

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: LUMARK

Report Number: P1067114

Luminaire Tested: **NAV-SA4B-830-U-T3BC**

Issue Date: 08/07/2025

**Test Information**

Test Method: LM-79-08  
Report Number: P1067114  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/07/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: LUMARK  
Catalog Number: NAV-SA4B-830-U-T3BC  
Description: Navion AREA AND ROADWAY LUMINAIRE 800mA 4xLight Square PACKAGE  
80CRI 3000K FIXTURE w/ TYPE III ANGLED BACKLIGHT CONTROL  
Light Source: (56) 3000K CCT, 80 CRI LEDs  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 14620.1 lumens  
Efficiency: N/A  
Efficacy: 101.5 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B0 - U0 - G3

Input Watts (W): 144.1  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.97  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

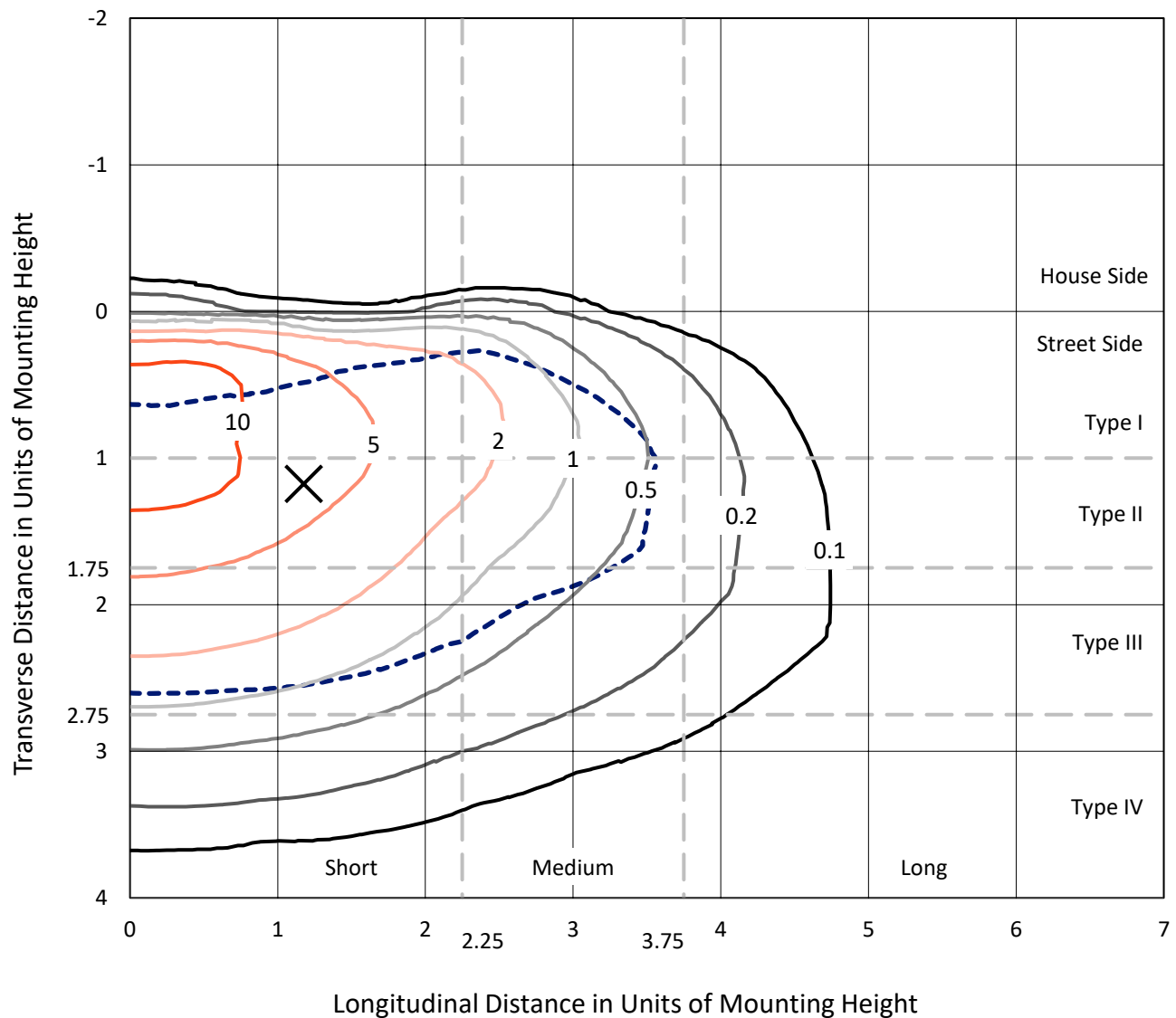


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

