

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: P630018

Luminaire Tested: GWS-SA1C-827-U-T2-W-GRSBK

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P630018  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-20)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1C-827-U-T2-W-GRSBK  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS W/ FACTORY INSTALLED GLARE SHIELD, BK  
Light Source: (16) 2700K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

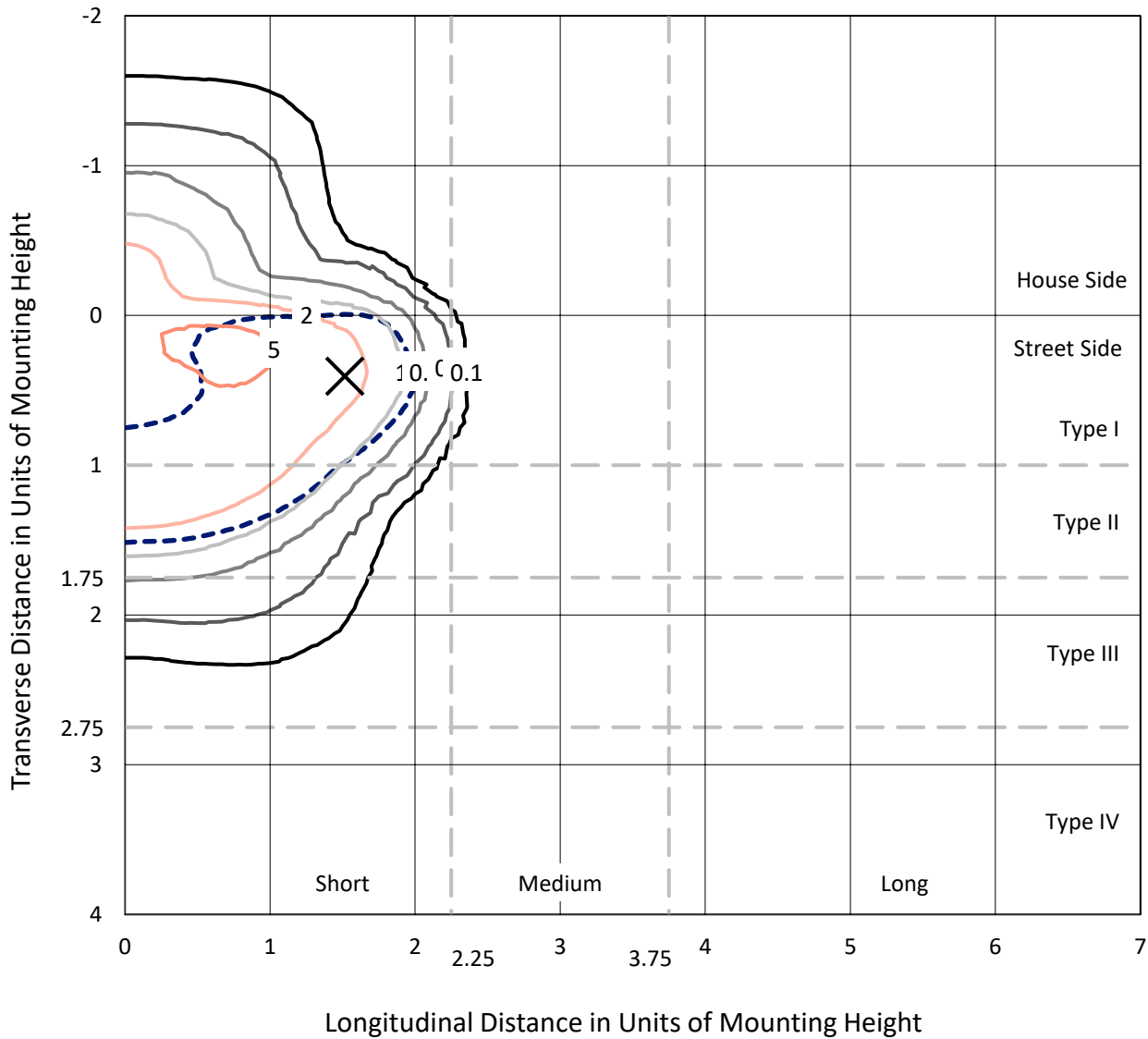
Lumens per Lamp: N/A  
Luminaire Lumens: 2098.8 lumens  
Efficiency: N/A  
Efficacy: 61.5 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G0  
  
Input Watts (W): 34.1  
Input Voltage (V): 120  
Input Current (Ain): 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

