

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: P636773

Luminaire Tested: GWS-SA4B-740-U-SL4-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P636773  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-35)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA4B-740-U-SL4-W  
Description: GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE IV SPILL LIGHT ELIMINATOR OPTICS  
Light Source: (64) 4000K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 13901 lumens  
Efficiency: N/A  
Efficacy: 147.3 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G3

Input Watts (W): 94.4  
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



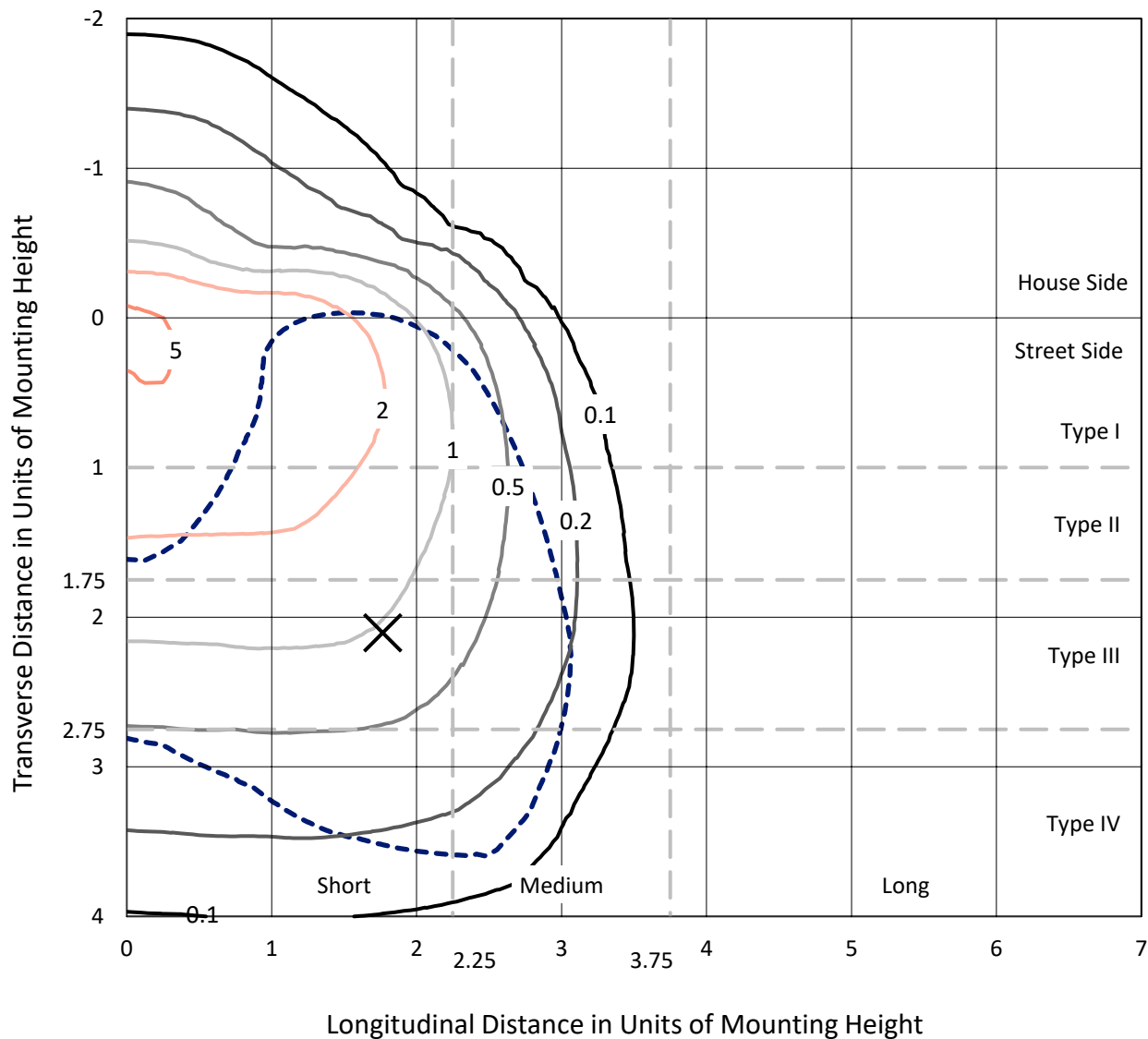
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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

