

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: P636605

Luminaire Tested: GWS-SA4B-727-U-SL3-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P636605  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-34)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA4B-727-U-SL3-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (64) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

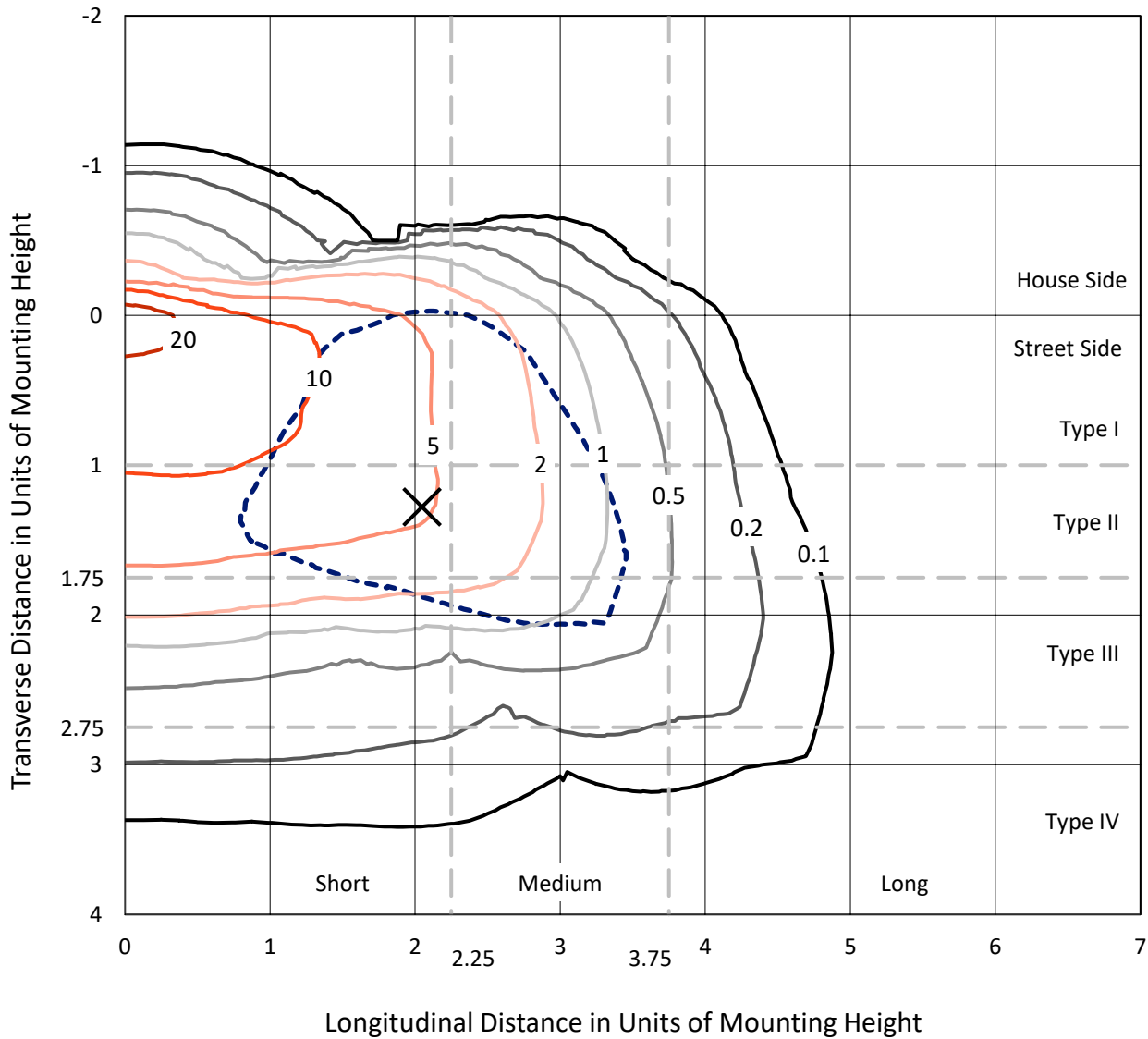
Lumens per Lamp: N/A  
Luminaire Lumens: 9804 lumens  
Efficiency: N/A  
Efficacy: 103.9 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B1 - U0 - G2  
  
Input Watts (W): 94.4  
Input Voltage (V): 120  
Input Current (Ain): NR  
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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 CATALOG NUMBER: GWS-SA4B-727-U-SL3-W-HSS

