

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 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: P318231

Luminaire Tested: **GLEON-SA7A-830-U-T2**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P318231  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-12)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA7A-830-U-T2  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(7) 80 CRI, 3000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 25704 lumens  
Efficiency: N/A  
Efficacy: 113.7 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G4

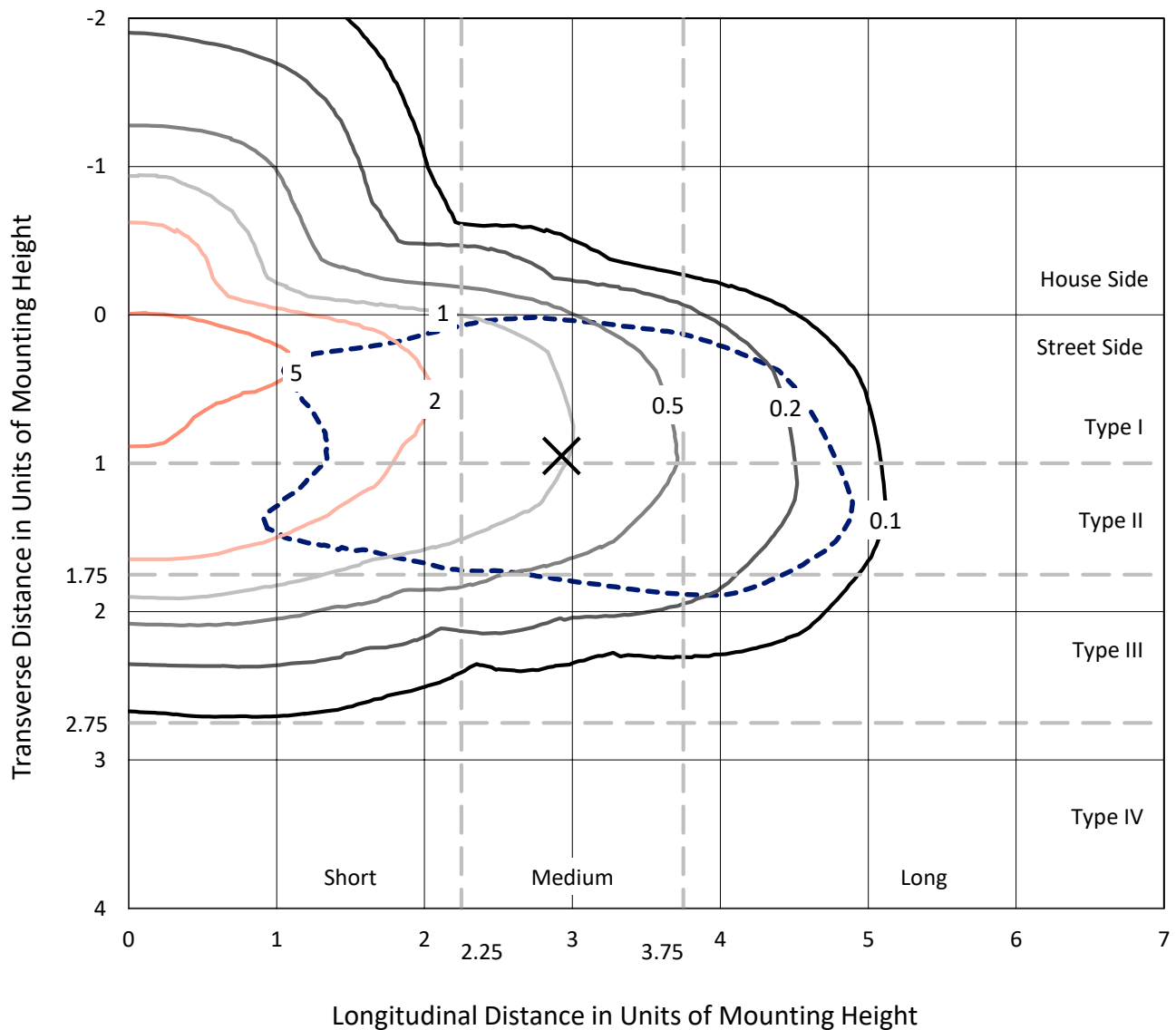
Input Watts (W): 226  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

