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: P868394

Luminaire Tested: **EMM2-HTN-SA3A-730-U-T2R**

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: | P868394 |
| Test Lab: | INNOVATION CENTER(G3) |
| Issue Date: | 08/22/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | INVUE |
| Catalog Number: | EMM2-HTN-SA3A-730-U-T2R |
| Description: | EPIC MODERN TALL HOUSING DISCRETE LED ARRAYS 130W 70CRI 3000K FIXTURE w/ TYPE II ROADWAY DISTRIBUTION OPTIC |
| Light Source: | (30) 3000K CCT, 70 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 16006 lumens |
| Efficiency: | N/A |
| Efficacy: | 141.6 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 0.33' x H: 0') |
| IES Classification: | Type II - Medium |
| BUG Rating: | B3 - U0 - G3 |

| | |
|---|---|
| Input Watts (W): | 113 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | 0.99 |
| Total Harmonic Distortion (THDi): | 7.77% |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 24 FT |

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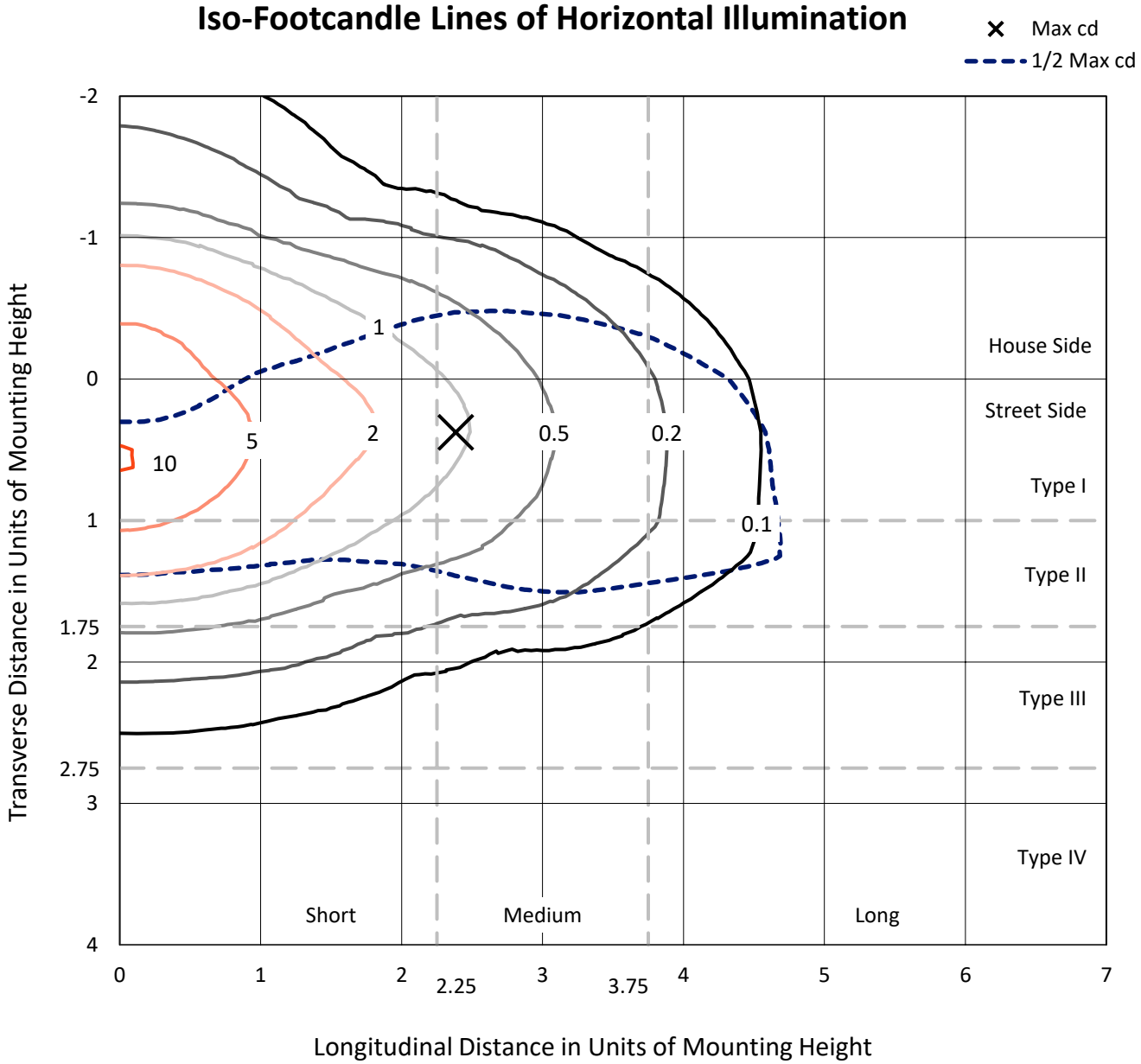
Scaled Data Report

REPORT NUMBER: P868394
CATALOG NUMBER: EMM2-HTN-SA3A-730-U-T2R

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 10.2 fc
Type II - Medium - N/A

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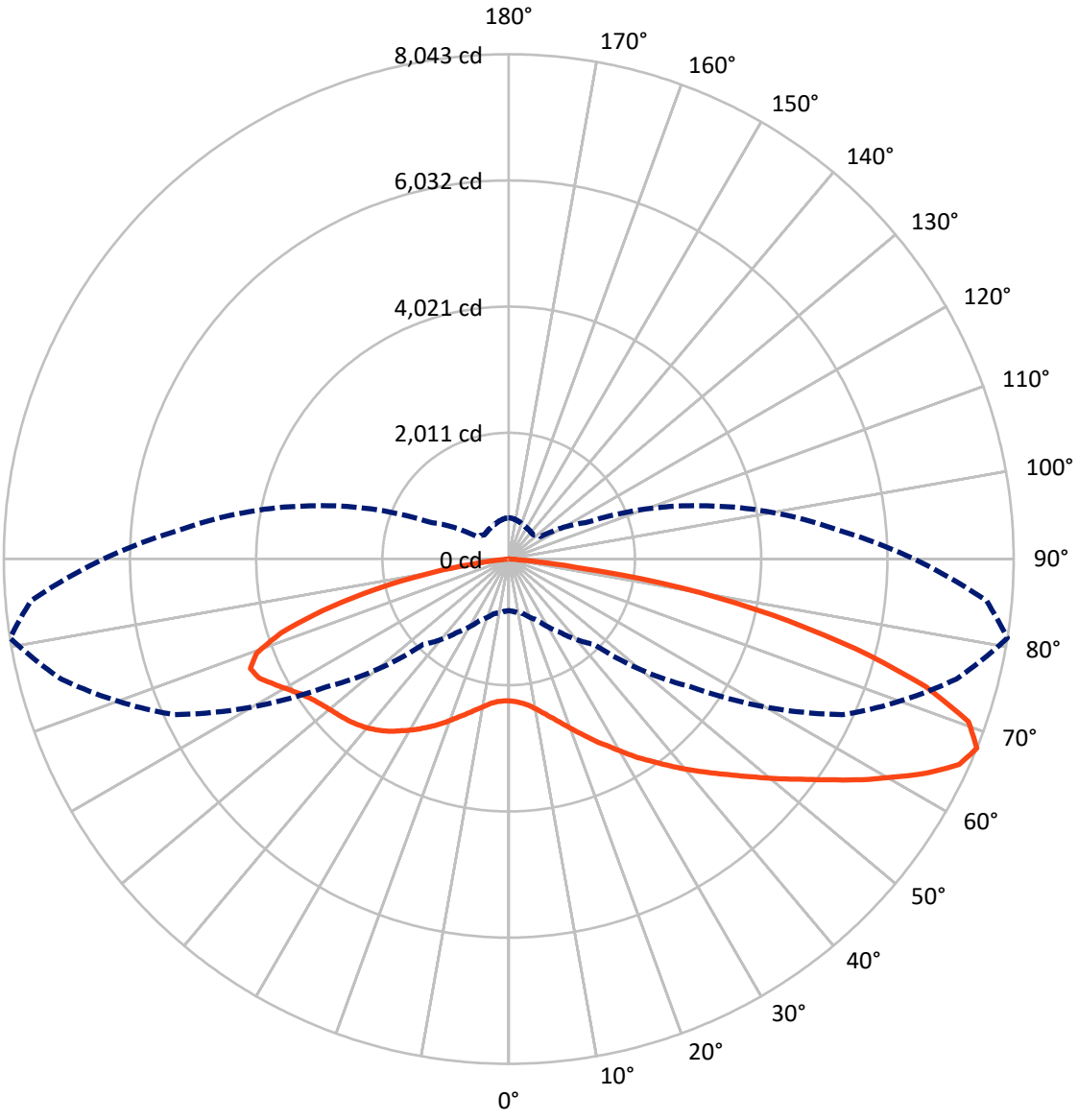
## Luminous Intensity Polar Plot



