

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



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P629207

Luminaire Tested: GWS-SA1B-727-U-T3R-W-GRSBK

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P629207  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-16)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1B-727-U-T3R-W-GRSBK  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III ROADWAY OPTICS W/ FACTORY INSTALLED GLARE SHIELD, BK  
Light Source: (16) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

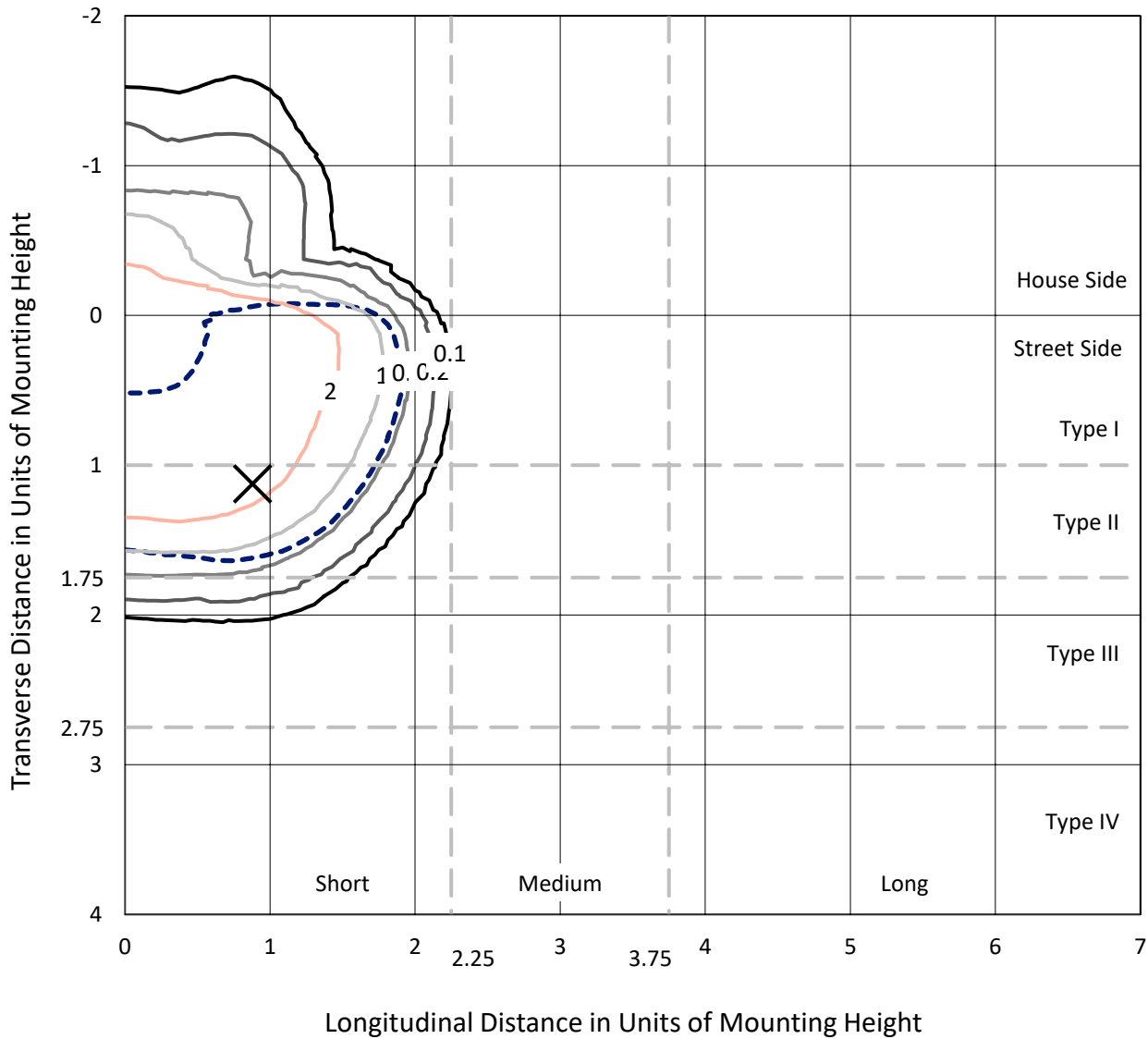
Lumens per Lamp: N/A  
Luminaire Lumens: 1879.9 lumens  
Efficiency: N/A  
Efficacy: 75.2 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G0  
  
