

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: P638032

Luminaire Tested: GWS-SA4E-722-U-SL2-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P638032  
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-SA4E-722-U-SL2-W  
Description: GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II SPILL LIGHT ELIMINATOR OPTICS  
Light Source: (64) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 22151.5 lumens  
Efficiency: N/A  
Efficacy: 109.3 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G4

Input Watts (W): 202.6  
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



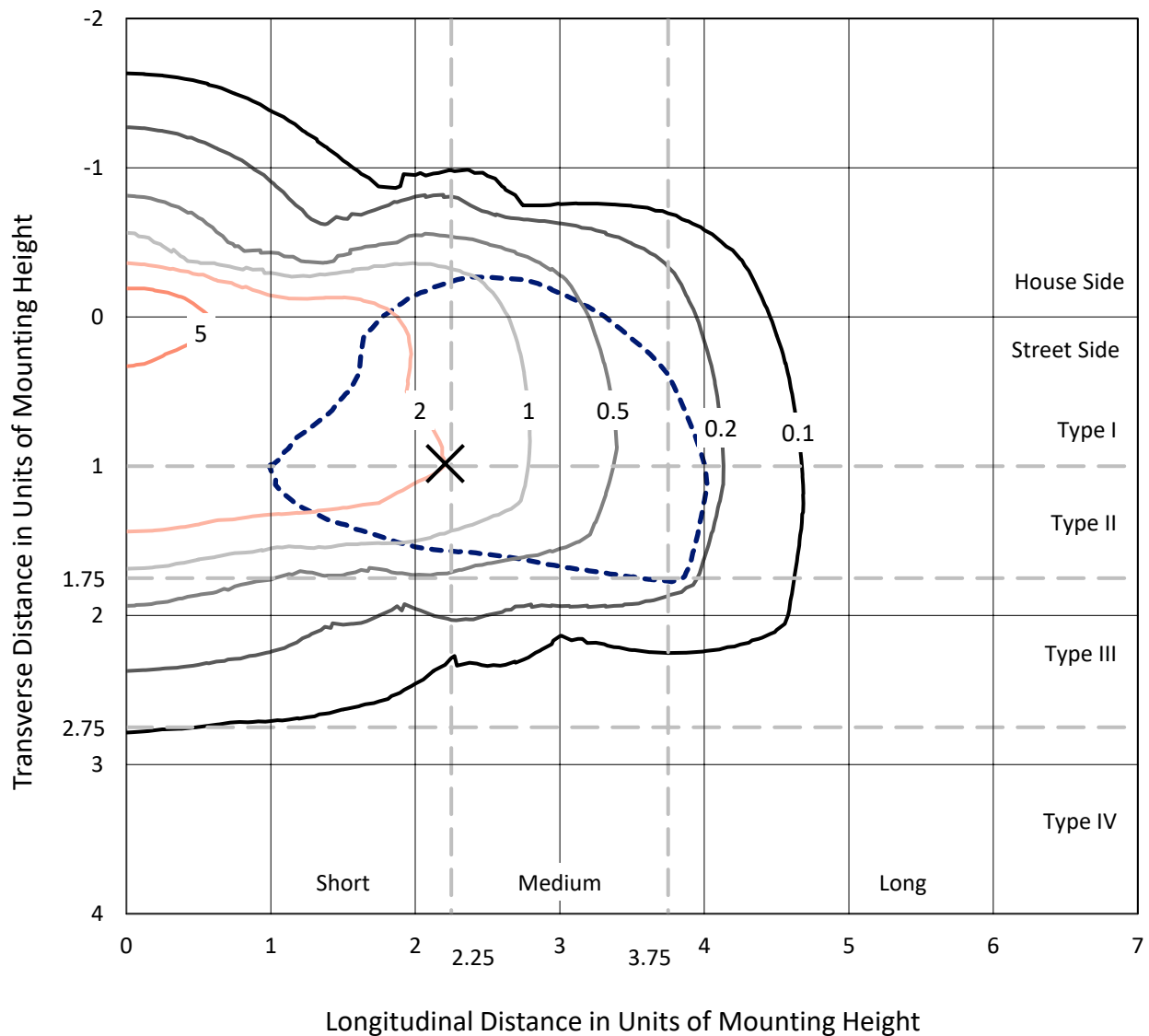
REPORT NUMBER: P638032

CATALOG NUMBER: GWS-SA4E-722-U-SL2-W

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

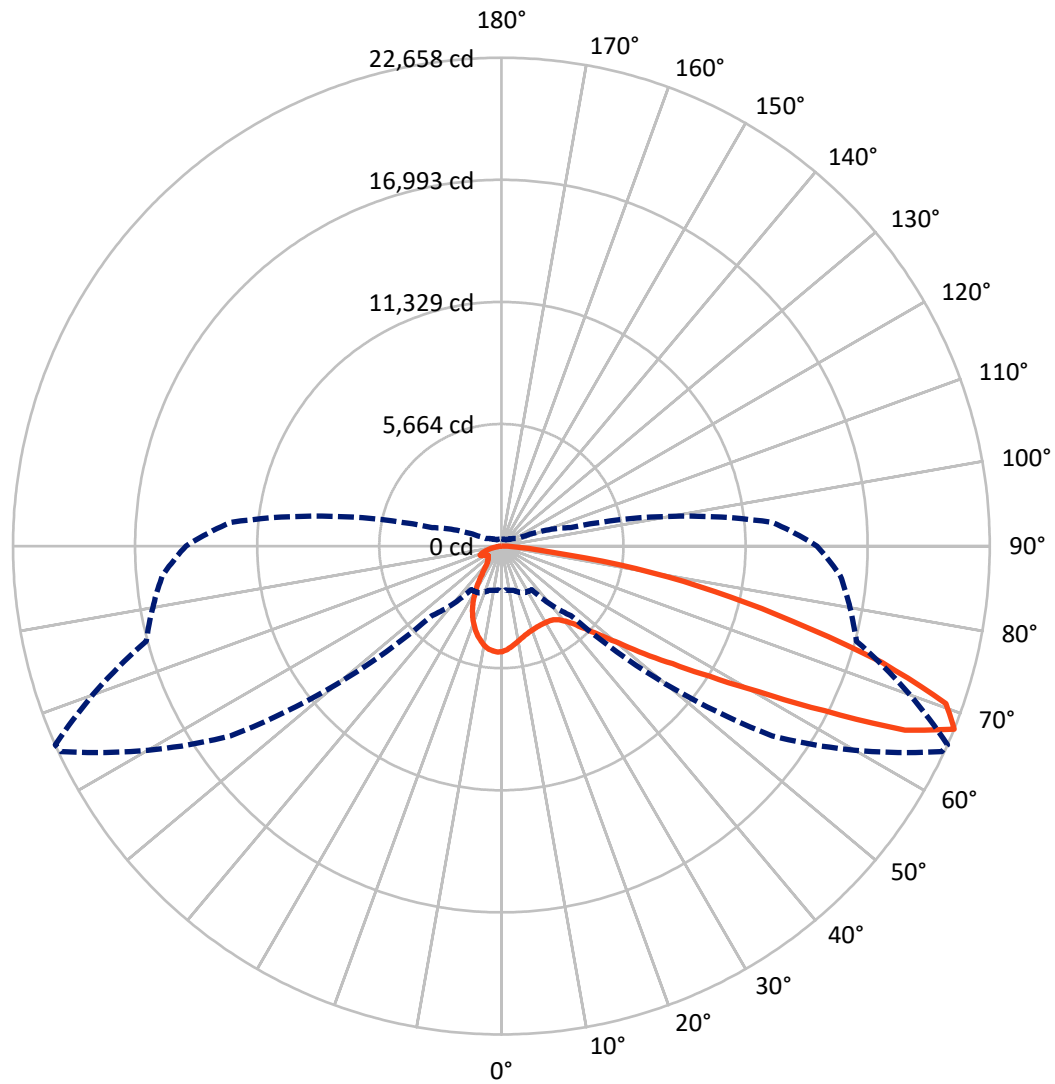


Based on 25 foot mounting height. Maximum calculated value = 7.8 fc  
Type II - Short - N/A

