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: P868155

Luminaire Tested: **MEM2-HSN-SA-130-740-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: | P868155 |
| Test Lab: | INNOVATION CENTER(G3) |
| Issue Date: | 08/21/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | STREETWORKS |
| Catalog Number: | MEM2-HSN-SA-130-740-U-T4W-HSS |
| Description: | EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 130W 70CRI 4000K FIXTURE w/ TYPE IV WIDE DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD |
| Light Source: | (30) 4000K CCT, 70 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 13493 lumens |
| Efficiency: | N/A |
| Efficacy: | 100.7 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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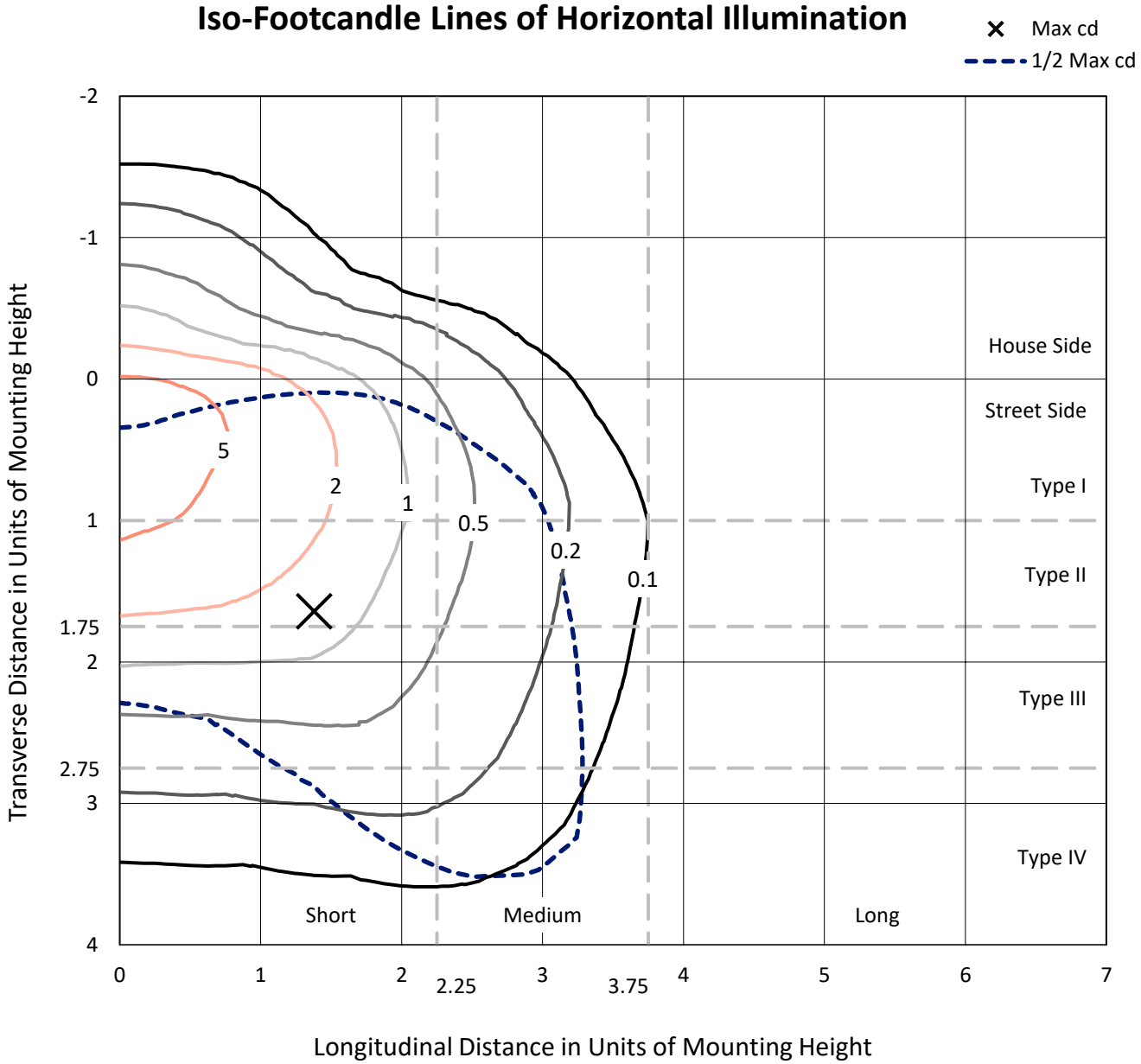
Scaled Data Report

REPORT NUMBER: P868155
CATALOG NUMBER: MEM2-HSN-SA-130-740-U-T4W-HSS

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 7.8 fc
Type IV - Short - N/A

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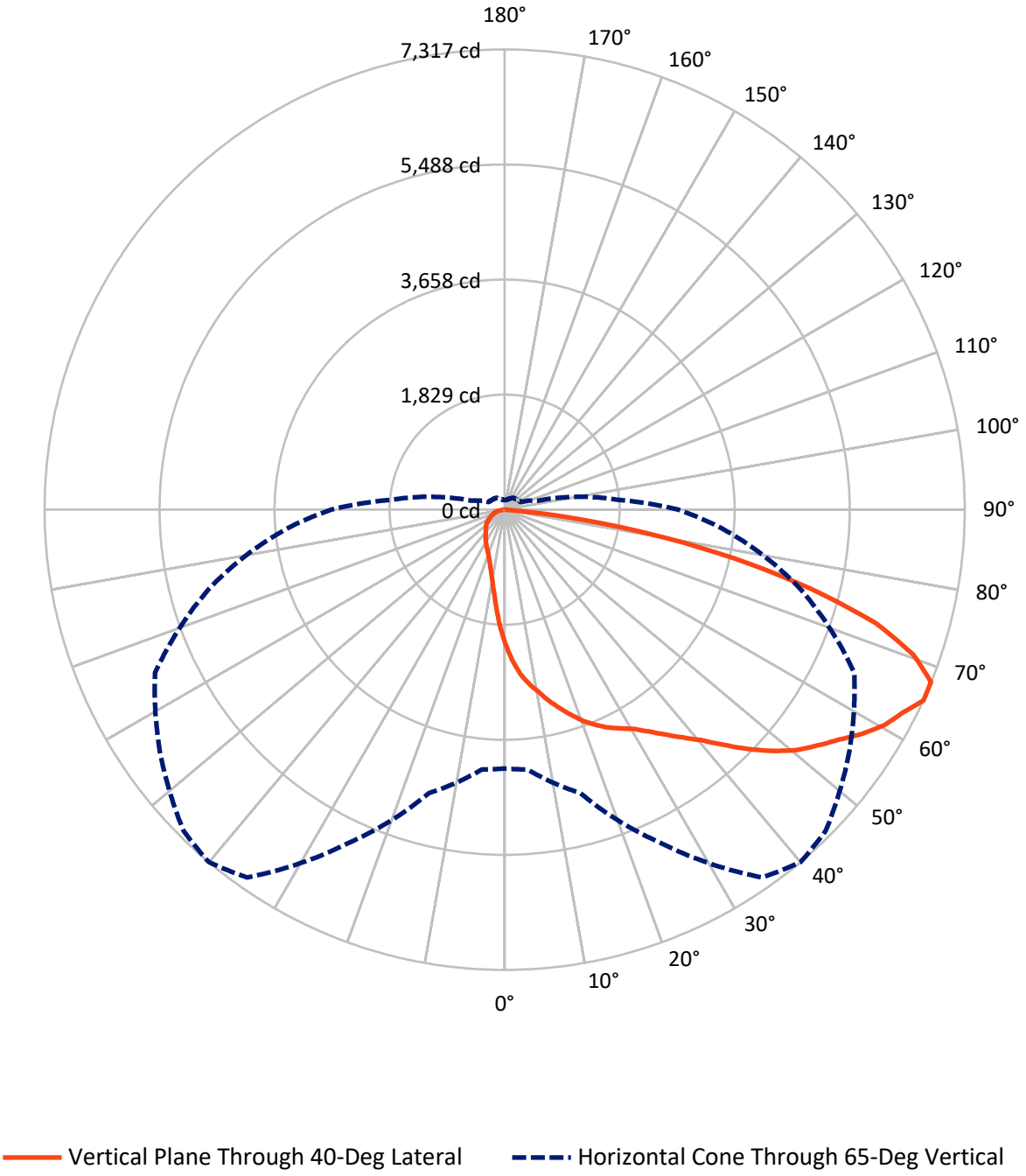
## Luminous Intensity Polar Plot



