

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: P636318

Luminaire Tested: GWS-SA3F-750-U-AFL-W-GRSWH

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P636318  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-47)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA3F-750-U-AFL-W-GRSWH  
Description: GALLEON WALL SLIM LUMINAIRE. (3) LIGHTSQUARES WITH 16 LEDS EACH AND AUTOMOTIVE FRONTLINE OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH  
Light Source: (48) 5000K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

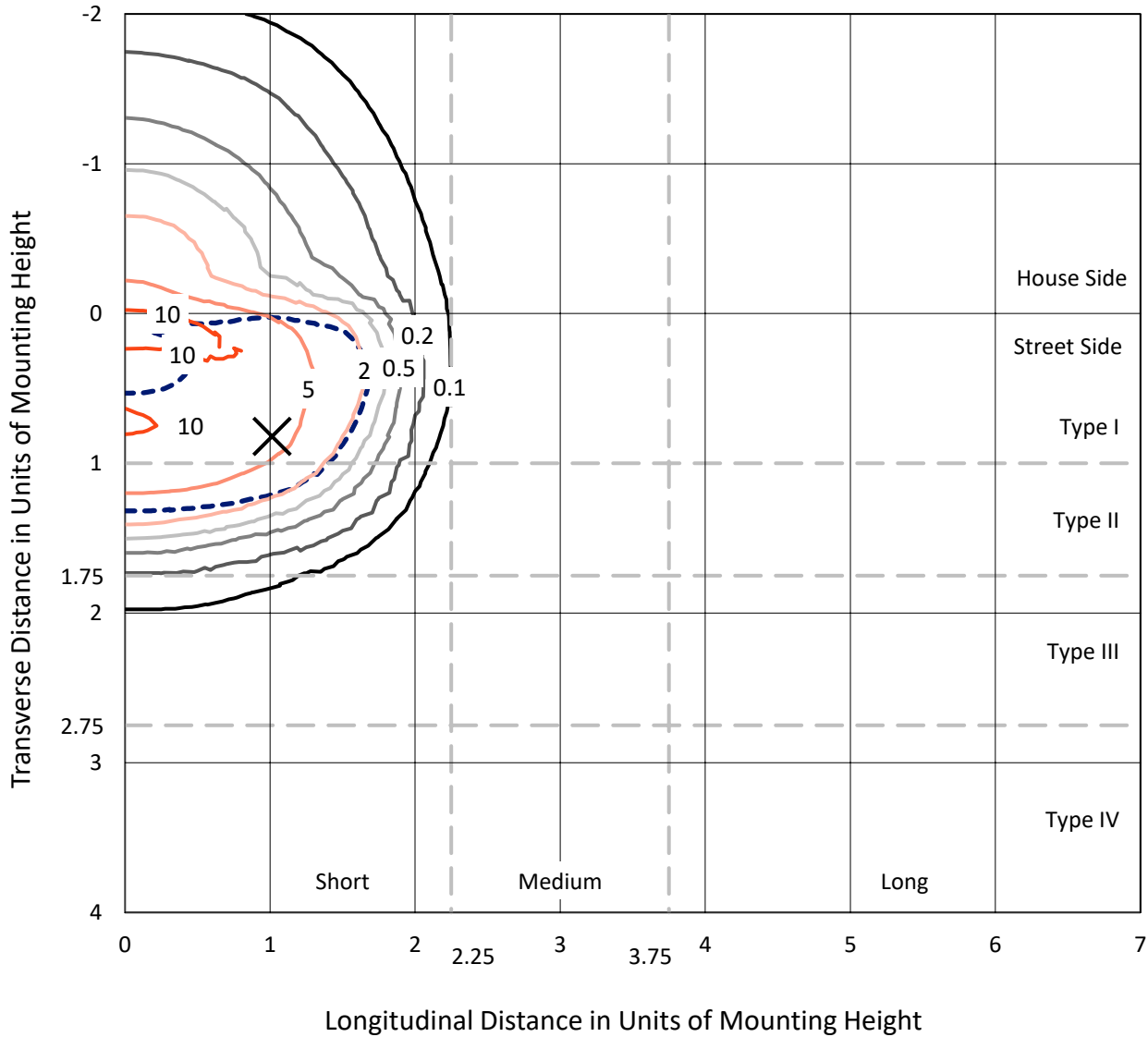
Lumens per Lamp: N/A  
Luminaire Lumens: 22689.9 lumens  
Efficiency: N/A  
Efficacy: 123.9 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G2  
  
Input Watts (W): 183.2  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P636318  
 CATALOG NUMBER: GWS-SA3F-750-U-AFL-W-GRSWH