REPORT NUMBER: P638032

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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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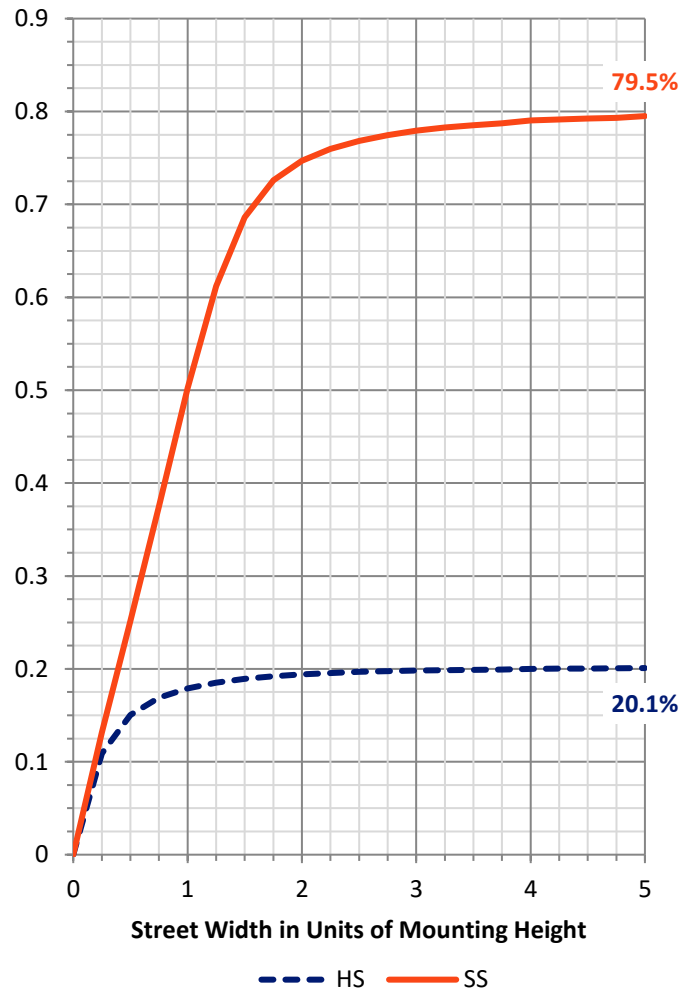
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4495.1   | 0.0    | 4495.1  |
|                    | % Fixture | 20.3     | 0.0    | 20.3    |
| <b>Street Side</b> | Lumens    | 17656.4  | 0.0    | 17656.4 |
|                    | % Fixture | 79.7     | 0.0    | 79.7    |
| <b>Total</b>       | Lumens    | 22151.5  | 0.0    | 22151.5 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 429.6   | 1.9       |
| 10°-20°   | 1055.8  | 4.8       |
| 20°-30°   | 1451.2  | 6.6       |
| 30°-40°   | 1984.0  | 9.0       |
| 40°-50°   | 3006.3  | 13.6      |
| 50°-60°   | 4673.3  | 21.1      |
| 60°-70°   | 5689.7  | 25.7      |
| 70°-80°   | 3465.9  | 15.6      |
| 80°-90°   | 395.9   | 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°    | 22151.5 | 100.0     |
| 0°-180°   | 22151.5 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P638032

