

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: P1461751

Luminaire Tested: USSL-110-727-U-T3RE

Issue Date: 06/10/2026

**Test Information**

Test Method: LM-79-2024  
Report Number: P1461751  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 6/11/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: USSL-110-727-U-T3RE  
Description: USSL DISCRETE LED 1 SQUARE 110W 70CRI 2700K FIXTURE w/ TYPE III ROADWAY  
ILLUMINANCE DISTRIBUTION OPTIC  
Light Source: (40) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 15438.7 lumens  
Efficiency: N/A  
Efficacy: 139.1 lumens/watt  
Luminous Opening: Rectangular (W 0.67' x L: 0.67' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B2 - U0 - G2

Input Watts (W): 111  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.98  
Total Harmonic Distortion (THDi): 2.87%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

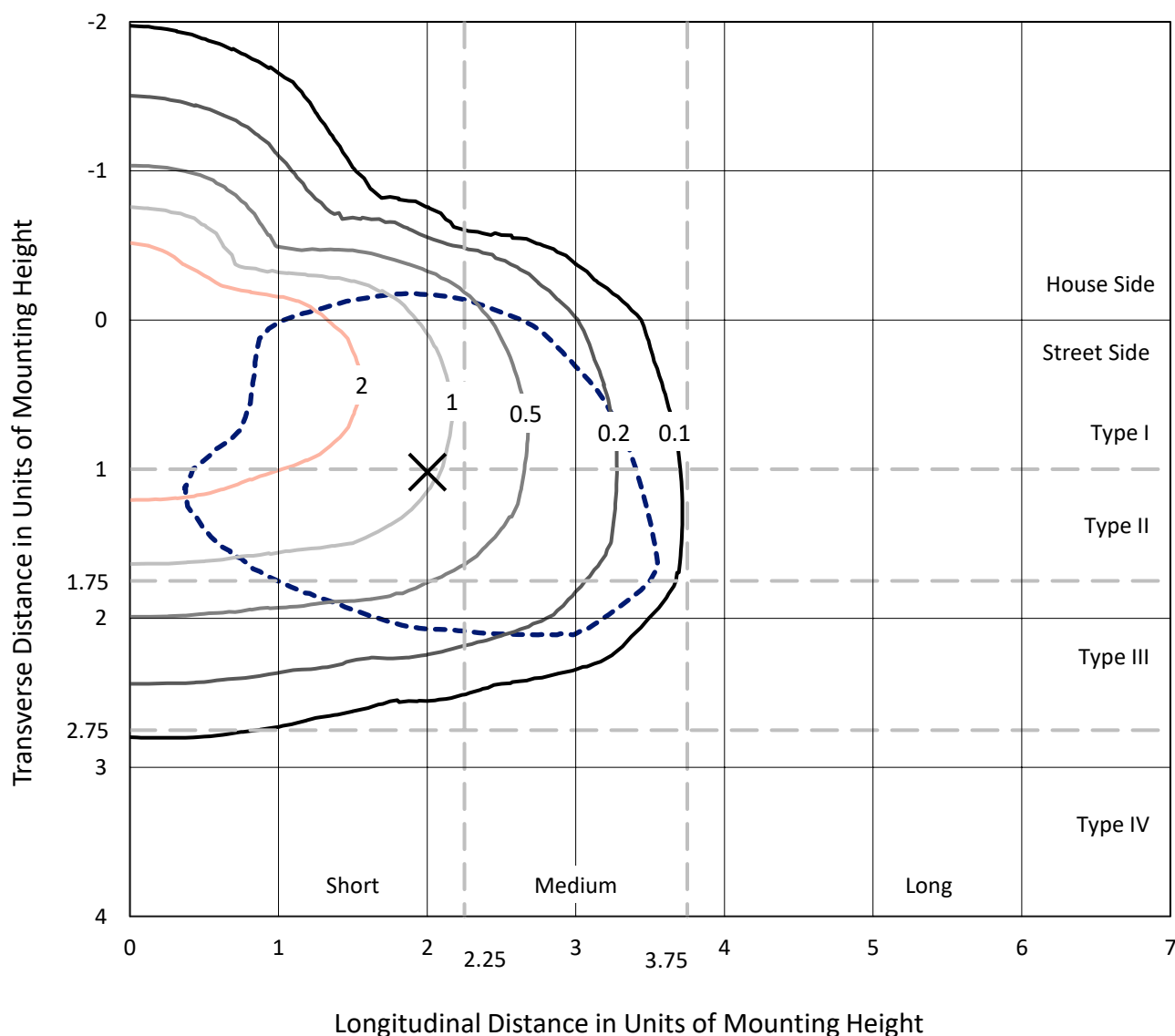
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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

