

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: P437809

Luminaire Tested: **ISC-SA1F-727-U-T2-HSS**

Issue Date: 12/9/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P437809  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-7)  
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-T2-HSS  
Description: IMPACT ELITE LED CYLINDER LUMINAIRE  
(1) 70 CRI, 2700K, 1200mA LIGHTSQUARE WITH 16 LEDS AND TYPE II OPTICS  
WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5038 lumens  
Efficiency: N/A  
Efficacy: 76.3 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B1 - U0 - G1

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

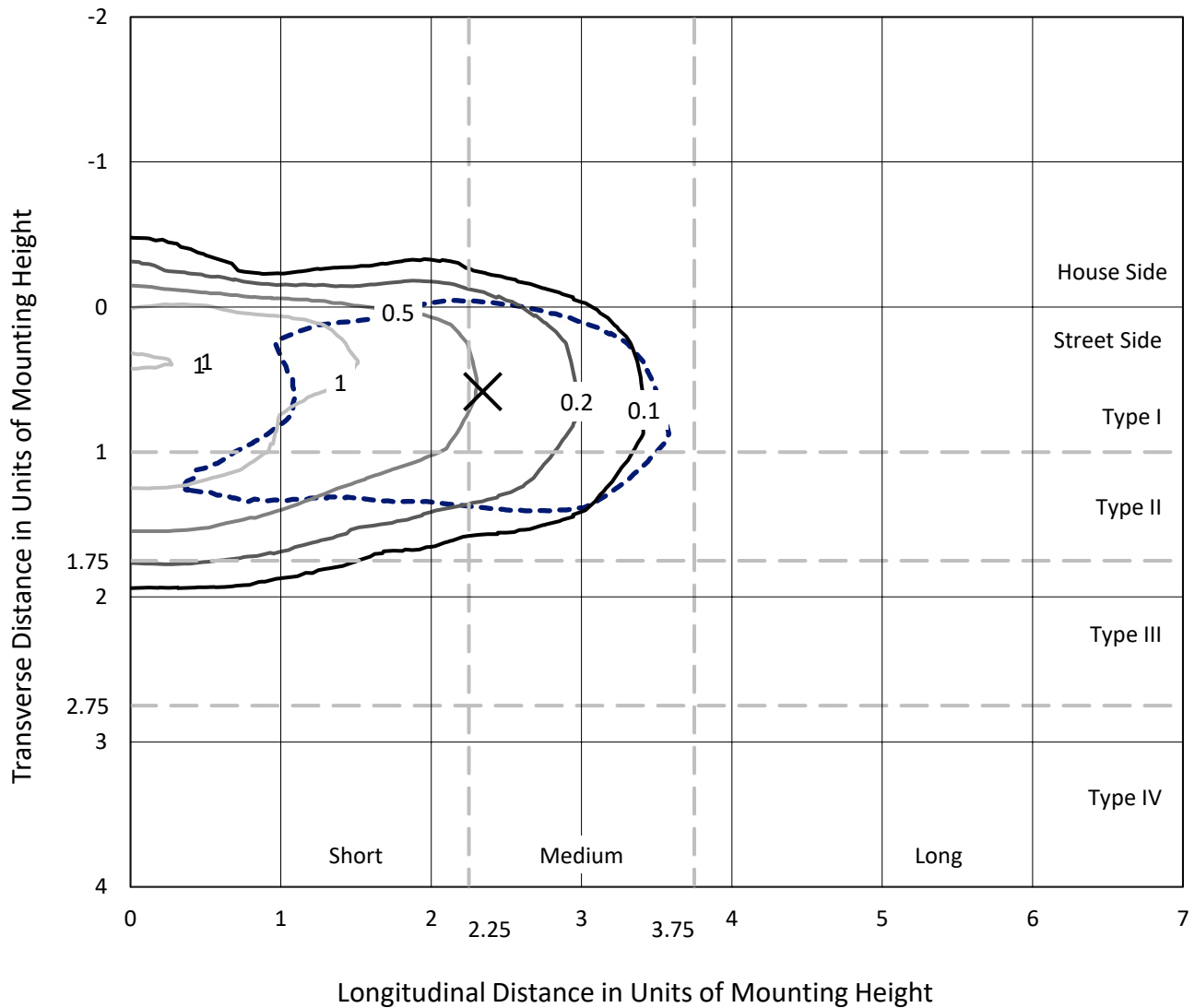


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

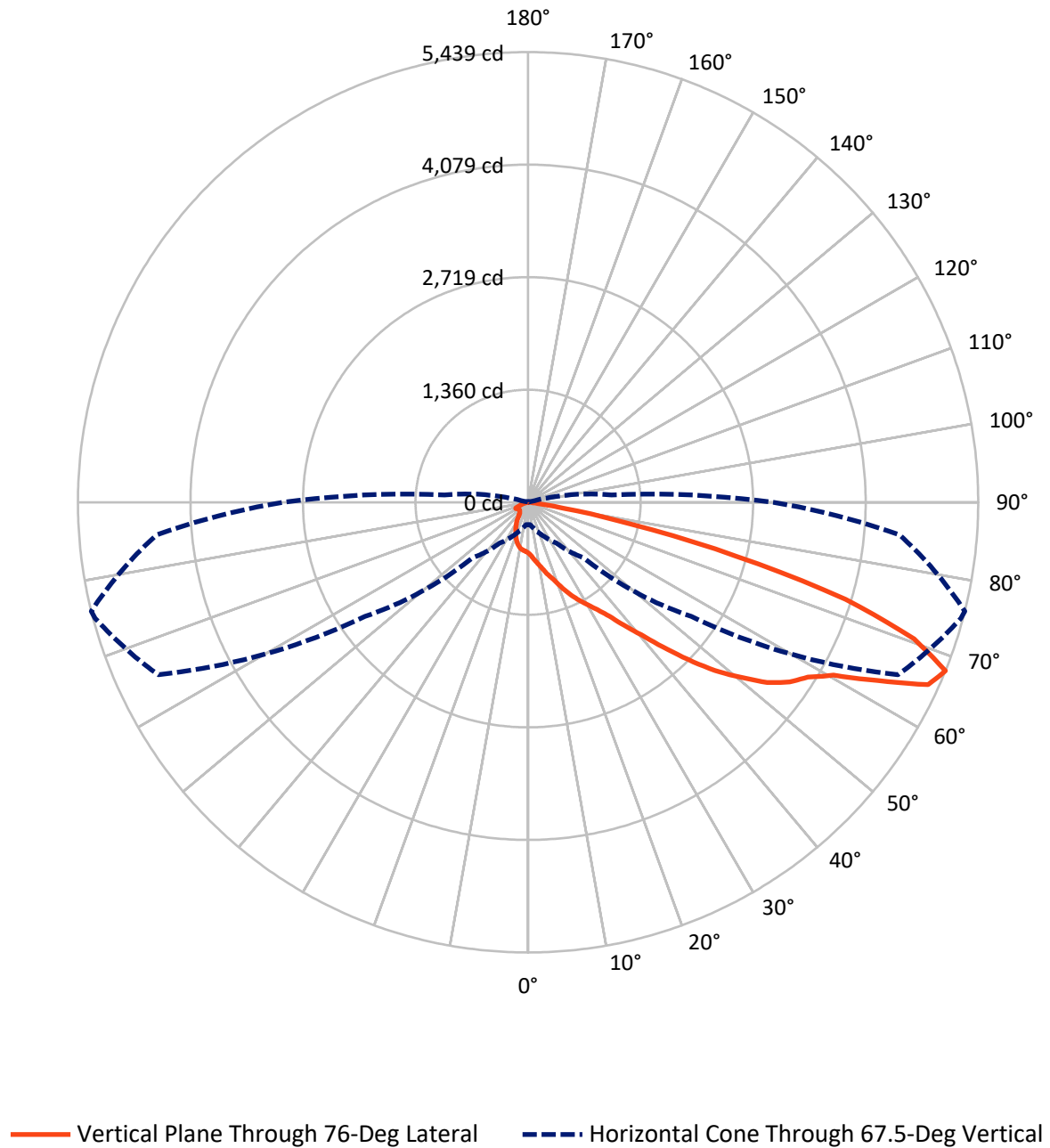


Based on 25 foot mounting height. Maximum calculated value = 1.5 fc  
 Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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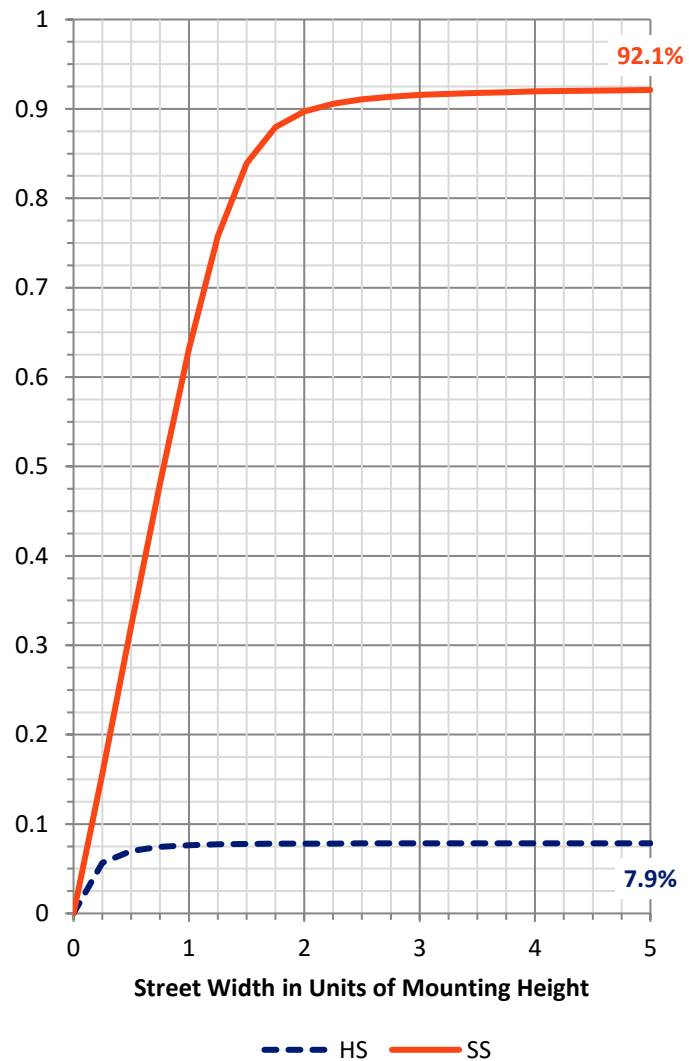
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 398.6    | 0.0    | 398.6  |
|                    | % Fixture | 7.9      | 0.0    | 7.9    |
| <b>Street Side</b> | Lumens    | 4639.4   | 0.0    | 4639.4 |
|                    | % Fixture | 92.1     | 0.0    | 92.1   |
| <b>Total</b>       | Lumens    | 5038.0   | 0.0    | 5038.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 58.8   | 1.2       |
| 10°-20°   | 163.7  | 3.2       |
| 20°-30°   | 282.5  | 5.6       |
| 30°-40°   | 503.3  | 10.0      |
| 40°-50°   | 896.2  | 17.8      |
| 50°-60°   | 1343.9 | 26.7      |
| 60°-70°   | 1272.9 | 25.3      |
| 70°-80°   | 496.1  | 9.8       |
| 80°-90°   | 20.6   | 0.4       |
| 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°    | 5038.0 | 100.0     |
| 0°-180°   | 5038.0 | 100.0     |

