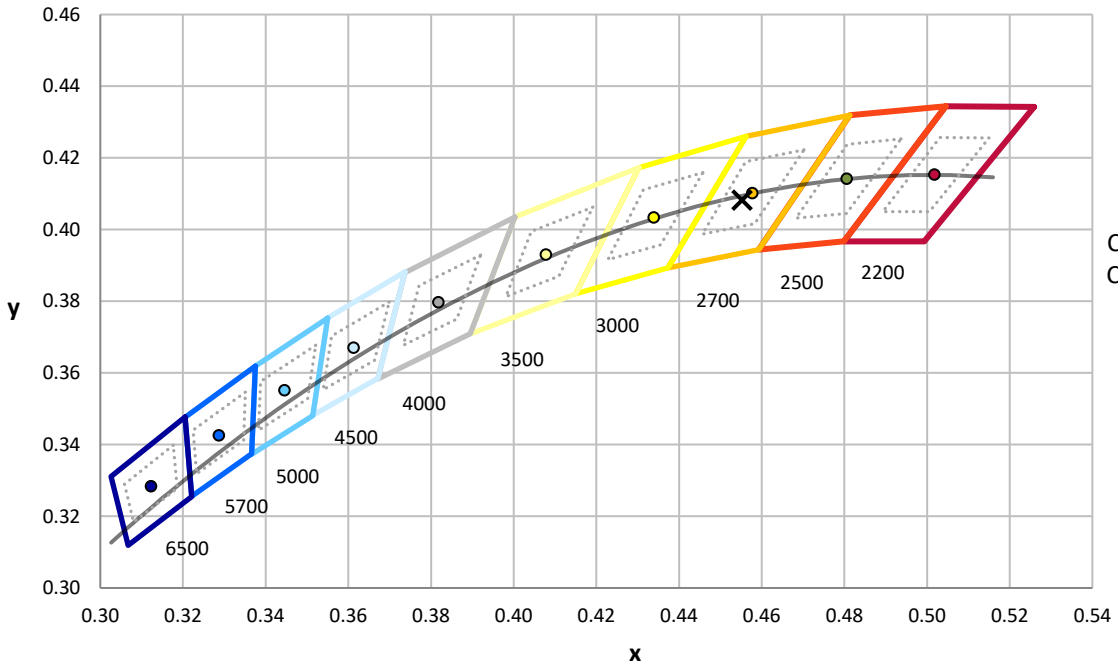
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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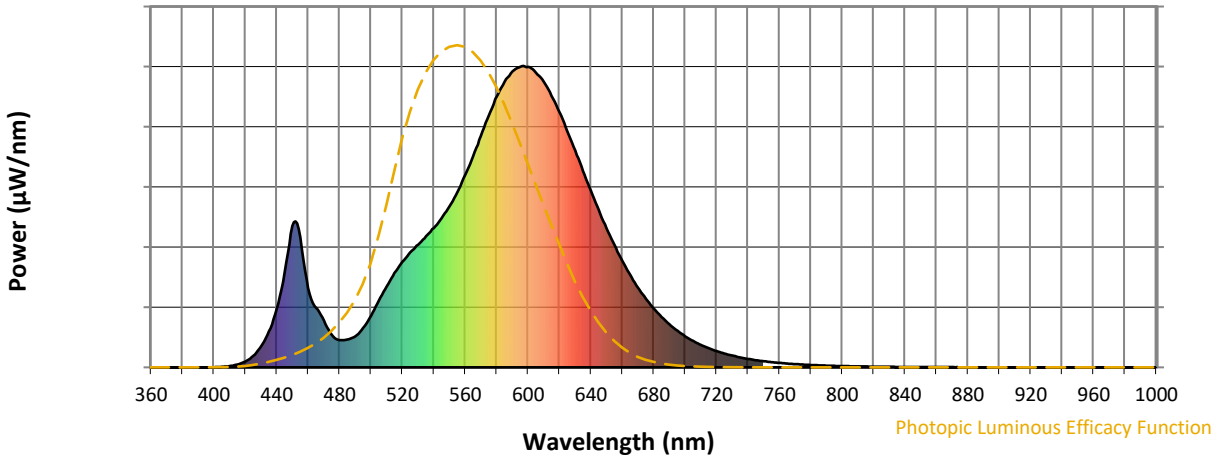
## Photopic Flux vs. Wavelength