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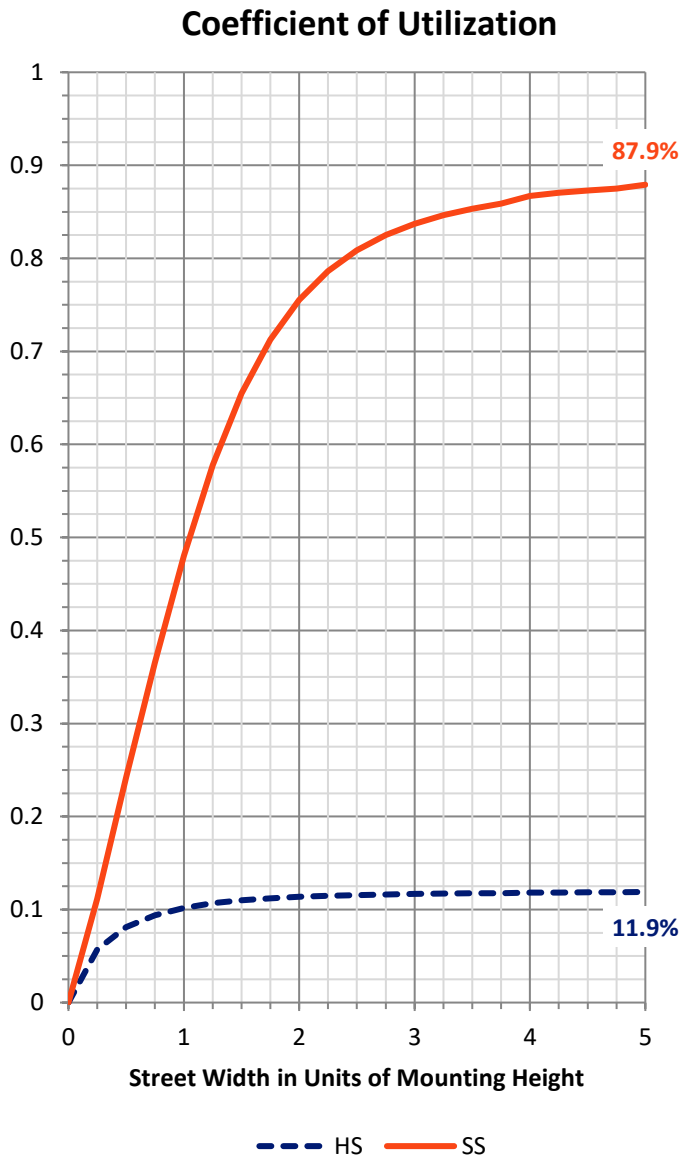
REPORT NUMBER: P868155
CATALOG NUMBER: MEM2-HSN-SA-130-740-U-T4W-HSS

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1615.4 | 0.0 | 1615.4 |
| | % Fixture | 12.0 | 0.0 | 12.0 |
| **Street Side** | Lumens | 11877.6 | 0.0 | 11877.6 |
| | % Fixture | 88.0 | 0.0 | 88.0 |
| **Total** | Lumens | 13493.0 | 0.0 | 13493.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 200.8 | 1.5 |
| 10°-20° | 603.7 | 4.5 |
| 20°-30° | 1038.5 | 7.7 |
| 30°-40° | 1569.8 | 11.6 |
| 40°-50° | 2295.4 | 17.0 |
| 50°-60° | 2931.8 | 21.7 |
| 60°-70° | 2925.9 | 21.7 |
| 70°-80° | 1715.8 | 12.7 |
| 80°-90° | 211.4 | 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° | 13493.0 | 100.0 |
| 0°-180° | 13493.0 | 100.0 |



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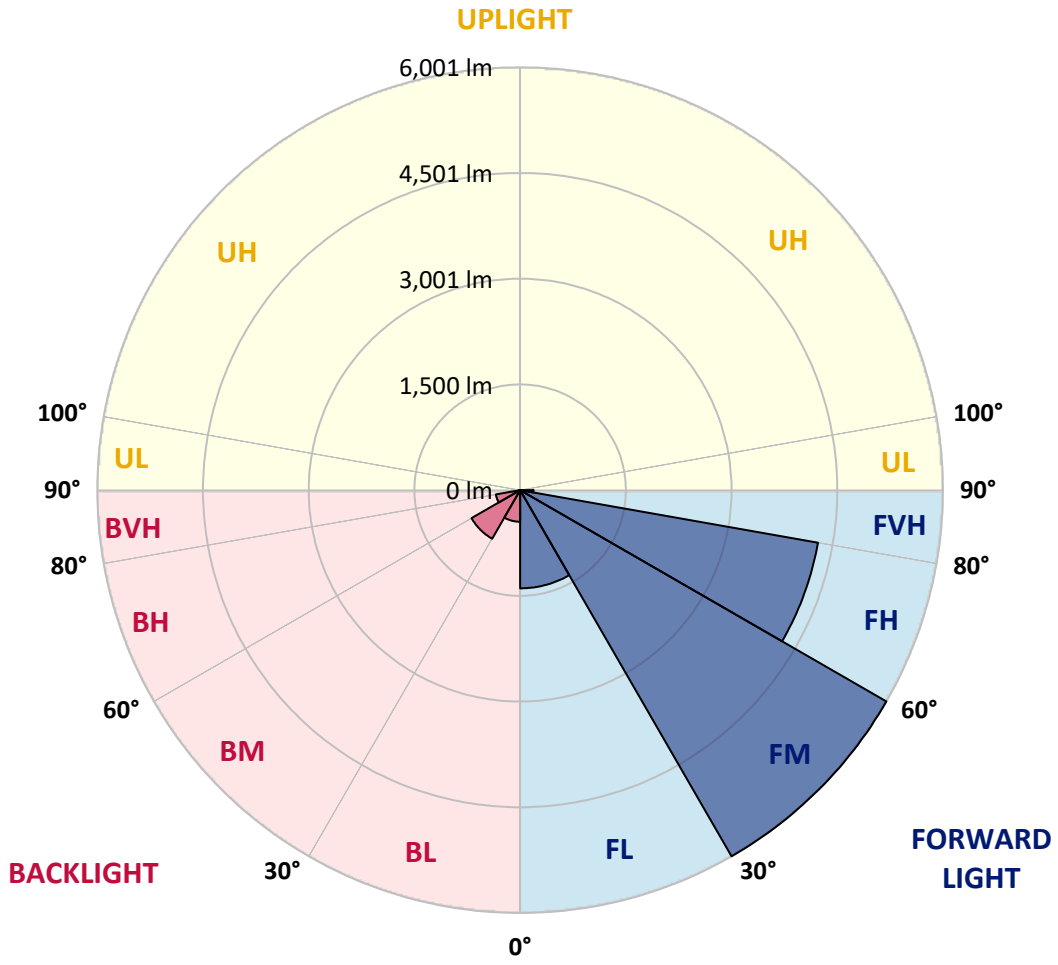
REPORT NUMBER: P868155
CATALOG NUMBER: MEM2-HSN-SA-130-740-U-T4W-HSS

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1393.6 | 10.3 | | | |
| FM | (30°-60°) | 6001.1 | 44.5 | | | |
| FH | (60°-80°) | 4291.9 | 31.8 | | | G2/5000 |
| FVH | (80°-90°) | 191.0 | 1.4 | | | G2/225 |
| BL | (0°-30°) | 449.3 | 3.3 | B1/500 | | |
| BM | (30°-60°) | 796.0 | 5.9 | B1/1000 | | |
| BH | (60°-80°) | 349.7 | 2.6 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 20.3 | 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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Scaled Data Report