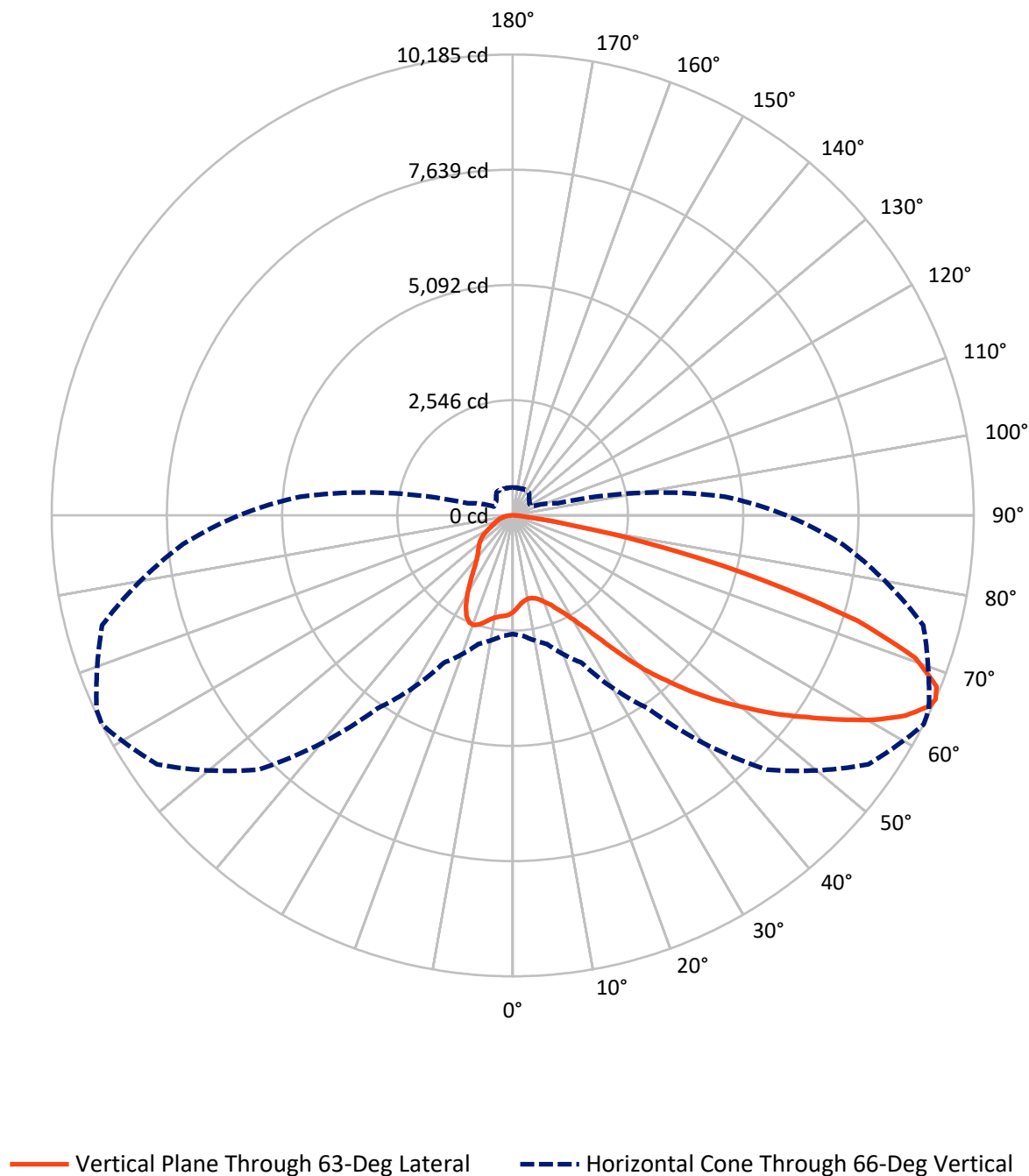


Based on 25 foot mounting height. Maximum calculated value = 3.6 fc  
 Type III - Short - N/A

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## Luminous Intensity Polar Plot



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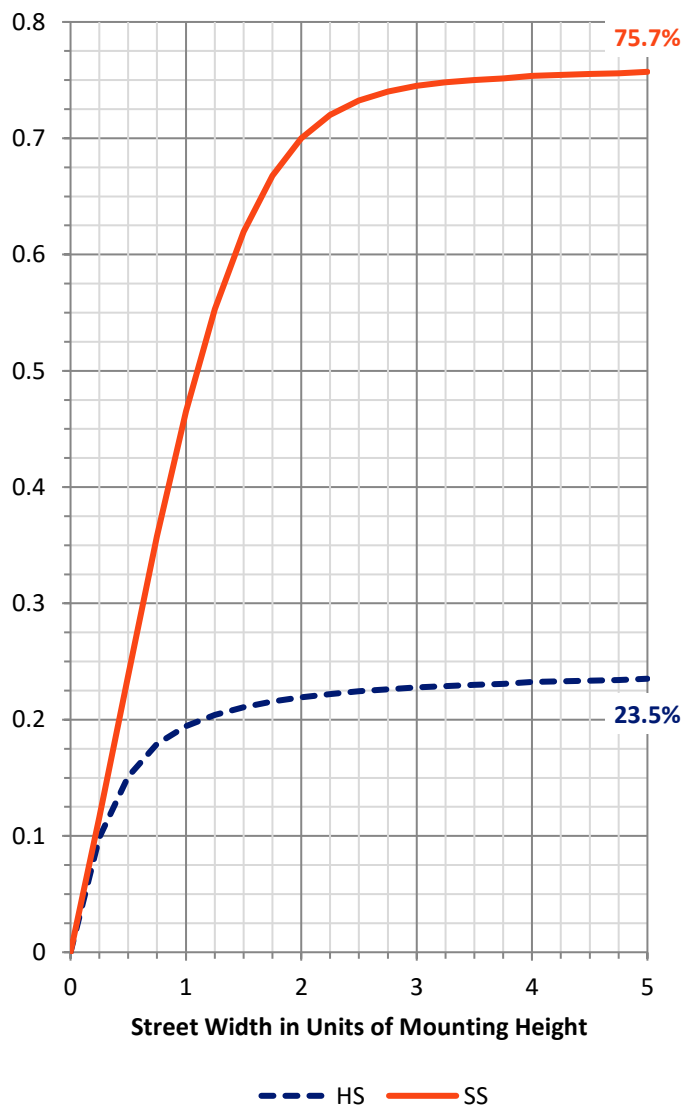
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3693.0   | 0.0    | 3693.0  |
|                    | % Fixture | 23.9     | 0.0    | 23.9    |
| <b>Street Side</b> | Lumens    | 11745.7  | 0.0    | 11745.7 |
|                    | % Fixture | 76.1     | 0.0    | 76.1    |
| <b>Total</b>       | Lumens    | 15438.7  | 0.0    | 15438.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 197.9   | 1.3       |
| 10°-20°   | 619.8   | 4.0       |
| 20°-30°   | 1104.3  | 7.2       |
| 30°-40°   | 1738.8  | 11.3      |
| 40°-50°   | 2611.0  | 16.9      |
| 50°-60°   | 3505.2  | 22.7      |
| 60°-70°   | 3761.1  | 24.4      |
| 70°-80°   | 1692.2  | 11.0      |
| 80°-90°   | 208.4   | 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°    | 15438.7 | 100.0     |
| 0°-180°   | 15438.7 | 100.0     |

**Coefficient of Utilization**



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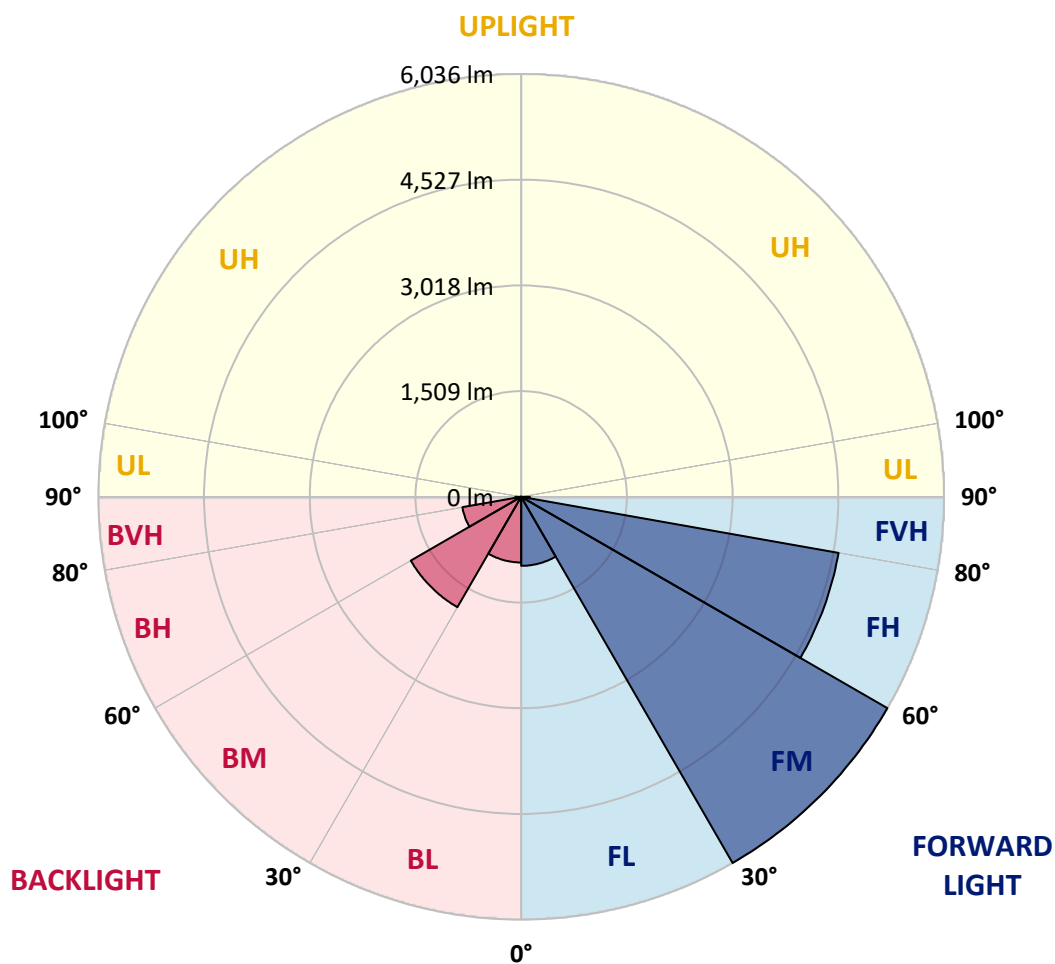
CATALOG NUMBER: USSL-110-727-U-T3RE