## 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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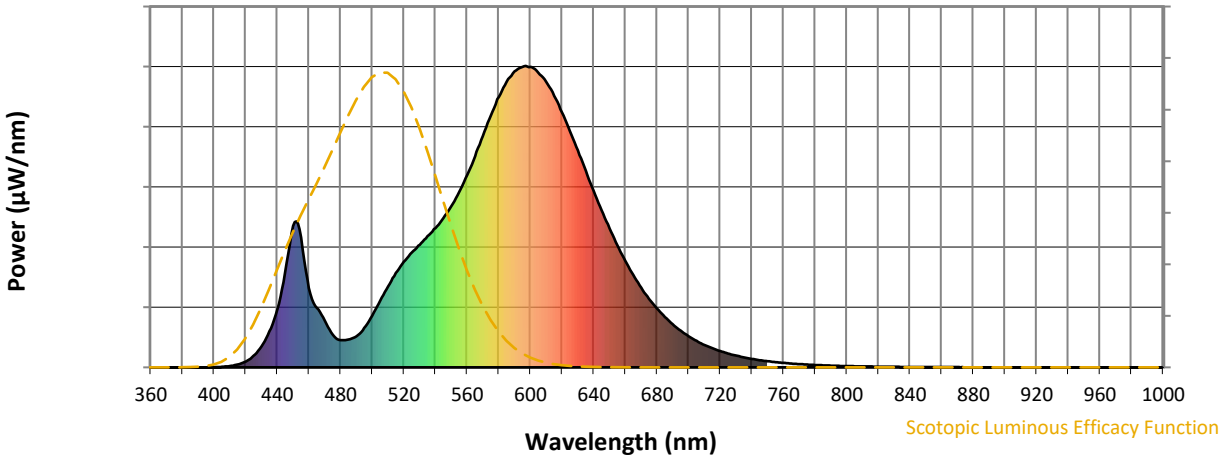
## Scotopic Flux vs. Wavelength




**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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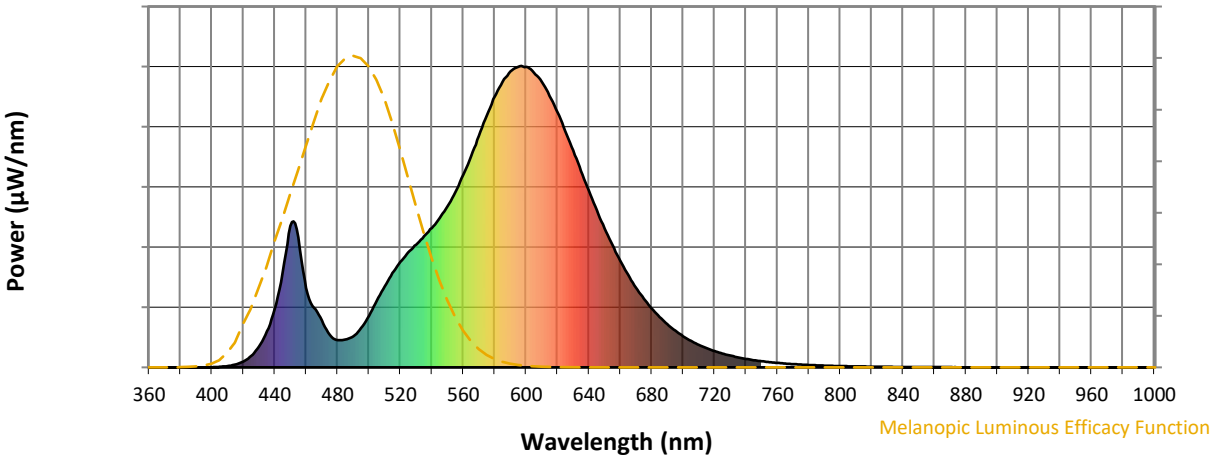
## Melanopic Flux vs. Wavelength




