

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269

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Peachtree City, GA 30269

Scaled data based on original data using  
LM-79-2024 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: STREETWORKS

Report Number: P1461748

Luminaire Tested: USSL-150-722-U-T3RE

Issue Date: 06/10/2026

**Test Information**

Test Method: LM-79-2024  
Report Number: P1461748  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 6/11/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: USSL-150-722-U-T3RE  
Description: USSL DISCRETE LED 1 SQUARE 150W 70CRI 2200K FIXTURE w/ TYPE III ROADWAY  
ILLUMINANCE DISTRIBUTION OPTIC  
Light Source: (40) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 17656 lumens  
Efficiency: N/A  
Efficacy: 116.2 lumens/watt  
Luminous Opening: Rectangular (W 0.67' x L: 0.67' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B3 - U0 - G3

Input Watts (W): 152  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.98  
Total Harmonic Distortion (THDi): 2.75%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

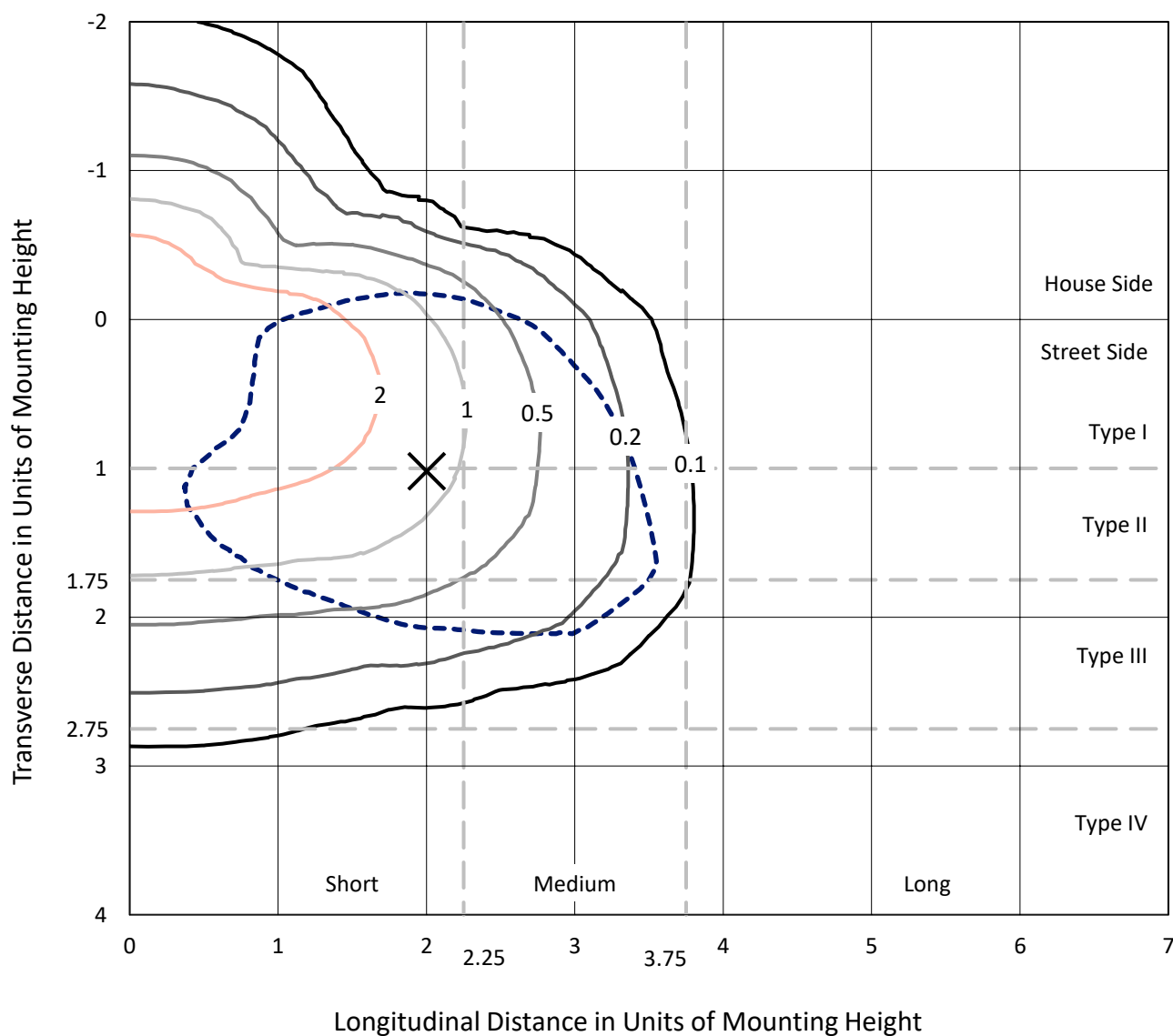
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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd



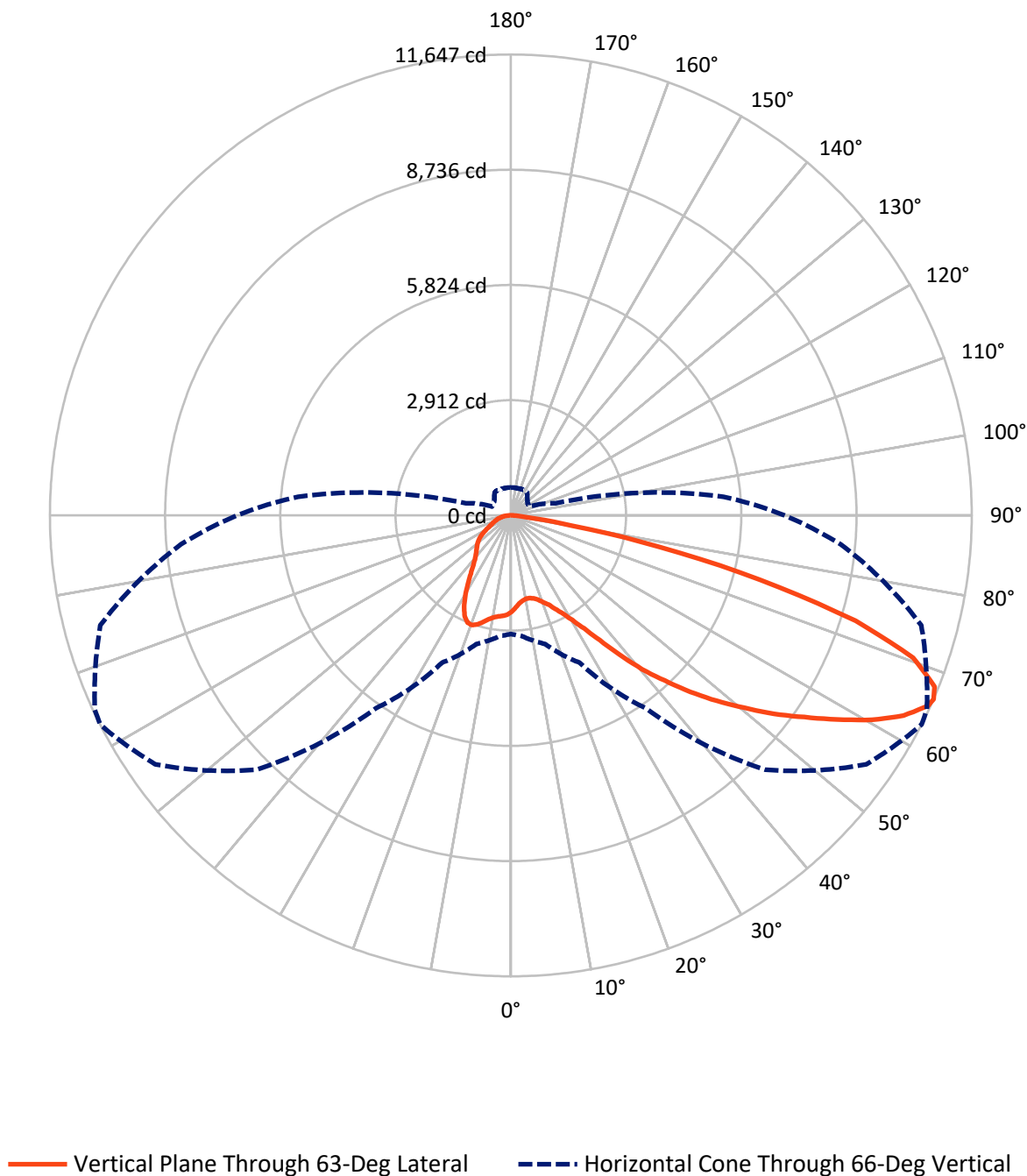
Based on 25 foot mounting height. Maximum calculated value = 4.1 fc

Type III - Short - N/A

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CATALOG NUMBER: USSL-150-722-U-T3RE

