

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: P437367

Luminaire Tested: **ISS-SA1C-750-U-SL4**

Issue Date: 12/9/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P437367  
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-750-U-SL4  
Description: IMPACT ELITE LED QUARTER SPHERE LUMINAIRE  
(1) 70 CRI, 5000K, 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: 4417 lumens  
Efficiency: N/A  
Efficacy: 129.2 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

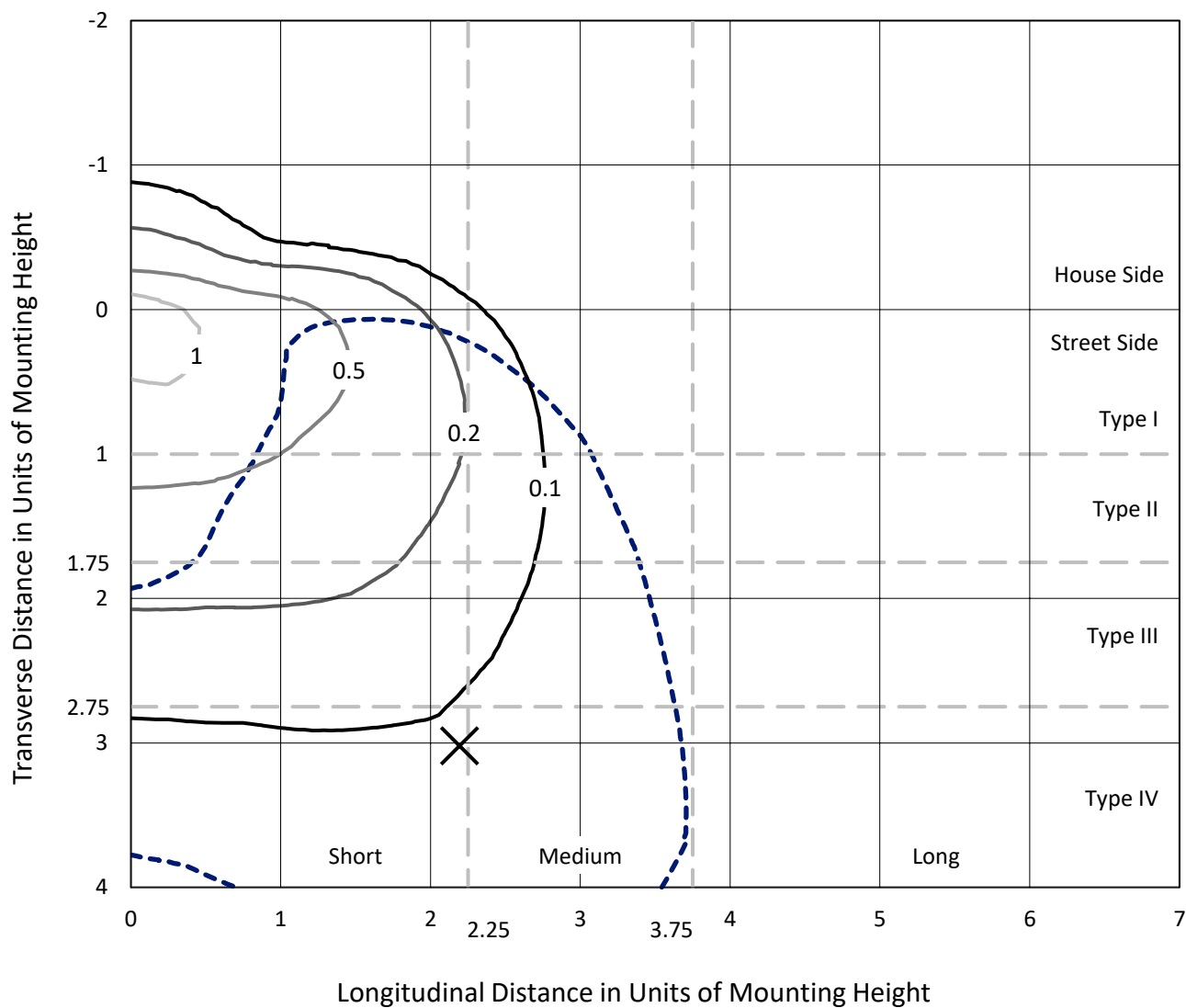


