

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: P1066969

Luminaire Tested: **NAV-SA4A-727-U-T3BC**

Issue Date: 08/07/2025

**Test Information**

Test Method: LM-79-08  
Report Number: P1066969  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/07/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: LUMARK  
Catalog Number: NAV-SA4A-727-U-T3BC  
Description: Navion AREA AND ROADWAY LUMINAIRE 615mA 4xLight Square PACKAGE  
70CRI 2700K FIXTURE w/ TYPE III ANGLED BACKLIGHT CONTROL  
Light Source: (56) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 12357.8 lumens  
Efficiency: N/A  
Efficacy: 115.1 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): 107.4  
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



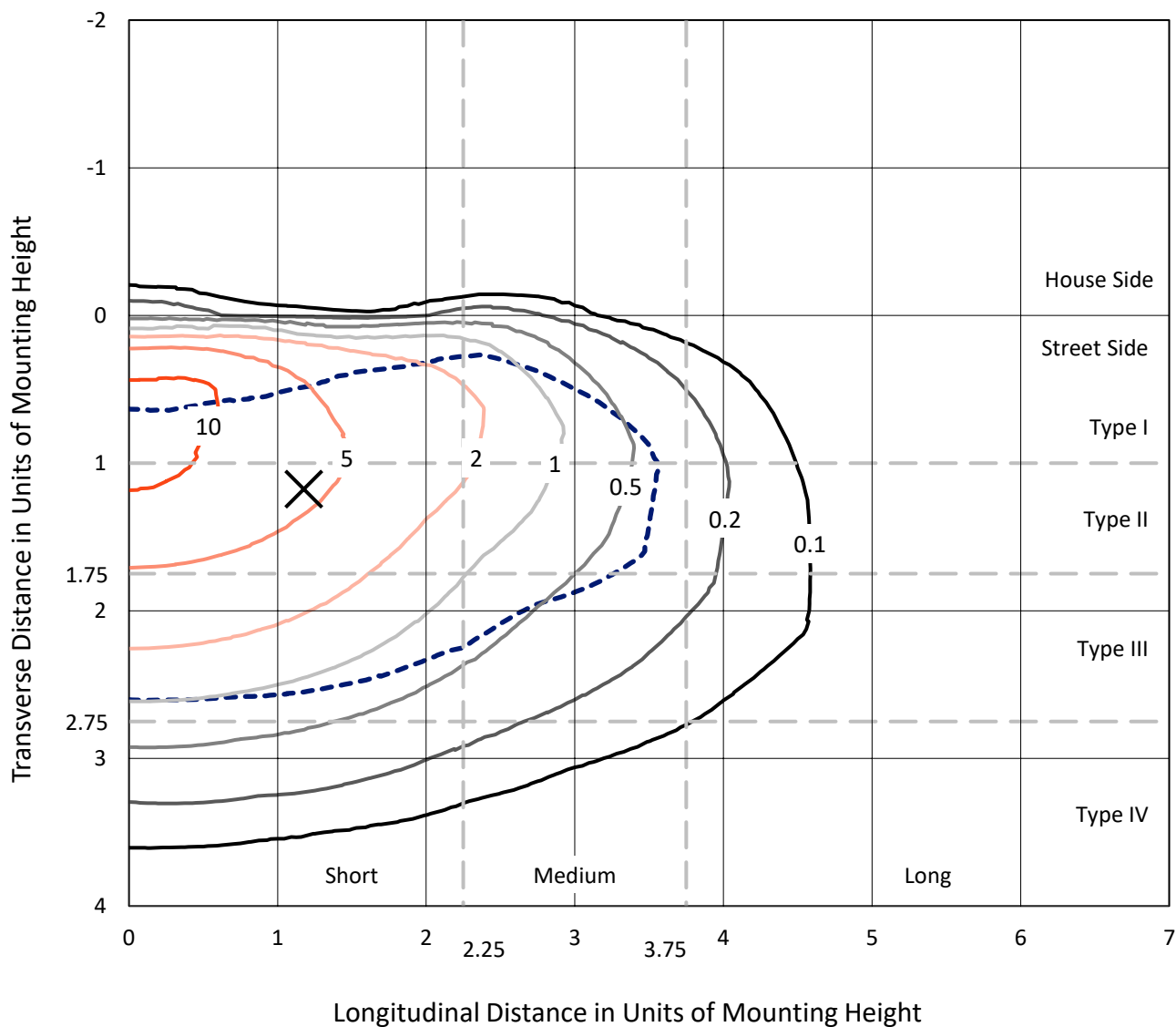
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CATALOG NUMBER: NAV-SA4A-727-U-T3BC

