

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: P636407

Luminaire Tested: GWS-SA3F-760-U-T3-W-GRSWH

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P636407  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-25)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA3F-760-U-T3-W-GRSWH  
Description: GALLEON WALL SLIM LUMINAIRE. (3) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH  
Light Source: (48) 5700K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

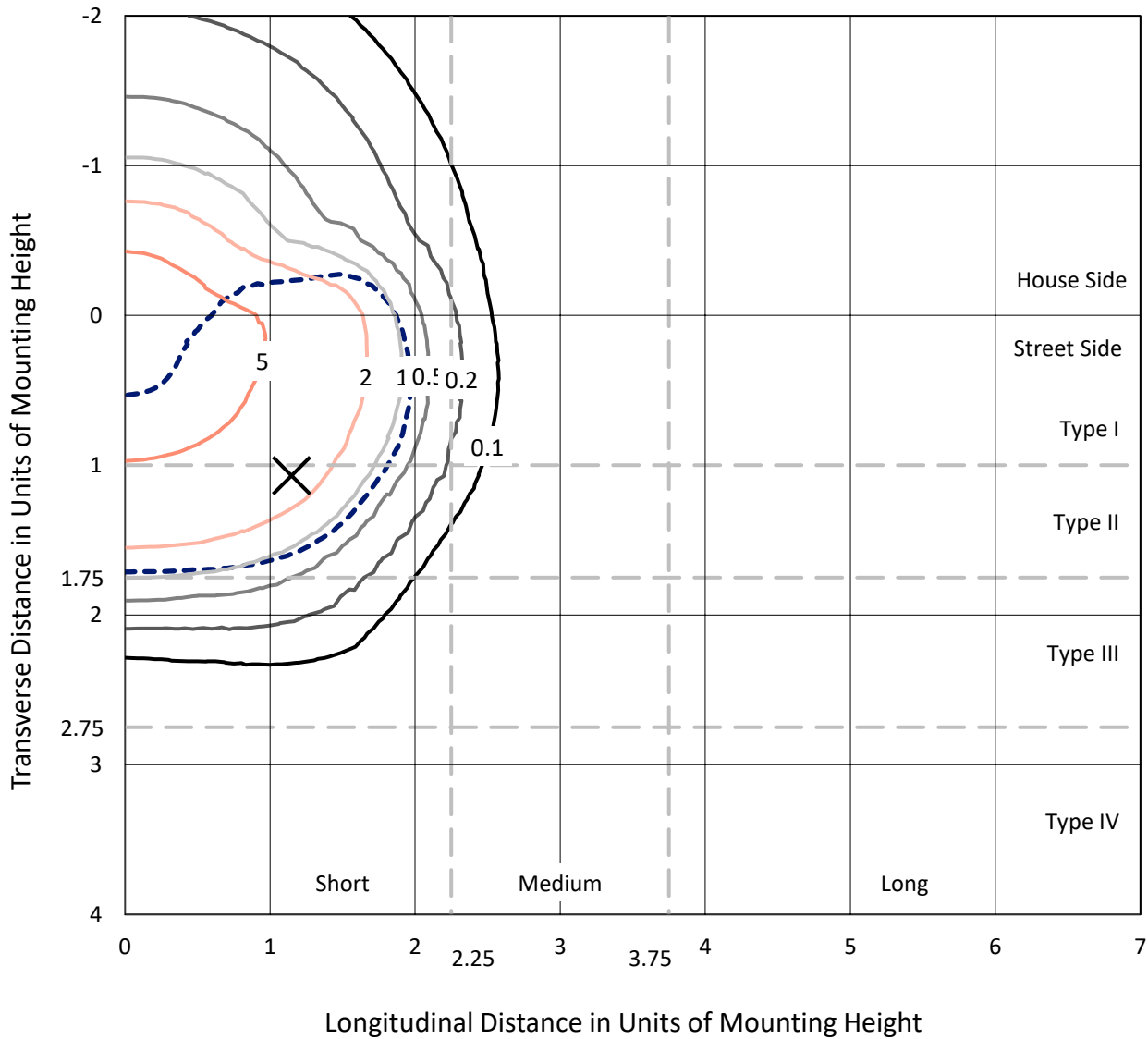
Lumens per Lamp: N/A  
Luminaire Lumens: 21054.4 lumens  
Efficiency: N/A  
Efficacy: 114.9 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G3  
  
Input Watts (W): 183.2  
Input Voltage (V): 120  
Input Current (Ain): 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: P636407  
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### Iso-Footcandle Lines of Horizontal Illumination

