

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



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P438632

Luminaire Tested: **ISW-SA1D-830-U-T4W-HSS**

Issue Date: 12/10/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P438632  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-13)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/10/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: ISW-SA1D-830-U-T4W-HSS  
Description: IMPACT ELITE LED WEDGE LUMINAIRE  
(1) 80 CRI, 3000K, 800mA LIGHTSQUARE WITH 16 LEDS AND TYPE IV WIDE OPTICS  
WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

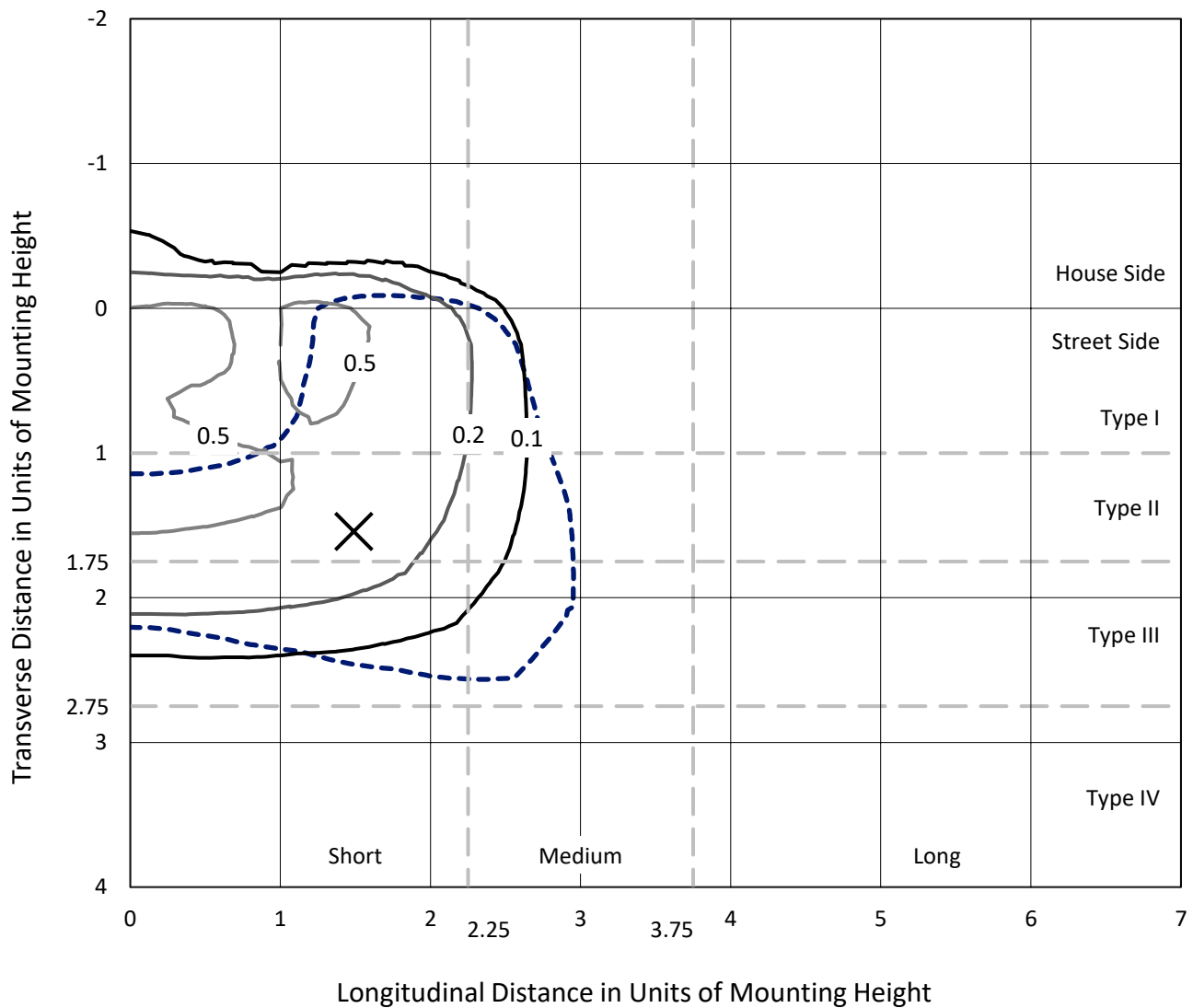
Lumens per Lamp: N/A  
Luminaire Lumens: 3305 lumens  
Efficiency: N/A  
Efficacy: 73.1 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B0 - U0 - G1  
  
