

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: P318889

Luminaire Tested: **GLEON-SA5C-830-U-T4FT**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P318889  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-16)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA5C-830-U-T4FT  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(5) 80 CRI, 3000K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 28261 lumens  
Efficiency: N/A  
Efficacy: 101.3 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

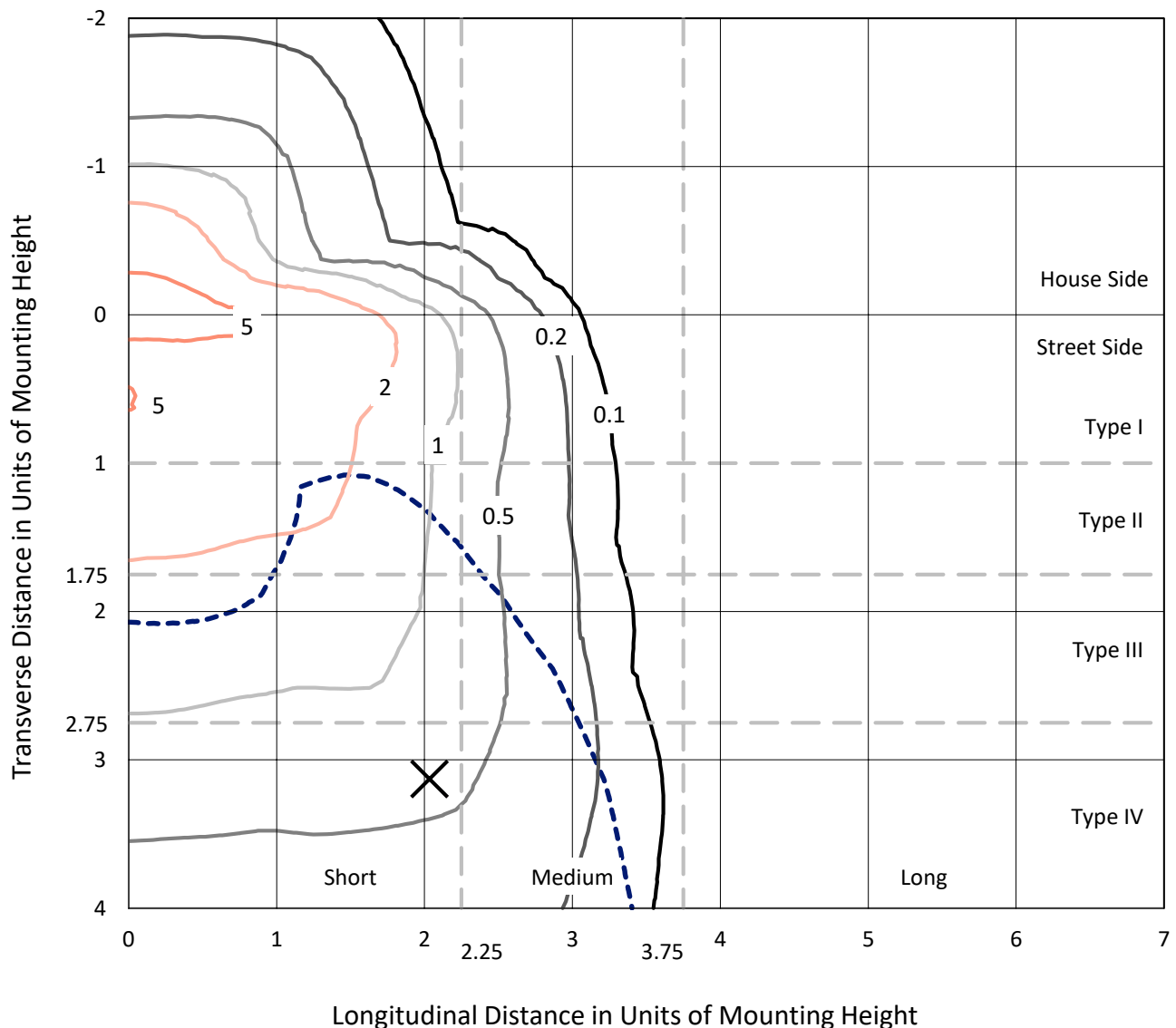
Input Watts (W): 279  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

