

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: STREETWORKS

Report Number: P822538

Luminaire Tested: **PMM-SA1A-840-U-T2**

Issue Date: 04/10/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P822538  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1910-543-8)  
Test Lab: INNOVATION CENTER  
Issue Date: 04/10/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: PMM-SA1A-840-U-T2  
Description: MESA POST TOP DECORATIVE LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS.  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 3389.7 lumens  
Efficiency: N/A  
Efficacy: 99.7 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

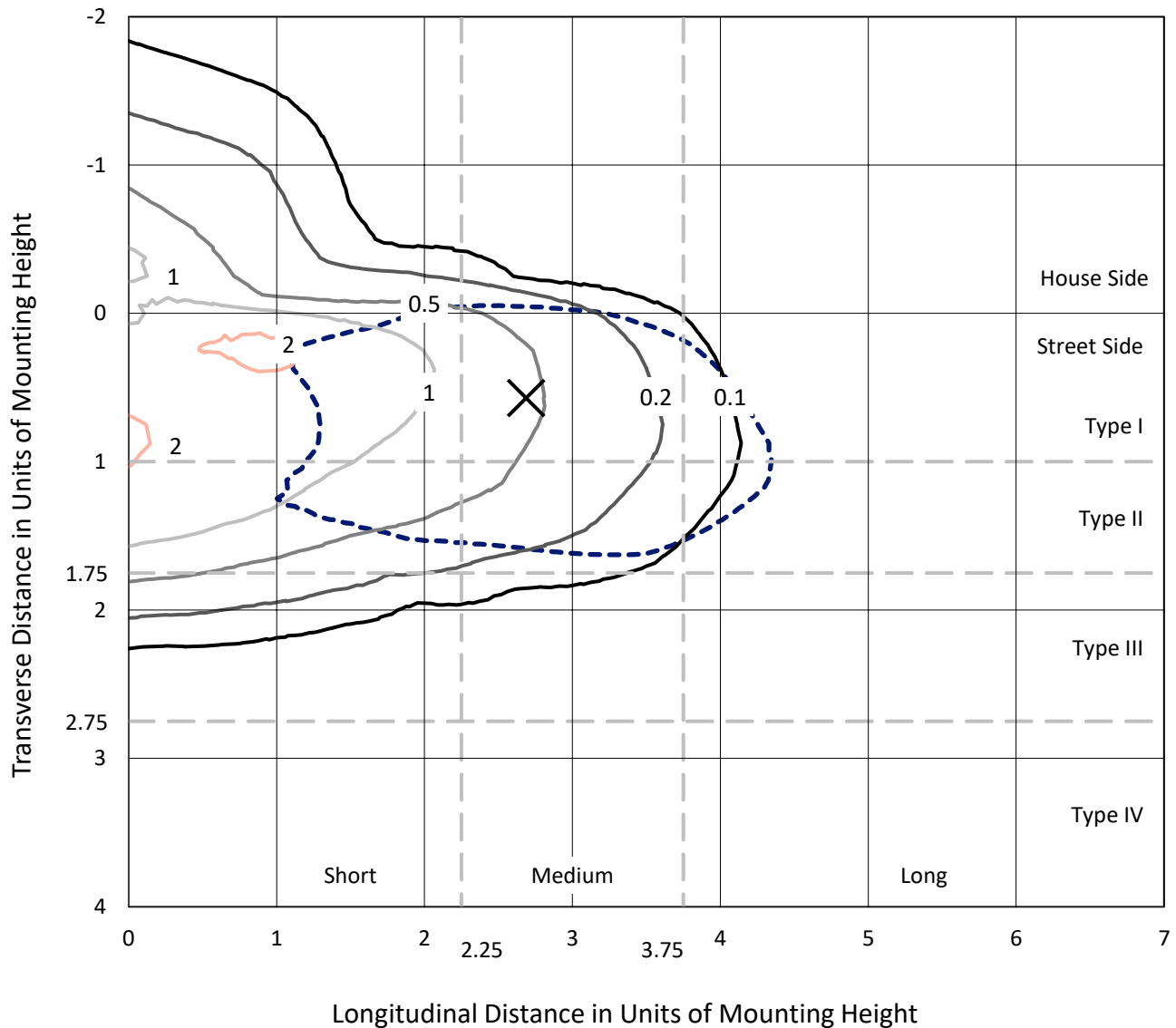
Input Watts (W): 34  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