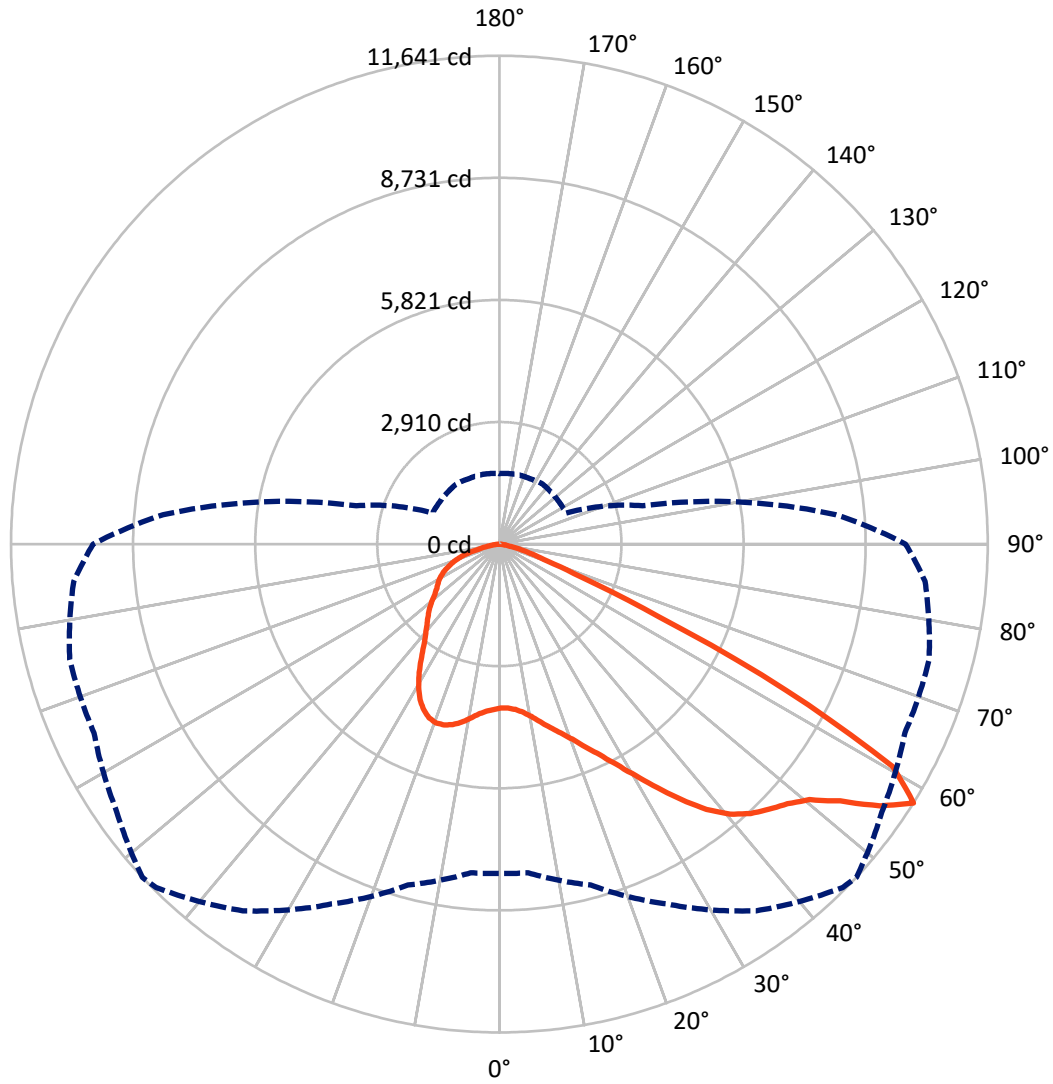
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 7 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 47-Deg Lateral    - - - Horizontal Cone Through 57.5-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 6663.7   | 0.0    | 6663.7  |
|                    | % Fixture | 31.6     | 0.0    | 31.6    |
| <b>Street Side</b> | Lumens    | 14390.7  | 0.0    | 14390.7 |
|                    | % Fixture | 68.4     | 0.0    | 68.4    |
| <b>Total</b>       | Lumens    | 21054.4  | 0.0    | 21054.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 385.1   | 1.8       |
| 10°-20°   | 1266.7  | 6.0       |
| 20°-30°   | 2280.8  | 10.8      |
| 30°-40°   | 3444.8  | 16.4      |
| 40°-50°   | 4638.9  | 22.0      |
| 50°-60°   | 5574.2  | 26.5      |
| 60°-70°   | 2714.8  | 12.9      |
| 70°-80°   | 668.8   | 3.2       |
| 80°-90°   | 80.4    | 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°    | 21054.4 | 100.0     |
| 0°-180°   | 21054.4 | 100.0     |

