

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: P636357

Luminaire Tested: GWS-SA3F-750-U-T3R-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P636357  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-18)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA3F-750-U-T3R-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (3) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III ROADWAY OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (48) 5000K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

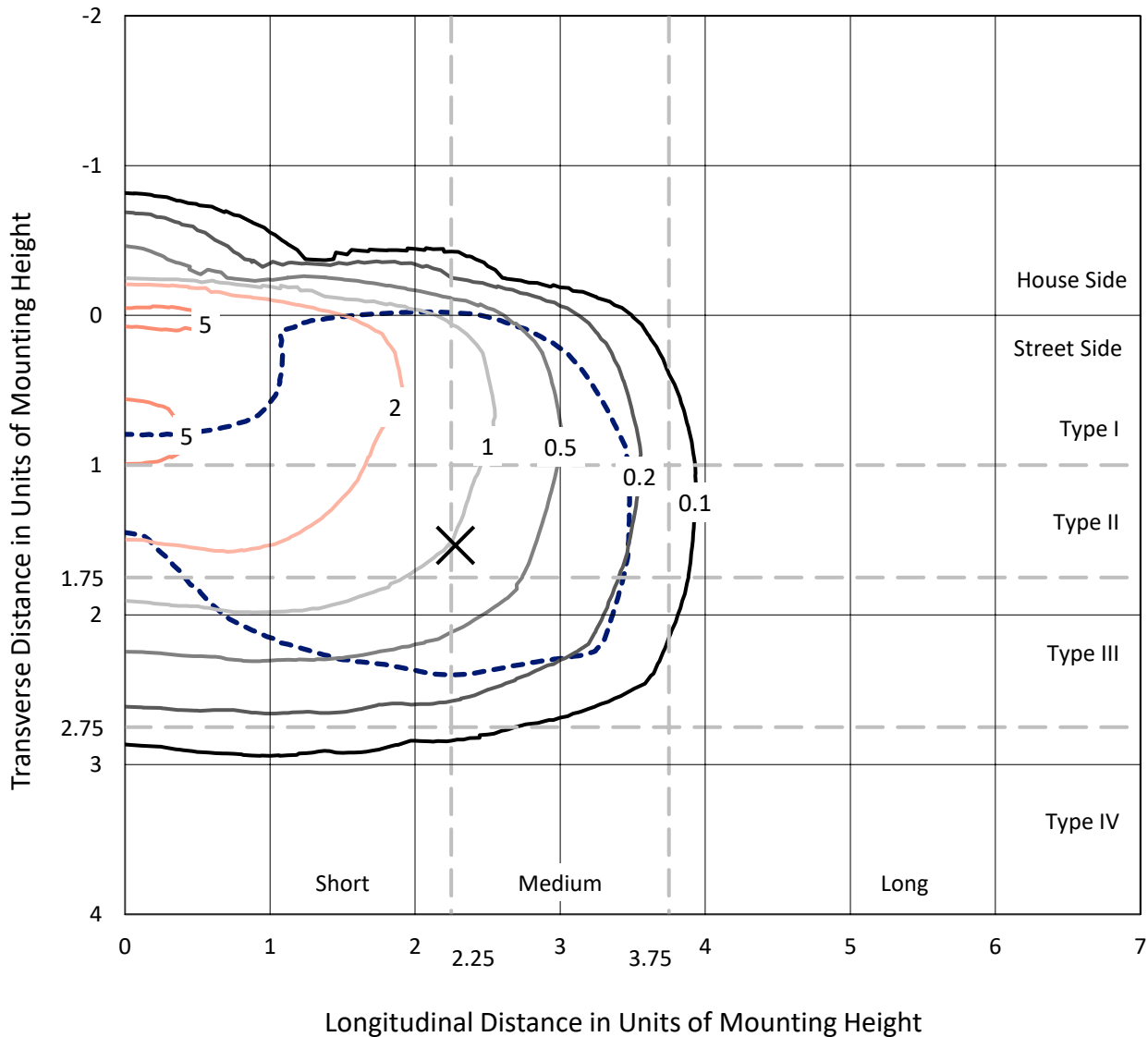
Lumens per Lamp: N/A  
Luminaire Lumens: 19579.1 lumens  
Efficiency: N/A  
Efficacy: 106.9 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B2 - U0 - G4  
  
Input Watts (W): 183.2  
Input Voltage (V): 120  
Input Current (Ain): 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: P636357  
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### Iso-Footcandle Lines of Horizontal Illumination

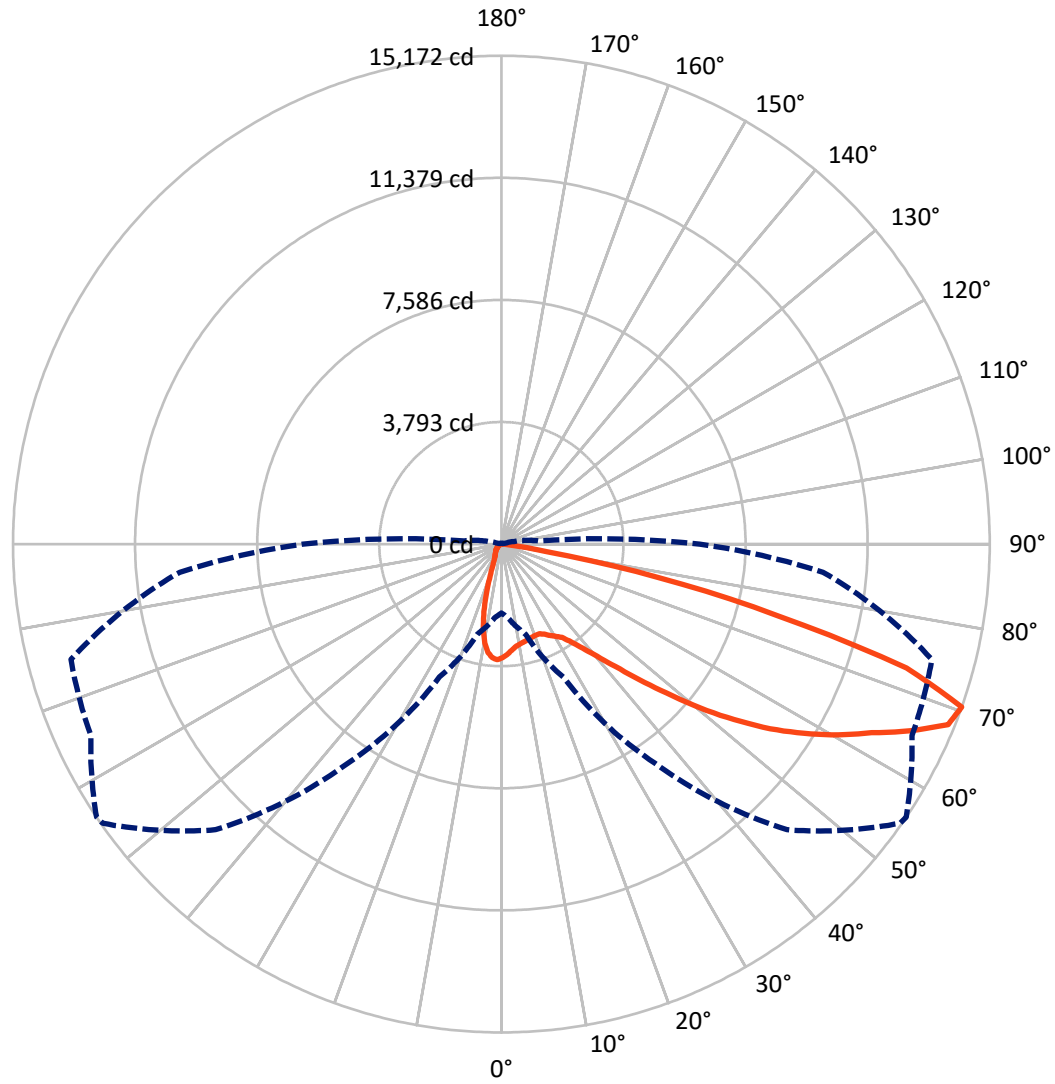
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6 fc  
 Type III - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 56-Deg Lateral    - - - Horizontal Cone Through 70-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1758.6   | 0.0    | 1758.6  |
|                    | % Fixture | 9.0      | 0.0    | 9.0     |
| <b>Street Side</b> | Lumens    | 17820.5  | 0.0    | 17820.5 |
|                    | % Fixture | 91.0     | 0.0    | 91.0    |
| <b>Total</b>       | Lumens    | 19579.1  | 0.0    | 19579.1 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 303.1   | 1.5       |
| 10°-20°   | 681.7   | 3.5       |
| 20°-30°   | 1079.9  | 5.5       |
