

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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: P437804

Luminaire Tested: **ISC-SA1F-727-U-SL4**

Issue Date: 12/9/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P437804  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-18)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/9/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: ISC-SA1F-727-U-SL4  
Description: IMPACT ELITE LED CYLINDER LUMINAIRE  
(1) 70 CRI, 2700K, 1200mA LIGHTSQUARE WITH 16 LEDS AND TYPE IV SPILL  
LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 6315 lumens  
Efficiency: N/A  
Efficacy: 95.7 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

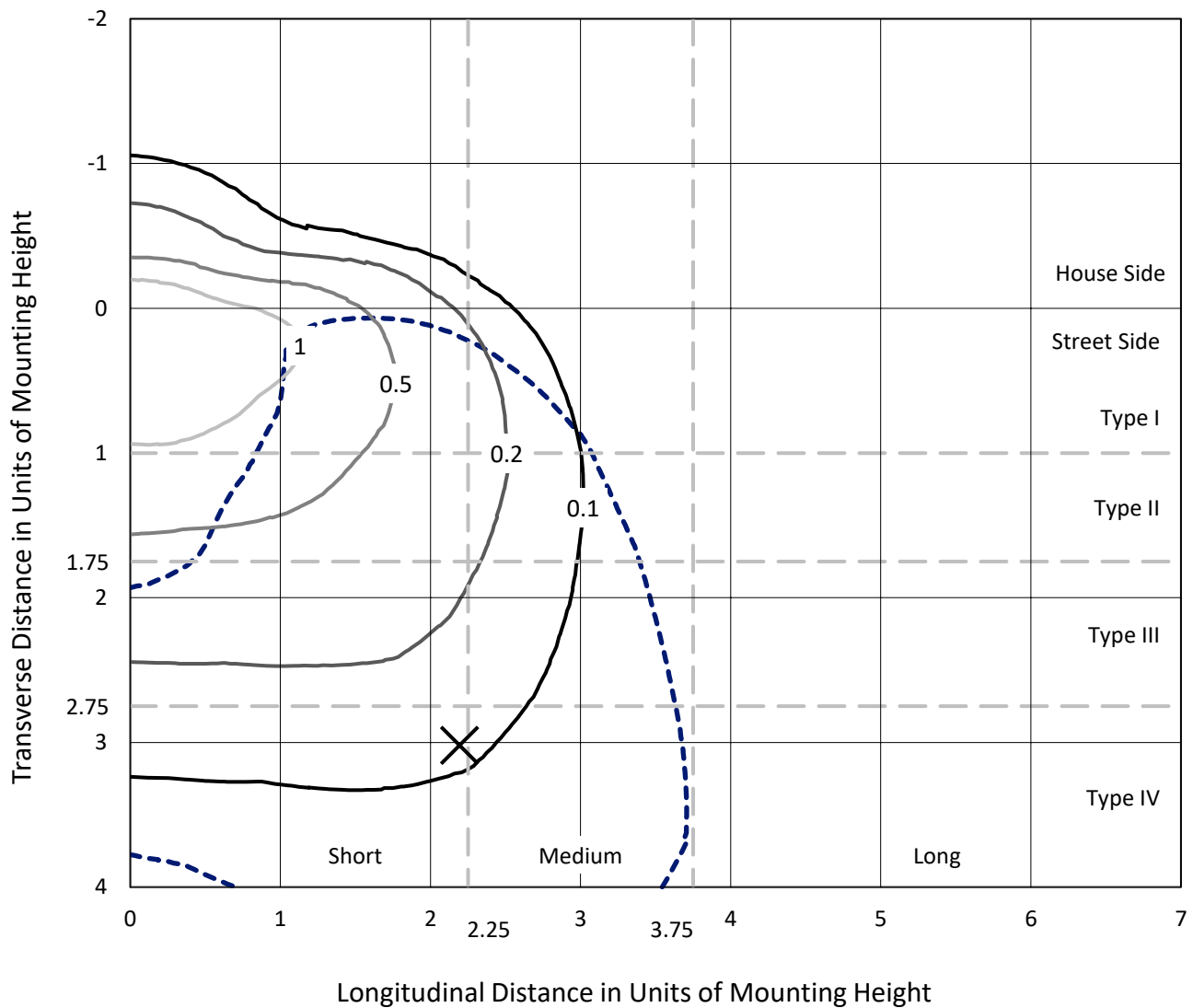
Input Watts (W): 66  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