Input Watts (W): 45.2  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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### Iso-Footcandle Lines of Horizontal Illumination

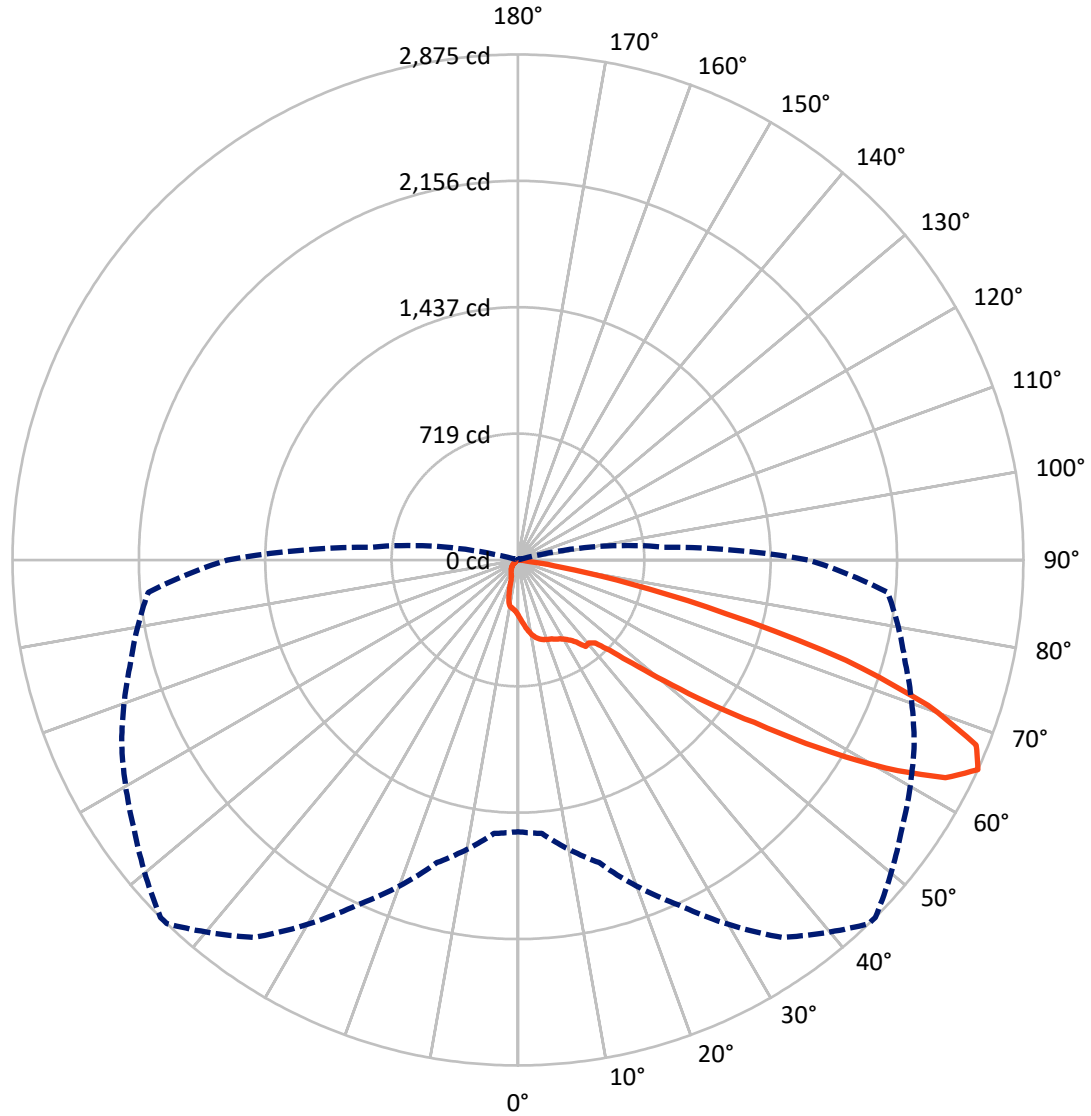
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 0.7 fc  
 Type III - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 44-Deg Lateral      - - - Horizontal Cone Through 65-Deg Vertical