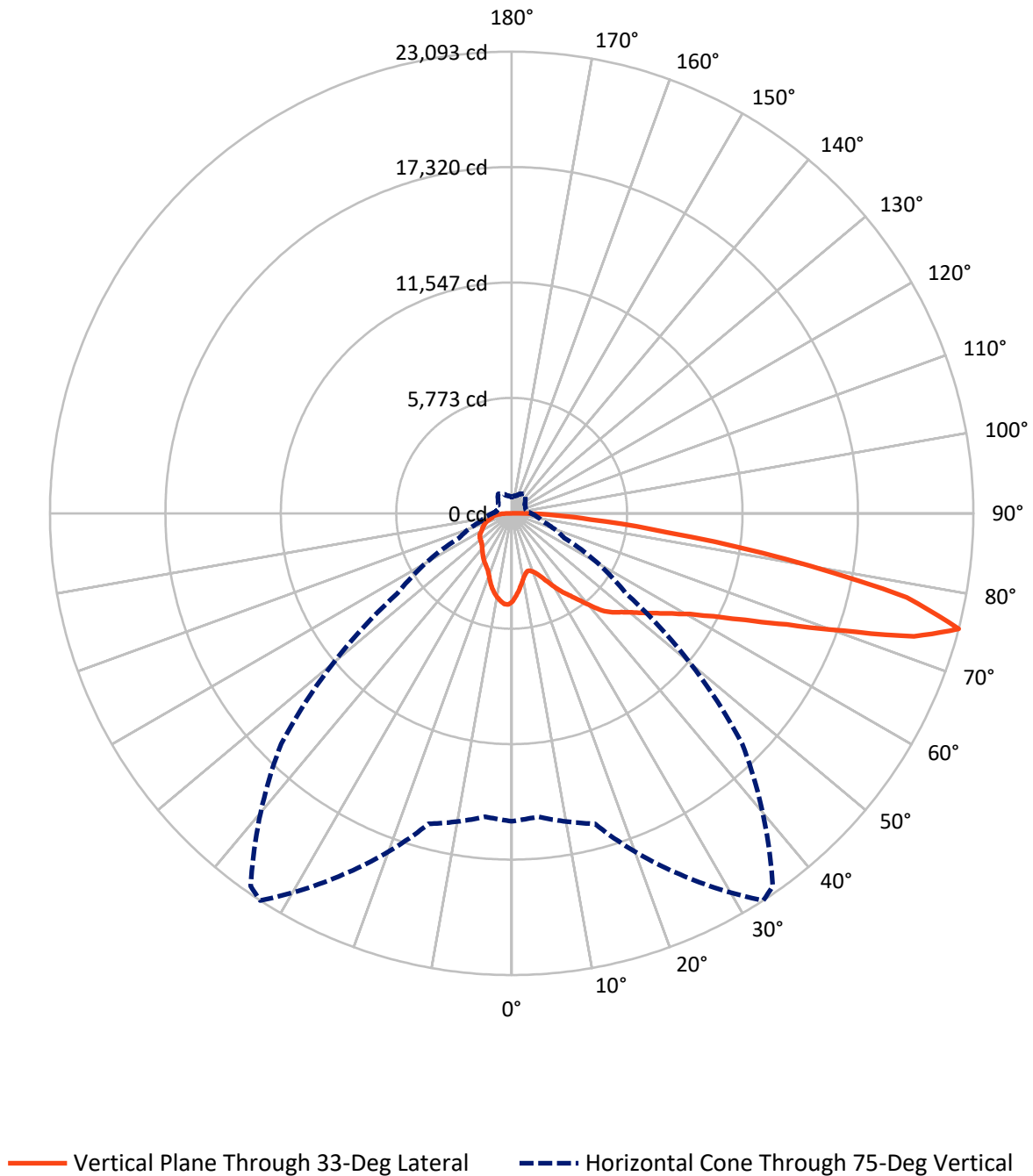
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 7.1 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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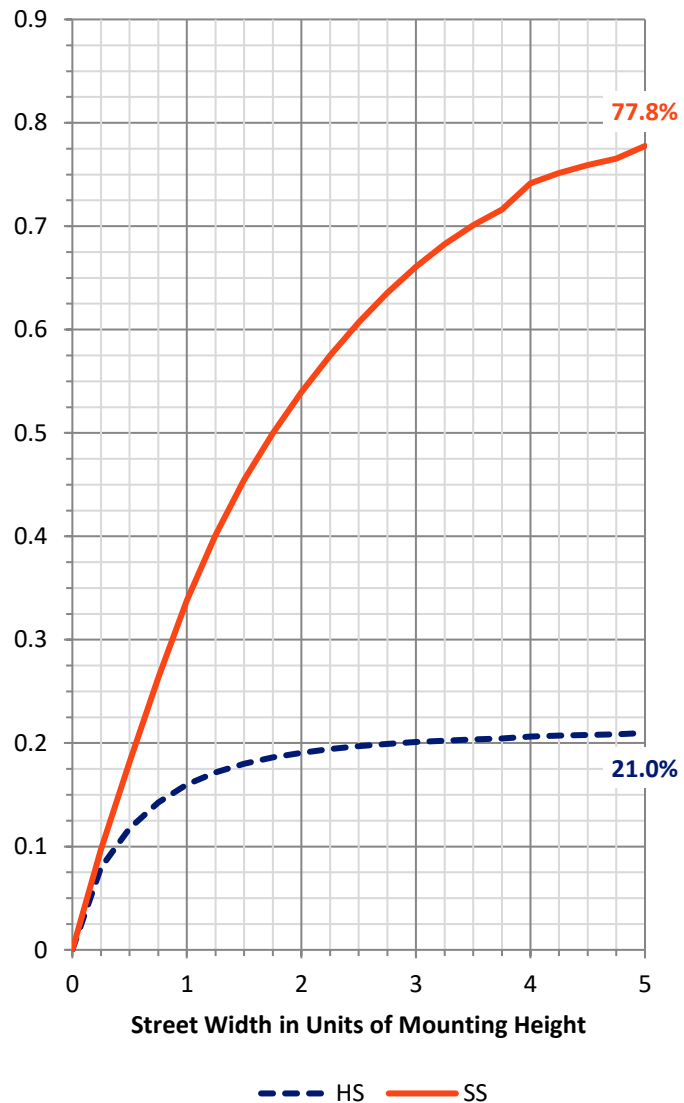
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 6068.4   | 0.0    | 6068.4  |
|                    | % Fixture | 21.5     | 0.0    | 21.5    |
| <b>Street Side</b> | Lumens    | 22192.6  | 0.0    | 22192.6 |
|                    | % Fixture | 78.5     | 0.0    | 78.5    |
| <b>Total</b>       | Lumens    | 28261.0  | 0.0    | 28261.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 399.5   | 1.4       |
| 10°-20°   | 1082.0  | 3.8       |
| 20°-30°   | 1767.1  | 6.3       |
| 30°-40°   | 2631.6  | 9.3       |
| 40°-50°   | 3774.4  | 13.4      |
| 50°-60°   | 5181.6  | 18.3      |
| 60°-70°   | 6487.2  | 23.0      |
| 70°-80°   | 5868.6  | 20.8      |
| 80°-90°   | 1069.0  | 3.8       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 28261.0 | 100.0     |
| 0°-180°   | 28261.0 | 100.0     |

