

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: P382623

Luminaire Tested: **GLEON-SA0A-735-U-T4FT**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P382623  
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-SA0A-735-U-T4FT  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(10) 70 CRI, 3500K, 615mA 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: 43227.5 lumens  
Efficiency: N/A  
Efficacy: 133.8 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

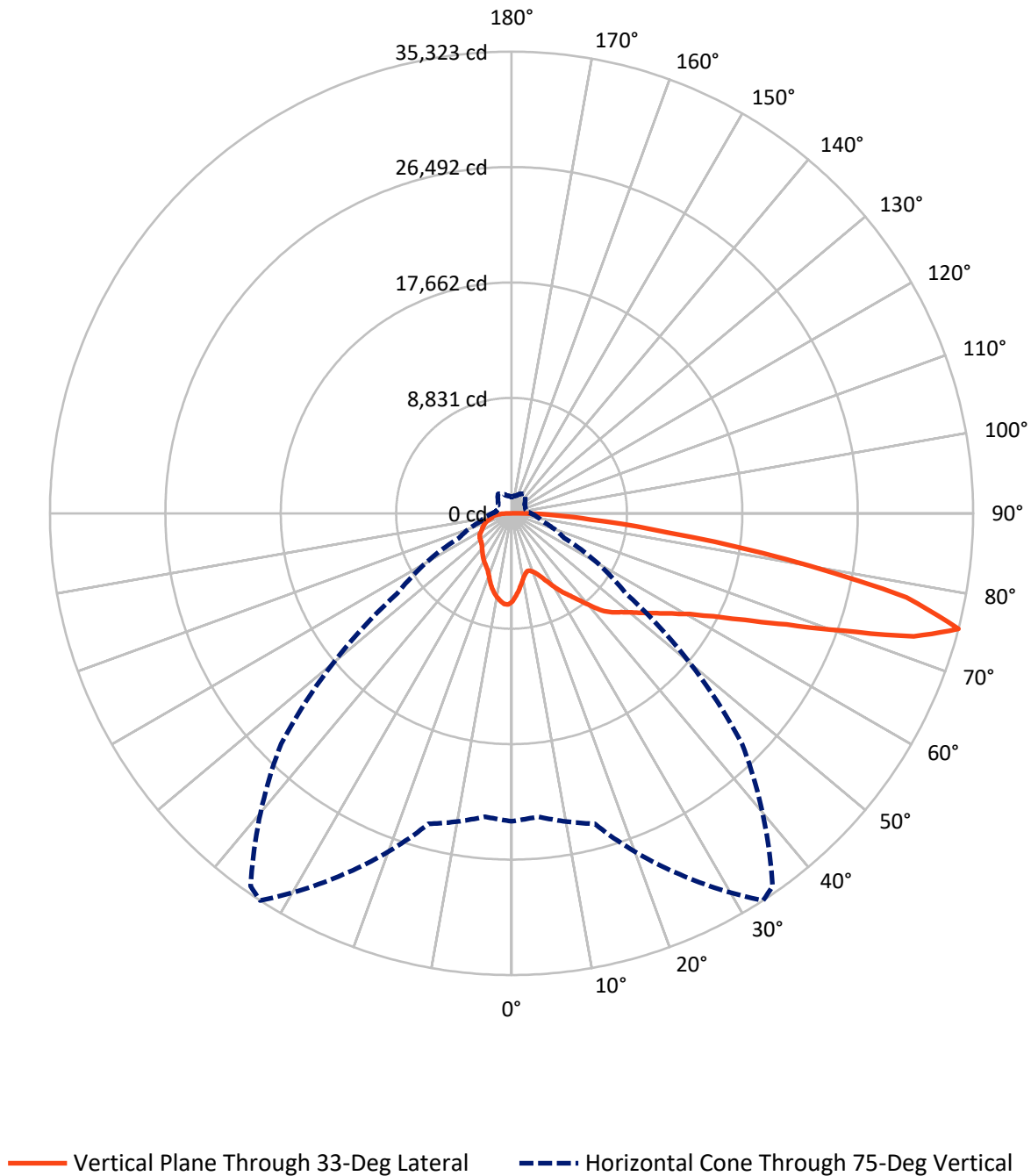
Input Watts (W): 323  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT





