

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: P822541

Luminaire Tested: **PMM-SA1A-840-U-T4FT-HSS**

Issue Date: 04/10/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P822541  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1910-543-13)  
Test Lab: INNOVATION CENTER  
Issue Date: 04/10/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: PMM-SA1A-840-U-T4FT-HSS  
Description: MESA POST TOP DECORATIVE LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS  
EACH AND TYPE IV FORWARD THROW OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2544.6 lumens  
Efficiency: N/A  
Efficacy: 74.8 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B0 - 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

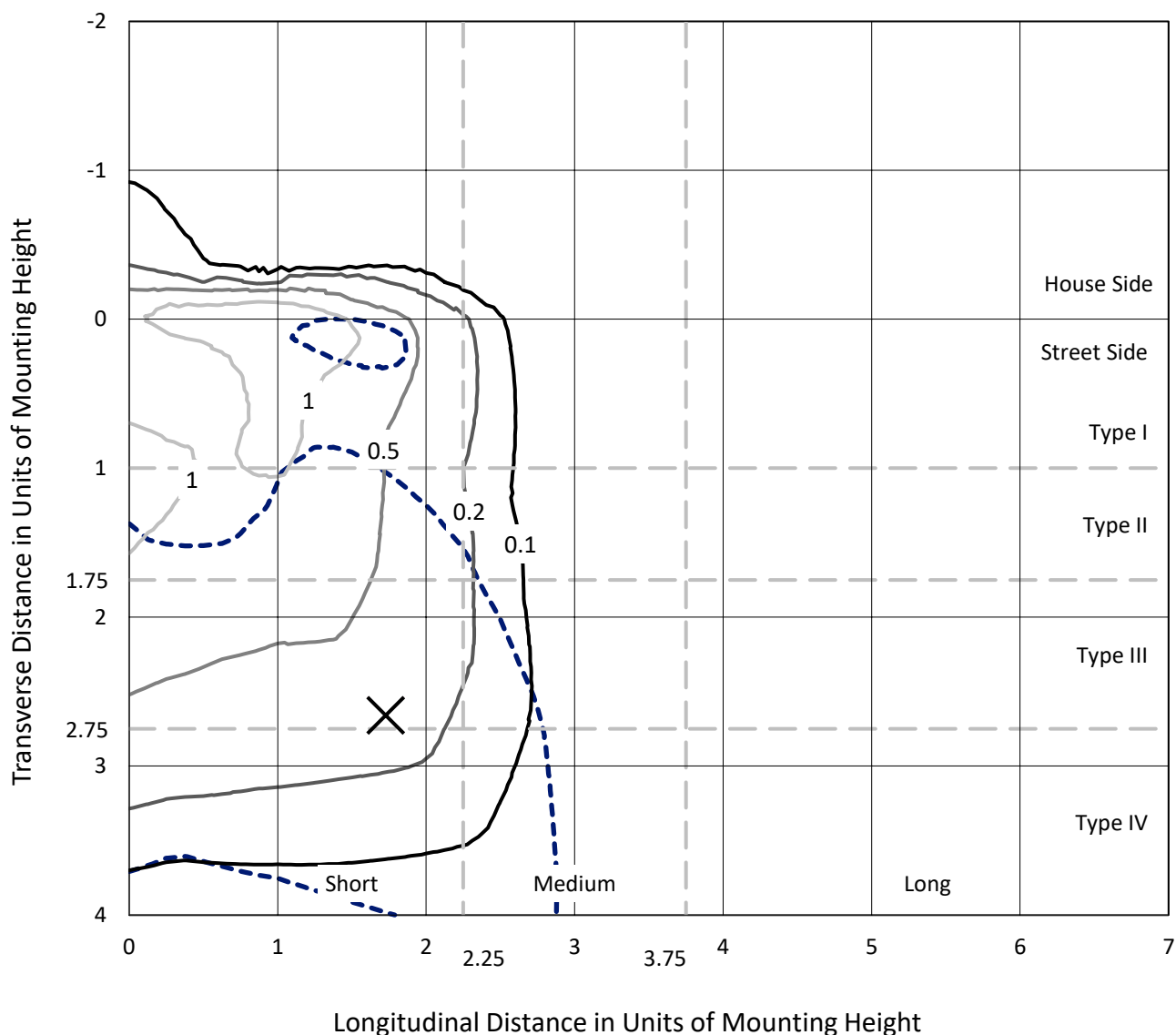
REPORT NUMBER: P822541

CATALOG NUMBER: PMM-SA1A-840-U-T4FT-HSS

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

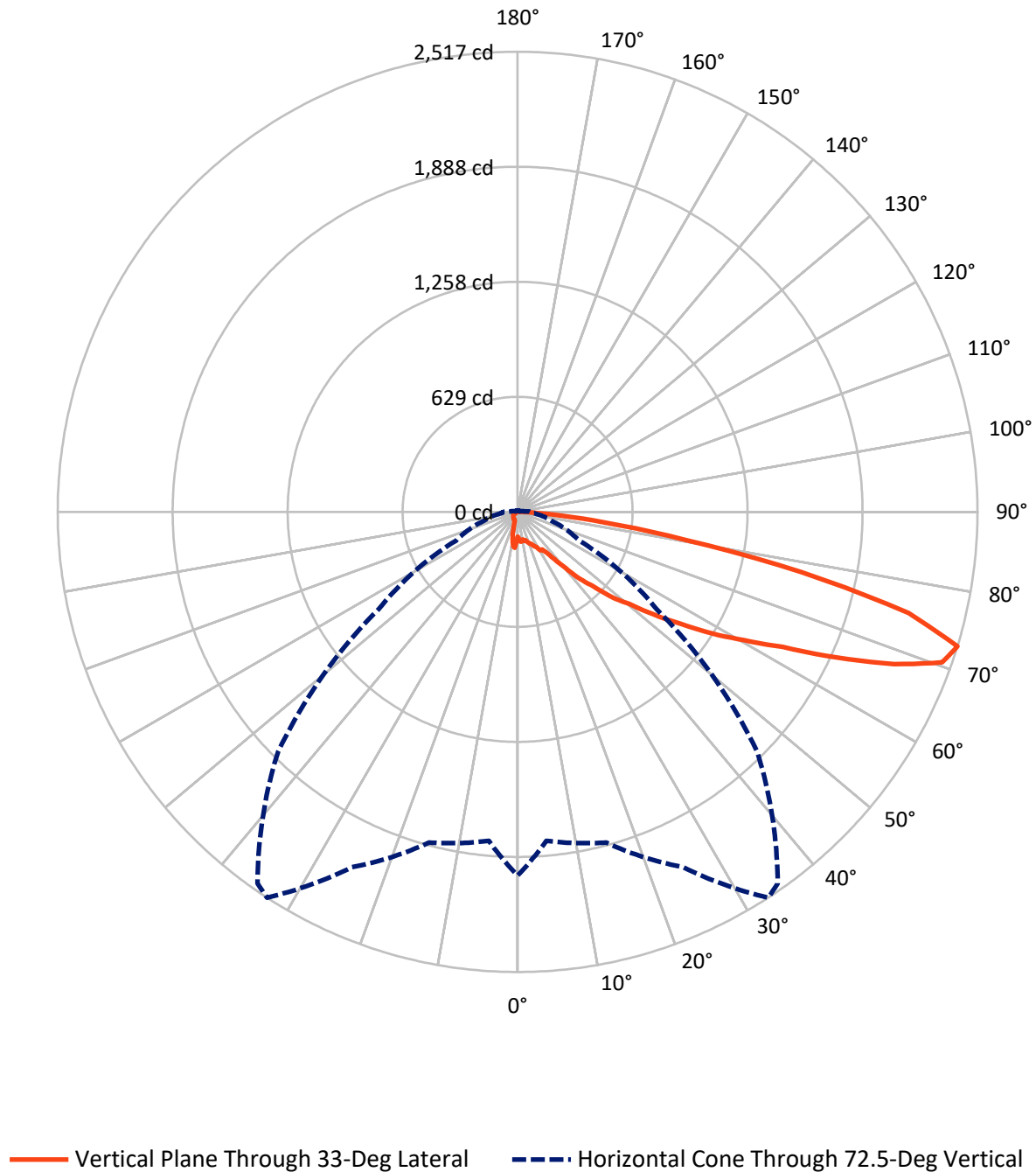


Based on 15 foot mounting height. Maximum calculated value = 1.8 fc

Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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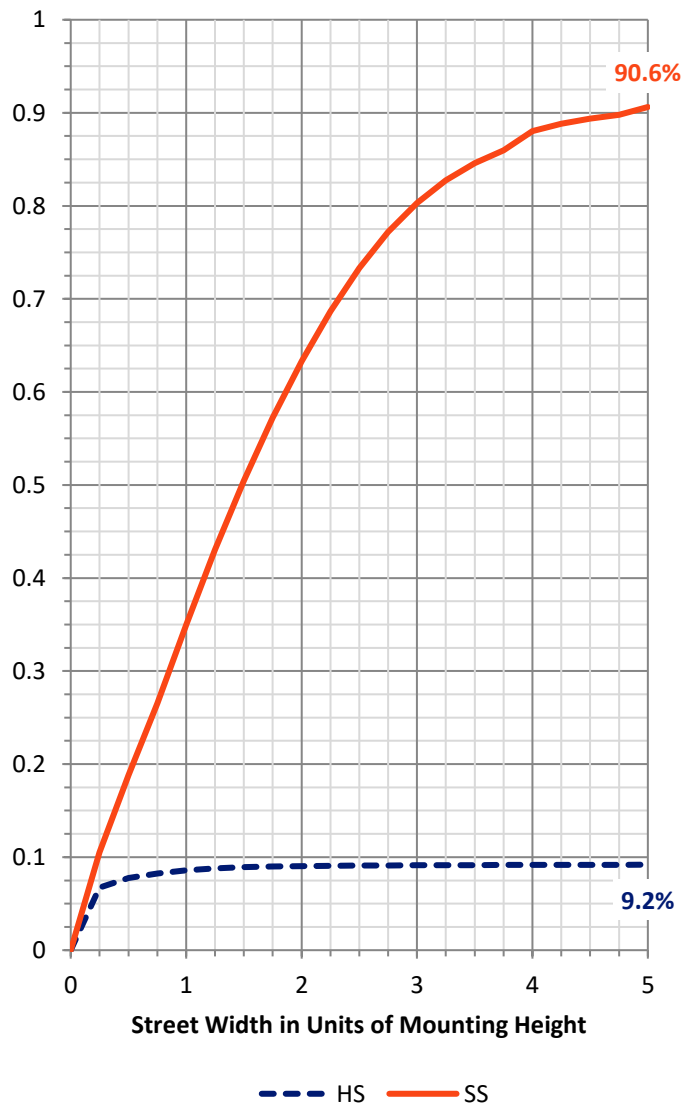
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 235.3    | 0.0    | 235.3  |
|                    | % Fixture | 9.2      | 0.0    | 9.2    |
| <b>Street Side</b> | Lumens    | 2309.3   | 0.0    | 2309.3 |
|                    | % Fixture | 90.8     | 0.0    | 90.8   |
| <b>Total</b>       | Lumens    | 2544.6   | 0.0    | 2544.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 17.5   | 0.7       |
| 10°-20°   | 52.2   | 2.1       |
| 20°-30°   | 88.5   | 3.5       |
| 30°-40°   | 162.0  | 6.4       |
| 40°-50°   | 341.9  | 13.4      |
| 50°-60°   | 572.1  | 22.5      |
| 60°-70°   | 765.8  | 30.1      |
| 70°-80°   | 500.2  | 19.7      |
| 80°-90°   | 44.3   | 1.7       |
| 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°    | 2544.6 | 100.0     |
| 0°-180°   | 2544.6 | 100.0     |