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

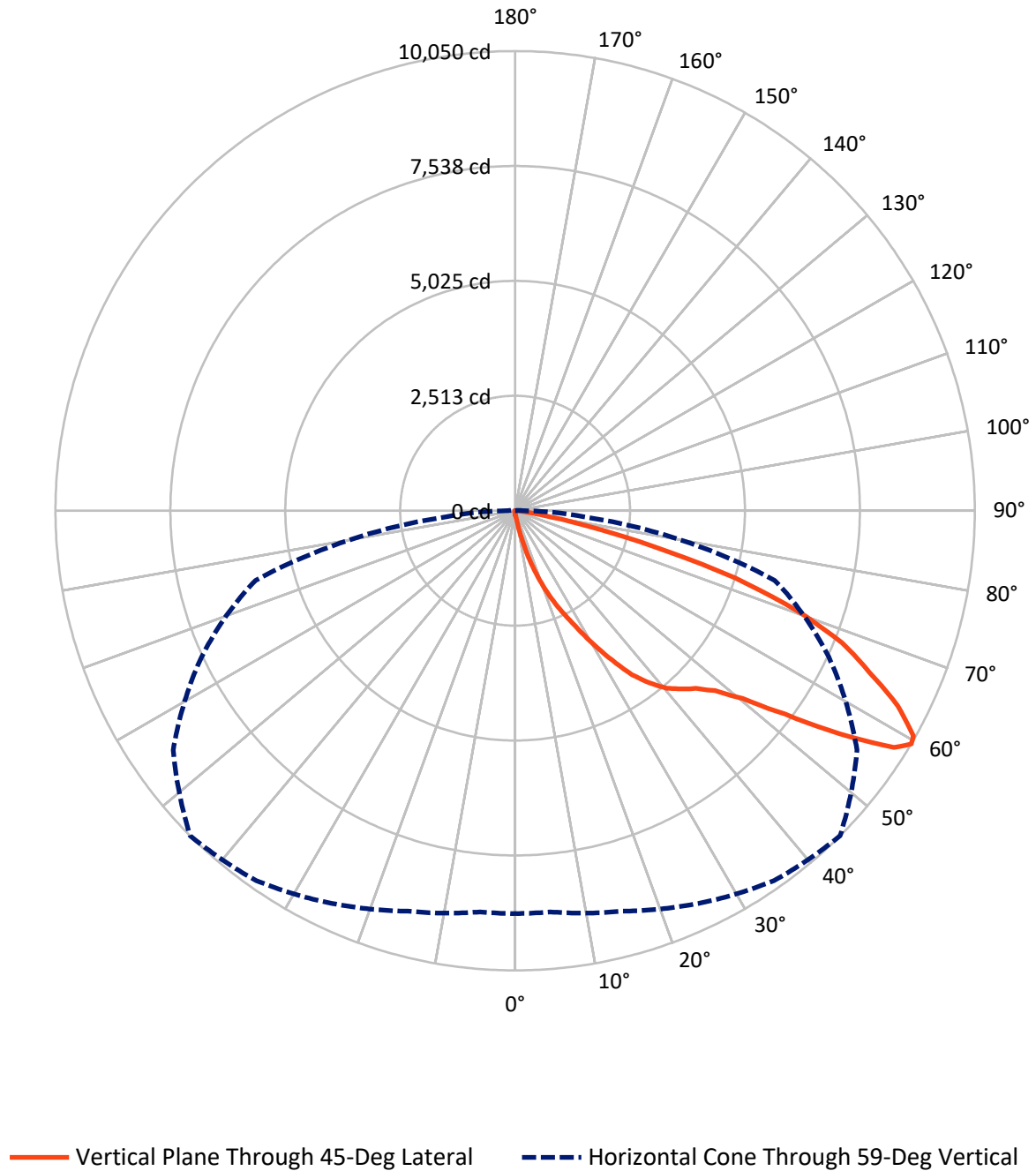


Based on 15 foot mounting height. Maximum calculated value = 13.5 fc  
 Type III - Short - N/A

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CATALOG NUMBER: NAV-SA4A-727-U-T3BC

## Luminous Intensity Polar Plot



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CATALOG NUMBER: NAV-SA4A-727-U-T3BC

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 43.9     | 0.0    | 43.9    |
|                    | % Fixture | 0.4      | 0.0    | 0.4     |
| <b>Street Side</b> | Lumens    | 12313.9  | 0.0    | 12313.9 |
|                    | % Fixture | 99.6     | 0.0    | 99.6    |
| <b>Total</b>       | Lumens    | 12357.8  | 0.0    | 12357.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 11.5    | 0.1       |
| 10°-20°   | 136.6   | 1.1       |
| 20°-30°   | 490.8   | 4.0       |
| 30°-40°   | 1140.4  | 9.2       |
| 40°-50°   | 1943.8  | 15.7      |
| 50°-60°   | 3202.9  | 25.9      |
| 60°-70°   | 3703.2  | 30.0      |
| 70°-80°   | 1591.0  | 12.9      |
| 80°-90°   | 137.5   | 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°    | 12357.8 | 100.0     |
| 0°-180°   | 12357.8 | 100.0     |



