

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: P319763

Luminaire Tested: **GLEON-SA9B-760-U-SL3**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319763  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-22)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GLEON-SA9B-760-U-SL3  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 70 CRI, 5700K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 51091 lumens  
Efficiency: N/A  
Efficacy: 136.6 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G5

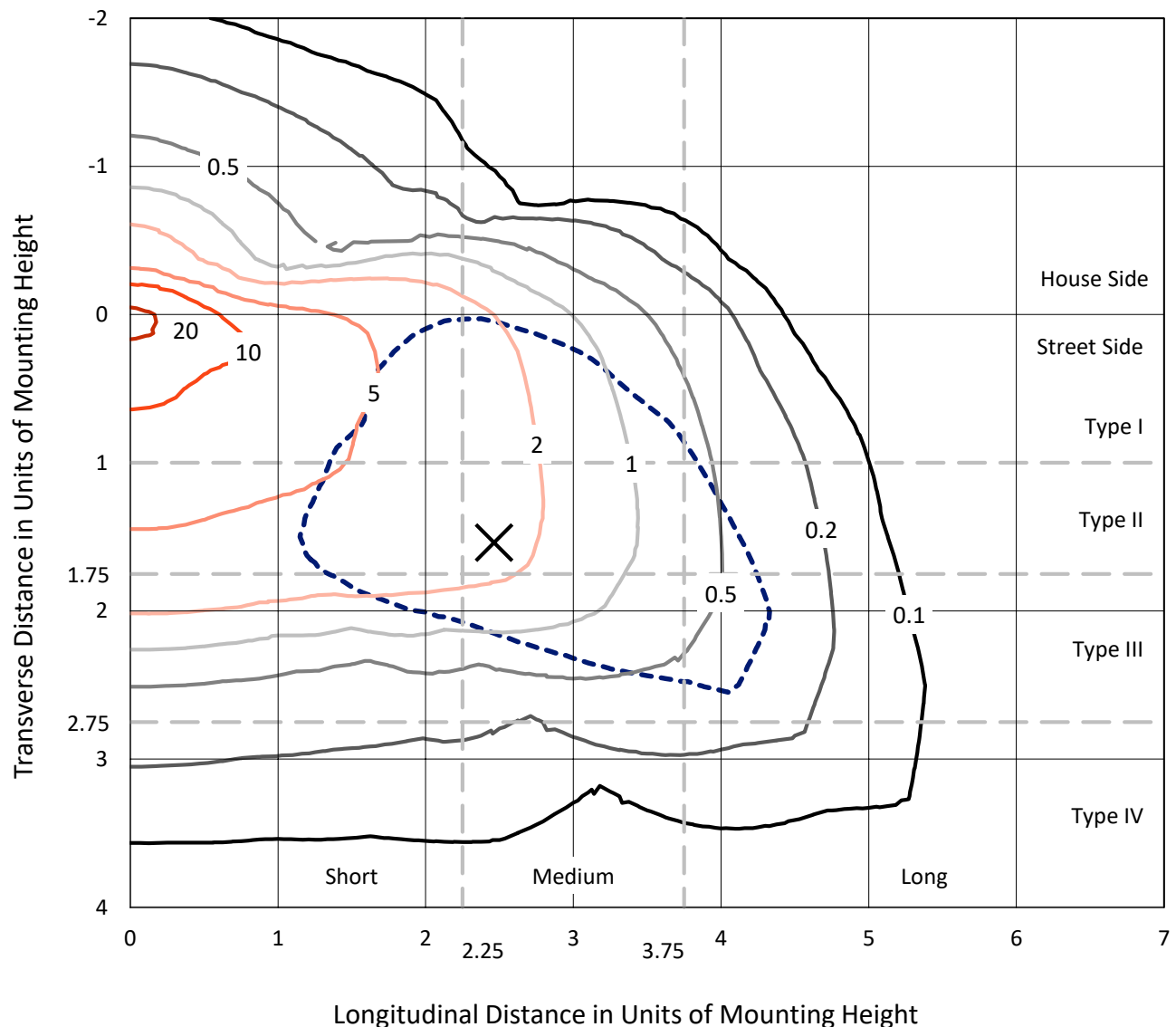
Input Watts (W): 374  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

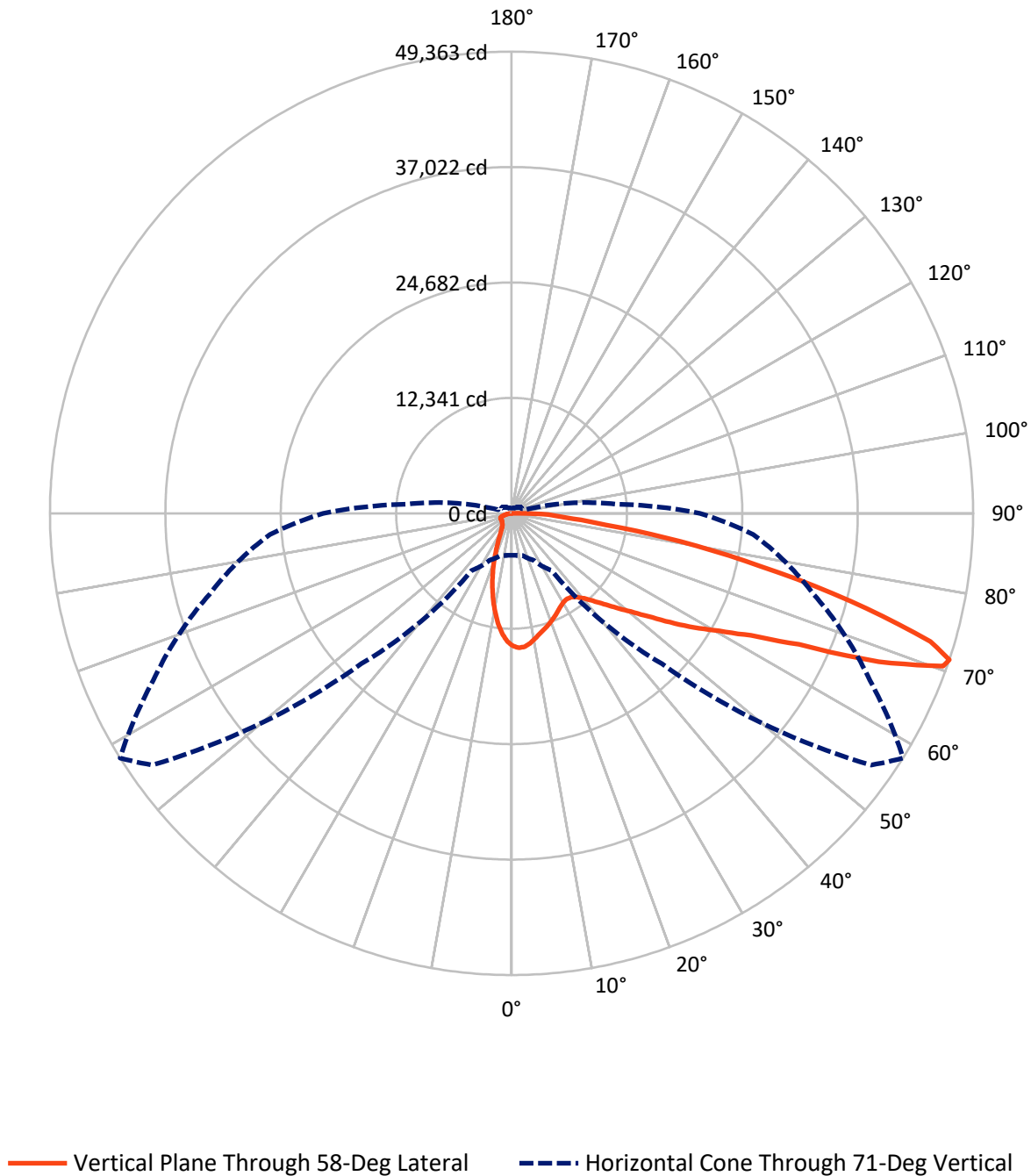
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 22.6 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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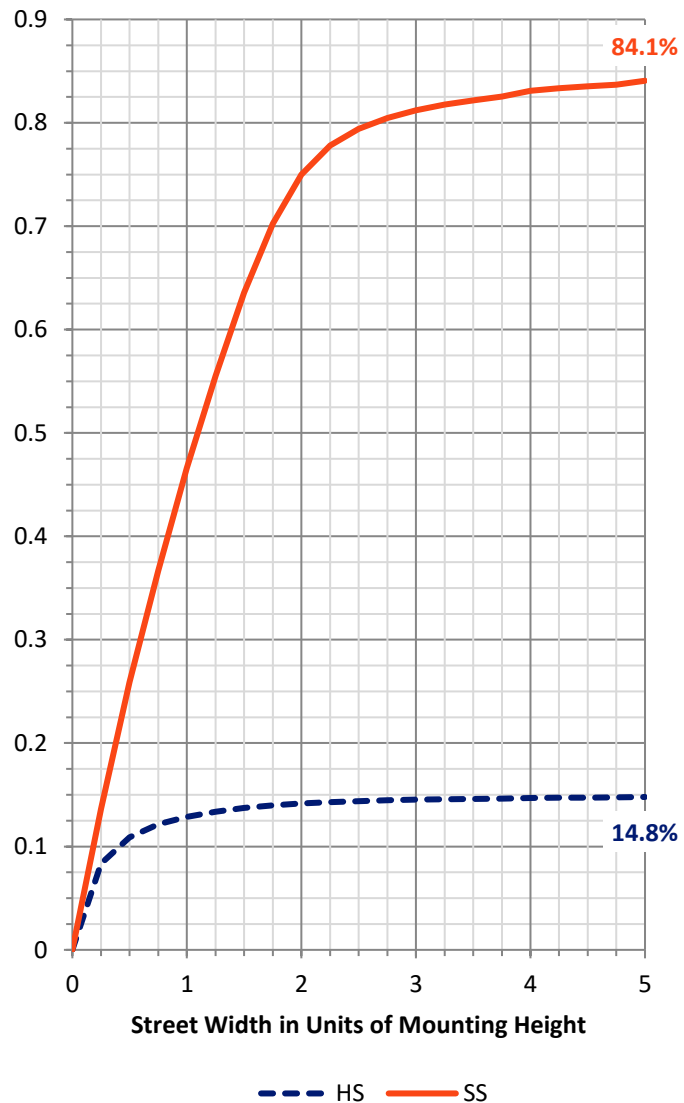
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 7638.5   | 0.0    | 7638.5  |
|                    | % Fixture | 15.0     | 0.0    | 15.0    |
| <b>Street Side</b> | Lumens    | 43452.5  | 0.0    | 43452.5 |
|                    | % Fixture | 85.0     | 0.0    | 85.0    |
| <b>Total</b>       | Lumens    | 51091.0  | 0.0    | 51091.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1221.2  | 2.4       |
| 10°-20°   | 2715.5  | 5.3       |
| 20°-30°   | 3451.1  | 6.8       |
| 30°-40°   | 4396.0  | 8.6       |
| 40°-50°   | 6233.8  | 12.2      |
| 50°-60°   | 9647.0  | 18.9      |
| 60°-70°   | 13133.2 | 25.7      |
| 70°-80°   | 8761.4  | 17.1      |
| 80°-90°   | 1531.8  | 3.0       |
| 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°    | 51091.0 | 100.0     |
| 0°-180°   | 51091.0 | 100.0     |