REPORT NUMBER: P822538

CATALOG NUMBER: PMM-SA1A-840-U-T2

## Iso-Footcandle Lines of Horizontal Illumination

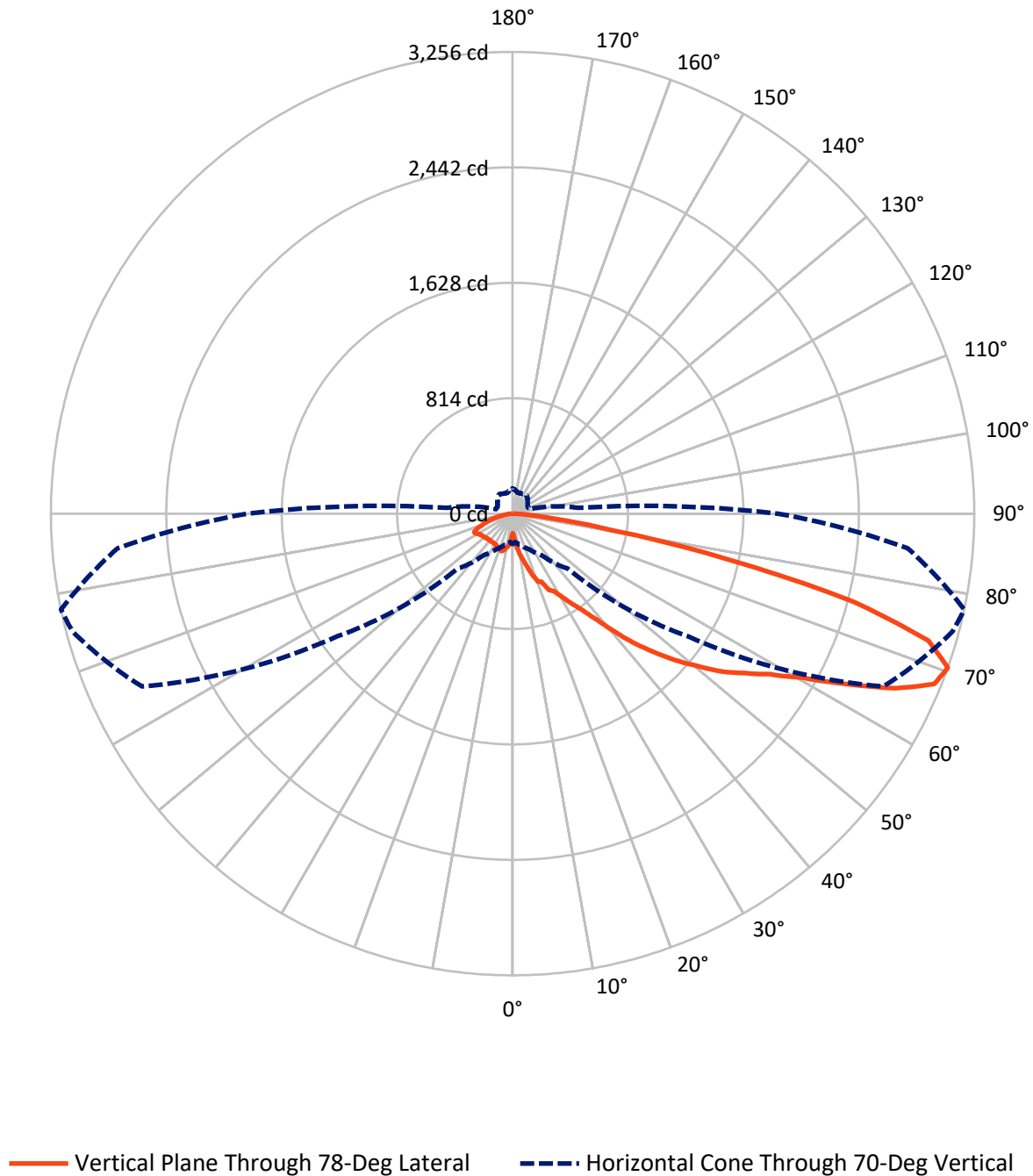
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 2.2 fc  
 Type II - Medium - N/A

REPORT NUMBER: P822538  
CATALOG NUMBER: PMM-SA1A-840-U-T2

## Luminous Intensity Polar Plot



REPORT NUMBER: P822538

CATALOG NUMBER: PMM-SA1A-840-U-T2

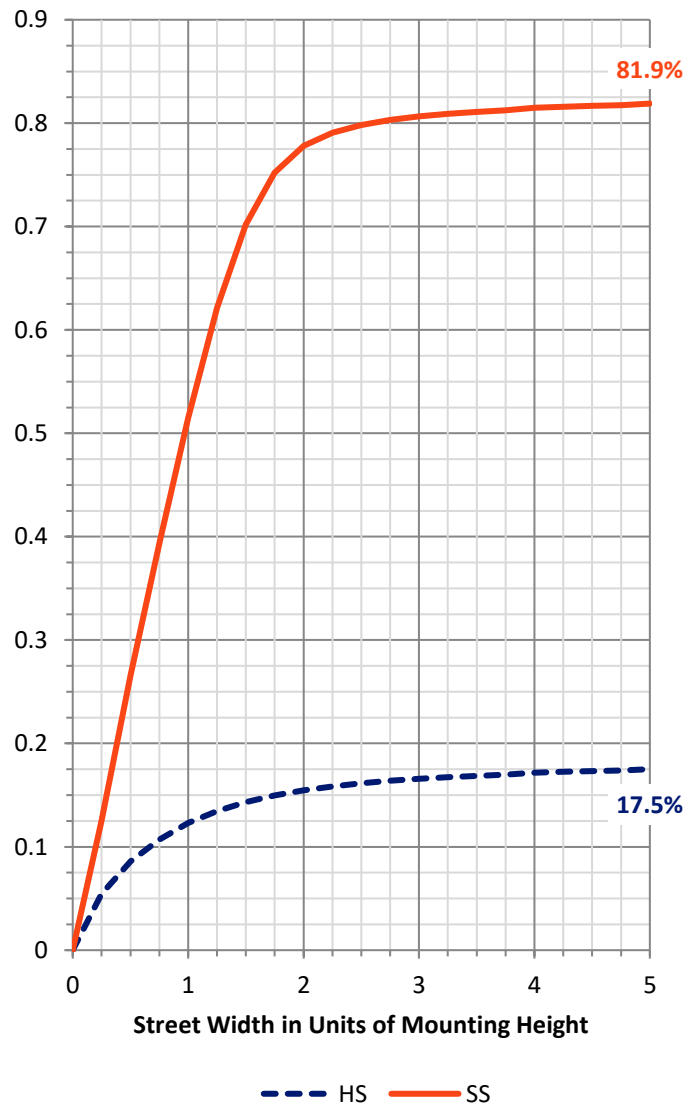
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 605.0    | 0.0    | 605.0  |
|                    | % Fixture | 17.8     | 0.0    | 17.8   |
| <b>Street Side</b> | Lumens    | 2784.7   | 0.0    | 2784.7 |
|                    | % Fixture | 82.2     | 0.0    | 82.2   |
| <b>Total</b>       | Lumens    | 3389.7   | 0.0    | 3389.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 21.4   | 0.6       |
| 10°-20°   | 94.1   | 2.8       |
| 20°-30°   | 181.1  | 5.3       |
| 30°-40°   | 305.1  | 9.0       |
| 40°-50°   | 527.9  | 15.6      |
| 50°-60°   | 797.0  | 23.5      |
| 60°-70°   | 882.8  | 26.0      |
| 70°-80°   | 509.0  | 15.0      |
| 80°-90°   | 71.4   | 2.1       |
| 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°    | 3389.7 | 100.0     |
| 0°-180°   | 3389.7 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P822538

