

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: P437288

Luminaire Tested: **ISC-SA1C-727-U-SL3-HSS**

Issue Date: 12/9/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P437288  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-17)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/9/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: ISC-SA1C-727-U-SL3-HSS  
Description: IMPACT ELITE LED CYLINDER LUMINAIRE  
(1) 70 CRI, 2700K, 615mA LIGHTSQUARE WITH 16 LEDS AND TYPE III SPILL  
LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 3202 lumens  
Efficiency: N/A  
Efficacy: 93.6 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B0 - 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

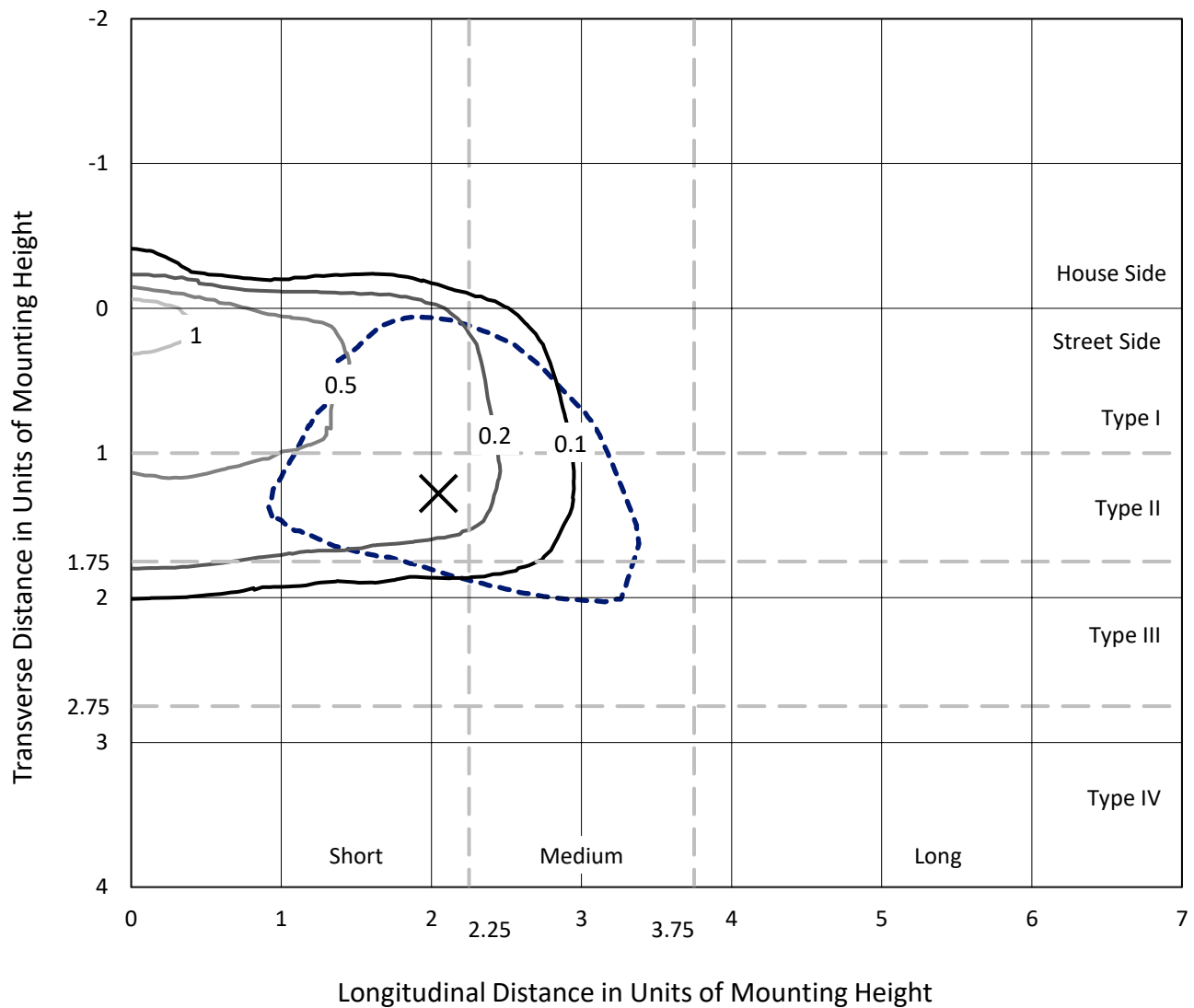


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

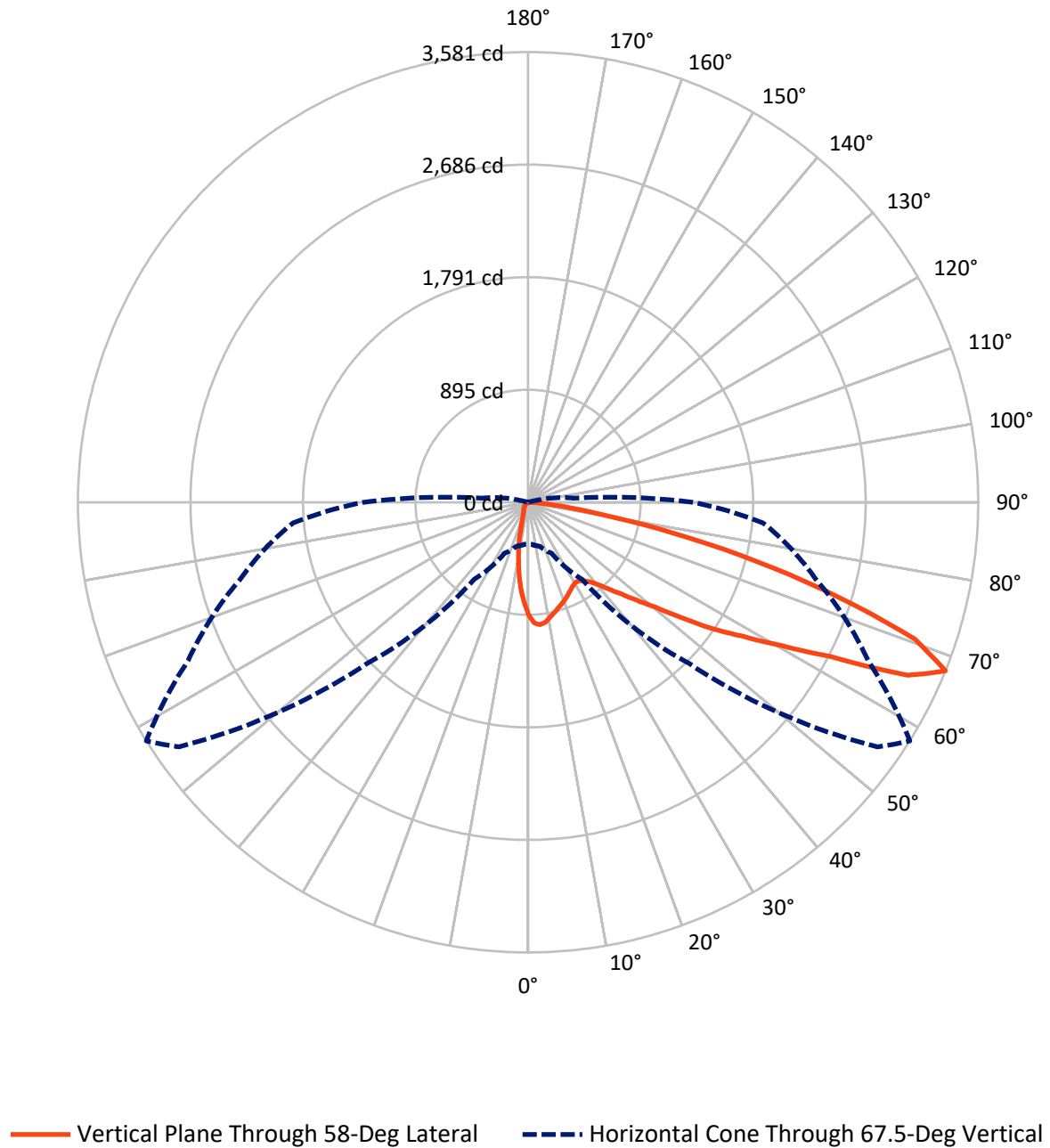


Based on 25 foot mounting height. Maximum calculated value = 1.5 fc  
 Type III - Short - N/A

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## Luminous Intensity Polar Plot