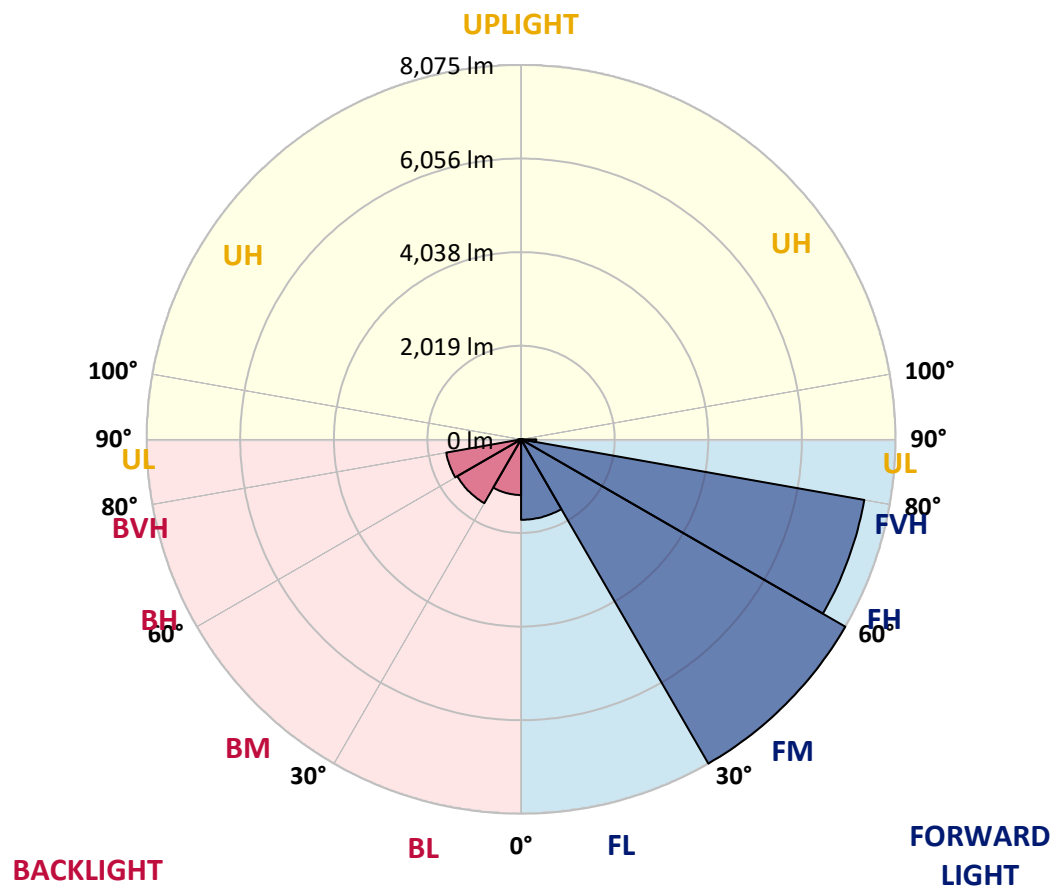
CATALOG NUMBER: GWS-SA4E-722-U-SL2-W

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1735.7 | 7.8       |                         |      |          |
| FM   | (30°-60°)   | 8075.1 | 36.5      |                         |      |          |
| FH   | (60°-80°)   | 7516.6 | 33.9      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 329.1  | 1.5       |                         |      | G3/500   |
| BL   | (0°-30°)    | 1200.8 | 5.4       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 1588.5 | 7.2       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1639.0 | 7.4       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 66.7   | 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-G4**