REPORT NUMBER: P382623  
CATALOG NUMBER: GLEON-SA0A-735-U-T4FT

## Luminous Intensity Polar Plot



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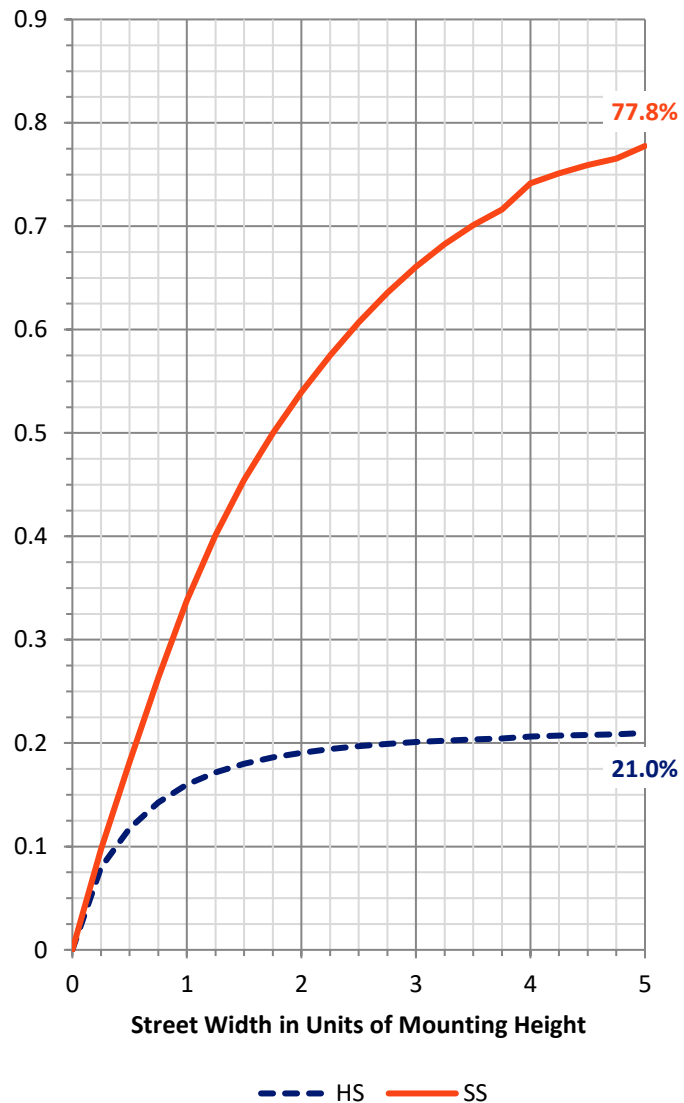
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 9282.1   | 0.0    | 9282.1  |
|                    | % Fixture | 21.5     | 0.0    | 21.5    |
| <b>Street Side</b> | Lumens    | 33945.4  | 0.0    | 33945.4 |
|                    | % Fixture | 78.5     | 0.0    | 78.5    |
| <b>Total</b>       | Lumens    | 43227.5  | 0.0    | 43227.5 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 611.1   | 1.4       |
| 10°-20°   | 1655.0  | 3.8       |
| 20°-30°   | 2702.9  | 6.3       |
| 30°-40°   | 4025.2  | 9.3       |
| 40°-50°   | 5773.2  | 13.4      |
| 50°-60°   | 7925.8  | 18.3      |
| 60°-70°   | 9922.7  | 23.0      |
| 70°-80°   | 8976.6  | 20.8      |
| 80°-90°   | 1635.1  | 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°    | 43227.5 | 100.0     |
| 0°-180°   | 43227.5 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P382623

