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: P868913

Luminaire Tested: **EMM2-HSN-SA3B-727-U-T2U-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: | P868913 |
| Test Lab: | INNOVATION CENTER(G3) |
| Issue Date: | 08/22/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | INVUE |
| Catalog Number: | EMM2-HSN-SA3B-727-U-T2U-HSS |
| Description: | EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 150W 70CRI 2700K FIXTURE w/ TYPE II URBAN 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: | 11933.2 lumens |
| Efficiency: | N/A |
| Efficacy: | 89.1 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 0.33' x H: 0') |
| IES Classification: | Type II - 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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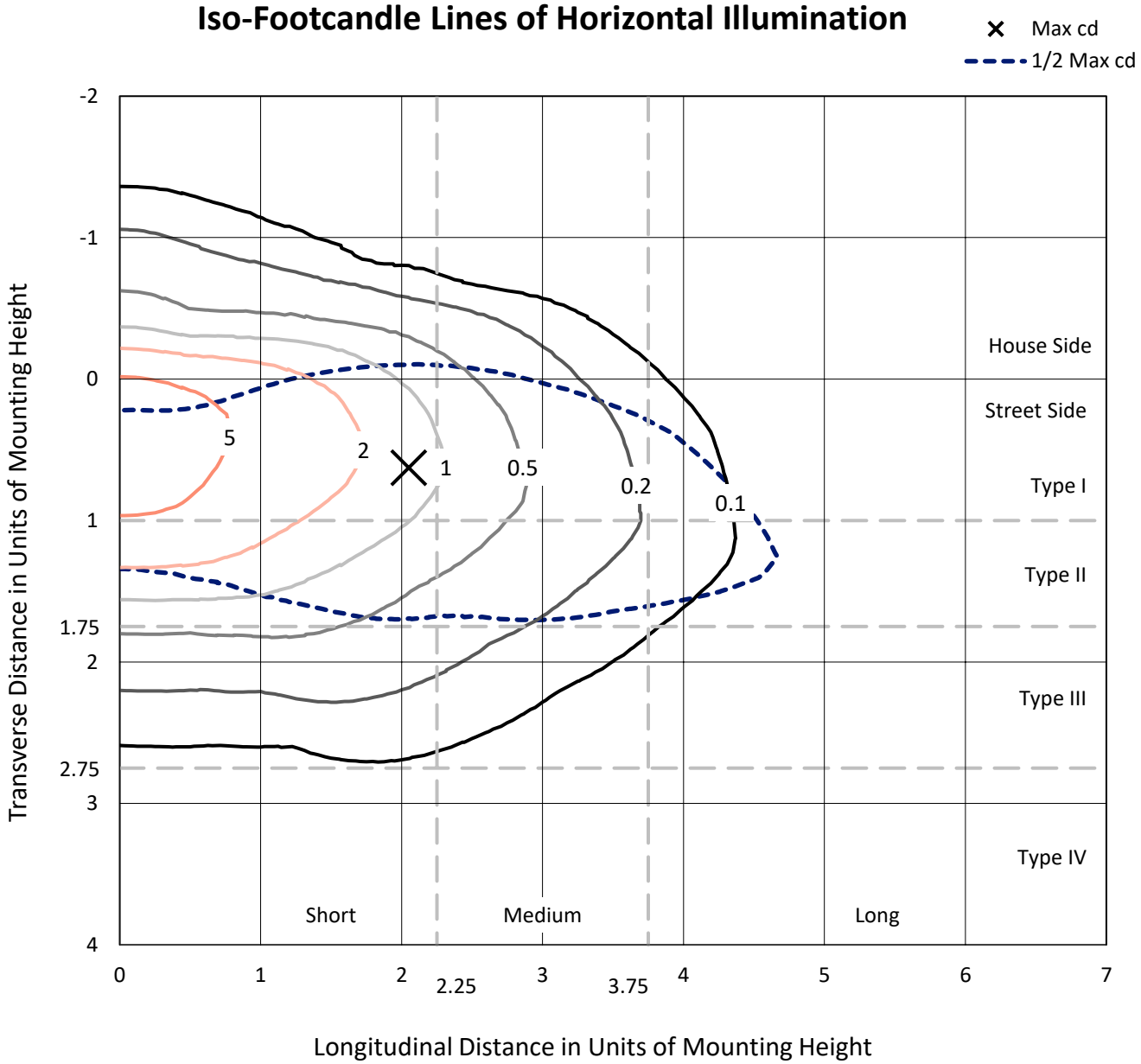
Scaled Data Report

REPORT NUMBER: P868913
CATALOG NUMBER: EMM2-HSN-SA3B-727-U-T2U-HSS

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 8.5 fc
Type II - Short - N/A

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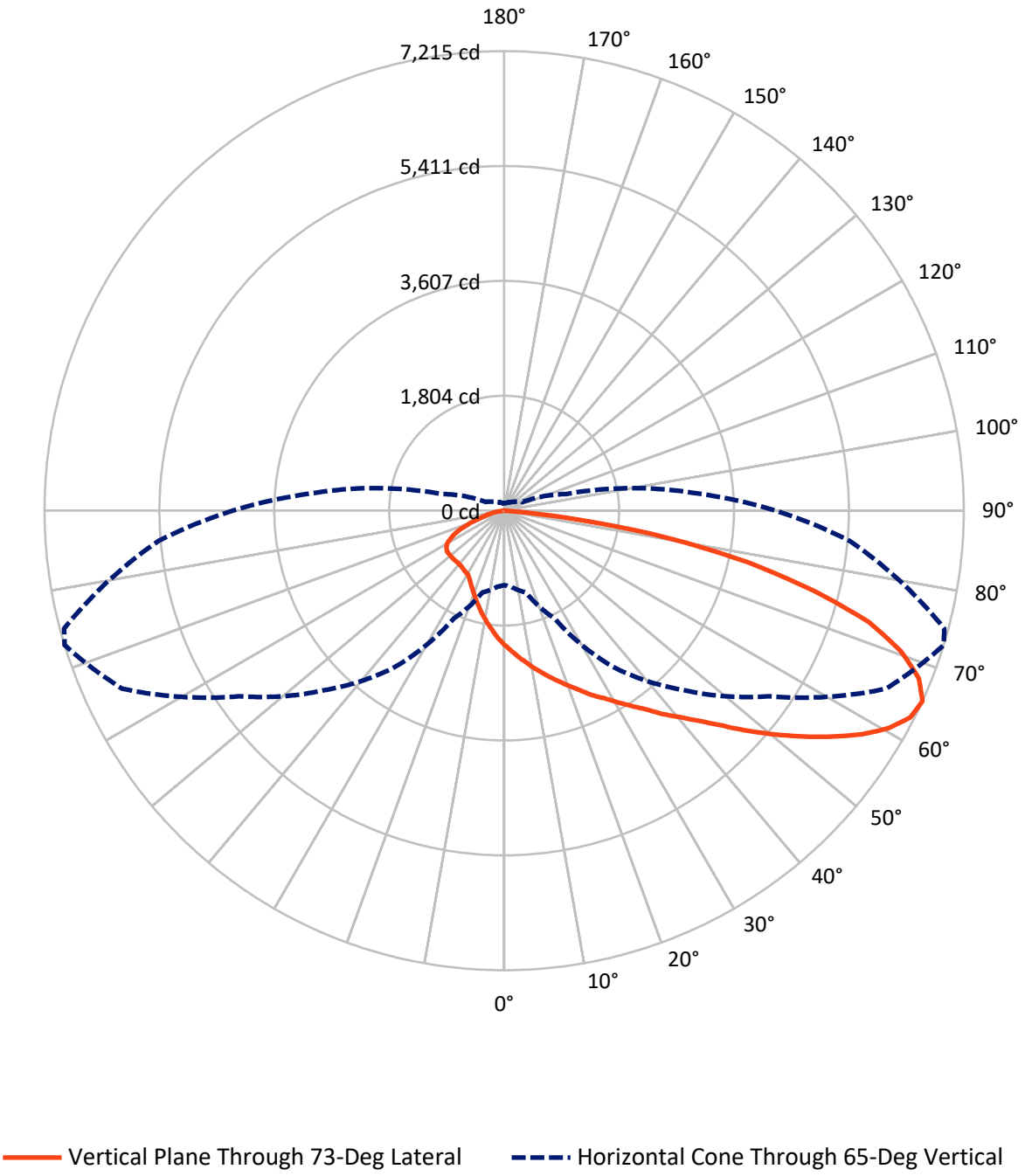
## Luminous Intensity Polar Plot



