

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: P437310

Luminaire Tested: **ISS-SA1C-730-U-SL4**

Issue Date: 12/9/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P437310  
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: ISS-SA1C-730-U-SL4  
Description: IMPACT ELITE LED QUARTER SPHERE LUMINAIRE  
(1) 70 CRI, 3000K, 615mA LIGHTSQUARE WITH 16 LEDS AND TYPE IV SPILL LIGHT  
ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

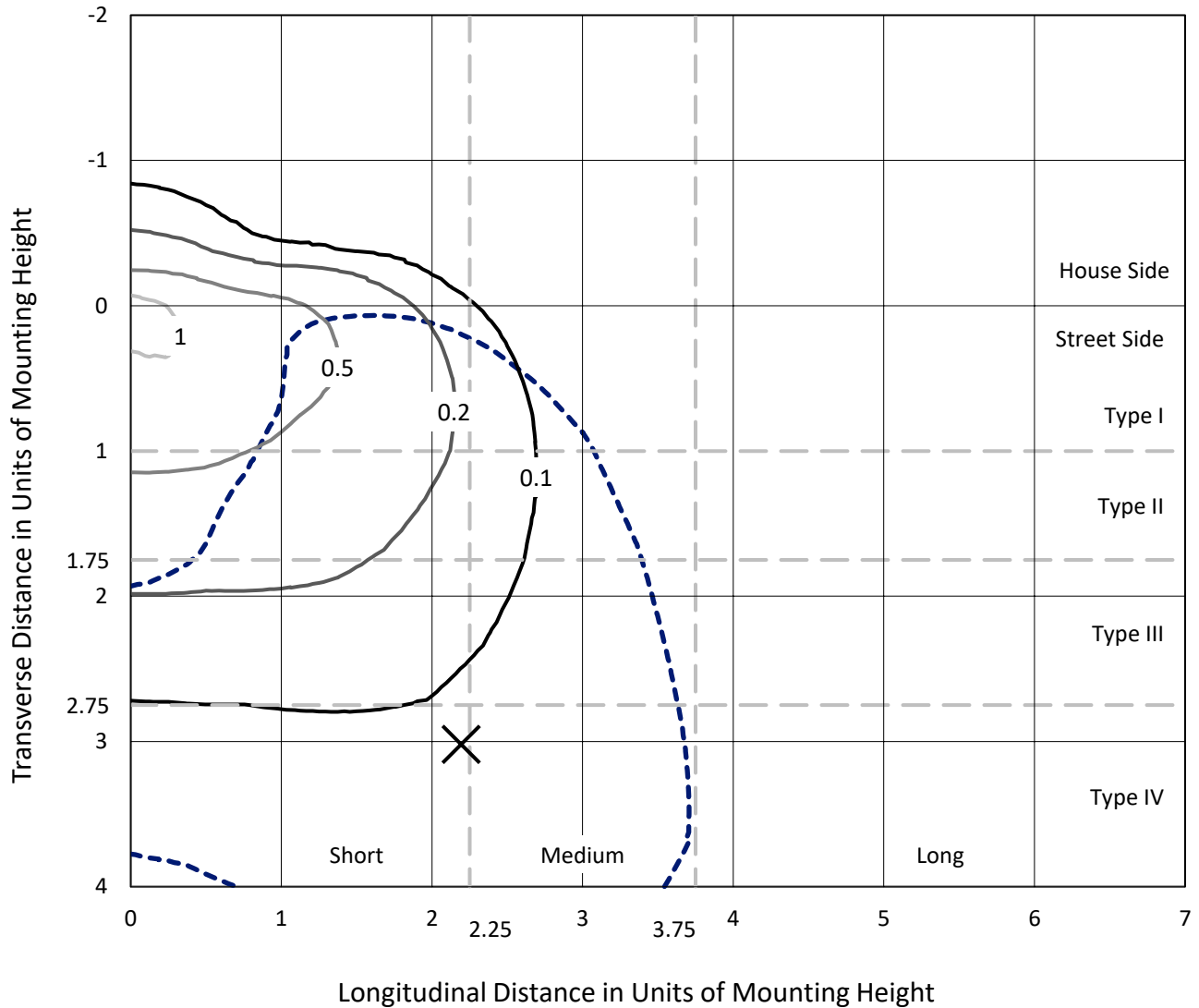
Lumens per Lamp: N/A  
Luminaire Lumens: 4023 lumens  
Efficiency: N/A  
Efficacy: 117.6 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G1  
  
Input Watts (W): 34.2  
Input Voltage (V): NR  
Input Current (Ain): NR  
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

