

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: P321658

Luminaire Tested: **GLEON-SA4D-750-U-T3R-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P321658  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-11)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA4D-750-U-T3R-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(4) 70 CRI, 5000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
ROADWAY OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 24072 lumens  
Efficiency: N/A  
Efficacy: 93.3 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B2 - U0 - G4

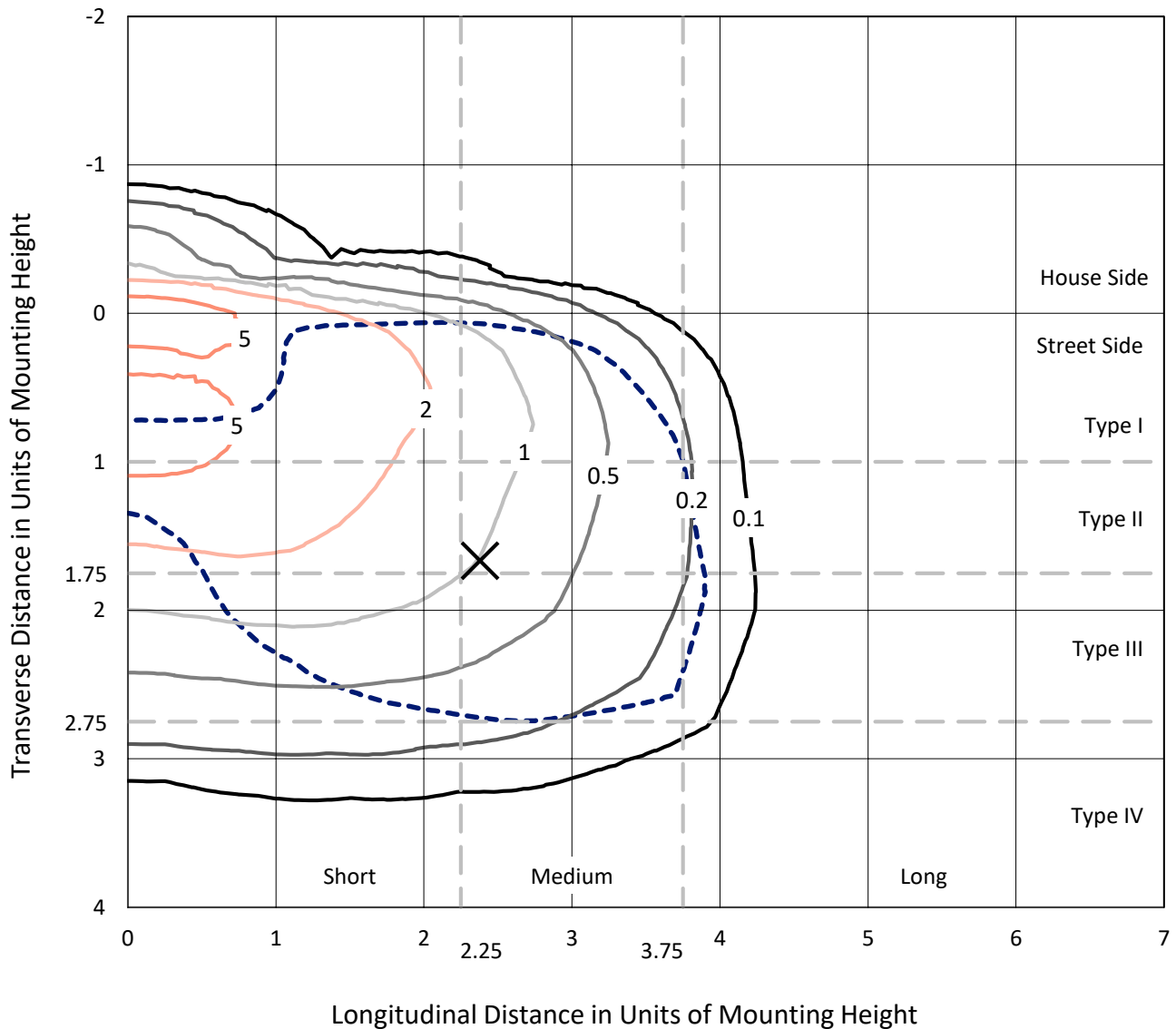
Input Watts (W): 258  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P321658  
 CATALOG NUMBER: GLEON-SA4D-750-U-T3R-HSS