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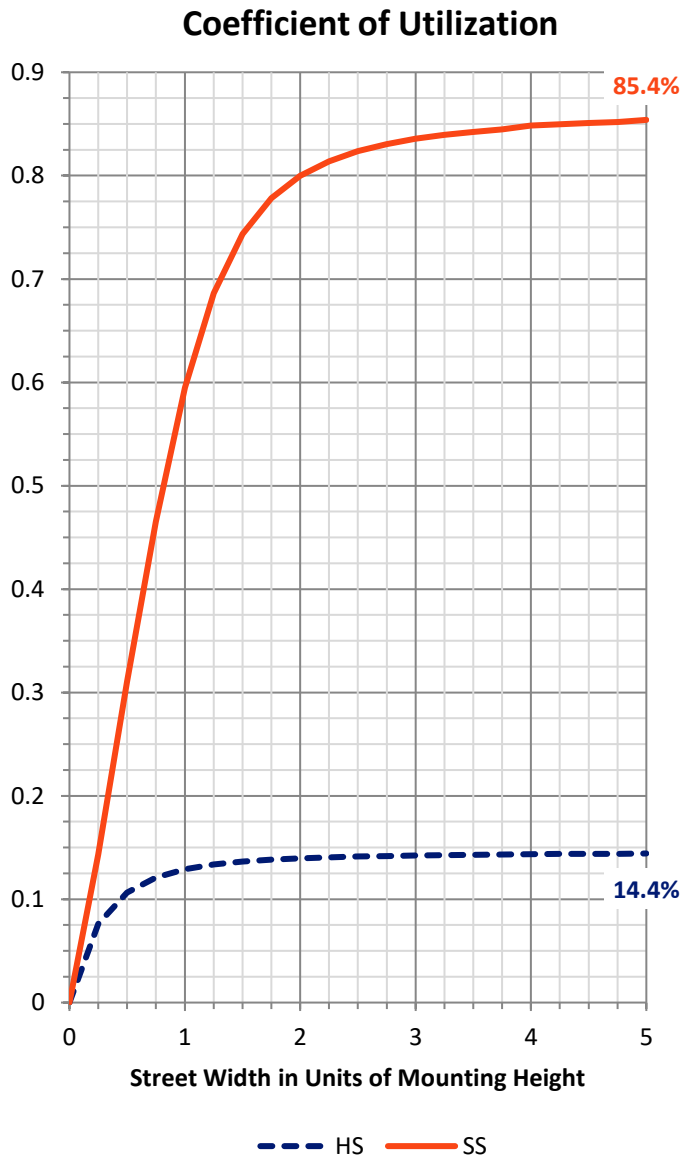
REPORT NUMBER: P868913
CATALOG NUMBER: EMM2-HSN-SA3B-727-U-T2U-HSS

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1735.3 | 0.0 | 1735.3 |
| | % Fixture | 14.5 | 0.0 | 14.5 |
| **Street Side** | Lumens | 10198.0 | 0.0 | 10198.0 |
| | % Fixture | 85.5 | 0.0 | 85.5 |
| **Total** | Lumens | 11933.2 | 0.0 | 11933.2 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 204.3 | 1.7 |
| 10°-20° | 621.0 | 5.2 |
| 20°-30° | 1040.1 | 8.7 |
| 30°-40° | 1568.9 | 13.1 |
| 40°-50° | 2216.8 | 18.6 |
| 50°-60° | 2494.4 | 20.9 |
| 60°-70° | 2236.8 | 18.7 |
| 70°-80° | 1360.4 | 11.4 |
| 80°-90° | 190.4 | 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° | 11933.2 | 100.0 |
| 0°-180° | 11933.2 | 100.0 |



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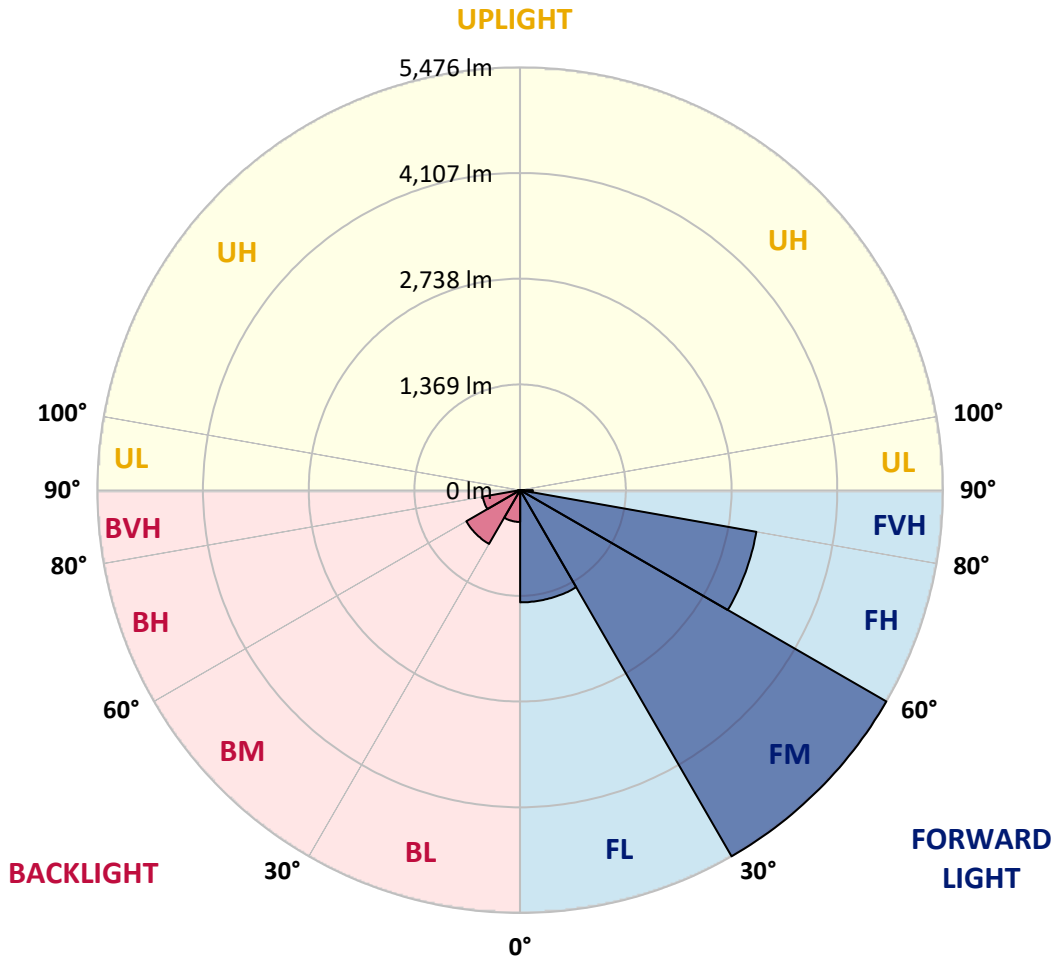
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1453.2 | 12.2 | | | |
| FM | (30°-60°) | 5475.5 | 45.9 | | | |
| FH | (60°-80°) | 3105.7 | 26.0 | | | G2/5000 |
| FVH | (80°-90°) | 163.5 | 1.4 | | | G2/225 |
| BL | (0°-30°) | 412.2 | 3.5 | B1/500 | | |
| BM | (30°-60°) | 804.7 | 6.7 | B1/1000 | | |
| BH | (60°-80°) | 491.5 | 4.1 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 26.8 | 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 II Short