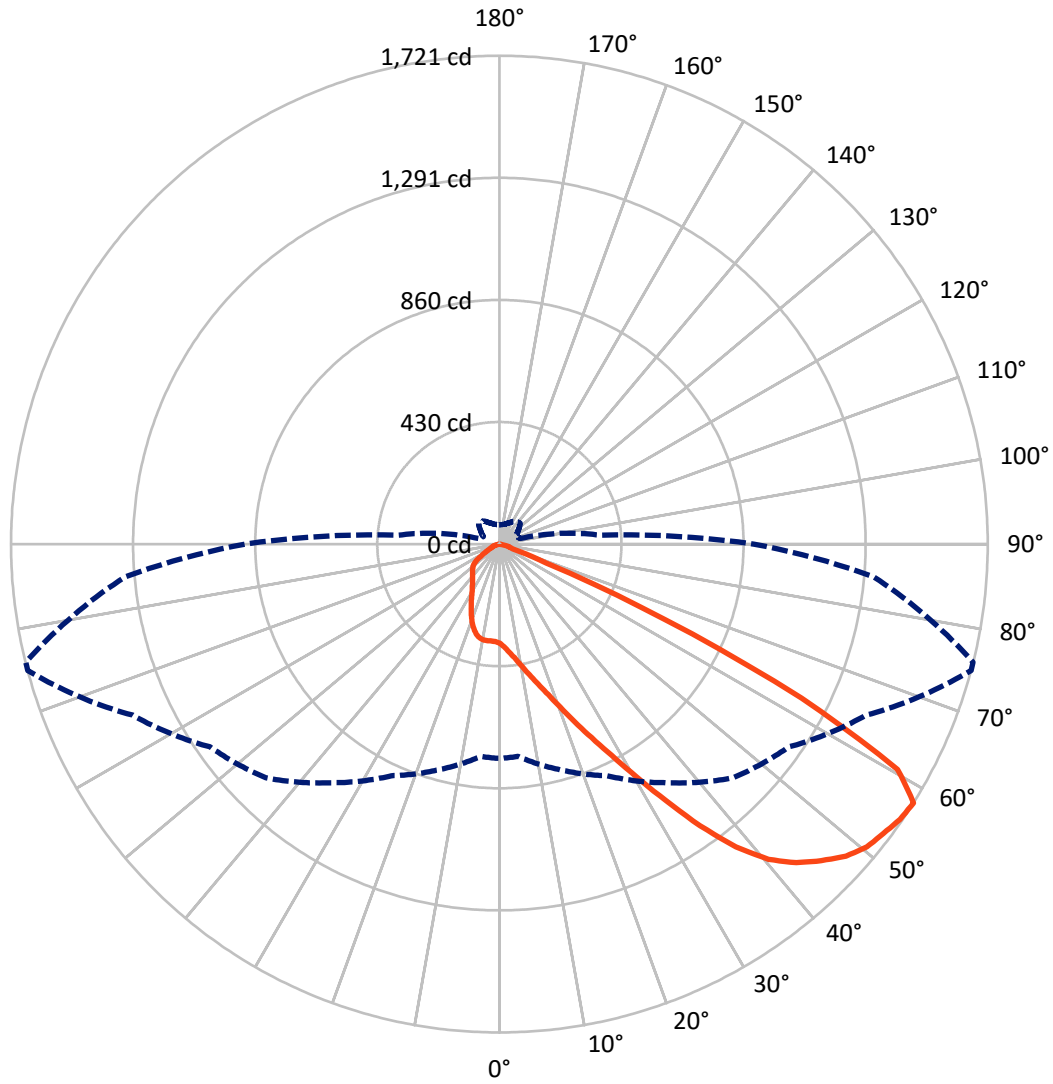
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 6.5 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 75-Deg Lateral    - - - Horizontal Cone Through 57.5-Deg Vertical