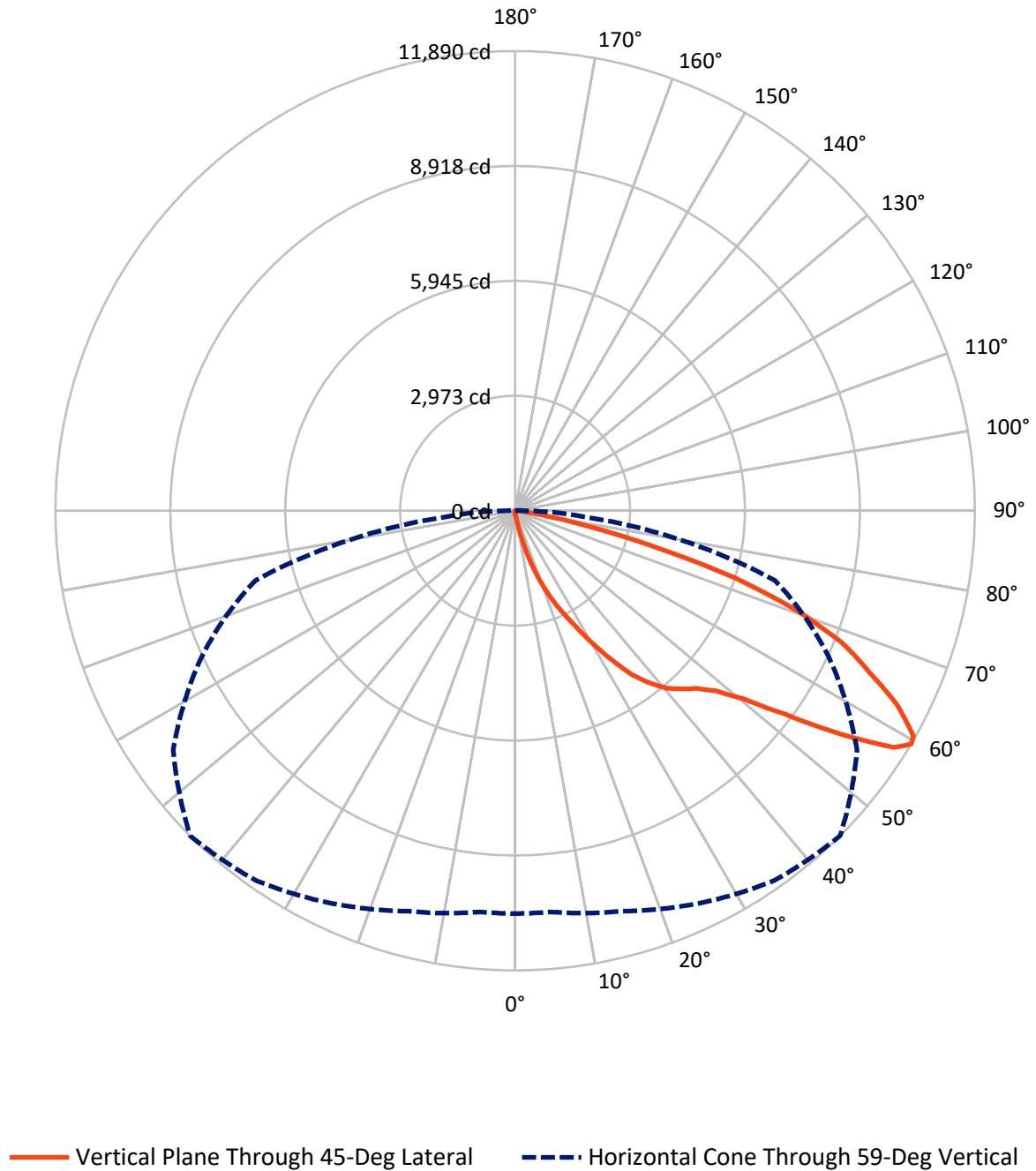


Based on 15 foot mounting height. Maximum calculated value = 15.9 fc  
 Type III - Short - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 51.9     | 0.0    | 51.9    |
|                    | % Fixture | 0.4      | 0.0    | 0.4     |
| <b>Street Side</b> | Lumens    | 14568.2  | 0.0    | 14568.2 |
|                    | % Fixture | 99.6     | 0.0    | 99.6    |
| <b>Total</b>       | Lumens    | 14620.1  | 0.0    | 14620.1 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 13.6    | 0.1       |
| 10°-20°   | 161.6   | 1.1       |
| 20°-30°   | 580.6   | 4.0       |
| 30°-40°   | 1349.2  | 9.2       |
| 40°-50°   | 2299.7  | 15.7      |
| 50°-60°   | 3789.2  | 25.9      |
| 60°-70°   | 4381.2  | 30.0      |
| 70°-80°   | 1882.3  | 12.9      |
| 80°-90°   | 162.7   | 1.1       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 14620.1 | 100.0     |
| 0°-180°   | 14620.1 | 100.0     |



