

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: P383178

Luminaire Tested: **GLEON-SA5A-735-U-T3-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P383178  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-15)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA5A-735-U-T3-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(5) 70 CRI, 3500K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 15812.1 lumens  
Efficiency: N/A  
Efficacy: 97.6 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B2 - U0 - G3

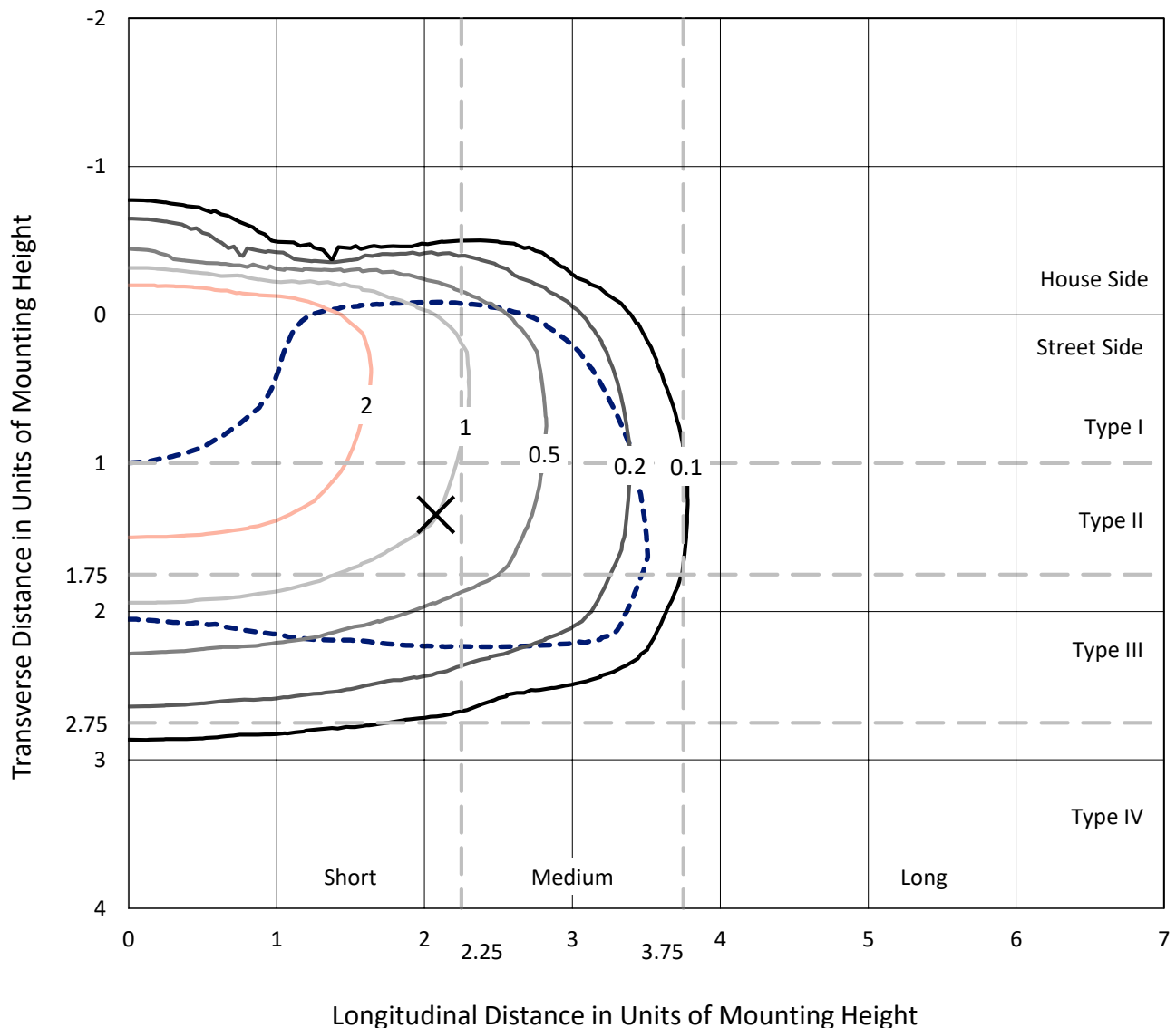
Input Watts (W): 162  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