| 30°-40°   | 1862.2  | 9.5       |
| 40°-50°   | 3144.6  | 16.1      |
| 50°-60°   | 4620.5  | 23.6      |
| 60°-70°   | 5477.8  | 28.0      |
| 70°-80°   | 2336.0  | 11.9      |
| 80°-90°   | 73.4    | 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°    | 19579.1 | 100.0     |
| 0°-180°   | 19579.1 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P636357

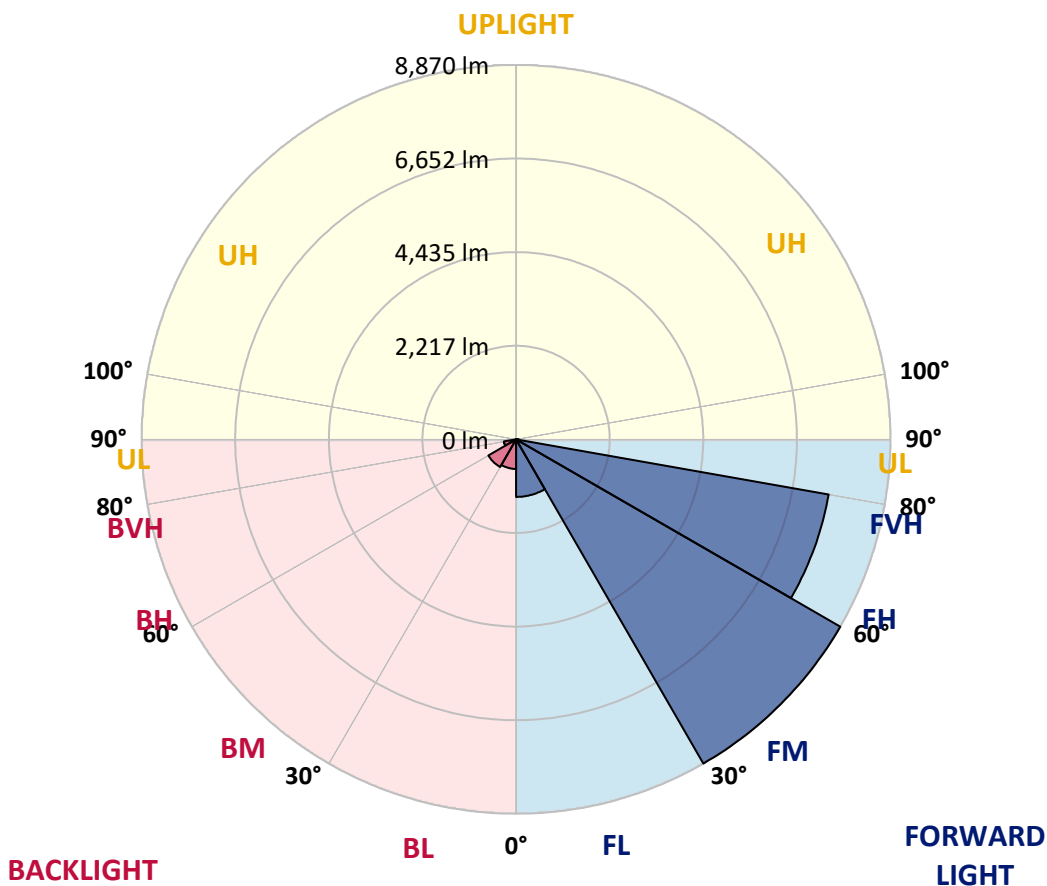
CATALOG NUMBER: GWS-SA3F-750-U-T3R-W-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|----------------|--------|-----------|-------------------------|------|----------|
|                |        |           | B                       | U    | G        |
| FL (0°-30°)    | 1364.3 | 7.0       |                         |      |          |
| FM (30°-60°)   | 8869.9 | 45.3      |                         |      |          |
| FH (60°-80°)   | 7520.5 | 38.4      |                         |      | G4/12000 |
| FVH (80°-90°)  | 65.9   | 0.3       |                         |      | G1/100   |
| BL (0°-30°)    | 700.4  | 3.6       | B2/1000                 |      |          |
| BM (30°-60°)   | 757.4  | 3.9       | B1/1000                 |      |          |
| BH (60°-80°)   | 293.3  | 1.5       | B1/500                  |      | G1/500   |
| BVH (80°-90°)  | 7.5    | 0.0       |                         |      | G0/10    |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |          |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |          |

**BUG Rating: B2-U0-G4**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°     | 35°     | 45°     | 55°     | 56°     | 65°     | 75°     | 85°     |
|-------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3530.3 | 3530.3 | 3530.3 | 3530.3  | 3530.3  | 3530.3  | 3530.3  | 3530.3  | 3530.3  | 3530.3  | 3530.3  |
