

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: P1461388

Luminaire Tested: USSL-150-727-U-T2U-HSS

Issue Date: 06/10/2026

**Test Information**

Test Method: LM-79-2024  
Report Number: P1461388  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 6/11/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: USSL-150-727-U-T2U-HSS  
Description: USSL DISCRETE LED 1 SQUARE 150W 70CRI 2700K FIXTURE w/ TYPE II URBAN  
DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD  
Light Source: (40) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 13525.9 lumens  
Efficiency: N/A  
Efficacy: 89.0 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

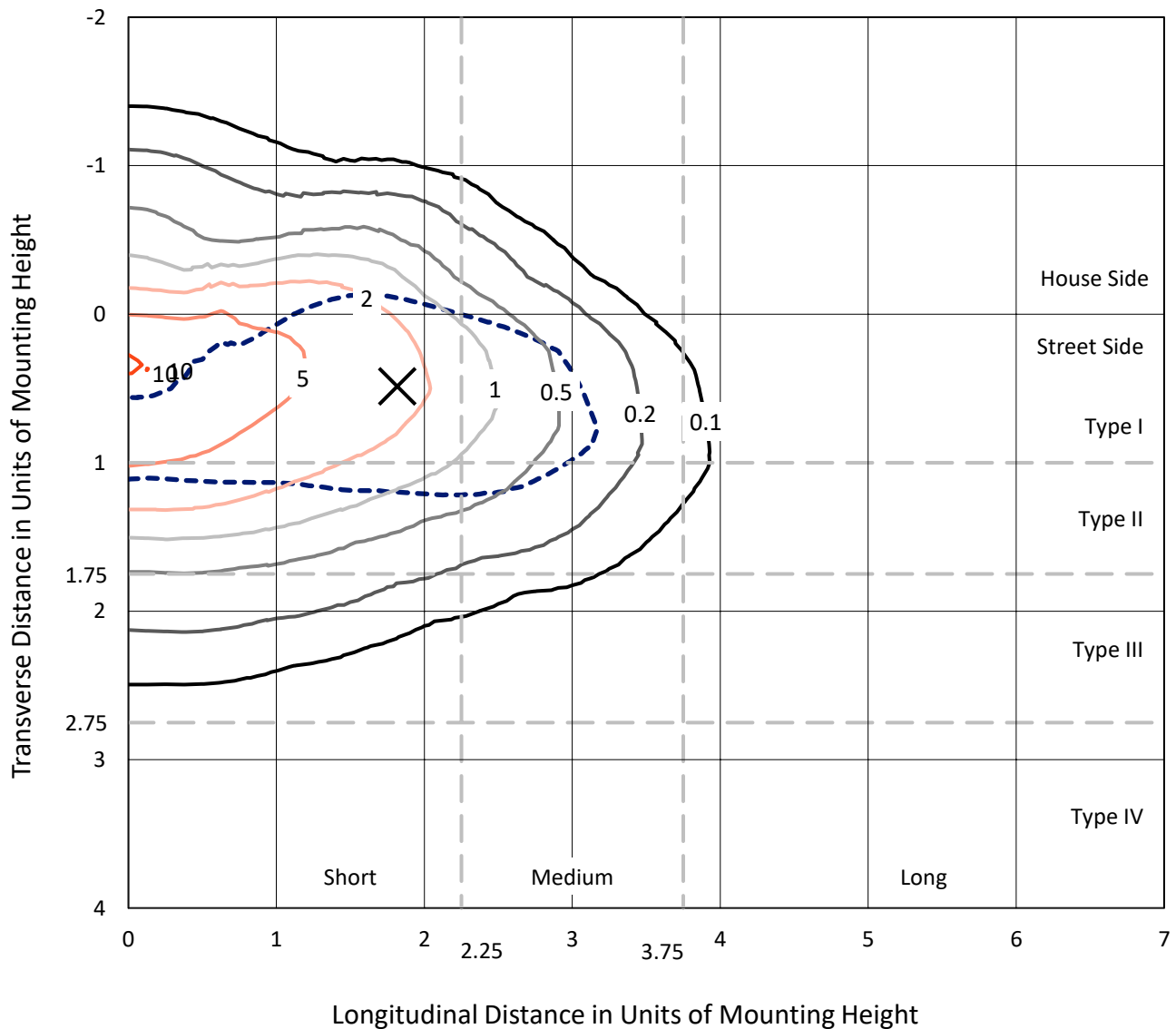
Input Watts (W): 152  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.98  
Total Harmonic Distortion (THDi): 2.75%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
- - - 1/2 Max cd

