

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: P643066

Luminaire Tested: GWS-SA6E-727-U-T3R-W-GRSWH

Issue Date: 1/10/2023

Test Information

Test Method: LM-79-2019
Report Number: P643066
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-17)
Test Lab: COOPER LIGHTING SOLUTIONS
Issue Date: 1/10/2023
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: McGRAW-EDISON
Catalog Number: GWS-SAGE-727-U-T3R-W-GRSWH
Description: GALLEON WALL SLIM LUMINAIRE. (6) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III ROADWAY OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH
Light Source: (96) 2700K CCT, 70 CRI LEDS
Ballast/Driver: -

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 32821.8 lumens
Efficiency: N/A
Efficacy: 101.4 lumens/watt
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')
IES Classification: Type II - Short
BUG Rating: B4 - U0 - G3

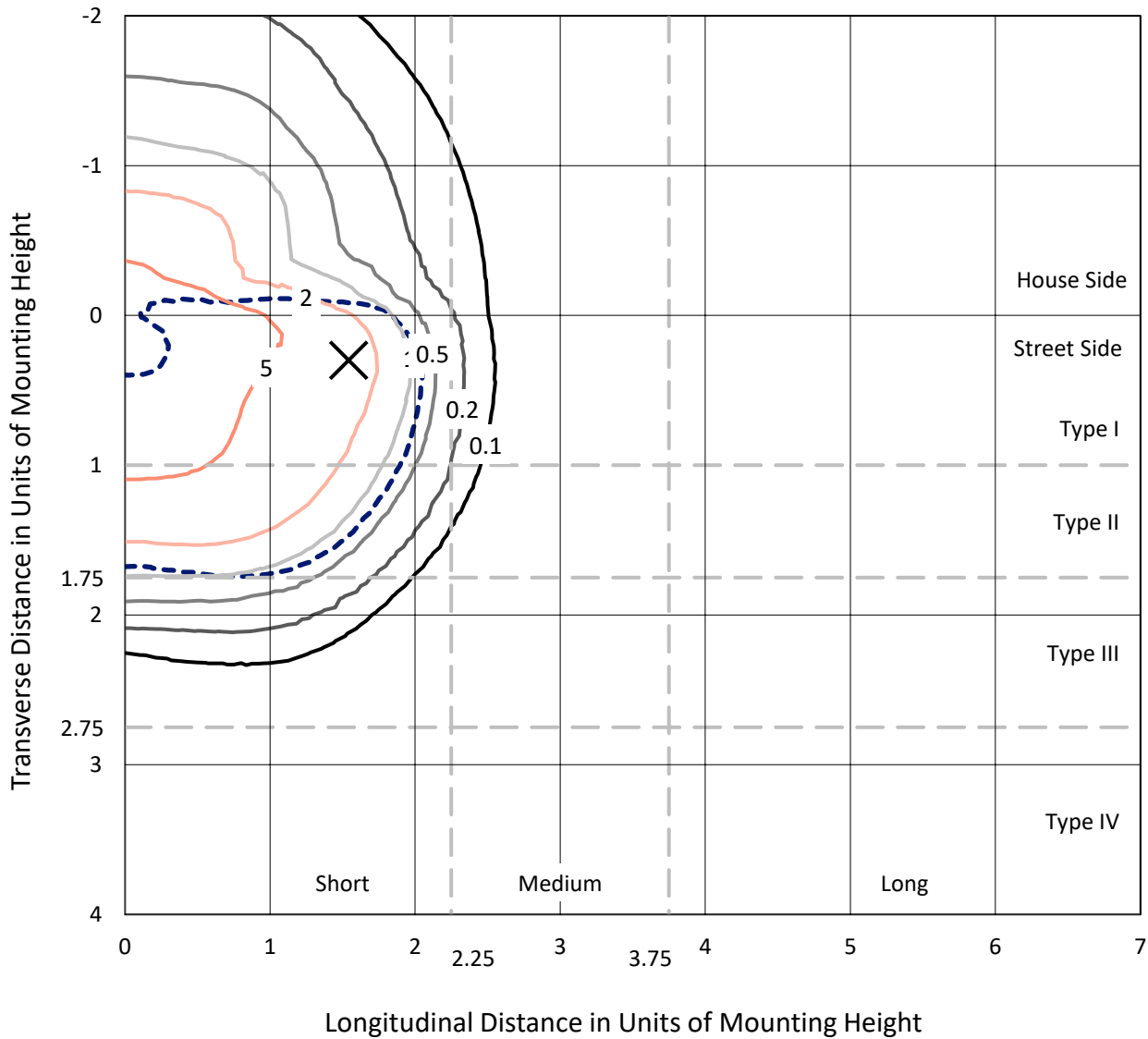
Input Watts (W): 323.8
Input Voltage (V): 120
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 0
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 28.75 FT