**Coefficient of Utilization**



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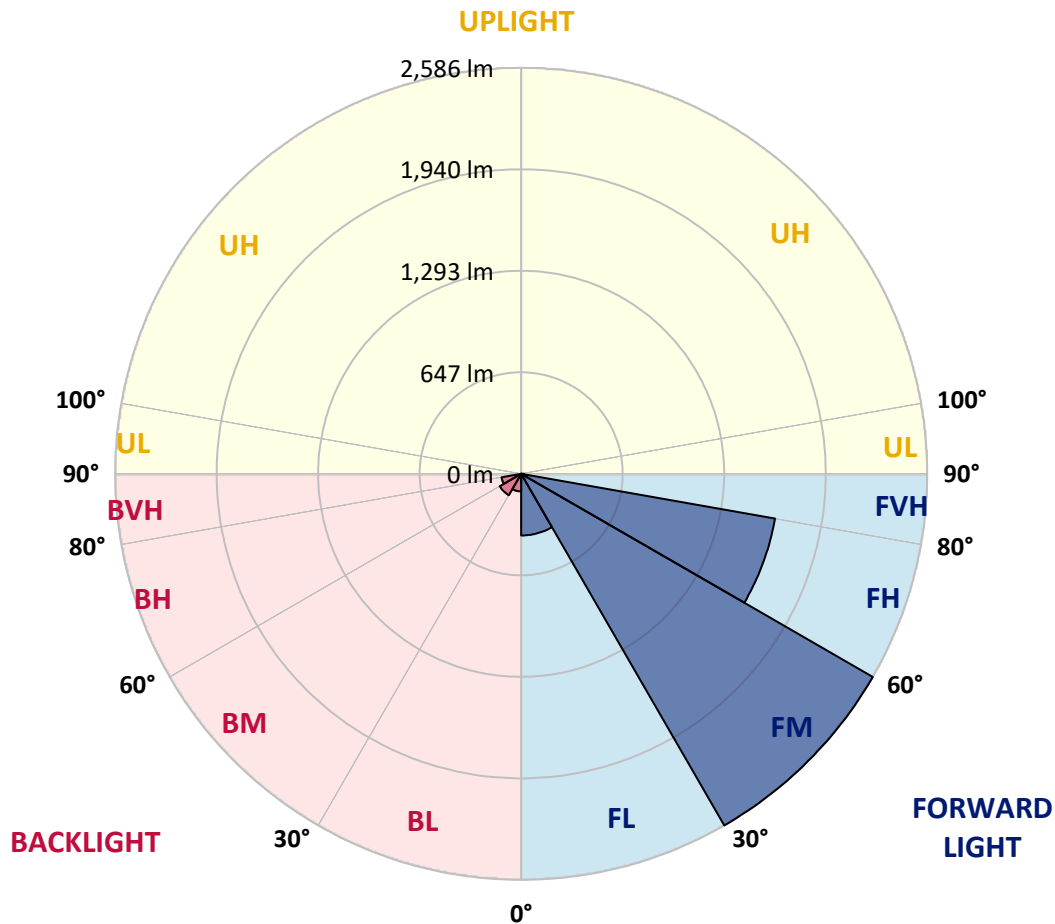
CATALOG NUMBER: ISC-SA1F-727-U-T2-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 392.8  | 7.8       |                         |      |         |
| FM   | (30°-60°)   | 2586.1 | 51.3      |                         |      |         |
| FH   | (60°-80°)   | 1641.8 | 32.6      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 18.7   | 0.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 112.2  | 2.2       | B1/500                  |      |         |
| BM   | (30°-60°)   | 157.3  | 3.1       | B0/220                  |      |         |
| BH   | (60°-80°)   | 127.2  | 2.5       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 1.8    | 0.0       |                         |      | 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 II Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 76°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 612.7  | 612.7  | 612.7  | 612.7  | 612.7  | 612.7  | 612.7  | 612.7  | 612.7  | 612.7  | 612.7  |
| 2.5°  | 725.8  | 718.7  | 714.0  | 711.6  | 706.9  | 692.8  | 681.0  | 659.8  | 640.9  | 640.9  | 629.2  |
| 5°    | 791.8  | 789.4  | 780.0  | 775.3  | 772.9  | 763.5  | 742.3  | 716.4  | 685.7  | 683.4  | 655.1  |
| 7.5°  | 810.6  | 813.0  | 813.0  | 817.7  | 820.0  | 815.3  | 796.5  | 772.9  | 732.8  | 728.1  | 685.7  |
| 10°   | 803.5  | 803.5  | 810.6  | 824.7  | 843.6  | 853.0  | 850.7  | 831.8  | 784.7  | 780.0  | 721.1  |
| 12.5° | 777.6  | 782.3  | 794.1  | 817.7  | 853.0  | 881.3  | 897.8  | 890.7  | 843.6  | 838.9  | 768.2  |
| 15°   | 742.3  | 747.0  | 768.2  | 801.2  | 848.3  | 902.5  | 940.2  | 961.4  | 914.3  | 909.6  | 817.7  |
| 17.5° | 692.8  | 697.5  | 721.1  | 770.5  | 836.5  | 911.9  | 985.0  | 1027.4 | 987.3  | 973.2  | 869.5  |
| 20°   | 673.9  | 678.6  | 697.5  | 737.6  | 815.3  | 911.9  | 1025.0 | 1105.2 | 1074.5 | 1062.7 | 935.5  |
| 22.5° | 749.3  | 747.0  | 730.5  | 735.2  | 794.1  | 904.9  | 1055.7 | 1201.8 | 1178.2 | 1161.7 | 1006.2 |
| 25°   | 886.0  | 895.4  | 871.9  | 817.7  | 808.3  | 897.8  | 1076.9 | 1277.2 | 1274.8 | 1258.3 | 1079.2 |
| 27.5° | 1043.9 | 1048.6 | 1022.7 | 966.1  | 888.4  | 911.9  | 1100.4 | 1352.6 | 1364.4 | 1350.2 | 1135.8 |
| 30°   | 1173.5 | 1190.0 | 1171.1 | 1119.3 | 1036.8 | 973.2  | 1116.9 | 1420.9 | 1461.0 | 1442.1 | 1190.0 |
| 32.5° | 1359.7 | 1366.7 | 1347.9 | 1272.5 | 1187.6 | 1091.0 | 1147.6 | 1479.8 | 1567.0 | 1550.5 | 1253.6 |
| 35°   | 1555.2 | 1564.7 | 1529.3 | 1446.8 | 1343.2 | 1234.8 | 1220.6 | 1559.9 | 1720.2 | 1687.2 | 1350.2 |
| 37.5° | 1729.6 | 1739.0 | 1722.5 | 1621.2 | 1519.9 | 1404.4 | 1350.2 | 1668.3 | 1906.3 | 1885.1 | 1470.4 |
| 40°   | 1868.6 | 1892.2 | 1887.5 | 1800.3 | 1706.0 | 1602.4 | 1536.4 | 1795.6 | 2120.8 | 2101.9 | 1623.6 |