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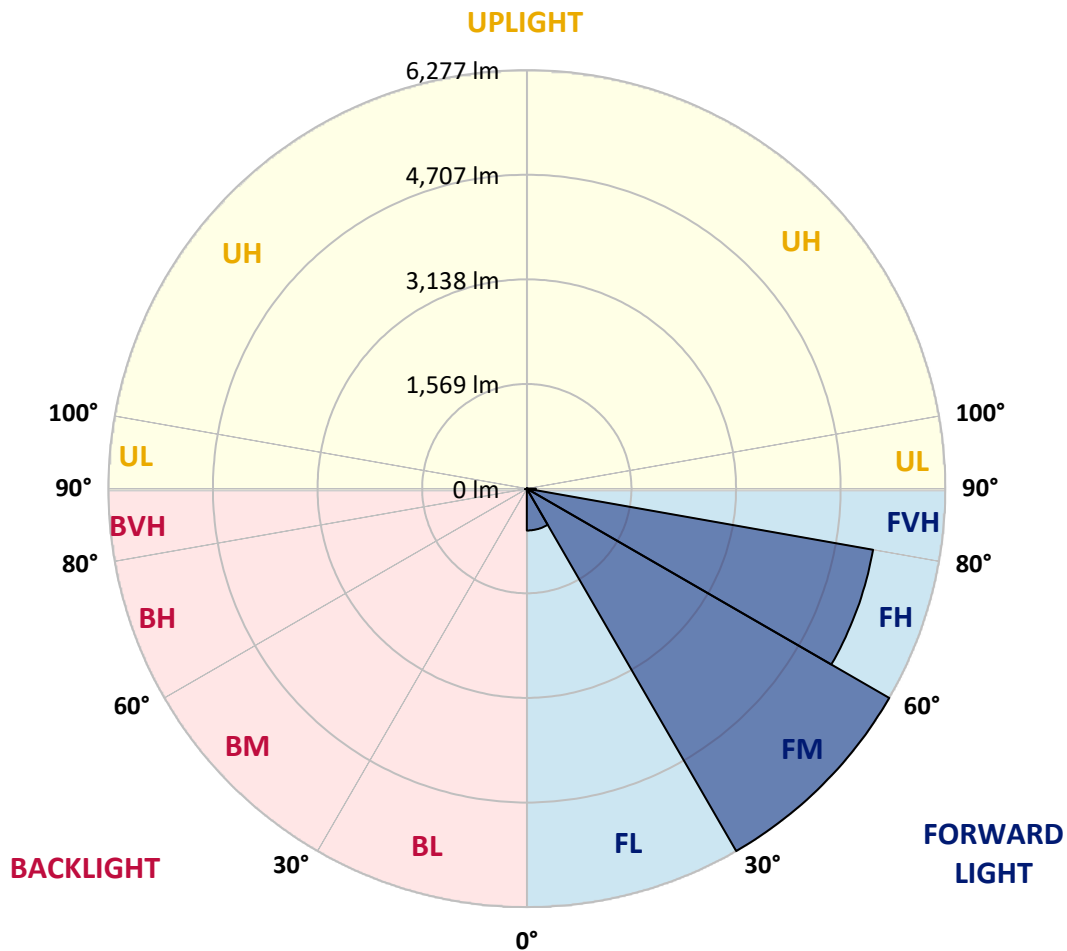
CATALOG NUMBER: NAV-SA4A-727-U-T3BC