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 CATALOG NUMBER: GWS-SA6E-727-U-T3R-W-GRSWH

Iso-Footcandle Lines of Horizontal Illumination

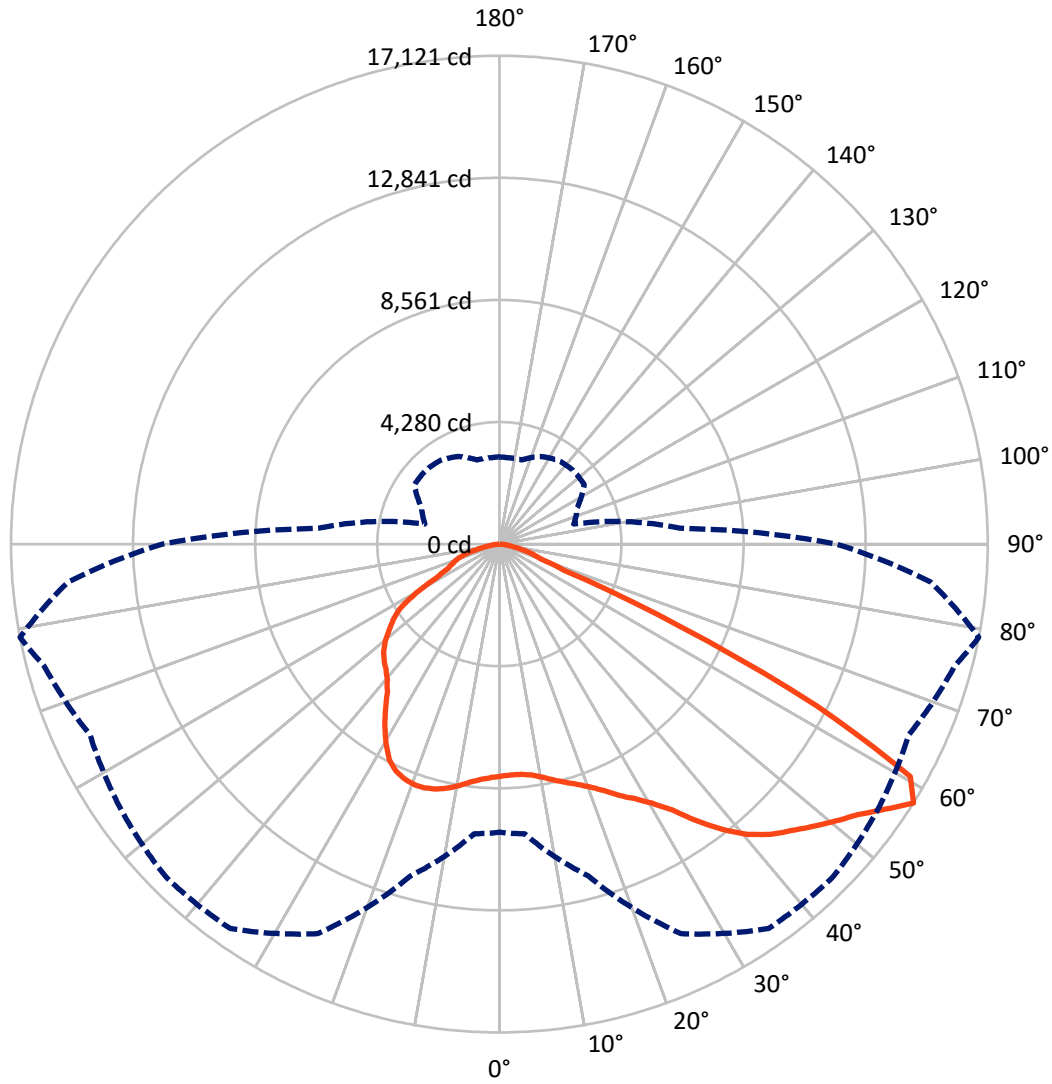
✕ Max cd
 - - - 1/2 Max cd



Based on 30 foot mounting height. Maximum calculated value = 9.1 fc
 Type II - Short - N/A

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Luminous Intensity Polar Plot



— Vertical Plane Through 79-Deg Lateral - - - Horizontal Cone Through 57.5-Deg Vertical

