

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: P630578

Luminaire Tested: GWS-SA1D-830-U-T3-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P630578  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-26)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1D-830-U-T3-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (16) 3000K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

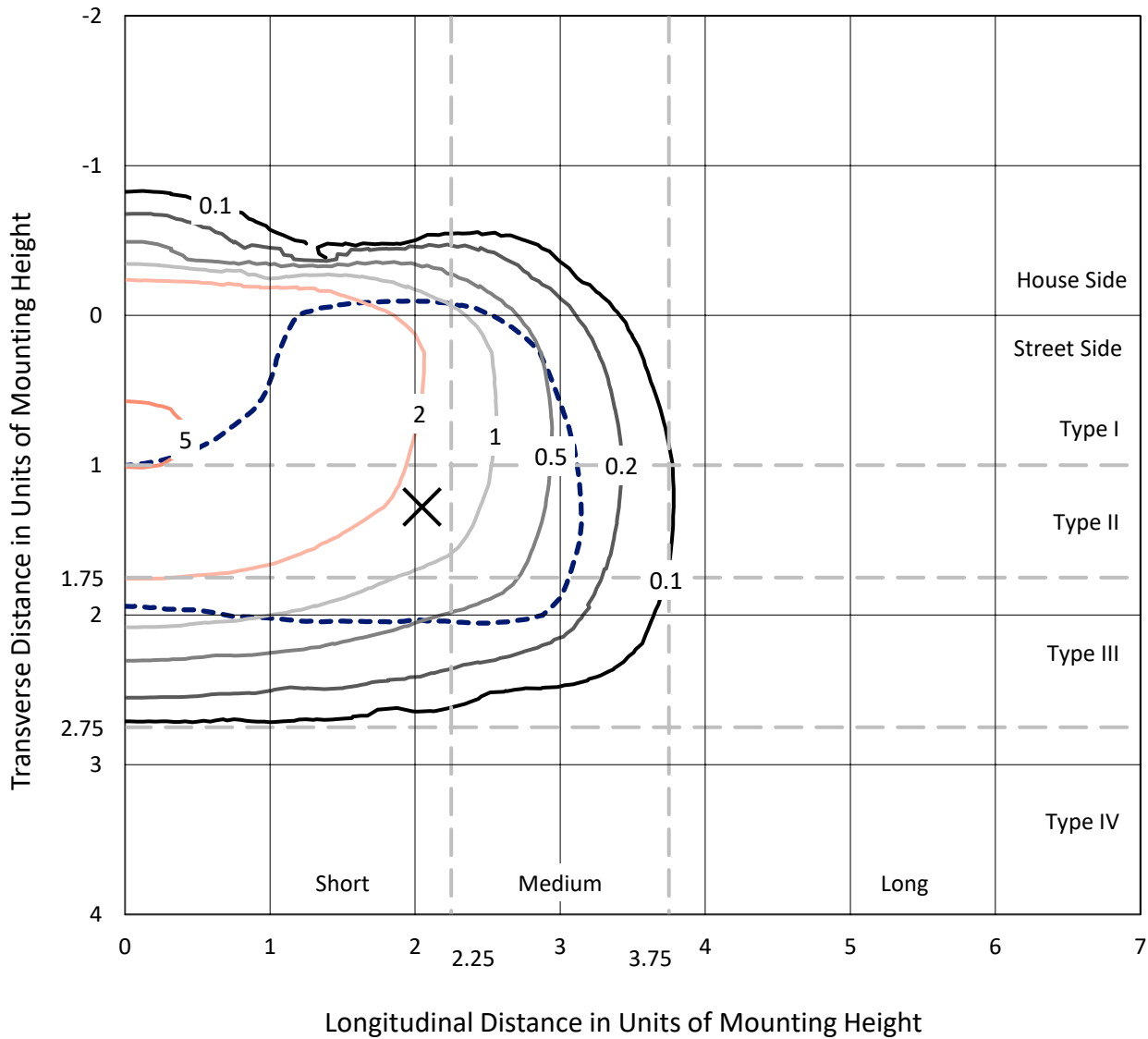
Lumens per Lamp: N/A  
Luminaire Lumens: 3536.4 lumens  
Efficiency: N/A  
Efficacy: 79.8 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B1 - U0 - G1  
  
Input Watts (W): 44.3  
Input Voltage (V): 120  
Input Current (Ain): 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

