

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: P317910

Luminaire Tested: **GLEON-SA6A-830-U-T3R**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P317910  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-10)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA6A-830-U-T3R  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(6) 80 CRI, 3000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
ROADWAY OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 22645 lumens  
Efficiency: N/A  
Efficacy: 117.3 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type IV - Medium  
BUG Rating: B3 - U0 - G4

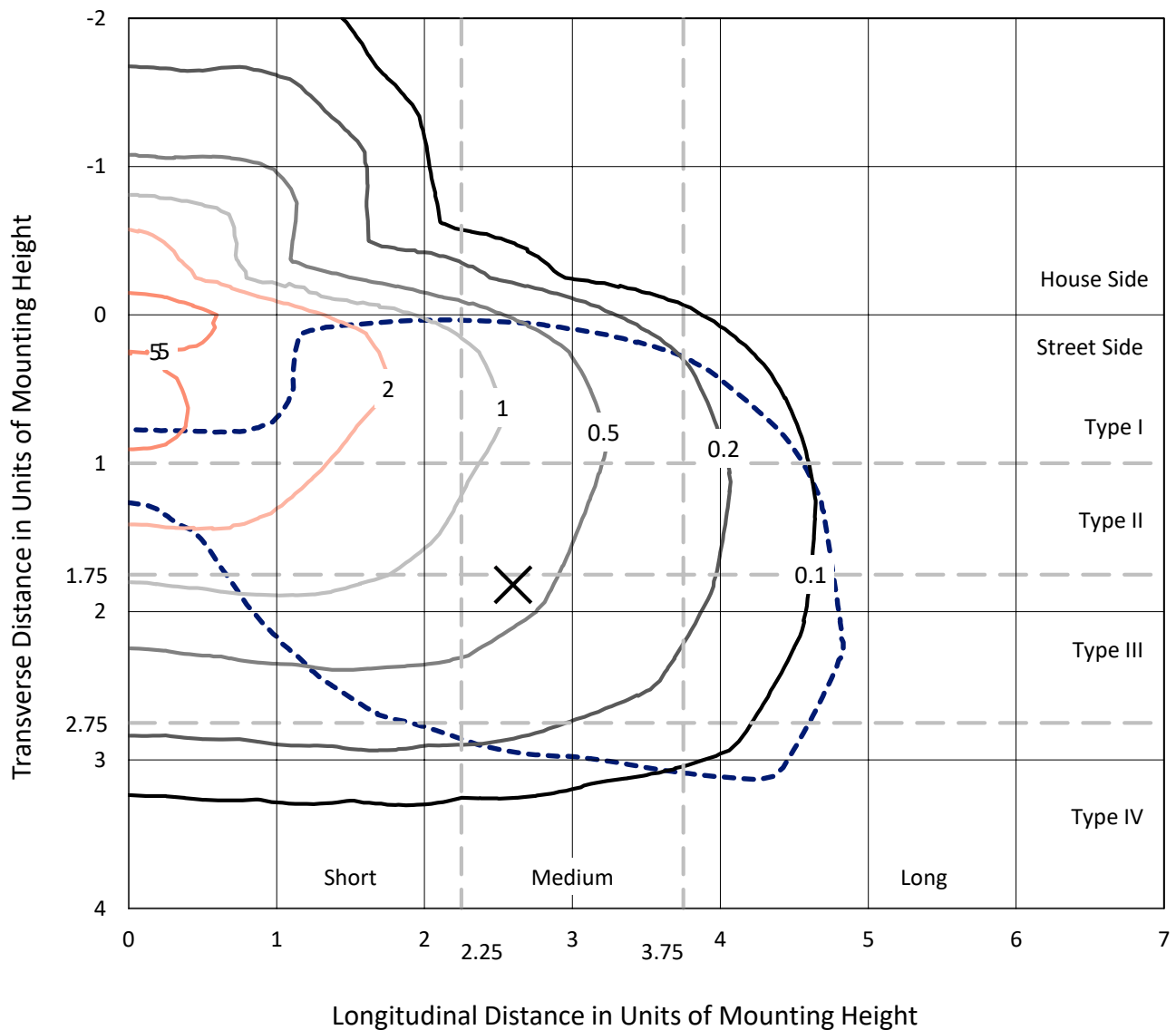
Input Watts (W): 193  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