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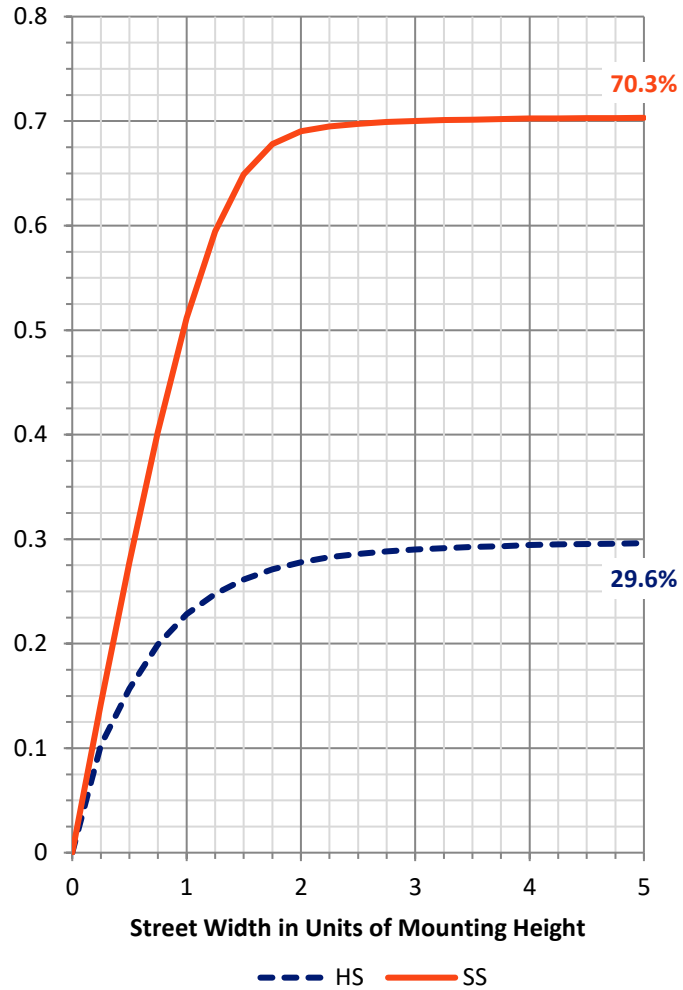
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|---------|
| House Side | Lumens | 9756.4 | 0.0 | 9756.4 |
| | % Fixture | 29.7 | 0.0 | 29.7 |
| Street Side | Lumens | 23065.4 | 0.0 | 23065.4 |
| | % Fixture | 70.3 | 0.0 | 70.3 |
| Total | Lumens | 32821.8 | 0.0 | 32821.8 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|---------|-----------|
| 0°-10° | 753.3 | 2.3 |
| 10°-20° | 2093.4 | 6.4 |
| 20°-30° | 3548.3 | 10.8 |
| 30°-40° | 5431.2 | 16.5 |
| 40°-50° | 7242.0 | 22.1 |
| 50°-60° | 8363.9 | 25.5 |
| 60°-70° | 4346.2 | 13.2 |
| 70°-80° | 923.9 | 2.8 |
| 80°-90° | 119.7 | 0.4 |
| 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° | 32821.8 | 100.0 |
| 0°-180° | 32821.8 | 100.0 |

