

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: P1461438

Luminaire Tested: USSL-70-727-U-T2U

Issue Date: 06/10/2026

**Test Information**

Test Method: LM-79-2024  
Report Number: P1461438  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 6/11/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: USSL-70-727-U-T2U  
Description: USSL DISCRETE LED 1 SQUARE 70W 70CRI 2700K FIXTURE w/ TYPE II URBAN DISTRIBUTION OPTIC  
Light Source: (40) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 10888.2 lumens  
Efficiency: N/A  
Efficacy: 149.2 lumens/watt  
Luminous Opening: Rectangular (W 0.67' x L: 0.67' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G2

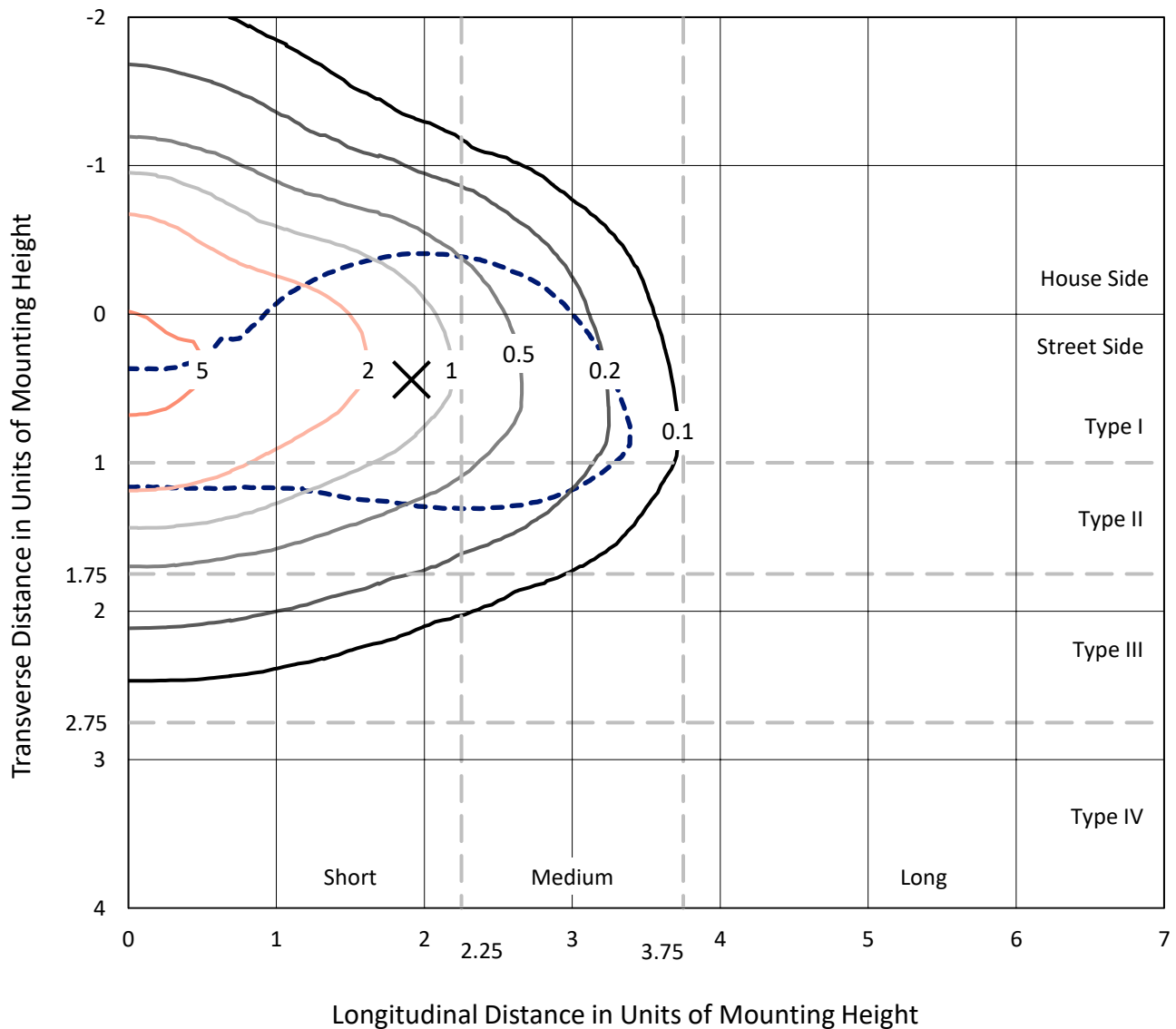
Input Watts (W): 73  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.98  
Total Harmonic Distortion (THDi): 2.73%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 --- 1/2 Max cd

