

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: P639462

Luminaire Tested: GWS-SA5B-830-U-SL2-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P639462  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-27)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA5B-830-U-SL2-W  
Description: GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II SPILL LIGHT ELIMINATOR OPTICS  
Light Source: (80) 3000K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

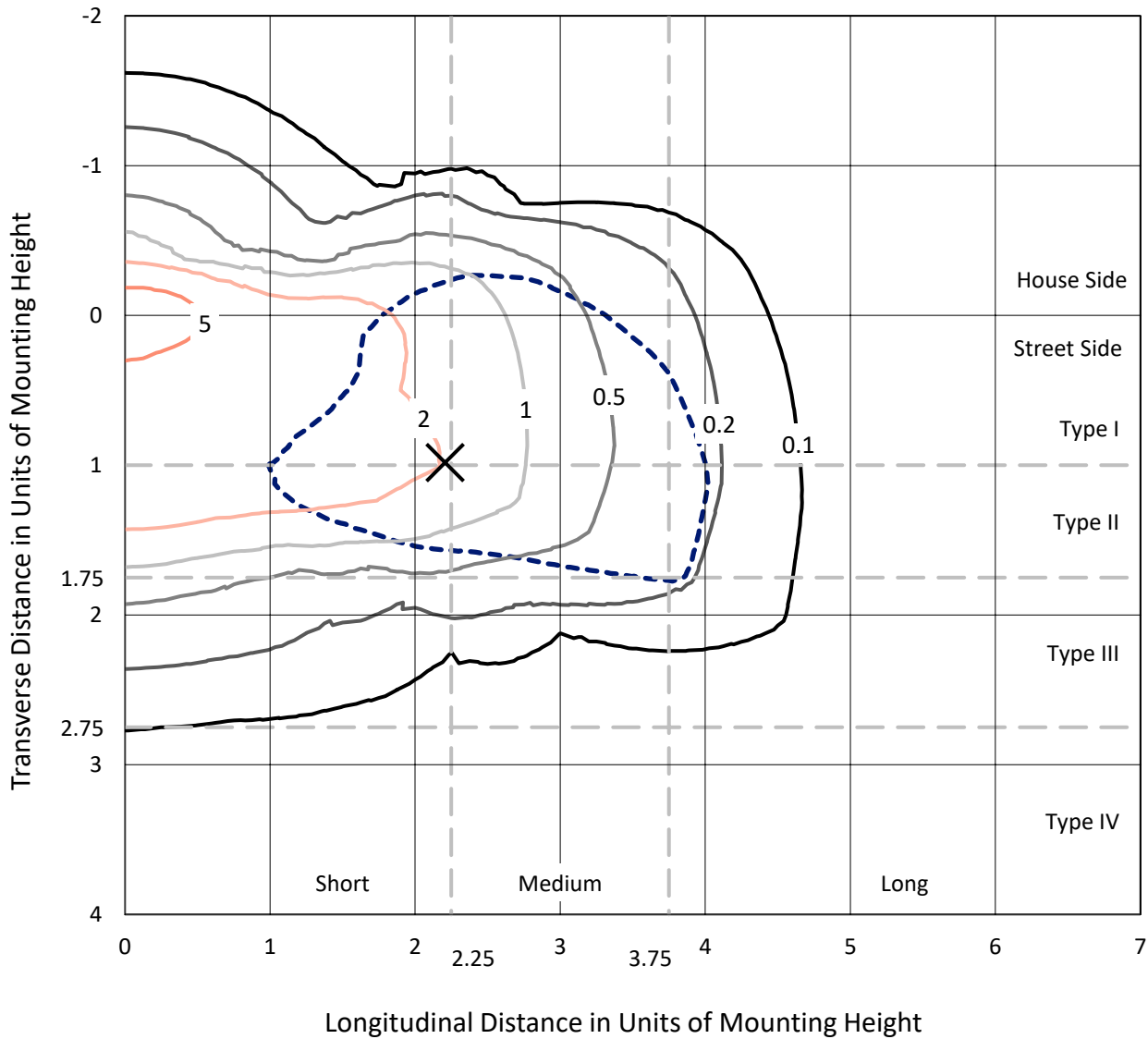
Lumens per Lamp: N/A  
Luminaire Lumens: 13860.8 lumens  
Efficiency: N/A  
Efficacy: 119.8 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G3  
  
Input Watts (W): 115.7  
Input Voltage (V): 120  
Input Current (Ain): 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: P639462  
 CATALOG NUMBER: GWS-SA5B-830-U-SL2-W