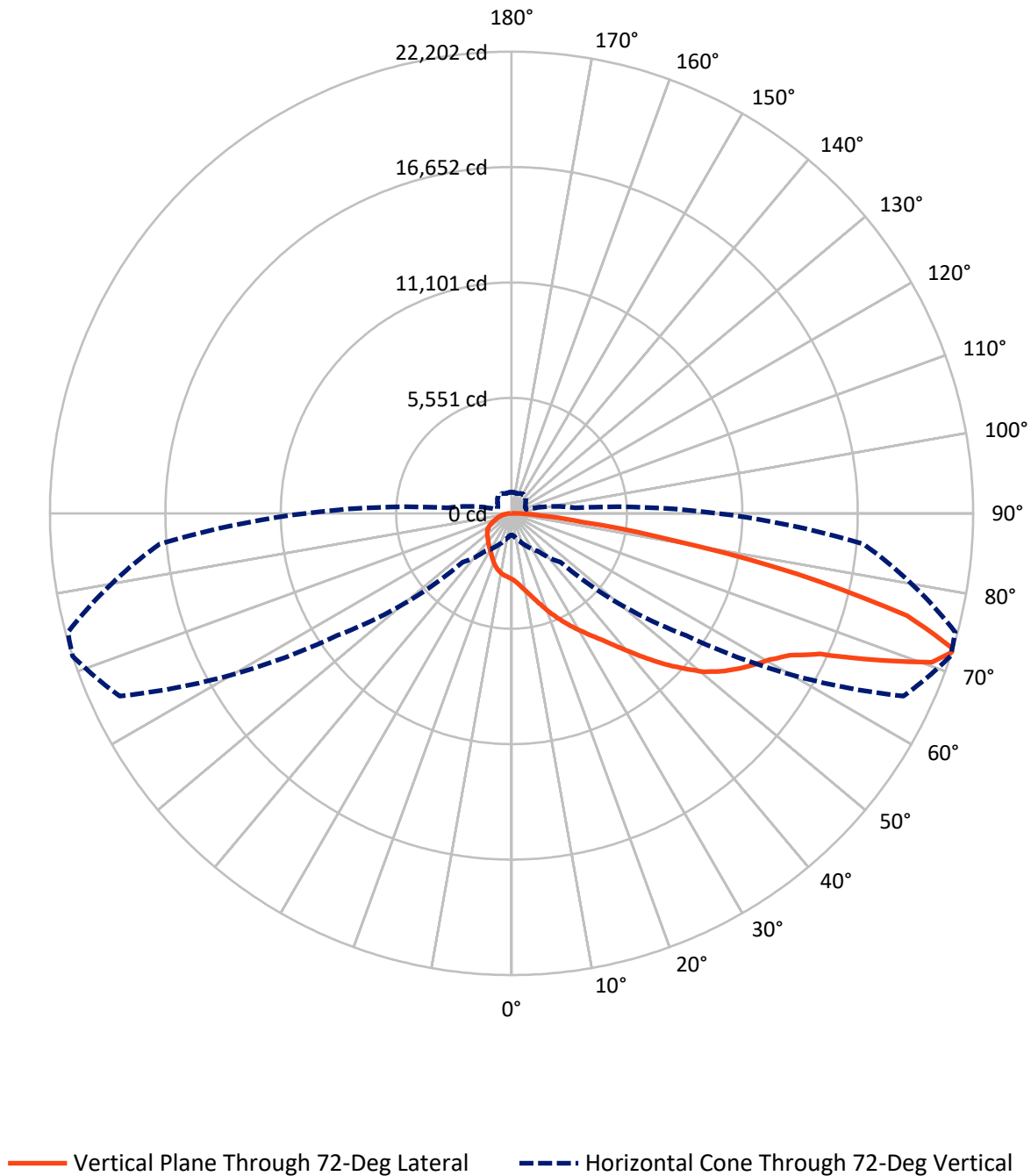
✕ Max cd  
 - - - 1/2 Max cd



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

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA7A-830-U-T2

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4768.3   | 0.0    | 4768.3  |
|                    | % Fixture | 18.6     | 0.0    | 18.6    |
| <b>Street Side</b> | Lumens    | 20935.7  | 0.0    | 20935.7 |
|                    | % Fixture | 81.4     | 0.0    | 81.4    |
| <b>Total</b>       | Lumens    | 25704.0  | 0.0    | 25704.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 316.9   | 1.2       |