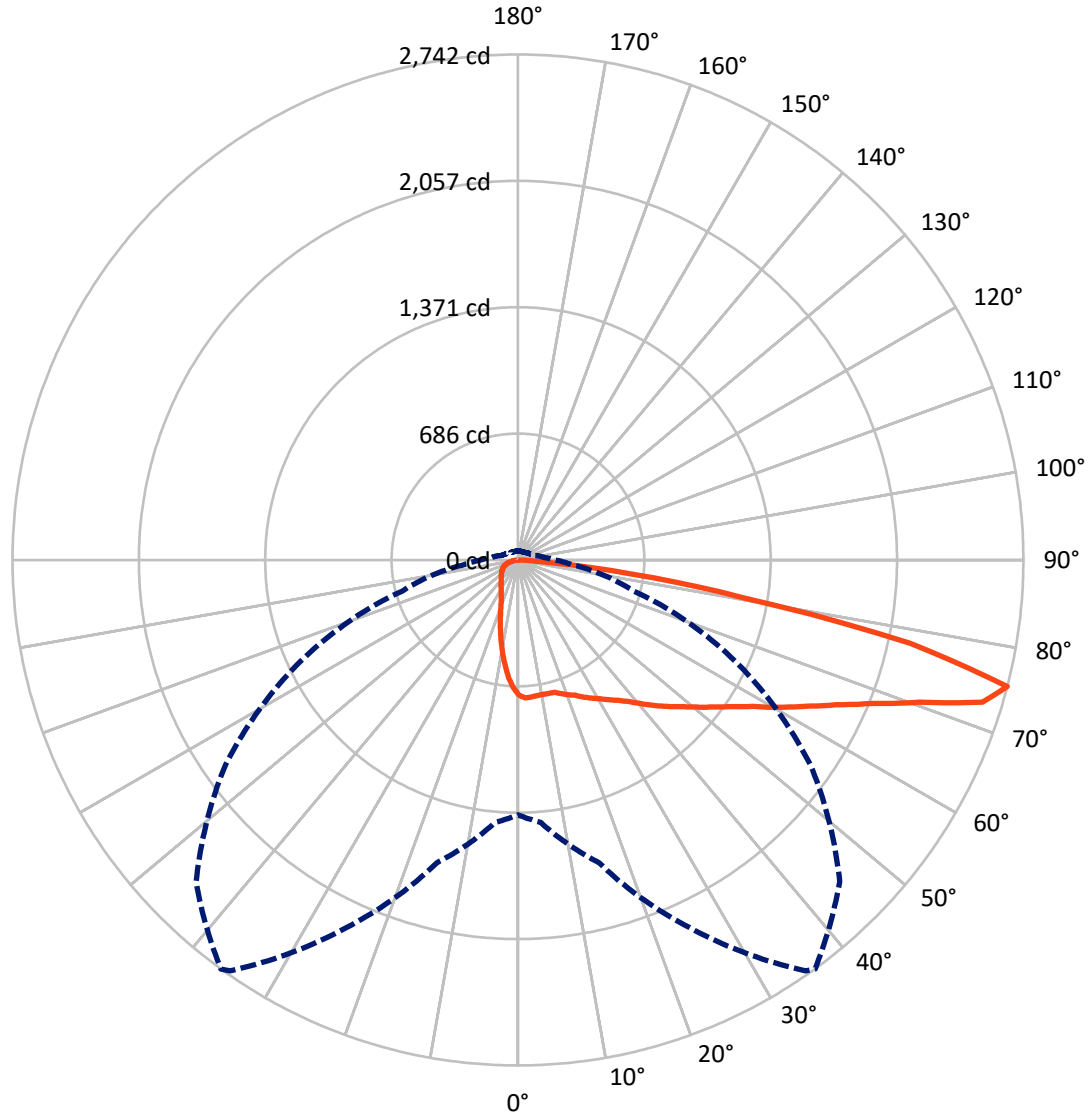
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.2 fc  
 Type IV - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 36-Deg Lateral      - - - Horizontal Cone Through 75-Deg Vertical

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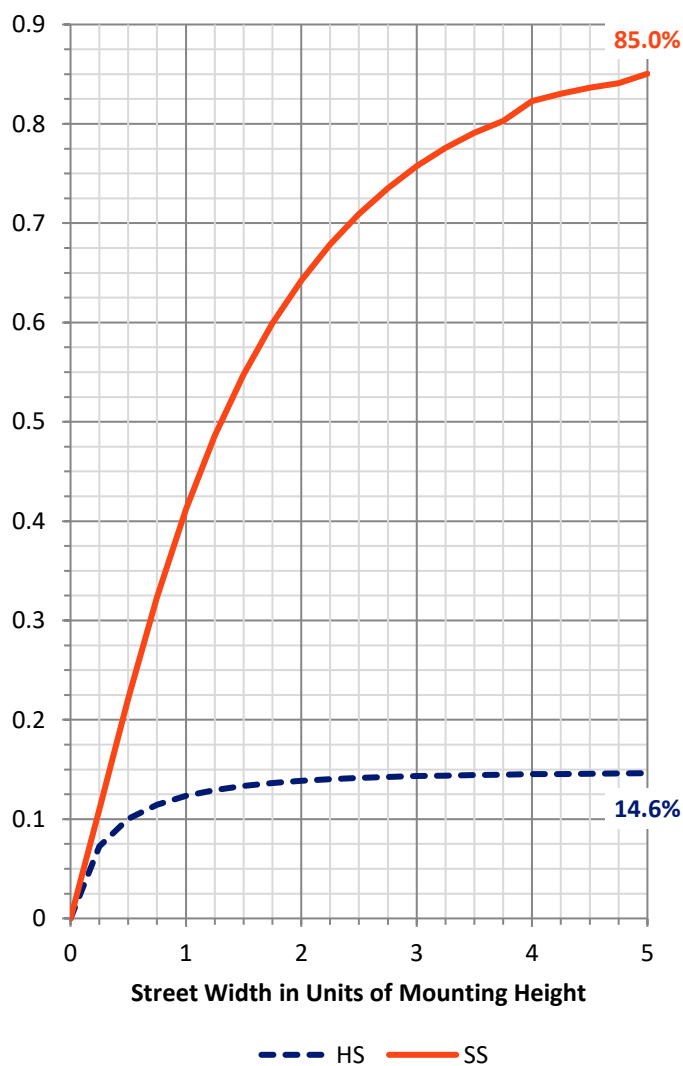
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 593.7    | 0.0    | 593.7  |
|                    | % Fixture | 14.8     | 0.0    | 14.8   |
| <b>Street Side</b> | Lumens    | 3429.3   | 0.0    | 3429.3 |
|                    | % Fixture | 85.2     | 0.0    | 85.2   |
| <b>Total</b>       | Lumens    | 4023.0   | 0.0    | 4023.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 64.7   | 1.6       |
| 10°-20°   | 167.4  | 4.2       |
| 20°-30°   | 258.9  | 6.4       |
| 30°-40°   | 374.9  | 9.3       |
| 40°-50°   | 542.3  | 13.5      |
| 50°-60°   | 752.2  | 18.7      |
| 60°-70°   | 949.7  | 23.6      |
| 70°-80°   | 815.8  | 20.3      |
| 80°-90°   | 97.2   | 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°    | 4023.0 | 100.0     |
| 0°-180°   | 4023.0 | 100.0     |