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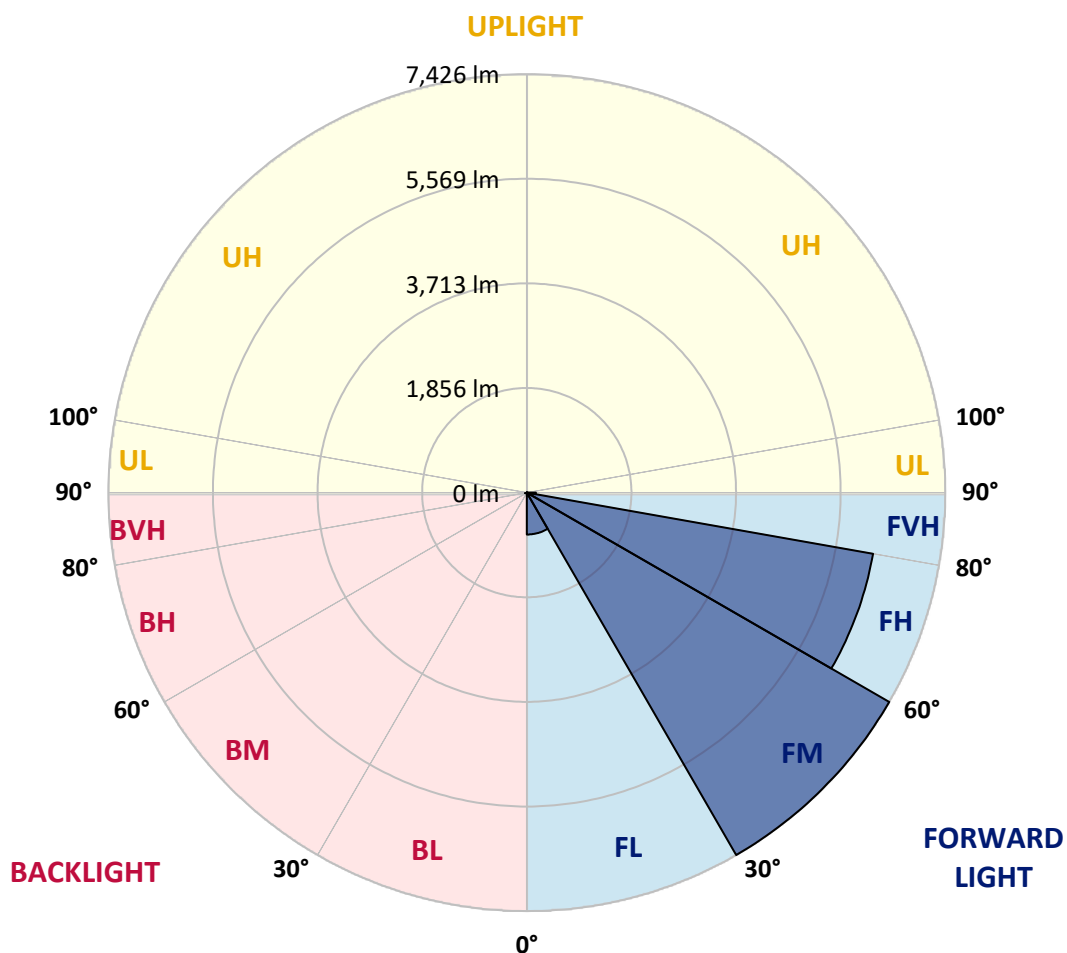
CATALOG NUMBER: NAV-SA4B-830-U-T3BC

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 743.0  | 5.1       |                         |      |         |
| FM   | (30°-60°)   | 7425.6 | 50.8      |                         |      |         |
| FH   | (60°-80°)   | 6239.1 | 42.7      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 160.5  | 1.1       |                         |      | G2/225  |
| BL   | (0°-30°)    | 12.8   | 0.1       | B0/110                  |      |         |
| BM   | (30°-60°)   | 12.6   | 0.1       | B0/220                  |      |         |
| BH   | (60°-80°)   | 24.4   | 0.2       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 2.1    | 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-G3**