### Iso-Footcandle Lines of Horizontal Illumination

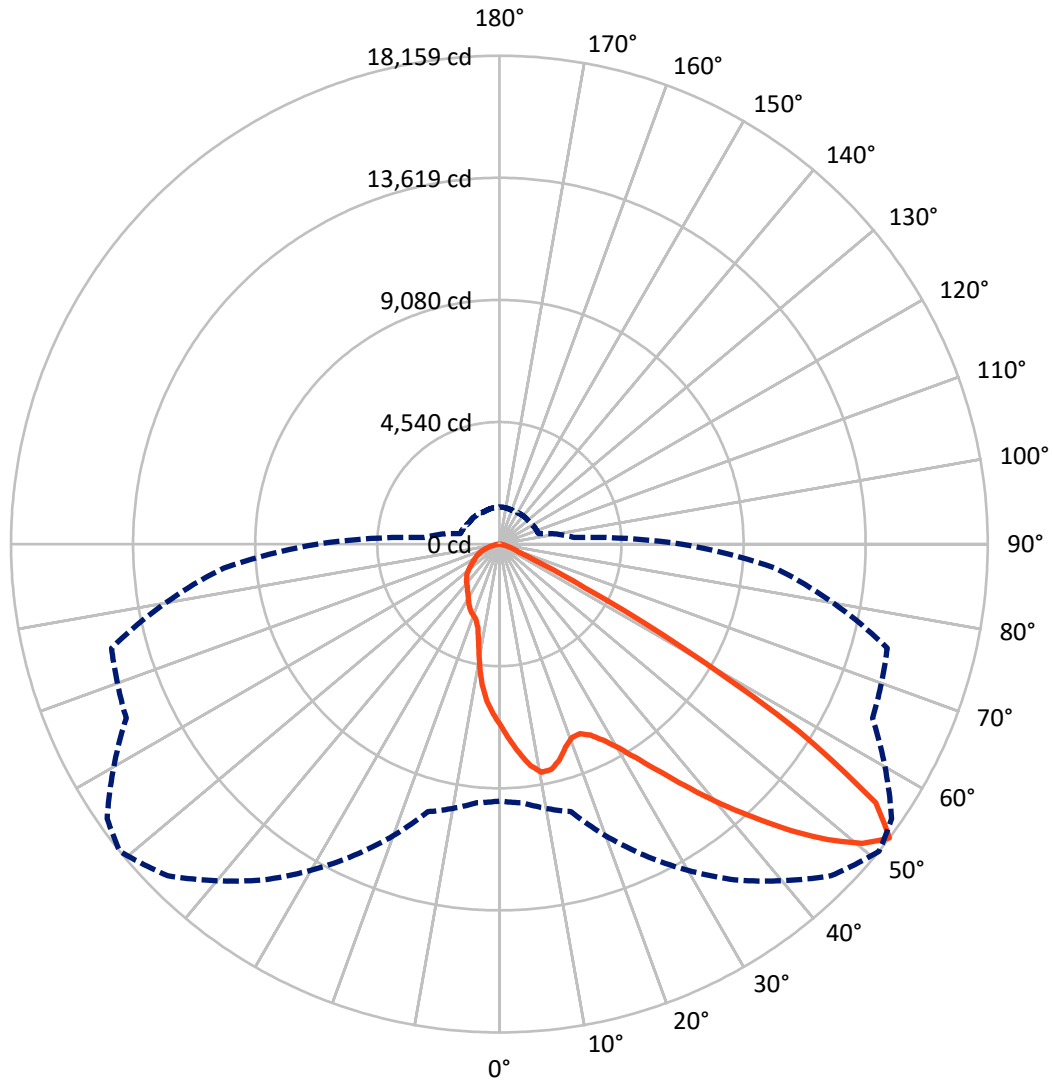
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 13.2 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 51-Deg Lateral    - - - Horizontal Cone Through 52.5-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4420.9   | 0.0    | 4420.9  |
|                    | % Fixture | 19.5     | 0.0    | 19.5    |
| <b>Street Side</b> | Lumens    | 18269.0  | 0.0    | 18269.0 |
|                    | % Fixture | 80.5     | 0.0    | 80.5    |
| <b>Total</b>       | Lumens    | 22689.9  | 0.0    | 22689.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 630.4   | 2.8       |
| 10°-20°   | 1638.1  | 7.2       |
| 20°-30°   | 2663.4  | 11.7      |
| 30°-40°   | 4220.9  | 18.6      |
| 40°-50°   | 6366.0  | 28.1      |
| 50°-60°   | 5507.1  | 24.3      |
| 60°-70°   | 1248.5  | 5.5       |
| 70°-80°   | 368.1   | 1.6       |
| 80°-90°   | 47.4    | 0.2       |
| 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°    | 22689.9 | 100.0     |
| 0°-180°   | 22689.9 | 100.0     |

**Coefficient of Utilization**



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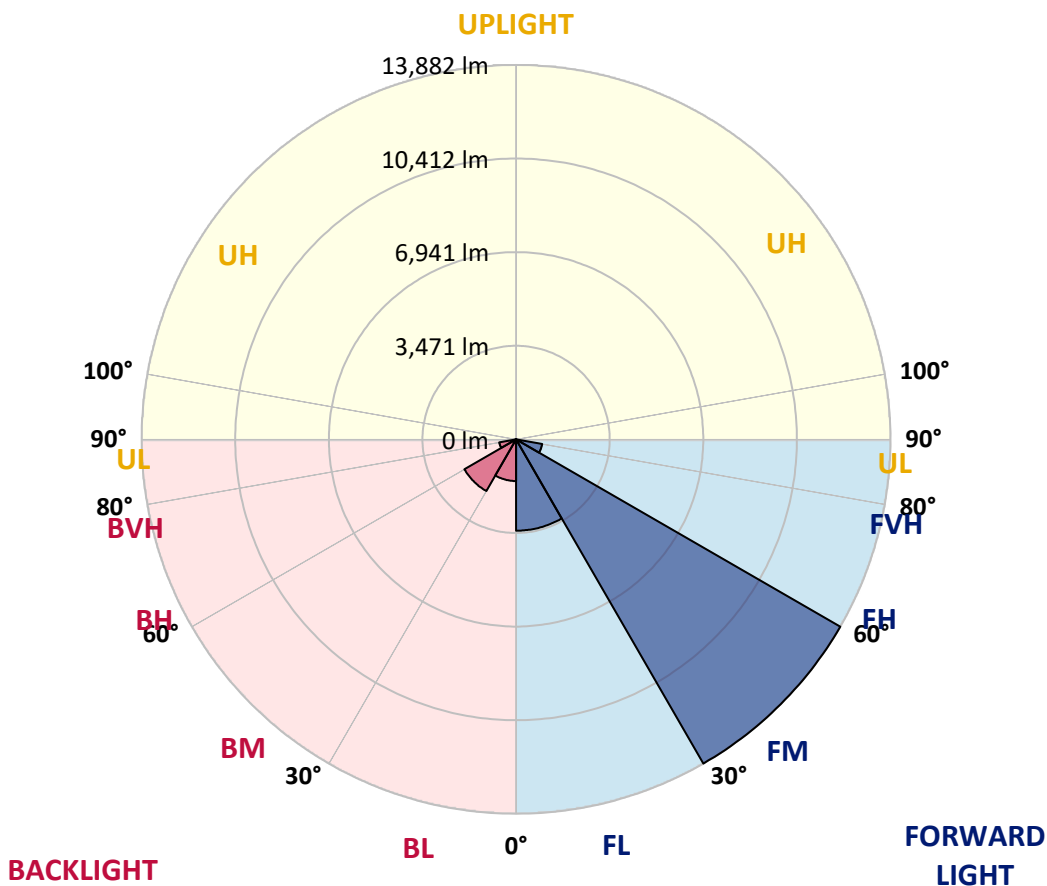
CATALOG NUMBER: GWS-SA3F-750-U-AFL-W-GRSWH