| 42.5° | 2010.0 | 2026.5 | 2017.1 | 1953.5 | 1887.5 | 1823.9 | 1741.4 | 1972.3 | 2396.5 | 2387.1 | 1814.4 |
| 45°   | 2186.8 | 2212.7 | 2200.9 | 2149.1 | 2068.9 | 2054.8 | 1977.0 | 2184.4 | 2724.0 | 2709.9 | 2045.4 |
| 47.5° | 2448.3 | 2471.9 | 2453.0 | 2382.3 | 2290.4 | 2264.5 | 2198.5 | 2424.8 | 3044.5 | 3037.4 | 2273.9 |
| 50°   | 2589.7 | 2613.3 | 2662.8 | 2674.5 | 2613.3 | 2474.2 | 2396.5 | 2653.3 | 3332.0 | 3320.2 | 2493.1 |
| 52.5° | 2540.2 | 2561.4 | 2681.6 | 2794.7 | 2929.0 | 2811.2 | 2636.8 | 2900.8 | 3595.9 | 3617.1 | 2707.5 |
| 55°   | 2328.1 | 2356.4 | 2528.4 | 2709.9 | 3035.1 | 3192.9 | 2992.7 | 3181.2 | 3803.3 | 3833.9 | 2848.9 |
| 57.5° | 1899.3 | 1932.3 | 2153.8 | 2434.2 | 2872.5 | 3289.6 | 3433.3 | 3567.6 | 3944.6 | 3984.7 | 3030.4 |
| 60°   | 1138.2 | 1190.0 | 1418.6 | 1790.9 | 2398.8 | 3061.0 | 3746.7 | 4123.7 | 4220.3 | 4239.2 | 3416.8 |
| 62.5° | 631.5  | 619.7  | 803.5  | 1109.9 | 1654.2 | 2486.0 | 3699.6 | 4800.0 | 4741.1 | 4741.1 | 4076.6 |
| 65°   | 379.4  | 391.2  | 485.4  | 659.8  | 961.4  | 1640.1 | 3299.0 | 5217.1 | 5294.9 | 5311.4 | 4611.5 |
| 67.5° | 268.6  | 271.0  | 339.3  | 452.4  | 600.9  | 944.9  | 2405.9 | 4929.6 | 5415.0 | 5438.6 | 4505.5 |
| 70°   | 174.4  | 176.7  | 242.7  | 322.8  | 428.9  | 520.8  | 1470.4 | 4062.5 | 4960.3 | 4948.5 | 3984.7 |
| 72.5° | 106.0  | 110.8  | 153.2  | 238.0  | 329.9  | 294.6  | 791.8  | 2936.1 | 3930.5 | 4010.6 | 3127.0 |
| 75°   | 66.0   | 70.7   | 91.9   | 164.9  | 230.9  | 200.3  | 348.7  | 1960.5 | 2535.5 | 2596.8 | 2019.5 |
| 77.5° | 37.7   | 42.4   | 58.9   | 94.3   | 164.9  | 139.0  | 164.9  | 1029.8 | 1227.7 | 1267.8 | 810.6  |
| 80°   | 14.1   | 16.5   | 30.6   | 47.1   | 101.3  | 84.8   | 75.4   | 348.7  | 391.2  | 438.3  | 247.4  |
| 82.5° | 2.4    | 4.7    | 14.1   | 28.3   | 40.1   | 40.1   | 33.0   | 106.0  | 108.4  | 115.5  | 66.0   |
| 85°   | 0.0    | 0.0    | 4.7    | 7.1    | 7.1    | 7.1    | 11.8   | 21.2   | 33.0   | 33.0   | 18.9   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 2.4    | 2.4    | 2.4    | 4.7    | 4.7    | 4.7    | 4.7    |
| 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-T2-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 612.7  | 612.7  | 612.7 | 612.7 | 612.7 | 612.7 | 612.7 | 612.7 | 612.7 | 612.7 | 612.7 |
| 2.5°  | 617.4  | 612.7  | 593.8 | 575.0 | 560.8 | 549.0 | 530.2 | 530.2 | 523.1 | 516.1 | 518.4 |
| 5°    | 633.9  | 619.7  | 584.4 | 549.0 | 516.1 | 485.4 | 459.5 | 447.7 | 431.2 | 426.5 | 424.2 |
| 7.5°  | 655.1  | 629.2  | 570.3 | 513.7 | 459.5 | 419.4 | 386.5 | 365.2 | 346.4 | 341.7 | 344.0 |
| 10°   | 681.0  | 643.3  | 553.8 | 466.6 | 400.6 | 351.1 | 313.4 | 296.9 | 275.7 | 268.6 | 261.6 |
| 12.5° | 718.7  | 659.8  | 527.8 | 414.7 | 341.7 | 292.2 | 238.0 | 197.9 | 183.8 | 179.1 | 179.1 |
| 15°   | 749.3  | 669.2  | 494.8 | 365.2 | 292.2 | 214.4 | 169.7 | 162.6 | 160.2 | 160.2 | 160.2 |
