

Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P318998

Luminaire Tested: **GLEON-SA4B-730-U-T4W**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P318998  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-18)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA4B-730-U-T4W  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(4) 70 CRI, 3000K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 20846 lumens  
Efficiency: N/A  
Efficacy: 121.9 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G4

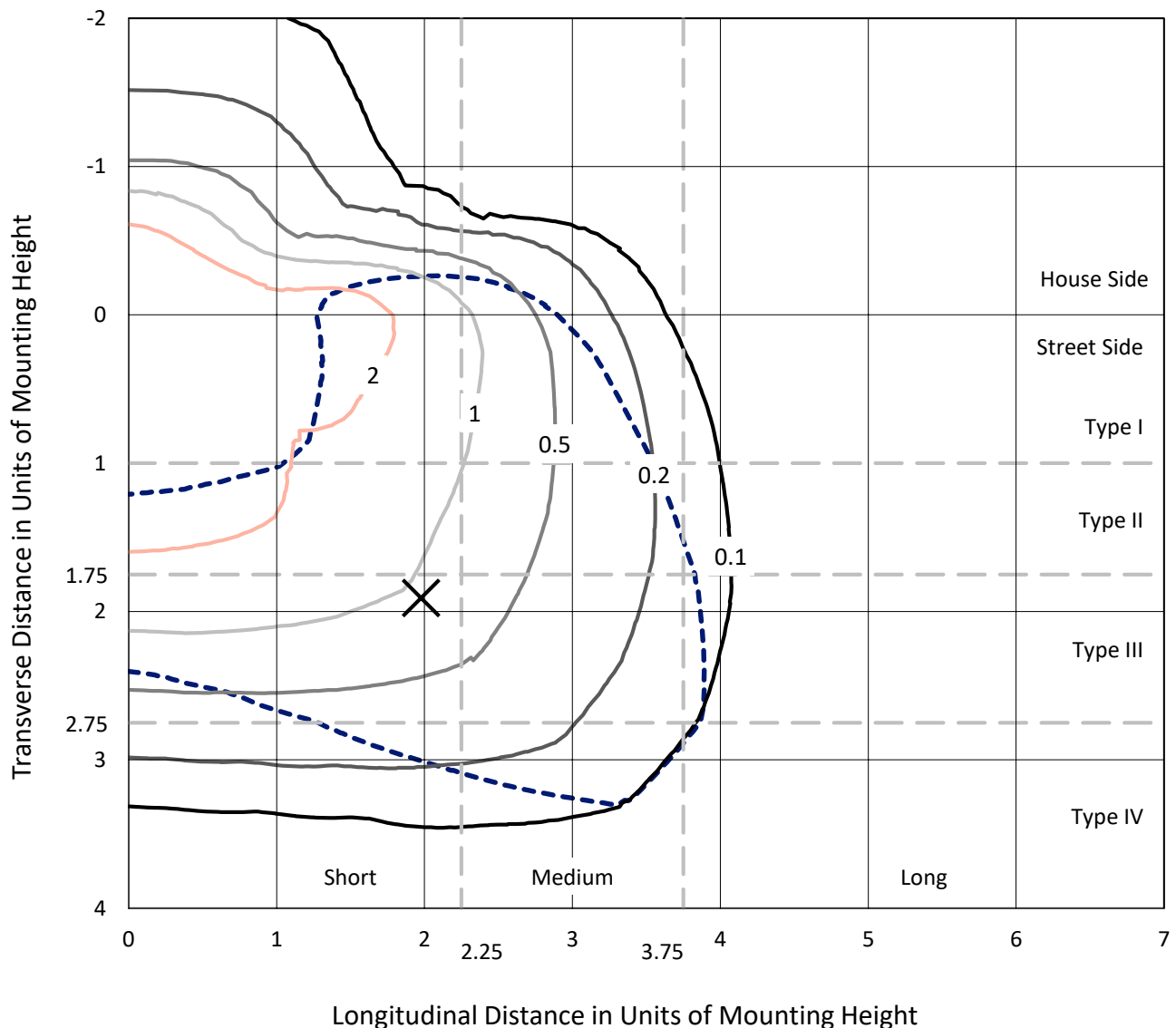
Input Watts (W): 171  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P318998  
 CATALOG NUMBER: GLEON-SA4B-730-U-T4W

## Iso-Footcandle Lines of Horizontal Illumination

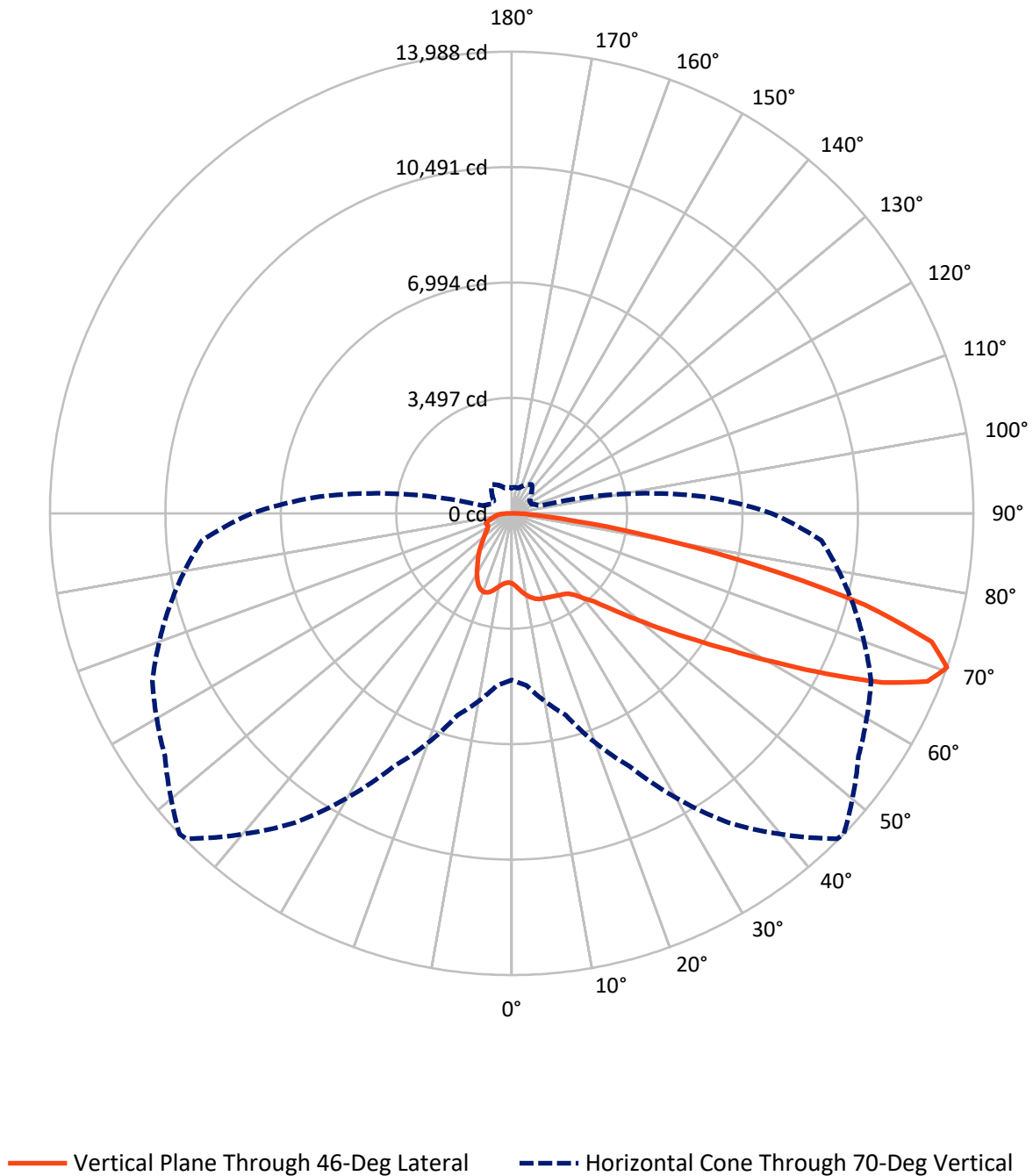
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 4.2 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA4B-730-U-T4W