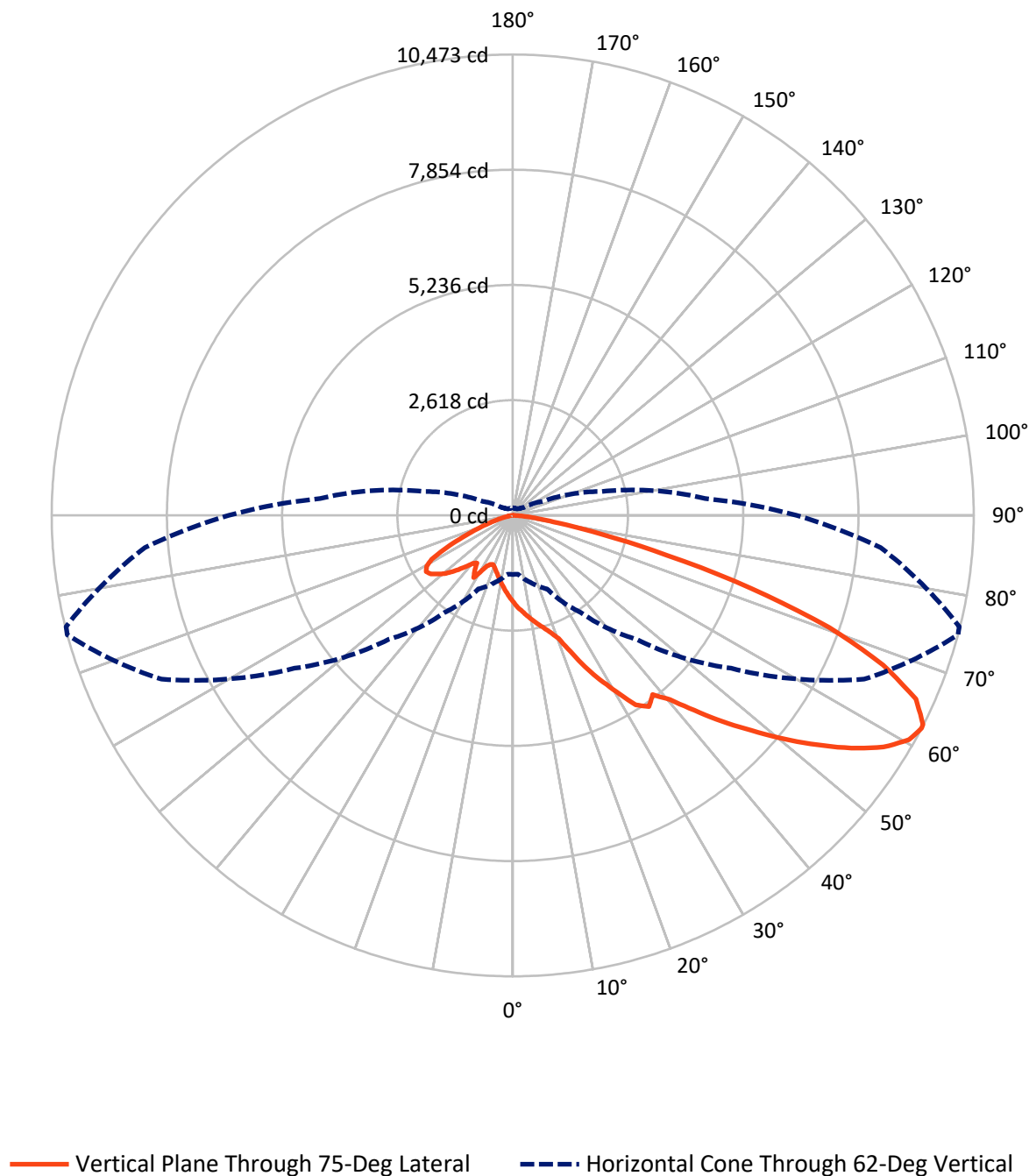


Based on 20 foot mounting height. Maximum calculated value = 10.3 fc  
Type II - Short - N/A

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## Luminous Intensity Polar Plot



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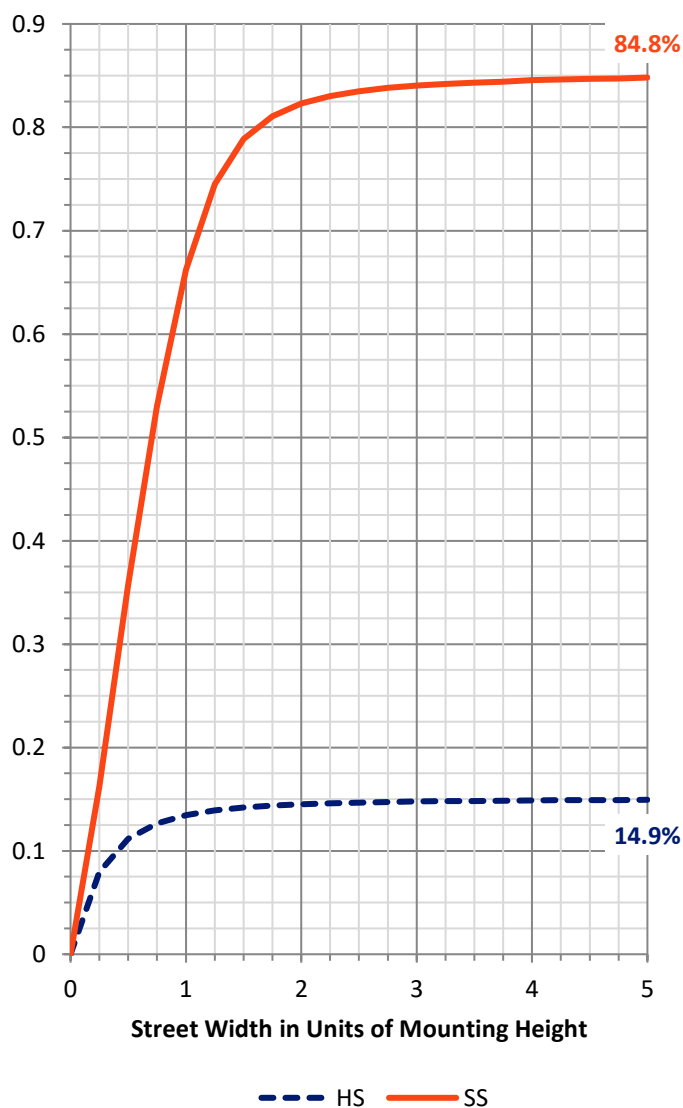
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2039.0   | 0.0    | 2039.0  |
|                    | % Fixture | 15.1     | 0.0    | 15.1    |
| <b>Street Side</b> | Lumens    | 11486.8  | 0.0    | 11486.8 |
|                    | % Fixture | 84.9     | 0.0    | 84.9    |
| <b>Total</b>       | Lumens    | 13525.9  | 0.0    | 13525.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 194.0   | 1.4       |
| 10°-20°   | 655.0   | 4.8       |
| 20°-30°   | 1239.3  | 9.2       |
| 30°-40°   | 1999.5  | 14.8      |
| 40°-50°   | 2781.8  | 20.6      |
| 50°-60°   | 3158.7  | 23.4      |
| 60°-70°   | 2478.0  | 18.3      |
| 70°-80°   | 901.7   | 6.7       |
| 80°-90°   | 117.8   | 0.9       |
| 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°    | 13525.9 | 100.0     |
| 0°-180°   | 13525.9 | 100.0     |