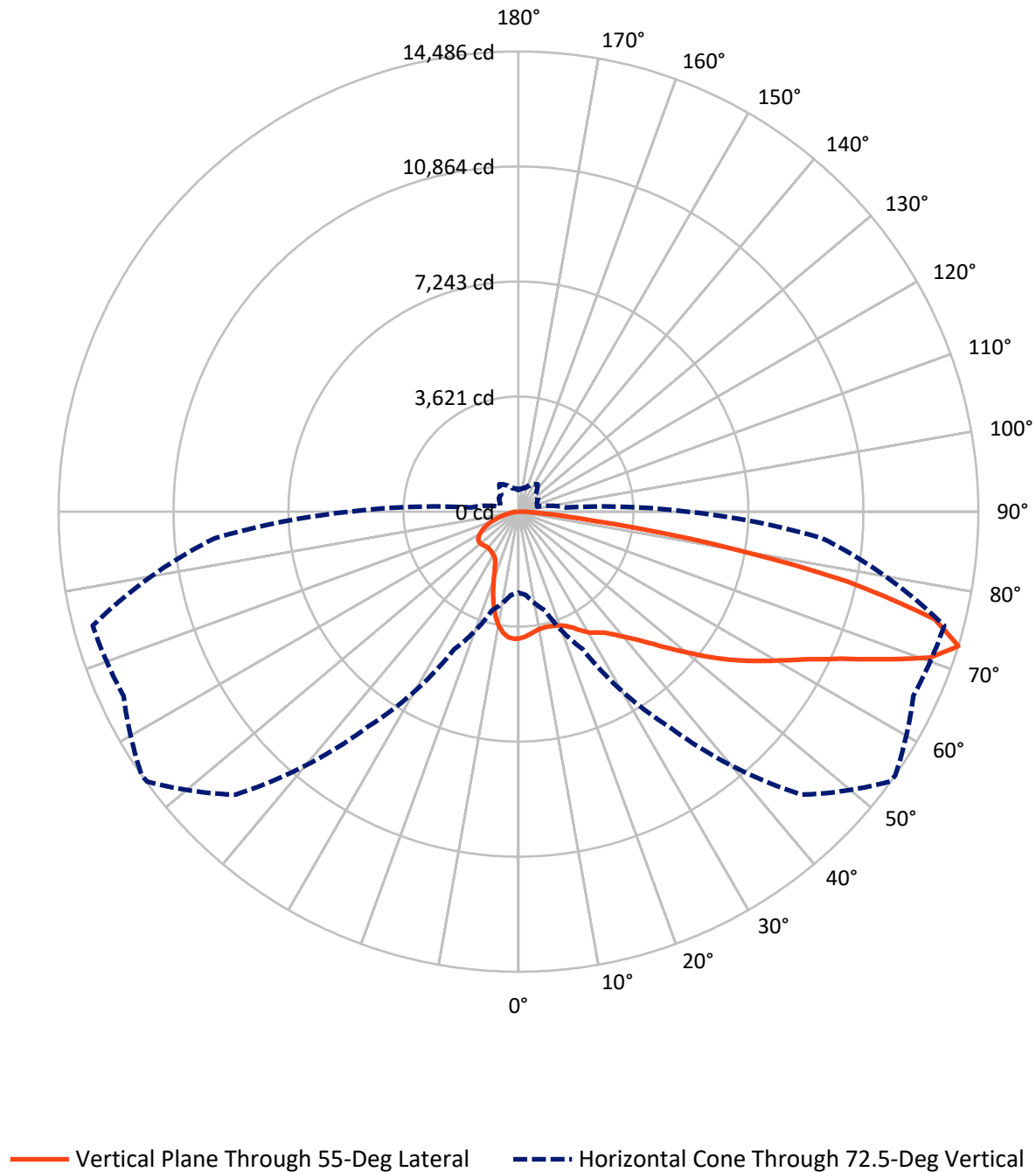
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6.4 fc  
 Type IV - Medium - N/A

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## Luminous Intensity Polar Plot