Type III Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 44°     | 45°     | 55°     | 65°     | 75°     | 85°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| 0°    | 92.4    | 92.4    | 92.4    | 92.4    | 92.4    | 92.4    | 92.4    | 92.4    | 92.4    | 92.4    | 92.4   |
| 2.5°  | 119.9   | 119.9   | 117.0   | 113.1   | 112.1   | 109.1   | 109.1   | 106.2   | 102.2   | 99.3    | 95.4   |
| 5°    | 174.0   | 173.0   | 165.2   | 155.3   | 142.5   | 134.7   | 134.7   | 123.9   | 114.0   | 105.2   | 97.3   |
| 7.5°  | 380.4   | 371.6   | 343.1   | 295.9   | 234.0   | 192.7   | 189.7   | 154.3   | 130.7   | 113.1   | 98.3   |
| 10°   | 873.0   | 842.5   | 802.2   | 689.1   | 509.2   | 355.9   | 349.0   | 225.1   | 156.3   | 121.9   | 100.3  |
| 12.5° | 1430.4  | 1454.9  | 1374.3  | 1196.4  | 986.0   | 733.4   | 684.2   | 379.5   | 206.4   | 133.7   | 102.2  |
| 15°   | 1937.6  | 1931.7  | 1886.5  | 1741.0  | 1498.2  | 1162.0  | 1131.5  | 659.6   | 295.9   | 152.4   | 104.2  |
| 17.5° | 2317.1  | 2310.2  | 2266.9  | 2173.5  | 1986.8  | 1650.6  | 1624.0  | 1051.9  | 464.0   | 178.9   | 106.2  |
| 20°   | 2717.2  | 2708.3  | 2647.4  | 2572.7  | 2409.5  | 2123.4  | 2091.9  | 1490.3  | 726.5   | 222.2   | 106.2  |
| 22.5° | 3196.9  | 3180.2  | 3115.3  | 2988.5  | 2816.5  | 2567.7  | 2539.2  | 1938.6  | 1051.9  | 293.0   | 111.1  |
| 25°   | 3776.9  | 3748.4  | 3658.9  | 3544.9  | 3337.5  | 3007.2  | 2976.7  | 2438.0  | 1444.1  | 400.1   | 116.0  |
| 27.5° | 4438.5  | 4443.4  | 4322.5  | 4129.8  | 3851.6  | 3514.4  | 3457.4  | 2885.3  | 1850.1  | 553.5   | 121.9  |
| 30°   | 5224.0  | 5174.8  | 5004.8  | 4780.6  | 4510.3  | 4080.7  | 4025.6  | 3330.6  | 2306.3  | 779.6   | 131.7  |
| 32.5° | 5959.3  | 5906.2  | 5677.2  | 5395.0  | 5105.0  | 4651.8  | 4606.6  | 3831.0  | 2721.1  | 1047.0  | 149.4  |
| 35°   | 6590.4  | 6553.1  | 6232.6  | 5888.5  | 5631.0  | 5225.9  | 5212.2  | 4389.4  | 3208.7  | 1335.0  | 169.1  |
| 37.5° | 7145.9  | 7078.0  | 6666.1  | 6309.3  | 6047.8  | 5685.0  | 5655.5  | 4900.5  | 3678.6  | 1669.2  | 198.6  |
| 40°   | 7619.7  | 7582.3  | 7080.0  | 6611.1  | 6398.7  | 6074.3  | 6037.0  | 5348.8  | 4164.2  | 2057.5  | 235.0  |
| 42.5° | 8126.9  | 8077.8  | 7590.2  | 7064.3  | 6673.0  | 6326.0  | 6301.4  | 5718.5  | 4596.8  | 2484.2  | 289.0  |
| 45°   | 8700.1  | 8608.6  | 8181.0  | 7709.1  | 7114.4  | 6586.5  | 6559.0  | 6047.8  | 5040.1  | 2942.3  | 354.9  |
| 47.5° | 9312.5  | 9232.9  | 8886.9  | 8555.6  | 7871.4  | 7016.1  | 6957.1  | 6327.9  | 5480.6  | 3471.2  | 438.4  |
| 50°   | 9935.8  | 9937.7  | 9678.2  | 9519.0  | 8796.4  | 7714.1  | 7630.5  | 6739.9  | 5943.6  | 4037.4  | 562.3  |
| 52.5° | 10661.3 | 10680.0 | 10676.0 | 10558.1 | 9997.7  | 8855.4  | 8743.3  | 7365.1  | 6481.3  | 4698.0  | 733.4  |
| 55°   | 10965.0 | 10998.5 | 11215.7 | 11477.2 | 11324.8 | 10302.5 | 10182.5 | 8443.5  | 7194.0  | 5434.3  | 987.0  |
| 57.5° | 10716.3 | 10753.7 | 11053.5 | 11511.6 | 11861.6 | 11569.6 | 11555.9 | 9847.3  | 8132.8  | 6327.0  | 1401.8 |
| 59°   | 10420.4 | 10415.5 | 10723.2 | 11208.8 | 11680.7 | 11870.4 | 11890.1 | 10796.9 | 8950.8  | 6953.2  | 1759.7 |
| 60°   | 10223.8 | 10227.7 | 10432.2 | 10930.6 | 11432.0 | 11761.3 | 11838.0 | 11356.3 | 9428.5  | 7403.4  | 2066.4 |
| 62.5° | 9464.9  | 9510.1  | 9672.3  | 10135.3 | 10611.1 | 10978.8 | 11109.5 | 11854.7 | 10796.0 | 8467.1  | 3133.0 |
| 65°   | 8640.1  | 8643.1  | 8874.1  | 9270.2  | 9726.4  | 9984.9  | 10067.5 | 11079.1 | 11709.2 | 9550.4  | 4531.9 |
| 67.5° | 7168.5  | 7228.4  | 7490.9  | 8132.8  | 8735.5  | 9062.8  | 9125.7  | 9643.8  | 11330.7 | 10256.3 | 5232.8 |
| 70°   | 5016.5  | 5095.2  | 5469.7  | 6302.4  | 7199.9  | 7737.7  | 7733.7  | 8016.8  | 9972.1  | 9941.7  | 4436.5 |
| 72.5° | 2504.8  | 2640.5  | 2946.2  | 3837.9  | 4925.1  | 5769.6  | 5947.5  | 6448.9  | 8010.9  | 8257.7  | 3310.0 |
| 75°   | 1106.9  | 1114.8  | 1288.8  | 1738.0  | 2447.8  | 3520.3  | 3679.6  | 5118.8  | 6146.1  | 5739.1  | 2390.8 |
| 77.5° | 643.9   | 649.8   | 681.3   | 780.5   | 991.9   | 1725.3  | 1904.2  | 3357.1  | 4343.2  | 3335.5  | 1559.1 |