**Coefficient of Utilization**



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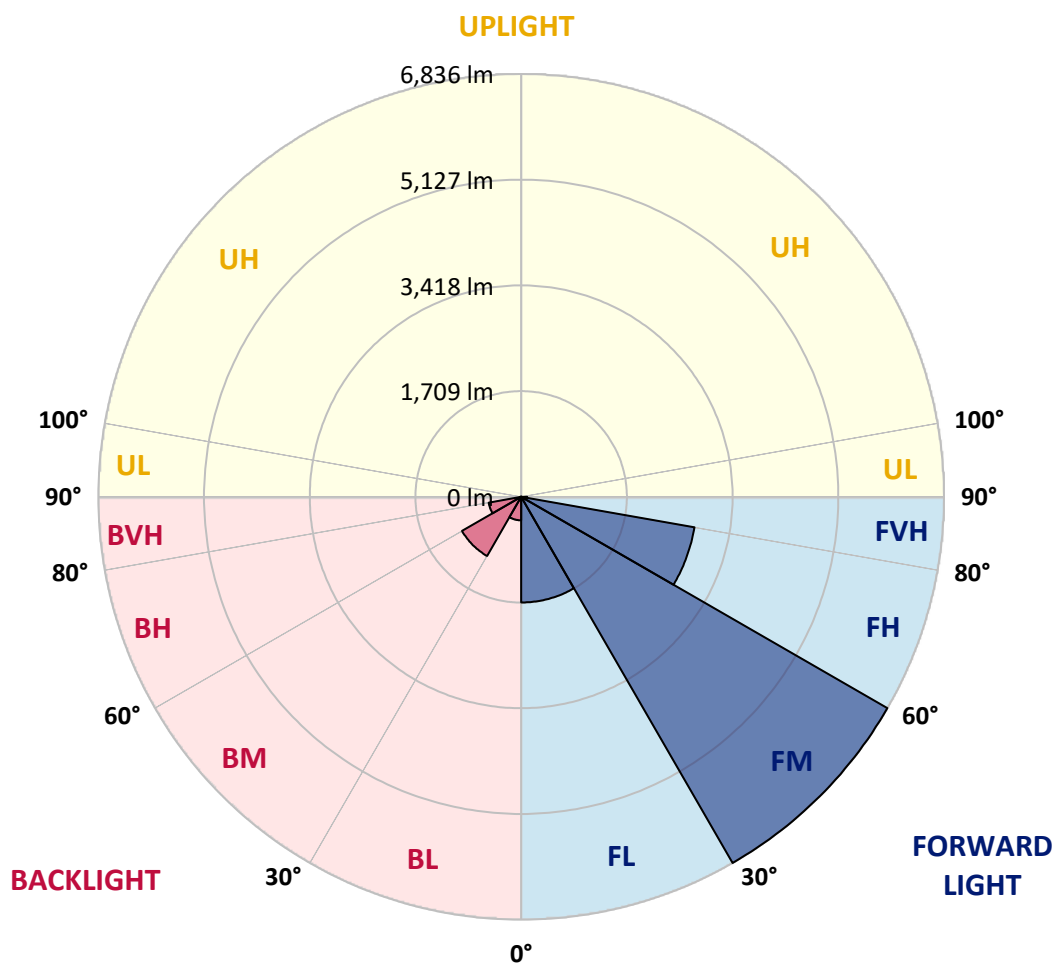
CATALOG NUMBER: USSL-150-727-U-T2U-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1708.0 | 12.6      |                         |      |         |
| FM   | (30°-60°)   | 6836.4 | 50.5      |                         |      |         |
| FH   | (60°-80°)   | 2846.0 | 21.0      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 96.5   | 0.7       |                         |      | G1/100  |
| BL   | (0°-30°)    | 380.3  | 2.8       | B1/500                  |      |         |
| BM   | (30°-60°)   | 1103.7 | 8.2       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 533.8  | 3.9       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 21.3   | 0.2       |                         |      | 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°     | 76°     | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|
| 0°    | 1967.6 | 1967.6 | 1967.6 | 1967.6 | 1967.6 | 1967.6 | 1967.6 | 1967.6 | 1967.6  | 1967.6  | 1967.6 |
| 2.5°  | 2398.9 | 2389.7 | 2380.5 | 2362.1 | 2331.7 | 2268.3 | 2208.5 | 2154.3 | 2084.4  | 2069.7  | 2009.9 |
| 5°    | 2826.4 | 2832.8 | 2788.7 | 2758.4 | 2678.4 | 2573.6 | 2462.3 | 2328.1 | 2181.9  | 2170.8  | 2042.1 |
| 7.5°  | 3294.4 | 3295.3 | 3235.6 | 3174.0 | 3055.4 | 2888.0 | 2698.6 | 2505.5 | 2294.0  | 2269.2  | 2072.5 |
| 10°   | 3777.1 | 3737.6 | 3707.2 | 3616.2 | 3448.9 | 3212.6 | 2969.8 | 2694.0 | 2407.1  | 2371.3  | 2110.2 |
| 12.5° | 4111.8 | 4098.0 | 4048.4 | 3944.5 | 3796.4 | 3560.1 | 3253.0 | 2885.3 | 2527.6  | 2479.8  | 2155.2 |
| 15°   | 4502.6 | 4458.4 | 4380.3 | 4266.3 | 4104.5 | 3859.9 | 3524.3 | 3104.1 | 2650.8  | 2602.1  | 2208.5 |
| 17.5° | 4904.4 | 4859.3 | 4822.6 | 4704.9 | 4509.0 | 4171.6 | 3801.0 | 3345.0 | 2797.9  | 2733.5  | 2270.1 |
| 20°   | 5059.8 | 5041.4 | 5057.9 | 5041.4 | 4939.3 | 4698.4 | 4234.1 | 3623.6 | 2984.6  | 2909.2  | 2365.8 |
| 22.5° | 4866.7 | 4854.7 | 4918.2 | 4998.2 | 5057.9 | 5042.3 | 4767.4 | 4185.4 | 3356.0  | 3255.8  | 2552.4 |
| 25°   | 4826.2 | 4825.3 | 4860.2 | 4905.3 | 4910.8 | 4956.8 | 4971.5 | 4646.9 | 3803.8  | 3688.9  | 2849.4 |
| 27.5° | 4983.5 | 4949.4 | 4968.7 | 5033.1 | 5042.3 | 5047.8 | 4966.0 | 4812.4 | 4224.9  | 4123.8  | 3184.1 |
| 30°   | 5214.2 | 5178.4 | 5160.0 | 5186.7 | 5208.7 | 5264.8 | 5240.0 | 5026.7 | 4648.8  | 4582.6  | 3722.9 |
| 32.5° | 5578.3 | 5537.9 | 5468.9 | 5422.0 | 5381.6 | 5496.5 | 5572.8 | 5480.9 | 5134.2  | 5061.6  | 4268.1 |