## Luminous Intensity Polar Plot



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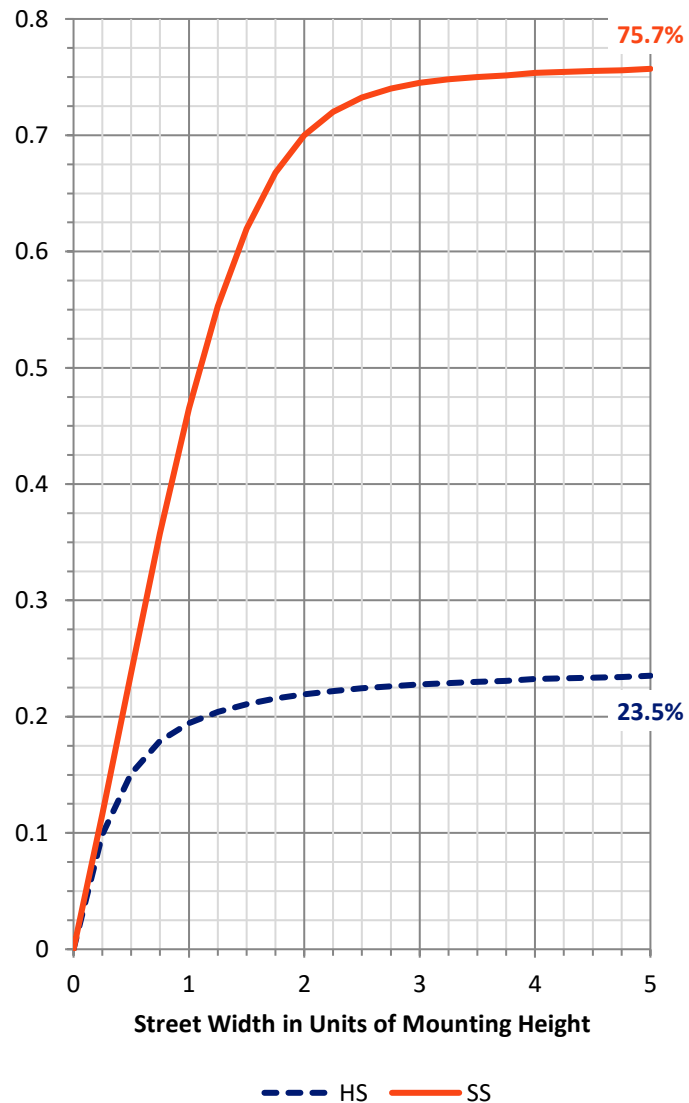
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4223.4   | 0.0    | 4223.4  |
|                    | % Fixture | 23.9     | 0.0    | 23.9    |
| <b>Street Side</b> | Lumens    | 13432.6  | 0.0    | 13432.6 |
|                    | % Fixture | 76.1     | 0.0    | 76.1    |
| <b>Total</b>       | Lumens    | 17656.0  | 0.0    | 17656.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 226.3   | 1.3       |
| 10°-20°   | 708.9   | 4.0       |
| 20°-30°   | 1262.9  | 7.2       |
| 30°-40°   | 1988.5  | 11.3      |
| 40°-50°   | 2986.0  | 16.9      |
| 50°-60°   | 4008.6  | 22.7      |
| 60°-70°   | 4301.3  | 24.4      |
| 70°-80°   | 1935.2  | 11.0      |
| 80°-90°   | 238.3   | 1.3       |
| 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°    | 17656.0 | 100.0     |
| 0°-180°   | 17656.0 | 100.0     |

**Coefficient of Utilization**



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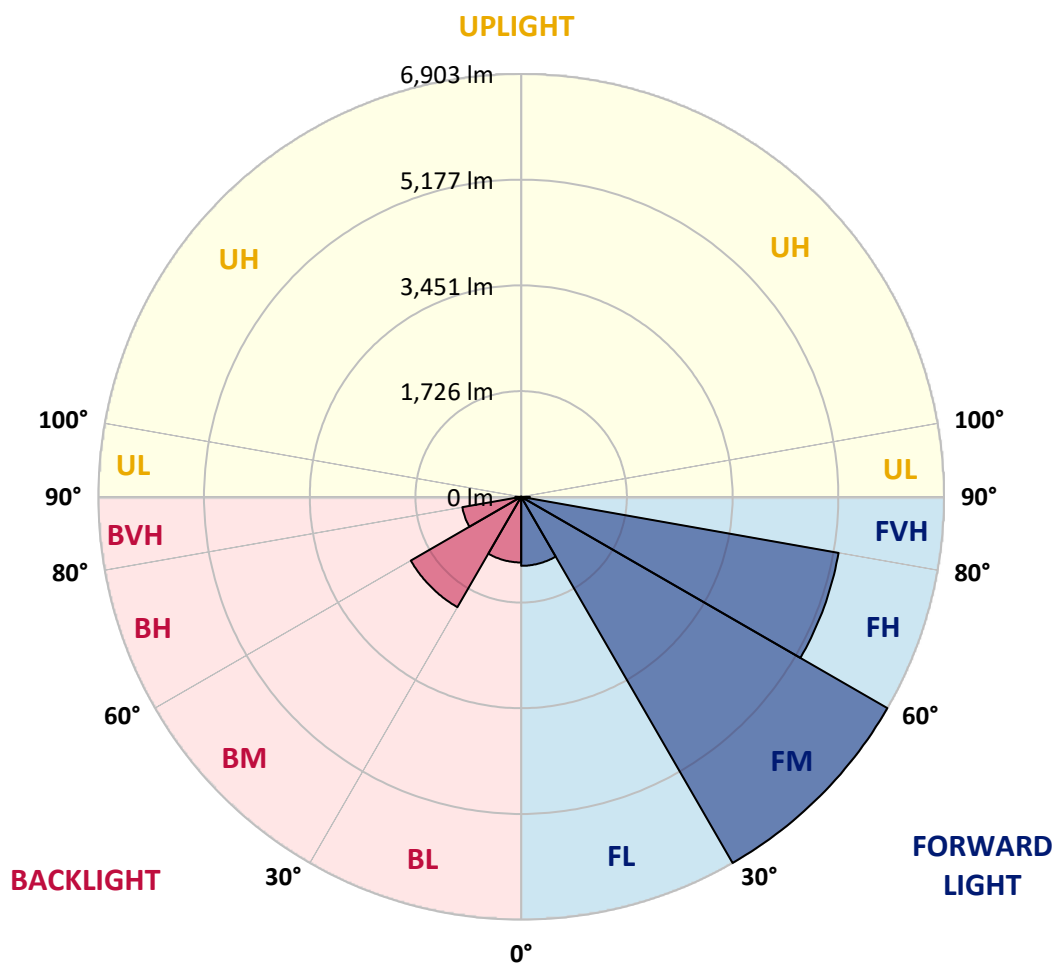
CATALOG NUMBER: USSL-150-722-U-T3RE

