

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P643369

Luminaire Tested: GWS-SA6E-827-U-SL3-W-GRSWH

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P643369  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-33)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SAGE-827-U-SL3-W-GRSWH  
Description: GALLEON WALL SLIM LUMINAIRE. (6) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III SPILL LIGHT ELIMINATOR OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH  
Light Source: (96) 2700K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

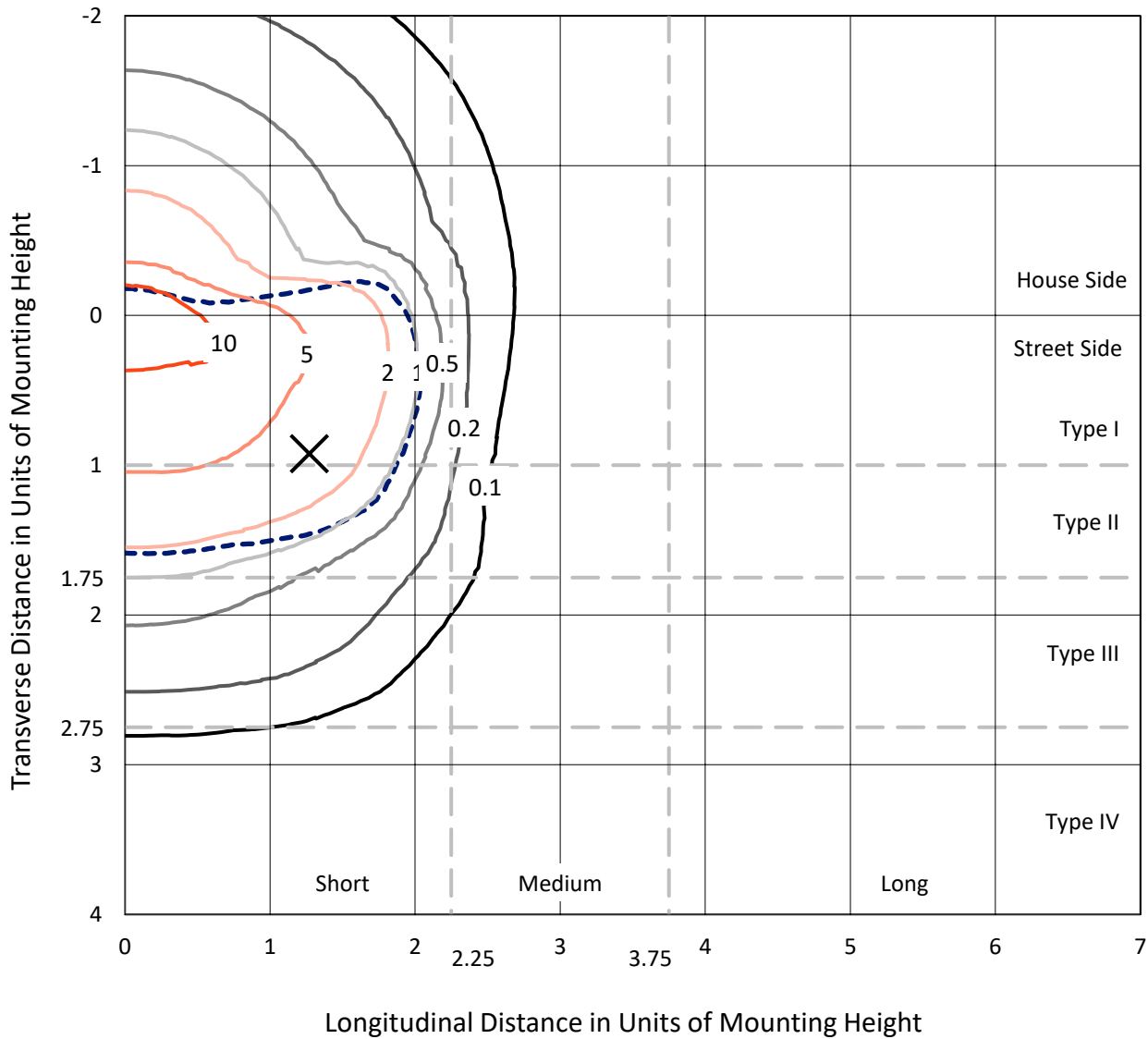
Lumens per Lamp: N/A  
Luminaire Lumens: 27558 lumens  
Efficiency: N/A  
Efficacy: 85.1 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G3  
  
Input Watts (W): 323.8  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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### Iso-Footcandle Lines of Horizontal Illumination

