

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: P1067117

Luminaire Tested: **NAV-SA5A-830-U-T3BC**

Issue Date: 08/07/2025

**Test Information**

Test Method: LM-79-08  
Report Number: P1067117  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/07/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: LUMARK  
Catalog Number: NAV-SA5A-830-U-T3BC  
Description: Navion AREA AND ROADWAY LUMINAIRE 615mA 5xLight Square PACKAGE  
80CRI 3000K FIXTURE w/ TYPE III ANGLED BACKLIGHT CONTROL  
Light Source: (70) 3000K CCT, 80 CRI LEDs  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 14723.5 lumens  
Efficiency: N/A  
Efficacy: 107.2 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1.5' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B0 - U0 - G3

Input Watts (W): 137.4  
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

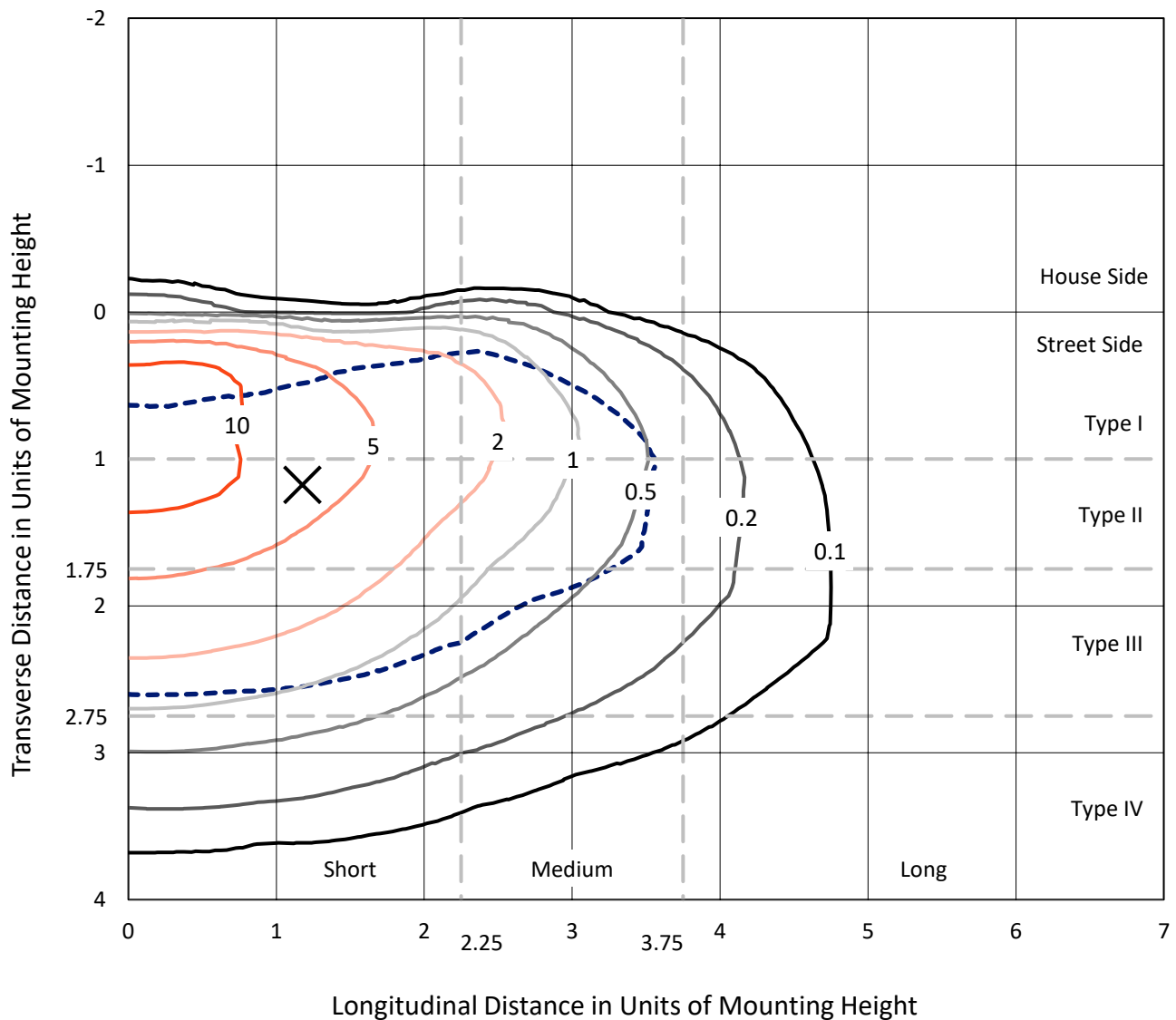


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

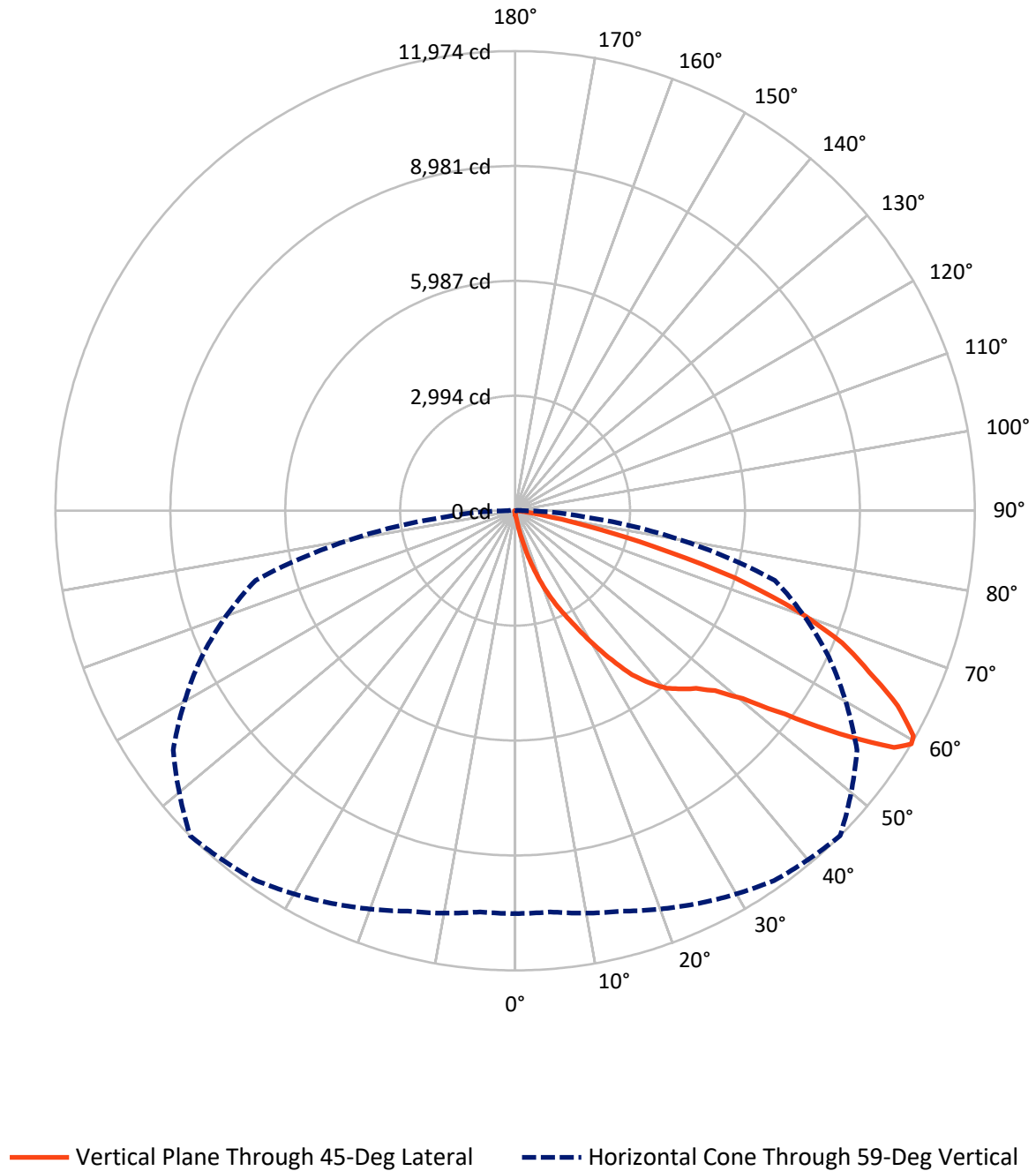


Based on 15 foot mounting height. Maximum calculated value = 16.1 fc  
 Type III - Short - N/A

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## Luminous Intensity Polar Plot