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4777.8   | 0.0    | 4777.8  |
|                    | % Fixture | 22.9     | 0.0    | 22.9    |
| <b>Street Side</b> | Lumens    | 16068.2  | 0.0    | 16068.2 |
|                    | % Fixture | 77.1     | 0.0    | 77.1    |
| <b>Total</b>       | Lumens    | 20846.0  | 0.0    | 20846.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 216.5   | 1.0       |
| 10°-20°   | 721.3   | 3.5       |
| 20°-30°   | 1202.7  | 5.8       |
| 30°-40°   | 1706.8  | 8.2       |
| 40°-50°   | 2510.6  | 12.0      |
| 50°-60°   | 4251.6  | 20.4      |
| 60°-70°   | 6035.1  | 29.0      |
| 70°-80°   | 3666.4  | 17.6      |
| 80°-90°   | 535.1   | 2.6       |
| 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°    | 20846.0 | 100.0     |
| 0°-180°   | 20846.0 | 100.0     |

**Coefficient of Utilization**



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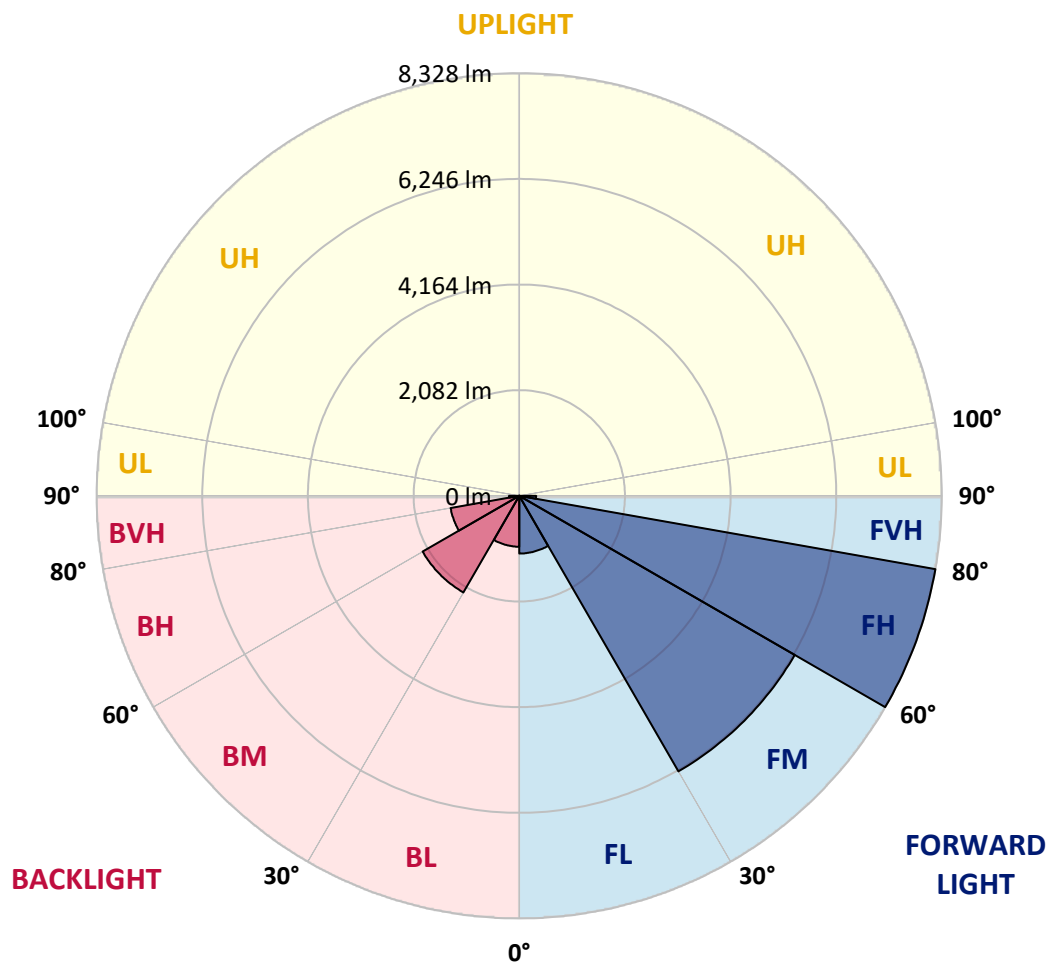
CATALOG NUMBER: GLEON-SA4B-730-U-T4W

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1137.5 | 5.5       |                         |      |          |
| FM   | (30°-60°)   | 6269.6 | 30.1      |                         |      |          |
| FH   | (60°-80°)   | 8327.9 | 39.9      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 333.3  | 1.6       |                         |      | G3/500   |
| BL   | (0°-30°)    | 1003.1 | 4.8       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 2199.4 | 10.6      | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1373.6 | 6.6       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 201.8  | 1.0       |                         |      | G2/225   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |          |

**BUG Rating: B3-U0-G4**

Type IV Short





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CATALOG NUMBER: GLEON-SA4B-730-U-T4W