**Coefficient of Utilization**



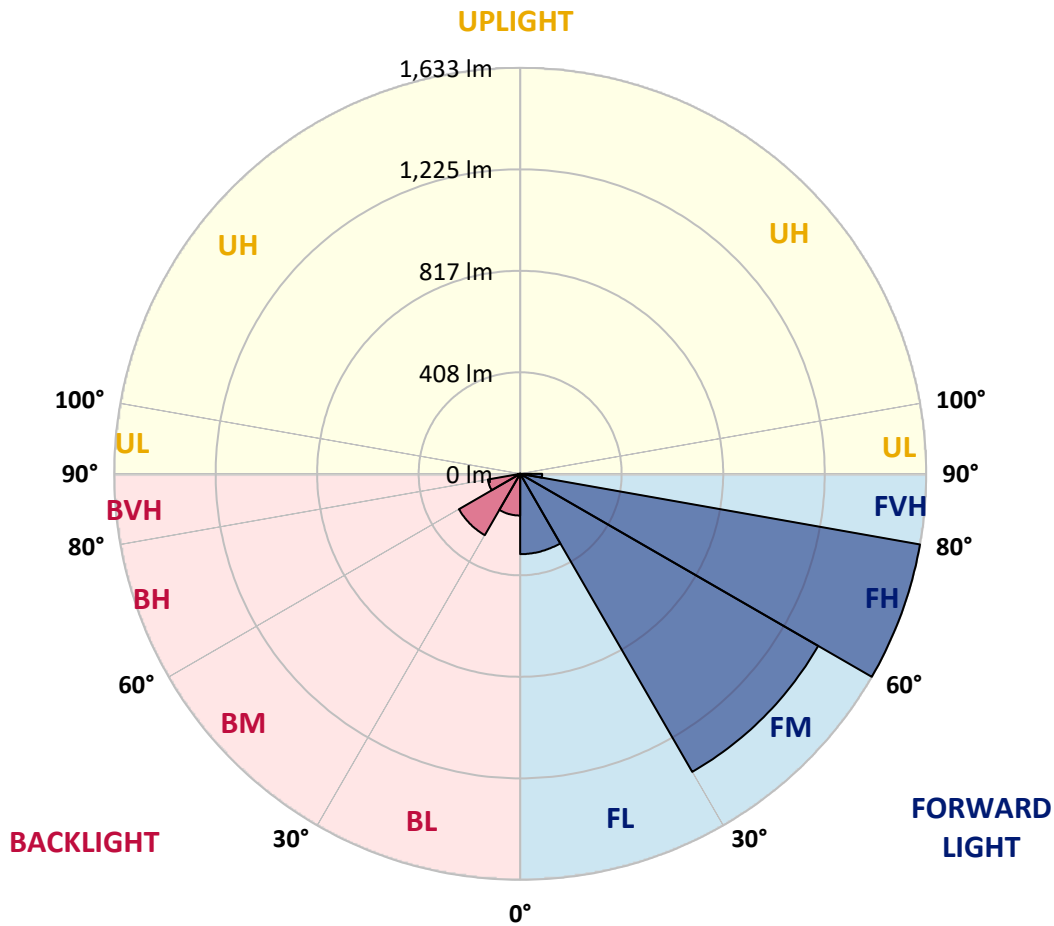
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 323.1  | 8.0       |                         |      |         |
| FM (30°-60°)   | 1384.7 | 34.4      |                         |      |         |
| FH (60°-80°)   | 1633.3 | 40.6      |                         |      | G1/1800 |
| FVH (80°-90°)  | 88.2   | 2.2       |                         |      | G1/100  |
| BL (0°-30°)    | 167.9  | 4.2       | B1/500                  |      |         |
| BM (30°-60°)   | 284.7  | 7.1       | B1/1000                 |      |         |
| BH (60°-80°)   | 132.2  | 3.3       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 9.0    | 0.2       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 36°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 734.0  | 734.0  | 734.0  | 734.0  | 734.0  | 734.0  | 734.0  | 734.0  | 734.0  | 734.0  | 734.0  |
| 2.5°  | 755.0  | 755.0  | 755.0  | 753.5  | 750.5  | 749.0  | 746.0  | 743.0  | 741.5  | 735.5  | 734.0  |
| 5°    | 755.0  | 756.5  | 755.0  | 753.5  | 750.5  | 747.5  | 744.5  | 738.5  | 734.0  | 726.5  | 719.0  |
| 7.5°  | 747.5  | 749.0  | 749.0  | 747.5  | 744.5  | 743.0  | 740.0  | 732.5  | 726.5  | 716.0  | 704.0  |
| 10°   | 735.5  | 738.5  | 738.5  | 740.0  | 741.5  | 741.5  | 738.5  | 732.5  | 723.5  | 711.5  | 691.9  |
| 12.5° | 720.5  | 728.0  | 732.5  | 737.0  | 743.0  | 743.0  | 744.5  | 735.5  | 728.0  | 711.5  | 691.9  |
| 15°   | 716.0  | 720.5  | 729.5  | 743.0  | 749.0  | 744.5  | 750.5  | 746.0  | 737.0  | 720.5  | 696.5  |
| 17.5° | 714.5  | 719.0  | 734.0  | 750.5  | 759.5  | 762.5  | 762.5  | 756.5  | 746.0  | 729.5  | 699.5  |
| 20°   | 720.5  | 726.5  | 746.0  | 767.0  | 780.5  | 780.5  | 779.0  | 771.5  | 758.0  | 738.5  | 705.5  |
| 22.5° | 740.0  | 741.5  | 764.0  | 789.5  | 800.0  | 797.0  | 800.0  | 786.5  | 771.5  | 752.0  | 713.0  |
| 25°   | 765.5  | 768.5  | 786.5  | 816.5  | 822.5  | 824.0  | 819.5  | 804.5  | 788.0  | 768.5  | 722.0  |
| 27.5° | 800.0  | 804.5  | 818.0  | 846.5  | 851.1  | 848.1  | 842.0  | 824.0  | 807.5  | 789.5  | 740.0  |
| 30°   | 840.5  | 843.5  | 860.1  | 872.1  | 876.6  | 873.6  | 869.1  | 849.6  | 836.0  | 819.5  | 767.0  |
| 32.5° | 879.6  | 881.1  | 899.1  | 911.1  | 903.6  | 903.6  | 897.6  | 878.1  | 867.6  | 864.6  | 801.5  |
| 35°   | 920.1  | 923.1  | 939.6  | 945.6  | 933.6  | 935.1  | 933.6  | 917.1  | 920.1  | 926.1  | 854.1  |
| 37.5° | 957.6  | 962.1  | 981.6  | 983.1  | 978.6  | 974.1  | 978.6  | 969.6  | 975.6  | 999.6  | 915.6  |
| 40°   | 990.6  | 996.6  | 1020.7 | 1025.2 | 1023.7 | 1023.7 | 1026.7 | 1025.2 | 1047.7 | 1086.7 | 990.6  |
| 42.5° | 1017.7 | 1025.2 | 1053.7 | 1065.7 | 1074.7 | 1079.2 | 1089.7 | 1092.7 | 1125.7 | 1188.8 | 1077.7 |