### Iso-Footcandle Lines of Horizontal Illumination

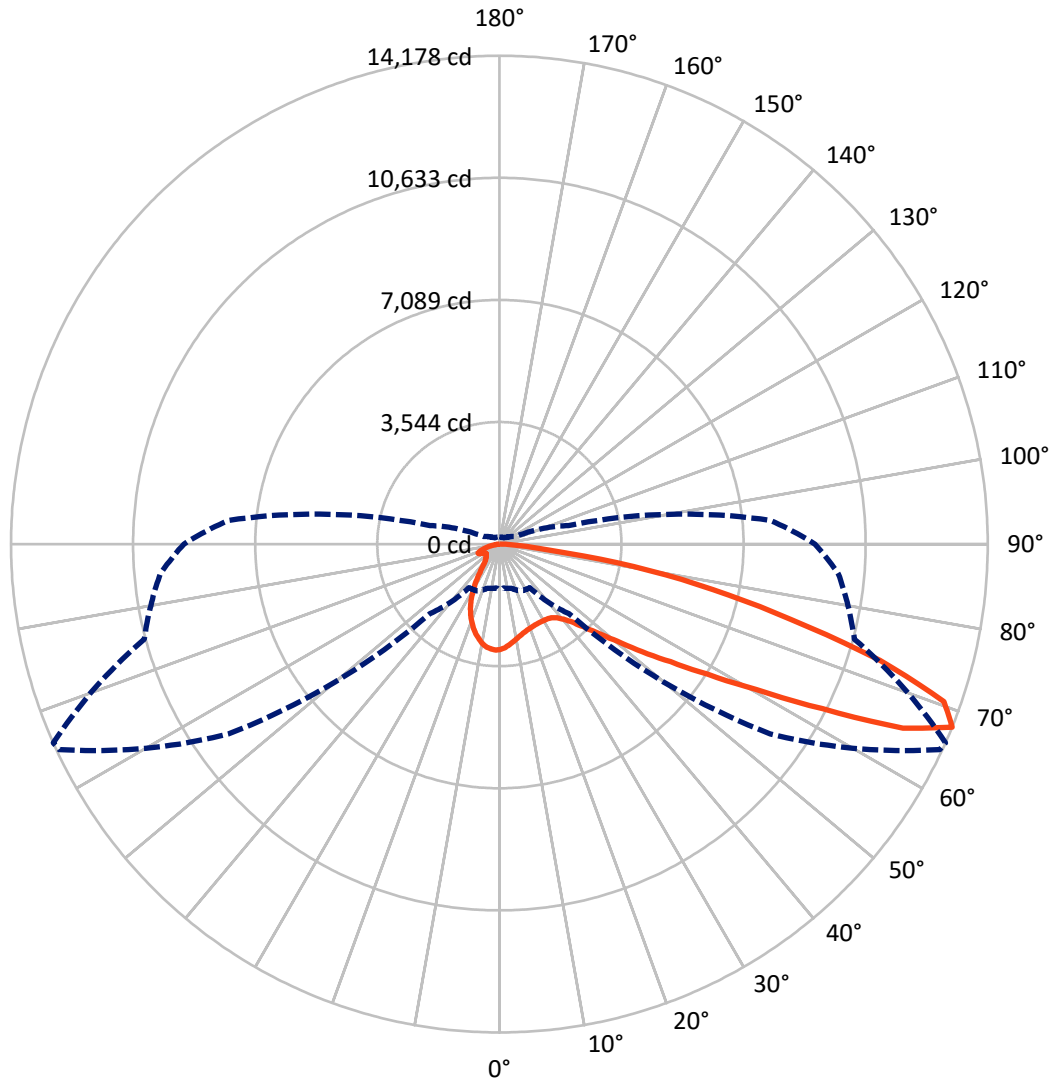
✕ Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 7.7 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 66-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2812.7   | 0.0    | 2812.7  |
|                    | % Fixture | 20.3     | 0.0    | 20.3    |
| <b>Street Side</b> | Lumens    | 11048.1  | 0.0    | 11048.1 |
|                    | % Fixture | 79.7     | 0.0    | 79.7    |
| <b>Total</b>       | Lumens    | 13860.8  | 0.0    | 13860.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 268.8   | 1.9       |
| 10°-20°   | 660.6   | 4.8       |
| 20°-30°   | 908.0   | 6.6       |
| 30°-40°   | 1241.4  | 9.0       |
| 40°-50°   | 1881.1  | 13.6      |
| 50°-60°   | 2924.2  | 21.1      |
| 60°-70°   | 3560.2  | 25.7      |
| 70°-80°   | 2168.7  | 15.6      |
| 80°-90°   | 247.7   | 1.8       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 13860.8 | 100.0     |
| 0°-180°   | 13860.8 | 100.0     |