**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1126.6 | 6.4       |                         |      |         |
| FM   | (30°-60°)   | 6902.7 | 39.1      |                         |      |         |
| FH   | (60°-80°)   | 5261.4 | 29.8      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 141.9  | 0.8       |                         |      | G2/225  |
| BL   | (0°-30°)    | 1071.5 | 6.1       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 2080.4 | 11.8      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 975.0  | 5.5       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 96.5   | 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 III Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°     | 63°     | 65°     | 75°     | 85°    |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|--------|
| 0°    | 2434.1 | 2434.1 | 2434.1 | 2434.1 | 2434.1 | 2434.1 | 2434.1  | 2434.1  | 2434.1  | 2434.1  | 2434.1 |
| 2.5°  | 2182.5 | 2187.5 | 2195.0 | 2205.8 | 2223.3 | 2255.8 | 2298.3  | 2334.1  | 2341.6  | 2386.6  | 2417.5 |
| 5°    | 2011.6 | 2017.5 | 2023.3 | 2038.3 | 2069.1 | 2106.6 | 2170.8  | 2235.8  | 2253.3  | 2346.6  | 2429.1 |
| 7.5°  | 1971.6 | 1973.3 | 1975.8 | 1980.0 | 1998.3 | 2029.1 | 2094.1  | 2173.3  | 2191.6  | 2324.1  | 2458.3 |
| 10°   | 2018.3 | 2019.1 | 2018.3 | 2013.3 | 2009.1 | 2020.8 | 2065.0  | 2138.3  | 2164.1  | 2324.1  | 2507.5 |
| 12.5° | 2114.1 | 2122.5 | 2115.8 | 2098.3 | 2074.1 | 2066.6 | 2087.5  | 2142.5  | 2166.6  | 2350.8  | 2577.5 |
| 15°   | 2249.1 | 2257.5 | 2241.6 | 2215.8 | 2180.0 | 2148.3 | 2142.5  | 2178.3  | 2199.1  | 2391.6  | 2672.5 |
| 17.5° | 2414.1 | 2410.8 | 2392.5 | 2357.5 | 2308.3 | 2257.5 | 2228.3  | 2242.5  | 2258.3  | 2453.3  | 2776.6 |
| 20°   | 2612.5 | 2625.0 | 2586.6 | 2535.0 | 2477.5 | 2400.0 | 2335.8  | 2341.6  | 2346.6  | 2535.0  | 2901.6 |
| 22.5° | 2940.0 | 2955.0 | 2882.5 | 2784.1 | 2677.5 | 2571.6 | 2490.0  | 2448.3  | 2463.3  | 2629.1  | 3030.8 |
| 25°   | 3264.1 | 3266.6 | 3213.3 | 3117.5 | 2959.1 | 2790.0 | 2666.6  | 2617.5  | 2615.0  | 2766.6  | 3207.5 |
| 27.5° | 3604.1 | 3581.6 | 3520.8 | 3417.5 | 3268.3 | 3073.3 | 2886.6  | 2812.5  | 2805.0  | 2959.1  | 3404.1 |
| 30°   | 3917.5 | 3905.8 | 3845.8 | 3735.8 | 3564.1 | 3380.0 | 3163.3  | 3069.1  | 3060.8  | 3242.5  | 3683.3 |
| 32.5° | 4208.3 | 4211.6 | 4155.0 | 4039.1 | 3900.0 | 3711.6 | 3495.8  | 3406.6  | 3396.6  | 3650.8  | 4035.0 |
| 35°   | 4439.9 | 4432.4 | 4398.3 | 4352.4 | 4240.0 | 4073.3 | 3875.0  | 3873.3  | 3896.6  | 4227.5  | 4487.4 |
| 37.5° | 4667.4 | 4662.4 | 4609.1 | 4580.8 | 4589.1 | 4442.4 | 4361.6  | 4454.9  | 4504.1  | 4848.3  | 5001.6 |
| 40°   | 5042.4 | 5014.9 | 4946.6 | 4864.1 | 4874.1 | 4805.8 | 4835.8  | 5109.1  | 5198.3  | 5542.4  | 5542.4 |
| 42.5° | 5324.1 | 5313.3 | 5301.6 | 5269.9 | 5225.8 | 5170.8 | 5344.1  | 5708.3  | 5794.9  | 6144.1  | 6009.9 |
| 45°   | 5429.9 | 5444.9 | 5516.6 | 5644.1 | 5635.8 | 5557.4 | 5896.6  | 6362.4  | 6439.9  | 6755.8  | 6477.4 |
| 47.5° | 5521.6 | 5538.3 | 5625.8 | 5888.3 | 6025.8 | 6040.8 | 6494.1  | 7000.8  | 7091.6  | 7399.9  | 6909.9 |
| 50°   | 5520.8 | 5555.8 | 5729.9 | 6028.3 | 6289.1 | 6515.8 | 7129.9  | 7644.9  | 7736.6  | 8002.4  | 7285.7 |
| 52.5° | 5402.4 | 5426.6 | 5722.4 | 6142.4 | 6496.6 | 6999.9 | 7790.7  | 8328.2  | 8369.9  | 8573.2  | 7613.2 |
| 55°   | 5270.8 | 5291.6 | 5599.9 | 6168.3 | 6714.9 | 7533.2 | 8475.7  | 8997.4  | 9063.2  | 9159.1  | 7945.7 |
| 57.5° | 5117.4 | 5150.8 | 5457.4 | 6089.9 | 6899.1 | 8059.1 | 9177.4  | 9724.9  | 9756.6  | 9724.1  | 8313.2 |
| 60°   | 4932.4 | 4945.8 | 5242.4 | 5889.1 | 7004.1 | 8602.4 | 9858.2  | 10489.9 | 10496.5 | 10286.5 | 8614.1 |
| 62.5° | 4275.8 | 4289.9 | 4639.1 | 5471.6 | 6929.1 | 9016.6 | 10449.9 | 11138.2 | 11124.9 | 10711.5 | 8755.7 |
| 65°   | 3281.6 | 3340.8 | 3693.3 | 4555.8 | 6354.9 | 9198.2 | 10909.9 | 11591.5 | 11543.2 | 10813.2 | 8561.6 |
| 66°   | 2995.8 | 3055.8 | 3363.3 | 4101.6 | 5949.1 | 9083.2 | 10967.4 | 11647.4 | 11600.7 | 10739.0 | 8364.1 |
| 67.5° | 2680.8 | 2691.6 | 2941.6 | 3502.5 | 5100.8 | 8549.9 | 10774.9 | 11550.7 | 11498.2 | 10411.5 | 7897.4 |
| 70°   | 1953.3 | 2005.0 | 2228.3 | 2656.6 | 3598.3 | 6861.6 | 9719.1  | 10786.5 | 10709.9 | 9284.9  | 6714.9 |
| 72.5° | 1282.5 | 1303.3 | 1401.7 | 1595.0 | 2291.6 | 4614.1 | 8024.1  | 9110.7  | 9180.7  | 7409.9  | 4999.9 |
| 75°   | 894.2  | 882.5  | 840.8  | 860.0  | 1145.8 | 2250.8 | 5617.4  | 6504.9  | 6594.1  | 4795.8  | 2956.6 |
| 77.5° | 735.8  | 720.8  | 652.5  | 572.5  | 586.7  | 837.5  | 2974.1  | 3845.0  | 3775.0  | 2350.8  | 1335.0 |
| 80°   | 635.0  | 620.8  | 547.5  | 475.8  | 432.5  | 400.0  | 936.7   | 1565.8  | 1450.8  | 789.2   | 462.5  |
| 82.5° | 507.5  | 500.0  | 467.5  | 400.0  | 350.8  | 289.2  | 292.5   | 407.5   | 435.8   | 294.2   | 203.3  |
| 85°   | 308.3  | 305.0  | 307.5  | 316.7  | 250.0  | 211.7  | 174.2   | 183.3   | 178.3   | 147.5   | 126.7  |
| 87.5° | 159.2  | 147.5  | 158.3  | 189.2  | 148.3  | 97.5   | 73.3    | 75.8    | 80.0    | 75.8    | 65.0   |
| 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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CATALOG NUMBER: USSL-150-722-U-T3RE