**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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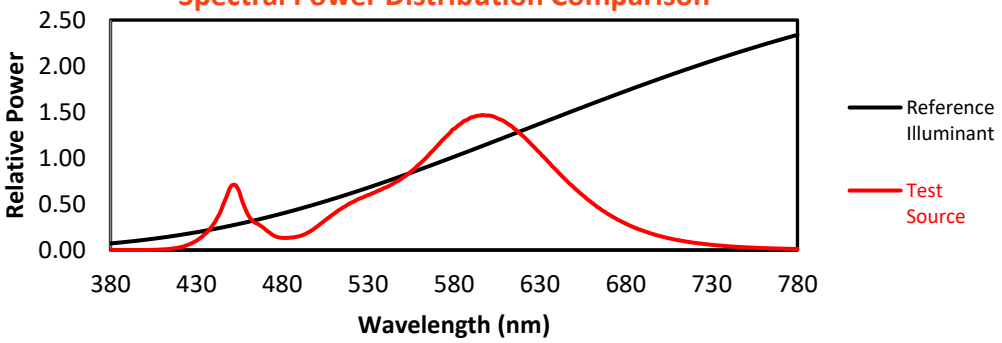
# TM-30-18

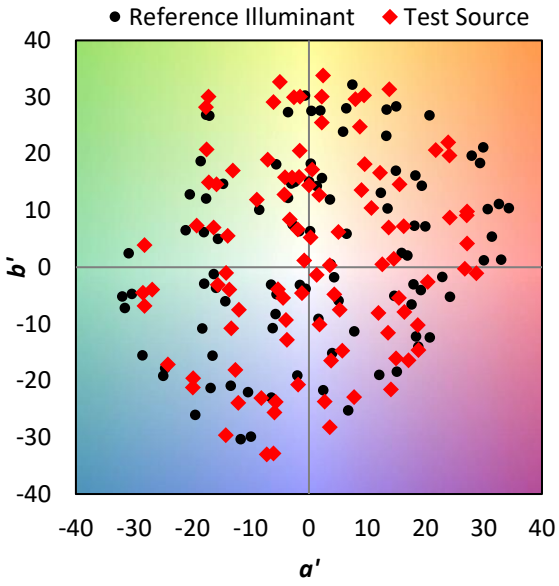
## Summary

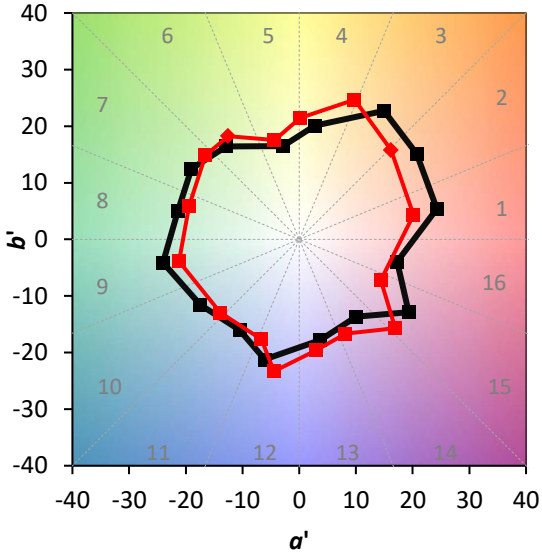
$R_f$ = 75.5
$R_g$ = 93.6
CIE $R_a$ = 71.7
$R_9$ = -35.3

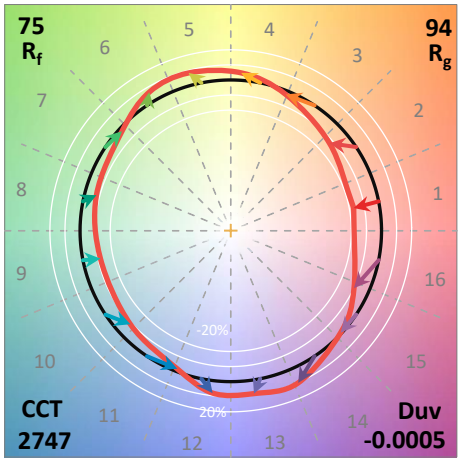
## Spectral Power Distribution Comparison