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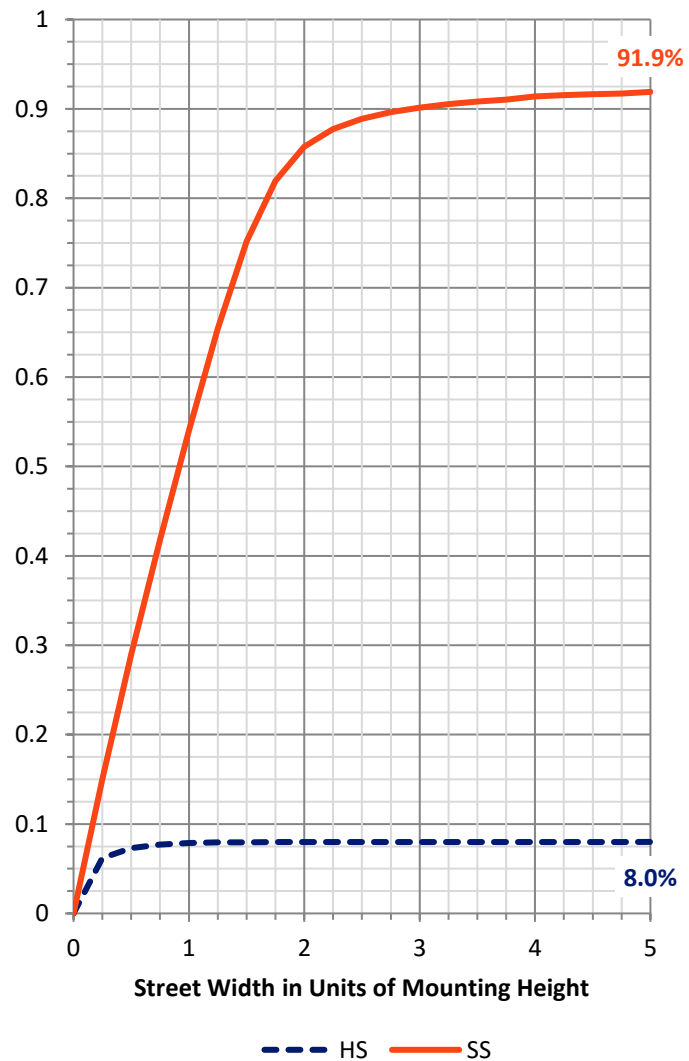
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 258.2    | 0.0    | 258.2  |
|                    | % Fixture | 8.1      | 0.0    | 8.1    |
| <b>Street Side</b> | Lumens    | 2943.8   | 0.0    | 2943.8 |
|                    | % Fixture | 91.9     | 0.0    | 91.9   |
| <b>Total</b>       | Lumens    | 3202.0   | 0.0    | 3202.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 72.2   | 2.3       |
| 10°-20°   | 152.1  | 4.8       |
| 20°-30°   | 205.8  | 6.4       |
| 30°-40°   | 283.1  | 8.8       |
| 40°-50°   | 443.2  | 13.8      |
| 50°-60°   | 746.6  | 23.3      |
| 60°-70°   | 886.0  | 27.7      |
| 70°-80°   | 384.8  | 12.0      |
| 80°-90°   | 28.3   | 0.9       |
| 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°    | 3202.0 | 100.0     |
| 0°-180°   | 3202.0 | 100.0     |

**Coefficient of Utilization**



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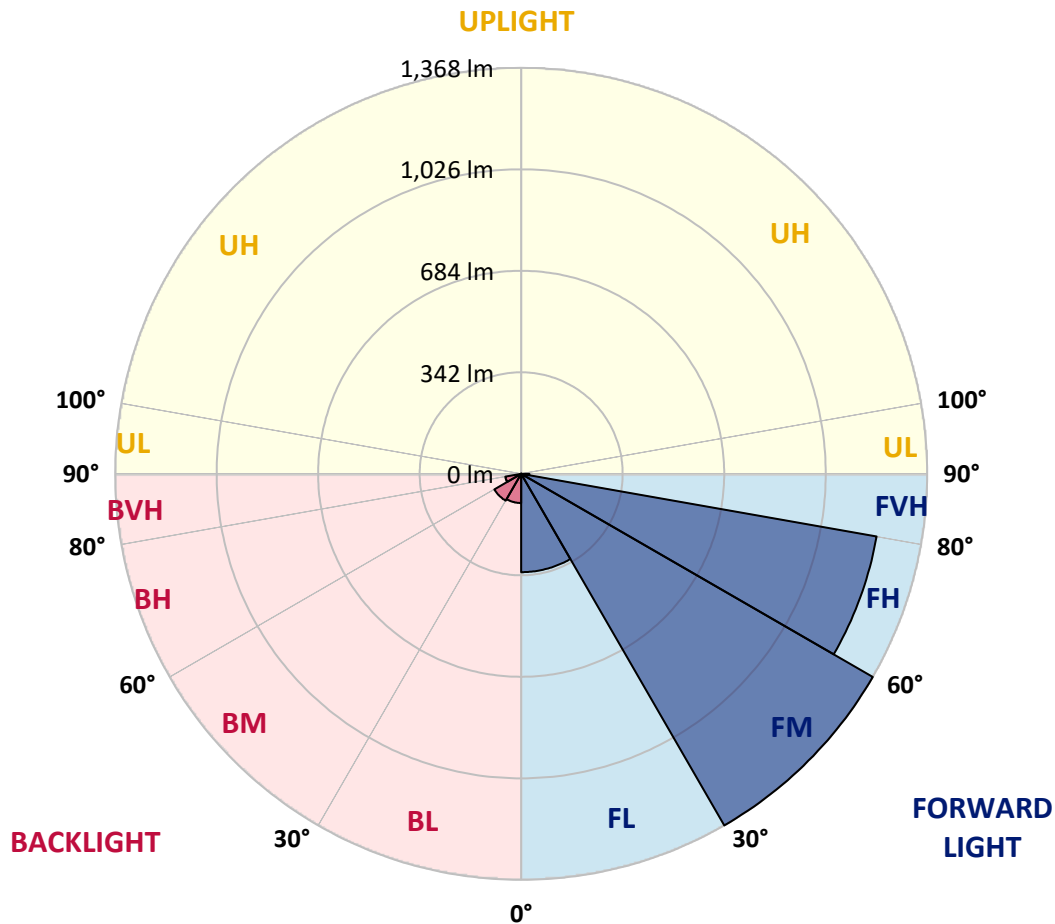
CATALOG NUMBER: ISC-SA1C-727-U-SL3-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 331.6  | 10.4      |                         |      |         |
| FM   | (30°-60°)   | 1368.4 | 42.7      |                         |      |         |
| FH   | (60°-80°)   | 1216.4 | 38.0      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 27.4   | 0.9       |                         |      | G1/100  |
| BL   | (0°-30°)    | 98.6   | 3.1       | B0/110                  |      |         |
| BM   | (30°-60°)   | 104.4  | 3.3       | B0/220                  |      |         |
| BH   | (60°-80°)   | 54.3   | 1.7       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.9    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B0-U0-G1**