Type II Short



REPORT NUMBER: P638032

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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°     | 55°     | 65°     | 66°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
| 0°    | 4894.9 | 4894.9 | 4894.9 | 4894.9 | 4894.9 | 4894.9  | 4894.9  | 4894.9  | 4894.9  | 4894.9  | 4894.9  |
| 2.5°  | 4584.6 | 4600.7 | 4591.0 | 4652.5 | 4655.7 | 4733.3  | 4776.9  | 4814.1  | 4817.3  | 4865.8  | 4898.1  |
| 5°    | 4271.1 | 4280.8 | 4280.8 | 4338.9 | 4377.7 | 4481.2  | 4581.3  | 4688.0  | 4696.1  | 4812.4  | 4901.3  |
| 7.5°  | 4017.4 | 4027.1 | 4020.6 | 4098.2 | 4148.3 | 4263.0  | 4390.7  | 4553.9  | 4570.0  | 4757.5  | 4912.6  |
| 10°   | 3818.6 | 3815.4 | 3831.5 | 3902.6 | 3967.3 | 4104.6  | 4246.8  | 4432.7  | 4456.9  | 4694.5  | 4925.6  |
| 12.5° | 3682.9 | 3686.1 | 3695.8 | 3770.1 | 3839.6 | 3975.4  | 4122.4  | 4324.4  | 4350.3  | 4621.7  | 4919.1  |
| 15°   | 3618.2 | 3611.8 | 3619.8 | 3687.7 | 3754.0 | 3873.5  | 4025.4  | 4233.9  | 4259.8  | 4557.1  | 4920.7  |
| 17.5° | 3603.7 | 3598.8 | 3597.2 | 3645.7 | 3695.8 | 3807.3  | 3952.7  | 4164.4  | 4191.9  | 4515.1  | 4930.4  |
| 20°   | 3648.9 | 3642.5 | 3624.7 | 3645.7 | 3666.7 | 3760.4  | 3901.0  | 4114.3  | 4145.0  | 4487.6  | 4949.8  |
| 22.5° | 3773.4 | 3762.0 | 3734.6 | 3708.7 | 3681.2 | 3737.8  | 3868.7  | 4077.2  | 4107.9  | 4469.8  | 4969.2  |
| 25°   | 3962.4 | 3952.7 | 3923.6 | 3865.5 | 3765.3 | 3755.6  | 3862.2  | 4061.0  | 4091.7  | 4456.9  | 4977.3  |
| 27.5° | 4222.6 | 4208.1 | 4179.0 | 4094.9 | 3931.7 | 3821.8  | 3886.5  | 4059.4  | 4088.5  | 4442.4  | 4969.2  |
| 30°   | 4531.3 | 4521.6 | 4505.4 | 4403.6 | 4185.4 | 3962.4  | 3941.4  | 4072.3  | 4094.9  | 4434.3  | 4953.0  |
| 32.5° | 4844.8 | 4835.1 | 4848.0 | 4799.5 | 4531.3 | 4195.1  | 4061.0  | 4107.9  | 4124.0  | 4432.7  | 4938.5  |
| 35°   | 5121.1 | 5132.4 | 5226.1 | 5234.2 | 4970.8 | 4510.2  | 4250.1  | 4190.3  | 4193.5  | 4465.0  | 4944.9  |
| 37.5° | 5410.4 | 5454.0 | 5576.8 | 5681.8 | 5462.1 | 4927.2  | 4531.3  | 4345.4  | 4342.2  | 4547.4  | 4985.3  |
| 40°   | 5793.3 | 5812.7 | 5969.5 | 6166.6 | 6029.3 | 5499.2  | 4930.4  | 4599.1  | 4576.5  | 4715.5  | 5093.6  |