**Coefficient of Utilization**

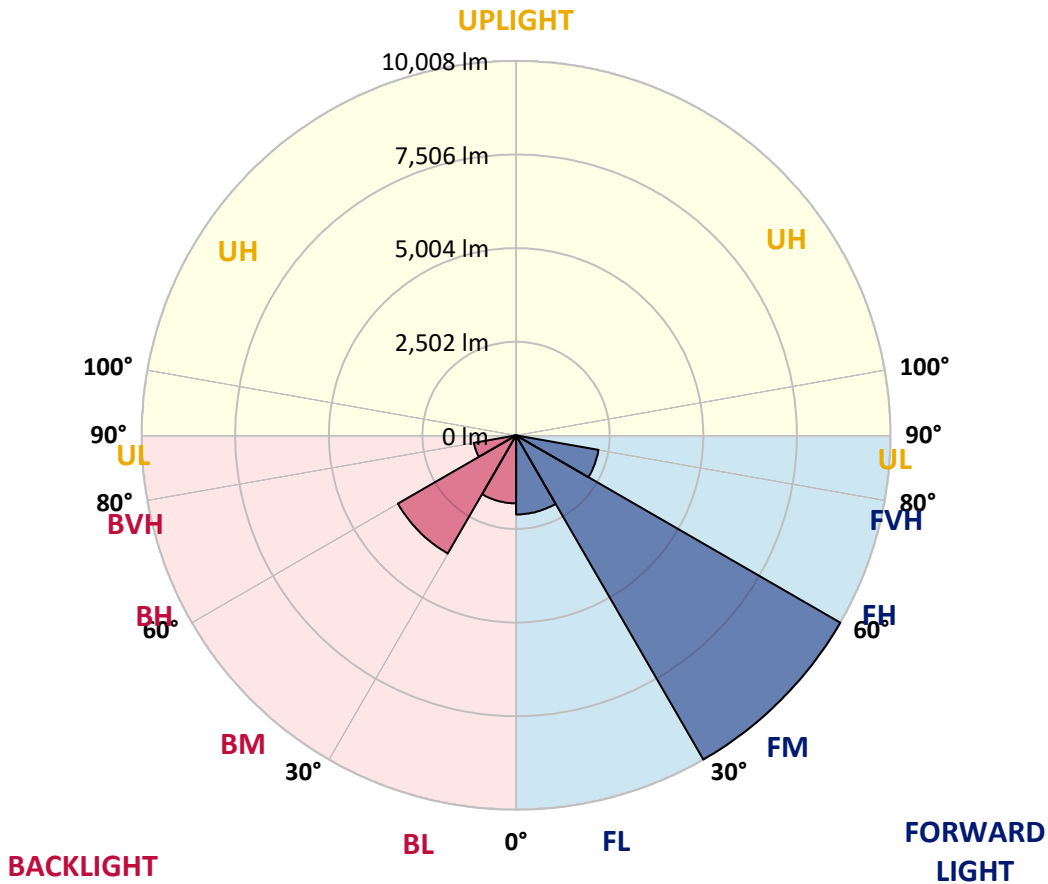


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|---------|-----------|-------------------------|------|---------|
|                |         |           | B                       | U    | G       |
| FL (0°-30°)    | 2114.8  | 10.0      |                         |      |         |
| FM (30°-60°)   | 10008.3 | 47.5      |                         |      |         |
| FH (60°-80°)   | 2237.4  | 10.6      |                         |      | G2/5000 |
| FVH (80°-90°)  | 30.2    | 0.1       |                         |      | G1/100  |
| BL (0°-30°)    | 1817.7  | 8.6       | B3/2500                 |      |         |
| BM (30°-60°)   | 3649.7  | 17.3      | B3/5000                 |      |         |
| BH (60°-80°)   | 1146.1  | 5.4       | B3/2500                 |      | G3/2500 |
| BVH (80°-90°)  | 50.2    | 0.2       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**  
 Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°     | 45°     | 47°     | 55°     | 65°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3904.6 | 3904.6 | 3904.6 | 3904.6 | 3904.6  | 3904.6  | 3904.6  | 3904.6  | 3904.6  | 3904.6  | 3904.6  |
| 2.5°  | 3897.5 | 3895.7 | 3895.7 | 3906.3 | 3906.3  | 3909.9  | 3915.2  | 3920.5  | 3922.3  | 3913.4  | 3894.0  |
| 5°    | 3939.9 | 3939.9 | 3939.9 | 3948.8 | 3948.8  | 3952.3  | 3959.4  | 3961.2  | 3959.4  | 3945.2  | 3925.8  |
| 7.5°  | 4007.1 | 4007.1 | 4008.9 | 4019.5 | 4028.4  | 4033.7  | 4046.0  | 4044.3  | 4039.0  | 4016.0  | 3991.2  |
| 10°   | 4116.8 | 4122.1 | 4127.4 | 4139.8 | 4157.4  | 4169.8  | 4178.7  | 4178.7  | 4171.6  | 4136.2  | 4104.4  |
| 12.5° | 4272.4 | 4279.5 | 4284.8 | 4295.4 | 4309.5  | 4330.7  | 4350.2  | 4350.2  | 4341.4  | 4297.1  | 4249.4  |
| 15°   | 4454.5 | 4461.6 | 4459.8 | 4463.4 | 4489.9  | 4520.0  | 4535.9  | 4546.5  | 4550.0  | 4488.1  | 4413.9  |
| 17.5° | 4663.2 | 4670.3 | 4663.2 | 4652.6 | 4656.1  | 4703.9  | 4732.2  | 4771.1  | 4794.1  | 4710.9  | 4592.5  |
| 20°   | 4852.4 | 4845.3 | 4845.3 | 4852.4 | 4863.0  | 4921.4  | 4963.8  | 5027.5  | 5055.8  | 4955.0  | 4771.1  |
| 22.5° | 5052.2 | 5068.2 | 5061.1 | 5061.1 | 5103.5  | 5200.8  | 5252.1  | 5335.2  | 5365.2  | 5234.4  | 4986.8  |
| 25°   | 5310.4 | 5324.6 | 5321.0 | 5324.6 | 5374.1  | 5512.0  | 5563.3  | 5717.2  | 5747.2  | 5559.8  | 5225.5  |
| 27.5° | 5593.4 | 5616.4 | 5627.0 | 5623.4 | 5703.0  | 5883.4  | 5947.0  | 6161.0  | 6215.8  | 5924.1  | 5480.2  |
| 30°   | 5961.2 | 5985.9 | 5994.8 | 5991.2 | 6085.0  | 6330.8  | 6403.3  | 6647.3  | 6725.1  | 6355.5  | 5803.8  |
| 32.5° | 6387.4 | 6412.1 | 6438.6 | 6449.3 | 6569.5  | 6820.6  | 6925.0  | 7177.8  | 7289.2  | 6854.2  | 6194.6  |