Type III Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 901.5  | 901.5  | 901.5  | 901.5  | 901.5  | 901.5  | 901.5  | 901.5  | 901.5  | 901.5  | 901.5  |
| 2.5°  | 1006.3 | 1000.8 | 998.0  | 996.6  | 987.0  | 978.7  | 962.2  | 960.8  | 949.8  | 929.1  | 908.4  |
| 5°    | 984.2  | 988.4  | 989.7  | 993.9  | 992.5  | 992.5  | 981.5  | 978.7  | 963.6  | 934.6  | 894.6  |
| 7.5°  | 936.0  | 934.6  | 937.4  | 948.4  | 953.9  | 964.9  | 963.6  | 966.3  | 959.4  | 927.7  | 871.2  |
| 10°   | 865.7  | 868.4  | 876.7  | 886.4  | 901.5  | 920.8  | 933.2  | 936.0  | 941.5  | 915.3  | 849.1  |
| 12.5° | 800.9  | 805.0  | 810.5  | 829.8  | 846.4  | 876.7  | 900.1  | 905.7  | 916.7  | 902.9  | 829.8  |
| 15°   | 747.1  | 748.5  | 752.6  | 770.6  | 798.1  | 836.7  | 871.2  | 879.5  | 897.4  | 891.9  | 814.7  |
| 17.5° | 704.4  | 705.8  | 711.3  | 726.5  | 748.5  | 794.0  | 840.9  | 854.7  | 880.8  | 885.0  | 798.1  |
| 20°   | 681.0  | 681.0  | 681.0  | 690.6  | 712.7  | 755.4  | 810.5  | 829.8  | 867.1  | 874.0  | 784.4  |
| 22.5° | 674.1  | 674.1  | 671.3  | 674.1  | 687.9  | 723.7  | 780.2  | 803.6  | 850.5  | 869.8  | 767.8  |
| 25°   | 683.7  | 679.6  | 679.6  | 672.7  | 674.1  | 697.5  | 752.6  | 778.8  | 840.9  | 867.1  | 759.5  |
| 27.5° | 701.6  | 700.3  | 694.7  | 689.2  | 681.0  | 686.5  | 729.2  | 755.4  | 831.2  | 871.2  | 752.6  |
| 30°   | 722.3  | 722.3  | 719.6  | 716.8  | 703.0  | 692.0  | 718.2  | 741.6  | 827.1  | 878.1  | 748.5  |
| 32.5° | 745.8  | 744.4  | 751.3  | 754.0  | 737.5  | 716.8  | 720.9  | 743.0  | 829.8  | 898.8  | 751.3  |
| 35°   | 773.3  | 773.3  | 785.7  | 802.3  | 788.5  | 756.8  | 747.1  | 766.4  | 843.6  | 920.8  | 762.3  |
| 37.5° | 803.6  | 805.0  | 827.1  | 850.5  | 840.9  | 813.3  | 796.8  | 803.6  | 872.6  | 962.2  | 787.1  |
| 40°   | 839.5  | 839.5  | 872.6  | 911.2  | 911.2  | 879.5  | 857.4  | 862.9  | 913.9  | 1021.4 | 831.2  |
| 42.5° | 878.1  | 882.2  | 929.1  | 976.0  | 989.7  | 960.8  | 937.4  | 944.3  | 980.1  | 1098.6 | 896.0  |
| 45°   | 933.2  | 945.6  | 1006.3 | 1051.8 | 1079.3 | 1065.6 | 1035.2 | 1040.7 | 1066.9 | 1210.3 | 993.9  |
| 47.5° | 1031.1 | 1042.1 | 1094.5 | 1140.0 | 1174.5 | 1181.4 | 1167.6 | 1164.8 | 1175.8 | 1341.3 | 1117.9 |
| 50°   | 1148.3 | 1157.9 | 1193.8 | 1232.4 | 1280.6 | 1322.0 | 1313.7 | 1309.5 | 1313.7 | 1484.6 | 1269.6 |
| 52.5° | 1264.1 | 1259.9 | 1302.7 | 1323.3 | 1390.9 | 1481.9 | 1517.7 | 1517.7 | 1495.6 | 1634.9 | 1418.4 |
| 55°   | 1367.4 | 1385.4 | 1430.9 | 1468.1 | 1524.6 | 1633.5 | 1754.8 | 1770.0 | 1694.1 | 1783.7 | 1542.5 |