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

| Zone           | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|---------|-----------|-------------------------|------|---------|
|                |         |           | B                       | U    | G       |
| FL (0°-30°)    | 3386.5  | 14.9      |                         |      |         |
| FM (30°-60°)   | 13882.0 | 61.2      |                         |      |         |
| FH (60°-80°)   | 982.6   | 4.3       |                         |      | G1/1800 |
| FVH (80°-90°)  | 17.9    | 0.1       |                         |      | G1/100  |
| BL (0°-30°)    | 1545.4  | 6.8       | B3/2500                 |      |         |
| BM (30°-60°)   | 2211.9  | 9.7       | B2/2500                 |      |         |
| BH (60°-80°)   | 634.1   | 2.8       | B2/1000                 |      | G2/1000 |
| BVH (80°-90°)  | 29.6    | 0.1       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G2**

Type II Short





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CATALOG NUMBER: GWS-SA3F-750-U-AFL-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 51°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 6755.9  | 6755.9  | 6755.9  | 6755.9  | 6755.9  | 6755.9  | 6755.9  | 6755.9  | 6755.9  | 6755.9  | 6755.9  |
| 2.5°  | 7528.7  | 7571.7  | 7505.4  | 7480.3  | 7439.0  | 7367.3  | 7284.8  | 7261.5  | 7084.0  | 6967.5  | 6836.6  |
| 5°    | 8285.3  | 8308.6  | 8254.8  | 8201.1  | 8098.9  | 7971.5  | 7812.0  | 7777.9  | 7455.2  | 7188.0  | 6910.1  |
| 7.5°  | 8453.9  | 8444.9  | 8491.5  | 8522.0  | 8509.4  | 8459.2  | 8317.6  | 8251.3  | 7865.8  | 7442.6  | 7032.0  |
| 10°   | 7786.9  | 7736.7  | 7908.8  | 8113.2  | 8358.8  | 8642.1  | 8626.0  | 8620.6  | 8285.3  | 7785.1  | 7188.0  |
| 12.5° | 6902.9  | 6877.8  | 7017.7  | 7274.1  | 7738.5  | 8366.0  | 8600.9  | 8783.8  | 8663.6  | 8111.4  | 7361.9  |
| 15°   | 6397.3  | 6388.4  | 6483.4  | 6668.1  | 7037.4  | 7829.9  | 8331.9  | 8694.1  | 8988.2  | 8461.0  | 7546.6  |
| 17.5° | 6305.9  | 6311.3  | 6343.5  | 6449.3  | 6714.7  | 7367.3  | 7948.2  | 8453.9  | 9241.0  | 8844.7  | 7777.9  |
| 20°   | 6573.0  | 6608.9  | 6553.3  | 6569.4  | 6712.9  | 7200.6  | 7686.5  | 8211.8  | 9402.3  | 9230.2  | 8027.1  |
| 22.5° | 7166.5  | 7154.0  | 7032.0  | 6960.3  | 6962.1  | 7302.8  | 7657.8  | 8098.9  | 9508.1  | 9604.9  | 8253.0  |
| 25°   | 7838.9  | 7824.5  | 7679.3  | 7519.7  | 7419.3  | 7580.7  | 7864.0  | 8219.0  | 9603.2  | 9947.4  | 8434.1  |
| 27.5° | 8633.2  | 8588.3  | 8427.0  | 8222.6  | 8000.2  | 8070.2  | 8262.0  | 8543.5  | 9750.2  | 10284.5 | 8554.3  |
| 30°   | 9402.3  | 9454.3  | 9223.0  | 8981.0  | 8746.1  | 8703.1  | 8814.2  | 9068.8  | 10049.6 | 10678.9 | 8697.7  |