| 35°   | 5895.6 | 5879.0 | 5840.4 | 5742.9 | 5649.1 | 5742.0 | 5984.7 | 5993.9 | 5335.6  | 5223.4  | 4192.7 |
| 37.5° | 6210.9 | 6181.5 | 6170.5 | 6099.7 | 5981.1 | 5948.9 | 6152.1 | 5991.2 | 5164.6  | 5038.6  | 3947.2 |
| 40°   | 6360.8 | 6335.1 | 6419.6 | 6419.6 | 6267.0 | 6151.2 | 6238.5 | 6087.7 | 5499.3  | 5407.3  | 4309.5 |
| 42.5° | 6324.9 | 6305.6 | 6415.0 | 6456.4 | 6452.7 | 6395.7 | 6498.7 | 6510.7 | 6051.9  | 5951.6  | 4866.7 |
| 45°   | 5953.5 | 5878.1 | 6012.3 | 6312.1 | 6461.0 | 6556.6 | 6827.9 | 7023.7 | 6679.9  | 6567.7  | 5451.5 |
| 47.5° | 5426.6 | 5359.5 | 5566.4 | 5994.9 | 6320.3 | 6630.2 | 7085.3 | 7511.0 | 7302.3  | 7192.9  | 6087.7 |
| 50°   | 4549.5 | 4598.2 | 4958.6 | 5496.5 | 6036.2 | 6598.9 | 7282.1 | 7967.1 | 7981.8  | 7868.7  | 6750.7 |
| 52.5° | 3609.8 | 3655.8 | 4237.8 | 4867.6 | 5631.7 | 6358.0 | 7363.0 | 8448.9 | 8662.2  | 8559.2  | 7385.1 |
| 55°   | 2714.2 | 2786.0 | 3278.8 | 4077.8 | 4968.7 | 5971.9 | 7287.6 | 8821.3 | 9334.3  | 9276.4  | 7961.6 |
| 57.5° | 2073.4 | 2125.8 | 2463.2 | 3201.5 | 4116.4 | 5425.7 | 7030.2 | 9050.2 | 9933.8  | 9875.9  | 8349.6 |
| 60°   | 1588.8 | 1616.4 | 1908.8 | 2347.4 | 3309.1 | 4680.0 | 6580.6 | 9033.7 | 10345.7 | 10304.4 | 8487.5 |
| 62°   | 1339.6 | 1340.6 | 1579.6 | 1843.5 | 2691.3 | 3984.0 | 6055.5 | 8805.6 | 10472.6 | 10456.1 | 8388.2 |
| 62.5° | 1280.8 | 1315.7 | 1514.3 | 1752.5 | 2503.7 | 3806.6 | 5871.7 | 8699.9 | 10459.7 | 10444.1 | 8326.6 |
| 65°   | 1018.8 | 1045.4 | 1193.5 | 1338.7 | 1902.4 | 2792.4 | 4882.3 | 8000.2 | 10066.2 | 10066.2 | 7883.4 |
| 67.5° | 828.4  | 833.0  | 943.4  | 1028.9 | 1385.6 | 1895.9 | 3617.1 | 6966.7 | 9079.6  | 9134.8  | 7108.3 |
| 70°   | 631.7  | 644.5  | 703.4  | 781.5  | 1001.3 | 1346.1 | 2441.2 | 5521.3 | 7628.7  | 7549.7  | 5913.9 |
| 72.5° | 500.2  | 500.2  | 530.5  | 563.6  | 701.5  | 950.7  | 1672.5 | 4003.3 | 5658.3  | 5604.1  | 4345.4 |
| 75°   | 410.1  | 412.8  | 419.3  | 415.6  | 480.0  | 651.0  | 1095.1 | 2477.9 | 3622.7  | 3610.7  | 2637.0 |
| 77.5° | 308.0  | 311.7  | 332.8  | 327.3  | 325.5  | 401.8  | 692.4  | 1343.3 | 2056.8  | 2053.1  | 1381.9 |
| 80°   | 233.5  | 233.5  | 241.8  | 239.1  | 228.9  | 251.9  | 419.3  | 729.1  | 1047.3  | 1055.5  | 736.5  |
| 82.5° | 166.4  | 166.4  | 177.5  | 174.7  | 163.7  | 172.9  | 239.1  | 401.8  | 559.9   | 546.2   | 421.1  |
| 85°   | 93.8   | 96.5   | 99.3   | 106.7  | 103.9  | 108.5  | 140.7  | 199.5  | 275.8   | 288.7   | 234.5  |
| 87.5° | 46.0   | 50.6   | 51.5   | 56.1   | 54.2   | 56.1   | 65.3   | 88.3   | 81.8    | 81.8    | 60.7   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0    |