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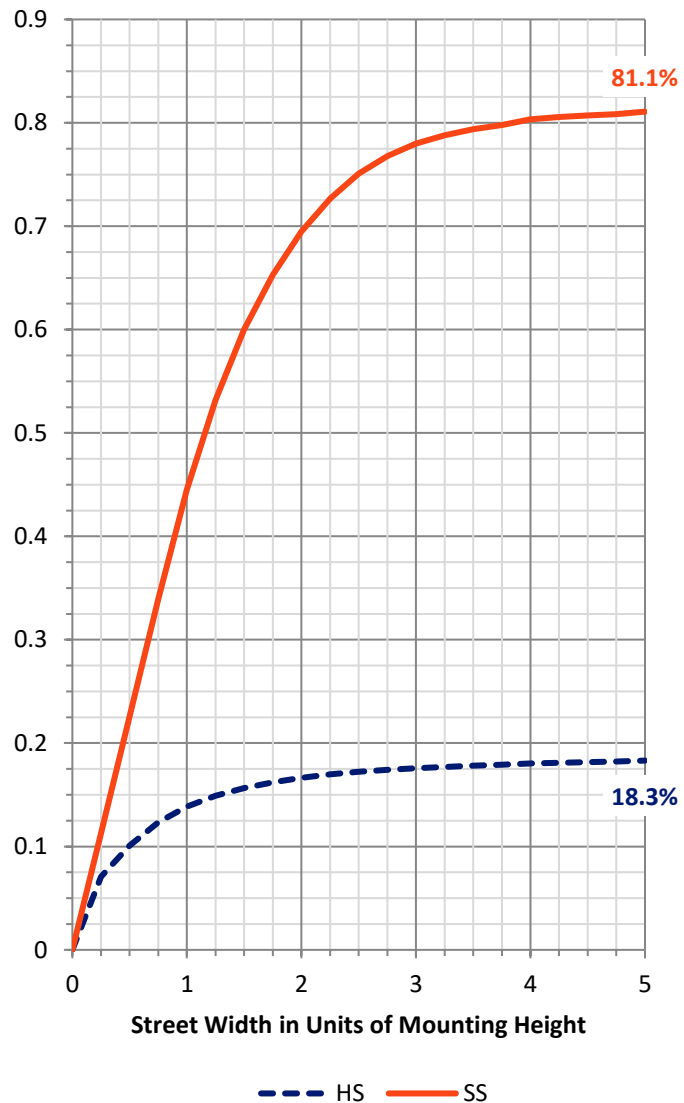
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4209.0   | 0.0    | 4209.0  |
|                    | % Fixture | 18.6     | 0.0    | 18.6    |
| <b>Street Side</b> | Lumens    | 18436.0  | 0.0    | 18436.0 |
|                    | % Fixture | 81.4     | 0.0    | 81.4    |
| <b>Total</b>       | Lumens    | 22645.0  | 0.0    | 22645.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 361.4   | 1.6       |
| 10°-20°   | 962.2   | 4.2       |
| 20°-30°   | 1586.5  | 7.0       |
| 30°-40°   | 2346.8  | 10.4      |
| 40°-50°   | 3275.6  | 14.5      |
| 50°-60°   | 4265.0  | 18.8      |
| 60°-70°   | 5241.5  | 23.1      |
| 70°-80°   | 4108.7  | 18.1      |
| 80°-90°   | 497.2   | 2.2       |
| 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°    | 22645.0 | 100.0     |
| 0°-180°   | 22645.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P317910