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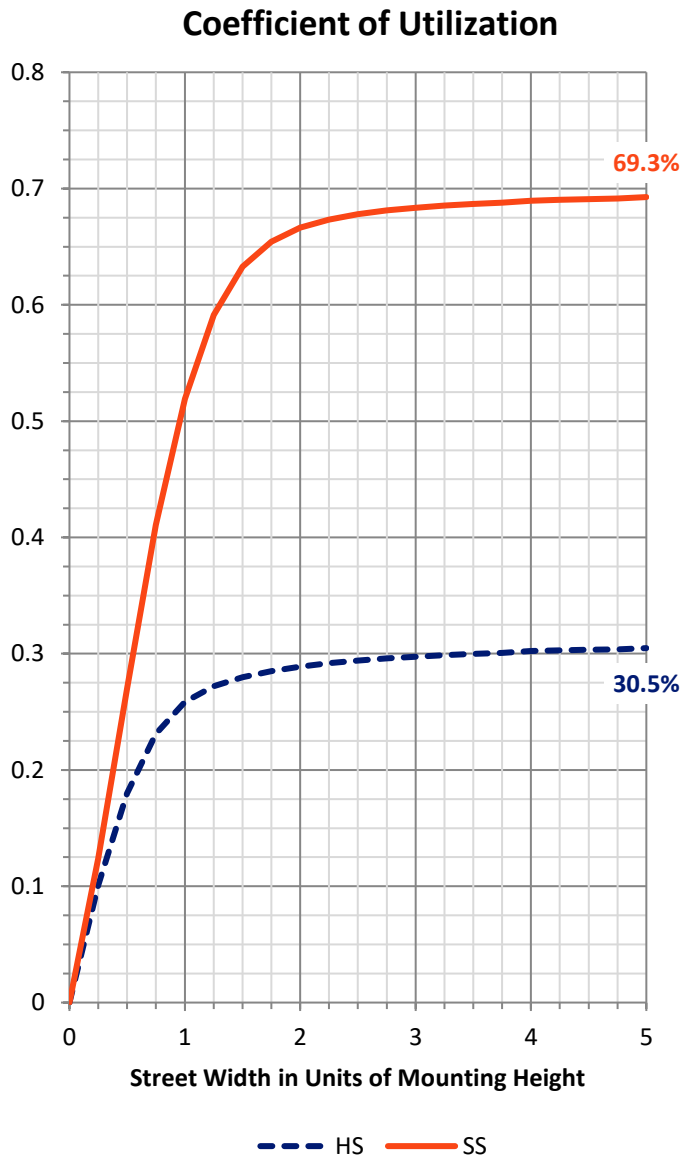
REPORT NUMBER: P868394
CATALOG NUMBER: EMM2-HTN-SA3A-730-U-T2R

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 4904.6 | 0.0 | 4904.6 |
| | % Fixture | 30.6 | 0.0 | 30.6 |
| **Street Side** | Lumens | 11101.3 | 0.0 | 11101.3 |
| | % Fixture | 69.4 | 0.0 | 69.4 |
| **Total** | Lumens | 16006.0 | 0.0 | 16006.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 230.4 | 1.4 |
| 10°-20° | 818.0 | 5.1 |
| 20°-30° | 1629.2 | 10.2 |
| 30°-40° | 2559.6 | 16.0 |
| 40°-50° | 3174.3 | 19.8 |
| 50°-60° | 3103.1 | 19.4 |
| 60°-70° | 2609.5 | 16.3 |
| 70°-80° | 1658.1 | 10.4 |
| 80°-90° | 223.8 | 1.4 |
| 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° | 16006.0 | 100.0 |
| 0°-180° | 16006.0 | 100.0 |



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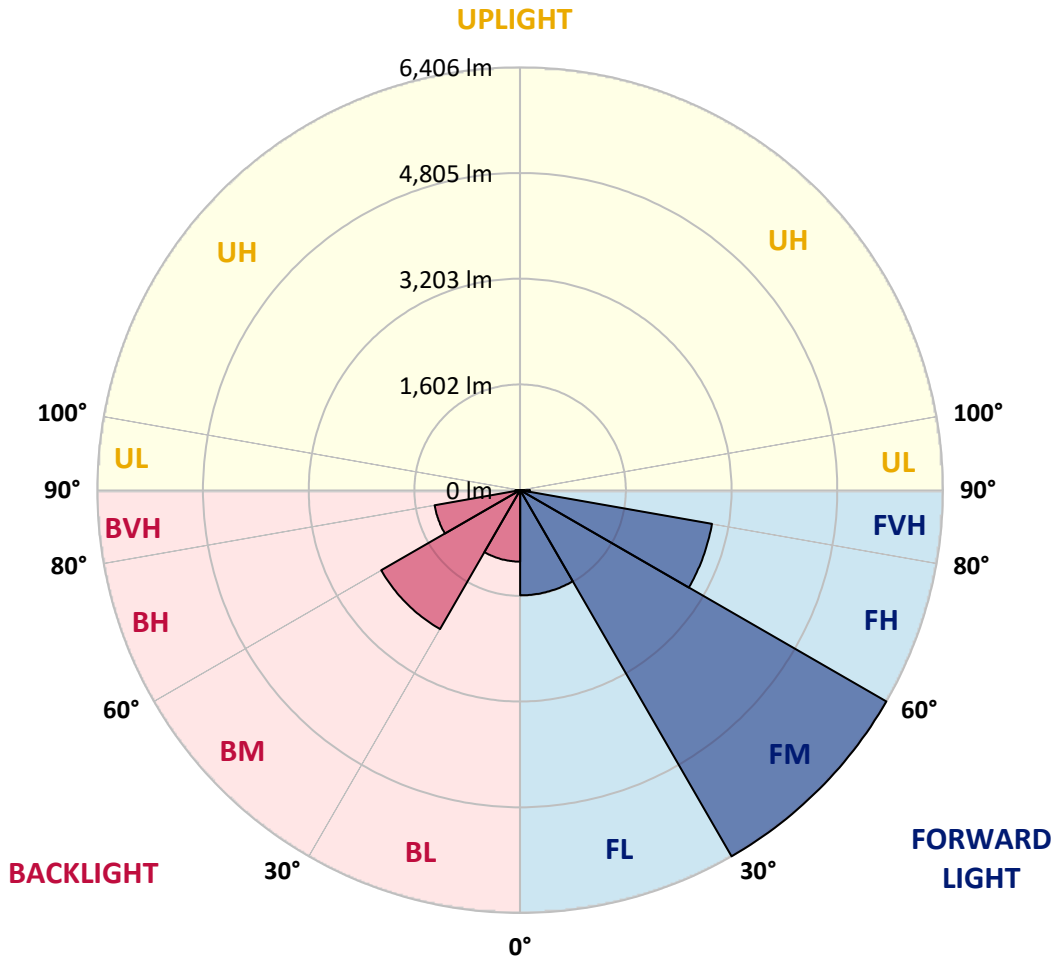
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1594.3 | 10.0 | | | |
| FM | (30°-60°) | 6406.1 | 40.0 | | | |
| FH | (60°-80°) | 2951.0 | 18.4 | | | G2/5000 |
| FVH | (80°-90°) | 150.0 | 0.9 | | | G2/225 |
| BL | (0°-30°) | 1083.3 | 6.8 | B3/2500 | | |
| BM | (30°-60°) | 2430.9 | 15.2 | B2/2500 | | |
| BH | (60°-80°) | 1316.6 | 8.2 | B3/2500 | | G3/2500 |
| BVH | (80°-90°) | 73.8 | 0.5 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B3-U0-G3**
Type II Medium