**Coefficient of Utilization**



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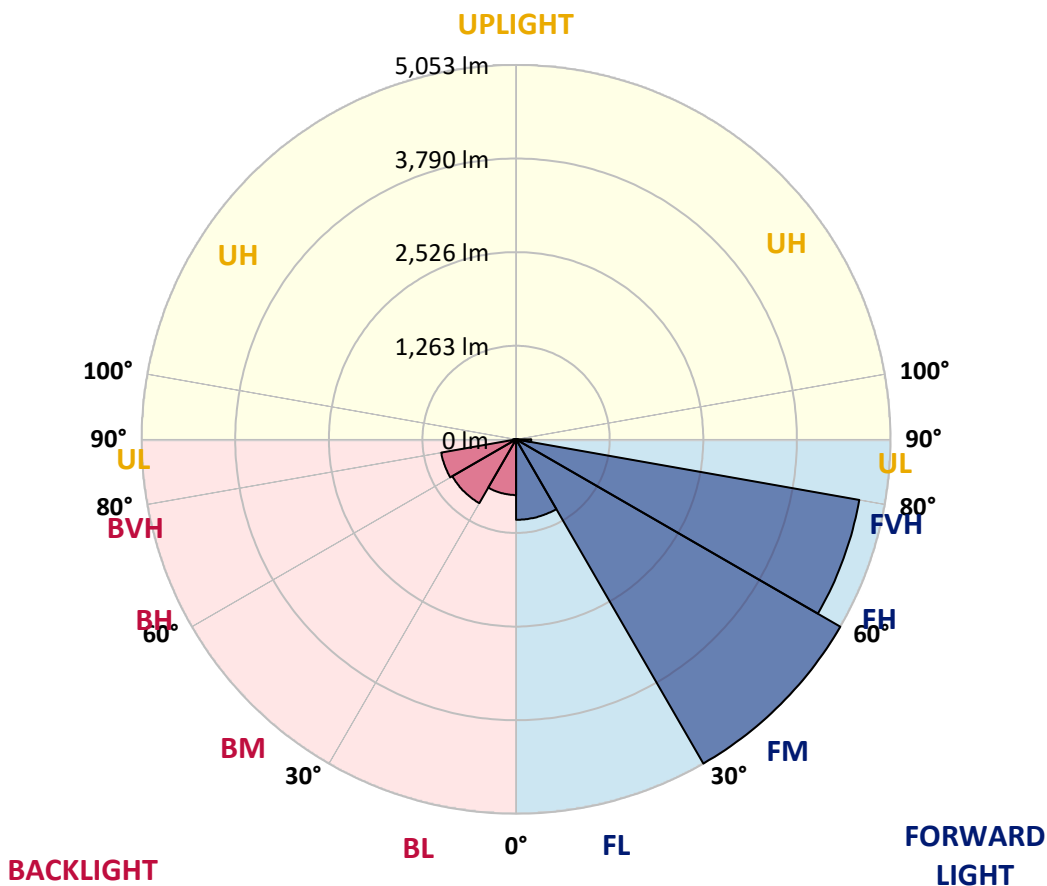
CATALOG NUMBER: GWS-SA5B-830-U-SL2-W

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1086.1 | 7.8       |                         |      |         |
| FM (30°-60°)   | 5052.8 | 36.5      |                         |      |         |
| FH (60°-80°)   | 4703.3 | 33.9      |                         |      | G2/5000 |
| FVH (80°-90°)  | 206.0  | 1.5       |                         |      | G2/225  |
| BL (0°-30°)    | 751.4  | 5.4       | B2/1000                 |      |         |
| BM (30°-60°)   | 994.0  | 7.2       | B1/1000                 |      |         |
| BH (60°-80°)   | 1025.6 | 7.4       | B3/2500                 |      | G3/2500 |
| BVH (80°-90°)  | 41.8   | 0.3       |                         |      | 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