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 985.1  | 6.4       |                         |      |         |
| FM   | (30°-60°)   | 6035.9 | 39.1      |                         |      |         |
| FH   | (60°-80°)   | 4600.7 | 29.8      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 124.1  | 0.8       |                         |      | G2/225  |
| BL   | (0°-30°)    | 937.0  | 6.1       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1819.1 | 11.8      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 852.6  | 5.5       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 84.3   | 0.5       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G2**

Type III Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 63°     | 65°     | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|
| 0°    | 2128.5 | 2128.5 | 2128.5 | 2128.5 | 2128.5 | 2128.5 | 2128.5 | 2128.5  | 2128.5  | 2128.5 | 2128.5 |
| 2.5°  | 1908.4 | 1912.8 | 1919.3 | 1928.8 | 1944.1 | 1972.5 | 2009.7 | 2041.0  | 2047.6  | 2086.9 | 2113.9 |
| 5°    | 1759.0 | 1764.1 | 1769.2 | 1782.3 | 1809.3 | 1842.1 | 1898.2 | 1955.0  | 1970.3  | 2051.9 | 2124.1 |
| 7.5°  | 1724.0 | 1725.5 | 1727.7 | 1731.3 | 1747.4 | 1774.3 | 1831.2 | 1900.4  | 1916.4  | 2032.3 | 2149.6 |
| 10°   | 1764.9 | 1765.6 | 1764.9 | 1760.5 | 1756.8 | 1767.0 | 1805.7 | 1869.8  | 1892.4  | 2032.3 | 2192.6 |
| 12.5° | 1848.6 | 1855.9 | 1850.1 | 1834.8 | 1813.7 | 1807.1 | 1825.3 | 1873.4  | 1894.6  | 2055.6 | 2253.8 |
| 15°   | 1966.7 | 1974.0 | 1960.1 | 1937.5 | 1906.2 | 1878.5 | 1873.4 | 1904.8  | 1923.0  | 2091.3 | 2336.9 |
| 17.5° | 2111.0 | 2108.1 | 2092.0 | 2061.4 | 2018.4 | 1974.0 | 1948.5 | 1960.9  | 1974.7  | 2145.2 | 2427.9 |
| 20°   | 2284.4 | 2295.3 | 2261.8 | 2216.6 | 2166.4 | 2098.6 | 2042.5 | 2047.6  | 2051.9  | 2216.6 | 2537.2 |
| 22.5° | 2570.8 | 2583.9 | 2520.5 | 2434.5 | 2341.2 | 2248.7 | 2177.3 | 2140.8  | 2154.0  | 2299.0 | 2650.2 |
| 25°   | 2854.2 | 2856.4 | 2809.8 | 2726.0 | 2587.5 | 2439.6 | 2331.8 | 2288.8  | 2286.6  | 2419.2 | 2804.7 |
| 27.5° | 3151.5 | 3131.8 | 3078.7 | 2988.3 | 2857.9 | 2687.4 | 2524.1 | 2459.3  | 2452.7  | 2587.5 | 2976.6 |
| 30°   | 3425.5 | 3415.3 | 3362.8 | 3266.7 | 3116.5 | 2955.5 | 2766.1 | 2683.7  | 2676.4  | 2835.3 | 3220.7 |
| 32.5° | 3679.8 | 3682.7 | 3633.2 | 3531.9 | 3410.2 | 3245.5 | 3056.8 | 2978.8  | 2970.1  | 3192.3 | 3528.2 |
| 35°   | 3882.4 | 3875.8 | 3845.9 | 3805.9 | 3707.5 | 3561.8 | 3388.3 | 3386.9  | 3407.3  | 3696.6 | 3923.9 |
| 37.5° | 4081.3 | 4076.9 | 4030.3 | 4005.5 | 4012.8 | 3884.6 | 3813.9 | 3895.5  | 3938.5  | 4239.4 | 4373.5 |
| 40°   | 4409.2 | 4385.2 | 4325.4 | 4253.3 | 4262.0 | 4202.3 | 4228.5 | 4467.5  | 4545.5  | 4846.4 | 4846.4 |
| 42.5° | 4655.5 | 4646.0 | 4635.8 | 4608.1 | 4569.5 | 4521.4 | 4673.0 | 4991.4  | 5067.2  | 5372.5 | 5255.2 |
| 45°   | 4748.0 | 4761.2 | 4823.8 | 4935.3 | 4928.0 | 4859.5 | 5156.1 | 5563.4  | 5631.2  | 5907.4 | 5664.0 |
| 47.5° | 4828.2 | 4842.8 | 4919.3 | 5148.8 | 5269.1 | 5282.2 | 5678.6 | 6121.6  | 6201.0  | 6470.6 | 6042.2 |
| 50°   | 4827.5 | 4858.1 | 5010.4 | 5271.2 | 5499.3 | 5697.5 | 6234.5 | 6684.9  | 6765.0  | 6997.5 | 6370.8 |
| 52.5° | 4724.0 | 4745.1 | 5003.8 | 5371.1 | 5680.8 | 6120.9 | 6812.4 | 7282.4  | 7318.8  | 7496.6 | 6657.2 |
| 55°   | 4608.9 | 4627.1 | 4896.7 | 5393.7 | 5871.7 | 6587.2 | 7411.4 | 7867.5  | 7925.1  | 8008.9 | 6947.9 |
| 57.5° | 4474.8 | 4503.9 | 4772.1 | 5325.2 | 6032.7 | 7047.0 | 8024.9 | 8503.6  | 8531.3  | 8502.9 | 7269.3 |
| 60°   | 4313.0 | 4324.7 | 4584.1 | 5149.5 | 6124.5 | 7522.1 | 8620.2 | 9172.6  | 9178.4  | 8994.8 | 7532.3 |
| 62.5° | 3738.8 | 3751.2 | 4056.5 | 4784.5 | 6058.9 | 7884.3 | 9137.6 | 9739.5  | 9727.8  | 9366.4 | 7656.2 |
| 65°   | 2869.5 | 2921.3 | 3229.5 | 3983.7 | 5556.9 | 8043.1 | 9539.8 | 10135.9 | 10093.6 | 9455.3 | 7486.4 |
| 66°   | 2619.6 | 2672.1 | 2940.9 | 3586.5 | 5202.0 | 7942.6 | 9590.1 | 10184.7 | 10143.9 | 9390.4 | 7313.7 |
| 67.5° | 2344.1 | 2353.6 | 2572.2 | 3062.6 | 4460.2 | 7476.2 | 9421.8 | 10100.2 | 10054.3 | 9104.1 | 6905.7 |
| 70°   | 1708.0 | 1753.2 | 1948.5 | 2323.0 | 3146.4 | 5999.9 | 8498.5 | 9432.0  | 9364.9  | 8118.9 | 5871.7 |
| 72.5° | 1121.4 | 1139.6 | 1225.6 | 1394.7 | 2003.9 | 4034.7 | 7016.4 | 7966.6  | 8027.8  | 6479.4 | 4372.1 |
| 75°   | 781.9  | 771.7  | 735.2  | 752.0  | 1001.9 | 1968.2 | 4912.0 | 5688.0  | 5766.0  | 4193.5 | 2585.3 |
| 77.5° | 643.4  | 630.3  | 570.6  | 500.6  | 513.0  | 732.3  | 2600.6 | 3362.1  | 3300.9  | 2055.6 | 1167.3 |
| 80°   | 555.3  | 542.9  | 478.7  | 416.1  | 378.2  | 349.8  | 819.0  | 1369.2  | 1268.6  | 690.1  | 404.4  |
| 82.5° | 443.8  | 437.2  | 408.8  | 349.8  | 306.8  | 252.9  | 255.8  | 356.3   | 381.1   | 257.2  | 177.8  |
| 85°   | 269.6  | 266.7  | 268.9  | 276.9  | 218.6  | 185.1  | 152.3  | 160.3   | 155.9   | 129.0  | 110.8  |
| 87.5° | 139.2  | 129.0  | 138.4  | 165.4  | 129.7  | 85.3   | 64.1   | 66.3    | 70.0    | 66.3   | 56.8   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0    | 0.0    |