| 10°-20°   | 1024.0  | 4.0       |
| 20°-30°   | 1794.3  | 7.0       |
| 30°-40°   | 2660.4  | 10.4      |
| 40°-50°   | 3891.0  | 15.1      |
| 50°-60°   | 5354.0  | 20.8      |
| 60°-70°   | 5960.6  | 23.2      |
| 70°-80°   | 4038.9  | 15.7      |
| 80°-90°   | 663.8   | 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°    | 25704.0 | 100.0     |
| 0°-180°   | 25704.0 | 100.0     |

**Coefficient of Utilization**



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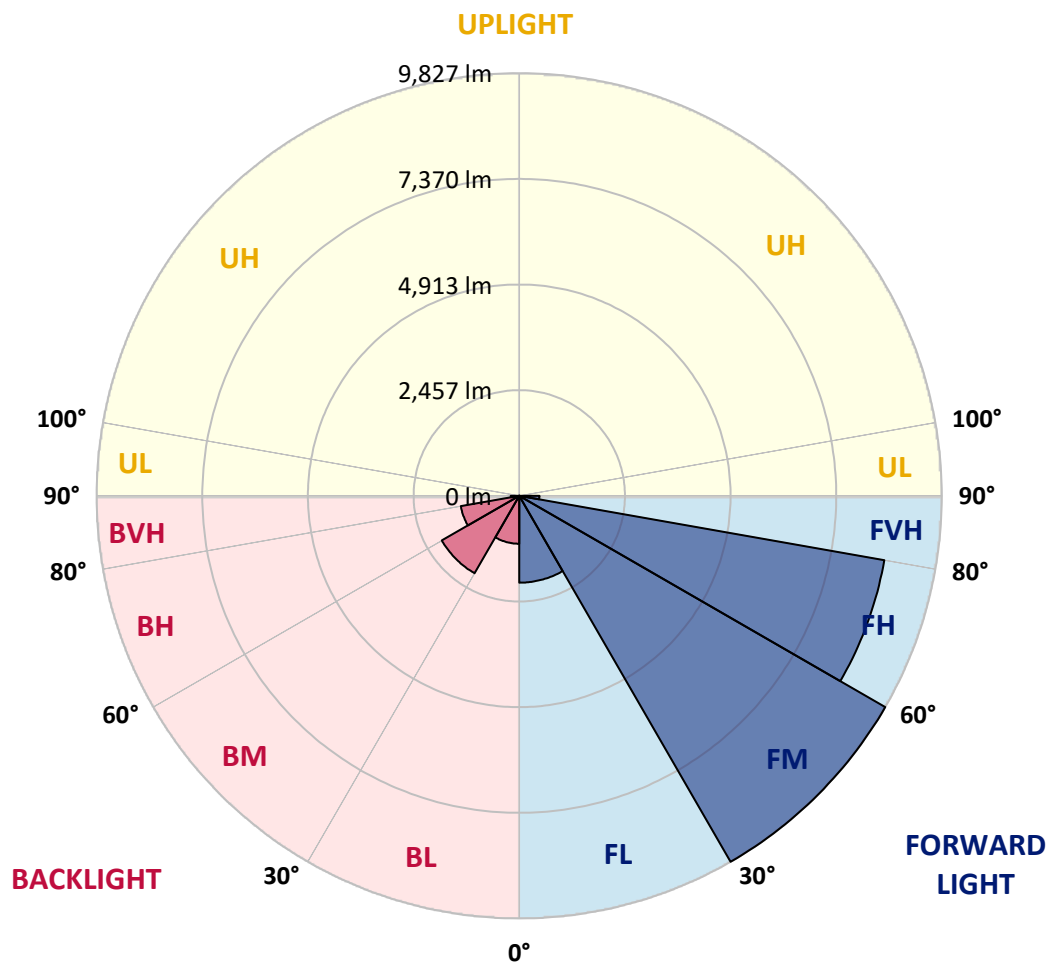
CATALOG NUMBER: GLEON-SA7A-830-U-T2