| 80°   | 234.0   | 239.9   | 238.9   | 295.9   | 434.5   | 679.3   | 757.0   | 1627.0  | 2897.1  | 1756.7  | 816.9  |
| 82.5° | 143.5   | 143.5   | 138.6   | 139.6   | 158.3   | 260.5   | 285.1   | 693.1   | 1410.7  | 865.1   | 234.0  |
| 85°   | 70.8    | 74.7    | 79.6    | 89.5    | 106.2   | 128.8   | 136.6   | 198.6   | 474.8   | 209.4   | 56.0   |
| 87.5° | 42.3    | 43.3    | 47.2    | 57.0    | 70.8    | 92.4    | 98.3    | 134.7   | 170.1   | 140.6   | 13.8   |
| 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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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°  | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|------|------|------|------|------|------|------|------|------|------|
| 0°    | 92.4   | 92.4 | 92.4 | 92.4 | 92.4 | 92.4 | 92.4 | 92.4 | 92.4 | 92.4 | 92.4 |
| 2.5°  | 93.4   | 92.4 | 87.5 | 83.6 | 79.6 | 75.7 | 72.7 | 69.8 | 69.8 | 70.8 | 69.8 |
| 5°    | 93.4   | 89.5 | 81.6 | 74.7 | 68.8 | 63.9 | 59.0 | 55.1 | 54.1 | 54.1 | 55.1 |
| 7.5°  | 92.4   | 87.5 | 76.7 | 67.8 | 60.0 | 53.1 | 48.2 | 43.3 | 42.3 | 43.3 | 42.3 |
| 10°   | 91.4   | 85.5 | 72.7 | 61.9 | 51.1 | 44.2 | 37.4 | 32.4 | 32.4 | 32.4 | 33.4 |
| 12.5° | 91.4   | 82.6 | 68.8 | 56.0 | 44.2 | 36.4 | 29.5 | 24.6 | 23.6 | 23.6 | 23.6 |
| 15°   | 90.4   | 80.6 | 64.9 | 49.2 | 37.4 | 27.5 | 21.6 | 16.7 | 16.7 | 16.7 | 16.7 |
| 17.5° | 88.5   | 77.7 | 60.0 | 43.3 | 29.5 | 20.6 | 14.7 | 9.8  | 9.8  | 11.8 | 11.8 |
| 20°   | 86.5   | 74.7 | 54.1 | 35.4 | 24.6 | 15.7 | 9.8  | 5.9  | 5.9  | 8.8  | 9.8  |
| 22.5° | 87.5   | 74.7 | 50.1 | 31.5 | 19.7 | 11.8 | 7.9  | 4.9  | 3.9  | 6.9  | 8.8  |
| 25°   | 88.5   | 72.7 | 45.2 | 27.5 | 14.7 | 8.8  | 5.9  | 2.0  | 1.0  | 2.0  | 2.9  |
| 27.5° | 88.5   | 70.8 | 39.3 | 21.6 | 10.8 | 6.9  | 2.9  | 0.0  | 0.0  | 0.0  | 0.0  |
| 30°   | 87.5   | 67.8 | 34.4 | 17.7 | 7.9  | 3.9  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 32.5° | 86.5   | 64.9 | 31.5 | 13.8 | 6.9  | 2.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 35°   | 87.5   | 60.9 | 27.5 | 10.8 | 3.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 2.0  |
| 37.5° | 90.4   | 57.0 | 23.6 | 8.8  | 2.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 40°   | 94.4   | 54.1 | 19.7 | 6.9  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 42.5° | 102.2  | 54.1 | 17.7 | 4.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 45°   | 112.1  | 54.1 | 14.7 | 3.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 47.5° | 124.8  | 55.1 | 12.8 | 3.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 50°   | 140.6  | 57.0 | 11.8 | 2.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 52.5° | 152.4  | 55.1 | 10.8 | 2.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 55°   | 173.0  | 53.1 | 9.8  | 2.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 57.5° | 200.5  | 50.1 | 9.8  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 59°   | 228.1  | 46.2 | 9.8  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 60°   | 259.5  | 44.2 | 8.8  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 62.5° | 428.6  | 39.3 | 7.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 65°   | 827.7  | 37.4 | 6.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 67.5° | 1337.9 | 37.4 | 4.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 70°   | 1406.8 | 37.4 | 3.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 72.5° | 935.9  | 30.5 | 2.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 75°   | 501.4  | 27.5 | 2.9  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 77.5° | 270.3  | 25.6 | 3.9  | 2.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 80°   | 119.0  | 18.7 | 4.9  | 2.9  | 2.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 82.5° | 47.2   | 12.8 | 5.9  | 4.9  | 3.9  | 2.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 85°   | 22.6   | 9.8  | 7.9  | 6.9  | 4.9  | 2.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 87.5° | 10.8   | 9.8  | 8.8  | 7.9  | 6.9  | 4.9  | 1.0  | 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  |