**Coefficient of Utilization**



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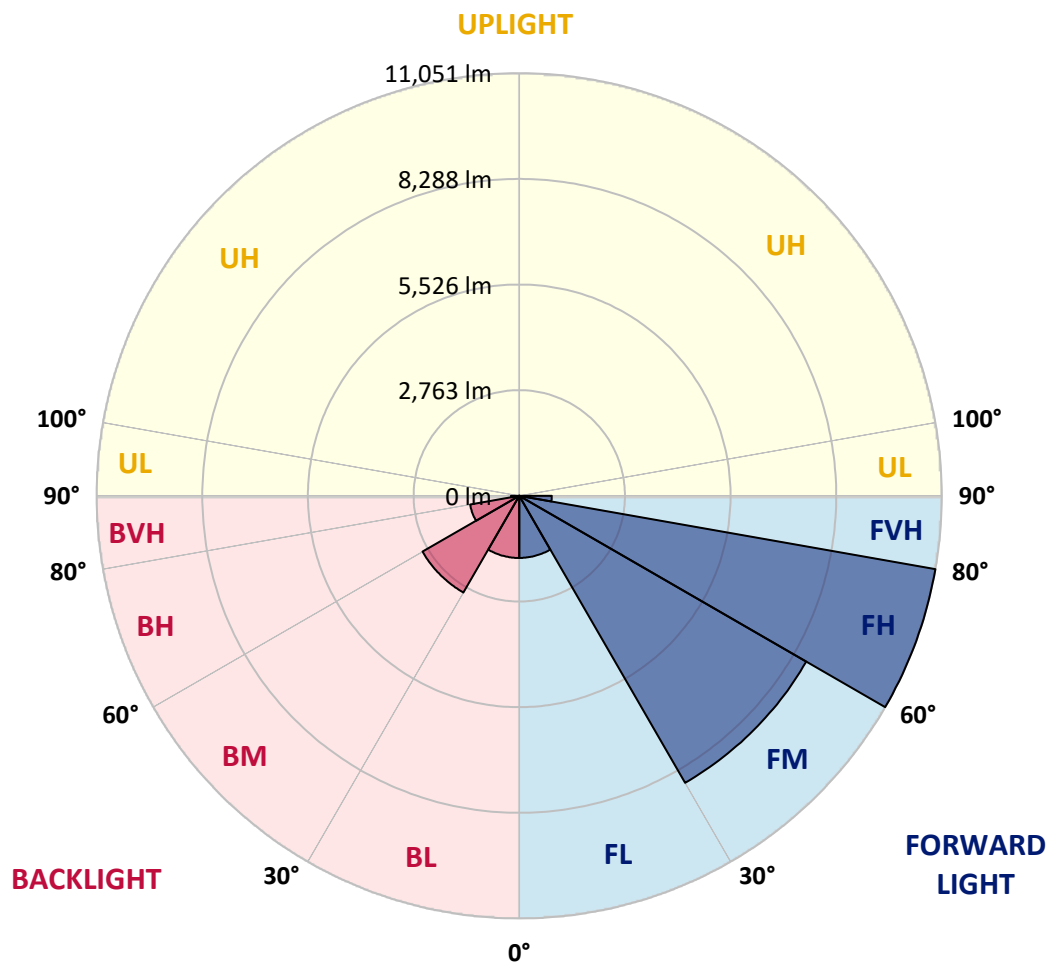
CATALOG NUMBER: GLEON-SA5C-830-U-T4FT