Coefficient of Utilization



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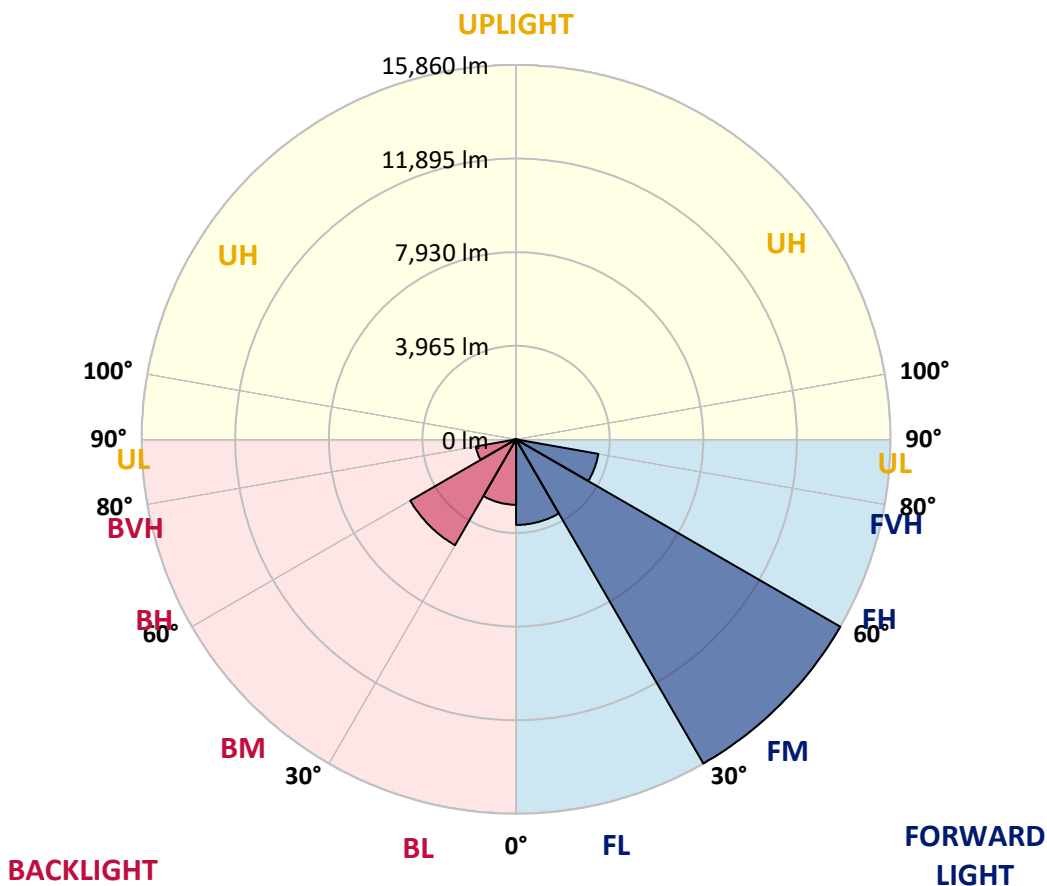
CATALOG NUMBER: GWS-SA6E-727-U-T3R-W-GRSWH

LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|---------|-----------|-------------------------|------|---------|
| | | | B | U | G |
| FL (0°-30°) | 3624.3 | 11.0 | | | |
| FM (30°-60°) | 15860.4 | 48.3 | | | |
| FH (60°-80°) | 3539.0 | 10.8 | | | G2/5000 |
| FVH (80°-90°) | 41.7 | 0.1 | | | G1/100 |
| BL (0°-30°) | 2770.7 | 8.4 | B4/5000 | | |
| BM (30°-60°) | 5176.7 | 15.8 | B4/8500 | | |
| BH (60°-80°) | 1731.1 | 5.3 | B3/2500 | | G3/2500 |
| BVH (80°-90°) | 77.9 | 0.2 | | | G1/100 |
| UL (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH (100°-180°) | 0.0 | 0.0 | | U0/0 | |