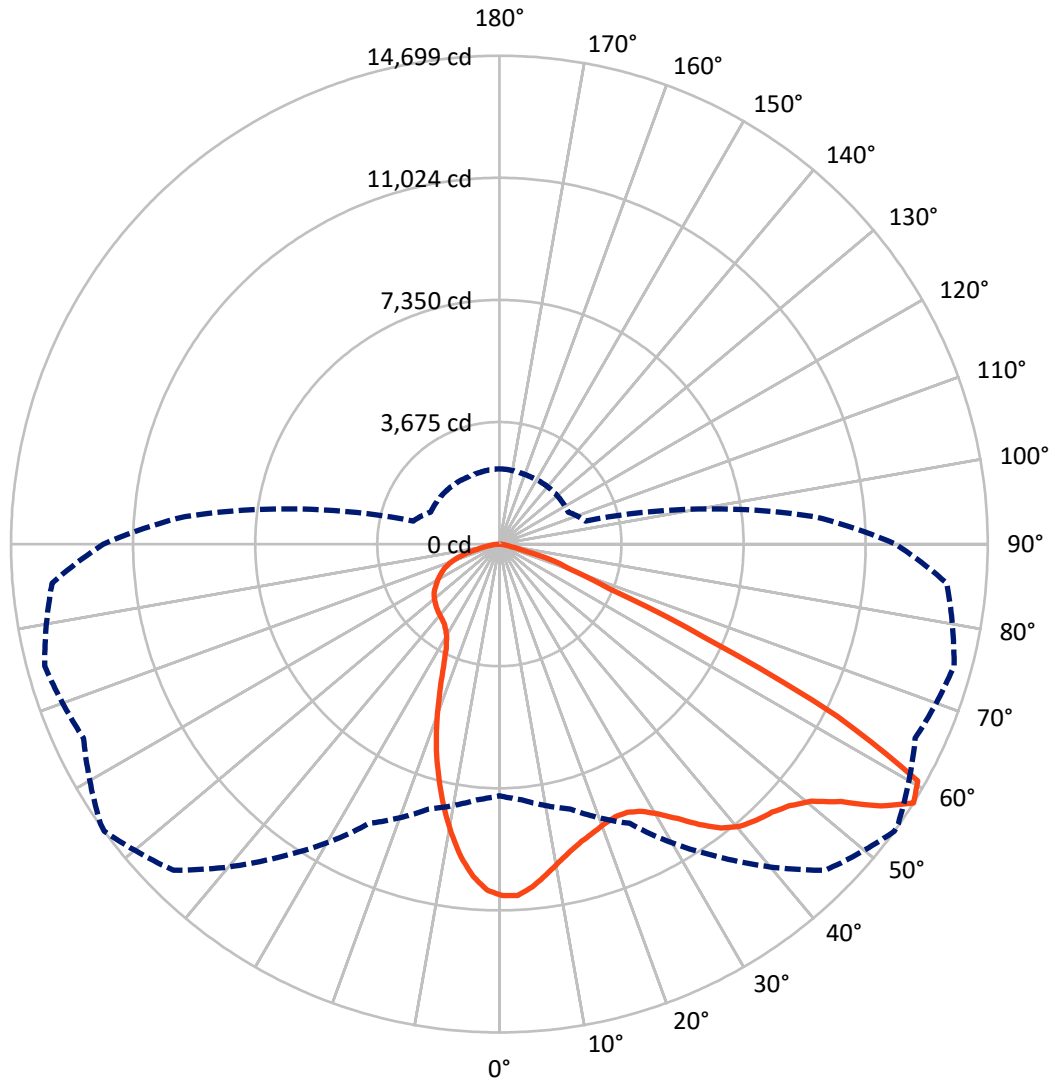
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 16.9 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 54-Deg Lateral    - - - Horizontal Cone Through 57.5-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 8011.4   | 0.0    | 8011.4  |
|                    | % Fixture | 29.1     | 0.0    | 29.1    |
| <b>Street Side</b> | Lumens    | 19546.6  | 0.0    | 19546.6 |
|                    | % Fixture | 70.9     | 0.0    | 70.9    |
| <b>Total</b>       | Lumens    | 27558.0  | 0.0    | 27558.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 930.0   | 3.4       |
| 10°-20°   | 2219.1  | 8.1       |
| 20°-30°   | 3070.8  | 11.1      |
| 30°-40°   | 4266.9  | 15.5      |
| 40°-50°   | 5635.3  | 20.4      |
| 50°-60°   | 6696.8  | 24.3      |
| 60°-70°   | 3710.1  | 13.5      |
| 70°-80°   | 923.9   | 3.4       |
| 80°-90°   | 105.1   | 0.4       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 27558.0 | 100.0     |
| 0°-180°   | 27558.0 | 100.0     |