| 45°   | 1044.7 | 1052.2 | 1091.2 | 1110.7 | 1131.7 | 1133.2 | 1154.2 | 1164.8 | 1226.3 | 1283.3 | 1172.3 |
| 47.5° | 1076.2 | 1085.2 | 1121.2 | 1160.3 | 1184.3 | 1188.8 | 1227.8 | 1248.8 | 1323.9 | 1397.4 | 1260.8 |
| 50°   | 1119.7 | 1122.7 | 1151.2 | 1217.3 | 1247.3 | 1254.8 | 1298.3 | 1341.9 | 1424.4 | 1498.0 | 1338.9 |
| 52.5° | 1173.8 | 1170.8 | 1184.3 | 1268.3 | 1314.9 | 1325.4 | 1395.9 | 1439.4 | 1538.5 | 1606.0 | 1400.4 |
| 55°   | 1218.8 | 1215.8 | 1235.3 | 1326.9 | 1400.4 | 1403.4 | 1487.5 | 1529.5 | 1643.6 | 1685.6 | 1452.9 |
| 57.5° | 1271.3 | 1265.3 | 1284.8 | 1397.4 | 1498.0 | 1499.5 | 1597.0 | 1645.1 | 1738.1 | 1756.1 | 1487.5 |
| 60°   | 1314.9 | 1314.9 | 1340.4 | 1466.5 | 1606.0 | 1622.6 | 1711.1 | 1748.6 | 1829.7 | 1807.2 | 1504.0 |
| 62.5° | 1355.4 | 1362.9 | 1398.9 | 1558.0 | 1733.6 | 1747.1 | 1837.2 | 1852.2 | 1924.2 | 1846.2 | 1486.0 |
| 65°   | 1403.4 | 1415.4 | 1484.5 | 1667.6 | 1885.2 | 1894.2 | 1969.3 | 1990.3 | 2018.8 | 1844.7 | 1407.9 |
| 67.5° | 1454.4 | 1474.0 | 1565.5 | 1790.7 | 2051.8 | 2075.8 | 2156.9 | 2135.9 | 2081.9 | 1786.2 | 1244.3 |
| 70°   | 1523.5 | 1547.5 | 1678.1 | 1954.3 | 2280.0 | 2310.0 | 2416.6 | 2287.5 | 2048.8 | 1577.5 | 1008.7 |
| 72.5° | 1576.0 | 1607.5 | 1786.2 | 2165.9 | 2589.2 | 2635.7 | 2610.2 | 2290.5 | 1837.2 | 1257.8 | 675.4  |
| 75°   | 1382.4 | 1430.4 | 1700.6 | 2200.4 | 2721.3 | 2742.3 | 2469.1 | 1936.3 | 1301.3 | 649.9  | 291.2  |
| 77.5° | 1010.2 | 1007.2 | 1242.8 | 1709.6 | 2230.4 | 2174.9 | 1873.2 | 1259.3 | 618.4  | 235.7  | 147.1  |
| 80°   | 507.3  | 487.8  | 672.4  | 911.1  | 1203.8 | 1241.3 | 1107.7 | 654.4  | 244.7  | 126.1  | 88.6   |
| 82.5° | 187.6  | 192.1  | 246.2  | 372.2  | 604.9  | 613.9  | 447.3  | 277.7  | 133.6  | 66.0   | 46.5   |
| 85°   | 72.0   | 75.0   | 81.1   | 81.1   | 112.6  | 124.6  | 115.6  | 111.1  | 45.0   | 22.5   | 25.5   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 1.5    | 1.5    | 1.5    | 1.5    | 1.5    | 1.5    | 1.5    |
| 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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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 734.0  | 734.0 | 734.0 | 734.0 | 734.0 | 734.0 | 734.0 | 734.0 | 734.0 | 734.0 | 734.0 |
| 2.5°  | 729.5  | 726.5 | 720.5 | 710.0 | 704.0 | 699.5 | 693.4 | 687.4 | 685.9 | 684.4 | 691.9 |
| 5°    | 711.5  | 707.0 | 691.9 | 678.4 | 663.4 | 651.4 | 639.4 | 628.9 | 622.9 | 621.4 | 624.4 |
| 7.5°  | 693.4  | 687.4 | 664.9 | 637.9 | 612.4 | 591.4 | 570.4 | 559.9 | 543.4 | 543.4 | 544.9 |
| 10°   | 682.9  | 672.4 | 640.9 | 600.4 | 567.4 | 529.8 | 504.3 | 478.8 | 468.3 | 460.8 | 457.8 |
| 12.5° | 676.9  | 660.4 | 618.4 | 573.4 | 522.3 | 472.8 | 438.3 | 406.8 | 390.3 | 378.2 | 378.2 |
| 15°   | 678.4  | 660.4 | 603.4 | 544.9 | 478.8 | 418.8 | 375.2 | 340.7 | 319.7 | 307.7 | 304.7 |
| 17.5° | 676.9  | 654.4 | 585.4 | 508.8 | 435.3 | 372.2 | 319.7 | 283.7 | 262.7 | 255.2 | 253.7 |
