

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: P640015

Luminaire Tested: GWS-SA5D-722-U-SL3-W-HSS

Issue Date: 1/10/2023

### Test Information

Test Method: LM-79-2019  
Report Number: P640015  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-34)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA5D-722-U-SL3-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE III 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: 17921.9 lumens  
Efficiency: N/A  
Efficacy: 87.6 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B2 - U0 - G3

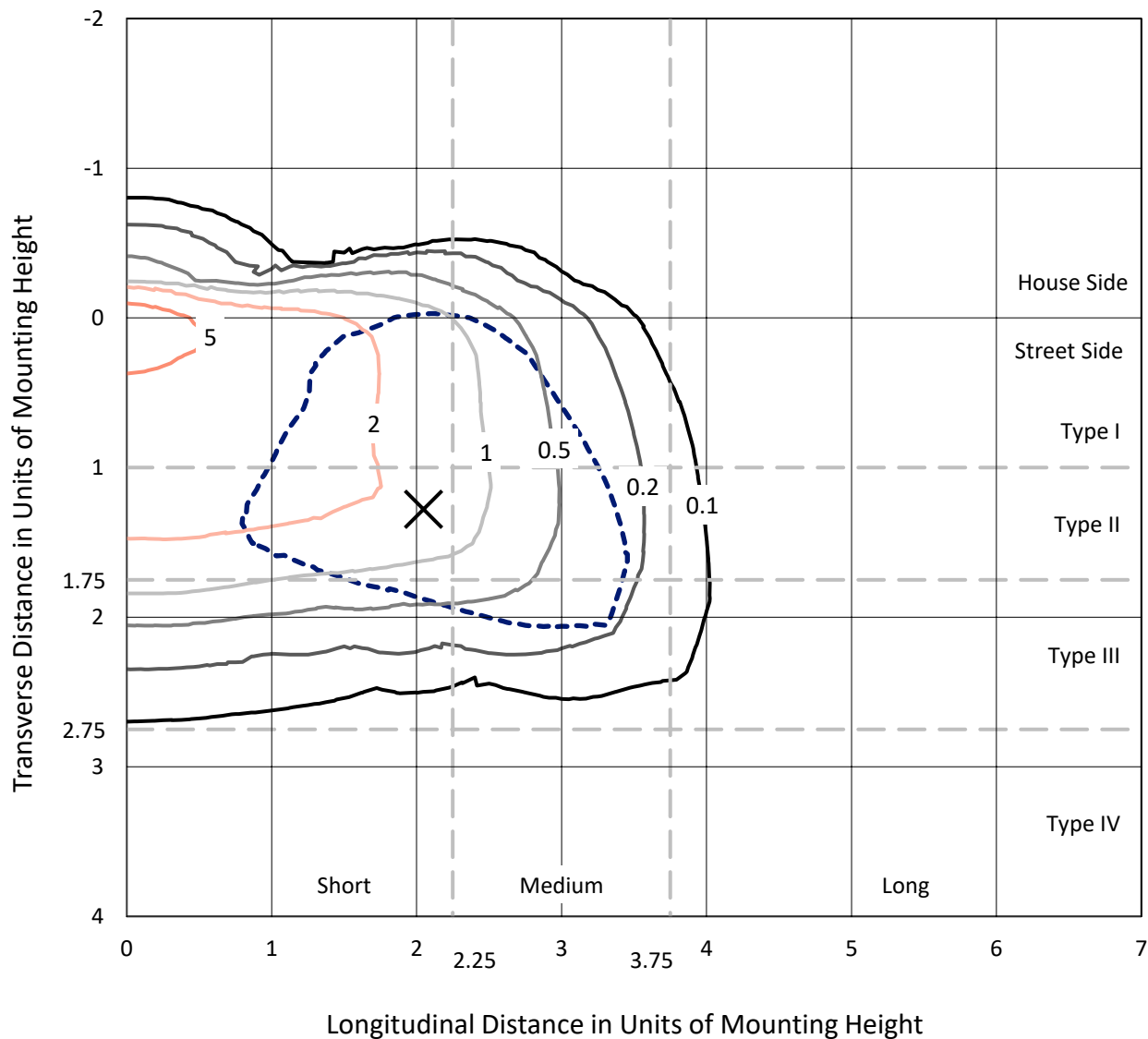
Input Watts (W): 204.6  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P640015  
 CATALOG NUMBER: GWS-SA5D-722-U-SL3-W-HSS