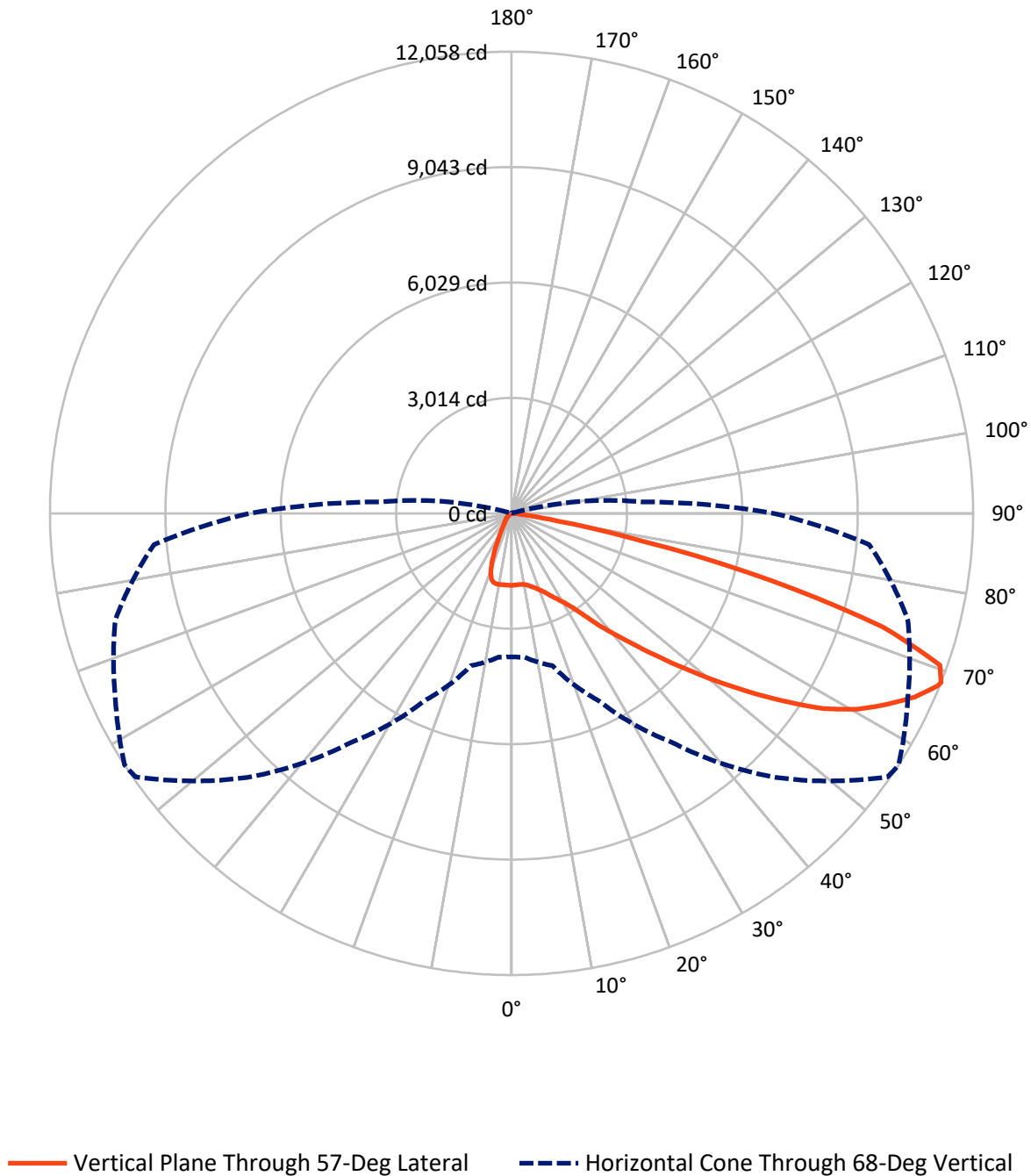
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 3.9 fc  
 Type III - 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    | 1733.9   | 0.0    | 1733.9  |
|                    | % Fixture | 11.0     | 0.0    | 11.0    |
| <b>Street Side</b> | Lumens    | 14078.2  | 0.0    | 14078.2 |
|                    | % Fixture | 89.0     | 0.0    | 89.0    |
| <b>Total</b>       | Lumens    | 15812.1  | 0.0    | 15812.1 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 175.8   | 1.1       |
| 10°-20°   | 487.3   | 3.1       |
| 20°-30°   | 840.6   | 5.3       |
| 30°-40°   | 1450.8  | 9.2       |
| 40°-50°   | 2481.6  | 15.7      |
| 50°-60°   | 3970.3  | 25.1      |
| 60°-70°   | 4587.2  | 29.0      |
| 70°-80°   | 1752.8  | 11.1      |
| 80°-90°   | 65.7    | 0.4       |
| 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°    | 15812.1 | 100.0     |
| 0°-180°   | 15812.1 | 100.0     |