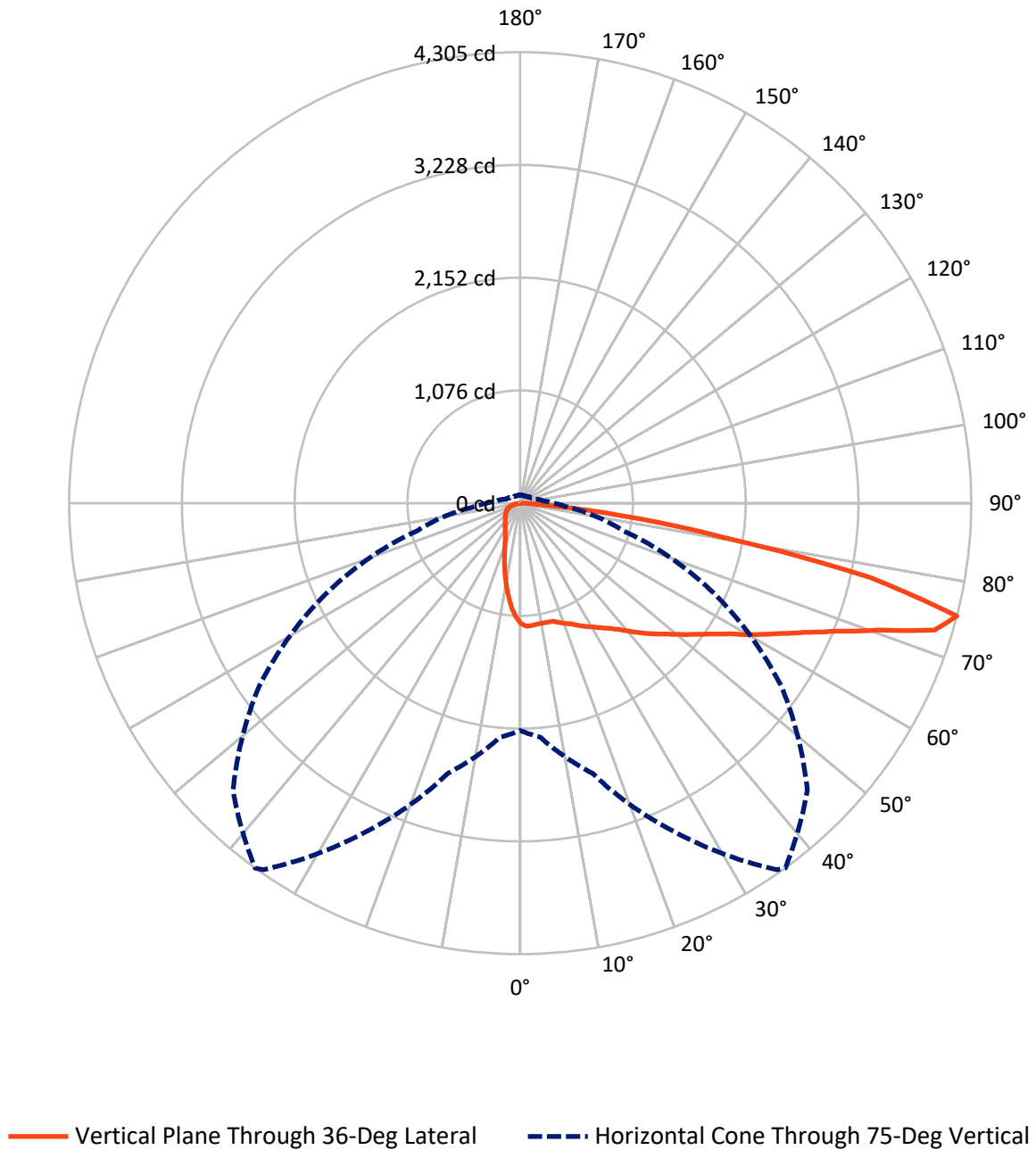
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.8 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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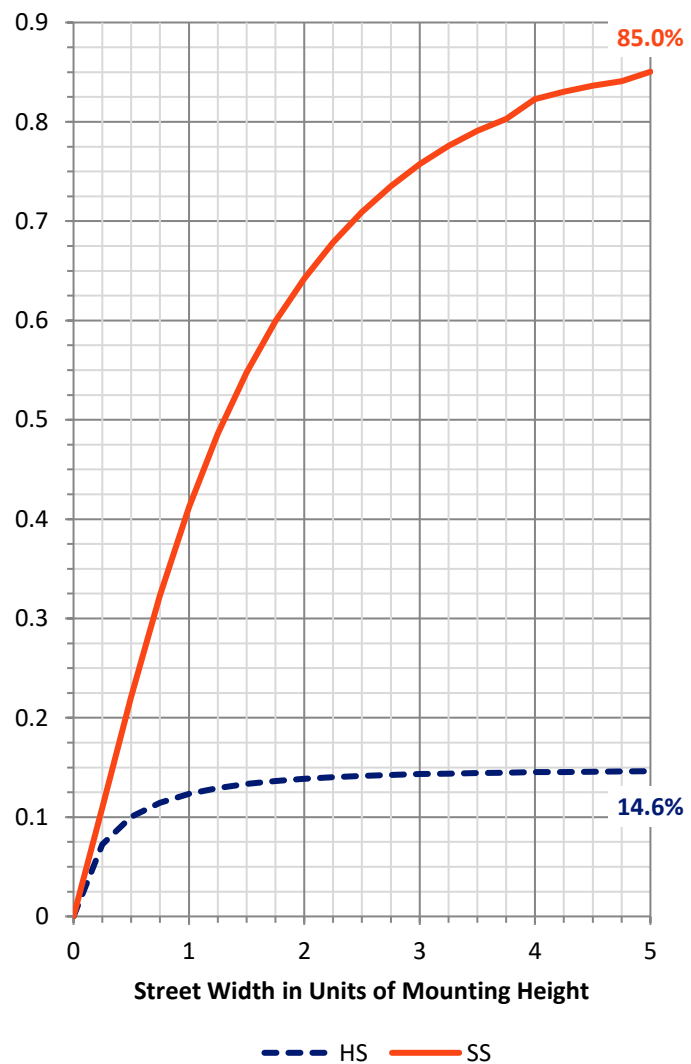
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 932.0    | 0.0    | 932.0  |
|                    | % Fixture | 14.8     | 0.0    | 14.8   |
| <b>Street Side</b> | Lumens    | 5383.0   | 0.0    | 5383.0 |
|                    | % Fixture | 85.2     | 0.0    | 85.2   |
| <b>Total</b>       | Lumens    | 6315.0   | 0.0    | 6315.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 101.6  | 1.6       |
| 10°-20°   | 262.8  | 4.2       |
| 20°-30°   | 406.3  | 6.4       |
| 30°-40°   | 588.5  | 9.3       |
| 40°-50°   | 851.2  | 13.5      |
| 50°-60°   | 1180.7 | 18.7      |
| 60°-70°   | 1490.8 | 23.6      |
| 70°-80°   | 1280.5 | 20.3      |
| 80°-90°   | 152.6  | 2.4       |
| 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°    | 6315.0 | 100.0     |
| 0°-180°   | 6315.0 | 100.0     |

**Coefficient of Utilization**



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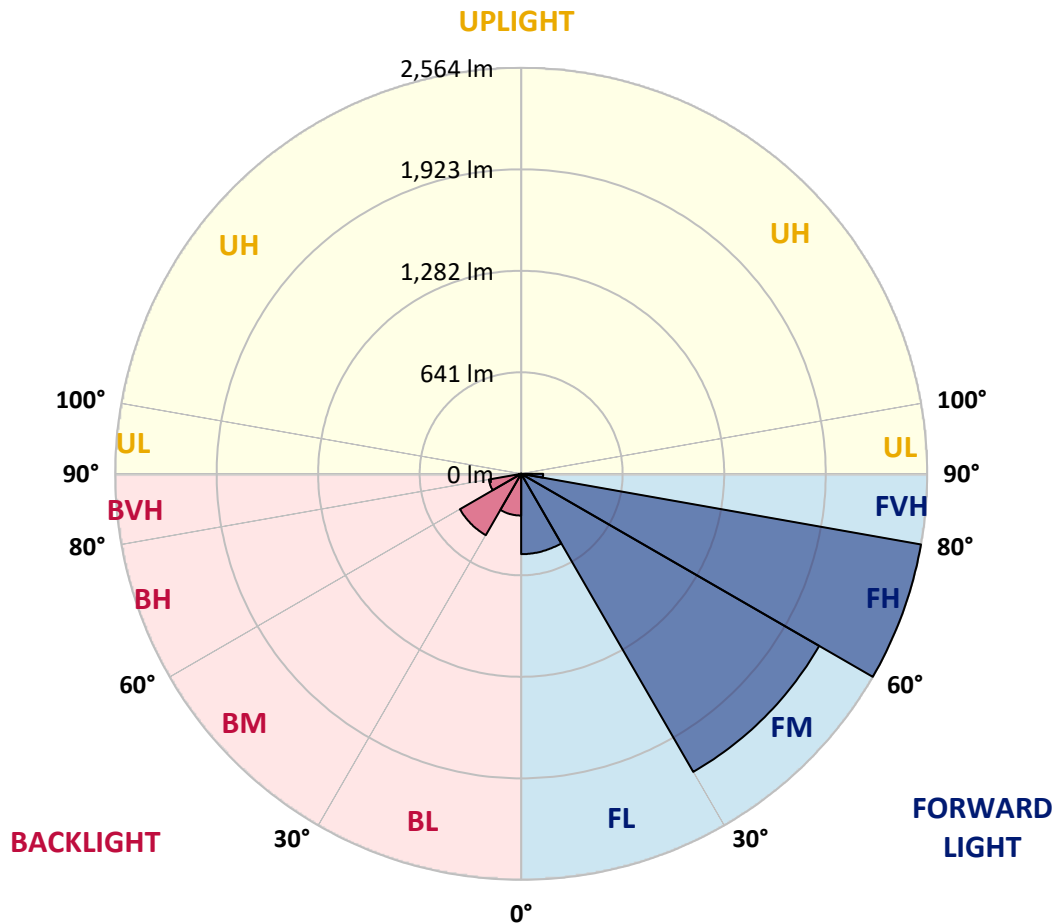
CATALOG NUMBER: ISC-SA1F-727-U-SL4