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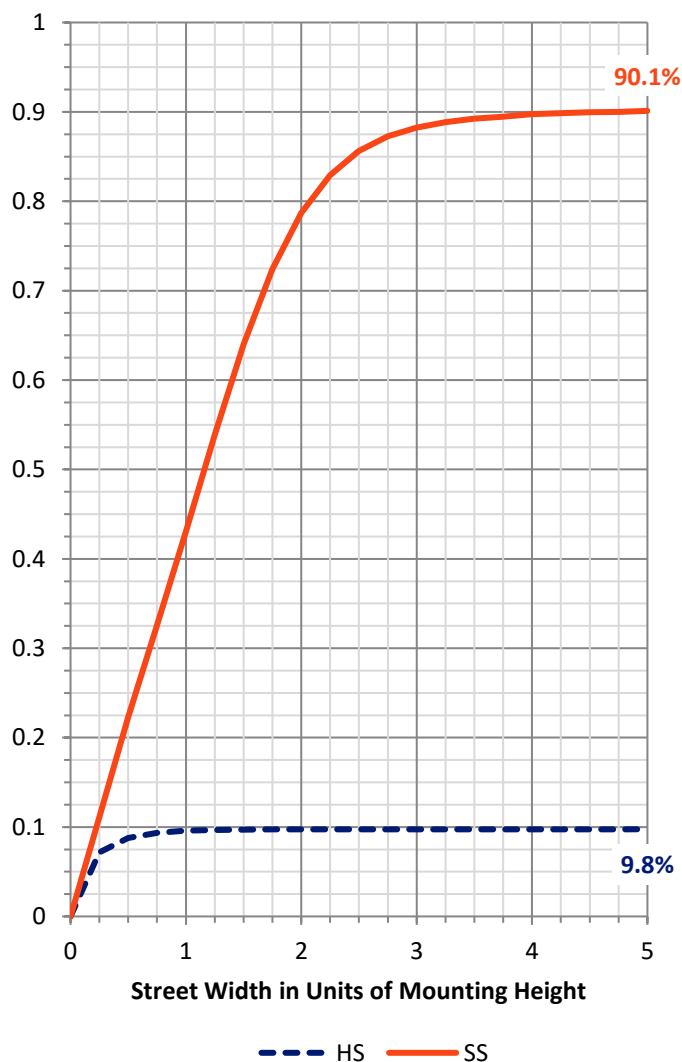
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 325.1    | 0.0    | 325.1  |
|                    | % Fixture | 9.8      | 0.0    | 9.8    |
| <b>Street Side</b> | Lumens    | 2979.9   | 0.0    | 2979.9 |
|                    | % Fixture | 90.2     | 0.0    | 90.2   |
| <b>Total</b>       | Lumens    | 3305.0   | 0.0    | 3305.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 31.9   | 1.0       |
| 10°-20°   | 96.2   | 2.9       |
| 20°-30°   | 154.0  | 4.7       |
| 30°-40°   | 228.7  | 6.9       |
| 40°-50°   | 417.0  | 12.6      |
| 50°-60°   | 874.2  | 26.5      |
| 60°-70°   | 1112.7 | 33.7      |
| 70°-80°   | 373.5  | 11.3      |
| 80°-90°   | 16.7   | 0.5       |
| 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°    | 3305.0 | 100.0     |
| 0°-180°   | 3305.0 | 100.0     |