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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1967.6 | 1967.6 | 1967.6 | 1967.6 | 1967.6 | 1967.6 | 1967.6 | 1967.6 | 1967.6 | 1967.6 | 1967.6 |
| 2.5°  | 1971.3 | 1929.9 | 1864.7 | 1792.9 | 1729.5 | 1683.5 | 1621.9 | 1582.4 | 1554.8 | 1548.4 | 1586.1 |
| 5°    | 1969.5 | 1895.0 | 1756.2 | 1629.3 | 1512.5 | 1419.6 | 1333.2 | 1267.0 | 1224.7 | 1199.0 | 1222.0 |
| 7.5°  | 1963.0 | 1861.9 | 1653.2 | 1468.4 | 1306.5 | 1181.5 | 1076.7 | 1013.2 | 963.6  | 948.0  | 939.7  |
| 10°   | 1972.2 | 1829.7 | 1559.4 | 1317.6 | 1132.8 | 976.5  | 884.5  | 828.4  | 798.1  | 773.3  | 778.8  |
| 12.5° | 1977.8 | 1799.4 | 1469.3 | 1193.5 | 975.5  | 835.8  | 754.9  | 714.4  | 692.4  | 681.3  | 674.9  |
| 15°   | 1984.2 | 1776.4 | 1381.0 | 1062.0 | 844.1  | 731.9  | 667.5  | 636.3  | 616.0  | 612.4  | 605.9  |
| 17.5° | 2014.5 | 1762.6 | 1304.7 | 953.5  | 742.9  | 646.4  | 600.4  | 576.5  | 562.7  | 559.9  | 557.2  |
| 20°   | 2065.1 | 1772.7 | 1242.2 | 862.5  | 666.6  | 586.6  | 547.1  | 529.6  | 522.3  | 519.5  | 517.7  |
| 22.5° | 2190.1 | 1825.1 | 1200.8 | 789.8  | 605.9  | 535.1  | 504.8  | 493.7  | 489.2  | 487.3  | 485.5  |
| 25°   | 2426.4 | 1996.1 | 1223.8 | 742.9  | 562.7  | 489.2  | 468.0  | 462.5  | 457.9  | 457.0  | 457.0  |
| 27.5° | 2683.0 | 2177.3 | 1295.5 | 739.2  | 533.3  | 456.1  | 436.7  | 433.1  | 431.2  | 431.2  | 431.2  |
| 30°   | 3154.7 | 2518.4 | 1452.7 | 815.6  | 538.8  | 429.4  | 408.2  | 406.4  | 408.2  | 411.0  | 411.0  |
| 32.5° | 3625.4 | 2933.1 | 1667.9 | 887.3  | 550.8  | 407.3  | 383.4  | 383.4  | 388.0  | 393.5  | 393.5  |
| 35°   | 3596.9 | 2900.9 | 1523.5 | 770.5  | 486.4  | 380.7  | 360.4  | 361.3  | 371.5  | 377.0  | 377.0  |
| 37.5° | 3301.8 | 2603.9 | 1351.6 | 676.7  | 446.9  | 360.4  | 339.3  | 341.1  | 352.2  | 358.6  | 359.5  |
| 40°   | 3551.9 | 2782.3 | 1413.2 | 690.5  | 433.1  | 345.7  | 320.9  | 323.6  | 332.8  | 338.4  | 337.4  |
| 42.5° | 4013.4 | 3107.8 | 1546.5 | 716.3  | 422.0  | 333.8  | 306.2  | 306.2  | 311.7  | 315.4  | 314.5  |
| 45°   | 4507.2 | 3477.4 | 1708.4 | 738.3  | 410.1  | 323.6  | 294.2  | 289.6  | 291.5  | 292.4  | 290.5  |
| 47.5° | 5054.3 | 3904.0 | 1873.9 | 765.9  | 399.0  | 314.5  | 278.6  | 273.1  | 271.2  | 268.5  | 270.3  |
| 50°   | 5613.3 | 4292.0 | 2035.7 | 784.3  | 388.9  | 302.5  | 264.8  | 254.7  | 250.1  | 246.4  | 245.5  |
| 52.5° | 6168.6 | 4737.0 | 2164.4 | 795.3  | 377.9  | 288.7  | 249.2  | 235.4  | 228.9  | 223.4  | 221.6  |
| 55°   | 6651.4 | 5079.1 | 2289.4 | 800.8  | 365.9  | 274.0  | 231.7  | 215.2  | 204.1  | 197.7  | 196.8  |
| 57.5° | 6908.8 | 5191.3 | 2343.7 | 800.8  | 352.2  | 257.4  | 214.2  | 194.9  | 187.6  | 182.1  | 181.1  |
| 60°   | 6808.6 | 4912.7 | 2263.7 | 789.8  | 332.8  | 238.1  | 194.9  | 180.2  | 175.6  | 178.4  | 178.4  |
| 62°   | 6449.1 | 4388.6 | 2094.5 | 756.7  | 313.5  | 217.9  | 182.1  | 170.1  | 167.3  | 171.0  | 172.9  |
| 62.5° | 6331.4 | 4242.4 | 2010.9 | 745.7  | 307.1  | 214.2  | 179.3  | 166.4  | 165.5  | 169.2  | 168.3  |
| 65°   | 5535.1 | 3318.3 | 1581.5 | 662.9  | 276.8  | 194.0  | 164.6  | 156.3  | 160.9  | 160.9  | 160.0  |
| 67.5° | 4681.0 | 2544.1 | 1148.4 | 553.5  | 246.4  | 176.5  | 149.9  | 149.9  | 149.0  | 146.2  | 145.3  |
| 70°   | 3679.7 | 1872.9 | 798.1  | 423.0  | 211.5  | 158.1  | 136.1  | 132.4  | 128.7  | 126.9  | 127.8  |
| 72.5° | 2529.4 | 1319.4 | 527.8  | 315.4  | 171.0  | 132.4  | 117.7  | 112.2  | 107.6  | 104.8  | 103.9  |
| 75°   | 1506.1 | 806.4  | 351.2  | 211.5  | 130.6  | 111.3  | 96.5   | 90.1   | 87.3   | 82.8   | 82.8   |
| 77.5° | 825.7  | 486.4  | 205.0  | 145.3  | 103.0  | 91.9   | 79.1   | 69.9   | 70.8   | 67.1   | 67.1   |
| 80°   | 439.5  | 254.7  | 126.9  | 98.4   | 78.2   | 75.4   | 65.3   | 57.9   | 56.1   | 47.8   | 46.0   |
| 82.5° | 261.1  | 143.4  | 80.0   | 67.1   | 57.0   | 57.9   | 51.5   | 45.1   | 39.5   | 16.6   | 12.9   |
| 85°   | 149.0  | 70.8   | 37.7   | 33.1   | 28.5   | 34.0   | 30.3   | 23.0   | 14.7   | 2.8    | 3.7    |
| 87.5° | 45.1   | 14.7   | 10.1   | 10.1   | 9.2    | 8.3    | 6.4    | 4.6    | 3.7    | 0.0    | 0.0    |
| 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