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 628.0  | 5.1       |                         |      |         |
| FM   | (30°-60°)   | 6276.5 | 50.8      |                         |      |         |
| FH   | (60°-80°)   | 5273.6 | 42.7      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 135.7  | 1.1       |                         |      | G2/225  |
| BL   | (0°-30°)    | 10.8   | 0.1       | B0/110                  |      |         |
| BM   | (30°-60°)   | 10.6   | 0.1       | B0/220                  |      |         |
| BH   | (60°-80°)   | 20.6   | 0.2       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 1.8    | 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°    | 78.1   | 78.1   | 78.1   | 78.1   | 78.1    | 78.1    | 78.1    | 78.1    | 78.1   | 78.1   | 78.1   |
| 2.5°  | 101.4  | 101.4  | 98.9   | 95.6   | 94.7    | 92.2    | 92.2    | 89.7    | 86.4   | 83.9   | 80.6   |
| 5°    | 147.1  | 146.2  | 139.6  | 131.3  | 120.5   | 113.8   | 113.8   | 104.7   | 96.4   | 88.9   | 82.3   |
| 7.5°  | 321.6  | 314.1  | 290.0  | 250.1  | 197.8   | 162.9   | 160.4   | 130.5   | 110.5  | 95.6   | 83.1   |
| 10°   | 737.9  | 712.1  | 678.0  | 582.5  | 430.4   | 300.8   | 295.0   | 190.3   | 132.1  | 103.0  | 84.8   |
| 12.5° | 1209.0 | 1229.8 | 1161.7 | 1011.3 | 833.4   | 619.9   | 578.3   | 320.7   | 174.5  | 113.0  | 86.4   |
| 15°   | 1637.8 | 1632.8 | 1594.6 | 1471.6 | 1266.4  | 982.2   | 956.4   | 557.6   | 250.1  | 128.8  | 88.1   |
| 17.5° | 1958.5 | 1952.7 | 1916.1 | 1837.2 | 1679.3  | 1395.1  | 1372.7  | 889.1   | 392.2  | 151.2  | 89.7   |
| 20°   | 2296.7 | 2289.2 | 2237.7 | 2174.6 | 2036.6  | 1794.8  | 1768.2  | 1259.7  | 614.1  | 187.8  | 89.7   |
| 22.5° | 2702.2 | 2688.1 | 2633.3 | 2526.1 | 2380.6  | 2170.4  | 2146.3  | 1638.6  | 889.1  | 247.6  | 93.9   |
| 25°   | 3192.5 | 3168.4 | 3092.8 | 2996.4 | 2821.0  | 2541.8  | 2516.1  | 2060.7  | 1220.7 | 338.2  | 98.1   |
| 27.5° | 3751.7 | 3755.9 | 3653.6 | 3490.8 | 3255.6  | 2970.6  | 2922.4  | 2438.8  | 1563.8 | 467.8  | 103.0  |
| 30°   | 4415.6 | 4374.1 | 4230.3 | 4040.9 | 3812.4  | 3449.2  | 3402.7  | 2815.2  | 1949.4 | 658.9  | 111.3  |
| 32.5° | 5037.2 | 4992.3 | 4798.7 | 4560.2 | 4315.1  | 3932.0  | 3893.8  | 3238.2  | 2300.0 | 885.0  | 126.3  |
| 35°   | 5570.6 | 5539.1 | 5268.2 | 4977.3 | 4759.6  | 4417.3  | 4405.6  | 3710.2  | 2712.2 | 1128.4 | 142.9  |
| 37.5° | 6040.1 | 5982.8 | 5634.6 | 5333.0 | 5111.9  | 4805.3  | 4780.4  | 4142.2  | 3109.4 | 1410.9 | 167.9  |
| 40°   | 6440.6 | 6409.0 | 5984.4 | 5588.1 | 5408.6  | 5134.4  | 5102.8  | 4521.1  | 3519.9 | 1739.2 | 198.6  |
| 42.5° | 6869.4 | 6827.8 | 6415.7 | 5971.1 | 5640.4  | 5347.1  | 5326.3  | 4833.6  | 3885.5 | 2099.8 | 244.3  |
| 45°   | 7353.8 | 7276.5 | 6915.1 | 6516.2 | 6013.5  | 5567.3  | 5544.0  | 5111.9  | 4260.2 | 2487.0 | 300.0  |
| 47.5° | 7871.5 | 7804.2 | 7511.7 | 7231.7 | 6653.3  | 5930.4  | 5880.6  | 5348.8  | 4632.5 | 2934.1 | 370.6  |
| 50°   | 8398.3 | 8400.0 | 8180.6 | 8046.0 | 7435.3  | 6520.4  | 6449.8  | 5696.9  | 5023.9 | 3412.7 | 475.3  |
| 52.5° | 9011.6 | 9027.3 | 9024.0 | 8924.3 | 8450.7  | 7485.1  | 7390.4  | 6225.4  | 5478.4 | 3971.1 | 619.9  |
| 55°   | 9268.3 | 9296.6 | 9480.2 | 9701.2 | 9572.4  | 8708.3  | 8606.9  | 7137.0  | 6080.8 | 4593.4 | 834.3  |
| 57.5° | 9058.1 | 9089.7 | 9343.1 | 9730.3 | 10026.1 | 9779.3  | 9767.7  | 8323.5  | 6874.4 | 5347.9 | 1184.9 |
| 59°   | 8808.0 | 8803.8 | 9063.9 | 9474.4 | 9873.2  | 10033.6 | 10050.2 | 9126.2  | 7565.7 | 5877.2 | 1487.4 |
| 60°   | 8641.8 | 8645.1 | 8817.9 | 9239.2 | 9663.0  | 9941.4  | 10006.2 | 9599.0  | 7969.6 | 6257.8 | 1746.6 |
| 62.5° | 8000.3 | 8038.5 | 8175.6 | 8567.0 | 8969.2  | 9279.9  | 9390.5  | 10020.3 | 9125.4 | 7156.9 | 2648.2 |
| 65°   | 7303.1 | 7305.6 | 7500.9 | 7835.8 | 8221.3  | 8439.9  | 8509.7  | 9364.7  | 9897.3 | 8072.6 | 3830.6 |
| 67.5° | 6059.2 | 6109.9 | 6331.8 | 6874.4 | 7383.7  | 7660.4  | 7713.6  | 8151.5  | 9577.4 | 8669.2 | 4423.1 |
| 70°   | 4240.3 | 4306.8 | 4623.4 | 5327.2 | 6085.8  | 6540.3  | 6537.0  | 6776.3  | 8429.1 | 8403.3 | 3750.0 |
| 72.5° | 2117.2 | 2231.9 | 2490.3 | 3244.0 | 4163.0  | 4876.8  | 5027.2  | 5451.0  | 6771.3 | 6979.9 | 2797.8 |
| 75°   | 935.6  | 942.3  | 1089.4 | 1469.1 | 2069.0  | 2975.6  | 3110.2  | 4326.7  | 5195.0 | 4851.0 | 2020.8 |
| 77.5° | 544.3  | 549.3  | 575.8  | 659.8  | 838.4   | 1458.3  | 1609.5  | 2837.7  | 3671.1 | 2819.4 | 1317.9 |
| 80°   | 197.8  | 202.7  | 201.9  | 250.1  | 367.3   | 574.2   | 639.8   | 1375.2  | 2448.8 | 1484.9 | 690.5  |
| 82.5° | 121.3  | 121.3  | 117.2  | 118.0  | 133.8   | 220.2   | 241.0   | 585.8   | 1192.4 | 731.2  | 197.8  |
| 85°   | 59.8   | 63.2   | 67.3   | 75.6   | 89.7    | 108.9   | 115.5   | 167.9   | 401.3  | 177.0  | 47.4   |
| 87.5° | 35.7   | 36.6   | 39.9   | 48.2   | 59.8    | 78.1    | 83.1    | 113.8   | 143.8  | 118.8  | 11.6   |
| 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: NAV-SA4A-727-U-T3BC