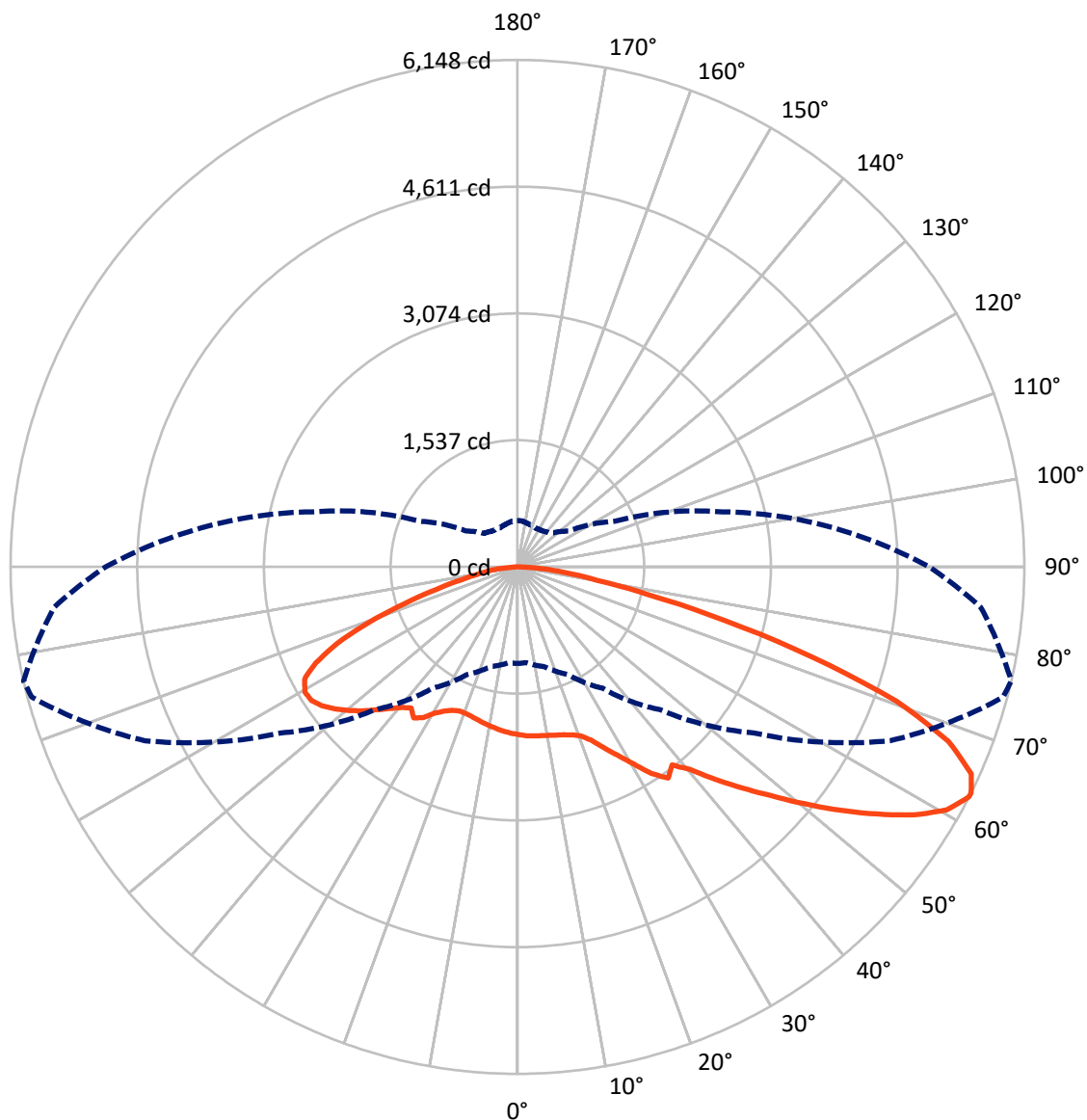


Based on 20 foot mounting height. Maximum calculated value = 6.3 fc  
 Type II - Short - N/A

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CATALOG NUMBER: USSL-70-727-U-T2U

## Luminous Intensity Polar Plot



— Vertical Plane Through 77-Deg Lateral      - - - Horizontal Cone Through 63-Deg Vertical

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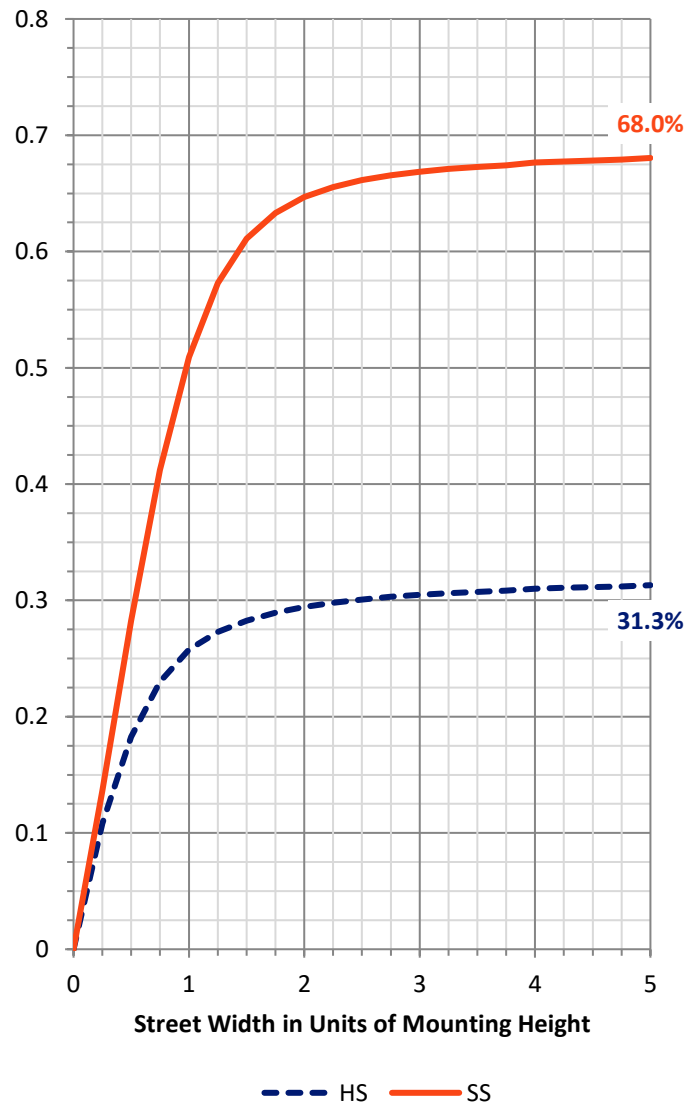
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3453.4   | 0.0    | 3453.4  |
|                    | % Fixture | 31.7     | 0.0    | 31.7    |
| <b>Street Side</b> | Lumens    | 7434.8   | 0.0    | 7434.8  |
|                    | % Fixture | 68.3     | 0.0    | 68.3    |
| <b>Total</b>       | Lumens    | 10888.2  | 0.0    | 10888.2 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 194.3   | 1.8       |
| 10°-20°   | 596.2   | 5.5       |
| 20°-30°   | 1058.6  | 9.7       |
| 30°-40°   | 1577.1  | 14.5      |
| 40°-50°   | 2021.6  | 18.6      |
| 50°-60°   | 2271.1  | 20.9      |
| 60°-70°   | 2005.4  | 18.4      |
| 70°-80°   | 958.8   | 8.8       |
| 80°-90°   | 205.1   | 1.9       |
| 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°    | 10888.2 | 100.0     |
| 0°-180°   | 10888.2 | 100.0     |