**Coefficient of Utilization**

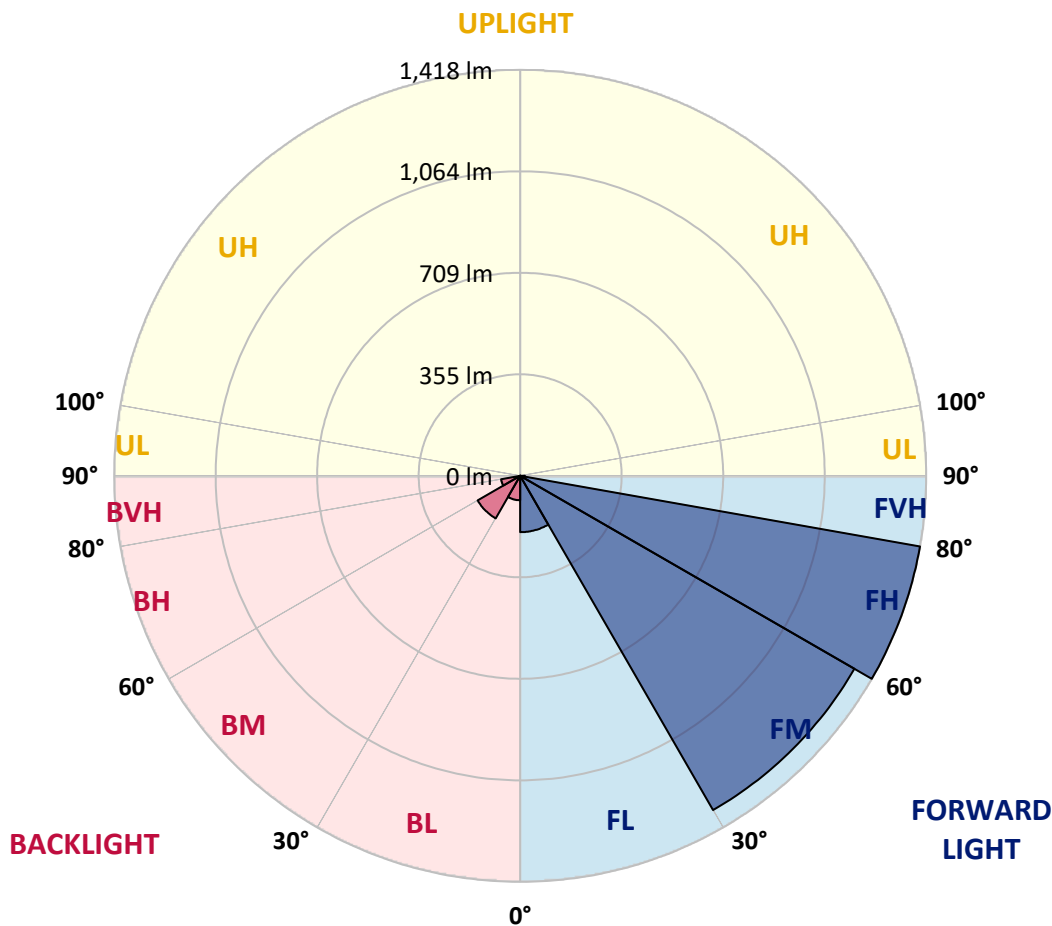


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 196.8  | 6.0       |                         |      |         |
| FM (30°-60°)   | 1348.4 | 40.8      |                         |      |         |
| FH (60°-80°)   | 1418.4 | 42.9      |                         |      | G1/1800 |
| FVH (80°-90°)  | 16.3   | 0.5       |                         |      | G1/100  |
| BL (0°-30°)    | 85.4   | 2.6       | B0/110                  |      |         |
| BM (30°-60°)   | 171.5  | 5.2       | B0/220                  |      |         |
| BH (60°-80°)   | 67.8   | 2.1       | B0/110                  |      | G0/110  |
| BVH (80°-90°)  | 0.5    | 0.0       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B0-U0-G1**  
 Type III Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 44°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 314.8  | 314.8  | 314.8  | 314.8  | 314.8  | 314.8  | 314.8  | 314.8  | 314.8  | 314.8  | 314.8  |
| 2.5°  | 354.8  | 356.4  | 350.0  | 351.6  | 348.4  | 342.0  | 340.4  | 335.6  | 329.2  | 324.4  | 319.6  |
| 5°    | 401.1  | 399.5  | 396.3  | 389.9  | 381.9  | 372.3  | 369.2  | 359.6  | 348.4  | 335.6  | 326.0  |
| 7.5°  | 439.5  | 439.5  | 434.7  | 428.3  | 415.5  | 402.7  | 399.5  | 386.7  | 370.7  | 353.2  | 335.6  |
| 10°   | 473.0  | 471.4  | 466.6  | 458.6  | 442.7  | 431.5  | 426.7  | 410.7  | 391.5  | 372.3  | 351.6  |
| 12.5° | 498.6  | 498.6  | 492.2  | 481.0  | 463.4  | 452.2  | 449.1  | 434.7  | 415.5  | 393.1  | 364.4  |
| 15°   | 513.0  | 511.4  | 506.6  | 492.2  | 479.4  | 466.6  | 465.0  | 452.2  | 436.3  | 412.3  | 381.9  |
| 17.5° | 513.0  | 514.6  | 506.6  | 498.6  | 487.4  | 476.2  | 474.6  | 465.0  | 449.1  | 428.3  | 396.3  |
| 20°   | 506.6  | 506.6  | 500.2  | 493.8  | 487.4  | 482.6  | 481.0  | 474.6  | 461.8  | 444.3  | 412.3  |
| 22.5° | 498.6  | 497.0  | 495.4  | 490.6  | 489.0  | 487.4  | 489.0  | 485.8  | 477.8  | 458.6  | 428.3  |
| 25°   | 497.0  | 495.4  | 492.2  | 489.0  | 490.6  | 498.6  | 498.6  | 500.2  | 492.2  | 476.2  | 447.5  |
| 27.5° | 503.4  | 503.4  | 498.6  | 493.8  | 497.0  | 508.2  | 508.2  | 513.0  | 508.2  | 497.0  | 468.2  |
| 30°   | 530.6  | 524.2  | 516.2  | 506.6  | 509.8  | 522.6  | 524.2  | 533.8  | 533.8  | 525.8  | 501.8  |