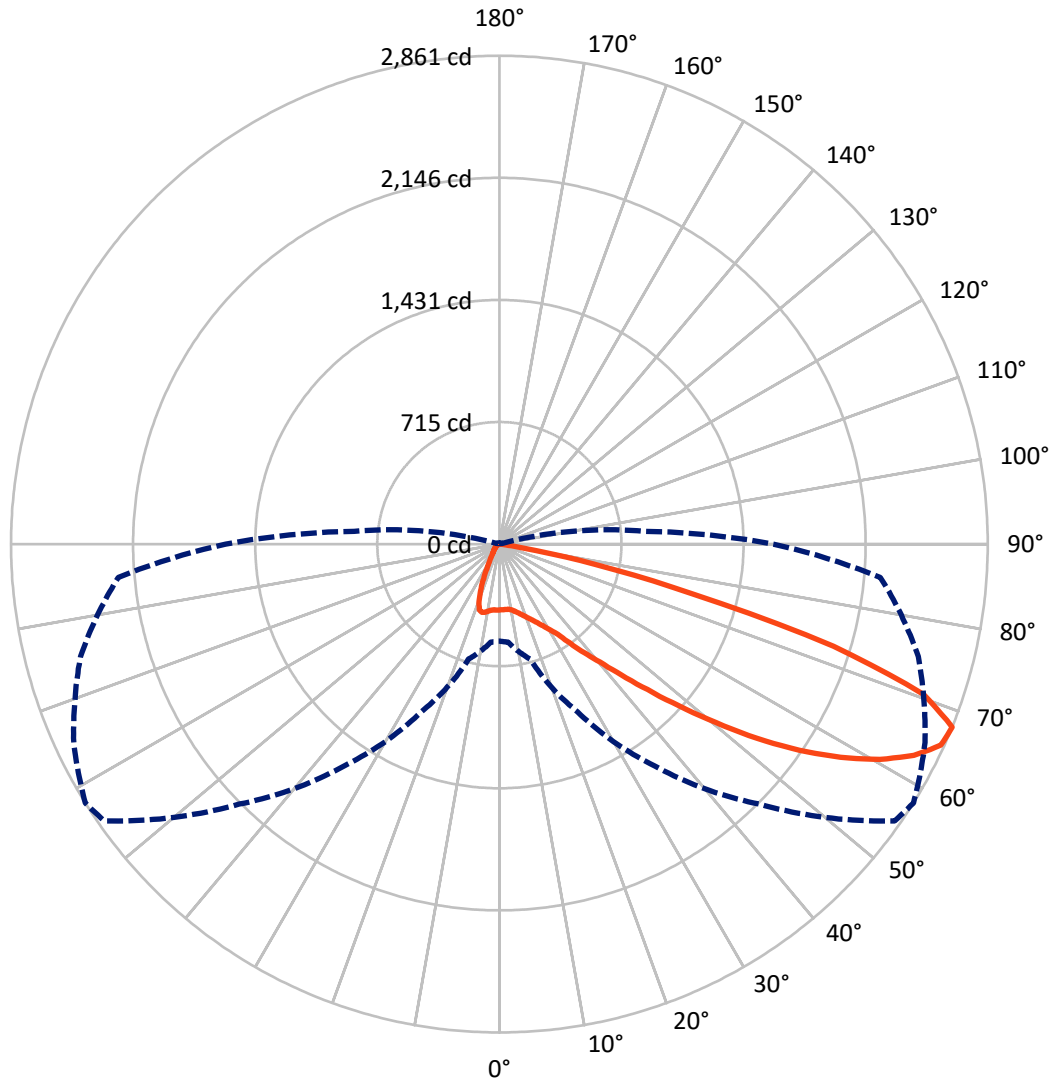
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 5.4 fc  
 Type III - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 58-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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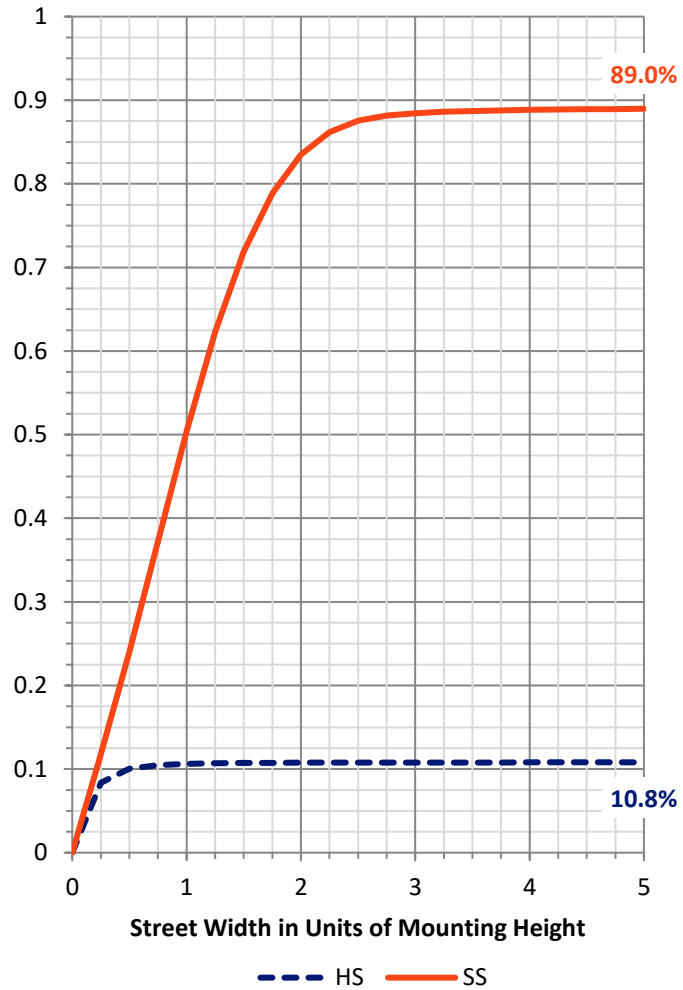
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 385.8    | 0.0    | 385.8  |
|                    | % Fixture | 10.9     | 0.0    | 10.9   |
| <b>Street Side</b> | Lumens    | 3150.6   | 0.0    | 3150.6 |
|                    | % Fixture | 89.1     | 0.0    | 89.1   |
| <b>Total</b>       | Lumens    | 3536.4   | 0.0    | 3536.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 36.2   | 1.0       |
| 10°-20°   | 101.6  | 2.9       |
| 20°-30°   | 177.4  | 5.0       |
| 30°-40°   | 316.8  | 9.0       |
| 40°-50°   | 579.1  | 16.4      |
| 50°-60°   | 963.1  | 27.2      |
| 60°-70°   | 1046.1 | 29.6      |
| 70°-80°   | 307.2  | 8.7       |
| 80°-90°   | 8.7    | 0.2       |
| 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°    | 3536.4 | 100.0     |
| 0°-180°   | 3536.4 | 100.0     |