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°     | 35°     | 45°     | 46°     | 55°     | 65°     | 75°     | 85°     |
|-------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 2123.8 | 2123.8 | 2123.8 | 2123.8  | 2123.8  | 2123.8  | 2123.8  | 2123.8  | 2123.8  | 2123.8  | 2123.8  |
| 2.5°  | 2230.1 | 2231.5 | 2234.4 | 2227.2  | 2207.3  | 2201.6  | 2199.4  | 2178.7  | 2165.2  | 2145.2  | 2128.1  |
| 5°    | 2408.4 | 2409.9 | 2405.6 | 2385.6  | 2341.4  | 2308.6  | 2305.7  | 2258.6  | 2215.8  | 2170.2  | 2135.9  |
| 7.5°  | 2594.6 | 2596.8 | 2583.2 | 2545.4  | 2483.4  | 2426.3  | 2422.7  | 2358.5  | 2293.6  | 2224.4  | 2173.0  |
| 10°   | 2759.4 | 2750.9 | 2728.8 | 2676.0  | 2602.5  | 2532.6  | 2529.7  | 2462.7  | 2387.8  | 2304.3  | 2235.8  |
| 12.5° | 2869.3 | 2862.2 | 2833.6 | 2769.4  | 2688.8  | 2624.6  | 2618.9  | 2556.8  | 2484.1  | 2392.8  | 2310.7  |
| 15°   | 2929.9 | 2934.9 | 2896.4 | 2823.6  | 2745.2  | 2691.0  | 2686.0  | 2641.7  | 2576.8  | 2484.8  | 2390.6  |
| 17.5° | 2937.8 | 2942.1 | 2905.0 | 2832.9  | 2768.7  | 2731.6  | 2729.5  | 2700.2  | 2653.1  | 2564.7  | 2466.2  |
| 20°   | 2892.1 | 2895.0 | 2864.3 | 2805.1  | 2763.0  | 2751.6  | 2750.9  | 2738.0  | 2703.1  | 2624.6  | 2529.0  |
| 22.5° | 2825.8 | 2827.9 | 2805.8 | 2763.0  | 2748.7  | 2766.6  | 2771.6  | 2766.6  | 2741.6  | 2668.1  | 2578.2  |
| 25°   | 2809.4 | 2808.0 | 2785.1 | 2741.6  | 2753.7  | 2791.5  | 2798.0  | 2800.1  | 2783.0  | 2718.8  | 2641.0  |
| 27.5° | 2888.6 | 2883.6 | 2840.1 | 2770.1  | 2778.0  | 2823.6  | 2832.2  | 2852.9  | 2842.2  | 2785.8  | 2712.4  |
| 30°   | 3117.6 | 3109.0 | 3019.8 | 2878.6  | 2840.1  | 2863.6  | 2874.3  | 2907.1  | 2909.3  | 2862.2  | 2807.2  |
| 32.5° | 3504.2 | 3493.5 | 3333.7 | 3081.2  | 2944.9  | 2904.3  | 2914.2  | 2963.5  | 2989.9  | 2953.5  | 2894.3  |
| 35°   | 3992.9 | 3980.8 | 3771.0 | 3425.8  | 3120.4  | 2982.0  | 2989.2  | 3028.4  | 3081.2  | 3029.8  | 2951.3  |
| 37.5° | 4502.3 | 4473.0 | 4271.1 | 3831.0  | 3399.4  | 3148.2  | 3148.2  | 3153.2  | 3178.2  | 3071.2  | 3018.4  |
| 40°   | 5008.8 | 4979.5 | 4796.9 | 4307.5  | 3760.3  | 3410.1  | 3393.7  | 3283.1  | 3263.1  | 3171.1  | 3153.2  |
| 42.5° | 5479.6 | 5471.1 | 5363.4 | 4846.1  | 4184.1  | 3667.6  | 3644.8  | 3457.1  | 3461.4  | 3404.4  | 3405.1  |
| 45°   | 5980.5 | 5980.5 | 5892.7 | 5389.8  | 4677.8  | 4081.4  | 4058.5  | 3782.5  | 3825.3  | 3798.9  | 3862.4  |
| 47.5° | 6389.2 | 6402.1 | 6389.9 | 5956.2  | 5252.1  | 4607.2  | 4565.8  | 4233.3  | 4353.2  | 4443.8  | 4628.6  |
| 50°   | 6806.6 | 6826.5 | 6828.7 | 6577.6  | 5946.2  | 5232.1  | 5185.0  | 4831.9  | 5099.4  | 5359.1  | 5722.2  |
| 52.5° | 7412.3 | 7457.2 | 7278.1 | 7197.5  | 6796.6  | 5974.0  | 5927.7  | 5601.6  | 6048.2  | 6412.8  | 7038.4  |
| 55°   | 7973.7 | 7934.5 | 7806.8 | 7856.7  | 7706.9  | 6818.7  | 6783.7  | 6497.7  | 7105.5  | 7579.2  | 8391.8  |
| 57.5° | 8277.6 | 8274.8 | 8403.2 | 8617.2  | 8688.5  | 7860.3  | 7831.0  | 7552.8  | 8297.6  | 8653.6  | 9662.3  |
| 60°   | 8634.3 | 8639.3 | 8957.5 | 9443.3  | 9737.2  | 9157.2  | 9144.4  | 8933.2  | 9455.4  | 9656.6  | 10658.9 |
| 62.5° | 8684.2 | 8774.1 | 9322.0 | 10158.1 | 10718.9 | 10672.5 | 10701.0 | 10176.7 | 10491.3 | 10457.1 | 11403.0 |
| 65°   | 8110.0 | 8228.4 | 9220.0 | 10374.3 | 11694.8 | 12329.7 | 12356.1 | 11427.3 | 11308.1 | 11141.2 | 11669.1 |
| 67.5° | 6932.8 | 7108.3 | 8185.6 | 9904.2  | 12016.6 | 13554.6 | 13591.7 | 12396.8 | 11985.9 | 11373.1 | 11028.5 |
| 70°   | 5045.2 | 5239.9 | 6324.3 | 8458.8  | 11443.0 | 13946.3 | 13988.4 | 12825.6 | 12011.6 | 10713.2 | 9414.8  |
| 72.5° | 3047.7 | 3200.3 | 4094.2 | 6227.3  | 9658.0  | 13232.9 | 13307.8 | 12281.9 | 10966.4 | 9074.5  | 6952.1  |
| 75°   | 1338.3 | 1438.2 | 1979.7 | 3588.4  | 6914.3  | 10948.6 | 11042.0 | 10512.7 | 8910.4  | 6594.7  | 4109.2  |
| 77.5° | 570.0  | 598.5  | 811.9  | 1558.8  | 3908.7  | 7481.5  | 7609.9  | 7681.2  | 6045.4  | 3588.4  | 1736.4  |
| 80°   | 355.3  | 366.7  | 459.4  | 705.6   | 1829.2  | 4201.9  | 4340.3  | 4519.4  | 3002.0  | 1319.1  | 606.4   |
| 82.5° | 216.2  | 229.0  | 305.3  | 426.6   | 952.4   | 1904.8  | 1971.1  | 2097.4  | 1165.0  | 570.0   | 313.9   |
| 85°   | 129.8  | 139.1  | 186.9  | 269.7   | 542.2   | 749.1   | 748.4   | 827.5   | 548.6   | 366.7   | 165.5   |
| 87.5° | 62.1   | 69.2   | 99.9   | 139.8   | 273.2   | 281.1   | 263.2   | 298.2   | 333.2   | 240.4   | 83.5    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