### Iso-Footcandle Lines of Horizontal Illumination

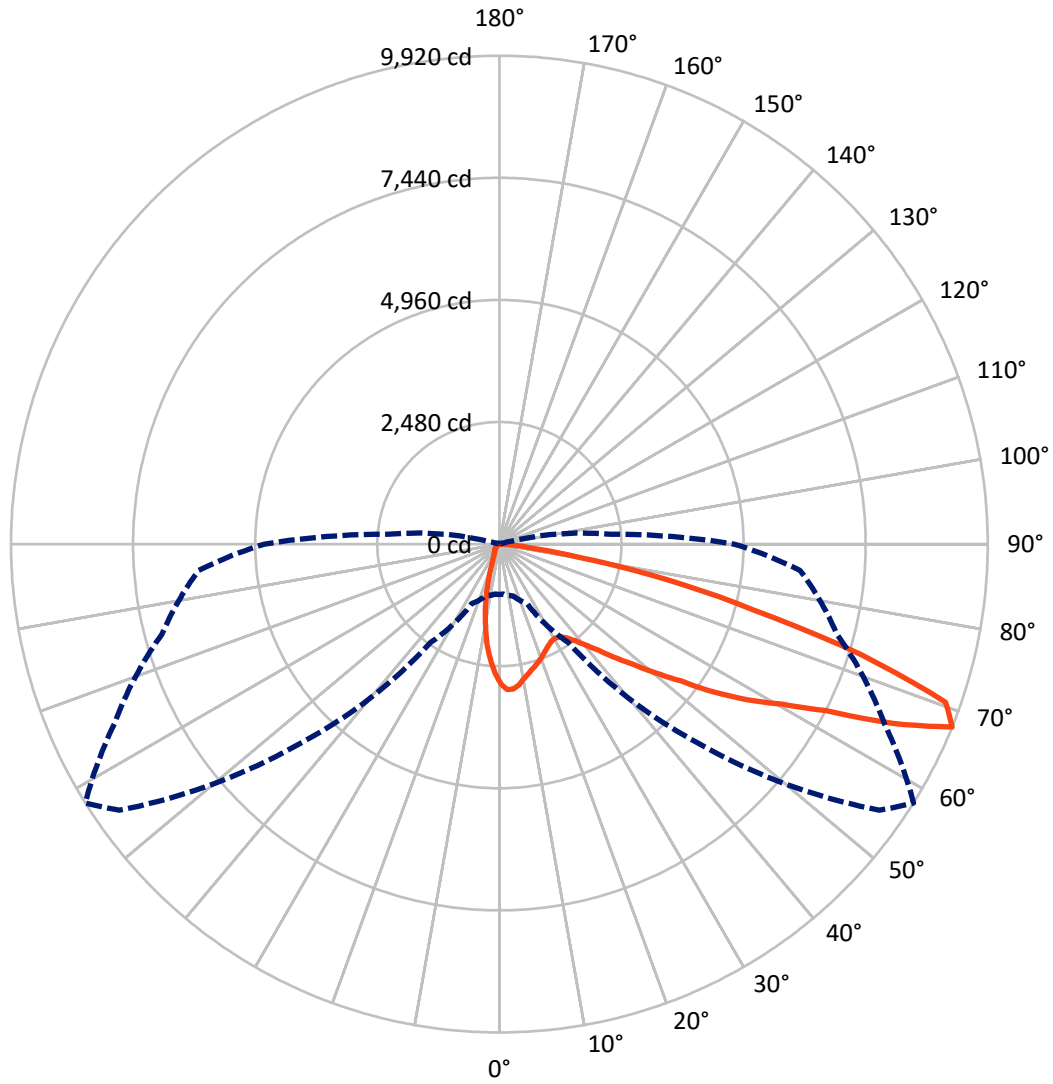
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 28.3 fc  
 Type III - Short - N/A

REPORT NUMBER: P636605  
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### Luminous Intensity Polar Plot



— Vertical Plane Through 58-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 957.8    | 0.0    | 957.8  |
|                    | % Fixture | 9.8      | 0.0    | 9.8    |
| <b>Street Side</b> | Lumens    | 8846.2   | 0.0    | 8846.2 |
|                    | % Fixture | 90.2     | 0.0    | 90.2   |
| <b>Total</b>       | Lumens    | 9804.0   | 0.0    | 9804.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 229.8  | 2.3       |
| 10°-20°   | 478.4  | 4.9       |
| 20°-30°   | 645.1  | 6.6       |
| 30°-40°   | 906.5  | 9.2       |
| 40°-50°   | 1400.0 | 14.3      |
| 50°-60°   | 2238.8 | 22.8      |
| 60°-70°   | 2650.9 | 27.0      |
| 70°-80°   | 1172.7 | 12.0      |
| 80°-90°   | 82.0   | 0.8       |