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CATALOG NUMBER: USSL-110-727-U-T3RE

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2128.5 | 2128.5 | 2128.5 | 2128.5 | 2128.5 | 2128.5 | 2128.5 | 2128.5 | 2128.5 | 2128.5 | 2128.5 |
| 2.5°  | 2132.1 | 2148.1 | 2173.6 | 2190.4 | 2201.3 | 2207.9 | 2207.2 | 2206.4 | 2204.2 | 2199.1 | 2202.1 |
| 5°    | 2155.4 | 2183.1 | 2215.9 | 2226.1 | 2223.9 | 2220.3 | 2214.4 | 2213.0 | 2215.2 | 2210.8 | 2210.8 |
| 7.5°  | 2194.8 | 2225.4 | 2256.0 | 2250.1 | 2239.9 | 2250.9 | 2268.4 | 2292.4 | 2307.0 | 2315.7 | 2327.4 |
| 10°   | 2247.2 | 2288.8 | 2299.0 | 2281.5 | 2293.1 | 2336.1 | 2375.5 | 2402.4 | 2418.5 | 2426.5 | 2434.5 |
| 12.5° | 2325.9 | 2361.6 | 2342.0 | 2333.9 | 2385.0 | 2438.9 | 2449.8 | 2430.1 | 2409.0 | 2396.6 | 2397.3 |
| 15°   | 2413.4 | 2436.7 | 2396.6 | 2419.9 | 2483.3 | 2478.2 | 2402.4 | 2321.6 | 2263.3 | 2238.5 | 2241.4 |
| 17.5° | 2506.6 | 2511.0 | 2458.6 | 2514.7 | 2520.5 | 2403.2 | 2251.6 | 2137.9 | 2100.0 | 2086.2 | 2087.7 |
| 20°   | 2615.9 | 2596.3 | 2541.6 | 2596.3 | 2473.1 | 2239.2 | 2073.8 | 2006.0 | 1989.3 | 1995.8 | 1997.3 |
| 22.5° | 2713.6 | 2668.4 | 2629.1 | 2614.5 | 2320.1 | 2046.8 | 1940.5 | 1915.7 | 1920.8 | 1932.4 | 1944.8 |
| 25°   | 2830.9 | 2749.3 | 2712.9 | 2538.7 | 2119.0 | 1895.3 | 1848.6 | 1851.6 | 1852.3 | 1862.5 | 1872.0 |
| 27.5° | 2961.3 | 2841.8 | 2769.7 | 2363.1 | 1905.5 | 1786.7 | 1773.6 | 1775.8 | 1768.5 | 1768.5 | 1777.2 |
| 30°   | 3118.0 | 2952.6 | 2779.2 | 2125.5 | 1712.4 | 1689.1 | 1688.3 | 1673.0 | 1643.2 | 1635.9 | 1641.0 |
| 32.5° | 3335.9 | 3118.0 | 2737.6 | 1845.0 | 1573.9 | 1594.3 | 1586.3 | 1546.2 | 1505.4 | 1496.0 | 1506.9 |
| 35°   | 3657.9 | 3359.2 | 2655.3 | 1587.1 | 1453.7 | 1491.6 | 1482.1 | 1429.7 | 1369.2 | 1345.9 | 1348.8 |
| 37.5° | 3988.0 | 3657.2 | 2551.1 | 1374.3 | 1345.1 | 1399.1 | 1377.2 | 1307.2 | 1243.1 | 1200.1 | 1206.0 |
| 40°   | 4334.2 | 3958.2 | 2428.7 | 1237.3 | 1251.1 | 1300.7 | 1281.7 | 1195.8 | 1112.7 | 1074.8 | 1092.3 |
| 42.5° | 4674.5 | 4246.0 | 2297.5 | 1147.7 | 1162.2 | 1211.8 | 1192.1 | 1101.8 | 1039.8 | 999.7  | 1006.3 |
| 45°   | 4979.8 | 4474.1 | 2178.7 | 1080.6 | 1085.7 | 1124.3 | 1095.2 | 1043.5 | 980.8  | 946.5  | 944.4  |
| 47.5° | 5252.3 | 4643.8 | 2104.4 | 1026.7 | 1009.9 | 1021.6 | 1017.2 | 980.8  | 934.2  | 902.1  | 899.2  |
| 50°   | 5486.2 | 4772.1 | 2091.3 | 977.9  | 928.3  | 907.2  | 926.9  | 915.9  | 879.5  | 856.2  | 854.0  |
| 52.5° | 5674.9 | 4889.4 | 2148.1 | 928.3  | 825.6  | 815.4  | 844.5  | 847.4  | 819.8  | 809.6  | 810.3  |
| 55°   | 5903.0 | 5034.4 | 2263.3 | 859.1  | 734.5  | 736.0  | 774.6  | 777.5  | 761.5  | 762.9  | 765.8  |
| 57.5° | 6152.2 | 5198.4 | 2358.7 | 768.8  | 650.7  | 662.4  | 714.1  | 719.2  | 703.9  | 709.7  | 711.9  |
| 60°   | 6362.8 | 5347.0 | 2246.5 | 656.5  | 575.7  | 605.5  | 671.8  | 668.9  | 660.2  | 674.8  | 678.4  |
| 62.5° | 6424.0 | 5309.1 | 1843.5 | 558.9  | 516.6  | 561.1  | 642.0  | 642.7  | 659.5  | 685.0  | 689.3  |
| 65°   | 6207.6 | 4946.2 | 1257.0 | 486.8  | 469.3  | 522.5  | 624.5  | 650.0  | 642.7  | 639.0  | 643.4  |
| 66°   | 6045.8 | 4718.9 | 1026.7 | 462.0  | 451.8  | 511.5  | 620.1  | 630.3  | 617.2  | 616.5  | 616.5  |
| 67.5° | 5680.8 | 4246.7 | 749.8  | 429.9  | 432.1  | 494.0  | 593.9  | 585.1  | 597.5  | 609.2  | 613.5  |
| 70°   | 4816.5 | 3243.3 | 474.4  | 380.4  | 397.9  | 448.1  | 530.5  | 564.7  | 587.3  | 601.2  | 610.6  |
| 72.5° | 3569.8 | 2093.5 | 338.1  | 335.9  | 361.4  | 402.2  | 487.5  | 537.8  | 556.7  | 615.7  | 632.5  |
| 75°   | 2187.5 | 1163.7 | 284.2  | 298.8  | 309.7  | 365.1  | 440.8  | 507.9  | 503.5  | 521.0  | 525.4  |
| 77.5° | 945.1  | 523.2  | 242.6  | 258.7  | 264.5  | 309.0  | 392.8  | 461.3  | 460.5  | 479.5  | 487.5  |
| 80°   | 323.5  | 237.5  | 207.7  | 210.6  | 229.5  | 260.9  | 335.2  | 400.0  | 400.8  | 408.8  | 400.0  |
| 82.5° | 172.0  | 161.8  | 166.9  | 172.7  | 196.0  | 212.8  | 276.9  | 346.1  | 319.2  | 226.6  | 223.0  |
| 85°   | 108.6  | 96.9   | 110.0  | 129.7  | 143.5  | 154.5  | 211.3  | 260.9  | 227.3  | 99.8   | 88.9   |
| 87.5° | 43.7   | 43.7   | 51.0   | 68.5   | 61.9   | 67.0   | 112.9  | 147.9  | 121.0  | 40.1   | 21.1   |
| 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: SP2-2501-321-3