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

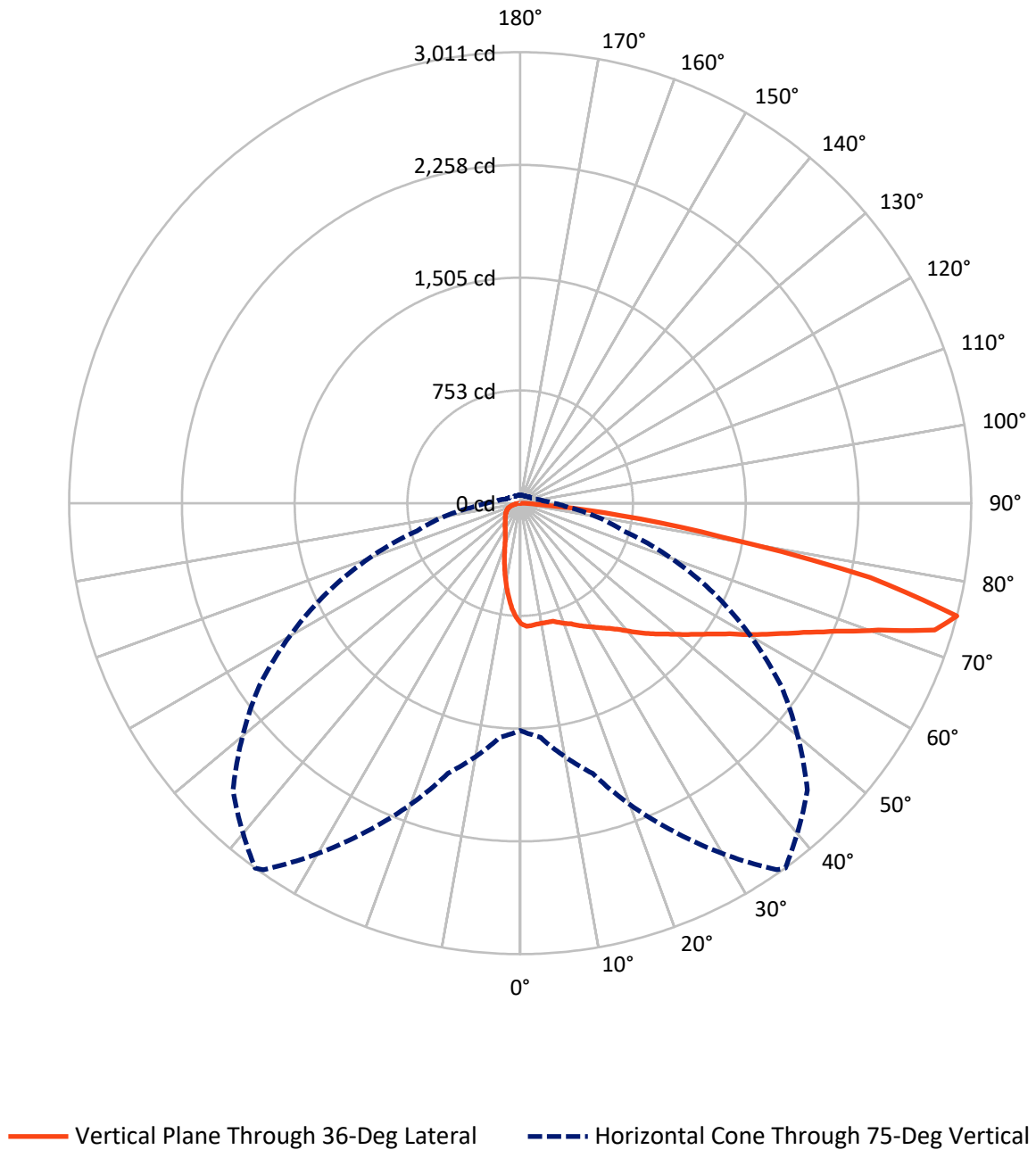
--- 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.3 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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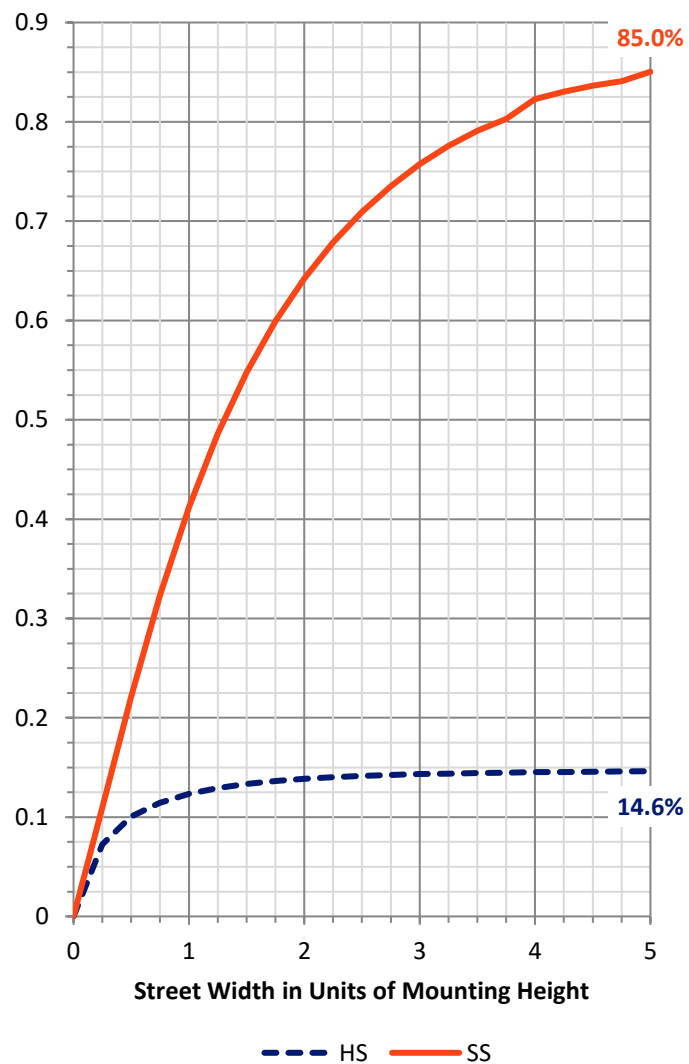
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 651.9    | 0.0    | 651.9  |
|                    | % Fixture | 14.8     | 0.0    | 14.8   |
| <b>Street Side</b> | Lumens    | 3765.1   | 0.0    | 3765.1 |
|                    | % Fixture | 85.2     | 0.0    | 85.2   |
| <b>Total</b>       | Lumens    | 4417.0   | 0.0    | 4417.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 71.1   | 1.6       |
| 10°-20°   | 183.8  | 4.2       |
| 20°-30°   | 284.2  | 6.4       |
| 30°-40°   | 411.6  | 9.3       |
| 40°-50°   | 595.4  | 13.5      |
| 50°-60°   | 825.8  | 18.7      |
| 60°-70°   | 1042.7 | 23.6      |
| 70°-80°   | 895.7  | 20.3      |
| 80°-90°   | 106.7  | 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°    | 4417.0 | 100.0     |
| 0°-180°   | 4417.0 | 100.0     |