## Iso-Footcandle Lines of Horizontal Illumination

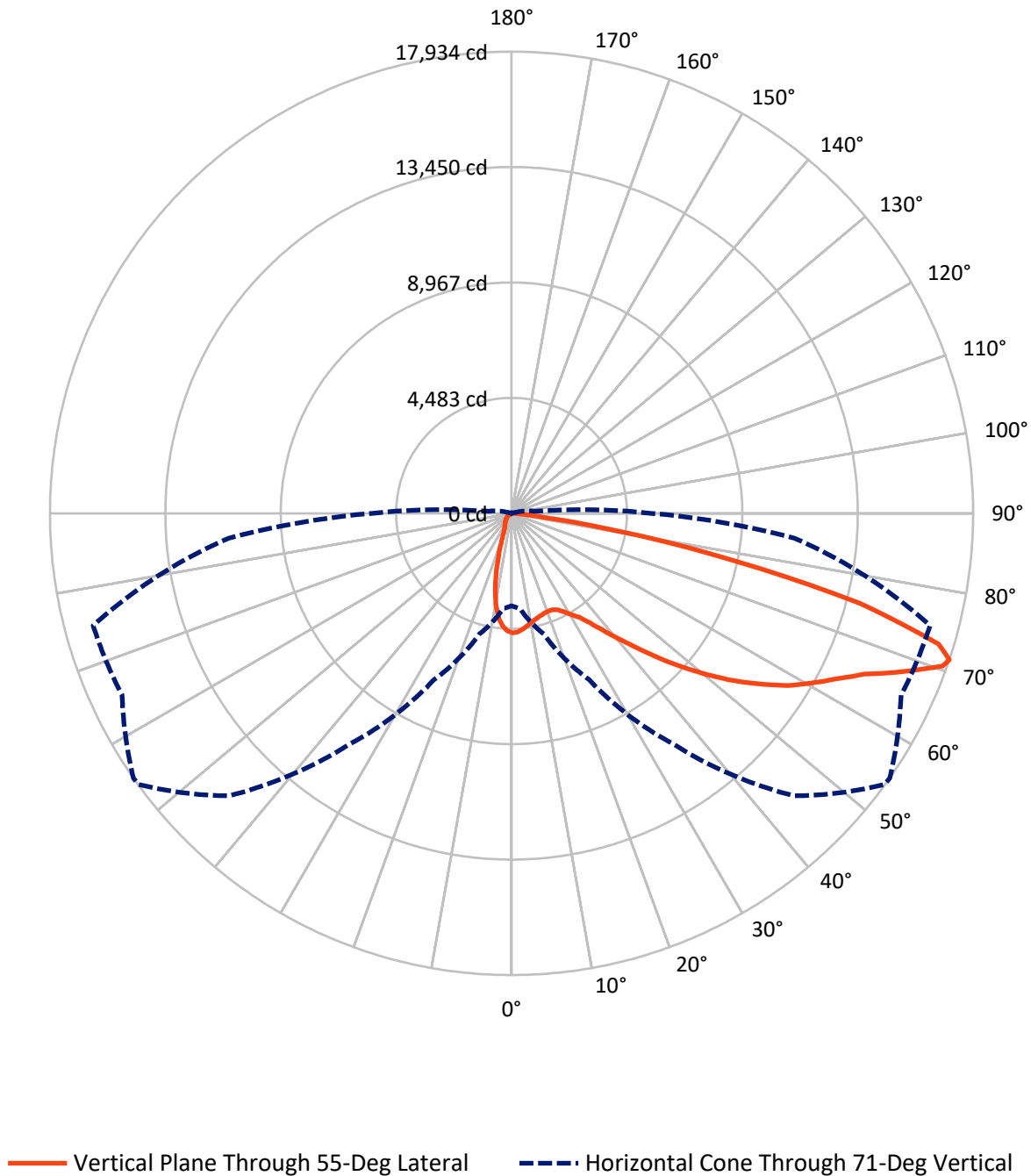
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 7.6 fc  
 Type III - 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    | 1905.8   | 0.0    | 1905.8  |
|                    | % Fixture | 7.9      | 0.0    | 7.9     |
| <b>Street Side</b> | Lumens    | 22166.2  | 0.0    | 22166.2 |
|                    | % Fixture | 92.1     | 0.0    | 92.1    |
| <b>Total</b>       | Lumens    | 24072.0  | 0.0    | 24072.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 395.8   | 1.6       |
| 10°-20°   | 893.6   | 3.7       |
| 20°-30°   | 1436.1  | 6.0       |
| 30°-40°   | 2439.9  | 10.1      |
| 40°-50°   | 3787.1  | 15.7      |
| 50°-60°   | 5091.6  | 21.2      |
| 60°-70°   | 6228.7  | 25.9      |
| 70°-80°   | 3641.8  | 15.1      |
| 80°-90°   | 157.4   | 0.7       |
| 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°    | 24072.0 | 100.0     |
| 0°-180°   | 24072.0 | 100.0     |