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2434.1 | 2434.1 | 2434.1 | 2434.1 | 2434.1 | 2434.1 | 2434.1 | 2434.1 | 2434.1 | 2434.1 | 2434.1 |
| 2.5°  | 2438.3 | 2456.6 | 2485.8 | 2505.0 | 2517.5 | 2525.0 | 2524.1 | 2523.3 | 2520.8 | 2515.0 | 2518.3 |
| 5°    | 2465.0 | 2496.6 | 2534.1 | 2545.8 | 2543.3 | 2539.1 | 2532.5 | 2530.8 | 2533.3 | 2528.3 | 2528.3 |
| 7.5°  | 2510.0 | 2545.0 | 2580.0 | 2573.3 | 2561.6 | 2574.1 | 2594.1 | 2621.6 | 2638.3 | 2648.3 | 2661.6 |
| 10°   | 2570.0 | 2617.5 | 2629.1 | 2609.1 | 2622.5 | 2671.6 | 2716.6 | 2747.5 | 2765.8 | 2775.0 | 2784.1 |
| 12.5° | 2660.0 | 2700.8 | 2678.3 | 2669.1 | 2727.5 | 2789.1 | 2801.6 | 2779.1 | 2755.0 | 2740.8 | 2741.6 |
| 15°   | 2760.0 | 2786.6 | 2740.8 | 2767.5 | 2840.0 | 2834.1 | 2747.5 | 2655.0 | 2588.3 | 2560.0 | 2563.3 |
| 17.5° | 2866.6 | 2871.6 | 2811.6 | 2875.8 | 2882.5 | 2748.3 | 2575.0 | 2445.0 | 2401.6 | 2385.8 | 2387.5 |
| 20°   | 2991.6 | 2969.1 | 2906.6 | 2969.1 | 2828.3 | 2560.8 | 2371.6 | 2294.1 | 2275.0 | 2282.5 | 2284.1 |
| 22.5° | 3103.3 | 3051.6 | 3006.6 | 2990.0 | 2653.3 | 2340.8 | 2219.1 | 2190.8 | 2196.6 | 2210.0 | 2224.1 |
| 25°   | 3237.5 | 3144.1 | 3102.5 | 2903.3 | 2423.3 | 2167.5 | 2114.1 | 2117.5 | 2118.3 | 2130.0 | 2140.8 |
| 27.5° | 3386.6 | 3250.0 | 3167.5 | 2702.5 | 2179.1 | 2043.3 | 2028.3 | 2030.8 | 2022.5 | 2022.5 | 2032.5 |
| 30°   | 3565.8 | 3376.6 | 3178.3 | 2430.8 | 1958.3 | 1931.6 | 1930.8 | 1913.3 | 1879.1 | 1870.8 | 1876.6 |
| 32.5° | 3815.0 | 3565.8 | 3130.8 | 2110.0 | 1800.0 | 1823.3 | 1814.1 | 1768.3 | 1721.6 | 1710.8 | 1723.3 |
| 35°   | 4183.3 | 3841.6 | 3036.6 | 1815.0 | 1662.5 | 1705.8 | 1695.0 | 1635.0 | 1565.8 | 1539.1 | 1542.5 |
| 37.5° | 4560.8 | 4182.5 | 2917.5 | 1571.6 | 1538.3 | 1600.0 | 1575.0 | 1495.0 | 1421.7 | 1372.5 | 1379.2 |
| 40°   | 4956.6 | 4526.6 | 2777.5 | 1415.0 | 1430.8 | 1487.5 | 1465.8 | 1367.5 | 1272.5 | 1229.2 | 1249.2 |
| 42.5° | 5345.8 | 4855.8 | 2627.5 | 1312.5 | 1329.2 | 1385.8 | 1363.3 | 1260.0 | 1189.2 | 1143.3 | 1150.8 |
| 45°   | 5694.9 | 5116.6 | 2491.6 | 1235.8 | 1241.7 | 1285.8 | 1252.5 | 1193.3 | 1121.7 | 1082.5 | 1080.0 |
| 47.5° | 6006.6 | 5310.8 | 2406.6 | 1174.2 | 1155.0 | 1168.3 | 1163.3 | 1121.7 | 1068.3 | 1031.7 | 1028.3 |
| 50°   | 6274.1 | 5457.4 | 2391.6 | 1118.3 | 1061.7 | 1037.5 | 1060.0 | 1047.5 | 1005.8 | 979.2  | 976.7  |
| 52.5° | 6489.9 | 5591.6 | 2456.6 | 1061.7 | 944.2  | 932.5  | 965.8  | 969.2  | 937.5  | 925.8  | 926.7  |
| 55°   | 6750.8 | 5757.4 | 2588.3 | 982.5  | 840.0  | 841.7  | 885.8  | 889.2  | 870.8  | 872.5  | 875.8  |
| 57.5° | 7035.8 | 5944.9 | 2697.5 | 879.2  | 744.2  | 757.5  | 816.7  | 822.5  | 805.0  | 811.7  | 814.2  |
| 60°   | 7276.6 | 6114.9 | 2569.1 | 750.8  | 658.3  | 692.5  | 768.3  | 765.0  | 755.0  | 771.7  | 775.8  |
| 62.5° | 7346.6 | 6071.6 | 2108.3 | 639.2  | 590.8  | 641.7  | 734.2  | 735.0  | 754.2  | 783.3  | 788.3  |
| 65°   | 7099.1 | 5656.6 | 1437.5 | 556.7  | 536.7  | 597.5  | 714.2  | 743.3  | 735.0  | 730.8  | 735.8  |
| 66°   | 6914.1 | 5396.6 | 1174.2 | 528.3  | 516.7  | 585.0  | 709.2  | 720.8  | 705.8  | 705.0  | 705.0  |
| 67.5° | 6496.6 | 4856.6 | 857.5  | 491.7  | 494.2  | 565.0  | 679.2  | 669.2  | 683.3  | 696.7  | 701.7  |
| 70°   | 5508.3 | 3709.1 | 542.5  | 435.0  | 455.0  | 512.5  | 606.7  | 645.8  | 671.7  | 687.5  | 698.3  |
| 72.5° | 4082.5 | 2394.1 | 386.7  | 384.2  | 413.3  | 460.0  | 557.5  | 615.0  | 636.7  | 704.2  | 723.3  |
| 75°   | 2501.6 | 1330.8 | 325.0  | 341.7  | 354.2  | 417.5  | 504.2  | 580.8  | 575.8  | 595.8  | 600.8  |
| 77.5° | 1080.8 | 598.3  | 277.5  | 295.8  | 302.5  | 353.3  | 449.2  | 527.5  | 526.7  | 548.3  | 557.5  |
| 80°   | 370.0  | 271.7  | 237.5  | 240.8  | 262.5  | 298.3  | 383.3  | 457.5  | 458.3  | 467.5  | 457.5  |
| 82.5° | 196.7  | 185.0  | 190.8  | 197.5  | 224.2  | 243.3  | 316.7  | 395.8  | 365.0  | 259.2  | 255.0  |
| 85°   | 124.2  | 110.8  | 125.8  | 148.3  | 164.2  | 176.7  | 241.7  | 298.3  | 260.0  | 114.2  | 101.7  |
| 87.5° | 50.0   | 50.0   | 58.3   | 78.3   | 70.8   | 76.7   | 129.2  | 169.2  | 138.3  | 45.8   | 24.2   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGraw-Edison

Report Number: SP2-2501-321-2

Test Date: 04/09/2025

Luminaire Tested: GKO-PB1E-722-U-T4W

Data in this report applies to families of products including GKO-PB1E-722-U-T4W

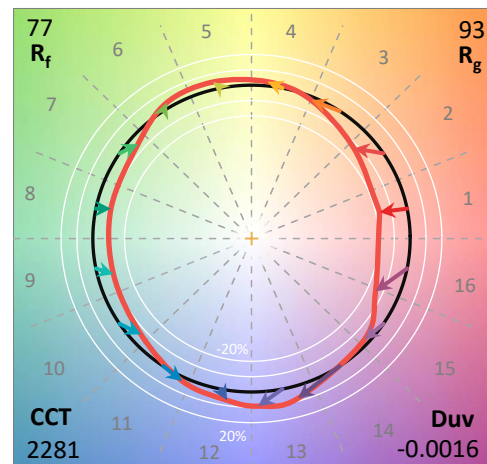
### Test Information

Test Method: LM-79-2019  
 Report Number: SP2-2501-321-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP2 - 165CM SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/10/2025  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGraw-Edison  
 Catalog Number: **GKO-PB1E-722-U-T4W**  
 Description: Gekko Wedge Wall Pack Fixture 1 SQ w/ T4W distribution

### Spectral Parameters

CCT (K): 2281  
 CIE  $u'$ : 0.2851  
 CIE  $v'$ : 0.5324  
 Duv: -0.0016  
 CIE x: 0.4942  
 CIE y: 0.4102  
 CIE z: 0.0956  
 Peak Wavelength (nm): 602  
 Dominant Wavelength (nm): 587  
 Purity: 71.48321  
 R<sub>f</sub>: 76.9  
 R<sub>g</sub>: 92.6

CRI (Ra): 70.6  
 R1: 68.4  
 R2: 88.7  
 R3: 85.7  
 R4: 63.2  
 R5: 69.0  
 R6: 88.6  
 R7: 68.8  
 R8: 32.6  
 R9: -35.1  
 R10: 78.0  
 R11: 60.2  
 R12: 73.8  
 R13: 72.8  
 R14: 92.4  
 R15: 58.4



### Test Conditions

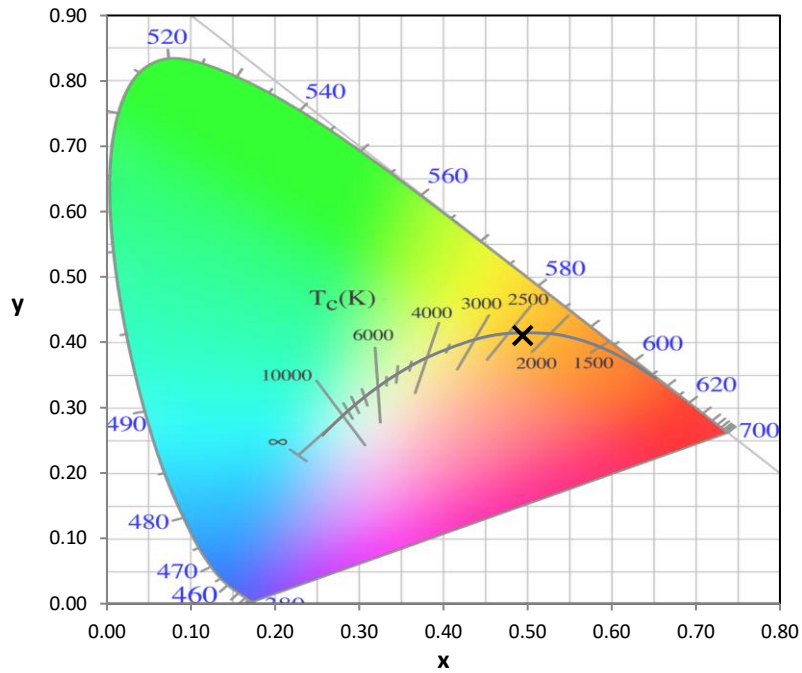
Stabilization Time: 40M  
 Operation Time: 1H 40M  
 Sphere Temperature (°C): 25.0