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 507.1  | 8.0       |                         |      |         |
| FM   | (30°-60°)   | 2173.6 | 34.4      |                         |      |         |
| FH   | (60°-80°)   | 2563.9 | 40.6      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 138.5  | 2.2       |                         |      | G2/225  |
| BL   | (0°-30°)    | 263.6  | 4.2       | B1/500                  |      |         |
| BM   | (30°-60°)   | 446.9  | 7.1       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 207.5  | 3.3       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 14.1   | 0.2       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type IV Short



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CATALOG NUMBER: ISC-SA1F-727-U-SL4

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 36°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 |
| 2.5°  | 1185.1 | 1185.1 | 1185.1 | 1182.8 | 1178.1 | 1175.7 | 1171.0 | 1166.3 | 1163.9 | 1154.5 | 1152.1 |
| 5°    | 1185.1 | 1187.5 | 1185.1 | 1182.8 | 1178.1 | 1173.3 | 1168.6 | 1159.2 | 1152.1 | 1140.4 | 1128.6 |
| 7.5°  | 1173.3 | 1175.7 | 1175.7 | 1173.3 | 1168.6 | 1166.3 | 1161.6 | 1149.8 | 1140.4 | 1123.9 | 1105.0 |
| 10°   | 1154.5 | 1159.2 | 1159.2 | 1161.6 | 1163.9 | 1163.9 | 1159.2 | 1149.8 | 1135.6 | 1116.8 | 1086.2 |
| 12.5° | 1130.9 | 1142.7 | 1149.8 | 1156.9 | 1166.3 | 1166.3 | 1168.6 | 1154.5 | 1142.7 | 1116.8 | 1086.2 |
| 15°   | 1123.9 | 1130.9 | 1145.1 | 1166.3 | 1175.7 | 1168.6 | 1178.1 | 1171.0 | 1156.9 | 1130.9 | 1093.2 |
| 17.5° | 1121.5 | 1128.6 | 1152.1 | 1178.1 | 1192.2 | 1196.9 | 1196.9 | 1187.5 | 1171.0 | 1145.1 | 1097.9 |
| 20°   | 1130.9 | 1140.4 | 1171.0 | 1204.0 | 1225.2 | 1225.2 | 1222.8 | 1211.0 | 1189.8 | 1159.2 | 1107.4 |
| 22.5° | 1161.6 | 1163.9 | 1199.3 | 1239.3 | 1255.8 | 1251.1 | 1255.8 | 1234.6 | 1211.0 | 1180.4 | 1119.2 |
| 25°   | 1201.6 | 1206.3 | 1234.6 | 1281.7 | 1291.2 | 1293.5 | 1286.4 | 1262.9 | 1237.0 | 1206.3 | 1133.3 |
| 27.5° | 1255.8 | 1262.9 | 1284.1 | 1328.8 | 1335.9 | 1331.2 | 1321.8 | 1293.5 | 1267.6 | 1239.3 | 1161.6 |
| 30°   | 1319.4 | 1324.1 | 1350.1 | 1368.9 | 1376.0 | 1371.3 | 1364.2 | 1333.6 | 1312.4 | 1286.4 | 1204.0 |
| 32.5° | 1380.7 | 1383.0 | 1411.3 | 1430.2 | 1418.4 | 1418.4 | 1409.0 | 1378.3 | 1361.8 | 1357.1 | 1258.2 |
| 35°   | 1444.3 | 1449.0 | 1474.9 | 1484.4 | 1465.5 | 1467.9 | 1465.5 | 1439.6 | 1444.3 | 1453.7 | 1340.6 |
| 37.5° | 1503.2 | 1510.3 | 1540.9 | 1543.3 | 1536.2 | 1529.1 | 1536.2 | 1522.0 | 1531.5 | 1569.2 | 1437.2 |
| 40°   | 1555.0 | 1564.5 | 1602.2 | 1609.2 | 1606.9 | 1606.9 | 1611.6 | 1609.2 | 1644.6 | 1705.8 | 1555.0 |
| 42.5° | 1597.4 | 1609.2 | 1654.0 | 1672.8 | 1687.0 | 1694.0 | 1710.5 | 1715.3 | 1767.1 | 1866.0 | 1691.7 |
| 45°   | 1639.9 | 1651.6 | 1712.9 | 1743.5 | 1776.5 | 1778.9 | 1811.9 | 1828.3 | 1924.9 | 2014.5 | 1840.1 |
| 47.5° | 1689.3 | 1703.5 | 1760.0 | 1821.3 | 1859.0 | 1866.0 | 1927.3 | 1960.3 | 2078.1 | 2193.5 | 1979.1 |
| 50°   | 1757.7 | 1762.4 | 1807.1 | 1910.8 | 1957.9 | 1969.7 | 2038.0 | 2106.4 | 2236.0 | 2351.4 | 2101.7 |
| 52.5° | 1842.5 | 1837.8 | 1859.0 | 1990.9 | 2064.0 | 2080.4 | 2191.2 | 2259.5 | 2415.0 | 2521.0 | 2198.3 |
| 55°   | 1913.2 | 1908.5 | 1939.1 | 2082.8 | 2198.3 | 2203.0 | 2334.9 | 2400.9 | 2579.9 | 2645.9 | 2280.7 |
| 57.5° | 1995.6 | 1986.2 | 2016.8 | 2193.5 | 2351.4 | 2353.8 | 2506.9 | 2582.3 | 2728.4 | 2756.7 | 2334.9 |
| 60°   | 2064.0 | 2064.0 | 2104.0 | 2301.9 | 2521.0 | 2547.0 | 2686.0 | 2744.9 | 2872.1 | 2836.8 | 2360.8 |
| 62.5° | 2127.6 | 2139.4 | 2195.9 | 2445.6 | 2721.3 | 2742.5 | 2883.9 | 2907.4 | 3020.5 | 2898.0 | 2332.6 |
| 65°   | 2203.0 | 2221.8 | 2330.2 | 2617.6 | 2959.3 | 2973.4 | 3091.2 | 3124.2 | 3169.0 | 2895.7 | 2210.0 |
| 67.5° | 2283.1 | 2313.7 | 2457.4 | 2810.8 | 3220.8 | 3258.5 | 3385.7 | 3352.8 | 3267.9 | 2803.8 | 1953.2 |
| 70°   | 2391.5 | 2429.2 | 2634.1 | 3067.7 | 3578.9 | 3626.1 | 3793.3 | 3590.7 | 3216.1 | 2476.3 | 1583.3 |
| 72.5° | 2473.9 | 2523.4 | 2803.8 | 3399.9 | 4064.3 | 4137.3 | 4097.3 | 3595.4 | 2883.9 | 1974.4 | 1060.3 |
| 75°   | 2170.0 | 2245.4 | 2669.5 | 3454.1 | 4271.6 | 4304.6 | 3875.8 | 3039.4 | 2042.8 | 1020.2 | 457.1  |
| 77.5° | 1585.7 | 1581.0 | 1950.9 | 2683.6 | 3501.2 | 3414.0 | 2940.4 | 1976.8 | 970.7  | 369.9  | 230.9  |
| 80°   | 796.4  | 765.7  | 1055.5 | 1430.2 | 1889.6 | 1948.5 | 1738.8 | 1027.3 | 384.0  | 197.9  | 139.0  |
| 82.5° | 294.5  | 301.6  | 386.4  | 584.3  | 949.5  | 963.7  | 702.1  | 435.9  | 209.7  | 103.7  | 73.0   |
| 85°   | 113.1  | 117.8  | 127.2  | 127.2  | 176.7  | 195.6  | 181.4  | 174.4  | 70.7   | 35.3   | 40.1   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 2.4    | 2.4    | 2.4    | 2.4    | 2.4    | 2.4    | 2.4    |
| 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: ISC-SA1F-727-U-SL4