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Scaled Data Report

REPORT NUMBER: P868394
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 81° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2259.8 | 2259.8 | 2259.8 | 2259.8 | 2259.8 | 2259.8 | 2259.8 | 2259.8 | 2259.8 | *2259.8* | 2259.8 |
| 2.5° | 2339.1 | 2335.9 | 2335.9 | 2310.5 | 2310.5 | 2304.2 | 2307.4 | 2288.3 | 2278.8 | *2275.6* | 2272.5 |
| 5° | 2507.3 | 2507.3 | 2488.3 | 2472.4 | 2440.7 | 2412.1 | 2386.7 | 2348.6 | 2320.1 | *2307.4* | 2297.8 |
| 7.5° | 2761.2 | 2742.2 | 2735.8 | 2688.2 | 2621.6 | 2564.4 | 2513.7 | 2431.1 | 2377.2 | *2358.1* | 2345.5 |
| 10° | 3072.3 | 3046.9 | 2999.3 | 2945.3 | 2859.6 | 2773.9 | 2672.4 | 2561.3 | 2472.4 | *2434.3* | 2418.4 |
| 12.5° | 3392.8 | 3357.9 | 3291.2 | 3240.5 | 3129.4 | 2999.3 | 2856.4 | 2704.1 | 2580.3 | *2526.4* | 2497.8 |
| 15° | 3745.1 | 3726.1 | 3646.7 | 3545.2 | 3415.0 | 3230.9 | 3053.2 | 2866.0 | 2707.3 | *2631.1* | 2583.5 |
| 17.5° | 4126.0 | 4097.4 | 4011.7 | 3887.9 | 3703.8 | 3484.9 | 3278.6 | 3037.3 | 2853.3 | *2754.9* | 2700.9 |
| 20° | 4500.5 | 4494.1 | 4367.2 | 4249.7 | 4033.9 | 3761.0 | 3494.4 | 3240.5 | 3008.8 | *2894.5* | 2824.7 |
| 22.5° | 4919.4 | 4878.2 | 4767.1 | 4602.0 | 4345.0 | 4094.2 | 3780.0 | 3449.9 | 3177.0 | *3043.7* | 2964.3 |
| 25° | 5354.2 | 5351.1 | 5214.6 | 5011.5 | 4709.9 | 4392.6 | 4053.0 | 3688.0 | 3376.9 | *3215.1* | 3110.3 |
| 27.5° | 5893.8 | 5852.5 | 5678.0 | 5446.3 | 5097.2 | 4732.2 | 4338.6 | 3935.5 | 3567.4 | *3373.8* | 3246.8 |
| 30° | 6366.7 | 6354.0 | 6157.2 | 5897.0 | 5506.6 | 5071.8 | 4646.5 | 4214.8 | 3792.7 | *3564.2* | 3424.6 |
| 32.5° | 6750.7 | 6734.8 | 6566.6 | 6306.4 | 5887.4 | 5436.8 | 4948.0 | 4478.3 | 4018.1 | *3770.5* | 3586.4 |
| 35° | 7071.3 | 7045.9 | 6871.3 | 6611.1 | 6249.2 | 5792.2 | 5271.7 | 4754.4 | 4265.6 | *3964.1* | 3789.5 |
| 37.5° | 7198.2 | 7176.0 | 7033.2 | 6817.4 | 6484.1 | 6065.2 | 5563.7 | 5059.1 | 4513.2 | *4183.1* | 3986.3 |
| 40° | 7150.6 | 7137.9 | 7036.4 | 6887.2 | 6633.3 | 6284.2 | 5843.0 | 5376.4 | 4792.5 | *4414.8* | 4179.9 |
| 42.5° | 6925.3 | 6925.3 | 6861.8 | 6785.6 | 6658.7 | 6407.9 | 6090.6 | 5681.1 | 5062.2 | *4646.5* | 4364.0 |
| 45° | 6607.9 | 6595.2 | 6573.0 | 6544.4 | 6525.4 | 6430.2 | 6252.4 | 5944.6 | 5360.6 | *4900.4* | 4586.2 |
| 47.5° | 6185.8 | 6195.3 | 6179.4 | 6192.1 | 6271.5 | 6331.8 | 6322.2 | 6188.9 | 5665.3 | *5179.7* | 4805.2 |
| 50° | 5522.4 | 5566.9 | 5617.7 | 5766.8 | 5928.7 | 6096.9 | 6252.4 | 6363.5 | 6023.9 | *5497.1* | 5059.1 |
| 52.5° | 4700.4 | 4719.5 | 4855.9 | 5208.2 | 5554.2 | 5776.3 | 6071.5 | 6442.9 | 6341.3 | *5827.1* | 5357.4 |
| 55° | 3688.0 | 3722.9 | 3929.2 | 4427.5 | 5043.2 | 5468.5 | 5814.4 | 6407.9 | 6665.0 | *6204.8* | 5706.5 |
| 57.5° | 2643.8 | 2666.0 | 2996.1 | 3510.2 | 4313.2 | 5027.3 | 5522.4 | 6268.3 | 6925.3 | *6633.3* | 6065.2 |
| 60° | 1878.9 | 1920.2 | 2132.8 | 2634.3 | 3405.5 | 4418.0 | 5255.8 | 6065.2 | 7166.5 | *7052.2* | 6534.9 |
| 62.5° | 1387.0 | 1409.2 | 1558.3 | 1923.3 | 2558.1 | 3586.4 | 4909.9 | 5916.0 | 7325.2 | *7502.9* | 7004.6 |
| 65° | 1044.2 | 1053.7 | 1155.3 | 1406.0 | 1913.8 | 2643.8 | 4364.0 | 5887.4 | 7414.0 | *7886.9* | 7420.4 |
| 67.5° | *822.0* | *837.9* | *901.4* | *1072.8* | *1425.0* | *1923.3* | *3554.7* | *5868.4* | *7382.3* | *8042.5* | *7639.4* |
| 70° | 691.9 | 695.1 | 742.7 | 837.9 | 1066.4 | 1383.8 | 2656.5 | 5582.7 | 7204.6 | *7769.5* | 7436.3 |
| 72.5° | 599.9 | 599.9 | 622.1 | 698.2 | 856.9 | 1047.4 | 1809.1 | 4900.4 | 6753.9 | *6941.1* | 6731.7 |
| 75° | 485.6 | 482.4 | 520.5 | 593.5 | 688.7 | 806.1 | 1215.6 | 3710.2 | 5808.1 | *5712.9* | 5541.5 |
| 77.5° | 422.1 | 418.9 | 450.7 | 514.2 | 568.1 | 644.3 | 831.5 | 2408.9 | 4570.3 | *4284.7* | 4176.7 |
| 80° | 361.8 | 352.3 | 377.7 | 438.0 | 466.6 | 501.5 | 574.5 | 1402.8 | 2986.6 | *2808.8* | 2678.7 |
| 82.5° | 272.9 | 250.7 | 244.4 | 295.2 | 314.2 | 292.0 | 292.0 | 491.9 | 1085.4 | *1095.0* | 1012.4 |
| 85° | 22.2 | 25.4 | 31.7 | 38.1 | 54.0 | 60.3 | 63.5 | 104.7 | 161.9 | *155.5* | 158.7 |
| 87.5° | 3.2 | 3.2 | 3.2 | 6.3 | 6.3 | 9.5 | 9.5 | 9.5 | 12.7 | *12.7* | 12.7 |
| 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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Scaled Data Report