**Coefficient of Utilization**



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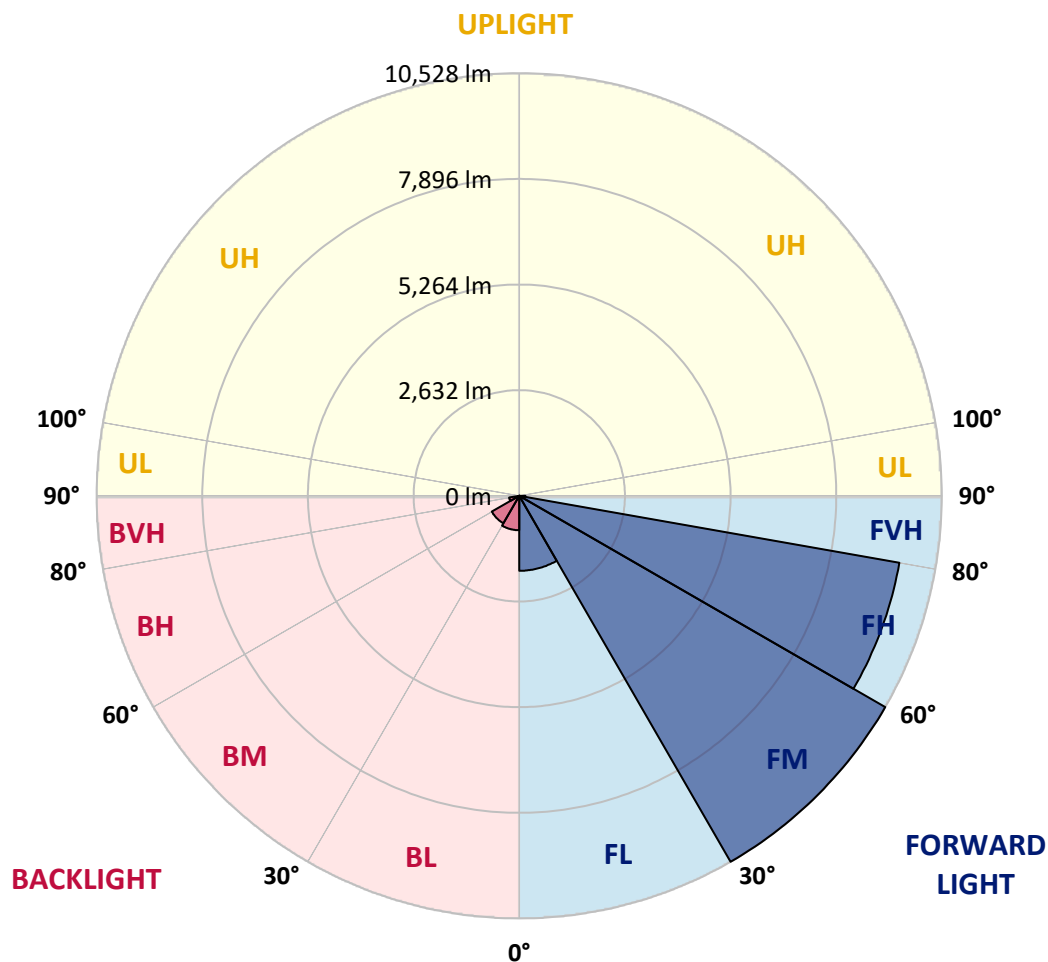
CATALOG NUMBER: GLEON-SA4D-750-U-T3R-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1867.7  | 7.8       |                         |      |          |
| FM   | (30°-60°)   | 10528.4 | 43.7      |                         |      |          |
| FH   | (60°-80°)   | 9615.2  | 39.9      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 154.9   | 0.6       |                         |      | G2/225   |
| BL   | (0°-30°)    | 857.8   | 3.6       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 790.2   | 3.3       | B1/1000                 |      |          |
| BH   | (60°-80°)   | 255.3   | 1.1       | B1/500                  |      | G1/500   |
| BVH  | (80°-90°)   | 2.5     | 0.0       |                         |      | G0/10    |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B2-U0-G4**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 54°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 4642.4  | 4642.4  | 4642.4  | 4642.4  | 4642.4  | 4642.4  | 4642.4  | 4642.4  | 4642.4  | 4642.4  | 4642.4  |
| 2.5°  | 4506.2  | 4511.6  | 4531.0  | 4539.7  | 4560.2  | 4594.8  | 4612.1  | 4613.2  | 4641.3  | 4652.1  | 4660.7  |
| 5°    | 4187.3  | 4219.7  | 4252.2  | 4286.8  | 4349.5  | 4432.7  | 4514.8  | 4522.4  | 4613.2  | 4680.2  | 4715.9  |
| 7.5°  | 3912.8  | 3942.0  | 3980.9  | 4036.0  | 4124.6  | 4255.4  | 4392.7  | 4408.9  | 4580.8  | 4733.2  | 4813.2  |
| 10°   | 3630.7  | 3654.4  | 3710.7  | 3791.7  | 3913.9  | 4089.0  | 4273.8  | 4300.8  | 4551.6  | 4804.5  | 4945.0  |
| 12.5° | 3329.1  | 3343.2  | 3411.3  | 3528.0  | 3707.4  | 3930.1  | 4173.3  | 4208.9  | 4533.2  | 4886.7  | 5100.7  |
| 15°   | 3100.0  | 3106.4  | 3171.3  | 3292.4  | 3497.7  | 3787.4  | 4095.4  | 4138.7  | 4537.5  | 4985.0  | 5270.4  |