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Scaled Data Report

REPORT NUMBER: P868913
CATALOG NUMBER: EMM2-HSN-SA3B-727-U-T2U-HSS

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 73° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 |
| 2.5° | 2443.5 | 2429.4 | 2408.4 | 2390.8 | 2359.2 | 2317.1 | 2282.0 | 2236.3 | 2204.8 | 2194.2 | 2148.6 |
| 5° | 2798.1 | 2780.5 | 2755.9 | 2713.8 | 2629.6 | 2580.4 | 2489.1 | 2383.8 | 2299.5 | 2282.0 | 2176.7 |
| 7.5° | 3163.2 | 3156.2 | 3100.0 | 3036.8 | 2935.0 | 2826.2 | 2685.7 | 2520.7 | 2397.8 | 2369.8 | 2208.3 |
| 10° | 3472.1 | 3440.5 | 3408.9 | 3349.3 | 3240.4 | 3085.9 | 2903.4 | 2675.2 | 2503.2 | 2457.5 | 2239.9 |
| 12.5° | 3658.2 | 3647.7 | 3619.6 | 3549.4 | 3444.0 | 3310.6 | 3093.0 | 2826.2 | 2605.0 | 2541.8 | 2271.5 |
| 15° | 3795.1 | 3805.7 | 3777.6 | 3731.9 | 3623.1 | 3496.7 | 3286.1 | 2984.1 | 2713.8 | 2640.1 | 2306.6 |
| 17.5° | 3925.0 | 3918.0 | 3914.5 | 3861.8 | 3763.5 | 3637.1 | 3423.0 | 3114.0 | 2822.6 | 2741.9 | 2341.7 |
| 20° | 3998.7 | 4002.3 | 3995.2 | 3974.2 | 3879.4 | 3756.5 | 3556.4 | 3268.5 | 2942.0 | 2850.7 | 2387.3 |
| 22.5° | 4037.4 | 4051.4 | 4065.4 | 4061.9 | 3984.7 | 3889.9 | 3682.8 | 3391.4 | 3064.9 | 2970.1 | 2443.5 |
| 25° | 4061.9 | 4072.5 | 4104.1 | 4146.2 | 4076.0 | 3998.7 | 3823.2 | 3538.8 | 3208.8 | 3100.0 | 2510.2 |
| 27.5° | 4083.0 | 4097.0 | 4135.7 | 4198.9 | 4142.7 | 4097.0 | 3946.1 | 3665.2 | 3331.7 | 3233.4 | 2587.4 |
| 30° | 4219.9 | 4237.5 | 4237.5 | 4269.1 | 4205.9 | 4195.3 | 4083.0 | 3816.2 | 3486.2 | 3380.9 | 2685.7 |
| 32.5° | 4581.5 | 4546.4 | 4483.2 | 4451.6 | 4300.7 | 4304.2 | 4216.4 | 3967.1 | 3651.2 | 3545.9 | 2808.6 |
| 35° | 4894.0 | 4894.0 | 4816.7 | 4714.9 | 4472.7 | 4423.5 | 4370.9 | 4167.3 | 3830.2 | 3728.4 | 2970.1 |
| 37.5° | 5195.9 | 5199.4 | 5118.7 | 5030.9 | 4753.6 | 4578.0 | 4549.9 | 4360.4 | 4051.4 | 3932.0 | 3138.6 |
| 40° | 5385.5 | 5406.6 | 5385.5 | 5318.8 | 5052.0 | 4848.3 | 4725.5 | 4578.0 | 4262.1 | 4170.8 | 3331.7 |
| 42.5° | 5417.1 | 5459.2 | 5536.5 | 5557.5 | 5269.6 | 5090.6 | 4950.2 | 4802.7 | 4514.8 | 4413.0 | 3552.9 |
| 45° | 5336.3 | 5350.4 | 5522.4 | 5547.0 | 5431.1 | 5283.7 | 5188.9 | 5066.0 | 4816.7 | 4729.0 | 3798.6 |
| 47.5° | 5115.2 | 5087.1 | 5146.8 | 5360.9 | 5406.6 | 5399.5 | 5424.1 | 5364.4 | 5167.8 | 5055.5 | 4069.0 |
| 50° | 4641.2 | 4651.7 | 4844.8 | 5104.6 | 5262.6 | 5441.7 | 5599.6 | 5666.4 | 5522.4 | 5410.1 | 4360.4 |
| 52.5° | 3777.6 | 3826.7 | 4195.3 | 4809.7 | 5083.6 | 5413.6 | 5726.0 | 5950.7 | 5891.0 | 5782.2 | 4648.2 |
| 55° | 3103.5 | 3177.2 | 3545.9 | 4335.8 | 4837.8 | 5276.7 | 5799.8 | 6249.1 | 6259.7 | 6175.4 | 4911.5 |
| 57.5° | 2429.4 | 2489.1 | 2878.8 | 3602.0 | 4486.7 | 5062.5 | 5810.3 | 6505.4 | 6624.8 | 6526.5 | 5143.2 |
| 60° | 1902.8 | 1945.0 | 2173.2 | 3001.7 | 4054.9 | 4757.1 | 5733.1 | 6709.0 | 6933.7 | 6860.0 | 5343.4 |
| 62.5° | 1442.9 | 1474.5 | 1678.1 | 2373.3 | 3524.8 | 4399.0 | 5473.3 | 6782.8 | 7151.4 | 7081.2 | 5455.7 |
| 65° | 1169.1 | 1197.2 | 1330.6 | 1864.2 | 3001.7 | 3984.7 | 5080.1 | 6614.3 | 7214.6 | 7151.4 | 5441.7 |
| 67.5° | 954.9 | 965.5 | 1074.3 | 1453.5 | 2538.3 | 3517.8 | 4504.3 | 6175.4 | 7021.5 | 7018.0 | 5280.2 |
| 70° | 772.4 | 800.5 | 891.7 | 1158.5 | 2110.0 | 2980.6 | 3833.7 | 5487.3 | 6603.7 | 6638.8 | 4957.2 |
| 72.5° | 656.5 | 663.5 | 744.3 | 958.4 | 1720.3 | 2418.9 | 3173.7 | 4693.9 | 5989.3 | 6017.4 | 4451.6 |
| 75° | 554.7 | 565.2 | 624.9 | 775.9 | 1397.3 | 1920.4 | 2552.3 | 3791.6 | 5013.4 | 5132.7 | 3749.5 |
| 77.5° | 477.5 | 481.0 | 523.1 | 639.0 | 993.5 | 1442.9 | 1871.2 | 2843.7 | 3925.0 | 4009.3 | 2945.5 |
| 80° | 375.7 | 382.7 | 428.3 | 505.5 | 691.6 | 937.4 | 1292.0 | 1945.0 | 2622.5 | 2717.3 | 2039.7 |
| 82.5° | 175.5 | 196.6 | 207.1 | 277.3 | 361.6 | 463.4 | 610.9 | 811.0 | 1186.6 | 1183.1 | 951.4 |
| 85° | 17.6 | 14.0 | 14.0 | 21.1 | 31.6 | 31.6 | 38.6 | 45.6 | 91.3 | 108.8 | 84.3 |
| 87.5° | 0.0 | 0.0 | 0.0 | 3.5 | 7.0 | 7.0 | 7.0 | 10.5 | 10.5 | 10.5 | 10.5 |
| 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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Scaled Data Report