REPORT NUMBER: P868394
CATALOG NUMBER: EMM2-HTN-SA3A-730-U-T2R

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2259.8 | 2259.8 | 2259.8 | 2259.8 | 2259.8 | 2259.8 | 2259.8 | 2259.8 | 2259.8 | 2259.8 | 2259.8 |
| 2.5° | 2269.3 | 2262.9 | 2256.6 | 2256.6 | 2256.6 | 2250.2 | 2247.1 | 2247.1 | 2243.9 | 2234.4 | 2231.2 |
| 5° | 2291.5 | 2282.0 | 2272.5 | 2272.5 | 2272.5 | 2269.3 | 2266.1 | 2269.3 | 2266.1 | 2256.6 | 2253.4 |
| 7.5° | 2335.9 | 2323.2 | 2310.5 | 2310.5 | 2316.9 | 2313.7 | 2313.7 | 2316.9 | 2313.7 | 2304.2 | 2301.0 |
| 10° | 2399.4 | 2380.4 | 2374.0 | 2374.0 | 2380.4 | 2377.2 | 2374.0 | 2374.0 | 2370.8 | 2355.0 | 2361.3 |
| 12.5° | 2469.2 | 2450.2 | 2443.8 | 2447.0 | 2443.8 | 2437.5 | 2440.7 | 2431.1 | 2428.0 | 2402.6 | 2399.4 |
| 15° | 2558.1 | 2535.9 | 2523.2 | 2526.4 | 2516.8 | 2504.1 | 2491.4 | 2485.1 | 2472.4 | 2450.2 | 2443.8 |
| 17.5° | 2659.7 | 2624.7 | 2608.9 | 2608.9 | 2589.8 | 2564.4 | 2545.4 | 2526.4 | 2507.3 | 2481.9 | 2475.6 |
| 20° | 2758.0 | 2726.3 | 2700.9 | 2694.6 | 2656.5 | 2615.2 | 2580.3 | 2548.6 | 2526.4 | 2497.8 | 2491.4 |
| 22.5° | 2881.8 | 2837.4 | 2802.5 | 2773.9 | 2716.8 | 2650.1 | 2596.2 | 2551.7 | 2520.0 | 2488.3 | 2478.8 |
| 25° | 3012.0 | 2948.5 | 2891.3 | 2837.4 | 2758.0 | 2662.8 | 2586.7 | 2523.2 | 2481.9 | 2447.0 | 2440.7 |
| 27.5° | 3142.1 | 3059.6 | 2977.0 | 2891.3 | 2770.7 | 2647.0 | 2539.1 | 2462.9 | 2408.9 | 2364.5 | 2358.1 |
| 30° | 3281.7 | 3180.2 | 3050.0 | 2926.3 | 2767.6 | 2605.7 | 2469.2 | 2361.3 | 2297.8 | 2247.1 | 2240.7 |
| 32.5° | 3424.6 | 3297.6 | 3119.9 | 2951.7 | 2751.7 | 2545.4 | 2367.7 | 2253.4 | 2174.1 | 2116.9 | 2101.1 |
| 35° | 3583.2 | 3427.7 | 3183.3 | 2961.2 | 2707.3 | 2456.5 | 2259.8 | 2116.9 | 2024.9 | 1967.8 | 1955.1 |
| 37.5° | 3745.1 | 3548.3 | 3224.6 | 2954.8 | 2643.8 | 2351.8 | 2120.1 | 1974.1 | 1866.2 | 1786.9 | 1774.2 |
| 40° | 3910.1 | 3659.4 | 3250.0 | 2923.1 | 2554.9 | 2221.7 | 1990.0 | 1812.3 | 1656.7 | 1583.7 | 1548.8 |
| 42.5° | 4062.5 | 3761.0 | 3262.7 | 2878.7 | 2456.5 | 2085.2 | 1818.6 | 1586.9 | 1440.9 | 1361.6 | 1377.4 |
| 45° | 4221.2 | 3856.2 | 3265.9 | 2824.7 | 2326.4 | 1910.6 | 1602.8 | 1387.0 | 1241.0 | 1180.7 | 1174.3 |
| 47.5° | 4357.7 | 3935.5 | 3259.5 | 2748.5 | 2180.4 | 1710.7 | 1377.4 | 1171.1 | 1063.2 | 1006.1 | 999.8 |
| 50° | 4538.6 | 4024.4 | 3250.0 | 2659.7 | 1990.0 | 1482.2 | 1168.0 | 999.8 | 901.4 | 856.9 | 853.8 |
| 52.5° | 4719.5 | 4122.8 | 3243.6 | 2535.9 | 1790.0 | 1266.4 | 977.5 | 844.2 | 777.6 | 755.4 | 749.0 |
| 55° | 4957.5 | 4243.4 | 3246.8 | 2393.1 | 1561.5 | 1044.2 | 828.4 | 736.3 | 701.4 | 691.9 | 691.9 |
| 57.5° | 5230.5 | 4398.9 | 3265.9 | 2234.4 | 1323.5 | 863.3 | 720.5 | 679.2 | 676.0 | 682.4 | 685.5 |
| 60° | 5560.5 | 4605.2 | 3303.9 | 2069.3 | 1104.5 | 730.0 | 657.0 | 653.8 | 663.3 | 685.5 | 691.9 |
| 62.5° | 5931.9 | 4830.6 | 3351.6 | 1853.5 | 895.0 | 641.1 | 622.1 | 634.8 | 647.5 | 672.8 | 676.0 |
| 65° | 6258.8 | 5084.5 | 3380.1 | 1647.2 | 749.0 | 590.3 | 599.9 | 606.2 | 637.9 | 672.8 | 672.8 |
| 67.5° | *6455.5* | *5268.5* | *3272.2* | *1387.0* | *625.2* | *545.9* | *564.9* | *584.0* | *618.9* | *650.6* | *657.0* |
| 70° | 6388.9 | 5208.2 | 2904.0 | 1075.9 | 530.0 | 504.6 | 526.9 | 555.4 | 590.3 | 628.4 | 647.5 |
| 72.5° | 5925.5 | 4779.8 | 2358.1 | 783.9 | 460.2 | 466.6 | 495.1 | 533.2 | 564.9 | 606.2 | 631.6 |
| 75° | 4954.3 | 3989.5 | 1701.2 | 564.9 | 403.1 | 428.5 | 472.9 | 504.6 | 526.9 | 536.4 | 539.5 |
| 77.5° | 3761.0 | 2932.6 | 1158.4 | 422.1 | 349.1 | 384.0 | 431.6 | 466.6 | 472.9 | 479.2 | 485.6 |
| 80° | 2456.5 | 1866.2 | 653.8 | 295.2 | 266.6 | 314.2 | 352.3 | 390.4 | 377.7 | 396.7 | 403.1 |
| 82.5° | 1037.8 | 815.7 | 298.3 | 146.0 | 123.8 | 133.3 | 142.8 | 127.0 | 117.4 | 117.4 | 101.6 |
| 85° | 136.5 | 104.7 | 44.4 | 19.0 | 15.9 | 9.5 | 9.5 | 9.5 | 6.3 | 6.3 | 6.3 |
| 87.5° | 12.7 | 12.7 | 9.5 | 9.5 | 6.3 | 6.3 | 3.2 | 6.3 | 3.2 | 3.2 | 3.2 |
| 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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# LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-157-4

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-40-730-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-40-730-U-5WQ-2

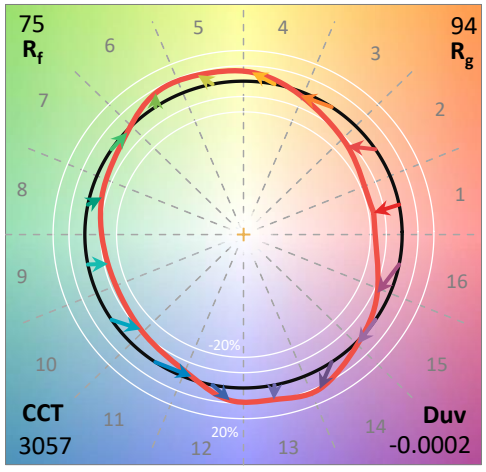
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-157-4 |
| 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-40-730-U-5WQ-2** |
| Description: | Epic Modern Light Square 40W 5WQ Optic and Flare Trim |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3057 | CRI (Ra): | 71.7 | | |
| CIE u': | 0.2487 | R1: | 68.1 | R9: | -34.8 |
| CIE v': | 0.5199 | R2: | 82.0 | R10: | 58.5 |
| Duv: | -0.0002 | R3: | 93.5 | R11: | 62.5 |
| CIE x: | 0.4326 | R4: | 67.5 | R12: | 47.5 |
| CIE y: | 0.4020 | R5: | 67.2 | R13: | 70.7 |
| CIE z: | 0.1654 | R6: | 74.9 | R14: | 96.4 |
| Peak Wavelength (nm): | 593 | R7: | 77.4 | R15: | 60.0 |
| Dominant Wavelength (nm): | 582 | R8: | 43.1 | | |
| Purity: | 50.50735 | | | | |
| Rf: | 74.6 | | | | |
| Rg: | 94 | | | | |




## Test Conditions

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

REPORT NUMBER: SP1-2407-157-4

| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC Power Source | IN0208 | 10/24/2023 | 10/24/2024 |
| Sphere Thermometer | IN0085 | 10/24/2023 | 10/24/2024 |
| Room Thermometer | IN0046 | 10/24/2023 | 10/24/2024 |