| 2.5°  | 3286.5 | 3281.1 | 3284.7 | 3311.6  | 3361.8  | 3385.1  | 3424.5  | 3431.7  | 3464.0  | 3505.2  | 3521.3  |
| 5°    | 3073.1 | 3055.2 | 3064.1 | 3101.8  | 3159.2  | 3223.7  | 3297.2  | 3316.9  | 3397.6  | 3489.1  | 3557.2  |
| 7.5°  | 2877.7 | 2858.0 | 2879.5 | 2938.6  | 3019.3  | 3089.2  | 3198.6  | 3211.2  | 3340.3  | 3501.6  | 3625.3  |
| 10°   | 2571.1 | 2576.5 | 2619.5 | 2723.5  | 2847.2  | 2992.4  | 3139.4  | 3157.4  | 3316.9  | 3542.9  | 3734.7  |
| 12.5° | 2336.2 | 2323.7 | 2370.3 | 2488.6  | 2662.5  | 2874.1  | 3094.6  | 3117.9  | 3318.7  | 3605.6  | 3874.6  |
| 15°   | 2226.8 | 2223.3 | 2243.0 | 2329.0  | 2497.6  | 2746.8  | 3053.4  | 3083.9  | 3342.0  | 3663.0  | 4007.2  |
| 17.5° | 2230.4 | 2225.0 | 2223.3 | 2273.5  | 2399.0  | 2651.8  | 3008.6  | 3048.0  | 3361.8  | 3725.7  | 4147.1  |
| 20°   | 2386.4 | 2361.3 | 2316.5 | 2293.2  | 2368.5  | 2590.8  | 2978.1  | 3022.9  | 3390.5  | 3792.1  | 4295.9  |
| 22.5° | 2712.7 | 2721.7 | 2601.6 | 2476.1  | 2440.2  | 2598.0  | 2974.5  | 3026.5  | 3453.2  | 3896.1  | 4478.8  |
| 25°   | 3365.4 | 3351.0 | 3128.7 | 2847.2  | 2651.8  | 2680.5  | 3037.2  | 3100.0  | 3576.9  | 4044.9  | 4650.9  |
| 27.5° | 4182.9 | 4195.5 | 3890.7 | 3442.5  | 3033.7  | 2850.8  | 3152.0  | 3214.8  | 3720.4  | 4138.1  | 4765.6  |
| 30°   | 5074.0 | 5061.5 | 4735.2 | 4238.5  | 3575.1  | 3134.1  | 3266.7  | 3322.3  | 3792.1  | 4188.3  | 4884.0  |
| 32.5° | 5916.7 | 5888.0 | 5565.3 | 5045.3  | 4265.4  | 3580.5  | 3424.5  | 3456.8  | 3887.1  | 4297.7  | 5043.6  |
| 35°   | 6635.7 | 6633.9 | 6352.4 | 5798.4  | 4975.4  | 4139.9  | 3695.3  | 3722.2  | 4064.6  | 4471.6  | 5278.4  |