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 | 1152.1 |
| 2.5°  | 1145.1 | 1140.4 | 1130.9 | 1114.4 | 1105.0 | 1097.9 | 1088.5 | 1079.1 | 1076.7 | 1074.4 | 1086.2 |
| 5°    | 1116.8 | 1109.7 | 1086.2 | 1065.0 | 1041.4 | 1022.6 | 1003.7 | 987.2  | 977.8  | 975.4  | 980.1  |
| 7.5°  | 1088.5 | 1079.1 | 1043.8 | 1001.3 | 961.3  | 928.3  | 895.3  | 878.8  | 852.9  | 852.9  | 855.3  |
| 10°   | 1072.0 | 1055.5 | 1006.1 | 942.4  | 890.6  | 831.7  | 791.7  | 751.6  | 735.1  | 723.3  | 718.6  |
| 12.5° | 1062.6 | 1036.7 | 970.7  | 900.0  | 819.9  | 742.2  | 688.0  | 638.5  | 612.6  | 593.7  | 593.7  |
| 15°   | 1065.0 | 1036.7 | 947.2  | 855.3  | 751.6  | 657.4  | 589.0  | 534.8  | 501.9  | 483.0  | 478.3  |
| 17.5° | 1062.6 | 1027.3 | 918.9  | 798.7  | 683.3  | 584.3  | 501.9  | 445.3  | 412.3  | 400.5  | 398.2  |
| 20°   | 1067.3 | 1020.2 | 885.9  | 746.9  | 617.3  | 511.3  | 426.5  | 374.6  | 355.8  | 346.3  | 344.0  |
| 22.5° | 1069.7 | 1006.1 | 852.9  | 690.3  | 546.6  | 442.9  | 372.3  | 336.9  | 322.8  | 315.7  | 313.4  |
| 25°   | 1074.4 | 1003.7 | 815.2  | 638.5  | 487.7  | 391.1  | 336.9  | 306.3  | 299.2  | 294.5  | 294.5  |
| 27.5° | 1093.2 | 1003.7 | 782.2  | 572.5  | 426.5  | 348.7  | 306.3  | 287.4  | 282.7  | 280.4  | 280.4  |
| 30°   | 1116.8 | 1008.4 | 751.6  | 518.3  | 379.3  | 315.7  | 285.1  | 271.0  | 268.6  | 266.2  | 266.2  |
| 32.5° | 1156.9 | 1024.9 | 716.3  | 466.5  | 339.3  | 292.2  | 268.6  | 256.8  | 252.1  | 252.1  | 252.1  |
| 35°   | 1211.0 | 1053.2 | 680.9  | 419.4  | 306.3  | 268.6  | 252.1  | 240.3  | 238.0  | 240.3  | 240.3  |
| 37.5° | 1288.8 | 1086.2 | 650.3  | 377.0  | 280.4  | 249.7  | 235.6  | 228.5  | 226.2  | 226.2  | 228.5  |
| 40°   | 1385.4 | 1145.1 | 619.7  | 344.0  | 261.5  | 233.3  | 223.8  | 216.8  | 214.4  | 216.8  | 216.8  |
| 42.5° | 1491.4 | 1208.7 | 593.7  | 311.0  | 242.7  | 221.5  | 209.7  | 205.0  | 202.6  | 205.0  | 207.3  |
| 45°   | 1609.2 | 1274.7 | 572.5  | 287.4  | 228.5  | 209.7  | 200.3  | 197.9  | 195.6  | 195.6  | 197.9  |
| 47.5° | 1708.2 | 1345.3 | 556.0  | 271.0  | 216.8  | 200.3  | 193.2  | 188.5  | 186.1  | 183.8  | 186.1  |
| 50°   | 1800.1 | 1399.5 | 551.3  | 261.5  | 209.7  | 190.8  | 183.8  | 179.1  | 176.7  | 174.4  | 176.7  |
| 52.5° | 1868.4 | 1427.8 | 551.3  | 254.5  | 202.6  | 183.8  | 176.7  | 172.0  | 169.6  | 164.9  | 167.3  |
| 55°   | 1915.5 | 1441.9 | 544.3  | 249.7  | 195.6  | 176.7  | 167.3  | 164.9  | 162.6  | 157.9  | 157.9  |
| 57.5° | 1943.8 | 1439.6 | 518.3  | 247.4  | 193.2  | 167.3  | 160.2  | 157.9  | 155.5  | 150.8  | 150.8  |
| 60°   | 1939.1 | 1394.8 | 471.2  | 238.0  | 188.5  | 160.2  | 150.8  | 150.8  | 150.8  | 146.1  | 146.1  |
| 62.5° | 1870.8 | 1269.9 | 393.5  | 223.8  | 183.8  | 153.1  | 141.4  | 146.1  | 148.4  | 143.7  | 143.7  |
| 65°   | 1687.0 | 1079.1 | 325.1  | 205.0  | 172.0  | 146.1  | 134.3  | 141.4  | 146.1  | 143.7  | 141.4  |
| 67.5° | 1420.7 | 855.3  | 268.6  | 186.1  | 160.2  | 136.7  | 124.9  | 134.3  | 136.7  | 136.7  | 136.7  |
| 70°   | 1097.9 | 614.9  | 221.5  | 162.6  | 143.7  | 122.5  | 113.1  | 117.8  | 120.2  | 120.2  | 122.5  |
| 72.5° | 650.3  | 367.6  | 181.4  | 139.0  | 122.5  | 106.0  | 99.0   | 101.3  | 99.0   | 99.0   | 99.0   |
| 75°   | 320.4  | 228.5  | 146.1  | 117.8  | 103.7  | 89.5   | 82.5   | 77.8   | 77.8   | 77.8   | 75.4   |
| 77.5° | 195.6  | 169.6  | 120.2  | 94.2   | 82.5   | 68.3   | 63.6   | 58.9   | 58.9   | 58.9   | 58.9   |
| 80°   | 139.0  | 131.9  | 91.9   | 70.7   | 56.5   | 49.5   | 47.1   | 44.8   | 44.8   | 42.4   | 42.4   |
| 82.5° | 87.2   | 99.0   | 68.3   | 47.1   | 37.7   | 35.3   | 33.0   | 30.6   | 28.3   | 25.9   | 25.9   |
| 85°   | 49.5   | 63.6   | 40.1   | 25.9   | 21.2   | 16.5   | 14.1   | 14.1   | 11.8   | 11.8   | 9.4    |
| 87.5° | 2.4    | 4.7    | 4.7    | 4.7    | 4.7    | 2.4    | 2.4    | 2.4    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-1-R4