Input Watts (W): 25  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
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

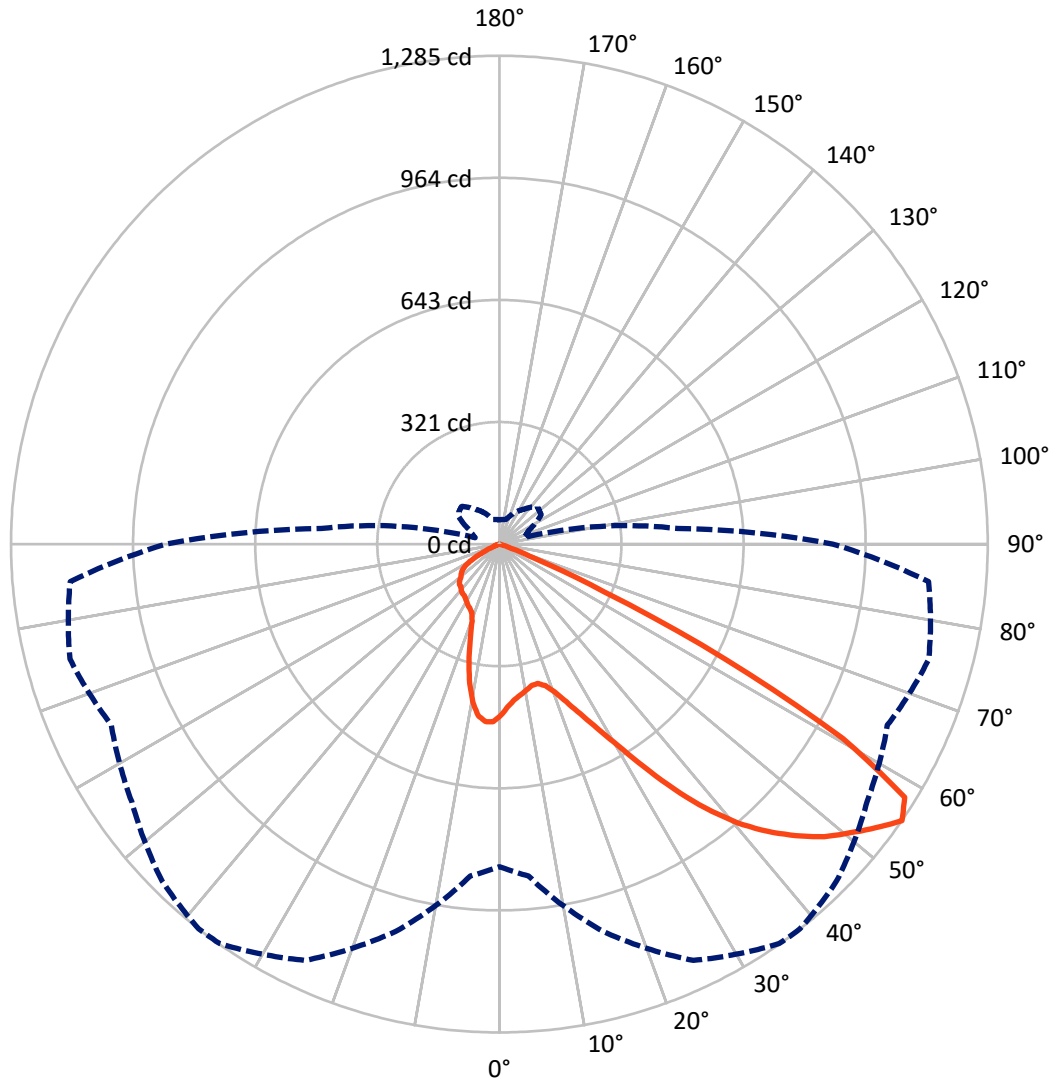
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 4.7 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 38-Deg Lateral    - - - Horizontal Cone Through 55-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 366.2    | 0.0    | 366.2  |
|                    | % Fixture | 19.5     | 0.0    | 19.5   |
| <b>Street Side</b> | Lumens    | 1513.6   | 0.0    | 1513.6 |
|                    | % Fixture | 80.5     | 0.0    | 80.5   |
| <b>Total</b>       | Lumens    | 1879.9   | 0.0    | 1879.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 41.7   | 2.2       |
| 10°-20°   | 112.2  | 6.0       |
| 20°-30°   | 192.6  | 10.2      |
| 30°-40°   | 319.4  | 17.0      |
| 40°-50°   | 469.5  | 25.0      |
| 50°-60°   | 548.7  | 29.2      |
| 60°-70°   | 186.0  | 9.9       |
| 70°-80°   | 9.5    | 0.5       |
| 80°-90°   | 0.3    | 0.0       |
| 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°    | 1879.9 | 100.0     |
| 0°-180°   | 1879.9 | 100.0     |