REPORT NUMBER: P868155
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 40° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 |
| 2.5° | 2502.3 | 2490.9 | 2468.1 | 2449.1 | 2422.4 | 2399.6 | 2376.8 | 2335.0 | 2281.7 | 2236.1 | 2179.0 |
| 5° | 2749.5 | 2730.5 | 2715.3 | 2692.4 | 2646.8 | 2627.8 | 2612.6 | 2525.1 | 2433.8 | 2338.8 | 2213.3 |
| 7.5° | 2924.4 | 2939.6 | 2909.2 | 2875.0 | 2817.9 | 2795.1 | 2772.3 | 2684.8 | 2570.7 | 2433.8 | 2255.1 |
| 10° | 3126.0 | 3129.8 | 3091.7 | 3049.9 | 2989.1 | 2943.4 | 2913.0 | 2806.5 | 2681.0 | 2528.9 | 2300.7 |
| 12.5° | 3319.9 | 3319.9 | 3297.1 | 3236.2 | 3156.4 | 3114.6 | 3061.3 | 2939.6 | 2787.5 | 2608.8 | 2354.0 |
| 15° | 3475.8 | 3483.4 | 3464.4 | 3418.8 | 3331.3 | 3274.3 | 3221.0 | 3080.3 | 2886.4 | 2700.0 | 2395.8 |
| 17.5° | 3616.5 | 3612.7 | 3601.3 | 3559.5 | 3475.8 | 3430.2 | 3377.0 | 3221.0 | 3000.5 | 2772.3 | 2460.5 |
| 20° | 3711.6 | 3711.6 | 3707.8 | 3685.0 | 3624.1 | 3589.9 | 3525.3 | 3361.7 | 3126.0 | 2878.8 | 2528.9 |
| 22.5° | 3783.9 | 3780.1 | 3780.1 | 3783.9 | 3749.6 | 3715.4 | 3688.8 | 3525.3 | 3255.3 | 2970.0 | 2597.4 |
| 25° | 3844.7 | 3840.9 | 3852.3 | 3859.9 | 3844.7 | 3837.1 | 3806.7 | 3681.2 | 3415.0 | 3076.5 | 2665.8 |
| 27.5° | 3924.6 | 3936.0 | 3932.2 | 3932.2 | 3928.4 | 3936.0 | 3932.2 | 3825.7 | 3570.9 | 3190.6 | 2738.1 |
| 30° | 4050.1 | 4069.1 | 4057.7 | 4042.5 | 4042.5 | 4046.3 | 4065.3 | 3996.8 | 3753.4 | 3331.3 | 2817.9 |
| 32.5° | 4342.9 | 4323.9 | 4244.0 | 4190.8 | 4198.4 | 4202.2 | 4221.2 | 4183.2 | 3936.0 | 3491.0 | 2901.6 |
| 35° | 4677.5 | 4654.7 | 4567.3 | 4445.6 | 4403.7 | 4388.5 | 4384.7 | 4361.9 | 4133.7 | 3662.2 | 3000.5 |
| 37.5° | 5111.1 | 5118.7 | 4989.4 | 4814.4 | 4688.9 | 4593.9 | 4574.9 | 4525.4 | 4304.9 | 3818.1 | 3103.1 |
| 40° | 5552.2 | 5521.8 | 5411.5 | 5240.4 | 4993.2 | 4818.2 | 4761.2 | 4692.8 | 4498.8 | 3981.6 | 3202.0 |
| 42.5° | 5978.1 | 5921.1 | 5776.6 | 5590.2 | 5301.2 | 5111.1 | 4981.8 | 4894.3 | 4677.5 | 4160.3 | 3297.1 |
| 45° | 6533.3 | 6369.8 | 6111.2 | 5943.9 | 5582.6 | 5426.7 | 5308.8 | 5114.9 | 4890.5 | 4339.1 | 3411.2 |
| 47.5° | 6970.7 | 6655.0 | 6419.3 | 6347.0 | 5875.4 | 5730.9 | 5624.5 | 5354.5 | 5107.3 | 4540.6 | 3529.1 |
| 50° | 6890.8 | 6696.9 | 6639.8 | 6575.2 | 6096.0 | 6008.5 | 5909.7 | 5628.3 | 5327.8 | 4753.6 | 3643.2 |
| 52.5° | 6685.5 | 6708.3 | 6780.5 | 6670.2 | 6290.0 | 6229.1 | 6164.5 | 5921.1 | 5548.4 | 4928.5 | 3745.8 |
| 55° | 6521.9 | 6567.6 | 6761.5 | 6727.3 | 6521.9 | 6453.5 | 6407.9 | 6210.1 | 5761.4 | 5088.3 | 3833.3 |
| 57.5° | 6225.3 | 6187.3 | 6430.7 | 6826.2 | 6769.1 | 6715.9 | 6670.2 | 6514.3 | 5978.1 | 5202.3 | 3890.3 |
| 60° | 5757.6 | 5616.9 | 5943.9 | 6704.5 | 6940.3 | 6947.9 | 6921.2 | 6742.5 | 6153.1 | 5202.3 | 3859.9 |
| 62.5° | 5099.7 | 4966.6 | 5369.7 | 6297.6 | 7031.5 | 7103.8 | 7088.6 | 6822.4 | 6229.1 | 5088.3 | 3742.0 |
| 65° | 4114.7 | 4145.1 | 4666.1 | 5837.4 | 7138.0 | 7316.7 | 7221.7 | 6693.1 | 6134.0 | 4867.7 | 3475.8 |
| 67.5° | 3285.7 | 3377.0 | 3844.7 | 5240.4 | 7088.6 | 7312.9 | 7179.8 | 6328.0 | 5727.1 | 4559.7 | 3068.9 |
| 70° | 2593.6 | 2654.4 | 3042.3 | 4434.2 | 6655.0 | 6890.8 | 6723.5 | 5769.0 | 5038.8 | 4084.3 | 2551.7 |
| 72.5° | 2026.9 | 2084.0 | 2414.8 | 3548.1 | 5902.1 | 6175.9 | 5966.7 | 5016.0 | 4179.4 | 3464.4 | 2026.9 |
| 75° | 1540.2 | 1582.0 | 1829.2 | 2734.3 | 4700.4 | 5042.6 | 4890.5 | 4015.8 | 3262.9 | 2741.9 | 1551.6 |
| 77.5° | 992.6 | 1049.6 | 1327.2 | 1916.7 | 3319.9 | 3730.6 | 3749.6 | 3000.5 | 2346.4 | 1981.3 | 1140.9 |
| 80° | 657.9 | 680.7 | 851.8 | 1247.3 | 2042.1 | 2361.6 | 2471.9 | 2026.9 | 1498.3 | 1262.6 | 821.4 |
| 82.5° | 273.8 | 304.2 | 406.9 | 627.5 | 1023.0 | 1026.8 | 1175.1 | 855.6 | 608.5 | 536.2 | 346.1 |
| 85° | 7.6 | 15.2 | 11.4 | 30.4 | 26.6 | 41.8 | 49.4 | 68.5 | 49.4 | 53.2 | 53.2 |
| 87.5° | 0.0 | 0.0 | 3.8 | 3.8 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 11.4 | 7.6 |
| 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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Peachtree City, GA 30269