**Coefficient of Utilization**



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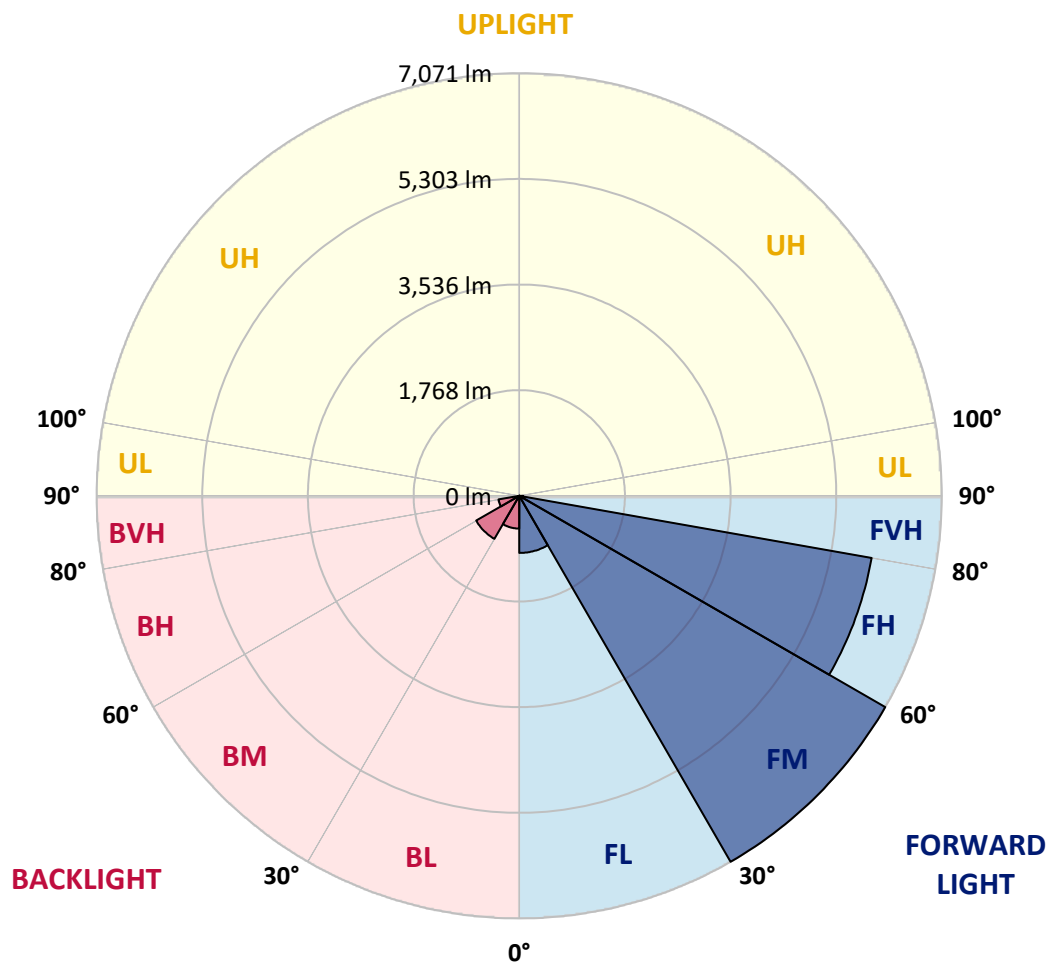
CATALOG NUMBER: GLEON-SA5A-735-U-T3-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 955.7  | 6.0       |                         |      |         |
| FM   | (30°-60°)   | 7071.0 | 44.7      |                         |      |         |
| FH   | (60°-80°)   | 5987.0 | 37.9      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 64.5   | 0.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 548.0  | 3.5       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 831.6  | 5.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 353.1  | 2.2       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 1.2    | 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-G3**