**Coefficient of Utilization**



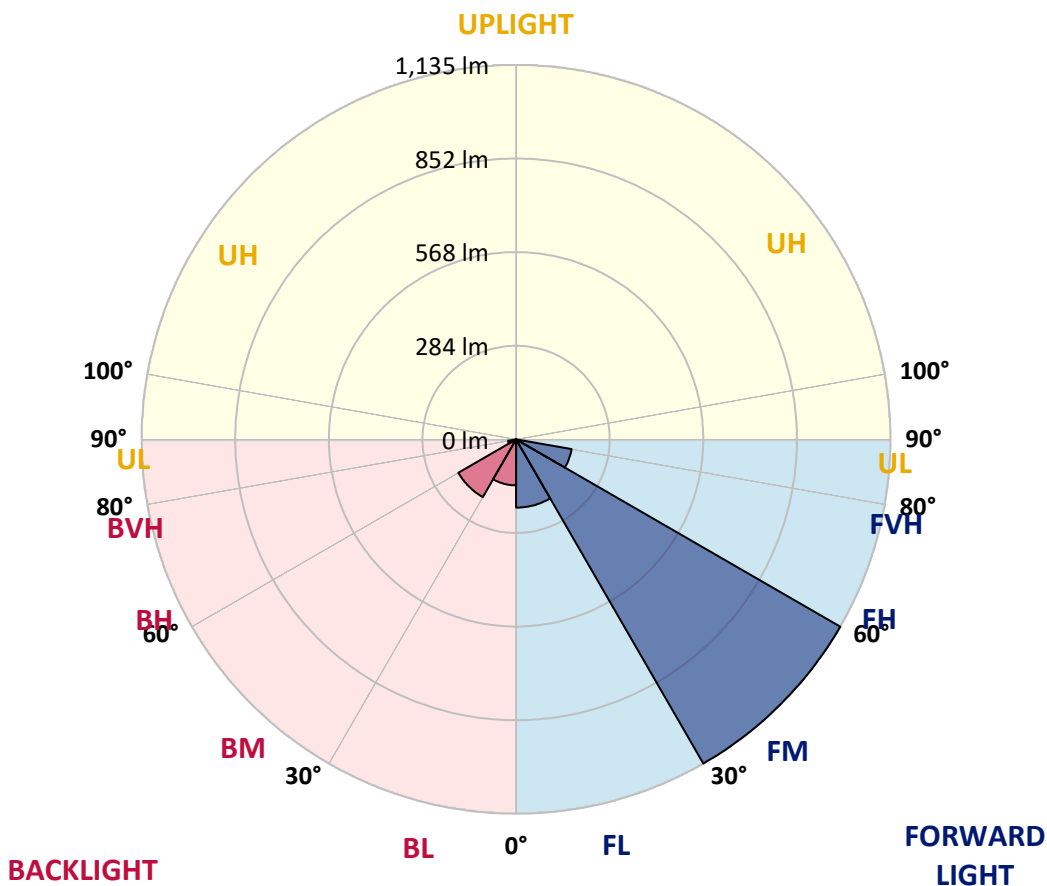
REPORT NUMBER: P629207

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|----------------|--------|-----------|-------------------------|------|--------|
|                |        |           | B                       | U    | G      |
| FL (0°-30°)    | 206.9  | 11.0      |                         |      |        |
| FM (30°-60°)   | 1135.4 | 60.4      |                         |      |        |
| FH (60°-80°)   | 171.1  | 9.1       |                         |      | G0/660 |
| FVH (80°-90°)  | 0.2    | 0.0       |                         |      | G0/10  |
| BL (0°-30°)    | 139.5  | 7.4       | B1/500                  |      |        |
| BM (30°-60°)   | 202.2  | 10.8      | B0/220                  |      |        |
| BH (60°-80°)   | 24.4   | 1.3       | B0/110                  |      | G0/110 |
| BVH (80°-90°)  | 0.2    | 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-G0**  
 Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 38°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 450.8  | 450.8  | 450.8  | 450.8  | 450.8  | 450.8  | 450.8  | 450.8  | 450.8  | 450.8  | 450.8  |
| 2.5°  | 419.9  | 419.0  | 420.7  | 424.2  | 427.4  | 428.5  | 431.7  | 436.2  | 439.0  | 445.7  | 451.0  |
| 5°    | 401.0  | 400.5  | 402.3  | 405.3  | 409.6  | 411.1  | 416.0  | 423.5  | 431.0  | 442.6  | 454.0  |
| 7.5°  | 383.8  | 383.6  | 386.1  | 392.8  | 399.0  | 401.0  | 407.0  | 416.2  | 426.3  | 444.2  | 460.9  |
| 10°   | 361.2  | 361.4  | 366.4  | 375.8  | 387.2  | 391.1  | 400.7  | 414.1  | 427.2  | 450.2  | 473.4  |
| 12.5° | 353.9  | 354.3  | 356.9  | 364.2  | 376.7  | 381.6  | 395.2  | 415.4  | 432.1  | 458.8  | 489.5  |