| 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°    | 9804.0 | 100.0     |
| 0°-180°   | 9804.0 | 100.0     |

**Coefficient of Utilization**



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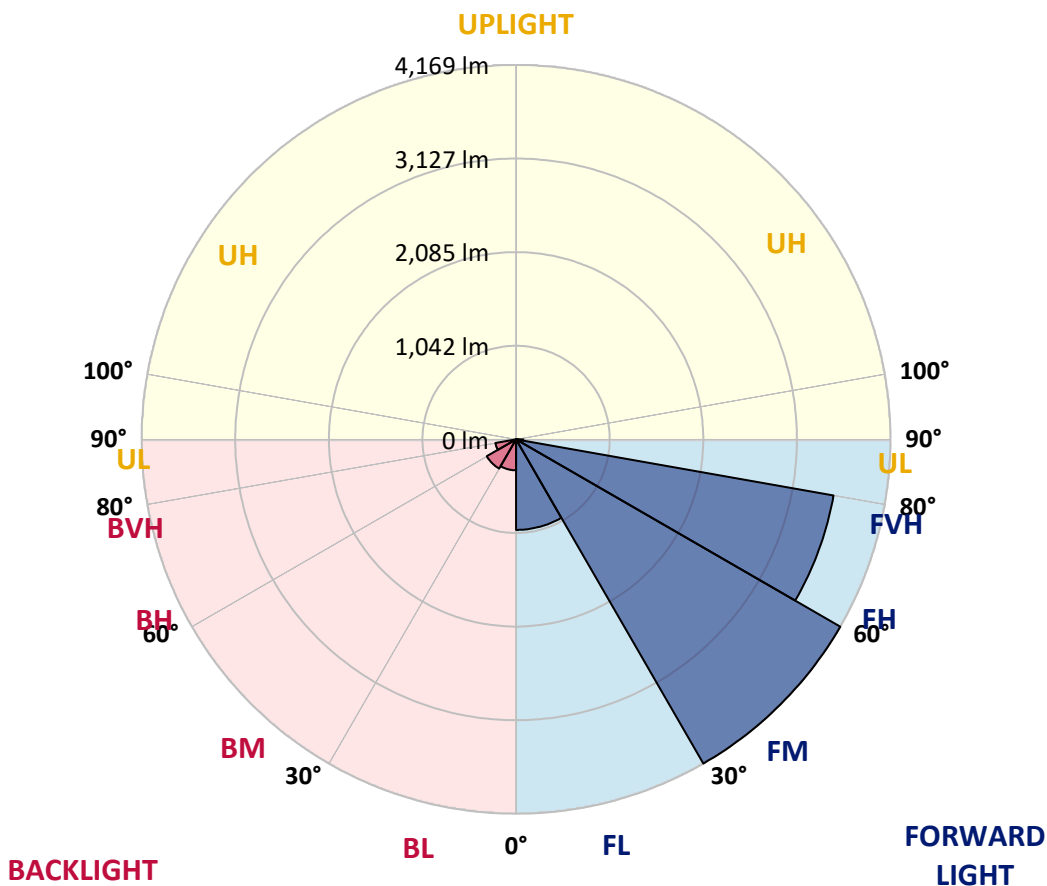
CATALOG NUMBER: GWS-SA4B-727-U-SL3-W-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1008.6 | 10.3      |                         |      |         |
| FM (30°-60°)   | 4169.4 | 42.5      |                         |      |         |
| FH (60°-80°)   | 3589.7 | 36.6      |                         |      | G2/5000 |
| FVH (80°-90°)  | 78.5   | 0.8       |                         |      | G1/100  |
| BL (0°-30°)    | 344.7  | 3.5       | B1/500                  |      |         |
| BM (30°-60°)   | 375.8  | 3.8       | B1/1000                 |      |         |
| BH (60°-80°)   | 233.8  | 2.4       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 3.5    | 0.0       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type III Short





