

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: P640389

Luminaire Tested: GWS-SA5D-827-U-AFL-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P640389  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-48)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA5D-827-U-AFL-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND  
AUTOMOTIVE FRONTLINE OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (80) 2700K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

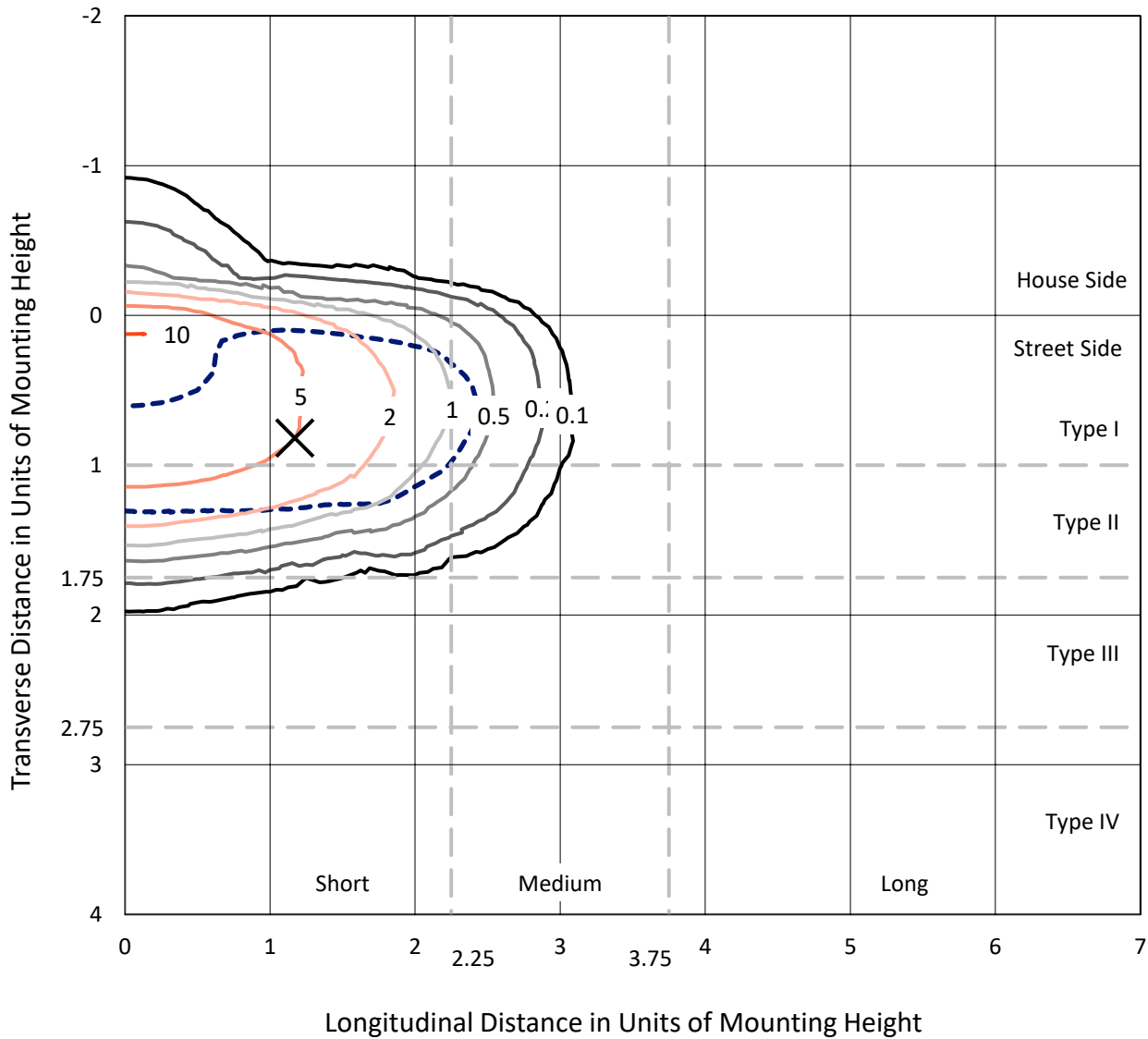
Lumens per Lamp: N/A  
Luminaire Lumens: 18519.2 lumens  
Efficiency: N/A  
Efficacy: 90.5 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G2  
  