## Iso-Footcandle Lines of Horizontal Illumination

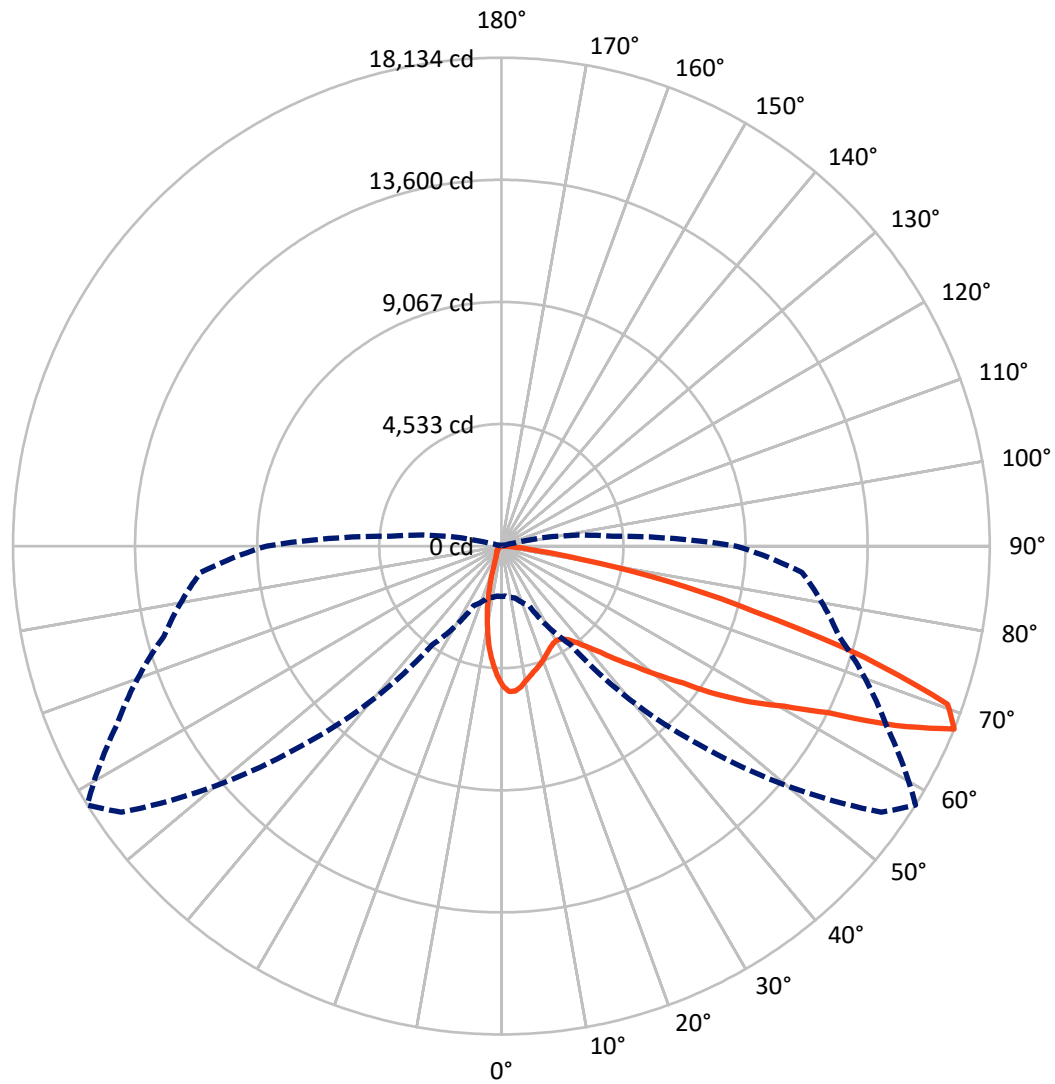
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 8.3 fc  
 Type III - Short - N/A