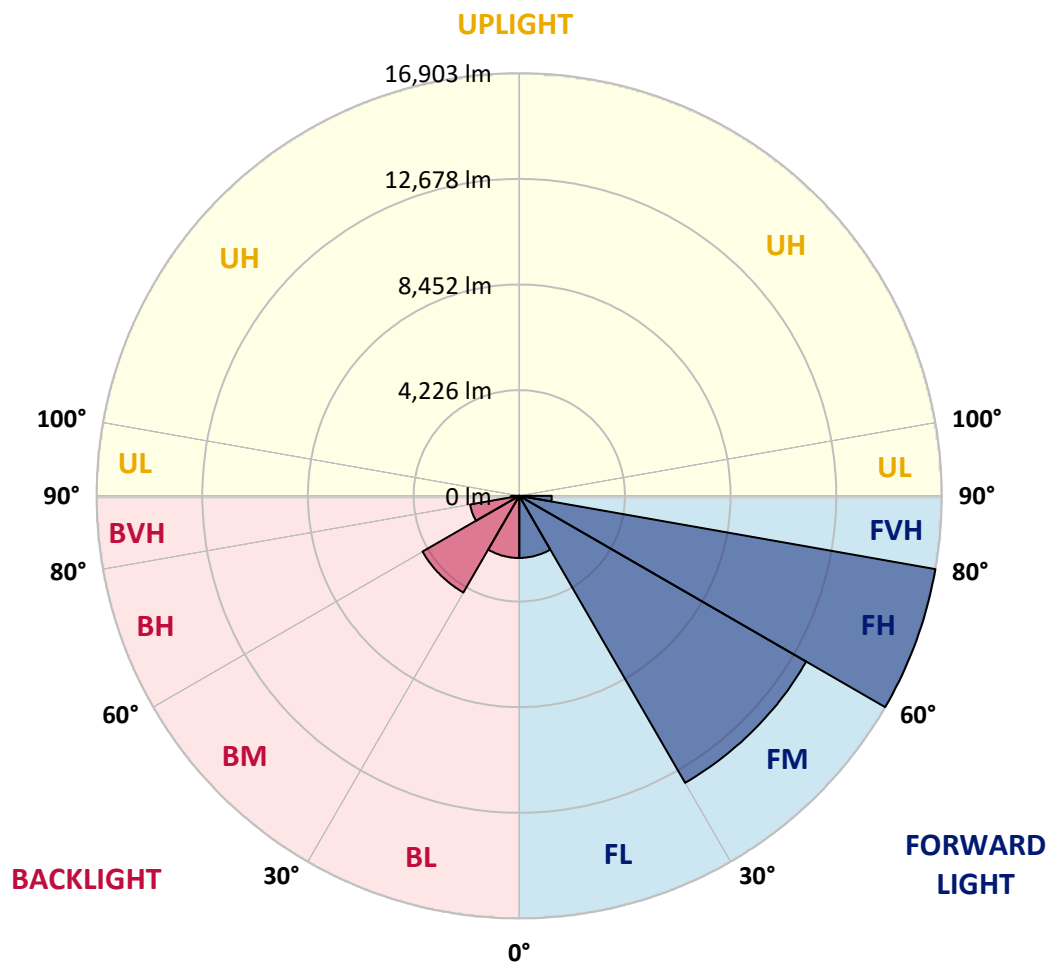
CATALOG NUMBER: GLEON-SA0A-735-U-T4FT

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 2482.8  | 5.7       |                         |      |         |
| FM   | (30°-60°)   | 13257.0 | 30.7      |                         |      |         |
| FH   | (60°-80°)   | 16903.5 | 39.1      |                         |      | G5      |
| FVH  | (80°-90°)   | 1302.2  | 3.0       |                         |      | G5      |
| BL   | (0°-30°)    | 2486.2  | 5.8       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 4467.2  | 10.3      | B3/5000                 |      |         |
| BH   | (60°-80°)   | 1995.8  | 4.6       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 332.9   | 0.8       |                         |      | G3/500  |
| 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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CATALOG NUMBER: GLEON-SA0A-735-U-T4FT