**Coefficient of Utilization**



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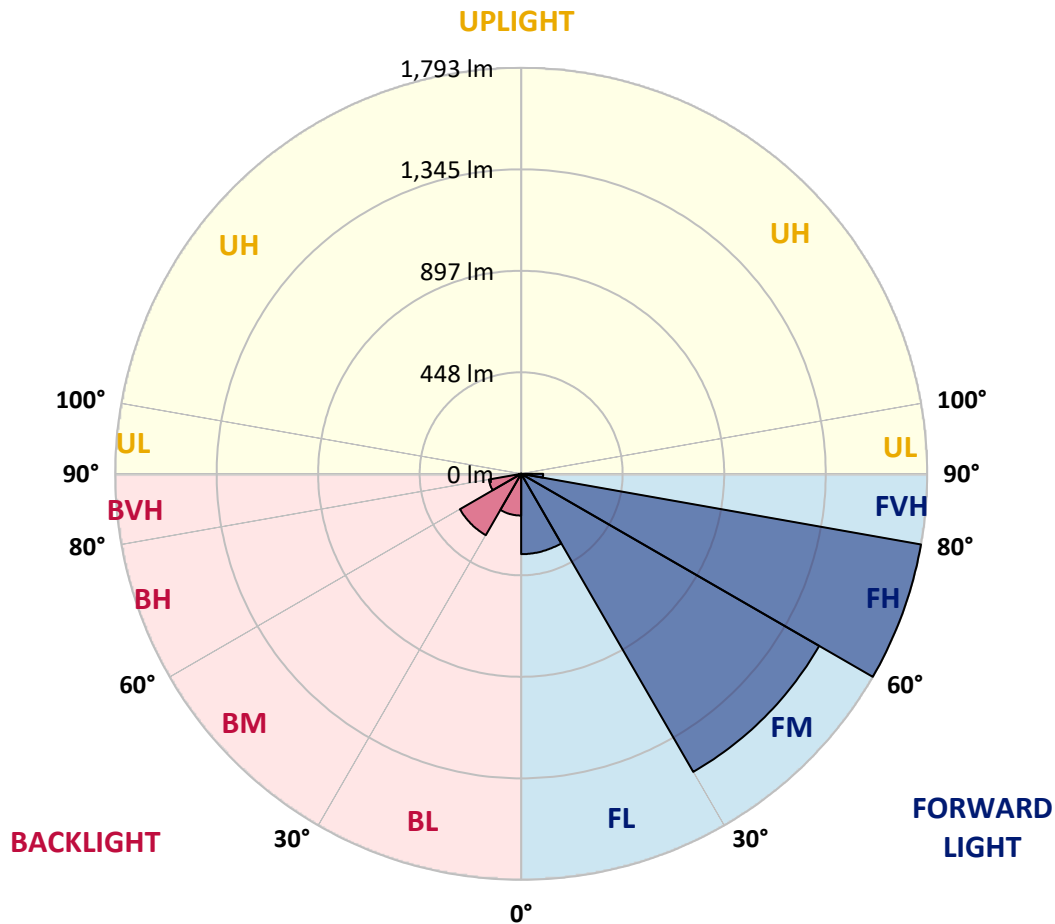
CATALOG NUMBER: ISS-SA1C-750-U-SL4