**Coefficient of Utilization**



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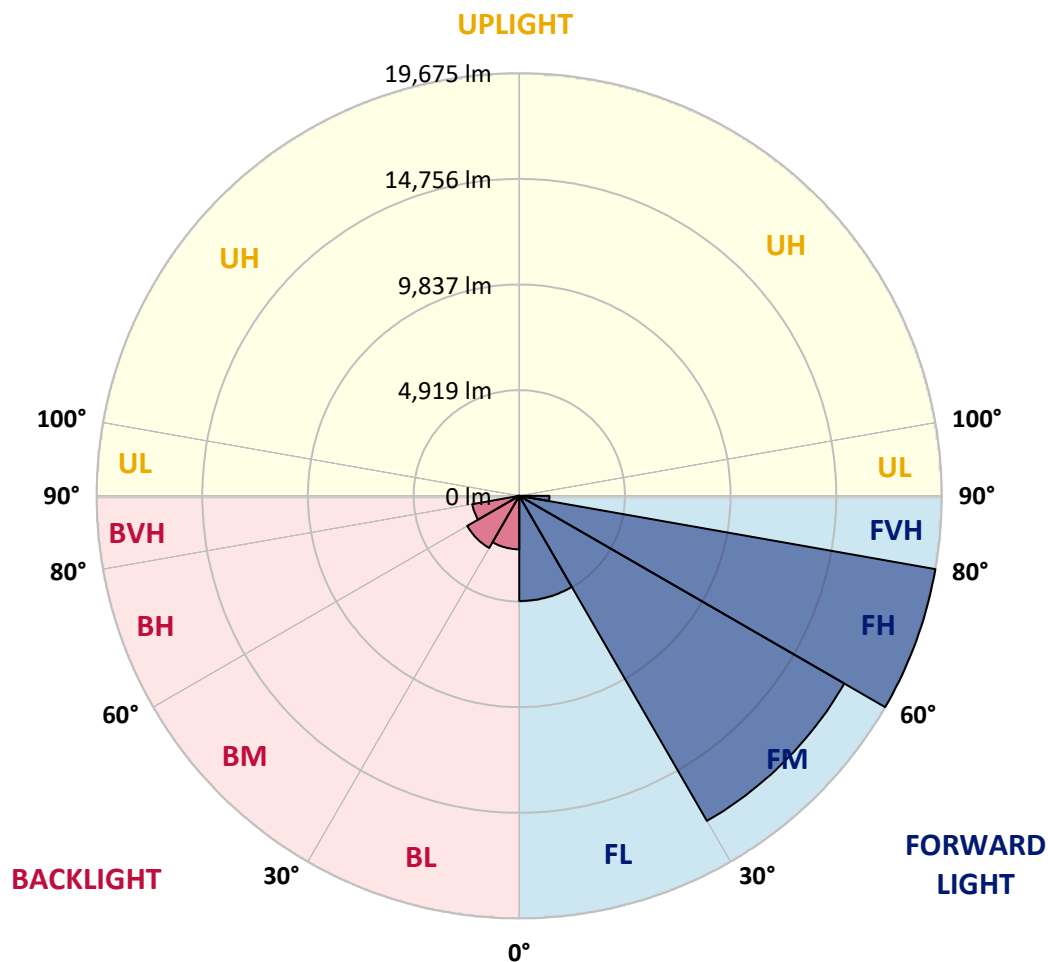
CATALOG NUMBER: GLEON-SA9B-760-U-SL3

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 4897.9  | 9.6       |                         |      |         |
| FM   | (30°-60°)   | 17475.6 | 34.2      |                         |      |         |
| FH   | (60°-80°)   | 19674.5 | 38.5      |                         |      | G5      |
| FVH  | (80°-90°)   | 1404.5  | 2.7       |                         |      | G5      |
| BL   | (0°-30°)    | 2489.9  | 4.9       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 2801.2  | 5.5       | B3/5000                 |      |         |
| BH   | (60°-80°)   | 2220.0  | 4.3       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 127.3   | 0.2       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G5**