**Coefficient of Utilization**



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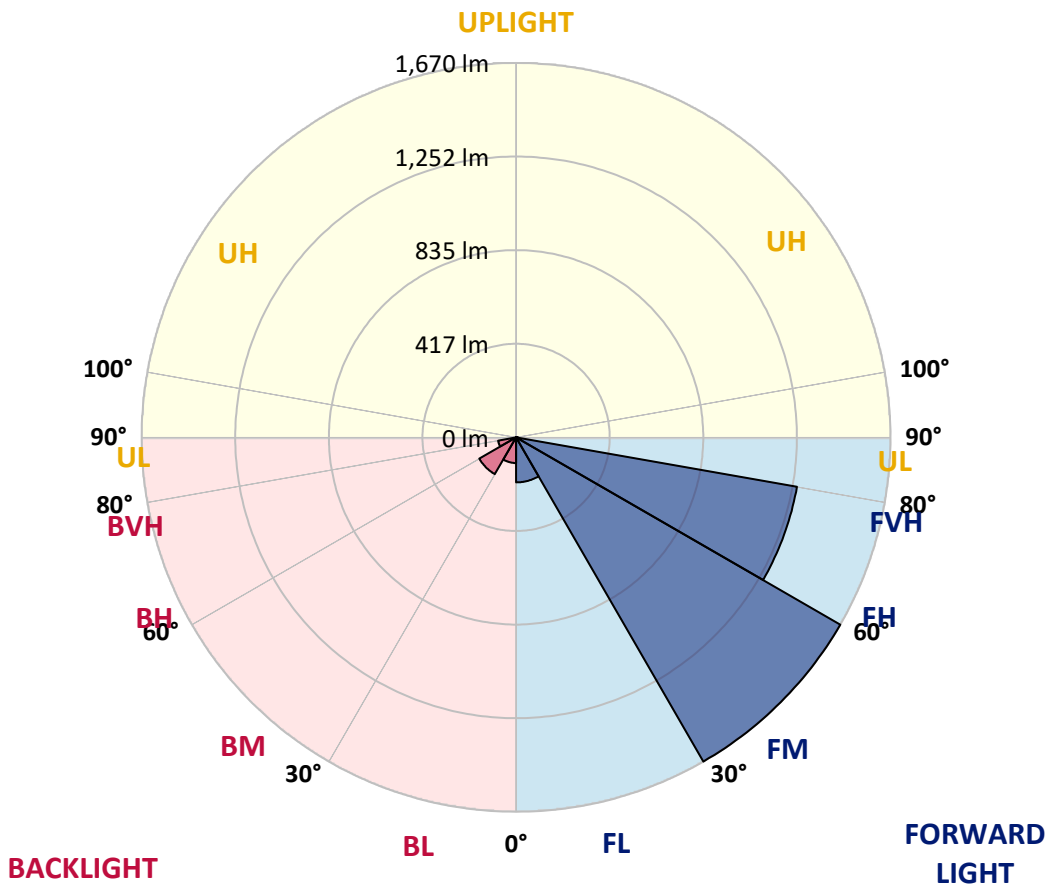
CATALOG NUMBER: GWS-SA1D-830-U-T3-W-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 200.8  | 5.7       |                         |      |         |
| FM (30°-60°)   | 1669.6 | 47.2      |                         |      |         |
| FH (60°-80°)   | 1271.8 | 36.0      |                         |      | G1/1800 |
| FVH (80°-90°)  | 8.3    | 0.2       |                         |      | G0/10   |
| BL (0°-30°)    | 114.4  | 3.2       | B1/500                  |      |         |
| BM (30°-60°)   | 189.5  | 5.4       | B0/220                  |      |         |
| BH (60°-80°)   | 81.4   | 2.3       | B0/110                  |      | G0/110  |
| BVH (80°-90°)  | 0.4    | 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-G1**