Type III Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°     | 55°     | 57°     | 65°     | 75°     | 85°    |
|-------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|--------|
| 0°    | 1878.9 | 1878.9 | 1878.9 | 1878.9 | 1878.9 | 1878.9  | 1878.9  | 1878.9  | 1878.9  | 1878.9  | 1878.9 |
| 2.5°  | 1834.8 | 1843.0 | 1849.0 | 1852.8 | 1857.2 | 1866.9  | 1869.9  | 1874.4  | 1876.7  | 1876.7  | 1881.9 |
| 5°    | 1762.3 | 1771.2 | 1783.9 | 1794.4 | 1815.3 | 1842.2  | 1861.7  | 1869.2  | 1882.7  | 1894.6  | 1901.3 |
| 7.5°  | 1695.0 | 1705.5 | 1720.4 | 1745.1 | 1780.9 | 1824.3  | 1864.7  | 1875.1  | 1901.3  | 1926.7  | 1939.5 |
| 10°   | 1651.6 | 1659.8 | 1679.3 | 1714.4 | 1761.5 | 1822.1  | 1878.9  | 1891.6  | 1936.5  | 1979.1  | 2003.0 |
| 12.5° | 1636.6 | 1644.1 | 1664.3 | 1703.9 | 1762.3 | 1833.3  | 1911.8  | 1930.4  | 1996.3  | 2058.3  | 2092.0 |
| 15°   | 1658.3 | 1659.8 | 1681.5 | 1718.9 | 1776.5 | 1861.0  | 1966.4  | 1988.8  | 2071.8  | 2152.5  | 2194.4 |
| 17.5° | 1742.1 | 1735.4 | 1746.6 | 1763.0 | 1808.6 | 1897.6  | 2024.0  | 2057.6  | 2168.3  | 2263.2  | 2302.8 |
| 20°   | 1951.4 | 1951.4 | 1926.0 | 1881.2 | 1881.9 | 1954.4  | 2101.7  | 2139.9  | 2275.1  | 2385.0  | 2421.0 |
| 22.5° | 2309.6 | 2302.8 | 2252.0 | 2142.1 | 2041.1 | 2052.4  | 2196.7  | 2246.0  | 2403.8  | 2521.1  | 2533.1 |
| 25°   | 2740.2 | 2731.9 | 2653.5 | 2498.7 | 2323.7 | 2210.8  | 2325.2  | 2382.1  | 2557.0  | 2661.0  | 2636.3 |
| 27.5° | 3196.3 | 3189.5 | 3111.8 | 2919.7 | 2670.7 | 2463.6  | 2478.6  | 2532.3  | 2713.3  | 2815.7  | 2737.3 |
| 30°   | 3638.2 | 3640.4 | 3563.4 | 3366.0 | 3084.2 | 2785.8  | 2672.9  | 2704.3  | 2865.1  | 2969.0  | 2856.9 |
| 32.5° | 4058.4 | 4061.4 | 3994.8 | 3774.3 | 3511.1 | 3160.4  | 2942.1  | 2933.8  | 3041.5  | 3144.0  | 3015.3 |
| 35°   | 4433.0 | 4440.4 | 4394.8 | 4223.5 | 3944.7 | 3577.6  | 3291.3  | 3271.8  | 3292.0  | 3407.9  | 3258.4 |
| 37.5° | 4794.0 | 4798.6 | 4764.1 | 4619.8 | 4386.6 | 4035.9  | 3732.3  | 3704.7  | 3661.4  | 3750.3  | 3579.1 |
| 40°   | 5189.6 | 5178.4 | 5138.7 | 5007.9 | 4807.5 | 4542.1  | 4206.4  | 4158.5  | 4083.1  | 4162.2  | 4000.8 |
| 42.5° | 5557.4 | 5544.8 | 5551.5 | 5403.4 | 5234.5 | 5062.5  | 4758.9  | 4676.6  | 4632.6  | 4723.8  | 4518.2 |
| 45°   | 6017.2 | 6010.5 | 6033.0 | 5904.3 | 5767.5 | 5642.7  | 5392.2  | 5302.5  | 5283.0  | 5389.9  | 5144.0 |
| 47.5° | 6471.1 | 6487.5 | 6557.1 | 6502.5 | 6447.1 | 6337.2  | 6062.9  | 6022.5  | 6034.5  | 6163.8  | 5804.2 |
| 50°   | 6849.4 | 6868.9 | 7059.5 | 7122.3 | 7202.3 | 7138.0  | 6862.9  | 6838.2  | 6885.3  | 7001.9  | 6514.4 |
| 52.5° | 7123.1 | 7162.7 | 7399.7 | 7689.0 | 7980.7 | 8024.0  | 7749.6  | 7727.2  | 7790.7  | 7808.7  | 7063.3 |
| 55°   | 7312.9 | 7348.1 | 7616.5 | 8145.8 | 8739.5 | 8926.5  | 8756.0  | 8669.3  | 8657.2  | 8480.1  | 7640.5 |