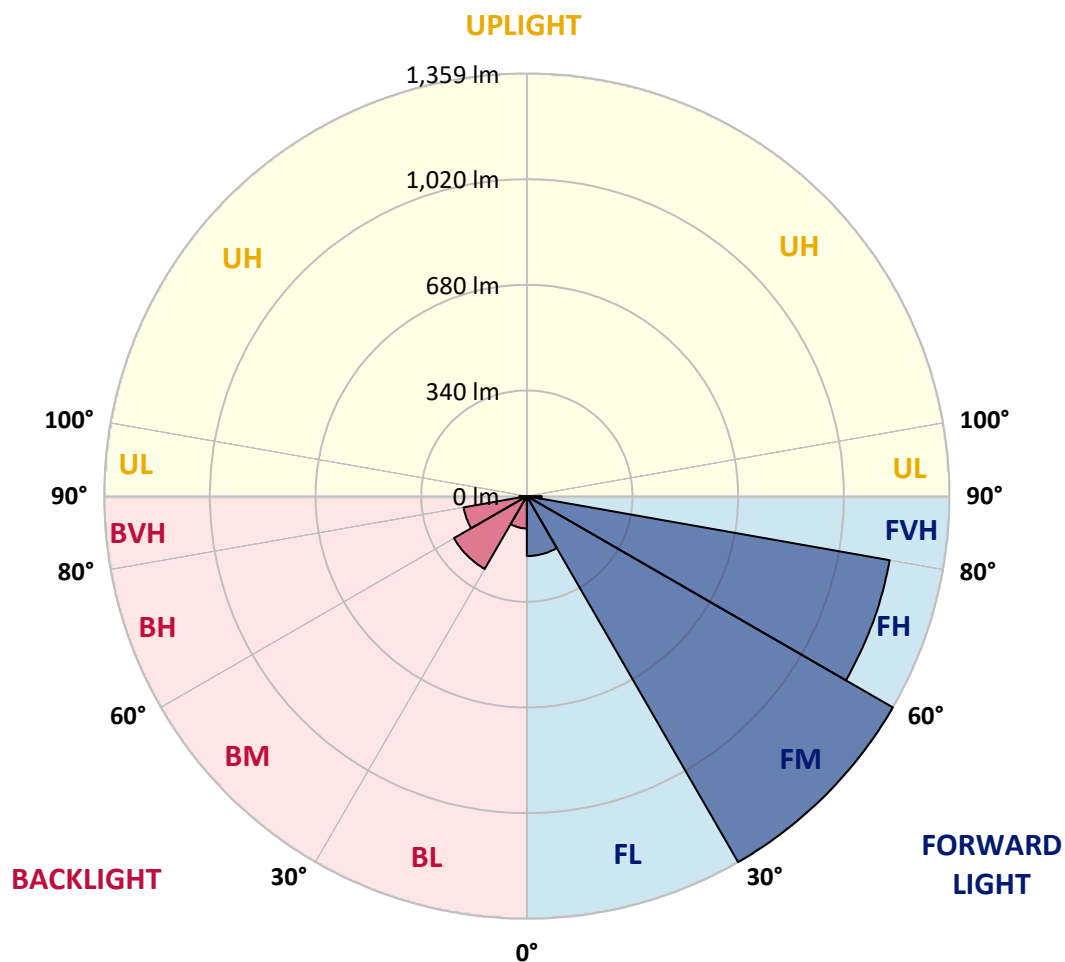
CATALOG NUMBER: PMM-SA1A-840-U-T2

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 192.7  | 5.7       |                         |      |         |
| FM   | (30°-60°)   | 1359.4 | 40.1      |                         |      |         |
| FH   | (60°-80°)   | 1185.0 | 35.0      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 47.6   | 1.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 103.9  | 3.1       | B0/110                  |      |         |
| BM   | (30°-60°)   | 270.6  | 8.0       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 206.8  | 6.1       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 23.8   | 0.7       |                         |      | G1/100  |
| 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