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

Report Prepared for

Cooper Lighting Solutions

McGraw-Edison

Report Number: SP1-2407-184-9

Test Date: 10/10/2024

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

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

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-184-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/15/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGraw-Edison  
 Catalog Number: **GSS-SB1A-830-U-5WQ**  
 Description: GALLEON II SITE SLIM 1SQ 350MA 5WQ HIGH DENSITY LIGHTSQUARE WITH 80 CRI  
 3000K CCT 26 LEDS

### Spectral Parameters

CCT (K): 3055  
 CIE  $u'$ : 0.2475  
 CIE  $v'$ : 0.5247  
 Duv: 0.0032  
 CIE x: 0.4377  
 CIE y: 0.4124  
 CIE z: 0.1499  
 Peak Wavelength (nm): 604  
 Dominant Wavelength (nm): 581  
 Purity: 55.16339  
 R<sub>f</sub>: 81.5  
 R<sub>g</sub>: 99.2

CRI (Ra): 80.9  
 R1: 79.5  
 R2: 85.6  
 R3: 92.1  
 R4: 82.4  
 R5: 78.9  
 R6: 81.7  
 R7: 85.1  
 R8: 61.9  
 R9: 6.8  
 R10: 67.1  
 R11: 82.5  
 R12: 63.4  
 R13: 80.2  
 R14: 95.1  
 R15: 71.7