| 57.5° | 7346.6 | 7342.8 | 7728.7 | 8441.2 | 9334.7 | 9816.9  | 9709.2  | 9624.0  | 9378.7  | 9100.7  | 8302.1 |
| 60°   | 7156.7 | 7178.4 | 7626.2 | 8543.6 | 9708.5 | 10490.5 | 10498.7 | 10388.2 | 10006.0 | 9704.0  | 8943.6 |
| 62.5° | 6572.0 | 6660.2 | 7112.6 | 8275.2 | 9704.0 | 10762.0 | 11077.5 | 10993.0 | 10536.2 | 10198.2 | 9594.1 |
| 65°   | 5623.9 | 5655.3 | 6086.7 | 7355.6 | 9048.3 | 10648.3 | 11598.6 | 11567.2 | 11013.9 | 10678.2 | 9928.3 |
| 67.5° | 4106.9 | 4038.9 | 4492.0 | 5792.2 | 7660.6 | 9985.9  | 11972.4 | 12012.0 | 11382.5 | 10776.9 | 9572.4 |
| 68°   | 3748.1 | 3768.3 | 4121.2 | 5405.7 | 7297.3 | 9751.8  | 11997.1 | 12057.7 | 11419.2 | 10712.6 | 9378.0 |
| 70°   | 2234.0 | 2272.9 | 2587.7 | 3721.9 | 5551.5 | 8427.7  | 11730.9 | 11869.2 | 11200.8 | 10049.4 | 8111.5 |
| 72.5° | 570.5  | 616.9  | 914.4  | 1665.8 | 3170.9 | 5938.0  | 9902.9  | 10136.9 | 9724.9  | 8152.6  | 5475.9 |
| 75°   | 234.7  | 246.8  | 326.7  | 548.8  | 1181.3 | 2675.1  | 6527.2  | 7028.1  | 6741.7  | 4880.8  | 2474.7 |
| 77.5° | 162.3  | 170.5  | 210.1  | 304.3  | 511.4  | 907.0   | 3200.1  | 3561.9  | 3209.0  | 1665.8  | 539.8  |
| 80°   | 116.6  | 123.3  | 150.3  | 202.6  | 293.8  | 323.7   | 1043.0  | 1206.0  | 957.7   | 365.6   | 133.9  |
| 82.5° | 69.5   | 74.8   | 112.2  | 144.3  | 178.7  | 154.7   | 259.4   | 294.6   | 277.4   | 181.7   | 59.8   |
| 85°   | 34.4   | 40.3   | 75.5   | 103.2  | 96.4   | 65.0    | 79.3    | 88.2    | 109.2   | 110.7   | 32.1   |
| 87.5° | 2.2    | 4.5    | 44.2   | 62.0   | 26.9   | 15.0    | 23.2    | 28.4    | 38.8    | 54.6    | 13.4   |
| 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-SA5A-735-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1878.9 | 1878.9 | 1878.9 | 1878.9 | 1878.9 | 1878.9 | 1878.9 | 1878.9 | 1878.9 | 1878.9 | 1878.9 |
| 2.5°  | 1884.1 | 1884.9 | 1879.7 | 1877.4 | 1878.9 | 1869.9 | 1866.2 | 1867.7 | 1867.7 | 1869.9 | 1866.2 |
| 5°    | 1902.8 | 1902.8 | 1893.8 | 1881.9 | 1875.1 | 1858.0 | 1846.7 | 1843.7 | 1841.5 | 1840.0 | 1837.0 |
| 7.5°  | 1943.2 | 1938.7 | 1923.0 | 1896.8 | 1874.4 | 1837.0 | 1808.6 | 1793.7 | 1786.1 | 1783.2 | 1780.9 |
| 10°   | 2008.2 | 2000.0 | 1973.9 | 1925.2 | 1873.6 | 1807.1 | 1745.1 | 1700.9 | 1664.3 | 1649.4 | 1640.4 |
| 12.5° | 2095.7 | 2083.8 | 2039.6 | 1958.9 | 1868.4 | 1745.8 | 1611.2 | 1481.9 | 1361.5 | 1312.2 | 1287.5 |
| 15°   | 2196.7 | 2179.4 | 2110.0 | 1987.3 | 1837.8 | 1607.5 | 1315.2 | 1088.6 | 921.9  | 859.1  | 832.2  |
| 17.5° | 2299.1 | 2276.6 | 2171.3 | 2005.2 | 1745.8 | 1321.1 | 922.6  | 696.8  | 585.4  | 555.5  | 545.0  |
| 20°   | 2402.3 | 2369.4 | 2224.3 | 1991.8 | 1538.0 | 952.5  | 608.6  | 509.2  | 477.0  | 468.0  | 465.0  |
| 22.5° | 2500.2 | 2449.4 | 2272.1 | 1939.5 | 1218.0 | 639.2  | 481.5  | 450.1  | 439.6  | 434.4  | 432.9  |
| 25°   | 2585.4 | 2514.4 | 2314.1 | 1778.0 | 862.1  | 483.0  | 433.6  | 423.2  | 409.7  | 400.0  | 400.8  |