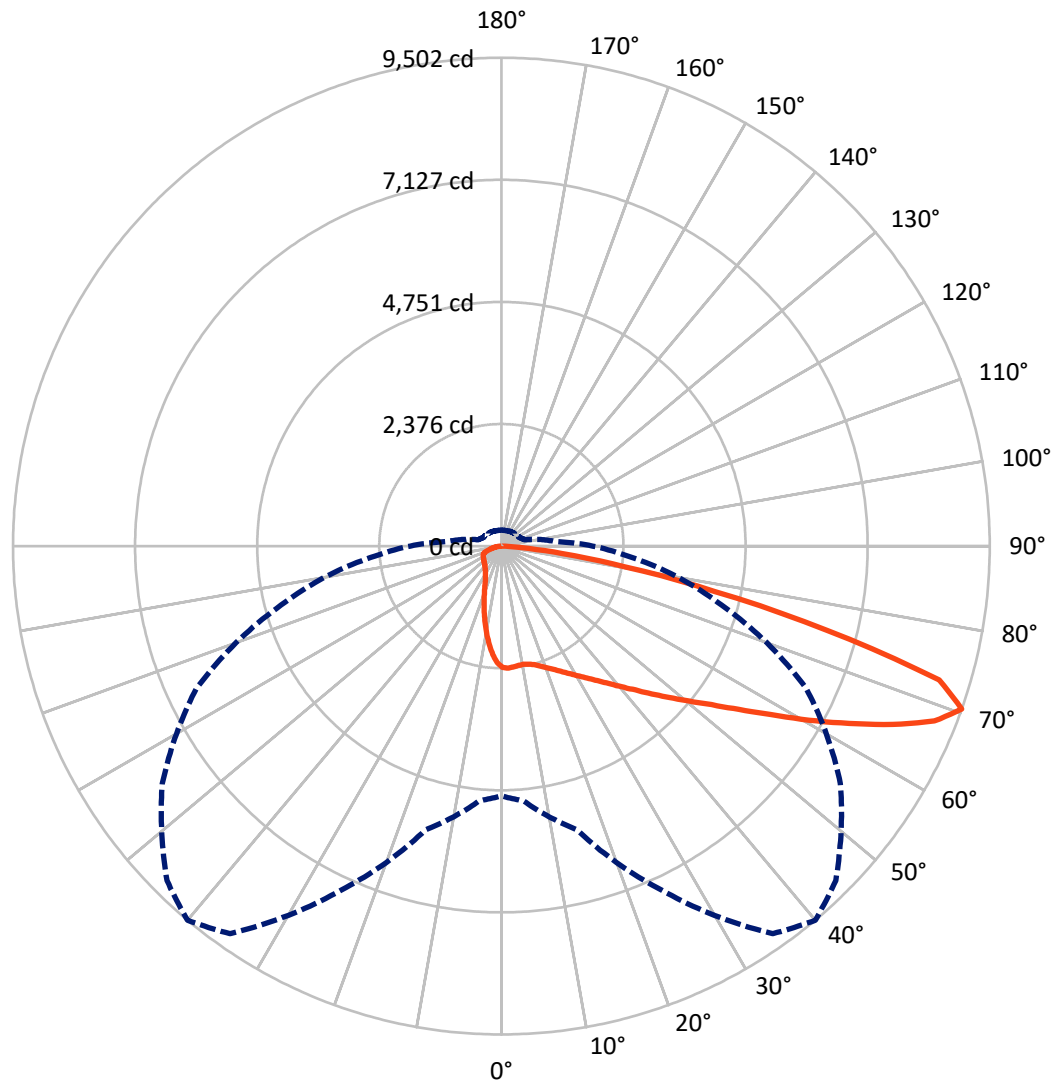


Based on 20 foot mounting height. Maximum calculated value = 5.9 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 40-Deg Lateral    - - - Horizontal Cone Through 70-Deg Vertical