| 35°   | 6810.0 | 6831.2 | 6882.5 | 6965.6 | 7130.1  | 7386.5  | 7478.5  | 7727.8  | 7835.7  | 7372.3  | 6666.8  |
| 37.5° | 7276.9 | 7291.0 | 7335.2 | 7450.2 | 7687.1  | 7931.2  | 8023.1  | 8261.8  | 8274.2  | 7872.8  | 7200.8  |
| 40°   | 7787.9 | 7787.9 | 7779.1 | 7892.3 | 8139.8  | 8385.6  | 8465.2  | 8603.1  | 8530.6  | 8258.3  | 7720.7  |
| 42.5° | 8221.2 | 8214.1 | 8221.2 | 8327.3 | 8511.2  | 8711.0  | 8780.0  | 8753.4  | 8661.5  | 8553.6  | 8191.1  |
| 45°   | 8612.0 | 8617.3 | 8680.9 | 8762.3 | 8857.8  | 8976.3  | 9016.9  | 8866.6  | 8783.5  | 8790.6  | 8567.8  |
| 47.5° | 8877.2 | 8882.5 | 9031.1 | 9167.2 | 9225.6  | 9262.7  | 9245.1  | 9036.4  | 8993.9  | 9073.5  | 8857.8  |
| 50°   | 8912.6 | 8940.9 | 9197.3 | 9476.7 | 9621.7  | 9627.0  | 9577.5  | 9322.9  | 9310.5  | 9400.7  | 9013.4  |
| 52.5° | 8919.7 | 8948.0 | 9268.0 | 9772.0 | 10148.7 | 10228.3 | 10171.7 | 9906.4  | 9777.3  | 9687.2  | 9204.4  |
| 55°   | 8893.2 | 8925.0 | 9278.7 | 9970.1 | 10691.6 | 11009.9 | 11015.2 | 10640.3 | 10228.3 | 10168.1 | 9749.0  |
| 57.5° | 7851.6 | 7864.0 | 8412.2 | 9466.1 | 10670.4 | 11572.2 | 11641.2 | 11131.9 | 10661.5 | 10604.9 | 10185.8 |
| 60°   | 5469.6 | 5519.1 | 6115.0 | 7506.7 | 8963.9  | 10553.7 | 10776.5 | 10627.9 | 10313.2 | 9901.1  | 8739.3  |
| 62.5° | 2739.2 | 2781.7 | 3379.4 | 4695.0 | 6182.2  | 7437.8  | 7676.5  | 7833.9  | 7908.2  | 7466.1  | 5950.6  |
| 65°   | 1179.5 | 1211.3 | 1582.7 | 2452.7 | 3499.6  | 4106.2  | 4189.3  | 4378.5  | 4841.8  | 4320.1  | 3206.1  |
| 67.5° | 788.7  | 809.9  | 999.1  | 1496.0 | 2061.9  | 2100.8  | 2088.4  | 2129.1  | 2229.9  | 1840.9  | 1448.3  |
| 70°   | 604.8  | 622.5  | 749.8  | 1096.4 | 1481.9  | 1267.9  | 1200.7  | 1089.3  | 1183.0  | 1206.0  | 1174.2  |
| 72.5° | 438.6  | 452.7  | 548.2  | 748.0  | 928.4   | 809.9   | 799.3   | 855.9   | 983.2   | 1018.6  | 999.1   |
| 75°   | 282.9  | 290.0  | 348.4  | 410.3  | 479.2   | 519.9   | 541.1   | 643.7   | 772.8   | 799.3   | 776.3   |
| 77.5° | 189.2  | 194.5  | 228.1  | 263.5  | 272.3   | 274.1   | 281.2   | 327.1   | 415.6   | 465.1   | 459.8   |
| 80°   | 99.0   | 99.0   | 111.4  | 111.4  | 127.3   | 152.1   | 159.2   | 189.2   | 229.9   | 254.6   | 256.4   |
| 82.5° | 38.9   | 40.7   | 47.7   | 53.1   | 63.7    | 77.8    | 83.1    | 99.0    | 120.2   | 137.9   | 153.8   |
| 85°   | 15.9   | 17.7   | 19.5   | 23.0   | 28.3    | 35.4    | 37.1    | 42.4    | 56.6    | 70.7    | 79.6    |
| 87.5° | 0.0    | 0.0    | 1.8    | 1.8    | 3.5     | 5.3     | 5.3     | 7.1     | 8.8     | 15.9    | 21.2    |
| 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: P636407