| 57.5° | 1355.0 | 1373.0 | 1457.0 | 1574.2 | 1741.0 | 1888.5 | 2007.1 | 2009.8 | 1899.5 | 1898.2 | 1695.5 |
| 60°   | 1210.3 | 1211.7 | 1324.7 | 1502.5 | 1836.1 | 2256.6 | 2325.5 | 2311.7 | 2078.7 | 2058.1 | 1906.4 |
| 62.5° | 851.9  | 846.4  | 992.5  | 1218.6 | 1694.1 | 2457.8 | 2807.9 | 2703.2 | 2376.5 | 2308.9 | 2103.5 |
| 65°   | 496.2  | 493.5  | 550.0  | 727.8  | 1283.4 | 2315.8 | 3301.4 | 3318.0 | 2768.0 | 2437.1 | 2062.2 |
| 67.5° | 333.6  | 336.3  | 362.5  | 449.4  | 748.5  | 1816.8 | 3392.4 | 3581.3 | 2985.8 | 2371.0 | 1876.1 |
| 70°   | 245.4  | 245.4  | 266.0  | 330.8  | 443.9  | 1138.6 | 2963.7 | 3265.6 | 3028.5 | 2205.6 | 1570.1 |
| 72.5° | 175.1  | 175.1  | 204.0  | 267.4  | 362.5  | 587.2  | 2202.8 | 2588.8 | 2557.1 | 1830.6 | 1086.2 |
| 75°   | 111.7  | 114.4  | 146.1  | 219.2  | 330.8  | 376.3  | 1494.3 | 1876.1 | 1783.7 | 1024.2 | 463.2  |
| 77.5° | 42.7   | 48.2   | 78.6   | 161.3  | 289.5  | 312.9  | 851.9  | 1182.7 | 941.5  | 358.4  | 124.1  |
| 80°   | 15.2   | 15.2   | 26.2   | 82.7   | 204.0  | 257.8  | 445.2  | 587.2  | 306.0  | 86.8   | 46.9   |
| 82.5° | 2.8    | 2.8    | 9.6    | 34.5   | 100.6  | 179.2  | 259.2  | 289.5  | 119.9  | 28.9   | 27.6   |
| 85°   | 0.0    | 0.0    | 1.4    | 6.9    | 23.4   | 17.9   | 103.4  | 97.9   | 37.2   | 12.4   | 17.9   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 1.4    | 1.4    | 2.8    | 2.8    | 2.8    | 2.8    | 2.8    |
| 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-SA1C-727-U-SL3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 901.5  | 901.5 | 901.5 | 901.5 | 901.5 | 901.5 | 901.5 | 901.5 | 901.5 | 901.5 | 901.5 |
| 2.5°  | 891.9  | 880.8 | 849.1 | 827.1 | 796.8 | 766.4 | 747.1 | 732.0 | 725.1 | 715.4 | 719.6 |
| 5°    | 869.8  | 845.0 | 787.1 | 734.7 | 685.1 | 632.7 | 594.1 | 559.7 | 548.6 | 529.3 | 526.6 |
| 7.5°  | 836.7  | 802.3 | 716.8 | 634.1 | 554.1 | 488.0 | 428.7 | 383.2 | 341.9 | 323.9 | 335.0 |
| 10°   | 805.0  | 758.2 | 646.5 | 536.2 | 430.1 | 337.7 | 267.4 | 212.3 | 180.6 | 166.8 | 169.6 |
| 12.5° | 774.7  | 715.4 | 573.4 | 442.5 | 312.9 | 208.1 | 151.6 | 122.7 | 113.0 | 111.7 | 108.9 |
| 15°   | 748.5  | 675.5 | 508.7 | 343.2 | 208.1 | 131.0 | 107.5 | 100.6 | 99.2  | 99.2  | 99.2  |
| 17.5° | 719.6  | 634.1 | 438.4 | 252.3 | 136.5 | 102.0 | 95.1  | 93.7  | 92.4  | 92.4  | 92.4  |
| 20°   | 697.5  | 598.3 | 373.6 | 176.4 | 104.8 | 91.0  | 88.2  | 88.2  | 86.8  | 86.8  | 86.8  |
| 22.5° | 674.1  | 561.0 | 310.2 | 129.6 | 89.6  | 84.1  | 81.3  | 80.0  | 80.0  | 78.6  | 78.6  |
| 25°   | 652.0  | 526.6 | 249.5 | 99.2  | 80.0  | 75.8  | 73.1  | 71.7  | 71.7  | 70.3  | 68.9  |