| 32.5° | 567.3  | 560.9  | 540.1  | 527.4  | 527.4  | 543.3  | 543.3  | 559.3  | 573.7  | 557.7  | 521.0  |
| 35°   | 596.1  | 592.9  | 568.9  | 552.9  | 557.7  | 572.1  | 576.9  | 602.5  | 615.3  | 575.3  | 530.6  |
| 37.5° | 692.0  | 687.2  | 640.8  | 581.7  | 584.9  | 624.8  | 628.0  | 639.2  | 628.0  | 583.3  | 549.7  |
| 40°   | 819.8  | 823.0  | 775.1  | 677.6  | 602.5  | 620.0  | 620.0  | 639.2  | 645.6  | 618.4  | 596.1  |
| 42.5° | 1013.2 | 994.0  | 946.0  | 813.4  | 680.8  | 645.6  | 647.2  | 674.4  | 707.9  | 692.0  | 695.2  |
| 45°   | 1181.0 | 1166.6 | 1115.4 | 987.6  | 807.0  | 730.3  | 723.9  | 759.1  | 824.6  | 839.0  | 875.7  |
| 47.5° | 1329.6 | 1315.2 | 1292.8 | 1173.0 | 995.6  | 878.9  | 855.0  | 890.1  | 1003.6 | 1078.7 | 1104.3 |
| 50°   | 1508.6 | 1511.8 | 1460.6 | 1391.9 | 1201.7 | 1078.7 | 1072.3 | 1073.9 | 1252.9 | 1315.2 | 1352.0 |
| 52.5° | 1735.5 | 1730.7 | 1641.2 | 1604.4 | 1487.8 | 1340.8 | 1304.0 | 1326.4 | 1503.8 | 1548.5 | 1609.2 |
| 55°   | 1896.9 | 1892.1 | 1849.0 | 1842.6 | 1804.2 | 1631.6 | 1622.0 | 1620.4 | 1780.2 | 1799.4 | 1871.3 |
| 57.5° | 1991.2 | 1999.2 | 2029.5 | 2111.0 | 2143.0 | 2018.3 | 1991.2 | 1938.4 | 2027.9 | 2023.1 | 2101.4 |
| 60°   | 2007.2 | 2019.9 | 2106.2 | 2293.2 | 2472.2 | 2405.1 | 2368.3 | 2230.9 | 2254.9 | 2214.9 | 2262.8 |
| 62.5° | 1877.7 | 1914.5 | 2067.9 | 2331.6 | 2638.4 | 2727.9 | 2697.5 | 2485.0 | 2429.0 | 2345.9 | 2285.2 |
| 65°   | 1545.3 | 1561.3 | 1781.8 | 2165.4 | 2620.8 | 2874.9 | 2874.9 | 2665.6 | 2486.6 | 2282.0 | 2111.0 |
| 67.5° | 1067.5 | 1075.5 | 1344.0 | 1746.7 | 2352.3 | 2811.0 | 2835.0 | 2662.4 | 2385.9 | 2031.1 | 1721.1 |
| 70°   | 605.7  | 650.4  | 813.4  | 1220.9 | 1853.7 | 2475.4 | 2501.0 | 2422.7 | 1997.6 | 1505.4 | 1128.2 |
| 72.5° | 252.5  | 281.3  | 396.3  | 711.1  | 1260.9 | 1949.6 | 1994.4 | 1920.9 | 1492.6 | 918.9  | 533.8  |
| 75°   | 78.3   | 81.5   | 131.0  | 310.0  | 688.8  | 1224.1 | 1299.2 | 1296.0 | 891.7  | 429.9  | 217.3  |
| 77.5° | 43.1   | 44.7   | 62.3   | 126.2  | 302.0  | 653.6  | 699.9  | 661.6  | 441.1  | 185.4  | 67.1   |
| 80°   | 20.8   | 22.4   | 33.6   | 60.7   | 132.6  | 244.5  | 287.6  | 266.9  | 153.4  | 87.9   | 22.4   |
| 82.5° | 6.4    | 8.0    | 16.0   | 27.2   | 52.7   | 57.5   | 57.5   | 102.3  | 78.3   | 57.5   | 11.2   |