| 20°   | 679.9  | 649.9 | 564.4 | 475.8 | 393.3 | 325.7 | 271.7 | 238.7 | 226.6 | 220.6 | 219.1 |
| 22.5° | 681.4  | 640.9 | 543.4 | 439.8 | 348.2 | 282.2 | 237.2 | 214.6 | 205.6 | 201.1 | 199.6 |
| 25°   | 684.4  | 639.4 | 519.3 | 406.8 | 310.7 | 249.2 | 214.6 | 195.1 | 190.6 | 187.6 | 187.6 |
| 27.5° | 696.5  | 639.4 | 498.3 | 364.7 | 271.7 | 222.1 | 195.1 | 183.1 | 180.1 | 178.6 | 178.6 |
| 30°   | 711.5  | 642.4 | 478.8 | 330.2 | 241.7 | 201.1 | 181.6 | 172.6 | 171.1 | 169.6 | 169.6 |
| 32.5° | 737.0  | 652.9 | 456.3 | 297.2 | 216.1 | 186.1 | 171.1 | 163.6 | 160.6 | 160.6 | 160.6 |
| 35°   | 771.5  | 670.9 | 433.8 | 267.2 | 195.1 | 171.1 | 160.6 | 153.1 | 151.6 | 153.1 | 153.1 |
| 37.5° | 821.0  | 691.9 | 414.3 | 240.2 | 178.6 | 159.1 | 150.1 | 145.6 | 144.1 | 144.1 | 145.6 |
| 40°   | 882.6  | 729.5 | 394.8 | 219.1 | 166.6 | 148.6 | 142.6 | 138.1 | 136.6 | 138.1 | 138.1 |
| 42.5° | 950.1  | 770.0 | 378.2 | 198.1 | 154.6 | 141.1 | 133.6 | 130.6 | 129.1 | 130.6 | 132.1 |
| 45°   | 1025.2 | 812.0 | 364.7 | 183.1 | 145.6 | 133.6 | 127.6 | 126.1 | 124.6 | 124.6 | 126.1 |
| 47.5° | 1088.2 | 857.1 | 354.2 | 172.6 | 138.1 | 127.6 | 123.1 | 120.1 | 118.6 | 117.1 | 118.6 |
| 50°   | 1146.7 | 891.6 | 351.2 | 166.6 | 133.6 | 121.6 | 117.1 | 114.1 | 112.6 | 111.1 | 112.6 |
| 52.5° | 1190.3 | 909.6 | 351.2 | 162.1 | 129.1 | 117.1 | 112.6 | 109.6 | 108.1 | 105.1 | 106.6 |
| 55°   | 1220.3 | 918.6 | 346.7 | 159.1 | 124.6 | 112.6 | 106.6 | 105.1 | 103.6 | 100.6 | 100.6 |
| 57.5° | 1238.3 | 917.1 | 330.2 | 157.6 | 123.1 | 106.6 | 102.1 | 100.6 | 99.1  | 96.1  | 96.1  |
| 60°   | 1235.3 | 888.6 | 300.2 | 151.6 | 120.1 | 102.1 | 96.1  | 96.1  | 96.1  | 93.1  | 93.1  |
| 62.5° | 1191.8 | 809.0 | 250.7 | 142.6 | 117.1 | 97.6  | 90.1  | 93.1  | 94.6  | 91.6  | 91.6  |
| 65°   | 1074.7 | 687.4 | 207.1 | 130.6 | 109.6 | 93.1  | 85.6  | 90.1  | 93.1  | 91.6  | 90.1  |
| 67.5° | 905.1  | 544.9 | 171.1 | 118.6 | 102.1 | 87.1  | 79.6  | 85.6  | 87.1  | 87.1  | 87.1  |
| 70°   | 699.5  | 391.8 | 141.1 | 103.6 | 91.6  | 78.1  | 72.0  | 75.0  | 76.5  | 76.5  | 78.1  |
| 72.5° | 414.3  | 234.2 | 115.6 | 88.6  | 78.1  | 67.5  | 63.0  | 64.5  | 63.0  | 63.0  | 63.0  |
| 75°   | 204.1  | 145.6 | 93.1  | 75.0  | 66.0  | 57.0  | 52.5  | 49.5  | 49.5  | 49.5  | 48.0  |
| 77.5° | 124.6  | 108.1 | 76.5  | 60.0  | 52.5  | 43.5  | 40.5  | 37.5  | 37.5  | 37.5  | 37.5  |
| 80°   | 88.6   | 84.1  | 58.5  | 45.0  | 36.0  | 31.5  | 30.0  | 28.5  | 28.5  | 27.0  | 27.0  |
| 82.5° | 55.5   | 63.0  | 43.5  | 30.0  | 24.0  | 22.5  | 21.0  | 19.5  | 18.0  | 16.5  | 16.5  |
| 85°   | 31.5   | 40.5  | 25.5  | 16.5  | 13.5  | 10.5  | 9.0   | 9.0   | 7.5   | 7.5   | 6.0   |
| 87.5° | 1.5    | 3.0   | 3.0   | 3.0   | 3.0   | 1.5   | 1.5   | 1.5   | 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   |