| 32.5° | 10422.5 | 10404.6 | 10148.2 | 9832.7  | 9497.4  | 9465.1  | 9553.0  | 9786.0  | 10587.5 | 11224.0 | 8916.4  |
| 35°   | 11657.9 | 11661.5 | 11297.5 | 10870.8 | 10393.9 | 10307.8 | 10454.8 | 10680.7 | 11389.0 | 11962.7 | 9262.5  |
| 37.5° | 12941.7 | 12936.3 | 12618.9 | 12134.8 | 11484.0 | 11362.1 | 11530.6 | 11699.1 | 12391.2 | 12968.6 | 9800.4  |
| 40°   | 13841.7 | 13877.6 | 13728.8 | 13474.2 | 12857.4 | 12559.8 | 12708.6 | 12825.1 | 13481.4 | 14151.9 | 10508.6 |
| 42.5° | 14352.7 | 14406.5 | 14438.8 | 14591.2 | 14266.7 | 13949.3 | 13895.5 | 13956.5 | 14454.9 | 15251.0 | 11173.8 |
| 45°   | 14462.1 | 14533.8 | 14768.7 | 15333.5 | 15459.0 | 15369.3 | 15193.6 | 15046.6 | 15181.1 | 16031.0 | 11609.5 |
| 47.5° | 13979.8 | 14105.3 | 14607.3 | 15595.3 | 16328.6 | 16610.1 | 16414.7 | 16190.5 | 15600.6 | 16231.8 | 11564.7 |
| 50°   | 12068.5 | 12215.5 | 13346.9 | 15061.0 | 16452.3 | 17477.9 | 17495.8 | 17164.1 | 15550.4 | 15652.6 | 11001.7 |
| 52.5° | 9554.7  | 9655.1  | 10302.4 | 12767.7 | 15238.5 | 17442.0 | 18159.2 | 17804.2 | 15308.4 | 14928.3 | 10297.0 |
| 55°   | 5710.6  | 5872.0  | 6476.2  | 8423.4  | 11871.3 | 15459.0 | 16986.6 | 17158.7 | 15190.1 | 14320.5 | 9816.5  |
| 57.5° | 1927.4  | 2006.3  | 2583.7  | 3720.4  | 6996.2  | 11319.0 | 13124.5 | 13823.8 | 13789.7 | 13391.7 | 8878.8  |
| 60°   | 918.0   | 935.9   | 1052.5  | 1411.1  | 2800.6  | 5915.0  | 7768.9  | 8575.8  | 9310.9  | 9384.4  | 5524.1  |
| 62.5° | 699.3   | 710.0   | 769.2   | 846.3   | 1126.0  | 2492.2  | 3560.8  | 4177.6  | 4462.7  | 3829.8  | 2011.7  |
| 65°   | 584.5   | 593.5   | 638.3   | 686.7   | 765.6   | 1079.4  | 1366.2  | 1576.0  | 1420.0  | 1106.3  | 959.2   |
| 67.5° | 487.7   | 494.9   | 528.9   | 580.9   | 634.7   | 722.6   | 758.4   | 779.9   | 817.6   | 918.0   | 882.1   |
| 70°   | 381.9   | 389.1   | 424.9   | 469.8   | 521.8   | 543.3   | 577.3   | 598.9   | 674.2   | 803.3   | 799.7   |
| 72.5° | 294.0   | 303.0   | 322.7   | 351.4   | 394.5   | 416.0   | 453.6   | 478.7   | 521.8   | 625.7   | 668.8   |
| 75°   | 215.2   | 220.5   | 238.5   | 247.4   | 252.8   | 247.4   | 285.1   | 313.8   | 371.1   | 410.6   | 421.3   |
| 77.5° | 87.9    | 98.6    | 95.0    | 95.0    | 113.0   | 136.3   | 156.0   | 173.9   | 213.4   | 236.7   | 238.5   |
| 80°   | 35.9    | 39.4    | 46.6    | 52.0    | 62.8    | 80.7    | 93.2    | 100.4   | 118.3   | 132.7   | 143.4   |
| 82.5° | 21.5    | 23.3    | 26.9    | 28.7    | 35.9    | 46.6    | 53.8    | 59.2    | 73.5    | 87.9    | 93.2    |
| 85°   | 10.8    | 10.8    | 12.6    | 14.3    | 17.9    | 21.5    | 25.1    | 28.7    | 37.7    | 46.6    | 52.0    |
| 87.5° | 1.8     | 1.8     | 1.8     | 3.6     | 5.4     | 7.2     | 9.0     | 10.8    | 12.6    | 14.3    | 17.9    |
| 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: P636318