BUG Rating: B4-U0-G3

Type II Short





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CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 79° | 85° |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0° | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 |
| 2.5° | 7763.7 | 7747.6 | 7752.9 | 7774.4 | 7854.9 | 7913.9 | 7975.7 | 8032.0 | 8085.7 | 8101.8 | 8115.2 |
| 5° | 7487.3 | 7457.7 | 7465.8 | 7500.7 | 7594.6 | 7693.9 | 7803.9 | 7938.1 | 8066.9 | 8109.8 | 8166.2 |
| 7.5° | 7291.3 | 7286.0 | 7299.4 | 7353.1 | 7452.4 | 7546.3 | 7688.5 | 7879.1 | 8101.8 | 8174.3 | 8273.5 |
| 10° | 7031.0 | 7020.3 | 7074.0 | 7184.0 | 7347.7 | 7498.0 | 7667.1 | 7892.5 | 8203.8 | 8311.1 | 8464.1 |
| 12.5° | 6824.4 | 6819.0 | 6875.4 | 7028.4 | 7237.7 | 7476.5 | 7710.0 | 7962.3 | 8340.6 | 8488.2 | 8676.1 |
| 15° | 6945.2 | 6921.0 | 6923.7 | 7031.0 | 7218.9 | 7500.7 | 7817.3 | 8088.4 | 8477.5 | 8665.4 | 8906.9 |
| 17.5° | 7296.7 | 7253.8 | 7221.6 | 7240.4 | 7347.7 | 7640.2 | 7981.0 | 8257.4 | 8635.8 | 8855.9 | 9151.1 |
| 20° | 7782.4 | 7758.3 | 7669.7 | 7610.7 | 7634.9 | 7892.5 | 8238.7 | 8496.3 | 8842.5 | 9089.4 | 9406.0 |
| 22.5° | 8434.6 | 8375.5 | 8254.8 | 8160.8 | 8088.4 | 8289.6 | 8609.0 | 8831.7 | 9129.6 | 9387.2 | 9717.3 |
| 25° | 9242.3 | 9156.5 | 8965.9 | 8818.3 | 8662.7 | 8869.3 | 9153.8 | 9322.8 | 9524.1 | 9762.9 | 10076.9 |
| 27.5° | 10066.2 | 9993.7 | 9781.7 | 9583.1 | 9389.9 | 9518.7 | 9856.9 | 9953.5 | 9932.0 | 10106.4 | 10374.8 |
| 30° | 10943.7 | 10852.5 | 10651.2 | 10436.5 | 10187.0 | 10270.1 | 10573.4 | 10621.7 | 10393.6 | 10538.5 | 10721.0 |
| 32.5° | 11869.6 | 11781.0 | 11606.6 | 11357.0 | 11075.2 | 11107.4 | 11190.6 | 11236.2 | 11018.9 | 11102.1 | 11241.6 |
| 35° | 12811.5 | 12728.3 | 12551.2 | 12304.3 | 12097.7 | 11901.8 | 11692.5 | 11874.9 | 11748.8 | 11909.8 | 11899.1 |
| 37.5° | 13673.0 | 13589.8 | 13479.7 | 13289.2 | 12935.0 | 12548.5 | 12065.5 | 12290.9 | 12486.8 | 12690.8 | 12655.9 |
| 40° | 14255.3 | 14198.9 | 14225.8 | 14196.3 | 13740.0 | 12975.2 | 12248.0 | 12494.9 | 13028.9 | 13377.8 | 13359.0 |
| 42.5° | 14757.1 | 14700.8 | 14856.4 | 14969.1 | 14432.4 | 13369.7 | 12336.5 | 12572.7 | 13375.1 | 13919.8 | 13893.0 |
| 45° | 14979.9 | 14963.8 | 15221.4 | 15578.3 | 15065.7 | 13788.4 | 12564.6 | 12733.7 | 13638.1 | 14335.8 | 14233.8 |
| 47.5° | 14714.2 | 14770.6 | 15277.8 | 15881.6 | 15591.7 | 14284.8 | 13031.6 | 13074.5 | 13981.6 | 14786.7 | 14499.5 |
| 50° | 14185.5 | 14309.0 | 14993.3 | 15889.6 | 15975.5 | 14845.7 | 13678.3 | 13571.0 | 14443.2 | 15267.0 | 14639.1 |
| 52.5° | 13415.3 | 13544.1 | 14660.5 | 15827.9 | 16195.5 | 15495.1 | 14539.8 | 14386.8 | 15025.5 | 15747.4 | 14663.2 |
| 55° | 11646.8 | 11821.3 | 13898.4 | 15688.3 | 16410.2 | 16085.5 | 15511.2 | 15199.9 | 15776.9 | 16407.5 | 14902.0 |
| 57.5° | 10103.8 | 10195.0 | 12041.3 | 15068.4 | 16453.2 | 16520.3 | 16203.6 | 15833.3 | 16522.9 | 17121.4 | 15170.4 |
| 60° | 7414.8 | 7436.3 | 9097.4 | 12468.0 | 15135.5 | 16268.0 | 16147.2 | 15597.1 | 16168.7 | 16549.8 | 13941.3 |
| 62.5° | 4189.1 | 4191.8 | 5517.5 | 8321.9 | 11306.0 | 13259.7 | 13334.8 | 12849.1 | 12368.7 | 12481.4 | 9703.9 |
| 65° | 1572.6 | 1720.2 | 2519.9 | 4089.8 | 6518.5 | 7828.1 | 8139.4 | 8252.1 | 7452.4 | 6955.9 | 5203.5 |
| 67.5° | 1052.0 | 1086.9 | 1470.6 | 2103.9 | 2901.0 | 3349.1 | 3746.3 | 3757.0 | 2748.0 | 2450.1 | 2050.3 |
| 70° | 802.4 | 837.3 | 1156.6 | 1505.5 | 1470.6 | 1357.9 | 1467.9 | 1427.7 | 1476.0 | 1516.2 | 1559.2 |
| 72.5° | 598.4 | 633.3 | 896.3 | 1062.7 | 882.9 | 869.5 | 984.9 | 1094.9 | 1196.9 | 1239.8 | 1306.9 |
| 75° | 397.2 | 424.0 | 603.8 | 568.9 | 488.4 | 577.0 | 719.2 | 829.2 | 888.3 | 939.3 | 990.2 |
| 77.5° | 252.3 | 271.0 | 322.0 | 260.3 | 271.0 | 338.1 | 418.6 | 517.9 | 574.3 | 625.3 | 652.1 |
| 80° | 115.4 | 112.7 | 110.0 | 123.4 | 153.0 | 198.6 | 252.3 | 311.3 | 354.2 | 375.7 | 391.8 |
| 82.5° | 45.6 | 51.0 | 56.4 | 67.1 | 83.2 | 107.3 | 142.2 | 182.5 | 217.4 | 222.7 | 236.2 |
| 85° | 18.8 | 21.5 | 24.2 | 29.5 | 37.6 | 48.3 | 59.0 | 83.2 | 104.7 | 112.7 | 120.8 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 2.7 | 5.4 | 8.1 | 13.4 | 24.2 | 26.8 | 29.5 |
| 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: P643066