| 17.5° | 3041.6  | 3044.8  | 3079.4  | 3162.6  | 3344.2  | 3659.9  | 4033.8  | 4086.8  | 4550.5  | 5081.2  | 5441.1  |
| 20°   | 3278.3  | 3255.6  | 3219.9  | 3207.0  | 3284.8  | 3583.1  | 3997.1  | 4056.5  | 4567.8  | 5166.6  | 5594.6  |
| 22.5° | 3927.9  | 3860.9  | 3712.8  | 3515.0  | 3395.0  | 3588.5  | 4006.8  | 4066.3  | 4622.9  | 5271.4  | 5771.9  |
| 25°   | 4892.1  | 4799.1  | 4547.3  | 4158.1  | 3784.2  | 3744.2  | 4087.9  | 4148.4  | 4729.9  | 5396.8  | 5941.6  |
| 27.5° | 5989.1  | 5897.3  | 5589.2  | 5033.6  | 4395.9  | 4052.2  | 4273.8  | 4330.0  | 4888.8  | 5508.2  | 6071.3  |
| 30°   | 7039.8  | 7013.8  | 6650.6  | 6019.4  | 5165.5  | 4551.6  | 4513.7  | 4561.3  | 5006.6  | 5575.2  | 6174.0  |
| 32.5° | 7930.4  | 7889.3  | 7597.5  | 6983.6  | 6046.4  | 5151.5  | 4795.9  | 4809.9  | 5095.3  | 5661.6  | 6308.0  |
| 35°   | 8756.2  | 8705.4  | 8449.2  | 7868.8  | 6950.0  | 5884.3  | 5230.4  | 5209.8  | 5288.7  | 5835.7  | 6502.6  |
| 37.5° | 9477.1  | 9523.6  | 9239.3  | 8687.0  | 7760.7  | 6646.3  | 5816.2  | 5754.6  | 5591.4  | 6118.9  | 6784.7  |
| 40°   | 10080.3 | 10080.3 | 9932.2  | 9471.7  | 8636.2  | 7434.3  | 6478.8  | 6397.7  | 6046.4  | 6555.5  | 7142.4  |
| 42.5° | 10297.5 | 10344.0 | 10399.1 | 10138.6 | 9419.9  | 8253.6  | 7217.0  | 7132.7  | 6687.4  | 7174.9  | 7594.2  |
| 45°   | 10310.5 | 10384.0 | 10666.1 | 10665.0 | 10127.8 | 9067.5  | 8049.3  | 8009.3  | 7508.9  | 7970.4  | 8154.1  |
| 47.5° | 10127.8 | 10219.7 | 10684.5 | 10948.2 | 10688.8 | 9825.2  | 8959.4  | 8909.7  | 8474.1  | 8945.3  | 8740.0  |
| 50°   | 9845.7  | 9947.3  | 10487.8 | 11059.5 | 11070.4 | 10484.5 | 9918.1  | 9843.6  | 9536.6  | 10059.7 | 9345.3  |
| 52.5° | 9340.9  | 9537.7  | 10311.6 | 11085.5 | 11321.1 | 11054.1 | 10830.4 | 10798.0 | 10725.6 | 11133.0 | 9827.3  |