REPORT NUMBER: P868913
CATALOG NUMBER: EMM2-HSN-SA3B-727-U-T2U-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 | 2117.0 |
| 2.5° | 2127.5 | 2095.9 | 2039.7 | 1987.1 | 1952.0 | 1923.9 | 1878.3 | 1850.2 | 1829.1 | 1801.0 | 1797.5 |
| 5° | 2120.5 | 2064.3 | 1952.0 | 1857.2 | 1765.9 | 1688.7 | 1607.9 | 1558.8 | 1506.1 | 1481.5 | 1502.6 |
| 7.5° | 2127.5 | 2036.2 | 1860.7 | 1716.8 | 1579.8 | 1457.0 | 1351.6 | 1284.9 | 1235.8 | 1211.2 | 1214.7 |
| 10° | 2131.0 | 2011.7 | 1783.5 | 1583.3 | 1407.8 | 1263.9 | 1144.5 | 1053.2 | 993.5 | 979.5 | 961.9 |
| 12.5° | 2124.0 | 1980.1 | 1706.2 | 1453.5 | 1242.8 | 1084.8 | 944.4 | 874.2 | 814.5 | 786.4 | 786.4 |
| 15° | 2131.0 | 1955.5 | 1625.5 | 1334.1 | 1095.4 | 912.8 | 793.4 | 716.2 | 681.1 | 656.5 | 660.0 |
| 17.5° | 2131.0 | 1934.4 | 1548.2 | 1218.2 | 951.4 | 782.9 | 674.1 | 610.9 | 575.8 | 561.7 | 558.2 |
| 20° | 2155.6 | 1916.9 | 1474.5 | 1109.4 | 825.0 | 667.0 | 579.3 | 530.1 | 502.0 | 488.0 | 481.0 |
| 22.5° | 2173.2 | 1902.8 | 1407.8 | 1004.1 | 719.7 | 582.8 | 509.1 | 463.4 | 442.4 | 435.3 | 435.3 |
| 25° | 2204.8 | 1899.3 | 1348.1 | 902.3 | 635.4 | 519.6 | 452.9 | 417.8 | 400.2 | 393.2 | 393.2 |
| 27.5° | 2250.4 | 1906.3 | 1292.0 | 814.5 | 572.3 | 456.4 | 407.2 | 379.2 | 368.6 | 365.1 | 361.6 |
| 30° | 2317.1 | 1937.9 | 1256.8 | 747.8 | 512.6 | 417.8 | 372.1 | 354.6 | 347.6 | 344.1 | 344.1 |
| 32.5° | 2404.9 | 1994.1 | 1242.8 | 712.7 | 477.5 | 386.2 | 347.6 | 333.5 | 326.5 | 326.5 | 323.0 |
| 35° | 2513.7 | 2057.3 | 1232.3 | 681.1 | 452.9 | 365.1 | 330.0 | 316.0 | 312.5 | 312.5 | 312.5 |
| 37.5° | 2643.6 | 2124.0 | 1214.7 | 660.0 | 438.8 | 347.6 | 316.0 | 301.9 | 301.9 | 301.9 | 301.9 |
| 40° | 2787.5 | 2222.3 | 1211.2 | 646.0 | 428.3 | 337.0 | 301.9 | 287.9 | 287.9 | 287.9 | 287.9 |
| 42.5° | 2949.0 | 2327.6 | 1207.7 | 635.4 | 421.3 | 330.0 | 287.9 | 273.8 | 273.8 | 273.8 | 273.8 |
| 45° | 3145.6 | 2461.0 | 1214.7 | 628.4 | 421.3 | 323.0 | 277.3 | 259.8 | 256.3 | 256.3 | 256.3 |
| 47.5° | 3338.7 | 2587.4 | 1221.7 | 621.4 | 414.3 | 312.5 | 263.3 | 245.8 | 242.2 | 238.7 | 238.7 |
| 50° | 3545.9 | 2717.3 | 1221.7 | 614.4 | 407.2 | 301.9 | 252.8 | 228.2 | 224.7 | 221.2 | 221.2 |
| 52.5° | 3749.5 | 2826.2 | 1225.3 | 603.8 | 389.7 | 284.4 | 235.2 | 214.2 | 207.1 | 203.6 | 200.1 |
| 55° | 3946.1 | 2942.0 | 1228.8 | 586.3 | 368.6 | 266.8 | 224.7 | 200.1 | 189.6 | 182.6 | 182.6 |
| 57.5° | 4093.5 | 3036.8 | 1211.2 | 551.2 | 340.5 | 249.3 | 207.1 | 182.6 | 168.5 | 161.5 | 161.5 |
| 60° | 4234.0 | 3096.5 | 1179.6 | 498.5 | 312.5 | 231.7 | 193.1 | 165.0 | 151.0 | 143.9 | 143.9 |
| 62.5° | 4290.1 | 3107.0 | 1105.9 | 407.2 | 277.3 | 214.2 | 175.5 | 151.0 | 140.4 | 136.9 | 136.9 |
| 65° | *4258.5* | *3061.4* | *1007.6* | *323.0* | *245.8* | *193.1* | *161.5* | *140.4* | *126.4* | *115.9* | *115.9* |
| 67.5° | 4086.5 | 2903.4 | 874.2 | 256.3 | 214.2 | 175.5 | 147.5 | 126.4 | 112.3 | 101.8 | 101.8 |
| 70° | 3760.0 | 2650.6 | 681.1 | 203.6 | 186.1 | 154.5 | 133.4 | 115.9 | 101.8 | 91.3 | 91.3 |
| 72.5° | 3279.0 | 2299.5 | 495.0 | 172.0 | 161.5 | 136.9 | 119.4 | 105.3 | 91.3 | 84.3 | 84.3 |
| 75° | 2703.3 | 1772.9 | 351.1 | 147.5 | 143.9 | 122.9 | 108.8 | 94.8 | 84.3 | 77.2 | 77.2 |
| 77.5° | 2029.2 | 1235.8 | 273.8 | 129.9 | 126.4 | 112.3 | 98.3 | 87.8 | 77.2 | 73.7 | 70.2 |
| 80° | 1351.6 | 765.3 | 207.1 | 98.3 | 94.8 | 87.8 | 80.7 | 73.7 | 63.2 | 56.2 | 56.2 |
| 82.5° | 603.8 | 323.0 | 105.3 | 56.2 | 49.2 | 42.1 | 35.1 | 24.6 | 24.6 | 21.1 | 21.1 |
| 85° | 63.2 | 42.1 | 21.1 | 14.0 | 14.0 | 10.5 | 10.5 | 10.5 | 7.0 | 7.0 | 7.0 |
| 87.5° | 10.5 | 10.5 | 7.0 | 7.0 | 7.0 | 3.5 | 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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# 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