### Test Conditions

Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-184-9

| 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

| λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 170                      | NR            | 620    | 938                      | NR            | 750    | 35                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 234                      | NR            | 625    | 894                      | NR            | 755    | 30                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 302                      | NR            | 630    | 847                      | NR            | 760    | 26                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 371                      | NR            | 635    | 788                      | NR            | 765    | 22                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 431                      | NR            | 640    | 728                      | NR            | 770    | 19                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 482                      | NR            | 645    | 665                      | NR            | 775    | 16                       | NR            | 905    | 1                        | NR            |
| 390    | 0                        | NR            | 520    | 523                      | NR            | 650    | 603                      | NR            | 780    | 14                       | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 553                      | NR            | 655    | 542                      | NR            | 785    | 12                       | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 580                      | NR            | 660    | 484                      | NR            | 790    | 11                       | NR            | 920    | 0                        | NR            |
| 405    | 8                        | NR            | 535    | 603                      | NR            | 665    | 430                      | NR            | 795    | 9                        | NR            | 925    | 0                        | NR            |
| 410    | 18                       | NR            | 540    | 622                      | NR            | 670    | 377                      | NR            | 800    | 8                        | NR            | 930    | 0                        | NR            |
| 415    | 36                       | NR            | 545    | 644                      | NR            | 675    | 330                      | NR            | 805    | 7                        | NR            | 935    | 0                        | NR            |
| 420    | 71                       | NR            | 550    | 668                      | NR            | 680    | 289                      | NR            | 810    | 6                        | NR            | 940    | 0                        | NR            |
| 425    | 131                      | NR            | 555    | 693                      | NR            | 685    | 250                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 215                      | NR            | 560    | 720                      | NR            | 690    | 218                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 341                      | NR            | 565    | 754                      | NR            | 695    | 188                      | NR            | 825    | 4                        | NR            | 955    | 0                        | NR            |
| 440    | 514                      | NR            | 570    | 792                      | NR            | 700    | 161                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 576                      | NR            | 575    | 832                      | NR            | 705    | 139                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 358                      | NR            | 580    | 875                      | NR            | 710    | 119                      | NR            | 840    | 3                        | NR            | 970    | 0                        | NR            |
| 455    | 222                      | NR            | 585    | 913                      | NR            | 715    | 102                      | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 170                      | NR            | 590    | 950                      | NR            | 720    | 88                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 115                      | NR            | 595    | 977                      | NR            | 725    | 76                       | NR            | 855    | 2                        | NR            | 985    | 0                        | NR            |
| 470    | 88                       | NR            | 600    | 994                      | NR            | 730    | 65                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 87                       | NR            | 605    | 997                      | NR            | 735    | 56                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 96                       | NR            | 610    | 990                      | NR            | 740    | 47                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 122                      | NR            | 615    | 971                      | NR            | 745    | 41                       | NR            | 875    | 1                        | NR            |        |                          |               |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.28

| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 170                         | NR               | 620       | 938                         | NR               | 750       | 35                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 234                         | NR               | 625       | 894                         | NR               | 755       | 30                          | NR               | 885       | 1                           | NR               |
| 370       | 0                           | NR               | 500       | 302                         | NR               | 630       | 847                         | NR               | 760       | 26                          | NR               | 890       | 1                           | NR               |
| 375       | 0                           | NR               | 505       | 371                         | NR               | 635       | 788                         | NR               | 765       | 22                          | NR               | 895       | 1                           | NR               |
| 380       | 0                           | NR               | 510       | 431                         | NR               | 640       | 728                         | NR               | 770       | 19                          | NR               | 900       | 1                           | NR               |
| 385       | 0                           | NR               | 515       | 482                         | NR               | 645       | 665                         | NR               | 775       | 16                          | NR               | 905       | 1                           | NR               |
| 390       | 0                           | NR               | 520       | 523                         | NR               | 650       | 603                         | NR               | 780       | 14                          | NR               | 910       | 0                           | NR               |
| 395       | 2                           | NR               | 525       | 553                         | NR               | 655       | 542                         | NR               | 785       | 12                          | NR               | 915       | 0                           | NR               |
| 400       | 4                           | NR               | 530       | 580                         | NR               | 660       | 484                         | NR               | 790       | 11                          | NR               | 920       | 0                           | NR               |
| 405       | 8                           | NR               | 535       | 603                         | NR               | 665       | 430                         | NR               | 795       | 9                           | NR               | 925       | 0                           | NR               |
| 410       | 18                          | NR               | 540       | 622                         | NR               | 670       | 377                         | NR               | 800       | 8                           | NR               | 930       | 0                           | NR               |
| 415       | 36                          | NR               | 545       | 644                         | NR               | 675       | 330                         | NR               | 805       | 7                           | NR               | 935       | 0                           | NR               |
| 420       | 71                          | NR               | 550       | 668                         | NR               | 680       | 289                         | NR               | 810       | 6                           | NR               | 940       | 0                           | NR               |
| 425       | 131                         | NR               | 555       | 693                         | NR               | 685       | 250                         | NR               | 815       | 5                           | NR               | 945       | 0                           | NR               |
| 430       | 215                         | NR               | 560       | 720                         | NR               | 690       | 218                         | NR               | 820       | 4                           | NR               | 950       | 0                           | NR               |
| 435       | 341                         | NR               | 565       | 754                         | NR               | 695       | 188                         | NR               | 825       | 4                           | NR               | 955       | 0                           | NR               |
| 440       | 514                         | NR               | 570       | 792                         | NR               | 700       | 161                         | NR               | 830       | 3                           | NR               | 960       | 0                           | NR               |
| 445       | 576                         | NR               | 575       | 832                         | NR               | 705       | 139                         | NR               | 835       | 3                           | NR               | 965       | 0                           | NR               |
| 450       | 358                         | NR               | 580       | 875                         | NR               | 710       | 119                         | NR               | 840       | 3                           | NR               | 970       | 0                           | NR               |
| 455       | 222                         | NR               | 585       | 913                         | NR               | 715       | 102                         | NR               | 845       | 2                           | NR               | 975       | 0                           | NR               |
| 460       | 170                         | NR               | 590       | 950                         | NR               | 720       | 88                          | NR               | 850       | 2                           | NR               | 980       | 0                           | NR               |
| 465       | 115                         | NR               | 595       | 977                         | NR               | 725       | 76                          | NR               | 855       | 2                           | NR               | 985       | 0                           | NR               |
| 470       | 88                          | NR               | 600       | 994                         | NR               | 730       | 65                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 87                          | NR               | 605       | 997                         | NR               | 735       | 56                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 96                          | NR               | 610       | 990                         | NR               | 740       | 47                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 122                         | NR               | 615       | 971                         | NR               | 745       | 41                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: NR**
**M/P: 2.33**