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 33°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 6756.7  | 6756.7  | 6756.7  | 6756.7  | 6756.7  | 6756.7  | 6756.7  | 6756.7  | 6756.7  | 6756.7  | 6756.7  |
| 2.5°  | 6274.4  | 6250.5  | 6295.3  | 6301.3  | 6340.1  | 6355.0  | 6408.8  | 6492.4  | 6561.1  | 6640.3  | 6711.9  |
| 5°    | 5705.5  | 5689.1  | 5751.7  | 5796.6  | 5881.7  | 5917.6  | 6044.4  | 6222.2  | 6380.4  | 6559.6  | 6722.3  |
| 7.5°  | 5165.0  | 5156.0  | 5226.2  | 5327.7  | 5426.3  | 5475.5  | 5695.0  | 5953.3  | 6217.7  | 6507.3  | 6756.7  |
| 10°   | 4709.5  | 4706.6  | 4773.7  | 4873.8  | 5018.6  | 5073.9  | 5357.6  | 5698.0  | 6068.4  | 6467.0  | 6814.9  |
| 12.5° | 4454.2  | 4464.6  | 4496.0  | 4579.7  | 4714.0  | 4769.2  | 5084.3  | 5484.5  | 5942.9  | 6453.6  | 6900.1  |
| 15°   | 4516.9  | 4533.4  | 4479.6  | 4476.6  | 4572.1  | 4615.4  | 4911.1  | 5332.2  | 5853.3  | 6476.0  | 7024.0  |
| 17.5° | 4784.2  | 4787.2  | 4645.3  | 4555.7  | 4614.0  | 4636.4  | 4857.4  | 5245.6  | 5801.0  | 6526.8  | 7179.3  |
| 20°   | 5160.5  | 5153.0  | 4902.2  | 4752.8  | 4784.2  | 4790.2  | 4933.5  | 5247.1  | 5796.6  | 6614.8  | 7380.8  |
| 22.5° | 5659.2  | 5604.0  | 5266.5  | 5063.4  | 5056.0  | 5047.0  | 5129.1  | 5357.6  | 5862.3  | 6758.2  | 7621.3  |
| 25°   | 6310.2  | 6258.0  | 5793.6  | 5515.9  | 5456.2  | 5433.7  | 5445.6  | 5593.5  | 5992.2  | 6912.0  | 7890.0  |
| 27.5° | 7034.4  | 6943.4  | 6495.4  | 6102.7  | 5978.8  | 5947.4  | 5875.7  | 5926.5  | 6134.1  | 7059.8  | 8209.5  |
| 30°   | 7640.6  | 7591.4  | 7200.2  | 6734.3  | 6588.0  | 6543.2  | 6355.0  | 6299.8  | 6338.6  | 7261.4  | 8612.7  |
| 32.5° | 7979.6  | 7946.8  | 7709.4  | 7333.0  | 7197.2  | 7134.4  | 6868.7  | 6758.2  | 6667.1  | 7579.4  | 9159.3  |
| 35°   | 8390.3  | 8369.4  | 8226.0  | 7952.7  | 7751.1  | 7685.5  | 7479.4  | 7364.4  | 7130.0  | 8017.0  | 9865.6  |
| 37.5° | 8912.9  | 8890.5  | 8893.5  | 8672.4  | 8432.1  | 8370.9  | 8235.0  | 8114.1  | 7730.3  | 8591.8  | 10633.1 |
| 40°   | 9504.2  | 9460.9  | 9444.5  | 9434.0  | 9281.7  | 9247.4  | 9175.7  | 9011.4  | 8482.9  | 9278.7  | 11390.1 |
| 42.5° | 10394.1 | 10240.3 | 9911.9  | 10035.7 | 10186.6 | 10168.7 | 10226.9 | 9990.9  | 9319.0  | 10091.0 | 12129.2 |
| 45°   | 11252.7 | 11000.4 | 10433.0 | 10459.8 | 10789.8 | 10889.9 | 11325.8 | 11158.6 | 10225.4 | 10981.0 | 12893.7 |
| 47.5° | 11644.0 | 11452.8 | 10970.5 | 10972.0 | 11299.0 | 11506.6 | 12462.2 | 12342.7 | 11178.0 | 11991.8 | 13827.0 |
| 50°   | 12081.4 | 11890.3 | 11457.3 | 11620.0 | 11905.3 | 12126.2 | 13559.7 | 13498.5 | 12084.4 | 13098.3 | 14945.4 |
| 52.5° | 12559.2 | 12235.2 | 11960.5 | 12251.6 | 12651.8 | 12908.6 | 14658.6 | 14491.4 | 12916.1 | 14212.2 | 16231.0 |
| 55°   | 12565.3 | 12477.1 | 12686.2 | 12899.7 | 13498.5 | 13813.5 | 15809.9 | 15367.9 | 13594.1 | 15306.7 | 17277.8 |
| 57.5° | 13280.5 | 13137.2 | 13580.6 | 13679.1 | 14461.6 | 14817.0 | 16955.2 | 16131.0 | 14283.9 | 16146.0 | 17842.2 |
| 60°   | 14227.2 | 14104.7 | 14467.6 | 14727.4 | 15653.2 | 16128.0 | 18178.1 | 16914.9 | 14826.0 | 16779.0 | 17815.3 |
| 62.5° | 15862.2 | 15723.3 | 15718.8 | 16083.2 | 17330.0 | 17882.5 | 19550.4 | 17683.9 | 15041.0 | 16904.4 | 17055.2 |
| 65°   | 18255.8 | 18034.8 | 17618.2 | 17791.4 | 19646.0 | 20197.0 | 21083.9 | 18240.9 | 14757.2 | 16232.5 | 15097.7 |
| 67.5° | 20585.2 | 20577.7 | 20065.5 | 20420.9 | 22704.1 | 23146.0 | 22830.9 | 18296.2 | 13871.8 | 13892.7 | 11624.5 |
| 70°   | 22907.1 | 22936.9 | 22850.4 | 24086.7 | 26835.7 | 27295.6 | 24691.5 | 17554.0 | 11881.3 | 10032.8 | 6964.2  |
| 72.5° | 24746.7 | 24739.3 | 25175.3 | 28363.2 | 32197.7 | 32094.7 | 26259.3 | 15305.2 | 8530.6  | 5415.8  | 3328.3  |
| 75°   | 23555.1 | 23295.3 | 24594.4 | 30480.6 | 35323.0 | 34819.9 | 24925.9 | 10676.4 | 4427.4  | 2465.2  | 1791.8  |
| 77.5° | 15363.5 | 15609.8 | 17516.6 | 25179.7 | 30897.2 | 30285.0 | 18287.1 | 4981.3  | 2086.0  | 1617.2  | 1299.0  |
| 80°   | 5563.7  | 5823.5  | 8202.1  | 14263.0 | 21287.0 | 21186.9 | 9005.5  | 2047.2  | 1411.1  | 1221.4  | 946.7   |
| 82.5° | 1914.2  | 2009.8  | 3235.7  | 6334.2  | 12018.7 | 12466.7 | 3388.0  | 1163.2  | 1025.8  | 866.1   | 648.1   |
| 85°   | 751.1   | 860.1   | 1479.8  | 3047.7  | 6062.3  | 6107.1  | 1372.3  | 695.9   | 713.8   | 567.4   | 355.4   |
| 87.5° | 285.2   | 346.4   | 707.8   | 1415.6  | 2768.4  | 2542.9  | 491.3   | 331.4   | 406.2   | 337.5   | 168.7   |
| 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: P382623