REPORT NUMBER: P822538

CATALOG NUMBER: PMM-SA1A-840-U-T2

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 78°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 138.2  | 138.2  | 138.2  | 138.2  | 138.2  | 138.2  | 138.2  | 138.2  | 138.2  | 138.2  | 138.2  |
| 2.5°  | 177.9  | 171.5  | 162.0  | 165.9  | 170.7  | 171.3  | 169.7  | 160.9  | 158.0  | 164.6  | 166.6  |
| 5°    | 249.2  | 238.6  | 232.0  | 229.9  | 222.7  | 207.7  | 218.5  | 212.9  | 214.1  | 210.8  | 217.2  |
| 7.5°  | 309.3  | 302.1  | 292.5  | 289.9  | 273.3  | 261.5  | 268.9  | 266.5  | 254.9  | 250.4  | 257.6  |
| 10°   | 339.8  | 331.9  | 332.3  | 326.5  | 322.1  | 323.3  | 319.6  | 309.0  | 300.5  | 294.3  | 277.0  |
| 12.5° | 358.2  | 360.2  | 370.8  | 367.8  | 384.4  | 397.9  | 387.6  | 371.9  | 344.7  | 339.1  | 321.9  |
| 15°   | 401.9  | 409.3  | 399.3  | 403.9  | 410.9  | 436.9  | 432.6  | 429.3  | 400.4  | 389.8  | 358.0  |
| 17.5° | 446.9  | 448.2  | 433.2  | 430.9  | 447.8  | 461.0  | 477.5  | 458.4  | 461.9  | 454.4  | 403.0  |
| 20°   | 456.4  | 466.2  | 444.7  | 429.9  | 464.8  | 490.7  | 511.3  | 491.0  | 509.7  | 511.7  | 440.2  |
| 22.5° | 491.6  | 479.9  | 451.6  | 437.1  | 467.6  | 499.5  | 532.9  | 544.1  | 538.3  | 521.5  | 476.0  |
| 25°   | 516.1  | 509.8  | 481.0  | 464.9  | 476.5  | 505.9  | 564.4  | 593.9  | 599.1  | 596.9  | 510.3  |
| 27.5° | 561.4  | 564.5  | 505.2  | 509.7  | 493.6  | 496.3  | 583.3  | 659.9  | 627.2  | 618.2  | 552.6  |
| 30°   | 633.0  | 619.2  | 552.6  | 556.3  | 529.6  | 525.1  | 623.3  | 716.9  | 687.6  | 676.8  | 587.5  |
| 32.5° | 707.8  | 709.0  | 628.2  | 596.9  | 582.6  | 578.1  | 615.4  | 746.6  | 763.9  | 749.7  | 640.3  |
| 35°   | 813.2  | 805.8  | 710.2  | 668.9  | 617.4  | 609.5  | 671.8  | 833.2  | 864.8  | 825.3  | 702.8  |
| 37.5° | 973.8  | 951.6  | 840.2  | 744.9  | 706.7  | 697.6  | 752.4  | 910.7  | 981.9  | 932.7  | 805.2  |
| 40°   | 1102.6 | 1057.5 | 956.4  | 840.2  | 775.6  | 786.8  | 809.5  | 1004.9 | 1103.4 | 1075.8 | 899.8  |
| 42.5° | 1205.3 | 1165.3 | 1038.6 | 956.9  | 869.2  | 855.4  | 880.2  | 1121.4 | 1268.8 | 1241.7 | 1018.0 |
| 45°   | 1303.8 | 1222.4 | 1131.0 | 1057.5 | 973.2  | 990.0  | 986.3  | 1240.4 | 1471.6 | 1388.1 | 1122.4 |
| 47.5° | 1401.0 | 1324.6 | 1229.0 | 1130.2 | 1045.2 | 1149.9 | 1110.8 | 1328.9 | 1608.4 | 1546.5 | 1232.3 |
| 50°   | 1526.0 | 1441.9 | 1332.9 | 1233.6 | 1182.7 | 1259.3 | 1193.7 | 1403.7 | 1761.5 | 1688.9 | 1336.0 |
| 52.5° | 1608.9 | 1527.1 | 1431.5 | 1360.7 | 1356.0 | 1326.4 | 1309.6 | 1498.6 | 1895.8 | 1851.7 | 1446.0 |
| 55°   | 1599.1 | 1520.3 | 1477.0 | 1484.9 | 1542.5 | 1442.9 | 1429.2 | 1638.9 | 2035.8 | 1984.8 | 1564.7 |
| 57.5° | 1477.0 | 1390.8 | 1400.1 | 1446.1 | 1601.0 | 1647.3 | 1624.0 | 1788.8 | 2160.7 | 2137.6 | 1711.5 |
| 60°   | 1150.5 | 1106.3 | 1181.0 | 1265.3 | 1522.7 | 1707.3 | 1871.2 | 1971.7 | 2314.5 | 2351.5 | 1942.1 |
| 62.5° | 747.4  | 688.3  | 806.4  | 949.5  | 1289.2 | 1667.7 | 2122.9 | 2318.4 | 2566.3 | 2650.3 | 2292.5 |
| 65°   | 387.2  | 377.7  | 460.4  | 591.8  | 897.4  | 1422.0 | 2211.6 | 2682.1 | 2872.3 | 2970.3 | 2627.3 |
| 67.5° | 281.4  | 264.0  | 302.2  | 379.6  | 547.8  | 969.6  | 2043.5 | 2960.4 | 3118.1 | 3207.8 | 2821.9 |
| 70°   | 214.3  | 201.4  | 230.6  | 278.5  | 357.8  | 547.7  | 1508.5 | 2884.5 | 3212.9 | 3256.4 | 2796.1 |
| 72.5° | 160.5  | 149.3  | 174.9  | 219.6  | 275.7  | 308.4  | 891.6  | 2371.7 | 3051.1 | 3065.9 | 2509.5 |
| 75°   | 128.2  | 119.6  | 130.6  | 173.4  | 224.7  | 209.8  | 473.7  | 1718.3 | 2479.0 | 2491.7 | 1916.8 |
| 77.5° | 105.1  | 97.8   | 102.3  | 130.0  | 174.8  | 157.8  | 235.0  | 1093.0 | 1573.9 | 1554.4 | 1078.5 |
| 80°   | 85.8   | 79.4   | 81.6   | 93.9   | 133.1  | 117.8  | 132.0  | 570.2  | 750.8  | 720.5  | 448.5  |
| 82.5° | 66.0   | 60.6   | 64.8   | 69.1   | 96.4   | 84.7   | 77.0   | 259.4  | 307.5  | 286.4  | 164.5  |
| 85°   | 44.2   | 39.3   | 56.3   | 51.9   | 63.0   | 52.0   | 42.1   | 103.3  | 114.6  | 106.8  | 57.8   |
| 87.5° | 12.2   | 11.4   | 18.9   | 25.9   | 25.9   | 19.7   | 15.4   | 25.0   | 32.0   | 28.0   | 13.5   |
| 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: P822538