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 170                                  | NR                             | 620               | 938                                  | NR                             | 750               | 35                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 234                                  | NR                             | 625               | 894                                  | NR                             | 755               | 30                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 302                                  | NR                             | 630               | 847                                  | NR                             | 760               | 26                                   | NR                             | 890               | 1                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 371                                  | NR                             | 635               | 788                                  | NR                             | 765               | 22                                   | NR                             | 895               | 1                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 431                                  | NR                             | 640               | 728                                  | NR                             | 770               | 19                                   | NR                             | 900               | 1                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 482                                  | NR                             | 645               | 665                                  | NR                             | 775               | 16                                   | NR                             | 905               | 1                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 523                                  | NR                             | 650               | 603                                  | NR                             | 780               | 14                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 2                                    | NR                             | 525               | 553                                  | NR                             | 655               | 542                                  | NR                             | 785               | 12                                   | NR                             | 915               | 0                                    | NR                             |
| 400               | 4                                    | NR                             | 530               | 580                                  | NR                             | 660               | 484                                  | NR                             | 790               | 11                                   | NR                             | 920               | 0                                    | NR                             |
| 405               | 8                                    | NR                             | 535               | 603                                  | NR                             | 665               | 430                                  | NR                             | 795               | 9                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 18                                   | NR                             | 540               | 622                                  | NR                             | 670               | 377                                  | NR                             | 800               | 8                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 36                                   | NR                             | 545               | 644                                  | NR                             | 675               | 330                                  | NR                             | 805               | 7                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 71                                   | NR                             | 550               | 668                                  | NR                             | 680               | 289                                  | NR                             | 810               | 6                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 131                                  | NR                             | 555               | 693                                  | NR                             | 685               | 250                                  | NR                             | 815               | 5                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 215                                  | NR                             | 560               | 720                                  | NR                             | 690               | 218                                  | NR                             | 820               | 4                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 341                                  | NR                             | 565               | 754                                  | NR                             | 695               | 188                                  | NR                             | 825               | 4                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 514                                  | NR                             | 570               | 792                                  | NR                             | 700               | 161                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 576                                  | NR                             | 575               | 832                                  | NR                             | 705               | 139                                  | NR                             | 835               | 3                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 358                                  | NR                             | 580               | 875                                  | NR                             | 710               | 119                                  | NR                             | 840               | 3                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 222                                  | NR                             | 585               | 913                                  | NR                             | 715               | 102                                  | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 170                                  | NR                             | 590               | 950                                  | NR                             | 720               | 88                                   | NR                             | 850               | 2                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 115                                  | NR                             | 595               | 977                                  | NR                             | 725               | 76                                   | NR                             | 855               | 2                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 88                                   | NR                             | 600               | 994                                  | NR                             | 730               | 65                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 87                                   | NR                             | 605               | 997                                  | NR                             | 735               | 56                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 96                                   | NR                             | 610               | 990                                  | NR                             | 740               | 47                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 122                                  | NR                             | 615               | 971                                  | NR                             | 745               | 41                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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TM-30-18

### Summary

$R_f = 81.5$   
 $R_g = 99.2$   
 $CIE R_a = 80.9$   
 $R_g = 6.8$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 91 | 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 = 93 |
| 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 = 90 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 77 | 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)