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1623.2  | 5.7       |                         |      |          |
| FM   | (30°-60°)   | 8667.1  | 30.7      |                         |      |          |
| FH   | (60°-80°)   | 11051.0 | 39.1      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 851.4   | 3.0       |                         |      | G5       |
| BL   | (0°-30°)    | 1625.4  | 5.8       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 2920.5  | 10.3      | B3/5000                 |      |          |
| BH   | (60°-80°)   | 1304.8  | 4.6       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 217.6   | 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-G5**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 33°     | 35°     | 45°     | 55°     | 65°    | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|--------|---------|---------|
| 0°    | 4417.4  | 4417.4  | 4417.4  | 4417.4  | 4417.4  | 4417.4  | 4417.4  | 4417.4  | 4417.4 | 4417.4  | 4417.4  |
| 2.5°  | 4102.0  | 4086.4  | 4115.7  | 4119.6  | 4145.0  | 4154.8  | 4189.9  | 4244.6  | 4289.5 | 4341.2  | 4388.1  |
| 5°    | 3730.1  | 3719.4  | 3760.4  | 3789.6  | 3845.3  | 3868.7  | 3951.7  | 4067.9  | 4171.3 | 4288.5  | 4394.9  |
| 7.5°  | 3376.7  | 3370.9  | 3416.7  | 3483.1  | 3547.5  | 3579.8  | 3723.3  | 3892.2  | 4064.9 | 4254.3  | 4417.4  |
| 10°   | 3079.0  | 3077.0  | 3120.9  | 3186.4  | 3281.0  | 3317.2  | 3502.6  | 3725.2  | 3967.3 | 4228.0  | 4455.4  |
| 12.5° | 2912.0  | 2918.9  | 2939.4  | 2994.0  | 3081.9  | 3118.0  | 3324.0  | 3585.6  | 3885.3 | 4219.2  | 4511.1  |
| 15°   | 2953.0  | 2963.8  | 2928.6  | 2926.7  | 2989.2  | 3017.5  | 3210.8  | 3486.0  | 3826.7 | 4233.8  | 4592.1  |
| 17.5° | 3127.8  | 3129.7  | 3037.0  | 2978.4  | 3016.5  | 3031.1  | 3175.6  | 3429.4  | 3792.6 | 4267.0  | 4693.6  |
| 20°   | 3373.8  | 3368.9  | 3204.9  | 3107.3  | 3127.8  | 3131.7  | 3225.4  | 3430.4  | 3789.6 | 4324.6  | 4825.4  |
| 22.5° | 3699.8  | 3663.7  | 3443.1  | 3310.3  | 3305.4  | 3299.6  | 3353.3  | 3502.6  | 3832.6 | 4418.3  | 4982.6  |
| 25°   | 4125.5  | 4091.3  | 3787.7  | 3606.1  | 3567.1  | 3552.4  | 3560.2  | 3656.9  | 3917.5 | 4518.9  | 5158.3  |
| 27.5° | 4598.9  | 4539.4  | 4246.5  | 3989.8  | 3908.7  | 3888.2  | 3841.4  | 3874.6  | 4010.3 | 4615.5  | 5367.2  |
| 30°   | 4995.3  | 4963.1  | 4707.3  | 4402.7  | 4307.0  | 4277.8  | 4154.8  | 4118.6  | 4144.0 | 4747.3  | 5630.8  |
| 32.5° | 5216.9  | 5195.4  | 5040.2  | 4794.2  | 4705.3  | 4664.3  | 4490.6  | 4418.3  | 4358.8 | 4955.2  | 5988.1  |
| 35°   | 5485.3  | 5471.7  | 5377.9  | 5199.3  | 5067.5  | 5024.6  | 4889.8  | 4814.7  | 4661.4 | 5241.3  | 6449.8  |
| 37.5° | 5827.0  | 5812.4  | 5814.3  | 5669.8  | 5512.7  | 5472.6  | 5383.8  | 5304.7  | 5053.8 | 5617.1  | 6951.6  |
| 40°   | 6213.6  | 6185.3  | 6174.5  | 6167.7  | 6068.1  | 6045.7  | 5998.8  | 5891.4  | 5545.9 | 6066.2  | 7446.5  |
| 42.5° | 6795.4  | 6694.9  | 6480.1  | 6561.1  | 6659.7  | 6648.0  | 6686.1  | 6531.8  | 6092.5 | 6597.2  | 7929.8  |
| 45°   | 7356.7  | 7191.7  | 6820.8  | 6838.4  | 7054.1  | 7119.5  | 7404.6  | 7295.2  | 6685.1 | 7179.1  | 8429.6  |
| 47.5° | 7612.5  | 7487.5  | 7172.2  | 7173.2  | 7387.0  | 7522.7  | 8147.5  | 8069.4  | 7307.9 | 7839.9  | 9039.7  |
| 50°   | 7898.5  | 7773.6  | 7490.5  | 7596.9  | 7783.3  | 7927.8  | 8865.0  | 8824.9  | 7900.5 | 8563.3  | 9770.9  |
| 52.5° | 8210.9  | 7999.1  | 7819.4  | 8009.8  | 8271.4  | 8439.3  | 9583.5  | 9474.1  | 8444.2 | 9291.6  | 10611.4 |
| 55°   | 8214.8  | 8157.2  | 8293.9  | 8433.5  | 8824.9  | 9030.9  | 10336.1 | 10047.2 | 8887.4 | 10007.1 | 11295.7 |
| 57.5° | 8682.4  | 8588.7  | 8878.6  | 8943.1  | 9454.6  | 9686.9  | 11084.9 | 10546.0 | 9338.4 | 10555.8 | 11664.7 |
| 60°   | 9301.3  | 9221.3  | 9458.5  | 9628.4  | 10233.6 | 10544.1 | 11884.4 | 11058.5 | 9692.8 | 10969.7 | 11647.2 |
| 62.5° | 10370.3 | 10279.5 | 10276.6 | 10514.8 | 11329.9 | 11691.1 | 12781.5 | 11561.3 | 9833.4 | 11051.7 | 11150.3 |
| 65°   | 11935.2 | 11790.7 | 11518.3 | 11631.5 | 12844.0 | 13204.2 | 13784.1 | 11925.4 | 9647.9 | 10612.4 | 9870.5  |
| 67.5° | 13458.0 | 13453.2 | 13118.3 | 13350.7 | 14843.3 | 15132.2 | 14926.3 | 11961.5 | 9069.0 | 9082.7  | 7599.8  |
| 70°   | 14976.0 | 14995.6 | 14939.0 | 15747.3 | 17544.5 | 17845.1 | 16142.6 | 11476.3 | 7767.7 | 6559.2  | 4553.0  |
| 72.5° | 16178.7 | 16173.9 | 16458.9 | 18543.1 | 21050.0 | 20982.7 | 17167.6 | 10006.2 | 5577.1 | 3540.7  | 2176.0  |
| 75°   | 15399.7 | 15229.9 | 16079.2 | 19927.4 | 23093.2 | 22764.3 | 16295.9 | 6979.9  | 2894.5 | 1611.7  | 1171.5  |
| 77.5° | 10044.2 | 10205.3 | 11451.9 | 16461.8 | 20199.7 | 19799.5 | 11955.7 | 3256.6  | 1363.8 | 1057.2  | 849.3   |
| 80°   | 3637.4  | 3807.2  | 5362.3  | 9324.8  | 13916.9 | 13851.5 | 5887.5  | 1338.4  | 922.5  | 798.5   | 618.9   |
| 82.5° | 1251.5  | 1314.0  | 2115.4  | 4141.1  | 7857.5  | 8150.4  | 2215.0  | 760.5   | 670.7  | 566.2   | 423.7   |
| 85°   | 491.0   | 562.3   | 967.4   | 1992.4  | 3963.4  | 3992.7  | 897.1   | 454.9   | 466.6  | 371.0   | 232.3   |
| 87.5° | 186.5   | 226.5   | 462.7   | 925.4   | 1809.9  | 1662.5  | 321.2   | 216.7   | 265.5  | 220.6   | 110.3   |
| 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: P318889