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 354.7  | 8.0       |                         |      |         |
| FM   | (30°-60°)   | 1520.3 | 34.4      |                         |      |         |
| FH   | (60°-80°)   | 1793.3 | 40.6      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 96.8   | 2.2       |                         |      | G1/100  |
| BL   | (0°-30°)    | 184.4  | 4.2       | B1/500                  |      |         |
| BM   | (30°-60°)   | 312.5  | 7.1       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 145.1  | 3.3       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 9.9    | 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°    | 805.9  | 805.9  | 805.9  | 805.9  | 805.9  | 805.9  | 805.9  | 805.9  | 805.9  | 805.9  | 805.9  |
| 2.5°  | 828.9  | 828.9  | 828.9  | 827.3  | 824.0  | 822.3  | 819.0  | 815.7  | 814.1  | 807.5  | 805.9  |
| 5°    | 828.9  | 830.6  | 828.9  | 827.3  | 824.0  | 820.7  | 817.4  | 810.8  | 805.9  | 797.6  | 789.4  |
| 7.5°  | 820.7  | 822.3  | 822.3  | 820.7  | 817.4  | 815.7  | 812.5  | 804.2  | 797.6  | 786.1  | 772.9  |
| 10°   | 807.5  | 810.8  | 810.8  | 812.5  | 814.1  | 814.1  | 810.8  | 804.2  | 794.3  | 781.1  | 759.7  |
| 12.5° | 791.0  | 799.3  | 804.2  | 809.2  | 815.7  | 815.7  | 817.4  | 807.5  | 799.3  | 781.1  | 759.7  |
| 15°   | 786.1  | 791.0  | 800.9  | 815.7  | 822.3  | 817.4  | 824.0  | 819.0  | 809.2  | 791.0  | 764.7  |
| 17.5° | 784.4  | 789.4  | 805.9  | 824.0  | 833.9  | 837.2  | 837.2  | 830.6  | 819.0  | 800.9  | 768.0  |
| 20°   | 791.0  | 797.6  | 819.0  | 842.1  | 856.9  | 856.9  | 855.3  | 847.1  | 832.2  | 810.8  | 774.5  |
| 22.5° | 812.5  | 814.1  | 838.8  | 866.8  | 878.4  | 875.1  | 878.4  | 863.5  | 847.1  | 825.6  | 782.8  |
| 25°   | 840.5  | 843.8  | 863.5  | 896.5  | 903.1  | 904.7  | 899.8  | 883.3  | 865.2  | 843.8  | 792.7  |
| 27.5° | 878.4  | 883.3  | 898.1  | 929.5  | 934.4  | 931.1  | 924.5  | 904.7  | 886.6  | 866.8  | 812.5  |
| 30°   | 922.9  | 926.2  | 944.3  | 957.5  | 962.4  | 959.1  | 954.2  | 932.8  | 917.9  | 899.8  | 842.1  |
| 32.5° | 965.7  | 967.4  | 987.1  | 1000.3 | 992.1  | 992.1  | 985.5  | 964.1  | 952.5  | 949.2  | 880.0  |
| 35°   | 1010.2 | 1013.5 | 1031.6 | 1038.2 | 1025.0 | 1026.7 | 1025.0 | 1006.9 | 1010.2 | 1016.8 | 937.7  |