**Coefficient of Utilization**



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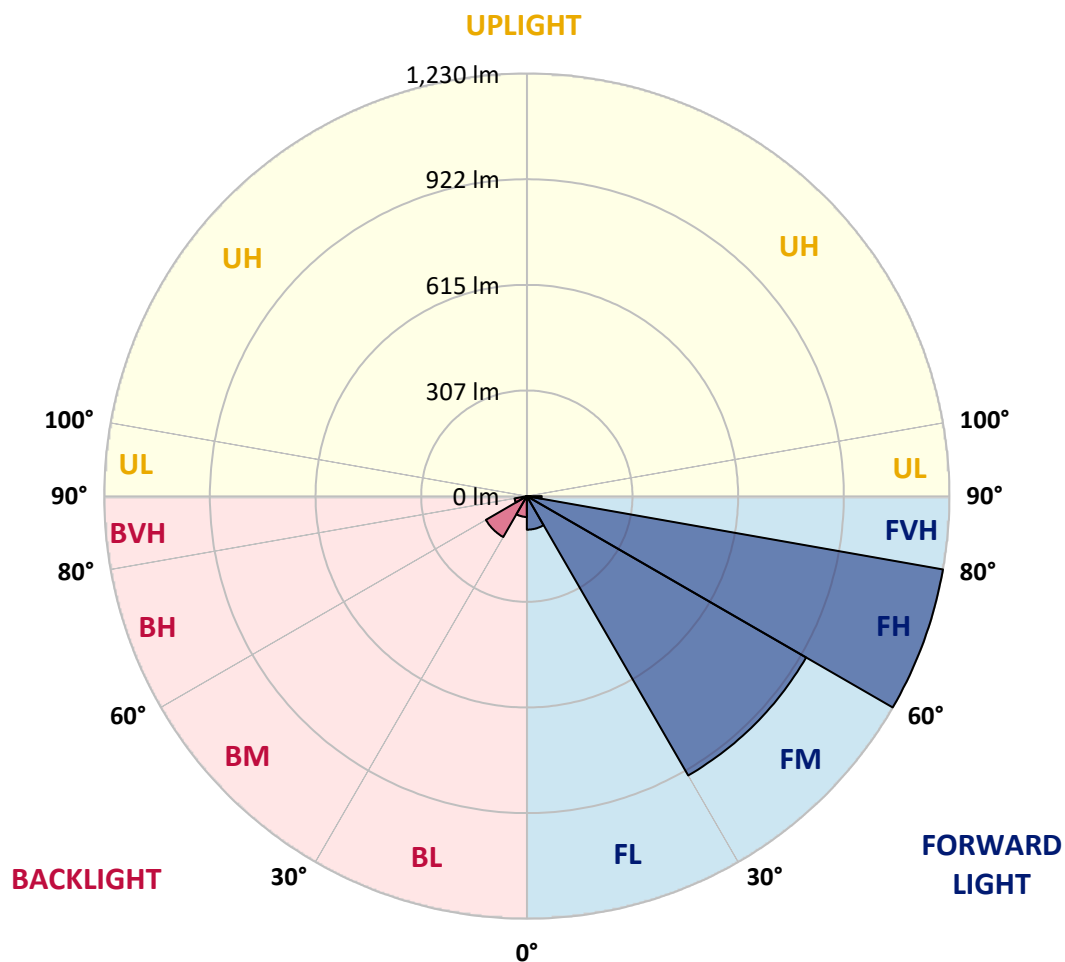
CATALOG NUMBER: PMM-SA1A-840-U-T4FT-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 97.7   | 3.8       |                         |      |         |
| FM   | (30°-60°)   | 938.5  | 36.9      |                         |      |         |
| FH   | (60°-80°)   | 1229.6 | 48.3      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 43.5   | 1.7       |                         |      | G1/100  |
| BL   | (0°-30°)    | 60.6   | 2.4       | B0/110                  |      |         |
| BM   | (30°-60°)   | 137.5  | 5.4       | B0/220                  |      |         |
| BH   | (60°-80°)   | 36.3   | 1.4       | 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 IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 33°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 135.3  | 135.3  | 135.3  | 135.3  | 135.3  | 135.3  | 135.3  | 135.3  | 135.3  | 135.3  | 135.3  |
| 2.5°  | 161.4  | 155.1  | 146.1  | 146.7  | 148.2  | 149.4  | 152.9  | 151.4  | 148.8  | 148.6  | 161.4  |
| 5°    | 171.0  | 164.1  | 163.5  | 164.3  | 163.9  | 166.2  | 163.3  | 172.5  | 180.3  | 189.6  | 204.6  |
| 7.5°  | 166.2  | 163.1  | 158.9  | 163.1  | 163.1  | 161.9  | 163.7  | 182.4  | 201.1  | 213.1  | 237.8  |
| 10°   | 152.9  | 149.2  | 152.3  | 153.7  | 152.7  | 157.7  | 169.9  | 185.3  | 207.7  | 232.5  | 244.5  |
| 12.5° | 149.0  | 151.3  | 152.5  | 152.5  | 161.9  | 164.5  | 183.2  | 197.6  | 224.4  | 243.9  | 278.8  |
| 15°   | 163.9  | 168.3  | 160.5  | 158.8  | 161.8  | 163.1  | 184.1  | 201.5  | 235.6  | 271.5  | 300.8  |
| 17.5° | 187.4  | 187.2  | 175.2  | 168.5  | 173.2  | 176.6  | 188.2  | 208.5  | 228.6  | 293.1  | 335.5  |
| 20°   | 203.8  | 204.0  | 182.4  | 168.5  | 183.9  | 185.9  | 198.8  | 215.0  | 230.8  | 304.0  | 358.3  |
| 22.5° | 224.6  | 217.1  | 193.2  | 179.9  | 190.3  | 192.1  | 206.3  | 219.1  | 242.4  | 302.7  | 387.4  |
| 25°   | 241.8  | 236.9  | 206.9  | 197.5  | 206.9  | 204.3  | 217.1  | 236.5  | 254.9  | 323.0  | 404.5  |
| 27.5° | 268.2  | 260.1  | 216.4  | 218.1  | 217.5  | 219.4  | 222.3  | 252.0  | 276.7  | 323.9  | 444.0  |
| 30°   | 293.0  | 288.2  | 237.9  | 237.9  | 243.4  | 239.9  | 242.0  | 277.9  | 297.9  | 346.9  | 488.6  |
| 32.5° | 318.5  | 318.9  | 263.2  | 249.7  | 245.4  | 259.9  | 274.2  | 290.4  | 323.5  | 386.1  | 556.6  |