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

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### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-1-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-727-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-1-R3. TO UPDATE THE CATALOG NUMBER.\*\*\*TESTED IN SITU. (1) 70 CRI, 2700K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2741   | CRI (Ra): | 71.5 |      |       |
| CIE u':                   | 0.2605 | R1:       | 69.2 | R9:  | -16.1 |
| CIE v':                   | 0.5272 | R2:       | 79.4 | R10: | 51.4  |
| Duv:                      | 0.0005 | R3:       | 87.8 | R11: | 63.1  |
| CIE x:                    | 0.4573 | R4:       | 69.4 | R12: | 42.0  |
| CIE y:                    | 0.4113 | R5:       | 66.4 | R13: | 70.2  |
| CIE z:                    | 0.1313 | R6:       | 69.8 | R14: | 92.4  |
| Peak Wavelength (nm):     | 602    | R7:       | 79.8 |      |       |
| Dominant Wavelength (nm): | 583    | R8:       | 50.1 |      |       |
| Purity:                   | 61.2   |           |      |      |       |
| Rf:                       | 69.9   |           |      |      |       |
| Rg:                       | 98.3   |           |      |      |       |



### Test Conditions

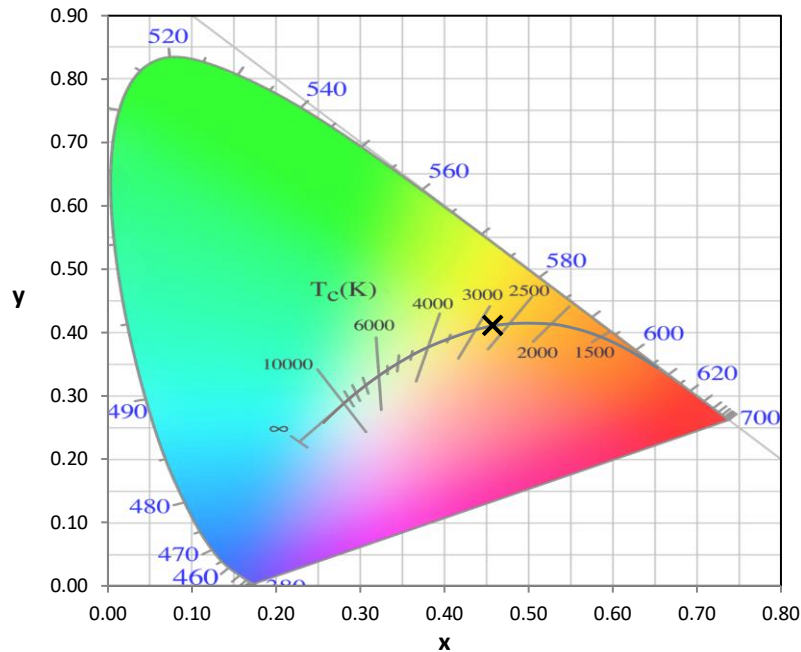
Stabilization Time: 56M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3./42%  
 Sphere Temperature (°C): 25.7

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

REPORT NUMBER: SP1-1908-441-1-R4

CIE 1931 Chromaticity Diagram



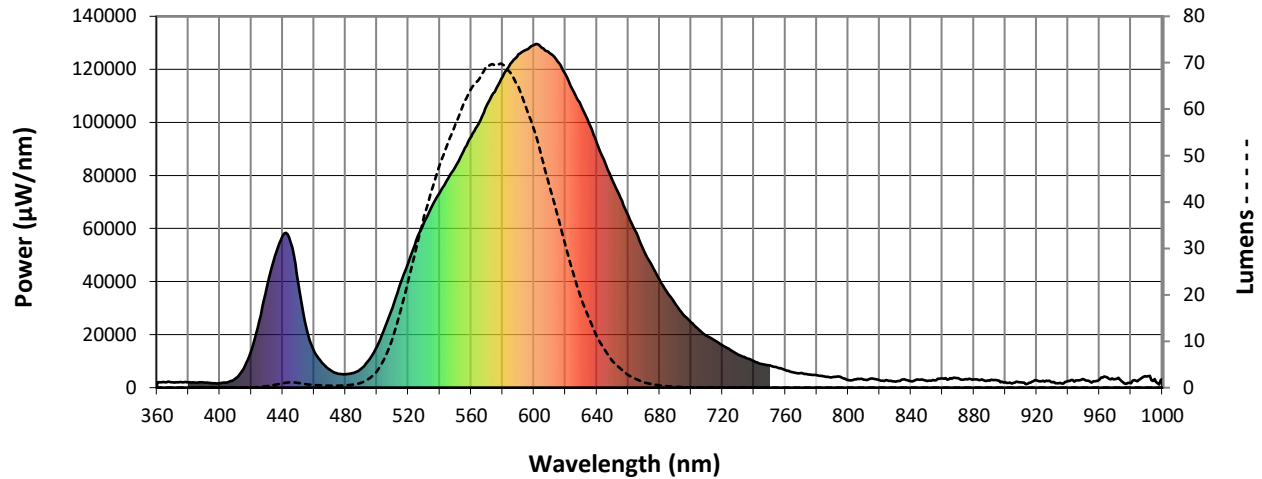
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: 6211.7**