| 55°   | 8261.2  | 8479.5  | 9869.5  | 11094.1 | 11553.5 | 11558.9 | 11685.4 | 11694.0 | 11839.9 | 12136.1 | 10186.2 |
| 57.5° | 7751.0  | 7874.2  | 9097.8  | 11135.2 | 11898.3 | 12131.8 | 12556.6 | 12623.6 | 12849.5 | 13088.4 | 10595.8 |
| 60°   | 7430.0  | 7575.9  | 8717.3  | 11079.0 | 12439.8 | 12883.0 | 13364.0 | 13386.7 | 13628.8 | 14070.9 | 11150.3 |
| 62.5° | 7173.8  | 7317.5  | 8477.3  | 10862.8 | 13048.4 | 13786.6 | 14153.0 | 14155.2 | 14336.8 | 15241.5 | 11780.5 |
| 65°   | 6541.5  | 6662.5  | 7992.0  | 10619.6 | 13450.4 | 14680.5 | 15069.6 | 15055.6 | 15203.6 | 16475.8 | 12512.2 |
| 67.5° | 5627.1  | 5720.0  | 7000.8  | 9697.6  | 13299.1 | 15493.3 | 16453.1 | 16406.6 | 16227.2 | 17542.7 | 12799.8 |
| 70°   | 4350.5  | 4384.0  | 5517.9  | 8081.7  | 11881.0 | 15805.7 | 17790.2 | 17766.4 | 16855.2 | 17351.3 | 11745.9 |
| 71°   | 3596.1  | 3706.3  | 4862.9  | 7132.7  | 10930.9 | 15517.1 | 17919.9 | 17933.9 | 16697.4 | 16830.4 | 11020.6 |
| 72.5° | 2088.3  | 2182.3  | 3524.7  | 5477.9  | 9280.4  | 14313.0 | 17247.6 | 17349.2 | 15960.2 | 15308.5 | 9413.4  |
| 75°   | 447.5   | 478.8   | 1306.8  | 2651.4  | 5105.0  | 10031.6 | 13613.7 | 13975.8 | 13008.4 | 10414.3 | 5673.5  |
| 77.5° | 311.3   | 336.2   | 559.9   | 1203.0  | 1687.3  | 4956.9  | 8456.8  | 8865.4  | 7771.5  | 3913.9  | 1815.9  |
| 80°   | 246.4   | 274.5   | 436.7   | 594.5   | 456.1   | 1598.6  | 3961.4  | 4211.1  | 2591.9  | 873.3   | 305.9   |
| 82.5° | 137.3   | 163.2   | 340.5   | 321.0   | 175.1   | 303.7   | 1109.0  | 1253.8  | 518.8   | 176.2   | 72.4    |
| 85°   | 40.0    | 48.6    | 219.4   | 233.5   | 74.6    | 58.4    | 189.2   | 234.6   | 98.4    | 46.5    | 32.4    |
| 87.5° | 0.0     | 0.0     | 105.9   | 89.7    | 21.6    | 8.6     | 17.3    | 19.5    | 19.5    | 19.5    | 21.6    |
| 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: P321658