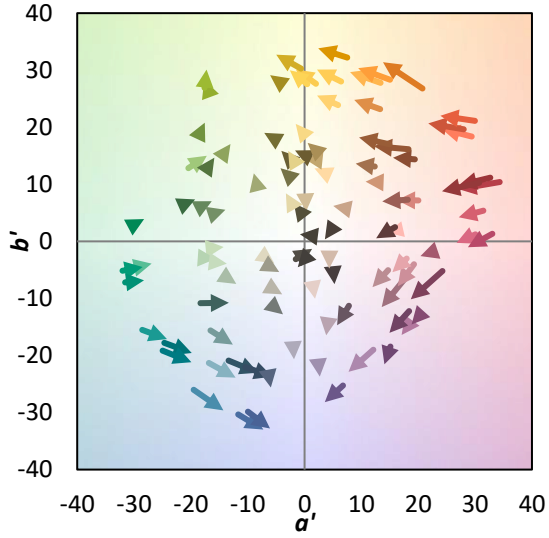



## Color Vector Graphics



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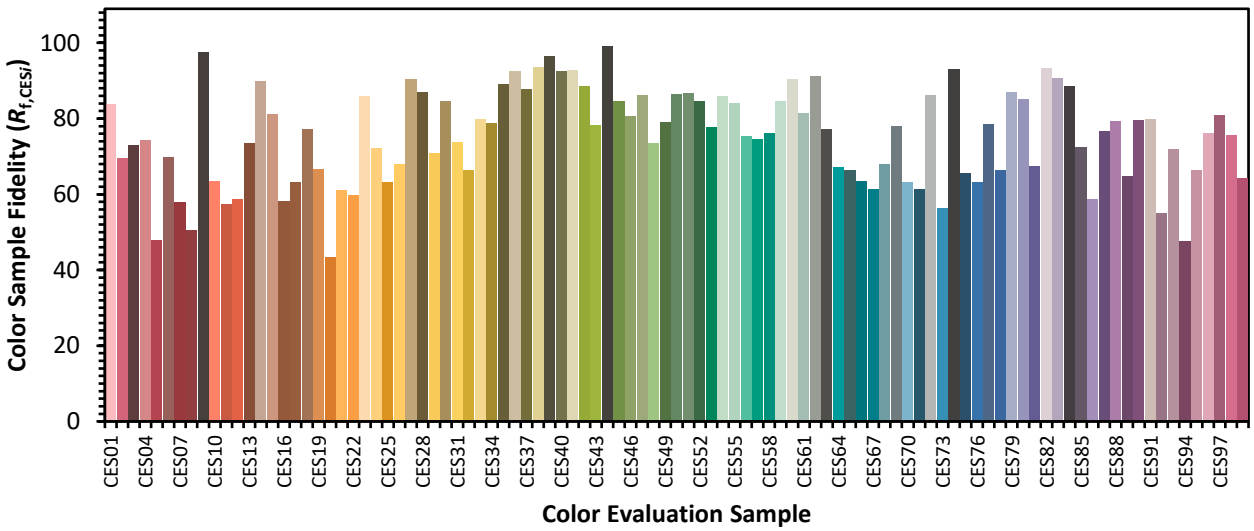
# TM-30-18