Type III Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 58°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 |
| 2.5°  | 14531.1 | 14511.6 | 14518.7 | 14504.4 | 14470.6 | 14436.8 | 14387.0 | 14395.9 | 14326.5 | 14223.3 | 14095.1 |
| 5°    | 14257.1 | 14249.9 | 14303.3 | 14333.6 | 14358.5 | 14338.9 | 14324.7 | 14342.5 | 14241.0 | 14098.7 | 13876.2 |
| 7.5°  | 13682.2 | 13603.9 | 13671.5 | 13773.0 | 13869.1 | 13942.1 | 14038.2 | 14050.6 | 13986.6 | 13837.1 | 13545.2 |
| 10°   | 12865.4 | 12790.6 | 12890.3 | 13048.7 | 13240.9 | 13415.3 | 13609.3 | 13644.9 | 13657.3 | 13522.1 | 13167.9 |
| 12.5° | 12018.2 | 11961.3 | 12060.9 | 12283.4 | 12602.0 | 12870.7 | 13180.4 | 13233.7 | 13344.1 | 13253.3 | 12819.1 |
| 15°   | 11260.1 | 11238.7 | 11359.7 | 11578.6 | 11945.3 | 12356.4 | 12803.1 | 12900.9 | 13087.8 | 13057.6 | 12546.8 |
| 17.5° | 10605.1 | 10599.8 | 10692.4 | 10921.9 | 11327.7 | 11847.4 | 12427.5 | 12593.1 | 12870.7 | 12906.3 | 12322.5 |
| 20°   | 10117.5 | 10106.8 | 10170.9 | 10340.0 | 10758.2 | 11347.3 | 12021.8 | 12249.6 | 12650.0 | 12774.6 | 12091.2 |
| 22.5° | 9855.9  | 9854.1  | 9855.9  | 9936.0  | 10277.7 | 10825.8 | 11626.7 | 11904.3 | 12434.7 | 12669.6 | 11834.9 |
| 25°   | 9811.4  | 9806.1  | 9766.9  | 9758.0  | 9952.0  | 10389.8 | 11235.2 | 11541.3 | 12230.0 | 12596.6 | 11591.1 |
| 27.5° | 9927.1  | 9934.2  | 9882.6  | 9799.0  | 9838.1  | 10103.3 | 10895.2 | 11222.7 | 12066.3 | 12582.4 | 11422.0 |
| 30°   | 10167.3 | 10163.8 | 10119.3 | 10032.1 | 9955.6  | 9996.5  | 10653.2 | 10980.7 | 11955.9 | 12644.7 | 11306.3 |
| 32.5° | 10432.5 | 10452.1 | 10443.2 | 10395.1 | 10281.2 | 10117.5 | 10580.2 | 10900.6 | 11923.9 | 12794.2 | 11256.5 |
| 35°   | 10751.1 | 10772.4 | 10836.5 | 10873.9 | 10740.4 | 10477.0 | 10736.8 | 11014.5 | 12016.4 | 13075.4 | 11336.6 |
| 37.5° | 11053.6 | 11108.8 | 11288.5 | 11446.9 | 11333.0 | 11039.4 | 11153.3 | 11350.8 | 12303.0 | 13518.5 | 11551.9 |
| 40°   | 11402.4 | 11450.5 | 11744.1 | 12080.5 | 12062.7 | 11758.4 | 11824.2 | 11955.9 | 12808.4 | 14153.8 | 11941.7 |
| 42.5° | 11745.9 | 11842.0 | 12267.4 | 12744.3 | 12881.4 | 12612.6 | 12717.6 | 12787.0 | 13520.3 | 14995.6 | 12621.5 |
| 45°   | 12203.3 | 12306.5 | 12897.4 | 13472.2 | 13792.6 | 13641.3 | 13808.6 | 13835.3 | 14415.5 | 16141.8 | 13609.3 |
| 47.5° | 12895.6 | 13013.1 | 13701.8 | 14305.1 | 14794.5 | 14810.5 | 15086.4 | 15075.7 | 15533.1 | 17453.4 | 14853.3 |
| 50°   | 13974.1 | 14143.2 | 14707.3 | 15271.5 | 15865.9 | 16196.9 | 16565.3 | 16513.7 | 16873.2 | 18850.4 | 16285.9 |
| 52.5° | 15387.2 | 15465.5 | 15883.7 | 16300.1 | 17038.7 | 17780.8 | 18309.4 | 18263.1 | 18393.1 | 20286.6 | 17912.5 |
| 55°   | 16851.8 | 16910.6 | 17083.2 | 17311.0 | 18304.1 | 19514.3 | 20631.9 | 20558.9 | 20229.7 | 21778.0 | 19519.6 |
| 57.5° | 18168.8 | 18288.1 | 18407.3 | 18501.6 | 19578.3 | 21326.0 | 23007.8 | 23013.1 | 22222.9 | 23386.9 | 21180.0 |
| 60°   | 18373.5 | 18478.5 | 19266.9 | 20010.8 | 21758.4 | 23742.8 | 25551.0 | 25497.6 | 24285.6 | 25132.7 | 23030.9 |
| 62.5° | 16241.4 | 16478.1 | 17795.1 | 19774.1 | 23858.5 | 28163.5 | 28795.3 | 28729.5 | 26752.2 | 27284.4 | 25186.1 |
| 65°   | 11639.1 | 11907.9 | 13497.1 | 16471.0 | 22840.5 | 33034.5 | 34650.5 | 33764.2 | 30115.8 | 29930.8 | 27709.7 |
| 67.5° | 6714.8  | 6778.8  | 7467.6  | 9855.9  | 17391.1 | 33289.0 | 43582.7 | 42342.3 | 35339.2 | 32933.1 | 28944.8 |
| 70°   | 4965.3  | 4963.5  | 5127.3  | 6065.2  | 9411.0  | 27168.7 | 47830.8 | 48943.1 | 40838.5 | 33920.8 | 27198.9 |
| 71°   | 4490.1  | 4495.5  | 4678.8  | 5520.6  | 7453.3  | 22740.8 | 46928.5 | 49363.2 | 42287.1 | 33433.2 | 25935.4 |
| 72.5° | 3840.6  | 3858.4  | 4112.9  | 4951.1  | 6269.8  | 15682.6 | 43041.7 | 46843.1 | 42974.1 | 32230.1 | 23958.1 |
| 75°   | 2913.3  | 2954.3  | 3306.7  | 4173.4  | 5730.6  | 7953.4  | 31589.4 | 37405.4 | 38176.0 | 28439.4 | 17802.2 |
| 77.5° | 2078.7  | 2124.9  | 2523.6  | 3509.5  | 5447.6  | 5994.0  | 21155.1 | 27284.4 | 28094.1 | 18225.8 | 8029.9  |
| 80°   | 1313.4  | 1368.6  | 1669.3  | 2792.3  | 5118.4  | 5691.4  | 13294.3 | 18339.7 | 15319.5 | 5832.0  | 2043.1  |
| 82.5° | 770.6   | 813.3   | 1035.8  | 1824.2  | 4180.5  | 5481.4  | 7821.7  | 10165.6 | 5961.9  | 1761.9  | 929.0   |
| 85°   | 446.7   | 466.3   | 646.0   | 1162.1  | 3036.1  | 5173.5  | 5746.6  | 5682.5  | 2587.7  | 861.4   | 439.6   |
| 87.5° | 208.2   | 231.4   | 382.6   | 606.9   | 1685.4  | 3749.8  | 4541.8  | 3924.2  | 1608.8  | 404.0   | 206.4   |
| 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-SA9B-760-U-SL3

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°    | 115°    | 125°    | 135°    | 145°    | 155°    | 165°    | 175°    | 180°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 | 14155.6 |
| 2.5°  | 14032.8 | 14002.6 | 13876.2 | 13764.1 | 13646.6 | 13493.6 | 13324.5 | 13303.2 | 13199.9 | 13219.5 | 13183.9 |
| 5°    | 13755.2 | 13678.7 | 13374.3 | 13098.5 | 12772.8 | 12480.9 | 12164.2 | 12018.2 | 11808.2 | 11794.0 | 11740.6 |
| 7.5°  | 13358.3 | 13215.9 | 12744.3 | 12221.1 | 11697.9 | 11199.6 | 10706.6 | 10382.7 | 10051.7 | 9911.1  | 9898.6  |
| 10°   | 12911.6 | 12669.6 | 11975.5 | 11201.3 | 10446.8 | 9718.9  | 9014.1  | 8492.7  | 8022.8  | 7800.4  | 7791.5  |
| 12.5° | 12488.1 | 12130.3 | 11178.2 | 10124.6 | 9092.4  | 8149.2  | 7182.8  | 6497.6  | 5908.6  | 5711.0  | 5627.4  |
| 15°   | 12128.6 | 11624.9 | 10402.3 | 9055.0  | 7802.1  | 6492.3  | 5392.4  | 4671.7  | 4127.1  | 3938.4  | 3902.9  |
| 17.5° | 11779.7 | 11131.9 | 9606.7  | 7974.8  | 6460.3  | 5020.5  | 3918.9  | 3383.2  | 3093.1  | 3016.6  | 3014.8  |
| 20°   | 11432.7 | 10624.7 | 8775.6  | 6869.6  | 5162.9  | 3755.1  | 3013.0  | 2772.8  | 2674.9  | 2666.0  | 2651.7  |
| 22.5° | 11039.4 | 10087.3 | 7901.8  | 5760.8  | 4029.2  | 2952.5  | 2561.0  | 2464.9  | 2452.4  | 2484.4  | 2484.4  |
| 25°   | 10671.0 | 9553.4  | 7015.5  | 4675.2  | 3134.0  | 2463.1  | 2286.9  | 2267.3  | 2301.1  | 2358.1  | 2363.4  |
| 27.5° | 10327.5 | 9039.0  | 6150.6  | 3710.6  | 2511.1  | 2169.4  | 2096.5  | 2119.6  | 2180.1  | 2246.0  | 2247.7  |
| 30°   | 10044.5 | 8553.2  | 5310.6  | 2924.0  | 2121.4  | 1950.5  | 1938.1  | 1984.3  | 2050.2  | 2101.8  | 2114.3  |
| 32.5° | 9825.6  | 8138.5  | 4499.0  | 2351.0  | 1866.9  | 1786.8  | 1797.5  | 1836.6  | 1877.6  | 1906.0  | 1925.6  |
| 35°   | 9724.2  | 7782.6  | 3749.8  | 1982.6  | 1704.9  | 1660.4  | 1674.7  | 1696.0  | 1713.8  | 1735.2  | 1751.2  |
| 37.5° | 9742.0  | 7506.7  | 3080.6  | 1753.0  | 1596.4  | 1573.2  | 1573.2  | 1573.2  | 1573.2  | 1583.9  | 1585.7  |
| 40°   | 9907.5  | 7348.3  | 2536.1  | 1607.1  | 1523.4  | 1498.5  | 1478.9  | 1461.1  | 1446.9  | 1454.0  | 1450.4  |
| 42.5° | 10331.1 | 7334.1  | 2137.4  | 1514.5  | 1464.7  | 1423.7  | 1384.6  | 1359.7  | 1341.9  | 1349.0  | 1352.6  |
| 45°   | 11050.1 | 7512.1  | 1868.7  | 1448.7  | 1409.5  | 1347.2  | 1297.4  | 1270.7  | 1258.2  | 1281.4  | 1284.9  |
| 47.5° | 11980.8 | 7900.0  | 1704.9  | 1400.6  | 1357.9  | 1276.0  | 1222.6  | 1197.7  | 1201.3  | 1235.1  | 1244.0  |
| 50°   | 13180.4 | 8530.0  | 1626.6  | 1370.4  | 1322.3  | 1215.5  | 1160.4  | 1139.0  | 1149.7  | 1197.7  | 1208.4  |
| 52.5° | 14497.3 | 9437.7  | 1635.5  | 1361.5  | 1299.2  | 1171.0  | 1112.3  | 1087.4  | 1105.2  | 1149.7  | 1158.6  |
| 55°   | 16017.2 | 10528.6 | 1783.2  | 1373.9  | 1265.4  | 1142.6  | 1073.2  | 1030.4  | 1044.7  | 1085.6  | 1092.7  |
| 57.5° | 17706.1 | 11778.0 | 2080.5  | 1370.4  | 1222.6  | 1115.9  | 1032.2  | 968.1   | 978.8   | 1003.7  | 1010.9  |
| 60°   | 19464.4 | 13287.1 | 2541.4  | 1381.0  | 1203.1  | 1083.8  | 977.0   | 897.0   | 893.4   | 914.8   | 918.3   |
| 62.5° | 21575.1 | 15033.0 | 3068.2  | 1388.2  | 1215.5  | 1042.9  | 904.1   | 825.8   | 815.1   | 820.4   | 824.0   |
| 65°   | 23749.9 | 16296.6 | 2870.6  | 1359.7  | 1254.7  | 1009.1  | 840.0   | 756.4   | 736.8   | 733.2   | 735.0   |
| 67.5° | 23817.5 | 14942.2 | 2012.8  | 1302.7  | 1270.7  | 991.3   | 792.0   | 697.6   | 665.6   | 653.1   | 651.4   |
| 70°   | 21359.8 | 12139.2 | 1567.9  | 1242.2  | 1206.6  | 962.8   | 747.5   | 649.6   | 601.5   | 582.0   | 580.2   |
| 71°   | 20160.3 | 11174.6 | 1486.0  | 1212.0  | 1158.6  | 934.3   | 727.9   | 628.2   | 578.4   | 557.0   | 553.5   |
| 72.5° | 18279.2 | 10017.9 | 1386.4  | 1163.9  | 1066.0  | 861.4   | 690.5   | 598.0   | 546.4   | 521.4   | 516.1   |
| 75°   | 13118.1 | 6551.0  | 1190.6  | 1037.6  | 882.7   | 687.0   | 605.1   | 537.5   | 493.0   | 462.7   | 459.2   |
| 77.5° | 5054.3  | 2607.2  | 900.5   | 863.1   | 676.3   | 537.5   | 498.3   | 464.5   | 432.5   | 402.2   | 400.4   |
| 80°   | 1562.6  | 1165.7  | 656.7   | 649.6   | 489.4   | 400.4   | 388.0   | 379.1   | 366.6   | 334.6   | 327.5   |
| 82.5° | 834.7   | 669.2   | 452.0   | 420.0   | 320.3   | 267.0   | 281.2   | 284.7   | 286.5   | 252.7   | 249.2   |
| 85°   | 398.6   | 354.2   | 254.5   | 238.5   | 186.9   | 149.5   | 172.6   | 186.9   | 188.6   | 154.8   | 144.2   |
| 87.5° | 190.4   | 185.1   | 119.2   | 90.8    | 69.4    | 49.8    | 60.5    | 74.7    | 81.9    | 58.7    | 51.6    |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-9-R4