CATALOG NUMBER: PMM-SA1A-840-U-T2

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 138.2  | 138.2 | 138.2 | 138.2 | 138.2 | 138.2 | 138.2 | 138.2 | 138.2 | 138.2 | 138.2 |
| 2.5°  | 167.4  | 164.3 | 156.2 | 155.4 | 157.4 | 157.7 | 156.4 | 153.5 | 151.9 | 160.4 | 159.1 |
| 5°    | 215.6  | 204.6 | 197.9 | 191.9 | 183.4 | 177.3 | 178.9 | 183.1 | 184.6 | 190.9 | 191.6 |
| 7.5°  | 253.1  | 238.6 | 223.9 | 204.5 | 191.6 | 183.4 | 189.6 | 194.2 | 197.7 | 206.7 | 210.4 |
| 10°   | 269.3  | 253.5 | 232.8 | 212.4 | 208.9 | 210.2 | 206.7 | 207.9 | 213.3 | 213.8 | 215.6 |
| 12.5° | 299.6  | 281.6 | 244.4 | 225.9 | 224.9 | 228.0 | 226.6 | 231.9 | 235.7 | 246.0 | 241.7 |
| 15°   | 328.5  | 305.7 | 253.2 | 234.3 | 230.2 | 236.1 | 243.0 | 251.8 | 260.0 | 269.8 | 264.8 |
| 17.5° | 363.7  | 329.2 | 253.6 | 230.5 | 231.2 | 243.9 | 251.1 | 255.9 | 280.4 | 293.8 | 287.0 |
| 20°   | 385.9  | 331.7 | 244.2 | 221.0 | 231.2 | 242.6 | 252.7 | 257.9 | 285.3 | 305.5 | 310.2 |
| 22.5° | 406.0  | 332.5 | 236.8 | 215.9 | 222.4 | 237.6 | 252.7 | 264.2 | 281.8 | 301.1 | 301.8 |
| 25°   | 417.0  | 331.8 | 227.4 | 216.4 | 222.2 | 229.7 | 243.2 | 253.8 | 266.8 | 293.8 | 294.5 |
| 27.5° | 445.3  | 322.6 | 218.0 | 218.0 | 221.2 | 221.4 | 238.6 | 244.7 | 246.6 | 271.2 | 275.6 |
| 30°   | 453.4  | 324.6 | 216.9 | 217.8 | 219.3 | 216.4 | 223.9 | 228.1 | 230.7 | 251.9 | 252.7 |
| 32.5° | 466.6  | 308.8 | 220.3 | 215.2 | 213.3 | 212.8 | 214.7 | 218.3 | 219.5 | 232.4 | 234.9 |
| 35°   | 482.6  | 302.4 | 221.4 | 214.5 | 210.6 | 208.5 | 213.9 | 209.4 | 212.9 | 228.2 | 229.9 |
| 37.5° | 534.6  | 293.6 | 227.2 | 214.5 | 209.4 | 207.0 | 204.3 | 206.4 | 219.1 | 233.7 | 242.8 |
| 40°   | 567.8  | 296.3 | 225.8 | 216.6 | 205.6 | 203.3 | 198.8 | 206.6 | 226.1 | 252.1 | 258.9 |
| 42.5° | 626.0  | 297.8 | 227.5 | 215.6 | 206.9 | 198.1 | 201.1 | 209.6 | 230.1 | 244.9 | 255.4 |
| 45°   | 686.2  | 302.6 | 226.4 | 212.7 | 204.1 | 208.1 | 204.1 | 211.7 | 221.4 | 221.8 | 229.7 |
| 47.5° | 745.3  | 322.1 | 223.9 | 206.6 | 203.3 | 214.1 | 203.6 | 204.9 | 205.6 | 208.1 | 217.5 |
| 50°   | 814.7  | 342.7 | 220.6 | 198.1 | 204.3 | 214.3 | 205.2 | 199.0 | 198.3 | 206.6 | 217.0 |
| 52.5° | 893.5  | 366.0 | 216.2 | 189.9 | 198.5 | 211.7 | 210.6 | 199.4 | 193.3 | 201.4 | 211.8 |
| 55°   | 986.3  | 392.5 | 211.1 | 181.7 | 192.1 | 212.0 | 213.5 | 196.4 | 193.5 | 202.2 | 213.3 |
| 57.5° | 1109.7 | 431.0 | 201.2 | 169.9 | 184.4 | 207.6 | 205.9 | 193.0 | 190.2 | 199.5 | 211.1 |
| 60°   | 1320.2 | 504.9 | 187.1 | 158.1 | 176.1 | 196.9 | 199.6 | 186.9 | 184.2 | 194.4 | 206.6 |
| 62.5° | 1602.2 | 593.8 | 170.0 | 146.7 | 165.9 | 185.3 | 191.9 | 178.2 | 177.9 | 191.1 | 203.8 |
| 65°   | 1864.5 | 644.2 | 152.3 | 136.2 | 155.4 | 174.5 | 183.1 | 170.0 | 170.5 | 187.1 | 199.8 |
| 67.5° | 1973.7 | 584.8 | 136.5 | 126.9 | 143.5 | 162.2 | 175.9 | 163.6 | 161.8 | 181.7 | 193.5 |
| 70°   | 1871.2 | 464.6 | 122.8 | 117.0 | 129.8 | 148.9 | 165.9 | 155.1 | 150.9 | 169.0 | 178.2 |
| 72.5° | 1655.7 | 387.3 | 109.9 | 105.4 | 118.0 | 135.0 | 152.3 | 143.7 | 138.2 | 152.0 | 160.3 |
| 75°   | 1294.2 | 317.8 | 95.3  | 93.9  | 104.4 | 122.3 | 138.2 | 132.3 | 125.2 | 134.0 | 142.2 |
| 77.5° | 736.9  | 201.1 | 80.0  | 80.8  | 88.3  | 107.1 | 121.3 | 116.5 | 109.4 | 113.0 | 122.5 |
| 80°   | 294.9  | 101.5 | 64.3  | 64.8  | 71.2  | 88.0  | 100.5 | 98.8  | 91.3  | 94.3  | 100.7 |
| 82.5° | 110.2  | 55.7  | 47.5  | 47.8  | 54.2  | 69.6  | 85.8  | 84.9  | 77.9  | 75.8  | 79.4  |
| 85°   | 43.8   | 27.6  | 29.1  | 30.4  | 36.5  | 50.2  | 68.8  | 61.0  | 52.7  | 46.2  | 48.4  |
| 87.5° | 10.4   | 8.7   | 10.2  | 10.8  | 11.9  | 15.7  | 25.1  | 20.2  | 20.8  | 16.6  | 12.4  |
| 90°   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-2309-178-2

Test Date: 09/22/2023

Luminaire Tested: GALN-SA2A-840-U-T4W

Data in this report applies to families of products including GALN-SA2A-840-U-T4W.

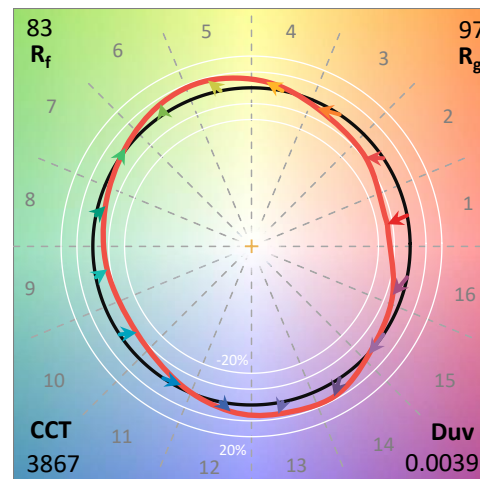
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2309-178-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 09/22/2023  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **GALN-SA2A-840-U-T4W**  
 Description: GALLEON 2 AREA AND ROADWAY LUMINAIRE. (2) 80 CRI, 4000K, 615MA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS

LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 3867   | CRI (Ra): | 79.8 |      |      |
| CIE u':                   | 0.2254 | R1:       | 76.6 | R9:  | -8.6 |
| CIE v':                   | 0.5090 | R2:       | 84.7 | R10: | 66.3 |
| Duv:                      | 0.0039 | R3:       | 93.7 | R11: | 80.5 |
| CIE x:                    | 0.3895 | R4:       | 80.6 | R12: | 67.3 |
| CIE y:                    | 0.3908 | R5:       | 77.9 | R13: | 77.9 |
| CIE z:                    | 0.2197 | R6:       | 81.2 | R14: | 96.6 |
| Peak Wavelength (nm):     | 593    | R7:       | 84.2 |      |      |
| Dominant Wavelength (nm): | 577    | R8:       | 59.0 |      |      |
| Purity:                   | 34.3   |           |      |      |      |
| Rf:                       | 82.7   |           |      |      |      |
| Rg:                       | 96.5   |           |      |      |      |