| 17.5° | 784.7  | 676.3  | 454.8 | 318.1 | 226.2 | 157.9 | 148.5 | 148.5 | 146.1 | 146.1 | 143.7 |
| 20°   | 822.4  | 678.6  | 412.4 | 275.7 | 160.2 | 141.4 | 134.3 | 132.0 | 127.2 | 124.9 | 124.9 |
| 22.5° | 864.8  | 676.3  | 365.2 | 226.2 | 141.4 | 129.6 | 117.8 | 113.1 | 108.4 | 103.7 | 103.7 |
| 25°   | 900.2  | 671.6  | 322.8 | 162.6 | 129.6 | 113.1 | 101.3 | 94.3  | 89.5  | 87.2  | 84.8  |
| 27.5° | 930.8  | 645.7  | 280.4 | 139.0 | 117.8 | 101.3 | 87.2  | 80.1  | 75.4  | 73.0  | 73.0  |
| 30°   | 933.1  | 603.2  | 245.1 | 129.6 | 108.4 | 89.5  | 75.4  | 70.7  | 68.3  | 66.0  | 66.0  |
| 32.5° | 947.3  | 560.8  | 207.4 | 122.5 | 96.6  | 80.1  | 68.3  | 63.6  | 58.9  | 58.9  | 58.9  |
| 35°   | 975.6  | 523.1  | 160.2 | 110.8 | 87.2  | 70.7  | 61.3  | 56.6  | 54.2  | 51.8  | 51.8  |
| 37.5° | 1020.3 | 497.2  | 132.0 | 101.3 | 80.1  | 63.6  | 56.6  | 51.8  | 49.5  | 47.1  | 47.1  |
| 40°   | 1079.2 | 483.1  | 120.2 | 91.9  | 70.7  | 58.9  | 51.8  | 47.1  | 42.4  | 40.1  | 40.1  |
| 42.5° | 1180.6 | 483.1  | 110.8 | 82.5  | 63.6  | 54.2  | 47.1  | 42.4  | 37.7  | 35.3  | 35.3  |
| 45°   | 1298.4 | 501.9  | 103.7 | 73.0  | 56.6  | 49.5  | 42.4  | 35.3  | 30.6  | 28.3  | 28.3  |
| 47.5° | 1428.0 | 537.3  | 96.6  | 66.0  | 51.8  | 44.8  | 37.7  | 28.3  | 23.6  | 21.2  | 21.2  |
| 50°   | 1578.8 | 589.1  | 91.9  | 58.9  | 47.1  | 40.1  | 30.6  | 21.2  | 18.9  | 16.5  | 16.5  |
| 52.5° | 1706.0 | 640.9  | 84.8  | 54.2  | 42.4  | 35.3  | 23.6  | 18.9  | 14.1  | 14.1  | 14.1  |
| 55°   | 1826.2 | 697.5  | 80.1  | 49.5  | 40.1  | 28.3  | 18.9  | 14.1  | 11.8  | 11.8  | 11.8  |
| 57.5° | 1986.5 | 768.2  | 73.0  | 44.8  | 33.0  | 21.2  | 16.5  | 11.8  | 9.4   | 9.4   | 9.4   |
| 60°   | 2314.0 | 926.1  | 63.6  | 40.1  | 28.3  | 18.9  | 14.1  | 11.8  | 9.4   | 7.1   | 7.1   |
| 62.5° | 2846.6 | 1182.9 | 54.2  | 35.3  | 21.2  | 16.5  | 11.8  | 9.4   | 7.1   | 4.7   | 4.7   |
| 65°   | 3183.5 | 1246.5 | 44.8  | 28.3  | 16.5  | 11.8  | 9.4   | 7.1   | 4.7   | 2.4   | 2.4   |
| 67.5° | 2966.7 | 1013.3 | 35.3  | 21.2  | 14.1  | 9.4   | 7.1   | 4.7   | 2.4   | 0.0   | 0.0   |
| 70°   | 2504.9 | 765.8  | 25.9  | 14.1  | 11.8  | 7.1   | 4.7   | 2.4   | 0.0   | 0.0   | 0.0   |
| 72.5° | 1979.4 | 582.0  | 23.6  | 11.8  | 9.4   | 4.7   | 4.7   | 2.4   | 0.0   | 0.0   | 0.0   |
| 75°   | 1298.4 | 299.3  | 18.9  | 11.8  | 7.1   | 4.7   | 2.4   | 2.4   | 0.0   | 0.0   | 0.0   |
| 77.5° | 511.3  | 113.1  | 14.1  | 9.4   | 7.1   | 4.7   | 2.4   | 2.4   | 0.0   | 0.0   | 0.0   |
| 80°   | 139.0  | 37.7   | 7.1   | 4.7   | 4.7   | 2.4   | 2.4   | 2.4   | 0.0   | 0.0   | 0.0   |
| 82.5° | 35.3   | 16.5   | 4.7   | 4.7   | 2.4   | 2.4   | 2.4   | 2.4   | 2.4   | 0.0   | 0.0   |
| 85°   | 11.8   | 4.7    | 4.7   | 2.4   | 2.4   | 2.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 4.7    | 4.7    | 4.7   | 2.4   | 2.4   | 2.4   | 0.0   | 0.0   | 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