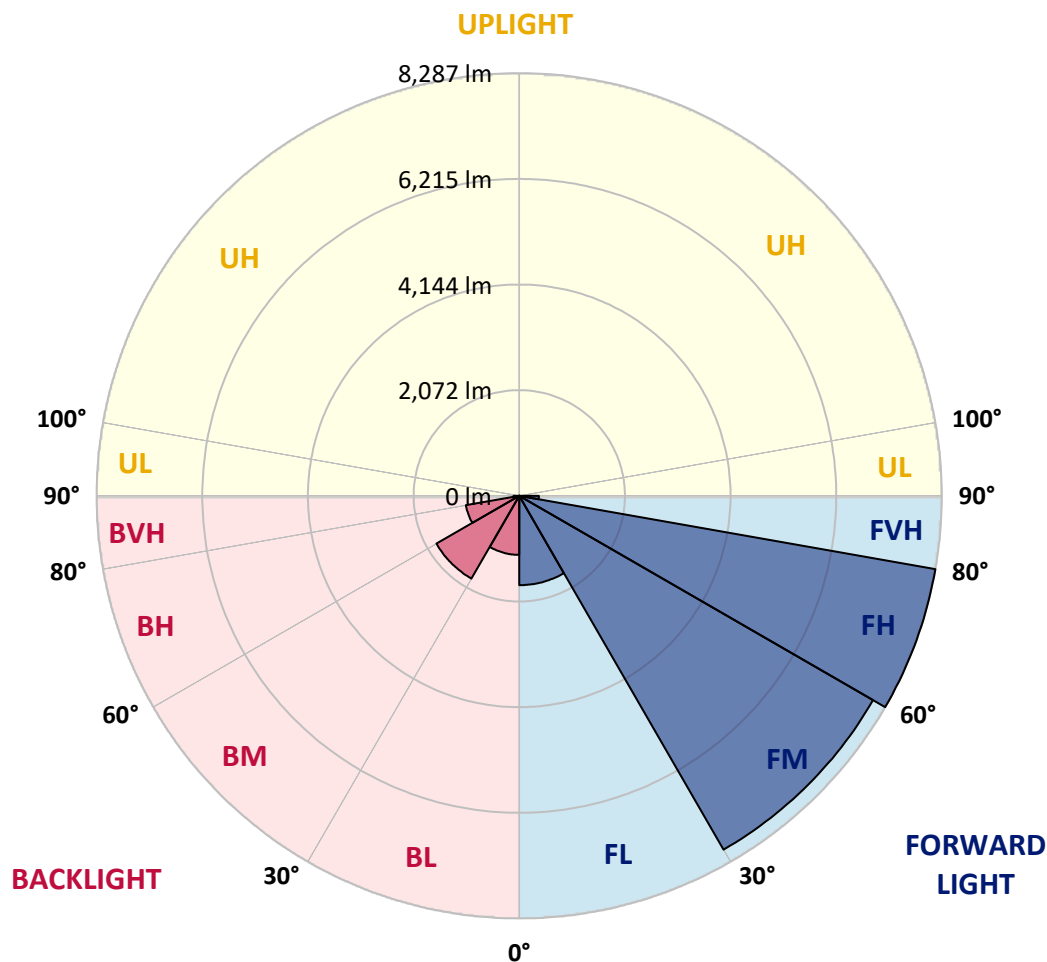
CATALOG NUMBER: GLEON-SA6A-830-U-T3R

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1752.1 | 7.7       |                         |      |          |
| FM   | (30°-60°)   | 8012.3 | 35.4      |                         |      |          |
| FH   | (60°-80°)   | 8287.3 | 36.6      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 384.4  | 1.7       |                         |      | G3/500   |
| BL   | (0°-30°)    | 1158.1 | 5.1       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 1875.2 | 8.3       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1063.0 | 4.7       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 112.8  | 0.5       |                         |      | 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 Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°     | 54°     | 55°     | 65°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
| 0°    | 3994.1 | 3994.1 | 3994.1 | 3994.1 | 3994.1 | 3994.1  | 3994.1  | 3994.1  | 3994.1  | 3994.1  | 3994.1  |
| 2.5°  | 3864.1 | 3854.9 | 3866.4 | 3882.4 | 3900.0 | 3923.7  | 3937.5  | 3943.6  | 3967.3  | 3976.5  | 3996.4  |
| 5°    | 3685.1 | 3680.5 | 3699.6 | 3727.2 | 3766.2 | 3821.2  | 3865.6  | 3874.0  | 3936.7  | 3981.1  | 4021.6  |
| 7.5°  | 3555.1 | 3555.1 | 3577.2 | 3610.1 | 3653.7 | 3727.9  | 3790.6  | 3802.1  | 3908.4  | 4004.0  | 4079.0  |
| 10°   | 3451.8 | 3455.6 | 3481.6 | 3520.6 | 3571.9 | 3650.7  | 3734.0  | 3747.0  | 3900.8  | 4057.6  | 4176.9  |
| 12.5° | 3383.0 | 3392.1 | 3415.9 | 3451.0 | 3514.5 | 3610.1  | 3715.7  | 3733.3  | 3916.8  | 4134.1  | 4294.7  |
| 15°   | 3426.6 | 3441.9 | 3444.2 | 3458.7 | 3493.9 | 3597.9  | 3726.4  | 3744.7  | 3951.3  | 4212.1  | 4428.5  |
| 17.5° | 3617.8 | 3623.1 | 3599.4 | 3568.8 | 3552.0 | 3618.5  | 3758.5  | 3777.6  | 3992.6  | 4289.3  | 4557.0  |
| 20°   | 3908.4 | 3905.4 | 3854.1 | 3771.5 | 3685.9 | 3696.6  | 3811.3  | 3831.2  | 4048.4  | 4357.4  | 4685.5  |
| 22.5° | 4275.6 | 4264.9 | 4186.1 | 4033.9 | 3887.8 | 3826.6  | 3903.8  | 3920.7  | 4132.5  | 4454.5  | 4823.2  |
| 25°   | 4720.7 | 4697.0 | 4593.0 | 4388.8 | 4173.8 | 4016.3  | 4043.0  | 4059.1  | 4254.9  | 4563.1  | 4949.4  |
| 27.5° | 5190.3 | 5166.6 | 5034.3 | 4787.2 | 4501.2 | 4255.7  | 4235.0  | 4248.8  | 4394.1  | 4643.5  | 5042.7  |
| 30°   | 5681.4 | 5656.1 | 5535.3 | 5258.4 | 4848.4 | 4503.5  | 4414.0  | 4419.4  | 4492.0  | 4687.1  | 5119.2  |
| 32.5° | 6174.7 | 6151.0 | 6015.6 | 5694.4 | 5225.5 | 4769.7  | 4543.3  | 4536.4  | 4550.9  | 4732.2  | 5205.6  |