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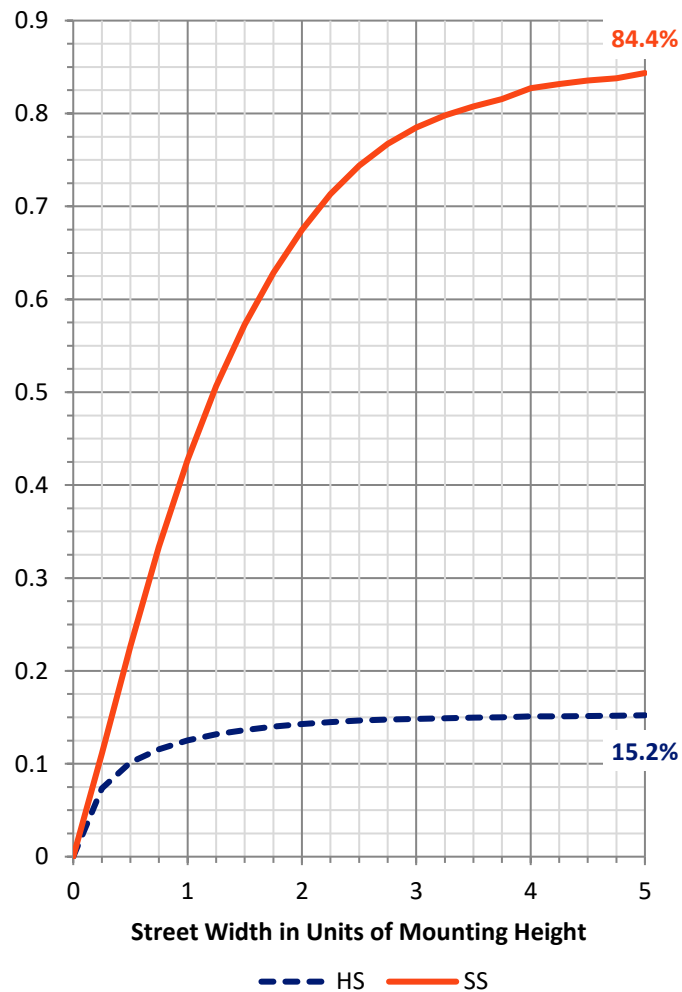
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2141.1   | 0.0    | 2141.1  |
|                    | % Fixture | 15.4     | 0.0    | 15.4    |
| <b>Street Side</b> | Lumens    | 11759.9  | 0.0    | 11759.9 |
|                    | % Fixture | 84.6     | 0.0    | 84.6    |
| <b>Total</b>       | Lumens    | 13901.0  | 0.0    | 13901.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 208.5   | 1.5       |
| 10°-20°   | 543.6   | 3.9       |
| 20°-30°   | 853.5   | 6.1       |
| 30°-40°   | 1283.2  | 9.2       |
| 40°-50°   | 1980.7  | 14.2      |
| 50°-60°   | 2941.5  | 21.2      |
| 60°-70°   | 3707.8  | 26.7      |
| 70°-80°   | 2144.2  | 15.4      |
| 80°-90°   | 238.0   | 1.7       |
| 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°    | 13901.0 | 100.0     |
| 0°-180°   | 13901.0 | 100.0     |

