

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: P640017

Luminaire Tested: GWS-SA5D-722-U-SL4-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P640017  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-36)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA5D-722-U-SL4-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE IV SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (80) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 17435 lumens  
Efficiency: N/A  
Efficacy: 85.2 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G3

Input Watts (W): 204.6  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



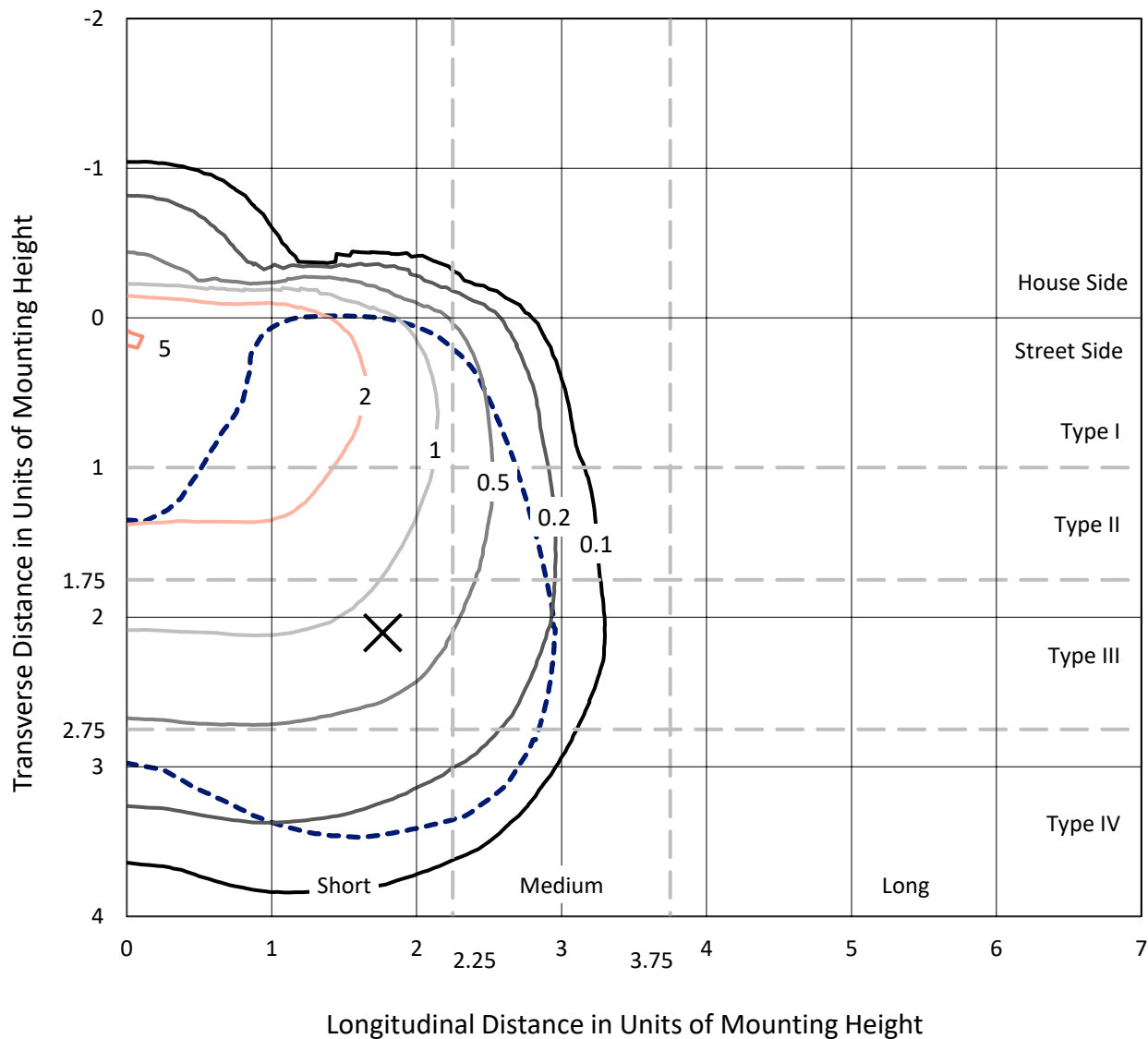
REPORT NUMBER: P640017

CATALOG NUMBER: GWS-SA5D-722-U-SL4-W-HSS

## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

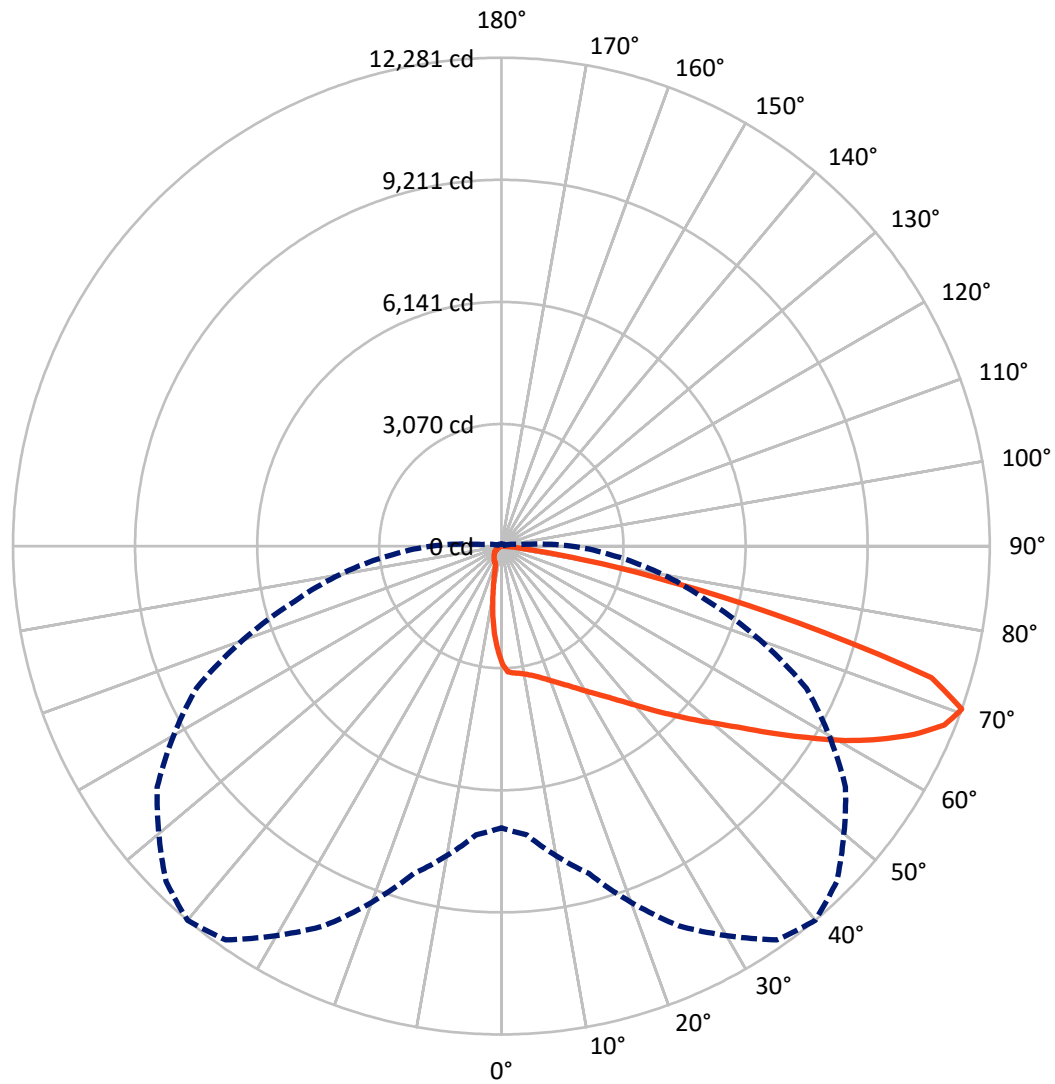


Based on 25 foot mounting height. Maximum calculated value = 5.1 fc  
 Type IV - Short - N/A