| 27.5° | 638.2  | 499.0 | 195.7 | 84.1  | 71.7  | 68.9  | 66.2  | 63.4  | 60.7  | 59.3  | 59.3  |
| 30°   | 628.6  | 465.9 | 148.9 | 73.1  | 66.2  | 62.0  | 57.9  | 53.8  | 49.6  | 48.2  | 48.2  |
| 32.5° | 614.8  | 439.7 | 114.4 | 66.2  | 59.3  | 55.1  | 49.6  | 45.5  | 41.4  | 38.6  | 38.6  |
| 35°   | 614.8  | 417.7 | 88.2  | 59.3  | 53.8  | 48.2  | 44.1  | 37.2  | 33.1  | 31.7  | 30.3  |
| 37.5° | 624.4  | 392.9 | 73.1  | 55.1  | 49.6  | 44.1  | 38.6  | 31.7  | 27.6  | 26.2  | 26.2  |
| 40°   | 646.5  | 384.6 | 62.0  | 49.6  | 44.1  | 38.6  | 33.1  | 26.2  | 23.4  | 20.7  | 20.7  |
| 42.5° | 692.0  | 387.4 | 55.1  | 46.9  | 40.0  | 34.5  | 27.6  | 22.1  | 19.3  | 17.9  | 17.9  |
| 45°   | 758.2  | 395.6 | 51.0  | 42.7  | 35.8  | 28.9  | 23.4  | 19.3  | 15.2  | 13.8  | 13.8  |
| 47.5° | 850.5  | 421.8 | 45.5  | 38.6  | 31.7  | 24.8  | 19.3  | 15.2  | 12.4  | 11.0  | 11.0  |
| 50°   | 960.8  | 467.3 | 42.7  | 34.5  | 28.9  | 20.7  | 15.2  | 11.0  | 8.3   | 8.3   | 8.3   |
| 52.5° | 1090.4 | 512.8 | 38.6  | 31.7  | 24.8  | 17.9  | 12.4  | 8.3   | 6.9   | 5.5   | 5.5   |
| 55°   | 1199.3 | 552.8 | 34.5  | 28.9  | 20.7  | 13.8  | 9.6   | 6.9   | 5.5   | 4.1   | 4.1   |
| 57.5° | 1341.3 | 610.7 | 28.9  | 24.8  | 16.5  | 11.0  | 6.9   | 5.5   | 2.8   | 2.8   | 2.8   |
| 60°   | 1531.5 | 679.6 | 24.8  | 20.7  | 12.4  | 8.3   | 5.5   | 2.8   | 2.8   | 1.4   | 1.4   |
| 62.5° | 1612.8 | 624.4 | 22.1  | 16.5  | 9.6   | 5.5   | 4.1   | 2.8   | 1.4   | 1.4   | 1.4   |
| 65°   | 1523.2 | 510.0 | 17.9  | 12.4  | 6.9   | 4.1   | 2.8   | 1.4   | 1.4   | 0.0   | 0.0   |
| 67.5° | 1313.7 | 376.3 | 15.2  | 8.3   | 5.5   | 2.8   | 1.4   | 0.0   | 0.0   | 0.0   | 0.0   |
| 70°   | 1071.1 | 278.5 | 11.0  | 5.5   | 2.8   | 2.8   | 1.4   | 0.0   | 0.0   | 0.0   | 0.0   |
| 72.5° | 741.6  | 168.2 | 8.3   | 4.1   | 2.8   | 1.4   | 1.4   | 0.0   | 0.0   | 0.0   | 0.0   |
| 75°   | 288.1  | 66.2  | 6.9   | 4.1   | 2.8   | 1.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 77.5° | 81.3   | 23.4  | 5.5   | 2.8   | 2.8   | 1.4   | 1.4   | 1.4   | 0.0   | 0.0   | 0.0   |
| 80°   | 33.1   | 12.4  | 4.1   | 2.8   | 2.8   | 2.8   | 1.4   | 1.4   | 0.0   | 0.0   | 0.0   |
| 82.5° | 20.7   | 6.9   | 2.8   | 1.4   | 1.4   | 1.4   | 1.4   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 13.8   | 4.1   | 2.8   | 1.4   | 1.4   | 0.0   | 0.0   | 0.0   | 0.0   | 1.4   | 1.4   |
| 87.5° | 2.8    | 2.8   | 1.4   | 1.4   | 1.4   | 1.4   | 0.0   | 0.0   | 0.0   | 0.0   | 1.4   |
| 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