Type III Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 385.4  | 385.4  | 385.4  | 385.4  | 385.4  | 385.4  | 385.4  | 385.4  | 385.4  | 385.4  | 385.4  |
| 2.5°  | 378.1  | 377.4  | 377.4  | 380.2  | 380.5  | 381.9  | 385.0  | 385.4  | 387.1  | 386.4  | 384.0  |
| 5°    | 358.4  | 358.8  | 360.8  | 365.7  | 369.8  | 375.0  | 382.6  | 384.3  | 388.1  | 390.2  | 388.8  |
| 7.5°  | 340.1  | 340.5  | 343.6  | 351.2  | 359.1  | 369.5  | 381.9  | 385.4  | 393.0  | 398.5  | 398.8  |
| 10°   | 333.2  | 332.9  | 336.0  | 344.6  | 355.0  | 369.5  | 387.4  | 391.9  | 403.3  | 413.0  | 414.7  |
| 12.5° | 335.3  | 334.9  | 338.1  | 346.0  | 357.4  | 375.7  | 397.1  | 403.3  | 417.8  | 432.7  | 435.8  |
| 15°   | 343.6  | 343.2  | 345.3  | 351.9  | 364.3  | 383.3  | 409.5  | 418.9  | 437.2  | 455.1  | 459.9  |
| 17.5° | 368.4  | 366.7  | 364.6  | 365.3  | 372.6  | 392.3  | 425.4  | 436.8  | 459.6  | 481.0  | 485.2  |
| 20°   | 412.6  | 408.2  | 402.6  | 395.4  | 391.9  | 405.4  | 443.7  | 456.8  | 484.5  | 509.0  | 509.7  |
| 22.5° | 479.3  | 477.6  | 464.8  | 443.7  | 428.9  | 429.2  | 465.1  | 480.3  | 514.2  | 541.1  | 537.3  |
| 25°   | 572.2  | 571.1  | 551.5  | 516.9  | 478.2  | 465.1  | 492.4  | 507.9  | 549.4  | 578.0  | 566.0  |
| 27.5° | 687.5  | 680.3  | 657.1  | 610.5  | 552.8  | 511.7  | 526.9  | 540.7  | 586.7  | 613.6  | 590.8  |
| 30°   | 788.0  | 788.3  | 766.6  | 717.9  | 653.0  | 581.8  | 569.1  | 581.2  | 620.9  | 649.2  | 621.6  |
| 32.5° | 884.7  | 887.8  | 864.0  | 820.1  | 749.0  | 673.3  | 629.5  | 631.6  | 664.7  | 695.4  | 662.0  |
| 35°   | 974.5  | 976.9  | 960.3  | 923.0  | 856.7  | 769.0  | 713.7  | 712.7  | 730.7  | 762.1  | 718.2  |
| 37.5° | 1074.9 | 1077.4 | 1061.1 | 1027.6 | 965.5  | 878.5  | 809.4  | 808.0  | 815.3  | 840.8  | 790.8  |
| 40°   | 1182.0 | 1186.5 | 1168.5 | 1140.2 | 1080.8 | 1007.3 | 920.6  | 908.2  | 900.9  | 930.9  | 884.7  |
| 42.5° | 1290.4 | 1297.3 | 1291.1 | 1262.8 | 1212.0 | 1151.3 | 1064.9 | 1045.6 | 1030.0 | 1067.7 | 1018.7 |
| 45°   | 1425.1 | 1433.4 | 1430.6 | 1408.9 | 1369.5 | 1320.1 | 1238.6 | 1216.2 | 1208.9 | 1243.8 | 1185.4 |
| 47.5° | 1554.6 | 1563.5 | 1573.6 | 1568.7 | 1540.8 | 1518.0 | 1427.5 | 1414.7 | 1412.6 | 1449.9 | 1359.5 |
| 50°   | 1650.9 | 1659.2 | 1697.5 | 1725.2 | 1744.1 | 1739.3 | 1660.9 | 1641.9 | 1638.8 | 1662.7 | 1543.2 |
| 52.5° | 1720.0 | 1727.9 | 1780.7 | 1867.1 | 1936.8 | 1974.8 | 1895.7 | 1891.6 | 1874.7 | 1866.4 | 1715.1 |
| 55°   | 1773.5 | 1784.5 | 1840.1 | 1970.7 | 2111.2 | 2195.5 | 2146.1 | 2131.2 | 2087.7 | 2040.1 | 1874.7 |
| 57.5° | 1784.2 | 1788.7 | 1867.1 | 2043.2 | 2246.6 | 2383.0 | 2383.0 | 2357.1 | 2273.2 | 2207.2 | 2059.1 |
| 60°   | 1688.2 | 1702.0 | 1808.0 | 2037.3 | 2304.6 | 2505.5 | 2579.4 | 2561.5 | 2448.2 | 2367.1 | 2236.5 |
| 62.5° | 1475.1 | 1490.7 | 1619.8 | 1896.8 | 2246.6 | 2530.8 | 2728.3 | 2725.5 | 2597.7 | 2499.3 | 2383.7 |
| 65°   | 1131.2 | 1142.6 | 1255.2 | 1586.7 | 2001.4 | 2433.7 | 2834.6 | 2842.2 | 2715.8 | 2586.7 | 2434.4 |
| 67.5° | 568.4  | 576.3  | 697.9  | 1083.9 | 1586.3 | 2154.4 | 2827.4 | 2861.2 | 2751.7 | 2540.4 | 2240.7 |
| 70°   | 198.6  | 206.5  | 263.8  | 465.1  | 965.5  | 1645.0 | 2582.9 | 2638.1 | 2540.8 | 2168.5 | 1653.0 |
| 72.5° | 68.0   | 71.8   | 109.5  | 172.7  | 375.7  | 975.1  | 1964.1 | 2047.3 | 1872.9 | 1455.8 | 949.9  |
| 75°   | 38.7   | 41.1   | 58.7   | 93.6   | 157.5  | 320.8  | 1114.3 | 1165.4 | 1091.9 | 793.5  | 390.9  |
| 77.5° | 26.2   | 28.3   | 36.6   | 53.2   | 87.0   | 103.2  | 454.4  | 572.2  | 499.0  | 259.0  | 99.8   |
| 80°   | 15.5   | 16.9   | 22.4   | 31.4   | 44.5   | 40.1   | 97.4   | 129.5  | 166.8  | 77.3   | 30.0   |
| 82.5° | 7.3    | 8.3    | 14.5   | 20.7   | 22.4   | 16.9   | 28.7   | 34.9   | 47.0   | 38.0   | 12.4   |
| 85°   | 0.0    | 0.0    | 4.8    | 8.6    | 8.3    | 4.8    | 7.9    | 8.6    | 12.8   | 19.0   | 4.8    |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.3    | 0.7    | 1.0    | 2.1    | 3.8    | 2.1    |
| 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: P630578