**Coefficient of Utilization**



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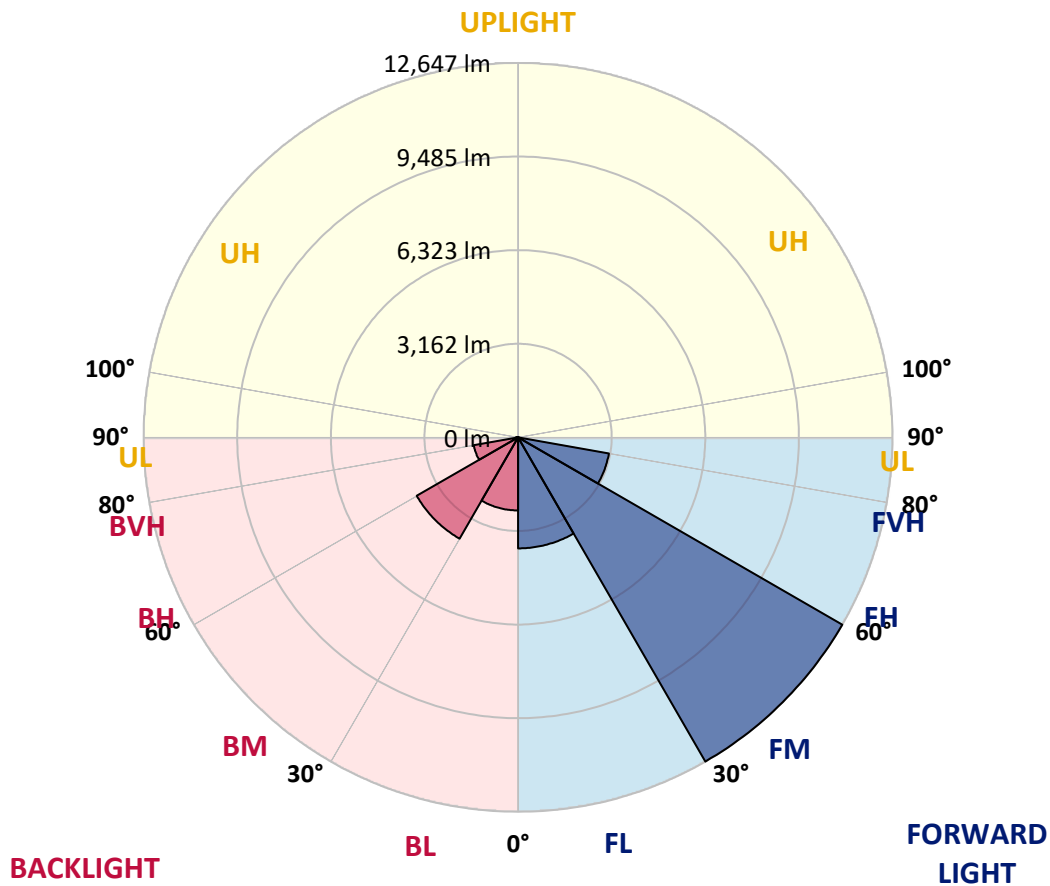
CATALOG NUMBER: GWS-SA6E-827-U-SL3-W-GRSWH

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

| Zone           | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|---------|-----------|-------------------------|------|---------|
|                |         |           | B                       | U    | G       |
| FL (0°-30°)    | 3751.1  | 13.6      |                         |      |         |
| FM (30°-60°)   | 12646.8 | 45.9      |                         |      |         |
| FH (60°-80°)   | 3115.8  | 11.3      |                         |      | G2/5000 |
| FVH (80°-90°)  | 32.9    | 0.1       |                         |      | G1/100  |
| BL (0°-30°)    | 2468.8  | 9.0       | B3/2500                 |      |         |
| BM (30°-60°)   | 3952.2  | 14.3      | B3/5000                 |      |         |
| BH (60°-80°)   | 1518.2  | 5.5       | B3/2500                 |      | G3/2500 |
| BVH (80°-90°)  | 72.2    | 0.3       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**

Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 54°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 |
| 2.5°  | 10382.0 | 10403.2 | 10417.4 | 10466.9 | 10509.4 | 10547.1 | 10587.2 | 10587.2 | 10584.9 | 10577.8 | 10563.6 |
| 5°    | 9971.5  | 9995.1  | 10028.1 | 10096.5 | 10188.5 | 10254.6 | 10363.1 | 10372.5 | 10419.7 | 10438.6 | 10429.2 |
| 7.5°  | 9495.0  | 9502.1  | 9544.5  | 9634.2  | 9780.4  | 9898.4  | 10054.1 | 10073.0 | 10186.2 | 10252.2 | 10240.4 |
| 10°   | 8973.7  | 8950.1  | 9025.6  | 9157.7  | 9348.7  | 9546.9  | 9747.4  | 9763.9  | 9945.6  | 10070.6 | 10061.2 |
| 12.5° | 8497.1  | 8499.5  | 8575.0  | 8735.4  | 8973.7  | 9219.0  | 9487.9  | 9525.7  | 9749.8  | 9910.2  | 9893.7  |
| 15°   | 8098.5  | 8107.9  | 8199.9  | 8381.5  | 8652.8  | 8945.4  | 9280.3  | 9315.7  | 9598.8  | 9811.1  | 9763.9  |
| 17.5° | 7780.0  | 7789.4  | 7869.6  | 8077.2  | 8367.4  | 8721.2  | 9129.4  | 9164.7  | 9516.2  | 9768.6  | 9671.9  |
| 20°   | 7560.6  | 7555.9  | 7633.7  | 7831.9  | 8131.5  | 8516.0  | 8997.2  | 9049.1  | 9490.3  | 9785.2  | 9610.6  |
| 22.5° | 7471.0  | 7468.6  | 7525.2  | 7688.0  | 7968.7  | 8358.0  | 8917.0  | 8987.8  | 9518.6  | 9858.3  | 9572.8  |
| 25°   | 7515.8  | 7506.4  | 7555.9  | 7676.2  | 7900.3  | 8296.6  | 8940.6  | 9016.1  | 9638.9  | 10009.3 | 9579.9  |
| 27.5° | 7655.0  | 7643.2  | 7685.6  | 7794.2  | 7964.0  | 8360.3  | 9105.8  | 9193.0  | 9893.7  | 10285.3 | 9674.3  |
| 30°   | 7867.3  | 7860.2  | 7902.7  | 8006.5  | 8155.1  | 8572.6  | 9421.9  | 9520.9  | 10287.6 | 10714.6 | 9879.5  |
| 32.5° | 8115.0  | 8103.2  | 8178.7  | 8299.0  | 8471.2  | 8959.5  | 9846.5  | 9976.2  | 10754.7 | 11266.6 | 10223.9 |
| 35°   | 8393.3  | 8383.9  | 8487.7  | 8662.3  | 8910.0  | 9497.4  | 10360.8 | 10502.3 | 11231.2 | 11891.7 | 10681.6 |
| 37.5° | 8664.6  | 8664.6  | 8865.1  | 9124.6  | 9436.0  | 10082.4 | 10844.4 | 10934.0 | 11561.5 | 12446.1 | 11172.3 |
| 40°   | 8905.2  | 8919.4  | 9221.4  | 9610.6  | 10006.9 | 10610.8 | 11162.8 | 11238.3 | 11707.7 | 12828.3 | 11599.2 |
| 42.5° | 9171.8  | 9183.6  | 9535.1  | 10044.6 | 10516.4 | 11037.8 | 11356.3 | 11394.0 | 11736.1 | 13019.4 | 11901.2 |
| 45°   | 9384.1  | 9400.6  | 9837.1  | 10382.0 | 10959.9 | 11358.6 | 11509.6 | 11542.6 | 11776.2 | 13123.2 | 12120.6 |
| 47.5° | 9495.0  | 9518.6  | 10018.7 | 10653.3 | 11259.5 | 11646.4 | 11762.0 | 11776.2 | 11941.3 | 13304.8 | 12384.8 |
| 50°   | 9476.1  | 9523.3  | 10087.1 | 10787.7 | 11481.3 | 11936.6 | 12167.8 | 12191.3 | 12278.6 | 13571.4 | 12693.8 |
| 52.5° | 9643.6  | 9664.8  | 10233.4 | 10948.1 | 11797.4 | 12472.1 | 12873.1 | 12906.1 | 12866.0 | 13771.9 | 12877.8 |
| 55°   | 9365.3  | 9466.7  | 10051.7 | 10924.6 | 12278.6 | 13300.1 | 13918.1 | 13901.6 | 13399.2 | 13996.0 | 13184.5 |
| 57.5° | 7574.8  | 7723.4  | 8258.9  | 9273.3  | 11486.0 | 13880.4 | 14699.0 | 14658.9 | 13812.0 | 14168.2 | 13517.1 |
| 60°   | 5244.1  | 5267.7  | 5751.3  | 6470.8  | 8865.1  | 12262.1 | 14470.1 | 14557.4 | 13887.5 | 13951.2 | 12901.4 |
| 62.5° | 4194.3  | 4187.2  | 4232.1  | 4250.9  | 5638.0  | 8619.8  | 11422.3 | 11740.8 | 11537.9 | 10870.3 | 9143.5  |
| 65°   | 3581.0  | 3606.9  | 3739.0  | 3670.6  | 3680.0  | 4854.8  | 6824.6  | 6869.4  | 6727.9  | 6487.3  | 4836.0  |
| 67.5° | 2802.5  | 2847.3  | 3080.9  | 3347.4  | 3262.5  | 3125.7  | 3540.9  | 3519.6  | 2774.2  | 2146.7  | 1774.0  |
| 70°   | 1755.1  | 1783.4  | 2033.5  | 2627.9  | 2840.2  | 2566.6  | 2276.4  | 2267.0  | 1486.2  | 1222.0  | 1339.9  |
| 72.5° | 1023.8  | 1028.5  | 1099.3  | 1464.9  | 1884.8  | 1755.1  | 1674.9  | 1613.6  | 955.4   | 974.3   | 1068.6  |
| 75°   | 563.8   | 563.8   | 561.4   | 632.2   | 743.1   | 658.2   | 636.9   | 620.4   | 639.3   | 724.2   | 795.0   |
| 77.5° | 118.0   | 120.3   | 127.4   | 167.5   | 217.0   | 264.2   | 332.6   | 335.0   | 417.5   | 483.6   | 540.2   |
| 80°   | 54.3    | 56.6    | 70.8    | 89.6    | 115.6   | 153.3   | 202.9   | 205.2   | 252.4   | 304.3   | 342.1   |
| 82.5° | 28.3    | 30.7    | 37.7    | 47.2    | 61.3    | 80.2    | 113.2   | 113.2   | 151.0   | 179.3   | 202.9   |
| 85°   | 9.4     | 9.4     | 14.2    | 18.9    | 25.9    | 33.0    | 44.8    | 44.8    | 66.1    | 87.3    | 101.4   |
| 87.5° | 0.0     | 0.0     | 0.0     | 0.0     | 2.4     | 4.7     | 9.4     | 9.4     | 11.8    | 14.2    | 23.6    |