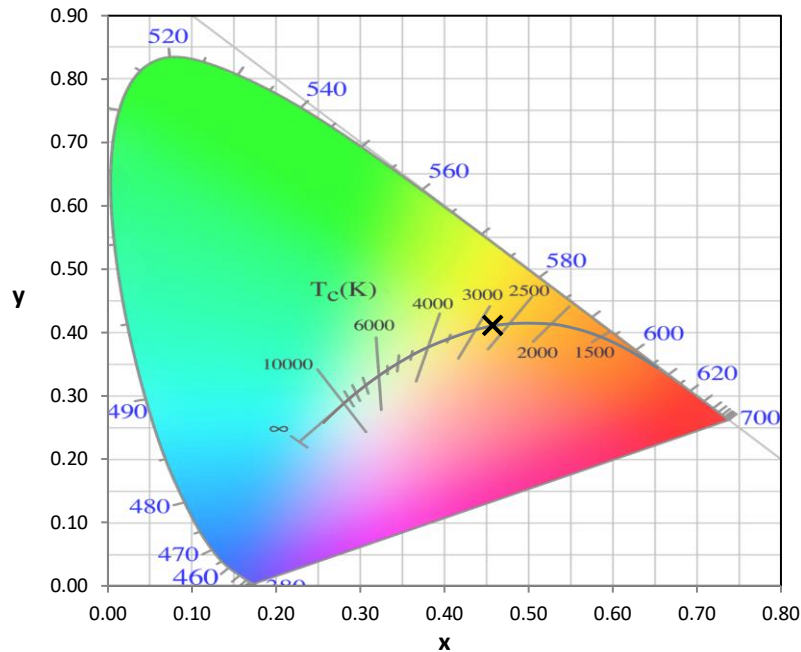
Stabilization Time: 56M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3./42%  
 Sphere Temperature (°C): 25.7