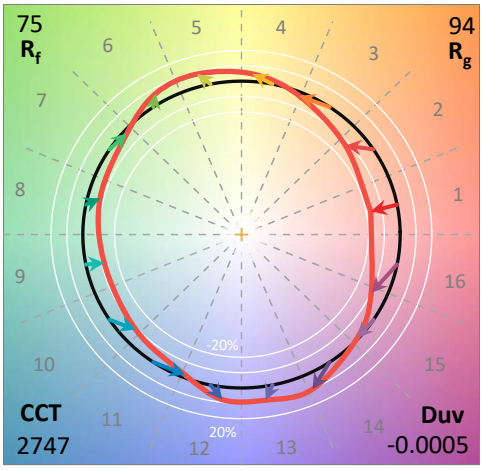
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## 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

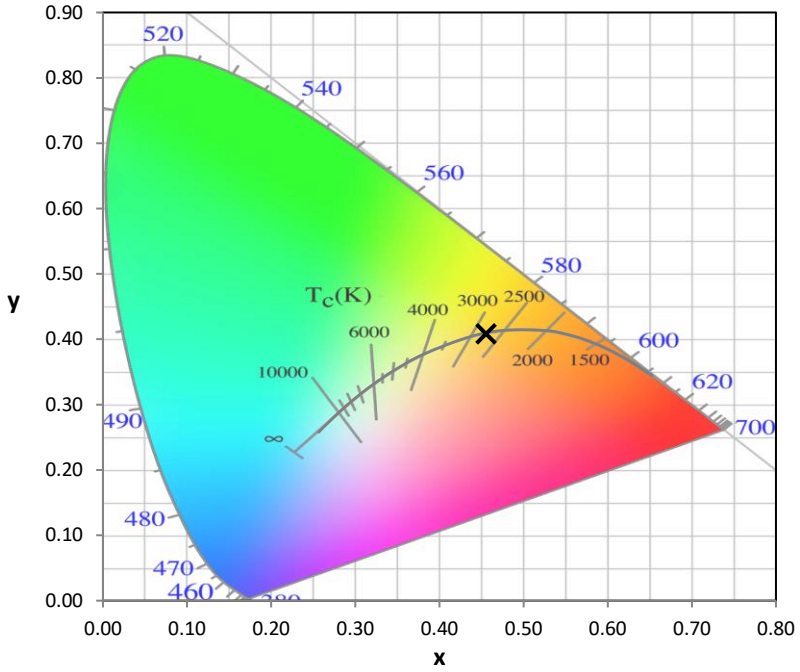
| | |
|---|---|
| Stabilization Time: | 22M |
| Operation Time: | 1H 22M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2407-157-3

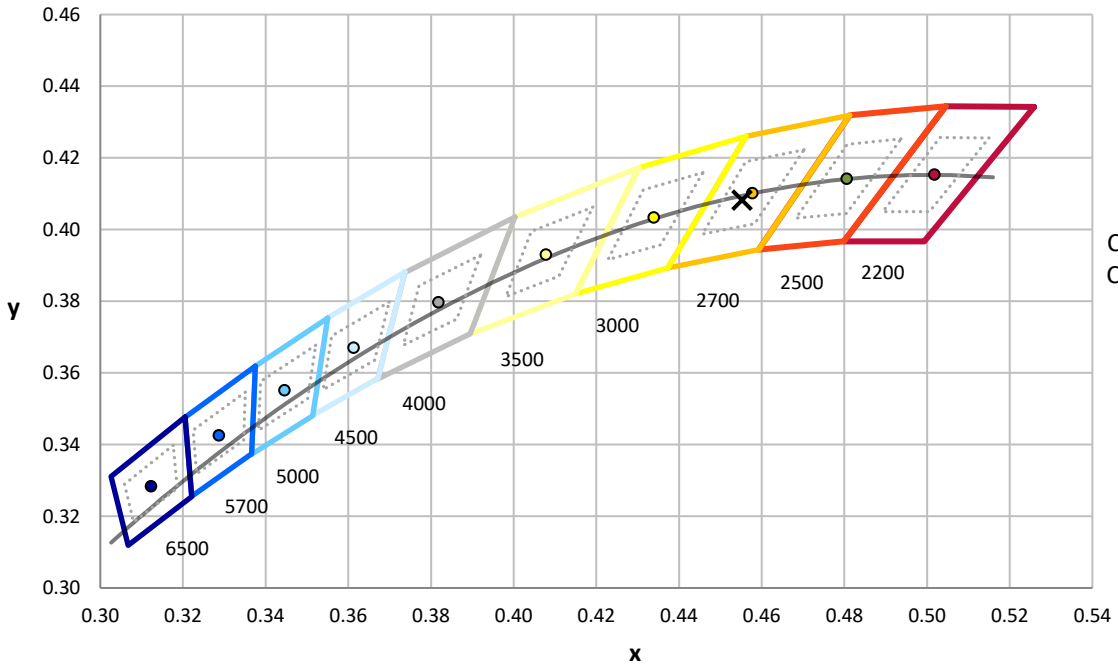
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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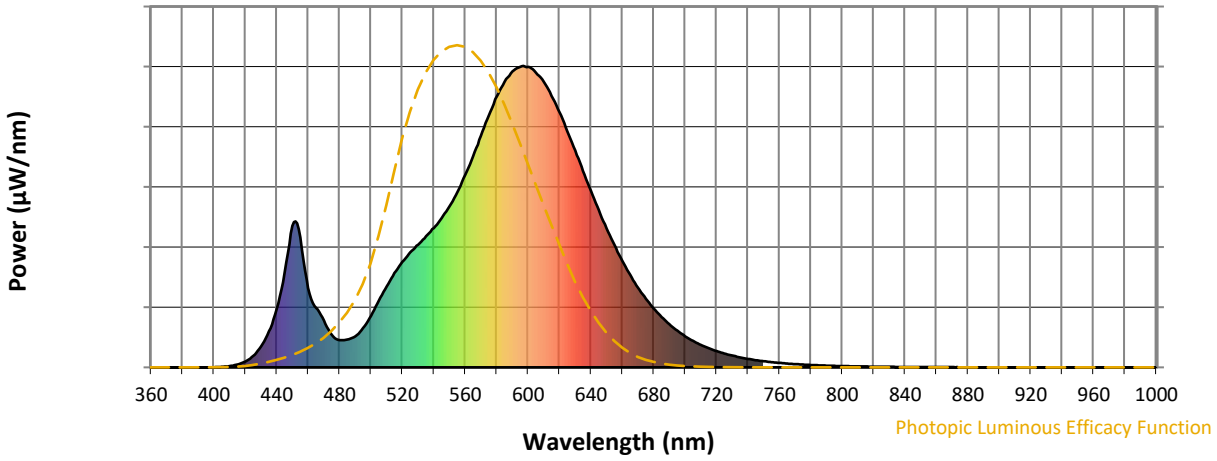
## Photopic Flux vs. Wavelength