CATALOG NUMBER: GLEON-SA4D-750-U-T3R-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4642.4 | 4642.4 | 4642.4 | 4642.4 | 4642.4 | 4642.4 | 4642.4 | 4642.4 | 4642.4 | 4642.4 | 4642.4 |
| 2.5°  | 4660.7 | 4668.3 | 4641.3 | 4605.6 | 4567.8 | 4521.3 | 4472.7 | 4434.8 | 4433.8 | 4415.4 | 4397.0 |
| 5°    | 4718.0 | 4713.7 | 4639.1 | 4525.6 | 4391.6 | 4252.2 | 4119.2 | 3969.0 | 3919.3 | 3857.7 | 3837.1 |
| 7.5°  | 4824.0 | 4793.7 | 4635.9 | 4387.3 | 4093.3 | 3801.4 | 3499.9 | 3196.2 | 3066.5 | 2949.7 | 2929.2 |
| 10°   | 4956.9 | 4899.6 | 4615.3 | 4179.8 | 3640.4 | 3102.1 | 2647.1 | 2234.2 | 2052.6 | 1913.2 | 1906.7 |
| 12.5° | 5095.3 | 5007.7 | 4558.1 | 3866.3 | 3047.0 | 2290.4 | 1766.2 | 1359.7 | 1208.4 | 1111.1 | 1119.8 |
| 15°   | 5240.1 | 5109.3 | 4434.8 | 3443.7 | 2371.4 | 1554.3 | 1085.2 | 846.3  | 785.8  | 760.9  | 767.4  |
| 17.5° | 5388.2 | 5179.6 | 4263.0 | 2934.6 | 1704.5 | 1003.1 | 751.2  | 684.2  | 684.2  | 689.6  | 691.8  |
| 20°   | 5516.8 | 5217.4 | 4010.1 | 2363.9 | 1155.5 | 730.7  | 657.2  | 647.4  | 652.9  | 661.5  | 662.6  |
| 22.5° | 5644.3 | 5219.6 | 3680.4 | 1785.6 | 808.5  | 639.9  | 625.8  | 621.5  | 624.7  | 634.5  | 635.6  |
| 25°   | 5748.1 | 5193.6 | 3267.5 | 1270.0 | 645.3  | 603.1  | 596.6  | 594.5  | 596.6  | 608.5  | 608.5  |
| 27.5° | 5790.3 | 5099.6 | 2763.8 | 892.8  | 578.3  | 562.1  | 559.9  | 562.1  | 565.3  | 573.9  | 575.0  |
| 30°   | 5794.6 | 4935.3 | 2214.7 | 646.4  | 524.2  | 506.9  | 511.3  | 518.8  | 515.6  | 513.4  | 515.6  |
| 32.5° | 5805.4 | 4745.1 | 1679.7 | 531.8  | 478.8  | 451.8  | 446.4  | 446.4  | 433.4  | 425.9  | 421.5  |
| 35°   | 5841.1 | 4521.3 | 1218.1 | 477.7  | 432.4  | 401.0  | 380.5  | 356.7  | 331.8  | 318.9  | 315.6  |
| 37.5° | 5897.3 | 4286.8 | 872.3  | 442.1  | 391.3  | 355.6  | 316.7  | 274.5  | 238.9  | 229.1  | 229.1  |
| 40°   | 6000.0 | 4044.6 | 645.3  | 414.0  | 358.9  | 314.5  | 256.2  | 201.0  | 168.6  | 163.2  | 163.2  |
| 42.5° | 6162.1 | 3789.6 | 514.5  | 389.1  | 330.7  | 272.4  | 195.6  | 145.9  | 122.1  | 118.9  | 117.8  |
| 45°   | 6330.7 | 3508.5 | 449.6  | 365.3  | 300.5  | 223.7  | 144.8  | 108.1  | 94.0   | 90.8   | 90.8   |
| 47.5° | 6499.3 | 3209.1 | 418.3  | 342.6  | 271.3  | 174.0  | 108.1  | 85.4   | 78.9   | 78.9   | 80.0   |
| 50°   | 6642.0 | 2896.8 | 395.6  | 317.8  | 233.5  | 131.9  | 85.4   | 72.4   | 70.3   | 74.6   | 75.7   |
| 52.5° | 6677.7 | 2589.8 | 367.5  | 286.4  | 187.0  | 100.5  | 70.3   | 63.8   | 63.8   | 63.8   | 63.8   |
| 55°   | 6656.0 | 2352.0 | 330.7  | 247.5  | 138.4  | 80.0   | 60.5   | 56.2   | 55.1   | 55.1   | 55.1   |
| 57.5° | 6729.5 | 2211.5 | 264.8  | 192.4  | 99.4   | 64.9   | 53.0   | 49.7   | 47.6   | 46.5   | 46.5   |
| 60°   | 6877.6 | 2119.6 | 189.2  | 138.4  | 74.6   | 54.0   | 45.4   | 42.2   | 38.9   | 36.7   | 36.7   |
| 62.5° | 7074.3 | 2039.6 | 140.5  | 102.7  | 57.3   | 43.2   | 37.8   | 34.6   | 30.3   | 28.1   | 28.1   |
| 65°   | 7225.7 | 1896.9 | 107.0  | 76.7   | 43.2   | 34.6   | 29.2   | 28.1   | 21.6   | 19.5   | 18.4   |
| 67.5° | 6994.4 | 1583.5 | 86.5   | 56.2   | 32.4   | 27.0   | 22.7   | 21.6   | 13.0   | 10.8   | 10.8   |
| 70°   | 5998.9 | 1102.5 | 69.2   | 41.1   | 23.8   | 21.6   | 18.4   | 14.1   | 9.7    | 8.6    | 8.6    |
| 71°   | 5440.1 | 920.9  | 62.7   | 34.6   | 20.5   | 20.5   | 17.3   | 11.9   | 8.6    | 7.6    | 7.6    |
| 72.5° | 4519.2 | 653.9  | 53.0   | 27.0   | 18.4   | 21.6   | 18.4   | 10.8   | 8.6    | 7.6    | 6.5    |
| 75°   | 2623.3 | 273.5  | 36.7   | 18.4   | 14.1   | 25.9   | 23.8   | 9.7    | 6.5    | 5.4    | 5.4    |
| 77.5° | 789.0  | 100.5  | 20.5   | 11.9   | 10.8   | 22.7   | 27.0   | 8.6    | 3.2    | 1.1    | 1.1    |
| 80°   | 143.8  | 43.2   | 13.0   | 7.6    | 7.6    | 14.1   | 20.5   | 4.3    | 0.0    | 0.0    | 0.0    |
| 82.5° | 50.8   | 21.6   | 7.6    | 4.3    | 3.2    | 6.5    | 9.7    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 29.2   | 15.1   | 4.3    | 2.2    | 0.0    | 1.1    | 2.2    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 19.5   | 4.3    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-4-R4