REPORT NUMBER: P640015  
CATALOG NUMBER: GWS-SA5D-722-U-SL3-W-HSS

## Luminous Intensity Polar Plot



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

REPORT NUMBER: P640015

CATALOG NUMBER: GWS-SA5D-722-U-SL3-W-HSS

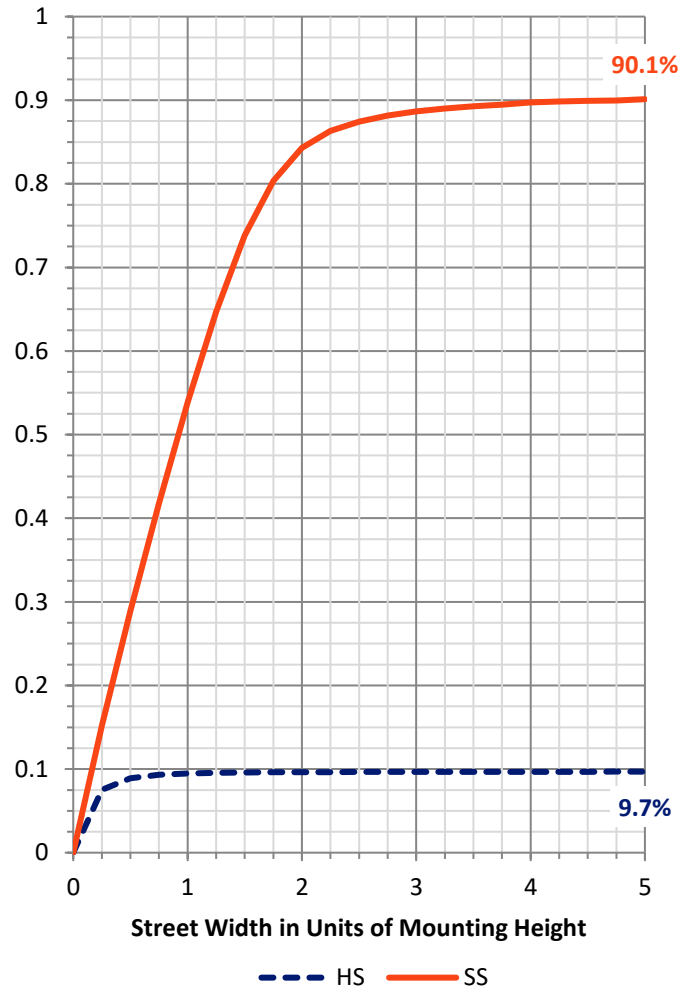
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1750.9   | 0.0    | 1750.9  |
|                    | % Fixture | 9.8      | 0.0    | 9.8     |
| <b>Street Side</b> | Lumens    | 16171.0  | 0.0    | 16171.0 |
|                    | % Fixture | 90.2     | 0.0    | 90.2    |
| <b>Total</b>       | Lumens    | 17921.9  | 0.0    | 17921.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 420.1   | 2.3       |
| 10°-20°   | 874.4   | 4.9       |
| 20°-30°   | 1179.2  | 6.6       |
| 30°-40°   | 1657.1  | 9.2       |
| 40°-50°   | 2559.2  | 14.3      |
| 50°-60°   | 4092.5  | 22.8      |
| 60°-70°   | 4845.8  | 27.0      |
| 70°-80°   | 2143.7  | 12.0      |
| 80°-90°   | 149.9   | 0.8       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 17921.9 | 100.0     |
| 0°-180°   | 17921.9 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P640015