Scaled Data Report

REPORT NUMBER: P868155
CATALOG NUMBER: MEM2-HSN-SA-130-740-U-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 | 2144.8 |
| 2.5° | 2152.4 | 2118.2 | 2049.8 | 1996.5 | 1939.5 | 1897.6 | 1859.6 | 1817.8 | 1791.2 | 1795.0 | 1768.3 |
| 5° | 2152.4 | 2087.8 | 1950.9 | 1829.2 | 1718.9 | 1639.0 | 1551.6 | 1483.1 | 1433.7 | 1426.1 | 1448.9 |
| 7.5° | 2163.8 | 2057.4 | 1852.0 | 1669.5 | 1517.3 | 1391.9 | 1300.6 | 1232.1 | 1197.9 | 1175.1 | 1171.3 |
| 10° | 2175.2 | 2034.5 | 1760.7 | 1528.8 | 1338.6 | 1201.7 | 1121.8 | 1045.8 | 1007.8 | 1004.0 | 992.6 |
| 12.5° | 2182.9 | 2007.9 | 1677.1 | 1388.1 | 1190.3 | 1061.0 | 981.1 | 920.3 | 889.9 | 889.9 | 886.1 |
| 15° | 2209.5 | 2000.3 | 1589.6 | 1281.6 | 1076.2 | 950.7 | 882.3 | 832.8 | 813.8 | 802.4 | 798.6 |
| 17.5° | 2232.3 | 1985.1 | 1513.5 | 1175.1 | 973.5 | 863.3 | 798.6 | 764.4 | 745.4 | 737.8 | 734.0 |
| 20° | 2266.5 | 1977.5 | 1441.3 | 1087.6 | 897.5 | 791.0 | 741.6 | 711.1 | 699.7 | 692.1 | 692.1 |
| 22.5° | 2300.7 | 1969.9 | 1369.0 | 1011.6 | 832.8 | 737.8 | 692.1 | 665.5 | 654.1 | 650.3 | 646.5 |
| 25° | 2342.6 | 1966.1 | 1308.2 | 946.9 | 775.8 | 695.9 | 654.1 | 631.3 | 616.1 | 608.5 | 608.5 |
| 27.5° | 2384.4 | 1969.9 | 1247.3 | 882.3 | 726.3 | 657.9 | 616.1 | 589.4 | 578.0 | 562.8 | 566.6 |
| 30° | 2441.4 | 1973.7 | 1197.9 | 829.0 | 684.5 | 619.9 | 581.8 | 547.6 | 532.4 | 524.8 | 524.8 |
| 32.5° | 2498.5 | 1988.9 | 1148.5 | 779.6 | 642.7 | 589.4 | 543.8 | 513.4 | 494.4 | 490.6 | 486.8 |
| 35° | 2559.3 | 2000.3 | 1102.8 | 737.8 | 608.5 | 555.2 | 509.6 | 479.2 | 464.0 | 460.1 | 460.1 |
| 37.5° | 2627.8 | 2019.3 | 1068.6 | 699.7 | 574.2 | 521.0 | 479.2 | 448.7 | 437.3 | 433.5 | 433.5 |
| 40° | 2700.0 | 2049.8 | 1042.0 | 665.5 | 547.6 | 490.6 | 452.5 | 425.9 | 418.3 | 414.5 | 414.5 |
| 42.5° | 2772.3 | 2076.4 | 1019.2 | 638.9 | 521.0 | 464.0 | 433.5 | 406.9 | 395.5 | 395.5 | 395.5 |
| 45° | 2840.8 | 2095.4 | 996.4 | 612.3 | 494.4 | 444.9 | 410.7 | 387.9 | 376.5 | 376.5 | 376.5 |
| 47.5° | 2901.6 | 2114.4 | 962.1 | 585.6 | 467.8 | 418.3 | 391.7 | 368.9 | 357.5 | 357.5 | 357.5 |
| 50° | 2966.2 | 2125.8 | 924.1 | 551.4 | 441.1 | 399.3 | 372.7 | 346.1 | 338.5 | 334.7 | 334.7 |
| 52.5° | 3019.5 | 2125.8 | 874.7 | 517.2 | 410.7 | 372.7 | 349.9 | 327.0 | 315.6 | 308.0 | 308.0 |
| 55° | 3057.5 | 2125.8 | 821.4 | 475.4 | 380.3 | 349.9 | 327.0 | 304.2 | 289.0 | 277.6 | 277.6 |
| 57.5° | 3080.3 | 2114.4 | 760.6 | 425.9 | 349.9 | 319.4 | 304.2 | 277.6 | 247.2 | 224.4 | 216.8 |
| 60° | 3061.3 | 2080.2 | 695.9 | 372.7 | 315.6 | 292.8 | 281.4 | 247.2 | 205.4 | 193.9 | 193.9 |
| 62.5° | 2981.5 | 2000.3 | 631.3 | 327.0 | 289.0 | 266.2 | 254.8 | 216.8 | 186.3 | 174.9 | 174.9 |
| 65° | *2757.1* | *1806.4* | *551.4* | *285.2* | *258.6* | *243.4* | *228.2* | *193.9* | *167.3* | *152.1* | *152.1* |
| 67.5° | 2430.0 | 1559.2 | 460.1 | 251.0 | 232.0 | 220.6 | 209.2 | 174.9 | 148.3 | 133.1 | 133.1 |
| 70° | 1969.9 | 1258.8 | 391.7 | 220.6 | 205.4 | 197.7 | 186.3 | 159.7 | 129.3 | 117.9 | 117.9 |
| 72.5° | 1547.8 | 988.7 | 327.0 | 197.7 | 190.1 | 174.9 | 167.3 | 140.7 | 117.9 | 106.5 | 106.5 |
| 75° | 1152.3 | 737.8 | 289.0 | 174.9 | 174.9 | 155.9 | 152.1 | 125.5 | 102.7 | 95.1 | 95.1 |
| 77.5° | 848.0 | 547.6 | 251.0 | 152.1 | 152.1 | 136.9 | 129.3 | 110.3 | 95.1 | 87.5 | 87.5 |
| 80° | 574.2 | 372.7 | 186.3 | 114.1 | 114.1 | 110.3 | 102.7 | 95.1 | 79.9 | 72.3 | 68.5 |
| 82.5° | 243.4 | 155.9 | 91.3 | 57.0 | 53.2 | 41.8 | 34.2 | 26.6 | 26.6 | 22.8 | 22.8 |
| 85° | 41.8 | 19.0 | 19.0 | 15.2 | 11.4 | 11.4 | 11.4 | 7.6 | 7.6 | 7.6 | 7.6 |
| 87.5° | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| 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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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: SP1-2407-157-5

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-30-740-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-30-740-U-5WQ-2

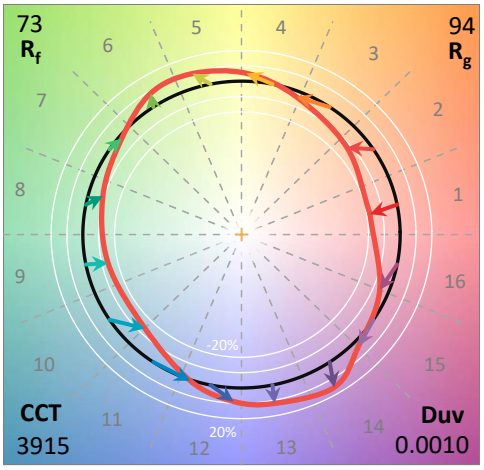
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-157-5 |
| 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-30-740-U-5WQ-2** |
| Description: | Epic Modern Light Square 30W 5WQ Optic and Flare Trim |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3915 | CRI (Ra): | 71.0 | | |
| CIE u': | 0.2262 | R1: | 67.6 | R9: | -38.4 |
| CIE v': | 0.5044 | R2: | 78.3 | R10: | 48.9 |
| Duv: | 0.0010 | R3: | 87.1 | R11: | 65.3 |
| CIE x: | 0.3850 | R4: | 69.7 | R12: | 40.4 |
| CIE y: | 0.3816 | R5: | 67.4 | R13: | 69.3 |
| CIE z: | 0.2334 | R6: | 69.3 | R14: | 92.6 |
| Peak Wavelength (nm): | 449 | R7: | 79.7 | R15: | 59.9 |
| Dominant Wavelength (nm): | 578 | R8: | 48.7 | | |
| Purity: | 30.05482 | | | | |
| Rf: | 73.2 | | | | |
| Rg: | 93.9 | | | | |




## Test Conditions

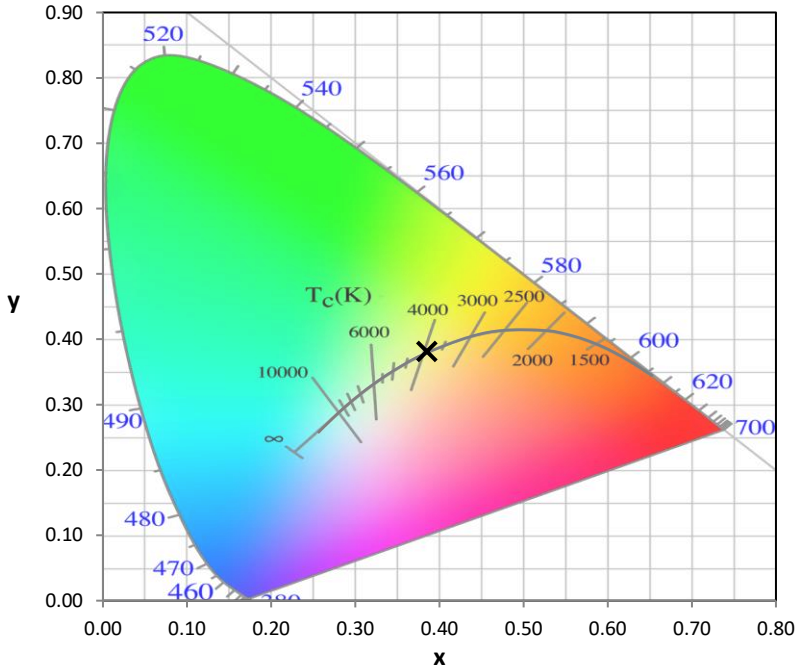
| | |
|---|---|
| Stabilization Time: | 21M |
| Operation Time: | 1H 21M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2407-157-5