| 37.5° | 1051.4 | 1056.4 | 1077.8 | 1079.4 | 1074.5 | 1069.5 | 1074.5 | 1064.6 | 1071.2 | 1097.6 | 1005.3 |
| 40°   | 1087.7 | 1094.3 | 1120.6 | 1125.6 | 1123.9 | 1123.9 | 1127.2 | 1125.6 | 1150.3 | 1193.1 | 1087.7 |
| 42.5° | 1117.3 | 1125.6 | 1156.9 | 1170.1 | 1179.9 | 1184.9 | 1196.4 | 1199.7 | 1236.0 | 1305.2 | 1183.2 |
| 45°   | 1147.0 | 1155.2 | 1198.1 | 1219.5 | 1242.6 | 1244.2 | 1267.3 | 1278.8 | 1346.4 | 1409.0 | 1287.1 |
| 47.5° | 1181.6 | 1191.5 | 1231.0 | 1273.9 | 1300.3 | 1305.2 | 1348.0 | 1371.1 | 1453.5 | 1534.3 | 1384.3 |
| 50°   | 1229.4 | 1232.7 | 1264.0 | 1336.5 | 1369.5 | 1377.7 | 1425.5 | 1473.3 | 1563.9 | 1644.7 | 1470.0 |
| 52.5° | 1288.7 | 1285.4 | 1300.3 | 1392.5 | 1443.6 | 1455.2 | 1532.6 | 1580.4 | 1689.2 | 1763.3 | 1537.6 |
| 55°   | 1338.2 | 1334.9 | 1356.3 | 1456.8 | 1537.6 | 1540.9 | 1633.1 | 1679.3 | 1804.5 | 1850.7 | 1595.2 |
| 57.5° | 1395.8 | 1389.2 | 1410.7 | 1534.3 | 1644.7 | 1646.3 | 1753.4 | 1806.2 | 1908.4 | 1928.1 | 1633.1 |
| 60°   | 1443.6 | 1443.6 | 1471.6 | 1610.1 | 1763.3 | 1781.5 | 1878.7 | 1919.9 | 2008.9 | 1984.2 | 1651.3 |
| 62.5° | 1488.1 | 1496.4 | 1535.9 | 1710.6 | 1903.4 | 1918.2 | 2017.1 | 2033.6 | 2112.7 | 2027.0 | 1631.5 |
| 65°   | 1540.9 | 1554.0 | 1629.8 | 1830.9 | 2069.9 | 2079.7 | 2162.1 | 2185.2 | 2216.5 | 2025.4 | 1545.8 |
| 67.5° | 1596.9 | 1618.3 | 1718.8 | 1966.0 | 2252.8 | 2279.1 | 2368.1 | 2345.1 | 2285.7 | 1961.1 | 1366.2 |
| 70°   | 1672.7 | 1699.1 | 1842.4 | 2145.7 | 2503.3 | 2536.2 | 2653.2 | 2511.5 | 2249.5 | 1732.0 | 1107.4 |
| 72.5° | 1730.4 | 1765.0 | 1961.1 | 2378.0 | 2842.8 | 2893.8 | 2865.8 | 2514.8 | 2017.1 | 1381.0 | 741.6  |
| 75°   | 1517.8 | 1570.5 | 1867.2 | 2415.9 | 2987.8 | 3010.8 | 2710.9 | 2125.9 | 1428.8 | 713.6  | 319.7  |
| 77.5° | 1109.1 | 1105.8 | 1364.5 | 1877.0 | 2448.9 | 2387.9 | 2056.7 | 1382.7 | 679.0  | 258.7  | 161.5  |
| 80°   | 557.0  | 535.6  | 738.3  | 1000.3 | 1321.7 | 1362.9 | 1216.2 | 718.5  | 268.6  | 138.4  | 97.2   |
| 82.5° | 206.0  | 210.9  | 270.3  | 408.7  | 664.1  | 674.0  | 491.1  | 304.9  | 146.7  | 72.5   | 51.1   |
| 85°   | 79.1   | 82.4   | 89.0   | 89.0   | 123.6  | 136.8  | 126.9  | 122.0  | 49.4   | 24.7   | 28.0   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 1.6    | 1.6    | 1.6    | 1.6    | 1.6    | 1.6    | 1.6    |
| 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: ISS-SA1C-750-U-SL4