### Test Conditions

Stabilization Time: 25M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/46%  
 Sphere Temperature (°C): 24.7

REPORT NUMBER: SP1-2309-178-2

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 8/9/2023         | 2/9/2024             |
| Power Meter                    | XITRON 2801 IN0071    | 11/29/2022       | 11/29/2023           |
| AC Power Source                | CHROMA 61603 IN0063   | 11/28/2022       | 11/28/2023           |
| DC Power Source                | AGILENT E3634A IN0208 | 11/28/2022       | 11/28/2023           |
| Sphere Thermometer             | ONSET IN0085          | 11/28/2022       | 11/28/2023           |
| Room Thermometer               | ONSET IN0046          | 11/28/2022       | 11/28/2023           |

REPORT NUMBER: SP1-2309-178-2

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2309-178-2

**Photopic Flux vs. Wavelength**



#####

| 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       | 3123             | NR               | 490       | 57459            | NR               | 620       | 129941           | NR               | 750       | 5858             | NR               | 880       | 4622             | NR               |
| 365       | 3041             | NR               | 495       | 69038            | NR               | 625       | 121678           | NR               | 755       | 5395             | NR               | 885       | 3949             | NR               |
| 370       | 2965             | NR               | 500       | 79493            | NR               | 630       | 112252           | NR               | 760       | 5011             | NR               | 890       | 4035             | NR               |
| 375       | 3195             | NR               | 505       | 87950            | NR               | 635       | 102369           | NR               | 765       | 4514             | NR               | 895       | 3391             | NR               |
| 380       | 3028             | NR               | 510       | 94704            | NR               | 640       | 93616            | NR               | 770       | 4375             | NR               | 900       | 3268             | NR               |
| 385       | 2738             | NR               | 515       | 100214           | NR               | 645       | 84211            | NR               | 775       | 3450             | NR               | 905       | 2767             | NR               |
| 390       | 2690             | NR               | 520       | 103961           | NR               | 650       | 75380            | NR               | 780       | 3547             | NR               | 910       | 3391             | NR               |
| 395       | 2604             | NR               | 525       | 106854           | NR               | 655       | 66946            | NR               | 785       | 3648             | NR               | 915       | 3784             | NR               |
| 400       | 2384             | NR               | 530       | 109533           | NR               | 660       | 59483            | NR               | 790       | 3081             | NR               | 920       | 3790             | NR               |
| 405       | 3031             | NR               | 535       | 112417           | NR               | 665       | 51858            | NR               | 795       | 3104             | NR               | 925       | 3175             | NR               |
| 410       | 5239             | NR               | 540       | 115725           | NR               | 670       | 44882            | NR               | 800       | 3444             | NR               | 930       | 3642             | NR               |
| 415       | 10499            | NR               | 545       | 119091           | NR               | 675       | 38742            | NR               | 805       | 3315             | NR               | 935       | 3040             | NR               |
| 420       | 20790            | NR               | 550       | 122884           | NR               | 680       | 33597            | NR               | 810       | 3022             | NR               | 940       | 4039             | NR               |
| 425       | 39276            | NR               | 555       | 128300           | NR               | 685       | 29101            | NR               | 815       | 2832             | NR               | 945       | 4797             | NR               |
| 430       | 66418            | NR               | 560       | 133274           | NR               | 690       | 24855            | NR               | 820       | 3142             | NR               | 950       | 4945             | NR               |
| 435       | 101961           | NR               | 565       | 139112           | NR               | 695       | 21367            | NR               | 825       | 3115             | NR               | 955       | 3757             | NR               |
| 440       | 134023           | NR               | 570       | 144467           | NR               | 700       | 18479            | NR               | 830       | 2520             | NR               | 960       | 4539             | NR               |
| 445       | 129385           | NR               | 575       | 149331           | NR               | 705       | 16131            | NR               | 835       | 2783             | NR               | 965       | 4857             | NR               |
| 450       | 90434            | NR               | 580       | 154784           | NR               | 710       | 14388            | NR               | 840       | 3364             | NR               | 970       | 4463             | NR               |
| 455       | 63521            | NR               | 585       | 156899           | NR               | 715       | 12865            | NR               | 845       | 3807             | NR               | 975       | 3718             | NR               |
| 460       | 48429            | NR               | 590       | 157796           | NR               | 720       | 11277            | NR               | 850       | 2907             | NR               | 980       | 3955             | NR               |
| 465       | 36445            | NR               | 595       | 157849           | NR               | 725       | 10063            | NR               | 855       | 3470             | NR               | 985       | 4314             | NR               |
| 470       | 31953            | NR               | 600       | 155418           | NR               | 730       | 8942             | NR               | 860       | 3820             | NR               | 990       | 4478             | NR               |
| 475       | 32768            | NR               | 605       | 151601           | NR               | 735       | 7722             | NR               | 865       | 3922             | NR               | 995       | 2959             | NR               |
| 480       | 37631            | NR               | 610       | 146416           | NR               | 740       | 6964             | NR               | 870       | 4061             | NR               | 1000      | 4570             | NR               |
| 485       | 46354            | NR               | 615       | 139241           | NR               | 745       | 6117             | NR               | 875       | 3975             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2309-178-2