Test Date: 10/23/2019

Luminaire Tested: SA1C-760-U-5WQ

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

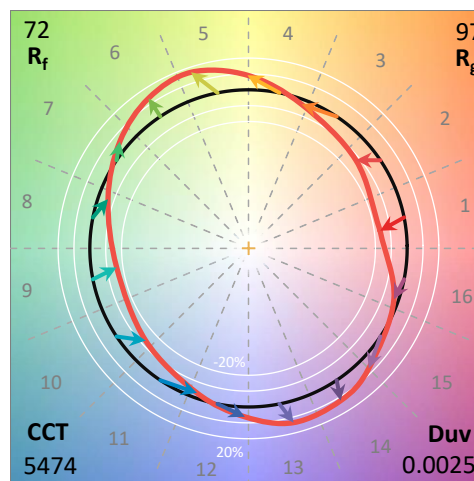
### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-9-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-760-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):                  | 5474   | CRI (Ra): | 71.7 |      |       |
| CIE u':                   | 0.2052 | R1:       | 70.6 | R9:  | -27.1 |
| CIE v':                   | 0.4804 | R2:       | 74.6 | R10: | 40.8  |
| Duv:                      | 0.0025 | R3:       | 78.3 | R11: | 74.6  |
| CIE x:                    | 0.3330 | R4:       | 73.8 | R12: | 50.4  |
| CIE y:                    | 0.3466 | R5:       | 72.4 | R13: | 70.0  |
| CIE z:                    | 0.3204 | R6:       | 67.5 | R14: | 87.8  |
| Peak Wavelength (nm):     | 442    | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 554    | R8:       | 58.9 |      |       |
| Purity:                   | 4.1    |           |      |      |       |
| Rf:                       | 72.1   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



### Test Conditions

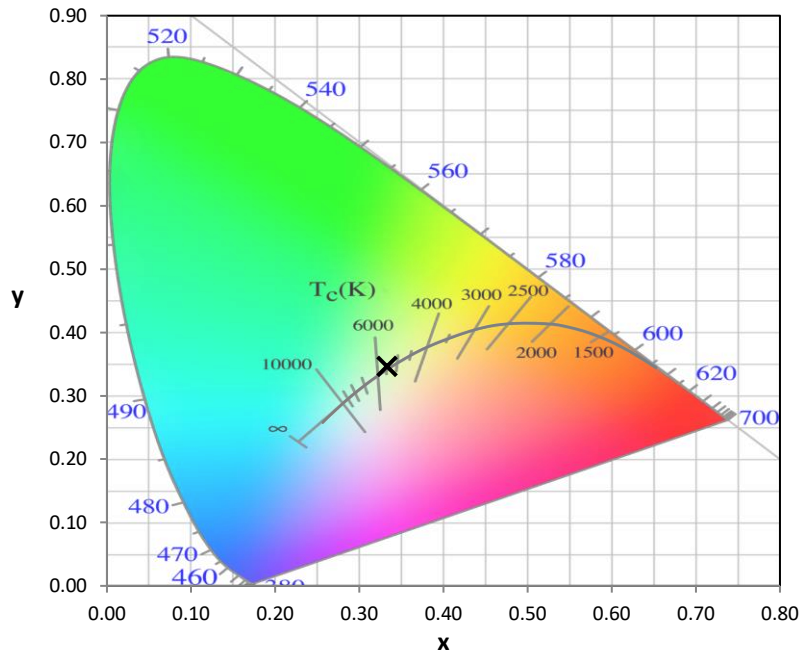
Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.6/31%  
 Sphere Temperature (°C): 25.9

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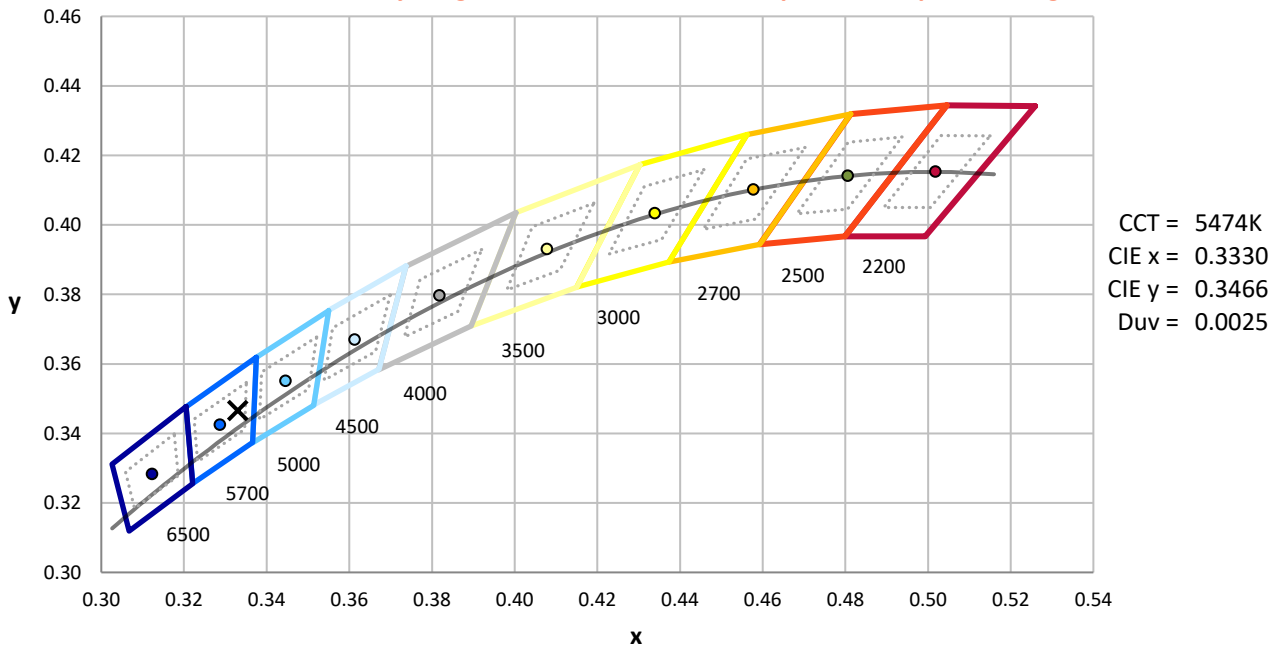
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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