REPORT NUMBER: P639462  
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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°     | 65°     | 66°     | 75°     | 85°    |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|--------|
| 0°    | 3062.8 | 3062.8 | 3062.8 | 3062.8 | 3062.8 | 3062.8 | 3062.8  | 3062.8  | 3062.8  | 3062.8  | 3062.8 |
| 2.5°  | 2868.7 | 2878.8 | 2872.7 | 2911.2 | 2913.2 | 2961.7 | 2989.0  | 3012.3  | 3014.3  | 3044.6  | 3064.9 |
| 5°    | 2672.5 | 2678.6 | 2678.6 | 2715.0 | 2739.3 | 2804.0 | 2866.7  | 2933.4  | 2938.5  | 3011.3  | 3066.9 |
| 7.5°  | 2513.8 | 2519.8 | 2515.8 | 2564.3 | 2595.7 | 2667.5 | 2747.4  | 2849.5  | 2859.6  | 2976.9  | 3074.0 |
| 10°   | 2389.4 | 2387.4 | 2397.5 | 2442.0 | 2482.4 | 2568.4 | 2657.4  | 2773.6  | 2788.8  | 2937.5  | 3082.1 |
| 12.5° | 2304.5 | 2306.5 | 2312.6 | 2359.1 | 2402.5 | 2487.5 | 2579.5  | 2705.9  | 2722.1  | 2892.0  | 3078.0 |
| 15°   | 2264.0 | 2260.0 | 2265.0 | 2307.5 | 2349.0 | 2423.8 | 2518.8  | 2649.3  | 2665.5  | 2851.5  | 3079.0 |
| 17.5° | 2254.9 | 2251.9 | 2250.9 | 2281.2 | 2312.6 | 2382.3 | 2473.3  | 2605.8  | 2623.0  | 2825.2  | 3085.1 |
| 20°   | 2283.2 | 2279.2 | 2268.1 | 2281.2 | 2294.4 | 2353.0 | 2441.0  | 2574.4  | 2593.7  | 2808.0  | 3097.2 |
| 22.5° | 2361.1 | 2354.0 | 2336.8 | 2320.6 | 2303.5 | 2338.8 | 2420.7  | 2551.2  | 2570.4  | 2796.9  | 3109.4 |
| 25°   | 2479.4 | 2473.3 | 2455.1 | 2418.7 | 2356.0 | 2350.0 | 2416.7  | 2541.1  | 2560.3  | 2788.8  | 3114.4 |
| 27.5° | 2642.2 | 2633.1 | 2614.9 | 2562.3 | 2460.2 | 2391.4 | 2431.9  | 2540.1  | 2558.3  | 2779.7  | 3109.4 |
| 30°   | 2835.3 | 2829.3 | 2819.2 | 2755.4 | 2618.9 | 2479.4 | 2466.3  | 2548.2  | 2562.3  | 2774.7  | 3099.2 |
| 32.5° | 3031.5 | 3025.4 | 3033.5 | 3003.2 | 2835.3 | 2625.0 | 2541.1  | 2570.4  | 2580.5  | 2773.6  | 3090.1 |
| 35°   | 3204.4 | 3211.5 | 3270.1 | 3275.2 | 3110.4 | 2822.2 | 2659.4  | 2622.0  | 2624.0  | 2793.9  | 3094.2 |
| 37.5° | 3385.4 | 3412.7 | 3489.6 | 3555.3 | 3417.8 | 3083.1 | 2835.3  | 2719.0  | 2717.0  | 2845.4  | 3119.5 |
| 40°   | 3625.1 | 3637.2 | 3735.3 | 3858.6 | 3772.7 | 3441.0 | 3085.1  | 2877.8  | 2863.6  | 2950.6  | 3187.2 |
| 42.5° | 3858.6 | 3888.0 | 4044.7 | 4186.3 | 4157.9 | 3844.5 | 3399.6  | 3115.4  | 3090.1  | 3136.7  | 3326.8 |
| 45°   | 4155.9 | 4184.2 | 4360.2 | 4542.2 | 4593.8 | 4300.5 | 3802.0  | 3453.2  | 3427.9  | 3416.8  | 3582.6 |
| 47.5° | 4453.2 | 4482.5 | 4640.3 | 4903.2 | 5084.2 | 4870.8 | 4325.8  | 3899.1  | 3857.6  | 3814.1  | 3968.9 |
| 50°   | 4653.4 | 4687.8 | 4838.5 | 5153.9 | 5578.6 | 5582.7 | 4946.7  | 4483.5  | 4431.0  | 4362.2  | 4512.9 |
| 52.5° | 4646.3 | 4668.6 | 4812.2 | 5176.2 | 5934.6 | 6400.7 | 5777.8  | 5227.8  | 5185.3  | 5035.6  | 5167.1 |
| 55°   | 4281.3 | 4314.7 | 4459.3 | 4914.3 | 5973.0 | 7176.3 | 6999.3  | 6105.5  | 6029.6  | 5761.7  | 5906.3 |
| 57.5° | 3548.2 | 3576.5 | 3722.1 | 4283.3 | 5632.2 | 7573.7 | 8550.5  | 7223.8  | 7119.7  | 6552.4  | 6719.2 |
| 60°   | 2678.6 | 2644.2 | 2713.0 | 3204.4 | 4817.2 | 7583.8 | 9919.6  | 8740.6  | 8566.7  | 7397.7  | 7537.3 |
| 62.5° | 2010.2 | 1975.8 | 1991.0 | 2129.5 | 3266.1 | 6971.0 | 10700.2 | 10815.5 | 10528.3 | 8352.3  | 8325.0 |
| 65°   | 1588.6 | 1569.3 | 1612.8 | 1707.9 | 1904.0 | 5308.7 | 10706.3 | 13059.3 | 12878.3 | 9458.5  | 9132.9 |
| 67.5° | 1294.3 | 1282.2 | 1326.7 | 1502.6 | 1544.1 | 2852.5 | 9600.1  | 14106.9 | 14177.7 | 10669.9 | 9882.2 |
| 70°   | 1042.5 | 1024.3 | 1094.1 | 1325.6 | 1435.9 | 1726.1 | 6877.0  | 13573.0 | 13687.2 | 11391.9 | 9670.9 |
| 72.5° | 720.0  | 721.0  | 756.4  | 1073.9 | 1386.3 | 1490.5 | 3890.0  | 11301.9 | 11549.6 | 10737.6 | 8501.9 |
| 75°   | 485.4  | 489.4  | 499.5  | 708.8  | 1277.1 | 1446.0 | 2072.9  | 8556.5  | 8731.5  | 8875.1  | 7027.7 |
| 77.5° | 293.2  | 295.3  | 318.5  | 428.7  | 880.7  | 1349.9 | 1404.5  | 6202.5  | 6340.1  | 5850.6  | 4356.1 |
| 80°   | 169.9  | 177.0  | 198.2  | 287.2  | 594.6  | 1014.2 | 1087.0  | 3803.0  | 3958.7  | 2600.7  | 1384.3 |
| 82.5° | 74.8   | 79.9   | 108.2  | 166.8  | 346.8  | 862.5  | 848.4   | 1502.6  | 1480.4  | 725.0   | 480.3  |
| 85°   | 13.1   | 16.2   | 23.3   | 52.6   | 127.4  | 455.0  | 658.3   | 663.3   | 623.9   | 275.0   | 199.2  |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 3.0    | 99.1    | 178.0   | 177.0   | 77.9    | 68.8   |