| 42.5° | 6166.6 | 6213.5 | 6464.0 | 6690.2 | 6645.0 | 6144.0  | 5433.0  | 4978.9  | 4938.5  | 5012.8  | 5316.6  |
| 45°   | 6641.7 | 6687.0 | 6968.2 | 7259.1 | 7341.5 | 6872.8  | 6076.1  | 5518.6  | 5478.2  | 5460.5  | 5725.5  |
| 47.5° | 7116.8 | 7163.7 | 7415.8 | 7836.0 | 8125.2 | 7784.3  | 6913.2  | 6231.3  | 6165.0  | 6095.5  | 6342.8  |
| 50°   | 7436.8 | 7491.8 | 7732.5 | 8236.7 | 8915.5 | 8921.9  | 7905.5  | 7165.3  | 7081.3  | 6971.4  | 7212.2  |
| 52.5° | 7425.5 | 7461.1 | 7690.5 | 8272.3 | 9484.3 | 10229.3 | 9233.8  | 8354.7  | 8286.8  | 8047.7  | 8257.7  |
| 55°   | 6842.1 | 6895.5 | 7126.5 | 7853.7 | 9545.7 | 11468.7 | 11185.9 | 9757.4  | 9636.2  | 9207.9  | 9439.0  |
| 57.5° | 5670.5 | 5715.8 | 5948.5 | 6845.4 | 9001.1 | 12103.8 | 13664.9 | 11544.7 | 11378.2 | 10471.7 | 10738.3 |
| 60°   | 4280.8 | 4225.8 | 4335.7 | 5121.1 | 7698.6 | 12120.0 | 15852.9 | 13968.7 | 13690.7 | 11822.6 | 12045.6 |
| 62.5° | 3212.6 | 3157.7 | 3181.9 | 3403.3 | 5219.7 | 11140.7 | 17100.5 | 17284.7 | 16825.8 | 13348.1 | 13304.5 |
| 65°   | 2538.7 | 2508.0 | 2577.5 | 2729.4 | 3042.9 | 8484.0  | 17110.2 | 20870.6 | 20581.3 | 15116.0 | 14595.7 |
| 67.5° | 2068.5 | 2049.1 | 2120.2 | 2401.4 | 2467.6 | 4558.7  | 15342.3 | 22544.8 | 22657.9 | 17052.0 | 15793.1 |
| 70°   | 1666.1 | 1637.0 | 1748.5 | 2118.6 | 2294.7 | 2758.5  | 10990.4 | 21691.5 | 21874.1 | 18205.8 | 15455.4 |
| 72.5° | 1150.6 | 1152.2 | 1208.8 | 1716.2 | 2215.5 | 2382.0  | 6216.7  | 18062.0 | 18457.9 | 17160.3 | 13587.3 |
| 75°   | 775.7  | 782.1  | 798.3  | 1132.8 | 2041.0 | 2310.9  | 3312.8  | 13674.6 | 13954.1 | 14183.6 | 11231.2 |
| 77.5° | 468.6  | 471.9  | 509.0  | 685.2  | 1407.5 | 2157.4  | 2244.6  | 9912.5  | 10132.3 | 9350.2  | 6961.7  |
| 80°   | 271.5  | 282.8  | 316.7  | 458.9  | 950.2  | 1620.8  | 1737.2  | 6077.8  | 6326.6  | 4156.3  | 2212.3  |
| 82.5° | 119.6  | 127.7  | 172.9  | 266.6  | 554.3  | 1378.4  | 1355.8  | 2401.4  | 2365.8  | 1158.7  | 767.6   |
| 85°   | 21.0   | 25.9   | 37.2   | 84.0   | 203.6  | 727.2   | 1052.0  | 1060.1  | 997.1   | 439.6   | 318.4   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 4.8     | 158.4   | 284.4   | 282.8   | 124.4   | 109.9   |
| 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: P638032