| 37.5° | 7378.0 | 7352.9 | 7037.3 | 6531.7  | 5705.2  | 4753.1  | 4109.4  | 4098.7  | 4344.3  | 4728.0  | 5567.1  |
| 40°   | 7987.6 | 7971.4 | 7729.4 | 7243.5  | 6463.6  | 5430.8  | 4611.5  | 4579.2  | 4676.0  | 5083.0  | 5968.7  |
| 42.5° | 8439.4 | 8441.2 | 8365.9 | 8070.0  | 7266.8  | 6214.3  | 5242.6  | 5192.4  | 5190.6  | 5619.1  | 6499.4  |
| 45°   | 8781.8 | 8805.2 | 8918.1 | 8873.3  | 8215.3  | 7127.0  | 6051.2  | 5999.2  | 5911.3  | 6314.8  | 7107.2  |
| 47.5° | 8941.4 | 8971.9 | 9312.6 | 9491.9  | 9045.4  | 8032.4  | 7014.0  | 6904.6  | 6732.5  | 7239.9  | 7786.8  |
| 50°   | 8925.3 | 8979.1 | 9454.2 | 9999.3  | 9798.4  | 8950.4  | 8062.9  | 8010.9  | 7729.4  | 8218.9  | 8459.1  |
| 52.5° | 8559.5 | 8674.3 | 9463.2 | 10307.6 | 10377.6 | 9796.7  | 9147.6  | 9050.8  | 8914.5  | 9240.8  | 9090.2  |
| 55°   | 7566.2 | 7706.1 | 9084.9 | 10406.3 | 10829.4 | 10535.3 | 10209.0 | 10130.1 | 9904.2  | 10205.4 | 9640.7  |
| 57.5° | 7026.6 | 7146.7 | 8288.8 | 10357.8 | 11213.1 | 11218.5 | 11153.9 | 11089.4 | 10902.9 | 11159.3 | 10286.1 |
| 60°   | 6702.0 | 6822.2 | 7863.9 | 10180.3 | 11560.9 | 11939.2 | 12041.4 | 12034.2 | 11765.3 | 12244.0 | 11042.7 |
| 62.5° | 6226.9 | 6391.8 | 7421.0 | 9719.6  | 11808.3 | 12649.2 | 12957.6 | 12909.2 | 12609.8 | 13373.6 | 11792.2 |
| 65°   | 5267.7 | 5411.1 | 6513.8 | 8959.3  | 11663.1 | 13237.3 | 13950.9 | 13976.0 | 13630.0 | 14436.8 | 12383.9 |
| 67.5° | 3693.5 | 3799.3 | 4894.7 | 7363.6  | 10677.0 | 13431.0 | 14967.5 | 14965.7 | 14375.8 | 14981.8 | 12122.1 |
| 70°   | 2140.8 | 2286.0 | 2892.0 | 4552.3  | 8306.7  | 12550.6 | 15119.9 | 15171.9 | 14072.8 | 13843.3 | 10031.5 |