| 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       | 2044             | 0.0              | 490       | 7179             | 1.0              | 620       | 118034           | 30.7             | 750       | 8362             | 0.0              | 880       | 3128             | 0.0              |
| 365       | 2016             | 0.0              | 495       | 10476            | 1.9              | 625       | 111884           | 24.7             | 755       | 7635             | 0.0              | 885       | 3110             | 0.0              |
| 370       | 2020             | 0.0              | 500       | 15549            | 3.4              | 630       | 106119           | 19.2             | 760       | 6582             | 0.0              | 890       | 2632             | 0.0              |
| 375       | 2137             | 0.0              | 505       | 22477            | 6.3              | 635       | 99706            | 15.0             | 765       | 5777             | 0.0              | 895       | 2709             | 0.0              |
| 380       | 2046             | 0.0              | 510       | 30417            | 10.4             | 640       | 92142            | 11.0             | 770       | 5474             | 0.0              | 900       | 2016             | 0.0              |
| 385       | 1925             | 0.0              | 515       | 39274            | 16.3             | 645       | 84987            | 8.2              | 775       | 4977             | 0.0              | 905       | 1748             | 0.0              |
| 390       | 1893             | 0.0              | 520       | 47282            | 22.9             | 650       | 78016            | 5.7              | 780       | 4723             | 0.0              | 910       | 2046             | 0.0              |
| 395       | 1695             | 0.0              | 525       | 55413            | 29.7             | 655       | 71541            | 4.1              | 785       | 4219             | 0.0              | 915       | 1844             | 0.0              |
| 400       | 1633             | 0.0              | 530       | 62377            | 36.7             | 660       | 64863            | 2.7              | 790       | 3969             | 0.0              | 920       | 2734             | 0.0              |
| 405       | 2065             | 0.0              | 535       | 68520            | 42.5             | 665       | 58485            | 1.9              | 795       | 4122             | 0.0              | 925       | 2307             | 0.0              |
| 410       | 3449             | 0.0              | 540       | 73435            | 47.8             | 670       | 51641            | 1.1              | 800       | 2864             | 0.0              | 930       | 2039             | 0.0              |
| 415       | 7117             | 0.0              | 545       | 78677            | 52.4             | 675       | 46030            | 0.8              | 805       | 3151             | 0.0              | 935       | 1784             | 0.0              |
| 420       | 13992            | 0.0              | 550       | 83331            | 56.6             | 680       | 40590            | 0.5              | 810       | 3022             | 0.0              | 940       | 2464             | 0.0              |
| 425       | 25176            | 0.1              | 555       | 89120            | 60.9             | 685       | 35691            | 0.3              | 815       | 3471             | 0.0              | 945       | 2794             | 0.0              |
| 430       | 38151            | 0.3              | 560       | 94613            | 64.3             | 690       | 31631            | 0.2              | 820       | 2749             | 0.0              | 950       | 3090             | 0.0              |
| 435       | 49673            | 0.6              | 565       | 99818            | 66.4             | 695       | 27437            | 0.1              | 825       | 2729             | 0.0              | 955       | 1866             | 0.0              |
| 440       | 57273            | 0.9              | 570       | 106526           | 69.3             | 700       | 24589            | 0.1              | 830       | 2282             | 0.0              | 960       | 3110             | 0.0              |
| 445       | 54802            | 1.1              | 575       | 111610           | 69.4             | 705       | 21832            | 0.0              | 835       | 3140             | 0.0              | 965       | 3880             | 0.0              |
| 450       | 39184            | 1.0              | 580       | 117163           | 69.6             | 710       | 19500            | 0.0              | 840       | 2365             | 0.0              | 970       | 3243             | 0.0              |
| 455       | 22506            | 0.8              | 585       | 122201           | 67.9             | 715       | 17870            | 0.0              | 845       | 3024             | 0.0              | 975       | 2014             | 0.0              |
| 460       | 13692            | 0.6              | 590       | 125662           | 65.0             | 720       | 15924            | 0.0              | 850       | 2510             | 0.0              | 980       | 1688             | 0.0              |
| 465       | 9446             | 0.5              | 595       | 127415           | 60.4             | 725       | 14268            | 0.0              | 855       | 2739             | 0.0              | 985       | 2827             | 0.0              |
| 470       | 6698             | 0.4              | 600       | 129155           | 55.7             | 730       | 12438            | 0.0              | 860       | 3515             | 0.0              | 990       | 4172             | 0.0              |
| 475       | 5328             | 0.4              | 605       | 128057           | 49.6             | 735       | 11255            | 0.0              | 865       | 3600             | 0.0              | 995       | 3177             | 0.0              |
| 480       | 5081             | 0.5              | 610       | 126031           | 43.3             | 740       | 9951             | 0.0              | 870       | 3609             | 0.0              | 1000      | 3241             | 0.0              |
| 485       | 5579             | 0.7              | 615       | 123059           | 37.1             | 745       | 8870             | 0.0              | 875       | 3208             | 0.0              |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3