| 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: P639462  
 CATALOG NUMBER: GWS-SA5B-830-U-SL2-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3062.8 | 3062.8 | 3062.8 | 3062.8 | 3062.8 | 3062.8 | 3062.8 | 3062.8 | 3062.8 | 3062.8 | 3062.8 |
| 2.5°  | 3078.0 | 3050.7 | 3075.0 | 3078.0 | 3073.0 | 3068.9 | 3038.6 | 3012.3 | 3009.3 | 2980.9 | 2980.9 |
| 5°    | 3089.1 | 3063.9 | 3076.0 | 3052.7 | 3016.3 | 2978.9 | 2914.2 | 2869.7 | 2849.5 | 2813.1 | 2813.1 |
| 7.5°  | 3104.3 | 3078.0 | 3063.9 | 3006.2 | 2921.3 | 2839.4 | 2735.2 | 2648.3 | 2612.9 | 2561.3 | 2559.3 |
| 10°   | 3118.5 | 3085.1 | 3036.6 | 2924.3 | 2788.8 | 2658.4 | 2506.7 | 2383.3 | 2299.4 | 2237.7 | 2237.7 |
| 12.5° | 3117.4 | 3074.0 | 2977.9 | 2812.1 | 2625.0 | 2435.9 | 2233.7 | 2047.6 | 1936.4 | 1840.3 | 1834.3 |
| 15°   | 3115.4 | 3055.8 | 2903.1 | 2681.6 | 2433.9 | 2172.0 | 1897.0 | 1654.3 | 1489.5 | 1395.4 | 1387.3 |
| 17.5° | 3113.4 | 3032.5 | 2819.2 | 2533.0 | 2201.3 | 1844.4 | 1481.4 | 1218.5 | 1080.9 | 1023.3 | 1025.3 |
| 20°   | 3113.4 | 3006.2 | 2729.2 | 2362.1 | 1933.4 | 1452.0 | 1087.0 | 895.9  | 861.5  | 864.6  | 867.6  |
| 22.5° | 3104.3 | 2973.9 | 2629.1 | 2176.0 | 1635.1 | 1067.8 | 801.9  | 737.1  | 755.3  | 783.7  | 787.7  |
| 25°   | 3083.1 | 2920.3 | 2512.8 | 1969.8 | 1280.1 | 777.6  | 654.2  | 642.1  | 675.5  | 710.9  | 721.0  |
| 27.5° | 3049.7 | 2858.6 | 2382.3 | 1728.1 | 942.4  | 624.9  | 575.4  | 574.3  | 600.6  | 626.9  | 636.0  |
| 30°   | 3014.3 | 2789.8 | 2244.8 | 1459.1 | 682.5  | 544.0  | 524.8  | 524.8  | 537.9  | 554.1  | 552.1  |
| 32.5° | 2972.8 | 2720.1 | 2097.2 | 1179.0 | 556.1  | 498.5  | 492.4  | 489.4  | 491.4  | 497.5  | 497.5  |
| 35°   | 2937.5 | 2658.4 | 1945.5 | 882.8  | 498.5  | 473.2  | 467.2  | 460.1  | 457.1  | 453.0  | 455.0  |
| 37.5° | 2924.3 | 2609.8 | 1788.8 | 665.4  | 470.2  | 455.0  | 444.9  | 434.8  | 427.7  | 425.7  | 424.7  |
| 40°   | 2945.5 | 2589.6 | 1632.0 | 548.1  | 450.0  | 435.8  | 424.7  | 411.5  | 405.5  | 405.5  | 405.5  |
| 42.5° | 3028.5 | 2604.8 | 1472.3 | 495.5  | 435.8  | 419.6  | 403.5  | 391.3  | 389.3  | 391.3  | 392.3  |
| 45°   | 3180.1 | 2663.4 | 1306.4 | 469.2  | 423.7  | 403.5  | 384.2  | 375.1  | 375.1  | 377.2  | 377.2  |
| 47.5° | 3451.1 | 2817.1 | 1142.6 | 453.0  | 411.5  | 390.3  | 370.1  | 361.0  | 360.0  | 362.0  | 362.0  |
| 50°   | 3920.3 | 3094.2 | 995.0  | 441.9  | 402.4  | 380.2  | 360.0  | 347.8  | 344.8  | 343.8  | 343.8  |
| 52.5° | 4511.9 | 3574.5 | 901.0  | 433.8  | 391.3  | 369.1  | 348.9  | 332.7  | 326.6  | 323.6  | 323.6  |
| 55°   | 5226.8 | 4214.6 | 901.0  | 427.7  | 377.2  | 355.9  | 332.7  | 316.5  | 307.4  | 303.4  | 303.4  |
| 57.5° | 6036.7 | 4959.8 | 1056.7 | 422.7  | 366.0  | 340.8  | 315.5  | 299.3  | 289.2  | 283.1  | 283.1  |
| 60°   | 6860.8 | 5747.5 | 1441.9 | 415.6  | 355.9  | 321.6  | 296.3  | 281.1  | 268.0  | 260.9  | 259.9  |
| 62.5° | 7715.3 | 6615.1 | 1949.5 | 419.6  | 348.9  | 303.4  | 276.1  | 258.9  | 247.7  | 240.7  | 239.6  |
| 65°   | 8497.9 | 7441.2 | 2393.4 | 451.0  | 349.9  | 287.2  | 252.8  | 237.6  | 228.5  | 219.4  | 218.4  |
| 67.5° | 9162.2 | 7897.3 | 2082.0 | 514.7  | 371.1  | 268.0  | 229.5  | 214.4  | 206.3  | 200.2  | 199.2  |
| 70°   | 8697.1 | 7201.6 | 1181.1 | 554.1  | 400.4  | 247.7  | 203.2  | 193.1  | 185.0  | 181.0  | 180.0  |
| 72.5° | 7437.2 | 6097.4 | 789.7  | 489.4  | 365.0  | 221.4  | 179.0  | 170.9  | 164.8  | 159.8  | 158.8  |
| 75°   | 6024.6 | 4835.4 | 603.7  | 401.4  | 284.1  | 180.0  | 153.7  | 147.6  | 141.6  | 136.5  | 135.5  |
| 77.5° | 3564.4 | 2793.9 | 444.9  | 317.5  | 200.2  | 140.6  | 127.4  | 122.4  | 116.3  | 112.2  | 111.2  |
| 80°   | 1137.6 | 970.7  | 282.1  | 218.4  | 132.5  | 108.2  | 98.1   | 94.0   | 88.0   | 82.9   | 81.9   |
| 82.5° | 433.8  | 375.1  | 149.7  | 111.2  | 88.0   | 73.8   | 65.7   | 61.7   | 57.6   | 52.6   | 51.6   |
| 85°   | 192.1  | 180.0  | 82.9   | 59.7   | 47.5   | 36.4   | 32.4   | 30.3   | 25.3   | 21.2   | 20.2   |
| 87.5° | 67.7   | 67.7   | 35.4   | 17.2   | 10.1   | 5.1    | 3.0    | 1.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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Peachtree City, GA 30269