## 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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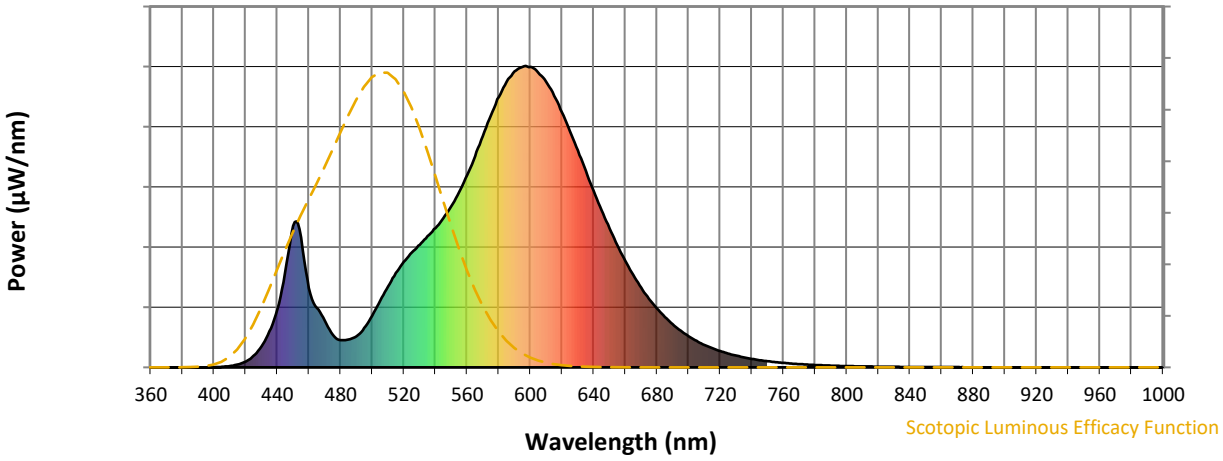
## Scotopic Flux vs. Wavelength




**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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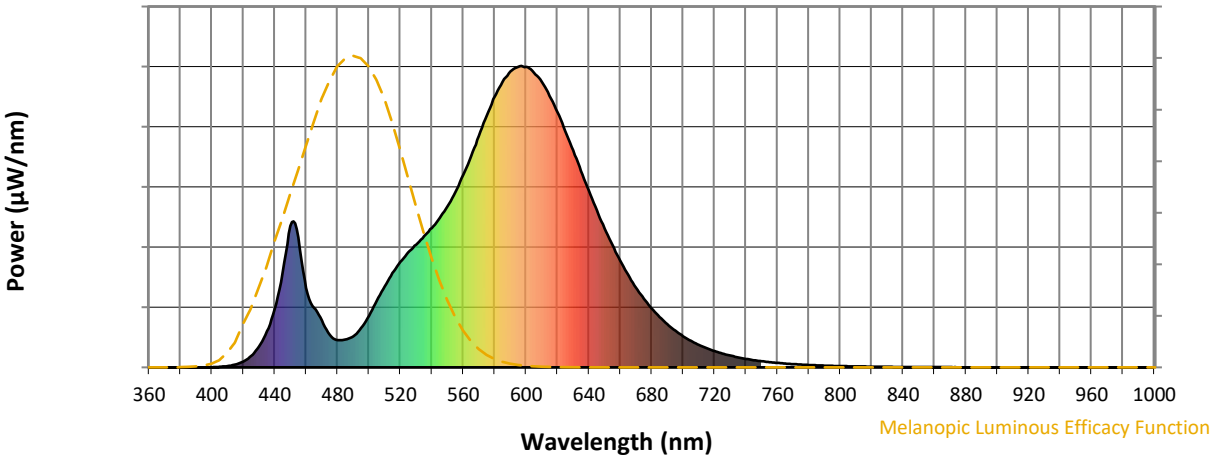
## Melanopic Flux vs. Wavelength




**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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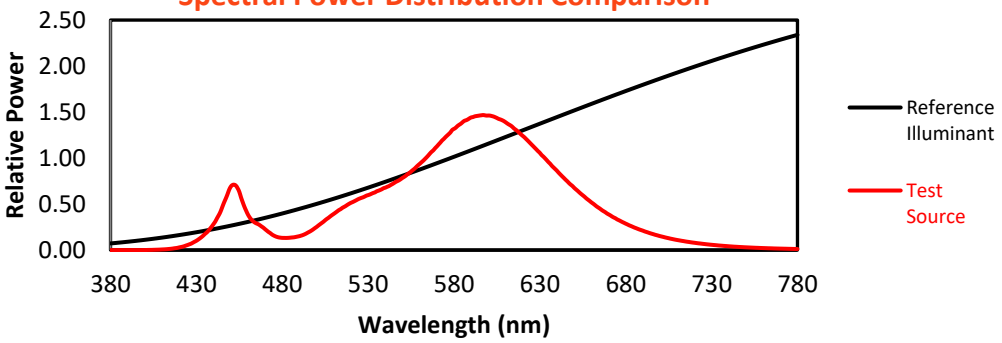
# TM-30-18