Input Watts (W): 204.6  
Input Voltage (V): 120  
Input Current (Ain): 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



REPORT NUMBER: P640389  
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### Iso-Footcandle Lines of Horizontal Illumination

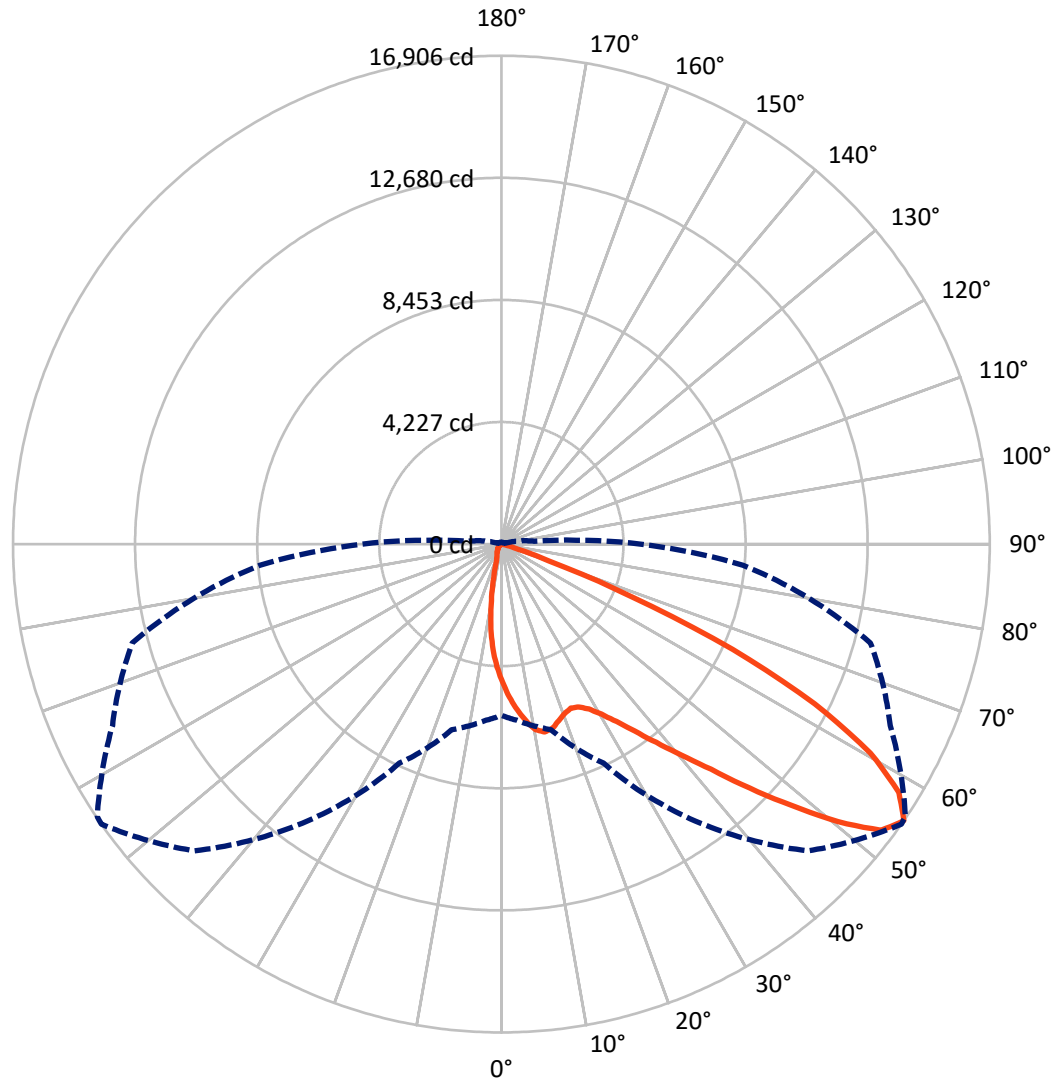
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 10 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 55-Deg Lateral    - - - Horizontal Cone Through 55-Deg Vertical