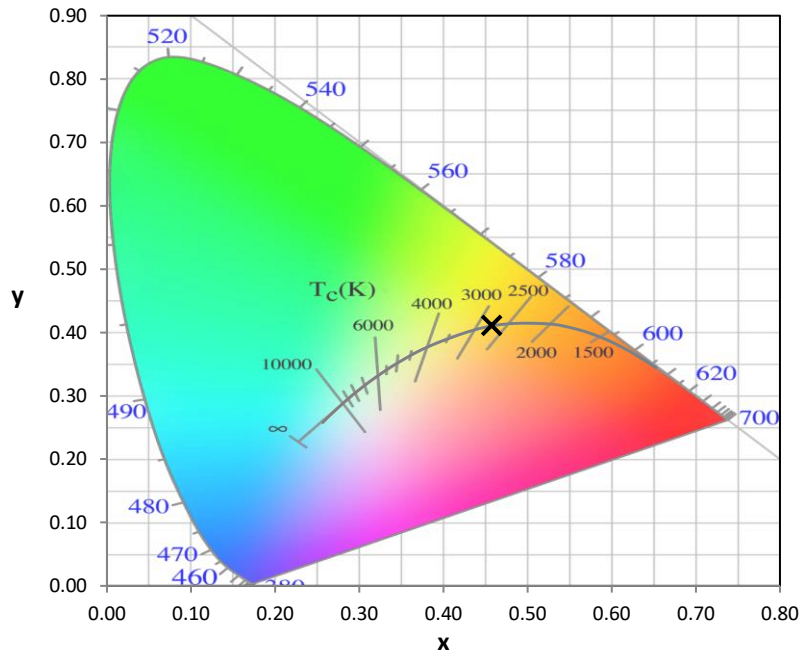
Stabilization Time: 56M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3./42%  
 Sphere Temperature (°C): 25.7