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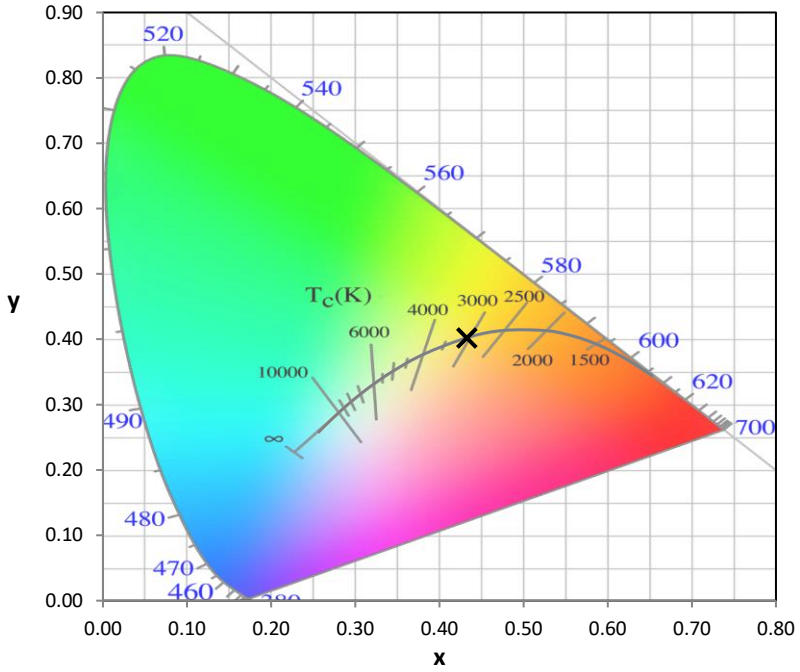
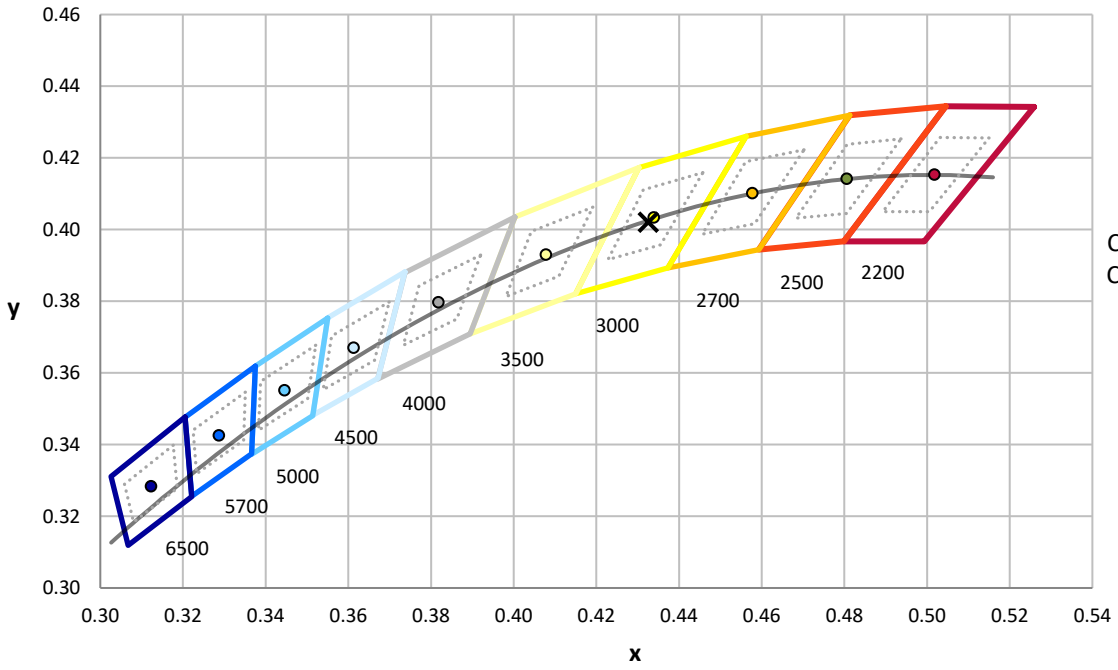
## CIE 1931 Chromaticity Diagram




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




CCT = 3057K
CIE x = 0.4326
CIE y = 0.4020
Duv = -0.0002

Point lies inside the ANSI 3000K 4-step quadrangle

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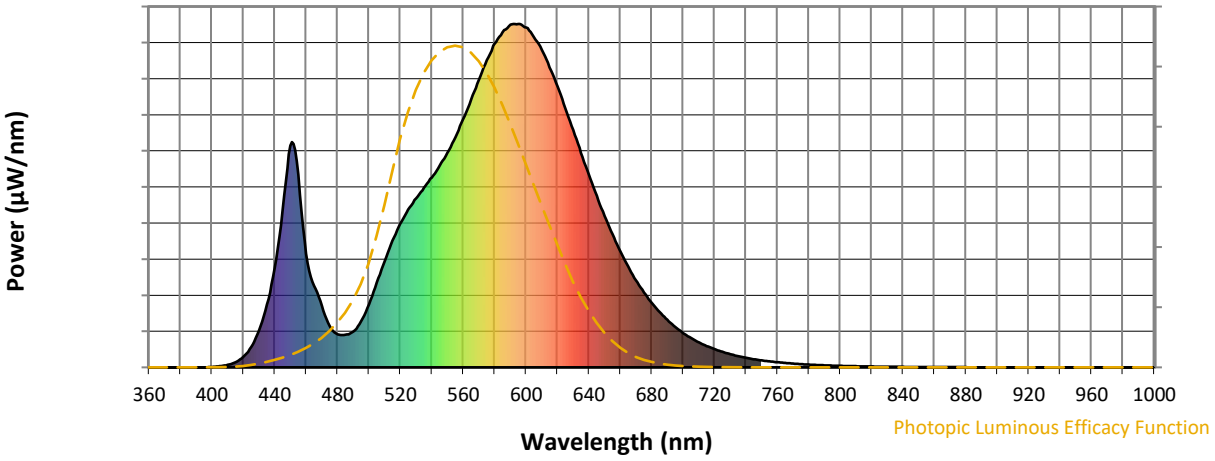
## Photopic Flux vs. Wavelength




## 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 | 104 | NR | 620 | 818 | NR | 750 | 20 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 135 | NR | 625 | 755 | NR | 755 | 17 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 184 | NR | 630 | 691 | NR | 760 | 15 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 247 | NR | 635 | 625 | NR | 765 | 13 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 309 | NR | 640 | 561 | NR | 770 | 11 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 369 | NR | 645 | 499 | NR | 775 | 9 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 419 | NR | 650 | 441 | NR | 780 | 8 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 460 | NR | 655 | 388 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 492 | NR | 660 | 338 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 3 | NR | 535 | 524 | NR | 665 | 294 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 7 | NR | 540 | 553 | NR | 670 | 253 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 15 | NR | 545 | 588 | NR | 675 | 218 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 31 | NR | 550 | 625 | NR | 680 | 188 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 60 | NR | 555 | 670 | NR | 685 | 161 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 107 | NR | 560 | 723 | NR | 690 | 139 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 183 | NR | 565 | 780 | NR | 695 | 118 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 289 | NR | 570 | 837 | NR | 700 | 100 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 460 | NR | 575 | 894 | NR | 705 | 85 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 646 | NR | 580 | 942 | NR | 710 | 73 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 561 | NR | 585 | 976 | NR | 715 | 62 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 331 | NR | 590 | 998 | NR | 720 | 53 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 238 | NR | 595 | 1000 | NR | 725 | 45 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 178 | NR | 600 | 990 | NR | 730 | 39 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 120 | NR | 605 | 962 | NR | 735 | 33 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 96 | NR | 610 | 925 | NR | 740 | 28 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 95 | NR | 615 | 873 | NR | 745 | 24 | NR | 875 | 1 | NR | | | |