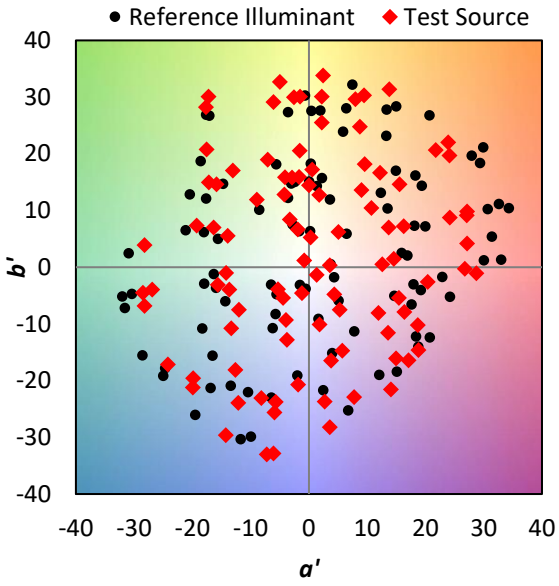
## Summary

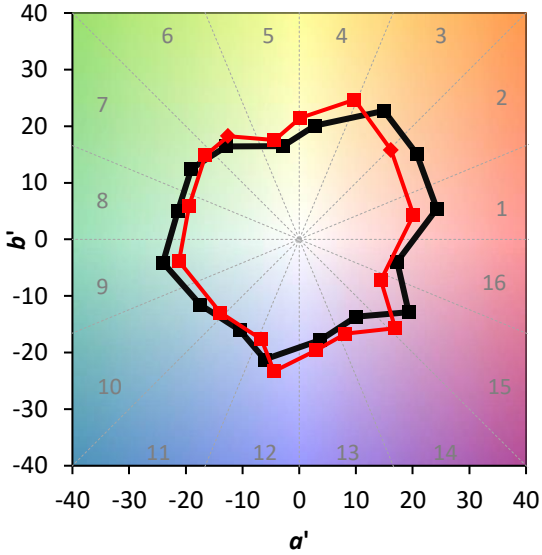
$R_f$ = 75.5
$R_g$ = 93.6
CIE $R_a$ = 71.7
$R_9$ = -35.3

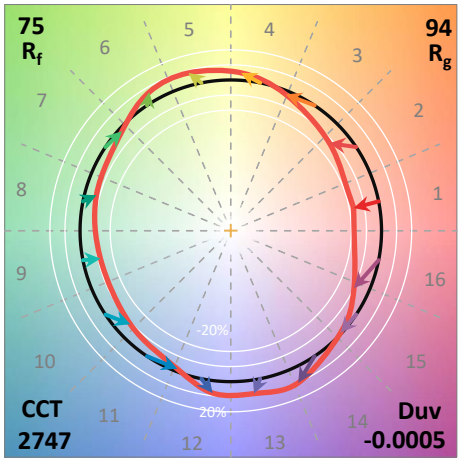
## Spectral Power Distribution Comparison

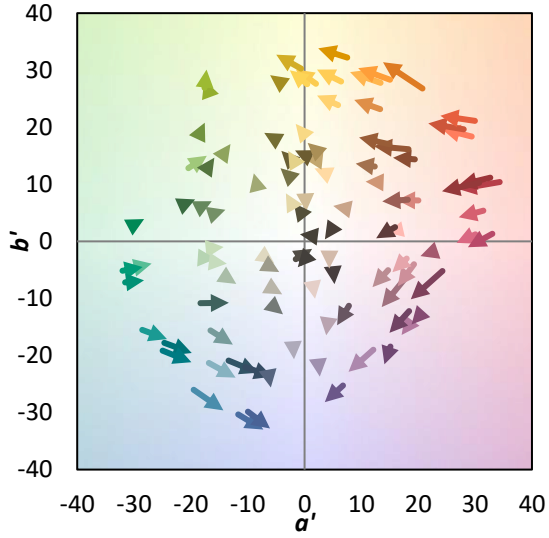



## Color Vector Graphics



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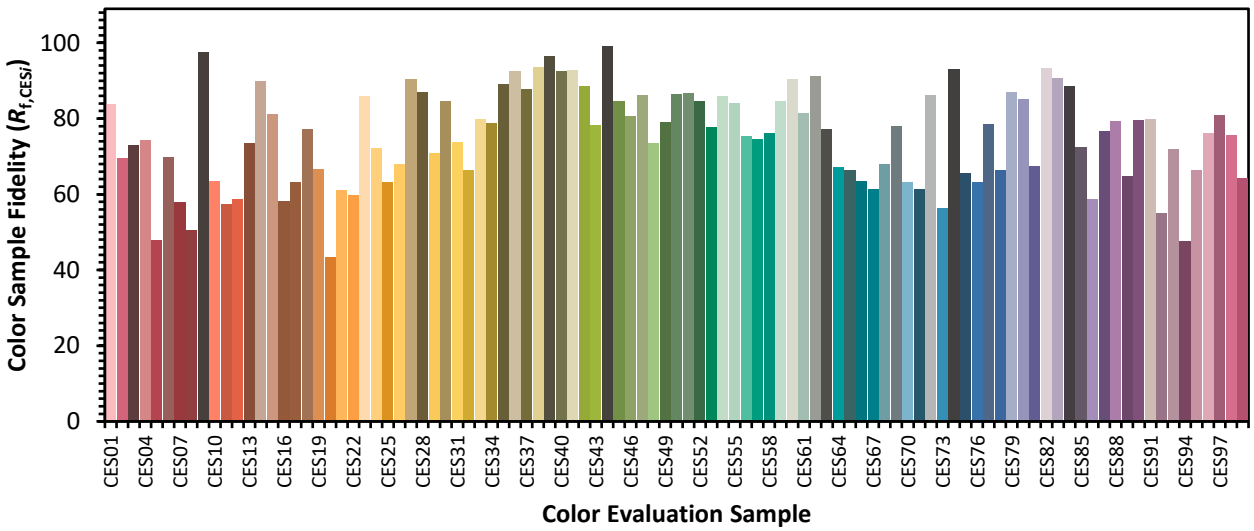
# TM-30-18