| 15°   | 371.7  | 371.7  | 369.6  | 370.4  | 376.0  | 380.5  | 394.7  | 419.7  | 440.5  | 469.1  | 505.4  |
| 17.5° | 406.3  | 405.0  | 399.7  | 392.4  | 390.4  | 391.9  | 403.3  | 428.9  | 452.3  | 481.1  | 523.4  |
| 20°   | 453.2  | 453.6  | 443.1  | 427.8  | 415.6  | 415.4  | 422.2  | 445.2  | 469.3  | 495.5  | 543.0  |
| 22.5° | 509.9  | 508.2  | 494.2  | 473.4  | 452.1  | 450.4  | 453.2  | 470.2  | 493.8  | 518.3  | 567.1  |
| 25°   | 575.7  | 574.8  | 555.0  | 527.1  | 498.9  | 494.9  | 494.9  | 511.6  | 528.8  | 550.7  | 595.9  |
| 27.5° | 644.4  | 644.4  | 625.3  | 593.1  | 555.7  | 548.4  | 547.3  | 567.1  | 578.5  | 582.7  | 620.1  |
| 30°   | 715.1  | 714.3  | 695.3  | 662.3  | 622.3  | 614.8  | 611.8  | 626.4  | 634.5  | 621.6  | 650.4  |
| 32.5° | 786.9  | 788.4  | 769.3  | 738.5  | 702.9  | 697.9  | 688.7  | 688.7  | 695.3  | 677.3  | 698.1  |
| 35°   | 864.0  | 863.6  | 848.6  | 827.7  | 797.2  | 791.6  | 776.4  | 752.5  | 762.6  | 754.7  | 764.1  |
| 37.5° | 932.1  | 935.4  | 928.1  | 912.6  | 887.9  | 882.3  | 857.1  | 814.0  | 821.7  | 834.2  | 842.5  |
| 40°   | 1001.3 | 1003.9 | 1011.2 | 1006.3 | 975.1  | 964.8  | 920.1  | 849.2  | 857.8  | 900.6  | 924.6  |
| 42.5° | 1069.2 | 1070.5 | 1085.3 | 1093.5 | 1051.8 | 1033.8 | 967.8  | 870.7  | 879.7  | 952.6  | 994.7  |
| 45°   | 1112.4 | 1115.2 | 1139.7 | 1164.6 | 1119.5 | 1094.8 | 1009.3 | 898.2  | 902.1  | 988.7  | 1046.5 |
| 47.5° | 1110.7 | 1117.2 | 1163.1 | 1208.5 | 1177.7 | 1151.1 | 1059.1 | 942.2  | 935.8  | 1022.6 | 1080.6 |
| 50°   | 1076.1 | 1083.8 | 1149.8 | 1221.8 | 1219.6 | 1194.9 | 1114.6 | 1006.1 | 985.9  | 1052.7 | 1084.9 |