| 72.5° | 828.3  | 948.5  | 1638.8 | 2418.7  | 4331.8  | 9613.8  | 13006.0 | 13158.4 | 11777.9 | 10678.8 | 6981.7  |
| 75°   | 247.4  | 276.1  | 771.0  | 1287.3  | 1739.2  | 4643.7  | 8805.2  | 8848.2  | 8079.0  | 6660.8  | 3578.7  |
| 77.5° | 184.7  | 204.4  | 337.1  | 650.8   | 609.6   | 1407.5  | 4555.9  | 4975.4  | 4288.7  | 2379.2  | 986.1   |
| 80°   | 125.5  | 148.8  | 240.3  | 317.4   | 225.9   | 374.7   | 1280.2  | 1405.7  | 1308.8  | 534.3   | 247.4   |
| 82.5° | 55.6   | 71.7   | 170.3  | 159.6   | 82.5    | 107.6   | 394.4   | 419.5   | 270.7   | 161.4   | 86.1    |
| 85°   | 5.4    | 7.2    | 64.5   | 69.9    | 30.5    | 25.1    | 82.5    | 82.5    | 59.2    | 55.6    | 35.9    |
| 87.5° | 0.0    | 0.0    | 1.8    | 3.6     | 3.6     | 5.4     | 7.2     | 9.0     | 10.8    | 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: P636357

CATALOG NUMBER: GWS-SA3F-750-U-T3R-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3530.3 | 3530.3 | 3530.3 | 3530.3 | 3530.3 | 3530.3 | 3530.3 | 3530.3 | 3530.3 | 3530.3 | 3530.3 |
| 2.5°  | 3562.6 | 3541.1 | 3568.0 | 3589.5 | 3594.9 | 3555.4 | 3532.1 | 3498.0 | 3490.9 | 3492.7 | 3483.7 |
| 5°    | 3611.0 | 3600.2 | 3620.0 | 3596.6 | 3535.7 | 3420.9 | 3322.3 | 3213.0 | 3153.8 | 3119.7 | 3116.1 |
| 7.5°  | 3700.6 | 3695.3 | 3673.7 | 3568.0 | 3377.9 | 3123.3 | 2877.7 | 2637.4 | 2488.6 | 2434.8 | 2425.9 |
| 10°   | 3833.3 | 3822.6 | 3734.7 | 3483.7 | 3078.5 | 2589.0 | 2176.6 | 1832.4 | 1622.6 | 1561.7 | 1486.4 |
| 12.5° | 3985.7 | 3964.2 | 3772.4 | 3302.6 | 2626.7 | 1948.9 | 1434.4 | 1048.9 | 867.8  | 814.0  | 814.0  |
| 15°   | 4132.7 | 4086.1 | 3750.8 | 3003.2 | 2070.9 | 1267.6 | 801.4  | 606.0  | 550.4  | 536.1  | 536.1  |