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

| 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**



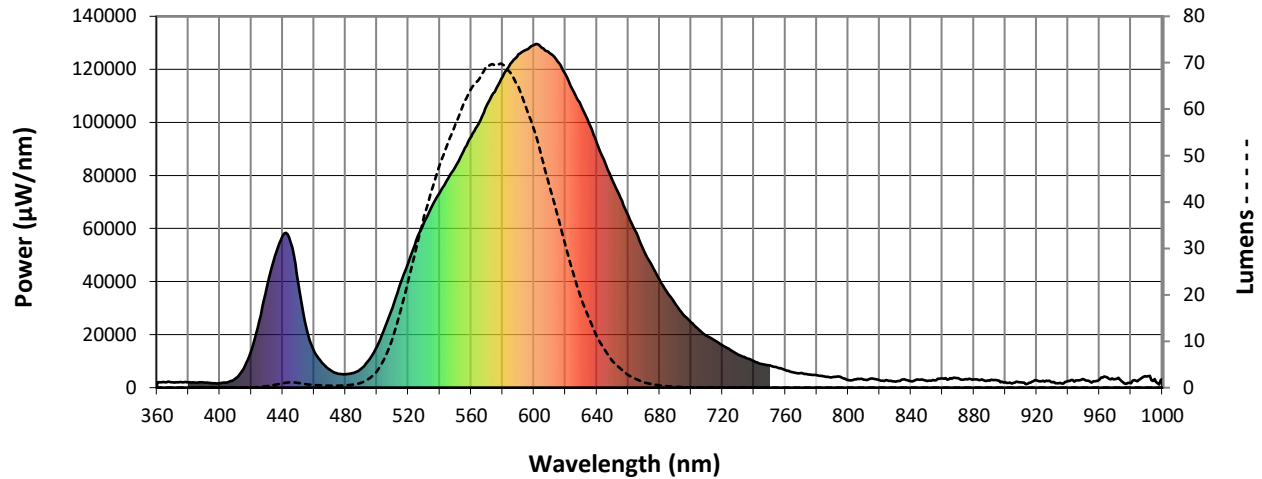
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