CATALOG NUMBER: GWS-SA6E-727-U-T3R-W-GRSWH

CANDELA DISTRIBUTION (continued):

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 | 8134.0 |
| 2.5° | 8187.7 | 8152.8 | 8211.8 | 8252.1 | 8289.6 | 8249.4 | 8236.0 | 8201.1 | 8195.7 | 8195.7 | 8214.5 |
| 5° | 8262.8 | 8238.7 | 8300.4 | 8324.5 | 8321.9 | 8233.3 | 8179.6 | 8109.8 | 8075.0 | 8075.0 | 8080.3 |
| 7.5° | 8397.0 | 8383.6 | 8418.5 | 8380.9 | 8295.0 | 8115.2 | 7938.1 | 7790.5 | 7691.2 | 7640.2 | 7656.3 |
| 10° | 8619.7 | 8603.6 | 8574.1 | 8434.6 | 8187.7 | 7814.7 | 7452.4 | 7184.0 | 7023.0 | 6931.7 | 6937.1 |
| 12.5° | 8837.1 | 8810.3 | 8705.6 | 8397.0 | 7889.8 | 7296.7 | 6821.7 | 6521.2 | 6344.0 | 6236.7 | 6212.5 |
| 15° | 9075.9 | 9006.2 | 8780.7 | 8203.8 | 7404.1 | 6663.4 | 6166.9 | 5842.2 | 5651.7 | 5587.3 | 5584.6 |
| 17.5° | 9304.1 | 9180.6 | 8772.7 | 7860.3 | 6821.7 | 6000.5 | 5501.4 | 5300.1 | 5267.9 | 5297.4 | 5305.5 |
| 20° | 9534.8 | 9336.3 | 8684.1 | 7385.3 | 6129.3 | 5340.4 | 5082.7 | 5165.9 | 5286.7 | 5367.2 | 5386.0 |
| 22.5° | 9773.7 | 9465.1 | 8482.9 | 6773.4 | 5399.4 | 4894.9 | 5002.2 | 5184.7 | 5335.0 | 5442.3 | 5453.1 |
| 25° | 10042.0 | 9585.8 | 8182.3 | 6024.7 | 4814.4 | 4771.4 | 4983.5 | 5176.7 | 5337.7 | 5461.1 | 5482.6 |
| 27.5° | 10195.0 | 9588.5 | 7761.0 | 5254.5 | 4546.0 | 4723.1 | 4937.8 | 5120.3 | 5281.3 | 5415.5 | 5439.7 |
| 30° | 10345.3 | 9516.1 | 7092.8 | 4629.2 | 4468.2 | 4666.8 | 4860.0 | 5029.1 | 5182.0 | 5313.5 | 5343.1 |
| 32.5° | 10557.3 | 9449.0 | 6322.6 | 4269.6 | 4422.6 | 4613.1 | 4771.4 | 4921.7 | 5039.8 | 5098.8 | 5114.9 |
| 35° | 10820.3 | 9363.1 | 5504.1 | 4114.0 | 4393.1 | 4570.2 | 4709.7 | 4790.2 | 4637.3 | 4605.1 | 4639.9 |
| 37.5° | 11187.9 | 9282.6 | 4688.3 | 4046.9 | 4374.3 | 4554.1 | 4677.5 | 4470.9 | 4283.0 | 4207.9 | 4234.7 |
| 40° | 11585.1 | 9237.0 | 4135.4 | 3993.2 | 4382.3 | 4570.2 | 4543.3 | 4237.4 | 3966.4 | 3808.0 | 3802.7 |
| 42.5° | 11923.2 | 9167.2 | 3781.2 | 3958.3 | 4403.8 | 4631.9 | 4360.9 | 4030.8 | 3628.2 | 3534.3 | 3537.0 |