**Coefficient of Utilization**



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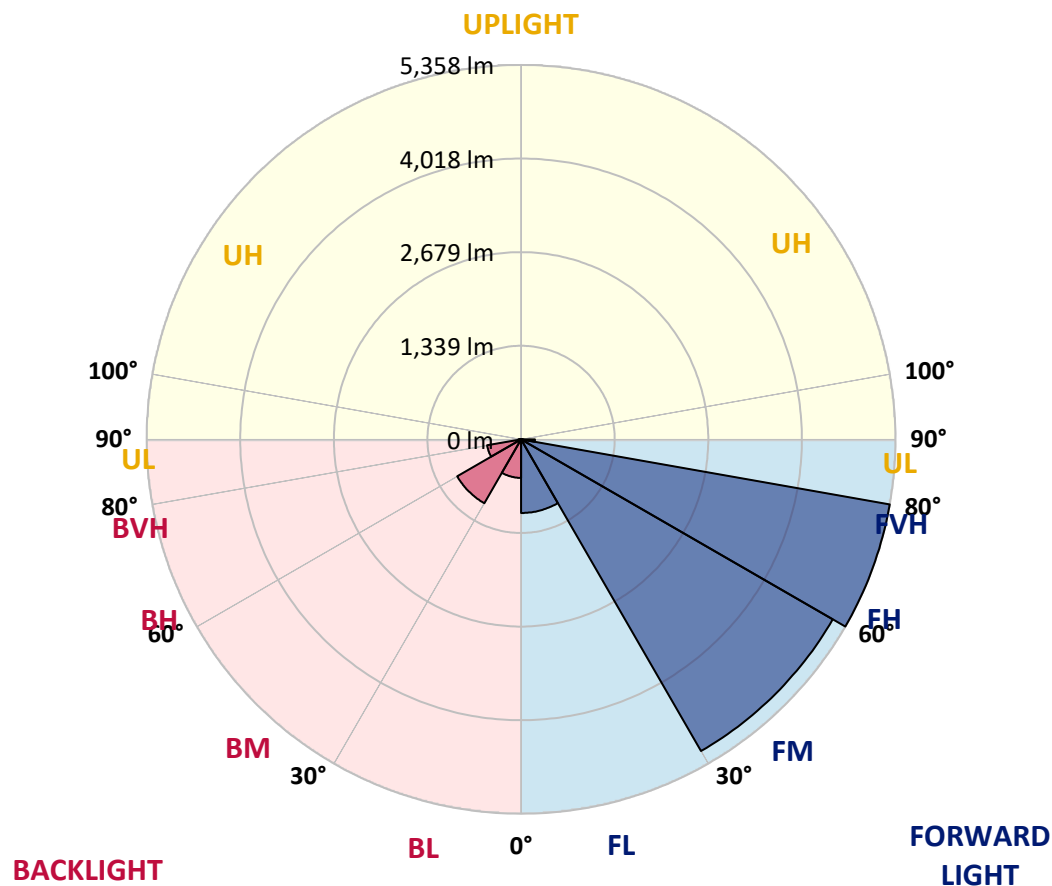
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1053.8 | 7.6       |                         |      |         |
| FM   | (30°-60°)   | 5150.1 | 37.0      |                         |      |         |
| FH   | (60°-80°)   | 5357.8 | 38.5      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 198.2  | 1.4       |                         |      | G2/225  |
| BL   | (0°-30°)    | 551.8  | 4.0       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1055.4 | 7.6       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 494.2  | 3.6       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 39.8   | 0.3       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G3**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 40°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 |
| 2.5°  | 2375.1 | 2379.2 | 2382.3 | 2386.5 | 2384.4 | 2378.2 | 2383.4 | 2383.4 | 2372.0 | 2359.5 | 2348.1 |
| 5°    | 2378.2 | 2383.4 | 2382.3 | 2381.3 | 2373.0 | 2362.6 | 2362.6 | 2356.4 | 2336.7 | 2317.0 | 2298.3 |
| 7.5°  | 2372.0 | 2370.9 | 2369.9 | 2366.8 | 2357.4 | 2346.0 | 2343.9 | 2331.5 | 2305.6 | 2278.6 | 2251.6 |
| 10°   | 2343.9 | 2342.9 | 2346.0 | 2353.3 | 2351.2 | 2340.8 | 2340.8 | 2329.4 | 2299.3 | 2266.1 | 2230.8 |
| 12.5° | 2321.1 | 2321.1 | 2333.6 | 2353.3 | 2360.5 | 2356.4 | 2357.4 | 2349.1 | 2314.9 | 2275.5 | 2234.0 |
| 15°   | 2324.2 | 2325.3 | 2352.2 | 2384.4 | 2397.9 | 2394.8 | 2395.8 | 2386.5 | 2348.1 | 2308.7 | 2252.6 |
| 17.5° | 2345.0 | 2350.2 | 2396.9 | 2441.5 | 2459.1 | 2455.0 | 2447.7 | 2432.1 | 2388.6 | 2343.9 | 2275.5 |
| 20°   | 2388.6 | 2396.9 | 2457.0 | 2513.1 | 2533.8 | 2524.5 | 2512.0 | 2480.9 | 2433.2 | 2384.4 | 2300.4 |
| 22.5° | 2474.7 | 2479.9 | 2546.3 | 2601.3 | 2617.9 | 2606.5 | 2581.6 | 2536.9 | 2481.9 | 2431.1 | 2330.5 |
| 25°   | 2596.1 | 2602.3 | 2665.6 | 2716.4 | 2712.3 | 2698.8 | 2664.6 | 2609.6 | 2544.2 | 2490.2 | 2374.0 |
| 27.5° | 2740.3 | 2750.7 | 2812.9 | 2853.4 | 2826.4 | 2806.7 | 2768.3 | 2701.9 | 2628.3 | 2579.5 | 2440.4 |
| 30°   | 2898.0 | 2902.2 | 2955.1 | 2995.6 | 2954.1 | 2927.1 | 2880.4 | 2808.8 | 2742.4 | 2706.1 | 2540.1 |
| 32.5° | 3050.6 | 3054.7 | 3100.4 | 3123.2 | 3079.6 | 3059.9 | 3019.4 | 2943.7 | 2897.0 | 2877.3 | 2688.4 |
| 35°   | 3211.4 | 3210.3 | 3247.7 | 3267.4 | 3222.8 | 3214.5 | 3173.0 | 3114.9 | 3106.6 | 3132.5 | 2905.3 |
| 37.5° | 3372.2 | 3362.9 | 3382.6 | 3408.5 | 3383.6 | 3391.9 | 3364.9 | 3345.2 | 3377.4 | 3444.8 | 3193.7 |
| 40°   | 3500.9 | 3500.9 | 3521.6 | 3553.8 | 3562.1 | 3598.4 | 3582.8 | 3608.8 | 3712.5 | 3873.4 | 3550.7 |
| 42.5° | 3615.0 | 3616.1 | 3659.6 | 3709.4 | 3769.6 | 3825.6 | 3838.1 | 3905.5 | 4120.3 | 4372.5 | 3998.9 |
| 45°   | 3734.3 | 3735.4 | 3794.5 | 3867.2 | 3994.8 | 4101.6 | 4126.6 | 4278.0 | 4585.2 | 4892.3 | 4485.6 |