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 ( $R_{f,i}$ )**

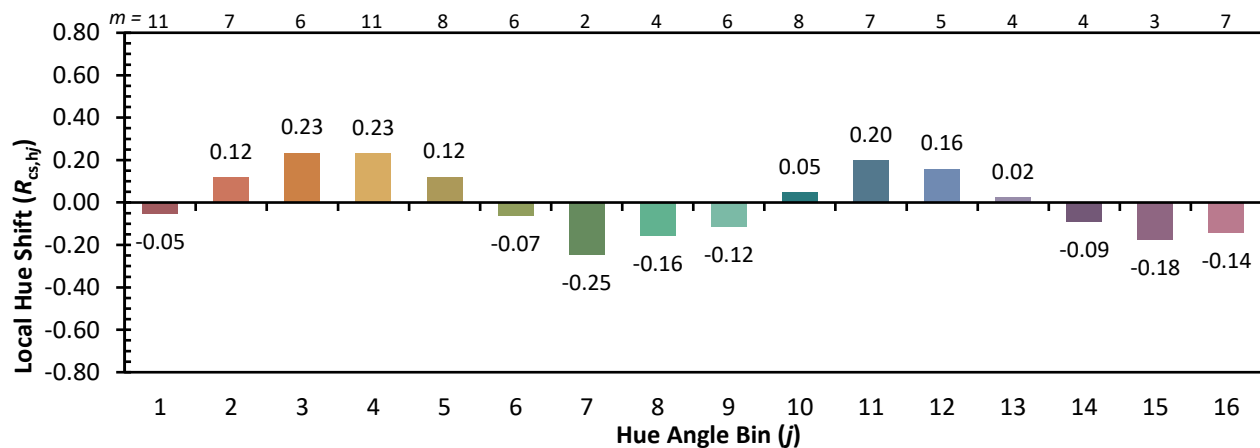
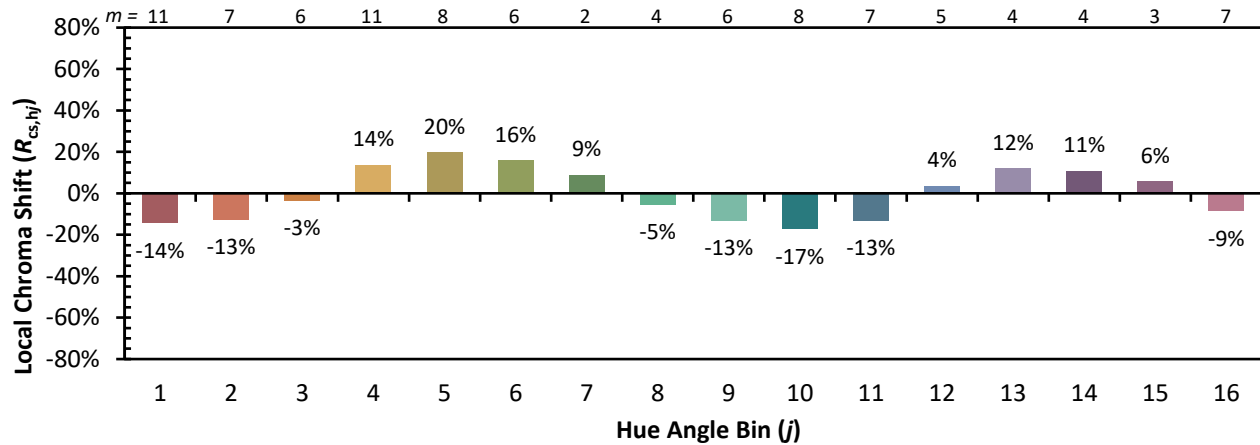
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 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)