CATALOG NUMBER: GWS-SA3F-760-U-T3-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3904.6 | 3904.6 | 3904.6 | 3904.6 | 3904.6 | 3904.6 | 3904.6 | 3904.6 | 3904.6 | 3904.6 | 3904.6 |
| 2.5°  | 3916.9 | 3894.0 | 3916.9 | 3924.0 | 3943.5 | 3950.5 | 3938.2 | 3936.4 | 3936.4 | 3918.7 | 3913.4 |
| 5°    | 3943.5 | 3922.3 | 3945.2 | 3955.9 | 3984.1 | 4001.8 | 4005.4 | 4019.5 | 4028.4 | 4021.3 | 4019.5 |
| 7.5°  | 4008.9 | 3982.4 | 4007.1 | 4023.0 | 4060.2 | 4088.5 | 4100.9 | 4132.7 | 4155.7 | 4152.1 | 4150.4 |
| 10°   | 4123.8 | 4088.5 | 4116.8 | 4143.3 | 4184.0 | 4217.6 | 4219.3 | 4237.0 | 4260.0 | 4252.9 | 4249.4 |
| 12.5° | 4256.5 | 4222.9 | 4254.7 | 4281.2 | 4329.0 | 4343.1 | 4320.1 | 4313.1 | 4316.6 | 4307.8 | 4300.7 |
| 15°   | 4419.2 | 4371.4 | 4399.7 | 4429.8 | 4456.3 | 4440.4 | 4390.9 | 4371.4 | 4369.7 | 4357.3 | 4350.2 |
| 17.5° | 4581.9 | 4521.7 | 4543.0 | 4558.9 | 4546.5 | 4497.0 | 4435.1 | 4401.5 | 4385.6 | 4360.8 | 4353.7 |
| 20°   | 4742.8 | 4666.7 | 4663.2 | 4650.8 | 4594.2 | 4504.0 | 4420.9 | 4353.7 | 4313.1 | 4279.5 | 4267.1 |
| 22.5° | 4926.7 | 4820.6 | 4767.5 | 4710.9 | 4587.2 | 4440.4 | 4314.8 | 4219.3 | 4153.9 | 4111.5 | 4097.3 |
| 25°   | 5124.7 | 4974.4 | 4864.8 | 4751.6 | 4516.4 | 4304.2 | 4129.2 | 3998.3 | 3920.5 | 3874.5 | 3858.6 |
| 27.5° | 5321.0 | 5114.1 | 4949.7 | 4756.9 | 4375.0 | 4107.9 | 3872.7 | 3695.9 | 3618.1 | 3581.0 | 3568.6 |
| 30°   | 5586.3 | 5299.8 | 5050.5 | 4688.0 | 4189.3 | 3835.6 | 3542.1 | 3363.4 | 3312.2 | 3285.6 | 3275.0 |
| 32.5° | 5892.2 | 5535.0 | 5184.9 | 4543.0 | 3952.3 | 3517.3 | 3207.8 | 3084.0 | 3048.7 | 2997.4 | 2995.6 |
| 35°   | 6295.4 | 5871.0 | 5312.2 | 4329.0 | 3653.5 | 3176.0 | 2951.4 | 2863.0 | 2799.3 | 2718.0 | 2710.9 |
| 37.5° | 6765.8 | 6290.1 | 5381.2 | 4056.6 | 3305.1 | 2894.8 | 2760.4 | 2661.4 | 2558.8 | 2451.0 | 2436.8 |
| 40°   | 7252.1 | 6779.9 | 5386.5 | 3734.8 | 2963.8 | 2709.1 | 2596.0 | 2466.9 | 2339.6 | 2219.3 | 2203.4 |
| 42.5° | 7763.2 | 7236.2 | 5292.7 | 3363.4 | 2684.4 | 2548.2 | 2433.3 | 2270.6 | 2127.4 | 2046.0 | 2037.2 |
| 45°   | 8219.4 | 7604.0 | 5080.5 | 2972.6 | 2477.5 | 2413.8 | 2267.1 | 2092.0 | 2015.9 | 1957.6 | 1945.2 |
| 47.5° | 8578.4 | 7848.0 | 4794.1 | 2622.5 | 2309.5 | 2275.9 | 2084.9 | 1994.7 | 1936.4 | 1883.3 | 1870.9 |
| 50°   | 8755.2 | 7902.9 | 4420.9 | 2337.8 | 2153.9 | 2113.2 | 1982.3 | 1913.4 | 1874.5 | 1832.0 | 1821.4 |
| 52.5° | 8974.5 | 7964.8 | 4099.1 | 2099.1 | 2001.8 | 1947.0 | 1897.5 | 1842.6 | 1814.4 | 1787.8 | 1779.0 |
| 55°   | 9478.5 | 8198.2 | 3929.3 | 1908.1 | 1856.8 | 1832.0 | 1825.0 | 1779.0 | 1770.1 | 1752.5 | 1736.5 |
| 57.5° | 9683.6 | 8047.9 | 3527.9 | 1752.5 | 1741.8 | 1745.4 | 1763.1 | 1720.6 | 1711.8 | 1690.6 | 1680.0 |
| 60°   | 7787.9 | 6083.2 | 2389.1 | 1618.1 | 1646.4 | 1669.3 | 1687.0 | 1644.6 | 1632.2 | 1628.7 | 1614.5 |
| 62.5° | 4990.4 | 3741.9 | 1667.6 | 1492.5 | 1534.9 | 1563.2 | 1573.9 | 1533.2 | 1524.3 | 1552.6 | 1554.4 |
| 65°   | 2597.7 | 2038.9 | 1352.8 | 1358.1 | 1393.5 | 1435.9 | 1457.1 | 1443.0 | 1439.5 | 1469.5 | 1471.3 |
| 67.5° | 1326.3 | 1246.7 | 1179.5 | 1199.0 | 1227.3 | 1282.1 | 1331.6 | 1393.5 | 1414.7 | 1418.2 | 1420.0 |
| 70°   | 1130.0 | 1094.6 | 1061.0 | 1073.4 | 1103.5 | 1133.5 | 1181.3 | 1211.3 | 1176.0 | 1167.1 | 1163.6 |
| 72.5° | 962.0  | 935.5  | 919.6  | 933.7  | 949.6  | 944.3  | 930.2  | 944.3  | 949.6  | 951.4  | 953.2  |
| 75°   | 748.0  | 728.6  | 716.2  | 718.0  | 718.0  | 698.5  | 672.0  | 656.1  | 638.4  | 624.2  | 624.2  |
| 77.5° | 458.0  | 461.5  | 473.9  | 472.2  | 470.4  | 463.3  | 436.8  | 422.6  | 380.2  | 367.8  | 367.8  |
| 80°   | 261.7  | 267.0  | 279.4  | 282.9  | 282.9  | 274.1  | 247.6  | 231.7  | 212.2  | 203.4  | 201.6  |
| 82.5° | 159.2  | 166.2  | 173.3  | 176.8  | 178.6  | 168.0  | 145.0  | 132.6  | 122.0  | 113.2  | 113.2  |
| 85°   | 83.1   | 86.7   | 93.7   | 95.5   | 90.2   | 79.6   | 67.2   | 61.9   | 51.3   | 49.5   | 49.5   |
| 87.5° | 23.0   | 24.8   | 28.3   | 23.0   | 21.2   | 15.9   | 8.8    | 7.1    | 3.5    | 1.8    | 1.8    |
| 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: SP1-1908-441-9-R4