REPORT NUMBER: P640017

CATALOG NUMBER: GWS-SA5D-722-U-SL4-W-HSS

## Luminous Intensity Polar Plot



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

REPORT NUMBER: P640017

CATALOG NUMBER: GWS-SA5D-722-U-SL4-W-HSS

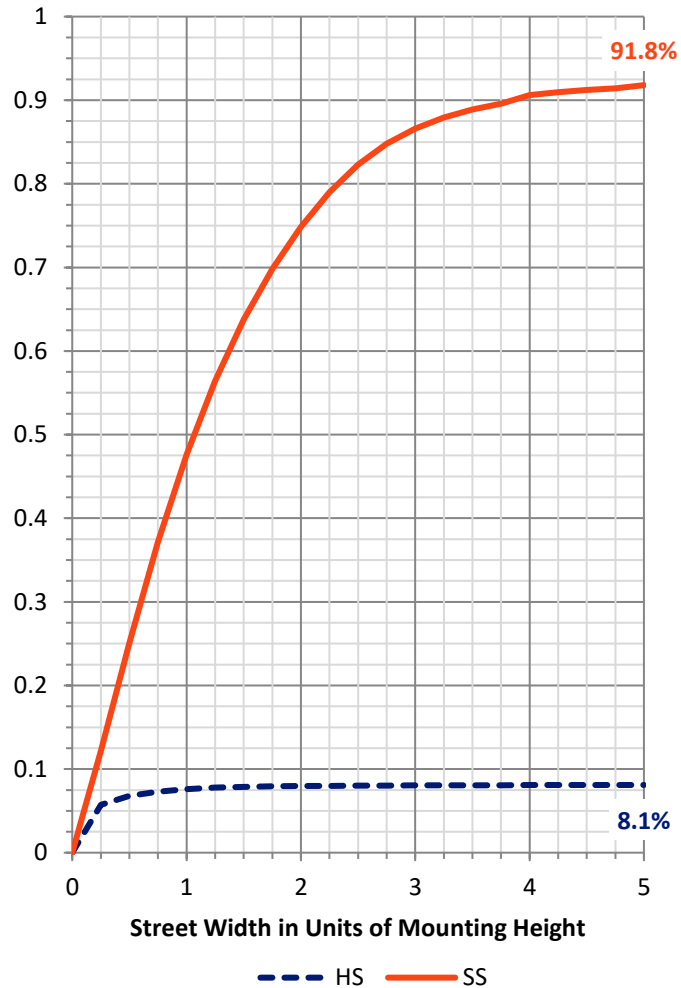
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1425.7   | 0.0    | 1425.7  |
|                    | % Fixture | 8.2      | 0.0    | 8.2     |
| <b>Street Side</b> | Lumens    | 16009.3  | 0.0    | 16009.3 |
|                    | % Fixture | 91.8     | 0.0    | 91.8    |
| <b>Total</b>       | Lumens    | 17435.0  | 0.0    | 17435.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 250.1   | 1.4       |
| 10°-20°   | 634.2   | 3.6       |
| 20°-30°   | 1061.4  | 6.1       |
| 30°-40°   | 1667.1  | 9.6       |
| 40°-50°   | 2637.0  | 15.1      |
| 50°-60°   | 3846.7  | 22.1      |
| 60°-70°   | 4768.5  | 27.4      |
| 70°-80°   | 2412.6  | 13.8      |
| 80°-90°   | 157.5   | 0.9       |
| 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°    | 17435.0 | 100.0     |
| 0°-180°   | 17435.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P640017