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2020.5 | 7.9       |                         |      |          |
| FM   | (30°-60°)   | 9827.0 | 38.2      |                         |      |          |
| FH   | (60°-80°)   | 8620.0 | 33.5      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 468.2  | 1.8       |                         |      | G3/500   |
| BL   | (0°-30°)    | 1114.6 | 4.3       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 2078.5 | 8.1       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1379.5 | 5.4       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 195.6  | 0.8       |                         |      | 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 III Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 72°     | 75°     | 85°     |
|-------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3162.3 | 3162.3 | 3162.3  | 3162.3  | 3162.3  | 3162.3  | 3162.3  | 3162.3  | 3162.3  | 3162.3  | 3162.3  |
| 2.5°  | 3493.3 | 3488.0 | 3469.4  | 3469.4  | 3434.0  | 3403.9  | 3347.2  | 3309.2  | 3264.0  | 3248.1  | 3195.0  |
| 5°    | 3831.4 | 3833.1 | 3810.1  | 3794.2  | 3742.0  | 3678.2  | 3581.8  | 3494.2  | 3406.5  | 3371.1  | 3262.3  |
| 7.5°  | 4115.5 | 4111.9 | 4105.7  | 4092.4  | 4043.8  | 3978.3  | 3848.2  | 3718.1  | 3588.9  | 3535.8  | 3348.1  |
| 10°   | 4297.8 | 4305.7 | 4311.0  | 4317.2  | 4296.9  | 4250.0  | 4127.0  | 3968.5  | 3799.5  | 3726.9  | 3450.8  |
| 12.5° | 4389.8 | 4404.0 | 4428.8  | 4471.2  | 4504.9  | 4499.6  | 4410.2  | 4242.0  | 4041.1  | 3950.0  | 3579.1  |
| 15°   | 4443.8 | 4462.4 | 4501.3  | 4577.4  | 4672.1  | 4726.1  | 4702.2  | 4550.0  | 4326.1  | 4213.7  | 3735.8  |
| 17.5° | 4477.4 | 4492.5 | 4552.7  | 4654.4  | 4795.2  | 4938.5  | 5001.4  | 4873.9  | 4648.3  | 4519.9  | 3915.4  |
| 20°   | 4500.4 | 4512.0 | 4587.2  | 4706.7  | 4889.0  | 5117.3  | 5292.6  | 5260.7  | 5003.2  | 4836.8  | 4103.1  |
| 22.5° | 4551.8 | 4561.5 | 4633.2  | 4753.6  | 4955.4  | 5250.1  | 5573.1  | 5620.9  | 5377.5  | 5189.0  | 4304.0  |
| 25°   | 4695.2 | 4695.2 | 4755.3  | 4839.4  | 5028.8  | 5365.1  | 5810.3  | 6021.8  | 5759.9  | 5540.4  | 4489.8  |
| 27.5° | 4968.6 | 4966.0 | 4988.1  | 5017.3  | 5160.7  | 5482.0  | 6021.8  | 6375.9  | 6156.4  | 5916.5  | 4670.4  |
| 30°   | 5292.6 | 5310.3 | 5312.9  | 5298.8  | 5366.0  | 5628.0  | 6217.4  | 6749.3  | 6555.5  | 6297.1  | 4855.4  |
| 32.5° | 5709.4 | 5720.9 | 5707.6  | 5660.7  | 5651.0  | 5835.1  | 6409.5  | 7140.5  | 6987.4  | 6694.5  | 5024.4  |
| 35°   | 6238.7 | 6216.5 | 6175.0  | 6079.4  | 5988.2  | 6112.1  | 6629.0  | 7531.7  | 7472.4  | 7175.1  | 5257.2  |