Scotopic Flux vs. Wavelength



Scotopic Lumens: 14236

S/P: 1.59

| 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       | 3123             | NR               | 490       | 57459            | NR               | 620       | 129941           | NR               | 750       | 5858             | NR               | 880       | 4622             | NR               |
| 365       | 3041             | NR               | 495       | 69038            | NR               | 625       | 121678           | NR               | 755       | 5395             | NR               | 885       | 3949             | NR               |
| 370       | 2965             | NR               | 500       | 79493            | NR               | 630       | 112252           | NR               | 760       | 5011             | NR               | 890       | 4035             | NR               |
| 375       | 3195             | NR               | 505       | 87950            | NR               | 635       | 102369           | NR               | 765       | 4514             | NR               | 895       | 3391             | NR               |
| 380       | 3028             | NR               | 510       | 94704            | NR               | 640       | 93616            | NR               | 770       | 4375             | NR               | 900       | 3268             | NR               |
| 385       | 2738             | NR               | 515       | 100214           | NR               | 645       | 84211            | NR               | 775       | 3450             | NR               | 905       | 2767             | NR               |
| 390       | 2690             | NR               | 520       | 103961           | NR               | 650       | 75380            | NR               | 780       | 3547             | NR               | 910       | 3391             | NR               |
| 395       | 2604             | NR               | 525       | 106854           | NR               | 655       | 66946            | NR               | 785       | 3648             | NR               | 915       | 3784             | NR               |
| 400       | 2384             | NR               | 530       | 109533           | NR               | 660       | 59483            | NR               | 790       | 3081             | NR               | 920       | 3790             | NR               |
| 405       | 3031             | NR               | 535       | 112417           | NR               | 665       | 51858            | NR               | 795       | 3104             | NR               | 925       | 3175             | NR               |
| 410       | 5239             | NR               | 540       | 115725           | NR               | 670       | 44882            | NR               | 800       | 3444             | NR               | 930       | 3642             | NR               |
| 415       | 10499            | NR               | 545       | 119091           | NR               | 675       | 38742            | NR               | 805       | 3315             | NR               | 935       | 3040             | NR               |
| 420       | 20790            | NR               | 550       | 122884           | NR               | 680       | 33597            | NR               | 810       | 3022             | NR               | 940       | 4039             | NR               |
| 425       | 39276            | NR               | 555       | 128300           | NR               | 685       | 29101            | NR               | 815       | 2832             | NR               | 945       | 4797             | NR               |
| 430       | 66418            | NR               | 560       | 133274           | NR               | 690       | 24855            | NR               | 820       | 3142             | NR               | 950       | 4945             | NR               |
| 435       | 101961           | NR               | 565       | 139112           | NR               | 695       | 21367            | NR               | 825       | 3115             | NR               | 955       | 3757             | NR               |
| 440       | 134023           | NR               | 570       | 144467           | NR               | 700       | 18479            | NR               | 830       | 2520             | NR               | 960       | 4539             | NR               |
| 445       | 129385           | NR               | 575       | 149331           | NR               | 705       | 16131            | NR               | 835       | 2783             | NR               | 965       | 4857             | NR               |
| 450       | 90434            | NR               | 580       | 154784           | NR               | 710       | 14388            | NR               | 840       | 3364             | NR               | 970       | 4463             | NR               |
| 455       | 63521            | NR               | 585       | 156899           | NR               | 715       | 12865            | NR               | 845       | 3807             | NR               | 975       | 3718             | NR               |
| 460       | 48429            | NR               | 590       | 157796           | NR               | 720       | 11277            | NR               | 850       | 2907             | NR               | 980       | 3955             | NR               |
| 465       | 36445            | NR               | 595       | 157849           | NR               | 725       | 10063            | NR               | 855       | 3470             | NR               | 985       | 4314             | NR               |
| 470       | 31953            | NR               | 600       | 155418           | NR               | 730       | 8942             | NR               | 860       | 3820             | NR               | 990       | 4478             | NR               |
| 475       | 32768            | NR               | 605       | 151601           | NR               | 735       | 7722             | NR               | 865       | 3922             | NR               | 995       | 2959             | NR               |
| 480       | 37631            | NR               | 610       | 146416           | NR               | 740       | 6964             | NR               | 870       | 4061             | NR               | 1000      | 4570             | NR               |
| 485       | 46354            | NR               | 615       | 139241           | NR               | 745       | 6117             | NR               | 875       | 3975             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2309-178-2

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5542.6 M/P: 0.62**

| 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       | 3123             | NR               | 490       | 57459            | NR               | 620       | 129941           | NR               | 750       | 5858             | NR               | 880       | 4622             | NR               |
| 365       | 3041             | NR               | 495       | 69038            | NR               | 625       | 121678           | NR               | 755       | 5395             | NR               | 885       | 3949             | NR               |
| 370       | 2965             | NR               | 500       | 79493            | NR               | 630       | 112252           | NR               | 760       | 5011             | NR               | 890       | 4035             | NR               |
| 375       | 3195             | NR               | 505       | 87950            | NR               | 635       | 102369           | NR               | 765       | 4514             | NR               | 895       | 3391             | NR               |
| 380       | 3028             | NR               | 510       | 94704            | NR               | 640       | 93616            | NR               | 770       | 4375             | NR               | 900       | 3268             | NR               |
| 385       | 2738             | NR               | 515       | 100214           | NR               | 645       | 84211            | NR               | 775       | 3450             | NR               | 905       | 2767             | NR               |
| 390       | 2690             | NR               | 520       | 103961           | NR               | 650       | 75380            | NR               | 780       | 3547             | NR               | 910       | 3391             | NR               |
| 395       | 2604             | NR               | 525       | 106854           | NR               | 655       | 66946            | NR               | 785       | 3648             | NR               | 915       | 3784             | NR               |
| 400       | 2384             | NR               | 530       | 109533           | NR               | 660       | 59483            | NR               | 790       | 3081             | NR               | 920       | 3790             | NR               |
| 405       | 3031             | NR               | 535       | 112417           | NR               | 665       | 51858            | NR               | 795       | 3104             | NR               | 925       | 3175             | NR               |
| 410       | 5239             | NR               | 540       | 115725           | NR               | 670       | 44882            | NR               | 800       | 3444             | NR               | 930       | 3642             | NR               |
| 415       | 10499            | NR               | 545       | 119091           | NR               | 675       | 38742            | NR               | 805       | 3315             | NR               | 935       | 3040             | NR               |
| 420       | 20790            | NR               | 550       | 122884           | NR               | 680       | 33597            | NR               | 810       | 3022             | NR               | 940       | 4039             | NR               |
| 425       | 39276            | NR               | 555       | 128300           | NR               | 685       | 29101            | NR               | 815       | 2832             | NR               | 945       | 4797             | NR               |
| 430       | 66418            | NR               | 560       | 133274           | NR               | 690       | 24855            | NR               | 820       | 3142             | NR               | 950       | 4945             | NR               |
| 435       | 101961           | NR               | 565       | 139112           | NR               | 695       | 21367            | NR               | 825       | 3115             | NR               | 955       | 3757             | NR               |
| 440       | 134023           | NR               | 570       | 144467           | NR               | 700       | 18479            | NR               | 830       | 2520             | NR               | 960       | 4539             | NR               |
| 445       | 129385           | NR               | 575       | 149331           | NR               | 705       | 16131            | NR               | 835       | 2783             | NR               | 965       | 4857             | NR               |
| 450       | 90434            | NR               | 580       | 154784           | NR               | 710       | 14388            | NR               | 840       | 3364             | NR               | 970       | 4463             | NR               |
| 455       | 63521            | NR               | 585       | 156899           | NR               | 715       | 12865            | NR               | 845       | 3807             | NR               | 975       | 3718             | NR               |
| 460       | 48429            | NR               | 590       | 157796           | NR               | 720       | 11277            | NR               | 850       | 2907             | NR               | 980       | 3955             | NR               |
| 465       | 36445            | NR               | 595       | 157849           | NR               | 725       | 10063            | NR               | 855       | 3470             | NR               | 985       | 4314             | NR               |
| 470       | 31953            | NR               | 600       | 155418           | NR               | 730       | 8942             | NR               | 860       | 3820             | NR               | 990       | 4478             | NR               |
| 475       | 32768            | NR               | 605       | 151601           | NR               | 735       | 7722             | NR               | 865       | 3922             | NR               | 995       | 2959             | NR               |
| 480       | 37631            | NR               | 610       | 146416           | NR               | 740       | 6964             | NR               | 870       | 4061             | NR               | 1000      | 4570             | NR               |
| 485       | 46354            | NR               | 615       | 139241           | NR               | 745       | 6117             | NR               | 875       | 3975             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2309-178-2