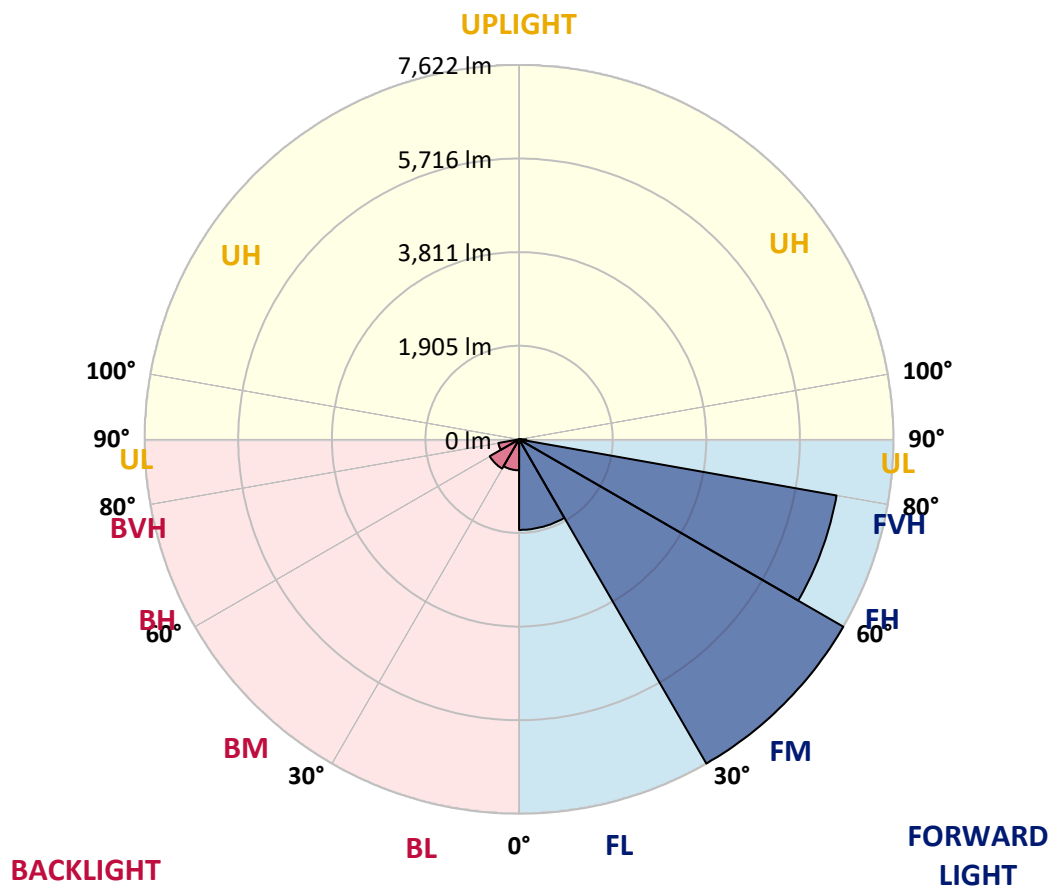
CATALOG NUMBER: GWS-SA5D-722-U-SL3-W-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1843.7 | 10.3      |                         |      |         |
| FM   | (30°-60°)   | 7621.8 | 42.5      |                         |      |         |
| FH   | (60°-80°)   | 6562.0 | 36.6      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 143.5  | 0.8       |                         |      | G2/225  |
| BL   | (0°-30°)    | 630.1  | 3.5       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 687.0  | 3.8       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 427.4  | 2.4       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 6.4    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type III Short