| 27.5° | 2665.4 | 2579.5 | 2339.5 | 1511.8 | 575.0  | 412.7  | 401.5  | 387.3  | 362.7  | 348.4  | 348.4  |
| 30°   | 2761.9 | 2666.2 | 2358.1 | 1163.4 | 423.2  | 364.9  | 355.9  | 334.2  | 300.5  | 281.9  | 281.9  |
| 32.5° | 2906.9 | 2797.8 | 2346.2 | 816.5  | 350.6  | 320.7  | 299.8  | 269.9  | 233.3  | 215.4  | 214.5  |
| 35°   | 3129.0 | 3001.2 | 2261.0 | 535.4  | 309.6  | 278.9  | 245.3  | 208.6  | 176.4  | 161.5  | 160.8  |
| 37.5° | 3428.1 | 3273.3 | 2069.5 | 382.8  | 277.4  | 240.0  | 199.6  | 159.3  | 135.4  | 125.6  | 124.8  |
| 40°   | 3816.1 | 3589.5 | 1795.9 | 310.3  | 247.5  | 202.6  | 154.0  | 123.3  | 106.9  | 99.4   | 100.1  |
| 42.5° | 4281.9 | 3928.2 | 1467.7 | 267.6  | 218.4  | 166.7  | 120.4  | 97.2   | 86.7   | 81.5   | 80.0   |
| 45°   | 4799.3 | 4262.5 | 1123.7 | 238.5  | 189.2  | 134.6  | 94.2   | 77.0   | 68.7   | 65.8   | 65.8   |
| 47.5° | 5368.2 | 4587.7 | 822.5  | 213.0  | 157.8  | 104.0  | 75.5   | 62.8   | 56.1   | 53.8   | 53.1   |
| 50°   | 5884.9 | 4813.5 | 592.9  | 186.1  | 129.4  | 82.3   | 61.3   | 52.4   | 47.9   | 44.9   | 44.9   |
| 52.5° | 6315.5 | 4884.6 | 436.6  | 157.0  | 104.7  | 65.8   | 50.9   | 44.9   | 40.3   | 38.1   | 38.1   |
| 55°   | 6694.7 | 4855.3 | 324.5  | 129.4  | 84.5   | 53.8   | 43.4   | 38.1   | 34.4   | 32.1   | 32.1   |
| 57.5° | 7058.0 | 4761.1 | 242.2  | 105.5  | 68.0   | 43.4   | 36.6   | 32.1   | 28.4   | 26.9   | 26.9   |
| 60°   | 7354.8 | 4604.2 | 180.2  | 85.2   | 54.6   | 35.1   | 30.6   | 26.2   | 23.2   | 21.0   | 21.0   |
| 62.5° | 7595.6 | 4430.7 | 132.4  | 70.2   | 43.4   | 27.7   | 23.9   | 21.7   | 17.2   | 15.0   | 15.0   |
| 65°   | 7597.1 | 4142.9 | 99.4   | 58.3   | 33.6   | 21.7   | 18.0   | 17.2   | 11.2   | 8.9    | 8.2    |
| 67.5° | 7047.5 | 3571.6 | 76.3   | 50.1   | 26.2   | 16.5   | 13.4   | 14.2   | 6.0    | 3.7    | 3.0    |
| 68°   | 6847.9 | 3426.6 | 71.8   | 49.4   | 24.7   | 15.7   | 12.7   | 14.2   | 5.2    | 3.0    | 2.2    |
| 70°   | 5773.5 | 2726.0 | 57.6   | 47.9   | 21.7   | 11.9   | 10.4   | 14.2   | 4.5    | 2.2    | 1.5    |
| 72.5° | 3692.7 | 1582.0 | 42.6   | 38.1   | 16.5   | 8.9    | 6.7    | 12.7   | 4.5    | 1.5    | 0.7    |
| 75°   | 1571.6 | 490.5  | 29.2   | 26.9   | 9.7    | 6.7    | 4.5    | 8.2    | 3.0    | 0.7    | 0.0    |
| 77.5° | 331.3  | 110.7  | 17.2   | 16.5   | 6.7    | 4.5    | 3.0    | 2.2    | 0.7    | 0.0    | 0.0    |
| 80°   | 85.2   | 32.1   | 8.9    | 8.2    | 3.7    | 2.2    | 1.5    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 26.9   | 12.7   | 5.2    | 3.7    | 1.5    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 13.4   | 7.5    | 3.0    | 1.5    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 7.5    | 2.2    | 0.7    | 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-79-08: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