| 52.5° | 1004.3 | 1026.7 | 1126.4 | 1223.5 | 1253.4 | 1240.9 | 1183.1 | 1092.0 | 1053.5 | 1095.9 | 1091.8 |
| 55°   | 849.2  | 876.7  | 1055.3 | 1208.9 | 1283.9 | 1285.4 | 1255.1 | 1181.6 | 1127.0 | 1170.2 | 1134.1 |
| 57.5° | 644.6  | 666.6  | 812.2  | 1076.1 | 1233.4 | 1258.1 | 1283.0 | 1228.9 | 1172.4 | 1220.9 | 1144.0 |
| 60°   | 388.5  | 413.9  | 508.6  | 789.7  | 996.2  | 1038.3 | 1136.1 | 1125.5 | 1057.4 | 1078.3 | 938.2  |
| 62.5° | 157.5  | 170.8  | 234.9  | 435.1  | 627.0  | 666.3  | 760.0  | 775.9  | 759.2  | 737.9  | 569.0  |
| 65°   | 57.6   | 63.0   | 94.1   | 179.9  | 288.4  | 302.8  | 352.2  | 380.3  | 403.5  | 343.6  | 211.7  |
| 67.5° | 35.7   | 39.1   | 61.2   | 92.4   | 104.9  | 97.6   | 99.3   | 118.4  | 113.0  | 69.8   | 37.8   |
| 70°   | 26.4   | 29.2   | 47.9   | 64.0   | 42.3   | 32.7   | 22.1   | 23.6   | 21.3   | 18.7   | 18.5   |
| 72.5° | 18.3   | 20.8   | 35.9   | 37.8   | 16.3   | 11.6   | 8.2    | 11.4   | 12.9   | 12.7   | 13.1   |
| 75°   | 12.0   | 14.0   | 22.6   | 14.8   | 4.1    | 3.2    | 2.8    | 6.0    | 7.7    | 7.7    | 8.0    |
| 77.5° | 7.1    | 8.2    | 8.0    | 3.0    | 0.9    | 0.9    | 0.6    | 1.1    | 1.7    | 1.9    | 2.4    |
| 80°   | 0.9    | 0.6    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.6    | 0.6    | 0.6    |
| 82.5° | 0.2    | 0.2    | 0.2    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.6    | 0.6    |
| 85°   | 0.0    | 0.0    | 0.2    | 0.2    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.6    | 0.6    |
| 87.5° | 0.0    | 0.0    | 0.2    | 0.2    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.6    | 0.6    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P629207