| 85°   | 0.0    | 0.0    | 4.8    | 9.6    | 9.6    | 9.6    | 9.6    | 22.4   | 36.8   | 35.2   | 4.8    |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 1.6    | 1.6    | 1.6    | 1.6    | 1.6    | 3.2    | 1.6    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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 CATALOG NUMBER: ISW-SA1D-830-U-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 314.8  | 314.8  | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 |
| 2.5°  | 316.4  | 314.8  | 308.4 | 302.0 | 298.8 | 295.6 | 292.4 | 289.2 | 289.2 | 290.8 | 289.2 |
| 5°    | 319.6  | 314.8  | 305.2 | 295.6 | 289.2 | 284.5 | 278.1 | 276.5 | 274.9 | 276.5 | 276.5 |
| 7.5°  | 327.6  | 321.2  | 306.8 | 292.4 | 282.9 | 274.9 | 270.1 | 268.5 | 265.3 | 265.3 | 265.3 |
| 10°   | 340.4  | 329.2  | 310.0 | 294.0 | 281.3 | 270.1 | 255.7 | 239.7 | 230.1 | 223.7 | 218.9 |
| 12.5° | 353.2  | 340.4  | 314.8 | 295.6 | 281.3 | 249.3 | 214.1 | 183.8 | 167.8 | 159.8 | 158.2 |
| 15°   | 367.6  | 351.6  | 324.4 | 302.0 | 263.7 | 204.6 | 156.6 | 131.0 | 124.6 | 124.6 | 123.1 |
| 17.5° | 378.7  | 364.4  | 332.4 | 303.6 | 231.7 | 153.4 | 118.3 | 110.3 | 111.9 | 115.1 | 115.1 |
| 20°   | 396.3  | 378.7  | 343.6 | 289.2 | 179.0 | 115.1 | 103.9 | 105.5 | 107.1 | 108.7 | 110.3 |
| 22.5° | 412.3  | 393.1  | 356.4 | 257.3 | 131.0 | 99.1  | 99.1  | 100.7 | 102.3 | 103.9 | 105.5 |
| 25°   | 431.5  | 413.9  | 369.2 | 210.9 | 100.7 | 91.1  | 92.7  | 95.9  | 97.5  | 99.1  | 99.1  |
| 27.5° | 453.8  | 434.7  | 369.2 | 166.2 | 87.9  | 84.7  | 84.7  | 87.9  | 89.5  | 92.7  | 92.7  |
| 30°   | 484.2  | 463.4  | 359.6 | 123.1 | 81.5  | 78.3  | 76.7  | 79.9  | 81.5  | 84.7  | 84.7  |
| 32.5° | 503.4  | 490.6  | 338.8 | 92.7  | 75.1  | 71.9  | 70.3  | 70.3  | 71.9  | 75.1  | 75.1  |
| 35°   | 522.6  | 516.2  | 306.8 | 79.9  | 70.3  | 67.1  | 63.9  | 60.7  | 60.7  | 60.7  | 60.7  |
| 37.5° | 552.9  | 562.5  | 260.5 | 73.5  | 67.1  | 62.3  | 57.5  | 52.7  | 49.5  | 47.9  | 46.3  |
| 40°   | 615.3  | 623.2  | 214.1 | 68.7  | 62.3  | 57.5  | 49.5  | 43.1  | 38.4  | 35.2  | 35.2  |
| 42.5° | 712.7  | 706.3  | 163.0 | 65.5  | 57.5  | 51.1  | 41.5  | 35.2  | 28.8  | 25.6  | 25.6  |
| 45°   | 882.1  | 810.2  | 119.9 | 60.7  | 54.3  | 46.3  | 35.2  | 27.2  | 20.8  | 19.2  | 19.2  |