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CATALOG NUMBER: GWS-SA4B-727-U-SL3-W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 |
| 2.5°  | 2974.6 | 2979.8 | 2986.7 | 2995.4 | 2993.7 | 2985.9 | 2976.3 | 2954.6 | 2940.7 | 2897.4 | 2844.4 |
| 5°    | 2879.1 | 2878.3 | 2895.6 | 2912.1 | 2941.6 | 2957.2 | 2978.9 | 2959.0 | 2952.0 | 2900.0 | 2814.1 |
| 7.5°  | 2692.6 | 2702.1 | 2722.1 | 2748.1 | 2790.6 | 2836.6 | 2888.7 | 2882.6 | 2903.4 | 2868.7 | 2762.0 |
| 10°   | 2509.5 | 2504.3 | 2535.5 | 2574.6 | 2639.6 | 2698.6 | 2774.1 | 2773.3 | 2827.9 | 2824.5 | 2703.0 |
| 12.5° | 2348.9 | 2348.1 | 2372.4 | 2416.6 | 2493.0 | 2575.4 | 2677.8 | 2680.4 | 2748.1 | 2775.9 | 2652.7 |
| 15°   | 2213.6 | 2215.3 | 2238.7 | 2284.7 | 2363.7 | 2464.4 | 2583.2 | 2604.9 | 2681.3 | 2737.7 | 2603.2 |
| 17.5° | 2117.3 | 2118.1 | 2132.0 | 2171.9 | 2249.2 | 2356.8 | 2499.9 | 2529.4 | 2627.5 | 2709.1 | 2563.3 |
| 20°   | 2073.0 | 2069.5 | 2072.1 | 2092.1 | 2152.0 | 2250.0 | 2414.9 | 2453.1 | 2578.0 | 2689.1 | 2526.8 |
| 22.5° | 2079.1 | 2073.9 | 2061.7 | 2059.1 | 2086.0 | 2160.6 | 2324.7 | 2371.5 | 2524.2 | 2676.9 | 2493.9 |
| 25°   | 2132.9 | 2121.6 | 2104.2 | 2078.2 | 2067.8 | 2105.1 | 2245.7 | 2294.3 | 2473.9 | 2677.8 | 2468.7 |
| 27.5° | 2215.3 | 2203.2 | 2181.5 | 2146.8 | 2106.0 | 2090.4 | 2191.9 | 2237.9 | 2438.3 | 2697.8 | 2456.5 |
| 30°   | 2320.3 | 2310.8 | 2289.9 | 2248.3 | 2193.6 | 2129.4 | 2180.6 | 2218.8 | 2421.0 | 2738.6 | 2461.8 |
| 32.5° | 2444.4 | 2437.5 | 2420.1 | 2381.9 | 2319.4 | 2221.4 | 2218.8 | 2248.3 | 2434.9 | 2797.6 | 2481.7 |
| 35°   | 2564.1 | 2566.7 | 2567.6 | 2546.8 | 2480.0 | 2361.1 | 2323.8 | 2334.2 | 2492.1 | 2886.1 | 2526.8 |
| 37.5° | 2693.4 | 2687.4 | 2718.6 | 2733.4 | 2669.1 | 2542.5 | 2486.0 | 2486.9 | 2601.5 | 3017.1 | 2611.9 |
| 40°   | 2791.5 | 2793.2 | 2860.9 | 2921.6 | 2894.7 | 2772.4 | 2691.7 | 2690.8 | 2769.8 | 3196.7 | 2749.0 |
| 42.5° | 2883.5 | 2894.7 | 2994.5 | 3098.7 | 3136.0 | 3027.5 | 2969.4 | 2947.7 | 3005.8 | 3439.7 | 2954.6 |
| 45°   | 2981.5 | 2998.0 | 3137.7 | 3286.1 | 3384.1 | 3319.9 | 3273.9 | 3282.6 | 3289.6 | 3722.6 | 3231.4 |
| 47.5° | 3096.1 | 3106.5 | 3279.2 | 3488.3 | 3671.4 | 3654.9 | 3657.5 | 3647.1 | 3643.6 | 4079.2 | 3597.6 |
| 50°   | 3234.9 | 3259.2 | 3457.9 | 3707.8 | 3957.7 | 4067.1 | 4103.5 | 4107.8 | 4051.4 | 4467.9 | 3976.8 |
| 52.5° | 3529.9 | 3559.4 | 3729.5 | 3948.2 | 4270.1 | 4500.1 | 4648.4 | 4618.9 | 4532.2 | 4844.5 | 4392.5 |
| 55°   | 3877.9 | 3900.4 | 4064.4 | 4290.9 | 4651.9 | 4974.7 | 5327.0 | 5314.8 | 5102.3 | 5241.1 | 4734.3 |
| 57.5° | 3910.9 | 3936.0 | 4190.3 | 4537.4 | 5142.2 | 5561.3 | 5931.8 | 5970.9 | 5659.3 | 5522.2 | 5039.8 |
| 60°   | 3540.3 | 3591.5 | 3938.6 | 4405.5 | 5329.6 | 6350.1 | 6594.8 | 6602.6 | 6068.0 | 5807.7 | 5412.9 |
| 62.5° | 2837.5 | 2861.8 | 3211.5 | 3820.6 | 5040.6 | 6809.9 | 7607.4 | 7442.5 | 6593.0 | 6249.4 | 6003.8 |
| 65°   | 1487.3 | 1586.2 | 1890.8 | 2565.0 | 4087.9 | 6649.4 | 8825.7 | 8780.6 | 7537.1 | 6882.0 | 6463.7 |
| 67.5° | 1020.5 | 1019.6 | 1091.6 | 1337.2 | 2437.5 | 5725.3 | 9423.6 | 9919.9 | 8628.7 | 7098.9 | 6130.5 |
| 70°   | 776.6  | 779.2  | 843.4  | 1003.1 | 1262.5 | 3811.1 | 8767.5 | 9616.2 | 8831.8 | 6445.5 | 4958.2 |
| 72.5° | 515.4  | 520.6  | 627.4  | 810.5  | 1008.3 | 1868.2 | 6813.4 | 7694.2 | 7431.2 | 5176.9 | 3490.0 |
| 75°   | 308.0  | 312.4  | 388.7  | 589.2  | 896.4  | 1045.6 | 4329.1 | 5319.2 | 5115.3 | 3568.1 | 1870.8 |
| 77.5° | 126.7  | 130.2  | 199.6  | 367.1  | 656.0  | 812.2  | 2394.1 | 3480.5 | 3064.0 | 1418.7 | 511.1  |
| 80°   | 52.9   | 54.7   | 96.3   | 256.8  | 472.9  | 509.4  | 1109.0 | 1635.7 | 1255.6 | 305.4  | 156.2  |
| 82.5° | 19.1   | 20.0   | 35.6   | 141.4  | 294.2  | 383.5  | 559.7  | 646.5  | 354.0  | 99.8   | 84.2   |
| 85°   | 0.9    | 0.9    | 8.7    | 47.7   | 111.9  | 108.5  | 320.2  | 309.8  | 117.1  | 41.7   | 50.3   |
| 87.5° | 0.0    | 0.0    | 0.9    | 0.9    | 1.7    | 4.3    | 30.4   | 53.8   | 25.2   | 10.4   | 21.7   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 | 2827.9 |