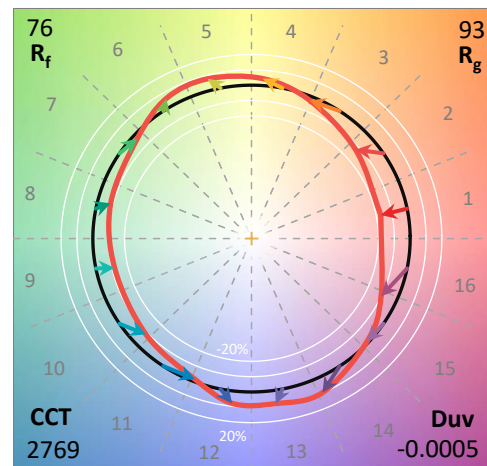
Data in this report applies to families of products including GKO-PB1E-727-U-T4W

### 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

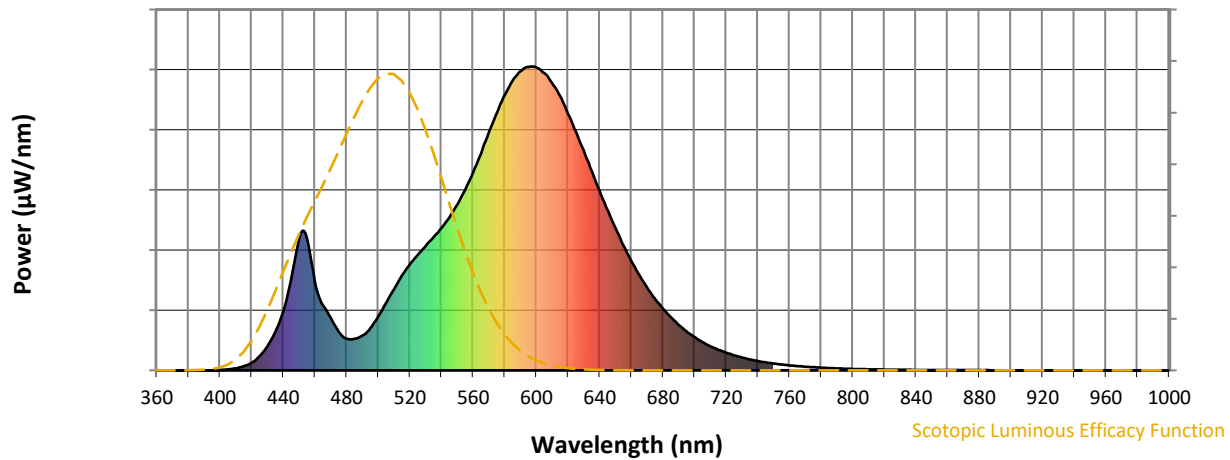


### Photopic Lumens: NR

| $\lambda$<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



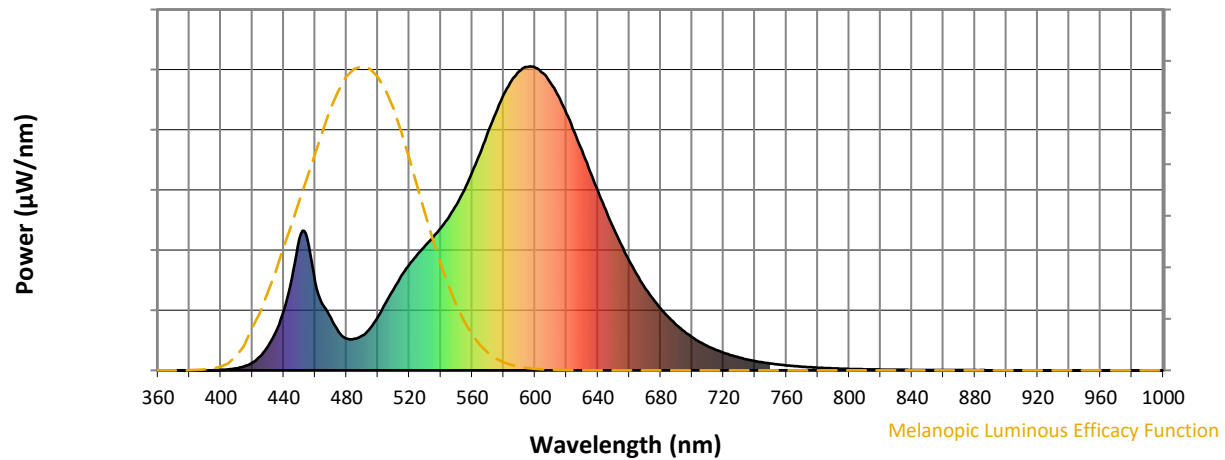
Scotopic Lumens: NR