REPORT NUMBER: SP2-2501-321-2

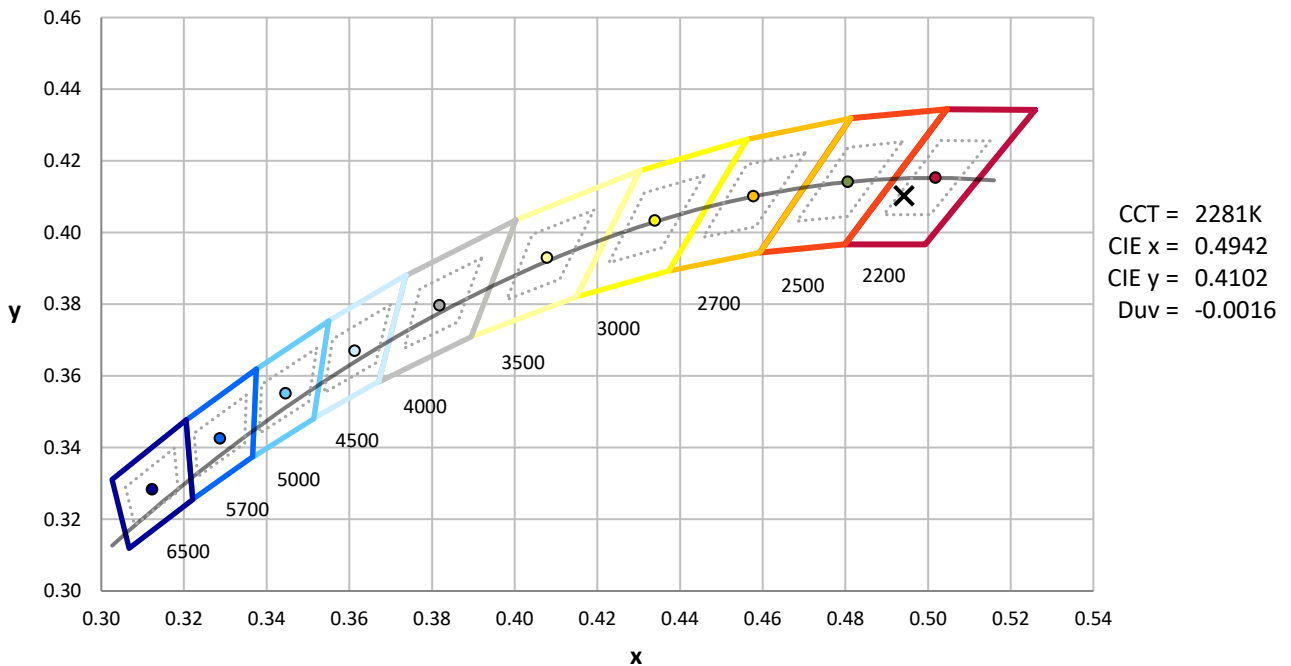
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN2187                | 1/6/2025         | 7/6/2025             |
| Power Meter                    | INXT2011002           | 1/21/2025        | 1/21/2026            |
| AC Power Source                | IN0458                | 10/22/2024       | 10/22/2025           |
| DC Power Source                | IN0212                | 10/22/2024       | 10/22/2025           |
| Sphere Thermometer             | IN4036B               | 10/22/2024       | 10/22/2025           |
| Room Thermometer               | IN0046                | 10/22/2024       | 10/22/2025           |

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**CIE 1931 Chromaticity Diagram**



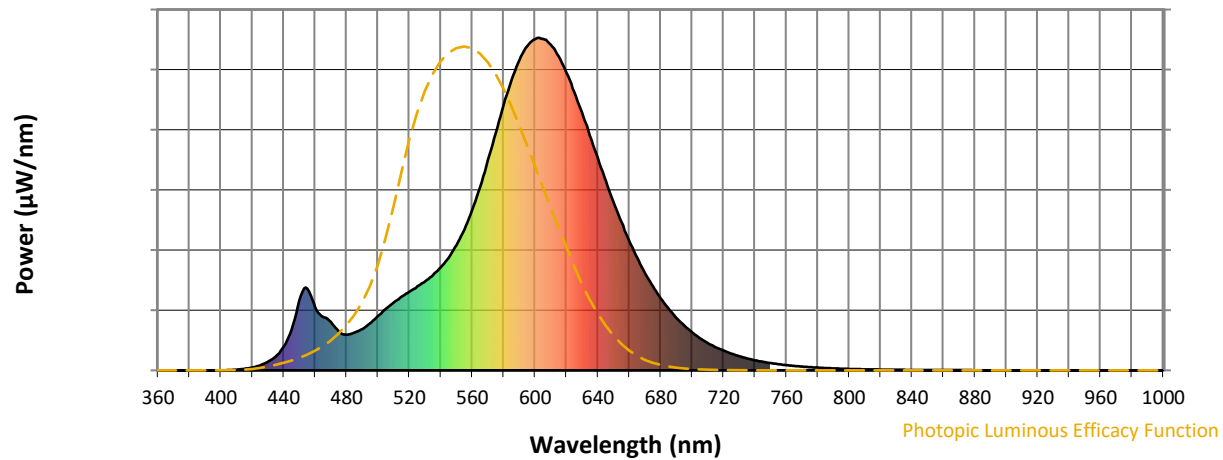
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2200K 4-step quadrangle

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### Photopic Flux vs. Wavelength

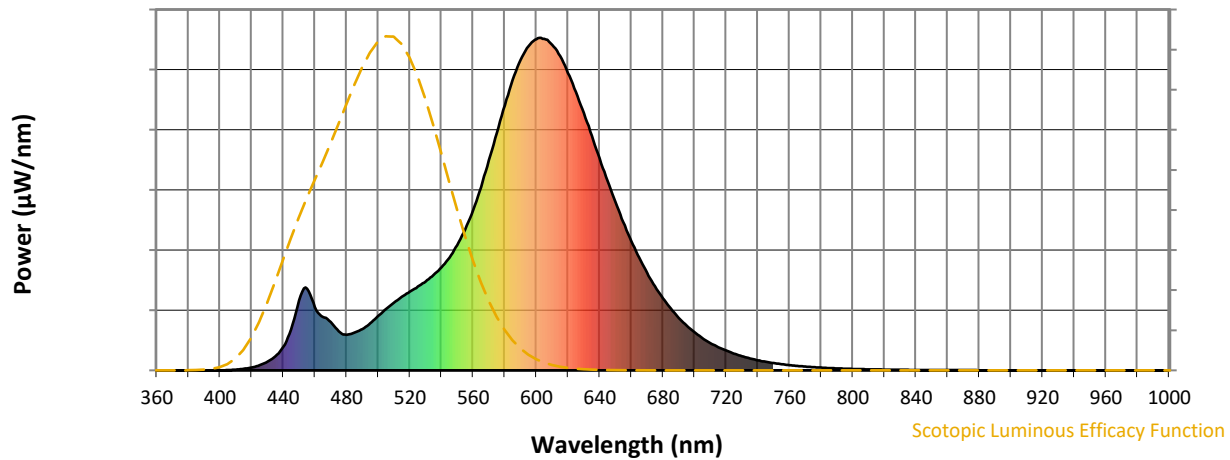


### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 124                                  | NR                             | 620               | 894                                  | NR                             | 750               | 22                                   | NR                             | 880               | 0                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 141                                  | NR                             | 625               | 837                                  | NR                             | 755               | 19                                   | NR                             | 885               | 0                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 163                                  | NR                             | 630               | 774                                  | NR                             | 760               | 16                                   | NR                             | 890               | 0                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 184                                  | NR                             | 635               | 706                                  | NR                             | 765               | 13                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 204                                  | NR                             | 640               | 638                                  | NR                             | 770               | 11                                   | NR                             | 900               | 0                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 221                                  | NR                             | 645               | 570                                  | NR                             | 775               | 10                                   | NR                             | 905               | 0                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 237                                  | NR                             | 650               | 505                                  | NR                             | 780               | 8                                    | NR                             | 910               | 0                                    | NR                             |
| 395               | 0                                    | NR                             | 525               | 252                                  | NR                             | 655               | 446                                  | NR                             | 785               | 7                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 0                                    | NR                             | 530               | 268                                  | NR                             | 660               | 389                                  | NR                             | 790               | 6                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 1                                    | NR                             | 535               | 287                                  | NR                             | 665               | 339                                  | NR                             | 795               | 5                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 2                                    | NR                             | 540               | 310                                  | NR                             | 670               | 292                                  | NR                             | 800               | 4                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 5                                    | NR                             | 545               | 339                                  | NR                             | 675               | 253                                  | NR                             | 805               | 4                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 9                                    | NR                             | 550               | 377                                  | NR                             | 680               | 217                                  | NR                             | 810               | 3                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 15                                   | NR                             | 555               | 424                                  | NR                             | 685               | 186                                  | NR                             | 815               | 3                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 26                                   | NR                             | 560               | 482                                  | NR                             | 690               | 158                                  | NR                             | 820               | 2                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 43                                   | NR                             | 565               | 551                                  | NR                             | 695               | 135                                  | NR                             | 825               | 2                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 71                                   | NR                             | 570               | 632                                  | NR                             | 700               | 114                                  | NR                             | 830               | 2                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 123                                  | NR                             | 575               | 714                                  | NR                             | 705               | 97                                   | NR                             | 835               | 2                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 210                                  | NR                             | 580               | 797                                  | NR                             | 710               | 82                                   | NR                             | 840               | 1                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 245                                  | NR                             | 585               | 873                                  | NR                             | 715               | 70                                   | NR                             | 845               | 1                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 190                                  | NR                             | 590               | 934                                  | NR                             | 720               | 59                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 161                                  | NR                             | 595               | 975                                  | NR                             | 725               | 50                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 145                                  | NR                             | 600               | 996                                  | NR                             | 730               | 43                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 117                                  | NR                             | 605               | 997                                  | NR                             | 735               | 36                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 107                                  | NR                             | 610               | 978                                  | NR                             | 740               | 30                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 113                                  | NR                             | 615               | 945                                  | NR                             | 745               | 26                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