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 805.9  | 805.9  | 805.9 | 805.9 | 805.9 | 805.9 | 805.9 | 805.9 | 805.9 | 805.9 | 805.9 |
| 2.5°  | 800.9  | 797.6  | 791.0 | 779.5 | 772.9 | 768.0 | 761.4 | 754.8 | 753.1 | 751.5 | 759.7 |
| 5°    | 781.1  | 776.2  | 759.7 | 744.9 | 728.4 | 715.2 | 702.0 | 690.5 | 683.9 | 682.3 | 685.6 |
| 7.5°  | 761.4  | 754.8  | 730.1 | 700.4 | 672.4 | 649.3 | 626.2 | 614.7 | 596.6 | 596.6 | 598.2 |
| 10°   | 749.8  | 738.3  | 703.7 | 659.2 | 622.9 | 581.7 | 553.7 | 525.7 | 514.2 | 505.9 | 502.6 |
| 12.5° | 743.2  | 725.1  | 679.0 | 629.5 | 573.5 | 519.1 | 481.2 | 446.6 | 428.5 | 415.3 | 415.3 |
| 15°   | 744.9  | 725.1  | 662.5 | 598.2 | 525.7 | 459.8 | 412.0 | 374.1 | 351.0 | 337.8 | 334.5 |
| 17.5° | 743.2  | 718.5  | 642.7 | 558.7 | 477.9 | 408.7 | 351.0 | 311.5 | 288.4 | 280.2 | 278.5 |
| 20°   | 746.5  | 713.6  | 619.6 | 522.4 | 431.8 | 357.6 | 298.3 | 262.0 | 248.8 | 242.3 | 240.6 |
| 22.5° | 748.2  | 703.7  | 596.6 | 482.9 | 382.3 | 309.8 | 260.4 | 235.7 | 225.8 | 220.8 | 219.2 |
| 25°   | 751.5  | 702.0  | 570.2 | 446.6 | 341.1 | 273.6 | 235.7 | 214.2 | 209.3 | 206.0 | 206.0 |
| 27.5° | 764.7  | 702.0  | 547.1 | 400.5 | 298.3 | 243.9 | 214.2 | 201.1 | 197.8 | 196.1 | 196.1 |
| 30°   | 781.1  | 705.3  | 525.7 | 362.6 | 265.3 | 220.8 | 199.4 | 189.5 | 187.9 | 186.2 | 186.2 |
| 32.5° | 809.2  | 716.9  | 501.0 | 326.3 | 237.3 | 204.3 | 187.9 | 179.6 | 176.3 | 176.3 | 176.3 |
| 35°   | 847.1  | 736.6  | 476.3 | 293.3 | 214.2 | 187.9 | 176.3 | 168.1 | 166.4 | 168.1 | 168.1 |
| 37.5° | 901.4  | 759.7  | 454.8 | 263.7 | 196.1 | 174.7 | 164.8 | 159.9 | 158.2 | 158.2 | 159.9 |
| 40°   | 969.0  | 800.9  | 433.4 | 240.6 | 182.9 | 163.1 | 156.6 | 151.6 | 150.0 | 151.6 | 151.6 |
| 42.5° | 1043.2 | 845.4  | 415.3 | 217.5 | 169.7 | 154.9 | 146.7 | 143.4 | 141.7 | 143.4 | 145.0 |
| 45°   | 1125.6 | 891.6  | 400.5 | 201.1 | 159.9 | 146.7 | 140.1 | 138.4 | 136.8 | 136.8 | 138.4 |
| 47.5° | 1194.8 | 941.0  | 388.9 | 189.5 | 151.6 | 140.1 | 135.1 | 131.8 | 130.2 | 128.5 | 130.2 |
| 50°   | 1259.1 | 978.9  | 385.6 | 182.9 | 146.7 | 133.5 | 128.5 | 125.2 | 123.6 | 122.0 | 123.6 |
| 52.5° | 1306.8 | 998.7  | 385.6 | 178.0 | 141.7 | 128.5 | 123.6 | 120.3 | 118.7 | 115.4 | 117.0 |
| 55°   | 1339.8 | 1008.6 | 380.7 | 174.7 | 136.8 | 123.6 | 117.0 | 115.4 | 113.7 | 110.4 | 110.4 |
| 57.5° | 1359.6 | 1006.9 | 362.6 | 173.0 | 135.1 | 117.0 | 112.1 | 110.4 | 108.8 | 105.5 | 105.5 |
| 60°   | 1356.3 | 975.6  | 329.6 | 166.4 | 131.8 | 112.1 | 105.5 | 105.5 | 105.5 | 102.2 | 102.2 |
| 62.5° | 1308.5 | 888.3  | 275.2 | 156.6 | 128.5 | 107.1 | 98.9  | 102.2 | 103.8 | 100.5 | 100.5 |
| 65°   | 1179.9 | 754.8  | 227.4 | 143.4 | 120.3 | 102.2 | 93.9  | 98.9  | 102.2 | 100.5 | 98.9  |
| 67.5° | 993.7  | 598.2  | 187.9 | 130.2 | 112.1 | 95.6  | 87.3  | 93.9  | 95.6  | 95.6  | 95.6  |
| 70°   | 768.0  | 430.1  | 154.9 | 113.7 | 100.5 | 85.7  | 79.1  | 82.4  | 84.0  | 84.0  | 85.7  |
| 72.5° | 454.8  | 257.1  | 126.9 | 97.2  | 85.7  | 74.2  | 69.2  | 70.9  | 69.2  | 69.2  | 69.2  |
| 75°   | 224.1  | 159.9  | 102.2 | 82.4  | 72.5  | 62.6  | 57.7  | 54.4  | 54.4  | 54.4  | 52.7  |
| 77.5° | 136.8  | 118.7  | 84.0  | 65.9  | 57.7  | 47.8  | 44.5  | 41.2  | 41.2  | 41.2  | 41.2  |
| 80°   | 97.2   | 92.3   | 64.3  | 49.4  | 39.6  | 34.6  | 33.0  | 31.3  | 31.3  | 29.7  | 29.7  |
| 82.5° | 61.0   | 69.2   | 47.8  | 33.0  | 26.4  | 24.7  | 23.1  | 21.4  | 19.8  | 18.1  | 18.1  |
| 85°   | 34.6   | 44.5   | 28.0  | 18.1  | 14.8  | 11.5  | 9.9   | 9.9   | 8.2   | 8.2   | 6.6   |
| 87.5° | 1.6    | 3.3    | 3.3   | 3.3   | 3.3   | 1.6   | 1.6   | 1.6   | 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: SP1-1908-441-4-R4