| 47.5° | 3872.3 | 3860.9 | 3942.9 | 4064.3 | 4245.9 | 4399.4 | 4463.8 | 4678.6 | 5066.6 | 5444.3 | 4944.2 |
| 50°   | 4028.0 | 4004.1 | 4095.4 | 4305.0 | 4529.1 | 4739.8 | 4847.7 | 5093.6 | 5583.3 | 5953.8 | 5375.8 |
| 52.5° | 4203.3 | 4189.8 | 4285.3 | 4540.6 | 4883.0 | 5125.8 | 5272.1 | 5594.8 | 6085.5 | 6461.2 | 5718.2 |
| 55°   | 4421.2 | 4389.1 | 4527.1 | 4851.8 | 5298.0 | 5607.2 | 5780.5 | 6090.7 | 6634.4 | 6921.9 | 5979.7 |
| 57.5° | 4659.9 | 4624.6 | 4809.3 | 5240.9 | 5837.6 | 6176.9 | 6393.7 | 6649.0 | 7151.2 | 7274.6 | 6133.3 |
| 60°   | 4917.2 | 4905.8 | 5124.7 | 5697.5 | 6480.9 | 6875.2 | 7031.8 | 7263.2 | 7600.4 | 7479.0 | 6094.9 |
| 62.5° | 5152.7 | 5148.6 | 5467.1 | 6192.4 | 7162.6 | 7596.3 | 7720.8 | 7782.0 | 7924.2 | 7465.6 | 5789.8 |
| 65°   | 5400.7 | 5436.0 | 5866.6 | 6766.2 | 7943.9 | 8369.3 | 8421.2 | 8265.6 | 8033.1 | 7111.7 | 5165.2 |
| 67.5° | 5431.9 | 5500.3 | 6117.7 | 7303.7 | 8684.7 | 9086.3 | 9044.8 | 8449.2 | 7711.5 | 6127.1 | 4048.7 |
| 70°   | 4858.1 | 4977.4 | 5717.2 | 7385.7 | 9206.7 | 9502.4 | 9202.5 | 8053.9 | 6544.2 | 4438.9 | 2546.3 |
| 72.5° | 4059.1 | 4161.8 | 4815.5 | 6298.3 | 8533.3 | 8909.9 | 8504.2 | 6817.1 | 4624.6 | 2546.3 | 1297.0 |
| 75°   | 3159.5 | 3278.8 | 3881.7 | 5006.4 | 6388.5 | 6539.0 | 6335.6 | 4754.3 | 2542.1 | 1050.1 | 589.4  |
| 77.5° | 1927.9 | 2014.0 | 2483.0 | 3391.9 | 4470.0 | 4244.8 | 3597.4 | 2665.6 | 1115.4 | 503.2  | 364.2  |
| 80°   | 852.9  | 905.8  | 1223.3 | 1822.0 | 2582.6 | 2441.5 | 1924.8 | 1138.3 | 610.1  | 319.6  | 254.2  |
| 82.5° | 457.6  | 491.8  | 602.8  | 721.1  | 1134.1 | 1186.0 | 961.9  | 655.8  | 327.9  | 182.6  | 145.3  |
| 85°   | 201.3  | 221.0  | 273.9  | 261.5  | 372.5  | 366.3  | 369.4  | 450.3  | 156.7  | 84.0   | 94.4   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 1.0    | 1.0    | 11.4   | 60.2   | 15.6   | 24.9   | 21.8   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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CATALOG NUMBER: GWS-SA4B-740-U-SL4-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 | 2360.5 |
| 2.5°  | 2335.6 | 2317.0 | 2311.8 | 2305.6 | 2294.1 | 2274.4 | 2259.9 | 2243.3 | 2236.0 | 2227.7 | 2228.8 |
| 5°    | 2277.5 | 2254.7 | 2232.9 | 2204.9 | 2169.6 | 2130.2 | 2103.2 | 2072.1 | 2055.5 | 2039.9 | 2044.1 |
| 7.5°  | 2227.7 | 2192.5 | 2147.8 | 2088.7 | 2025.4 | 1954.8 | 1897.8 | 1853.2 | 1823.1 | 1802.3 | 1812.7 |
| 10°   | 2196.6 | 2155.1 | 2077.3 | 1980.8 | 1873.9 | 1766.0 | 1684.0 | 1607.2 | 1559.5 | 1522.2 | 1520.1 |
| 12.5° | 2190.4 | 2136.4 | 2023.3 | 1883.3 | 1728.6 | 1584.4 | 1464.1 | 1360.3 | 1297.0 | 1250.3 | 1268.0 |
| 15°   | 2196.6 | 2128.1 | 1976.6 | 1793.0 | 1597.9 | 1402.8 | 1253.4 | 1134.1 | 1058.4 | 1015.8 | 1012.7 |
| 17.5° | 2203.9 | 2119.8 | 1923.7 | 1695.4 | 1460.9 | 1237.9 | 1064.6 | 938.0  | 860.2  | 817.6  | 818.7  |
| 20°   | 2210.1 | 2107.4 | 1861.5 | 1588.6 | 1321.9 | 1084.3 | 904.8  | 784.4  | 714.9  | 683.8  | 689.0  |
| 22.5° | 2220.5 | 2094.9 | 1795.1 | 1474.4 | 1179.8 | 935.9  | 778.2  | 680.7  | 639.2  | 618.4  | 619.4  |