Test Date: 10/23/2019

Luminaire Tested: SA1C-760-U-5WQ

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

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-9-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-760-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):                  | 5474   | CRI (Ra): | 71.7 | R9:  | -27.1 |
| CIE u':                   | 0.2052 | R1:       | 70.6 | R10: | 40.8  |
| CIE v':                   | 0.4804 | R2:       | 74.6 | R11: | 74.6  |
| Duv:                      | 0.0025 | R3:       | 78.3 | R12: | 50.4  |
| CIE x:                    | 0.3330 | R4:       | 73.8 | R13: | 70.0  |
| CIE y:                    | 0.3466 | R5:       | 72.4 | R14: | 87.8  |
| CIE z:                    | 0.3204 | R6:       | 67.5 |      |       |
| Peak Wavelength (nm):     | 442    | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 554    | R8:       | 58.9 |      |       |
| Purity:                   | 4.1    |           |      |      |       |
| Rf:                       | 72.1   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



**Test Conditions**

Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.6/31%  
 Sphere Temperature (°C): 25.9

REPORT NUMBER: SP1-1908-441-9-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            |

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 5700K 4-step quadrangle

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**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               | 3540                                 | NR                             | 490               | 33363                                | NR                             | 620               | 80193                                | NR                             | 750               | 4663                                 | NR                             | 880               | 4678                                 | NR                             |
| 365               | 2862                                 | NR                             | 495               | 44177                                | NR                             | 625               | 73091                                | NR                             | 755               | 4147                                 | NR                             | 885               | 4128                                 | NR                             |
| 370               | 2865                                 | NR                             | 500               | 57019                                | NR                             | 630               | 66269                                | NR                             | 760               | 4040                                 | NR                             | 890               | 4504                                 | NR                             |
| 375               | 3254                                 | NR                             | 505               | 70030                                | NR                             | 635               | 60012                                | NR                             | 765               | 3474                                 | NR                             | 895               | 4371                                 | NR                             |
| 380               | 3076                                 | NR                             | 510               | 81972                                | NR                             | 640               | 53914                                | NR                             | 770               | 3469                                 | NR                             | 900               | 4082                                 | NR                             |
| 385               | 2904                                 | NR                             | 515               | 92590                                | NR                             | 645               | 48385                                | NR                             | 775               | 3181                                 | NR                             | 905               | 2982                                 | NR                             |
| 390               | 2689                                 | NR                             | 520               | 100305                               | NR                             | 650               | 43219                                | NR                             | 780               | 2969                                 | NR                             | 910               | 4351                                 | NR                             |
| 395               | 2619                                 | NR                             | 525               | 107452                               | NR                             | 655               | 38562                                | NR                             | 785               | 3132                                 | NR                             | 915               | 3365                                 | NR                             |
| 400               | 2679                                 | NR                             | 530               | 111373                               | NR                             | 660               | 34110                                | NR                             | 790               | 2507                                 | NR                             | 920               | 3430                                 | NR                             |
| 405               | 3515                                 | NR                             | 535               | 114505                               | NR                             | 665               | 30085                                | NR                             | 795               | 2968                                 | NR                             | 925               | 4264                                 | NR                             |
| 410               | 6934                                 | NR                             | 540               | 116408                               | NR                             | 670               | 26205                                | NR                             | 800               | 2758                                 | NR                             | 930               | 4095                                 | NR                             |
| 415               | 14943                                | NR                             | 545               | 118700                               | NR                             | 675               | 22906                                | NR                             | 805               | 2872                                 | NR                             | 935               | 5048                                 | NR                             |
| 420               | 31939                                | NR                             | 550               | 119209                               | NR                             | 680               | 20058                                | NR                             | 810               | 3094                                 | NR                             | 940               | 4074                                 | NR                             |
| 425               | 64701                                | NR                             | 555               | 120742                               | NR                             | 685               | 17413                                | NR                             | 815               | 3222                                 | NR                             | 945               | 4949                                 | NR                             |
| 430               | 110939                               | NR                             | 560               | 121594                               | NR                             | 690               | 15447                                | NR                             | 820               | 3238                                 | NR                             | 950               | 4387                                 | NR                             |
| 435               | 164597                               | NR                             | 565               | 121913                               | NR                             | 695               | 13398                                | NR                             | 825               | 3524                                 | NR                             | 955               | 4978                                 | NR                             |
| 440               | 207696                               | NR                             | 570               | 122147                               | NR                             | 700               | 11777                                | NR                             | 830               | 2921                                 | NR                             | 960               | 4706                                 | NR                             |
| 445               | 201830                               | NR                             | 575               | 121605                               | NR                             | 705               | 10412                                | NR                             | 835               | 3595                                 | NR                             | 965               | 5083                                 | NR                             |
| 450               | 145410                               | NR                             | 580               | 120248                               | NR                             | 710               | 9544                                 | NR                             | 840               | 3016                                 | NR                             | 970               | 4522                                 | NR                             |
| 455               | 89594                                | NR                             | 585               | 117717                               | NR                             | 715               | 8940                                 | NR                             | 845               | 4032                                 | NR                             | 975               | 4740                                 | NR                             |
| 460               | 58321                                | NR                             | 590               | 114359                               | NR                             | 720               | 7897                                 | NR                             | 850               | 3579                                 | NR                             | 980               | 6122                                 | NR                             |
| 465               | 39318                                | NR                             | 595               | 109974                               | NR                             | 725               | 7045                                 | NR                             | 855               | 4571                                 | NR                             | 985               | 6450                                 | NR                             |
| 470               | 27693                                | NR                             | 600               | 105269                               | NR                             | 730               | 6483                                 | NR                             | 860               | 4485                                 | NR                             | 990               | 4875                                 | NR                             |
| 475               | 23081                                | NR                             | 605               | 99453                                | NR                             | 735               | 5838                                 | NR                             | 865               | 3978                                 | NR                             | 995               | 4764                                 | NR                             |
| 480               | 23002                                | NR                             | 610               | 92921                                | NR                             | 740               | 5261                                 | NR                             | 870               | 4298                                 | NR                             | 1000              | 3640                                 | NR                             |
| 485               | 26201                                | NR                             | 615               | 86989                                | NR                             | 745               | 4760                                 | NR                             | 875               | 4356                                 | NR                             |                   |                                      |                                |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 13759.3 S/P: 1.85

