

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: P635557

Luminaire Tested: GWS-SA3E-722-U-SL2-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P635557  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-27)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA3E-722-U-SL2-W  
Description: GALLEON WALL SLIM LUMINAIRE. (3) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II SPILL LIGHT ELIMINATOR OPTICS  
Light Source: (48) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 15918.4 lumens  
Efficiency: N/A  
Efficacy: 100.0 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G3

Input Watts (W): 159.2  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



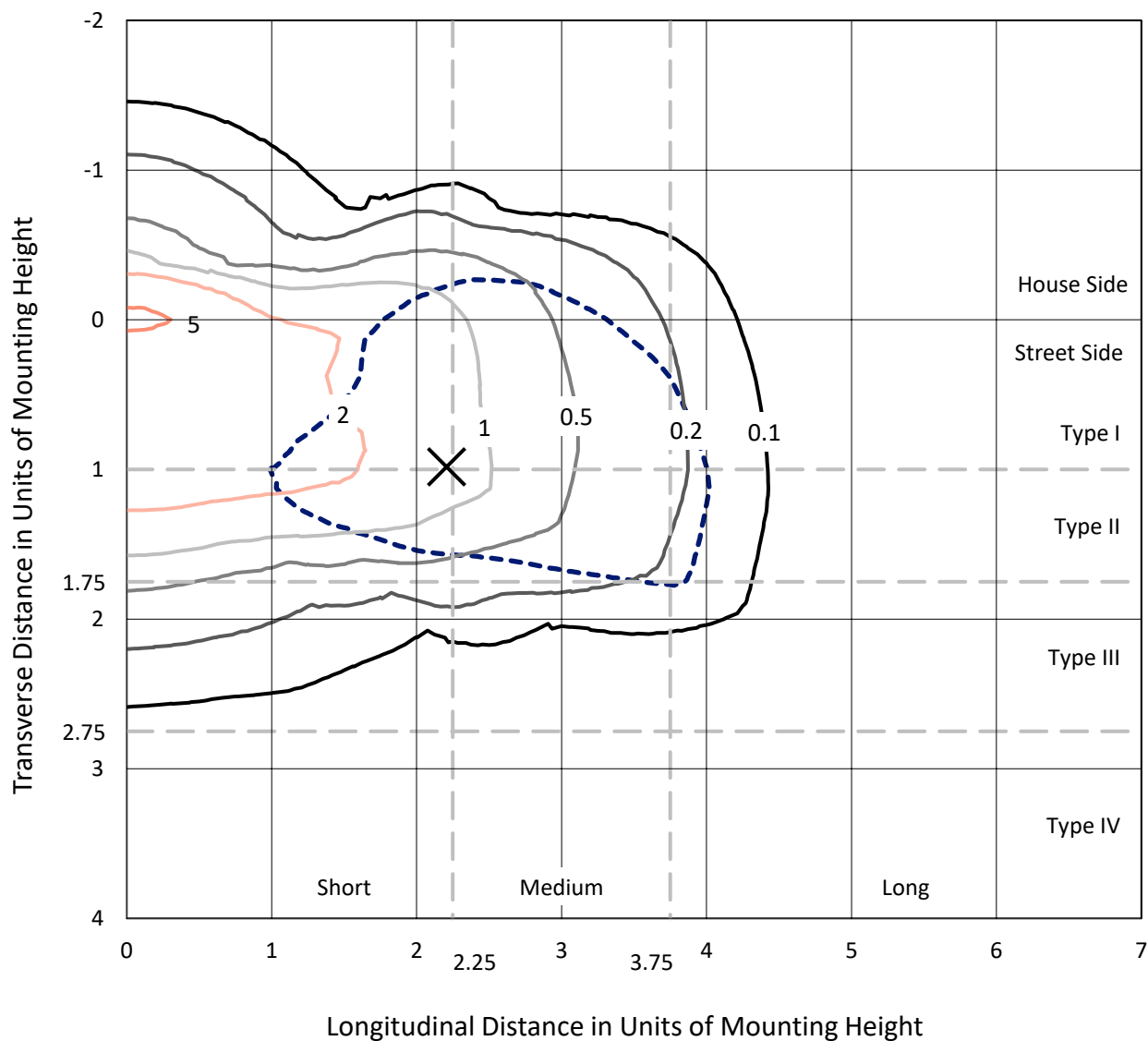
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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