CATALOG NUMBER: GLEON-SA5C-830-U-T4FT

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4417.4 | 4417.4 | 4417.4 | 4417.4 | 4417.4 | 4417.4 | 4417.4 | 4417.4 | 4417.4 | 4417.4 | 4417.4 |
| 2.5°  | 4424.2 | 4444.7 | 4487.6 | 4516.9 | 4548.2 | 4557.0 | 4560.9 | 4568.7 | 4576.5 | 4573.5 | 4574.5 |
| 5°    | 4451.5 | 4491.5 | 4560.9 | 4590.1 | 4603.8 | 4588.2 | 4557.9 | 4533.5 | 4516.0 | 4506.2 | 4503.3 |
| 7.5°  | 4496.4 | 4553.0 | 4627.2 | 4622.4 | 4591.1 | 4521.8 | 4443.7 | 4385.1 | 4336.3 | 4318.8 | 4309.0 |
| 10°   | 4556.0 | 4622.4 | 4674.1 | 4618.5 | 4527.7 | 4407.6 | 4290.4 | 4199.7 | 4126.4 | 4098.1 | 4093.3 |
| 12.5° | 4632.1 | 4699.5 | 4709.2 | 4591.1 | 4440.8 | 4276.8 | 4117.7 | 3997.6 | 3888.2 | 3853.1 | 3845.3 |
| 15°   | 4730.7 | 4794.2 | 4733.6 | 4543.3 | 4333.4 | 4112.8 | 3906.8 | 3743.8 | 3628.6 | 3585.6 | 3570.0 |
| 17.5° | 4834.2 | 4894.7 | 4738.5 | 4464.2 | 4192.8 | 3918.5 | 3659.8 | 3492.9 | 3361.1 | 3311.3 | 3305.4 |
| 20°   | 4958.2 | 4985.5 | 4718.0 | 4351.0 | 3999.5 | 3666.6 | 3394.3 | 3237.1 | 3166.8 | 3131.7 | 3127.8 |
| 22.5° | 5111.4 | 5082.2 | 4671.2 | 4197.7 | 3754.5 | 3375.7 | 3154.1 | 3080.9 | 3063.3 | 3055.5 | 3058.5 |
| 25°   | 5273.5 | 5183.7 | 4601.9 | 3997.6 | 3445.0 | 3084.8 | 2978.4 | 2998.9 | 3022.3 | 3019.4 | 3019.4 |
| 27.5° | 5452.1 | 5287.2 | 4495.4 | 3732.1 | 3102.4 | 2846.6 | 2859.3 | 2934.5 | 2969.6 | 2968.7 | 2967.7 |
| 30°   | 5681.5 | 5404.3 | 4359.8 | 3412.8 | 2782.2 | 2678.7 | 2755.8 | 2847.6 | 2895.4 | 2893.5 | 2894.5 |
| 32.5° | 5963.7 | 5533.2 | 4175.3 | 3056.5 | 2550.8 | 2554.7 | 2643.6 | 2734.4 | 2790.0 | 2785.1 | 2786.1 |
| 35°   | 6293.6 | 5677.6 | 3925.3 | 2705.1 | 2397.6 | 2456.1 | 2526.4 | 2589.9 | 2642.6 | 2635.8 | 2628.9 |
| 37.5° | 6652.9 | 5819.2 | 3593.4 | 2390.7 | 2272.6 | 2364.4 | 2423.0 | 2433.7 | 2458.1 | 2440.5 | 2427.8 |
| 40°   | 6994.5 | 5927.6 | 3165.9 | 2133.0 | 2146.7 | 2286.3 | 2324.4 | 2281.4 | 2237.5 | 2231.6 | 2214.0 |
| 42.5° | 7292.3 | 5963.7 | 2733.4 | 1927.0 | 2013.9 | 2204.3 | 2227.7 | 2137.9 | 2058.8 | 2021.7 | 2006.1 |