**Coefficient of Utilization**



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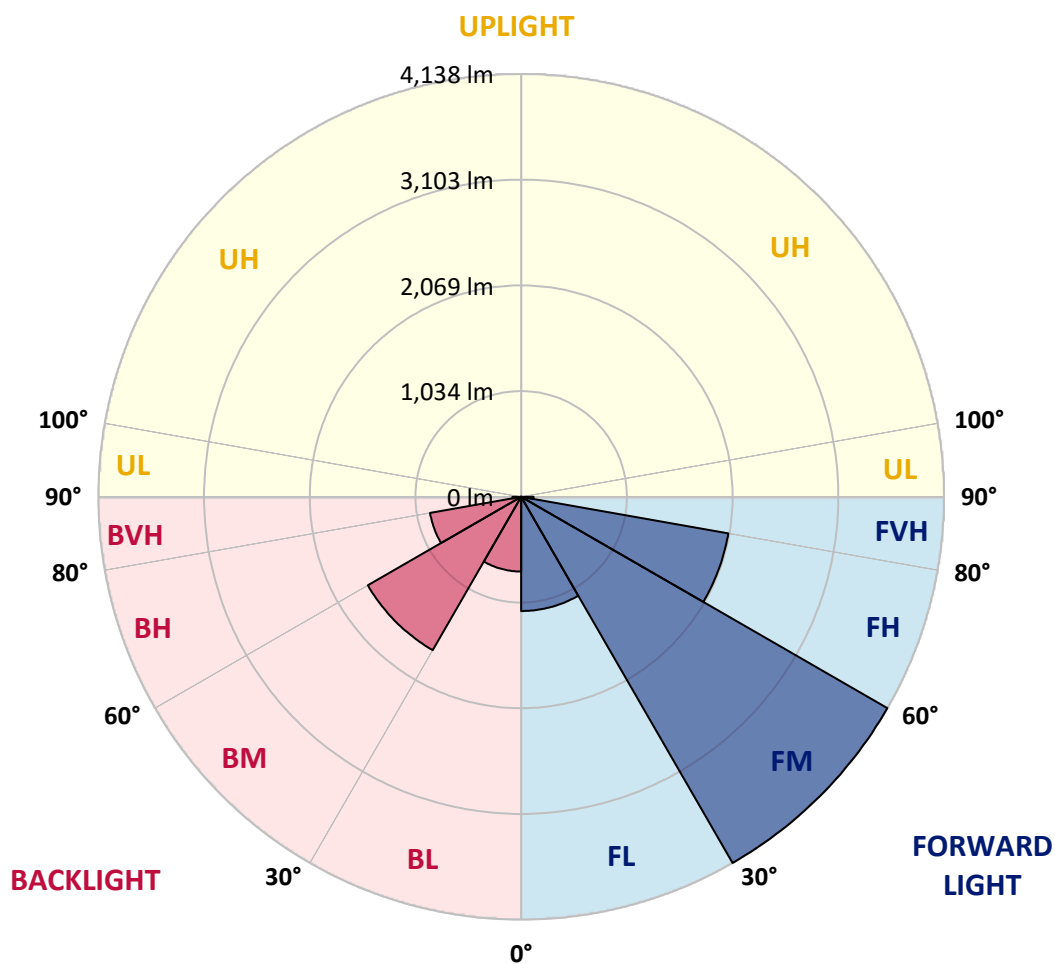
CATALOG NUMBER: USSL-70-727-U-T2U