REPORT NUMBER: P318998

CATALOG NUMBER: GLEON-SA4B-730-U-T4W

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2123.8  | 2123.8 | 2123.8 | 2123.8 | 2123.8 | 2123.8 | 2123.8 | 2123.8 | 2123.8 | 2123.8 | 2123.8 |
| 2.5°  | 2122.4  | 2119.5 | 2110.2 | 2103.1 | 2101.7 | 2097.4 | 2093.8 | 2096.0 | 2098.8 | 2099.5 | 2099.5 |
| 5°    | 2121.7  | 2113.8 | 2101.7 | 2096.7 | 2103.1 | 2111.7 | 2122.4 | 2136.6 | 2145.2 | 2151.6 | 2155.9 |
| 7.5°  | 2155.9  | 2140.9 | 2127.4 | 2124.5 | 2137.4 | 2160.2 | 2184.4 | 2214.4 | 2235.1 | 2249.4 | 2252.2 |
| 10°   | 2213.0  | 2194.4 | 2180.9 | 2183.7 | 2206.6 | 2239.4 | 2273.6 | 2312.1 | 2343.5 | 2362.8 | 2364.2 |
| 12.5° | 2278.6  | 2260.8 | 2247.9 | 2260.1 | 2297.9 | 2337.8 | 2373.5 | 2407.0 | 2435.6 | 2454.8 | 2454.8 |
| 15°   | 2354.2  | 2341.4 | 2326.4 | 2354.2 | 2405.6 | 2441.3 | 2456.2 | 2472.7 | 2488.3 | 2502.6 | 2499.8 |
| 17.5° | 2427.0  | 2414.9 | 2407.0 | 2439.8 | 2493.3 | 2509.8 | 2499.8 | 2487.6 | 2487.6 | 2495.5 | 2496.9 |
| 20°   | 2489.8  | 2479.1 | 2484.1 | 2516.2 | 2544.0 | 2526.9 | 2489.8 | 2451.3 | 2435.6 | 2439.8 | 2444.1 |
| 22.5° | 2544.7  | 2539.7 | 2554.7 | 2569.7 | 2549.7 | 2489.8 | 2421.3 | 2369.2 | 2349.9 | 2348.5 | 2349.9 |
| 25°   | 2608.9  | 2608.2 | 2626.7 | 2599.6 | 2511.2 | 2400.6 | 2308.6 | 2257.9 | 2247.2 | 2255.8 | 2270.0 |
| 27.5° | 2688.8  | 2696.7 | 2705.9 | 2606.8 | 2432.7 | 2265.8 | 2172.3 | 2137.4 | 2148.1 | 2168.7 | 2182.3 |
| 30°   | 2790.8  | 2812.2 | 2792.3 | 2588.9 | 2320.0 | 2111.7 | 2022.5 | 2012.5 | 2041.8 | 2071.0 | 2085.3 |
| 32.5° | 2890.0  | 2923.5 | 2875.0 | 2542.6 | 2174.5 | 1948.3 | 1879.1 | 1876.2 | 1911.9 | 1940.5 | 1960.4 |
| 35°   | 2969.9  | 3036.2 | 2937.1 | 2450.5 | 2006.1 | 1797.8 | 1747.1 | 1727.9 | 1740.7 | 1774.2 | 1797.1 |
| 37.5° | 3074.1  | 3184.6 | 2979.9 | 2310.0 | 1823.5 | 1673.6 | 1614.4 | 1570.2 | 1558.8 | 1572.3 | 1583.8 |
| 40°   | 3264.5  | 3410.8 | 2999.9 | 2113.8 | 1645.1 | 1549.5 | 1489.6 | 1424.7 | 1379.7 | 1346.9 | 1347.6 |
| 42.5° | 3575.6  | 3705.4 | 2987.0 | 1875.5 | 1480.3 | 1428.2 | 1360.5 | 1285.6 | 1212.8 | 1138.6 | 1132.9 |
| 45°   | 4080.7  | 4143.4 | 2948.5 | 1623.0 | 1335.5 | 1301.2 | 1237.8 | 1162.8 | 1065.8 | 981.6  | 973.8  |
| 47.5° | 4888.9  | 4749.8 | 2888.6 | 1402.5 | 1207.8 | 1193.5 | 1135.0 | 1048.7 | 946.0  | 878.2  | 872.5  |
| 50°   | 5991.2  | 5625.2 | 2859.3 | 1227.1 | 1095.1 | 1099.4 | 1051.6 | 960.2  | 863.2  | 813.3  | 807.6  |
| 52.5° | 7309.5  | 6644.6 | 2915.7 | 1091.5 | 1004.5 | 1019.5 | 983.8  | 898.2  | 816.8  | 777.6  | 771.9  |
| 55°   | 8677.1  | 7700.5 | 2976.3 | 993.1  | 918.9  | 948.1  | 936.0  | 865.4  | 791.9  | 755.5  | 750.5  |
| 57.5° | 9847.8  | 8488.8 | 2855.0 | 913.2  | 842.5  | 888.2  | 898.9  | 844.7  | 779.0  | 746.2  | 740.5  |
| 60°   | 10584.8 | 8806.2 | 2536.9 | 838.2  | 781.9  | 840.4  | 877.5  | 839.0  | 784.0  | 781.2  | 776.9  |
| 62.5° | 10934.3 | 8778.4 | 2059.6 | 779.0  | 744.1  | 819.7  | 893.2  | 871.1  | 841.1  | 866.8  | 868.9  |
| 65°   | 10777.4 | 8358.9 | 1533.8 | 739.8  | 717.0  | 827.5  | 940.3  | 931.7  | 857.5  | 883.2  | 886.8  |
| 67.5° | 9744.4  | 7358.0 | 1135.7 | 705.6  | 687.0  | 849.7  | 1025.9 | 951.7  | 825.4  | 844.0  | 832.5  |
| 70°   | 7876.0  | 5833.5 | 876.1  | 667.0  | 656.3  | 846.8  | 1064.4 | 939.6  | 790.5  | 794.7  | 764.1  |
| 72.5° | 5431.1  | 3977.9 | 712.7  | 631.4  | 612.1  | 771.9  | 1037.3 | 909.6  | 761.2  | 728.4  | 687.7  |
| 75°   | 2953.5  | 2135.2 | 605.7  | 594.3  | 534.3  | 677.7  | 987.3  | 888.2  | 734.8  | 691.3  | 668.5  |
| 77.5° | 1162.1  | 886.0  | 525.8  | 543.6  | 467.3  | 598.5  | 931.7  | 847.5  | 698.4  | 641.3  | 629.9  |
| 80°   | 474.4   | 452.3  | 435.9  | 470.1  | 401.6  | 523.6  | 864.6  | 799.7  | 654.9  | 595.0  | 572.1  |
| 82.5° | 269.0   | 281.1  | 338.9  | 371.0  | 326.0  | 482.3  | 832.5  | 761.2  | 602.8  | 532.9  | 505.8  |
| 85°   | 137.7   | 164.8  | 236.1  | 266.1  | 239.7  | 410.2  | 766.9  | 666.3  | 483.7  | 408.1  | 410.2  |
| 87.5° | 66.3    | 92.0   | 149.1  | 166.9  | 155.5  | 296.8  | 572.9  | 483.0  | 376.7  | 298.2  | 288.9  |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-2-R4

Test Date: 10/03/2019

Luminaire Tested: SA1C-730-U-5WQ

Data in this report applies to families of products SA1C-730-U-5WQ .