| 25°   | 2240.2 | 2087.7 | 1726.6 | 1349.9 | 1039.7 | 817.6  | 691.0  | 625.7  | 599.7  | 587.3  | 586.2  |
| 27.5° | 2280.7 | 2093.9 | 1655.0 | 1229.6 | 913.1  | 727.4  | 635.0  | 592.5  | 574.8  | 566.5  | 565.5  |
| 30°   | 2348.1 | 2118.8 | 1592.7 | 1107.1 | 804.1  | 656.8  | 596.6  | 570.7  | 560.3  | 553.0  | 552.0  |
| 32.5° | 2450.8 | 2165.5 | 1525.3 | 993.0  | 715.9  | 604.9  | 566.5  | 553.0  | 545.8  | 541.6  | 541.6  |
| 35°   | 2606.5 | 2250.6 | 1458.9 | 893.4  | 647.5  | 564.5  | 542.7  | 537.5  | 531.3  | 529.2  | 531.3  |
| 37.5° | 2830.6 | 2386.5 | 1398.7 | 806.2  | 598.7  | 533.3  | 516.7  | 518.8  | 513.6  | 516.7  | 519.8  |
| 40°   | 3114.9 | 2568.1 | 1347.8 | 734.6  | 562.4  | 510.5  | 493.9  | 501.2  | 498.0  | 501.2  | 506.4  |
| 42.5° | 3474.9 | 2793.2 | 1309.5 | 678.6  | 536.4  | 491.8  | 476.3  | 483.5  | 481.4  | 485.6  | 490.8  |
| 45°   | 3876.5 | 3090.0 | 1291.8 | 639.2  | 517.8  | 478.3  | 461.7  | 466.9  | 464.8  | 468.0  | 473.1  |
| 47.5° | 4261.4 | 3359.8 | 1307.4 | 616.3  | 502.2  | 466.9  | 449.3  | 451.4  | 450.3  | 449.3  | 452.4  |
| 50°   | 4593.5 | 3574.5 | 1352.0 | 609.1  | 491.8  | 455.5  | 438.9  | 439.9  | 436.8  | 430.6  | 432.7  |
| 52.5° | 4864.3 | 3746.8 | 1379.0 | 609.1  | 486.6  | 443.1  | 427.5  | 428.5  | 422.3  | 414.0  | 415.0  |
| 55°   | 5042.8 | 3816.3 | 1357.2 | 608.0  | 484.6  | 432.7  | 416.1  | 417.1  | 410.9  | 400.5  | 401.6  |
| 57.5° | 5093.6 | 3748.9 | 1265.9 | 596.6  | 482.5  | 424.4  | 404.7  | 406.7  | 402.6  | 391.2  | 391.2  |
| 60°   | 4951.4 | 3501.9 | 1098.8 | 570.7  | 477.3  | 419.2  | 396.4  | 399.5  | 397.4  | 386.0  | 386.0  |
| 62.5° | 4578.9 | 3063.0 | 899.6  | 531.3  | 462.8  | 413.0  | 389.1  | 395.3  | 400.5  | 394.3  | 393.3  |
| 65°   | 3881.7 | 2453.9 | 731.5  | 487.7  | 444.1  | 402.6  | 378.7  | 394.3  | 405.7  | 414.0  | 414.0  |
| 67.5° | 2912.6 | 1756.7 | 596.6  | 442.0  | 416.1  | 381.8  | 365.2  | 379.8  | 388.1  | 393.3  | 396.4  |
| 70°   | 1775.3 | 1033.5 | 470.0  | 389.1  | 375.6  | 350.7  | 338.3  | 323.7  | 312.3  | 310.2  | 311.3  |
| 72.5° | 868.5  | 591.4  | 381.8  | 331.0  | 320.6  | 297.8  | 269.8  | 263.6  | 258.4  | 255.3  | 254.2  |
| 75°   | 478.3  | 411.9  | 315.4  | 275.0  | 256.3  | 228.3  | 222.0  | 211.7  | 209.6  | 205.4  | 206.5  |
| 77.5° | 338.3  | 324.8  | 260.4  | 223.1  | 195.1  | 180.5  | 183.7  | 176.4  | 176.4  | 173.3  | 172.2  |
| 80°   | 254.2  | 255.3  | 200.3  | 162.9  | 144.2  | 139.0  | 142.2  | 142.2  | 140.1  | 139.0  | 138.0  |
| 82.5° | 160.8  | 181.6  | 134.9  | 104.8  | 102.7  | 103.8  | 102.7  | 101.7  | 103.8  | 100.6  | 99.6   |
| 85°   | 111.0  | 130.7  | 82.0   | 62.3   | 62.3   | 61.2   | 63.3   | 62.3   | 64.3   | 61.2   | 61.2   |
| 87.5° | 24.9   | 58.1   | 30.1   | 18.7   | 19.7   | 18.7   | 19.7   | 20.8   | 22.8   | 23.9   | 23.9   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