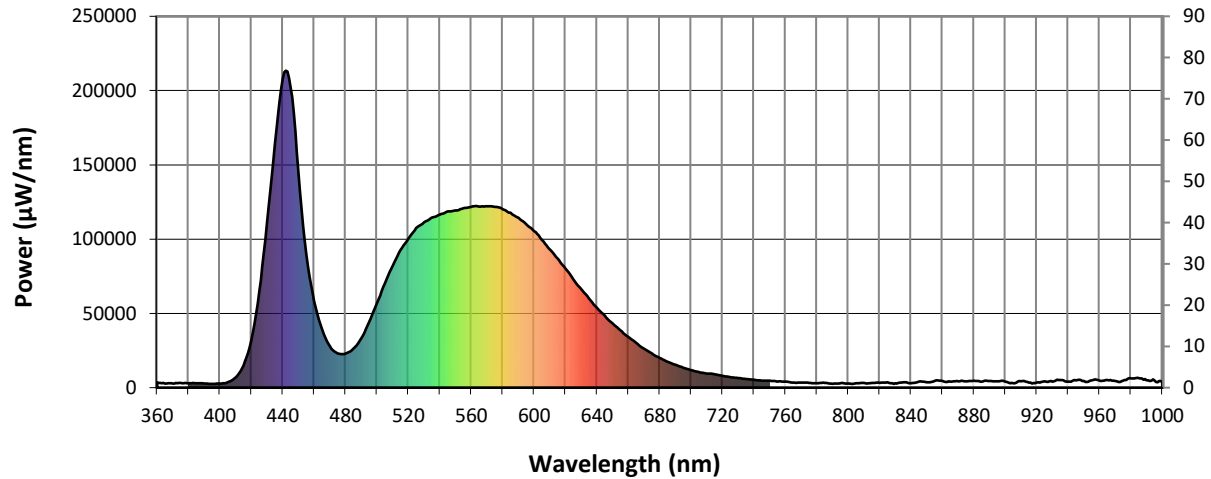
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 5700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**

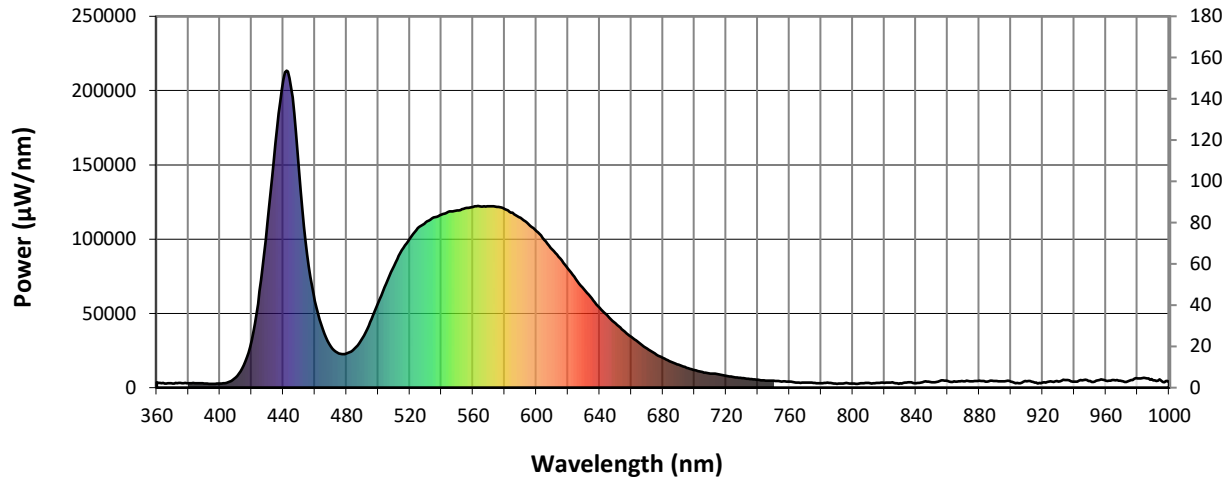


#####

| 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       | 3540             | NR               | 490       | 33363            | NR               | 620       | 80193            | NR               | 750       | 4663             | NR               | 880       | 4678             | NR               |
| 365       | 2862             | NR               | 495       | 44177            | NR               | 625       | 73091            | NR               | 755       | 4147             | NR               | 885       | 4128             | NR               |
| 370       | 2865             | NR               | 500       | 57019            | NR               | 630       | 66269            | NR               | 760       | 4040             | NR               | 890       | 4504             | NR               |
| 375       | 3254             | NR               | 505       | 70030            | NR               | 635       | 60012            | NR               | 765       | 3474             | NR               | 895       | 4371             | NR               |
| 380       | 3076             | NR               | 510       | 81972            | NR               | 640       | 53914            | NR               | 770       | 3469             | NR               | 900       | 4082             | NR               |
| 385       | 2904             | NR               | 515       | 92590            | NR               | 645       | 48385            | NR               | 775       | 3181             | NR               | 905       | 2982             | NR               |
| 390       | 2689             | NR               | 520       | 100305           | NR               | 650       | 43219            | NR               | 780       | 2969             | NR               | 910       | 4351             | NR               |
| 395       | 2619             | NR               | 525       | 107452           | NR               | 655       | 38562            | NR               | 785       | 3132             | NR               | 915       | 3365             | NR               |
| 400       | 2679             | NR               | 530       | 111373           | NR               | 660       | 34110            | NR               | 790       | 2507             | NR               | 920       | 3430             | NR               |
| 405       | 3515             | NR               | 535       | 114505           | NR               | 665       | 30085            | NR               | 795       | 2968             | NR               | 925       | 4264             | NR               |
| 410       | 6934             | NR               | 540       | 116408           | NR               | 670       | 26205            | NR               | 800       | 2758             | NR               | 930       | 4095             | NR               |
| 415       | 14943            | NR               | 545       | 118700           | NR               | 675       | 22906            | NR               | 805       | 2872             | NR               | 935       | 5048             | NR               |
| 420       | 31939            | NR               | 550       | 119209           | NR               | 680       | 20058            | NR               | 810       | 3094             | NR               | 940       | 4074             | NR               |
| 425       | 64701            | NR               | 555       | 120742           | NR               | 685       | 17413            | NR               | 815       | 3222             | NR               | 945       | 4949             | NR               |
| 430       | 110939           | NR               | 560       | 121594           | NR               | 690       | 15447            | NR               | 820       | 3238             | NR               | 950       | 4387             | NR               |
| 435       | 164597           | NR               | 565       | 121913           | NR               | 695       | 13398            | NR               | 825       | 3524             | NR               | 955       | 4978             | NR               |
| 440       | 207696           | NR               | 570       | 122147           | NR               | 700       | 11777            | NR               | 830       | 2921             | NR               | 960       | 4706             | NR               |
| 445       | 201830           | NR               | 575       | 121605           | NR               | 705       | 10412            | NR               | 835       | 3595             | NR               | 965       | 5083             | NR               |
| 450       | 145410           | NR               | 580       | 120248           | NR               | 710       | 9544             | NR               | 840       | 3016             | NR               | 970       | 4522             | NR               |
| 455       | 89594            | NR               | 585       | 117717           | NR               | 715       | 8940             | NR               | 845       | 4032             | NR               | 975       | 4740             | NR               |
| 460       | 58321            | NR               | 590       | 114359           | NR               | 720       | 7897             | NR               | 850       | 3579             | NR               | 980       | 6122             | NR               |
| 465       | 39318            | NR               | 595       | 109974           | NR               | 725       | 7045             | NR               | 855       | 4571             | NR               | 985       | 6450             | NR               |
| 470       | 27693            | NR               | 600       | 105269           | NR               | 730       | 6483             | NR               | 860       | 4485             | NR               | 990       | 4875             | NR               |
| 475       | 23081            | NR               | 605       | 99453            | NR               | 735       | 5838             | NR               | 865       | 3978             | NR               | 995       | 4764             | NR               |
| 480       | 23002            | NR               | 610       | 92921            | NR               | 740       | 5261             | NR               | 870       | 4298             | NR               | 1000      | 3640             | NR               |
| 485       | 26201            | NR               | 615       | 86989            | NR               | 745       | 4760             | NR               | 875       | 4356             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