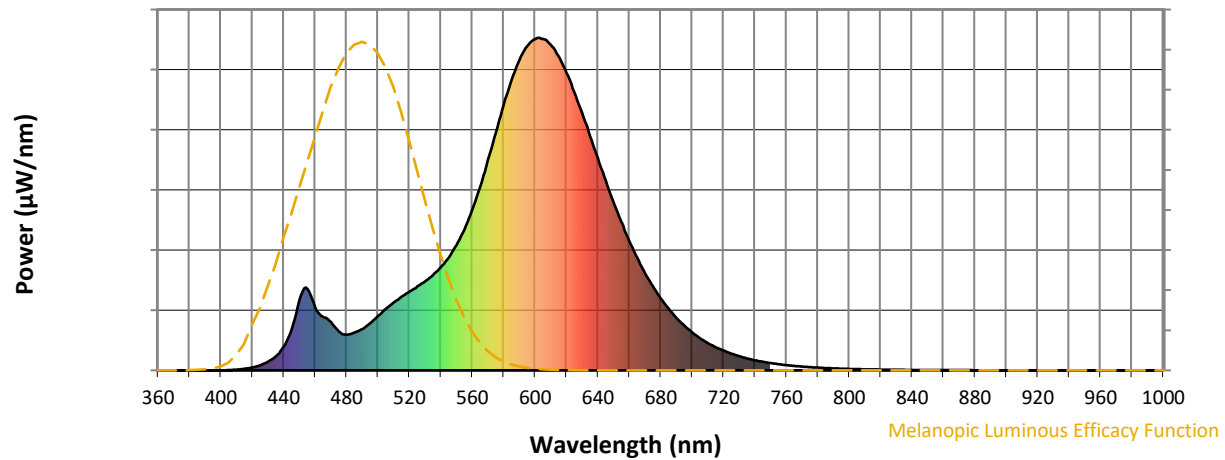
Scotopic Lumens: NR

S/P: 0.98

| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 124                         | NR               | 620       | 894                         | NR               | 750       | 22                          | NR               | 880       | 0                           | NR               |
| 365       | 0                           | NR               | 495       | 141                         | NR               | 625       | 837                         | NR               | 755       | 19                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 163                         | NR               | 630       | 774                         | NR               | 760       | 16                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 184                         | NR               | 635       | 706                         | NR               | 765       | 13                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 204                         | NR               | 640       | 638                         | NR               | 770       | 11                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 221                         | NR               | 645       | 570                         | NR               | 775       | 10                          | NR               | 905       | 0                           | NR               |
| 390       | 0                           | NR               | 520       | 237                         | NR               | 650       | 505                         | NR               | 780       | 8                           | NR               | 910       | 0                           | NR               |
| 395       | 0                           | NR               | 525       | 252                         | NR               | 655       | 446                         | NR               | 785       | 7                           | NR               | 915       | 0                           | NR               |
| 400       | 0                           | NR               | 530       | 268                         | NR               | 660       | 389                         | NR               | 790       | 6                           | NR               | 920       | 0                           | NR               |
| 405       | 1                           | NR               | 535       | 287                         | NR               | 665       | 339                         | NR               | 795       | 5                           | NR               | 925       | 0                           | NR               |
| 410       | 2                           | NR               | 540       | 310                         | NR               | 670       | 292                         | NR               | 800       | 4                           | NR               | 930       | 0                           | NR               |
| 415       | 5                           | NR               | 545       | 339                         | NR               | 675       | 253                         | NR               | 805       | 4                           | NR               | 935       | 0                           | NR               |
| 420       | 9                           | NR               | 550       | 377                         | NR               | 680       | 217                         | NR               | 810       | 3                           | NR               | 940       | 0                           | NR               |
| 425       | 15                          | NR               | 555       | 424                         | NR               | 685       | 186                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 26                          | NR               | 560       | 482                         | NR               | 690       | 158                         | NR               | 820       | 2                           | NR               | 950       | 0                           | NR               |
| 435       | 43                          | NR               | 565       | 551                         | NR               | 695       | 135                         | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 71                          | NR               | 570       | 632                         | NR               | 700       | 114                         | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 123                         | NR               | 575       | 714                         | NR               | 705       | 97                          | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 210                         | NR               | 580       | 797                         | NR               | 710       | 82                          | NR               | 840       | 1                           | NR               | 970       | 0                           | NR               |
| 455       | 245                         | NR               | 585       | 873                         | NR               | 715       | 70                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 190                         | NR               | 590       | 934                         | NR               | 720       | 59                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 161                         | NR               | 595       | 975                         | NR               | 725       | 50                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 145                         | NR               | 600       | 996                         | NR               | 730       | 43                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 117                         | NR               | 605       | 997                         | NR               | 735       | 36                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 107                         | NR               | 610       | 978                         | NR               | 740       | 30                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 113                         | NR               | 615       | 945                         | NR               | 745       | 26                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 1.75

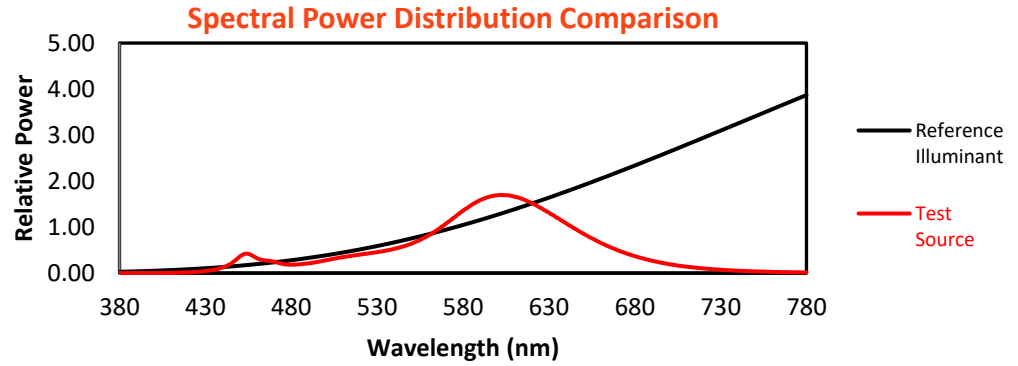
| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|
| 360               | 0                                      | NR                             | 490               | 124                                    | NR                             | 620               | 894                                    | NR                             | 750               | 22                                     | NR                             | 880               | 0                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 141                                    | NR                             | 625               | 837                                    | NR                             | 755               | 19                                     | NR                             | 885               | 0                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 163                                    | NR                             | 630               | 774                                    | NR                             | 760               | 16                                     | NR                             | 890               | 0                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 184                                    | NR                             | 635               | 706                                    | NR                             | 765               | 13                                     | NR                             | 895               | 0                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 204                                    | NR                             | 640               | 638                                    | NR                             | 770               | 11                                     | NR                             | 900               | 0                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 221                                    | NR                             | 645               | 570                                    | NR                             | 775               | 10                                     | NR                             | 905               | 0                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 237                                    | NR                             | 650               | 505                                    | NR                             | 780               | 8                                      | NR                             | 910               | 0                                      | NR                             |
| 395               | 0                                      | NR                             | 525               | 252                                    | NR                             | 655               | 446                                    | NR                             | 785               | 7                                      | NR                             | 915               | 0                                      | NR                             |
| 400               | 0                                      | NR                             | 530               | 268                                    | NR                             | 660               | 389                                    | NR                             | 790               | 6                                      | NR                             | 920               | 0                                      | NR                             |
| 405               | 1                                      | NR                             | 535               | 287                                    | NR                             | 665               | 339                                    | NR                             | 795               | 5                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 2                                      | NR                             | 540               | 310                                    | NR                             | 670               | 292                                    | NR                             | 800               | 4                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 5                                      | NR                             | 545               | 339                                    | NR                             | 675               | 253                                    | NR                             | 805               | 4                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 9                                      | NR                             | 550               | 377                                    | NR                             | 680               | 217                                    | NR                             | 810               | 3                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 15                                     | NR                             | 555               | 424                                    | NR                             | 685               | 186                                    | NR                             | 815               | 3                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 26                                     | NR                             | 560               | 482                                    | NR                             | 690               | 158                                    | NR                             | 820               | 2                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 43                                     | NR                             | 565               | 551                                    | NR                             | 695               | 135                                    | NR                             | 825               | 2                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 71                                     | NR                             | 570               | 632                                    | NR                             | 700               | 114                                    | NR                             | 830               | 2                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 123                                    | NR                             | 575               | 714                                    | NR                             | 705               | 97                                     | NR                             | 835               | 2                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 210                                    | NR                             | 580               | 797                                    | NR                             | 710               | 82                                     | NR                             | 840               | 1                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 245                                    | NR                             | 585               | 873                                    | NR                             | 715               | 70                                     | NR                             | 845               | 1                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 190                                    | NR                             | 590               | 934                                    | NR                             | 720               | 59                                     | NR                             | 850               | 1                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 161                                    | NR                             | 595               | 975                                    | NR                             | 725               | 50                                     | NR                             | 855               | 1                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 145                                    | NR                             | 600               | 996                                    | NR                             | 730               | 43                                     | NR                             | 860               | 1                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 117                                    | NR                             | 605               | 997                                    | NR                             | 735               | 36                                     | NR                             | 865               | 1                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 107                                    | NR                             | 610               | 978                                    | NR                             | 740               | 30                                     | NR                             | 870               | 1                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 113                                    | NR                             | 615               | 945                                    | NR                             | 745               | 26                                     | NR                             | 875               | 1                                      | NR                             |                   |                                        |                                |