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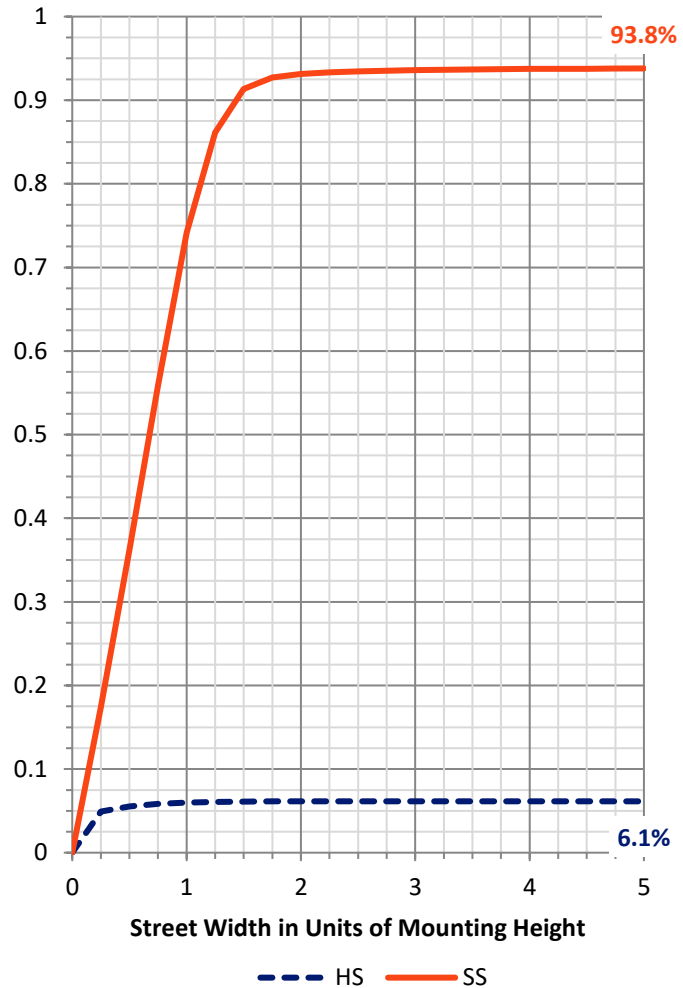
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1142.7   | 0.0    | 1142.7  |
|                    | % Fixture | 6.2      | 0.0    | 6.2     |
| <b>Street Side</b> | Lumens    | 17376.5  | 0.0    | 17376.5 |
|                    | % Fixture | 93.8     | 0.0    | 93.8    |
| <b>Total</b>       | Lumens    | 18519.2  | 0.0    | 18519.2 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 422.8   | 2.3       |
| 10°-20°   | 1019.4  | 5.5       |
| 20°-30°   | 1697.6  | 9.2       |
| 30°-40°   | 2892.9  | 15.6      |
| 40°-50°   | 4722.2  | 25.5      |
| 50°-60°   | 4943.9  | 26.7      |
| 60°-70°   | 2493.6  | 13.5      |
| 70°-80°   | 315.0   | 1.7       |
| 80°-90°   | 12.0    | 0.1       |
| 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°    | 18519.2 | 100.0     |
| 0°-180°   | 18519.2 | 100.0     |