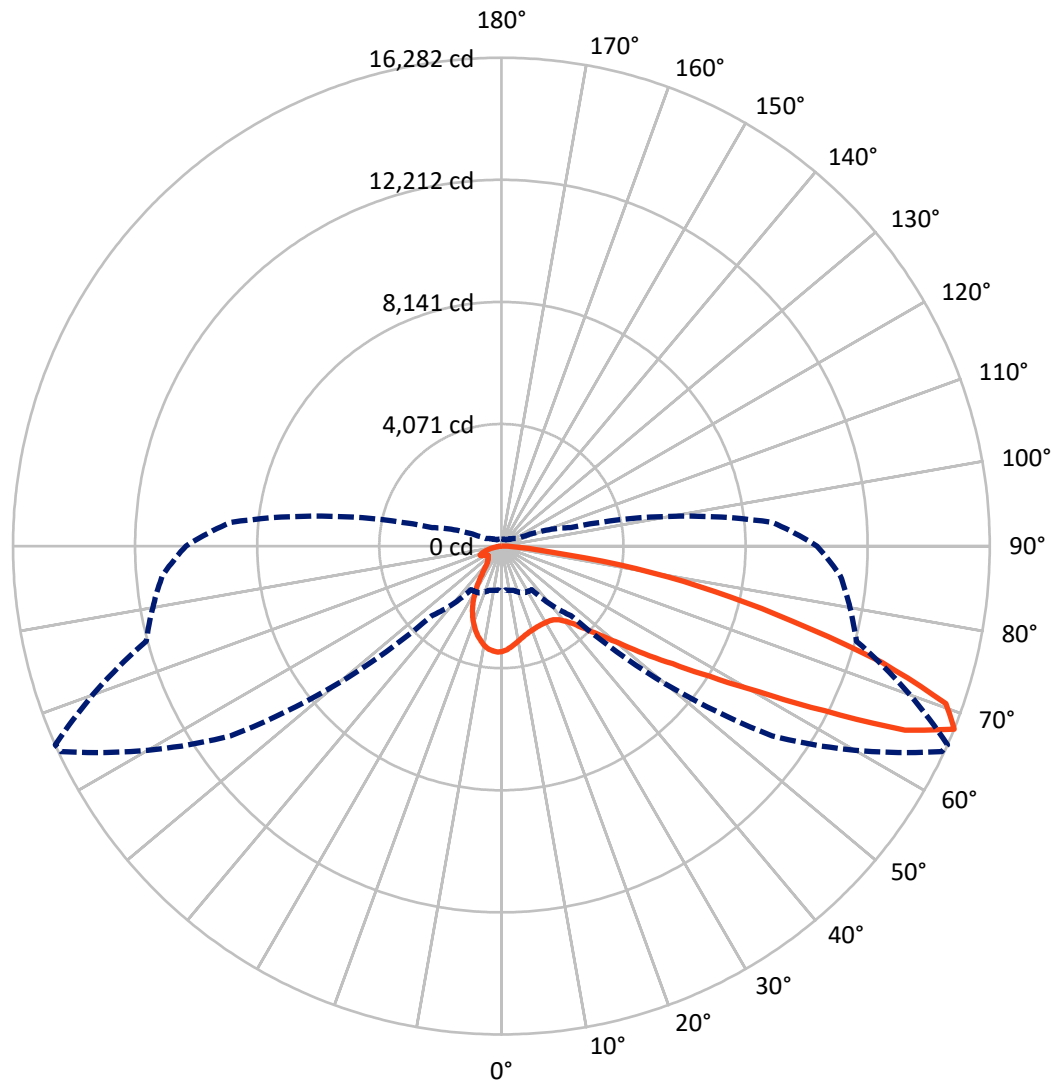


Based on 25 foot mounting height. Maximum calculated value = 5.6 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 66-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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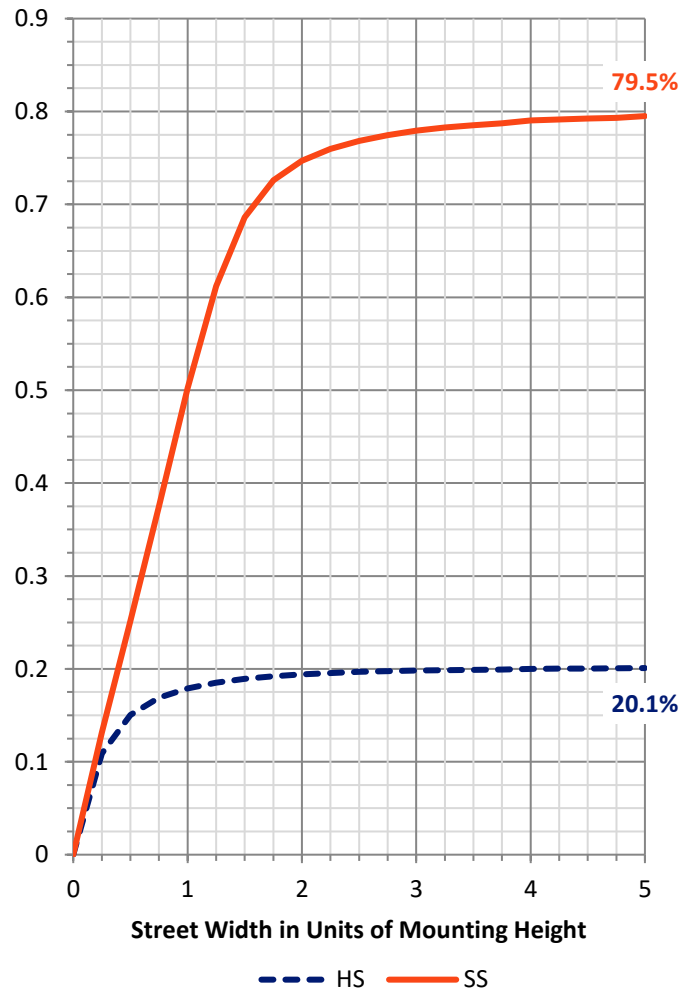
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3230.2   | 0.0    | 3230.2  |
|                    | % Fixture | 20.3     | 0.0    | 20.3    |
| <b>Street Side</b> | Lumens    | 12688.2  | 0.0    | 12688.2 |
|                    | % Fixture | 79.7     | 0.0    | 79.7    |
| <b>Total</b>       | Lumens    | 15918.4  | 0.0    | 15918.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 308.7   | 1.9       |
| 10°-20°   | 758.7   | 4.8       |
| 20°-30°   | 1042.8  | 6.6       |
| 30°-40°   | 1425.7  | 9.0       |
| 40°-50°   | 2160.3  | 13.6      |
| 50°-60°   | 3358.3  | 21.1      |
| 60°-70°   | 4088.7  | 25.7      |
| 70°-80°   | 2490.6  | 15.6      |
| 80°-90°   | 284.5   | 1.8       |
| 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°    | 15918.4 | 100.0     |
| 0°-180°   | 15918.4 | 100.0     |