CATALOG NUMBER: GWS-SA1B-727-U-T3R-W-GRSBK

**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 450.8 | 450.8 | 450.8 | 450.8 | 450.8 | 450.8 | 450.8 | 450.8 | 450.8 | 450.8 | 450.8 |
| 2.5°  | 455.1 | 453.6 | 459.8 | 464.4 | 468.0 | 469.7 | 467.4 | 467.1 | 467.1 | 462.4 | 461.1 |
| 5°    | 460.5 | 461.1 | 469.9 | 473.8 | 474.5 | 472.3 | 466.9 | 463.3 | 461.1 | 456.2 | 453.4 |
| 7.5°  | 470.8 | 472.9 | 481.3 | 480.7 | 474.9 | 465.0 | 450.8 | 439.9 | 432.8 | 425.0 | 420.3 |
| 10°   | 485.6 | 489.7 | 494.9 | 485.8 | 467.4 | 442.2 | 413.0 | 392.2 | 379.7 | 370.9 | 365.5 |
| 12.5° | 503.7 | 507.8 | 506.0 | 484.8 | 446.3 | 401.4 | 363.8 | 333.7 | 319.3 | 311.4 | 305.8 |
| 15°   | 521.9 | 524.5 | 513.3 | 471.9 | 409.1 | 348.7 | 306.8 | 277.0 | 259.4 | 252.9 | 248.2 |
| 17.5° | 540.6 | 540.0 | 514.6 | 446.5 | 359.5 | 289.4 | 248.2 | 227.8 | 222.8 | 221.8 | 221.3 |
| 20°   | 560.2 | 554.4 | 509.5 | 410.2 | 299.8 | 230.8 | 207.4 | 208.6 | 217.7 | 222.0 | 222.8 |
| 22.5° | 582.5 | 567.9 | 496.6 | 361.0 | 238.7 | 192.3 | 194.7 | 207.4 | 219.6 | 225.4 | 226.3 |
| 25°   | 606.4 | 580.4 | 475.1 | 297.8 | 188.2 | 176.8 | 190.8 | 205.4 | 218.5 | 225.6 | 226.5 |
| 27.5° | 622.1 | 583.4 | 439.9 | 234.2 | 161.6 | 170.8 | 185.7 | 199.6 | 213.2 | 220.9 | 222.0 |
| 30°   | 639.0 | 582.1 | 391.9 | 180.5 | 152.6 | 165.7 | 178.6 | 191.2 | 203.7 | 212.3 | 213.2 |
| 32.5° | 664.0 | 581.2 | 333.5 | 146.5 | 148.9 | 161.6 | 171.0 | 181.6 | 190.2 | 195.1 | 194.5 |
| 35°   | 696.6 | 580.2 | 265.4 | 132.2 | 146.8 | 158.4 | 165.9 | 170.8 | 161.4 | 158.4 | 159.0 |
| 37.5° | 738.5 | 582.7 | 208.0 | 126.1 | 146.1 | 157.5 | 164.0 | 149.8 | 135.2 | 129.6 | 128.7 |
| 40°   | 784.9 | 589.4 | 158.6 | 123.8 | 148.3 | 159.7 | 156.6 | 133.2 | 115.2 | 104.2 | 101.9 |
| 42.5° | 831.6 | 596.7 | 125.5 | 122.9 | 151.9 | 165.7 | 144.6 | 121.2 | 94.1  | 87.9  | 87.0  |