**Coefficient of Utilization**

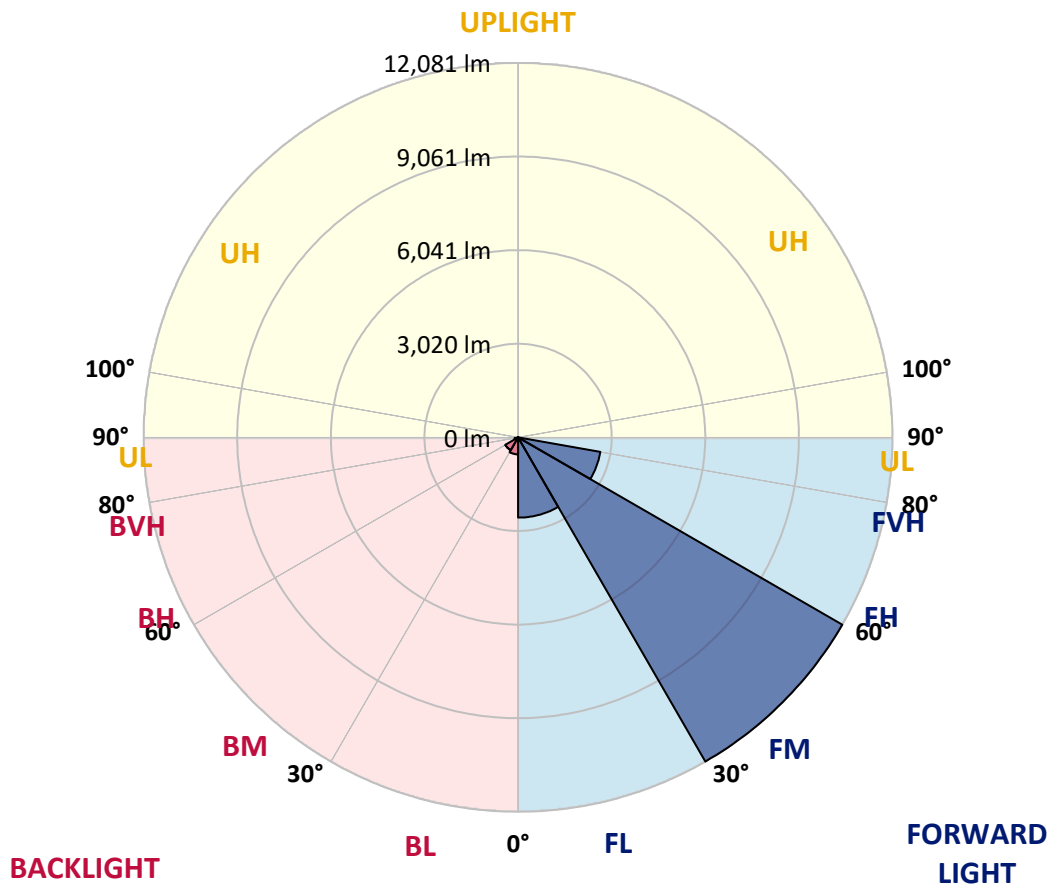


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|---------|-----------|-------------------------|------|---------|
|                |         |           | B                       | U    | G       |
| FL (0°-30°)    | 2590.6  | 14.0      |                         |      |         |
| FM (30°-60°)   | 12081.1 | 65.2      |                         |      |         |
| FH (60°-80°)   | 2693.9  | 14.5      |                         |      | G2/5000 |
| FVH (80°-90°)  | 10.9    | 0.1       |                         |      | G1/100  |
| BL (0°-30°)    | 549.2   | 3.0       | B2/1000                 |      |         |
| BM (30°-60°)   | 477.8   | 2.6       | B1/1000                 |      |         |
| BH (60°-80°)   | 114.6   | 0.6       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 1.1     | 0.0       |                         |      | G0/10   |
| 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°     | 56°     | 65°     | 75°     | 85°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| 0°    | 4784.3  | 4784.3  | 4784.3  | 4784.3  | 4784.3  | 4784.3  | 4784.3  | 4784.3  | 4784.3  | 4784.3  | 4784.3 |
| 2.5°  | 5577.4  | 5550.5  | 5591.7  | 5544.2  | 5463.4  | 5395.4  | 5306.7  | 5275.1  | 5132.6  | 4998.0  | 4868.2 |
| 5°    | 6255.0  | 6262.9  | 6250.3  | 6183.8  | 6069.8  | 5943.1  | 5764.2  | 5724.7  | 5476.1  | 5219.6  | 4942.6 |
| 7.5°  | 6422.8  | 6418.1  | 6445.0  | 6470.3  | 6451.3  | 6388.0  | 6193.3  | 6153.7  | 5845.0  | 5460.3  | 5056.6 |
| 10°   | 5905.1  | 5908.3  | 5963.7  | 6134.7  | 6346.8  | 6566.9  | 6536.8  | 6514.7  | 6212.3  | 5732.6  | 5183.2 |
| 12.5° | 5173.7  | 5202.2  | 5260.8  | 5504.6  | 5864.0  | 6364.3  | 6674.6  | 6696.7  | 6549.5  | 6031.8  | 5332.0 |