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°  | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|------|------|------|------|------|------|------|------|------|------|
| 0°    | 78.1   | 78.1 | 78.1 | 78.1 | 78.1 | 78.1 | 78.1 | 78.1 | 78.1 | 78.1 | 78.1 |
| 2.5°  | 78.9   | 78.1 | 74.0 | 70.6 | 67.3 | 64.0 | 61.5 | 59.0 | 59.0 | 59.8 | 59.0 |
| 5°    | 78.9   | 75.6 | 69.0 | 63.2 | 58.2 | 54.0 | 49.9 | 46.5 | 45.7 | 45.7 | 46.5 |
| 7.5°  | 78.1   | 74.0 | 64.8 | 57.3 | 50.7 | 44.9 | 40.7 | 36.6 | 35.7 | 36.6 | 35.7 |
| 10°   | 77.3   | 72.3 | 61.5 | 52.3 | 43.2 | 37.4 | 31.6 | 27.4 | 27.4 | 27.4 | 28.3 |
| 12.5° | 77.3   | 69.8 | 58.2 | 47.4 | 37.4 | 30.7 | 24.9 | 20.8 | 19.9 | 19.9 | 19.9 |
| 15°   | 76.4   | 68.1 | 54.8 | 41.5 | 31.6 | 23.3 | 18.3 | 14.1 | 14.1 | 14.1 | 14.1 |
| 17.5° | 74.8   | 65.6 | 50.7 | 36.6 | 24.9 | 17.4 | 12.5 | 8.3  | 8.3  | 10.0 | 10.0 |
| 20°   | 73.1   | 63.2 | 45.7 | 29.9 | 20.8 | 13.3 | 8.3  | 5.0  | 5.0  | 7.5  | 8.3  |
| 22.5° | 74.0   | 63.2 | 42.4 | 26.6 | 16.6 | 10.0 | 6.6  | 4.2  | 3.3  | 5.8  | 7.5  |
| 25°   | 74.8   | 61.5 | 38.2 | 23.3 | 12.5 | 7.5  | 5.0  | 1.7  | 0.8  | 1.7  | 2.5  |
| 27.5° | 74.8   | 59.8 | 33.2 | 18.3 | 9.1  | 5.8  | 2.5  | 0.0  | 0.0  | 0.0  | 0.0  |
| 30°   | 74.0   | 57.3 | 29.1 | 15.0 | 6.6  | 3.3  | 0.8  | 0.0  | 0.0  | 0.0  | 0.0  |
| 32.5° | 73.1   | 54.8 | 26.6 | 11.6 | 5.8  | 1.7  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 35°   | 74.0   | 51.5 | 23.3 | 9.1  | 3.3  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 1.7  |
| 37.5° | 76.4   | 48.2 | 19.9 | 7.5  | 2.5  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 40°   | 79.8   | 45.7 | 16.6 | 5.8  | 0.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 42.5° | 86.4   | 45.7 | 15.0 | 4.2  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 45°   | 94.7   | 45.7 | 12.5 | 3.3  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 47.5° | 105.5  | 46.5 | 10.8 | 3.3  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 50°   | 118.8  | 48.2 | 10.0 | 2.5  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 52.5° | 128.8  | 46.5 | 9.1  | 2.5  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 55°   | 146.2  | 44.9 | 8.3  | 1.7  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 57.5° | 169.5  | 42.4 | 8.3  | 0.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 59°   | 192.8  | 39.1 | 8.3  | 0.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 60°   | 219.4  | 37.4 | 7.5  | 0.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 62.5° | 362.3  | 33.2 | 6.6  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 65°   | 699.7  | 31.6 | 5.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 67.5° | 1130.9 | 31.6 | 4.2  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 70°   | 1189.1 | 31.6 | 3.3  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 72.5° | 791.1  | 25.8 | 2.5  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 75°   | 423.8  | 23.3 | 2.5  | 0.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 77.5° | 228.5  | 21.6 | 3.3  | 1.7  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 80°   | 100.5  | 15.8 | 4.2  | 2.5  | 1.7  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 82.5° | 39.9   | 10.8 | 5.0  | 4.2  | 3.3  | 1.7  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 85°   | 19.1   | 8.3  | 6.6  | 5.8  | 4.2  | 2.5  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 87.5° | 9.1    | 8.3  | 7.5  | 6.6  | 5.8  | 4.2  | 0.8  | 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: SP1-2407-184-3