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2408-195-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 08/07/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW EDISON  
 Catalog Number: **GALN-SB1A-830-U-5WQ**  
 Description: GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS

**Spectral Parameters**

CCT (K): 3050  
 CIE u': 0.2476  
 CIE v': 0.5251  
 Duv: 0.0034  
 CIE x: 0.4383  
 CIE y: 0.4131  
 CIE z: 0.1487  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 581  
 Purity: 55.55201  
 Rf: 81.5  
 Rg: 99.2

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 81.0 |      |      |
| R1:       | 79.6 | R9:  | 7.1  |
| R2:       | 85.6 | R10: | 67.0 |
| R3:       | 92.0 | R11: | 82.7 |
| R4:       | 82.6 | R12: | 63.2 |
| R5:       | 78.9 | R13: | 80.3 |
| R6:       | 81.7 | R14: | 95.0 |
| R7:       | 85.2 | R15: | 71.7 |
| R8:       | 62.0 |      |      |



**Test Conditions**

Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 24.2

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

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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 3000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) |
|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|
| 360               | 0                           | NR                      | 490               | 168                         | NR                      | 620               | 940                         | NR                      | 750               | 35                          | NR                      | 880               | 1                           | NR                      |
| 365               | 0                           | NR                      | 495               | 233                         | NR                      | 625               | 897                         | NR                      | 755               | 30                          | NR                      | 885               | 1                           | NR                      |
| 370               | 0                           | NR                      | 500               | 300                         | NR                      | 630               | 847                         | NR                      | 760               | 26                          | NR                      | 890               | 1                           | NR                      |
| 375               | 0                           | NR                      | 505               | 372                         | NR                      | 635               | 790                         | NR                      | 765               | 22                          | NR                      | 895               | 1                           | NR                      |
| 380               | 0                           | NR                      | 510               | 430                         | NR                      | 640               | 730                         | NR                      | 770               | 19                          | NR                      | 900               | 1                           | NR                      |
| 385               | 0                           | NR                      | 515               | 483                         | NR                      | 645               | 668                         | NR                      | 775               | 16                          | NR                      | 905               | 1                           | NR                      |
| 390               | 0                           | NR                      | 520               | 524                         | NR                      | 650               | 605                         | NR                      | 780               | 14                          | NR                      | 910               | 0                           | NR                      |
| 395               | 2                           | NR                      | 525               | 555                         | NR                      | 655               | 545                         | NR                      | 785               | 12                          | NR                      | 915               | 0                           | NR                      |
| 400               | 4                           | NR                      | 530               | 581                         | NR                      | 660               | 485                         | NR                      | 790               | 10                          | NR                      | 920               | 0                           | NR                      |
| 405               | 7                           | NR                      | 535               | 604                         | NR                      | 665               | 430                         | NR                      | 795               | 9                           | NR                      | 925               | 0                           | NR                      |
| 410               | 17                          | NR                      | 540               | 623                         | NR                      | 670               | 378                         | NR                      | 800               | 8                           | NR                      | 930               | 0                           | NR                      |
| 415               | 34                          | NR                      | 545               | 645                         | NR                      | 675               | 331                         | NR                      | 805               | 7                           | NR                      | 935               | 0                           | NR                      |
| 420               | 68                          | NR                      | 550               | 667                         | NR                      | 680               | 290                         | NR                      | 810               | 6                           | NR                      | 940               | 0                           | NR                      |
| 425               | 128                         | NR                      | 555               | 693                         | NR                      | 685               | 251                         | NR                      | 815               | 5                           | NR                      | 945               | 0                           | NR                      |
| 430               | 214                         | NR                      | 560               | 719                         | NR                      | 690               | 218                         | NR                      | 820               | 4                           | NR                      | 950               | 0                           | NR                      |
| 435               | 339                         | NR                      | 565               | 754                         | NR                      | 695               | 188                         | NR                      | 825               | 4                           | NR                      | 955               | 0                           | NR                      |
| 440               | 507                         | NR                      | 570               | 791                         | NR                      | 700               | 162                         | NR                      | 830               | 3                           | NR                      | 960               | 0                           | NR                      |
| 445               | 573                         | NR                      | 575               | 830                         | NR                      | 705               | 139                         | NR                      | 835               | 3                           | NR                      | 965               | 0                           | NR                      |
| 450               | 356                         | NR                      | 580               | 873                         | NR                      | 710               | 119                         | NR                      | 840               | 3                           | NR                      | 970               | 0                           | NR                      |
| 455               | 217                         | NR                      | 585               | 913                         | NR                      | 715               | 102                         | NR                      | 845               | 2                           | NR                      | 975               | 0                           | NR                      |
| 460               | 168                         | NR                      | 590               | 948                         | NR                      | 720               | 88                          | NR                      | 850               | 2                           | NR                      | 980               | 0                           | NR                      |
| 465               | 113                         | NR                      | 595               | 974                         | NR                      | 725               | 76                          | NR                      | 855               | 2                           | NR                      | 985               | 0                           | NR                      |
| 470               | 85                          | NR                      | 600               | 994                         | NR                      | 730               | 65                          | NR                      | 860               | 1                           | NR                      | 990               | 0                           | NR                      |
| 475               | 85                          | NR                      | 605               | 998                         | NR                      | 735               | 55                          | NR                      | 865               | 1                           | NR                      | 995               | 0                           | NR                      |
| 480               | 94                          | NR                      | 610               | 994                         | NR                      | 740               | 47                          | NR                      | 870               | 1                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 120                         | NR                      | 615               | 973                         | NR                      | 745               | 41                          | NR                      | 875               | 1                           | NR                      |                   |                             |                         |