| 47.5° | 1089.9 | 930.1  | 91.1  | 57.5  | 49.5  | 40.0  | 27.2  | 20.8  | 16.0  | 14.4  | 14.4  |
| 50°   | 1313.6 | 1053.1 | 75.1  | 52.7  | 44.7  | 33.6  | 22.4  | 14.4  | 11.2  | 11.2  | 11.2  |
| 52.5° | 1524.5 | 1136.2 | 62.3  | 47.9  | 38.4  | 27.2  | 16.0  | 11.2  | 9.6   | 9.6   | 9.6   |
| 55°   | 1721.1 | 1187.4 | 51.1  | 41.5  | 32.0  | 20.8  | 12.8  | 9.6   | 8.0   | 6.4   | 6.4   |
| 57.5° | 1855.3 | 1179.4 | 41.5  | 33.6  | 24.0  | 14.4  | 9.6   | 8.0   | 6.4   | 4.8   | 4.8   |
| 60°   | 1901.7 | 1109.1 | 32.0  | 27.2  | 17.6  | 11.2  | 8.0   | 6.4   | 4.8   | 3.2   | 3.2   |
| 62.5° | 1836.2 | 970.0  | 25.6  | 20.8  | 12.8  | 9.6   | 6.4   | 4.8   | 3.2   | 1.6   | 1.6   |
| 65°   | 1652.4 | 834.2  | 19.2  | 14.4  | 9.6   | 6.4   | 4.8   | 3.2   | 1.6   | 0.0   | 0.0   |
| 67.5° | 1315.2 | 647.2  | 16.0  | 9.6   | 6.4   | 4.8   | 3.2   | 1.6   | 0.0   | 0.0   | 0.0   |
| 70°   | 823.0  | 405.9  | 12.8  | 6.4   | 4.8   | 3.2   | 1.6   | 0.0   | 0.0   | 0.0   | 0.0   |
| 72.5° | 399.5  | 199.8  | 9.6   | 4.8   | 3.2   | 1.6   | 1.6   | 0.0   | 0.0   | 0.0   | 0.0   |
| 75°   | 148.6  | 65.5   | 8.0   | 4.8   | 1.6   | 1.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 77.5° | 47.9   | 22.4   | 6.4   | 4.8   | 3.2   | 1.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 17.6   | 9.6    | 3.2   | 1.6   | 1.6   | 1.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 8.0    | 4.8    | 1.6   | 1.6   | 1.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 3.2    | 3.2    | 1.6   | 1.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 1.6    | 1.6    | 1.6   | 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

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



CCT = 3050K  
 CIE x = 0.4383  
 CIE y = 0.4131  
 Duv = 0.0034

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**

| $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /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

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 2.32**

| $\lambda$<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                      |                   |                             |                         |

**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)