**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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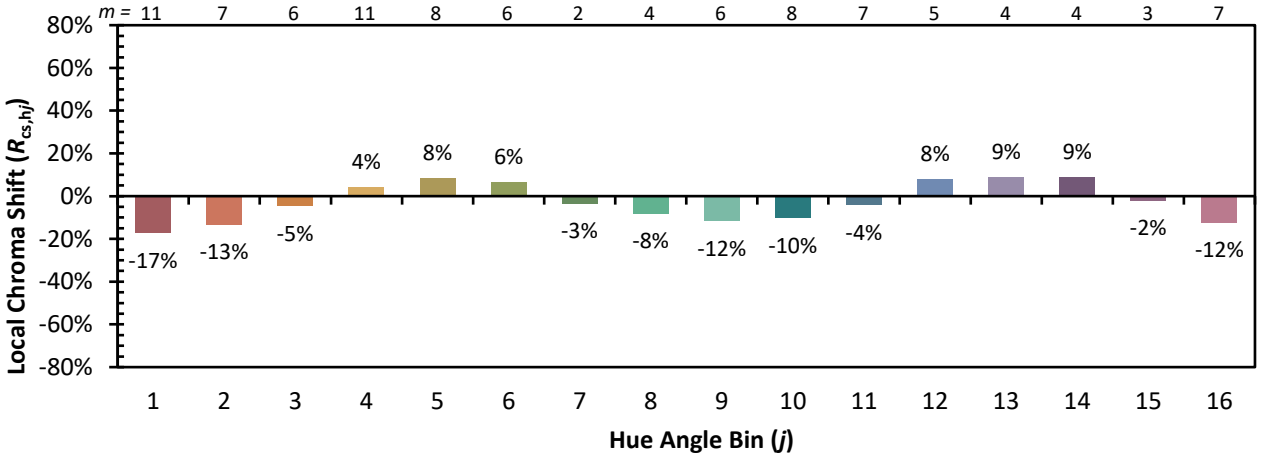
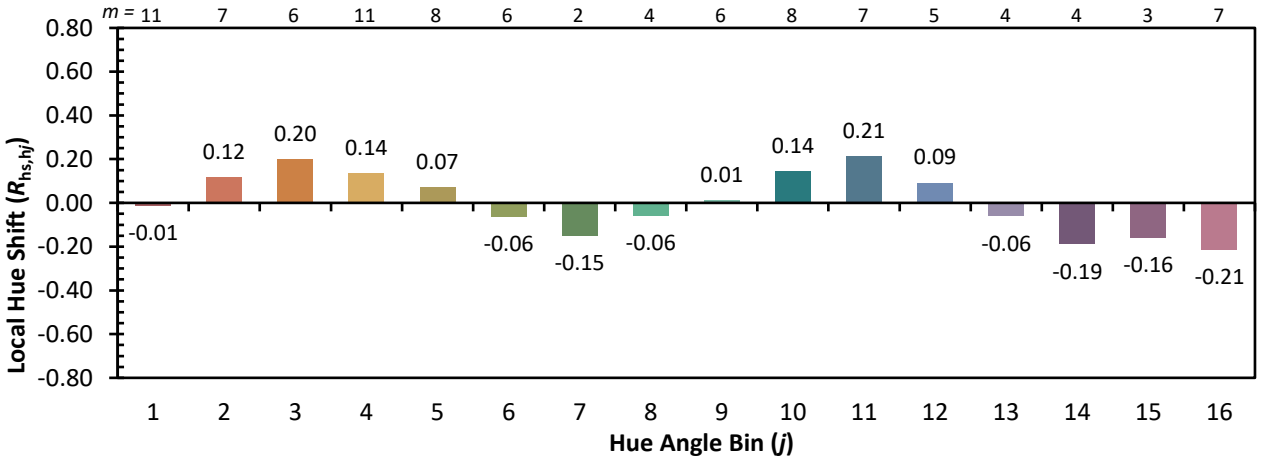
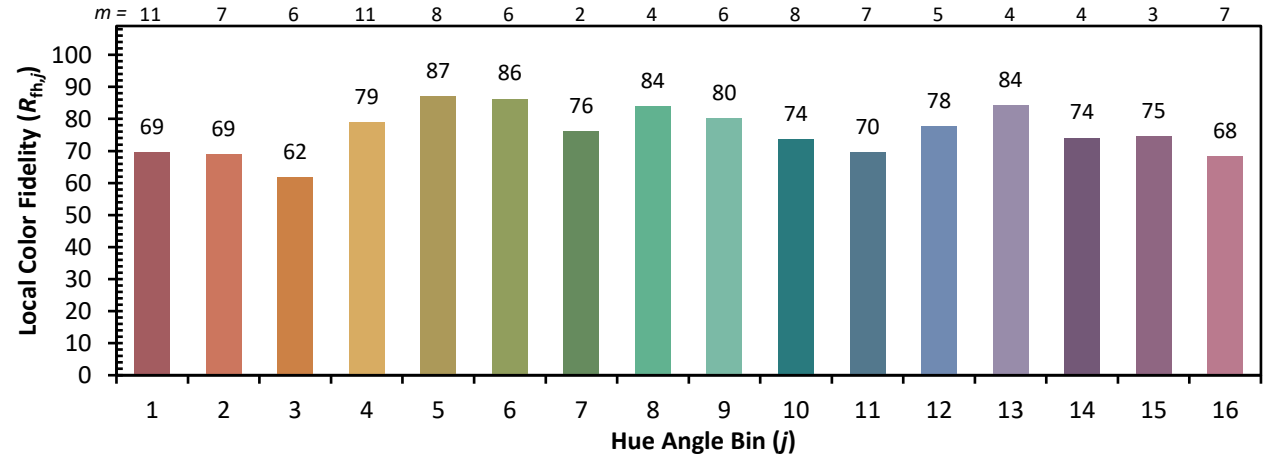
**TM-30-18**