MCGRAW, INVUE, LUMARK AND STREETWORKS

DATA VALID FOR LUMINAIRES UTILIZING SA LIGHT ENGINES

Report Number: SP1-2101-121-2

Luminaire Tested: IFLD-S-SA2A-740-U-T3R-HSS

Test Date: 03/05/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/05/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-740-U-T3R-HSS**  
 Description: STREETWORKS INF FLOOD

SHIELD, DRIVER PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 3905    | CRI (Ra): | 71.2 |      |       |
| CIE u':                   | 0.2273  | R1:       | 68.9 | R9:  | -29.7 |
| CIE v':                   | 0.5024  | R2:       | 77.0 | R10: | 46.2  |
| Duv:                      | -0.0008 | R3:       | 84.0 | R11: | 68.8  |
| CIE x:                    | 0.3841  | R4:       | 71.6 | R12: | 45.6  |
| CIE y:                    | 0.3774  | R5:       | 68.9 | R13: | 69.5  |
| CIE z:                    | 0.2385  | R6:       | 68.3 | R14: | 90.7  |
| Peak Wavelength (nm):     | 443     | R7:       | 78.7 |      |       |
| Dominant Wavelength (nm): | 579     | R8:       | 52.2 |      |       |
| Purity:                   | 28.7    |           |      |      |       |
| Rf:                       | 71.7    |           |      |      |       |
| Rg:                       | 96.9    |           |      |      |       |



### Test Conditions

Stabilization Time: 211M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/312%  
 Sphere Temperature (°C): 24.1

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

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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 4000K 4-step quadrangle

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### Photopic Flux vs. Wavelength



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| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2304             | 0.0              | 490       | 19043            | 2.7              | 620       | 97577            | 25.4             | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 4.8              | 625       | 90158            | 19.9             | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 8.0              | 630       | 82240            | 14.9             | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 13.3             | 635       | 74361            | 11.2             | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 20.2             | 640       | 66994            | 8.0              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 28.5             | 645       | 60405            | 5.8              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 37.4             | 650       | 53806            | 3.9              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 44.9             | 655       | 47610            | 2.7              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 52.6             | 660       | 42018            | 1.8              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.0              | 535       | 94097            | 58.4             | 665       | 36742            | 1.2              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.0              | 540       | 96845            | 63.1             | 670       | 32105            | 0.7              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.0              | 545       | 100829           | 67.1             | 675       | 27946            | 0.5              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 0.1              | 550       | 105648           | 71.8             | 680       | 24146            | 0.3              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 0.2              | 555       | 110017           | 75.1             | 685       | 21191            | 0.2              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 0.5              | 560       | 114586           | 77.9             | 690       | 18544            | 0.1              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 1.2              | 565       | 118987           | 79.1             | 695       | 16058            | 0.1              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 2.1              | 570       | 122326           | 79.5             | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 2.9              | 575       | 125968           | 78.4             | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 2.7              | 580       | 127613           | 75.8             | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 2.0              | 585       | 129466           | 71.9             | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 1.5              | 590       | 128813           | 66.6             | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 1.3              | 595       | 126387           | 59.9             | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 1.0              | 600       | 123477           | 53.2             | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 1.1              | 605       | 118718           | 46.0             | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 1.2              | 610       | 112091           | 38.5             | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 1.7              | 615       | 105039           | 31.7             | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-2

### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 10425.8**
**S/P: 1.47**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2304             | 0.0              | 490       | 19043            | 29.3             | 620       | 97577            | 1.2              | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 43.0             | 625       | 90158            | 0.8              | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 60.8             | 630       | 82240            | 0.5              | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 81.1             | 635       | 74361            | 0.3              | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 99.6             | 640       | 66994            | 0.2              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 113.9            | 645       | 60405            | 0.1              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 122.6            | 650       | 53806            | 0.1              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 125.0            | 655       | 47610            | 0.0              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 123.1            | 660       | 42018            | 0.0              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.1              | 535       | 94097            | 117.3            | 665       | 36742            | 0.0              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.2              | 540       | 96845            | 107.0            | 670       | 32105            | 0.0              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.9              | 545       | 100829           | 96.7             | 675       | 27946            | 0.0              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 3.0              | 550       | 105648           | 86.4             | 680       | 24146            | 0.0              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 9.3              | 555       | 110017           | 75.2             | 685       | 21191            | 0.0              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 23.0             | 560       | 114586           | 64.0             | 690       | 18544            | 0.0              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 45.7             | 565       | 118987           | 53.4             | 695       | 16058            | 0.0              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 75.5             | 570       | 122326           | 43.2             | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 93.8             | 575       | 125968           | 34.3             | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 79.3             | 580       | 127613           | 26.3             | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 51.3             | 585       | 129466           | 19.8             | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 35.6             | 590       | 128813           | 14.3             | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 26.0             | 595       | 126387           | 10.1             | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 19.3             | 600       | 123477           | 7.0              | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 16.8             | 605       | 118718           | 4.7              | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 17.7             | 610       | 112091           | 3.0              | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 21.4             | 615       | 105039           | 1.9              | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-2

### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 3927.2**      **M/P: 0.55**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2304             | 0.0              | 490       | 19043            | 15.8             | 620       | 97577            | 0.1              | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 22.0             | 625       | 90158            | 0.0              | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 29.2             | 630       | 82240            | 0.0              | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 36.6             | 635       | 74361            | 0.0              | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 42.2             | 640       | 66994            | 0.0              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 44.9             | 645       | 60405            | 0.0              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 44.9             | 650       | 53806            | 0.0              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 42.4             | 655       | 47610            | 0.0              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 38.6             | 660       | 42018            | 0.0              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.0              | 535       | 94097            | 33.9             | 665       | 36742            | 0.0              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.2              | 540       | 96845            | 28.3             | 670       | 32105            | 0.0              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.6              | 545       | 100829           | 23.4             | 675       | 27946            | 0.0              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 2.1              | 550       | 105648           | 19.0             | 680       | 24146            | 0.0              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 5.9              | 555       | 110017           | 14.8             | 685       | 21191            | 0.0              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 14.3             | 560       | 114586           | 11.3             | 690       | 18544            | 0.0              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 27.3             | 565       | 118987           | 8.4              | 695       | 16058            | 0.0              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 45.1             | 570       | 122326           | 6.0              | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 55.3             | 575       | 125968           | 4.2              | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 47.2             | 580       | 127613           | 2.9              | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 30.8             | 585       | 129466           | 1.9              | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 21.7             | 590       | 128813           | 1.3              | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 16.1             | 595       | 126387           | 0.8              | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 12.0             | 600       | 123477           | 0.5              | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 10.3             | 605       | 118718           | 0.3              | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 10.5             | 610       | 112091           | 0.2              | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 12.1             | 615       | 105039           | 0.1              | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

### Summary

$R_f = 71.7$   
 $R_g = 96.9$   
 CIE  $R_a = 71.2$   
 $R_g = -29.7$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 55 | CES51 = 86 | CES76 = 45 |
| CES02 = 61 | CES27 = 80 | CES52 = 87 | CES77 = 68 |
| CES03 = 30 | CES28 = 79 | CES53 = 74 | CES78 = 49 |
| CES04 = 70 | CES29 = 51 | CES54 = 81 | CES79 = 77 |
| CES05 = 47 | CES30 = 60 | CES55 = 80 | CES80 = 75 |
| CES06 = 50 | CES31 = 56 | CES56 = 69 | CES81 = 75 |
| CES07 = 40 | CES32 = 52 | CES57 = 67 | CES82 = 90 |
| CES08 = 39 | CES33 = 62 | CES58 = 69 | CES83 = 85 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 81 | CES60 = 91 | CES85 = 83 |
| CES11 = 57 | CES36 = 92 | CES61 = 85 | CES86 = 72 |
| CES12 = 63 | CES37 = 74 | CES62 = 81 | CES87 = 77 |
| CES13 = 42 | CES38 = 69 | CES63 = 72 | CES88 = 77 |
| CES14 = 74 | CES39 = 92 | CES64 = 69 | CES89 = 72 |
| CES15 = 71 | CES40 = 86 | CES65 = 64 | CES90 = 75 |
| CES16 = 46 | CES41 = 84 | CES66 = 63 | CES91 = 91 |
| CES17 = 49 | CES42 = 75 | CES67 = 60 | CES92 = 66 |
| CES18 = 56 | CES43 = 70 | CES68 = 67 | CES93 = 80 |
| CES19 = 72 | CES44 = 98 | CES69 = 77 | CES94 = 56 |
| CES20 = 65 | CES45 = 80 | CES70 = 57 | CES95 = 72 |
| CES21 = 86 | CES46 = 77 | CES71 = 53 | CES96 = 78 |
| CES22 = 78 | CES47 = 74 | CES72 = 84 | CES97 = 83 |
| CES23 = 92 | CES48 = 66 | CES73 = 47 | CES98 = 73 |
| CES24 = 91 | CES49 = 76 | CES74 = 96 | CES99 = 63 |
| CES25 = 72 | CES50 = 85 | CES75 = 52 |            |



Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-2101-121-2

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)