| 2.5°  | 2809.7 | 2763.7 | 2713.4 | 2666.5 | 2591.9 | 2547.7 | 2493.0 | 2468.7 | 2434.0 | 2425.3 | 2430.5 |
| 5°    | 2752.4 | 2673.5 | 2552.9 | 2443.5 | 2302.1 | 2188.4 | 2073.9 | 2025.3 | 1962.8 | 1921.2 | 1903.8 |
| 7.5°  | 2671.7 | 2568.5 | 2380.2 | 2181.5 | 1987.1 | 1779.7 | 1621.8 | 1517.7 | 1423.1 | 1371.0 | 1360.6 |
| 10°   | 2590.2 | 2455.7 | 2185.8 | 1901.2 | 1600.1 | 1351.9 | 1138.5 | 980.5  | 852.1  | 794.0  | 748.9  |
| 12.5° | 2506.0 | 2338.5 | 1988.0 | 1616.6 | 1266.9 | 928.5  | 664.7  | 511.1  | 419.1  | 382.7  | 388.7  |
| 15°   | 2428.8 | 2225.7 | 1791.9 | 1332.0 | 892.0  | 560.6  | 367.1  | 309.8  | 288.1  | 281.1  | 280.3  |
| 17.5° | 2355.0 | 2119.0 | 1596.6 | 1055.2 | 588.3  | 343.6  | 281.1  | 267.3  | 261.2  | 257.7  | 257.7  |
| 20°   | 2288.2 | 2016.6 | 1405.7 | 794.8  | 380.1  | 272.5  | 254.2  | 247.3  | 242.1  | 239.5  | 239.5  |
| 22.5° | 2225.7 | 1917.7 | 1219.2 | 562.3  | 280.3  | 244.7  | 233.4  | 226.5  | 220.4  | 216.9  | 216.9  |
| 25°   | 2169.3 | 1828.3 | 1041.3 | 387.0  | 241.2  | 223.9  | 211.7  | 203.9  | 193.5  | 187.4  | 187.4  |
| 27.5° | 2128.5 | 1748.5 | 870.3  | 282.0  | 217.8  | 201.3  | 187.4  | 177.0  | 165.7  | 158.8  | 157.1  |
| 30°   | 2104.2 | 1680.8 | 697.7  | 231.7  | 196.1  | 179.6  | 164.0  | 151.0  | 138.0  | 131.0  | 130.2  |
| 32.5° | 2090.4 | 1618.3 | 539.7  | 202.2  | 177.9  | 158.8  | 141.4  | 127.6  | 114.5  | 106.7  | 105.9  |
| 35°   | 2095.6 | 1569.7 | 404.4  | 182.2  | 160.5  | 140.6  | 121.5  | 107.6  | 96.3   | 89.4   | 87.6   |
| 37.5° | 2140.7 | 1548.0 | 303.7  | 166.6  | 145.8  | 125.0  | 105.0  | 92.0   | 81.6   | 76.4   | 75.5   |
| 40°   | 2228.3 | 1552.4 | 238.6  | 154.5  | 133.6  | 109.3  | 90.2   | 78.1   | 70.3   | 65.9   | 65.1   |
| 42.5° | 2364.6 | 1588.8 | 197.0  | 144.0  | 120.6  | 95.5   | 78.1   | 68.6   | 60.7   | 56.4   | 55.5   |
| 45°   | 2567.6 | 1664.3 | 171.8  | 131.9  | 106.7  | 82.4   | 67.7   | 59.0   | 52.1   | 46.9   | 46.0   |
| 47.5° | 2861.8 | 1795.3 | 155.3  | 120.6  | 94.6   | 71.2   | 58.1   | 49.5   | 43.4   | 39.0   | 38.2   |
| 50°   | 3175.0 | 1952.4 | 141.4  | 109.3  | 84.2   | 61.6   | 49.5   | 40.8   | 35.6   | 31.2   | 30.4   |
| 52.5° | 3509.1 | 2121.6 | 131.0  | 98.9   | 74.6   | 52.9   | 41.7   | 33.8   | 28.6   | 24.3   | 23.4   |
| 55°   | 3830.2 | 2291.7 | 118.9  | 92.0   | 63.3   | 45.1   | 34.7   | 27.8   | 22.6   | 19.1   | 19.1   |
| 57.5° | 4142.5 | 2447.9 | 105.9  | 80.7   | 52.1   | 38.2   | 28.6   | 22.6   | 18.2   | 15.6   | 14.8   |
| 60°   | 4515.7 | 2663.9 | 91.1   | 68.6   | 43.4   | 32.1   | 23.4   | 18.2   | 14.8   | 12.1   | 12.1   |
| 62.5° | 5070.1 | 2888.7 | 78.1   | 57.3   | 36.4   | 26.9   | 19.1   | 14.8   | 12.1   | 10.4   | 9.5    |
| 65°   | 5251.5 | 2767.2 | 65.9   | 46.9   | 29.5   | 21.7   | 15.6   | 13.0   | 10.4   | 9.5    | 8.7    |
| 67.5° | 4767.3 | 2268.2 | 54.7   | 38.2   | 24.3   | 18.2   | 13.9   | 11.3   | 9.5    | 8.7    | 7.8    |
| 70°   | 3720.0 | 1609.6 | 42.5   | 28.6   | 20.0   | 14.8   | 12.1   | 10.4   | 8.7    | 7.8    | 7.8    |
| 72.5° | 2530.3 | 951.9  | 33.8   | 21.7   | 16.5   | 13.0   | 10.4   | 9.5    | 8.7    | 7.8    | 6.9    |
| 75°   | 1246.1 | 338.4  | 26.0   | 16.5   | 13.0   | 11.3   | 9.5    | 8.7    | 7.8    | 6.9    | 6.9    |
| 77.5° | 335.8  | 93.7   | 20.0   | 13.0   | 10.4   | 8.7    | 8.7    | 8.7    | 7.8    | 6.1    | 6.1    |
| 80°   | 113.7  | 39.0   | 14.8   | 9.5    | 8.7    | 6.9    | 6.1    | 7.8    | 6.9    | 6.1    | 5.2    |
| 82.5° | 62.5   | 19.1   | 10.4   | 7.8    | 6.1    | 5.2    | 5.2    | 5.2    | 5.2    | 4.3    | 4.3    |
| 85°   | 39.9   | 10.4   | 6.9    | 6.1    | 6.1    | 4.3    | 3.5    | 3.5    | 2.6    | 2.6    | 2.6    |
| 87.5° | 18.2   | 6.1    | 6.1    | 5.2    | 5.2    | 4.3    | 2.6    | 1.7    | 0.9    | 0.9    | 0.9    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
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LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-1-R4