CATALOG NUMBER: GWS-SA1D-830-U-T3-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 385.4  | 385.4  | 385.4 | 385.4 | 385.4 | 385.4 | 385.4 | 385.4 | 385.4 | 385.4 | 385.4 |
| 2.5°  | 386.7  | 384.3  | 387.1 | 385.7 | 387.1 | 386.7 | 384.0 | 382.3 | 382.3 | 379.1 | 378.1 |
| 5°    | 391.6  | 389.2  | 389.9 | 386.7 | 386.1 | 384.3 | 380.9 | 379.5 | 379.5 | 376.4 | 375.3 |
| 7.5°  | 402.3  | 398.5  | 397.8 | 391.6 | 388.8 | 384.0 | 377.8 | 375.3 | 375.0 | 371.9 | 370.9 |
| 10°   | 419.2  | 414.7  | 411.6 | 403.7 | 395.7 | 386.1 | 372.9 | 361.9 | 355.7 | 347.4 | 346.7 |
| 12.5° | 439.9  | 434.4  | 429.6 | 417.5 | 404.4 | 382.6 | 343.9 | 303.5 | 278.7 | 259.0 | 260.4 |
| 15°   | 463.1  | 457.9  | 450.3 | 432.0 | 405.0 | 348.4 | 267.6 | 205.5 | 175.1 | 158.8 | 158.2 |
| 17.5° | 488.3  | 480.7  | 468.2 | 443.4 | 383.3 | 266.2 | 174.0 | 122.9 | 107.0 | 101.5 | 100.1 |
| 20°   | 511.7  | 502.4  | 486.9 | 445.8 | 320.4 | 180.2 | 108.8 | 95.3  | 92.5  | 90.8  | 90.8  |
| 22.5° | 536.6  | 524.9  | 501.7 | 427.1 | 238.3 | 115.3 | 92.5  | 89.4  | 87.4  | 84.9  | 84.6  |
| 25°   | 561.8  | 546.6  | 515.2 | 378.5 | 156.1 | 90.8  | 86.7  | 83.2  | 79.4  | 75.6  | 74.6  |
| 27.5° | 583.2  | 563.5  | 525.6 | 305.9 | 100.1 | 81.8  | 79.1  | 73.2  | 68.0  | 63.9  | 63.2  |
| 30°   | 608.8  | 583.6  | 530.0 | 223.8 | 78.7  | 72.2  | 68.0  | 61.8  | 55.6  | 51.5  | 50.1  |
| 32.5° | 643.0  | 615.3  | 523.1 | 145.7 | 69.8  | 63.5  | 57.0  | 49.7  | 43.5  | 39.0  | 38.3  |
| 35°   | 696.1  | 663.3  | 491.4 | 92.9  | 63.2  | 54.9  | 47.0  | 39.4  | 34.2  | 30.7  | 30.0  |
| 37.5° | 761.1  | 730.7  | 439.2 | 69.8  | 56.6  | 47.7  | 38.3  | 31.1  | 27.3  | 24.9  | 24.2  |
| 40°   | 857.4  | 814.9  | 374.7 | 61.1  | 50.1  | 40.4  | 31.4  | 25.6  | 22.8  | 20.7  | 20.0  |
| 42.5° | 982.4  | 914.4  | 300.4 | 55.6  | 43.9  | 33.8  | 25.6  | 21.1  | 18.6  | 17.3  | 16.9  |
| 45°   | 1128.5 | 1011.4 | 222.0 | 50.1  | 38.0  | 28.0  | 21.1  | 17.3  | 15.5  | 14.5  | 14.2  |
| 47.5° | 1278.0 | 1096.3 | 153.3 | 44.2  | 32.5  | 23.1  | 17.6  | 14.8  | 13.5  | 12.1  | 11.7  |
| 50°   | 1437.5 | 1168.2 | 104.6 | 38.3  | 27.6  | 19.0  | 15.2  | 13.5  | 11.7  | 10.7  | 10.4  |
| 52.5° | 1554.6 | 1194.8 | 72.9  | 33.1  | 23.5  | 16.2  | 13.5  | 12.1  | 10.7  | 9.3   | 9.0   |
| 55°   | 1662.7 | 1194.1 | 55.2  | 28.0  | 20.0  | 14.2  | 12.1  | 10.7  | 9.3   | 8.3   | 7.9   |
| 57.5° | 1770.4 | 1184.7 | 43.5  | 23.8  | 17.3  | 12.8  | 10.7  | 9.3   | 8.6   | 7.3   | 6.9   |
| 60°   | 1840.1 | 1149.5 | 33.8  | 20.0  | 14.8  | 11.0  | 9.3   | 8.3   | 7.3   | 6.2   | 5.9   |
| 62.5° | 1877.1 | 1100.5 | 25.9  | 15.9  | 12.1  | 9.7   | 8.3   | 7.3   | 6.2   | 5.2   | 4.8   |
| 65°   | 1827.0 | 1013.5 | 20.4  | 12.4  | 9.3   | 8.3   | 6.9   | 5.9   | 4.8   | 3.8   | 3.5   |
| 67.5° | 1605.0 | 854.6  | 15.9  | 10.0  | 7.3   | 6.2   | 5.9   | 4.8   | 3.5   | 2.8   | 2.4   |
| 70°   | 1134.3 | 585.3  | 12.4  | 7.6   | 5.5   | 4.8   | 4.5   | 3.8   | 2.8   | 2.1   | 1.7   |
| 72.5° | 622.6  | 295.2  | 9.0   | 5.5   | 4.1   | 3.8   | 3.5   | 3.1   | 2.4   | 1.7   | 1.7   |
| 75°   | 239.6  | 81.1   | 6.6   | 3.8   | 2.8   | 2.8   | 2.4   | 2.4   | 2.1   | 1.4   | 1.4   |
| 77.5° | 62.5   | 24.2   | 4.1   | 2.4   | 1.7   | 1.7   | 1.7   | 1.4   | 1.4   | 1.0   | 1.0   |
| 80°   | 20.0   | 7.9    | 2.4   | 1.7   | 1.4   | 1.0   | 1.0   | 0.7   | 1.0   | 0.7   | 0.7   |
| 82.5° | 6.6    | 2.8    | 1.4   | 1.4   | 1.0   | 0.7   | 0.7   | 0.3   | 0.3   | 0.0   | 0.0   |
| 85°   | 2.4    | 1.4    | 1.0   | 0.7   | 0.7   | 0.7   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 1.4    | 0.7    | 0.7   | 0.7   | 0.7   | 0.3   | 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