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

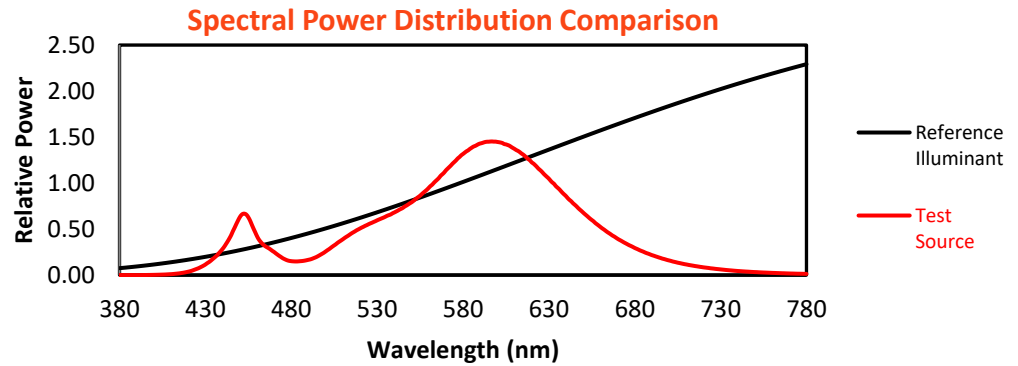
| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm)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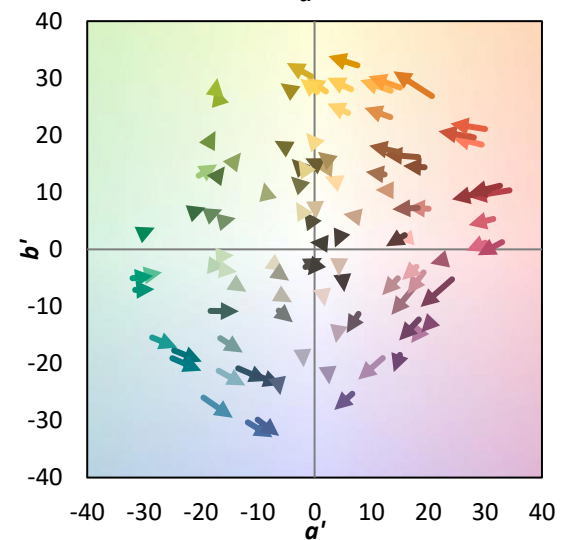
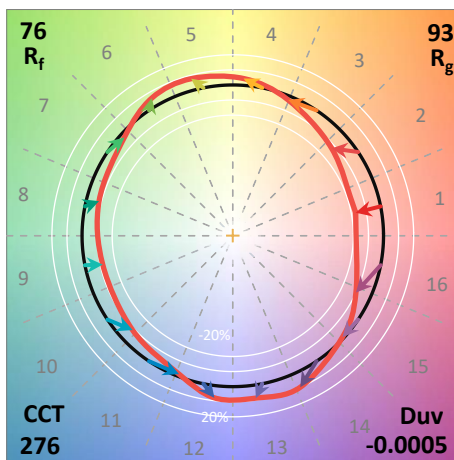
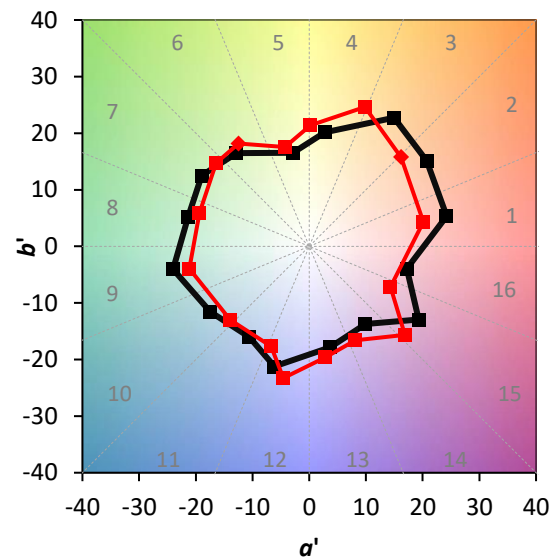
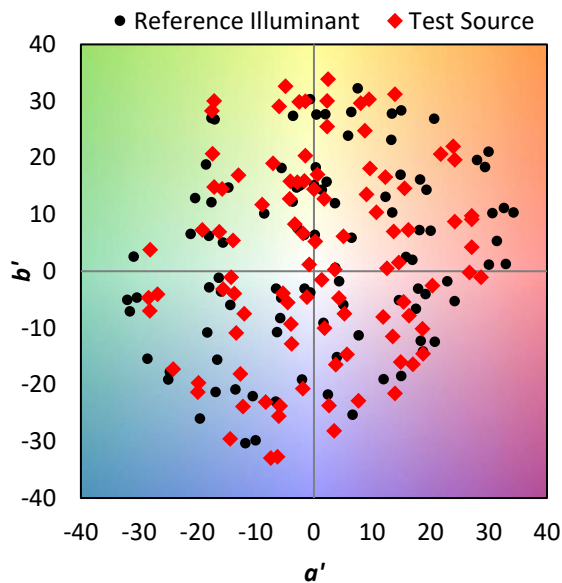
TM-30-18