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-1-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGRAW-EDISON  
 Catalog Number: **SA1C-727-U-5WQ**  
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-1-R3. TO UPDATE THE CATALOG NUMBER.\*\*\*TESTED IN SITU. (1) 70 CRI, 2700K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

CCT (K): 2741  
 CIE u': 0.2605  
 CIE v': 0.5272  
 Duv: 0.0005  
 CIE x: 0.4573  
 CIE y: 0.4113  
 CIE z: 0.1313  
 Peak Wavelength (nm): 602  
 Dominant Wavelength (nm): 583  
 Purity: 61.2

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.5 |      |       |
| R1:       | 69.2 | R9:  | -16.1 |
| R2:       | 79.4 | R10: | 51.4  |
| R3:       | 87.8 | R11: | 63.1  |
| R4:       | 69.4 | R12: | 42.0  |
| R5:       | 66.4 | R13: | 70.2  |
| R6:       | 69.8 | R14: | 92.4  |
| R7:       | 79.8 |      |       |
| R8:       | 50.1 |      |       |

Rf: 69.9  
 Rg: 98.3



**Test Conditions**

Stabilization Time: 56M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3./42%  
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-1-R4

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

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CIE 1931 Chromaticity Diagram



CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: 6211.7**

| $\lambda$ (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            | 2044                              | 0.0                         | 490            | 7179                              | 1.0                         | 620            | 118034                            | 30.7                        | 750            | 8362                              | 0.0                         | 880            | 3128                              | 0.0                         |
| 365            | 2016                              | 0.0                         | 495            | 10476                             | 1.9                         | 625            | 111884                            | 24.7                        | 755            | 7635                              | 0.0                         | 885            | 3110                              | 0.0                         |
| 370            | 2020                              | 0.0                         | 500            | 15549                             | 3.4                         | 630            | 106119                            | 19.2                        | 760            | 6582                              | 0.0                         | 890            | 2632                              | 0.0                         |
| 375            | 2137                              | 0.0                         | 505            | 22477                             | 6.3                         | 635            | 99706                             | 15.0                        | 765            | 5777                              | 0.0                         | 895            | 2709                              | 0.0                         |
| 380            | 2046                              | 0.0                         | 510            | 30417                             | 10.4                        | 640            | 92142                             | 11.0                        | 770            | 5474                              | 0.0                         | 900            | 2016                              | 0.0                         |
| 385            | 1925                              | 0.0                         | 515            | 39274                             | 16.3                        | 645            | 84987                             | 8.2                         | 775            | 4977                              | 0.0                         | 905            | 1748                              | 0.0                         |
| 390            | 1893                              | 0.0                         | 520            | 47282                             | 22.9                        | 650            | 78016                             | 5.7                         | 780            | 4723                              | 0.0                         | 910            | 2046                              | 0.0                         |
| 395            | 1695                              | 0.0                         | 525            | 55413                             | 29.7                        | 655            | 71541                             | 4.1                         | 785            | 4219                              | 0.0                         | 915            | 1844                              | 0.0                         |
| 400            | 1633                              | 0.0                         | 530            | 62377                             | 36.7                        | 660            | 64863                             | 2.7                         | 790            | 3969                              | 0.0                         | 920            | 2734                              | 0.0                         |
| 405            | 2065                              | 0.0                         | 535            | 68520                             | 42.5                        | 665            | 58485                             | 1.9                         | 795            | 4122                              | 0.0                         | 925            | 2307                              | 0.0                         |
| 410            | 3449                              | 0.0                         | 540            | 73435                             | 47.8                        | 670            | 51641                             | 1.1                         | 800            | 2864                              | 0.0                         | 930            | 2039                              | 0.0                         |
| 415            | 7117                              | 0.0                         | 545            | 78677                             | 52.4                        | 675            | 46030                             | 0.8                         | 805            | 3151                              | 0.0                         | 935            | 1784                              | 0.0                         |
| 420            | 13992                             | 0.0                         | 550            | 83331                             | 56.6                        | 680            | 40590                             | 0.5                         | 810            | 3022                              | 0.0                         | 940            | 2464                              | 0.0                         |
| 425            | 25176                             | 0.1                         | 555            | 89120                             | 60.9                        | 685            | 35691                             | 0.3                         | 815            | 3471                              | 0.0                         | 945            | 2794                              | 0.0                         |
| 430            | 38151                             | 0.3                         | 560            | 94613                             | 64.3                        | 690            | 31631                             | 0.2                         | 820            | 2749                              | 0.0                         | 950            | 3090                              | 0.0                         |
| 435            | 49673                             | 0.6                         | 565            | 99818                             | 66.4                        | 695            | 27437                             | 0.1                         | 825            | 2729                              | 0.0                         | 955            | 1866                              | 0.0                         |
| 440            | 57273                             | 0.9                         | 570            | 106526                            | 69.3                        | 700            | 24589                             | 0.1                         | 830            | 2282                              | 0.0                         | 960            | 3110                              | 0.0                         |
| 445            | 54802                             | 1.1                         | 575            | 111610                            | 69.4                        | 705            | 21832                             | 0.0                         | 835            | 3140                              | 0.0                         | 965            | 3880                              | 0.0                         |
| 450            | 39184                             | 1.0                         | 580            | 117163                            | 69.6                        | 710            | 19500                             | 0.0                         | 840            | 2365                              | 0.0                         | 970            | 3243                              | 0.0                         |
| 455            | 22506                             | 0.8                         | 585            | 122201                            | 67.9                        | 715            | 17870                             | 0.0                         | 845            | 3024                              | 0.0                         | 975            | 2014                              | 0.0                         |
| 460            | 13692                             | 0.6                         | 590            | 125662                            | 65.0                        | 720            | 15924                             | 0.0                         | 850            | 2510                              | 0.0                         | 980            | 1688                              | 0.0                         |
| 465            | 9446                              | 0.5                         | 595            | 127415                            | 60.4                        | 725            | 14268                             | 0.0                         | 855            | 2739                              | 0.0                         | 985            | 2827                              | 0.0                         |
| 470            | 6698                              | 0.4                         | 600            | 129155                            | 55.7                        | 730            | 12438                             | 0.0                         | 860            | 3515                              | 0.0                         | 990            | 4172                              | 0.0                         |
| 475            | 5328                              | 0.4                         | 605            | 128057                            | 49.6                        | 735            | 11255                             | 0.0                         | 865            | 3600                              | 0.0                         | 995            | 3177                              | 0.0                         |
| 480            | 5081                              | 0.5                         | 610            | 126031                            | 43.3                        | 740            | 9951                              | 0.0                         | 870            | 3609                              | 0.0                         | 1000           | 3241                              | 0.0                         |
| 485            | 5579                              | 0.7                         | 615            | 123059                            | 37.1                        | 745            | 8870                              | 0.0                         | 875            | 3208                              | 0.0                         |                |                                   |                             |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3 S/P: 1.04