### Test Information

Test Method: LM-79-2008  
Report Number: SP1-1908-441-2-R4  
Test Lab: COOPER LIGHTING SOLUTIONS  
Photometer: SP1 - 76IN SPHERE  
Measurement Geometry:  $4\pi$   
Issue Date: 10/28/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: MCGRAW-EDISON  
Catalog Number: **SA1C-730-U-5WQ**  
Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-2-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. (1) 70 CRI, 3000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2993   | CRI (Ra): | 71.8 |      |       |
| CIE u':                   | 0.2508 | R1:       | 67.5 | R9:  | -38.3 |
| CIE v':                   | 0.5215 | R2:       | 82.9 | R10: | 62.5  |
| Duv:                      | 0.0000 | R3:       | 94.7 | R11: | 63.7  |
| CIE x:                    | 0.4374 | R4:       | 67.7 | R12: | 57.8  |
| CIE y:                    | 0.4043 | R5:       | 67.9 | R13: | 70.4  |
| CIE z:                    | 0.1583 | R6:       | 77.6 | R14: | 97.3  |
| Peak Wavelength (nm):     | 593    | R7:       | 76.0 |      |       |
| Dominant Wavelength (nm): | 582    | R8:       | 40.5 |      |       |
| Purity:                   | 53     |           |      |      |       |
| Rf:                       | 75.7   |           |      |      |       |
| Rg:                       | 93.9   |           |      |      |       |



### Test Conditions

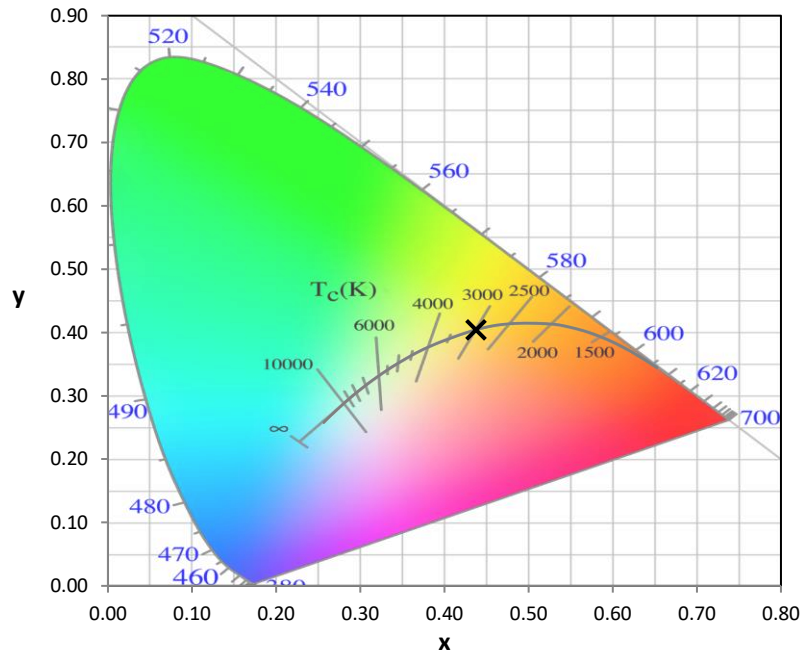
Stabilization Time: 53M  
Operation Time: 12H  
Room Temperature (°C) / RH%: 25.0./44%  
Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-2-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 3000K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-2-R4

**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2397             | NR               | 490       | 24908            | NR               | 620       | 118784           | NR               | 750       | 5037             | NR               | 880       | 2677             | NR               |
| 365       | 2084             | NR               | 495       | 30998            | NR               | 625       | 108951           | NR               | 755       | 4413             | NR               | 885       | 2940             | NR               |
| 370       | 2143             | NR               | 500       | 37103            | NR               | 630       | 99573            | NR               | 760       | 4189             | NR               | 890       | 3116             | NR               |
| 375       | 2413             | NR               | 505       | 42987            | NR               | 635       | 90444            | NR               | 765       | 3677             | NR               | 895       | 3345             | NR               |
| 380       | 2172             | NR               | 510       | 48702            | NR               | 640       | 80749            | NR               | 770       | 3366             | NR               | 900       | 2312             | NR               |
| 385       | 1997             | NR               | 515       | 53741            | NR               | 645       | 71664            | NR               | 775       | 3211             | NR               | 905       | 2829             | NR               |
| 390       | 1830             | NR               | 520       | 57283            | NR               | 650       | 63936            | NR               | 780       | 2682             | NR               | 910       | 2783             | NR               |
| 395       | 1861             | NR               | 525       | 61876            | NR               | 655       | 56611            | NR               | 785       | 2804             | NR               | 915       | 2662             | NR               |
| 400       | 1717             | NR               | 530       | 65398            | NR               | 660       | 49763            | NR               | 790       | 2581             | NR               | 920       | 3047             | NR               |
| 405       | 1761             | NR               | 535       | 69597            | NR               | 665       | 42891            | NR               | 795       | 2711             | NR               | 925       | 2256             | NR               |
| 410       | 2680             | NR               | 540       | 74214            | NR               | 670       | 36939            | NR               | 800       | 2609             | NR               | 930       | 2976             | NR               |
| 415       | 4374             | NR               | 545       | 79911            | NR               | 675       | 31946            | NR               | 805       | 2581             | NR               | 935       | 3503             | NR               |
| 420       | 8071             | NR               | 550       | 86153            | NR               | 680       | 27385            | NR               | 810       | 2404             | NR               | 940       | 4226             | NR               |
| 425       | 15169            | NR               | 555       | 93952            | NR               | 685       | 23504            | NR               | 815       | 2556             | NR               | 945       | 2930             | NR               |
| 430       | 26038            | NR               | 560       | 102904           | NR               | 690       | 20210            | NR               | 820       | 2742             | NR               | 950       | 2115             | NR               |
| 435       | 41316            | NR               | 565       | 112009           | NR               | 695       | 17459            | NR               | 825       | 2014             | NR               | 955       | 2634             | NR               |
| 440       | 59674            | NR               | 570       | 121662           | NR               | 700       | 15207            | NR               | 830       | 2488             | NR               | 960       | 4200             | NR               |
| 445       | 72751            | NR               | 575       | 130476           | NR               | 705       | 13322            | NR               | 835       | 2625             | NR               | 965       | 1982             | NR               |
| 450       | 65091            | NR               | 580       | 137926           | NR               | 710       | 11676            | NR               | 840       | 2754             | NR               | 970       | 3613             | NR               |
| 455       | 44894            | NR               | 585       | 143406           | NR               | 715       | 10626            | NR               | 845       | 2708             | NR               | 975       | 4034             | NR               |
| 460       | 32712            | NR               | 590       | 147039           | NR               | 720       | 9416             | NR               | 850       | 2608             | NR               | 980       | 3922             | NR               |
| 465       | 25296            | NR               | 595       | 147365           | NR               | 725       | 8333             | NR               | 855       | 2605             | NR               | 985       | 1909             | NR               |
| 470       | 19318            | NR               | 600       | 145800           | NR               | 730       | 7134             | NR               | 860       | 1765             | NR               | 990       | 3617             | NR               |
| 475       | 17265            | NR               | 605       | 141363           | NR               | 735       | 6437             | NR               | 865       | 2581             | NR               | 995       | 4767             | NR               |
| 480       | 18260            | NR               | 610       | 134199           | NR               | 740       | 5834             | NR               | 870       | 3016             | NR               | 1000      | 2528             | NR               |
| 485       | 20845            | NR               | 615       | 127683           | NR               | 745       | 5500             | NR               | 875       | 3952             | NR               |           |                  |                  |