| 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    | 3540          | NR            | 490    | 33363         | NR            | 620    | 80193         | NR            | 750    | 4663          | NR            | 880    | 4678          | NR            |
| 365    | 2862          | NR            | 495    | 44177         | NR            | 625    | 73091         | NR            | 755    | 4147          | NR            | 885    | 4128          | NR            |
| 370    | 2865          | NR            | 500    | 57019         | NR            | 630    | 66269         | NR            | 760    | 4040          | NR            | 890    | 4504          | NR            |
| 375    | 3254          | NR            | 505    | 70030         | NR            | 635    | 60012         | NR            | 765    | 3474          | NR            | 895    | 4371          | NR            |
| 380    | 3076          | NR            | 510    | 81972         | NR            | 640    | 53914         | NR            | 770    | 3469          | NR            | 900    | 4082          | NR            |
| 385    | 2904          | NR            | 515    | 92590         | NR            | 645    | 48385         | NR            | 775    | 3181          | NR            | 905    | 2982          | NR            |
| 390    | 2689          | NR            | 520    | 100305        | NR            | 650    | 43219         | NR            | 780    | 2969          | NR            | 910    | 4351          | NR            |
| 395    | 2619          | NR            | 525    | 107452        | NR            | 655    | 38562         | NR            | 785    | 3132          | NR            | 915    | 3365          | NR            |
| 400    | 2679          | NR            | 530    | 111373        | NR            | 660    | 34110         | NR            | 790    | 2507          | NR            | 920    | 3430          | NR            |
| 405    | 3515          | NR            | 535    | 114505        | NR            | 665    | 30085         | NR            | 795    | 2968          | NR            | 925    | 4264          | NR            |
| 410    | 6934          | NR            | 540    | 116408        | NR            | 670    | 26205         | NR            | 800    | 2758          | NR            | 930    | 4095          | NR            |
| 415    | 14943         | NR            | 545    | 118700        | NR            | 675    | 22906         | NR            | 805    | 2872          | NR            | 935    | 5048          | NR            |
| 420    | 31939         | NR            | 550    | 119209        | NR            | 680    | 20058         | NR            | 810    | 3094          | NR            | 940    | 4074          | NR            |
| 425    | 64701         | NR            | 555    | 120742        | NR            | 685    | 17413         | NR            | 815    | 3222          | NR            | 945    | 4949          | NR            |
| 430    | 110939        | NR            | 560    | 121594        | NR            | 690    | 15447         | NR            | 820    | 3238          | NR            | 950    | 4387          | NR            |
| 435    | 164597        | NR            | 565    | 121913        | NR            | 695    | 13398         | NR            | 825    | 3524          | NR            | 955    | 4978          | NR            |
| 440    | 207696        | NR            | 570    | 122147        | NR            | 700    | 11777         | NR            | 830    | 2921          | NR            | 960    | 4706          | NR            |
| 445    | 201830        | NR            | 575    | 121605        | NR            | 705    | 10412         | NR            | 835    | 3595          | NR            | 965    | 5083          | NR            |
| 450    | 145410        | NR            | 580    | 120248        | NR            | 710    | 9544          | NR            | 840    | 3016          | NR            | 970    | 4522          | NR            |
| 455    | 89594         | NR            | 585    | 117717        | NR            | 715    | 8940          | NR            | 845    | 4032          | NR            | 975    | 4740          | NR            |
| 460    | 58321         | NR            | 590    | 114359        | NR            | 720    | 7897          | NR            | 850    | 3579          | NR            | 980    | 6122          | NR            |
| 465    | 39318         | NR            | 595    | 109974        | NR            | 725    | 7045          | NR            | 855    | 4571          | NR            | 985    | 6450          | NR            |
| 470    | 27693         | NR            | 600    | 105269        | NR            | 730    | 6483          | NR            | 860    | 4485          | NR            | 990    | 4875          | NR            |
| 475    | 23081         | NR            | 605    | 99453         | NR            | 735    | 5838          | NR            | 865    | 3978          | NR            | 995    | 4764          | NR            |
| 480    | 23002         | NR            | 610    | 92921         | NR            | 740    | 5261          | NR            | 870    | 4298          | NR            | 1000   | 3640          | NR            |
| 485    | 26201         | NR            | 615    | 86989         | NR            | 745    | 4760          | NR            | 875    | 4356          | NR            |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5527.6 M/P: 0.74**

| 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    | 3540          | NR            | 490    | 33363         | NR            | 620    | 80193         | NR            | 750    | 4663          | NR            | 880    | 4678          | NR            |
| 365    | 2862          | NR            | 495    | 44177         | NR            | 625    | 73091         | NR            | 755    | 4147          | NR            | 885    | 4128          | NR            |
| 370    | 2865          | NR            | 500    | 57019         | NR            | 630    | 66269         | NR            | 760    | 4040          | NR            | 890    | 4504          | NR            |
| 375    | 3254          | NR            | 505    | 70030         | NR            | 635    | 60012         | NR            | 765    | 3474          | NR            | 895    | 4371          | NR            |
| 380    | 3076          | NR            | 510    | 81972         | NR            | 640    | 53914         | NR            | 770    | 3469          | NR            | 900    | 4082          | NR            |
| 385    | 2904          | NR            | 515    | 92590         | NR            | 645    | 48385         | NR            | 775    | 3181          | NR            | 905    | 2982          | NR            |
| 390    | 2689          | NR            | 520    | 100305        | NR            | 650    | 43219         | NR            | 780    | 2969          | NR            | 910    | 4351          | NR            |
| 395    | 2619          | NR            | 525    | 107452        | NR            | 655    | 38562         | NR            | 785    | 3132          | NR            | 915    | 3365          | NR            |
| 400    | 2679          | NR            | 530    | 111373        | NR            | 660    | 34110         | NR            | 790    | 2507          | NR            | 920    | 3430          | NR            |
| 405    | 3515          | NR            | 535    | 114505        | NR            | 665    | 30085         | NR            | 795    | 2968          | NR            | 925    | 4264          | NR            |
| 410    | 6934          | NR            | 540    | 116408        | NR            | 670    | 26205         | NR            | 800    | 2758          | NR            | 930    | 4095          | NR            |
| 415    | 14943         | NR            | 545    | 118700        | NR            | 675    | 22906         | NR            | 805    | 2872          | NR            | 935    | 5048          | NR            |
| 420    | 31939         | NR            | 550    | 119209        | NR            | 680    | 20058         | NR            | 810    | 3094          | NR            | 940    | 4074          | NR            |
| 425    | 64701         | NR            | 555    | 120742        | NR            | 685    | 17413         | NR            | 815    | 3222          | NR            | 945    | 4949          | NR            |
| 430    | 110939        | NR            | 560    | 121594        | NR            | 690    | 15447         | NR            | 820    | 3238          | NR            | 950    | 4387          | NR            |
| 435    | 164597        | NR            | 565    | 121913        | NR            | 695    | 13398         | NR            | 825    | 3524          | NR            | 955    | 4978          | NR            |
| 440    | 207696        | NR            | 570    | 122147        | NR            | 700    | 11777         | NR            | 830    | 2921          | NR            | 960    | 4706          | NR            |
| 445    | 201830        | NR            | 575    | 121605        | NR            | 705    | 10412         | NR            | 835    | 3595          | NR            | 965    | 5083          | NR            |
| 450    | 145410        | NR            | 580    | 120248        | NR            | 710    | 9544          | NR            | 840    | 3016          | NR            | 970    | 4522          | NR            |
| 455    | 89594         | NR            | 585    | 117717        | NR            | 715    | 8940          | NR            | 845    | 4032          | NR            | 975    | 4740          | NR            |
| 460    | 58321         | NR            | 590    | 114359        | NR            | 720    | 7897          | NR            | 850    | 3579          | NR            | 980    | 6122          | NR            |
| 465    | 39318         | NR            | 595    | 109974        | NR            | 725    | 7045          | NR            | 855    | 4571          | NR            | 985    | 6450          | NR            |
| 470    | 27693         | NR            | 600    | 105269        | NR            | 730    | 6483          | NR            | 860    | 4485          | NR            | 990    | 4875          | NR            |
| 475    | 23081         | NR            | 605    | 99453         | NR            | 735    | 5838          | NR            | 865    | 3978          | NR            | 995    | 4764          | NR            |
| 480    | 23002         | NR            | 610    | 92921         | NR            | 740    | 5261          | NR            | 870    | 4298          | NR            | 1000   | 3640          | NR            |
| 485    | 26201         | NR            | 615    | 86989         | NR            | 745    | 4760          | NR            | 875    | 4356          | NR            |        |               |               |