| 15°   | 4857.1  | 4863.4  | 4910.9  | 5058.2  | 5325.7  | 5943.1  | 6616.0  | 6677.7  | 6831.3  | 6332.6  | 5493.5 |
| 17.5° | 4849.2  | 4857.1  | 4877.7  | 4942.6  | 5116.7  | 5612.3  | 6427.6  | 6535.2  | 7043.4  | 6655.6  | 5686.7 |
| 20°   | 5146.8  | 5142.1  | 5127.8  | 5093.0  | 5169.0  | 5503.0  | 6253.4  | 6372.2  | 7159.0  | 6970.6  | 5881.4 |
| 22.5° | 5686.7  | 5680.3  | 5617.0  | 5472.9  | 5411.2  | 5602.8  | 6167.9  | 6275.6  | 7228.7  | 7250.8  | 6041.3 |
| 25°   | 6308.8  | 6353.2  | 6234.4  | 6016.0  | 5864.0  | 5857.7  | 6243.9  | 6319.9  | 7288.8  | 7499.4  | 6150.5 |
| 27.5° | 6991.2  | 7005.4  | 6904.1  | 6658.7  | 6438.7  | 6266.1  | 6464.0  | 6521.0  | 7355.3  | 7721.0  | 6212.3 |
| 30°   | 7740.0  | 7735.3  | 7619.7  | 7334.7  | 7067.2  | 6818.6  | 6834.5  | 6856.6  | 7510.5  | 7974.3  | 6280.4 |
| 32.5° | 8675.7  | 8696.2  | 8490.4  | 8102.6  | 7781.2  | 7437.6  | 7318.9  | 7322.1  | 7790.7  | 8300.5  | 6383.3 |
| 35°   | 9946.9  | 9896.3  | 9624.0  | 9071.4  | 8523.7  | 8153.2  | 7950.6  | 7933.2  | 8222.9  | 8739.0  | 6562.2 |
| 37.5° | 11158.0 | 11162.8 | 10877.8 | 10269.9 | 9578.1  | 8993.9  | 8707.3  | 8659.8  | 8830.8  | 9346.9  | 6859.8 |
| 40°   | 11998.7 | 12014.5 | 11895.8 | 11577.6 | 10844.6 | 10018.2 | 9597.0  | 9548.0  | 9619.2  | 10116.3 | 7249.2 |
| 42.5° | 12443.6 | 12487.9 | 12521.1 | 12595.5 | 12039.8 | 11297.4 | 10649.8 | 10645.1 | 10570.7 | 10993.4 | 7700.4 |
| 45°   | 12461.0 | 12527.5 | 12730.1 | 13238.3 | 13301.6 | 12757.0 | 12052.5 | 11946.4 | 11659.9 | 11932.2 | 8104.1 |
| 47.5° | 11772.3 | 11925.9 | 12356.5 | 13363.4 | 14028.3 | 14208.8 | 13510.6 | 13445.7 | 12641.4 | 12674.7 | 8406.5 |
| 50°   | 10167.0 | 10326.9 | 11120.0 | 12722.2 | 14211.9 | 15361.3 | 15111.2 | 14976.6 | 13461.5 | 13165.5 | 8552.2 |