**Coefficient of Utilization**



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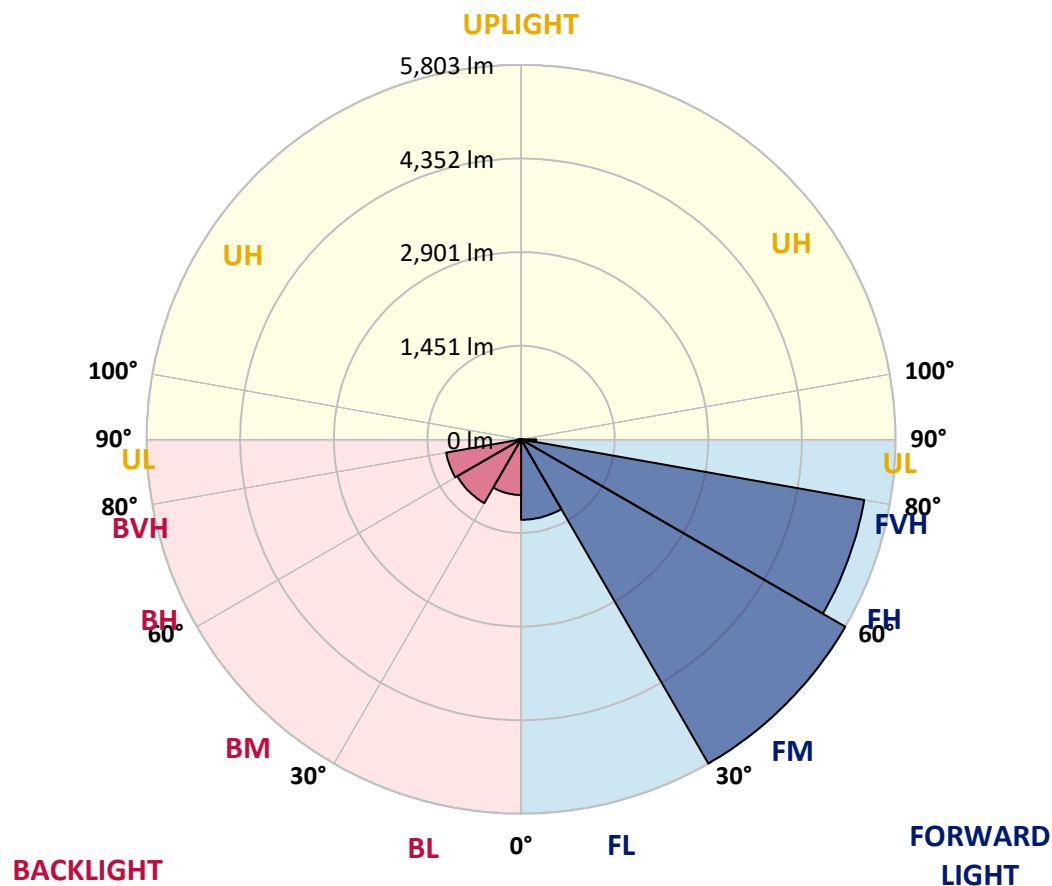
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1247.3 | 7.8       |                         |      |         |
| FM   | (30°-60°)   | 5802.9 | 36.5      |                         |      |         |
| FH   | (60°-80°)   | 5401.5 | 33.9      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 236.5  | 1.5       |                         |      | G3/500  |
| BL   | (0°-30°)    | 862.9  | 5.4       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1141.5 | 7.2       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1177.8 | 7.4       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 48.0   | 0.3       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°     | 65°     | 66°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
| 0°    | 3517.5 | 3517.5 | 3517.5 | 3517.5 | 3517.5 | 3517.5 | 3517.5  | 3517.5  | 3517.5  | 3517.5  | 3517.5  |
| 2.5°  | 3294.5 | 3306.2 | 3299.2 | 3343.3 | 3345.6 | 3401.4 | 3432.7  | 3459.5  | 3461.8  | 3496.6  | 3519.8  |
| 5°    | 3069.3 | 3076.2 | 3076.2 | 3118.0 | 3145.9 | 3220.2 | 3292.2  | 3368.9  | 3374.7  | 3458.3  | 3522.2  |
| 7.5°  | 2886.9 | 2893.9 | 2889.3 | 2945.0 | 2981.0 | 3063.5 | 3155.2  | 3272.5  | 3284.1  | 3418.8  | 3530.3  |
| 10°   | 2744.1 | 2741.8 | 2753.4 | 2804.5 | 2850.9 | 2949.6 | 3051.8  | 3185.4  | 3202.8  | 3373.5  | 3539.6  |
| 12.5° | 2646.6 | 2648.9 | 2655.8 | 2709.3 | 2759.2 | 2856.7 | 2962.4  | 3107.6  | 3126.2  | 3321.3  | 3534.9  |
| 15°   | 2600.1 | 2595.5 | 2601.3 | 2650.0 | 2697.7 | 2783.6 | 2892.7  | 3042.6  | 3061.1  | 3274.8  | 3536.1  |
| 17.5° | 2589.7 | 2586.2 | 2585.0 | 2619.8 | 2655.8 | 2736.0 | 2840.5  | 2992.6  | 3012.4  | 3244.6  | 3543.1  |
| 20°   | 2622.2 | 2617.5 | 2604.7 | 2619.8 | 2634.9 | 2702.3 | 2803.3  | 2956.6  | 2978.7  | 3224.9  | 3557.0  |
| 22.5° | 2711.6 | 2703.5 | 2683.7 | 2665.1 | 2645.4 | 2686.0 | 2780.1  | 2929.9  | 2952.0  | 3212.1  | 3570.9  |
| 25°   | 2847.5 | 2840.5 | 2819.6 | 2777.8 | 2705.8 | 2698.8 | 2775.5  | 2918.3  | 2940.4  | 3202.8  | 3576.7  |
| 27.5° | 3034.4 | 3024.0 | 3003.1 | 2942.7 | 2825.4 | 2746.4 | 2792.9  | 2917.1  | 2938.0  | 3192.4  | 3570.9  |