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2408-195-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 08/07/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW EDISON  
 Catalog Number: **GALN-SB1A-830-U-5WQ**  
 Description: GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS

**Spectral Parameters**

CCT (K): 3050  
 CIE u': 0.2476  
 CIE v': 0.5251  
 Duv: 0.0034  
 CIE x: 0.4383  
 CIE y: 0.4131  
 CIE z: 0.1487  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 581  
 Purity: 55.55201  
 Rf: 81.5  
 Rg: 99.2

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 81.0 |      |      |
| R1:       | 79.6 | R9:  | 7.1  |
| R2:       | 85.6 | R10: | 67.0 |
| R3:       | 92.0 | R11: | 82.7 |
| R4:       | 82.6 | R12: | 63.2 |
| R5:       | 78.9 | R13: | 80.3 |
| R6:       | 81.7 | R14: | 95.0 |
| R7:       | 85.2 | R15: | 71.7 |
| R8:       | 62.0 |      |      |



**Test Conditions**

Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 24.2

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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 3000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) |
|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|
| 360               | 0                           | NR                      | 490               | 168                         | NR                      | 620               | 940                         | NR                      | 750               | 35                          | NR                      | 880               | 1                           | NR                      |
| 365               | 0                           | NR                      | 495               | 233                         | NR                      | 625               | 897                         | NR                      | 755               | 30                          | NR                      | 885               | 1                           | NR                      |
| 370               | 0                           | NR                      | 500               | 300                         | NR                      | 630               | 847                         | NR                      | 760               | 26                          | NR                      | 890               | 1                           | NR                      |
| 375               | 0                           | NR                      | 505               | 372                         | NR                      | 635               | 790                         | NR                      | 765               | 22                          | NR                      | 895               | 1                           | NR                      |
| 380               | 0                           | NR                      | 510               | 430                         | NR                      | 640               | 730                         | NR                      | 770               | 19                          | NR                      | 900               | 1                           | NR                      |
| 385               | 0                           | NR                      | 515               | 483                         | NR                      | 645               | 668                         | NR                      | 775               | 16                          | NR                      | 905               | 1                           | NR                      |
| 390               | 0                           | NR                      | 520               | 524                         | NR                      | 650               | 605                         | NR                      | 780               | 14                          | NR                      | 910               | 0                           | NR                      |
| 395               | 2                           | NR                      | 525               | 555                         | NR                      | 655               | 545                         | NR                      | 785               | 12                          | NR                      | 915               | 0                           | NR                      |
| 400               | 4                           | NR                      | 530               | 581                         | NR                      | 660               | 485                         | NR                      | 790               | 10                          | NR                      | 920               | 0                           | NR                      |
| 405               | 7                           | NR                      | 535               | 604                         | NR                      | 665               | 430                         | NR                      | 795               | 9                           | NR                      | 925               | 0                           | NR                      |
| 410               | 17                          | NR                      | 540               | 623                         | NR                      | 670               | 378                         | NR                      | 800               | 8                           | NR                      | 930               | 0                           | NR                      |
| 415               | 34                          | NR                      | 545               | 645                         | NR                      | 675               | 331                         | NR                      | 805               | 7                           | NR                      | 935               | 0                           | NR                      |
| 420               | 68                          | NR                      | 550               | 667                         | NR                      | 680               | 290                         | NR                      | 810               | 6                           | NR                      | 940               | 0                           | NR                      |
| 425               | 128                         | NR                      | 555               | 693                         | NR                      | 685               | 251                         | NR                      | 815               | 5                           | NR                      | 945               | 0                           | NR                      |
| 430               | 214                         | NR                      | 560               | 719                         | NR                      | 690               | 218                         | NR                      | 820               | 4                           | NR                      | 950               | 0                           | NR                      |
| 435               | 339                         | NR                      | 565               | 754                         | NR                      | 695               | 188                         | NR                      | 825               | 4                           | NR                      | 955               | 0                           | NR                      |
| 440               | 507                         | NR                      | 570               | 791                         | NR                      | 700               | 162                         | NR                      | 830               | 3                           | NR                      | 960               | 0                           | NR                      |
| 445               | 573                         | NR                      | 575               | 830                         | NR                      | 705               | 139                         | NR                      | 835               | 3                           | NR                      | 965               | 0                           | NR                      |