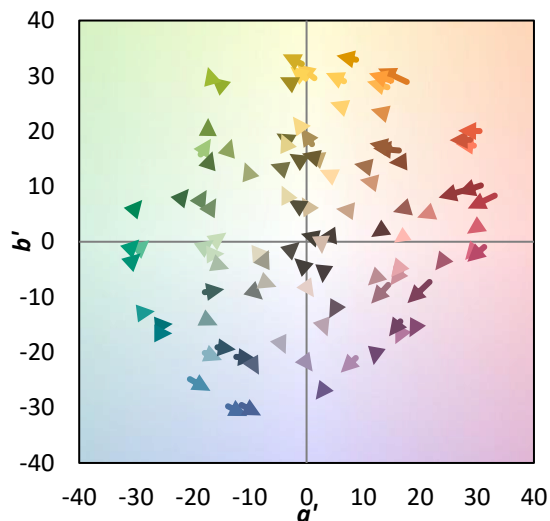
**TM-30-18**

**Summary**

$R_f = 82.7$   
 $R_g = 96.5$   
 $CIE R_a = 79.8$   
 $R_g = -8.6$



**Color Vector Graphics**



REPORT NUMBER: SP1-2309-178-2

TM-30-18

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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 76 | CES51 = 94 | CES76 = 73 |
| CES02 = 61 | CES27 = 91 | CES52 = 94 | CES77 = 85 |
| CES03 = 31 | CES28 = 90 | CES53 = 86 | CES78 = 73 |
| CES04 = 69 | CES29 = 73 | CES54 = 88 | CES79 = 91 |
| CES05 = 48 | CES30 = 76 | CES55 = 88 | CES80 = 89 |
| CES06 = 50 | CES31 = 77 | CES56 = 81 | CES81 = 80 |
| CES07 = 40 | CES32 = 74 | CES57 = 80 | CES82 = 95 |
| CES08 = 39 | CES33 = 78 | CES58 = 82 | CES83 = 92 |
| CES09 = 29 | CES34 = 84 | CES59 = 91 | CES84 = 92 |
| CES10 = 74 | CES35 = 92 | CES60 = 96 | CES85 = 85 |
| CES11 = 57 | CES36 = 97 | CES61 = 92 | CES86 = 73 |
| CES12 = 63 | CES37 = 89 | CES62 = 90 | CES87 = 85 |
| CES13 = 42 | CES38 = 83 | CES63 = 83 | CES88 = 83 |
| CES14 = 74 | CES39 = 95 | CES64 = 83 | CES89 = 77 |
| CES15 = 71 | CES40 = 91 | CES65 = 77 | CES90 = 82 |
| CES16 = 47 | CES41 = 90 | CES66 = 82 | CES91 = 91 |
| CES17 = 49 | CES42 = 90 | CES67 = 80 | CES92 = 68 |
| CES18 = 56 | CES43 = 86 | CES68 = 83 | CES93 = 82 |
| CES19 = 71 | CES44 = 99 | CES69 = 90 | CES94 = 61 |
| CES20 = 65 | CES45 = 91 | CES70 = 77 | CES95 = 76 |
| CES21 = 86 | CES46 = 87 | CES71 = 77 | CES96 = 82 |
| CES22 = 78 | CES47 = 85 | CES72 = 92 | CES97 = 89 |
| CES23 = 91 | CES48 = 77 | CES73 = 71 | CES98 = 81 |
| CES24 = 90 | CES49 = 87 | CES74 = 97 | CES99 = 70 |
| CES25 = 71 | CES50 = 93 | CES75 = 76 |            |



REPORT NUMBER: SP1-2309-178-2

**TM-30-18**

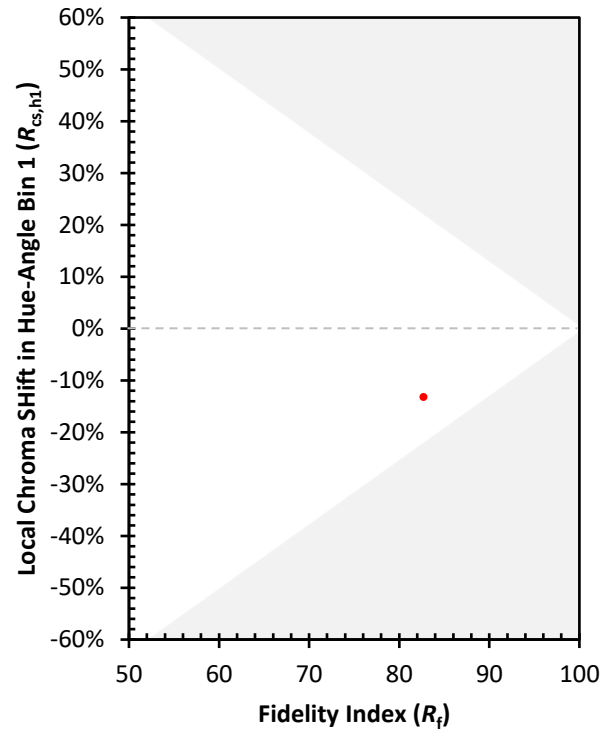
Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-2309-178-2

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)