All Brands

Data applicable to all product families using SA light engines

Report Number: SP1-2101-121-7

Luminaire Tested: IFLD-S-SA2A-735-U-T2

Test Date: 03/04/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/04/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-735-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3388   | CRI (Ra): | 73.1 |      |       |
| CIE u':                   | 0.2371 | R1:       | 68.9 | R9:  | -34.6 |
| CIE v':                   | 0.5177 | R2:       | 81.1 | R10: | 57.8  |
| Duv:                      | 0.0032 | R3:       | 93.1 | R11: | 68.6  |
| CIE x:                    | 0.4153 | R4:       | 71.6 | R12: | 53.9  |
| CIE y:                    | 0.4030 | R5:       | 69.4 | R13: | 70.9  |
| CIE z:                    | 0.1817 | R6:       | 75.0 | R14: | 96.2  |
| Peak Wavelength (nm):     | 590    | R7:       | 79.5 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 46.4 |      |       |
| Purity:                   | 45.7   |           |      |      |       |
| Rf:                       | 76.9   |           |      |      |       |
| Rg:                       | 94.4   |           |      |      |       |



### Test Conditions

Stabilization Time: 81M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0/30%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2101-121-7

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

REPORT NUMBER: SP1-2101-121-7

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 3500K 4-step quadrangle

REPORT NUMBER: SP1-2101-121-7

### Photopic Flux vs. Wavelength



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| 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       | 2672             | 0.0              | 490       | 34553            | 4.9              | 620       | 136720           | 35.6             | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 8.0              | 625       | 126308           | 27.9             | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 12.1             | 630       | 114625           | 20.7             | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 18.1             | 635       | 103216           | 15.5             | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 25.4             | 640       | 92605            | 11.1             | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 33.9             | 645       | 83234            | 8.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 43.0             | 650       | 73263            | 5.4              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 50.1             | 655       | 64627            | 3.7              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 57.9             | 660       | 56614            | 2.4              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 64.0             | 665       | 49537            | 1.6              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.0              | 540       | 107316           | 69.9             | 670       | 42866            | 0.9              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.0              | 545       | 113101           | 75.3             | 675       | 36708            | 0.6              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 0.0              | 550       | 120690           | 82.0             | 680       | 31814            | 0.4              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 0.1              | 555       | 128583           | 87.8             | 685       | 27485            | 0.2              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 0.3              | 560       | 137796           | 93.6             | 690       | 23698            | 0.1              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 0.8              | 565       | 146577           | 97.5             | 695       | 20309            | 0.1              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 1.6              | 570       | 154581           | 100.5            | 700       | 17890            | 0.1              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 2.4              | 575       | 162633           | 101.2            | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 2.5              | 580       | 168101           | 99.9             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 2.1              | 585       | 173145           | 96.2             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 1.8              | 590       | 174675           | 90.3             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 1.7              | 595       | 173724           | 82.3             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 1.5              | 600       | 171241           | 73.8             | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 1.7              | 605       | 165134           | 64.0             | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 2.2              | 610       | 156652           | 53.8             | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 3.3              | 615       | 147879           | 44.6             | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 12126