| 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    | 2044          | 0.0           | 490    | 7179          | 6.0           | 620    | 118034        | 0.1           | 750    | 8362          | 0.0           | 880    | 3128          | 0.0           |
| 365    | 2016          | 0.0           | 495    | 10476         | 8.6           | 625    | 111884        | 0.1           | 755    | 7635          | 0.0           | 885    | 3110          | 0.0           |
| 370    | 2020          | 0.0           | 500    | 15549         | 12.5          | 630    | 106119        | 0.0           | 760    | 6582          | 0.0           | 890    | 2632          | 0.0           |
| 375    | 2137          | 0.0           | 505    | 22477         | 17.3          | 635    | 99706         | 0.0           | 765    | 5777          | 0.0           | 895    | 2709          | 0.0           |
| 380    | 2046          | 0.0           | 510    | 30417         | 21.8          | 640    | 92142         | 0.0           | 770    | 5474          | 0.0           | 900    | 2016          | 0.0           |
| 385    | 1925          | 0.0           | 515    | 39274         | 25.7          | 645    | 84987         | 0.0           | 775    | 4977          | 0.0           | 905    | 1748          | 0.0           |
| 390    | 1893          | 0.0           | 520    | 47282         | 27.5          | 650    | 78016         | 0.0           | 780    | 4723          | 0.0           | 910    | 2046          | 0.0           |
| 395    | 1695          | 0.0           | 525    | 55413         | 28.1          | 655    | 71541         | 0.0           | 785    | 4219          | 0.0           | 915    | 1844          | 0.0           |
| 400    | 1633          | 0.0           | 530    | 62377         | 27.0          | 660    | 64863         | 0.0           | 790    | 3969          | 0.0           | 920    | 2734          | 0.0           |
| 405    | 2065          | 0.0           | 535    | 68520         | 24.7          | 665    | 58485         | 0.0           | 795    | 4122          | 0.0           | 925    | 2307          | 0.0           |
| 410    | 3449          | 0.1           | 540    | 73435         | 21.5          | 670    | 51641         | 0.0           | 800    | 2864          | 0.0           | 930    | 2039          | 0.0           |
| 415    | 7117          | 0.5           | 545    | 78677         | 18.3          | 675    | 46030         | 0.0           | 805    | 3151          | 0.0           | 935    | 1784          | 0.0           |
| 420    | 13992         | 1.6           | 550    | 83331         | 15.0          | 680    | 40590         | 0.0           | 810    | 3022          | 0.0           | 940    | 2464          | 0.0           |
| 425    | 25176         | 3.9           | 555    | 89120         | 12.0          | 685    | 35691         | 0.0           | 815    | 3471          | 0.0           | 945    | 2794          | 0.0           |
| 430    | 38151         | 8.1           | 560    | 94613         | 9.3           | 690    | 31631         | 0.0           | 820    | 2749          | 0.0           | 950    | 3090          | 0.0           |
| 435    | 49673         | 13.3          | 565    | 99818         | 7.0           | 695    | 27437         | 0.0           | 825    | 2729          | 0.0           | 955    | 1866          | 0.0           |
| 440    | 57273         | 19.1          | 570    | 106526        | 5.2           | 700    | 24589         | 0.0           | 830    | 2282          | 0.0           | 960    | 3110          | 0.0           |
| 445    | 54802         | 21.6          | 575    | 111610        | 3.7           | 705    | 21832         | 0.0           | 835    | 3140          | 0.0           | 965    | 3880          | 0.0           |
| 450    | 39184         | 18.1          | 580    | 117163        | 2.6           | 710    | 19500         | 0.0           | 840    | 2365          | 0.0           | 970    | 3243          | 0.0           |
| 455    | 22506         | 11.8          | 585    | 122201        | 1.8           | 715    | 17870         | 0.0           | 845    | 3024          | 0.0           | 975    | 2014          | 0.0           |
| 460    | 13692         | 8.1           | 590    | 125662        | 1.2           | 720    | 15924         | 0.0           | 850    | 2510          | 0.0           | 980    | 1688          | 0.0           |
| 465    | 9446          | 6.2           | 595    | 127415        | 0.8           | 725    | 14268         | 0.0           | 855    | 2739          | 0.0           | 985    | 2827          | 0.0           |
| 470    | 6698          | 4.8           | 600    | 129155        | 0.5           | 730    | 12438         | 0.0           | 860    | 3515          | 0.0           | 990    | 4172          | 0.0           |
| 475    | 5328          | 4.1           | 605    | 128057        | 0.4           | 735    | 11255         | 0.0           | 865    | 3600          | 0.0           | 995    | 3177          | 0.0           |
| 480    | 5081          | 4.1           | 610    | 126031        | 0.2           | 740    | 9951          | 0.0           | 870    | 3609          | 0.0           | 1000   | 3241          | 0.0           |
| 485    | 5579          | 4.6           | 615    | 123059        | 0.1           | 745    | 8870          | 0.0           | 875    | 3208          | 0.0           |        |               |               |

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Melanopic Flux vs. Wavelength