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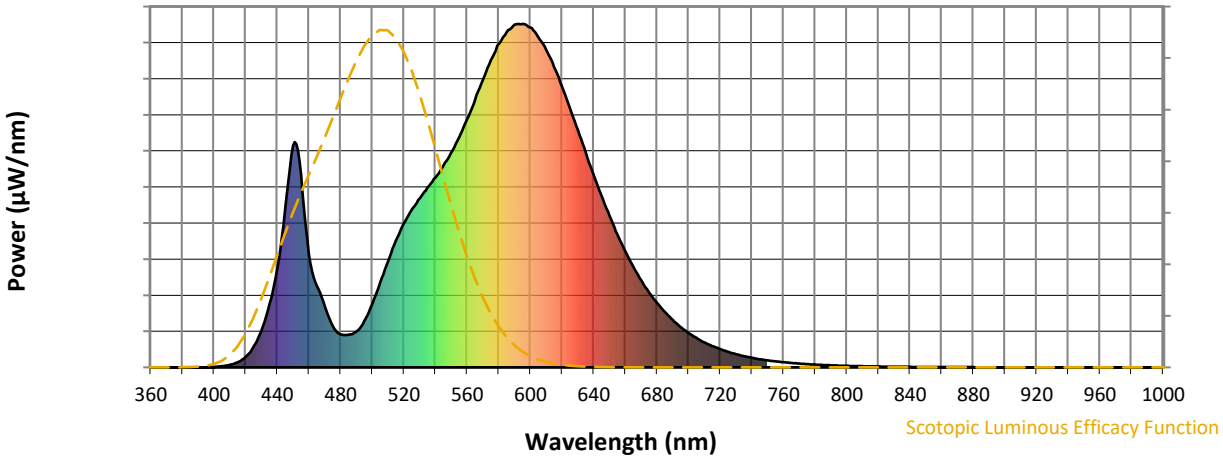
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.23**

| 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 | 104 | NR | 620 | 818 | NR | 750 | 20 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 135 | NR | 625 | 755 | NR | 755 | 17 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 184 | NR | 630 | 691 | NR | 760 | 15 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 247 | NR | 635 | 625 | NR | 765 | 13 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 309 | NR | 640 | 561 | NR | 770 | 11 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 369 | NR | 645 | 499 | NR | 775 | 9 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 419 | NR | 650 | 441 | NR | 780 | 8 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 460 | NR | 655 | 388 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 492 | NR | 660 | 338 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 3 | NR | 535 | 524 | NR | 665 | 294 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 7 | NR | 540 | 553 | NR | 670 | 253 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 15 | NR | 545 | 588 | NR | 675 | 218 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 31 | NR | 550 | 625 | NR | 680 | 188 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 60 | NR | 555 | 670 | NR | 685 | 161 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 107 | NR | 560 | 723 | NR | 690 | 139 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 183 | NR | 565 | 780 | NR | 695 | 118 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 289 | NR | 570 | 837 | NR | 700 | 100 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 460 | NR | 575 | 894 | NR | 705 | 85 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 646 | NR | 580 | 942 | NR | 710 | 73 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 561 | NR | 585 | 976 | NR | 715 | 62 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 331 | NR | 590 | 998 | NR | 720 | 53 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 238 | NR | 595 | 1000 | NR | 725 | 45 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 178 | NR | 600 | 990 | NR | 730 | 39 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 120 | NR | 605 | 962 | NR | 735 | 33 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 96 | NR | 610 | 925 | NR | 740 | 28 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 95 | NR | 615 | 873 | NR | 745 | 24 | NR | 875 | 1 | NR | | | |

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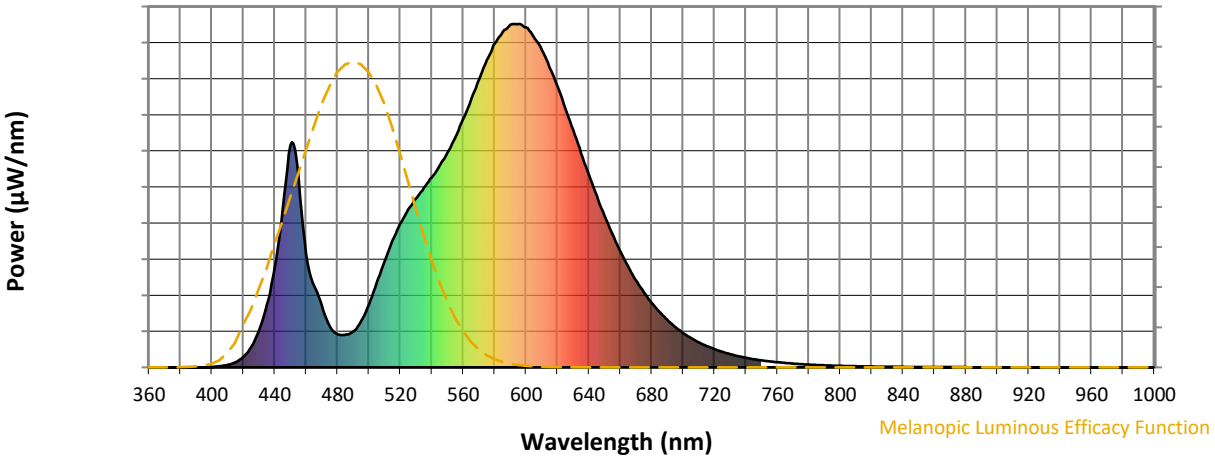
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.27**

| 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 | 104 | NR | 620 | 818 | NR | 750 | 20 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 135 | NR | 625 | 755 | NR | 755 | 17 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 184 | NR | 630 | 691 | NR | 760 | 15 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 247 | NR | 635 | 625 | NR | 765 | 13 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 309 | NR | 640 | 561 | NR | 770 | 11 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 369 | NR | 645 | 499 | NR | 775 | 9 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 419 | NR | 650 | 441 | NR | 780 | 8 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 460 | NR | 655 | 388 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 492 | NR | 660 | 338 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 3 | NR | 535 | 524 | NR | 665 | 294 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 7 | NR | 540 | 553 | NR | 670 | 253 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 15 | NR | 545 | 588 | NR | 675 | 218 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 31 | NR | 550 | 625 | NR | 680 | 188 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 60 | NR | 555 | 670 | NR | 685 | 161 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 107 | NR | 560 | 723 | NR | 690 | 139 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 183 | NR | 565 | 780 | NR | 695 | 118 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 289 | NR | 570 | 837 | NR | 700 | 100 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 460 | NR | 575 | 894 | NR | 705 | 85 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 646 | NR | 580 | 942 | NR | 710 | 73 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 561 | NR | 585 | 976 | NR | 715 | 62 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 331 | NR | 590 | 998 | NR | 720 | 53 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 238 | NR | 595 | 1000 | NR | 725 | 45 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 178 | NR | 600 | 990 | NR | 730 | 39 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 120 | NR | 605 | 962 | NR | 735 | 33 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 96 | NR | 610 | 925 | NR | 740 | 28 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 95 | NR | 615 | 873 | NR | 745 | 24 | NR | 875 | 1 | NR | | | |

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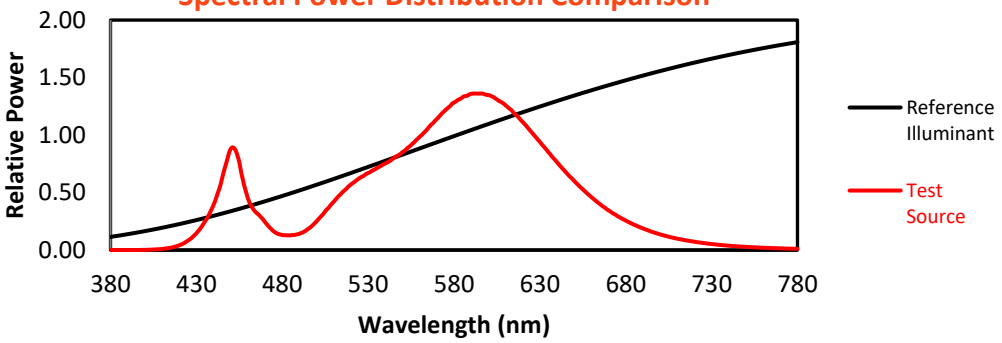
# TM-30-18