| 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: GWS-SA6E-827-U-SL3-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°    | 115°    | 125°    | 135°    | 145°    | 155°    | 165°    | 175°    | 180°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 | 10580.1 |
| 2.5°  | 10533.0 | 10459.8 | 10462.2 | 10476.3 | 10431.5 | 10363.1 | 10318.3 | 10261.7 | 10226.3 | 10219.2 | 10245.2 |
| 5°    | 10382.0 | 10297.1 | 10238.1 | 10176.8 | 10049.4 | 9898.4  | 9780.4  | 9683.7  | 9620.0  | 9596.4  | 9568.1  |
| 7.5°  | 10174.4 | 10063.5 | 9914.9  | 9742.7  | 9511.5  | 9242.6  | 9053.9  | 8876.9  | 8754.3  | 8718.9  | 8702.4  |
| 10°   | 9966.8  | 9806.4  | 9542.2  | 9221.4  | 8836.8  | 8473.5  | 8131.5  | 7869.6  | 7662.1  | 7544.1  | 7581.8  |
| 12.5° | 9752.1  | 9554.0  | 9141.1  | 8648.1  | 8112.6  | 7565.3  | 7117.1  | 6683.1  | 6348.1  | 6180.6  | 6131.1  |
| 15°   | 9563.4  | 9294.5  | 8718.9  | 8051.3  | 7338.9  | 6650.0  | 6001.3  | 5350.2  | 4925.6  | 4694.4  | 4630.7  |
| 17.5° | 9403.0  | 9053.9  | 8273.0  | 7442.7  | 6591.1  | 5609.7  | 4812.4  | 4208.5  | 3918.3  | 3790.9  | 3781.5  |
| 20°   | 9244.9  | 8818.0  | 7831.9  | 6786.9  | 5727.7  | 4628.4  | 3915.9  | 3632.9  | 3529.1  | 3484.3  | 3481.9  |
| 22.5° | 9103.4  | 8570.3  | 7367.2  | 6131.1  | 4869.0  | 3890.0  | 3498.4  | 3375.7  | 3347.4  | 3347.4  | 3342.7  |
| 25°   | 8983.1  | 8322.6  | 6890.7  | 5435.1  | 4092.9  | 3463.0  | 3281.4  | 3229.5  | 3241.3  | 3262.5  | 3264.9  |
| 27.5° | 8933.6  | 8129.1  | 6430.7  | 4720.4  | 3557.4  | 3215.3  | 3132.8  | 3125.7  | 3158.7  | 3191.7  | 3196.5  |
| 30°   | 8985.5  | 7997.0  | 5958.8  | 4036.3  | 3236.6  | 3064.3  | 3026.6  | 3040.8  | 3080.9  | 3113.9  | 3113.9  |
| 32.5° | 9145.9  | 7931.0  | 5477.6  | 3536.2  | 3050.2  | 2958.2  | 2946.4  | 2960.6  | 2991.2  | 3010.1  | 3012.5  |
| 35°   | 9417.2  | 7956.9  | 4979.9  | 3198.8  | 2929.9  | 2880.3  | 2878.0  | 2887.4  | 2899.2  | 2911.0  | 2913.4  |
| 37.5° | 9759.2  | 8072.5  | 4446.7  | 3003.0  | 2852.0  | 2823.7  | 2819.0  | 2816.7  | 2819.0  | 2819.0  | 2821.4  |
| 40°   | 10094.2 | 8247.1  | 3970.2  | 2887.4  | 2797.8  | 2774.2  | 2762.4  | 2745.9  | 2743.5  | 2738.8  | 2736.4  |
| 42.5° | 10341.9 | 8381.5  | 3590.4  | 2804.9  | 2748.2  | 2719.9  | 2705.8  | 2679.8  | 2677.5  | 2675.1  | 2672.8  |
| 45°   | 10528.2 | 8494.8  | 3274.3  | 2724.7  | 2696.3  | 2670.4  | 2639.7  | 2616.1  | 2620.9  | 2625.6  | 2625.6  |
| 47.5° | 10738.2 | 8593.9  | 3043.1  | 2649.2  | 2632.7  | 2606.7  | 2569.0  | 2552.4  | 2569.0  | 2585.5  | 2585.5  |
| 50°   | 10993.0 | 8733.0  | 2854.4  | 2573.7  | 2566.6  | 2535.9  | 2502.9  | 2495.8  | 2514.7  | 2538.3  | 2538.3  |
| 52.5° | 11179.3 | 8853.3  | 2719.9  | 2498.2  | 2498.2  | 2458.1  | 2429.8  | 2427.4  | 2448.6  | 2472.2  | 2474.6  |
| 55°   | 11528.5 | 9134.1  | 2672.8  | 2410.9  | 2401.5  | 2370.8  | 2349.6  | 2333.1  | 2359.0  | 2380.2  | 2380.2  |
| 57.5° | 11922.4 | 9506.8  | 2684.5  | 2285.9  | 2274.1  | 2264.6  | 2248.1  | 2229.3  | 2236.3  | 2259.9  | 2262.3  |
| 60°   | 11087.3 | 8784.9  | 2554.8  | 2160.8  | 2153.8  | 2149.1  | 2127.8  | 2094.8  | 2104.2  | 2123.1  | 2125.5  |
| 62.5° | 7744.6  | 5838.5  | 2066.5  | 2005.2  | 2028.7  | 2026.4  | 1998.1  | 1960.3  | 1962.7  | 1988.6  | 1988.6  |
| 65°   | 4019.7  | 3158.7  | 1814.1  | 1863.6  | 1899.0  | 1884.8  | 1837.7  | 1804.6  | 1799.9  | 1832.9  | 1825.9  |
| 67.5° | 1733.9  | 1724.4  | 1651.3  | 1715.0  | 1752.7  | 1722.1  | 1672.5  | 1618.3  | 1623.0  | 1634.8  | 1625.4  |
| 70°   | 1396.5  | 1439.0  | 1469.7  | 1538.1  | 1568.7  | 1512.1  | 1457.9  | 1427.2  | 1401.2  | 1398.9  | 1382.4  |
| 72.5° | 1115.8  | 1174.8  | 1243.2  | 1314.0  | 1323.4  | 1266.8  | 1198.4  | 1170.1  | 1130.0  | 1127.6  | 1111.1  |
| 75°   | 839.8   | 889.3   | 943.6   | 1000.2  | 1000.2  | 946.0   | 901.1   | 887.0   | 839.8   | 825.7   | 811.5   |
| 77.5° | 573.2   | 603.9   | 646.4   | 660.5   | 674.7   | 653.4   | 608.6   | 585.0   | 530.8   | 516.6   | 497.8   |
| 80°   | 360.9   | 382.2   | 408.1   | 417.5   | 431.7   | 405.7   | 370.4   | 344.4   | 306.7   | 294.9   | 285.4   |
| 82.5° | 217.0   | 231.2   | 247.7   | 252.4   | 264.2   | 245.3   | 212.3   | 193.4   | 172.2   | 162.8   | 155.7   |
| 85°   | 110.9   | 118.0   | 127.4   | 129.7   | 127.4   | 108.5   | 96.7    | 87.3    | 73.1    | 70.8    | 66.1    |
| 87.5° | 28.3    | 33.0    | 35.4    | 33.0    | 30.7    | 23.6    | 16.5    | 11.8    | 4.7     | 4.7     | 2.4     |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