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 8494.8**

**S/P: 1.23**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2397             | NR               | 490       | 24908            | NR               | 620       | 118784           | NR               | 750       | 5037             | NR               | 880       | 2677             | NR               |
| 365       | 2084             | NR               | 495       | 30998            | NR               | 625       | 108951           | NR               | 755       | 4413             | NR               | 885       | 2940             | NR               |
| 370       | 2143             | NR               | 500       | 37103            | NR               | 630       | 99573            | NR               | 760       | 4189             | NR               | 890       | 3116             | NR               |
| 375       | 2413             | NR               | 505       | 42987            | NR               | 635       | 90444            | NR               | 765       | 3677             | NR               | 895       | 3345             | NR               |
| 380       | 2172             | NR               | 510       | 48702            | NR               | 640       | 80749            | NR               | 770       | 3366             | NR               | 900       | 2312             | NR               |
| 385       | 1997             | NR               | 515       | 53741            | NR               | 645       | 71664            | NR               | 775       | 3211             | NR               | 905       | 2829             | NR               |
| 390       | 1830             | NR               | 520       | 57283            | NR               | 650       | 63936            | NR               | 780       | 2682             | NR               | 910       | 2783             | NR               |
| 395       | 1861             | NR               | 525       | 61876            | NR               | 655       | 56611            | NR               | 785       | 2804             | NR               | 915       | 2662             | NR               |
| 400       | 1717             | NR               | 530       | 65398            | NR               | 660       | 49763            | NR               | 790       | 2581             | NR               | 920       | 3047             | NR               |
| 405       | 1761             | NR               | 535       | 69597            | NR               | 665       | 42891            | NR               | 795       | 2711             | NR               | 925       | 2256             | NR               |
| 410       | 2680             | NR               | 540       | 74214            | NR               | 670       | 36939            | NR               | 800       | 2609             | NR               | 930       | 2976             | NR               |
| 415       | 4374             | NR               | 545       | 79911            | NR               | 675       | 31946            | NR               | 805       | 2581             | NR               | 935       | 3503             | NR               |
| 420       | 8071             | NR               | 550       | 86153            | NR               | 680       | 27385            | NR               | 810       | 2404             | NR               | 940       | 4226             | NR               |
| 425       | 15169            | NR               | 555       | 93952            | NR               | 685       | 23504            | NR               | 815       | 2556             | NR               | 945       | 2930             | NR               |
| 430       | 26038            | NR               | 560       | 102904           | NR               | 690       | 20210            | NR               | 820       | 2742             | NR               | 950       | 2115             | NR               |
| 435       | 41316            | NR               | 565       | 112009           | NR               | 695       | 17459            | NR               | 825       | 2014             | NR               | 955       | 2634             | NR               |
| 440       | 59674            | NR               | 570       | 121662           | NR               | 700       | 15207            | NR               | 830       | 2488             | NR               | 960       | 4200             | NR               |
| 445       | 72751            | NR               | 575       | 130476           | NR               | 705       | 13322            | NR               | 835       | 2625             | NR               | 965       | 1982             | NR               |
| 450       | 65091            | NR               | 580       | 137926           | NR               | 710       | 11676            | NR               | 840       | 2754             | NR               | 970       | 3613             | NR               |
| 455       | 44894            | NR               | 585       | 143406           | NR               | 715       | 10626            | NR               | 845       | 2708             | NR               | 975       | 4034             | NR               |
| 460       | 32712            | NR               | 590       | 147039           | NR               | 720       | 9416             | NR               | 850       | 2608             | NR               | 980       | 3922             | NR               |
| 465       | 25296            | NR               | 595       | 147365           | NR               | 725       | 8333             | NR               | 855       | 2605             | NR               | 985       | 1909             | NR               |
| 470       | 19318            | NR               | 600       | 145800           | NR               | 730       | 7134             | NR               | 860       | 1765             | NR               | 990       | 3617             | NR               |
| 475       | 17265            | NR               | 605       | 141363           | NR               | 735       | 6437             | NR               | 865       | 2581             | NR               | 995       | 4767             | NR               |
| 480       | 18260            | NR               | 610       | 134199           | NR               | 740       | 5834             | NR               | 870       | 3016             | NR               | 1000      | 2528             | NR               |
| 485       | 20845            | NR               | 615       | 127683           | NR               | 745       | 5500             | NR               | 875       | 3952             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 3101.5 M/P: 0.45**