| 30°   | 3256.2 | 3249.3 | 3237.6 | 3164.5 | 3007.7 | 2847.5 | 2832.4  | 2926.4  | 2942.7  | 3186.5  | 3559.3  |
| 32.5° | 3481.5 | 3474.5 | 3483.8 | 3449.0 | 3256.2 | 3014.7 | 2918.3  | 2952.0  | 2963.6  | 3185.4  | 3548.9  |
| 35°   | 3680.1 | 3688.2 | 3755.6 | 3761.4 | 3572.1 | 3241.1 | 3054.2  | 3011.2  | 3013.5  | 3208.6  | 3553.5  |
| 37.5° | 3888.0 | 3919.3 | 4007.6 | 4083.1 | 3925.1 | 3540.7 | 3256.2  | 3122.7  | 3120.4  | 3267.8  | 3582.5  |
| 40°   | 4163.2 | 4177.1 | 4289.8 | 4431.4 | 4332.7 | 3951.8 | 3543.1  | 3305.0  | 3288.7  | 3388.6  | 3660.4  |
| 42.5° | 4431.4 | 4465.1 | 4645.1 | 4807.7 | 4775.2 | 4415.2 | 3904.2  | 3577.9  | 3548.9  | 3602.3  | 3820.6  |
| 45°   | 4772.9 | 4805.4 | 5007.4 | 5216.5 | 5275.7 | 4938.9 | 4366.4  | 3965.8  | 3936.7  | 3924.0  | 4114.4  |
| 47.5° | 5114.3 | 5148.0 | 5329.1 | 5631.0 | 5838.9 | 5593.9 | 4968.0  | 4477.9  | 4430.3  | 4380.3  | 4558.0  |
| 50°   | 5344.2 | 5383.7 | 5556.7 | 5919.0 | 6406.8 | 6411.4 | 5681.0  | 5149.1  | 5088.7  | 5009.8  | 5182.8  |
| 52.5° | 5336.1 | 5361.6 | 5526.5 | 5944.6 | 6815.5 | 7350.9 | 6635.5  | 6003.8  | 5955.0  | 5783.2  | 5934.1  |
| 55°   | 4916.9 | 4955.2 | 5121.2 | 5643.8 | 6859.7 | 8241.6 | 8038.4  | 7011.8  | 6924.7  | 6617.0  | 6783.0  |
| 57.5° | 4074.9 | 4107.4 | 4274.7 | 4919.2 | 6468.3 | 8698.0 | 9819.8  | 8296.2  | 8176.6  | 7525.1  | 7716.7  |
| 60°   | 3076.2 | 3036.7 | 3115.7 | 3680.1 | 5532.3 | 8709.6 | 11392.1 | 10038.1 | 9838.4  | 8495.9  | 8656.2  |
| 62.5° | 2308.6 | 2269.1 | 2286.6 | 2445.7 | 3750.9 | 8005.9 | 12288.7 | 12421.0 | 12091.2 | 9592.2  | 9560.8  |
| 65°   | 1824.4 | 1802.3 | 1852.2 | 1961.4 | 2186.7 | 6096.7 | 12295.6 | 14997.9 | 14790.1 | 10862.6 | 10488.7 |
| 67.5° | 1486.4 | 1472.5 | 1523.6 | 1725.7 | 1773.3 | 3276.0 | 11025.2 | 16201.0 | 16282.3 | 12253.8 | 11349.2 |
| 70°   | 1197.3 | 1176.4 | 1256.5 | 1522.4 | 1649.0 | 1982.3 | 7897.9  | 15587.8 | 15719.1 | 13083.0 | 11106.5 |
| 72.5° | 826.8  | 828.0  | 868.6  | 1233.3 | 1592.1 | 1711.7 | 4467.4  | 12979.6 | 13264.1 | 12331.6 | 9764.0  |
| 75°   | 557.4  | 562.1  | 573.7  | 814.1  | 1466.7 | 1660.6 | 2380.6  | 9826.7  | 10027.6 | 10192.5 | 8070.9  |
| 77.5° | 336.8  | 339.1  | 365.8  | 492.4  | 1011.5 | 1550.3 | 1613.0  | 7123.3  | 7281.2  | 6719.2  | 5002.8  |