| 52.5° | 8520.5  | 8666.2  | 9204.4  | 11196.0 | 13450.4 | 15723.8 | 16460.0 | 16300.1 | 14197.7 | 13336.4 | 8492.0 |
| 55°   | 5928.9  | 6123.6  | 6649.2  | 8368.5  | 11696.3 | 15017.8 | 16906.4 | 16873.2 | 14854.7 | 13228.8 | 8398.6 |
| 57.5° | 2906.7  | 3099.8  | 3623.8  | 5159.5  | 8664.6  | 13111.6 | 16224.1 | 16399.8 | 15247.3 | 13113.2 | 8322.6 |
| 60°   | 1214.3  | 1293.4  | 1473.9  | 2263.9  | 4847.6  | 9908.9  | 14683.7 | 14927.5 | 15006.7 | 12956.5 | 8314.7 |
| 62.5° | 704.5   | 717.2   | 736.2   | 938.8   | 1885.5  | 5680.3  | 12180.7 | 12527.5 | 13741.7 | 12749.1 | 8189.6 |
| 65°   | 531.9   | 536.7   | 528.8   | 576.3   | 778.9   | 2154.7  | 8800.7  | 9272.5  | 11469.9 | 11938.5 | 7695.7 |
| 67.5° | 436.9   | 436.9   | 416.4   | 425.9   | 489.2   | 807.4   | 4858.7  | 5517.3  | 8487.3  | 9812.4  | 6354.8 |
| 70°   | 348.3   | 356.2   | 346.7   | 334.0   | 349.9   | 446.4   | 1728.8  | 2143.6  | 4942.6  | 5794.3  | 3706.2 |
| 72.5° | 264.4   | 264.4   | 280.2   | 270.7   | 259.6   | 280.2   | 603.2   | 677.6   | 1983.7  | 2415.9  | 1337.8 |
| 75°   | 204.2   | 210.6   | 221.6   | 212.1   | 196.3   | 166.2   | 289.7   | 307.1   | 598.4   | 562.0   | 299.2  |
| 77.5° | 104.5   | 106.1   | 140.9   | 155.1   | 145.6   | 101.3   | 126.7   | 139.3   | 194.7   | 174.1   | 110.8  |
| 80°   | 63.3    | 66.5    | 79.2    | 121.9   | 96.6    | 53.8    | 52.2    | 55.4    | 91.8    | 79.2    | 45.9   |
| 82.5° | 26.9    | 28.5    | 44.3    | 44.3    | 39.6    | 20.6    | 20.6    | 20.6    | 44.3    | 41.2    | 19.0   |
| 85°   | 0.0     | 0.0     | 7.9     | 6.3     | 6.3     | 7.9     | 7.9     | 7.9     | 11.1    | 15.8    | 9.5    |
| 87.5° | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 1.6     | 4.7     | 4.7    |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0    |