Test Date: 04/09/2025

Luminaire Tested: GKO-PB1E-727-U-T4W

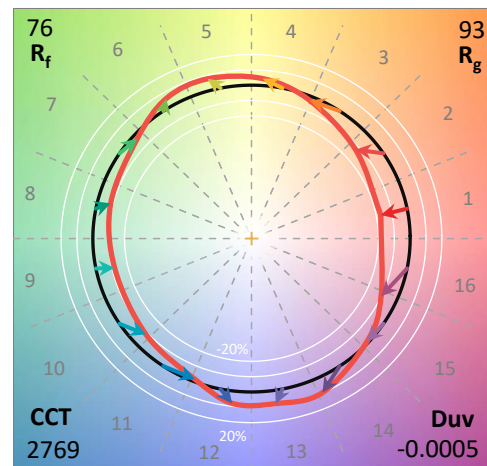
Data in this report applies to families of products including GKO-PB1E-727-U-T4W

### Test Information

Test Method: LM-79-2019  
 Report Number: SP2-2501-321-3  
 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-727-U-T4W**  
 Description: Gekko Wedge Wall Pack Fixture 1 SQ w/ T4W distribution

### Spectral Parameters

|                           |          |           |      |      |       |
|---------------------------|----------|-----------|------|------|-------|
| CCT (K):                  | 2769     | CRI (Ra): | 71.7 |      |       |
| CIE u':                   | 0.2596   | R1:       | 68.0 | R9:  | -34.5 |
| CIE v':                   | 0.5253   | R2:       | 84.0 | R10: | 64.3  |
| Duv:                      | -0.0005  | R3:       | 94.6 | R11: | 60.9  |
| CIE x:                    | 0.4535   | R4:       | 65.9 | R12: | 54.4  |
| CIE y:                    | 0.4078   | R5:       | 67.3 | R13: | 71.2  |
| CIE z:                    | 0.1387   | R6:       | 78.7 | R14: | 97.6  |
| Peak Wavelength (nm):     | 597      | R7:       | 75.2 | R15: | 59.5  |
| Dominant Wavelength (nm): | 584      | R8:       | 39.8 |      |       |
| Purity:                   | 58.54014 |           |      |      |       |
| Rf:                       | 75.7     |           |      |      |       |
| Rg:                       | 93.2     |           |      |      |       |



### Test Conditions

Stabilization Time: 36M  
 Operation Time: 1H 36M  
 Sphere Temperature (°C): 25.0

REPORT NUMBER: SP2-2501-321-3

| 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 2700K 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               | 114                                  | NR                             | 620               | 844                                  | NR                             | 750               | 22                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 138                                  | NR                             | 625               | 785                                  | NR                             | 755               | 19                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 176                                  | NR                             | 630               | 722                                  | NR                             | 760               | 16                                   | NR                             | 890               | 1                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 222                                  | NR                             | 635               | 655                                  | NR                             | 765               | 14                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 268                                  | NR                             | 640               | 591                                  | NR                             | 770               | 12                                   | NR                             | 900               | 0                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 311                                  | NR                             | 645               | 527                                  | NR                             | 775               | 10                                   | NR                             | 905               | 0                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 348                                  | NR                             | 650               | 467                                  | NR                             | 780               | 9                                    | NR                             | 910               | 0                                    | NR                             |
| 395               | 0                                    | NR                             | 525               | 381                                  | NR                             | 655               | 412                                  | NR                             | 785               | 8                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 2                                    | NR                             | 530               | 410                                  | NR                             | 660               | 360                                  | NR                             | 790               | 7                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 4                                    | NR                             | 535               | 438                                  | NR                             | 665               | 314                                  | NR                             | 795               | 6                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 7                                    | NR                             | 540               | 469                                  | NR                             | 670               | 272                                  | NR                             | 800               | 5                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 13                                   | NR                             | 545               | 503                                  | NR                             | 675               | 236                                  | NR                             | 805               | 4                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 25                                   | NR                             | 550               | 544                                  | NR                             | 680               | 203                                  | NR                             | 810               | 4                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 46                                   | NR                             | 555               | 594                                  | NR                             | 685               | 175                                  | NR                             | 815               | 3                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 79                                   | NR                             | 560               | 652                                  | NR                             | 690               | 149                                  | NR                             | 820               | 3                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 128                                  | NR                             | 565               | 714                                  | NR                             | 695               | 128                                  | NR                             | 825               | 2                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 196                                  | NR                             | 570               | 783                                  | NR                             | 700               | 109                                  | NR                             | 830               | 2                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 299                                  | NR                             | 575               | 847                                  | NR                             | 705               | 93                                   | NR                             | 835               | 2                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 433                                  | NR                             | 580               | 906                                  | NR                             | 710               | 80                                   | NR                             | 840               | 2                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 433                                  | NR                             | 585               | 953                                  | NR                             | 715               | 68                                   | NR                             | 845               | 1                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 293                                  | NR                             | 590               | 985                                  | NR                             | 720               | 58                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 215                                  | NR                             | 595               | 998                                  | NR                             | 725               | 50                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 173                                  | NR                             | 600               | 997                                  | NR                             | 730               | 42                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 127                                  | NR                             | 605               | 978                                  | NR                             | 735               | 36                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 104                                  | NR                             | 610               | 945                                  | NR                             | 740               | 30                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 104                                  | NR                             | 615               | 902                                  | NR                             | 745               | 26                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.14