| 35°   | 6674.9 | 6684.1 | 6525.8 | 6170.1 | 5643.1 | 5065.7  | 4696.2  | 4681.7  | 4649.6  | 4824.7  | 5328.0  |
| 37.5° | 7210.3 | 7204.2 | 6999.2 | 6627.5 | 6079.9 | 5386.9  | 4915.7  | 4913.5  | 4802.5  | 4999.9  | 5520.0  |
| 40°   | 7568.3 | 7572.1 | 7447.4 | 7095.6 | 6521.2 | 5742.6  | 5197.2  | 5191.9  | 5046.5  | 5262.2  | 5771.6  |
| 42.5° | 7708.2 | 7733.5 | 7765.6 | 7542.3 | 6983.2 | 6154.8  | 5533.0  | 5525.3  | 5386.9  | 5638.5  | 6067.6  |
| 45°   | 7718.2 | 7768.7 | 7967.5 | 7939.2 | 7451.3 | 6626.7  | 5962.1  | 5940.7  | 5841.2  | 6138.8  | 6421.0  |
| 47.5° | 7632.5 | 7684.5 | 8015.0 | 8175.6 | 7869.6 | 7124.7  | 6463.8  | 6447.0  | 6361.3  | 6764.4  | 6803.4  |
| 50°   | 7445.1 | 7494.8 | 7917.0 | 8291.1 | 8213.8 | 7603.5  | 7042.1  | 6997.7  | 6951.8  | 7487.2  | 7240.9  |
| 52.5° | 7094.1 | 7189.7 | 7786.3 | 8318.6 | 8419.6 | 8028.7  | 7650.1  | 7621.0  | 7646.3  | 8249.8  | 7679.2  |
| 55°   | 6262.7 | 6369.7 | 7449.0 | 8295.7 | 8571.8 | 8385.9  | 8258.2  | 8256.6  | 8387.4  | 9049.8  | 8149.6  |
| 57.5° | 5796.9 | 5872.6 | 6762.1 | 8256.6 | 8752.3 | 8740.8  | 8860.1  | 8874.7  | 9129.4  | 9921.0  | 8642.1  |
| 60°   | 5533.8 | 5613.3 | 6414.1 | 8112.1 | 9032.2 | 9199.7  | 9474.3  | 9503.4  | 9883.5  | 10885.5 | 9234.9  |
| 62.5° | 5294.4 | 5381.5 | 6198.4 | 7817.6 | 9361.9 | 9856.0  | 10210.1 | 10236.1 | 10682.0 | 11876.7 | 9807.8  |
| 65°   | 4885.2 | 4983.8 | 5882.5 | 7624.1 | 9661.7 | 10711.8 | 11145.5 | 11163.1 | 11599.1 | 12915.4 | 10246.0 |
| 67.5° | 4306.9 | 4397.2 | 5286.7 | 7196.6 | 9883.5 | 11751.3 | 12389.2 | 12399.1 | 12508.5 | 13648.9 | 10470.1 |
| 70°   | 3631.5 | 3666.0 | 4437.7 | 6313.9 | 9621.2 | 12723.4 | 13752.2 | 13754.4 | 13337.6 | 14118.5 | 10433.4 |
| 72.5° | 2551.6 | 2632.6 | 3221.6 | 4779.6 | 8268.1 | 12604.9 | 14459.6 | 14485.7 | 13723.1 | 13881.4 | 9599.7  |
| 75°   | 1564.9 | 1650.6 | 2020.8 | 2896.5 | 5245.4 | 9913.3  | 13359.8 | 13540.3 | 13000.3 | 12376.9 | 7842.1  |
| 77.5° | 1046.3 | 1078.5 | 1318.6 | 1688.8 | 2376.4 | 5703.5  | 10271.3 | 10610.9 | 10799.8 | 9026.1  | 5015.2  |
| 80°   | 583.6  | 644.8  | 874.2  | 1049.4 | 1057.0 | 2266.3  | 6158.6  | 6238.2  | 6008.7  | 3594.1  | 1547.3  |
| 82.5° | 309.0  | 342.7  | 583.6  | 616.5  | 576.7  | 758.7   | 2295.3  | 2297.6  | 1919.8  | 963.7   | 459.7   |
| 85°   | 239.4  | 267.7  | 400.0  | 376.3  | 294.5  | 336.5   | 757.2   | 798.5   | 653.2   | 394.7   | 149.9   |
| 87.5° | 119.3  | 148.4  | 271.5  | 238.6  | 115.5  | 96.4    | 270.8   | 289.1   | 257.8   | 154.5   | 54.3    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