CATALOG NUMBER: GWS-SA3F-750-U-AFL-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 6755.9 | 6755.9 | 6755.9 | 6755.9 | 6755.9 | 6755.9 | 6755.9 | 6755.9 | 6755.9 | 6755.9 | 6755.9 |
| 2.5°  | 6759.5 | 6662.7 | 6549.7 | 6460.1 | 6356.1 | 6279.0 | 6169.6 | 6101.5 | 6036.9 | 5983.1 | 5943.7 |
| 5°    | 6766.7 | 6603.5 | 6368.6 | 6160.6 | 5945.5 | 5741.1 | 5531.3 | 5361.0 | 5208.6 | 5081.3 | 5070.5 |
| 7.5°  | 6807.9 | 6573.0 | 6205.5 | 5841.5 | 5421.9 | 5016.7 | 4611.5 | 4281.6 | 4030.6 | 3899.7 | 3872.8 |
| 10°   | 6877.8 | 6569.4 | 6038.7 | 5457.8 | 4742.4 | 4089.8 | 3609.3 | 3358.2 | 3213.0 | 3161.0 | 3143.1 |
| 12.5° | 6951.3 | 6560.5 | 5825.4 | 4916.3 | 3923.0 | 3351.1 | 3087.5 | 3057.0 | 3083.9 | 3087.5 | 3085.7 |
| 15°   | 7041.0 | 6555.1 | 5556.4 | 4281.6 | 3324.2 | 3008.6 | 3026.5 | 3091.1 | 3153.8 | 3168.2 | 3168.2 |
| 17.5° | 7150.4 | 6542.6 | 5190.7 | 3661.2 | 2949.4 | 2942.3 | 3037.3 | 3123.4 | 3182.5 | 3193.3 | 3193.3 |
| 20°   | 7265.1 | 6510.3 | 4740.6 | 3155.6 | 2797.0 | 2901.0 | 3003.2 | 3069.6 | 3110.8 | 3125.1 | 3126.9 |
| 22.5° | 7344.0 | 6424.2 | 4222.4 | 2780.9 | 2702.0 | 2822.1 | 2895.6 | 2963.8 | 2963.8 | 2927.9 | 2917.2 |
| 25°   | 7360.1 | 6239.5 | 3661.2 | 2524.5 | 2589.1 | 2700.2 | 2775.5 | 2736.1 | 2662.6 | 2633.9 | 2632.1 |
| 27.5° | 7301.0 | 5970.6 | 3107.2 | 2341.6 | 2452.8 | 2563.9 | 2551.4 | 2494.0 | 2461.7 | 2433.1 | 2443.8 |
| 30°   | 7229.3 | 5647.9 | 2626.7 | 2191.0 | 2295.0 | 2404.4 | 2361.3 | 2341.6 | 2318.3 | 2286.0 | 2293.2 |
| 32.5° | 7180.8 | 5287.5 | 2257.4 | 2074.5 | 2189.2 | 2207.1 | 2237.6 | 2235.8 | 2214.3 | 2153.4 | 2149.8 |
| 35°   | 7195.2 | 4923.5 | 2009.9 | 1979.4 | 2101.4 | 2094.2 | 2151.6 | 2140.8 | 1992.0 | 1907.7 | 1902.3 |
| 37.5° | 7309.9 | 4573.9 | 1864.7 | 1904.1 | 1961.5 | 2006.3 | 2056.5 | 1927.4 | 1875.4 | 1821.7 | 1825.2 |
| 40°   | 7528.7 | 4249.3 | 1785.8 | 1862.9 | 1877.2 | 1943.6 | 1827.0 | 1825.2 | 1801.9 | 1753.5 | 1751.7 |
| 42.5° | 7776.1 | 3975.0 | 1732.0 | 1843.2 | 1823.5 | 1836.0 | 1712.3 | 1726.6 | 1724.8 | 1694.4 | 1685.4 |
| 45°   | 7926.7 | 3722.2 | 1689.0 | 1769.7 | 1775.0 | 1649.5 | 1611.9 | 1628.0 | 1637.0 | 1620.8 | 1619.1 |
| 47.5° | 7770.7 | 3431.7 | 1644.2 | 1656.7 | 1703.3 | 1565.3 | 1518.6 | 1520.4 | 1536.6 | 1538.4 | 1531.2 |
| 50°   | 7333.3 | 3107.2 | 1590.4 | 1559.9 | 1529.4 | 1477.4 | 1434.4 | 1425.4 | 1441.5 | 1457.7 | 1463.1 |
| 52.5° | 6768.5 | 2797.0 | 1500.7 | 1454.1 | 1382.4 | 1382.4 | 1362.7 | 1334.0 | 1355.5 | 1377.0 | 1384.2 |
| 55°   | 6354.3 | 2567.5 | 1373.4 | 1321.4 | 1242.5 | 1269.4 | 1265.8 | 1240.7 | 1269.4 | 1285.6 | 1290.9 |
| 57.5° | 5506.2 | 2063.7 | 1208.5 | 1192.3 | 1126.0 | 1158.3 | 1165.4 | 1133.2 | 1118.8 | 1122.4 | 1127.8 |
| 60°   | 3268.6 | 1332.2 | 1090.1 | 1088.3 | 1029.2 | 1066.8 | 1088.3 | 1056.1 | 1013.0 | 1018.4 | 1025.6 |
| 62.5° | 1466.7 | 1018.4 | 941.3  | 934.1  | 932.3  | 980.8  | 1004.1 | 973.6  | 912.6  | 918.0  | 925.2  |
| 65°   | 923.4  | 880.3  | 817.6  | 817.6  | 846.3  | 887.5  | 905.5  | 880.3  | 810.4  | 801.5  | 808.6  |
| 67.5° | 857.0  | 819.4  | 754.8  | 742.3  | 756.6  | 790.7  | 792.5  | 744.1  | 702.8  | 695.7  | 695.7  |
| 70°   | 769.2  | 740.5  | 677.7  | 652.6  | 647.3  | 645.5  | 640.1  | 627.5  | 600.6  | 593.5  | 597.1  |
| 72.5° | 636.5  | 616.8  | 577.3  | 550.4  | 536.1  | 534.3  | 512.8  | 502.0  | 478.7  | 475.1  | 473.3  |
| 75°   | 421.3  | 426.7  | 426.7  | 423.1  | 410.6  | 405.2  | 381.9  | 371.1  | 344.3  | 333.5  | 331.7  |
| 77.5° | 249.2  | 254.6  | 261.8  | 263.6  | 261.8  | 261.8  | 240.3  | 227.7  | 200.8  | 186.5  | 182.9  |
| 80°   | 152.4  | 156.0  | 159.6  | 165.0  | 157.8  | 152.4  | 132.7  | 120.1  | 107.6  | 98.6   | 96.8   |
| 82.5° | 98.6   | 102.2  | 104.0  | 107.6  | 104.0  | 96.8   | 80.7   | 73.5   | 64.5   | 57.4   | 55.6   |
| 85°   | 55.6   | 57.4   | 61.0   | 61.0   | 55.6   | 50.2   | 41.2   | 35.9   | 30.5   | 26.9   | 26.9   |
| 87.5° | 19.7   | 19.7   | 19.7   | 21.5   | 17.9   | 16.1   | 10.8   | 7.2    | 5.4    | 5.4    | 5.4    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-4-R4