CATALOG NUMBER: GLEON-SA0A-735-U-T4FT

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 6756.7  | 6756.7 | 6756.7 | 6756.7 | 6756.7 | 6756.7 | 6756.7 | 6756.7 | 6756.7 | 6756.7 | 6756.7 |
| 2.5°  | 6767.1  | 6798.5 | 6864.2 | 6909.0 | 6956.8 | 6970.2 | 6976.2 | 6988.2 | 7000.1 | 6995.6 | 6997.1 |
| 5°    | 6809.0  | 6870.2 | 6976.2 | 7021.0 | 7041.9 | 7018.0 | 6971.7 | 6934.4 | 6907.5 | 6892.6 | 6888.1 |
| 7.5°  | 6877.6  | 6964.2 | 7077.7 | 7070.3 | 7022.5 | 6916.5 | 6797.0 | 6707.4 | 6632.8 | 6605.9 | 6591.0 |
| 10°   | 6968.7  | 7070.3 | 7149.4 | 7064.3 | 6925.4 | 6741.8 | 6562.6 | 6423.8 | 6311.7 | 6268.5 | 6260.9 |
| 12.5° | 7085.2  | 7188.2 | 7203.2 | 7022.5 | 6792.6 | 6541.7 | 6298.3 | 6114.7 | 5947.4 | 5893.6 | 5881.7 |
| 15°   | 7236.0  | 7333.0 | 7240.5 | 6949.3 | 6628.3 | 6290.8 | 5975.8 | 5726.4 | 5550.2 | 5484.5 | 5460.6 |
| 17.5° | 7394.3  | 7486.8 | 7248.0 | 6828.3 | 6413.2 | 5993.7 | 5597.9 | 5342.6 | 5141.0 | 5064.9 | 5056.0 |
| 20°   | 7583.9  | 7625.7 | 7216.6 | 6655.2 | 6117.7 | 5608.5 | 5191.8 | 4951.5 | 4844.0 | 4790.2 | 4784.2 |
| 22.5° | 7818.4  | 7773.6 | 7145.0 | 6420.7 | 5742.8 | 5163.5 | 4824.5 | 4712.5 | 4685.7 | 4673.7 | 4678.1 |
| 25°   | 8066.3  | 7928.9 | 7039.0 | 6114.7 | 5269.5 | 4718.5 | 4555.7 | 4587.1 | 4622.9 | 4618.4 | 4618.4 |
| 27.5° | 8339.5  | 8087.1 | 6876.1 | 5708.5 | 4745.4 | 4354.1 | 4373.5 | 4488.6 | 4542.3 | 4540.8 | 4539.3 |
| 30°   | 8690.4  | 8266.4 | 6668.6 | 5220.2 | 4255.6 | 4097.3 | 4215.3 | 4355.6 | 4428.9 | 4425.8 | 4427.4 |
| 32.5° | 9121.9  | 8463.4 | 6386.4 | 4675.2 | 3901.7 | 3907.7 | 4043.6 | 4182.5 | 4267.5 | 4260.1 | 4261.6 |
| 35°   | 9626.6  | 8684.4 | 6004.1 | 4137.7 | 3667.3 | 3756.8 | 3864.4 | 3961.4 | 4042.1 | 4031.6 | 4021.2 |
| 37.5° | 10176.1 | 8900.9 | 5496.4 | 3656.8 | 3476.2 | 3616.5 | 3706.1 | 3722.6 | 3759.8 | 3733.0 | 3713.6 |
| 40°   | 10698.7 | 9066.7 | 4842.5 | 3262.7 | 3283.5 | 3497.0 | 3555.3 | 3489.6 | 3422.4 | 3413.5 | 3386.5 |
| 42.5° | 11154.2 | 9121.9 | 4181.0 | 2947.6 | 3080.4 | 3371.6 | 3407.5 | 3270.1 | 3149.2 | 3092.4 | 3068.5 |