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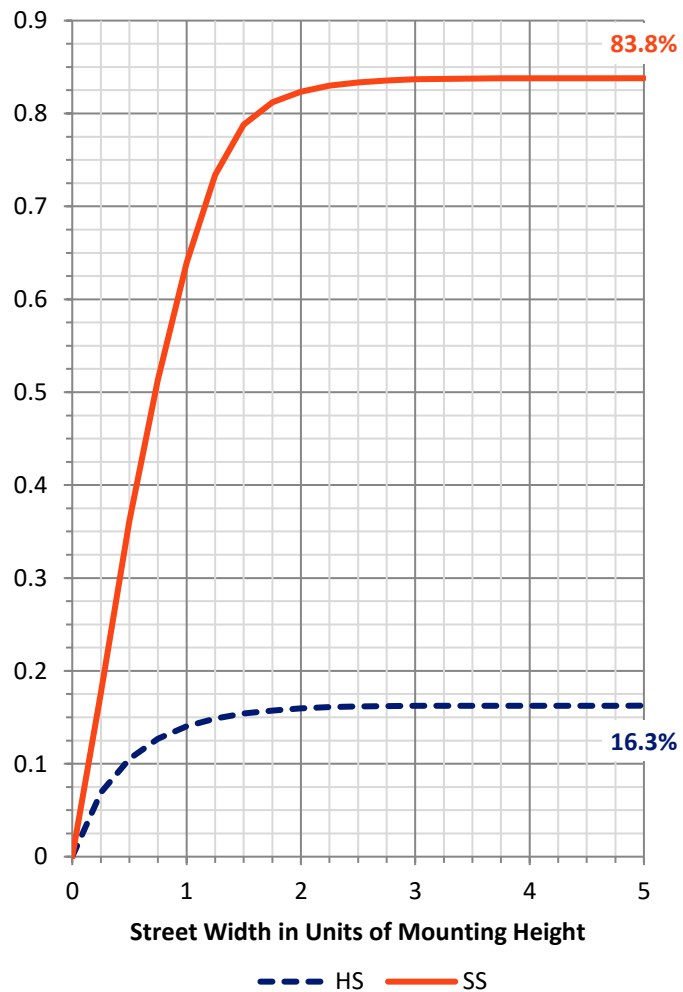
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 342.8    | 0.0    | 342.8  |
|                    | % Fixture | 16.3     | 0.0    | 16.3   |
| <b>Street Side</b> | Lumens    | 1756.0   | 0.0    | 1756.0 |
|                    | % Fixture | 83.7     | 0.0    | 83.7   |
| <b>Total</b>       | Lumens    | 2098.8   | 0.0    | 2098.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 35.6   | 1.7       |
| 10°-20°   | 115.7  | 5.5       |
| 20°-30°   | 211.9  | 10.1      |
| 30°-40°   | 351.6  | 16.8      |
| 40°-50°   | 536.9  | 25.6      |
| 50°-60°   | 603.3  | 28.7      |
| 60°-70°   | 222.5  | 10.6      |
| 70°-80°   | 21.3   | 1.0       |
| 80°-90°   | 0.0    | 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°    | 2098.8 | 100.0     |
| 0°-180°   | 2098.8 | 100.0     |