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1117.6 | 10.3      |                         |      |         |
| FM   | (30°-60°)   | 4137.9 | 38.0      |                         |      |         |
| FH   | (60°-80°)   | 2058.7 | 18.9      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 120.6  | 1.1       |                         |      | G2/225  |
| BL   | (0°-30°)    | 731.6  | 6.7       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1731.9 | 15.9      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 905.4  | 8.3       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 84.5   | 0.8       |                         |      | 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 II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 77°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 |
| 2.5°  | 2081.9 | 2091.0 | 2082.4 | 2081.4 | 2077.9 | 2067.7 | 2068.3 | 2055.1 | 2045.5 | 2050.0 | 2037.4 |
| 5°    | 2160.4 | 2161.4 | 2156.8 | 2149.2 | 2136.1 | 2115.8 | 2097.6 | 2078.4 | 2055.6 | 2057.6 | 2037.9 |
| 7.5°  | 2264.6 | 2267.1 | 2249.9 | 2234.7 | 2208.4 | 2171.5 | 2140.1 | 2099.6 | 2065.2 | 2066.2 | 2033.8 |
| 10°   | 2380.5 | 2383.0 | 2368.3 | 2342.0 | 2299.5 | 2245.4 | 2187.2 | 2132.5 | 2079.9 | 2077.4 | 2030.3 |
| 12.5° | 2511.6 | 2514.6 | 2503.5 | 2457.9 | 2402.3 | 2327.9 | 2250.4 | 2169.5 | 2100.1 | 2093.0 | 2035.9 |
| 15°   | 2658.3 | 2663.9 | 2637.1 | 2592.0 | 2519.7 | 2420.5 | 2321.3 | 2216.0 | 2123.4 | 2112.3 | 2041.4 |
| 17.5° | 2870.4 | 2852.1 | 2832.9 | 2771.2 | 2662.4 | 2539.9 | 2400.2 | 2272.2 | 2153.8 | 2141.6 | 2051.0 |
| 20°   | 3085.4 | 3086.9 | 3067.2 | 3028.7 | 2896.2 | 2738.3 | 2524.7 | 2353.7 | 2201.9 | 2185.2 | 2081.4 |
| 22.5° | 3069.2 | 3069.7 | 3078.8 | 3096.6 | 3081.9 | 2998.9 | 2803.0 | 2536.4 | 2311.2 | 2278.8 | 2140.1 |
| 25°   | 3122.9 | 3132.0 | 3125.9 | 3112.8 | 3048.5 | 3005.5 | 2963.0 | 2765.1 | 2472.1 | 2428.1 | 2250.4 |
| 27.5° | 3250.4 | 3265.6 | 3256.0 | 3244.3 | 3171.0 | 3089.0 | 2964.5 | 2866.8 | 2636.6 | 2583.4 | 2374.4 |
| 30°   | 3387.5 | 3393.1 | 3379.4 | 3361.2 | 3308.1 | 3236.7 | 3118.3 | 2947.3 | 2804.6 | 2767.6 | 2550.5 |
| 32.5° | 3490.3 | 3491.8 | 3485.2 | 3489.3 | 3435.1 | 3387.0 | 3304.0 | 3132.5 | 2998.9 | 2986.2 | 2840.0 |
| 35°   | 3566.2 | 3582.9 | 3577.8 | 3595.5 | 3563.1 | 3538.9 | 3494.3 | 3409.8 | 3197.3 | 3147.2 | 2924.5 |
| 37.5° | 3640.6 | 3659.3 | 3674.5 | 3683.6 | 3653.2 | 3650.7 | 3642.6 | 3506.0 | 3114.3 | 3046.5 | 2792.4 |
| 40°   | 3663.8 | 3674.5 | 3737.7 | 3774.2 | 3727.6 | 3725.1 | 3708.4 | 3535.3 | 3276.2 | 3229.7 | 2970.6 |
| 42.5° | 3639.6 | 3637.5 | 3712.9 | 3740.8 | 3766.1 | 3791.9 | 3824.3 | 3758.5 | 3549.5 | 3521.6 | 3238.8 |
| 45°   | 3485.7 | 3462.4 | 3502.9 | 3647.1 | 3734.7 | 3834.4 | 3971.5 | 4001.4 | 3864.8 | 3824.3 | 3533.8 |
| 47.5° | 3288.9 | 3273.7 | 3324.3 | 3494.8 | 3650.2 | 3848.6 | 4089.4 | 4265.0 | 4182.1 | 4144.1 | 3874.4 |
| 50°   | 2979.2 | 2996.9 | 3102.1 | 3289.4 | 3512.5 | 3826.3 | 4184.6 | 4519.6 | 4543.4 | 4515.5 | 4217.5 |
| 52.5° | 2574.3 | 2587.0 | 2811.7 | 3051.5 | 3322.8 | 3684.1 | 4226.1 | 4782.2 | 4919.4 | 4903.7 | 4568.2 |
| 55°   | 2140.6 | 2178.6 | 2340.0 | 2710.4 | 3036.3 | 3506.5 | 4197.2 | 4994.3 | 5316.6 | 5289.8 | 4936.6 |
| 57.5° | 1771.7 | 1811.2 | 1922.5 | 2258.0 | 2697.8 | 3237.7 | 4089.9 | 5144.6 | 5671.4 | 5673.9 | 5280.7 |
| 60°   | 1439.7 | 1474.6 | 1556.6 | 1827.4 | 2300.5 | 2917.4 | 3875.4 | 5174.9 | 5957.8 | 5981.6 | 5530.2 |
| 62.5° | 1205.9 | 1220.1 | 1297.5 | 1490.8 | 1901.3 | 2534.3 | 3574.8 | 5037.8 | 6099.0 | 6145.6 | 5644.6 |
| 63°   | 1171.5 | 1164.9 | 1252.0 | 1437.2 | 1795.5 | 2449.3 | 3512.5 | 4985.2 | 6099.5 | 6147.6 | 5644.0 |
| 65°   | 994.4  | 1004.0 | 1060.2 | 1217.1 | 1511.6 | 2094.6 | 3155.3 | 4708.3 | 5979.6 | 6048.9 | 5517.0 |
| 67.5° | 779.8  | 788.9  | 865.9  | 993.4  | 1202.9 | 1698.3 | 2684.1 | 4219.5 | 5573.2 | 5635.4 | 5085.4 |
| 70°   | 618.4  | 622.4  | 671.5  | 787.4  | 977.2  | 1323.3 | 2109.2 | 3536.3 | 4829.8 | 4878.4 | 4308.1 |
| 72.5° | 501.5  | 514.7  | 547.0  | 617.4  | 740.4  | 1005.5 | 1591.5 | 2788.9 | 3813.6 | 3740.8 | 3167.4 |
| 75°   | 420.5  | 424.6  | 457.0  | 491.9  | 555.7  | 724.2  | 1148.2 | 2056.1 | 2600.1 | 2594.6 | 2064.2 |
| 77.5° | 355.3  | 363.3  | 370.9  | 387.6  | 424.1  | 515.2  | 806.7  | 1428.1 | 1655.8 | 1627.5 | 1190.2 |
| 80°   | 299.6  | 302.6  | 299.6  | 302.6  | 316.3  | 348.7  | 523.8  | 935.2  | 1055.6 | 981.7  | 724.2  |
| 82.5° | 209.0  | 224.2  | 226.2  | 236.3  | 241.4  | 255.1  | 350.2  | 609.3  | 672.0  | 604.2  | 426.6  |
| 85°   | 124.0  | 122.5  | 128.5  | 145.7  | 162.4  | 160.9  | 222.2  | 304.6  | 362.3  | 337.0  | 205.0  |
| 87.5° | 44.0   | 41.5   | 41.5   | 51.1   | 55.2   | 59.7   | 72.9   | 95.1   | 90.1   | 90.6   | 51.1   |
| 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-70-727-U-T2U