| 45°   | 11634.9 | 9141.4 | 3564.3 | 2683.2 | 2884.8 | 3259.7 | 3298.4 | 3114.8 | 2944.6 | 2822.1 | 2781.8 |
| 47.5° | 12263.6 | 9281.7 | 3084.9 | 2487.7 | 2735.5 | 3185.0 | 3240.2 | 2990.8 | 2769.9 | 2595.2 | 2557.8 |
| 50°   | 13086.4 | 9559.4 | 2695.2 | 2338.4 | 2638.5 | 3135.7 | 3198.5 | 2869.9 | 2626.5 | 2416.0 | 2378.6 |
| 52.5° | 14000.2 | 9814.8 | 2380.2 | 2217.4 | 2544.4 | 3049.1 | 3144.6 | 2783.3 | 2492.2 | 2250.2 | 2209.9 |
| 55°   | 14639.3 | 9619.2 | 2126.4 | 2092.0 | 2421.9 | 2925.2 | 3070.0 | 2710.2 | 2299.5 | 2089.0 | 2053.1 |
| 57.5° | 14761.8 | 8950.2 | 1933.7 | 1962.0 | 2274.1 | 2769.9 | 2955.1 | 2547.4 | 2195.0 | 2018.8 | 1981.5 |
| 60°   | 14427.3 | 8018.5 | 1790.3 | 1842.6 | 2115.8 | 2574.2 | 2740.1 | 2432.5 | 2095.0 | 1944.1 | 1912.7 |
| 62.5° | 13586.6 | 7064.3 | 1684.3 | 1735.1 | 1968.0 | 2375.6 | 2605.6 | 2311.4 | 1993.4 | 1859.0 | 1827.7 |
| 65°   | 11888.8 | 5931.0 | 1582.8 | 1639.5 | 1830.7 | 2203.9 | 2484.7 | 2199.5 | 1893.4 | 1790.3 | 1760.4 |
| 67.5° | 8974.1  | 4442.3 | 1487.2 | 1538.0 | 1708.2 | 2054.6 | 2353.3 | 2089.0 | 1796.3 | 1730.6 | 1694.8 |
| 70°   | 5284.4  | 2781.8 | 1378.2 | 1432.0 | 1579.8 | 1899.3 | 2212.9 | 1968.0 | 1675.4 | 1645.5 | 1599.2 |
| 72.5° | 2459.3  | 1673.9 | 1254.3 | 1306.6 | 1418.6 | 1691.8 | 2032.3 | 1809.7 | 1532.0 | 1466.3 | 1403.6 |
| 75°   | 1467.8  | 1224.4 | 1108.0 | 1154.3 | 1233.4 | 1470.8 | 1805.2 | 1648.5 | 1396.1 | 1309.6 | 1243.8 |
| 77.5° | 1097.5  | 936.2  | 946.7  | 995.9  | 1060.2 | 1287.1 | 1599.2 | 1521.6 | 1291.6 | 1224.4 | 1179.6 |
| 80°   | 789.9   | 710.8  | 772.0  | 825.7  | 892.9  | 1170.7 | 1532.0 | 1406.5 | 1167.7 | 1078.1 | 1036.3 |
| 82.5° | 527.1   | 510.7  | 580.8  | 636.1  | 701.8  | 1024.3 | 1439.4 | 1231.9 | 997.4  | 883.9  | 791.3  |
| 85°   | 291.2   | 307.6  | 391.2  | 415.1  | 471.8  | 721.2  | 1179.6 | 990.0  | 751.1  | 604.8  | 577.8  |
| 87.5° | 120.9   | 141.9  | 210.5  | 203.1  | 250.9  | 430.0  | 776.4  | 597.3  | 477.8  | 356.9  | 277.7  |
| 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**