REPORT NUMBER: SP1-2408-195-9

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.27**

| $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) |
|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|
| 360            | 0                        | NR                   | 490            | 168                      | NR                   | 620            | 940                      | NR                   | 750            | 35                       | NR                   | 880            | 1                        | NR                   |
| 365            | 0                        | NR                   | 495            | 233                      | NR                   | 625            | 897                      | NR                   | 755            | 30                       | NR                   | 885            | 1                        | NR                   |
| 370            | 0                        | NR                   | 500            | 300                      | NR                   | 630            | 847                      | NR                   | 760            | 26                       | NR                   | 890            | 1                        | NR                   |
| 375            | 0                        | NR                   | 505            | 372                      | NR                   | 635            | 790                      | NR                   | 765            | 22                       | NR                   | 895            | 1                        | NR                   |
| 380            | 0                        | NR                   | 510            | 430                      | NR                   | 640            | 730                      | NR                   | 770            | 19                       | NR                   | 900            | 1                        | NR                   |
| 385            | 0                        | NR                   | 515            | 483                      | NR                   | 645            | 668                      | NR                   | 775            | 16                       | NR                   | 905            | 1                        | NR                   |
| 390            | 0                        | NR                   | 520            | 524                      | NR                   | 650            | 605                      | NR                   | 780            | 14                       | NR                   | 910            | 0                        | NR                   |
| 395            | 2                        | NR                   | 525            | 555                      | NR                   | 655            | 545                      | NR                   | 785            | 12                       | NR                   | 915            | 0                        | NR                   |
| 400            | 4                        | NR                   | 530            | 581                      | NR                   | 660            | 485                      | NR                   | 790            | 10                       | NR                   | 920            | 0                        | NR                   |
| 405            | 7                        | NR                   | 535            | 604                      | NR                   | 665            | 430                      | NR                   | 795            | 9                        | NR                   | 925            | 0                        | NR                   |
| 410            | 17                       | NR                   | 540            | 623                      | NR                   | 670            | 378                      | NR                   | 800            | 8                        | NR                   | 930            | 0                        | NR                   |
| 415            | 34                       | NR                   | 545            | 645                      | NR                   | 675            | 331                      | NR                   | 805            | 7                        | NR                   | 935            | 0                        | NR                   |
| 420            | 68                       | NR                   | 550            | 667                      | NR                   | 680            | 290                      | NR                   | 810            | 6                        | NR                   | 940            | 0                        | NR                   |
| 425            | 128                      | NR                   | 555            | 693                      | NR                   | 685            | 251                      | NR                   | 815            | 5                        | NR                   | 945            | 0                        | NR                   |
| 430            | 214                      | NR                   | 560            | 719                      | NR                   | 690            | 218                      | NR                   | 820            | 4                        | NR                   | 950            | 0                        | NR                   |
| 435            | 339                      | NR                   | 565            | 754                      | NR                   | 695            | 188                      | NR                   | 825            | 4                        | NR                   | 955            | 0                        | NR                   |
| 440            | 507                      | NR                   | 570            | 791                      | NR                   | 700            | 162                      | NR                   | 830            | 3                        | NR                   | 960            | 0                        | NR                   |
| 445            | 573                      | NR                   | 575            | 830                      | NR                   | 705            | 139                      | NR                   | 835            | 3                        | NR                   | 965            | 0                        | NR                   |
| 450            | 356                      | NR                   | 580            | 873                      | NR                   | 710            | 119                      | NR                   | 840            | 3                        | NR                   | 970            | 0                        | NR                   |
| 455            | 217                      | NR                   | 585            | 913                      | NR                   | 715            | 102                      | NR                   | 845            | 2                        | NR                   | 975            | 0                        | NR                   |
| 460            | 168                      | NR                   | 590            | 948                      | NR                   | 720            | 88                       | NR                   | 850            | 2                        | NR                   | 980            | 0                        | NR                   |
| 465            | 113                      | NR                   | 595            | 974                      | NR                   | 725            | 76                       | NR                   | 855            | 2                        | NR                   | 985            | 0                        | NR                   |
| 470            | 85                       | NR                   | 600            | 994                      | NR                   | 730            | 65                       | NR                   | 860            | 1                        | NR                   | 990            | 0                        | NR                   |
| 475            | 85                       | NR                   | 605            | 998                      | NR                   | 735            | 55                       | NR                   | 865            | 1                        | NR                   | 995            | 0                        | NR                   |
| 480            | 94                       | NR                   | 610            | 994                      | NR                   | 740            | 47                       | NR                   | 870            | 1                        | NR                   | 1000           | 0                        | NR                   |
| 485            | 120                      | NR                   | 615            | 973                      | NR                   | 745            | 41                       | NR                   | 875            | 1                        | NR                   |                |                          |                      |