| 45°   | 7606.6 | 5976.4 | 2330.2 | 1754.3 | 1886.0 | 2131.1 | 2156.4 | 2036.4 | 1925.1 | 1845.0 | 1818.7 |
| 47.5° | 8017.6 | 6068.1 | 2016.9 | 1626.4 | 1788.4 | 2082.3 | 2118.4 | 1955.3 | 1810.9 | 1696.7 | 1672.2 |
| 50°   | 8555.5 | 6249.7 | 1762.1 | 1528.7 | 1725.0 | 2050.0 | 2091.0 | 1876.3 | 1717.2 | 1579.5 | 1555.1 |
| 52.5° | 9153.0 | 6416.6 | 1556.1 | 1449.7 | 1663.5 | 1993.4 | 2055.9 | 1819.7 | 1629.3 | 1471.1 | 1444.8 |
| 55°   | 9570.8 | 6288.7 | 1390.1 | 1367.7 | 1583.4 | 1912.4 | 2007.1 | 1771.8 | 1503.4 | 1365.7 | 1342.3 |
| 57.5° | 9650.8 | 5851.4 | 1264.2 | 1282.7 | 1486.8 | 1810.9 | 1931.9 | 1665.4 | 1435.0 | 1319.8 | 1295.4 |
| 60°   | 9432.1 | 5242.3 | 1170.5 | 1204.6 | 1383.3 | 1683.0 | 1791.3 | 1590.2 | 1369.6 | 1271.0 | 1250.5 |
| 62.5° | 8882.5 | 4618.5 | 1101.2 | 1134.4 | 1286.6 | 1553.2 | 1703.5 | 1511.2 | 1303.2 | 1215.4 | 1194.9 |
| 65°   | 7772.6 | 3877.5 | 1034.8 | 1071.9 | 1196.8 | 1440.9 | 1624.4 | 1438.0 | 1237.8 | 1170.5 | 1151.0 |
| 67.5° | 5867.0 | 2904.2 | 972.3  | 1005.5 | 1116.8 | 1343.3 | 1538.5 | 1365.7 | 1174.4 | 1131.4 | 1108.0 |
| 70°   | 3454.8 | 1818.7 | 901.0  | 936.2  | 1032.8 | 1241.7 | 1446.7 | 1286.6 | 1095.3 | 1075.8 | 1045.5 |
| 72.5° | 1607.8 | 1094.3 | 820.0  | 854.2  | 927.4  | 1106.0 | 1328.6 | 1183.2 | 1001.6 | 958.6  | 917.6  |
| 75°   | 959.6  | 800.5  | 724.3  | 754.6  | 806.3  | 961.6  | 1180.2 | 1077.7 | 912.8  | 856.1  | 813.2  |
| 77.5° | 717.5  | 612.1  | 618.9  | 651.1  | 693.1  | 841.5  | 1045.5 | 994.8  | 844.4  | 800.5  | 771.2  |
| 80°   | 516.4  | 464.7  | 504.7  | 539.8  | 583.8  | 765.3  | 1001.6 | 919.6  | 763.4  | 704.8  | 677.5  |
| 82.5° | 344.6  | 333.9  | 379.7  | 415.9  | 458.8  | 669.7  | 941.1  | 805.4  | 652.1  | 577.9  | 517.4  |
| 85°   | 190.4  | 201.1  | 255.8  | 271.4  | 308.5  | 471.5  | 771.2  | 647.2  | 491.0  | 395.4  | 377.8  |
| 87.5° | 79.1   | 92.7   | 137.6  | 132.8  | 164.0  | 281.1  | 507.6  | 390.5  | 312.4  | 233.3  | 181.6  |
| 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

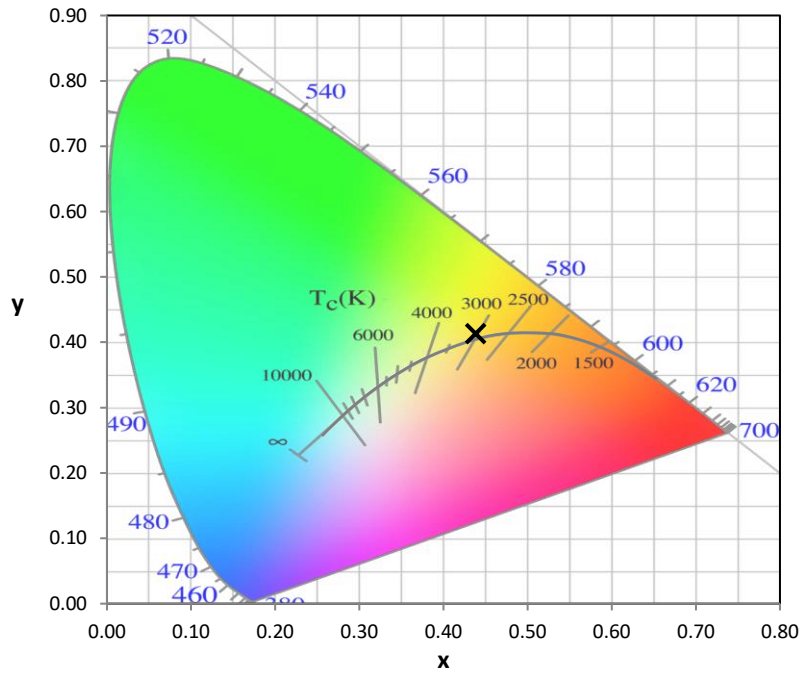
Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 24.2