**Coefficient of Utilization**



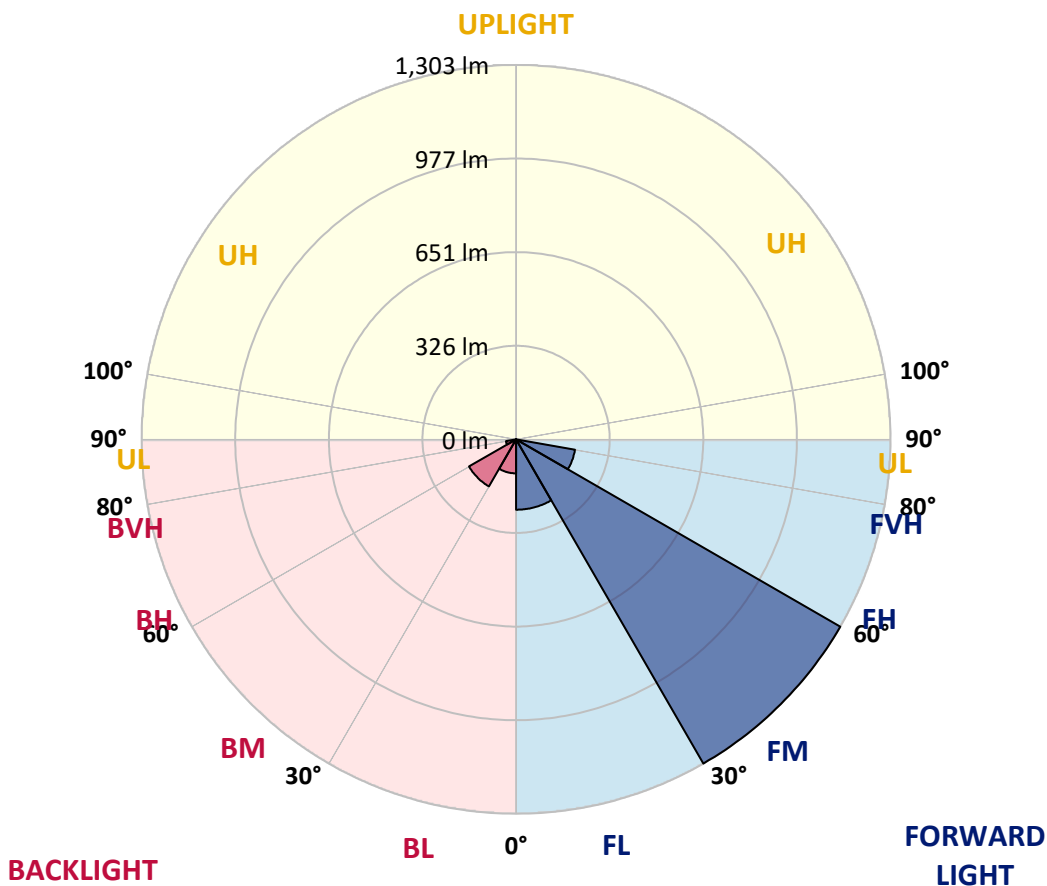
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|----------------|--------|-----------|-------------------------|------|--------|
|                |        |           | B                       | U    | G      |
| FL (0°-30°)    | 244.9  | 11.7      |                         |      |        |
| FM (30°-60°)   | 1302.8 | 62.1      |                         |      |        |
| FH (60°-80°)   | 208.2  | 9.9       |                         |      | G0/660 |
| FVH (80°-90°)  | 0.0    | 0.0       |                         |      | G0/10  |
| BL (0°-30°)    | 118.3  | 5.6       | B1/500                  |      |        |
| BM (30°-60°)   | 188.9  | 9.0       | B0/220                  |      |        |
| BH (60°-80°)   | 35.6   | 1.7       | B0/110                  |      | G0/110 |
| BVH (80°-90°)  | 0.0    | 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°    | 45°    | 55°    | 65°    | 75°    | 76°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 350.1  | 350.1  | 350.1  | 350.1  | 350.1  | 350.1  | 350.1  | 350.1  | 350.1  | 350.1  | 350.1  |
| 2.5°  | 391.1  | 395.1  | 393.9  | 391.3  | 389.8  | 384.5  | 381.2  | 371.6  | 364.7  | 364.0  | 357.6  |
| 5°    | 440.5  | 439.7  | 438.7  | 435.7  | 433.1  | 424.8  | 414.9  | 398.7  | 384.2  | 382.5  | 369.0  |
| 7.5°  | 467.6  | 468.1  | 468.6  | 468.1  | 466.3  | 460.0  | 449.1  | 430.1  | 408.1  | 406.5  | 385.3  |
| 10°   | 478.7  | 479.7  | 482.3  | 487.1  | 491.4  | 490.9  | 484.5  | 465.0  | 437.9  | 435.4  | 406.8  |
| 12.5° | 484.0  | 485.3  | 489.4  | 498.5  | 510.1  | 519.3  | 520.3  | 502.8  | 472.9  | 468.8  | 432.4  |
| 15°   | 491.4  | 492.7  | 497.7  | 509.6  | 526.6  | 544.6  | 556.2  | 545.1  | 511.7  | 507.3  | 460.5  |
| 17.5° | 494.7  | 496.5  | 503.8  | 519.5  | 541.5  | 569.1  | 595.5  | 594.5  | 557.5  | 554.2  | 493.2  |
| 20°   | 501.0  | 502.3  | 508.9  | 525.8  | 552.4  | 592.2  | 636.5  | 652.5  | 613.5  | 608.7  | 532.7  |
| 22.5° | 521.0  | 521.5  | 524.6  | 535.2  | 560.0  | 608.9  | 678.3  | 720.1  | 679.6  | 673.3  | 577.0  |
| 25°   | 553.7  | 553.4  | 554.7  | 556.5  | 574.7  | 625.9  | 718.6  | 796.4  | 755.3  | 748.5  | 627.2  |
| 27.5° | 595.2  | 595.2  | 598.3  | 593.2  | 600.6  | 646.9  | 758.4  | 884.0  | 843.5  | 833.8  | 682.1  |