Test Date: 10/02/2019

Luminaire Tested: SA1C-750-U-5WQ

Data in this report applies to families of products SA1C-760-U-5WQ .

### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-4-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-750-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 4884   | CRI (Ra): | 73.5 |      |       |
| CIE u':                   | 0.2101 | R1:       | 70.5 | R9:  | -28.4 |
| CIE v':                   | 0.4904 | R2:       | 77.7 | R10: | 48.6  |
| Duv:                      | 0.0037 | R3:       | 84.6 | R11: | 73.2  |
| CIE x:                    | 0.3493 | R4:       | 74.7 | R12: | 50.7  |
| CIE y:                    | 0.3624 | R5:       | 71.9 | R13: | 71.2  |
| CIE z:                    | 0.2884 | R6:       | 70.7 | R14: | 91.4  |
| Peak Wavelength (nm):     | 444    | R7:       | 81.2 |      |       |
| Dominant Wavelength (nm): | 571    | R8:       | 56.9 |      |       |
| Purity:                   | 13.7   |           |      |      |       |
| Rf:                       | 74.9   |           |      |      |       |
| Rg:                       | 96.3   |           |      |      |       |



### Test Conditions

Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0./44%  
 Sphere Temperature (°C): 25.7

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

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CIE 1931 Chromaticity Diagram



CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 5000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 13493.5