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



**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-2-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGRAW-EDISON  
 Catalog Number: **SA1C-730-U-5WQ**  
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-2-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. (1) 70 CRI, 3000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2993   | CRI (Ra): | 71.8 | R9:  | -38.3 |
| CIE u':                   | 0.2508 | R1:       | 67.5 | R10: | 62.5  |
| CIE v':                   | 0.5215 | R2:       | 82.9 | R11: | 63.7  |
| Duv:                      | 0.0000 | R3:       | 94.7 | R12: | 57.8  |
| CIE x:                    | 0.4374 | R4:       | 67.7 | R13: | 70.4  |
| CIE y:                    | 0.4043 | R5:       | 67.9 | R14: | 97.3  |
| CIE z:                    | 0.1583 | R6:       | 77.6 |      |       |
| Peak Wavelength (nm):     | 593    | R7:       | 76.0 |      |       |
| Dominant Wavelength (nm): | 582    | R8:       | 40.5 |      |       |
| Purity:                   | 53     |           |      |      |       |
| Rf:                       | 75.7   |           |      |      |       |
| Rg:                       | 93.9   |           |      |      |       |



**Test Conditions**

Stabilization Time: 53M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0./44%  
 Sphere Temperature (°C): 25.7

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

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 3000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 2397          | NR            | 490    | 24908         | NR            | 620    | 118784        | NR            | 750    | 5037          | NR            | 880    | 2677          | NR            |
| 365    | 2084          | NR            | 495    | 30998         | NR            | 625    | 108951        | NR            | 755    | 4413          | NR            | 885    | 2940          | NR            |
| 370    | 2143          | NR            | 500    | 37103         | NR            | 630    | 99573         | NR            | 760    | 4189          | NR            | 890    | 3116          | NR            |
| 375    | 2413          | NR            | 505    | 42987         | NR            | 635    | 90444         | NR            | 765    | 3677          | NR            | 895    | 3345          | NR            |
| 380    | 2172          | NR            | 510    | 48702         | NR            | 640    | 80749         | NR            | 770    | 3366          | NR            | 900    | 2312          | NR            |
| 385    | 1997          | NR            | 515    | 53741         | NR            | 645    | 71664         | NR            | 775    | 3211          | NR            | 905    | 2829          | NR            |
| 390    | 1830          | NR            | 520    | 57283         | NR            | 650    | 63936         | NR            | 780    | 2682          | NR            | 910    | 2783          | NR            |
| 395    | 1861          | NR            | 525    | 61876         | NR            | 655    | 56611         | NR            | 785    | 2804          | NR            | 915    | 2662          | NR            |
| 400    | 1717          | NR            | 530    | 65398         | NR            | 660    | 49763         | NR            | 790    | 2581          | NR            | 920    | 3047          | NR            |
| 405    | 1761          | NR            | 535    | 69597         | NR            | 665    | 42891         | NR            | 795    | 2711          | NR            | 925    | 2256          | NR            |
| 410    | 2680          | NR            | 540    | 74214         | NR            | 670    | 36939         | NR            | 800    | 2609          | NR            | 930    | 2976          | NR            |
| 415    | 4374          | NR            | 545    | 79911         | NR            | 675    | 31946         | NR            | 805    | 2581          | NR            | 935    | 3503          | NR            |
| 420    | 8071          | NR            | 550    | 86153         | NR            | 680    | 27385         | NR            | 810    | 2404          | NR            | 940    | 4226          | NR            |
| 425    | 15169         | NR            | 555    | 93952         | NR            | 685    | 23504         | NR            | 815    | 2556          | NR            | 945    | 2930          | NR            |
| 430    | 26038         | NR            | 560    | 102904        | NR            | 690    | 20210         | NR            | 820    | 2742          | NR            | 950    | 2115          | NR            |
| 435    | 41316         | NR            | 565    | 112009        | NR            | 695    | 17459         | NR            | 825    | 2014          | NR            | 955    | 2634          | NR            |
| 440    | 59674         | NR            | 570    | 121662        | NR            | 700    | 15207         | NR            | 830    | 2488          | NR            | 960    | 4200          | NR            |
| 445    | 72751         | NR            | 575    | 130476        | NR            | 705    | 13322         | NR            | 835    | 2625          | NR            | 965    | 1982          | NR            |
| 450    | 65091         | NR            | 580    | 137926        | NR            | 710    | 11676         | NR            | 840    | 2754          | NR            | 970    | 3613          | NR            |
| 455    | 44894         | NR            | 585    | 143406        | NR            | 715    | 10626         | NR            | 845    | 2708          | NR            | 975    | 4034          | NR            |
| 460    | 32712         | NR            | 590    | 147039        | NR            | 720    | 9416          | NR            | 850    | 2608          | NR            | 980    | 3922          | NR            |
| 465    | 25296         | NR            | 595    | 147365        | NR            | 725    | 8333          | NR            | 855    | 2605          | NR            | 985    | 1909          | NR            |
| 470    | 19318         | NR            | 600    | 145800        | NR            | 730    | 7134          | NR            | 860    | 1765          | NR            | 990    | 3617          | NR            |
| 475    | 17265         | NR            | 605    | 141363        | NR            | 735    | 6437          | NR            | 865    | 2581          | NR            | 995    | 4767          | NR            |
| 480    | 18260         | NR            | 610    | 134199        | NR            | 740    | 5834          | NR            | 870    | 3016          | NR            | 1000   | 2528          | NR            |
| 485    | 20845         | NR            | 615    | 127683        | NR            | 745    | 5500          | NR            | 875    | 3952          | NR            |        |               |               |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 8494.8