Test Date: 10/02/2019

Luminaire Tested: SA1C-750-U-5WQ

Data in this report applies to families of products SA1C-760-U-5WQ .

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-4-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-750-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): 4884  
 CIE u': 0.2101  
 CIE v': 0.4904  
 Duv: 0.0037  
 CIE x: 0.3493  
 CIE y: 0.3624  
 CIE z: 0.2884  
 Peak Wavelength (nm): 444  
 Dominant Wavelength (nm): 571  
 Purity: 13.7  
 Rf: 74.9  
 Rg: 96.3

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 73.5 |      |       |
| R1:       | 70.5 | R9:  | -28.4 |
| R2:       | 77.7 | R10: | 48.6  |
| R3:       | 84.6 | R11: | 73.2  |
| R4:       | 74.7 | R12: | 50.7  |
| R5:       | 71.9 | R13: | 71.2  |
| R6:       | 70.7 | R14: | 91.4  |
| R7:       | 81.2 |      |       |
| R8:       | 56.9 |      |       |



**Test Conditions**

Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0./44%  
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-4-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: SP1-1908-441-4-R4

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 5000K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-4-R4

**Photopic Flux vs. Wavelength**



#####

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 2945                                 | NR                             | 490               | 37941                                | NR                             | 620               | 88803                                | NR                             | 750               | 3908                                 | NR                             | 880               | 2997                                 | NR                             |
| 365               | 2596                                 | NR                             | 495               | 48525                                | NR                             | 625               | 80578                                | NR                             | 755               | 3988                                 | NR                             | 885               | 2927                                 | NR                             |
| 370               | 2732                                 | NR                             | 500               | 60609                                | NR                             | 630               | 73127                                | NR                             | 760               | 3335                                 | NR                             | 890               | 2649                                 | NR                             |
| 375               | 2894                                 | NR                             | 505               | 72036                                | NR                             | 635               | 66244                                | NR                             | 765               | 3438                                 | NR                             | 895               | 2828                                 | NR                             |
| 380               | 2822                                 | NR                             | 510               | 82168                                | NR                             | 640               | 59440                                | NR                             | 770               | 3427                                 | NR                             | 900               | 1407                                 | NR                             |
| 385               | 2394                                 | NR                             | 515               | 90898                                | NR                             | 645               | 52864                                | NR                             | 775               | 2759                                 | NR                             | 905               | 2224                                 | NR                             |
| 390               | 2370                                 | NR                             | 520               | 97142                                | NR                             | 650               | 47085                                | NR                             | 780               | 2340                                 | NR                             | 910               | 2905                                 | NR                             |
| 395               | 2267                                 | NR                             | 525               | 103255                               | NR                             | 655               | 41789                                | NR                             | 785               | 2412                                 | NR                             | 915               | 3350                                 | NR                             |
| 400               | 2262                                 | NR                             | 530               | 106697                               | NR                             | 660               | 37064                                | NR                             | 790               | 1999                                 | NR                             | 920               | 3114                                 | NR                             |
| 405               | 3000                                 | NR                             | 535               | 110081                               | NR                             | 665               | 32299                                | NR                             | 795               | 2054                                 | NR                             | 925               | 2834                                 | NR                             |
| 410               | 5324                                 | NR                             | 540               | 112494                               | NR                             | 670               | 28142                                | NR                             | 800               | 2331                                 | NR                             | 930               | 2271                                 | NR                             |
| 415               | 10725                                | NR                             | 545               | 115513                               | NR                             | 675               | 24505                                | NR                             | 805               | 2648                                 | NR                             | 935               | 2228                                 | NR                             |
| 420               | 22128                                | NR                             | 550               | 117203                               | NR                             | 680               | 21162                                | NR                             | 810               | 2485                                 | NR                             | 940               | 2833                                 | NR                             |
| 425               | 44095                                | NR                             | 555               | 119753                               | NR                             | 685               | 18400                                | NR                             | 815               | 2409                                 | NR                             | 945               | 2941                                 | NR                             |
| 430               | 77002                                | NR                             | 560               | 122602                               | NR                             | 690               | 16065                                | NR                             | 820               | 2221                                 | NR                             | 950               | 2323                                 | NR                             |
| 435               | 119881                               | NR                             | 565               | 124314                               | NR                             | 695               | 13860                                | NR                             | 825               | 1562                                 | NR                             | 955               | 1667                                 | NR                             |
| 440               | 164454                               | NR                             | 570               | 126775                               | NR                             | 700               | 12177                                | NR                             | 830               | 2249                                 | NR                             | 960               | 749                                  | NR                             |
| 445               | 179997                               | NR                             | 575               | 127511                               | NR                             | 705               | 10757                                | NR                             | 835               | 2573                                 | NR                             | 965               | 2669                                 | NR                             |
| 450               | 142822                               | NR                             | 580               | 127577                               | NR                             | 710               | 9601                                 | NR                             | 840               | 2764                                 | NR                             | 970               | 3968                                 | NR                             |
| 455               | 90008                                | NR                             | 585               | 126153                               | NR                             | 715               | 8944                                 | NR                             | 845               | 3109                                 | NR                             | 975               | 3886                                 | NR                             |
| 460               | 60557                                | NR                             | 590               | 123678                               | NR                             | 720               | 7947                                 | NR                             | 850               | 2963                                 | NR                             | 980               | 2788                                 | NR                             |
| 465               | 43305                                | NR                             | 595               | 119774                               | NR                             | 725               | 7062                                 | NR                             | 855               | 2336                                 | NR                             | 985               | 3496                                 | NR                             |
| 470               | 31089                                | NR                             | 600               | 115733                               | NR                             | 730               | 6004                                 | NR                             | 860               | 2118                                 | NR                             | 990               | 2913                                 | NR                             |
| 475               | 26278                                | NR                             | 605               | 109231                               | NR                             | 735               | 5594                                 | NR                             | 865               | 3144                                 | NR                             | 995               | 4659                                 | NR                             |
| 480               | 27060                                | NR                             | 610               | 102408                               | NR                             | 740               | 5165                                 | NR                             | 870               | 3069                                 | NR                             | 1000              | 1308                                 | NR                             |
| 485               | 30698                                | NR                             | 615               | 96015                                | NR                             | 745               | 4687                                 | NR                             | 875               | 3311                                 | NR                             |                   |                                      |                                |