REPORT NUMBER: P640389

CATALOG NUMBER: GWS-SA5D-827-U-AFL-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4784.3 | 4784.3 | 4784.3 | 4784.3 | 4784.3 | 4784.3 | 4784.3 | 4784.3 | 4784.3 | 4784.3 | 4784.3 |
| 2.5°  | 4784.3 | 4683.0 | 4546.8 | 4423.3 | 4257.1 | 4163.7 | 4033.9 | 3927.8 | 3837.6 | 3809.1 | 3796.4 |
| 5°    | 4785.9 | 4611.7 | 4320.4 | 4029.1 | 3671.3 | 3389.5 | 3099.8 | 2870.2 | 2681.9 | 2621.7 | 2605.9 |
| 7.5°  | 4817.5 | 4561.1 | 4089.3 | 3560.5 | 2962.1 | 2468.1 | 2026.4 | 1630.6 | 1447.0 | 1385.3 | 1372.6 |
| 10°   | 4860.3 | 4518.3 | 3821.7 | 2998.5 | 2138.8 | 1504.0 | 1065.5 | 812.2  | 691.8  | 625.3  | 634.8  |
| 12.5° | 4915.7 | 4483.5 | 3525.7 | 2390.6 | 1415.3 | 826.4  | 585.8  | 490.8  | 465.4  | 452.8  | 446.4  |
| 15°   | 4990.1 | 4442.3 | 3158.4 | 1787.4 | 867.6  | 531.9  | 451.2  | 425.9  | 416.4  | 410.0  | 408.5  |
| 17.5° | 5066.1 | 4394.8 | 2784.8 | 1257.0 | 576.3  | 441.7  | 405.3  | 392.6  | 386.3  | 381.5  | 380.0  |
| 20°   | 5146.8 | 4314.1 | 2346.2 | 866.0  | 454.4  | 397.4  | 373.6  | 359.4  | 351.5  | 343.5  | 342.0  |
| 22.5° | 5181.6 | 4184.3 | 1926.7 | 606.3  | 403.7  | 365.7  | 335.6  | 318.2  | 308.7  | 302.4  | 302.4  |
| 25°   | 5148.4 | 3973.7 | 1492.9 | 460.7  | 367.3  | 330.9  | 300.8  | 281.8  | 273.9  | 267.6  | 267.6  |
| 27.5° | 5059.7 | 3703.0 | 1089.2 | 381.5  | 327.7  | 294.5  | 266.0  | 248.6  | 242.2  | 239.1  | 239.1  |
| 30°   | 4961.6 | 3361.0 | 767.8  | 327.7  | 283.4  | 256.5  | 232.7  | 221.6  | 220.1  | 216.9  | 216.9  |
| 32.5° | 4877.7 | 3041.2 | 528.8  | 288.1  | 250.1  | 223.2  | 207.4  | 202.6  | 204.2  | 201.1  | 202.6  |
| 35°   | 4831.8 | 2727.8 | 392.6  | 256.5  | 223.2  | 197.9  | 190.0  | 190.0  | 190.0  | 188.4  | 188.4  |
| 37.5° | 4850.8 | 2419.1 | 319.8  | 234.3  | 199.5  | 180.5  | 172.6  | 175.7  | 178.9  | 178.9  | 178.9  |
| 40°   | 4945.8 | 2145.2 | 283.4  | 213.7  | 178.9  | 164.6  | 158.3  | 163.1  | 167.8  | 171.0  | 171.0  |
| 42.5° | 5066.1 | 1923.5 | 256.5  | 196.3  | 164.6  | 148.8  | 145.6  | 150.4  | 155.1  | 158.3  | 158.3  |
| 45°   | 5142.1 | 1700.3 | 229.6  | 174.1  | 150.4  | 131.4  | 131.4  | 137.7  | 136.2  | 137.7  | 137.7  |
| 47.5° | 5176.9 | 1523.0 | 202.6  | 150.4  | 128.2  | 114.0  | 115.6  | 118.7  | 115.6  | 118.7  | 118.7  |
| 50°   | 5091.4 | 1344.1 | 178.9  | 125.1  | 106.1  | 99.7   | 102.9  | 101.3  | 101.3  | 107.7  | 107.7  |
| 52.5° | 4934.7 | 1211.1 | 158.3  | 106.1  | 90.2   | 88.7   | 91.8   | 85.5   | 87.1   | 87.1   | 85.5   |
| 55°   | 4819.1 | 1135.1 | 140.9  | 91.8   | 77.6   | 79.2   | 77.6   | 66.5   | 60.2   | 53.8   | 52.2   |
| 57.5° | 4762.1 | 1105.0 | 128.2  | 82.3   | 69.7   | 69.7   | 63.3   | 45.9   | 34.8   | 26.9   | 23.7   |
| 60°   | 4749.4 | 1068.6 | 115.6  | 71.2   | 61.7   | 58.6   | 45.9   | 26.9   | 17.4   | 12.7   | 11.1   |
| 62.5° | 4629.1 | 980.0  | 104.5  | 57.0   | 53.8   | 47.5   | 28.5   | 15.8   | 9.5    | 6.3    | 4.7    |
| 65°   | 4234.9 | 805.8  | 93.4   | 44.3   | 41.2   | 34.8   | 17.4   | 9.5    | 4.7    | 1.6    | 0.0    |
| 67.5° | 3368.9 | 571.5  | 82.3   | 33.2   | 28.5   | 22.2   | 11.1   | 6.3    | 1.6    | 0.0    | 0.0    |
| 70°   | 1942.5 | 308.7  | 68.1   | 23.7   | 19.0   | 14.2   | 7.9    | 3.2    | 0.0    | 0.0    | 0.0    |
| 72.5° | 649.1  | 144.1  | 52.2   | 15.8   | 14.2   | 11.1   | 4.7    | 1.6    | 0.0    | 0.0    | 0.0    |
| 75°   | 142.5  | 85.5   | 34.8   | 11.1   | 9.5    | 7.9    | 3.2    | 0.0    | 0.0    | 0.0    | 0.0    |
| 77.5° | 53.8   | 60.2   | 17.4   | 7.9    | 6.3    | 4.7    | 1.6    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 20.6   | 39.6   | 7.9    | 4.7    | 4.7    | 1.6    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 11.1   | 15.8   | 4.7    | 3.2    | 3.2    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 6.3    | 7.9    | 3.2    | 1.6    | 1.6    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 3.2    | 1.6    | 1.6    | 1.6    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 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    |