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CATALOG NUMBER: GLEON-SA6A-830-U-T3R

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3994.1 | 3994.1 | 3994.1 | 3994.1 | 3994.1 | 3994.1 | 3994.1 | 3994.1 | 3994.1 | 3994.1 | 3994.1 |
| 2.5°  | 4004.0 | 4010.9 | 4019.3 | 4010.2 | 4007.1 | 3994.9 | 3974.2 | 3969.6 | 3958.9 | 3959.7 | 3965.8 |
| 5°    | 4039.2 | 4050.7 | 4046.1 | 4010.9 | 3968.9 | 3910.0 | 3848.8 | 3796.8 | 3762.3 | 3760.0 | 3757.7 |
| 7.5°  | 4106.5 | 4114.2 | 4078.2 | 3978.0 | 3860.2 | 3724.1 | 3595.6 | 3483.2 | 3415.1 | 3398.3 | 3394.4 |
| 10°   | 4212.1 | 4210.5 | 4111.9 | 3910.0 | 3675.1 | 3431.9 | 3225.4 | 3069.4 | 2978.4 | 2951.6 | 2944.7 |
| 12.5° | 4329.9 | 4312.3 | 4123.4 | 3786.0 | 3413.6 | 3076.3 | 2814.7 | 2641.1 | 2546.2 | 2515.6 | 2508.0 |
| 15°   | 4451.5 | 4407.9 | 4095.1 | 3601.0 | 3092.3 | 2693.1 | 2418.5 | 2257.9 | 2206.6 | 2189.8 | 2186.7 |
| 17.5° | 4564.7 | 4480.5 | 4014.0 | 3350.1 | 2726.0 | 2311.4 | 2097.2 | 2033.0 | 2045.2 | 2067.4 | 2068.2 |
| 20°   | 4675.6 | 4529.5 | 3884.0 | 3033.4 | 2339.7 | 1997.0 | 1924.4 | 1971.8 | 2029.9 | 2075.1 | 2081.2 |
| 22.5° | 4785.0 | 4563.9 | 3716.4 | 2667.8 | 1994.0 | 1820.4 | 1871.6 | 1958.0 | 2024.6 | 2073.5 | 2081.9 |
| 25°   | 4876.7 | 4572.3 | 3485.5 | 2277.7 | 1753.8 | 1753.8 | 1846.4 | 1928.2 | 1994.0 | 2042.2 | 2050.6 |
| 27.5° | 4910.4 | 4515.7 | 3159.6 | 1916.7 | 1633.0 | 1723.2 | 1811.2 | 1879.3 | 1935.1 | 1986.3 | 1995.5 |
| 30°   | 4923.4 | 4410.9 | 2783.3 | 1626.9 | 1583.3 | 1690.3 | 1763.8 | 1821.9 | 1874.7 | 1922.9 | 1931.3 |
| 32.5° | 4925.7 | 4284.7 | 2384.1 | 1462.4 | 1548.8 | 1655.9 | 1704.9 | 1756.1 | 1812.7 | 1831.8 | 1834.9 |
| 35°   | 4940.2 | 4135.6 | 1963.4 | 1378.3 | 1516.7 | 1623.8 | 1662.8 | 1699.5 | 1607.7 | 1614.6 | 1620.7 |
| 37.5° | 4982.3 | 3988.0 | 1611.6 | 1330.9 | 1496.1 | 1607.0 | 1653.6 | 1520.5 | 1448.6 | 1431.8 | 1429.5 |
| 40°   | 5061.1 | 3830.4 | 1350.7 | 1292.6 | 1488.4 | 1615.4 | 1594.7 | 1419.6 | 1295.7 | 1203.1 | 1189.4 |
| 42.5° | 5170.4 | 3660.6 | 1184.0 | 1267.4 | 1493.8 | 1655.9 | 1512.9 | 1322.4 | 1116.7 | 1057.0 | 1049.4 |
| 45°   | 5293.6 | 3482.4 | 1093.7 | 1249.8 | 1512.1 | 1687.3 | 1496.1 | 1193.2 | 1033.3 | 988.2  | 984.4  |
| 47.5° | 5412.9 | 3264.4 | 1047.1 | 1242.1 | 1537.4 | 1662.0 | 1424.9 | 1153.4 | 993.6  | 969.8  | 972.1  |
| 50°   | 5549.8 | 3067.8 | 1018.8 | 1233.7 | 1559.5 | 1646.0 | 1344.6 | 1132.8 | 978.3  | 1007.3 | 1037.9 |
| 52.5° | 5665.3 | 2864.4 | 993.6  | 1216.9 | 1568.0 | 1617.7 | 1324.0 | 1136.6 | 978.3  | 1034.1 | 1063.2 |
| 55°   | 5802.2 | 2710.7 | 964.5  | 1181.7 | 1551.9 | 1537.4 | 1309.4 | 1159.5 | 989.7  | 954.5  | 957.6  |
| 57.5° | 5978.9 | 2660.2 | 932.4  | 1126.6 | 1498.4 | 1420.3 | 1302.6 | 1181.7 | 982.8  | 960.7  | 968.3  |
| 60°   | 6223.7 | 2713.7 | 919.4  | 1054.7 | 1415.0 | 1328.6 | 1303.3 | 1170.2 | 934.7  | 896.4  | 897.2  |
| 62.5° | 6456.9 | 2773.4 | 918.6  | 1009.6 | 1312.5 | 1246.7 | 1285.7 | 1132.8 | 910.2  | 888.0  | 896.4  |
| 65°   | 6533.4 | 2713.0 | 881.9  | 959.1  | 1197.0 | 1148.8 | 1253.6 | 1093.0 | 891.8  | 858.2  | 856.6  |
| 67.5° | 6430.9 | 2525.6 | 807.7  | 877.3  | 1064.7 | 1034.9 | 1211.5 | 1045.6 | 862.8  | 835.2  | 830.6  |
| 70°   | 6126.5 | 2107.2 | 715.9  | 769.4  | 914.0  | 906.4  | 1145.0 | 990.5  | 823.8  | 800.0  | 780.2  |
| 72.5° | 5307.4 | 1501.4 | 603.5  | 640.2  | 744.2  | 768.7  | 1053.2 | 918.6  | 768.7  | 717.4  | 686.8  |
| 75°   | 4358.9 | 1111.3 | 495.6  | 503.3  | 565.2  | 631.8  | 927.0  | 834.5  | 703.7  | 616.5  | 592.8  |
| 77.5° | 2669.4 | 680.0  | 394.7  | 397.7  | 405.4  | 504.0  | 763.3  | 740.4  | 621.1  | 514.0  | 497.2  |
| 80°   | 864.3  | 371.0  | 285.3  | 299.8  | 276.9  | 369.4  | 590.5  | 630.2  | 533.1  | 429.9  | 411.5  |
| 82.5° | 328.9  | 216.5  | 192.7  | 202.7  | 192.0  | 247.8  | 430.6  | 504.8  | 436.7  | 353.4  | 287.6  |
| 85°   | 159.1  | 122.4  | 114.0  | 127.7  | 118.6  | 127.0  | 275.3  | 371.7  | 331.2  | 230.2  | 214.2  |
| 87.5° | 56.6   | 54.3   | 43.6   | 58.9   | 50.5   | 45.1   | 84.1   | 187.4  | 218.7  | 158.3  | 141.5  |
| 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           |