REPORT NUMBER: SP1-1908-441-4-R4

Scotopic Flux vs. Wavelength



Scotopic Lumens: 13493.5 S/P: 1.77

| 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    | 2945          | NR            | 490    | 37941         | NR            | 620    | 88803         | NR            | 750    | 3908          | NR            | 880    | 2997          | NR            |
| 365    | 2596          | NR            | 495    | 48525         | NR            | 625    | 80578         | NR            | 755    | 3988          | NR            | 885    | 2927          | NR            |
| 370    | 2732          | NR            | 500    | 60609         | NR            | 630    | 73127         | NR            | 760    | 3335          | NR            | 890    | 2649          | NR            |
| 375    | 2894          | NR            | 505    | 72036         | NR            | 635    | 66244         | NR            | 765    | 3438          | NR            | 895    | 2828          | NR            |
| 380    | 2822          | NR            | 510    | 82168         | NR            | 640    | 59440         | NR            | 770    | 3427          | NR            | 900    | 1407          | NR            |
| 385    | 2394          | NR            | 515    | 90898         | NR            | 645    | 52864         | NR            | 775    | 2759          | NR            | 905    | 2224          | NR            |
| 390    | 2370          | NR            | 520    | 97142         | NR            | 650    | 47085         | NR            | 780    | 2340          | NR            | 910    | 2905          | NR            |
| 395    | 2267          | NR            | 525    | 103255        | NR            | 655    | 41789         | NR            | 785    | 2412          | NR            | 915    | 3350          | NR            |
| 400    | 2262          | NR            | 530    | 106697        | NR            | 660    | 37064         | NR            | 790    | 1999          | NR            | 920    | 3114          | NR            |
| 405    | 3000          | NR            | 535    | 110081        | NR            | 665    | 32299         | NR            | 795    | 2054          | NR            | 925    | 2834          | NR            |
| 410    | 5324          | NR            | 540    | 112494        | NR            | 670    | 28142         | NR            | 800    | 2331          | NR            | 930    | 2271          | NR            |
| 415    | 10725         | NR            | 545    | 115513        | NR            | 675    | 24505         | NR            | 805    | 2648          | NR            | 935    | 2228          | NR            |
| 420    | 22128         | NR            | 550    | 117203        | NR            | 680    | 21162         | NR            | 810    | 2485          | NR            | 940    | 2833          | NR            |
| 425    | 44095         | NR            | 555    | 119753        | NR            | 685    | 18400         | NR            | 815    | 2409          | NR            | 945    | 2941          | NR            |
| 430    | 77002         | NR            | 560    | 122602        | NR            | 690    | 16065         | NR            | 820    | 2221          | NR            | 950    | 2323          | NR            |
| 435    | 119881        | NR            | 565    | 124314        | NR            | 695    | 13860         | NR            | 825    | 1562          | NR            | 955    | 1667          | NR            |
| 440    | 164454        | NR            | 570    | 126775        | NR            | 700    | 12177         | NR            | 830    | 2249          | NR            | 960    | 749           | NR            |
| 445    | 179997        | NR            | 575    | 127511        | NR            | 705    | 10757         | NR            | 835    | 2573          | NR            | 965    | 2669          | NR            |
| 450    | 142822        | NR            | 580    | 127577        | NR            | 710    | 9601          | NR            | 840    | 2764          | NR            | 970    | 3968          | NR            |
| 455    | 90008         | NR            | 585    | 126153        | NR            | 715    | 8944          | NR            | 845    | 3109          | NR            | 975    | 3886          | NR            |
| 460    | 60557         | NR            | 590    | 123678        | NR            | 720    | 7947          | NR            | 850    | 2963          | NR            | 980    | 2788          | NR            |
| 465    | 43305         | NR            | 595    | 119774        | NR            | 725    | 7062          | NR            | 855    | 2336          | NR            | 985    | 3496          | NR            |
| 470    | 31089         | NR            | 600    | 115733        | NR            | 730    | 6004          | NR            | 860    | 2118          | NR            | 990    | 2913          | NR            |
| 475    | 26278         | NR            | 605    | 109231        | NR            | 735    | 5594          | NR            | 865    | 3144          | NR            | 995    | 4659          | NR            |
| 480    | 27060         | NR            | 610    | 102408        | NR            | 740    | 5165          | NR            | 870    | 3069          | NR            | 1000   | 1308          | NR            |
| 485    | 30698         | NR            | 615    | 96015         | NR            | 745    | 4687          | NR            | 875    | 3311          | NR            |        |               |               |

REPORT NUMBER: SP1-1908-441-4-R4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5378.9**