### Summary

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

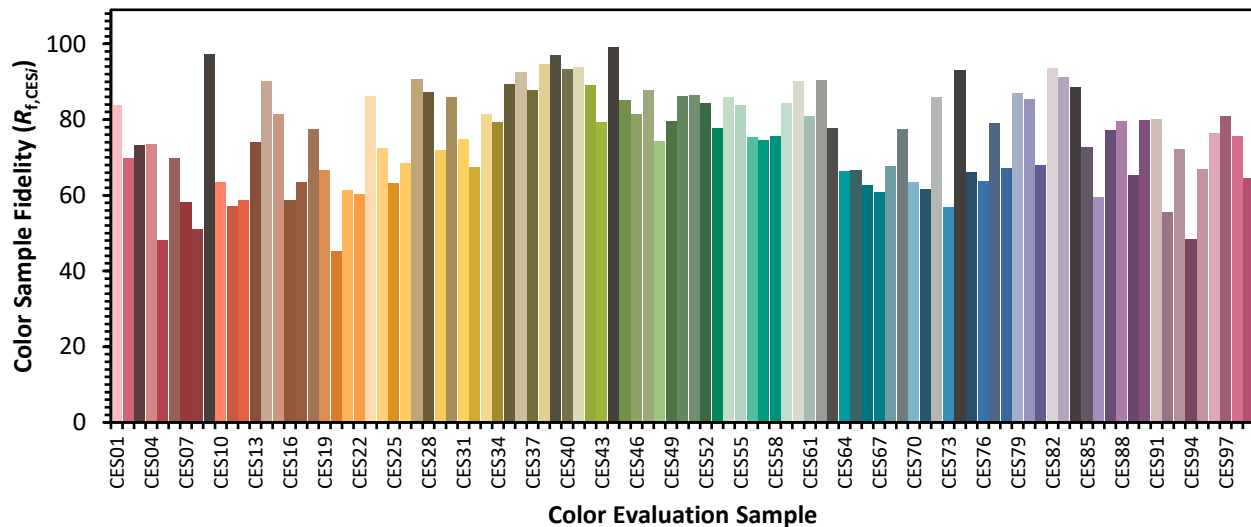


### Color Vector Graphics

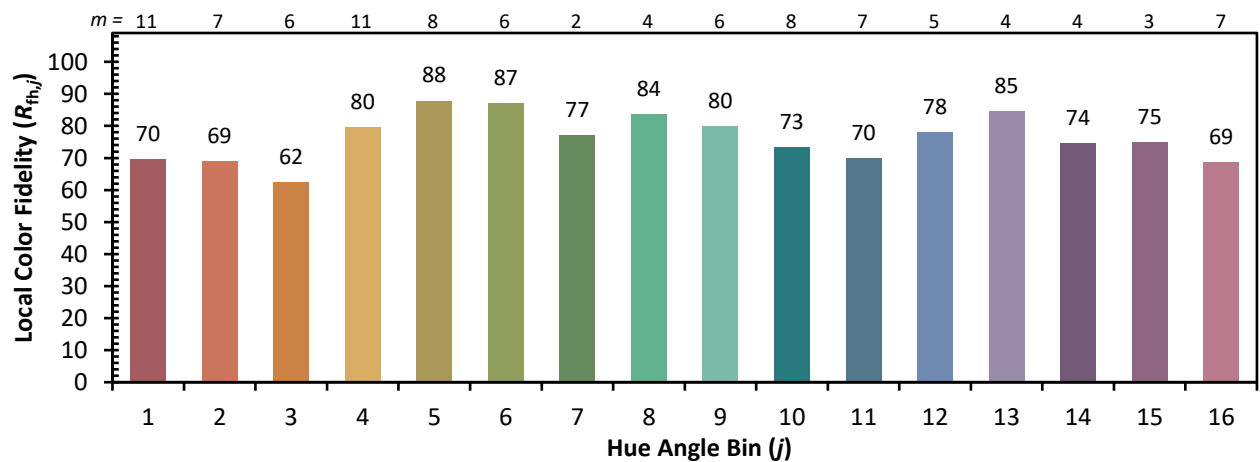


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

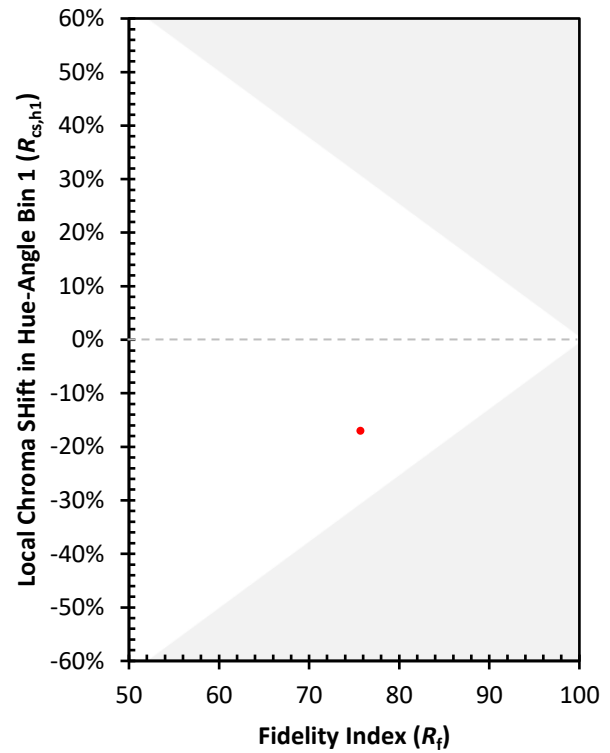
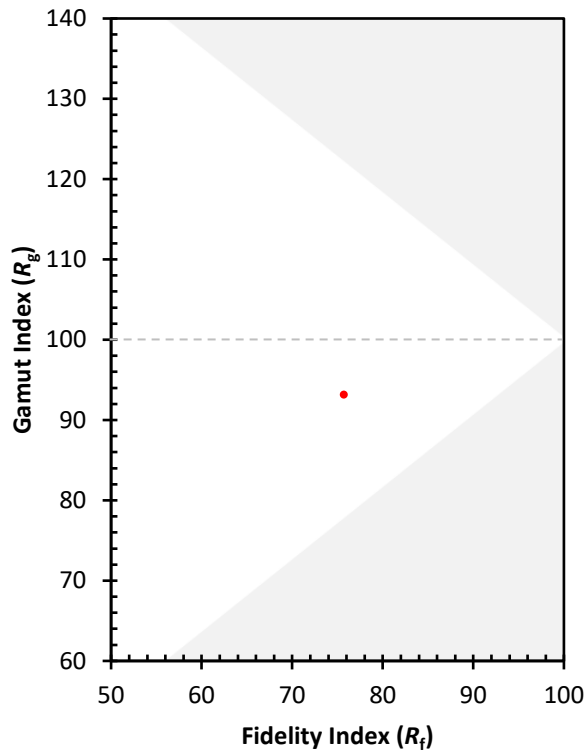
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 87 | CES76 = 64 |
| CES02 = 63 | CES27 = 91 | CES52 = 84 | CES77 = 79 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 67 |
| CES04 = 71 | CES29 = 72 | CES54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