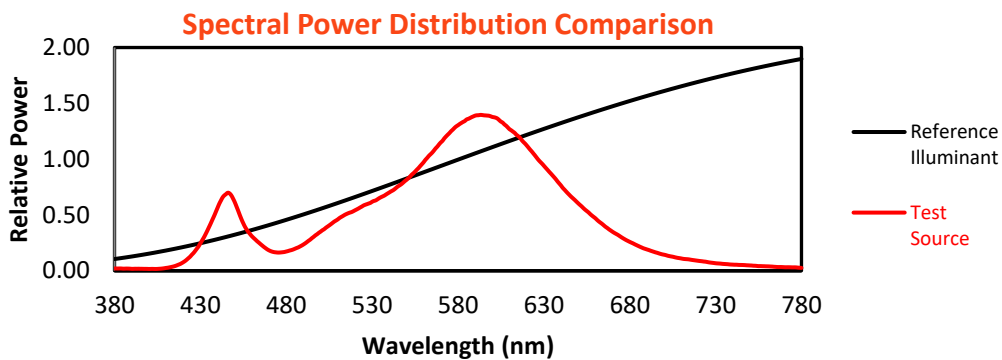
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2397             | NR               | 490       | 24908            | NR               | 620       | 118784           | NR               | 750       | 5037             | NR               | 880       | 2677             | NR               |
| 365       | 2084             | NR               | 495       | 30998            | NR               | 625       | 108951           | NR               | 755       | 4413             | NR               | 885       | 2940             | NR               |
| 370       | 2143             | NR               | 500       | 37103            | NR               | 630       | 99573            | NR               | 760       | 4189             | NR               | 890       | 3116             | NR               |
| 375       | 2413             | NR               | 505       | 42987            | NR               | 635       | 90444            | NR               | 765       | 3677             | NR               | 895       | 3345             | NR               |
| 380       | 2172             | NR               | 510       | 48702            | NR               | 640       | 80749            | NR               | 770       | 3366             | NR               | 900       | 2312             | NR               |
| 385       | 1997             | NR               | 515       | 53741            | NR               | 645       | 71664            | NR               | 775       | 3211             | NR               | 905       | 2829             | NR               |
| 390       | 1830             | NR               | 520       | 57283            | NR               | 650       | 63936            | NR               | 780       | 2682             | NR               | 910       | 2783             | NR               |
| 395       | 1861             | NR               | 525       | 61876            | NR               | 655       | 56611            | NR               | 785       | 2804             | NR               | 915       | 2662             | NR               |
| 400       | 1717             | NR               | 530       | 65398            | NR               | 660       | 49763            | NR               | 790       | 2581             | NR               | 920       | 3047             | NR               |
| 405       | 1761             | NR               | 535       | 69597            | NR               | 665       | 42891            | NR               | 795       | 2711             | NR               | 925       | 2256             | NR               |
| 410       | 2680             | NR               | 540       | 74214            | NR               | 670       | 36939            | NR               | 800       | 2609             | NR               | 930       | 2976             | NR               |
| 415       | 4374             | NR               | 545       | 79911            | NR               | 675       | 31946            | NR               | 805       | 2581             | NR               | 935       | 3503             | NR               |
| 420       | 8071             | NR               | 550       | 86153            | NR               | 680       | 27385            | NR               | 810       | 2404             | NR               | 940       | 4226             | NR               |
| 425       | 15169            | NR               | 555       | 93952            | NR               | 685       | 23504            | NR               | 815       | 2556             | NR               | 945       | 2930             | NR               |
| 430       | 26038            | NR               | 560       | 102904           | NR               | 690       | 20210            | NR               | 820       | 2742             | NR               | 950       | 2115             | NR               |
| 435       | 41316            | NR               | 565       | 112009           | NR               | 695       | 17459            | NR               | 825       | 2014             | NR               | 955       | 2634             | NR               |
| 440       | 59674            | NR               | 570       | 121662           | NR               | 700       | 15207            | NR               | 830       | 2488             | NR               | 960       | 4200             | NR               |
| 445       | 72751            | NR               | 575       | 130476           | NR               | 705       | 13322            | NR               | 835       | 2625             | NR               | 965       | 1982             | NR               |
| 450       | 65091            | NR               | 580       | 137926           | NR               | 710       | 11676            | NR               | 840       | 2754             | NR               | 970       | 3613             | NR               |
| 455       | 44894            | NR               | 585       | 143406           | NR               | 715       | 10626            | NR               | 845       | 2708             | NR               | 975       | 4034             | NR               |
| 460       | 32712            | NR               | 590       | 147039           | NR               | 720       | 9416             | NR               | 850       | 2608             | NR               | 980       | 3922             | NR               |
| 465       | 25296            | NR               | 595       | 147365           | NR               | 725       | 8333             | NR               | 855       | 2605             | NR               | 985       | 1909             | NR               |
| 470       | 19318            | NR               | 600       | 145800           | NR               | 730       | 7134             | NR               | 860       | 1765             | NR               | 990       | 3617             | NR               |
| 475       | 17265            | NR               | 605       | 141363           | NR               | 735       | 6437             | NR               | 865       | 2581             | NR               | 995       | 4767             | NR               |
| 480       | 18260            | NR               | 610       | 134199           | NR               | 740       | 5834             | NR               | 870       | 3016             | NR               | 1000      | 2528             | NR               |
| 485       | 20845            | NR               | 615       | 127683           | NR               | 745       | 5500             | NR               | 875       | 3952             | NR               |           |                  |                  |

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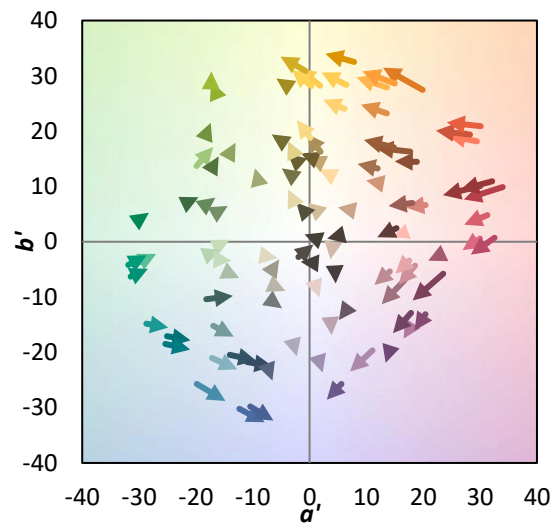
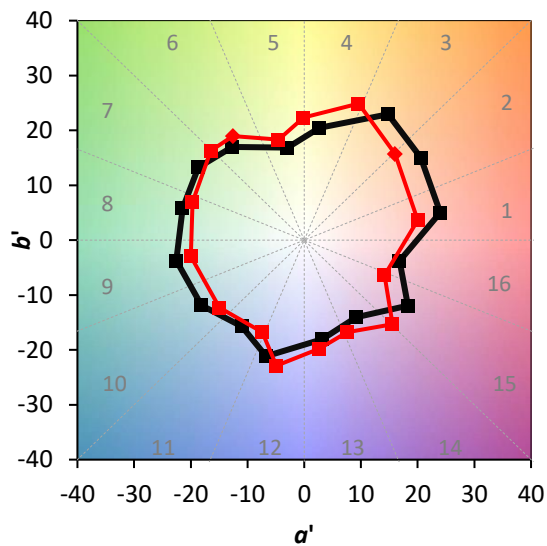
**TM-30-18**