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



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

Report Prepared for

Cooper Lighting Solutions

Invue

Report Number: SP1-2407-157-9

Test Date: 10/03/2024

Luminaire Tested: EMM2-HTN-SA1A-827-U-5WQ

Data applicable to all product families utilizing light square engine

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/03/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Invue  
 Catalog Number: **EMM2-HTN-SA1A-827-U-5WQ**  
 Description: Epic Modern Light Square 40W 5WQ Optic

**Spectral Parameters**

CCT (K): 2764  
 CIE u': 0.2591  
 CIE v': 0.5290  
 Duv: 0.0020  
 CIE x: 0.4581  
 CIE y: 0.4156  
 CIE z: 0.1263  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 583  
 Purity: 62.2537  
 Rf: 84.7  
 Rg: 94.6

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 80.9 |      |      |
| R1:       | 78.8 | R9:  | -1.5 |
| R2:       | 89.9 | R10: | 77.9 |
| R3:       | 96.2 | R11: | 78.9 |
| R4:       | 79.1 | R12: | 71.6 |
| R5:       | 79.1 | R13: | 81.2 |
| R6:       | 88.8 | R14: | 98.5 |
| R7:       | 81.3 | R15: | 69.9 |
| R8:       | 54.3 |      |      |



**Test Conditions**

Stabilization Time: 81M  
 Operation Time: 2H 21M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-157-9

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

REPORT NUMBER: SP1-2407-157-9

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

REPORT NUMBER: SP1-2407-157-9

**Photopic Flux vs. Wavelength**



**Photopic Lumens: 4337.9**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 2.6                            | 620               | 87426                                | 22.8                           | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 3.9                            | 625               | 83013                                | 18.2                           | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 5.8                            | 630               | 78077                                | 14.1                           | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 8.5                            | 635               | 72080                                | 10.7                           | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 11.5                           | 640               | 66249                                | 7.9                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 15.2                           | 645               | 59973                                | 5.7                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 18.7                           | 650               | 53972                                | 3.9                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 21.9                           | 655               | 48369                                | 2.7                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 24.9                           | 660               | 42641                                | 1.8                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 27.6                           | 665               | 37602                                | 1.1                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.0                            | 540               | 46032                                | 30.0                           | 670               | 32798                                | 0.7                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.0                            | 545               | 48553                                | 32.5                           | 675               | 28558                                | 0.5                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 0.0                            | 550               | 51408                                | 34.9                           | 680               | 24782                                | 0.3                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 0.0                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.2                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 0.0                            | 560               | 58847                                | 40.0                           | 690               | 18413                                | 0.1                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 0.1                            | 565               | 63386                                | 42.4                           | 695               | 15721                                | 0.1                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 0.2                            | 570               | 68196                                | 44.3                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 0.6                            | 575               | 73613                                | 46.0                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 0.9                            | 580               | 79207                                | 47.1                           | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 0.9                            | 585               | 84248                                | 47.0                           | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 0.9                            | 590               | 88397                                | 45.7                           | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 1.0                            | 595               | 91428                                | 43.4                           | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 0.9                            | 600               | 93452                                | 40.3                           | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 1.0                            | 605               | 93959                                | 36.4                           | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 1.3                            | 610               | 93079                                | 32.0                           | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 1.8                            | 615               | 90707                                | 27.3                           | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