**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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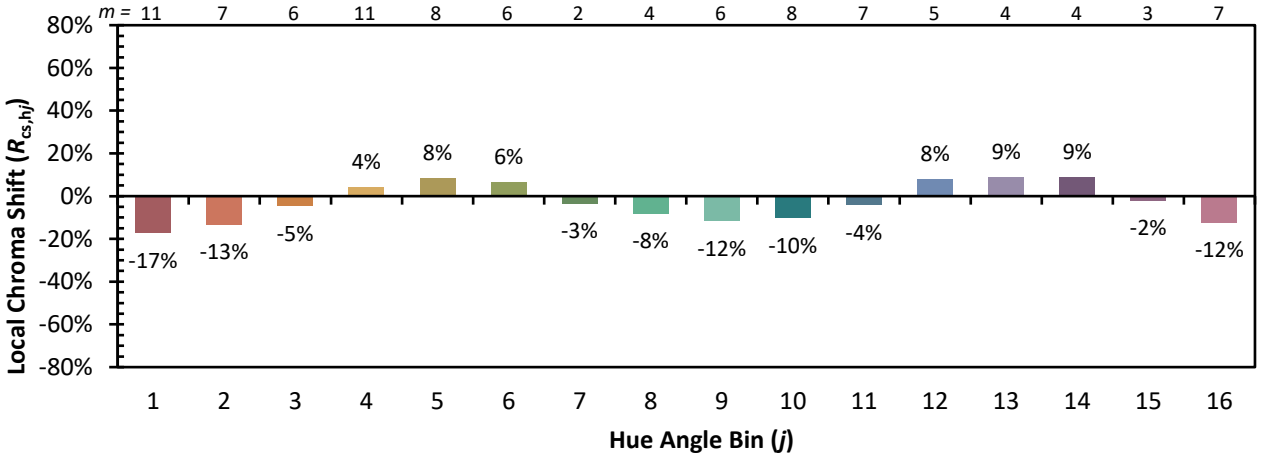
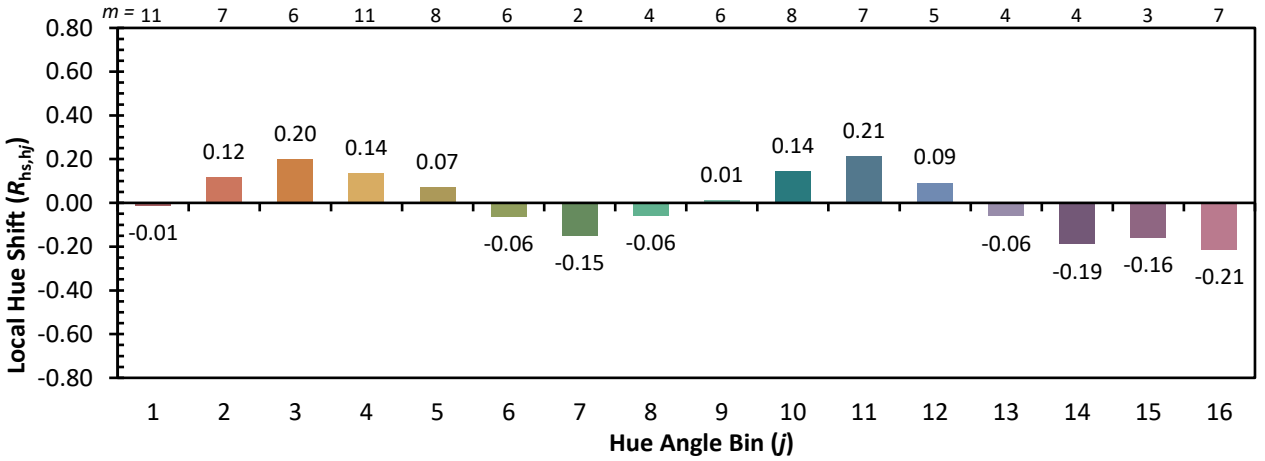
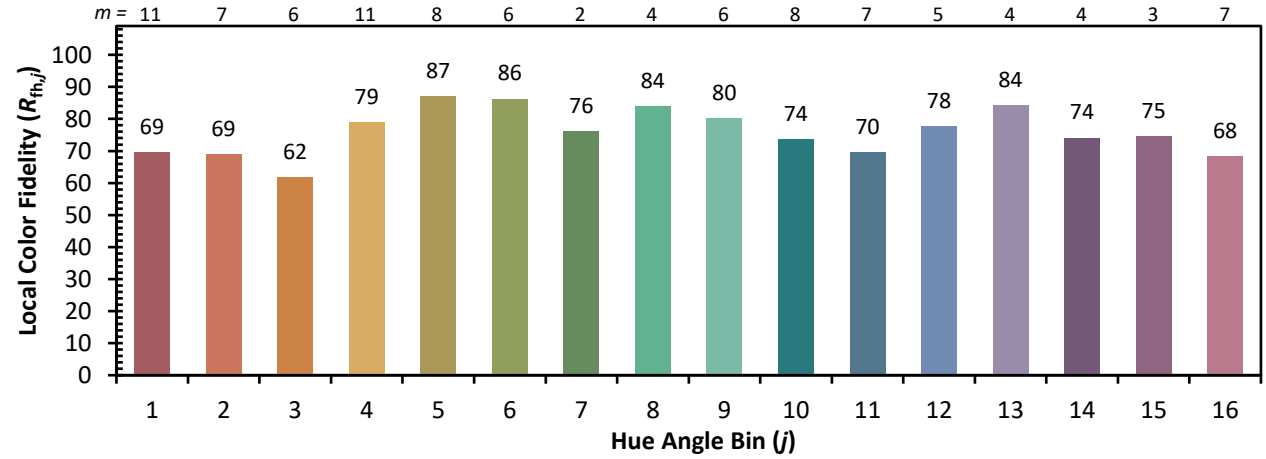
**TM-30-18**

## Color Rendition by Hue-Angle Bin



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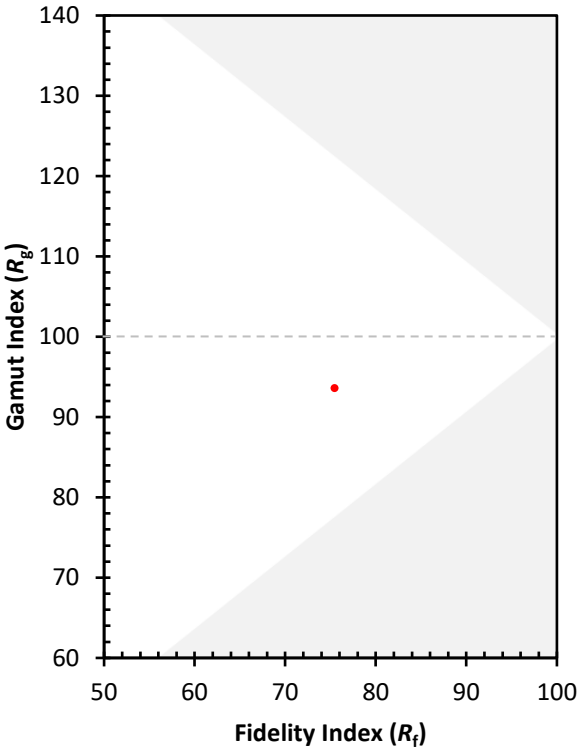
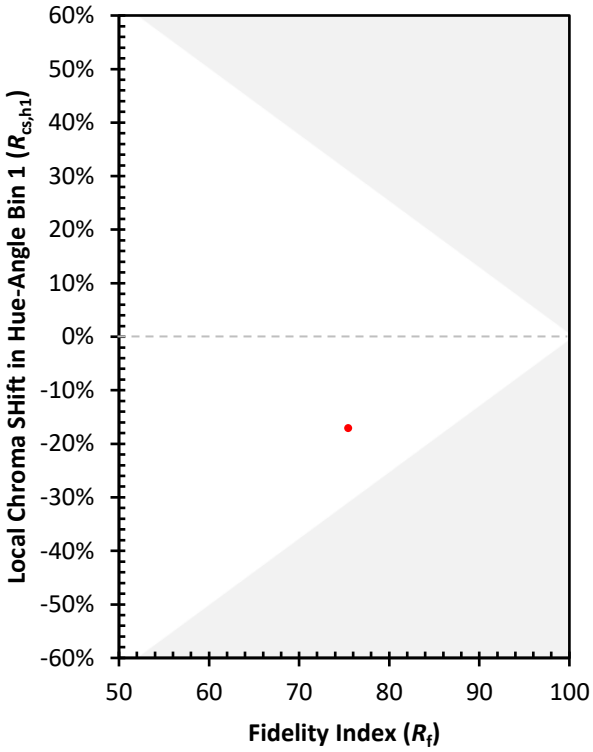
## Measure Comparisons

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