REPORT NUMBER: SP1-2408-195-9

**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

| $\lambda$<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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### 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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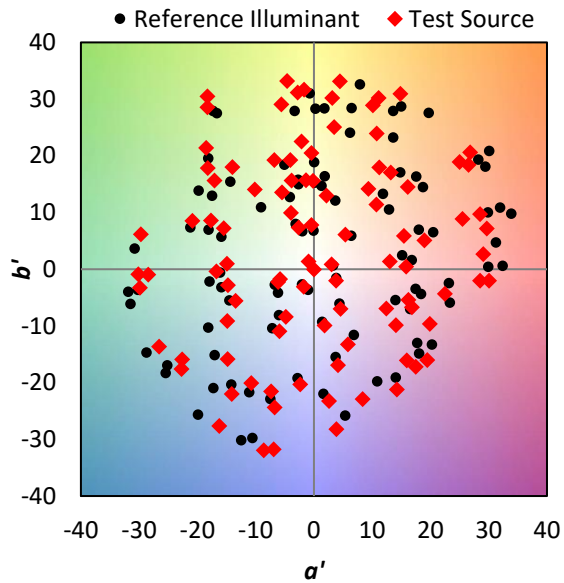
TM-30-18

### Summary

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



### Color Vector Graphics



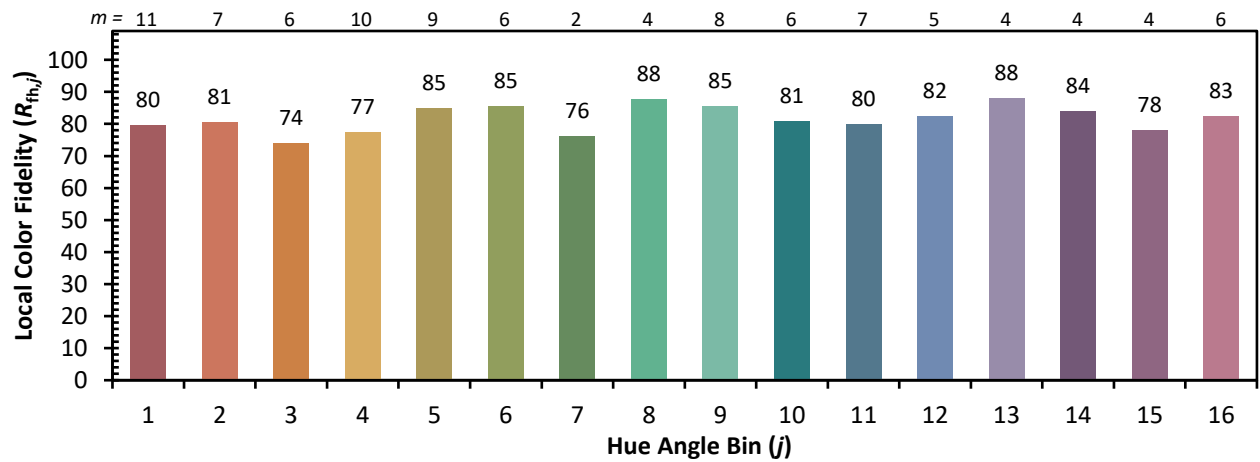
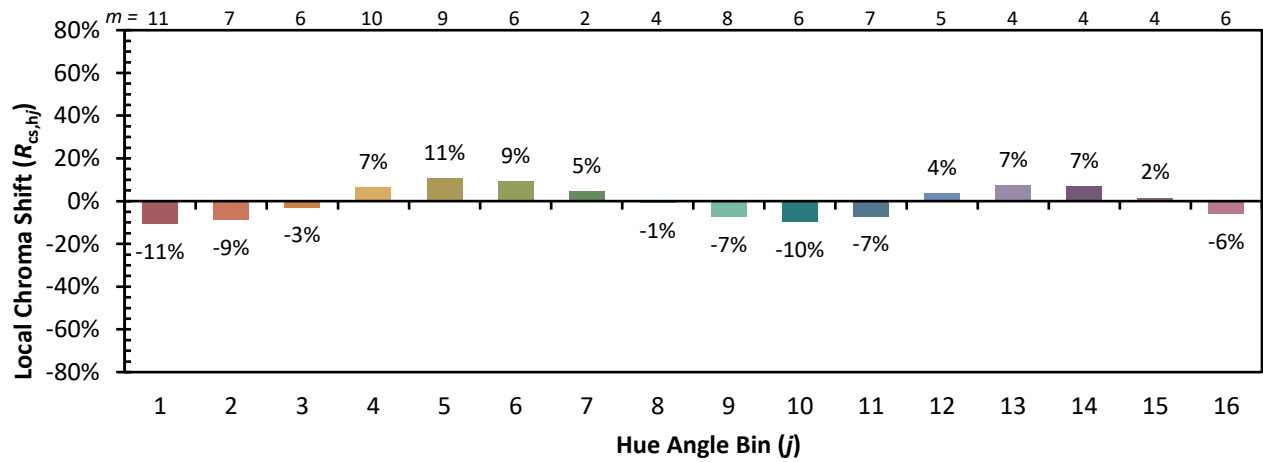