S/P: 1.23

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 2397          | NR            | 490    | 24908         | NR            | 620    | 118784        | NR            | 750    | 5037          | NR            | 880    | 2677          | NR            |
| 365    | 2084          | NR            | 495    | 30998         | NR            | 625    | 108951        | NR            | 755    | 4413          | NR            | 885    | 2940          | NR            |
| 370    | 2143          | NR            | 500    | 37103         | NR            | 630    | 99573         | NR            | 760    | 4189          | NR            | 890    | 3116          | NR            |
| 375    | 2413          | NR            | 505    | 42987         | NR            | 635    | 90444         | NR            | 765    | 3677          | NR            | 895    | 3345          | NR            |
| 380    | 2172          | NR            | 510    | 48702         | NR            | 640    | 80749         | NR            | 770    | 3366          | NR            | 900    | 2312          | NR            |
| 385    | 1997          | NR            | 515    | 53741         | NR            | 645    | 71664         | NR            | 775    | 3211          | NR            | 905    | 2829          | NR            |
| 390    | 1830          | NR            | 520    | 57283         | NR            | 650    | 63936         | NR            | 780    | 2682          | NR            | 910    | 2783          | NR            |
| 395    | 1861          | NR            | 525    | 61876         | NR            | 655    | 56611         | NR            | 785    | 2804          | NR            | 915    | 2662          | NR            |
| 400    | 1717          | NR            | 530    | 65398         | NR            | 660    | 49763         | NR            | 790    | 2581          | NR            | 920    | 3047          | NR            |
| 405    | 1761          | NR            | 535    | 69597         | NR            | 665    | 42891         | NR            | 795    | 2711          | NR            | 925    | 2256          | NR            |
| 410    | 2680          | NR            | 540    | 74214         | NR            | 670    | 36939         | NR            | 800    | 2609          | NR            | 930    | 2976          | NR            |
| 415    | 4374          | NR            | 545    | 79911         | NR            | 675    | 31946         | NR            | 805    | 2581          | NR            | 935    | 3503          | NR            |
| 420    | 8071          | NR            | 550    | 86153         | NR            | 680    | 27385         | NR            | 810    | 2404          | NR            | 940    | 4226          | NR            |
| 425    | 15169         | NR            | 555    | 93952         | NR            | 685    | 23504         | NR            | 815    | 2556          | NR            | 945    | 2930          | NR            |
| 430    | 26038         | NR            | 560    | 102904        | NR            | 690    | 20210         | NR            | 820    | 2742          | NR            | 950    | 2115          | NR            |
| 435    | 41316         | NR            | 565    | 112009        | NR            | 695    | 17459         | NR            | 825    | 2014          | NR            | 955    | 2634          | NR            |
| 440    | 59674         | NR            | 570    | 121662        | NR            | 700    | 15207         | NR            | 830    | 2488          | NR            | 960    | 4200          | NR            |
| 445    | 72751         | NR            | 575    | 130476        | NR            | 705    | 13322         | NR            | 835    | 2625          | NR            | 965    | 1982          | NR            |
| 450    | 65091         | NR            | 580    | 137926        | NR            | 710    | 11676         | NR            | 840    | 2754          | NR            | 970    | 3613          | NR            |
| 455    | 44894         | NR            | 585    | 143406        | NR            | 715    | 10626         | NR            | 845    | 2708          | NR            | 975    | 4034          | NR            |
| 460    | 32712         | NR            | 590    | 147039        | NR            | 720    | 9416          | NR            | 850    | 2608          | NR            | 980    | 3922          | NR            |
| 465    | 25296         | NR            | 595    | 147365        | NR            | 725    | 8333          | NR            | 855    | 2605          | NR            | 985    | 1909          | NR            |
| 470    | 19318         | NR            | 600    | 145800        | NR            | 730    | 7134          | NR            | 860    | 1765          | NR            | 990    | 3617          | NR            |
| 475    | 17265         | NR            | 605    | 141363        | NR            | 735    | 6437          | NR            | 865    | 2581          | NR            | 995    | 4767          | NR            |
| 480    | 18260         | NR            | 610    | 134199        | NR            | 740    | 5834          | NR            | 870    | 3016          | NR            | 1000   | 2528          | NR            |
| 485    | 20845         | NR            | 615    | 127683        | NR            | 745    | 5500          | NR            | 875    | 3952          | NR            |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 3101.5 M/P: 0.45**