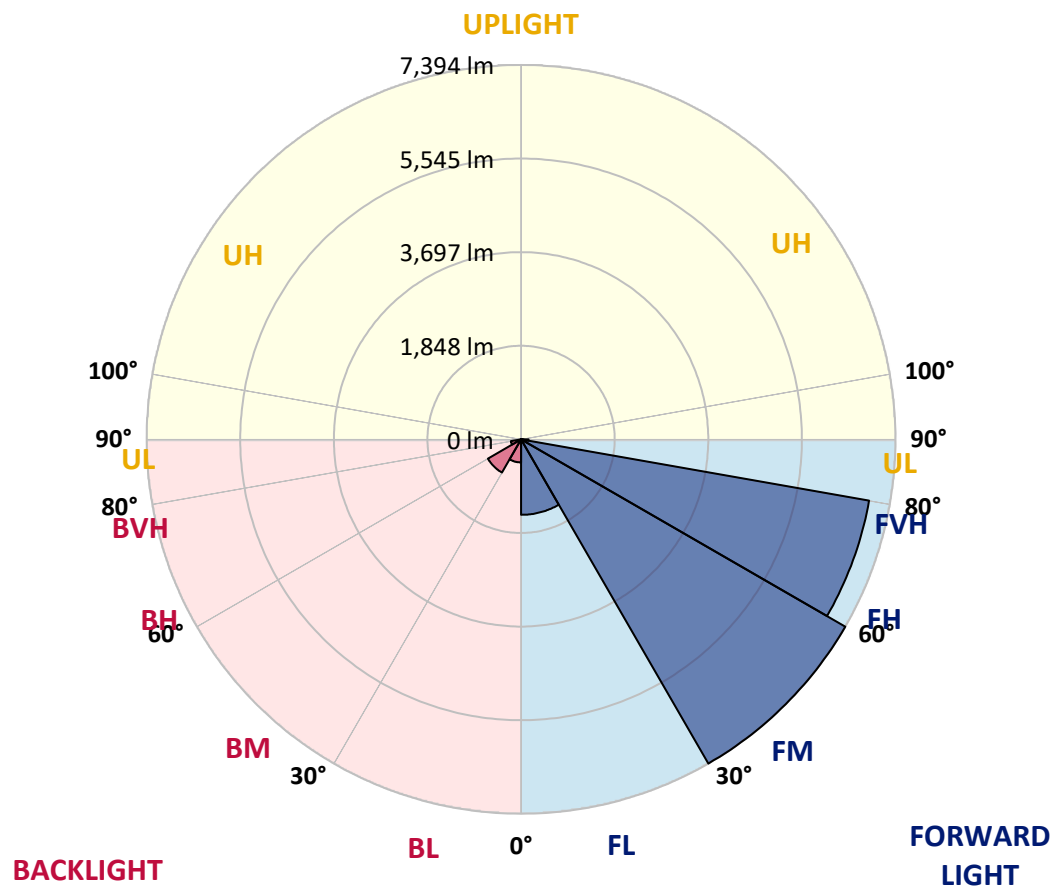
CATALOG NUMBER: GWS-SA5D-722-U-SL4-W-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1490.4 | 8.5       |                         |      |         |
| FM   | (30°-60°)   | 7394.0 | 42.4      |                         |      |         |
| FH   | (60°-80°)   | 6977.8 | 40.0      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 147.1  | 0.8       |                         |      | G2/225  |
| BL   | (0°-30°)    | 455.3  | 2.6       | B1/500                  |      |         |
| BM   | (30°-60°)   | 756.8  | 4.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 203.3  | 1.2       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 10.4   | 0.1       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G3**