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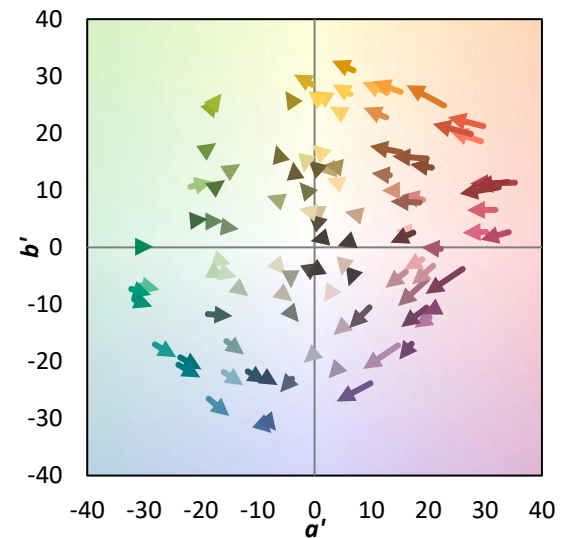
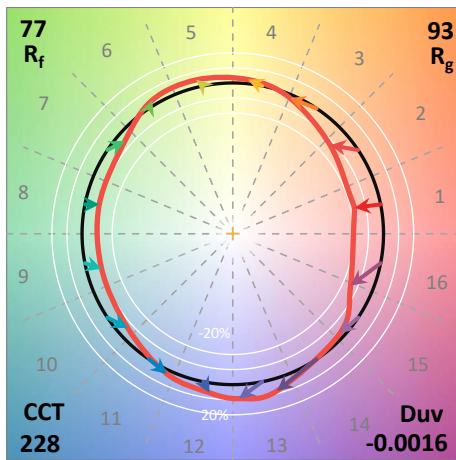
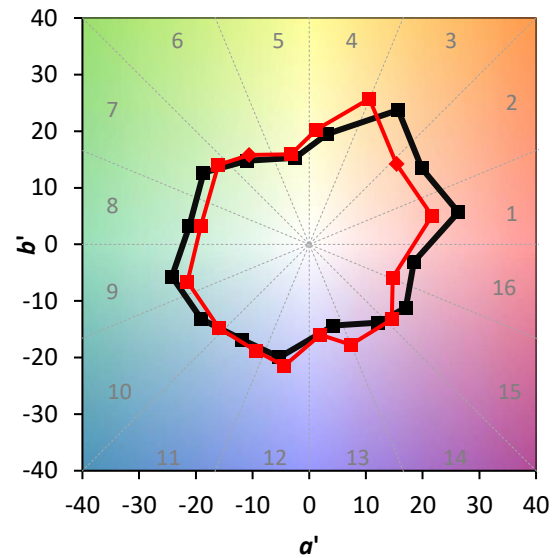
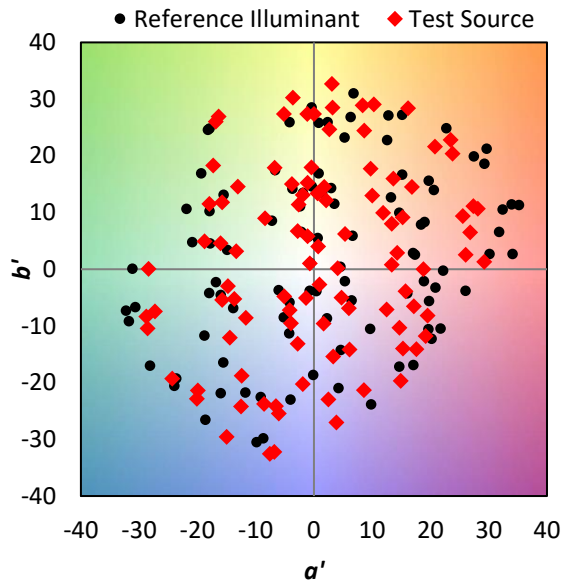
TM-30-18