Test Date: 10/09/2024

Luminaire Tested: GSS-SB1A-727-U-5WQ

Data in this report applies to families of products including GSS-SB1A-727-U-5WQ

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-184-3  
 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-727-U-5WQ**  
 Description: GALLEON II SITE SLIM 1SQ 350MA 5WQ HIGH DENSITY LIGHTSQUARE WITH 70 CRI  
 2700K CCT 26 LEDS

### Spectral Parameters

|                           |          |           |      |      |       |
|---------------------------|----------|-----------|------|------|-------|
| CCT (K):                  | 2672     | CRI (Ra): | 71.1 |      |       |
| CIE u':                   | 0.2638   | R1:       | 68.3 | R9:  | -27.8 |
| CIE v':                   | 0.5276   | R2:       | 79.8 | R10: | 54.4  |
| Duv:                      | -0.0002  | R3:       | 91.2 | R11: | 65.8  |
| CIE x:                    | 0.4619   | R4:       | 69.4 | R12: | 45.6  |
| CIE y:                    | 0.4106   | R5:       | 66.5 | R13: | 69.8  |
| CIE z:                    | 0.1275   | R6:       | 72.6 | R14: | 94.5  |
| Peak Wavelength (nm):     | 601      | R7:       | 77.0 | R15: | 60.1  |
| Dominant Wavelength (nm): | 584      | R8:       | 44.1 |      |       |
| Purity:                   | 61.88407 |           |      |      |       |
| Rf:                       | 67.9     |           |      |      |       |
| Rg:                       | 98.6     |           |      |      |       |



### Test Conditions

Stabilization Time: 21M  
 Operation Time: 1H 21M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-184-3

| 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           |



REPORT NUMBER: SP1-2407-184-3

### Photopic Flux vs. Wavelength



### Photopic Lumens: NR

| $\lambda$<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               | 52                                   | NR                             | 620               | 888                                  | NR                             | 750               | 27                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 87                                   | NR                             | 625               | 834                                  | NR                             | 755               | 23                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 135                                  | NR                             | 630               | 776                                  | NR                             | 760               | 20                                   | NR                             | 890               | 1                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 196                                  | NR                             | 635               | 712                                  | NR                             | 765               | 17                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 258                                  | NR                             | 640               | 648                                  | NR                             | 770               | 15                                   | NR                             | 900               | 0                                    | NR                             |
| 385               | 1                                    | NR                             | 515               | 317                                  | NR                             | 645               | 583                                  | NR                             | 775               | 12                                   | NR                             | 905               | 0                                    | NR                             |
| 390               | 2                                    | NR                             | 520               | 368                                  | NR                             | 650               | 523                                  | NR                             | 780               | 11                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 4                                    | NR                             | 525               | 408                                  | NR                             | 655               | 465                                  | NR                             | 785               | 9                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 6                                    | NR                             | 530               | 443                                  | NR                             | 660               | 410                                  | NR                             | 790               | 8                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 11                                   | NR                             | 535               | 473                                  | NR                             | 665               | 360                                  | NR                             | 795               | 7                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 23                                   | NR                             | 540               | 498                                  | NR                             | 670               | 313                                  | NR                             | 800               | 6                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 51                                   | NR                             | 545               | 530                                  | NR                             | 675               | 272                                  | NR                             | 805               | 5                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 111                                  | NR                             | 550               | 563                                  | NR                             | 680               | 236                                  | NR                             | 810               | 4                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 214                                  | NR                             | 555               | 605                                  | NR                             | 685               | 203                                  | NR                             | 815               | 4                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 339                                  | NR                             | 560               | 651                                  | NR                             | 690               | 175                                  | NR                             | 820               | 3                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 467                                  | NR                             | 565               | 705                                  | NR                             | 695               | 150                                  | NR                             | 825               | 3                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 535                                  | NR                             | 570               | 765                                  | NR                             | 700               | 128                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 372                                  | NR                             | 575               | 824                                  | NR                             | 705               | 110                                  | NR                             | 835               | 2                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 160                                  | NR                             | 580               | 882                                  | NR                             | 710               | 94                                   | NR                             | 840               | 2                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 89                                   | NR                             | 585               | 930                                  | NR                             | 715               | 80                                   | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 53                                   | NR                             | 590               | 968                                  | NR                             | 720               | 69                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 31                                   | NR                             | 595               | 991                                  | NR                             | 725               | 59                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 23                                   | NR                             | 600               | 999                                  | NR                             | 730               | 50                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 21                                   | NR                             | 605               | 992                                  | NR                             | 735               | 43                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 23                                   | NR                             | 610               | 969                                  | NR                             | 740               | 36                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 32                                   | NR                             | 615               | 935                                  | NR                             | 745               | 31                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.02