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 | 2032.8 |
| 2.5°  | 2030.8 | 2022.2 | 2018.2 | 2011.1 | 1999.9 | 1993.9 | 1988.3 | 1980.7 | 1978.2 | 1971.6 | 1970.6 |
| 5°    | 2023.7 | 2015.1 | 1998.4 | 1980.2 | 1965.0 | 1953.4 | 1932.1 | 1919.5 | 1907.8 | 1905.8 | 1908.8 |
| 7.5°  | 2012.6 | 2002.0 | 1975.6 | 1949.3 | 1919.5 | 1899.7 | 1872.4 | 1854.7 | 1844.6 | 1842.6 | 1846.6 |
| 10°   | 2008.0 | 1988.8 | 1950.3 | 1912.9 | 1875.4 | 1844.6 | 1814.7 | 1792.5 | 1777.8 | 1775.8 | 1771.2 |
| 12.5° | 2003.5 | 1979.2 | 1926.6 | 1879.5 | 1825.9 | 1789.9 | 1757.5 | 1739.3 | 1724.1 | 1722.1 | 1721.1 |
| 15°   | 2001.5 | 1970.6 | 1902.3 | 1839.0 | 1779.8 | 1736.8 | 1704.4 | 1689.7 | 1685.2 | 1682.1 | 1683.7 |
| 17.5° | 2004.5 | 1964.5 | 1881.0 | 1798.0 | 1730.2 | 1686.7 | 1661.4 | 1651.8 | 1650.3 | 1651.3 | 1654.8 |
| 20°   | 2020.7 | 1969.1 | 1863.3 | 1763.6 | 1686.7 | 1642.2 | 1623.4 | 1618.4 | 1618.4 | 1623.9 | 1627.5 |
| 22.5° | 2057.1 | 1993.4 | 1854.2 | 1735.8 | 1650.3 | 1608.8 | 1587.0 | 1580.9 | 1587.5 | 1597.6 | 1600.2 |
| 25°   | 2153.3 | 2063.7 | 1872.4 | 1720.1 | 1621.9 | 1572.3 | 1549.0 | 1548.0 | 1555.1 | 1564.2 | 1565.2 |
| 27.5° | 2263.1 | 2151.8 | 1914.9 | 1717.6 | 1595.6 | 1534.9 | 1510.1 | 1507.0 | 1510.6 | 1519.7 | 1519.7 |
| 30°   | 2413.9 | 2269.2 | 1979.2 | 1735.8 | 1577.4 | 1493.9 | 1464.5 | 1454.9 | 1459.0 | 1470.6 | 1467.1 |
| 32.5° | 2652.7 | 2456.4 | 2078.9 | 1767.7 | 1560.7 | 1452.9 | 1413.9 | 1405.8 | 1405.8 | 1414.9 | 1419.0 |
| 35°   | 2768.1 | 2595.1 | 2129.0 | 1755.5 | 1523.2 | 1405.3 | 1358.8 | 1347.1 | 1362.3 | 1379.5 | 1382.0 |
| 37.5° | 2650.7 | 2474.1 | 2058.6 | 1702.4 | 1470.1 | 1349.1 | 1304.6 | 1295.0 | 1308.2 | 1324.9 | 1326.9 |
| 40°   | 2791.4 | 2586.5 | 2112.8 | 1703.9 | 1436.7 | 1296.5 | 1244.4 | 1213.5 | 1215.5 | 1228.7 | 1225.7 |
| 42.5° | 3027.7 | 2778.8 | 2192.7 | 1711.0 | 1396.2 | 1239.3 | 1161.9 | 1108.3 | 1100.7 | 1102.7 | 1105.7 |
| 45°   | 3298.5 | 2995.3 | 2287.4 | 1712.5 | 1344.6 | 1169.0 | 1060.7 | 994.4  | 975.7  | 964.5  | 961.5  |
| 47.5° | 3587.9 | 3227.1 | 2390.6 | 1709.0 | 1278.3 | 1078.4 | 958.0  | 891.7  | 855.7  | 839.0  | 840.6  |
| 50°   | 3901.7 | 3467.0 | 2482.7 | 1692.3 | 1207.5 | 982.3  | 860.8  | 796.0  | 755.5  | 745.9  | 741.4  |
| 52.5° | 4198.8 | 3702.3 | 2571.3 | 1668.0 | 1128.0 | 884.1  | 769.2  | 713.5  | 679.6  | 670.5  | 668.5  |
| 55°   | 4513.0 | 3936.1 | 2645.7 | 1626.0 | 1038.4 | 791.5  | 688.7  | 651.3  | 627.5  | 621.4  | 622.4  |
| 57.5° | 4782.2 | 4142.1 | 2685.6 | 1564.7 | 952.4  | 709.5  | 630.0  | 605.2  | 590.6  | 593.6  | 595.6  |
| 60°   | 4982.6 | 4245.8 | 2677.5 | 1476.7 | 864.9  | 642.7  | 582.0  | 568.8  | 568.8  | 593.6  | 601.2  |
| 62.5° | 5013.5 | 4225.1 | 2596.1 | 1350.2 | 769.7  | 586.5  | 540.5  | 527.8  | 540.5  | 570.8  | 576.9  |
| 63°   | 4995.3 | 4190.7 | 2574.8 | 1309.2 | 755.0  | 574.4  | 531.4  | 519.2  | 536.4  | 560.7  | 560.7  |
| 65°   | 4815.6 | 4007.5 | 2386.1 | 1172.5 | 677.6  | 534.4  | 499.5  | 493.4  | 517.2  | 533.4  | 535.9  |
| 67.5° | 4375.9 | 3632.5 | 2063.2 | 970.6  | 596.6  | 488.9  | 457.5  | 468.1  | 485.8  | 498.5  | 502.5  |
| 70°   | 3678.0 | 3009.0 | 1650.8 | 780.8  | 520.2  | 441.3  | 423.6  | 430.1  | 446.3  | 457.5  | 461.5  |
| 72.5° | 2676.5 | 2267.6 | 1238.3 | 623.5  | 452.9  | 395.2  | 385.6  | 385.1  | 395.7  | 399.8  | 405.9  |
| 75°   | 1735.3 | 1517.7 | 904.3  | 503.0  | 386.6  | 348.2  | 337.5  | 334.5  | 354.7  | 362.8  | 370.9  |
| 77.5° | 1034.4 | 940.3  | 645.7  | 413.4  | 329.4  | 285.9  | 292.0  | 292.0  | 312.7  | 338.0  | 349.7  |
| 80°   | 625.5  | 574.9  | 478.7  | 343.1  | 259.1  | 233.8  | 239.9  | 243.4  | 294.0  | 342.6  | 347.2  |
| 82.5° | 377.0  | 370.4  | 355.3  | 265.7  | 200.9  | 178.6  | 190.8  | 214.1  | 276.8  | 212.0  | 244.4  |
| 85°   | 185.7  | 199.9  | 228.2  | 148.3  | 125.0  | 122.0  | 128.0  | 189.3  | 183.2  | 84.5   | 79.5   |
| 87.5° | 47.6   | 56.7   | 53.6   | 39.5   | 33.9   | 31.4   | 42.5   | 70.8   | 58.2   | 20.2   | 12.1   |
| 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

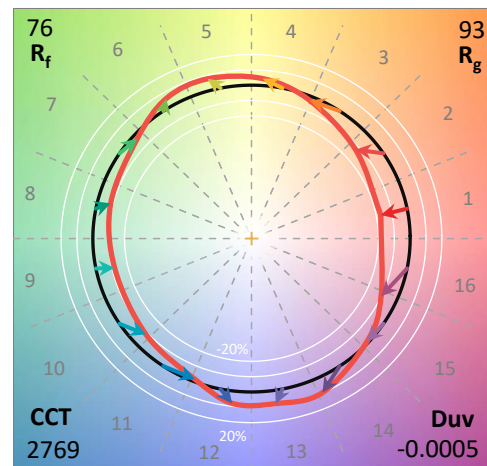
Data in this report applies to families of products including GKO-PB1E-727-U-T4W