| 30°   | 644.1  | 643.9  | 651.0  | 642.9  | 645.1  | 680.1  | 801.2  | 979.5  | 949.8  | 937.9  | 745.4  |
| 32.5° | 710.5  | 709.0  | 717.1  | 705.9  | 698.3  | 730.2  | 853.3  | 1079.3 | 1077.3 | 1059.0 | 825.0  |
| 35°   | 794.3  | 791.8  | 794.3  | 783.4  | 769.8  | 800.4  | 921.7  | 1178.8 | 1218.6 | 1199.3 | 919.7  |
| 37.5° | 877.7  | 885.8  | 888.6  | 869.8  | 858.7  | 889.3  | 1004.1 | 1268.0 | 1353.6 | 1333.6 | 1018.2 |
| 40°   | 975.9  | 973.4  | 983.0  | 962.0  | 954.9  | 988.9  | 1084.6 | 1334.3 | 1460.5 | 1441.5 | 1105.9 |
| 42.5° | 1048.4 | 1052.9 | 1064.8 | 1053.2 | 1047.6 | 1079.5 | 1152.2 | 1373.1 | 1534.7 | 1516.0 | 1168.4 |
| 45°   | 1135.3 | 1138.6 | 1143.1 | 1133.5 | 1127.7 | 1159.1 | 1201.1 | 1390.1 | 1591.2 | 1570.9 | 1210.5 |
| 47.5° | 1229.2 | 1231.8 | 1231.8 | 1212.0 | 1193.3 | 1206.2 | 1233.8 | 1399.7 | 1643.1 | 1623.6 | 1241.6 |
| 50°   | 1296.6 | 1297.9 | 1309.0 | 1295.1 | 1254.3 | 1234.3 | 1248.7 | 1409.1 | 1677.6 | 1659.3 | 1251.8 |
| 52.5° | 1236.8 | 1235.3 | 1272.0 | 1300.9 | 1311.8 | 1272.0 | 1274.6 | 1422.7 | 1694.3 | 1678.6 | 1259.9 |
| 55°   | 1041.5 | 1039.0 | 1090.7 | 1160.8 | 1256.8 | 1307.8 | 1305.7 | 1430.9 | 1712.8 | 1703.1 | 1289.3 |
| 57.5° | 755.1  | 750.8  | 822.7  | 900.7  | 1026.6 | 1164.6 | 1245.7 | 1426.3 | 1720.9 | 1720.1 | 1323.5 |
| 60°   | 453.9  | 450.4  | 518.2  | 600.3  | 697.6  | 836.4  | 970.9  | 1277.6 | 1612.5 | 1614.0 | 1234.5 |
| 62.5° | 279.4  | 282.7  | 344.0  | 385.8  | 422.0  | 463.8  | 541.5  | 859.4  | 1194.5 | 1204.4 | 867.5  |
| 65°   | 187.9  | 190.5  | 247.2  | 299.9  | 299.9  | 245.2  | 210.5  | 410.8  | 637.3  | 620.6  | 410.3  |
| 67.5° | 126.1  | 128.9  | 173.8  | 235.3  | 244.2  | 171.0  | 85.4   | 122.6  | 177.6  | 172.2  | 101.6  |
| 70°   | 74.2   | 77.3   | 115.8  | 161.3  | 177.8  | 119.0  | 57.0   | 51.9   | 50.4   | 48.9   | 39.5   |
| 72.5° | 33.2   | 34.4   | 59.0   | 82.1   | 75.0   | 50.2   | 40.3   | 41.5   | 39.3   | 38.5   | 32.2   |
| 75°   | 10.1   | 10.6   | 15.2   | 17.7   | 18.0   | 18.0   | 24.3   | 32.7   | 30.9   | 31.2   | 24.8   |
| 77.5° | 2.5    | 2.5    | 4.1    | 3.8    | 2.0    | 1.8    | 4.6    | 7.3    | 7.6    | 6.8    | 5.1    |
| 80°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.3    | 0.3    | 0.3    | 0.3    | 0.3    | 0.3    |
| 82.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P630018