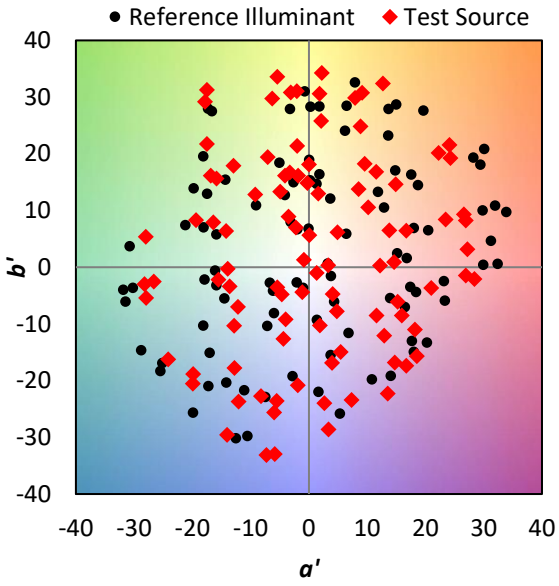
## Summary

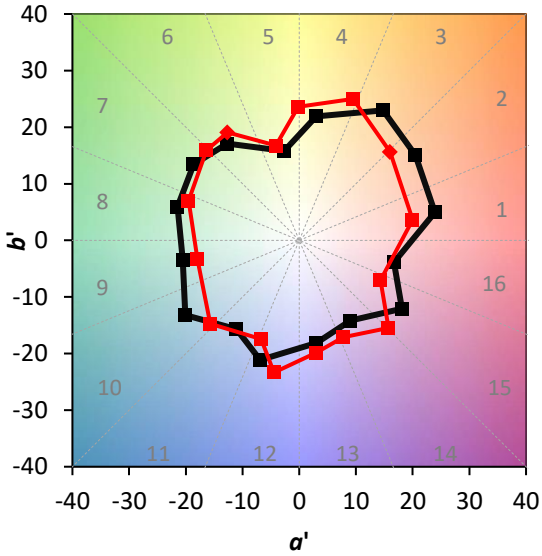
$R_f$ = 74.6
$R_g$ = 94
CIE $R_a$ = 71.7
$R_9$ = -34.8

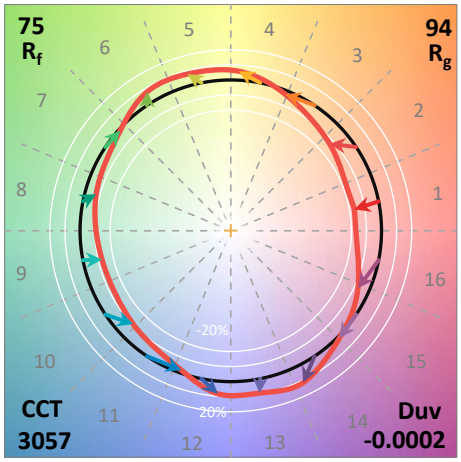
## Spectral Power Distribution Comparison

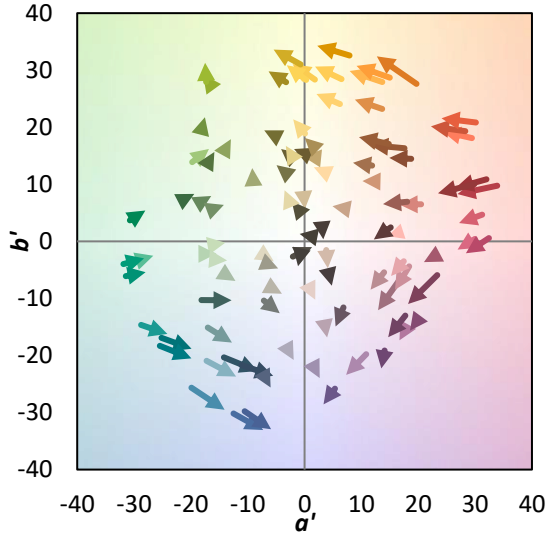



## Color Vector Graphics



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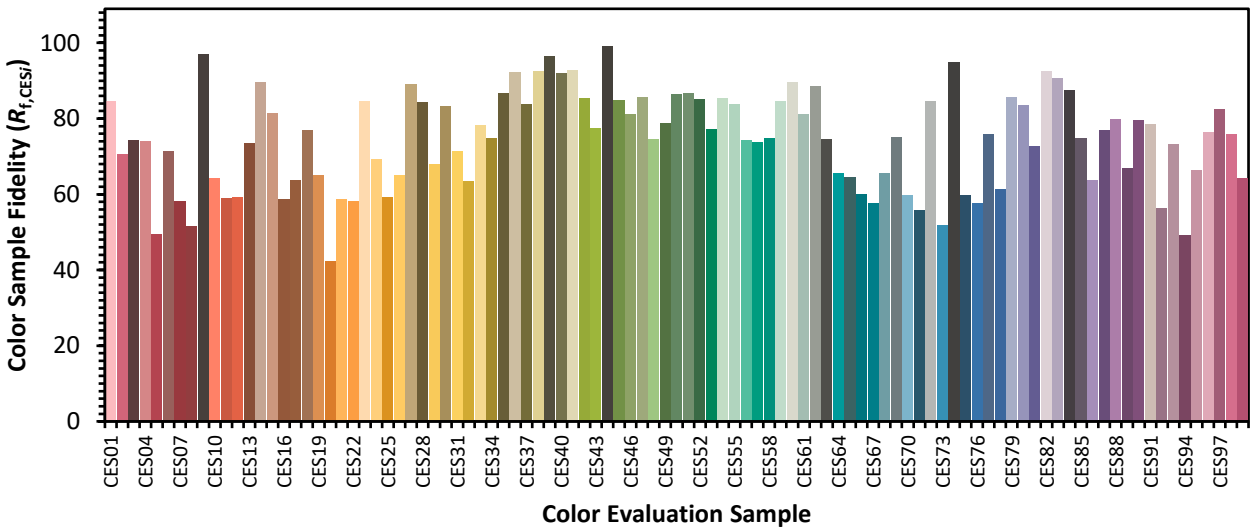
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 65 | CES51 = 87 | CES76 = 58 |
| CES02 = 62 | CES27 = 89 | CES52 = 85 | CES77 = 76 |
| CES03 = 31 | CES28 = 84 | CES53 = 77 | CES78 = 61 |
| CES04 = 71 | CES29 = 68 | CES54 = 85 | CES79 = 86 |
| CES05 = 49 | CES30 = 83 | CES55 = 84 | CES80 = 83 |
| CES06 = 51 | CES31 = 71 | CES56 = 74 | CES81 = 73 |
| CES07 = 41 | CES32 = 64 | CES57 = 74 | CES82 = 93 |
| CES08 = 40 | CES33 = 78 | CES58 = 75 | CES83 = 91 |
| CES09 = 29 | CES34 = 75 | CES59 = 85 | CES84 = 88 |
| CES10 = 76 | CES35 = 87 | CES60 = 90 | CES85 = 75 |
| CES11 = 59 | CES36 = 92 | CES61 = 81 | CES86 = 64 |
| CES12 = 65 | CES37 = 84 | CES62 = 89 | CES87 = 77 |
| CES13 = 43 | CES38 = 92 | CES63 = 75 | CES88 = 80 |
| CES14 = 74 | CES39 = 96 | CES64 = 65 | CES89 = 67 |
| CES15 = 71 | CES40 = 92 | CES65 = 64 | CES90 = 80 |
| CES16 = 47 | CES41 = 93 | CES66 = 60 | CES91 = 78 |
| CES17 = 50 | CES42 = 86 | CES67 = 58 | CES92 = 56 |
| CES18 = 56 | CES43 = 77 | CES68 = 66 | CES93 = 73 |
| CES19 = 73 | CES44 = 99 | CES69 = 75 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 60 | CES95 = 66 |
| CES21 = 87 | CES46 = 81 | CES71 = 56 | CES96 = 76 |
| CES22 = 79 | CES47 = 86 | CES72 = 85 | CES97 = 82 |
| CES23 = 92 | CES48 = 75 | CES73 = 52 | CES98 = 76 |
| CES24 = 91 | CES49 = 79 | CES74 = 95 | CES99 = 64 |
| CES25 = 73 | CES50 = 86 | CES75 = 60 | |