Test Date: 10/02/2019

Luminaire Tested: SA1C-750-U-5WQ

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

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### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-4-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-750-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):                  | 4884   | CRI (Ra): | 73.5 |      |       |
| CIE u':                   | 0.2101 | R1:       | 70.5 | R9:  | -28.4 |
| CIE v':                   | 0.4904 | R2:       | 77.7 | R10: | 48.6  |
| Duv:                      | 0.0037 | R3:       | 84.6 | R11: | 73.2  |
| CIE x:                    | 0.3493 | R4:       | 74.7 | R12: | 50.7  |
| CIE y:                    | 0.3624 | R5:       | 71.9 | R13: | 71.2  |
| CIE z:                    | 0.2884 | R6:       | 70.7 | R14: | 91.4  |
| Peak Wavelength (nm):     | 444    | R7:       | 81.2 |      |       |
| Dominant Wavelength (nm): | 571    | R8:       | 56.9 |      |       |
| Purity:                   | 13.7   |           |      |      |       |
| Rf:                       | 74.9   |           |      |      |       |
| Rg:                       | 96.3   |           |      |      |       |



### Test Conditions

Stabilization Time: 240M  
 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 5000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



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| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 13493.5

S/P: 1.77

| 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       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5378.9**

**M/P: 0.71**

| 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       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

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**TM-30-18**

**Summary**

$R_f = 74.9$   
 $R_g = 96.3$   
 CIE  $R_a = 73.5$   
 $R_g = -28.4$

**Spectral Power Distribution Comparison**



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 61 | CES51 = 90 | CES76 = 52 |
| CES02 = 60 | CES27 = 84 | CES52 = 91 | CES77 = 71 |
| CES03 = 30 | CES28 = 81 | CES53 = 79 | CES78 = 54 |
| CES04 = 69 | CES29 = 58 | CES54 = 83 | CES79 = 80 |
| CES05 = 46 | CES30 = 67 | CES55 = 83 | CES80 = 77 |
| CES06 = 50 | CES31 = 63 | CES56 = 73 | CES81 = 77 |
| CES07 = 39 | CES32 = 59 | CES57 = 72 | CES82 = 90 |
| CES08 = 38 | CES33 = 69 | CES58 = 73 | CES83 = 86 |
| CES09 = 29 | CES34 = 69 | CES59 = 88 | CES84 = 88 |
| CES10 = 73 | CES35 = 83 | CES60 = 93 | CES85 = 84 |
| CES11 = 56 | CES36 = 95 | CES61 = 88 | CES86 = 75 |
| CES12 = 61 | CES37 = 78 | CES62 = 85 | CES87 = 78 |
| CES13 = 41 | CES38 = 76 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 93 | CES64 = 74 | CES89 = 75 |
| CES15 = 70 | CES40 = 86 | CES65 = 67 | CES90 = 77 |
| CES16 = 46 | CES41 = 87 | CES66 = 69 | CES91 = 89 |
| CES17 = 49 | CES42 = 78 | CES67 = 67 | CES92 = 66 |
| CES18 = 55 | CES43 = 75 | CES68 = 73 | CES93 = 80 |
| CES19 = 71 | CES44 = 99 | CES69 = 81 | CES94 = 57 |
| CES20 = 64 | CES45 = 83 | CES70 = 63 | CES95 = 71 |
| CES21 = 85 | CES46 = 81 | CES71 = 60 | CES96 = 78 |
| CES22 = 77 | CES47 = 80 | CES72 = 86 | CES97 = 85 |
| CES23 = 91 | CES48 = 72 | CES73 = 53 | CES98 = 75 |
| CES24 = 90 | CES49 = 81 | CES74 = 96 | CES99 = 62 |
| CES25 = 71 | CES50 = 89 | CES75 = 58 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)