| 17.5° | 4283.3 | 4193.7 | 3666.6 | 2594.4 | 1430.8 | 749.5  | 534.3  | 496.6  | 489.5  | 491.3  | 493.1  |
| 20°   | 4425.0 | 4285.1 | 3517.8 | 2103.1 | 912.6  | 523.5  | 478.7  | 469.8  | 466.2  | 469.8  | 468.0  |
| 22.5° | 4579.2 | 4369.4 | 3291.8 | 1567.0 | 593.5  | 471.5  | 455.4  | 448.2  | 444.7  | 450.0  | 450.0  |
| 25°   | 4731.6 | 4430.4 | 2992.4 | 1054.3 | 471.5  | 439.3  | 430.3  | 423.1  | 419.5  | 421.3  | 421.3  |
| 27.5° | 4810.5 | 4407.1 | 2599.8 | 672.4  | 423.1  | 407.0  | 398.0  | 389.1  | 383.7  | 381.9  | 383.7  |
| 30°   | 4864.3 | 4335.3 | 2119.3 | 478.7  | 383.7  | 364.0  | 355.0  | 347.8  | 333.5  | 324.5  | 328.1  |
| 32.5° | 4948.5 | 4263.6 | 1597.5 | 401.6  | 351.4  | 320.9  | 306.6  | 288.7  | 268.9  | 260.0  | 260.0  |
| 35°   | 5048.9 | 4165.0 | 1120.6 | 362.2  | 317.4  | 285.1  | 258.2  | 227.7  | 204.4  | 197.2  | 197.2  |
| 37.5° | 5181.6 | 4071.8 | 745.9  | 335.3  | 288.7  | 254.6  | 216.9  | 181.1  | 156.0  | 152.4  | 150.6  |
| 40°   | 5380.6 | 3992.9 | 525.3  | 315.6  | 263.6  | 222.3  | 177.5  | 139.8  | 121.9  | 116.5  | 116.5  |
| 42.5° | 5638.8 | 3912.2 | 416.0  | 295.8  | 242.0  | 191.8  | 141.6  | 111.2  | 96.8   | 93.2   | 91.4   |
| 45°   | 5958.0 | 3817.2 | 362.2  | 277.9  | 220.5  | 159.6  | 113.0  | 93.2   | 82.5   | 78.9   | 78.9   |
| 47.5° | 6304.0 | 3688.1 | 337.1  | 254.6  | 195.4  | 129.1  | 95.0   | 80.7   | 75.3   | 73.5   | 71.7   |
| 50°   | 6644.7 | 3514.2 | 315.6  | 233.1  | 166.7  | 105.8  | 82.5   | 73.5   | 69.9   | 68.1   | 68.1   |
| 52.5° | 6942.3 | 3311.6 | 288.7  | 208.0  | 136.3  | 91.4   | 73.5   | 68.1   | 64.5   | 61.0   | 59.2   |
| 55°   | 7196.9 | 3091.0 | 254.6  | 179.3  | 111.2  | 80.7   | 68.1   | 62.8   | 59.2   | 55.6   | 53.8   |