**Summary**

$R_f = 75.7$   
 $R_g = 93.9$   
 CIE  $R_a = 71.8$   
 $R_g = -38.3$



**Color Vector Graphics**



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

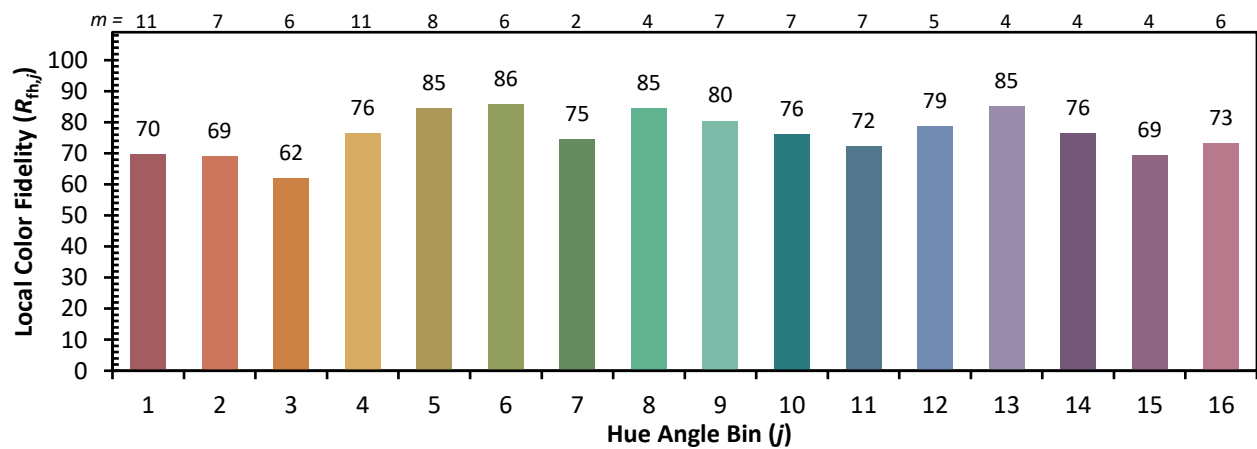
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|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 67 | CES51 = 87 | CES76 = 63 |
| CES02 = 63 | CES27 = 88 | CES52 = 86 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 67 |
| CES04 = 71 | CES29 = 66 | CES54 = 84 | CES79 = 87 |
| CES05 = 49 | CES30 = 73 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 70 | CES56 = 75 | CES81 = 71 |
| CES07 = 41 | CES32 = 65 | CES57 = 74 | CES82 = 94 |
| CES08 = 40 | CES33 = 73 | CES58 = 76 | CES83 = 90 |
| CES09 = 29 | CES34 = 79 | CES59 = 85 | CES84 = 89 |
| CES10 = 76 | CES35 = 89 | CES60 = 93 | CES85 = 77 |
| CES11 = 59 | CES36 = 97 | CES61 = 84 | CES86 = 61 |
| CES12 = 65 | CES37 = 87 | CES62 = 91 | CES87 = 78 |
| CES13 = 43 | CES38 = 81 | CES63 = 77 | CES88 = 77 |
| CES14 = 74 | CES39 = 95 | CES64 = 72 | CES89 = 67 |
| CES15 = 71 | CES40 = 92 | CES65 = 68 | CES90 = 76 |
| CES16 = 47 | CES41 = 88 | CES66 = 69 | CES91 = 89 |
| CES17 = 50 | CES42 = 89 | CES67 = 67 | CES92 = 58 |
| CES18 = 56 | CES43 = 79 | CES68 = 72 | CES93 = 74 |
| CES19 = 73 | CES44 = 99 | CES69 = 81 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 66 | CES95 = 68 |
| CES21 = 87 | CES46 = 80 | CES71 = 67 | CES96 = 76 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 82 |
| CES23 = 92 | CES48 = 69 | CES73 = 59 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 95 | CES99 = 62 |
| CES25 = 73 | CES50 = 87 | CES75 = 69 |            |



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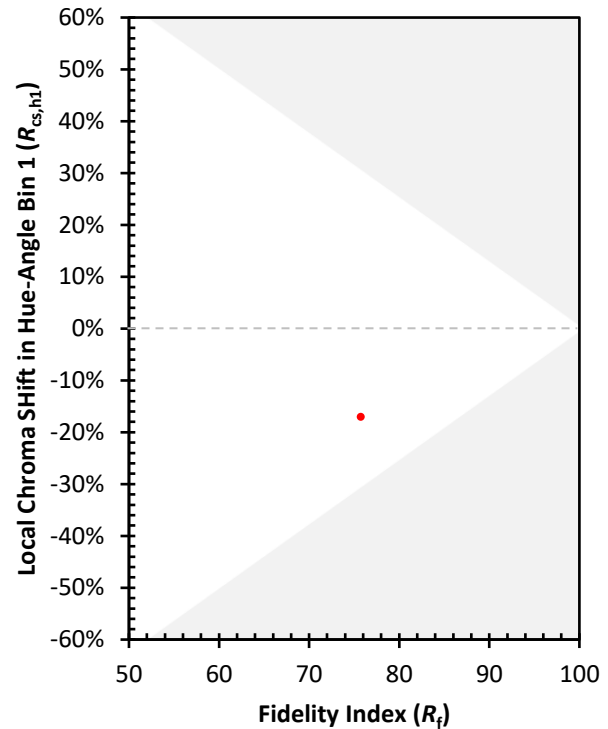
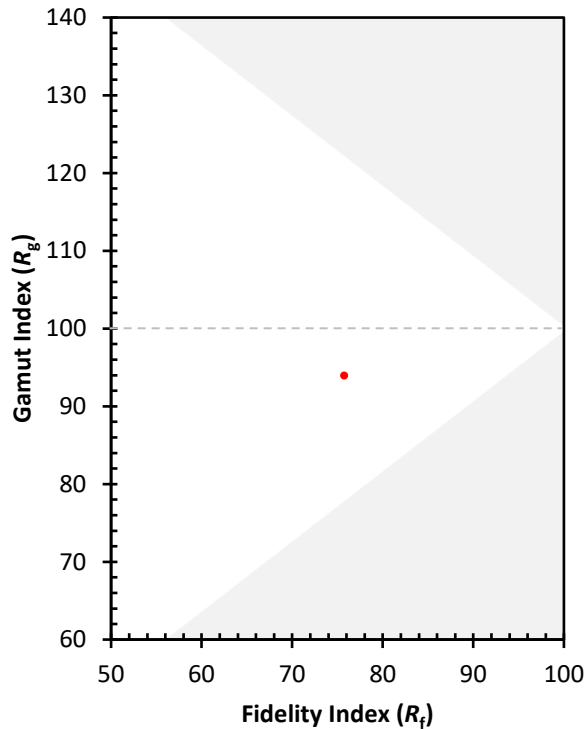
**Color Rendition by Hue-Angle Bin**



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**TM-30-18**

**Measure Comparisons**



(END OF REPORT)