| 35°   | 386.2  | 380.6  | 311.6  | 278.2  | 274.6  | 273.8  | 296.7  | 340.6  | 368.9  | 437.3  | 648.3  |
| 37.5° | 522.5  | 502.9  | 415.9  | 342.6  | 329.3  | 324.8  | 350.8  | 395.8  | 424.0  | 512.4  | 799.9  |
| 40°   | 662.5  | 626.4  | 529.8  | 447.1  | 404.1  | 384.5  | 414.8  | 453.1  | 503.1  | 595.4  | 940.2  |
| 42.5° | 785.2  | 740.7  | 615.5  | 559.9  | 503.8  | 495.3  | 467.0  | 529.2  | 616.1  | 716.4  | 1077.6 |
| 45°   | 904.9  | 817.3  | 691.8  | 647.7  | 579.6  | 584.4  | 574.8  | 628.8  | 733.5  | 848.9  | 1199.5 |
| 47.5° | 987.2  | 908.5  | 785.3  | 728.1  | 700.9  | 672.7  | 749.1  | 805.2  | 838.0  | 933.1  | 1305.0 |
| 50°   | 1075.9 | 996.3  | 865.7  | 825.8  | 789.9  | 818.3  | 917.3  | 924.8  | 922.1  | 1011.7 | 1376.7 |
| 52.5° | 1190.5 | 1096.5 | 958.0  | 912.8  | 933.1  | 961.4  | 1075.7 | 1077.1 | 996.8  | 1077.8 | 1428.4 |
| 55°   | 1296.5 | 1192.4 | 1080.9 | 1038.3 | 1080.7 | 1104.6 | 1231.3 | 1184.9 | 1040.4 | 1122.7 | 1453.8 |
| 57.5° | 1445.8 | 1325.3 | 1244.4 | 1169.2 | 1255.4 | 1232.5 | 1368.2 | 1299.2 | 1089.2 | 1152.5 | 1444.5 |
| 60°   | 1634.5 | 1492.7 | 1411.6 | 1332.1 | 1424.5 | 1440.0 | 1501.9 | 1356.2 | 1108.1 | 1162.3 | 1388.4 |
| 62.5° | 1826.5 | 1683.8 | 1577.2 | 1523.2 | 1628.1 | 1679.2 | 1625.6 | 1384.6 | 1085.4 | 1143.2 | 1261.4 |
| 65°   | 2064.7 | 1882.1 | 1757.5 | 1725.8 | 1920.0 | 1995.2 | 1772.0 | 1391.5 | 1041.5 | 1038.3 | 1014.2 |
| 67.5° | 2227.9 | 2050.0 | 1935.8 | 1988.7 | 2223.4 | 2229.5 | 1903.4 | 1393.7 | 893.5  | 812.9  | 665.7  |
| 70°   | 2266.6 | 2076.2 | 2025.1 | 2181.0 | 2465.4 | 2389.0 | 1945.8 | 1286.3 | 662.7  | 482.4  | 304.3  |
| 72.5° | 1989.7 | 1806.3 | 1872.9 | 2144.7 | 2516.8 | 2481.7 | 1852.1 | 928.0  | 373.1  | 193.0  | 93.4   |
| 75°   | 1220.5 | 1109.6 | 1405.0 | 1818.4 | 2209.3 | 2186.7 | 1444.9 | 479.5  | 150.4  | 77.1   | 34.9   |
| 77.5° | 530.8  | 492.9  | 733.2  | 1206.5 | 1587.5 | 1567.3 | 846.6  | 176.6  | 77.7   | 54.2   | 17.7   |
| 80°   | 175.6  | 170.4  | 277.7  | 571.3  | 929.9  | 912.0  | 356.7  | 73.5   | 55.4   | 43.5   | 9.9    |
| 82.5° | 41.7   | 41.4   | 97.0   | 262.9  | 473.7  | 458.9  | 109.5  | 40.5   | 40.1   | 34.3   | 5.2    |
| 85°   | 10.4   | 10.8   | 26.8   | 107.6  | 192.4  | 169.7  | 28.5   | 20.2   | 28.3   | 23.3   | 2.7    |
| 87.5° | 0.0    | 0.0    | 6.9    | 15.4   | 29.1   | 18.2   | 3.1    | 5.4    | 7.9    | 8.3    | 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    |