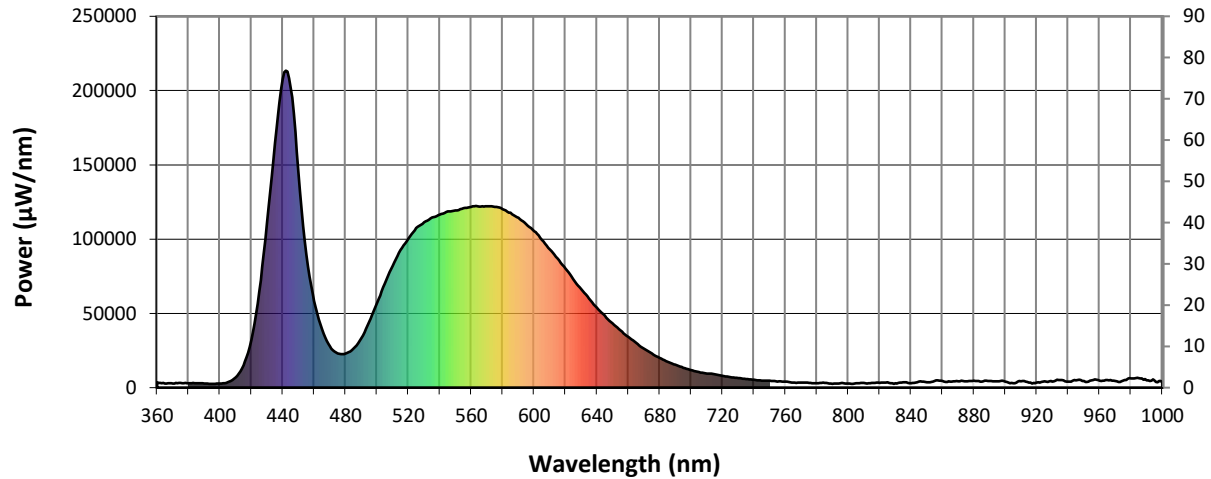
Scotopic Lumens: 13759.3

S/P: 1.85

| 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       | 3540             | NR               | 490       | 33363            | NR               | 620       | 80193            | NR               | 750       | 4663             | NR               | 880       | 4678             | NR               |
| 365       | 2862             | NR               | 495       | 44177            | NR               | 625       | 73091            | NR               | 755       | 4147             | NR               | 885       | 4128             | NR               |
| 370       | 2865             | NR               | 500       | 57019            | NR               | 630       | 66269            | NR               | 760       | 4040             | NR               | 890       | 4504             | NR               |
| 375       | 3254             | NR               | 505       | 70030            | NR               | 635       | 60012            | NR               | 765       | 3474             | NR               | 895       | 4371             | NR               |
| 380       | 3076             | NR               | 510       | 81972            | NR               | 640       | 53914            | NR               | 770       | 3469             | NR               | 900       | 4082             | NR               |
| 385       | 2904             | NR               | 515       | 92590            | NR               | 645       | 48385            | NR               | 775       | 3181             | NR               | 905       | 2982             | NR               |
| 390       | 2689             | NR               | 520       | 100305           | NR               | 650       | 43219            | NR               | 780       | 2969             | NR               | 910       | 4351             | NR               |
| 395       | 2619             | NR               | 525       | 107452           | NR               | 655       | 38562            | NR               | 785       | 3132             | NR               | 915       | 3365             | NR               |
| 400       | 2679             | NR               | 530       | 111373           | NR               | 660       | 34110            | NR               | 790       | 2507             | NR               | 920       | 3430             | NR               |
| 405       | 3515             | NR               | 535       | 114505           | NR               | 665       | 30085            | NR               | 795       | 2968             | NR               | 925       | 4264             | NR               |
| 410       | 6934             | NR               | 540       | 116408           | NR               | 670       | 26205            | NR               | 800       | 2758             | NR               | 930       | 4095             | NR               |
| 415       | 14943            | NR               | 545       | 118700           | NR               | 675       | 22906            | NR               | 805       | 2872             | NR               | 935       | 5048             | NR               |
| 420       | 31939            | NR               | 550       | 119209           | NR               | 680       | 20058            | NR               | 810       | 3094             | NR               | 940       | 4074             | NR               |
| 425       | 64701            | NR               | 555       | 120742           | NR               | 685       | 17413            | NR               | 815       | 3222             | NR               | 945       | 4949             | NR               |
| 430       | 110939           | NR               | 560       | 121594           | NR               | 690       | 15447            | NR               | 820       | 3238             | NR               | 950       | 4387             | NR               |
| 435       | 164597           | NR               | 565       | 121913           | NR               | 695       | 13398            | NR               | 825       | 3524             | NR               | 955       | 4978             | NR               |
| 440       | 207696           | NR               | 570       | 122147           | NR               | 700       | 11777            | NR               | 830       | 2921             | NR               | 960       | 4706             | NR               |
| 445       | 201830           | NR               | 575       | 121605           | NR               | 705       | 10412            | NR               | 835       | 3595             | NR               | 965       | 5083             | NR               |
| 450       | 145410           | NR               | 580       | 120248           | NR               | 710       | 9544             | NR               | 840       | 3016             | NR               | 970       | 4522             | NR               |
| 455       | 89594            | NR               | 585       | 117717           | NR               | 715       | 8940             | NR               | 845       | 4032             | NR               | 975       | 4740             | NR               |
| 460       | 58321            | NR               | 590       | 114359           | NR               | 720       | 7897             | NR               | 850       | 3579             | NR               | 980       | 6122             | NR               |
| 465       | 39318            | NR               | 595       | 109974           | NR               | 725       | 7045             | NR               | 855       | 4571             | NR               | 985       | 6450             | NR               |
| 470       | 27693            | NR               | 600       | 105269           | NR               | 730       | 6483             | NR               | 860       | 4485             | NR               | 990       | 4875             | NR               |
| 475       | 23081            | NR               | 605       | 99453            | NR               | 735       | 5838             | NR               | 865       | 3978             | NR               | 995       | 4764             | NR               |
| 480       | 23002            | NR               | 610       | 92921            | NR               | 740       | 5261             | NR               | 870       | 4298             | NR               | 1000      | 3640             | NR               |
| 485       | 26201            | NR               | 615       | 86989            | NR               | 745       | 4760             | NR               | 875       | 4356             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5527.6 M/P: 0.74**

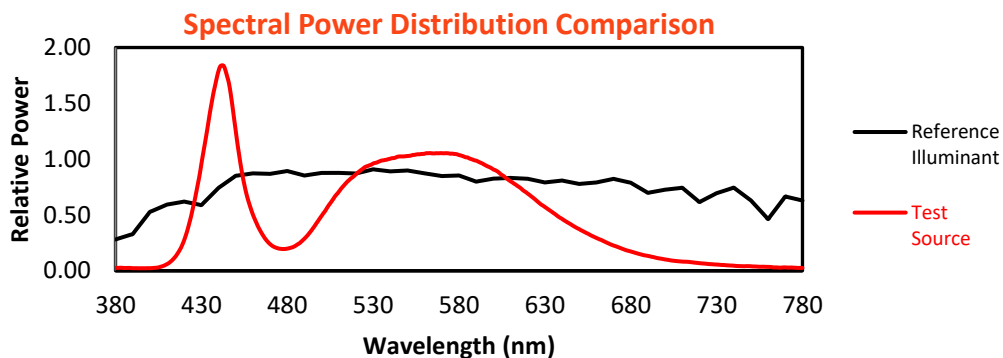
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 3540             | NR               | 490       | 33363            | NR               | 620       | 80193            | NR               | 750       | 4663             | NR               | 880       | 4678             | NR               |
| 365       | 2862             | NR               | 495       | 44177            | NR               | 625       | 73091            | NR               | 755       | 4147             | NR               | 885       | 4128             | NR               |
| 370       | 2865             | NR               | 500       | 57019            | NR               | 630       | 66269            | NR               | 760       | 4040             | NR               | 890       | 4504             | NR               |
| 375       | 3254             | NR               | 505       | 70030            | NR               | 635       | 60012            | NR               | 765       | 3474             | NR               | 895       | 4371             | NR               |
| 380       | 3076             | NR               | 510       | 81972            | NR               | 640       | 53914            | NR               | 770       | 3469             | NR               | 900       | 4082             | NR               |
| 385       | 2904             | NR               | 515       | 92590            | NR               | 645       | 48385            | NR               | 775       | 3181             | NR               | 905       | 2982             | NR               |
| 390       | 2689             | NR               | 520       | 100305           | NR               | 650       | 43219            | NR               | 780       | 2969             | NR               | 910       | 4351             | NR               |
| 395       | 2619             | NR               | 525       | 107452           | NR               | 655       | 38562            | NR               | 785       | 3132             | NR               | 915       | 3365             | NR               |
| 400       | 2679             | NR               | 530       | 111373           | NR               | 660       | 34110            | NR               | 790       | 2507             | NR               | 920       | 3430             | NR               |
| 405       | 3515             | NR               | 535       | 114505           | NR               | 665       | 30085            | NR               | 795       | 2968             | NR               | 925       | 4264             | NR               |
| 410       | 6934             | NR               | 540       | 116408           | NR               | 670       | 26205            | NR               | 800       | 2758             | NR               | 930       | 4095             | NR               |
| 415       | 14943            | NR               | 545       | 118700           | NR               | 675       | 22906            | NR               | 805       | 2872             | NR               | 935       | 5048             | NR               |
| 420       | 31939            | NR               | 550       | 119209           | NR               | 680       | 20058            | NR               | 810       | 3094             | NR               | 940       | 4074             | NR               |
| 425       | 64701            | NR               | 555       | 120742           | NR               | 685       | 17413            | NR               | 815       | 3222             | NR               | 945       | 4949             | NR               |
| 430       | 110939           | NR               | 560       | 121594           | NR               | 690       | 15447            | NR               | 820       | 3238             | NR               | 950       | 4387             | NR               |
| 435       | 164597           | NR               | 565       | 121913           | NR               | 695       | 13398            | NR               | 825       | 3524             | NR               | 955       | 4978             | NR               |
| 440       | 207696           | NR               | 570       | 122147           | NR               | 700       | 11777            | NR               | 830       | 2921             | NR               | 960       | 4706             | NR               |
| 445       | 201830           | NR               | 575       | 121605           | NR               | 705       | 10412            | NR               | 835       | 3595             | NR               | 965       | 5083             | NR               |
| 450       | 145410           | NR               | 580       | 120248           | NR               | 710       | 9544             | NR               | 840       | 3016             | NR               | 970       | 4522             | NR               |
| 455       | 89594            | NR               | 585       | 117717           | NR               | 715       | 8940             | NR               | 845       | 4032             | NR               | 975       | 4740             | NR               |
| 460       | 58321            | NR               | 590       | 114359           | NR               | 720       | 7897             | NR               | 850       | 3579             | NR               | 980       | 6122             | NR               |
| 465       | 39318            | NR               | 595       | 109974           | NR               | 725       | 7045             | NR               | 855       | 4571             | NR               | 985       | 6450             | NR               |
| 470       | 27693            | NR               | 600       | 105269           | NR               | 730       | 6483             | NR               | 860       | 4485             | NR               | 990       | 4875             | NR               |
| 475       | 23081            | NR               | 605       | 99453            | NR               | 735       | 5838             | NR               | 865       | 3978             | NR               | 995       | 4764             | NR               |
| 480       | 23002            | NR               | 610       | 92921            | NR               | 740       | 5261             | NR               | 870       | 4298             | NR               | 1000      | 3640             | NR               |
| 485       | 26201            | NR               | 615       | 86989            | NR               | 745       | 4760             | NR               | 875       | 4356             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-9-R4