| $\lambda$<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               | 52                                   | NR                             | 620               | 888                                  | NR                             | 750               | 27                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 87                                   | NR                             | 625               | 834                                  | NR                             | 755               | 23                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 135                                  | NR                             | 630               | 776                                  | NR                             | 760               | 20                                   | NR                             | 890               | 1                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 196                                  | NR                             | 635               | 712                                  | NR                             | 765               | 17                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 258                                  | NR                             | 640               | 648                                  | NR                             | 770               | 15                                   | NR                             | 900               | 0                                    | NR                             |
| 385               | 1                                    | NR                             | 515               | 317                                  | NR                             | 645               | 583                                  | NR                             | 775               | 12                                   | NR                             | 905               | 0                                    | NR                             |
| 390               | 2                                    | NR                             | 520               | 368                                  | NR                             | 650               | 523                                  | NR                             | 780               | 11                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 4                                    | NR                             | 525               | 408                                  | NR                             | 655               | 465                                  | NR                             | 785               | 9                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 6                                    | NR                             | 530               | 443                                  | NR                             | 660               | 410                                  | NR                             | 790               | 8                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 11                                   | NR                             | 535               | 473                                  | NR                             | 665               | 360                                  | NR                             | 795               | 7                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 23                                   | NR                             | 540               | 498                                  | NR                             | 670               | 313                                  | NR                             | 800               | 6                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 51                                   | NR                             | 545               | 530                                  | NR                             | 675               | 272                                  | NR                             | 805               | 5                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 111                                  | NR                             | 550               | 563                                  | NR                             | 680               | 236                                  | NR                             | 810               | 4                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 214                                  | NR                             | 555               | 605                                  | NR                             | 685               | 203                                  | NR                             | 815               | 4                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 339                                  | NR                             | 560               | 651                                  | NR                             | 690               | 175                                  | NR                             | 820               | 3                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 467                                  | NR                             | 565               | 705                                  | NR                             | 695               | 150                                  | NR                             | 825               | 3                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 535                                  | NR                             | 570               | 765                                  | NR                             | 700               | 128                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 372                                  | NR                             | 575               | 824                                  | NR                             | 705               | 110                                  | NR                             | 835               | 2                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 160                                  | NR                             | 580               | 882                                  | NR                             | 710               | 94                                   | NR                             | 840               | 2                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 89                                   | NR                             | 585               | 930                                  | NR                             | 715               | 80                                   | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 53                                   | NR                             | 590               | 968                                  | NR                             | 720               | 69                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 31                                   | NR                             | 595               | 991                                  | NR                             | 725               | 59                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 23                                   | NR                             | 600               | 999                                  | NR                             | 730               | 50                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 21                                   | NR                             | 605               | 992                                  | NR                             | 735               | 43                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 23                                   | NR                             | 610               | 969                                  | NR                             | 740               | 36                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 32                                   | NR                             | 615               | 935                                  | NR                             | 745               | 31                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 1.71