CATALOG NUMBER: GWS-SA1C-827-U-T2-W-GRSBK

**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 350.1 | 350.1 | 350.1 | 350.1 | 350.1 | 350.1 | 350.1 | 350.1 | 350.1 | 350.1 | 350.1 |
| 2.5°  | 354.9 | 348.3 | 344.0 | 337.9 | 333.6 | 329.0 | 325.0 | 321.7 | 319.9 | 319.4 | 319.7 |
| 5°    | 363.0 | 352.6 | 342.5 | 330.8 | 322.7 | 315.1 | 309.0 | 304.2 | 301.9 | 301.2 | 301.2 |
| 7.5°  | 375.4 | 360.9 | 343.0 | 324.7 | 311.0 | 299.1 | 292.0 | 286.7 | 284.7 | 284.2 | 282.7 |
| 10°   | 391.6 | 371.8 | 342.2 | 313.8 | 294.6 | 282.2 | 277.1 | 275.6 | 276.3 | 276.6 | 276.3 |
| 12.5° | 411.1 | 383.2 | 337.4 | 297.9 | 277.1 | 269.5 | 270.0 | 274.1 | 278.6 | 280.9 | 281.4 |
| 15°   | 431.9 | 393.6 | 326.5 | 278.9 | 262.2 | 261.9 | 269.3 | 278.6 | 287.5 | 291.3 | 292.3 |
| 17.5° | 455.2 | 402.0 | 309.8 | 258.6 | 249.2 | 256.6 | 269.8 | 284.2 | 296.1 | 302.4 | 303.7 |
| 20°   | 480.7 | 408.8 | 288.5 | 239.6 | 237.8 | 251.0 | 269.3 | 287.0 | 301.7 | 308.8 | 310.0 |
| 22.5° | 507.3 | 413.6 | 263.9 | 222.1 | 227.5 | 244.7 | 264.4 | 281.7 | 295.6 | 303.7 | 304.7 |
| 25°   | 537.7 | 414.1 | 238.9 | 207.4 | 217.8 | 236.1 | 252.8 | 267.0 | 278.6 | 285.7 | 286.5 |
| 27.5° | 564.3 | 408.1 | 216.6 | 195.5 | 209.0 | 225.4 | 236.6 | 244.4 | 252.5 | 256.6 | 256.8 |
| 30°   | 595.0 | 397.4 | 195.5 | 185.9 | 199.8 | 212.3 | 217.8 | 219.6 | 220.4 | 221.1 | 220.1 |
| 32.5° | 631.5 | 384.5 | 179.8 | 176.5 | 189.5 | 197.8 | 199.3 | 195.8 | 191.5 | 185.4 | 183.9 |
| 35°   | 676.3 | 372.8 | 166.9 | 167.4 | 178.1 | 183.1 | 181.9 | 174.3 | 165.9 | 158.6 | 157.3 |
| 37.5° | 724.9 | 363.0 | 157.0 | 158.6 | 165.7 | 169.2 | 165.4 | 157.0 | 153.2 | 146.9 | 147.2 |
| 40°   | 768.0 | 354.9 | 148.2 | 149.7 | 153.0 | 156.3 | 150.2 | 144.6 | 151.7 | 151.2 | 151.7 |
| 42.5° | 798.6 | 348.0 | 140.6 | 139.8 | 142.1 | 144.4 | 139.8 | 137.0 | 148.9 | 145.6 | 147.4 |
| 45°   | 816.6 | 341.7 | 134.2 | 129.7 | 133.2 | 137.3 | 134.2 | 130.7 | 134.8 | 119.6 | 118.3 |
| 47.5° | 828.8 | 338.1 | 128.7 | 119.8 | 126.1 | 133.2 | 126.9 | 118.3 | 112.5 | 99.3  | 98.3  |
| 50°   | 830.0 | 336.4 | 122.1 | 109.7 | 117.8 | 125.4 | 118.0 | 106.1 | 97.8  | 91.9  | 91.2  |
| 52.5° | 836.6 | 339.9 | 113.0 | 96.8  | 105.6 | 117.8 | 112.7 | 100.8 | 89.4  | 84.3  | 83.3  |
| 55°   | 866.0 | 354.9 | 97.8  | 79.0  | 91.9  | 112.0 | 108.4 | 89.9  | 79.0  | 76.0  | 75.2  |
| 57.5° | 896.4 | 357.9 | 77.0  | 62.6  | 80.0  | 103.6 | 99.0  | 82.8  | 72.2  | 68.6  | 67.9  |
| 60°   | 819.7 | 294.8 | 57.8  | 51.7  | 70.7  | 95.7  | 91.7  | 78.5  | 66.1  | 61.8  | 61.0  |
| 62.5° | 538.5 | 159.3 | 45.8  | 43.8  | 59.5  | 81.1  | 83.6  | 70.9  | 59.0  | 54.5  | 54.2  |
| 65°   | 248.2 | 74.0  | 35.2  | 34.7  | 46.6  | 64.6  | 71.9  | 62.1  | 49.9  | 45.8  | 45.8  |
| 67.5° | 67.6  | 36.7  | 27.6  | 25.6  | 31.7  | 43.3  | 52.4  | 46.4  | 35.5  | 30.6  | 30.4  |
| 70°   | 33.7  | 29.6  | 24.8  | 22.0  | 22.8  | 26.8  | 30.9  | 25.8  | 18.0  | 14.7  | 14.4  |
| 72.5° | 27.6  | 24.3  | 21.0  | 18.7  | 17.2  | 16.5  | 16.0  | 12.9  | 8.4   | 6.3   | 6.1   |
| 75°   | 20.5  | 17.5  | 14.9  | 12.2  | 10.4  | 9.6   | 8.6   | 6.3   | 3.5   | 2.0   | 1.8   |
| 77.5° | 4.6   | 4.3   | 4.1   | 3.0   | 2.8   | 2.3   | 1.8   | 1.3   | 0.5   | 0.0   | 0.0   |
| 80°   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



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

Invue

Report Number: SP1-2407-157-9

Test Date: 10/03/2024

Luminaire Tested: EMM2-HTN-SA1A-827-U-5WQ

Data applicable to all product families utilizing light square engine

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/03/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Invue  
 Catalog Number: **EMM2-HTN-SA1A-827-U-5WQ**  
 Description: Epic Modern Light Square 40W 5WQ Optic

**Spectral Parameters**

CCT (K): 2764  
 CIE u': 0.2591  
 CIE v': 0.5290  
 Duv: 0.0020  
 CIE x: 0.4581  
 CIE y: 0.4156  
 CIE z: 0.1263  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 583  
 Purity: 62.2537  
 Rf: 84.7  
 Rg: 94.6

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 80.9 |      |      |
| R1:       | 78.8 | R9:  | -1.5 |
| R2:       | 89.9 | R10: | 77.9 |
| R3:       | 96.2 | R11: | 78.9 |
| R4:       | 79.1 | R12: | 71.6 |
| R5:       | 79.1 | R13: | 81.2 |
| R6:       | 88.8 | R14: | 98.5 |
| R7:       | 81.3 | R15: | 69.9 |
| R8:       | 54.3 |      |      |



**Test Conditions**

Stabilization Time: 81M  
 Operation Time: 2H 21M  
 Sphere Temperature (°C): 25.2