REPORT NUMBER: P822541

CATALOG NUMBER: PMM-SA1A-840-U-T4FT-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 135.3  | 135.3 | 135.3 | 135.3 | 135.3 | 135.3 | 135.3 | 135.3 | 135.3 | 135.3 | 135.3 |
| 2.5°  | 164.1  | 162.6 | 149.9 | 153.0 | 157.8 | 157.4 | 160.5 | 158.1 | 156.0 | 166.4 | 165.4 |
| 5°    | 208.8  | 200.3 | 196.4 | 201.9 | 198.9 | 192.0 | 197.8 | 196.8 | 195.1 | 198.6 | 201.3 |
| 7.5°  | 242.3  | 234.5 | 231.0 | 219.4 | 202.6 | 189.3 | 191.4 | 186.5 | 181.8 | 187.4 | 193.0 |
| 10°   | 253.3  | 249.1 | 248.7 | 226.0 | 210.2 | 191.0 | 168.3 | 148.6 | 143.4 | 136.5 | 139.6 |
| 12.5° | 283.2  | 285.8 | 269.8 | 243.4 | 212.9 | 176.0 | 135.6 | 107.8 | 96.5  | 89.1  | 89.6  |
| 15°   | 307.9  | 316.8 | 293.6 | 246.1 | 187.4 | 134.2 | 90.3  | 65.3  | 58.2  | 56.3  | 55.8  |
| 17.5° | 344.4  | 353.0 | 300.9 | 227.0 | 151.0 | 91.0  | 58.0  | 50.9  | 51.3  | 52.6  | 52.3  |
| 20°   | 371.6  | 370.2 | 294.6 | 193.2 | 111.3 | 59.6  | 48.6  | 47.6  | 49.9  | 53.6  | 52.7  |
| 22.5° | 397.7  | 388.9 | 290.6 | 162.0 | 72.1  | 47.9  | 46.9  | 46.8  | 48.9  | 52.4  | 53.4  |
| 25°   | 416.3  | 417.8 | 284.0 | 126.9 | 52.4  | 44.5  | 45.3  | 46.6  | 48.8  | 52.6  | 52.0  |
| 27.5° | 469.7  | 430.2 | 256.3 | 92.1  | 44.2  | 42.6  | 44.8  | 47.3  | 48.0  | 52.8  | 53.0  |
| 30°   | 504.4  | 477.1 | 238.2 | 62.1  | 40.9  | 39.4  | 43.6  | 47.0  | 47.9  | 54.1  | 54.5  |
| 32.5° | 564.7  | 497.3 | 217.3 | 46.1  | 38.0  | 38.4  | 41.1  | 45.7  | 49.6  | 56.3  | 56.5  |
| 35°   | 639.7  | 562.1 | 179.4 | 41.4  | 37.0  | 36.3  | 37.6  | 42.8  | 49.3  | 56.5  | 57.9  |
| 37.5° | 782.5  | 601.0 | 142.3 | 40.1  | 37.0  | 35.7  | 37.0  | 40.1  | 48.4  | 59.4  | 62.3  |
| 40°   | 878.2  | 680.1 | 102.6 | 39.9  | 36.3  | 35.1  | 35.6  | 38.7  | 46.1  | 57.6  | 62.1  |
| 42.5° | 996.0  | 713.4 | 75.6  | 39.1  | 35.6  | 33.9  | 34.2  | 38.2  | 43.6  | 54.1  | 57.3  |
| 45°   | 1092.5 | 737.7 | 59.5  | 38.8  | 33.9  | 33.3  | 33.9  | 37.8  | 41.4  | 46.5  | 49.4  |
| 47.5° | 1165.8 | 766.0 | 47.8  | 37.0  | 33.5  | 33.3  | 32.6  | 35.3  | 37.6  | 38.8  | 40.9  |
| 50°   | 1219.5 | 759.7 | 39.5  | 34.2  | 32.0  | 32.9  | 31.6  | 32.0  | 32.6  | 32.0  | 34.2  |
| 52.5° | 1252.4 | 736.7 | 32.9  | 30.8  | 30.4  | 31.1  | 29.5  | 28.3  | 27.2  | 26.7  | 28.1  |
| 55°   | 1264.4 | 690.8 | 28.0  | 26.4  | 27.4  | 27.7  | 26.4  | 24.1  | 22.5  | 21.6  | 22.7  |
| 57.5° | 1241.7 | 620.9 | 24.3  | 21.9  | 24.1  | 24.1  | 22.5  | 20.1  | 18.1  | 16.6  | 17.8  |
| 60°   | 1184.0 | 543.6 | 21.6  | 18.2  | 20.6  | 20.8  | 18.8  | 16.2  | 14.7  | 13.3  | 14.0  |
| 62.5° | 1076.7 | 459.4 | 18.9  | 15.8  | 17.8  | 17.9  | 15.6  | 13.1  | 12.0  | 10.4  | 11.0  |
| 65°   | 861.9  | 351.3 | 16.1  | 14.0  | 15.4  | 15.0  | 12.9  | 11.2  | 9.8   | 8.3   | 8.6   |
| 67.5° | 559.5  | 216.9 | 14.0  | 12.7  | 13.0  | 12.6  | 10.8  | 9.8   | 8.2   | 7.1   | 7.2   |
| 70°   | 250.5  | 93.4  | 12.3  | 11.4  | 11.3  | 10.6  | 9.2   | 9.1   | 8.1   | 7.1   | 7.1   |
| 72.5° | 77.3   | 35.1  | 10.6  | 10.3  | 9.8   | 8.9   | 8.1   | 8.6   | 7.9   | 6.8   | 6.6   |
| 75°   | 30.5   | 16.1  | 8.7   | 8.7   | 8.5   | 7.3   | 7.2   | 7.7   | 7.3   | 6.2   | 6.0   |
| 77.5° | 16.0   | 10.2  | 7.2   | 7.5   | 7.3   | 5.6   | 6.5   | 7.1   | 6.8   | 5.2   | 4.4   |
| 80°   | 9.5    | 6.2   | 5.4   | 6.1   | 6.0   | 4.0   | 5.0   | 4.5   | 3.3   | 1.5   | 0.4   |
| 82.5° | 5.2    | 2.9   | 2.4   | 3.5   | 3.5   | 1.4   | 2.5   | 2.3   | 1.3   | 0.0   | 0.0   |
| 85°   | 2.5    | 2.0   | 1.8   | 2.0   | 1.4   | 0.4   | 1.3   | 1.3   | 0.7   | 0.0   | 0.0   |
| 87.5° | 1.3    | 1.1   | 0.8   | 0.7   | 0.6   | 0.0   | 0.4   | 0.6   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