| 57.5° | 7525.0 | 2965.5 | 204.4  | 145.2  | 91.4   | 71.7   | 62.8   | 57.4   | 53.8   | 48.4   | 48.4   |
| 60°   | 7889.0 | 2874.1 | 152.4  | 114.7  | 78.9   | 66.3   | 57.4   | 52.0   | 48.4   | 43.0   | 43.0   |
| 62.5° | 8181.2 | 2737.8 | 120.1  | 93.2   | 68.1   | 59.2   | 52.0   | 46.6   | 43.0   | 37.7   | 37.7   |
| 65°   | 8292.4 | 2456.3 | 98.6   | 73.5   | 55.6   | 52.0   | 46.6   | 43.0   | 37.7   | 32.3   | 32.3   |
| 67.5° | 7790.3 | 1893.3 | 82.5   | 59.2   | 46.6   | 44.8   | 41.2   | 39.4   | 32.3   | 28.7   | 26.9   |
| 70°   | 6169.5 | 1154.7 | 68.1   | 48.4   | 39.4   | 37.7   | 37.7   | 34.1   | 28.7   | 26.9   | 25.1   |
| 72.5° | 4227.8 | 595.3  | 55.6   | 39.4   | 34.1   | 34.1   | 32.3   | 30.5   | 26.9   | 25.1   | 25.1   |
| 75°   | 2196.4 | 199.0  | 43.0   | 30.5   | 26.9   | 28.7   | 28.7   | 26.9   | 25.1   | 25.1   | 23.3   |
| 77.5° | 629.3  | 89.6   | 32.3   | 23.3   | 21.5   | 21.5   | 23.3   | 23.3   | 23.3   | 21.5   | 21.5   |
| 80°   | 163.2  | 52.0   | 23.3   | 17.9   | 17.9   | 17.9   | 17.9   | 19.7   | 21.5   | 19.7   | 19.7   |
| 82.5° | 66.3   | 28.7   | 16.1   | 14.3   | 14.3   | 14.3   | 14.3   | 16.1   | 17.9   | 17.9   | 17.9   |
| 85°   | 41.2   | 14.3   | 12.6   | 12.6   | 12.6   | 10.8   | 10.8   | 12.6   | 12.6   | 14.3   | 14.3   |
| 87.5° | 25.1   | 10.8   | 10.8   | 10.8   | 10.8   | 9.0    | 9.0    | 9.0    | 9.0    | 9.0    | 9.0    |
| 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  
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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: SP1-1908-441-4-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)