| 45°   | 866.2 | 595.4 | 108.5 | 121.4 | 155.1 | 169.1 | 141.4 | 104.0 | 84.0  | 81.2  | 81.4  |
| 47.5° | 883.6 | 581.2 | 99.3  | 118.0 | 156.4 | 165.7 | 133.4 | 96.9  | 77.1  | 80.1  | 82.7  |
| 50°   | 874.3 | 544.5 | 90.7  | 111.3 | 153.6 | 161.2 | 120.8 | 91.5  | 73.7  | 86.2  | 92.0  |
| 52.5° | 863.2 | 499.4 | 81.2  | 101.0 | 147.0 | 154.9 | 115.8 | 90.0  | 71.6  | 83.2  | 87.5  |
| 55°   | 878.0 | 470.8 | 65.8  | 85.1  | 133.9 | 140.3 | 112.0 | 89.8  | 66.6  | 64.7  | 64.0  |
| 57.5° | 857.1 | 413.9 | 47.1  | 61.2  | 102.7 | 111.1 | 109.2 | 88.3  | 59.1  | 58.9  | 59.7  |
| 60°   | 662.5 | 252.5 | 32.2  | 38.9  | 63.0  | 70.9  | 99.1  | 84.4  | 50.9  | 46.8  | 47.1  |
| 62.5° | 376.5 | 107.4 | 22.1  | 24.1  | 32.2  | 38.2  | 75.6  | 76.7  | 47.1  | 44.7  | 47.1  |
| 65°   | 131.1 | 38.5  | 17.2  | 16.1  | 17.8  | 20.4  | 43.4  | 59.3  | 42.8  | 38.7  | 39.1  |
| 67.5° | 27.1  | 19.1  | 15.3  | 13.3  | 13.3  | 13.3  | 22.1  | 37.0  | 35.2  | 30.7  | 31.2  |
| 70°   | 17.2  | 16.3  | 13.3  | 11.4  | 11.0  | 10.1  | 12.7  | 20.4  | 24.3  | 22.3  | 22.6  |
| 72.5° | 12.7  | 12.5  | 10.5  | 9.2   | 8.2   | 7.3   | 8.0   | 10.1  | 12.5  | 12.9  | 13.1  |
| 75°   | 7.7   | 8.0   | 6.9   | 5.8   | 5.2   | 4.5   | 4.7   | 4.7   | 4.7   | 4.3   | 4.7   |
| 77.5° | 2.4   | 2.6   | 2.1   | 1.7   | 1.5   | 1.5   | 1.5   | 1.3   | 1.1   | 0.6   | 0.6   |
| 80°   | 0.6   | 0.6   | 0.6   | 0.6   | 0.6   | 0.4   | 0.4   | 0.2   | 0.2   | 0.0   | 0.0   |
| 82.5° | 0.6   | 0.6   | 0.6   | 0.6   | 0.4   | 0.4   | 0.2   | 0.2   | 0.0   | 0.0   | 0.0   |
| 85°   | 0.6   | 0.6   | 0.6   | 0.6   | 0.4   | 0.4   | 0.2   | 0.2   | 0.0   | 0.0   | 0.0   |
| 87.5° | 0.6   | 0.6   | 0.6   | 0.6   | 0.4   | 0.4   | 0.2   | 0.2   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Signify Classified - Internal  
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Peachtree City, GA 30269