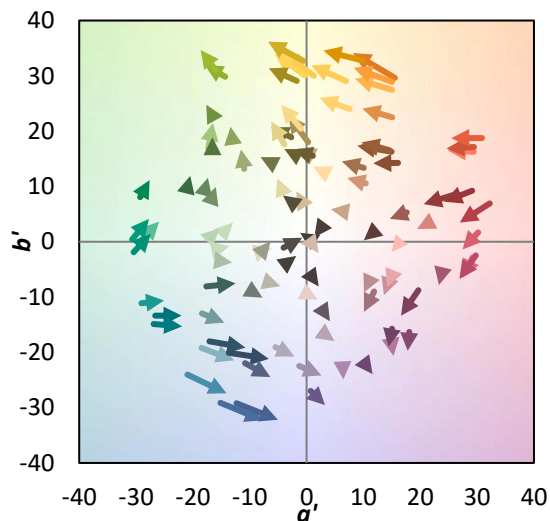
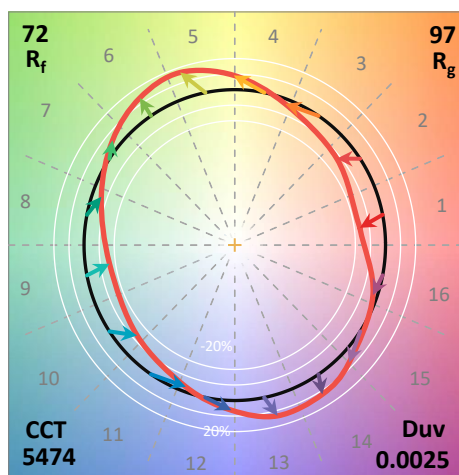
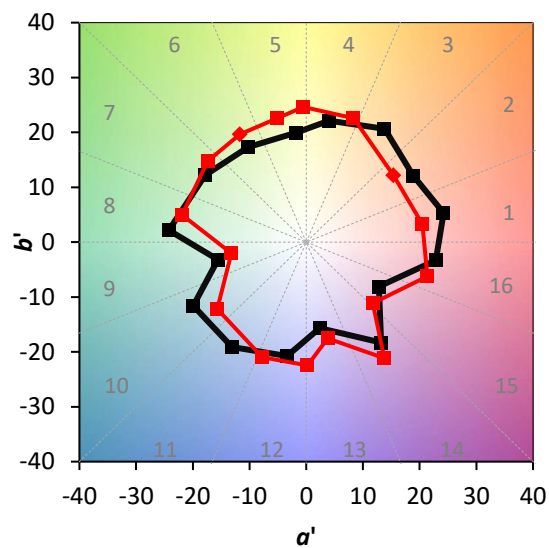
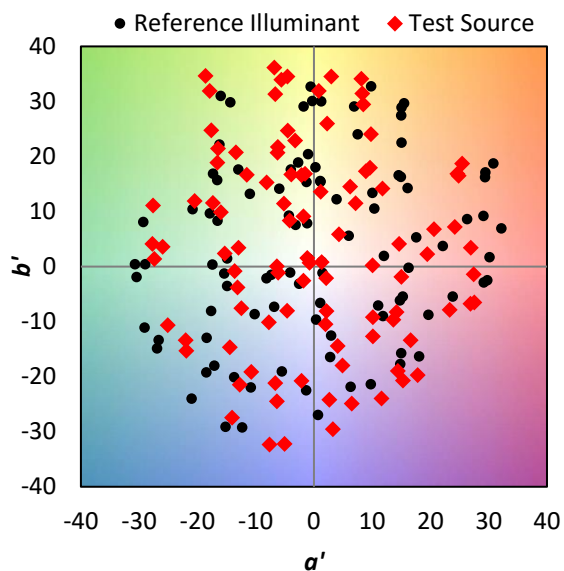
**TM-30-18**