REPORT NUMBER: P640015

CATALOG NUMBER: GWS-SA5D-722-U-SL3-W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°     | 55°     | 58°     | 65°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
| 0°    | 5169.5 | 5169.5 | 5169.5 | 5169.5 | 5169.5 | 5169.5  | 5169.5  | 5169.5  | 5169.5  | 5169.5  | 5169.5  |
| 2.5°  | 5437.6 | 5447.1 | 5459.8 | 5475.7 | 5472.5 | 5458.2  | 5440.8  | 5401.1  | 5375.7  | 5296.4  | 5199.7  |
| 5°    | 5263.1 | 5261.5 | 5293.2 | 5323.4 | 5377.3 | 5405.9  | 5445.5  | 5409.0  | 5396.3  | 5301.2  | 5144.1  |
| 7.5°  | 4922.1 | 4939.5 | 4976.0 | 5023.6 | 5101.3 | 5185.4  | 5280.6  | 5269.4  | 5307.5  | 5244.1  | 5049.0  |
| 10°   | 4587.4 | 4577.9 | 4635.0 | 4706.3 | 4825.3 | 4933.2  | 5071.2  | 5069.6  | 5169.5  | 5163.2  | 4941.1  |
| 12.5° | 4293.9 | 4292.3 | 4336.7 | 4417.6 | 4557.2 | 4707.9  | 4895.1  | 4899.9  | 5023.6  | 5074.3  | 4849.1  |
| 15°   | 4046.5 | 4049.6 | 4092.5 | 4176.5 | 4320.9 | 4504.9  | 4722.2  | 4761.9  | 4901.4  | 5004.5  | 4758.7  |
| 17.5° | 3870.4 | 3872.0 | 3897.4 | 3970.3 | 4111.5 | 4308.2  | 4569.9  | 4623.9  | 4803.1  | 4952.2  | 4685.7  |
| 20°   | 3789.5 | 3783.2 | 3787.9 | 3824.4 | 3933.8 | 4113.1  | 4414.5  | 4484.3  | 4712.7  | 4915.7  | 4619.1  |
| 22.5° | 3800.6 | 3791.1 | 3768.9 | 3764.1 | 3813.3 | 3949.7  | 4249.5  | 4335.2  | 4614.3  | 4893.5  | 4558.8  |
| 25°   | 3898.9 | 3878.3 | 3846.6 | 3799.0 | 3780.0 | 3848.2  | 4105.2  | 4194.0  | 4522.3  | 4895.1  | 4512.8  |
| 27.5° | 4049.6 | 4027.4 | 3987.8 | 3924.3 | 3849.8 | 3821.2  | 4006.8  | 4090.9  | 4457.3  | 4931.6  | 4490.6  |
| 30°   | 4241.6 | 4224.1 | 4186.1 | 4109.9 | 4010.0 | 3892.6  | 3986.2  | 4056.0  | 4425.6  | 5006.1  | 4500.1  |
| 32.5° | 4468.4 | 4455.7 | 4424.0 | 4354.2 | 4240.0 | 4060.7  | 4056.0  | 4109.9  | 4451.0  | 5114.0  | 4536.6  |
| 35°   | 4687.3 | 4692.1 | 4693.6 | 4655.6 | 4533.4 | 4316.1  | 4247.9  | 4267.0  | 4555.6  | 5275.8  | 4619.1  |
| 37.5° | 4923.7 | 4912.5 | 4969.7 | 4996.6 | 4879.2 | 4647.6  | 4544.5  | 4546.1  | 4755.5  | 5515.3  | 4774.5  |
| 40°   | 5102.9 | 5106.1 | 5229.8 | 5340.8 | 5291.7 | 5068.0  | 4920.5  | 4918.9  | 5063.2  | 5843.7  | 5025.2  |