### 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

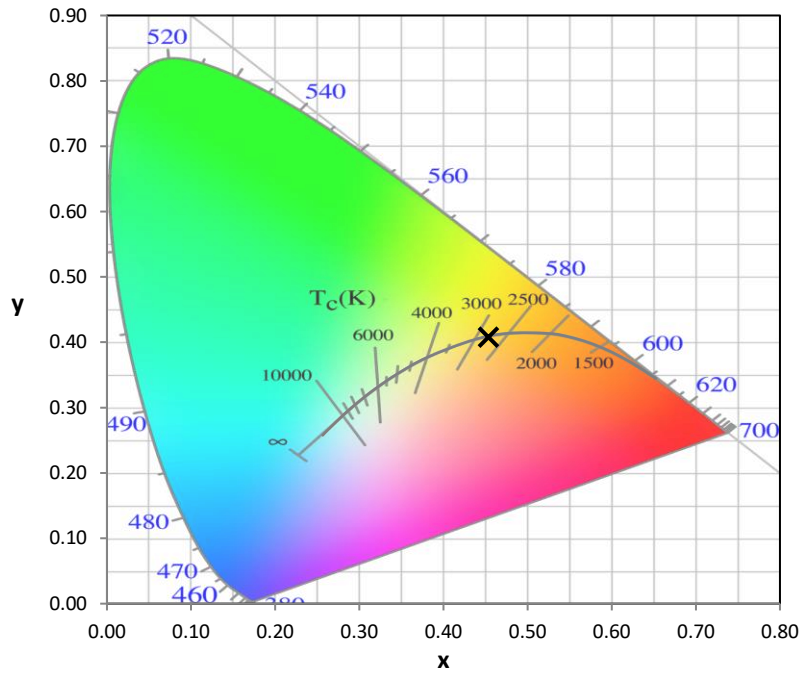
Stabilization Time: 36M  
 Operation Time: 1H 36M  
 Sphere Temperature (°C): 25.0

REPORT NUMBER: SP2-2501-321-3

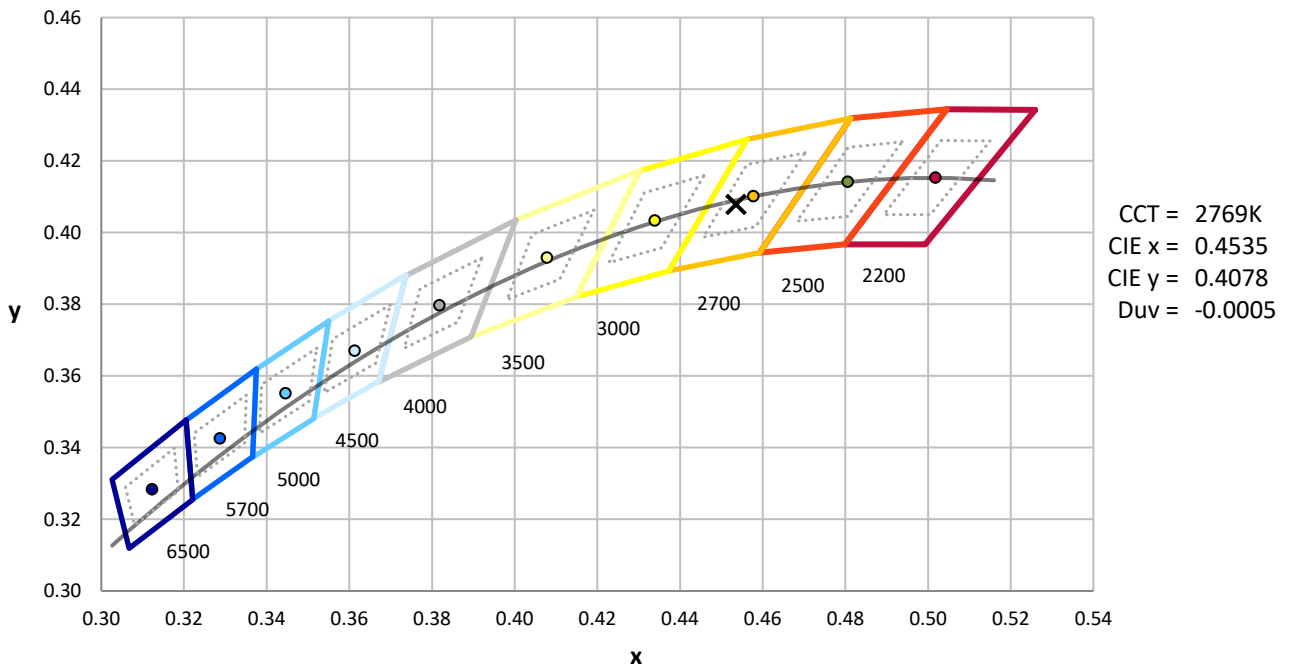
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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



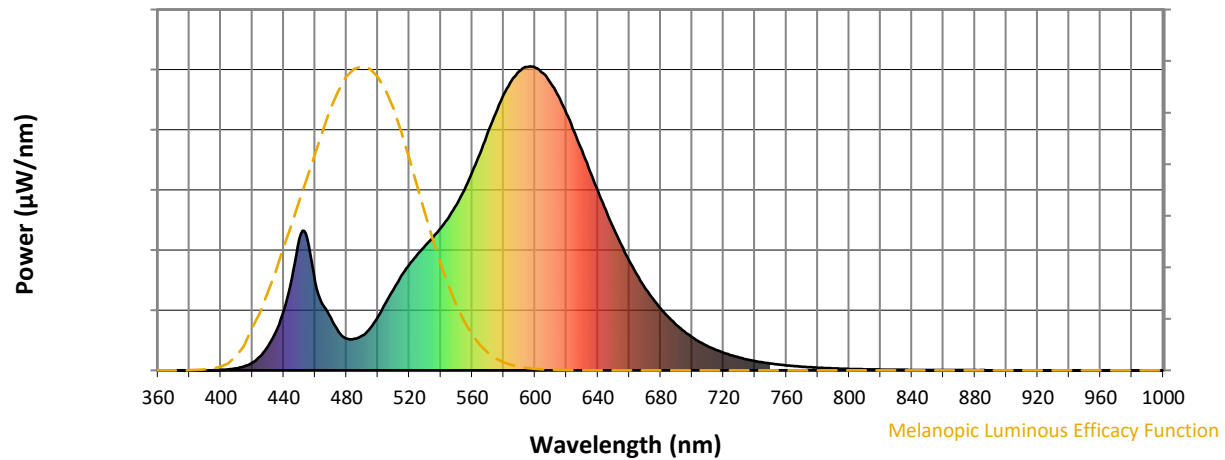
Scotopic Lumens: NR

S/P: 1.14

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (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