S/P: 1.36

| 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       | 2672             | 0.0              | 490       | 34553            | 53.2             | 620       | 136720           | 1.7              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 71.7             | 625       | 126308           | 1.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 91.4             | 630       | 114625           | 0.6              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 110.0            | 635       | 103216           | 0.4              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 125.1            | 640       | 92605            | 0.2              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 135.7            | 645       | 83234            | 0.1              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 140.8            | 650       | 73263            | 0.1              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 139.6            | 655       | 64627            | 0.1              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 135.7            | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.1              | 535       | 103269           | 128.7            | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.2              | 540       | 107316           | 118.6            | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.6              | 545       | 113101           | 108.4            | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 2.0              | 550       | 120690           | 98.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 5.9              | 555       | 128583           | 87.9             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 14.3             | 560       | 137796           | 77.0             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 30.5             | 565       | 146577           | 65.8             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 55.5             | 570       | 154581           | 54.6             | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 77.4             | 575       | 162633           | 44.3             | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 73.6             | 580       | 168101           | 34.6             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 53.7             | 585       | 173145           | 26.5             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 41.9             | 590       | 174675           | 19.5             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 34.3             | 595       | 173724           | 13.9             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 27.9             | 600       | 171241           | 9.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 27.1             | 605       | 165134           | 6.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 31.3             | 610       | 156652           | 4.2              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 40.0             | 615       | 147879           | 2.7              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: 4490.7

M/P: 0.5

| 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       | 2672             | 0.0              | 490       | 34553            | 28.8             | 620       | 136720           | 0.1              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 36.6             | 625       | 126308           | 0.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 43.9             | 630       | 114625           | 0.0              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 49.6             | 635       | 103216           | 0.0              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 53.0             | 640       | 92605            | 0.0              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 53.5             | 645       | 83234            | 0.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 51.6             | 650       | 73263            | 0.0              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 47.3             | 655       | 64627            | 0.0              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 42.5             | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 37.2             | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.1              | 540       | 107316           | 31.4             | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.4              | 545       | 113101           | 26.3             | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 1.4              | 550       | 120690           | 21.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 3.7              | 555       | 128583           | 17.3             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 8.9              | 560       | 137796           | 13.6             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 18.2             | 565       | 146577           | 10.3             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 33.2             | 570       | 154581           | 7.6              | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 45.6             | 575       | 162633           | 5.4              | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 43.8             | 580       | 168101           | 3.8              | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 32.2             | 585       | 173145           | 2.6              | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 25.6             | 590       | 174675           | 1.7              | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 21.2             | 595       | 173724           | 1.1              | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 17.4             | 600       | 171241           | 0.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 16.6             | 605       | 165134           | 0.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 18.6             | 610       | 156652           | 0.3              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 22.7             | 615       | 147879           | 0.2              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 76.9$   
 $R_g = 94.4$   
 CIE  $R_a = 73.1$   
 $R_g = -34.6$

### Spectral Power Distribution Comparison



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 88 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 84 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 75 | CES81 = 75 |
| CES07 = 40 | CES32 = 67 | CES57 = 74 | CES82 = 94 |
| CES08 = 39 | CES33 = 74 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 78 | CES59 = 87 | CES84 = 89 |
| CES10 = 75 | CES35 = 89 | CES60 = 93 | CES85 = 80 |
| CES11 = 58 | CES36 = 98 | CES61 = 86 | CES86 = 66 |
| CES12 = 64 | CES37 = 86 | CES62 = 89 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 68 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 88 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 82 | CES94 = 52 |
| CES20 = 65 | CES45 = 87 | CES70 = 67 | CES95 = 69 |
| CES21 = 86 | CES46 = 82 | CES71 = 66 | CES96 = 78 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 59 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 88 | CES75 = 66 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)