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            |

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**CIE 1931 Chromaticity Diagram**



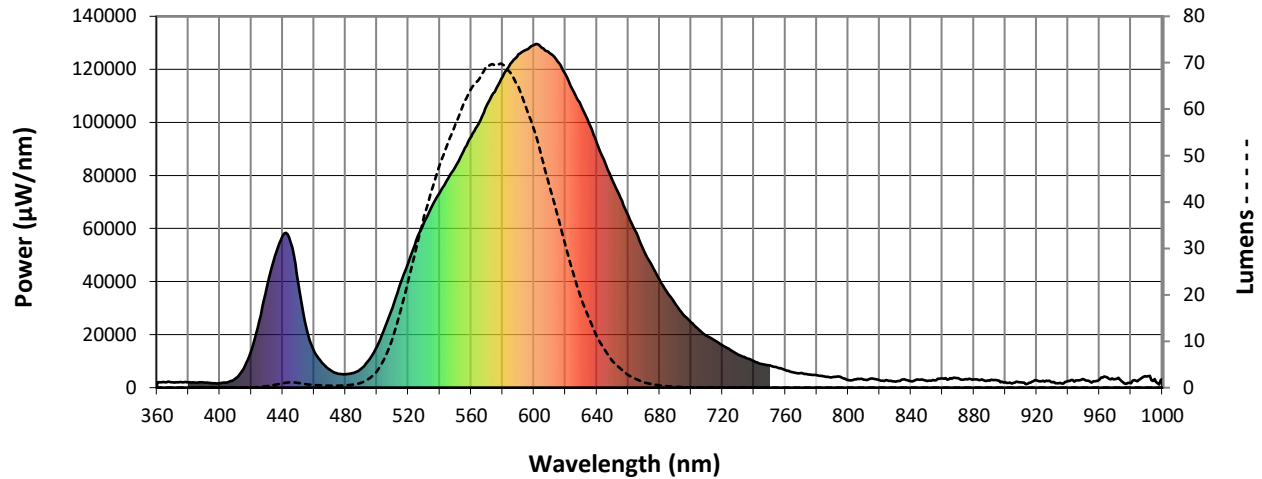
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 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 ( $R_{f,i}$ )**