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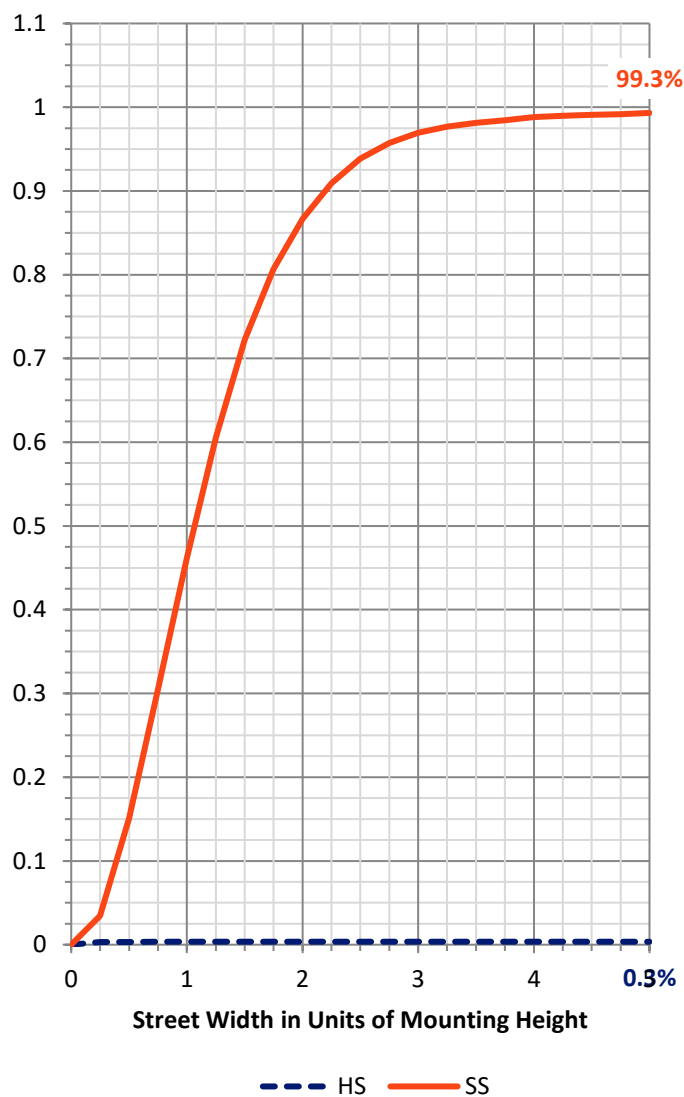
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 52.3     | 0.0    | 52.3    |
|                    | % Fixture | 0.4      | 0.0    | 0.4     |
| <b>Street Side</b> | Lumens    | 14671.2  | 0.0    | 14671.2 |
|                    | % Fixture | 99.6     | 0.0    | 99.6    |
| <b>Total</b>       | Lumens    | 14723.5  | 0.0    | 14723.5 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 13.7    | 0.1       |
| 10°-20°   | 162.7   | 1.1       |
| 20°-30°   | 584.7   | 4.0       |
| 30°-40°   | 1358.8  | 9.2       |
| 40°-50°   | 2315.9  | 15.7      |
| 50°-60°   | 3816.0  | 25.9      |
| 60°-70°   | 4412.2  | 30.0      |
| 70°-80°   | 1895.6  | 12.9      |
| 80°-90°   | 163.8   | 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°    | 14723.5 | 100.0     |
| 0°-180°   | 14723.5 | 100.0     |