| 37.5° | 6806.0 | 6806.9 | 6755.5  | 6538.7  | 6413.0  | 6466.1  | 6931.7  | 7975.1  | 8059.2  | 7746.8  | 5555.4  |
| 40°   | 7260.9 | 7284.8 | 7316.7  | 7031.7  | 6868.8  | 6942.3  | 7316.7  | 8489.3  | 8753.1  | 8424.7  | 5944.0  |
| 42.5° | 7578.6 | 7606.1 | 7696.3  | 7517.6  | 7348.5  | 7484.8  | 7769.8  | 9038.1  | 9531.9  | 9207.1  | 6398.9  |
| 45°   | 7914.9 | 7930.0 | 7993.7  | 7916.7  | 7808.7  | 8115.9  | 8280.5  | 9606.3  | 10355.9 | 10040.8 | 6907.8  |
| 47.5° | 8269.0 | 8284.9 | 8350.4  | 8299.1  | 8242.4  | 8705.3  | 8813.3  | 10141.7 | 11145.4 | 10956.8 | 7451.2  |
| 50°   | 8706.2 | 8716.8 | 8778.8  | 8685.8  | 8703.5  | 9149.6  | 9289.4  | 10632.9 | 11972.9 | 11779.9 | 7996.4  |
| 52.5° | 9302.7 | 9305.4 | 9391.2  | 9307.1  | 9223.9  | 9475.3  | 9699.2  | 11095.8 | 12621.6 | 12530.5 | 8541.6  |
| 55°   | 9770.0 | 9798.3 | 10079.8 | 10062.1 | 10014.3 | 9770.9  | 10041.7 | 11536.5 | 13200.4 | 13243.8 | 9120.4  |
| 57.5° | 9471.7 | 9582.4 | 10152.3 | 10554.2 | 10945.3 | 10506.4 | 10504.6 | 12033.1 | 13738.5 | 13943.9 | 9756.7  |
| 60°   | 8295.5 | 8446.0 | 9285.9  | 10177.1 | 11401.1 | 11786.1 | 11465.7 | 12639.3 | 14282.0 | 14637.7 | 10554.2 |
| 62.5° | 5924.5 | 6172.3 | 7310.5  | 8733.6  | 10776.3 | 12634.0 | 13421.7 | 13601.4 | 15021.0 | 15441.4 | 11590.5 |
| 65°   | 2995.0 | 3182.6 | 4136.7  | 5851.0  | 8609.7  | 12080.0 | 15547.6 | 15707.8 | 16305.2 | 16678.7 | 13186.3 |
| 67.5° | 1819.7 | 1890.5 | 2356.0  | 3254.3  | 5278.4  | 9409.8  | 16241.4 | 19218.7 | 18790.4 | 18988.6 | 15461.7 |
| 70°   | 1340.8 | 1393.1 | 1683.4  | 2161.3  | 3035.7  | 5521.8  | 14112.0 | 21724.3 | 21442.8 | 21420.7 | 17143.3 |
| 72°   | 1044.4 | 1082.4 | 1339.1  | 1746.2  | 2219.7  | 3312.7  | 10228.5 | 20799.4 | 22202.2 | 22090.7 | 16989.3 |
| 72.5° | 990.4  | 1024.0 | 1257.6  | 1643.5  | 2097.6  | 3003.0  | 9196.5  | 20175.5 | 22147.3 | 22096.9 | 16790.2 |
| 75°   | 779.7  | 803.6  | 931.1   | 1270.9  | 1641.8  | 1703.7  | 5039.4  | 15635.2 | 19647.1 | 20464.0 | 15101.5 |
| 77.5° | 645.2  | 648.7  | 716.0   | 924.9   | 1279.8  | 1204.5  | 2475.5  | 10848.0 | 14068.7 | 14967.0 | 10697.5 |
| 80°   | 525.7  | 530.1  | 562.0   | 648.7   | 968.2   | 891.2   | 1175.3  | 6237.8  | 7876.9  | 7886.6  | 5087.2  |
| 82.5° | 418.6  | 419.5  | 454.9   | 474.4   | 695.6   | 637.2   | 673.5   | 2928.6  | 3441.9  | 3310.9  | 1828.5  |
| 85°   | 294.7  | 288.5  | 444.3   | 389.4   | 454.9   | 408.9   | 371.7   | 1159.4  | 1423.2  | 1361.2  | 572.6   |
| 87.5° | 98.2   | 101.8  | 197.4   | 252.2   | 265.5   | 231.9   | 165.5   | 444.3   | 537.2   | 532.8   | 181.4   |
| 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: P318231