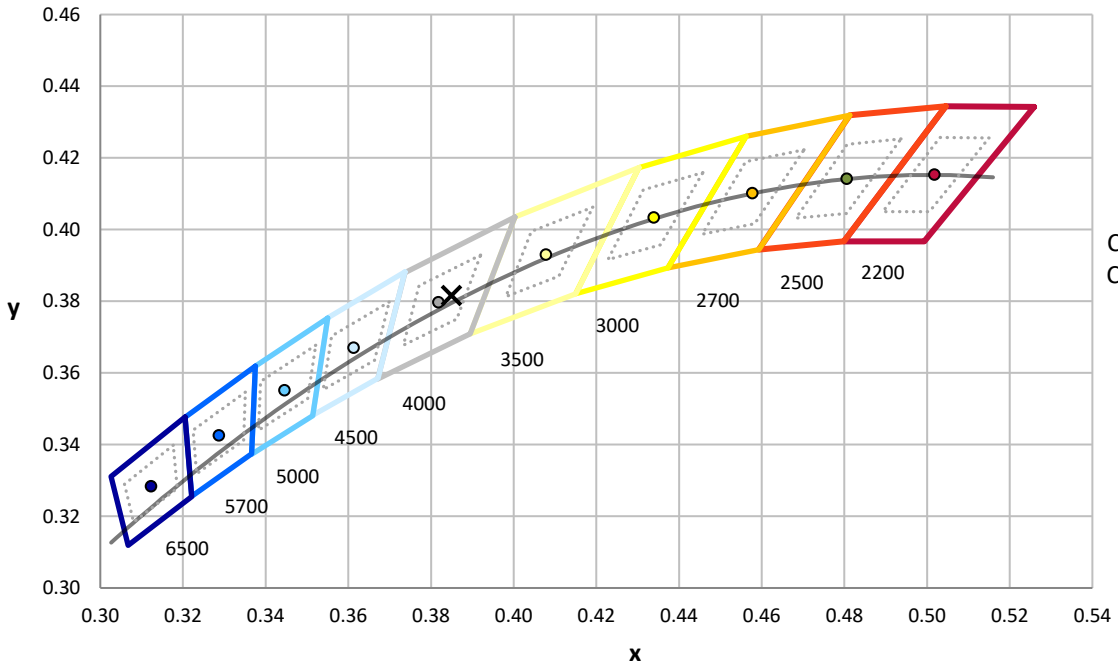
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC 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: SP1-2407-157-5

## CIE 1931 Chromaticity Diagram




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




CCT = 3915K
CIE x = 0.3850
CIE y = 0.3816
Duv = 0.0010

Point lies inside the ANSI 4000K 4-step quadrangle

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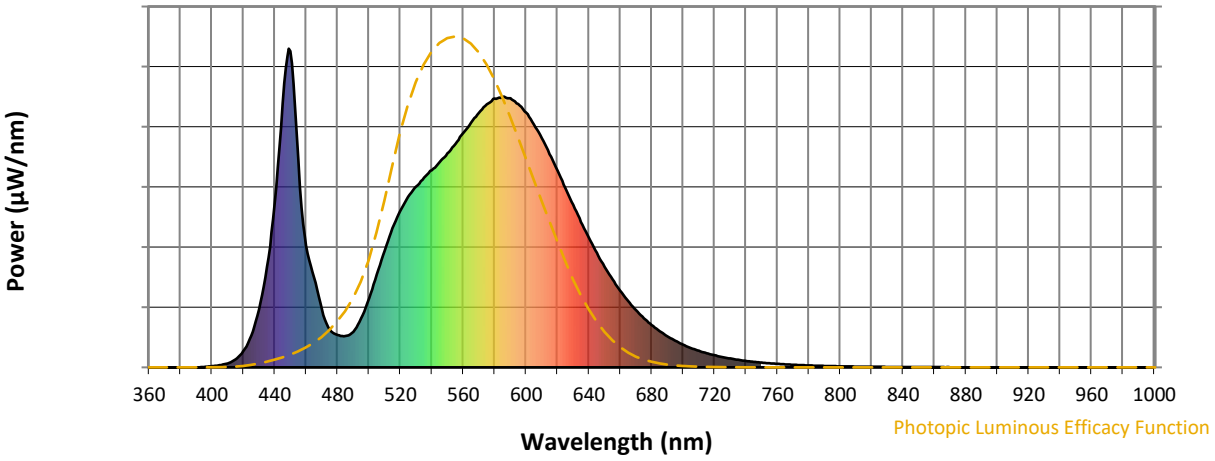
## Photopic Flux vs. Wavelength




## 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 | 112 | NR | 620 | 618 | NR | 750 | 15 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 153 | NR | 625 | 563 | NR | 755 | 13 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 216 | NR | 630 | 510 | NR | 760 | 11 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 291 | NR | 635 | 456 | NR | 765 | 9 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 366 | NR | 640 | 407 | NR | 770 | 8 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 436 | NR | 645 | 359 | NR | 775 | 7 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 492 | NR | 650 | 316 | NR | 780 | 6 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 536 | NR | 655 | 277 | NR | 785 | 5 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 567 | NR | 660 | 240 | NR | 790 | 4 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 596 | NR | 665 | 208 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 12 | NR | 540 | 619 | NR | 670 | 179 | NR | 800 | 3 | NR | 930 | 0 | NR |
| 415 | 25 | NR | 545 | 644 | NR | 675 | 154 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 51 | NR | 550 | 671 | NR | 680 | 133 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 100 | NR | 555 | 701 | NR | 685 | 114 | NR | 815 | 2 | NR | 945 | 0 | NR |
| 430 | 180 | NR | 560 | 735 | NR | 690 | 98 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 315 | NR | 565 | 768 | NR | 695 | 83 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 514 | NR | 570 | 798 | NR | 700 | 71 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 828 | NR | 575 | 825 | NR | 705 | 61 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 992 | NR | 580 | 843 | NR | 710 | 52 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 652 | NR | 585 | 848 | NR | 715 | 44 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 382 | NR | 590 | 844 | NR | 720 | 38 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 282 | NR | 595 | 826 | NR | 725 | 32 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 180 | NR | 600 | 800 | NR | 730 | 28 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 119 | NR | 605 | 762 | NR | 735 | 24 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 101 | NR | 610 | 719 | NR | 740 | 20 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 98 | NR | 615 | 669 | NR | 745 | 17 | NR | 875 | 0 | NR | | | |