| 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       | 114                         | NR               | 620       | 844                         | NR               | 750       | 22                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 138                         | NR               | 625       | 785                         | NR               | 755       | 19                          | NR               | 885       | 1                           | NR               |
| 370       | 0                           | NR               | 500       | 176                         | NR               | 630       | 722                         | NR               | 760       | 16                          | NR               | 890       | 1                           | NR               |
| 375       | 0                           | NR               | 505       | 222                         | NR               | 635       | 655                         | NR               | 765       | 14                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 268                         | NR               | 640       | 591                         | NR               | 770       | 12                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 311                         | NR               | 645       | 527                         | NR               | 775       | 10                          | NR               | 905       | 0                           | NR               |
| 390       | 0                           | NR               | 520       | 348                         | NR               | 650       | 467                         | NR               | 780       | 9                           | NR               | 910       | 0                           | NR               |
| 395       | 0                           | NR               | 525       | 381                         | NR               | 655       | 412                         | NR               | 785       | 8                           | NR               | 915       | 0                           | NR               |
| 400       | 2                           | NR               | 530       | 410                         | NR               | 660       | 360                         | NR               | 790       | 7                           | NR               | 920       | 0                           | NR               |
| 405       | 4                           | NR               | 535       | 438                         | NR               | 665       | 314                         | NR               | 795       | 6                           | NR               | 925       | 0                           | NR               |
| 410       | 7                           | NR               | 540       | 469                         | NR               | 670       | 272                         | NR               | 800       | 5                           | NR               | 930       | 0                           | NR               |
| 415       | 13                          | NR               | 545       | 503                         | NR               | 675       | 236                         | NR               | 805       | 4                           | NR               | 935       | 0                           | NR               |
| 420       | 25                          | NR               | 550       | 544                         | NR               | 680       | 203                         | NR               | 810       | 4                           | NR               | 940       | 0                           | NR               |
| 425       | 46                          | NR               | 555       | 594                         | NR               | 685       | 175                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 79                          | NR               | 560       | 652                         | NR               | 690       | 149                         | NR               | 820       | 3                           | NR               | 950       | 0                           | NR               |
| 435       | 128                         | NR               | 565       | 714                         | NR               | 695       | 128                         | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 196                         | NR               | 570       | 783                         | NR               | 700       | 109                         | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 299                         | NR               | 575       | 847                         | NR               | 705       | 93                          | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 433                         | NR               | 580       | 906                         | NR               | 710       | 80                          | NR               | 840       | 2                           | NR               | 970       | 0                           | NR               |
| 455       | 433                         | NR               | 585       | 953                         | NR               | 715       | 68                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 293                         | NR               | 590       | 985                         | NR               | 720       | 58                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 215                         | NR               | 595       | 998                         | NR               | 725       | 50                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 173                         | NR               | 600       | 997                         | NR               | 730       | 42                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 127                         | NR               | 605       | 978                         | NR               | 735       | 36                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 104                         | NR               | 610       | 945                         | NR               | 740       | 30                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 104                         | NR               | 615       | 902                         | NR               | 745       | 26                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: NR**
**M/P: 2.08**

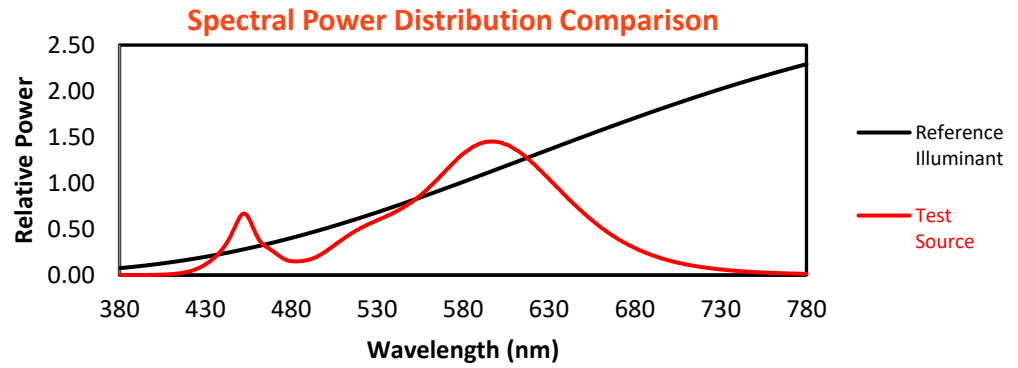
| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | 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               | 114                                    | NR                             | 620               | 844                                    | NR                             | 750               | 22                                     | NR                             | 880               | 1                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 138                                    | NR                             | 625               | 785                                    | NR                             | 755               | 19                                     | NR                             | 885               | 1                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 176                                    | NR                             | 630               | 722                                    | NR                             | 760               | 16                                     | NR                             | 890               | 1                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 222                                    | NR                             | 635               | 655                                    | NR                             | 765               | 14                                     | NR                             | 895               | 0                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 268                                    | NR                             | 640               | 591                                    | NR                             | 770               | 12                                     | NR                             | 900               | 0                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 311                                    | NR                             | 645               | 527                                    | NR                             | 775               | 10                                     | NR                             | 905               | 0                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 348                                    | NR                             | 650               | 467                                    | NR                             | 780               | 9                                      | NR                             | 910               | 0                                      | NR                             |
| 395               | 0                                      | NR                             | 525               | 381                                    | NR                             | 655               | 412                                    | NR                             | 785               | 8                                      | NR                             | 915               | 0                                      | NR                             |
| 400               | 2                                      | NR                             | 530               | 410                                    | NR                             | 660               | 360                                    | NR                             | 790               | 7                                      | NR                             | 920               | 0                                      | NR                             |
| 405               | 4                                      | NR                             | 535               | 438                                    | NR                             | 665               | 314                                    | NR                             | 795               | 6                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 7                                      | NR                             | 540               | 469                                    | NR                             | 670               | 272                                    | NR                             | 800               | 5                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 13                                     | NR                             | 545               | 503                                    | NR                             | 675               | 236                                    | NR                             | 805               | 4                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 25                                     | NR                             | 550               | 544                                    | NR                             | 680               | 203                                    | NR                             | 810               | 4                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 46                                     | NR                             | 555               | 594                                    | NR                             | 685               | 175                                    | NR                             | 815               | 3                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 79                                     | NR                             | 560               | 652                                    | NR                             | 690               | 149                                    | NR                             | 820               | 3                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 128                                    | NR                             | 565               | 714                                    | NR                             | 695               | 128                                    | NR                             | 825               | 2                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 196                                    | NR                             | 570               | 783                                    | NR                             | 700               | 109                                    | NR                             | 830               | 2                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 299                                    | NR                             | 575               | 847                                    | NR                             | 705               | 93                                     | NR                             | 835               | 2                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 433                                    | NR                             | 580               | 906                                    | NR                             | 710               | 80                                     | NR                             | 840               | 2                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 433                                    | NR                             | 585               | 953                                    | NR                             | 715               | 68                                     | NR                             | 845               | 1                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 293                                    | NR                             | 590               | 985                                    | NR                             | 720               | 58                                     | NR                             | 850               | 1                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 215                                    | NR                             | 595               | 998                                    | NR                             | 725               | 50                                     | NR                             | 855               | 1                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 173                                    | NR                             | 600               | 997                                    | NR                             | 730               | 42                                     | NR                             | 860               | 1                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 127                                    | NR                             | 605               | 978                                    | NR                             | 735               | 36                                     | NR                             | 865               | 1                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 104                                    | NR                             | 610               | 945                                    | NR                             | 740               | 30                                     | NR                             | 870               | 1                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 104                                    | NR                             | 615               | 902                                    | NR                             | 745               | 26                                     | NR                             | 875               | 1                                      | NR                             |                   |                                        |                                |