S/P: 1.77

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5378.9**

**M/P: 0.71**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

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**Summary**

$R_f = 74.9$   
 $R_g = 96.3$   
 CIE  $R_a = 73.5$   
 $R_g = -28.4$

**Spectral Power Distribution Comparison**



**Color Vector Graphics**



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

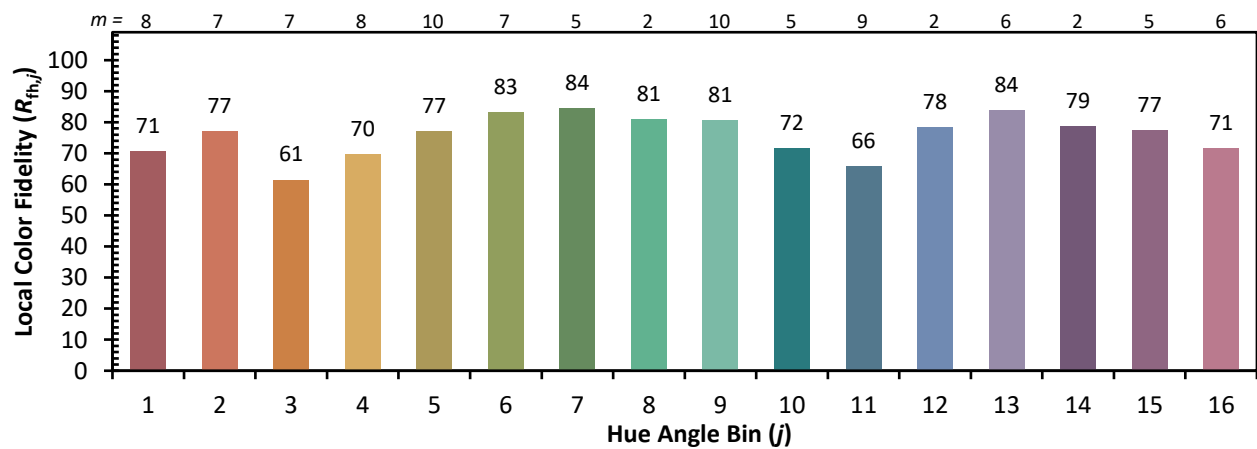
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 61 | CES51 = 90 | CES76 = 52 |
| CES02 = 60 | CES27 = 84 | CES52 = 91 | CES77 = 71 |
| CES03 = 30 | CES28 = 81 | CES53 = 79 | CES78 = 54 |
| CES04 = 69 | CES29 = 58 | CES54 = 83 | CES79 = 80 |
| CES05 = 46 | CES30 = 67 | CES55 = 83 | CES80 = 77 |
| CES06 = 50 | CES31 = 63 | CES56 = 73 | CES81 = 77 |
| CES07 = 39 | CES32 = 59 | CES57 = 72 | CES82 = 90 |
| CES08 = 38 | CES33 = 69 | CES58 = 73 | CES83 = 86 |
| CES09 = 29 | CES34 = 69 | CES59 = 88 | CES84 = 88 |
| CES10 = 73 | CES35 = 83 | CES60 = 93 | CES85 = 84 |
| CES11 = 56 | CES36 = 95 | CES61 = 88 | CES86 = 75 |
| CES12 = 61 | CES37 = 78 | CES62 = 85 | CES87 = 78 |
| CES13 = 41 | CES38 = 76 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 93 | CES64 = 74 | CES89 = 75 |
| CES15 = 70 | CES40 = 86 | CES65 = 67 | CES90 = 77 |
| CES16 = 46 | CES41 = 87 | CES66 = 69 | CES91 = 89 |
| CES17 = 49 | CES42 = 78 | CES67 = 67 | CES92 = 66 |
| CES18 = 55 | CES43 = 75 | CES68 = 73 | CES93 = 80 |
| CES19 = 71 | CES44 = 99 | CES69 = 81 | CES94 = 57 |
| CES20 = 64 | CES45 = 83 | CES70 = 63 | CES95 = 71 |
| CES21 = 85 | CES46 = 81 | CES71 = 60 | CES96 = 78 |
| CES22 = 77 | CES47 = 80 | CES72 = 86 | CES97 = 85 |
| CES23 = 91 | CES48 = 72 | CES73 = 53 | CES98 = 75 |
| CES24 = 90 | CES49 = 81 | CES74 = 96 | CES99 = 62 |
| CES25 = 71 | CES50 = 89 | CES75 = 58 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)