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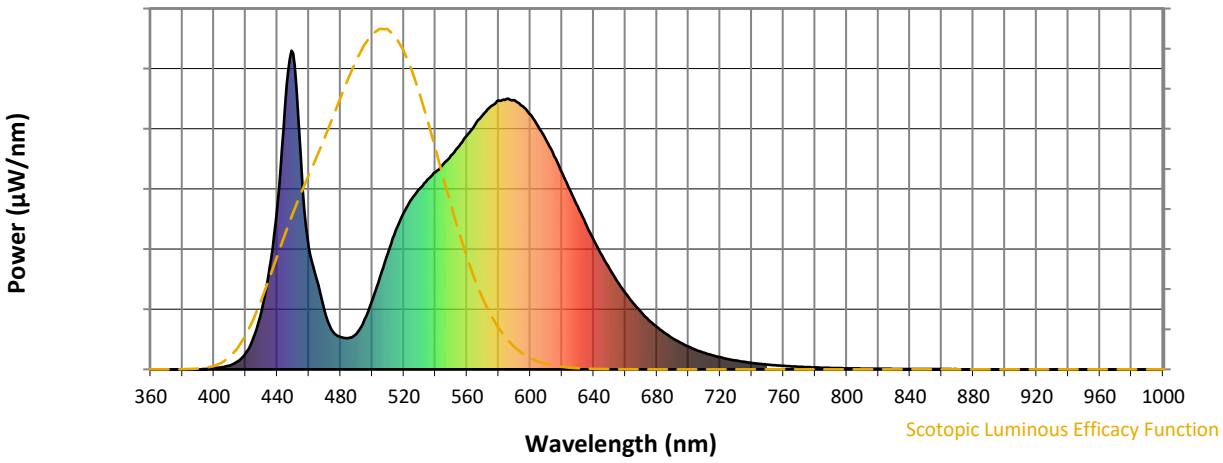
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.49**

| 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 | 112 | NR | 620 | 618 | NR | 750 | 15 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 153 | NR | 625 | 563 | NR | 755 | 13 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 216 | NR | 630 | 510 | NR | 760 | 11 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 291 | NR | 635 | 456 | NR | 765 | 9 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 366 | NR | 640 | 407 | NR | 770 | 8 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 436 | NR | 645 | 359 | NR | 775 | 7 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 492 | NR | 650 | 316 | NR | 780 | 6 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 536 | NR | 655 | 277 | NR | 785 | 5 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 567 | NR | 660 | 240 | NR | 790 | 4 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 596 | NR | 665 | 208 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 12 | NR | 540 | 619 | NR | 670 | 179 | NR | 800 | 3 | NR | 930 | 0 | NR |
| 415 | 25 | NR | 545 | 644 | NR | 675 | 154 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 51 | NR | 550 | 671 | NR | 680 | 133 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 100 | NR | 555 | 701 | NR | 685 | 114 | NR | 815 | 2 | NR | 945 | 0 | NR |
| 430 | 180 | NR | 560 | 735 | NR | 690 | 98 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 315 | NR | 565 | 768 | NR | 695 | 83 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 514 | NR | 570 | 798 | NR | 700 | 71 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 828 | NR | 575 | 825 | NR | 705 | 61 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 992 | NR | 580 | 843 | NR | 710 | 52 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 652 | NR | 585 | 848 | NR | 715 | 44 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 382 | NR | 590 | 844 | NR | 720 | 38 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 282 | NR | 595 | 826 | NR | 725 | 32 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 180 | NR | 600 | 800 | NR | 730 | 28 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 119 | NR | 605 | 762 | NR | 735 | 24 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 101 | NR | 610 | 719 | NR | 740 | 20 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 98 | NR | 615 | 669 | NR | 745 | 17 | NR | 875 | 0 | NR | | | |

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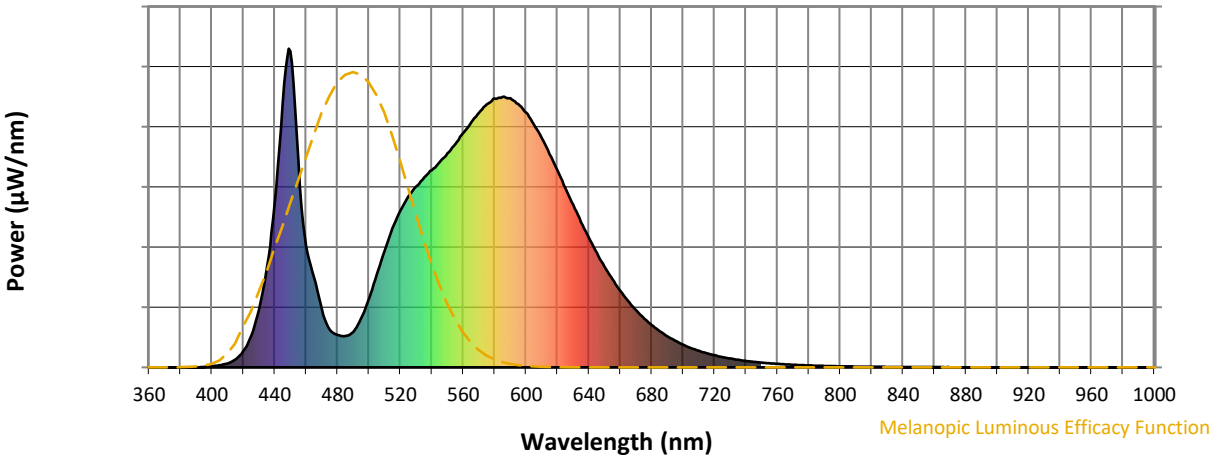
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.88**

| 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 | 112 | NR | 620 | 618 | NR | 750 | 15 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 153 | NR | 625 | 563 | NR | 755 | 13 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 216 | NR | 630 | 510 | NR | 760 | 11 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 291 | NR | 635 | 456 | NR | 765 | 9 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 366 | NR | 640 | 407 | NR | 770 | 8 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 436 | NR | 645 | 359 | NR | 775 | 7 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 492 | NR | 650 | 316 | NR | 780 | 6 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 536 | NR | 655 | 277 | NR | 785 | 5 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 567 | NR | 660 | 240 | NR | 790 | 4 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 596 | NR | 665 | 208 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 12 | NR | 540 | 619 | NR | 670 | 179 | NR | 800 | 3 | NR | 930 | 0 | NR |
| 415 | 25 | NR | 545 | 644 | NR | 675 | 154 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 51 | NR | 550 | 671 | NR | 680 | 133 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 100 | NR | 555 | 701 | NR | 685 | 114 | NR | 815 | 2 | NR | 945 | 0 | NR |
| 430 | 180 | NR | 560 | 735 | NR | 690 | 98 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 315 | NR | 565 | 768 | NR | 695 | 83 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 514 | NR | 570 | 798 | NR | 700 | 71 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 828 | NR | 575 | 825 | NR | 705 | 61 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 992 | NR | 580 | 843 | NR | 710 | 52 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 652 | NR | 585 | 848 | NR | 715 | 44 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 382 | NR | 590 | 844 | NR | 720 | 38 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 282 | NR | 595 | 826 | NR | 725 | 32 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 180 | NR | 600 | 800 | NR | 730 | 28 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 119 | NR | 605 | 762 | NR | 735 | 24 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 101 | NR | 610 | 719 | NR | 740 | 20 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 98 | NR | 615 | 669 | NR | 745 | 17 | NR | 875 | 0 | NR | | | |

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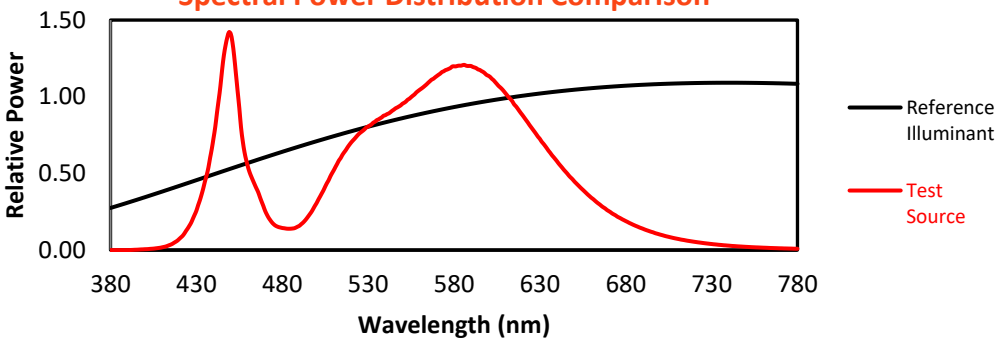
# TM-30-18