| 45° | 12151.4 | 8990.1 | 3593.3 | 3920.7 | 4422.6 | 4645.3 | 4275.0 | 3746.3 | 3459.2 | 3400.1 | 3397.4 |
| 47.5° | 12245.3 | 8668.0 | 3472.6 | 3861.7 | 4419.9 | 4535.3 | 4100.5 | 3628.2 | 3341.1 | 3325.0 | 3335.7 |
| 50° | 12183.6 | 8139.4 | 3349.1 | 3746.3 | 4355.5 | 4419.9 | 3899.3 | 3523.6 | 3260.6 | 3349.1 | 3413.5 |
| 52.5° | 11955.5 | 7455.0 | 3201.5 | 3588.0 | 4240.1 | 4288.4 | 3797.3 | 3459.2 | 3201.5 | 3319.6 | 3370.6 |
| 55° | 11896.4 | 6899.5 | 3013.7 | 3381.3 | 4068.3 | 4054.9 | 3690.0 | 3427.0 | 3161.3 | 3115.7 | 3123.7 |
| 57.5° | 11818.6 | 6357.5 | 2702.4 | 3011.0 | 3633.6 | 3655.1 | 3588.0 | 3389.4 | 3056.6 | 3043.2 | 3056.6 |
| 60° | 10267.5 | 4873.4 | 2409.9 | 2597.7 | 2984.2 | 3099.6 | 3472.6 | 3319.6 | 2887.6 | 2831.2 | 2828.5 |
| 62.5° | 6706.3 | 2952.0 | 2144.2 | 2265.0 | 2431.3 | 2565.5 | 3166.7 | 3118.3 | 2702.4 | 2667.5 | 2691.7 |
| 65° | 3606.8 | 2103.9 | 1951.0 | 2023.4 | 2114.7 | 2216.7 | 2624.6 | 2777.5 | 2442.1 | 2318.6 | 2321.3 |
| 67.5° | 1843.6 | 1790.0 | 1806.1 | 1857.1 | 1926.8 | 1977.8 | 2117.4 | 2251.5 | 2082.5 | 1977.8 | 1975.1 |
| 70° | 1578.0 | 1620.9 | 1645.0 | 1674.6 | 1720.2 | 1712.1 | 1725.6 | 1749.7 | 1736.3 | 1685.3 | 1682.6 |
| 72.5° | 1344.5 | 1411.6 | 1416.9 | 1422.3 | 1438.4 | 1400.8 | 1376.7 | 1336.4 | 1339.1 | 1347.2 | 1349.9 |
| 75° | 1022.5 | 1086.9 | 1103.0 | 1094.9 | 1111.0 | 1062.7 | 1030.5 | 990.2 | 941.9 | 933.9 | 939.3 |
| 77.5° | 665.5 | 716.5 | 740.7 | 735.3 | 743.4 | 705.8 | 689.7 | 646.7 | 590.4 | 568.9 | 568.9 |
| 80° | 402.5 | 432.1 | 450.8 | 456.2 | 464.3 | 437.4 | 410.6 | 373.0 | 348.9 | 324.7 | 324.7 |
| 82.5° | 244.2 | 263.0 | 276.4 | 276.4 | 284.5 | 254.9 | 233.5 | 206.6 | 195.9 | 174.4 | 174.4 |
| 85° | 123.4 | 136.9 | 142.2 | 139.5 | 134.2 | 110.0 | 102.0 | 88.6 | 83.2 | 72.5 | 72.5 |
| 87.5° | 29.5 | 37.6 | 37.6 | 26.8 | 26.8 | 13.4 | 8.1 | 2.7 | 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 |