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: 4337.9**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 2.6                            | 620               | 87426                                | 22.8                           | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 3.9                            | 625               | 83013                                | 18.2                           | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 5.8                            | 630               | 78077                                | 14.1                           | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 8.5                            | 635               | 72080                                | 10.7                           | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 11.5                           | 640               | 66249                                | 7.9                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 15.2                           | 645               | 59973                                | 5.7                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 18.7                           | 650               | 53972                                | 3.9                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 21.9                           | 655               | 48369                                | 2.7                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 24.9                           | 660               | 42641                                | 1.8                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 27.6                           | 665               | 37602                                | 1.1                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.0                            | 540               | 46032                                | 30.0                           | 670               | 32798                                | 0.7                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.0                            | 545               | 48553                                | 32.5                           | 675               | 28558                                | 0.5                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 0.0                            | 550               | 51408                                | 34.9                           | 680               | 24782                                | 0.3                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 0.0                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.2                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 0.0                            | 560               | 58847                                | 40.0                           | 690               | 18413                                | 0.1                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 0.1                            | 565               | 63386                                | 42.4                           | 695               | 15721                                | 0.1                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 0.2                            | 570               | 68196                                | 44.3                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 0.6                            | 575               | 73613                                | 46.0                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 0.9                            | 580               | 79207                                | 47.1                           | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 0.9                            | 585               | 84248                                | 47.0                           | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 0.9                            | 590               | 88397                                | 45.7                           | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 1.0                            | 595               | 91428                                | 43.4                           | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 0.9                            | 600               | 93452                                | 40.3                           | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 1.0                            | 605               | 93959                                | 36.4                           | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 1.3                            | 610               | 93079                                | 32.0                           | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 1.8                            | 615               | 90707                                | 27.3                           | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

REPORT NUMBER: SP1-2407-157-9

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 5286.7**

**S/P: 1.22**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 75.9                           | 620               | 87426                                | 0.4                            | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 93.2                           | 625               | 83013                                | 0.2                            | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 107.8                          | 630               | 78077                                | 0.1                            | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 118.7                          | 635               | 72080                                | 0.1                            | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 122.2                          | 640               | 66249                                | 0.1                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 120.8                          | 645               | 59973                                | 0.0                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 113.9                          | 650               | 53972                                | 0.0                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 104.1                          | 655               | 48369                                | 0.0                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 92.4                           | 660               | 42641                                | 0.0                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 80.5                           | 665               | 37602                                | 0.0                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.1                            | 540               | 46032                                | 68.2                           | 670               | 32798                                | 0.0                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.3                            | 545               | 48553                                | 57.1                           | 675               | 28558                                | 0.0                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 1.1                            | 550               | 51408                                | 46.7                           | 680               | 24782                                | 0.0                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 2.5                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.0                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 5.9                            | 560               | 58847                                | 29.4                           | 690               | 18413                                | 0.0                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 12.5                           | 565               | 63386                                | 22.5                           | 695               | 15721                                | 0.0                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 26.3                           | 570               | 68196                                | 16.9                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 55.2                           | 575               | 73613                                | 12.4                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 85.4                           | 580               | 79207                                | 9.0                            | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 75.1                           | 585               | 84248                                | 6.3                            | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 63.2                           | 590               | 88397                                | 4.4                            | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 63.2                           | 595               | 91428                                | 3.0                            | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 54.2                           | 600               | 93452                                | 2.0                            | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 48.8                           | 605               | 93959                                | 1.3                            | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 54.2                           | 610               | 93079                                | 0.9                            | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 63.3                           | 615               | 90707                                | 0.5                            | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