REPORT NUMBER: SP1-2407-157-9

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 5286.7**

**S/P: 1.22**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 75.9                           | 620               | 87426                                | 0.4                            | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 93.2                           | 625               | 83013                                | 0.2                            | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 107.8                          | 630               | 78077                                | 0.1                            | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 118.7                          | 635               | 72080                                | 0.1                            | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 122.2                          | 640               | 66249                                | 0.1                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 120.8                          | 645               | 59973                                | 0.0                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 113.9                          | 650               | 53972                                | 0.0                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 104.1                          | 655               | 48369                                | 0.0                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 92.4                           | 660               | 42641                                | 0.0                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 80.5                           | 665               | 37602                                | 0.0                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.1                            | 540               | 46032                                | 68.2                           | 670               | 32798                                | 0.0                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.3                            | 545               | 48553                                | 57.1                           | 675               | 28558                                | 0.0                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 1.1                            | 550               | 51408                                | 46.7                           | 680               | 24782                                | 0.0                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 2.5                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.0                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 5.9                            | 560               | 58847                                | 29.4                           | 690               | 18413                                | 0.0                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 12.5                           | 565               | 63386                                | 22.5                           | 695               | 15721                                | 0.0                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 26.3                           | 570               | 68196                                | 16.9                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 55.2                           | 575               | 73613                                | 12.4                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 85.4                           | 580               | 79207                                | 9.0                            | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 75.1                           | 585               | 84248                                | 6.3                            | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 63.2                           | 590               | 88397                                | 4.4                            | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 63.2                           | 595               | 91428                                | 3.0                            | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 54.2                           | 600               | 93452                                | 2.0                            | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 48.8                           | 605               | 93959                                | 1.3                            | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 54.2                           | 610               | 93079                                | 0.9                            | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 63.3                           | 615               | 90707                                | 0.5                            | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

REPORT NUMBER: SP1-2407-157-9

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 9797**

**M/P: 2.26**

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 0             | 0.0           | 490    | 18018         | 27.7          | 620    | 87426         | 1.1           | 750    | 2680          | 0.0           | 880    | 58            | 0.0           |
| 365    | 0             | 0.0           | 495    | 22295         | 36.0          | 625    | 83013         | 0.7           | 755    | 2287          | 0.0           | 885    | 46            | 0.0           |
| 370    | 0             | 0.0           | 500    | 26478         | 44.2          | 630    | 78077         | 0.4           | 760    | 1944          | 0.0           | 890    | 45            | 0.0           |
| 375    | 0             | 0.0           | 505    | 30524         | 51.8          | 635    | 72080         | 0.3           | 765    | 1653          | 0.0           | 895    | 41            | 0.0           |
| 380    | 0             | 0.0           | 510    | 33611         | 57.0          | 640    | 66249         | 0.2           | 770    | 1413          | 0.0           | 900    | 38            | 0.0           |
| 385    | 0             | 0.0           | 515    | 36490         | 60.5          | 645    | 59973         | 0.1           | 775    | 1198          | 0.0           | 905    | 33            | 0.0           |
| 390    | 0             | 0.0           | 520    | 38610         | 61.4          | 650    | 53972         | 0.1           | 780    | 1025          | 0.0           | 910    | 30            | 0.0           |
| 395    | 0             | 0.0           | 525    | 40511         | 60.6          | 655    | 48369         | 0.0           | 785    | 874           | 0.0           | 915    | 23            | 0.0           |
| 400    | 48            | 0.0           | 530    | 42223         | 58.2          | 660    | 42641         | 0.0           | 790    | 747           | 0.0           | 920    | 24            | 0.0           |
| 405    | 201           | 0.0           | 535    | 44137         | 55.0          | 665    | 37602         | 0.0           | 795    | 639           | 0.0           | 925    | 22            | 0.0           |
| 410    | 457           | 0.0           | 540    | 46032         | 50.9          | 670    | 32798         | 0.0           | 800    | 547           | 0.0           | 930    | 22            | 0.0           |
| 415    | 925           | 0.1           | 545    | 48553         | 46.6          | 675    | 28558         | 0.0           | 805    | 473           | 0.0           | 935    | 17            | 0.0           |
| 420    | 1816          | 0.3           | 550    | 51408         | 42.0          | 680    | 24782         | 0.0           | 810    | 401           | 0.0           | 940    | 13            | 0.0           |
| 425    | 3217          | 0.8           | 555    | 54711         | 37.4          | 685    | 21386         | 0.0           | 815    | 351           | 0.0           | 945    | 6             | 0.0           |
| 430    | 5520          | 1.9           | 560    | 58847         | 32.9          | 690    | 18413         | 0.0           | 820    | 307           | 0.0           | 950    | 10            | 0.0           |
| 435    | 9225          | 4.1           | 565    | 63386         | 28.4          | 695    | 15721         | 0.0           | 825    | 261           | 0.0           | 955    | 11            | 0.0           |
| 440    | 15522         | 8.7           | 570    | 68196         | 24.1          | 700    | 13432         | 0.0           | 830    | 228           | 0.0           | 960    | 8             | 0.0           |
| 445    | 27642         | 18.5          | 575    | 73613         | 20.0          | 705    | 11513         | 0.0           | 835    | 193           | 0.0           | 965    | 12            | 0.0           |
| 450    | 36602         | 28.3          | 580    | 79207         | 16.3          | 710    | 9780          | 0.0           | 840    | 174           | 0.0           | 970    | 3             | 0.0           |
| 455    | 28292         | 24.7          | 585    | 84248         | 12.9          | 715    | 8356          | 0.0           | 845    | 151           | 0.0           | 975    | 8             | 0.0           |
| 460    | 21166         | 20.4          | 590    | 88397         | 9.8           | 720    | 7161          | 0.0           | 850    | 123           | 0.0           | 980    | 2             | 0.0           |
| 465    | 19092         | 20.1          | 595    | 91428         | 7.3           | 725    | 6067          | 0.0           | 855    | 106           | 0.0           | 985    | 13            | 0.0           |
| 470    | 14951         | 17.2          | 600    | 93452         | 5.3           | 730    | 5164          | 0.0           | 860    | 95            | 0.0           | 990    | 16            | 0.0           |
| 475    | 12606         | 15.7          | 605    | 93959         | 3.7           | 735    | 4393          | 0.0           | 865    | 82            | 0.0           | 995    | 20            | 0.0           |
| 480    | 13323         | 18.0          | 610    | 93079         | 2.5           | 740    | 3694          | 0.0           | 870    | 77            | 0.0           | 1000   | 0             | 0.0           |
| 485    | 15164         | 21.9          | 615    | 90707         | 1.7           | 745    | 3157          | 0.0           | 875    | 65            | 0.0           |        |               |               |