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

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### Photopic Flux vs. Wavelength

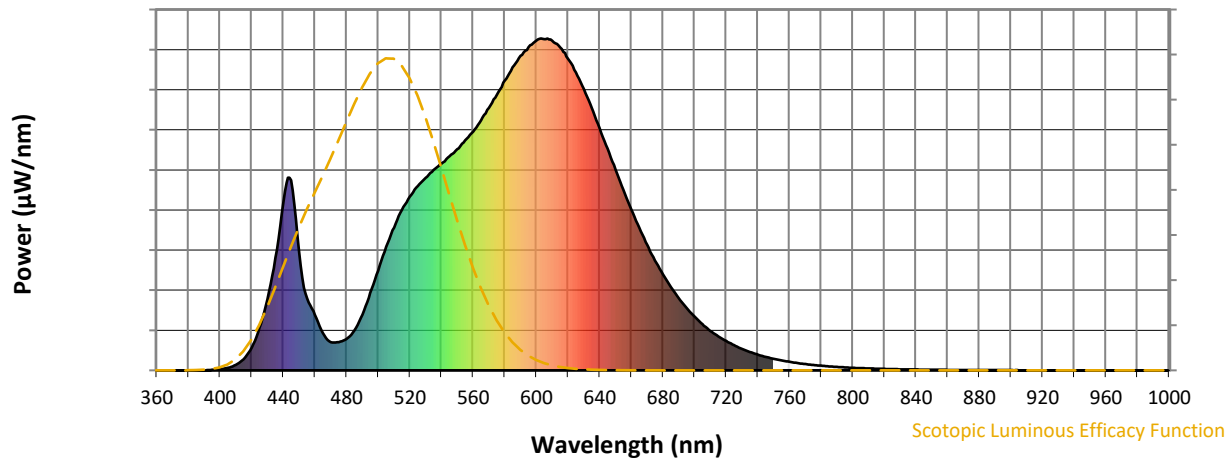


### Photopic Lumens: NR

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

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.27

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

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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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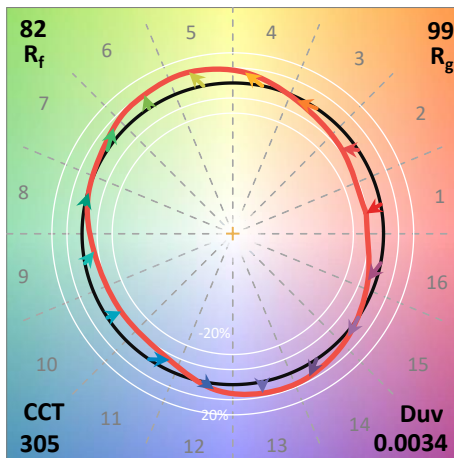
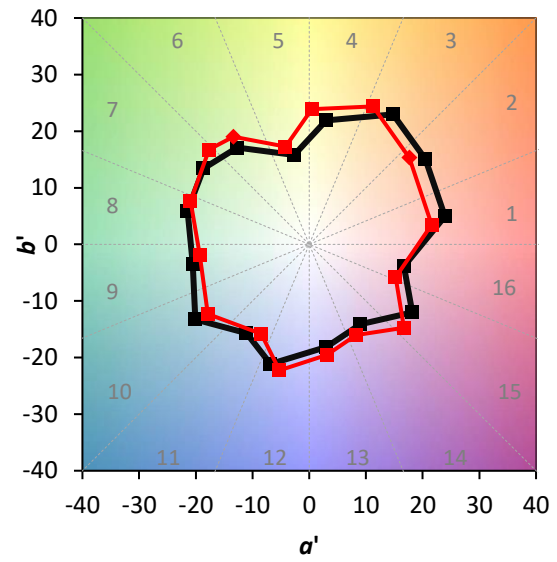
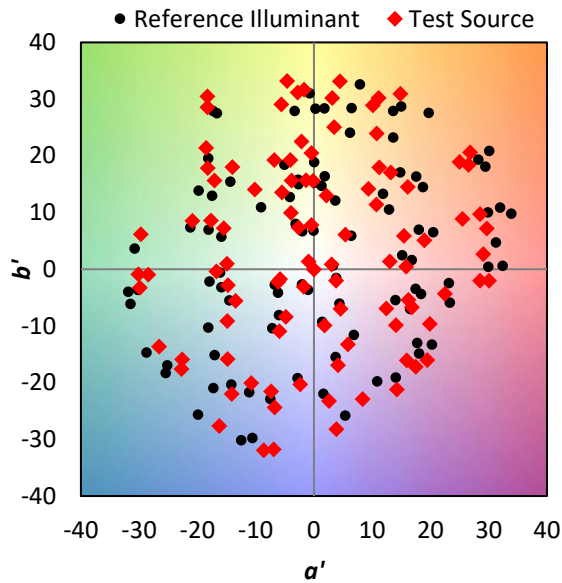
TM-30-18