| 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    | 52                       | NR            | 620    | 888                      | NR            | 750    | 27                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 87                       | NR            | 625    | 834                      | NR            | 755    | 23                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 135                      | NR            | 630    | 776                      | NR            | 760    | 20                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 196                      | NR            | 635    | 712                      | NR            | 765    | 17                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 258                      | NR            | 640    | 648                      | NR            | 770    | 15                       | NR            | 900    | 0                        | NR            |
| 385    | 1                        | NR            | 515    | 317                      | NR            | 645    | 583                      | NR            | 775    | 12                       | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 368                      | NR            | 650    | 523                      | NR            | 780    | 11                       | NR            | 910    | 0                        | NR            |
| 395    | 4                        | NR            | 525    | 408                      | NR            | 655    | 465                      | NR            | 785    | 9                        | NR            | 915    | 0                        | NR            |
| 400    | 6                        | NR            | 530    | 443                      | NR            | 660    | 410                      | NR            | 790    | 8                        | NR            | 920    | 0                        | NR            |
| 405    | 11                       | NR            | 535    | 473                      | NR            | 665    | 360                      | NR            | 795    | 7                        | NR            | 925    | 0                        | NR            |
| 410    | 23                       | NR            | 540    | 498                      | NR            | 670    | 313                      | NR            | 800    | 6                        | NR            | 930    | 0                        | NR            |
| 415    | 51                       | NR            | 545    | 530                      | NR            | 675    | 272                      | NR            | 805    | 5                        | NR            | 935    | 0                        | NR            |
| 420    | 111                      | NR            | 550    | 563                      | NR            | 680    | 236                      | NR            | 810    | 4                        | NR            | 940    | 0                        | NR            |
| 425    | 214                      | NR            | 555    | 605                      | NR            | 685    | 203                      | NR            | 815    | 4                        | NR            | 945    | 0                        | NR            |
| 430    | 339                      | NR            | 560    | 651                      | NR            | 690    | 175                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 467                      | NR            | 565    | 705                      | NR            | 695    | 150                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 535                      | NR            | 570    | 765                      | NR            | 700    | 128                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 372                      | NR            | 575    | 824                      | NR            | 705    | 110                      | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 160                      | NR            | 580    | 882                      | NR            | 710    | 94                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 89                       | NR            | 585    | 930                      | NR            | 715    | 80                       | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 53                       | NR            | 590    | 968                      | NR            | 720    | 69                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 31                       | NR            | 595    | 991                      | NR            | 725    | 59                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 23                       | NR            | 600    | 999                      | NR            | 730    | 50                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 21                       | NR            | 605    | 992                      | NR            | 735    | 43                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 23                       | NR            | 610    | 969                      | NR            | 740    | 36                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 32                       | NR            | 615    | 935                      | NR            | 745    | 31                       | NR            | 875    | 1                        | NR            |        |                          |               |

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TM-30-18

### Summary

$R_f = 67.9$   
 $R_g = 98.6$   
 $CIE R_a = 71.1$   
 $R_g = -27.8$

### Spectral Power Distribution Comparison



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 53 | CES51 = 75 | CES76 = 51 |
| CES02 = 63 | CES27 = 70 | CES52 = 80 | CES77 = 79 |
| CES03 = 31 | CES28 = 81 | CES53 = 64 | CES78 = 58 |
| CES04 = 71 | CES29 = 37 | CES54 = 73 | CES79 = 82 |
| CES05 = 50 | CES30 = 33 | CES55 = 69 | CES80 = 82 |
| CES06 = 52 | CES31 = 44 | CES56 = 60 | CES81 = 69 |
| CES07 = 42 | CES32 = 47 | CES57 = 54 | CES82 = 92 |
| CES08 = 41 | CES33 = 45 | CES58 = 59 | CES83 = 82 |
| CES09 = 29 | CES34 = 67 | CES59 = 85 | CES84 = 92 |
| CES10 = 77 | CES35 = 84 | CES60 = 86 | CES85 = 87 |
| CES11 = 60 | CES36 = 68 | CES61 = 86 | CES86 = 60 |
| CES12 = 66 | CES37 = 77 | CES62 = 59 | CES87 = 79 |
| CES13 = 44 | CES38 = 40 | CES63 = 66 | CES88 = 70 |
| CES14 = 74 | CES39 = 88 | CES64 = 69 | CES89 = 66 |
| CES15 = 72 | CES40 = 82 | CES65 = 64 | CES90 = 64 |
| CES16 = 48 | CES41 = 70 | CES66 = 65 | CES91 = 81 |
| CES17 = 51 | CES42 = 76 | CES67 = 64 | CES92 = 69 |
| CES18 = 57 | CES43 = 63 | CES68 = 73 | CES93 = 81 |
| CES19 = 73 | CES44 = 97 | CES69 = 83 | CES94 = 53 |
| CES20 = 67 | CES45 = 74 | CES70 = 64 | CES95 = 77 |
| CES21 = 88 | CES46 = 67 | CES71 = 60 | CES96 = 79 |
| CES22 = 80 | CES47 = 55 | CES72 = 87 | CES97 = 78 |
| CES23 = 92 | CES48 = 42 | CES73 = 57 | CES98 = 69 |
| CES24 = 92 | CES49 = 65 | CES74 = 84 | CES99 = 60 |
| CES25 = 73 | CES50 = 74 | CES75 = 60 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)