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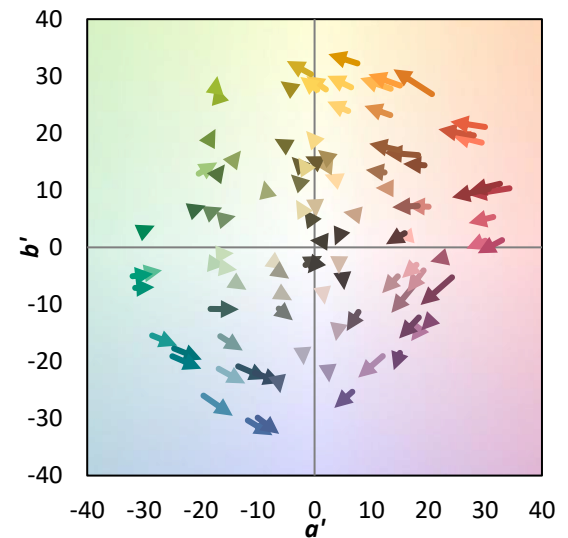
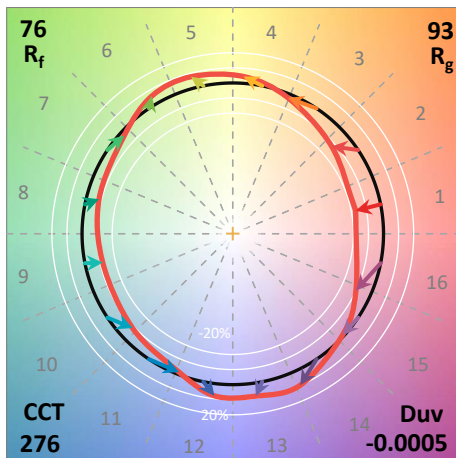
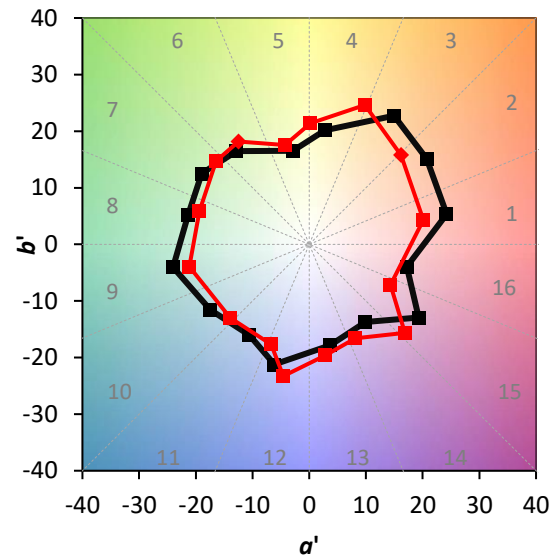
TM-30-18