Type IV Short





REPORT NUMBER: P640017

CATALOG NUMBER: GWS-SA5D-722-U-SL4-W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°     | 35°     | 40°     | 45°     | 55°     | 65°     | 75°    | 85°    |
|-------|--------|--------|--------|---------|---------|---------|---------|---------|---------|--------|--------|
| 0°    | 2958.5 | 2958.5 | 2958.5 | 2958.5  | 2958.5  | 2958.5  | 2958.5  | 2958.5  | 2958.5  | 2958.5 | 2958.5 |
| 2.5°  | 3180.6 | 3191.7 | 3190.1 | 3194.9  | 3183.8  | 3166.3  | 3163.1  | 3139.4  | 3096.5  | 3042.6 | 2982.3 |
| 5°    | 3245.6 | 3258.3 | 3248.8 | 3244.1  | 3223.4  | 3204.4  | 3199.6  | 3174.3  | 3125.1  | 3052.1 | 2947.4 |
| 7.5°  | 3301.2 | 3304.3 | 3298.0 | 3286.9  | 3256.7  | 3231.4  | 3213.9  | 3179.0  | 3120.3  | 3047.3 | 2926.8 |
| 10°   | 3310.7 | 3309.1 | 3312.3 | 3313.8  | 3294.8  | 3272.6  | 3258.3  | 3210.7  | 3136.2  | 3058.4 | 2928.4 |
| 12.5° | 3299.6 | 3299.6 | 3320.2 | 3344.0  | 3344.0  | 3332.9  | 3318.6  | 3275.8  | 3188.5  | 3096.5 | 2960.1 |
| 15°   | 3313.8 | 3318.6 | 3358.3 | 3402.7  | 3417.0  | 3405.9  | 3399.5  | 3355.1  | 3264.7  | 3163.1 | 3017.2 |
| 17.5° | 3364.6 | 3369.4 | 3432.8 | 3499.4  | 3516.9  | 3504.2  | 3491.5  | 3447.1  | 3350.3  | 3239.3 | 3082.2 |
| 20°   | 3439.2 | 3451.9 | 3532.8 | 3618.4  | 3634.3  | 3618.4  | 3593.0  | 3531.2  | 3434.4  | 3321.8 | 3144.1 |
| 22.5° | 3575.6 | 3583.5 | 3670.8 | 3761.2  | 3769.1  | 3743.7  | 3705.7  | 3620.0  | 3518.5  | 3409.0 | 3213.9 |
| 25°   | 3756.4 | 3767.5 | 3854.8 | 3942.0  | 3921.4  | 3883.3  | 3831.0  | 3734.2  | 3618.4  | 3512.1 | 3302.7 |
| 27.5° | 3972.2 | 3984.9 | 4070.5 | 4146.7  | 4092.7  | 4048.3  | 3989.6  | 3869.1  | 3751.7  | 3654.9 | 3417.0 |
| 30°   | 4205.4 | 4216.5 | 4292.6 | 4360.8  | 4289.4  | 4237.1  | 4167.3  | 4043.6  | 3924.6  | 3851.6 | 3578.8 |
| 32.5° | 4430.6 | 4429.0 | 4502.0 | 4557.5  | 4484.6  | 4443.3  | 4379.9  | 4254.5  | 4159.4  | 4127.6 | 3819.9 |
| 35°   | 4640.0 | 4640.0 | 4700.3 | 4755.8  | 4703.5  | 4681.3  | 4622.6  | 4522.6  | 4468.7  | 4506.8 | 4141.9 |
| 37.5° | 4851.0 | 4839.9 | 4897.0 | 4958.9  | 4954.1  | 4955.7  | 4922.4  | 4874.8  | 4878.0  | 5012.8 | 4584.5 |
| 40°   | 5025.5 | 5020.7 | 5087.4 | 5168.3  | 5231.7  | 5282.5  | 5261.9  | 5279.3  | 5379.3  | 5631.5 | 5150.8 |