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

**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: 4π  
 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  
 CIE u': 0.2605  
 CIE v': 0.5272  
 Duv: 0.0005  
 CIE x: 0.4573  
 CIE y: 0.4113  
 CIE z: 0.1313  
 Peak Wavelength (nm): 602  
 Dominant Wavelength (nm): 583  
 Purity: 61.2  
 Rf: 69.9  
 Rg: 98.3

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.5 |      |       |
| R1:       | 69.2 | R9:  | -16.1 |
| R2:       | 79.4 | R10: | 51.4  |
| R3:       | 87.8 | R11: | 63.1  |
| R4:       | 69.4 | R12: | 42.0  |
| R5:       | 66.4 | R13: | 70.2  |
| R6:       | 69.8 | R14: | 92.4  |
| R7:       | 79.8 |      |       |
| R8:       | 50.1 |      |       |



**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

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

**Photopic Flux vs. Wavelength**



**Photopic Lumens: 6211.7**

| $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360            | 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                         |                |                                   |                             |

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

Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3

S/P: 1.04

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 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

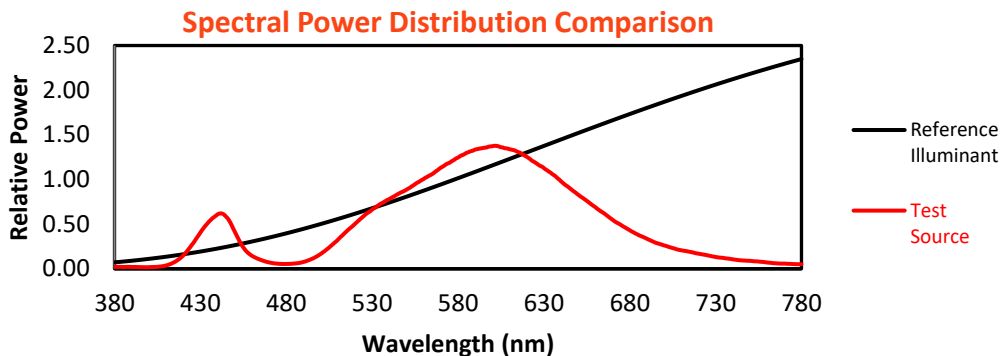
| $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360            | 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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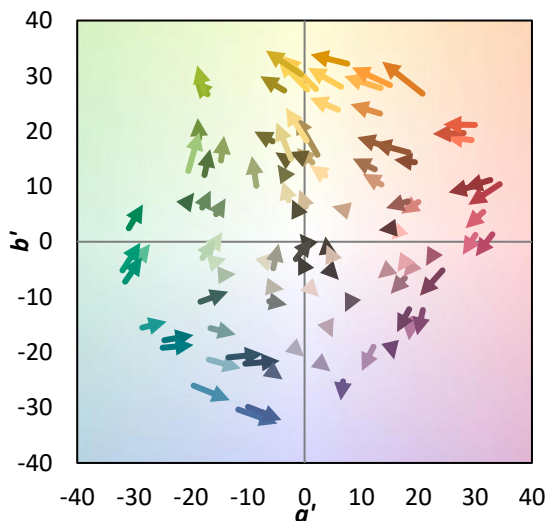
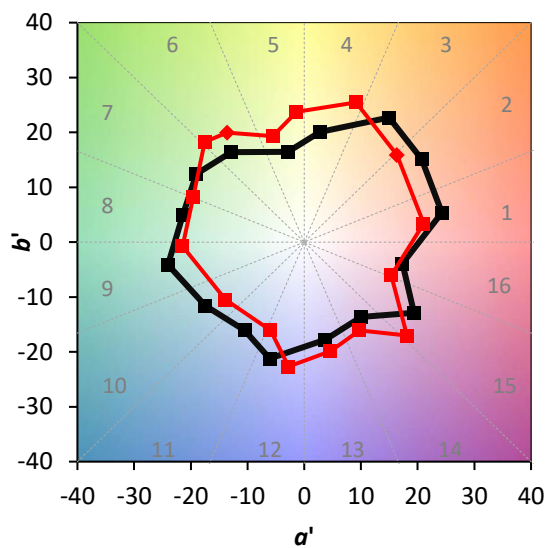
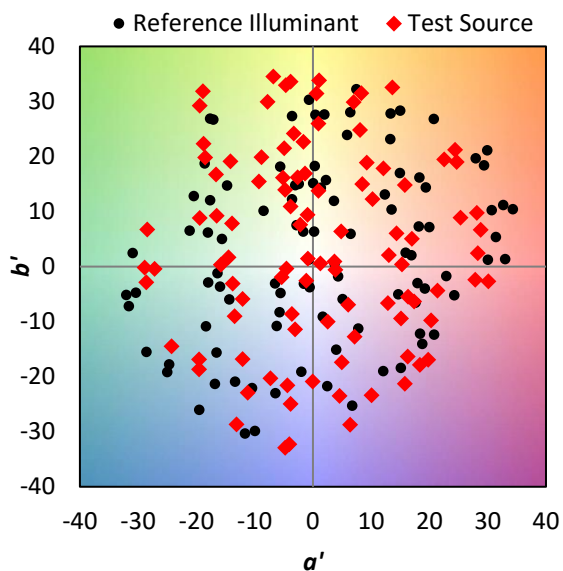
TM-30-18

**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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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)