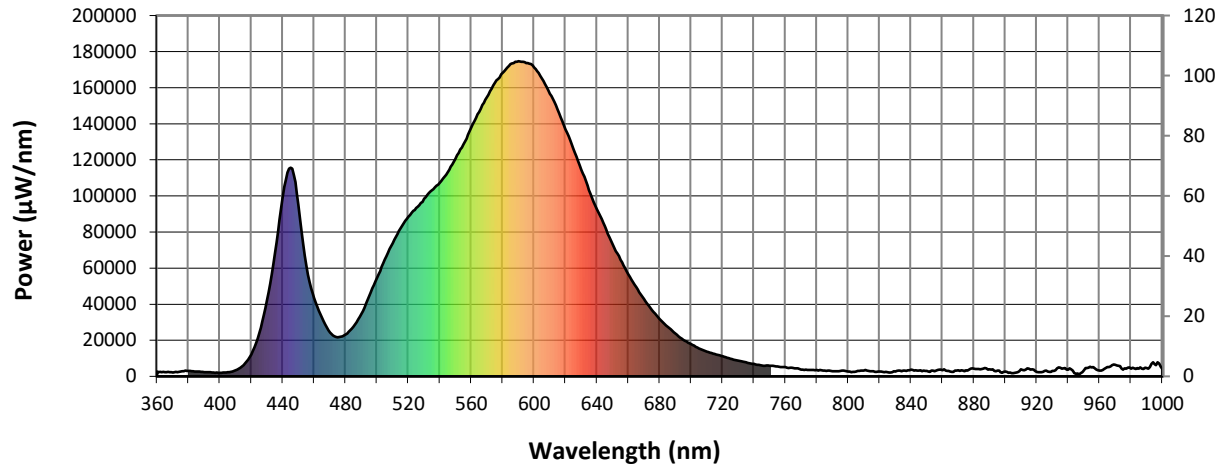
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3500K 4-step quadrangle