## Color Rendition by Hue-Angle Bin



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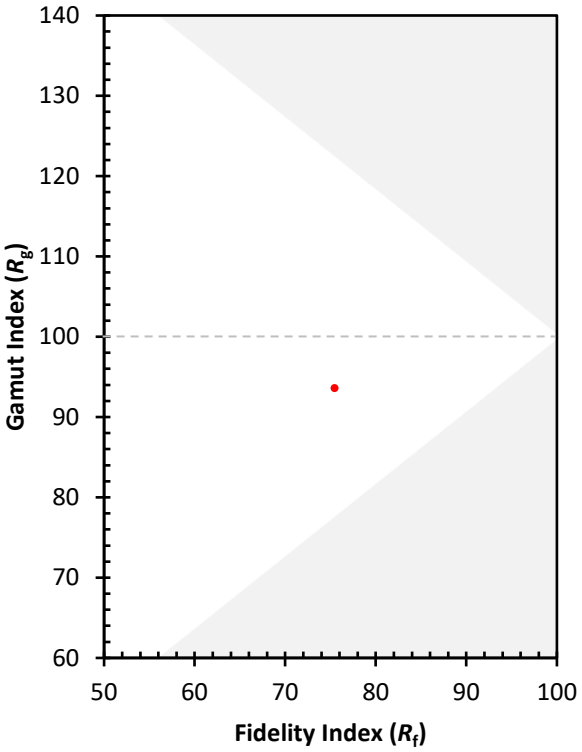
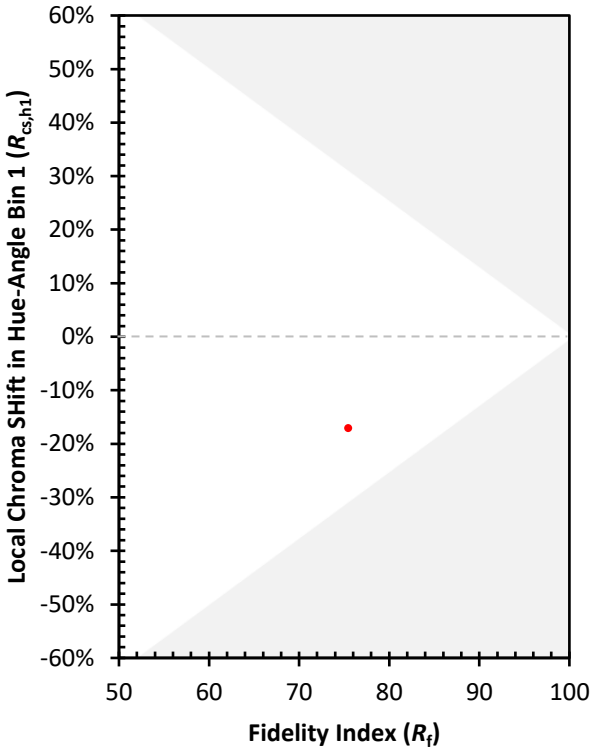
## Measure Comparisons

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