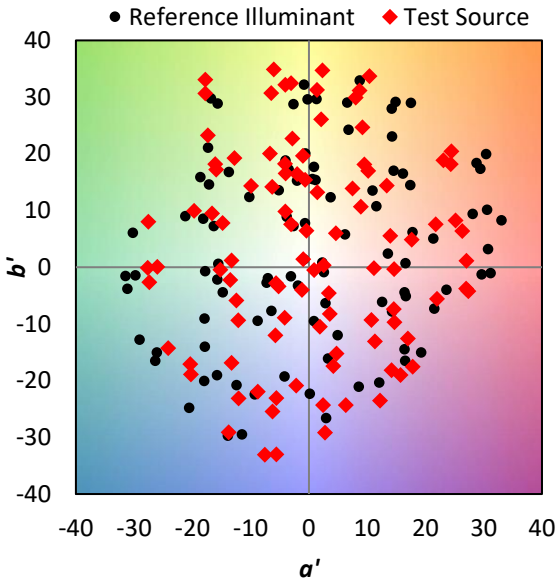
## Summary

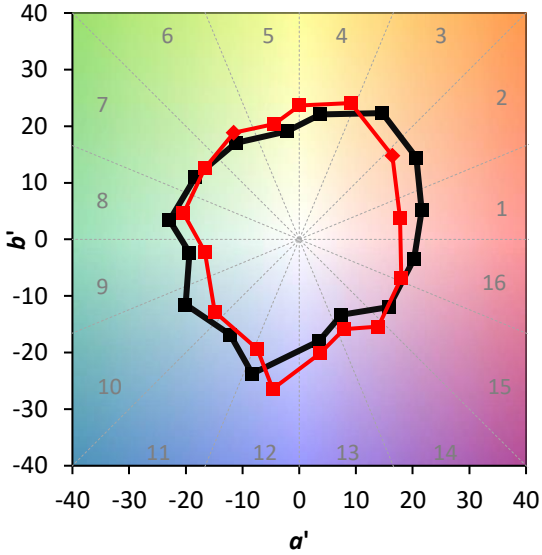
$R_f$ = 73.2
$R_g$ = 93.9
CIE $R_a$ = 71.0
$R_9$ = -38.4

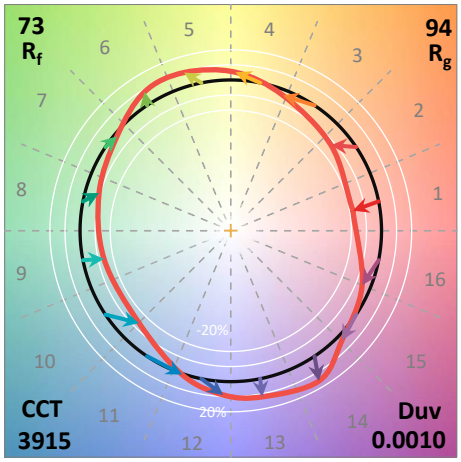
## Spectral Power Distribution Comparison

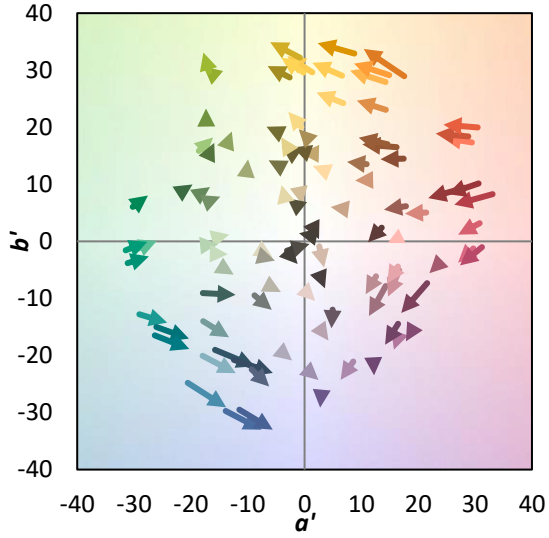



## Color Vector Graphics



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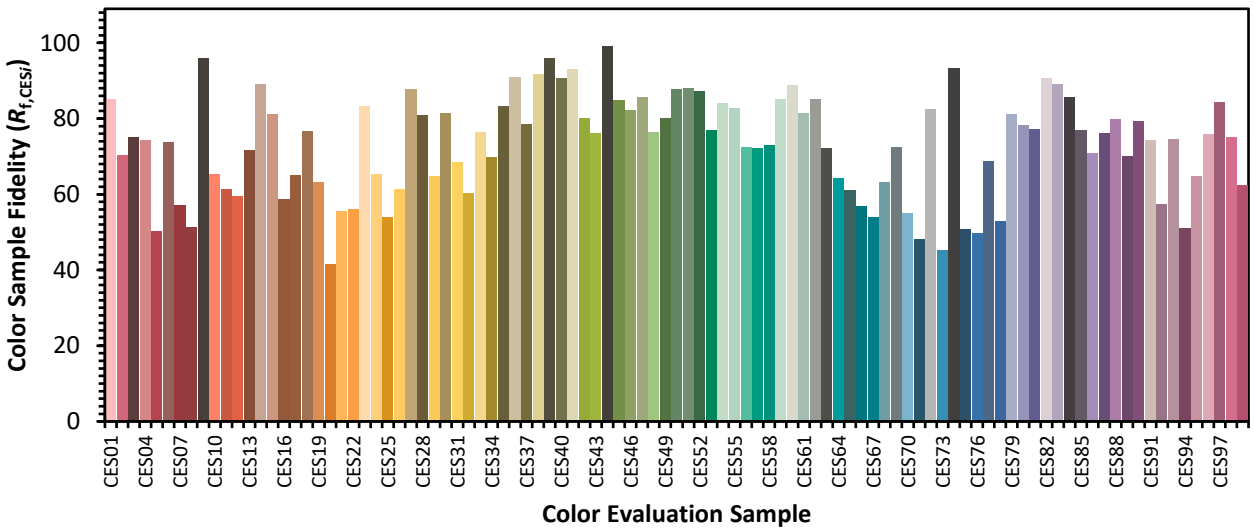
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 85 | CES26 = 61 | CES51 = 88 | CES76 = 50 |
| CES02 = 61 | CES27 = 88 | CES52 = 87 | CES77 = 69 |
| CES03 = 30 | CES28 = 81 | CES53 = 77 | CES78 = 53 |
| CES04 = 70 | CES29 = 65 | CES54 = 84 | CES79 = 81 |
| CES05 = 47 | CES30 = 81 | CES55 = 83 | CES80 = 78 |
| CES06 = 50 | CES31 = 69 | CES56 = 73 | CES81 = 77 |
| CES07 = 40 | CES32 = 60 | CES57 = 72 | CES82 = 91 |
| CES08 = 39 | CES33 = 76 | CES58 = 73 | CES83 = 89 |
| CES09 = 29 | CES34 = 70 | CES59 = 85 | CES84 = 86 |
| CES10 = 74 | CES35 = 83 | CES60 = 89 | CES85 = 77 |
| CES11 = 57 | CES36 = 91 | CES61 = 81 | CES86 = 71 |
| CES12 = 63 | CES37 = 79 | CES62 = 85 | CES87 = 76 |
| CES13 = 42 | CES38 = 92 | CES63 = 72 | CES88 = 80 |
| CES14 = 74 | CES39 = 96 | CES64 = 64 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 61 | CES90 = 79 |
| CES16 = 46 | CES41 = 93 | CES66 = 57 | CES91 = 74 |
| CES17 = 49 | CES42 = 80 | CES67 = 54 | CES92 = 57 |
| CES18 = 56 | CES43 = 76 | CES68 = 63 | CES93 = 74 |
| CES19 = 72 | CES44 = 99 | CES69 = 73 | CES94 = 51 |
| CES20 = 65 | CES45 = 85 | CES70 = 55 | CES95 = 65 |
| CES21 = 86 | CES46 = 82 | CES71 = 48 | CES96 = 76 |
| CES22 = 78 | CES47 = 86 | CES72 = 83 | CES97 = 84 |
| CES23 = 92 | CES48 = 77 | CES73 = 45 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 93 | CES99 = 62 |
| CES25 = 72 | CES50 = 88 | CES75 = 51 | |