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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           |

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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

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**

| $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 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  $R_a = 80.9$   
 $R_9 = -1.5$



**Color Vector Graphics**





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

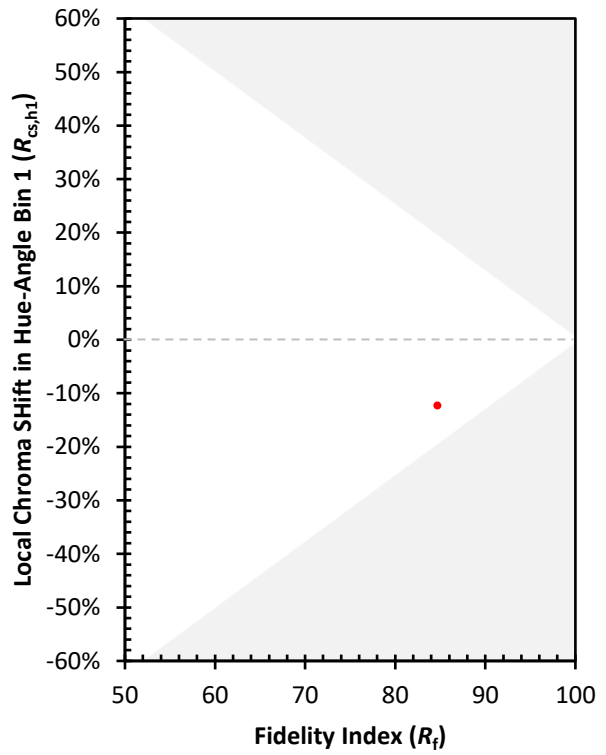
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 95 | CES76 = 81 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 71 | CES29 = 87 | CES54 = 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)