| 42.5° | 5165.1 | 5176.2 | 5261.9 | 5390.4  | 5550.6  | 5653.7  | 5668.0  | 5739.4  | 5996.3  | 6386.6 | 5790.1 |
| 45°   | 5325.3 | 5326.9 | 5445.9 | 5642.6  | 5898.0  | 6061.4  | 6118.5  | 6302.5  | 6667.4  | 7170.2 | 6491.3 |
| 47.5° | 5522.0 | 5503.0 | 5636.2 | 5912.3  | 6281.9  | 6523.0  | 6624.5  | 6854.5  | 7419.3  | 7934.8 | 7062.4 |
| 50°   | 5739.4 | 5704.5 | 5855.2 | 6231.1  | 6711.8  | 7013.2  | 7219.4  | 7555.7  | 8164.9  | 8563.0 | 7487.5 |
| 52.5° | 5991.6 | 5958.3 | 6129.6 | 6597.6  | 7227.3  | 7593.8  | 7858.7  | 8198.2  | 8804.1  | 9042.1 | 7741.3 |
| 55°   | 6312.0 | 6278.7 | 6459.5 | 7037.0  | 7836.5  | 8312.4  | 8590.0  | 8875.5  | 9399.0  | 9395.8 | 7925.3 |
| 57.5° | 6667.4 | 6621.4 | 6872.0 | 7592.2  | 8596.3  | 9091.3  | 9373.6  | 9513.2  | 9851.1  | 9670.3 | 8049.1 |
| 60°   | 7075.0 | 7033.8 | 7381.2 | 8253.7  | 9473.6  | 9932.0  | 10109.7 | 10052.6 | 10222.3 | 9832.1 | 8006.2 |
| 62.5° | 7443.1 | 7424.0 | 7855.5 | 8954.8  | 10309.6 | 10696.6 | 10745.8 | 10496.8 | 10495.2 | 9835.3 | 7717.5 |
| 65°   | 7825.4 | 7861.9 | 8502.7 | 9762.3  | 11150.3 | 11410.5 | 11326.4 | 10937.8 | 10604.6 | 9446.6 | 6864.1 |
| 67.5° | 7968.1 | 8074.4 | 8929.5 | 10492.0 | 11813.4 | 12016.5 | 11868.9 | 11158.3 | 10149.4 | 8139.5 | 5227.0 |
| 70°   | 7086.1 | 7286.0 | 8526.5 | 10533.2 | 12087.9 | 12281.4 | 11927.6 | 10565.0 | 8461.5  | 5391.9 | 2863.3 |
| 72.5° | 5388.8 | 5622.0 | 7105.2 | 8624.9  | 10871.1 | 11312.1 | 10707.7 | 8607.4  | 5453.8  | 2362.0 | 961.3  |
| 75°   | 3015.6 | 3267.8 | 5292.0 | 6494.4  | 7298.7  | 7701.6  | 7479.6  | 5522.0  | 2416.0  | 617.1  | 287.1  |
| 77.5° | 1020.0 | 1104.1 | 2462.0 | 4018.2  | 4817.7  | 4456.0  | 3772.3  | 2742.8  | 888.3   | 234.8  | 152.3  |
| 80°   | 604.4  | 636.1  | 916.9  | 2000.4  | 2535.0  | 2101.9  | 1659.3  | 1013.7  | 452.1   | 125.3  | 106.3  |
| 82.5° | 180.8  | 214.2  | 506.0  | 742.4   | 993.0   | 618.7   | 523.5   | 579.0   | 234.8   | 68.2   | 88.8   |
| 85°   | 0.0    | 0.0    | 107.9  | 230.0   | 260.2   | 101.5   | 101.5   | 328.4   | 42.8    | 28.6   | 65.0   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0     | 1.6     | 7.9     | 4.8     | 6.3    | 14.3   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0    | 0.0    |