Melanopic Lumens: 2145.7 M/P: 0.35

| $\lambda$ (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            | 2044                              | 0.0                         | 490            | 7179                              | 11.1                        | 620            | 118034                            | 1.5                         | 750            | 8362                              | 0.0                         | 880            | 3128                              | 0.0                         |
| 365            | 2016                              | 0.0                         | 495            | 10476                             | 16.9                        | 625            | 111884                            | 0.9                         | 755            | 7635                              | 0.0                         | 885            | 3110                              | 0.0                         |
| 370            | 2020                              | 0.0                         | 500            | 15549                             | 26.0                        | 630            | 106119                            | 0.6                         | 760            | 6582                              | 0.0                         | 890            | 2632                              | 0.0                         |
| 375            | 2137                              | 0.0                         | 505            | 22477                             | 38.2                        | 635            | 99706                             | 0.4                         | 765            | 5777                              | 0.0                         | 895            | 2709                              | 0.0                         |
| 380            | 2046                              | 0.0                         | 510            | 30417                             | 51.6                        | 640            | 92142                             | 0.2                         | 770            | 5474                              | 0.0                         | 900            | 2016                              | 0.0                         |
| 385            | 1925                              | 0.0                         | 515            | 39274                             | 65.1                        | 645            | 84987                             | 0.1                         | 775            | 4977                              | 0.0                         | 905            | 1748                              | 0.0                         |
| 390            | 1893                              | 0.0                         | 520            | 47282                             | 75.2                        | 650            | 78016                             | 0.1                         | 780            | 4723                              | 0.0                         | 910            | 2046                              | 0.0                         |
| 395            | 1695                              | 0.0                         | 525            | 55413                             | 82.9                        | 655            | 71541                             | 0.1                         | 785            | 4219                              | 0.0                         | 915            | 1844                              | 0.0                         |
| 400            | 1633                              | 0.0                         | 530            | 62377                             | 86.0                        | 660            | 64863                             | 0.0                         | 790            | 3969                              | 0.0                         | 920            | 2734                              | 0.0                         |
| 405            | 2065                              | 0.1                         | 535            | 68520                             | 85.4                        | 665            | 58485                             | 0.0                         | 795            | 4122                              | 0.0                         | 925            | 2307                              | 0.0                         |
| 410            | 3449                              | 0.2                         | 540            | 73435                             | 81.1                        | 670            | 51641                             | 0.0                         | 800            | 2864                              | 0.0                         | 930            | 2039                              | 0.0                         |
| 415            | 7117                              | 0.7                         | 545            | 78677                             | 75.4                        | 675            | 46030                             | 0.0                         | 805            | 3151                              | 0.0                         | 935            | 1784                              | 0.0                         |
| 420            | 13992                             | 2.3                         | 550            | 83331                             | 68.1                        | 680            | 40590                             | 0.0                         | 810            | 3022                              | 0.0                         | 940            | 2464                              | 0.0                         |
| 425            | 25176                             | 6.2                         | 555            | 89120                             | 60.9                        | 685            | 35691                             | 0.0                         | 815            | 3471                              | 0.0                         | 945            | 2794                              | 0.0                         |
| 430            | 38151                             | 13.0                        | 560            | 94613                             | 52.9                        | 690            | 31631                             | 0.0                         | 820            | 2749                              | 0.0                         | 950            | 3090                              | 0.0                         |
| 435            | 49673                             | 22.2                        | 565            | 99818                             | 44.8                        | 695            | 27437                             | 0.0                         | 825            | 2729                              | 0.0                         | 955            | 1866                              | 0.0                         |
| 440            | 57273                             | 32.0                        | 570            | 106526                            | 37.6                        | 700            | 24589                             | 0.0                         | 830            | 2282                              | 0.0                         | 960            | 3110                              | 0.0                         |
| 445            | 54802                             | 36.7                        | 575            | 111610                            | 30.4                        | 705            | 21832                             | 0.0                         | 835            | 3140                              | 0.0                         | 965            | 3880                              | 0.0                         |
| 450            | 39184                             | 30.4                        | 580            | 117163                            | 24.1                        | 710            | 19500                             | 0.0                         | 840            | 2365                              | 0.0                         | 970            | 3243                              | 0.0                         |
| 455            | 22506                             | 19.7                        | 585            | 122201                            | 18.7                        | 715            | 17870                             | 0.0                         | 845            | 3024                              | 0.0                         | 975            | 2014                              | 0.0                         |
| 460            | 13692                             | 13.2                        | 590            | 125662                            | 14.0                        | 720            | 15924                             | 0.0                         | 850            | 2510                              | 0.0                         | 980            | 1688                              | 0.0                         |
| 465            | 9446                              | 10.0                        | 595            | 127415                            | 10.2                        | 725            | 14268                             | 0.0                         | 855            | 2739                              | 0.0                         | 985            | 2827                              | 0.0                         |
| 470            | 6698                              | 7.7                         | 600            | 129155                            | 7.3                         | 730            | 12438                             | 0.0                         | 860            | 3515                              | 0.0                         | 990            | 4172                              | 0.0                         |
| 475            | 5328                              | 6.7                         | 605            | 128057                            | 5.0                         | 735            | 11255                             | 0.0                         | 865            | 3600                              | 0.0                         | 995            | 3177                              | 0.0                         |
| 480            | 5081                              | 6.9                         | 610            | 126031                            | 3.4                         | 740            | 9951                              | 0.0                         | 870            | 3609                              | 0.0                         | 1000           | 3241                              | 0.0                         |
| 485            | 5579                              | 8.1                         | 615            | 123059                            | 2.3                         | 745            | 8870                              | 0.0                         | 875            | 3208                              | 0.0                         |                |                                   |                             |

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TM-30-18

**Summary**

$R_f = 69.9$   
 $R_g = 98.3$   
 $CIE R_a = 71.5$   
 $R_9 = -16.1$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 77 | CES79 = 81 |
| CES05 = 50 | CES30 = 46 | CES55 = 74 | CES80 = 80 |
| CES06 = 52 | CES31 = 50 | CES56 = 63 | CES81 = 73 |
| CES07 = 42 | CES32 = 49 | CES57 = 60 | CES82 = 91 |
| CES08 = 41 | CES33 = 53 | CES58 = 63 | CES83 = 84 |
| CES09 = 29 | CES34 = 66 | CES59 = 85 | CES84 = 90 |
| CES10 = 77 | CES35 = 82 | CES60 = 89 | CES85 = 87 |
| CES11 = 60 | CES36 = 78 | CES61 = 85 | CES86 = 65 |
| CES12 = 66 | CES37 = 75 | CES62 = 69 | CES87 = 78 |
| CES13 = 43 | CES38 = 53 | CES63 = 68 | CES88 = 73 |
| CES14 = 74 | CES39 = 91 | CES64 = 68 | CES89 = 68 |
| CES15 = 71 | CES40 = 85 | CES65 = 65 | CES90 = 68 |
| CES16 = 48 | CES41 = 76 | CES66 = 62 | CES91 = 91 |
| CES17 = 50 | CES42 = 76 | CES67 = 60 | CES92 = 71 |
| CES18 = 57 | CES43 = 65 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 57 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 78 |
| CES21 = 88 | CES46 = 70 | CES71 = 57 | CES96 = 80 |
| CES22 = 80 | CES47 = 63 | CES72 = 86 | CES97 = 79 |
| CES23 = 92 | CES48 = 51 | CES73 = 52 | CES98 = 71 |
| CES24 = 91 | CES49 = 68 | CES74 = 90 | CES99 = 64 |
| CES25 = 73 | CES50 = 77 | CES75 = 58 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)