**M/P: 0.71**

| 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    | 2945          | NR            | 490    | 37941         | NR            | 620    | 88803         | NR            | 750    | 3908          | NR            | 880    | 2997          | NR            |
| 365    | 2596          | NR            | 495    | 48525         | NR            | 625    | 80578         | NR            | 755    | 3988          | NR            | 885    | 2927          | NR            |
| 370    | 2732          | NR            | 500    | 60609         | NR            | 630    | 73127         | NR            | 760    | 3335          | NR            | 890    | 2649          | NR            |
| 375    | 2894          | NR            | 505    | 72036         | NR            | 635    | 66244         | NR            | 765    | 3438          | NR            | 895    | 2828          | NR            |
| 380    | 2822          | NR            | 510    | 82168         | NR            | 640    | 59440         | NR            | 770    | 3427          | NR            | 900    | 1407          | NR            |
| 385    | 2394          | NR            | 515    | 90898         | NR            | 645    | 52864         | NR            | 775    | 2759          | NR            | 905    | 2224          | NR            |
| 390    | 2370          | NR            | 520    | 97142         | NR            | 650    | 47085         | NR            | 780    | 2340          | NR            | 910    | 2905          | NR            |
| 395    | 2267          | NR            | 525    | 103255        | NR            | 655    | 41789         | NR            | 785    | 2412          | NR            | 915    | 3350          | NR            |
| 400    | 2262          | NR            | 530    | 106697        | NR            | 660    | 37064         | NR            | 790    | 1999          | NR            | 920    | 3114          | NR            |
| 405    | 3000          | NR            | 535    | 110081        | NR            | 665    | 32299         | NR            | 795    | 2054          | NR            | 925    | 2834          | NR            |
| 410    | 5324          | NR            | 540    | 112494        | NR            | 670    | 28142         | NR            | 800    | 2331          | NR            | 930    | 2271          | NR            |
| 415    | 10725         | NR            | 545    | 115513        | NR            | 675    | 24505         | NR            | 805    | 2648          | NR            | 935    | 2228          | NR            |
| 420    | 22128         | NR            | 550    | 117203        | NR            | 680    | 21162         | NR            | 810    | 2485          | NR            | 940    | 2833          | NR            |
| 425    | 44095         | NR            | 555    | 119753        | NR            | 685    | 18400         | NR            | 815    | 2409          | NR            | 945    | 2941          | NR            |
| 430    | 77002         | NR            | 560    | 122602        | NR            | 690    | 16065         | NR            | 820    | 2221          | NR            | 950    | 2323          | NR            |
| 435    | 119881        | NR            | 565    | 124314        | NR            | 695    | 13860         | NR            | 825    | 1562          | NR            | 955    | 1667          | NR            |
| 440    | 164454        | NR            | 570    | 126775        | NR            | 700    | 12177         | NR            | 830    | 2249          | NR            | 960    | 749           | NR            |
| 445    | 179997        | NR            | 575    | 127511        | NR            | 705    | 10757         | NR            | 835    | 2573          | NR            | 965    | 2669          | NR            |
| 450    | 142822        | NR            | 580    | 127577        | NR            | 710    | 9601          | NR            | 840    | 2764          | NR            | 970    | 3968          | NR            |
| 455    | 90008         | NR            | 585    | 126153        | NR            | 715    | 8944          | NR            | 845    | 3109          | NR            | 975    | 3886          | NR            |
| 460    | 60557         | NR            | 590    | 123678        | NR            | 720    | 7947          | NR            | 850    | 2963          | NR            | 980    | 2788          | NR            |
| 465    | 43305         | NR            | 595    | 119774        | NR            | 725    | 7062          | NR            | 855    | 2336          | NR            | 985    | 3496          | NR            |
| 470    | 31089         | NR            | 600    | 115733        | NR            | 730    | 6004          | NR            | 860    | 2118          | NR            | 990    | 2913          | NR            |
| 475    | 26278         | NR            | 605    | 109231        | NR            | 735    | 5594          | NR            | 865    | 3144          | NR            | 995    | 4659          | NR            |
| 480    | 27060         | NR            | 610    | 102408        | NR            | 740    | 5165          | NR            | 870    | 3069          | NR            | 1000   | 1308          | NR            |
| 485    | 30698         | NR            | 615    | 96015         | NR            | 745    | 4687          | NR            | 875    | 3311          | NR            |        |               |               |

REPORT NUMBER: SP1-1908-441-4-R4

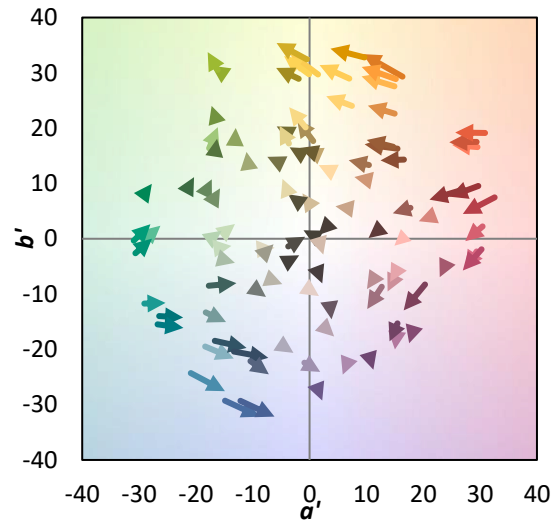
TM-30-18

**Summary**

$R_f = 74.9$   
 $R_g = 96.3$   
 CIE  $R_a = 73.5$   
 $R_g = -28.4$



**Color Vector Graphics**





REPORT NUMBER: SP1-1908-441-4-R4

TM-30-18

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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 61 | CES51 = 90 | CES76 = 52 |
| CES02 = 60 | CES27 = 84 | CES52 = 91 | CES77 = 71 |
| CES03 = 30 | CES28 = 81 | CES53 = 79 | CES78 = 54 |
| CES04 = 69 | CES29 = 58 | CES54 = 83 | CES79 = 80 |
| CES05 = 46 | CES30 = 67 | CES55 = 83 | CES80 = 77 |
| CES06 = 50 | CES31 = 63 | CES56 = 73 | CES81 = 77 |
| CES07 = 39 | CES32 = 59 | CES57 = 72 | CES82 = 90 |
| CES08 = 38 | CES33 = 69 | CES58 = 73 | CES83 = 86 |
| CES09 = 29 | CES34 = 69 | CES59 = 88 | CES84 = 88 |
| CES10 = 73 | CES35 = 83 | CES60 = 93 | CES85 = 84 |
| CES11 = 56 | CES36 = 95 | CES61 = 88 | CES86 = 75 |
| CES12 = 61 | CES37 = 78 | CES62 = 85 | CES87 = 78 |
| CES13 = 41 | CES38 = 76 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 93 | CES64 = 74 | CES89 = 75 |
| CES15 = 70 | CES40 = 86 | CES65 = 67 | CES90 = 77 |
| CES16 = 46 | CES41 = 87 | CES66 = 69 | CES91 = 89 |
| CES17 = 49 | CES42 = 78 | CES67 = 67 | CES92 = 66 |
| CES18 = 55 | CES43 = 75 | CES68 = 73 | CES93 = 80 |
| CES19 = 71 | CES44 = 99 | CES69 = 81 | CES94 = 57 |
| CES20 = 64 | CES45 = 83 | CES70 = 63 | CES95 = 71 |
| CES21 = 85 | CES46 = 81 | CES71 = 60 | CES96 = 78 |
| CES22 = 77 | CES47 = 80 | CES72 = 86 | CES97 = 85 |
| CES23 = 91 | CES48 = 72 | CES73 = 53 | CES98 = 75 |
| CES24 = 90 | CES49 = 81 | CES74 = 96 | CES99 = 62 |
| CES25 = 71 | CES50 = 89 | CES75 = 58 |            |



REPORT NUMBER: SP1-1908-441-4-R4

TM-30-18

Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-1908-441-4-R4

TM-30-18

Measure Comparisons



(END OF REPORT)