CATALOG NUMBER: GWS-SA4E-722-U-SL2-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4894.9  | 4894.9  | 4894.9 | 4894.9 | 4894.9 | 4894.9 | 4894.9 | 4894.9 | 4894.9 | 4894.9 | 4894.9 |
| 2.5°  | 4919.1  | 4875.5  | 4914.2 | 4919.1 | 4911.0 | 4904.5 | 4856.1 | 4814.1 | 4809.2 | 4764.0 | 4764.0 |
| 5°    | 4936.9  | 4896.5  | 4915.9 | 4878.7 | 4820.5 | 4760.7 | 4657.3 | 4586.2 | 4553.9 | 4495.7 | 4495.7 |
| 7.5°  | 4961.1  | 4919.1  | 4896.5 | 4804.4 | 4668.6 | 4537.7 | 4371.3 | 4232.3 | 4175.7 | 4093.3 | 4090.1 |
| 10°   | 4983.7  | 4930.4  | 4852.8 | 4673.5 | 4456.9 | 4248.5 | 4006.1 | 3808.9 | 3674.8 | 3576.2 | 3576.2 |
| 12.5° | 4982.1  | 4912.6  | 4759.1 | 4494.1 | 4195.1 | 3892.9 | 3569.7 | 3272.4 | 3094.6 | 2941.1 | 2931.4 |
| 15°   | 4978.9  | 4883.5  | 4639.5 | 4285.6 | 3889.7 | 3471.2 | 3031.6 | 2643.8 | 2380.4 | 2230.1 | 2217.1 |
| 17.5° | 4975.7  | 4846.4  | 4505.4 | 4048.1 | 3518.0 | 2947.6 | 2367.4 | 1947.3 | 1727.5 | 1635.4 | 1638.6 |
| 20°   | 4975.7  | 4804.4  | 4361.6 | 3775.0 | 3089.8 | 2320.6 | 1737.2 | 1431.8 | 1376.8 | 1381.7 | 1386.5 |
| 22.5° | 4961.1  | 4752.6  | 4201.6 | 3477.6 | 2613.1 | 1706.5 | 1281.5 | 1178.1 | 1207.1 | 1252.4 | 1258.9 |
| 25°   | 4927.2  | 4667.0  | 4015.8 | 3148.0 | 2045.9 | 1242.7 | 1045.5 | 1026.2 | 1079.5 | 1136.0 | 1152.2 |
| 27.5° | 4873.8  | 4568.4  | 3807.3 | 2761.7 | 1506.1 | 998.7  | 919.5  | 917.9  | 959.9  | 1001.9 | 1016.5 |
| 30°   | 4817.3  | 4458.5  | 3587.5 | 2331.9 | 1090.8 | 869.4  | 838.7  | 838.7  | 859.7  | 885.6  | 882.3  |
| 32.5° | 4751.0  | 4347.0  | 3351.6 | 1884.3 | 888.8  | 796.7  | 787.0  | 782.1  | 785.4  | 795.1  | 795.1  |
| 35°   | 4694.5  | 4248.5  | 3109.2 | 1410.8 | 796.7  | 756.3  | 746.6  | 735.3  | 730.4  | 724.0  | 727.2  |
| 37.5° | 4673.5  | 4170.9  | 2858.7 | 1063.3 | 751.4  | 727.2  | 711.0  | 694.9  | 683.6  | 680.3  | 678.7  |
| 40°   | 4707.4  | 4138.6  | 2608.2 | 875.9  | 719.1  | 696.5  | 678.7  | 657.7  | 648.0  | 648.0  | 648.0  |
| 42.5° | 4839.9  | 4162.8  | 2352.9 | 791.8  | 696.5  | 670.6  | 644.8  | 625.4  | 622.2  | 625.4  | 627.0  |
| 45°   | 5082.3  | 4256.5  | 2087.9 | 749.8  | 677.1  | 644.8  | 614.1  | 599.5  | 599.5  | 602.8  | 602.8  |
| 47.5° | 5515.4  | 4502.2  | 1826.1 | 724.0  | 657.7  | 623.8  | 591.5  | 576.9  | 575.3  | 578.5  | 578.5  |
| 50°   | 6265.2  | 4944.9  | 1590.1 | 706.2  | 643.2  | 607.6  | 575.3  | 555.9  | 551.1  | 549.4  | 549.4  |
| 52.5° | 7210.6  | 5712.5  | 1439.9 | 693.3  | 625.4  | 589.8  | 557.5  | 531.7  | 522.0  | 517.1  | 517.1  |
| 55°   | 8353.1  | 6735.5  | 1439.9 | 683.6  | 602.8  | 568.8  | 531.7  | 505.8  | 491.3  | 484.8  | 484.8  |
| 57.5° | 9647.5  | 7926.5  | 1688.7 | 675.5  | 585.0  | 544.6  | 504.2  | 478.3  | 462.2  | 452.5  | 452.5  |
| 60°   | 10964.5 | 9185.3  | 2304.4 | 664.2  | 568.8  | 513.9  | 473.5  | 449.2  | 428.2  | 416.9  | 415.3  |
| 62.5° | 12330.1 | 10571.8 | 3115.6 | 670.6  | 557.5  | 484.8  | 441.2  | 413.7  | 395.9  | 384.6  | 383.0  |
| 65°   | 13580.8 | 11892.1 | 3825.1 | 720.7  | 559.1  | 458.9  | 404.0  | 379.8  | 365.2  | 350.7  | 349.1  |
| 67.5° | 14642.5 | 12620.9 | 3327.3 | 822.5  | 593.1  | 428.2  | 366.8  | 342.6  | 329.7  | 320.0  | 318.4  |
| 70°   | 13899.2 | 11509.1 | 1887.5 | 885.6  | 639.9  | 395.9  | 324.8  | 308.7  | 295.7  | 289.3  | 287.6  |
| 72.5° | 11885.7 | 9744.5  | 1262.1 | 782.1  | 583.4  | 353.9  | 286.0  | 273.1  | 263.4  | 255.3  | 253.7  |
| 75°   | 9628.1  | 7727.7  | 964.7  | 641.6  | 454.1  | 287.6  | 245.6  | 235.9  | 226.2  | 218.2  | 216.5  |
| 77.5° | 5696.4  | 4465.0  | 711.0  | 507.4  | 320.0  | 224.6  | 203.6  | 195.5  | 185.8  | 179.4  | 177.8  |
| 80°   | 1818.0  | 1551.4  | 450.9  | 349.1  | 211.7  | 172.9  | 156.8  | 150.3  | 140.6  | 132.5  | 130.9  |
| 82.5° | 693.3   | 599.5   | 239.2  | 177.8  | 140.6  | 118.0  | 105.0  | 98.6   | 92.1   | 84.0   | 82.4   |
| 85°   | 307.0   | 287.6   | 132.5  | 95.3   | 76.0   | 58.2   | 51.7   | 48.5   | 40.4   | 33.9   | 32.3   |
| 87.5° | 108.3   | 108.3   | 56.6   | 27.5   | 16.2   | 8.1    | 4.8    | 1.6    | 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            |