S/P: 1.04

| 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       | 2044             | 0.0              | 490       | 7179             | 6.0              | 620       | 118034           | 0.1              | 750       | 8362             | 0.0              | 880       | 3128             | 0.0              |
| 365       | 2016             | 0.0              | 495       | 10476            | 8.6              | 625       | 111884           | 0.1              | 755       | 7635             | 0.0              | 885       | 3110             | 0.0              |
| 370       | 2020             | 0.0              | 500       | 15549            | 12.5             | 630       | 106119           | 0.0              | 760       | 6582             | 0.0              | 890       | 2632             | 0.0              |
| 375       | 2137             | 0.0              | 505       | 22477            | 17.3             | 635       | 99706            | 0.0              | 765       | 5777             | 0.0              | 895       | 2709             | 0.0              |
| 380       | 2046             | 0.0              | 510       | 30417            | 21.8             | 640       | 92142            | 0.0              | 770       | 5474             | 0.0              | 900       | 2016             | 0.0              |
| 385       | 1925             | 0.0              | 515       | 39274            | 25.7             | 645       | 84987            | 0.0              | 775       | 4977             | 0.0              | 905       | 1748             | 0.0              |
| 390       | 1893             | 0.0              | 520       | 47282            | 27.5             | 650       | 78016            | 0.0              | 780       | 4723             | 0.0              | 910       | 2046             | 0.0              |
| 395       | 1695             | 0.0              | 525       | 55413            | 28.1             | 655       | 71541            | 0.0              | 785       | 4219             | 0.0              | 915       | 1844             | 0.0              |
| 400       | 1633             | 0.0              | 530       | 62377            | 27.0             | 660       | 64863            | 0.0              | 790       | 3969             | 0.0              | 920       | 2734             | 0.0              |
| 405       | 2065             | 0.0              | 535       | 68520            | 24.7             | 665       | 58485            | 0.0              | 795       | 4122             | 0.0              | 925       | 2307             | 0.0              |
| 410       | 3449             | 0.1              | 540       | 73435            | 21.5             | 670       | 51641            | 0.0              | 800       | 2864             | 0.0              | 930       | 2039             | 0.0              |
| 415       | 7117             | 0.5              | 545       | 78677            | 18.3             | 675       | 46030            | 0.0              | 805       | 3151             | 0.0              | 935       | 1784             | 0.0              |
| 420       | 13992            | 1.6              | 550       | 83331            | 15.0             | 680       | 40590            | 0.0              | 810       | 3022             | 0.0              | 940       | 2464             | 0.0              |
| 425       | 25176            | 3.9              | 555       | 89120            | 12.0             | 685       | 35691            | 0.0              | 815       | 3471             | 0.0              | 945       | 2794             | 0.0              |
| 430       | 38151            | 8.1              | 560       | 94613            | 9.3              | 690       | 31631            | 0.0              | 820       | 2749             | 0.0              | 950       | 3090             | 0.0              |
| 435       | 49673            | 13.3             | 565       | 99818            | 7.0              | 695       | 27437            | 0.0              | 825       | 2729             | 0.0              | 955       | 1866             | 0.0              |
| 440       | 57273            | 19.1             | 570       | 106526           | 5.2              | 700       | 24589            | 0.0              | 830       | 2282             | 0.0              | 960       | 3110             | 0.0              |
| 445       | 54802            | 21.6             | 575       | 111610           | 3.7              | 705       | 21832            | 0.0              | 835       | 3140             | 0.0              | 965       | 3880             | 0.0              |
| 450       | 39184            | 18.1             | 580       | 117163           | 2.6              | 710       | 19500            | 0.0              | 840       | 2365             | 0.0              | 970       | 3243             | 0.0              |
| 455       | 22506            | 11.8             | 585       | 122201           | 1.8              | 715       | 17870            | 0.0              | 845       | 3024             | 0.0              | 975       | 2014             | 0.0              |
| 460       | 13692            | 8.1              | 590       | 125662           | 1.2              | 720       | 15924            | 0.0              | 850       | 2510             | 0.0              | 980       | 1688             | 0.0              |
| 465       | 9446             | 6.2              | 595       | 127415           | 0.8              | 725       | 14268            | 0.0              | 855       | 2739             | 0.0              | 985       | 2827             | 0.0              |
| 470       | 6698             | 4.8              | 600       | 129155           | 0.5              | 730       | 12438            | 0.0              | 860       | 3515             | 0.0              | 990       | 4172             | 0.0              |
| 475       | 5328             | 4.1              | 605       | 128057           | 0.4              | 735       | 11255            | 0.0              | 865       | 3600             | 0.0              | 995       | 3177             | 0.0              |
| 480       | 5081             | 4.1              | 610       | 126031           | 0.2              | 740       | 9951             | 0.0              | 870       | 3609             | 0.0              | 1000      | 3241             | 0.0              |
| 485       | 5579             | 4.6              | 615       | 123059           | 0.1              | 745       | 8870             | 0.0              | 875       | 3208             | 0.0              |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 2145.7 M/P: 0.35**

| 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       | 2044             | 0.0              | 490       | 7179             | 11.1             | 620       | 118034           | 1.5              | 750       | 8362             | 0.0              | 880       | 3128             | 0.0              |
| 365       | 2016             | 0.0              | 495       | 10476            | 16.9             | 625       | 111884           | 0.9              | 755       | 7635             | 0.0              | 885       | 3110             | 0.0              |
| 370       | 2020             | 0.0              | 500       | 15549            | 26.0             | 630       | 106119           | 0.6              | 760       | 6582             | 0.0              | 890       | 2632             | 0.0              |
| 375       | 2137             | 0.0              | 505       | 22477            | 38.2             | 635       | 99706            | 0.4              | 765       | 5777             | 0.0              | 895       | 2709             | 0.0              |
| 380       | 2046             | 0.0              | 510       | 30417            | 51.6             | 640       | 92142            | 0.2              | 770       | 5474             | 0.0              | 900       | 2016             | 0.0              |
| 385       | 1925             | 0.0              | 515       | 39274            | 65.1             | 645       | 84987            | 0.1              | 775       | 4977             | 0.0              | 905       | 1748             | 0.0              |
| 390       | 1893             | 0.0              | 520       | 47282            | 75.2             | 650       | 78016            | 0.1              | 780       | 4723             | 0.0              | 910       | 2046             | 0.0              |
| 395       | 1695             | 0.0              | 525       | 55413            | 82.9             | 655       | 71541            | 0.1              | 785       | 4219             | 0.0              | 915       | 1844             | 0.0              |
| 400       | 1633             | 0.0              | 530       | 62377            | 86.0             | 660       | 64863            | 0.0              | 790       | 3969             | 0.0              | 920       | 2734             | 0.0              |
| 405       | 2065             | 0.1              | 535       | 68520            | 85.4             | 665       | 58485            | 0.0              | 795       | 4122             | 0.0              | 925       | 2307             | 0.0              |
| 410       | 3449             | 0.2              | 540       | 73435            | 81.1             | 670       | 51641            | 0.0              | 800       | 2864             | 0.0              | 930       | 2039             | 0.0              |
| 415       | 7117             | 0.7              | 545       | 78677            | 75.4             | 675       | 46030            | 0.0              | 805       | 3151             | 0.0              | 935       | 1784             | 0.0              |
| 420       | 13992            | 2.3              | 550       | 83331            | 68.1             | 680       | 40590            | 0.0              | 810       | 3022             | 0.0              | 940       | 2464             | 0.0              |
| 425       | 25176            | 6.2              | 555       | 89120            | 60.9             | 685       | 35691            | 0.0              | 815       | 3471             | 0.0              | 945       | 2794             | 0.0              |
| 430       | 38151            | 13.0             | 560       | 94613            | 52.9             | 690       | 31631            | 0.0              | 820       | 2749             | 0.0              | 950       | 3090             | 0.0              |
| 435       | 49673            | 22.2             | 565       | 99818            | 44.8             | 695       | 27437            | 0.0              | 825       | 2729             | 0.0              | 955       | 1866             | 0.0              |
| 440       | 57273            | 32.0             | 570       | 106526           | 37.6             | 700       | 24589            | 0.0              | 830       | 2282             | 0.0              | 960       | 3110             | 0.0              |
| 445       | 54802            | 36.7             | 575       | 111610           | 30.4             | 705       | 21832            | 0.0              | 835       | 3140             | 0.0              | 965       | 3880             | 0.0              |
| 450       | 39184            | 30.4             | 580       | 117163           | 24.1             | 710       | 19500            | 0.0              | 840       | 2365             | 0.0              | 970       | 3243             | 0.0              |
| 455       | 22506            | 19.7             | 585       | 122201           | 18.7             | 715       | 17870            | 0.0              | 845       | 3024             | 0.0              | 975       | 2014             | 0.0              |
| 460       | 13692            | 13.2             | 590       | 125662           | 14.0             | 720       | 15924            | 0.0              | 850       | 2510             | 0.0              | 980       | 1688             | 0.0              |
| 465       | 9446             | 10.0             | 595       | 127415           | 10.2             | 725       | 14268            | 0.0              | 855       | 2739             | 0.0              | 985       | 2827             | 0.0              |
| 470       | 6698             | 7.7              | 600       | 129155           | 7.3              | 730       | 12438            | 0.0              | 860       | 3515             | 0.0              | 990       | 4172             | 0.0              |
| 475       | 5328             | 6.7              | 605       | 128057           | 5.0              | 735       | 11255            | 0.0              | 865       | 3600             | 0.0              | 995       | 3177             | 0.0              |
| 480       | 5081             | 6.9              | 610       | 126031           | 3.4              | 740       | 9951             | 0.0              | 870       | 3609             | 0.0              | 1000      | 3241             | 0.0              |
| 485       | 5579             | 8.1              | 615       | 123059           | 2.3              | 745       | 8870             | 0.0              | 875       | 3208             | 0.0              |           |                  |                  |