REPORT NUMBER: P640017

CATALOG NUMBER: GWS-SA5D-722-U-SL4-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2958.5 | 2958.5 | 2958.5 | 2958.5 | 2958.5 | 2958.5 | 2958.5 | 2958.5 | 2958.5 | 2958.5 | 2958.5 |
| 2.5°  | 2939.5 | 2884.0 | 2818.9 | 2757.0 | 2698.4 | 2622.2 | 2585.7 | 2541.3 | 2503.2 | 2482.6 | 2493.7 |
| 5°    | 2880.8 | 2793.5 | 2660.3 | 2525.4 | 2389.0 | 2260.5 | 2144.7 | 2067.0 | 1997.2 | 1960.7 | 1968.6 |
| 7.5°  | 2830.0 | 2712.6 | 2504.8 | 2284.3 | 2065.4 | 1844.9 | 1665.6 | 1526.1 | 1418.2 | 1373.8 | 1365.8 |
| 10°   | 2807.8 | 2660.3 | 2366.8 | 2049.5 | 1713.2 | 1416.6 | 1162.8 | 1008.9 | 899.5  | 845.5  | 855.0  |
| 12.5° | 2818.9 | 2633.3 | 2249.4 | 1819.5 | 1383.3 | 1037.5 | 794.8  | 650.4  | 572.7  | 540.9  | 533.0  |
| 15°   | 2850.6 | 2627.0 | 2144.7 | 1584.7 | 1067.6 | 725.0  | 548.9  | 490.2  | 474.3  | 471.1  | 471.1  |
| 17.5° | 2887.1 | 2628.6 | 2036.9 | 1346.8 | 810.6  | 537.8  | 469.6  | 458.5  | 453.7  | 450.5  | 452.1  |
| 20°   | 2923.6 | 2628.6 | 1913.1 | 1105.7 | 609.2  | 464.8  | 447.3  | 439.4  | 434.7  | 433.1  | 433.1  |
| 22.5° | 2968.0 | 2628.6 | 1775.1 | 882.0  | 488.6  | 441.0  | 426.7  | 422.0  | 417.2  | 415.6  | 414.0  |
| 25°   | 3022.0 | 2630.1 | 1622.8 | 690.1  | 444.2  | 420.4  | 409.3  | 404.5  | 399.8  | 396.6  | 396.6  |
| 27.5° | 3099.7 | 2642.8 | 1454.7 | 537.8  | 418.8  | 401.3  | 391.8  | 387.1  | 382.3  | 377.5  | 377.5  |
| 30°   | 3212.3 | 2674.6 | 1265.9 | 444.2  | 395.0  | 380.7  | 371.2  | 368.0  | 363.3  | 358.5  | 356.9  |
| 32.5° | 3380.5 | 2730.1 | 1070.8 | 398.2  | 372.8  | 358.5  | 347.4  | 344.2  | 339.5  | 334.7  | 333.1  |
| 35°   | 3615.3 | 2831.6 | 880.4  | 369.6  | 344.2  | 330.0  | 323.6  | 322.0  | 315.7  | 310.9  | 310.9  |
| 37.5° | 3959.5 | 2996.6 | 698.0  | 341.1  | 320.4  | 309.3  | 301.4  | 298.2  | 291.9  | 287.1  | 285.5  |
| 40°   | 4379.9 | 3210.7 | 542.5  | 318.9  | 298.2  | 287.1  | 279.2  | 274.4  | 266.5  | 260.2  | 257.0  |
| 42.5° | 4916.0 | 3472.5 | 428.3  | 295.1  | 277.6  | 266.5  | 260.2  | 250.6  | 239.5  | 230.0  | 228.4  |
| 45°   | 5474.4 | 3742.2 | 353.8  | 272.8  | 258.6  | 249.1  | 241.1  | 228.4  | 212.6  | 201.5  | 198.3  |
| 47.5° | 5902.7 | 3910.3 | 309.3  | 249.1  | 237.9  | 230.0  | 220.5  | 204.6  | 185.6  | 172.9  | 169.7  |
| 50°   | 6208.9 | 3935.7 | 276.0  | 226.8  | 220.5  | 212.6  | 198.3  | 179.3  | 158.6  | 145.9  | 142.8  |
| 52.5° | 6359.6 | 3821.5 | 249.1  | 206.2  | 201.5  | 193.5  | 176.1  | 155.5  | 133.3  | 120.6  | 117.4  |
| 55°   | 6427.8 | 3605.7 | 223.7  | 188.8  | 182.4  | 172.9  | 153.9  | 131.7  | 109.5  | 98.4   | 95.2   |
| 57.5° | 6400.9 | 3286.9 | 201.5  | 171.3  | 163.4  | 152.3  | 131.7  | 107.9  | 90.4   | 79.3   | 77.7   |
| 60°   | 6201.0 | 2839.5 | 179.3  | 153.9  | 144.4  | 131.7  | 111.0  | 88.8   | 73.0   | 65.0   | 63.5   |
| 62.5° | 5769.5 | 2284.3 | 157.0  | 133.3  | 126.9  | 114.2  | 95.2   | 73.0   | 60.3   | 55.5   | 53.9   |
| 65°   | 4885.9 | 1614.9 | 134.8  | 112.6  | 109.5  | 96.8   | 79.3   | 60.3   | 52.3   | 49.2   | 47.6   |
| 67.5° | 3512.1 | 981.9  | 114.2  | 96.8   | 93.6   | 82.5   | 66.6   | 52.3   | 47.6   | 46.0   | 46.0   |
| 70°   | 1765.6 | 464.8  | 90.4   | 79.3   | 79.3   | 68.2   | 57.1   | 47.6   | 46.0   | 44.4   | 44.4   |
| 72.5° | 599.6  | 198.3  | 68.2   | 61.9   | 65.0   | 58.7   | 49.2   | 44.4   | 44.4   | 44.4   | 44.4   |
| 75°   | 204.6  | 104.7  | 47.6   | 44.4   | 47.6   | 47.6   | 42.8   | 42.8   | 44.4   | 44.4   | 44.4   |
| 77.5° | 133.3  | 69.8   | 33.3   | 30.1   | 36.5   | 36.5   | 36.5   | 39.7   | 42.8   | 42.8   | 42.8   |
| 80°   | 109.5  | 38.1   | 22.2   | 20.6   | 27.0   | 27.0   | 30.1   | 36.5   | 39.7   | 39.7   | 39.7   |
| 82.5° | 93.6   | 23.8   | 12.7   | 14.3   | 19.0   | 20.6   | 25.4   | 30.1   | 34.9   | 36.5   | 36.5   |
| 85°   | 63.5   | 12.7   | 9.5    | 11.1   | 12.7   | 15.9   | 20.6   | 25.4   | 28.6   | 31.7   | 31.7   |
| 87.5° | 17.4   | 4.8    | 6.3    | 7.9    | 7.9    | 11.1   | 15.9   | 19.0   | 22.2   | 23.8   | 23.8   |
| 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            |

REPORT NUMBER: SP1-1908-441-10-R4

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

REPORT NUMBER: SP1-1908-441-10-R4

**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               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

**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               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

**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               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

### Summary

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



### Color Vector Graphics



REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

**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 |            |



REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)