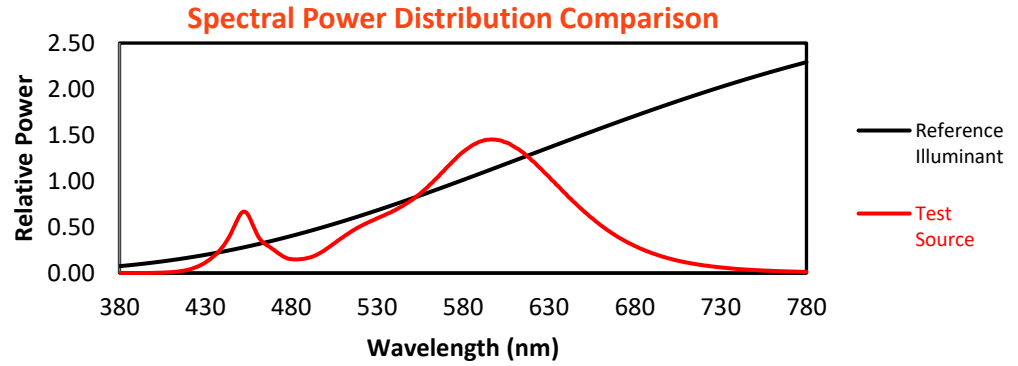
| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | 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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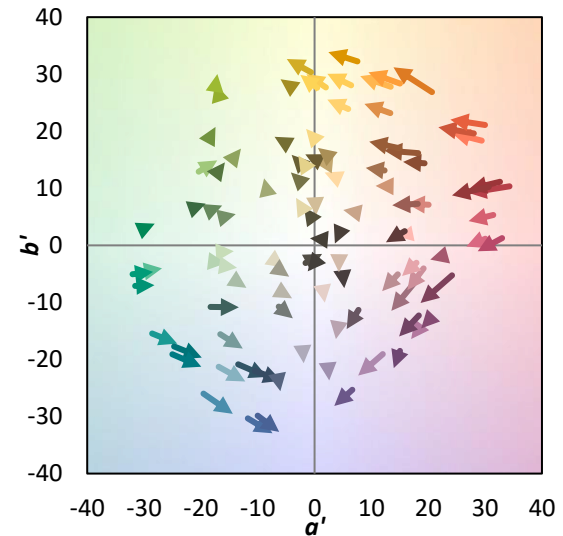
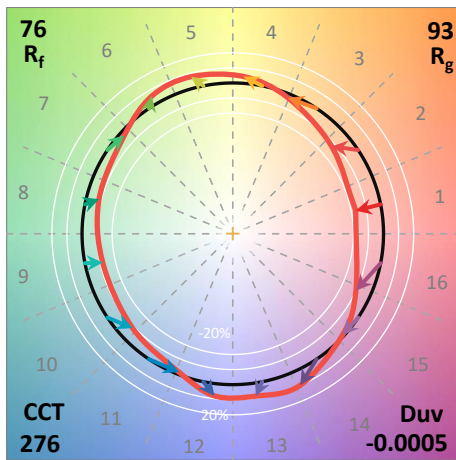
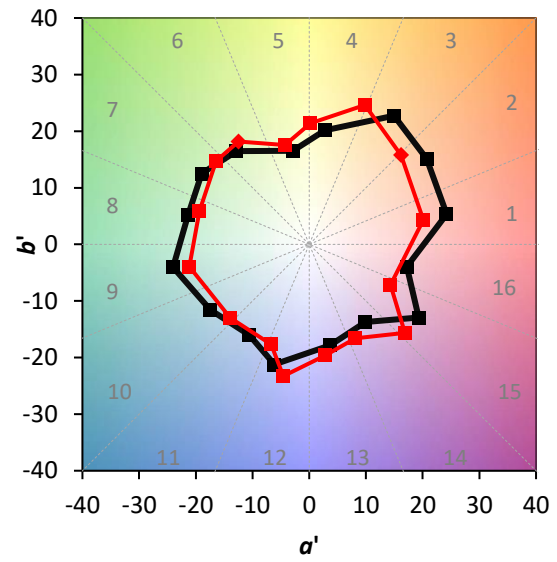
TM-30-18