| $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360            | 2397                              | NR                          | 490            | 24908                             | NR                          | 620            | 118784                            | NR                          | 750            | 5037                              | NR                          | 880            | 2677                              | NR                          |
| 365            | 2084                              | NR                          | 495            | 30998                             | NR                          | 625            | 108951                            | NR                          | 755            | 4413                              | NR                          | 885            | 2940                              | NR                          |
| 370            | 2143                              | NR                          | 500            | 37103                             | NR                          | 630            | 99573                             | NR                          | 760            | 4189                              | NR                          | 890            | 3116                              | NR                          |
| 375            | 2413                              | NR                          | 505            | 42987                             | NR                          | 635            | 90444                             | NR                          | 765            | 3677                              | NR                          | 895            | 3345                              | NR                          |
| 380            | 2172                              | NR                          | 510            | 48702                             | NR                          | 640            | 80749                             | NR                          | 770            | 3366                              | NR                          | 900            | 2312                              | NR                          |
| 385            | 1997                              | NR                          | 515            | 53741                             | NR                          | 645            | 71664                             | NR                          | 775            | 3211                              | NR                          | 905            | 2829                              | NR                          |
| 390            | 1830                              | NR                          | 520            | 57283                             | NR                          | 650            | 63936                             | NR                          | 780            | 2682                              | NR                          | 910            | 2783                              | NR                          |
| 395            | 1861                              | NR                          | 525            | 61876                             | NR                          | 655            | 56611                             | NR                          | 785            | 2804                              | NR                          | 915            | 2662                              | NR                          |
| 400            | 1717                              | NR                          | 530            | 65398                             | NR                          | 660            | 49763                             | NR                          | 790            | 2581                              | NR                          | 920            | 3047                              | NR                          |
| 405            | 1761                              | NR                          | 535            | 69597                             | NR                          | 665            | 42891                             | NR                          | 795            | 2711                              | NR                          | 925            | 2256                              | NR                          |
| 410            | 2680                              | NR                          | 540            | 74214                             | NR                          | 670            | 36939                             | NR                          | 800            | 2609                              | NR                          | 930            | 2976                              | NR                          |
| 415            | 4374                              | NR                          | 545            | 79911                             | NR                          | 675            | 31946                             | NR                          | 805            | 2581                              | NR                          | 935            | 3503                              | NR                          |
| 420            | 8071                              | NR                          | 550            | 86153                             | NR                          | 680            | 27385                             | NR                          | 810            | 2404                              | NR                          | 940            | 4226                              | NR                          |
| 425            | 15169                             | NR                          | 555            | 93952                             | NR                          | 685            | 23504                             | NR                          | 815            | 2556                              | NR                          | 945            | 2930                              | NR                          |
| 430            | 26038                             | NR                          | 560            | 102904                            | NR                          | 690            | 20210                             | NR                          | 820            | 2742                              | NR                          | 950            | 2115                              | NR                          |
| 435            | 41316                             | NR                          | 565            | 112009                            | NR                          | 695            | 17459                             | NR                          | 825            | 2014                              | NR                          | 955            | 2634                              | NR                          |
| 440            | 59674                             | NR                          | 570            | 121662                            | NR                          | 700            | 15207                             | NR                          | 830            | 2488                              | NR                          | 960            | 4200                              | NR                          |
| 445            | 72751                             | NR                          | 575            | 130476                            | NR                          | 705            | 13322                             | NR                          | 835            | 2625                              | NR                          | 965            | 1982                              | NR                          |
| 450            | 65091                             | NR                          | 580            | 137926                            | NR                          | 710            | 11676                             | NR                          | 840            | 2754                              | NR                          | 970            | 3613                              | NR                          |
| 455            | 44894                             | NR                          | 585            | 143406                            | NR                          | 715            | 10626                             | NR                          | 845            | 2708                              | NR                          | 975            | 4034                              | NR                          |
| 460            | 32712                             | NR                          | 590            | 147039                            | NR                          | 720            | 9416                              | NR                          | 850            | 2608                              | NR                          | 980            | 3922                              | NR                          |
| 465            | 25296                             | NR                          | 595            | 147365                            | NR                          | 725            | 8333                              | NR                          | 855            | 2605                              | NR                          | 985            | 1909                              | NR                          |
| 470            | 19318                             | NR                          | 600            | 145800                            | NR                          | 730            | 7134                              | NR                          | 860            | 1765                              | NR                          | 990            | 3617                              | NR                          |
| 475            | 17265                             | NR                          | 605            | 141363                            | NR                          | 735            | 6437                              | NR                          | 865            | 2581                              | NR                          | 995            | 4767                              | NR                          |
| 480            | 18260                             | NR                          | 610            | 134199                            | NR                          | 740            | 5834                              | NR                          | 870            | 3016                              | NR                          | 1000           | 2528                              | NR                          |
| 485            | 20845                             | NR                          | 615            | 127683                            | NR                          | 745            | 5500                              | NR                          | 875            | 3952                              | NR                          |                |                                   |                             |

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**Summary**

$R_f = 75.7$   
 $R_g = 93.9$   
 CIE  $R_a = 71.8$   
 $R_9 = -38.3$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 67 | CES51 = 87 | CES76 = 63 |
| CES02 = 63 | CES27 = 88 | CES52 = 86 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 67 |
| CES04 = 71 | CES29 = 66 | CES54 = 84 | CES79 = 87 |
| CES05 = 49 | CES30 = 73 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 70 | CES56 = 75 | CES81 = 71 |
| CES07 = 41 | CES32 = 65 | CES57 = 74 | CES82 = 94 |
| CES08 = 40 | CES33 = 73 | CES58 = 76 | CES83 = 90 |
| CES09 = 29 | CES34 = 79 | CES59 = 85 | CES84 = 89 |
| CES10 = 76 | CES35 = 89 | CES60 = 93 | CES85 = 77 |
| CES11 = 59 | CES36 = 97 | CES61 = 84 | CES86 = 61 |
| CES12 = 65 | CES37 = 87 | CES62 = 91 | CES87 = 78 |
| CES13 = 43 | CES38 = 81 | CES63 = 77 | CES88 = 77 |
| CES14 = 74 | CES39 = 95 | CES64 = 72 | CES89 = 67 |
| CES15 = 71 | CES40 = 92 | CES65 = 68 | CES90 = 76 |
| CES16 = 47 | CES41 = 88 | CES66 = 69 | CES91 = 89 |
| CES17 = 50 | CES42 = 89 | CES67 = 67 | CES92 = 58 |
| CES18 = 56 | CES43 = 79 | CES68 = 72 | CES93 = 74 |
| CES19 = 73 | CES44 = 99 | CES69 = 81 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 66 | CES95 = 68 |
| CES21 = 87 | CES46 = 80 | CES71 = 67 | CES96 = 76 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 82 |
| CES23 = 92 | CES48 = 69 | CES73 = 59 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 95 | CES99 = 62 |
| CES25 = 73 | CES50 = 87 | CES75 = 69 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)