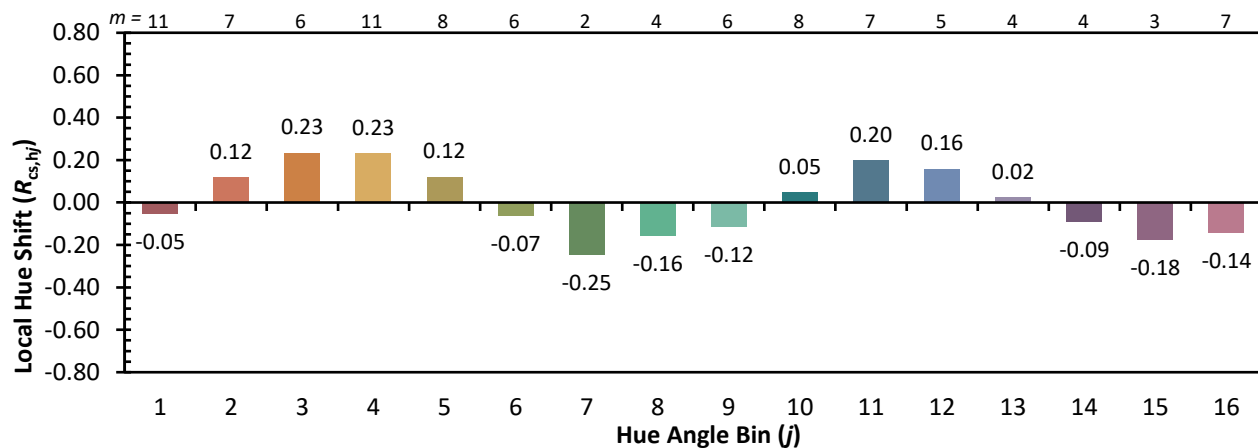
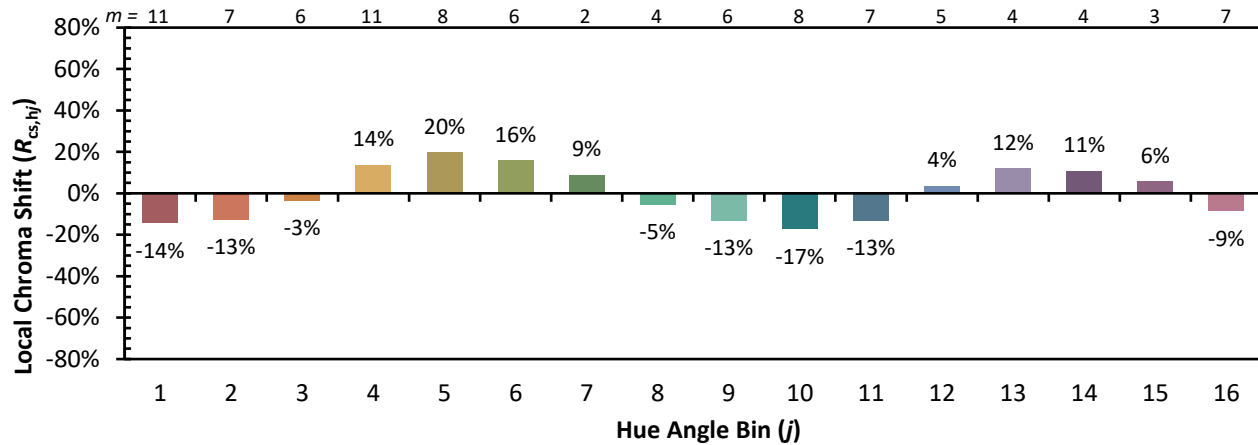
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54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



(END OF REPORT)