| 80°   | 195.1  | 203.2  | 227.6  | 329.8  | 682.8  | 1164.8 | 1248.4  | 4367.6  | 4546.4  | 2986.8  | 1589.8  |
| 82.5° | 85.9   | 91.7   | 124.3  | 191.6  | 398.3  | 990.6  | 974.3   | 1725.7  | 1700.1  | 832.6   | 551.6   |
| 85°   | 15.1   | 18.6   | 26.7   | 60.4   | 146.3  | 522.6  | 756.0   | 761.8   | 716.5   | 315.9   | 228.8   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 3.5    | 113.8   | 204.4   | 203.2   | 89.4    | 79.0    |
| 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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CATALOG NUMBER: GWS-SA3E-722-U-SL2-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3517.5  | 3517.5 | 3517.5 | 3517.5 | 3517.5 | 3517.5 | 3517.5 | 3517.5 | 3517.5 | 3517.5 | 3517.5 |
| 2.5°  | 3534.9  | 3503.6 | 3531.4 | 3534.9 | 3529.1 | 3524.5 | 3489.6 | 3459.5 | 3456.0 | 3423.5 | 3423.5 |
| 5°    | 3547.7  | 3518.7 | 3532.6 | 3505.9 | 3464.1 | 3421.1 | 3346.8 | 3295.7 | 3272.5 | 3230.7 | 3230.7 |
| 7.5°  | 3565.1  | 3534.9 | 3518.7 | 3452.5 | 3354.9 | 3260.9 | 3141.3 | 3041.4 | 3000.7 | 2941.5 | 2939.2 |
| 10°   | 3581.4  | 3543.1 | 3487.3 | 3358.4 | 3202.8 | 3053.0 | 2878.8 | 2737.1 | 2640.7 | 2569.9 | 2569.9 |
| 12.5° | 3580.2  | 3530.3 | 3420.0 | 3229.5 | 3014.7 | 2797.5 | 2565.3 | 2351.6 | 2223.8 | 2113.5 | 2106.6 |
| 15°   | 3577.9  | 3509.4 | 3334.0 | 3079.7 | 2795.2 | 2494.4 | 2178.6 | 1899.9 | 1710.6 | 1602.6 | 1593.3 |
| 17.5° | 3575.6  | 3482.7 | 3237.6 | 2909.0 | 2528.1 | 2118.2 | 1701.3 | 1399.3 | 1241.4 | 1175.2 | 1177.5 |
| 20°   | 3575.6  | 3452.5 | 3134.3 | 2712.7 | 2220.4 | 1667.6 | 1248.4 | 1028.9 | 989.4  | 992.9  | 996.4  |
| 22.5° | 3565.1  | 3415.3 | 3019.3 | 2499.1 | 1877.8 | 1226.3 | 920.9  | 846.6  | 867.5  | 900.0  | 904.6  |
| 25°   | 3540.7  | 3353.8 | 2885.8 | 2262.2 | 1470.2 | 893.0  | 751.3  | 737.4  | 775.7  | 816.4  | 828.0  |
| 27.5° | 3502.4  | 3282.9 | 2736.0 | 1984.6 | 1082.3 | 717.7  | 660.8  | 659.6  | 689.8  | 720.0  | 730.4  |
| 30°   | 3461.8  | 3204.0 | 2578.0 | 1675.7 | 783.9  | 624.8  | 602.7  | 602.7  | 617.8  | 636.4  | 634.1  |
| 32.5° | 3414.2  | 3123.8 | 2408.5 | 1354.1 | 638.7  | 572.5  | 565.5  | 562.1  | 564.4  | 571.3  | 571.3  |
| 35°   | 3373.5  | 3053.0 | 2234.3 | 1013.8 | 572.5  | 543.5  | 536.5  | 528.4  | 524.9  | 520.3  | 522.6  |