### Summary

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

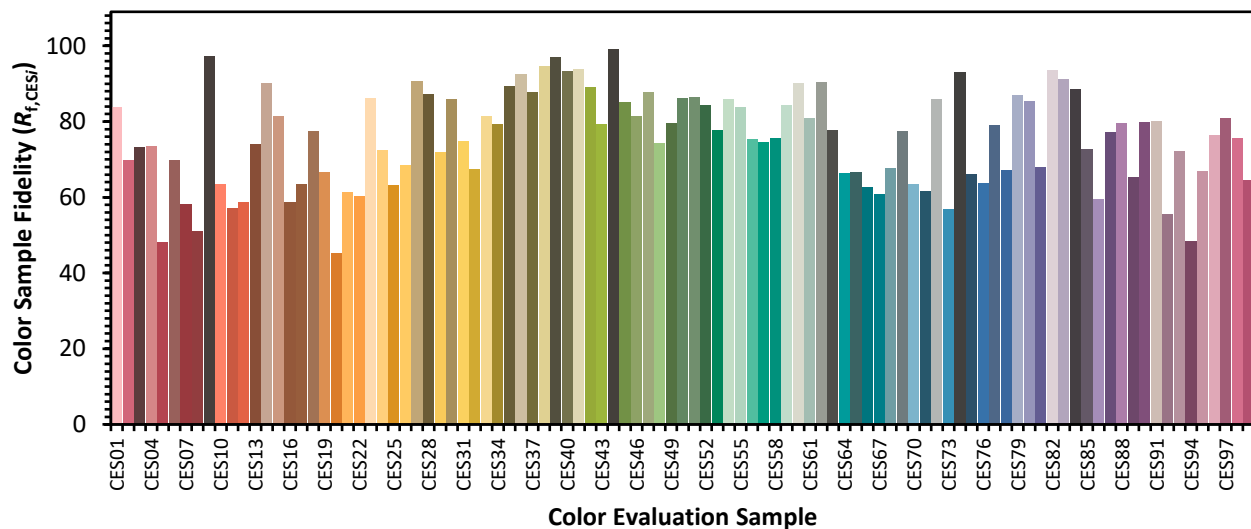


### Color Vector Graphics

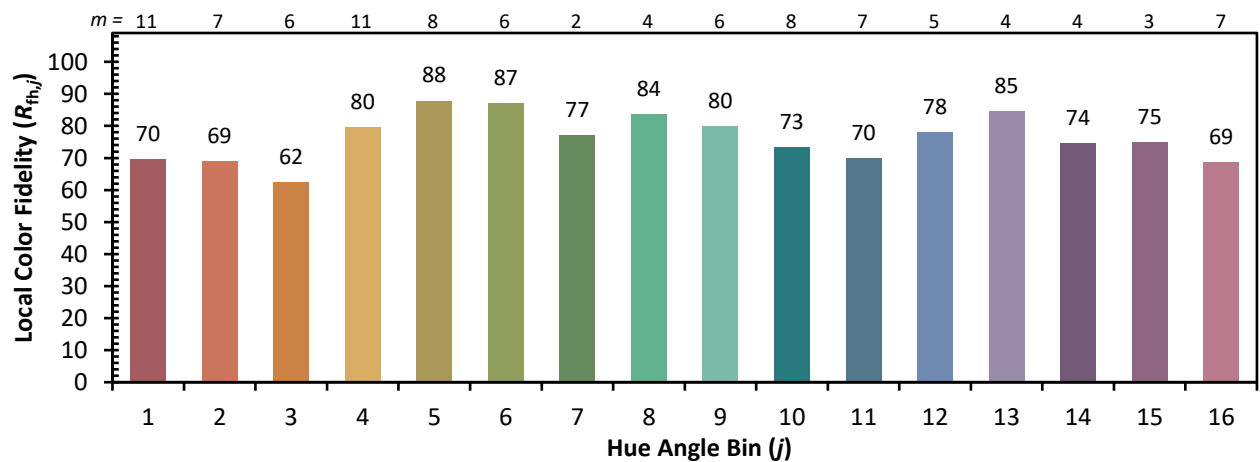
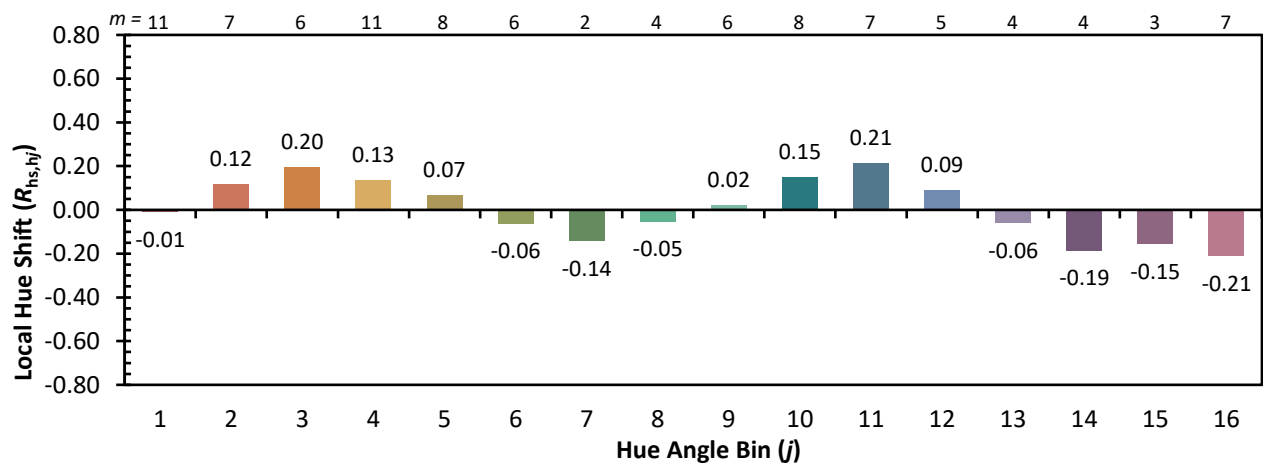


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

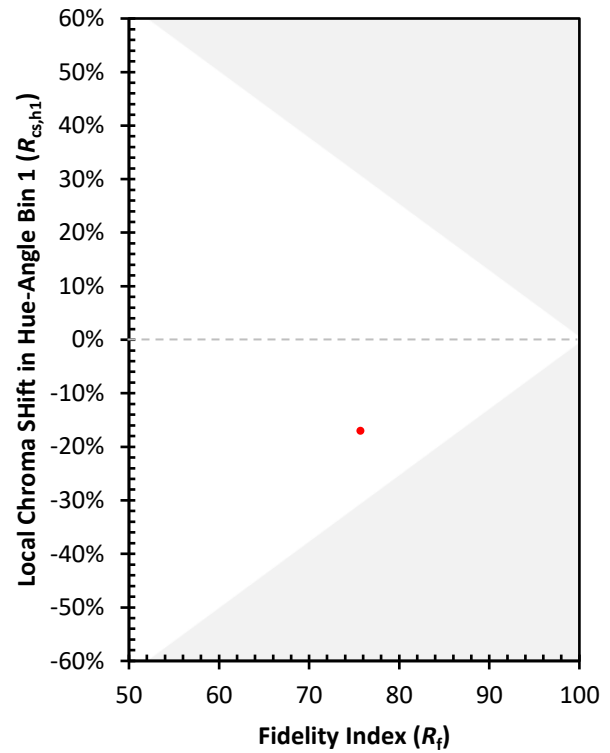
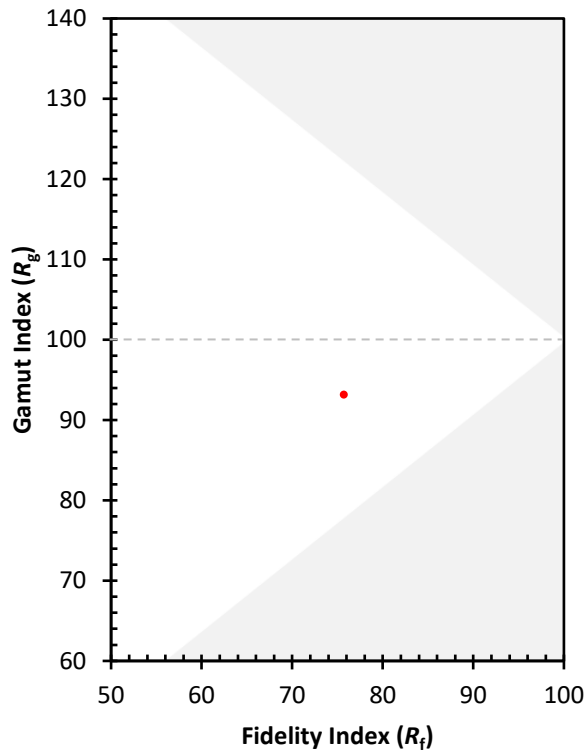
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 87 | CES76 = 64 |
| CES02 = 63 | CES27 = 91 | CES52 = 84 | CES77 = 79 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 67 |
| CES04 = 71 | CES29 = 72 | CES54 = 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)