**Summary**

$R_f = 72.1$   
 $R_g = 97.2$   
 CIE  $R_a = 71.7$   
 $R_g = -27.1$



**Color Vector Graphics**



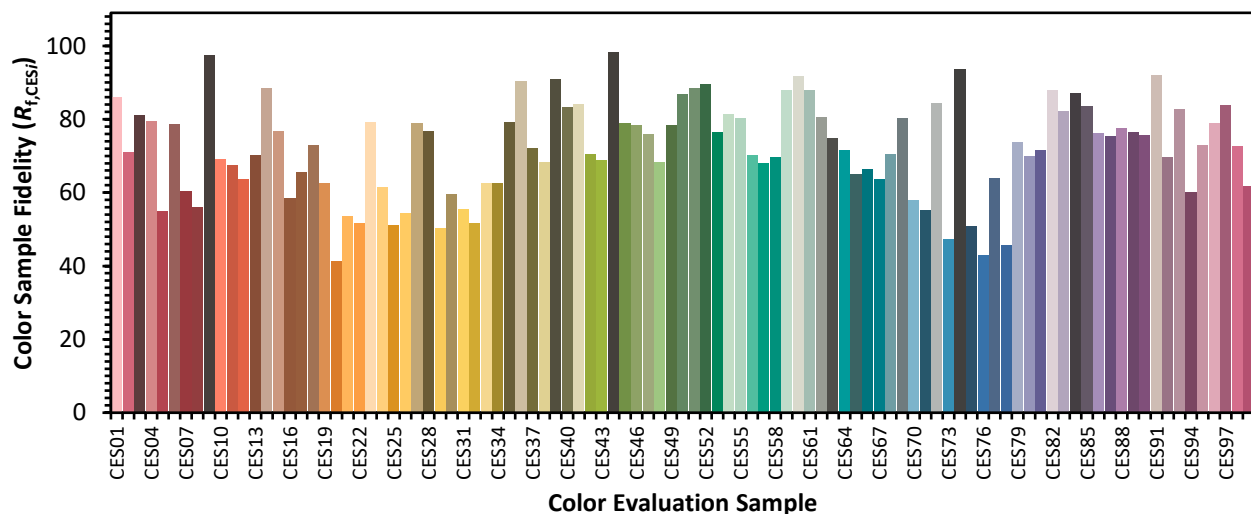


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

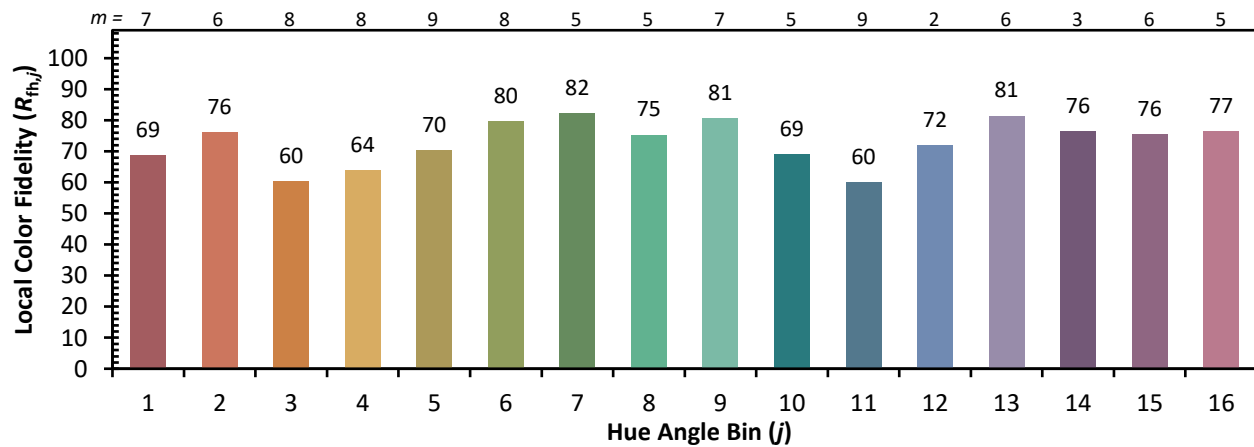
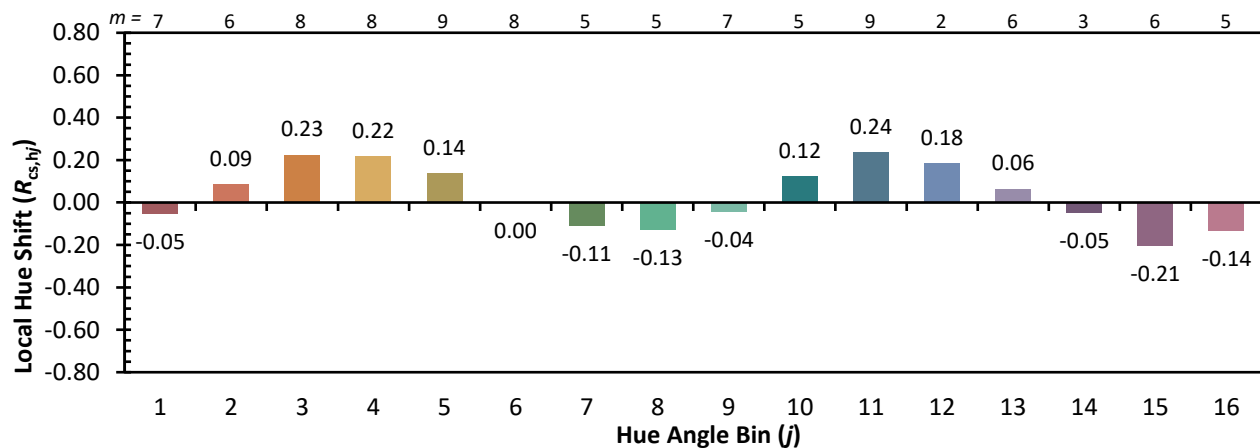
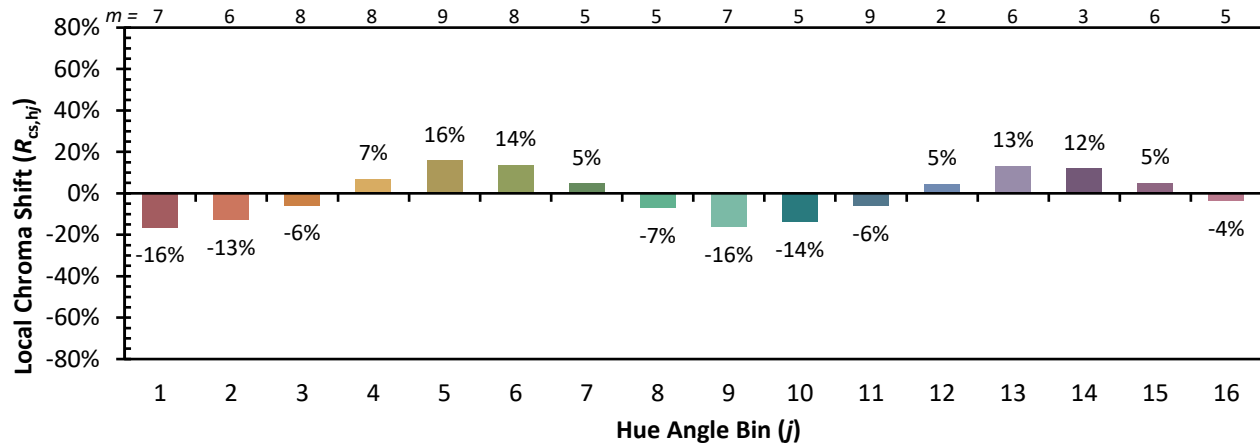
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 88 | CES76 = 43 |
| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 81 | CES79 = 74 |
| CES05 = 46 | CES30 = 59 | CES55 = 80 | CES80 = 70 |
| CES06 = 50 | CES31 = 55 | CES56 = 70 | CES81 = 71 |
| CES07 = 38 | CES32 = 52 | CES57 = 68 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 82 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 84 |
| CES11 = 55 | CES36 = 90 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 72 | CES62 = 81 | CES87 = 75 |
| CES13 = 41 | CES38 = 68 | CES63 = 75 | CES88 = 77 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 84 | CES66 = 66 | CES91 = 92 |
| CES17 = 48 | CES42 = 70 | CES67 = 64 | CES92 = 70 |
| CES18 = 55 | CES43 = 69 | CES68 = 71 | CES93 = 83 |
| CES19 = 70 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 73 |
| CES21 = 85 | CES46 = 78 | CES71 = 55 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 68 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 78 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



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**TM-30-18**

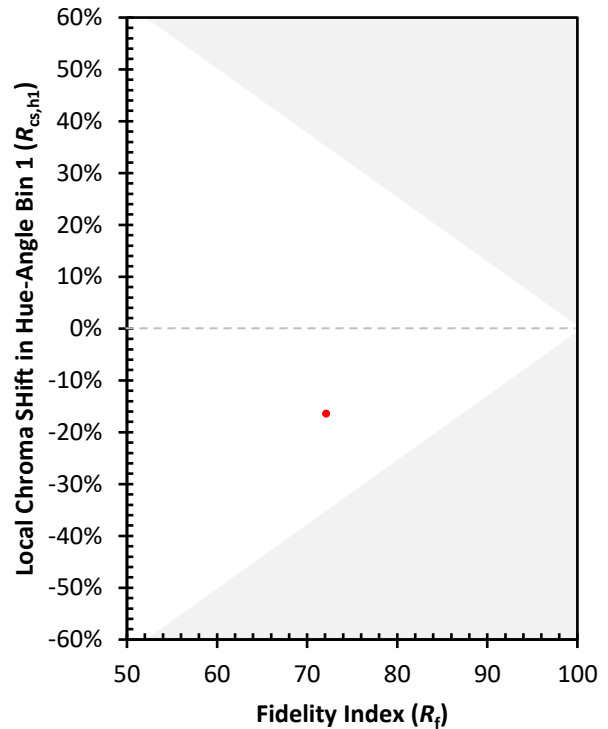
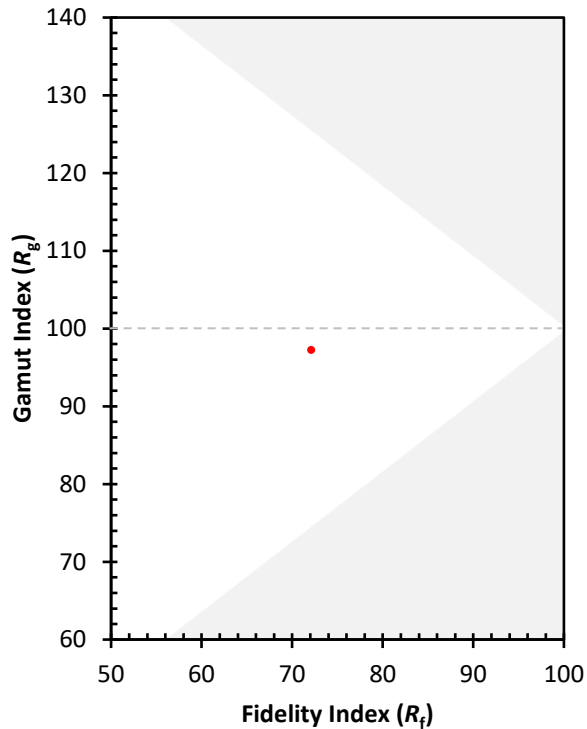
Color Rendition by Hue-Angle Bin



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**TM-30-18**

**Measure Comparisons**



(END OF REPORT)