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



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: 4π  
 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   |           |      |      |      |



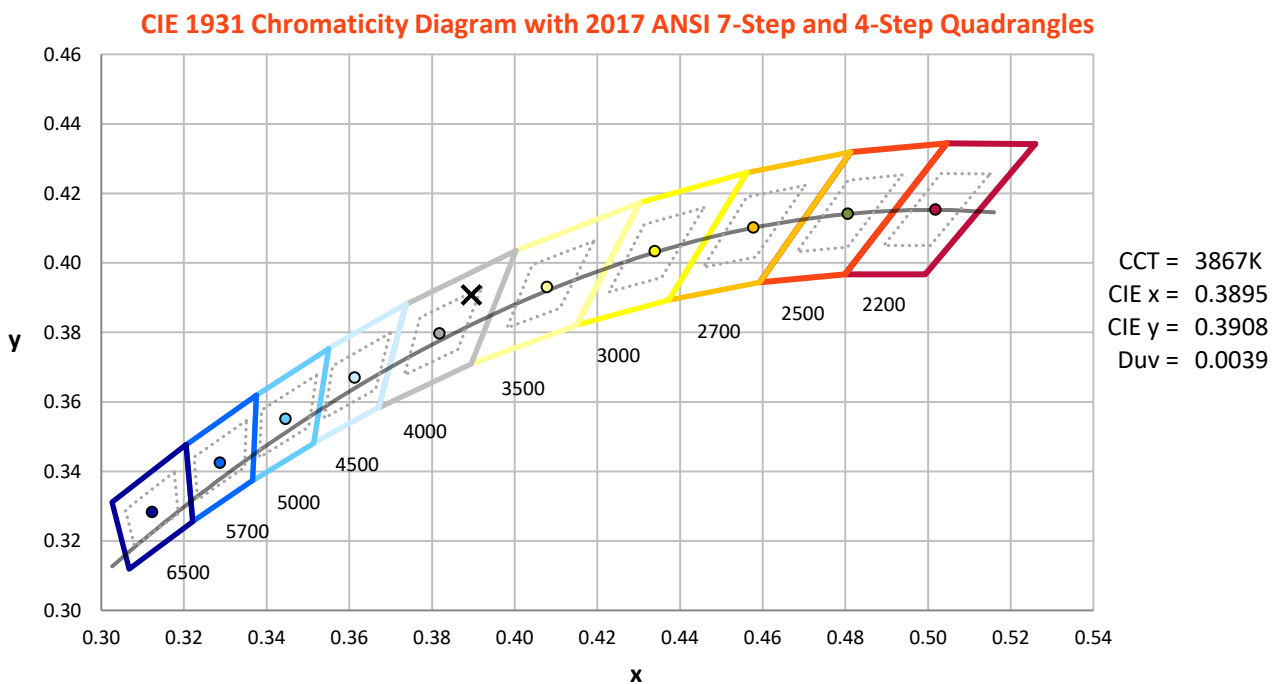
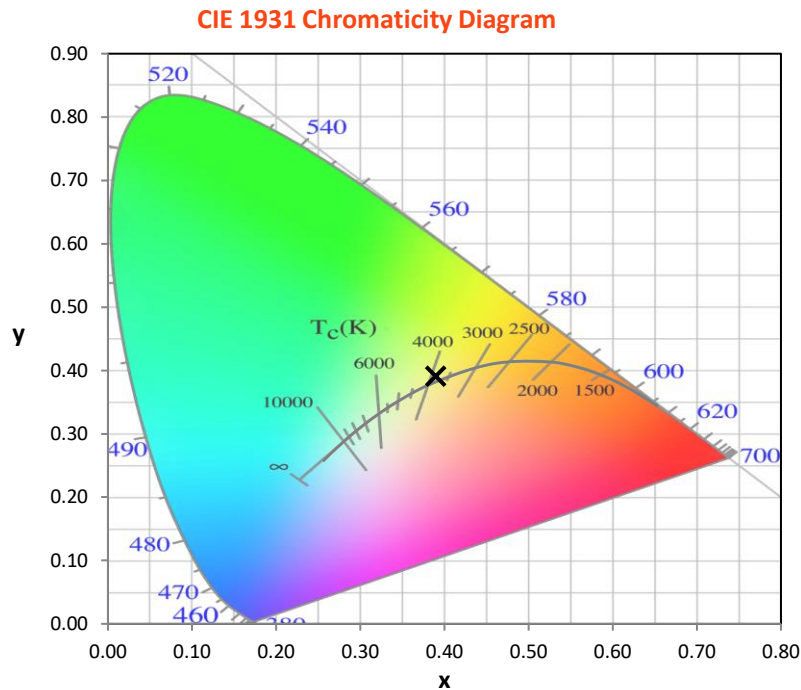
### Test Conditions