| 37.5° | 3358.4  | 2997.3 | 2054.3 | 764.1  | 540.0  | 522.6  | 511.0  | 499.4  | 491.2  | 488.9  | 487.7  |
| 40°   | 3382.8  | 2974.0 | 1874.3 | 629.4  | 516.8  | 500.5  | 487.7  | 472.6  | 465.7  | 465.7  | 465.7  |
| 42.5° | 3478.0  | 2991.5 | 1690.8 | 569.0  | 500.5  | 481.9  | 463.4  | 449.4  | 447.1  | 449.4  | 450.6  |
| 45°   | 3652.2  | 3058.8 | 1500.4 | 538.8  | 486.6  | 463.4  | 441.3  | 430.8  | 430.8  | 433.2  | 433.2  |
| 47.5° | 3963.4  | 3235.3 | 1312.2 | 520.3  | 472.6  | 448.3  | 425.0  | 414.6  | 413.4  | 415.7  | 415.7  |
| 50°   | 4502.3  | 3553.5 | 1142.7 | 507.5  | 462.2  | 436.6  | 413.4  | 399.5  | 396.0  | 394.8  | 394.8  |
| 52.5° | 5181.6  | 4105.1 | 1034.7 | 498.2  | 449.4  | 423.9  | 400.6  | 382.1  | 375.1  | 371.6  | 371.6  |
| 55°   | 6002.7  | 4840.2 | 1034.7 | 491.2  | 433.2  | 408.8  | 382.1  | 363.5  | 353.0  | 348.4  | 348.4  |
| 57.5° | 6932.8  | 5696.1 | 1213.5 | 485.4  | 420.4  | 391.4  | 362.3  | 343.7  | 332.1  | 325.2  | 325.2  |
| 60°   | 7879.3  | 6600.7 | 1656.0 | 477.3  | 408.8  | 369.3  | 340.3  | 322.8  | 307.7  | 299.6  | 298.4  |
| 62.5° | 8860.6  | 7597.1 | 2238.9 | 481.9  | 400.6  | 348.4  | 317.0  | 297.3  | 284.5  | 276.4  | 275.2  |
| 65°   | 9759.4  | 8545.9 | 2748.7 | 517.9  | 401.8  | 329.8  | 290.3  | 272.9  | 262.4  | 252.0  | 250.8  |
| 67.5° | 10522.4 | 9069.6 | 2391.1 | 591.1  | 426.2  | 307.7  | 263.6  | 246.2  | 236.9  | 229.9  | 228.8  |
| 70°   | 9988.2  | 8270.6 | 1356.4 | 636.4  | 459.9  | 284.5  | 233.4  | 221.8  | 212.5  | 207.9  | 206.7  |
| 72.5° | 8541.2  | 7002.5 | 907.0  | 562.1  | 419.2  | 254.3  | 205.5  | 196.3  | 189.3  | 183.5  | 182.3  |
| 75°   | 6918.9  | 5553.2 | 693.3  | 461.0  | 326.3  | 206.7  | 176.5  | 169.5  | 162.6  | 156.8  | 155.6  |
| 77.5° | 4093.5  | 3208.6 | 511.0  | 364.6  | 229.9  | 161.4  | 146.3  | 140.5  | 133.5  | 128.9  | 127.7  |
| 80°   | 1306.4  | 1114.8 | 324.0  | 250.8  | 152.1  | 124.3  | 112.6  | 108.0  | 101.0  | 95.2   | 94.1   |
| 82.5° | 498.2   | 430.8  | 171.9  | 127.7  | 101.0  | 84.8   | 75.5   | 70.8   | 66.2   | 60.4   | 59.2   |
| 85°   | 220.6   | 206.7  | 95.2   | 68.5   | 54.6   | 41.8   | 37.2   | 34.8   | 29.0   | 24.4   | 23.2   |
| 87.5° | 77.8    | 77.8   | 40.6   | 19.7   | 11.6   | 5.8    | 3.5    | 1.2    | 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    |



LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-10-R4

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

Data in this report applies to families of products SA1C-722-U-5WQ.

### Test Information

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-722-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2237    | CRI (Ra): | 72.0 |      |       |
| CIE u':                   | 0.2876  | R1:       | 68.9 | R9:  | -17.4 |
| CIE v':                   | 0.5346  | R2:       | 83.0 | R10: | 61.3  |
| Duv:                      | -0.0006 | R3:       | 95.2 | R11: | 59.8  |
| CIE x:                    | 0.5005  | R4:       | 66.2 | R12: | 50.5  |
| CIE y:                    | 0.4134  | R5:       | 65.9 | R13: | 71.1  |
| CIE z:                    | 0.0860  | R6:       | 76.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 603     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.8 |      |       |
| Purity:                   | 74.5    |           |      |      |       |
| Rf:                       | 69.8    |           |      |      |       |
| Rg:                       | 99.2    |           |      |      |       |



### Test Conditions

Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

REPORT NUMBER: SP1-1908-441-10-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 2200K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 4696.9

S/P: 0.85

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8 M/P: 0.27**

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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**Summary**

$R_f = 69.8$   
 $R_g = 99.2$   
 CIE  $R_a = 72.0$   
 $R_g = -17.4$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 84 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 51 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 42 | CES33 = 53 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 70 | CES59 = 84 | CES84 = 92 |
| CES10 = 78 | CES35 = 85 | CES60 = 90 | CES85 = 81 |
| CES11 = 61 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 70 | CES87 = 78 |
| CES13 = 45 | CES38 = 53 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 84 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 69 | CES93 = 79 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 63 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 63 | CES96 = 78 |
| CES22 = 81 | CES47 = 60 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 56 | CES98 = 71 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)