Signify Classified - Internal
Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

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

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

Test Information

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

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

Spectral Parameters

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

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

Rf: 69.9
 Rg: 98.3



Test Conditions

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

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

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

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

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2700K 4-step quadrangle

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

Photopic Flux vs. Wavelength



Photopic Lumens: 6211.7

| λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360 | 2044 | 0.0 | 490 | 7179 | 1.0 | 620 | 118034 | 30.7 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 1.9 | 625 | 111884 | 24.7 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 3.4 | 630 | 106119 | 19.2 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 6.3 | 635 | 99706 | 15.0 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 10.4 | 640 | 92142 | 11.0 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 16.3 | 645 | 84987 | 8.2 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 22.9 | 650 | 78016 | 5.7 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 29.7 | 655 | 71541 | 4.1 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 36.7 | 660 | 64863 | 2.7 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.0 | 535 | 68520 | 42.5 | 665 | 58485 | 1.9 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.0 | 540 | 73435 | 47.8 | 670 | 51641 | 1.1 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.0 | 545 | 78677 | 52.4 | 675 | 46030 | 0.8 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 0.0 | 550 | 83331 | 56.6 | 680 | 40590 | 0.5 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 0.1 | 555 | 89120 | 60.9 | 685 | 35691 | 0.3 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 0.3 | 560 | 94613 | 64.3 | 690 | 31631 | 0.2 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 0.6 | 565 | 99818 | 66.4 | 695 | 27437 | 0.1 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 0.9 | 570 | 106526 | 69.3 | 700 | 24589 | 0.1 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 1.1 | 575 | 111610 | 69.4 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 1.0 | 580 | 117163 | 69.6 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 0.8 | 585 | 122201 | 67.9 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 0.6 | 590 | 125662 | 65.0 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 0.5 | 595 | 127415 | 60.4 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 0.4 | 600 | 129155 | 55.7 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 0.4 | 605 | 128057 | 49.6 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 0.5 | 610 | 126031 | 43.3 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 0.7 | 615 | 123059 | 37.1 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

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

Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3 S/P: 1.04

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360 | 2044 | 0.0 | 490 | 7179 | 6.0 | 620 | 118034 | 0.1 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 8.6 | 625 | 111884 | 0.1 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 12.5 | 630 | 106119 | 0.0 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 17.3 | 635 | 99706 | 0.0 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 21.8 | 640 | 92142 | 0.0 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 25.7 | 645 | 84987 | 0.0 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 27.5 | 650 | 78016 | 0.0 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 28.1 | 655 | 71541 | 0.0 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 27.0 | 660 | 64863 | 0.0 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.0 | 535 | 68520 | 24.7 | 665 | 58485 | 0.0 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.1 | 540 | 73435 | 21.5 | 670 | 51641 | 0.0 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.5 | 545 | 78677 | 18.3 | 675 | 46030 | 0.0 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 1.6 | 550 | 83331 | 15.0 | 680 | 40590 | 0.0 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 3.9 | 555 | 89120 | 12.0 | 685 | 35691 | 0.0 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 8.1 | 560 | 94613 | 9.3 | 690 | 31631 | 0.0 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 13.3 | 565 | 99818 | 7.0 | 695 | 27437 | 0.0 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 19.1 | 570 | 106526 | 5.2 | 700 | 24589 | 0.0 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 21.6 | 575 | 111610 | 3.7 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 18.1 | 580 | 117163 | 2.6 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 11.8 | 585 | 122201 | 1.8 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 8.1 | 590 | 125662 | 1.2 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 6.2 | 595 | 127415 | 0.8 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 4.8 | 600 | 129155 | 0.5 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 4.1 | 605 | 128057 | 0.4 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 4.1 | 610 | 126031 | 0.2 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 4.6 | 615 | 123059 | 0.1 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

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

Melanopic Flux vs. Wavelength



Melanopic Lumens: 2145.7 M/P: 0.35

| λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360 | 2044 | 0.0 | 490 | 7179 | 11.1 | 620 | 118034 | 1.5 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 16.9 | 625 | 111884 | 0.9 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 26.0 | 630 | 106119 | 0.6 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 38.2 | 635 | 99706 | 0.4 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 51.6 | 640 | 92142 | 0.2 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 65.1 | 645 | 84987 | 0.1 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 75.2 | 650 | 78016 | 0.1 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 82.9 | 655 | 71541 | 0.1 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 86.0 | 660 | 64863 | 0.0 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.1 | 535 | 68520 | 85.4 | 665 | 58485 | 0.0 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.2 | 540 | 73435 | 81.1 | 670 | 51641 | 0.0 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.7 | 545 | 78677 | 75.4 | 675 | 46030 | 0.0 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 2.3 | 550 | 83331 | 68.1 | 680 | 40590 | 0.0 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 6.2 | 555 | 89120 | 60.9 | 685 | 35691 | 0.0 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 13.0 | 560 | 94613 | 52.9 | 690 | 31631 | 0.0 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 22.2 | 565 | 99818 | 44.8 | 695 | 27437 | 0.0 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 32.0 | 570 | 106526 | 37.6 | 700 | 24589 | 0.0 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 36.7 | 575 | 111610 | 30.4 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 30.4 | 580 | 117163 | 24.1 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 19.7 | 585 | 122201 | 18.7 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 13.2 | 590 | 125662 | 14.0 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 10.0 | 595 | 127415 | 10.2 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 7.7 | 600 | 129155 | 7.3 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 6.7 | 605 | 128057 | 5.0 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 6.9 | 610 | 126031 | 3.4 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 8.1 | 615 | 123059 | 2.3 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

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

TM-30-18

Summary

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



Color Vector Graphics



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

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

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



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)