REPORT NUMBER: SP1-2408-195-9

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.32

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 168                      | NR            | 620    | 940                      | NR            | 750    | 35                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 233                      | NR            | 625    | 897                      | NR            | 755    | 30                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 300                      | NR            | 630    | 847                      | NR            | 760    | 26                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 372                      | NR            | 635    | 790                      | NR            | 765    | 22                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 430                      | NR            | 640    | 730                      | NR            | 770    | 19                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 483                      | NR            | 645    | 668                      | NR            | 775    | 16                       | NR            | 905    | 1                        | NR            |
| 390    | 0                        | NR            | 520    | 524                      | NR            | 650    | 605                      | NR            | 780    | 14                       | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 555                      | NR            | 655    | 545                      | NR            | 785    | 12                       | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 581                      | NR            | 660    | 485                      | NR            | 790    | 10                       | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 604                      | NR            | 665    | 430                      | NR            | 795    | 9                        | NR            | 925    | 0                        | NR            |
| 410    | 17                       | NR            | 540    | 623                      | NR            | 670    | 378                      | NR            | 800    | 8                        | NR            | 930    | 0                        | NR            |
| 415    | 34                       | NR            | 545    | 645                      | NR            | 675    | 331                      | NR            | 805    | 7                        | NR            | 935    | 0                        | NR            |
| 420    | 68                       | NR            | 550    | 667                      | NR            | 680    | 290                      | NR            | 810    | 6                        | NR            | 940    | 0                        | NR            |
| 425    | 128                      | NR            | 555    | 693                      | NR            | 685    | 251                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 214                      | NR            | 560    | 719                      | NR            | 690    | 218                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 339                      | NR            | 565    | 754                      | NR            | 695    | 188                      | NR            | 825    | 4                        | NR            | 955    | 0                        | NR            |
| 440    | 507                      | NR            | 570    | 791                      | NR            | 700    | 162                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 573                      | NR            | 575    | 830                      | NR            | 705    | 139                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 356                      | NR            | 580    | 873                      | NR            | 710    | 119                      | NR            | 840    | 3                        | NR            | 970    | 0                        | NR            |
| 455    | 217                      | NR            | 585    | 913                      | NR            | 715    | 102                      | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 168                      | NR            | 590    | 948                      | NR            | 720    | 88                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 113                      | NR            | 595    | 974                      | NR            | 725    | 76                       | NR            | 855    | 2                        | NR            | 985    | 0                        | NR            |
| 470    | 85                       | NR            | 600    | 994                      | NR            | 730    | 65                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 85                       | NR            | 605    | 998                      | NR            | 735    | 55                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 94                       | NR            | 610    | 994                      | NR            | 740    | 47                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 120                      | NR            | 615    | 973                      | NR            | 745    | 41                       | NR            | 875    | 1                        | NR            |        |                          |               |

**Summary**

$R_f = 81.5$   
 $R_g = 99.2$   
 $CIE R_a = 81.0$   
 $R_9 = 7.1$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 51 | CES31 = 71 | CES56 = 78 | CES81 = 78 |
| CES07 = 42 | CES32 = 70 | CES57 = 76 | CES82 = 95 |
| CES08 = 41 | CES33 = 71 | CES58 = 78 | CES83 = 90 |
| CES09 = 29 | CES34 = 82 | CES59 = 92 | CES84 = 94 |
| CES10 = 76 | CES35 = 90 | CES60 = 95 | CES85 = 86 |
| CES11 = 59 | CES36 = 93 | CES61 = 93 | CES86 = 72 |
| CES12 = 65 | CES37 = 87 | CES62 = 83 | CES87 = 85 |
| CES13 = 43 | CES38 = 75 | CES63 = 77 | CES88 = 83 |
| CES14 = 74 | CES39 = 94 | CES64 = 83 | CES89 = 75 |
| CES15 = 71 | CES40 = 89 | CES65 = 77 | CES90 = 81 |
| CES16 = 47 | CES41 = 85 | CES66 = 80 | CES91 = 96 |
| CES17 = 50 | CES42 = 86 | CES67 = 79 | CES92 = 73 |
| CES18 = 56 | CES43 = 81 | CES68 = 84 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 91 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 78 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 76 | CES96 = 84 |
| CES22 = 79 | CES47 = 77 | CES72 = 92 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 71 | CES98 = 81 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 74 |
| CES25 = 72 | CES50 = 89 | CES75 = 74 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)