CATALOG NUMBER: GLEON-SA7A-830-U-T2

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3162.3  | 3162.3 | 3162.3 | 3162.3 | 3162.3 | 3162.3 | 3162.3 | 3162.3 | 3162.3 | 3162.3 | 3162.3 |
| 2.5°  | 3178.2  | 3149.9 | 3108.3 | 3062.3 | 3026.0 | 2988.8 | 2961.4 | 2947.2 | 2931.3 | 2918.0 | 2933.9 |
| 5°    | 3211.8  | 3158.7 | 3070.2 | 2983.5 | 2919.8 | 2863.1 | 2822.4 | 2801.2 | 2781.7 | 2768.4 | 2770.2 |
| 7.5°  | 3266.7  | 3180.8 | 3032.2 | 2905.6 | 2817.1 | 2756.0 | 2714.4 | 2700.3 | 2687.9 | 2684.3 | 2688.8 |
| 10°   | 3325.1  | 3198.5 | 2981.7 | 2813.6 | 2712.7 | 2662.2 | 2643.6 | 2653.4 | 2662.2 | 2670.2 | 2679.0 |
| 12.5° | 3391.5  | 3214.5 | 2908.3 | 2705.6 | 2619.7 | 2600.3 | 2618.8 | 2661.3 | 2692.3 | 2710.9 | 2722.4 |
| 15°   | 3478.2  | 3228.6 | 2823.3 | 2597.6 | 2540.1 | 2562.2 | 2625.0 | 2698.5 | 2752.5 | 2787.0 | 2792.3 |
| 17.5° | 3557.9  | 3227.8 | 2714.4 | 2488.7 | 2475.5 | 2540.1 | 2634.8 | 2738.3 | 2810.9 | 2859.6 | 2869.3 |
| 20°   | 3640.2  | 3203.9 | 2587.9 | 2382.5 | 2410.0 | 2516.2 | 2639.2 | 2764.0 | 2851.6 | 2908.3 | 2921.5 |
| 22.5° | 3717.2  | 3162.3 | 2448.9 | 2286.1 | 2355.1 | 2484.3 | 2622.4 | 2748.9 | 2836.6 | 2882.6 | 2896.7 |
| 25°   | 3769.4  | 3089.7 | 2308.2 | 2204.6 | 2306.4 | 2445.4 | 2567.5 | 2669.3 | 2734.8 | 2757.8 | 2761.3 |
| 27.5° | 3796.0  | 2995.0 | 2175.4 | 2133.8 | 2256.0 | 2381.7 | 2465.7 | 2516.2 | 2534.8 | 2533.0 | 2529.5 |
| 30°   | 3799.5  | 2870.2 | 2061.3 | 2076.3 | 2197.6 | 2287.8 | 2327.7 | 2317.9 | 2294.0 | 2253.3 | 2256.9 |
| 32.5° | 3788.0  | 2729.5 | 1965.7 | 2021.4 | 2123.2 | 2173.7 | 2175.4 | 2128.5 | 2064.8 | 2000.2 | 1982.5 |
| 35°   | 3791.5  | 2591.4 | 1881.6 | 1959.5 | 2032.9 | 2055.1 | 2034.7 | 1965.7 | 1878.9 | 1795.8 | 1778.1 |
| 37.5° | 3830.5  | 2471.0 | 1809.0 | 1887.8 | 1932.9 | 1938.2 | 1909.0 | 1836.5 | 1772.7 | 1691.3 | 1684.2 |
| 40°   | 3923.4  | 2385.2 | 1740.0 | 1807.3 | 1832.9 | 1835.6 | 1794.0 | 1742.7 | 1748.0 | 1704.6 | 1703.7 |
| 42.5° | 4090.7  | 2348.0 | 1678.9 | 1723.2 | 1739.1 | 1744.4 | 1712.6 | 1679.8 | 1725.8 | 1697.5 | 1687.8 |
| 45°   | 4306.6  | 2356.9 | 1627.6 | 1640.9 | 1670.1 | 1694.9 | 1675.4 | 1635.6 | 1653.3 | 1530.2 | 1489.5 |
| 47.5° | 4556.2  | 2413.5 | 1586.9 | 1570.1 | 1620.5 | 1667.4 | 1637.3 | 1577.1 | 1514.3 | 1392.2 | 1369.2 |
| 50°   | 4848.3  | 2501.1 | 1549.7 | 1500.1 | 1566.5 | 1630.3 | 1600.2 | 1514.3 | 1419.6 | 1360.3 | 1352.3 |
| 52.5° | 5152.7  | 2608.2 | 1512.5 | 1423.2 | 1498.4 | 1601.9 | 1586.9 | 1500.1 | 1383.3 | 1324.9 | 1314.3 |
| 55°   | 5497.9  | 2716.2 | 1465.6 | 1333.8 | 1424.9 | 1588.7 | 1580.7 | 1448.8 | 1355.9 | 1323.1 | 1315.2 |
| 57.5° | 5927.1  | 2839.2 | 1403.7 | 1240.8 | 1355.9 | 1540.9 | 1516.1 | 1417.8 | 1327.6 | 1302.8 | 1300.1 |
| 60°   | 6486.5  | 3020.7 | 1314.3 | 1141.7 | 1271.8 | 1467.4 | 1462.1 | 1372.7 | 1282.4 | 1264.7 | 1261.2 |