| 42.5° | 5271.0 | 5291.7 | 5474.1 | 5664.4 | 5732.6 | 5534.3  | 5428.1  | 5388.4  | 5494.7  | 6287.8  | 5401.1  |
| 45°   | 5450.3 | 5480.4 | 5735.8 | 6007.0 | 6186.3 | 6068.9  | 5984.8  | 6000.7  | 6013.4  | 6804.9  | 5907.1  |
| 47.5° | 5659.7 | 5678.7 | 5994.4 | 6376.6 | 6711.3 | 6681.2  | 6686.0  | 6666.9  | 6660.6  | 7456.9  | 6576.5  |
| 50°   | 5913.5 | 5957.9 | 6321.1 | 6778.0 | 7234.8 | 7434.7  | 7501.3  | 7509.2  | 7406.1  | 8167.5  | 7269.7  |
| 52.5° | 6452.8 | 6506.7 | 6817.6 | 7217.3 | 7805.8 | 8226.2  | 8497.4  | 8443.5  | 8284.9  | 8855.9  | 8029.5  |
| 55°   | 7088.9 | 7130.1 | 7429.9 | 7843.9 | 8503.8 | 9093.8  | 9737.9  | 9715.6  | 9327.0  | 9580.8  | 8654.5  |
| 57.5° | 7149.1 | 7195.1 | 7659.9 | 8294.4 | 9400.0 | 10166.1 | 10843.5 | 10914.8 | 10345.4 | 10094.8 | 9212.8  |
| 60°   | 6471.8 | 6565.4 | 7199.9 | 8053.3 | 9742.6 | 11608.0 | 12055.3 | 12069.6 | 11092.5 | 10616.6 | 9894.9  |
| 62.5° | 5187.0 | 5231.4 | 5870.6 | 6984.2 | 9214.4 | 12448.7 | 13906.5 | 13605.1 | 12052.2 | 11424.0 | 10975.1 |
| 65°   | 2718.8 | 2899.6 | 3456.4 | 4688.9 | 7472.7 | 12155.3 | 16133.5 | 16051.0 | 13778.0 | 12580.4 | 11815.8 |
| 67.5° | 1865.4 | 1863.8 | 1995.5 | 2444.4 | 4455.7 | 10465.9 | 17226.4 | 18133.8 | 15773.5 | 12976.9 | 11206.7 |
| 70°   | 1419.7 | 1424.4 | 1541.8 | 1833.7 | 2308.0 | 6966.7  | 16027.2 | 17578.6 | 16144.6 | 11782.5 | 9063.7  |
| 72.5° | 942.2  | 951.7  | 1146.8 | 1481.5 | 1843.2 | 3415.1  | 12455.1 | 14065.1 | 13584.5 | 9463.4  | 6379.8  |
| 75°   | 563.1  | 571.0  | 710.6  | 1077.0 | 1638.6 | 1911.4  | 7913.7  | 9723.6  | 9350.8  | 6522.6  | 3419.9  |
| 77.5° | 231.6  | 237.9  | 364.8  | 671.0  | 1199.2 | 1484.7  | 4376.4  | 6362.4  | 5601.0  | 2593.5  | 934.3   |
| 80°   | 96.8   | 99.9   | 176.1  | 469.5  | 864.5  | 931.1   | 2027.2  | 2990.0  | 2295.3  | 558.4   | 285.5   |
| 82.5° | 34.9   | 36.5   | 65.0   | 258.6  | 537.7  | 701.1   | 1023.1  | 1181.7  | 647.2   | 182.4   | 153.9   |
| 85°   | 1.6    | 1.6    | 15.9   | 87.2   | 204.6  | 198.3   | 585.3   | 566.3   | 214.1   | 76.1    | 92.0    |
| 87.5° | 0.0    | 0.0    | 1.6    | 1.6    | 3.2    | 7.9     | 55.5    | 98.3    | 46.0    | 19.0    | 39.7    |
| 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: P640015