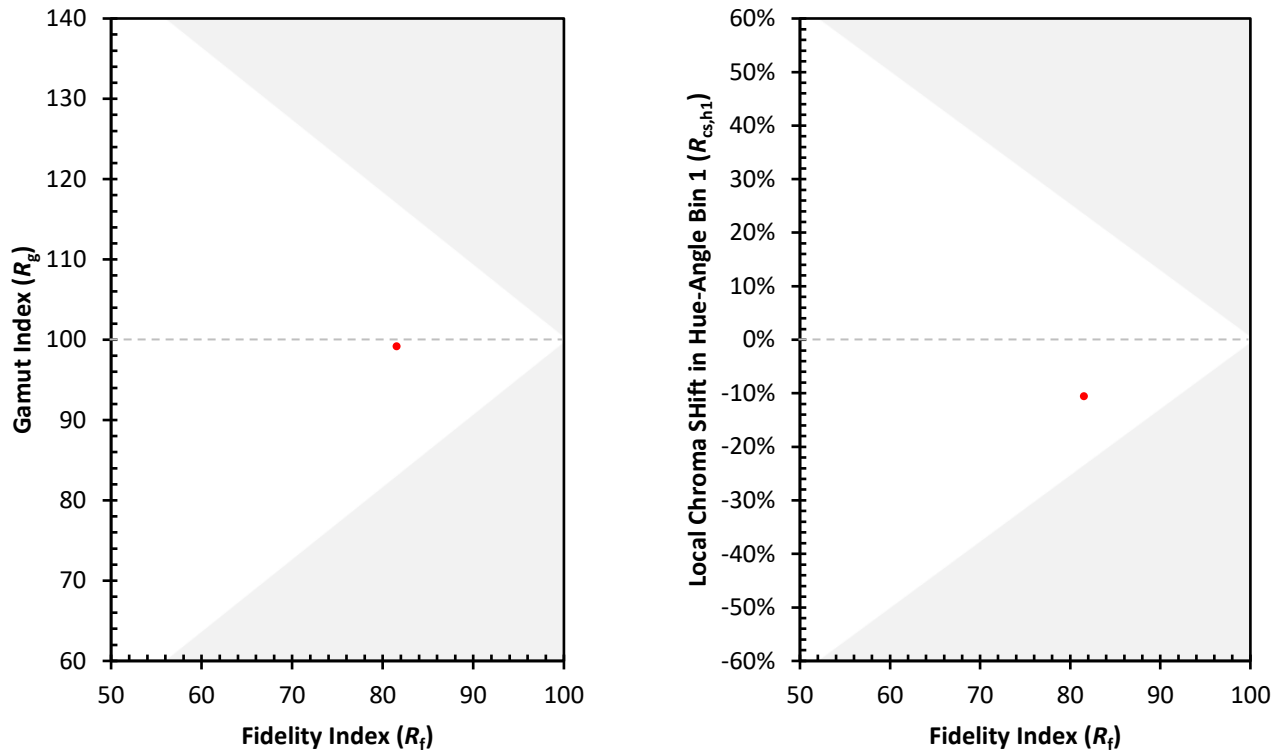
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

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



Color Rendition by Hue-Angle Bin



**Measure Comparisons**


(END OF REPORT)