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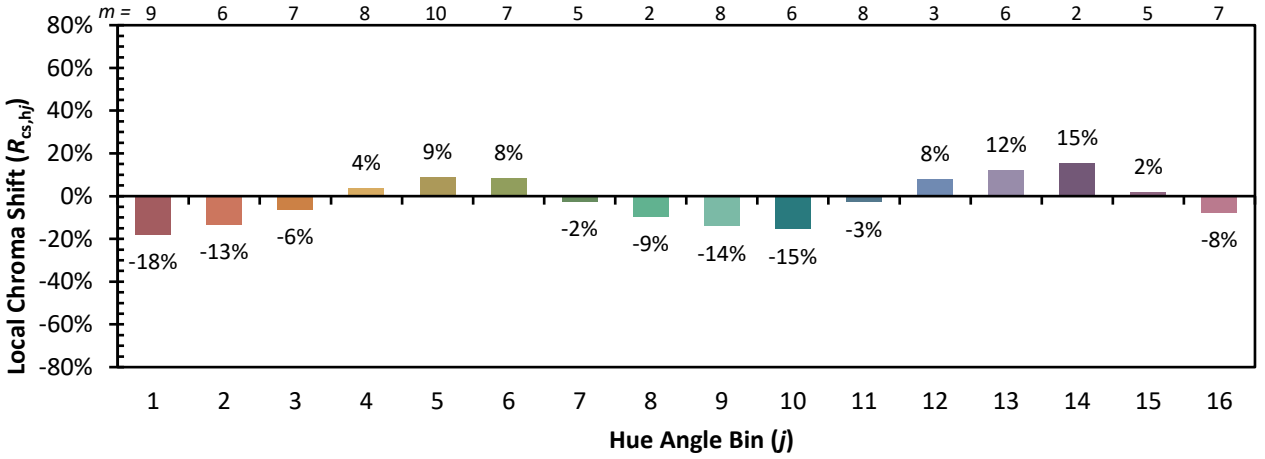
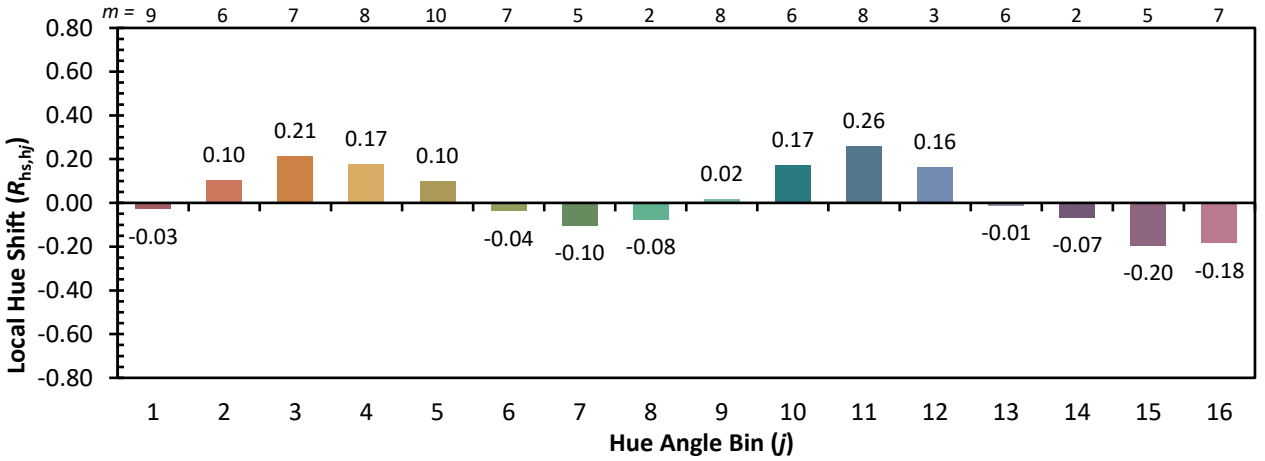
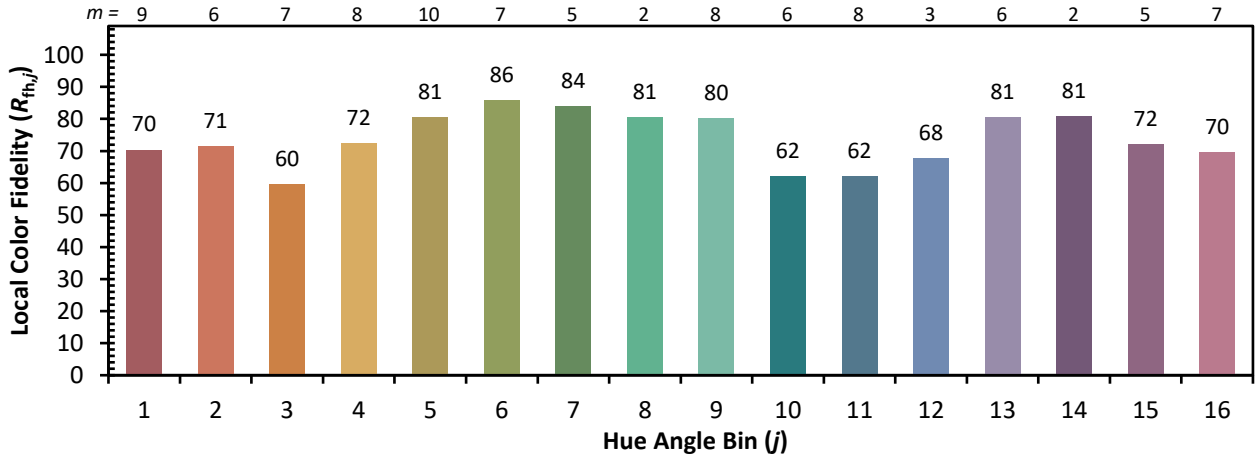
**TM-30-18**

## Color Rendition by Hue-Angle Bin



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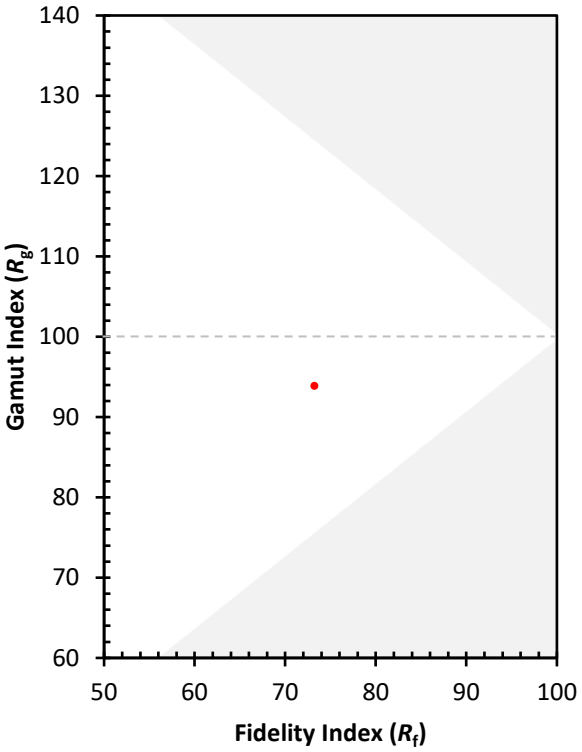
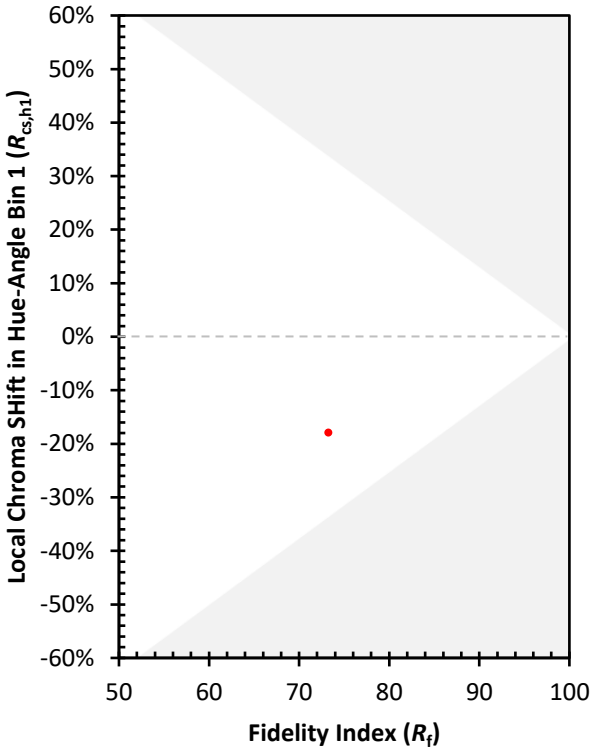
## Measure Comparisons

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