REPORT NUMBER: SP1-2407-157-9

Melanopic Flux vs. Wavelength



Melanopic Lumens: 9797 M/P: 2.26

| 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    | 0             | 0.0           | 490    | 18018         | 27.7          | 620    | 87426         | 1.1           | 750    | 2680          | 0.0           | 880    | 58            | 0.0           |
| 365    | 0             | 0.0           | 495    | 22295         | 36.0          | 625    | 83013         | 0.7           | 755    | 2287          | 0.0           | 885    | 46            | 0.0           |
| 370    | 0             | 0.0           | 500    | 26478         | 44.2          | 630    | 78077         | 0.4           | 760    | 1944          | 0.0           | 890    | 45            | 0.0           |
| 375    | 0             | 0.0           | 505    | 30524         | 51.8          | 635    | 72080         | 0.3           | 765    | 1653          | 0.0           | 895    | 41            | 0.0           |
| 380    | 0             | 0.0           | 510    | 33611         | 57.0          | 640    | 66249         | 0.2           | 770    | 1413          | 0.0           | 900    | 38            | 0.0           |
| 385    | 0             | 0.0           | 515    | 36490         | 60.5          | 645    | 59973         | 0.1           | 775    | 1198          | 0.0           | 905    | 33            | 0.0           |
| 390    | 0             | 0.0           | 520    | 38610         | 61.4          | 650    | 53972         | 0.1           | 780    | 1025          | 0.0           | 910    | 30            | 0.0           |
| 395    | 0             | 0.0           | 525    | 40511         | 60.6          | 655    | 48369         | 0.0           | 785    | 874           | 0.0           | 915    | 23            | 0.0           |
| 400    | 48            | 0.0           | 530    | 42223         | 58.2          | 660    | 42641         | 0.0           | 790    | 747           | 0.0           | 920    | 24            | 0.0           |
| 405    | 201           | 0.0           | 535    | 44137         | 55.0          | 665    | 37602         | 0.0           | 795    | 639           | 0.0           | 925    | 22            | 0.0           |
| 410    | 457           | 0.0           | 540    | 46032         | 50.9          | 670    | 32798         | 0.0           | 800    | 547           | 0.0           | 930    | 22            | 0.0           |
| 415    | 925           | 0.1           | 545    | 48553         | 46.6          | 675    | 28558         | 0.0           | 805    | 473           | 0.0           | 935    | 17            | 0.0           |
| 420    | 1816          | 0.3           | 550    | 51408         | 42.0          | 680    | 24782         | 0.0           | 810    | 401           | 0.0           | 940    | 13            | 0.0           |
| 425    | 3217          | 0.8           | 555    | 54711         | 37.4          | 685    | 21386         | 0.0           | 815    | 351           | 0.0           | 945    | 6             | 0.0           |
| 430    | 5520          | 1.9           | 560    | 58847         | 32.9          | 690    | 18413         | 0.0           | 820    | 307           | 0.0           | 950    | 10            | 0.0           |
| 435    | 9225          | 4.1           | 565    | 63386         | 28.4          | 695    | 15721         | 0.0           | 825    | 261           | 0.0           | 955    | 11            | 0.0           |
| 440    | 15522         | 8.7           | 570    | 68196         | 24.1          | 700    | 13432         | 0.0           | 830    | 228           | 0.0           | 960    | 8             | 0.0           |
| 445    | 27642         | 18.5          | 575    | 73613         | 20.0          | 705    | 11513         | 0.0           | 835    | 193           | 0.0           | 965    | 12            | 0.0           |
| 450    | 36602         | 28.3          | 580    | 79207         | 16.3          | 710    | 9780          | 0.0           | 840    | 174           | 0.0           | 970    | 3             | 0.0           |
| 455    | 28292         | 24.7          | 585    | 84248         | 12.9          | 715    | 8356          | 0.0           | 845    | 151           | 0.0           | 975    | 8             | 0.0           |
| 460    | 21166         | 20.4          | 590    | 88397         | 9.8           | 720    | 7161          | 0.0           | 850    | 123           | 0.0           | 980    | 2             | 0.0           |
| 465    | 19092         | 20.1          | 595    | 91428         | 7.3           | 725    | 6067          | 0.0           | 855    | 106           | 0.0           | 985    | 13            | 0.0           |
| 470    | 14951         | 17.2          | 600    | 93452         | 5.3           | 730    | 5164          | 0.0           | 860    | 95            | 0.0           | 990    | 16            | 0.0           |
| 475    | 12606         | 15.7          | 605    | 93959         | 3.7           | 735    | 4393          | 0.0           | 865    | 82            | 0.0           | 995    | 20            | 0.0           |
| 480    | 13323         | 18.0          | 610    | 93079         | 2.5           | 740    | 3694          | 0.0           | 870    | 77            | 0.0           | 1000   | 0             | 0.0           |
| 485    | 15164         | 21.9          | 615    | 90707         | 1.7           | 745    | 3157          | 0.0           | 875    | 65            | 0.0           |        |               |               |

**Summary**

$R_f = 84.7$   
 $R_g = 94.6$   
 CIE  $R_a = 80.9$   
 $R_9 = -1.5$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 95 | CES76 = 81 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 71 | CES29 = 87 | CES54 = 91 | CES79 = 89 |
| CES05 = 50 | CES30 = 94 | CES55 = 90 | CES80 = 89 |
| CES06 = 52 | CES31 = 89 | CES56 = 86 | CES81 = 69 |
| CES07 = 43 | CES32 = 82 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 91 | CES58 = 86 | CES83 = 93 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 77 | CES35 = 96 | CES60 = 94 | CES85 = 76 |
| CES11 = 60 | CES36 = 90 | CES61 = 89 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 94 | CES87 = 84 |
| CES13 = 44 | CES38 = 98 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 82 | CES89 = 73 |
| CES15 = 72 | CES40 = 95 | CES65 = 78 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 81 | CES91 = 82 |
| CES17 = 50 | CES42 = 97 | CES67 = 80 | CES92 = 64 |
| CES18 = 57 | CES43 = 91 | CES68 = 83 | CES93 = 78 |
| CES19 = 73 | CES44 = 99 | CES69 = 88 | CES94 = 59 |
| CES20 = 67 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 89 | CES71 = 79 | CES96 = 83 |
| CES22 = 79 | CES47 = 92 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 83 | CES73 = 75 | CES98 = 83 |
| CES24 = 91 | CES49 = 90 | CES74 = 91 | CES99 = 74 |
| CES25 = 72 | CES50 = 94 | CES75 = 81 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)