### Summary

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



### Color Vector Graphics



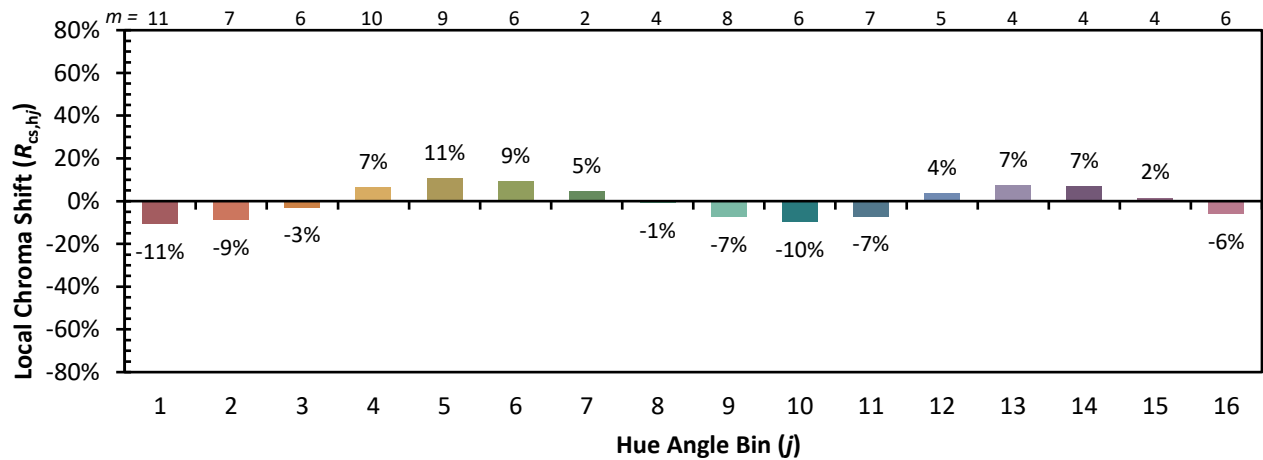


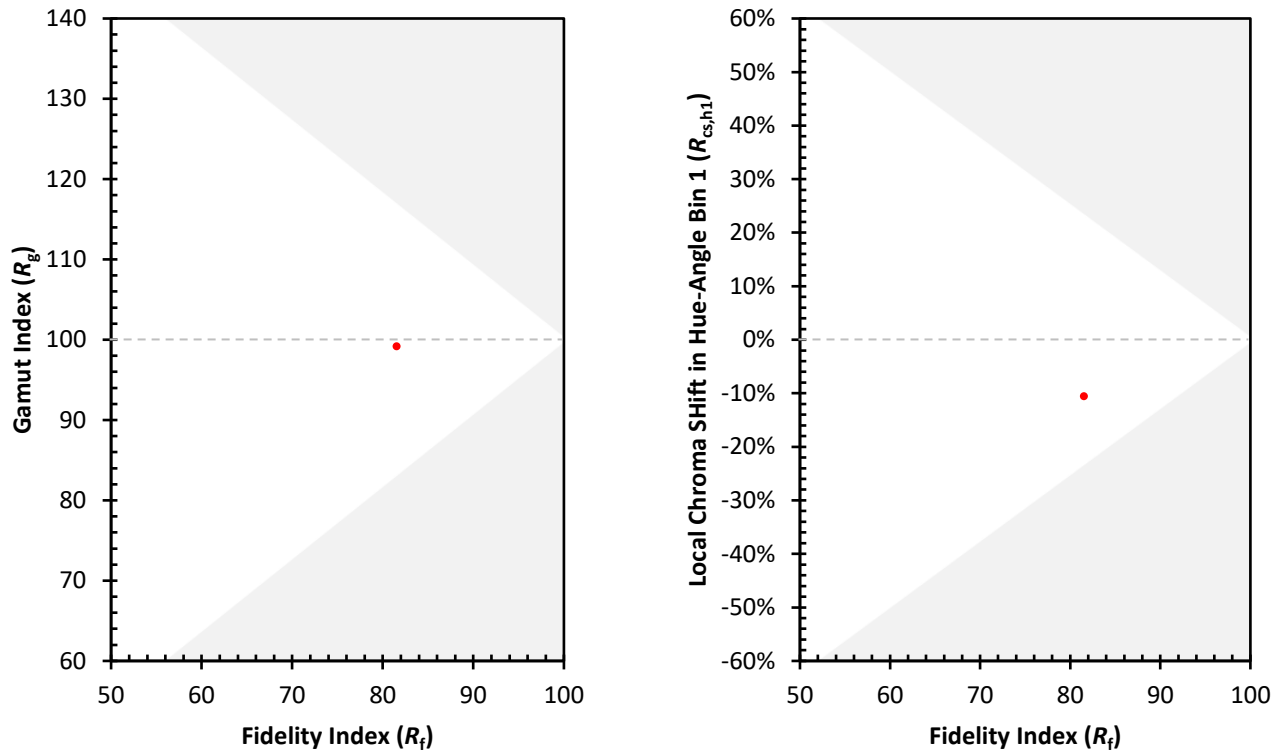
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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)