CATALOG NUMBER: GWS-SA5D-722-U-SL3-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 5169.5 | 5169.5 | 5169.5 | 5169.5 | 5169.5 | 5169.5 | 5169.5 | 5169.5 | 5169.5 | 5169.5 | 5169.5 |
| 2.5°  | 5136.2 | 5052.1 | 4960.1 | 4874.5 | 4738.1 | 4657.2 | 4557.2 | 4512.8 | 4449.4 | 4433.5 | 4443.0 |
| 5°    | 5031.5 | 4887.2 | 4666.7 | 4466.8 | 4208.3 | 4000.5 | 3791.1 | 3702.3 | 3588.0 | 3511.9 | 3480.2 |
| 7.5°  | 4884.0 | 4695.2 | 4351.0 | 3987.8 | 3632.5 | 3253.4 | 2964.7 | 2774.3 | 2601.4 | 2506.2 | 2487.2 |
| 10°   | 4734.9 | 4489.0 | 3995.7 | 3475.4 | 2925.0 | 2471.3 | 2081.1 | 1792.4 | 1557.7 | 1451.4 | 1368.9 |
| 12.5° | 4581.0 | 4274.9 | 3634.0 | 2955.1 | 2315.9 | 1697.3 | 1215.1 | 934.3  | 766.1  | 699.5  | 710.6  |
| 15°   | 4439.9 | 4068.7 | 3275.6 | 2434.9 | 1630.6 | 1024.7 | 671.0  | 566.3  | 526.6  | 513.9  | 512.4  |
| 17.5° | 4305.0 | 3873.6 | 2918.7 | 1928.9 | 1075.5 | 628.1  | 513.9  | 488.6  | 477.5  | 471.1  | 471.1  |
| 20°   | 4182.9 | 3686.4 | 2569.7 | 1453.0 | 694.8  | 498.1  | 464.8  | 452.1  | 442.6  | 437.8  | 437.8  |
| 22.5° | 4068.7 | 3505.6 | 2228.7 | 1027.9 | 512.4  | 447.3  | 426.7  | 414.0  | 402.9  | 396.6  | 396.6  |
| 25°   | 3965.6 | 3342.2 | 1903.5 | 707.5  | 441.0  | 409.2  | 387.0  | 372.8  | 353.7  | 342.6  | 342.6  |
| 27.5° | 3891.0 | 3196.2 | 1591.0 | 515.5  | 398.1  | 368.0  | 342.6  | 323.6  | 303.0  | 290.3  | 287.1  |
| 30°   | 3846.6 | 3072.5 | 1275.3 | 423.5  | 358.5  | 328.3  | 299.8  | 276.0  | 252.2  | 239.5  | 237.9  |
| 32.5° | 3821.2 | 2958.3 | 986.6  | 369.6  | 325.2  | 290.3  | 258.6  | 233.2  | 209.4  | 195.1  | 193.5  |
| 35°   | 3830.7 | 2869.5 | 739.2  | 333.1  | 293.5  | 257.0  | 222.1  | 196.7  | 176.1  | 163.4  | 160.2  |
| 37.5° | 3913.2 | 2829.8 | 555.2  | 304.6  | 266.5  | 228.4  | 191.9  | 168.1  | 149.1  | 139.6  | 138.0  |
| 40°   | 4073.4 | 2837.8 | 436.2  | 282.3  | 244.3  | 199.9  | 165.0  | 142.8  | 128.5  | 120.6  | 119.0  |
| 42.5° | 4322.5 | 2904.4 | 360.1  | 263.3  | 220.5  | 174.5  | 142.8  | 125.3  | 111.0  | 103.1  | 101.5  |
| 45°   | 4693.6 | 3042.4 | 314.1  | 241.1  | 195.1  | 150.7  | 123.7  | 107.9  | 95.2   | 85.7   | 84.1   |
| 47.5° | 5231.4 | 3281.9 | 283.9  | 220.5  | 172.9  | 130.1  | 106.3  | 90.4   | 79.3   | 71.4   | 69.8   |
| 50°   | 5804.0 | 3569.0 | 258.6  | 199.9  | 153.9  | 112.6  | 90.4   | 74.6   | 65.0   | 57.1   | 55.5   |
| 52.5° | 6414.7 | 3878.3 | 239.5  | 180.8  | 136.4  | 96.8   | 76.1   | 61.9   | 52.3   | 44.4   | 42.8   |
| 55°   | 7001.6 | 4189.2 | 217.3  | 168.1  | 115.8  | 82.5   | 63.4   | 50.8   | 41.2   | 34.9   | 34.9   |
| 57.5° | 7572.7 | 4474.7 | 193.5  | 147.5  | 95.2   | 69.8   | 52.3   | 41.2   | 33.3   | 28.6   | 27.0   |
| 60°   | 8254.7 | 4869.7 | 166.6  | 125.3  | 79.3   | 58.7   | 42.8   | 33.3   | 27.0   | 22.2   | 22.2   |
| 62.5° | 9268.3 | 5280.6 | 142.8  | 104.7  | 66.6   | 49.2   | 34.9   | 27.0   | 22.2   | 19.0   | 17.4   |
| 65°   | 9599.9 | 5058.5 | 120.6  | 85.7   | 53.9   | 39.7   | 28.6   | 23.8   | 19.0   | 17.4   | 15.9   |
| 67.5° | 8714.7 | 4146.4 | 99.9   | 69.8   | 44.4   | 33.3   | 25.4   | 20.6   | 17.4   | 15.9   | 14.3   |
| 70°   | 6800.2 | 2942.5 | 77.7   | 52.3   | 36.5   | 27.0   | 22.2   | 19.0   | 15.9   | 14.3   | 14.3   |
| 72.5° | 4625.4 | 1740.1 | 61.9   | 39.7   | 30.1   | 23.8   | 19.0   | 17.4   | 15.9   | 14.3   | 12.7   |
| 75°   | 2277.8 | 618.6  | 47.6   | 30.1   | 23.8   | 20.6   | 17.4   | 15.9   | 14.3   | 12.7   | 12.7   |
| 77.5° | 613.9  | 171.3  | 36.5   | 23.8   | 19.0   | 15.9   | 15.9   | 15.9   | 14.3   | 11.1   | 11.1   |
| 80°   | 207.8  | 71.4   | 27.0   | 17.4   | 15.9   | 12.7   | 11.1   | 14.3   | 12.7   | 11.1   | 9.5    |
| 82.5° | 114.2  | 34.9   | 19.0   | 14.3   | 11.1   | 9.5    | 9.5    | 9.5    | 9.5    | 7.9    | 7.9    |
| 85°   | 73.0   | 19.0   | 12.7   | 11.1   | 11.1   | 7.9    | 6.3    | 6.3    | 4.8    | 4.8    | 4.8    |
| 87.5° | 33.3   | 11.1   | 11.1   | 9.5    | 9.5    | 7.9    | 4.8    | 3.2    | 1.6    | 1.6    | 1.6    |
| 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)