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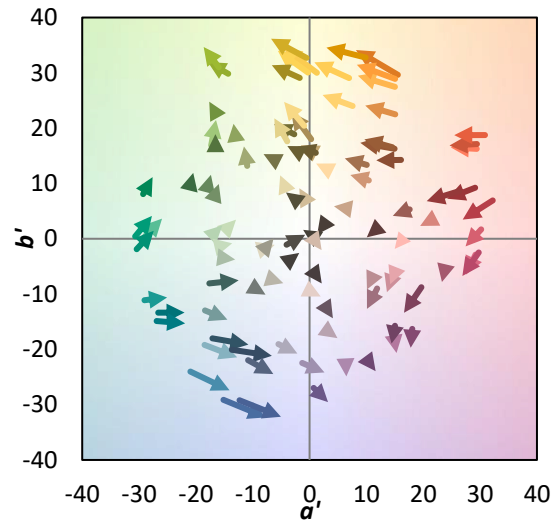
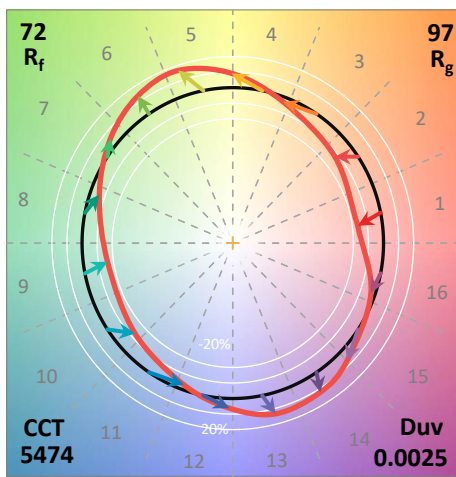
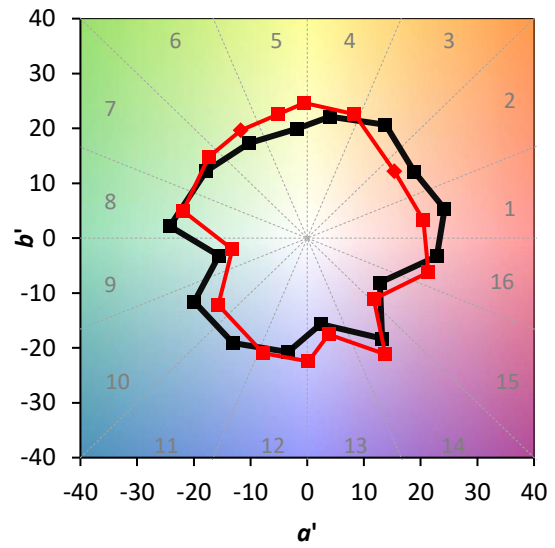
TM-30-18

**Summary**

$R_f = 72.1$   
 $R_g = 97.2$   
 CIE  $R_a = 71.7$   
 $R_g = -27.1$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 88 | CES76 = 43 |
| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 81 | CES79 = 74 |
| CES05 = 46 | CES30 = 59 | CES55 = 80 | CES80 = 70 |
| CES06 = 50 | CES31 = 55 | CES56 = 70 | CES81 = 71 |
| CES07 = 38 | CES32 = 52 | CES57 = 68 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 82 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 84 |
| CES11 = 55 | CES36 = 90 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 72 | CES62 = 81 | CES87 = 75 |
| CES13 = 41 | CES38 = 68 | CES63 = 75 | CES88 = 77 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 84 | CES66 = 66 | CES91 = 92 |
| CES17 = 48 | CES42 = 70 | CES67 = 64 | CES92 = 70 |
| CES18 = 55 | CES43 = 69 | CES68 = 71 | CES93 = 83 |
| CES19 = 70 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 73 |
| CES21 = 85 | CES46 = 78 | CES71 = 55 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 68 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 78 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)