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

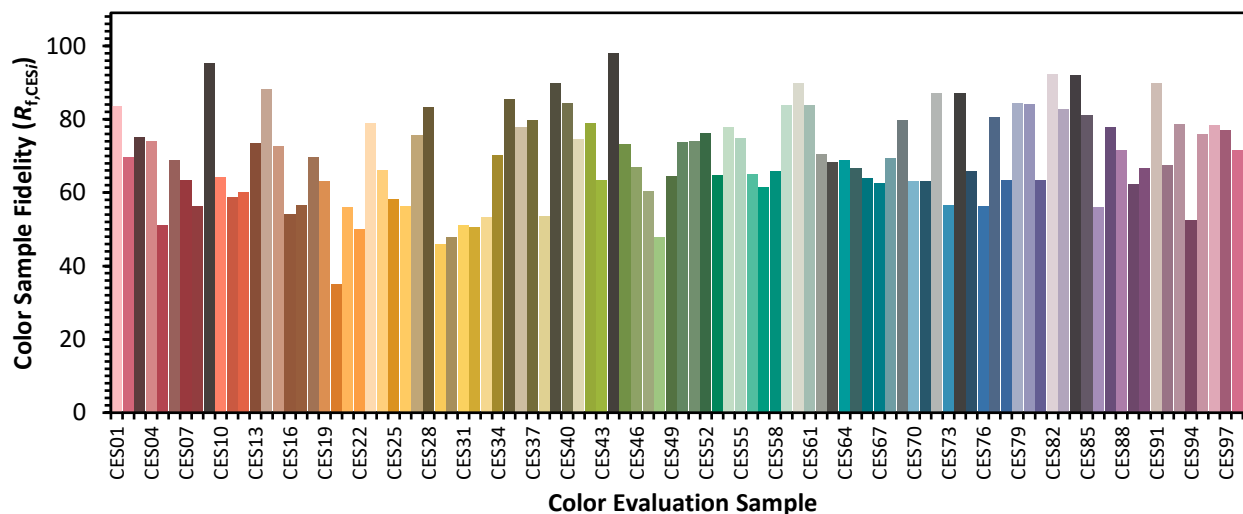


REPORT NUMBER: SP1-1908-441-10-R4

**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)