**Summary**

$R_f = 84.7$   
 $R_g = 94.6$   
 CIE  $R_a = 80.9$   
 $R_g = -1.5$



**Color Vector Graphics**



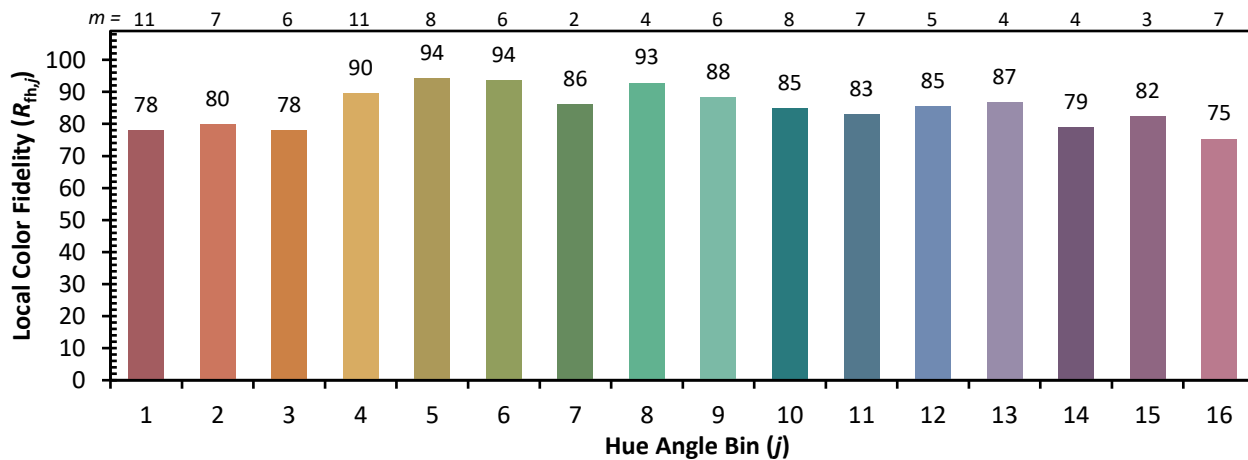


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 95 | CES76 = 81 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 71 | CES29 = 87 | CES54 = 91 | CES79 = 89 |
| CES05 = 50 | CES30 = 94 | CES55 = 90 | CES80 = 89 |
| CES06 = 52 | CES31 = 89 | CES56 = 86 | CES81 = 69 |
| CES07 = 43 | CES32 = 82 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 91 | CES58 = 86 | CES83 = 93 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 77 | CES35 = 96 | CES60 = 94 | CES85 = 76 |
| CES11 = 60 | CES36 = 90 | CES61 = 89 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 94 | CES87 = 84 |
| CES13 = 44 | CES38 = 98 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 82 | CES89 = 73 |
| CES15 = 72 | CES40 = 95 | CES65 = 78 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 81 | CES91 = 82 |
| CES17 = 50 | CES42 = 97 | CES67 = 80 | CES92 = 64 |
| CES18 = 57 | CES43 = 91 | CES68 = 83 | CES93 = 78 |
| CES19 = 73 | CES44 = 99 | CES69 = 88 | CES94 = 59 |
| CES20 = 67 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 89 | CES71 = 79 | CES96 = 83 |
| CES22 = 79 | CES47 = 92 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 83 | CES73 = 75 | CES98 = 83 |
| CES24 = 91 | CES49 = 90 | CES74 = 91 | CES99 = 74 |
| CES25 = 72 | CES50 = 94 | CES75 = 81 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)