| 450               | 356                         | NR                      | 580               | 873                         | NR                      | 710               | 119                         | NR                      | 840               | 3                           | NR                      | 970               | 0                           | NR                      |
| 455               | 217                         | NR                      | 585               | 913                         | NR                      | 715               | 102                         | NR                      | 845               | 2                           | NR                      | 975               | 0                           | NR                      |
| 460               | 168                         | NR                      | 590               | 948                         | NR                      | 720               | 88                          | NR                      | 850               | 2                           | NR                      | 980               | 0                           | NR                      |
| 465               | 113                         | NR                      | 595               | 974                         | NR                      | 725               | 76                          | NR                      | 855               | 2                           | NR                      | 985               | 0                           | NR                      |
| 470               | 85                          | NR                      | 600               | 994                         | NR                      | 730               | 65                          | NR                      | 860               | 1                           | NR                      | 990               | 0                           | NR                      |
| 475               | 85                          | NR                      | 605               | 998                         | NR                      | 735               | 55                          | NR                      | 865               | 1                           | NR                      | 995               | 0                           | NR                      |
| 480               | 94                          | NR                      | 610               | 994                         | NR                      | 740               | 47                          | NR                      | 870               | 1                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 120                         | NR                      | 615               | 973                         | NR                      | 745               | 41                          | NR                      | 875               | 1                           | NR                      |                   |                             |                         |

REPORT NUMBER: SP1-2408-195-9

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.27**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 168                      | NR            | 620    | 940                      | NR            | 750    | 35                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 233                      | NR            | 625    | 897                      | NR            | 755    | 30                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 300                      | NR            | 630    | 847                      | NR            | 760    | 26                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 372                      | NR            | 635    | 790                      | NR            | 765    | 22                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 430                      | NR            | 640    | 730                      | NR            | 770    | 19                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 483                      | NR            | 645    | 668                      | NR            | 775    | 16                       | NR            | 905    | 1                        | NR            |
| 390    | 0                        | NR            | 520    | 524                      | NR            | 650    | 605                      | NR            | 780    | 14                       | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 555                      | NR            | 655    | 545                      | NR            | 785    | 12                       | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 581                      | NR            | 660    | 485                      | NR            | 790    | 10                       | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 604                      | NR            | 665    | 430                      | NR            | 795    | 9                        | NR            | 925    | 0                        | NR            |
| 410    | 17                       | NR            | 540    | 623                      | NR            | 670    | 378                      | NR            | 800    | 8                        | NR            | 930    | 0                        | NR            |
| 415    | 34                       | NR            | 545    | 645                      | NR            | 675    | 331                      | NR            | 805    | 7                        | NR            | 935    | 0                        | NR            |
| 420    | 68                       | NR            | 550    | 667                      | NR            | 680    | 290                      | NR            | 810    | 6                        | NR            | 940    | 0                        | NR            |
| 425    | 128                      | NR            | 555    | 693                      | NR            | 685    | 251                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 214                      | NR            | 560    | 719                      | NR            | 690    | 218                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 339                      | NR            | 565    | 754                      | NR            | 695    | 188                      | NR            | 825    | 4                        | NR            | 955    | 0                        | NR            |
| 440    | 507                      | NR            | 570    | 791                      | NR            | 700    | 162                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 573                      | NR            | 575    | 830                      | NR            | 705    | 139                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 356                      | NR            | 580    | 873                      | NR            | 710    | 119                      | NR            | 840    | 3                        | NR            | 970    | 0                        | NR            |
| 455    | 217                      | NR            | 585    | 913                      | NR            | 715    | 102                      | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 168                      | NR            | 590    | 948                      | NR            | 720    | 88                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 113                      | NR            | 595    | 974                      | NR            | 725    | 76                       | NR            | 855    | 2                        | NR            | 985    | 0                        | NR            |
| 470    | 85                       | NR            | 600    | 994                      | NR            | 730    | 65                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 85                       | NR            | 605    | 998                      | NR            | 735    | 55                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 94                       | NR            | 610    | 994                      | NR            | 740    | 47                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 120                      | NR            | 615    | 973                      | NR            | 745    | 41                       | NR            | 875    | 1                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2408-195-9