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**TM-30-18**

**Summary**

$R_f = 69.9$   
 $R_g = 98.3$   
 $CIE R_a = 71.5$   
 $R_g = -16.1$



**Color Vector Graphics**





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

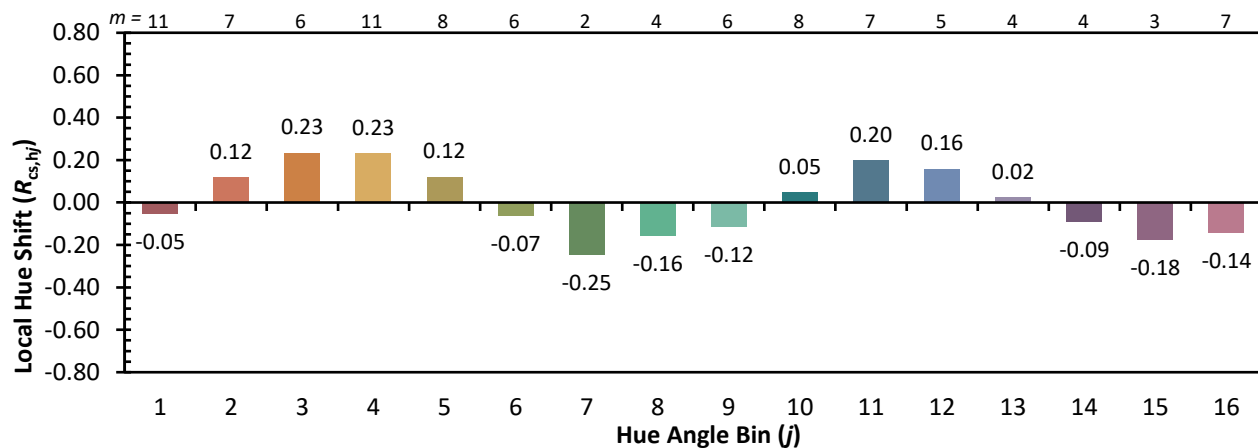
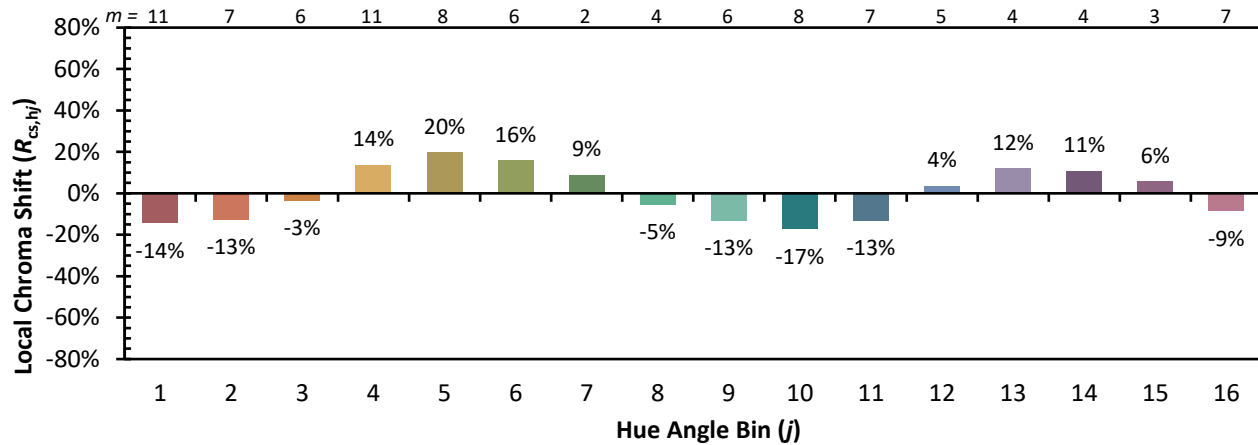
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|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 77 | CES79 = 81 |
| CES05 = 50 | CES30 = 46 | CES55 = 74 | CES80 = 80 |
| CES06 = 52 | CES31 = 50 | CES56 = 63 | CES81 = 73 |
| CES07 = 42 | CES32 = 49 | CES57 = 60 | CES82 = 91 |
| CES08 = 41 | CES33 = 53 | CES58 = 63 | CES83 = 84 |
| CES09 = 29 | CES34 = 66 | CES59 = 85 | CES84 = 90 |
| CES10 = 77 | CES35 = 82 | CES60 = 89 | CES85 = 87 |
| CES11 = 60 | CES36 = 78 | CES61 = 85 | CES86 = 65 |
| CES12 = 66 | CES37 = 75 | CES62 = 69 | CES87 = 78 |
| CES13 = 43 | CES38 = 53 | CES63 = 68 | CES88 = 73 |
| CES14 = 74 | CES39 = 91 | CES64 = 68 | CES89 = 68 |
| CES15 = 71 | CES40 = 85 | CES65 = 65 | CES90 = 68 |
| CES16 = 48 | CES41 = 76 | CES66 = 62 | CES91 = 91 |
| CES17 = 50 | CES42 = 76 | CES67 = 60 | CES92 = 71 |
| CES18 = 57 | CES43 = 65 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 57 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 78 |
| CES21 = 88 | CES46 = 70 | CES71 = 57 | CES96 = 80 |
| CES22 = 80 | CES47 = 63 | CES72 = 86 | CES97 = 79 |
| CES23 = 92 | CES48 = 51 | CES73 = 52 | CES98 = 71 |
| CES24 = 91 | CES49 = 68 | CES74 = 90 | CES99 = 64 |
| CES25 = 73 | CES50 = 77 | CES75 = 58 |            |



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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)