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



Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2309-178-2

**Photopic Flux vs. Wavelength**



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

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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               |           |                  |                  |

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**TM-30-18**

**Summary**

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



**Color Vector Graphics**



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**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 |            |



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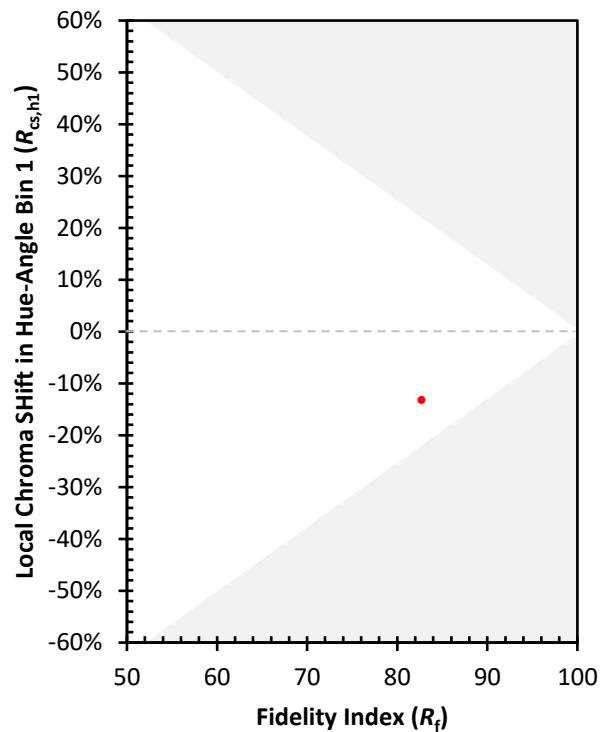
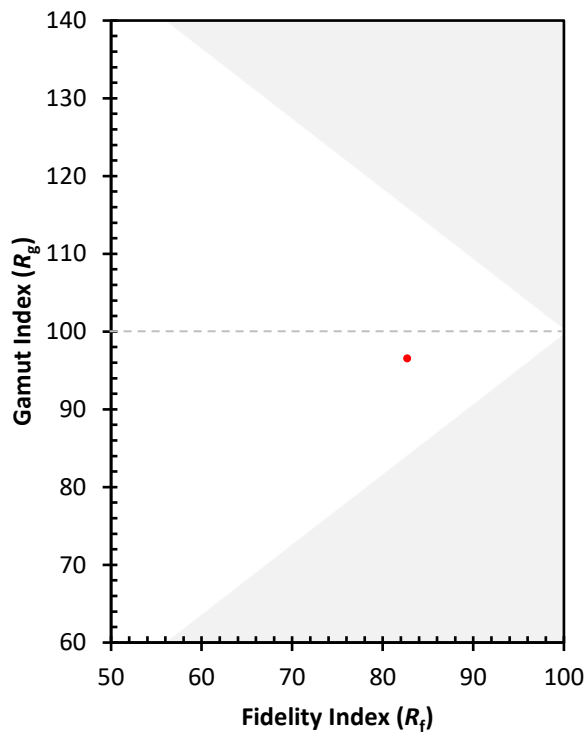
Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)