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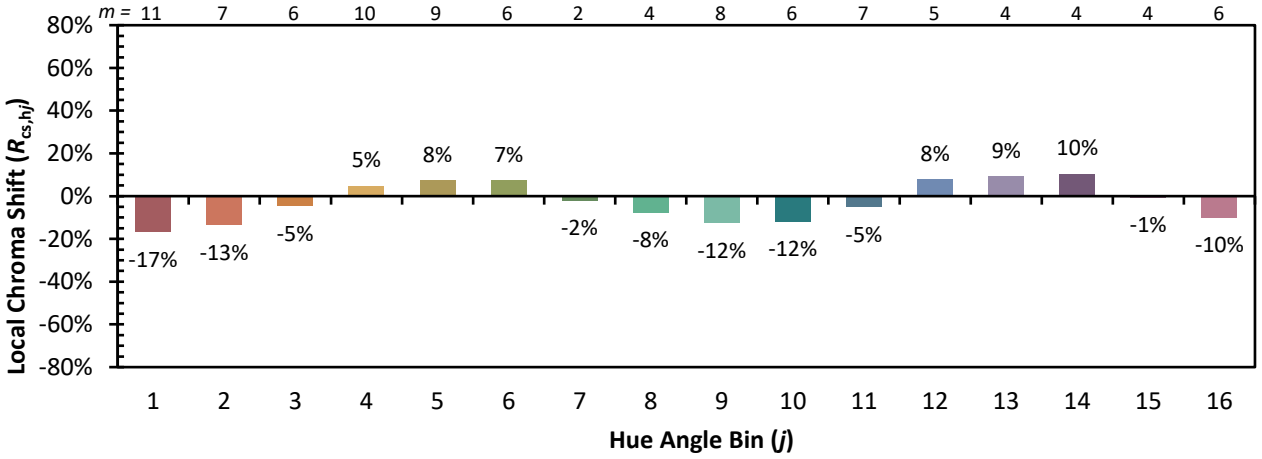
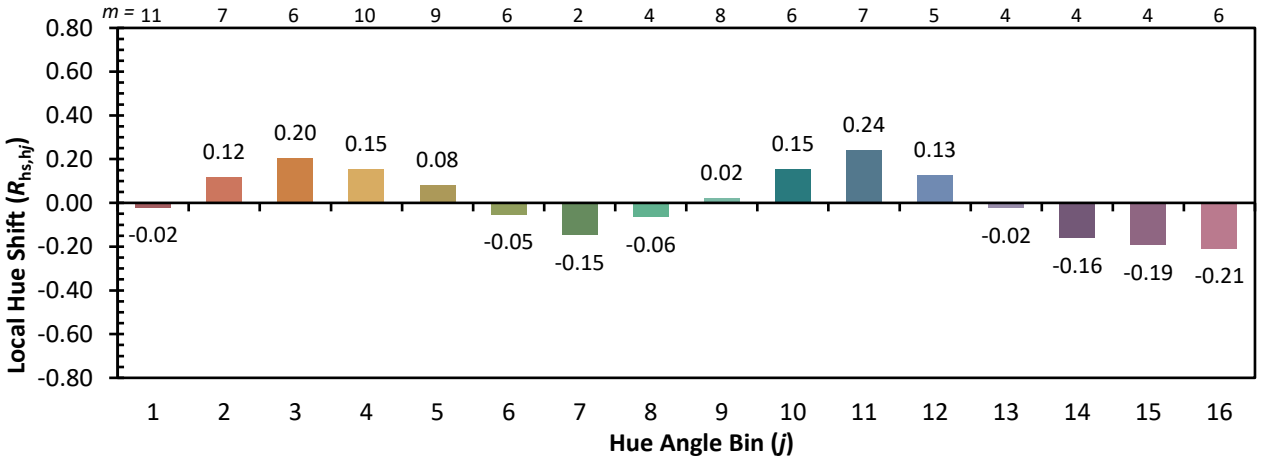
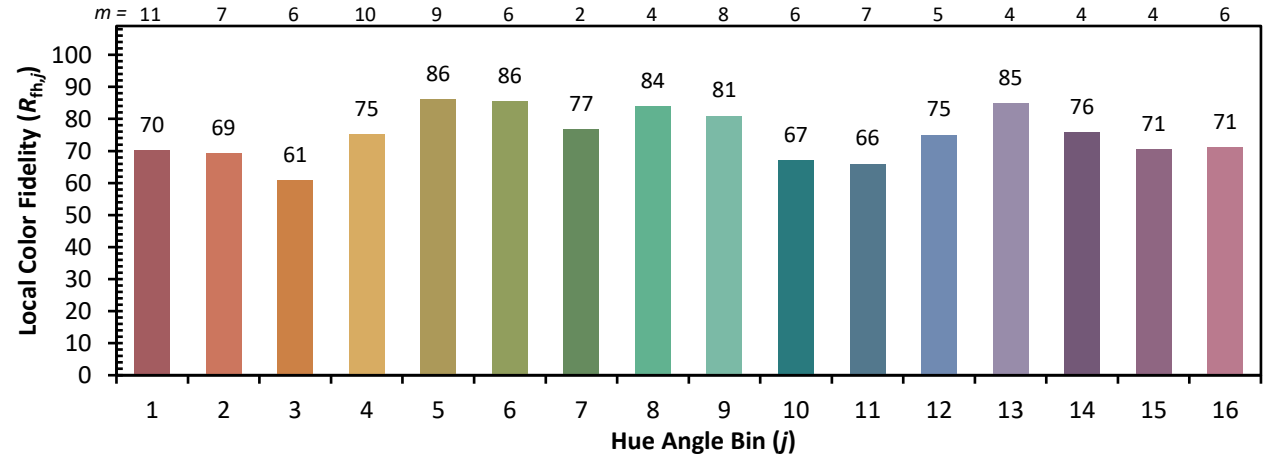
## Color Rendition by Hue-Angle Bin



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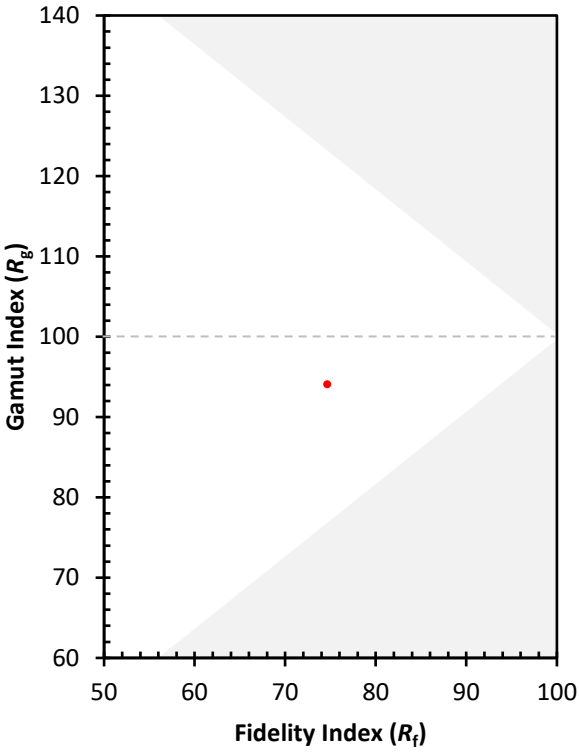
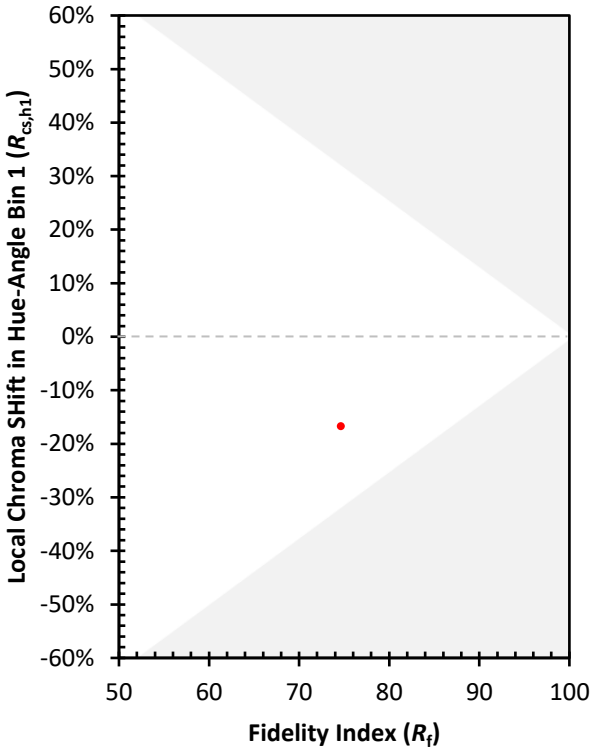
## TM-30-18

### Measure Comparisons




(END OF REPORT)