REPORT NUMBER: SP1-2101-121-7

### Photopic Flux vs. Wavelength



#####

| 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

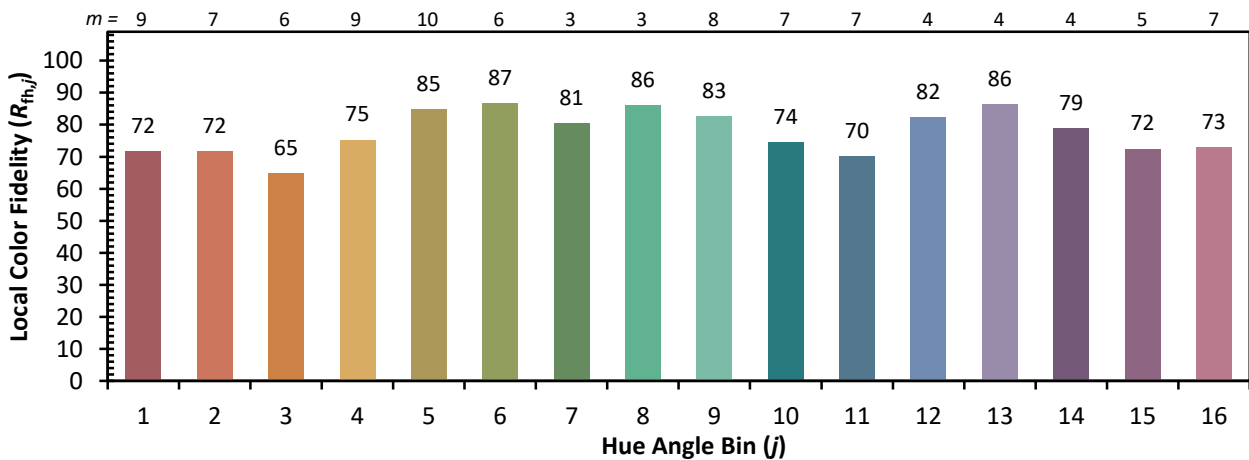
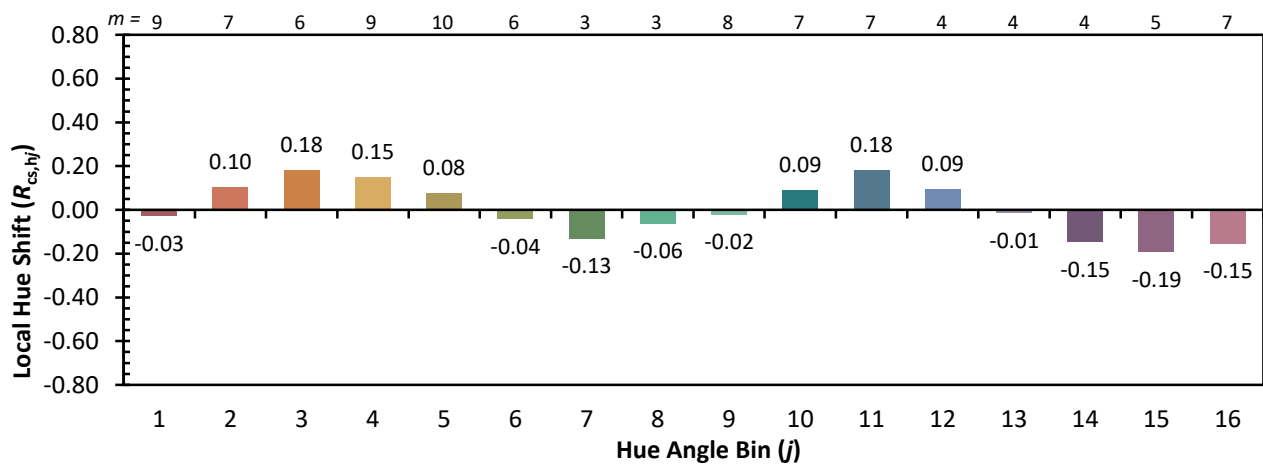




**Individual Sample Fidelity Index ( $R_{f,i}$ )**

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