### Summary

$R_f = 75.7$   
 $R_g = 93.2$   
 $CIE R_a = 71.7$   
 $R_g = -34.5$

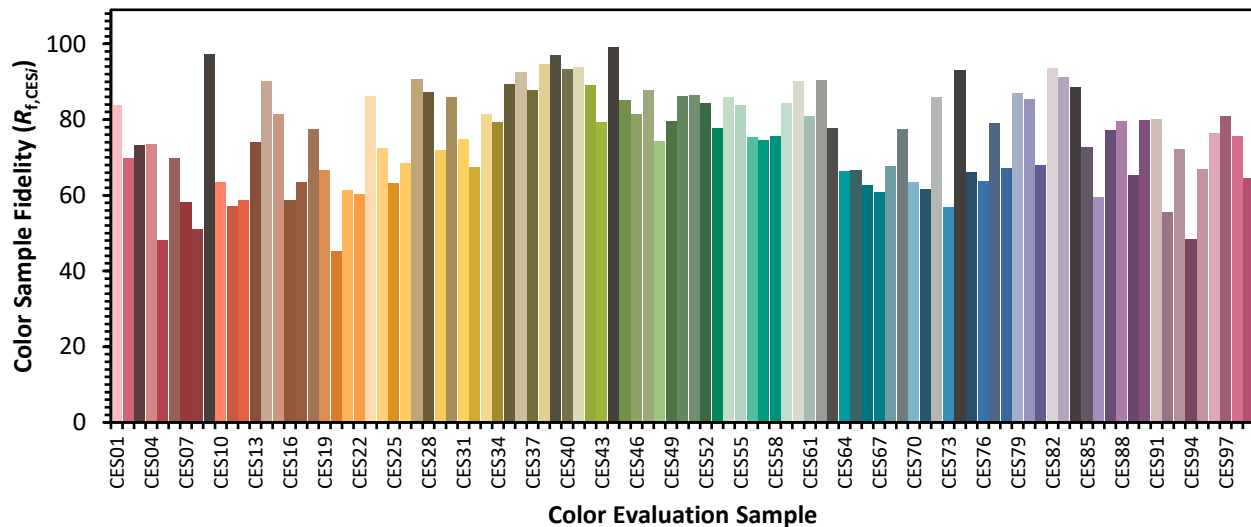


### Color Vector Graphics

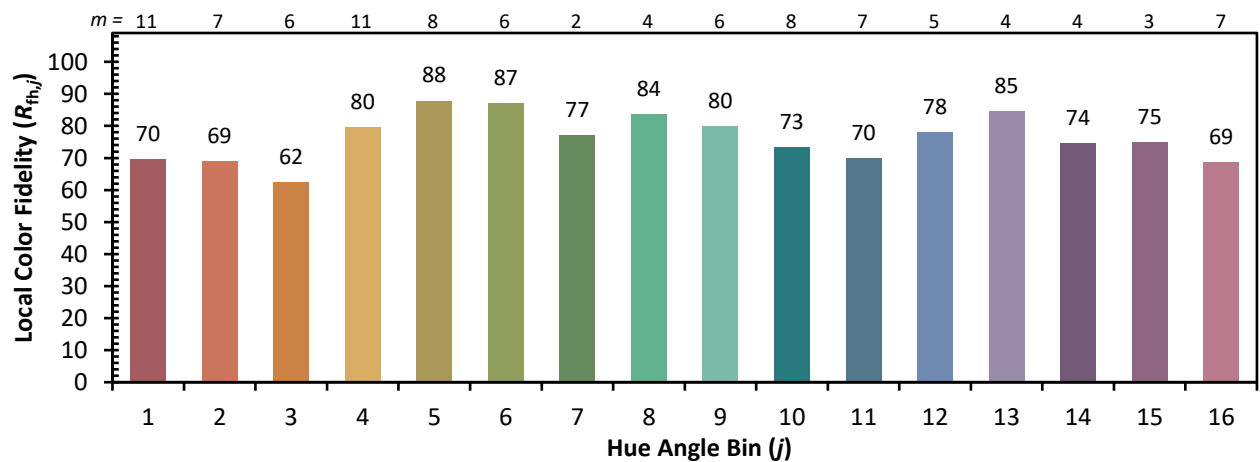


Individual Sample Fidelity Index ( $R_{f,i}$ )

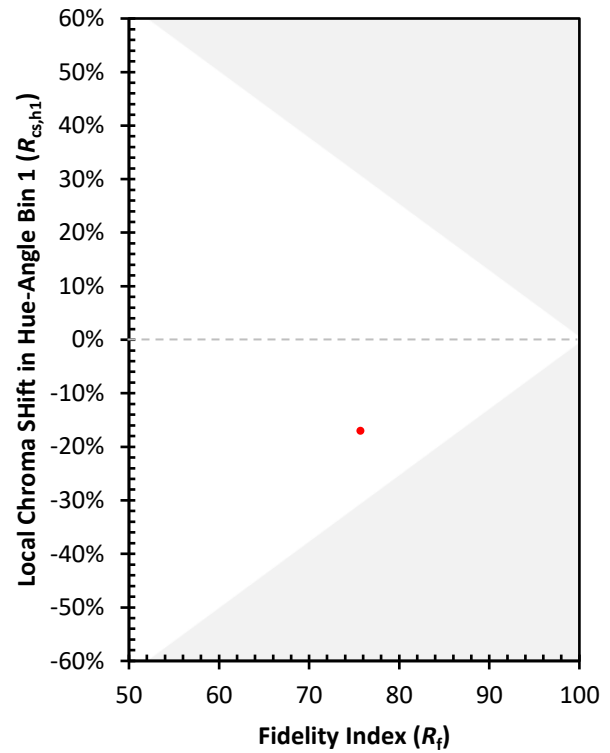
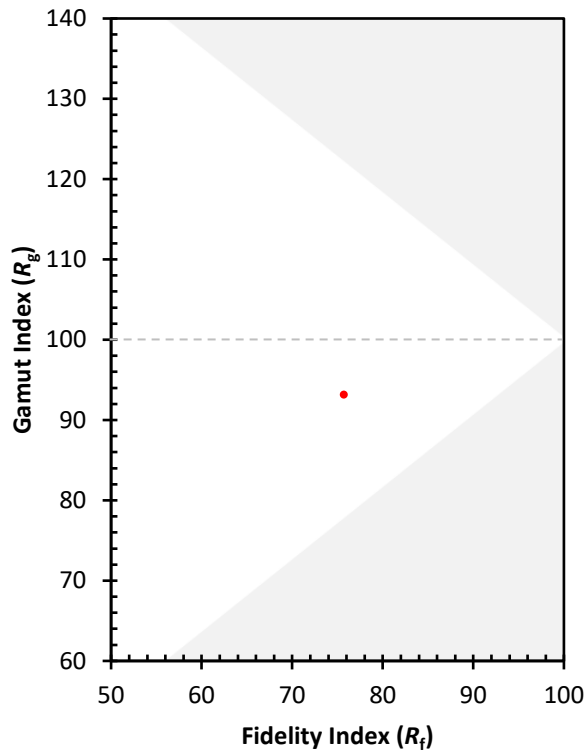
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 87 | CES76 = 64 |
| CES02 = 63 | CES27 = 91 | CES52 = 84 | CES77 = 79 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 67 |
| CES04 = 71 | CES29 = 72 | CES54 = 86 | CES79 = 87 |
| CES05 = 50 | CES30 = 86 | CES55 = 84 | CES80 = 85 |
| CES06 = 52 | CES31 = 75 | CES56 = 75 | CES81 = 68 |
| CES07 = 42 | CES32 = 67 | CES57 = 74 | CES82 = 94 |
| CES08 = 41 | CES33 = 81 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 79 | CES59 = 84 | CES84 = 89 |
| CES10 = 77 | CES35 = 89 | CES60 = 90 | CES85 = 73 |
| CES11 = 60 | CES36 = 92 | CES61 = 81 | CES86 = 59 |
| CES12 = 66 | CES37 = 88 | CES62 = 90 | CES87 = 77 |
| CES13 = 43 | CES38 = 95 | CES63 = 78 | CES88 = 79 |
| CES14 = 74 | CES39 = 97 | CES64 = 66 | CES89 = 65 |
| CES15 = 72 | CES40 = 93 | CES65 = 67 | CES90 = 80 |
| CES16 = 48 | CES41 = 94 | CES66 = 63 | CES91 = 80 |
| CES17 = 50 | CES42 = 89 | CES67 = 61 | CES92 = 55 |
| CES18 = 57 | CES43 = 79 | CES68 = 68 | CES93 = 72 |
| CES19 = 73 | CES44 = 99 | CES69 = 77 | CES94 = 48 |
| CES20 = 67 | CES45 = 85 | CES70 = 63 | CES95 = 67 |
| CES21 = 87 | CES46 = 81 | CES71 = 62 | CES96 = 76 |
| CES22 = 80 | CES47 = 88 | CES72 = 86 | CES97 = 81 |
| CES23 = 92 | CES48 = 74 | CES73 = 57 | CES98 = 76 |
| CES24 = 91 | CES49 = 80 | CES74 = 93 | CES99 = 64 |
| CES25 = 73 | CES50 = 86 | CES75 = 66 |            |



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)