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 2.32**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 168                      | NR            | 620    | 940                      | NR            | 750    | 35                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 233                      | NR            | 625    | 897                      | NR            | 755    | 30                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 300                      | NR            | 630    | 847                      | NR            | 760    | 26                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 372                      | NR            | 635    | 790                      | NR            | 765    | 22                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 430                      | NR            | 640    | 730                      | NR            | 770    | 19                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 483                      | NR            | 645    | 668                      | NR            | 775    | 16                       | NR            | 905    | 1                        | NR            |
| 390    | 0                        | NR            | 520    | 524                      | NR            | 650    | 605                      | NR            | 780    | 14                       | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 555                      | NR            | 655    | 545                      | NR            | 785    | 12                       | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 581                      | NR            | 660    | 485                      | NR            | 790    | 10                       | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 604                      | NR            | 665    | 430                      | NR            | 795    | 9                        | NR            | 925    | 0                        | NR            |
| 410    | 17                       | NR            | 540    | 623                      | NR            | 670    | 378                      | NR            | 800    | 8                        | NR            | 930    | 0                        | NR            |
| 415    | 34                       | NR            | 545    | 645                      | NR            | 675    | 331                      | NR            | 805    | 7                        | NR            | 935    | 0                        | NR            |
| 420    | 68                       | NR            | 550    | 667                      | NR            | 680    | 290                      | NR            | 810    | 6                        | NR            | 940    | 0                        | NR            |
| 425    | 128                      | NR            | 555    | 693                      | NR            | 685    | 251                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 214                      | NR            | 560    | 719                      | NR            | 690    | 218                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 339                      | NR            | 565    | 754                      | NR            | 695    | 188                      | NR            | 825    | 4                        | NR            | 955    | 0                        | NR            |
| 440    | 507                      | NR            | 570    | 791                      | NR            | 700    | 162                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 573                      | NR            | 575    | 830                      | NR            | 705    | 139                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 356                      | NR            | 580    | 873                      | NR            | 710    | 119                      | NR            | 840    | 3                        | NR            | 970    | 0                        | NR            |
| 455    | 217                      | NR            | 585    | 913                      | NR            | 715    | 102                      | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 168                      | NR            | 590    | 948                      | NR            | 720    | 88                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 113                      | NR            | 595    | 974                      | NR            | 725    | 76                       | NR            | 855    | 2                        | NR            | 985    | 0                        | NR            |
| 470    | 85                       | NR            | 600    | 994                      | NR            | 730    | 65                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 85                       | NR            | 605    | 998                      | NR            | 735    | 55                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 94                       | NR            | 610    | 994                      | NR            | 740    | 47                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 120                      | NR            | 615    | 973                      | NR            | 745    | 41                       | NR            | 875    | 1                        | NR            |        |                          |               |

**Summary**

$R_f = 81.5$   
 $R_g = 99.2$   
 $CIE R_a = 81.0$   
 $R_9 = 7.1$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 51 | CES31 = 71 | CES56 = 78 | CES81 = 78 |
| CES07 = 42 | CES32 = 70 | CES57 = 76 | CES82 = 95 |
| CES08 = 41 | CES33 = 71 | CES58 = 78 | CES83 = 90 |
| CES09 = 29 | CES34 = 82 | CES59 = 92 | CES84 = 94 |
| CES10 = 76 | CES35 = 90 | CES60 = 95 | CES85 = 86 |
| CES11 = 59 | CES36 = 93 | CES61 = 93 | CES86 = 72 |
| CES12 = 65 | CES37 = 87 | CES62 = 83 | CES87 = 85 |
| CES13 = 43 | CES38 = 75 | CES63 = 77 | CES88 = 83 |
| CES14 = 74 | CES39 = 94 | CES64 = 83 | CES89 = 75 |
| CES15 = 71 | CES40 = 89 | CES65 = 77 | CES90 = 81 |
| CES16 = 47 | CES41 = 85 | CES66 = 80 | CES91 = 96 |
| CES17 = 50 | CES42 = 86 | CES67 = 79 | CES92 = 73 |
| CES18 = 56 | CES43 = 81 | CES68 = 84 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 91 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 78 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 76 | CES96 = 84 |
| CES22 = 79 | CES47 = 77 | CES72 = 92 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 71 | CES98 = 81 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 74 |
| CES25 = 72 | CES50 = 89 | CES75 = 74 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)