| 62.5° | 7325.5  | 3320.7 | 1191.3 | 1042.6 | 1178.0 | 1342.6 | 1391.3 | 1311.6 | 1234.6 | 1233.8 | 1235.5 |
| 65°   | 8626.5  | 3772.1 | 1057.6 | 955.8  | 1083.3 | 1237.3 | 1309.0 | 1248.8 | 1186.0 | 1203.7 | 1206.3 |
| 67.5° | 10134.6 | 4146.4 | 926.6  | 870.9  | 986.8  | 1137.3 | 1234.6 | 1186.0 | 1121.4 | 1167.4 | 1168.3 |
| 70°   | 10636.5 | 3811.9 | 811.6  | 786.8  | 886.8  | 1040.8 | 1154.1 | 1116.9 | 1051.4 | 1097.5 | 1093.0 |
| 72°   | 9898.3  | 3077.3 | 737.2  | 723.1  | 811.6  | 961.2  | 1082.4 | 1052.3 | 987.7  | 1018.7 | 1007.2 |
| 72.5° | 9665.6  | 2933.9 | 718.7  | 707.2  | 791.2  | 940.8  | 1063.8 | 1036.4 | 971.8  | 998.3  | 987.7  |
| 75°   | 8622.1  | 2548.0 | 617.8  | 620.4  | 690.3  | 841.7  | 959.4  | 950.5  | 884.2  | 886.8  | 883.3  |
| 77.5° | 6253.7  | 1868.3 | 520.4  | 538.1  | 587.7  | 739.9  | 854.1  | 848.8  | 776.2  | 762.9  | 760.3  |
| 80°   | 2902.1  | 953.2  | 423.9  | 431.9  | 483.2  | 618.6  | 728.4  | 721.3  | 662.9  | 646.1  | 636.3  |
| 82.5° | 993.9   | 453.1  | 318.6  | 323.9  | 374.4  | 498.3  | 631.9  | 627.5  | 578.8  | 546.1  | 525.7  |
| 85°   | 354.9   | 225.7  | 223.0  | 217.7  | 267.3  | 392.1  | 550.5  | 526.6  | 454.9  | 387.6  | 385.9  |
| 87.5° | 115.1   | 96.5   | 115.1  | 114.2  | 155.8  | 265.5  | 400.0  | 340.7  | 330.1  | 274.4  | 269.1  |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2019: 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:  $4\pi$   
 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  
 R<sub>f</sub>: 81.5  
 R<sub>g</sub>: 99.2

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



### Test Conditions

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

REPORT NUMBER: SP1-2408-195-9

| 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

REPORT NUMBER: SP1-2408-195-9

### Photopic Flux vs. Wavelength



### Photopic Lumens: NR

| λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(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               |           |                             |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.27

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 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                             |                   |                                      |                                |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: NR**
**M/P: 2.32**

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 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                             |                   |                                      |                                |

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TM-30-18

### Summary

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



### 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)