### Summary

$R_f = 76.9$   
 $R_g = 92.6$   
 $CIE R_a = 70.6$   
 $R_g = -35.1$

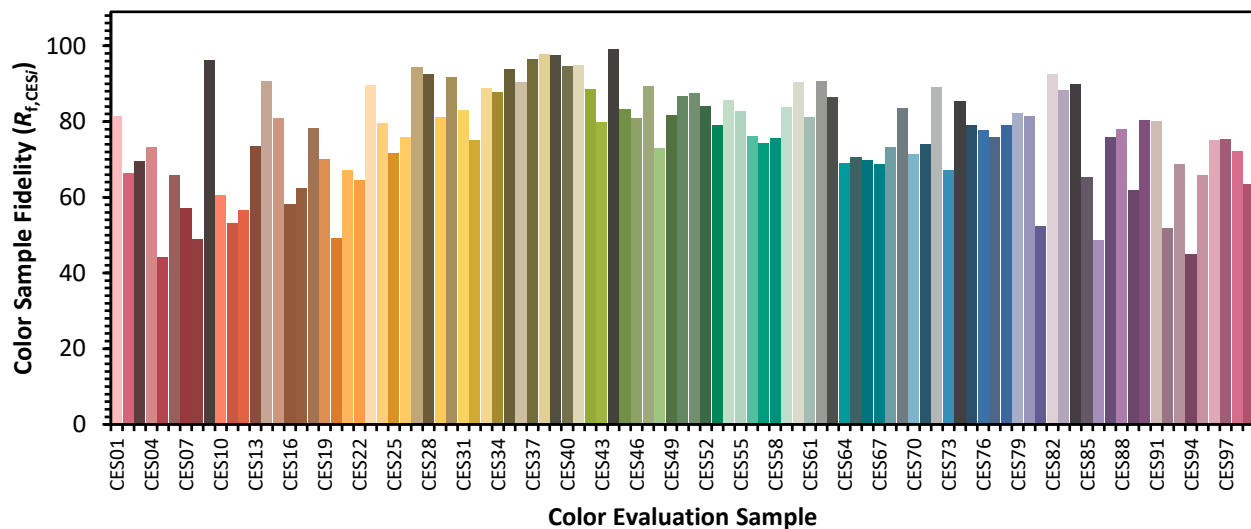


### Color Vector Graphics

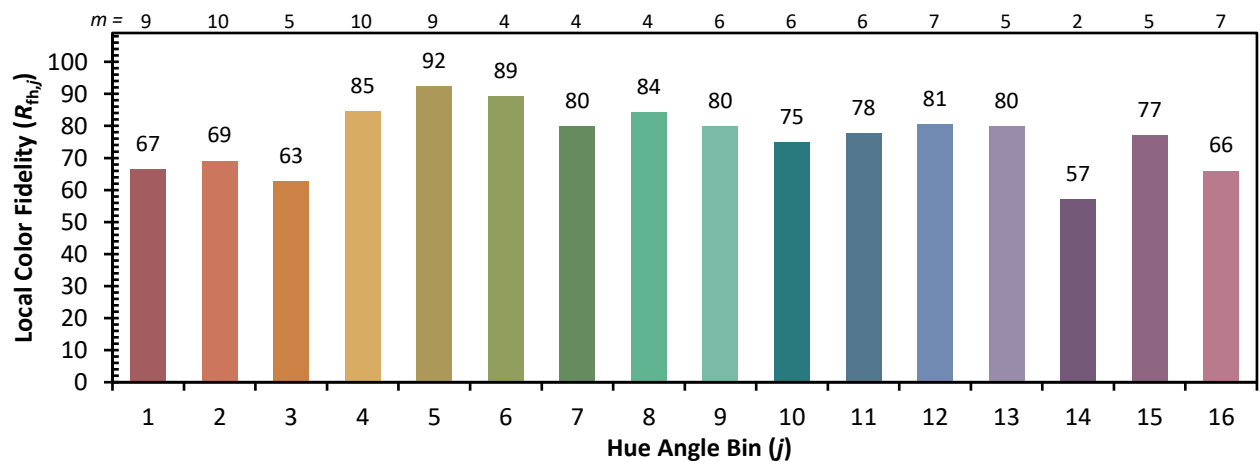
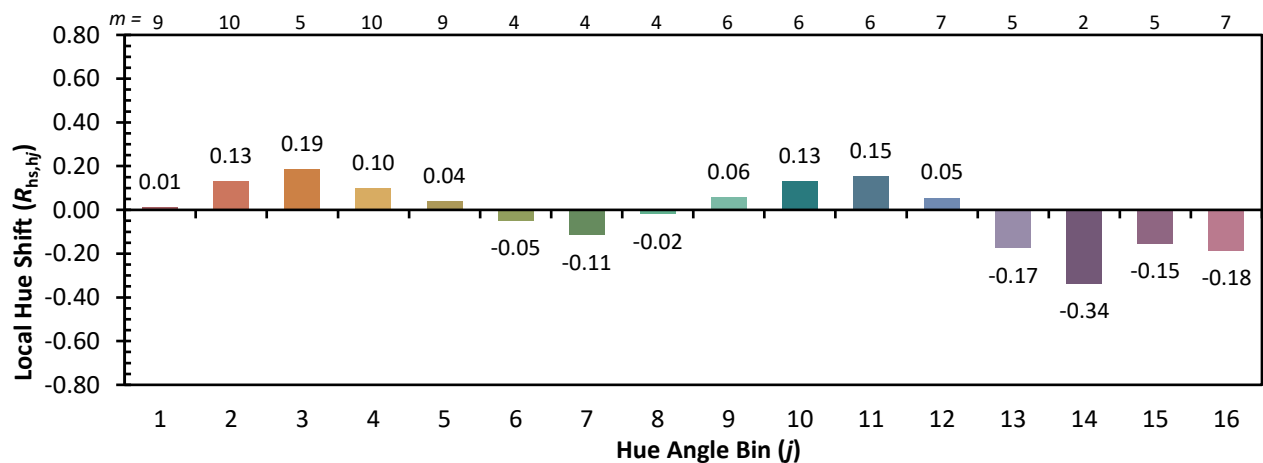
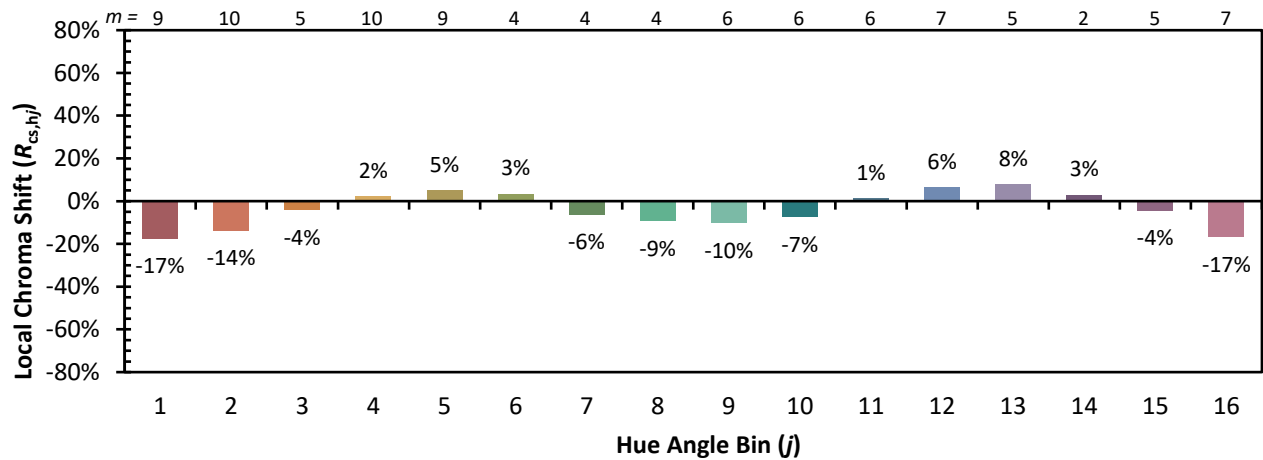


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

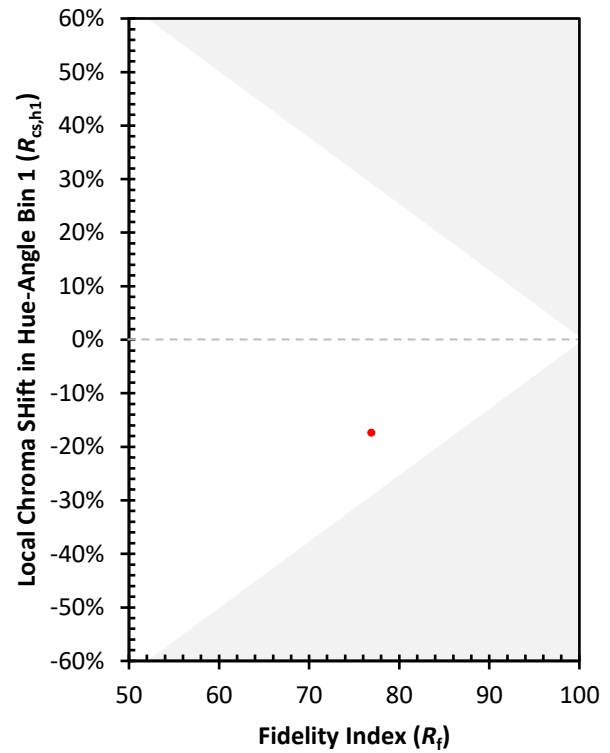
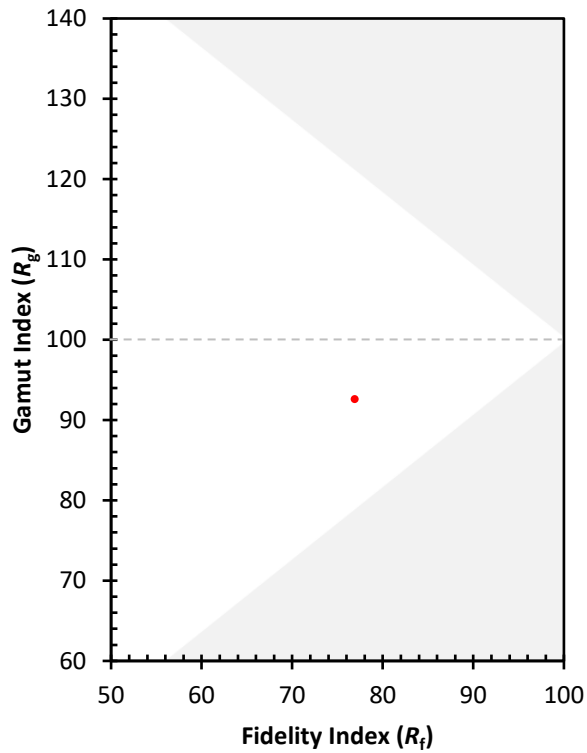
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 76 | CES51 = 88 | CES76 = 78 |
| CES02 = 65 | CES27 = 94 | CES52 = 84 | CES77 = 76 |
| CES03 = 32 | CES28 = 93 | CES53 = 79 | CES78 = 79 |
| CES04 = 72 | CES29 = 81 | CES54 = 86 | CES79 = 82 |
| CES05 = 51 | CES30 = 92 | CES55 = 83 | CES80 = 81 |
| CES06 = 52 | CES31 = 83 | CES56 = 76 | CES81 = 52 |
| CES07 = 44 | CES32 = 75 | CES57 = 74 | CES82 = 92 |
| CES08 = 42 | CES33 = 89 | CES58 = 76 | CES83 = 88 |
| CES09 = 29 | CES34 = 88 | CES59 = 84 | CES84 = 90 |
| CES10 = 79 | CES35 = 94 | CES60 = 91 | CES85 = 65 |
| CES11 = 62 | CES36 = 90 | CES61 = 81 | CES86 = 49 |
| CES12 = 68 | CES37 = 96 | CES62 = 91 | CES87 = 76 |
| CES13 = 44 | CES38 = 98 | CES63 = 86 | CES88 = 78 |
| CES14 = 75 | CES39 = 98 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 95 | CES65 = 71 | CES90 = 80 |
| CES16 = 48 | CES41 = 95 | CES66 = 70 | CES91 = 80 |
| CES17 = 51 | CES42 = 89 | CES67 = 69 | CES92 = 52 |
| CES18 = 57 | CES43 = 80 | CES68 = 73 | CES93 = 69 |
| CES19 = 74 | CES44 = 99 | CES69 = 84 | CES94 = 45 |
| CES20 = 68 | CES45 = 83 | CES70 = 71 | CES95 = 66 |
| CES21 = 88 | CES46 = 81 | CES71 = 74 | CES96 = 75 |
| CES22 = 81 | CES47 = 89 | CES72 = 89 | CES97 = 75 |
| CES23 = 92 | CES48 = 73 | CES73 = 67 | CES98 = 72 |
| CES24 = 92 | CES49 = 82 | CES74 = 85 | CES99 = 64 |
| CES25 = 73 | CES50 = 87 | CES75 = 79 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)