REPORT NUMBER: P1067117

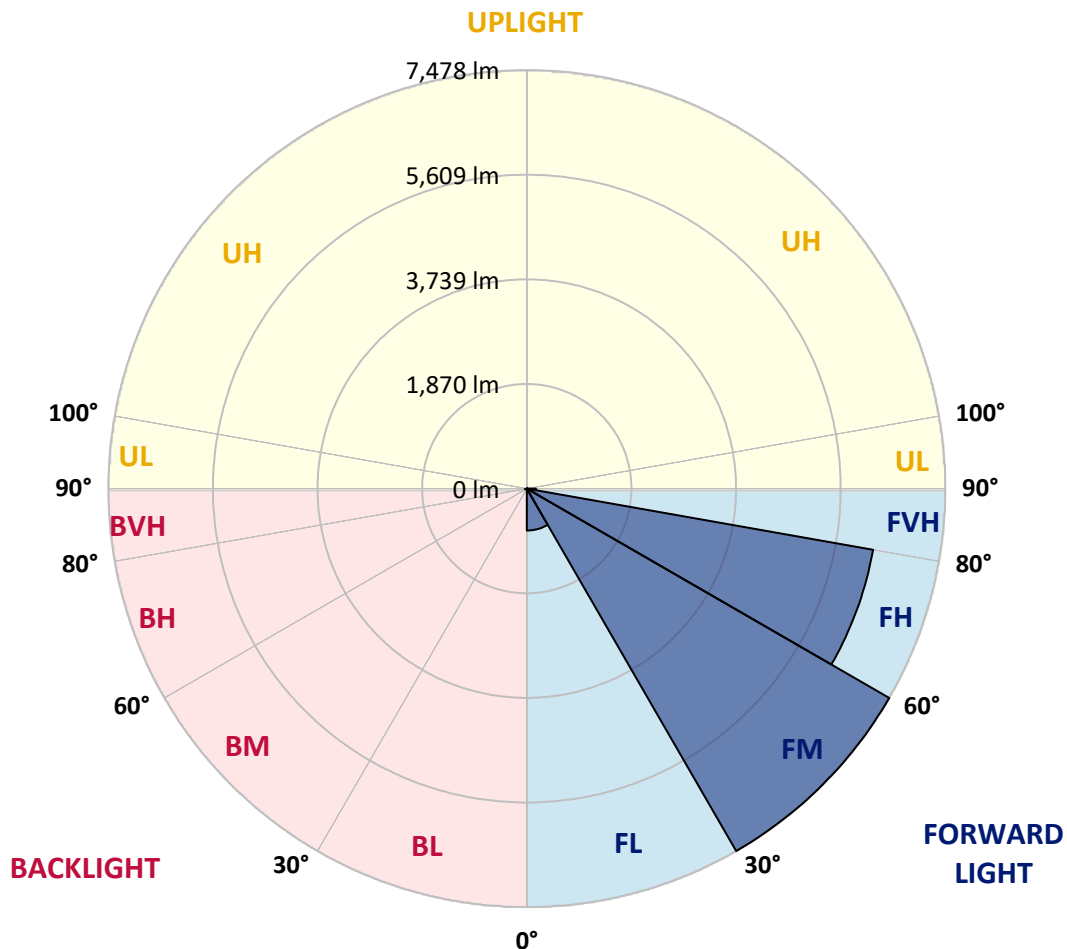
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 748.3  | 5.1       |                         |      |         |
| FM   | (30°-60°)   | 7478.1 | 50.8      |                         |      |         |
| FH   | (60°-80°)   | 6283.2 | 42.7      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 161.7  | 1.1       |                         |      | G2/225  |
| BL   | (0°-30°)    | 12.9   | 0.1       | B0/110                  |      |         |
| BM   | (30°-60°)   | 12.6   | 0.1       | B0/220                  |      |         |
| BH   | (60°-80°)   | 24.6   | 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°    | 93.1    | 93.1    | 93.1    | 93.1    | 93.1    | 93.1    | 93.1    | 93.1    | 93.1    | 93.1    | 93.1   |
| 2.5°  | 120.8   | 120.8   | 117.8   | 113.9   | 112.9   | 109.9   | 109.9   | 106.9   | 103.0   | 100.0   | 96.0   |
| 5°    | 175.2   | 174.2   | 166.3   | 156.4   | 143.6   | 135.6   | 135.6   | 124.7   | 114.8   | 105.9   | 98.0   |
| 7.5°  | 383.1   | 374.2   | 345.5   | 298.0   | 235.6   | 194.0   | 191.1   | 155.4   | 131.7   | 113.9   | 99.0   |
| 10°   | 879.1   | 848.4   | 807.8   | 694.0   | 512.8   | 358.4   | 351.5   | 226.7   | 157.4   | 122.8   | 101.0  |
| 12.5° | 1440.5  | 1465.2  | 1384.0  | 1204.8  | 993.0   | 738.5   | 689.0   | 382.1   | 207.9   | 134.6   | 103.0  |
| 15°   | 1951.3  | 1945.4  | 1899.8  | 1753.3  | 1508.8  | 1170.2  | 1139.5  | 664.3   | 298.0   | 153.5   | 104.9  |
| 17.5° | 2333.4  | 2326.5  | 2283.0  | 2188.9  | 2000.8  | 1662.2  | 1635.5  | 1059.3  | 467.3   | 180.2   | 106.9  |
| 20°   | 2736.4  | 2727.5  | 2666.1  | 2590.9  | 2426.5  | 2138.4  | 2106.7  | 1500.9  | 731.6   | 223.7   | 106.9  |
| 22.5° | 3219.5  | 3202.7  | 3137.3  | 3009.6  | 2836.4  | 2585.9  | 2557.2  | 1952.3  | 1059.3  | 295.0   | 111.9  |
| 25°   | 3803.6  | 3774.9  | 3684.8  | 3570.0  | 3361.1  | 3028.4  | 2997.7  | 2455.2  | 1454.3  | 402.9   | 116.8  |
| 27.5° | 4469.9  | 4474.8  | 4353.1  | 4159.0  | 3878.9  | 3539.3  | 3481.9  | 2905.7  | 1863.2  | 557.4   | 122.8  |
| 30°   | 5260.9  | 5211.4  | 5040.1  | 4814.4  | 4542.2  | 4109.5  | 4054.1  | 3354.1  | 2322.6  | 785.1   | 132.7  |
| 32.5° | 6001.4  | 5948.0  | 5717.3  | 5433.2  | 5141.1  | 4684.7  | 4639.2  | 3858.1  | 2740.3  | 1054.4  | 150.5  |
| 35°   | 6637.0  | 6599.4  | 6276.7  | 5930.1  | 5670.8  | 5262.9  | 5249.0  | 4420.4  | 3231.4  | 1344.4  | 170.3  |
| 37.5° | 7196.4  | 7128.1  | 6713.2  | 6353.9  | 6090.5  | 5725.2  | 5695.5  | 4935.2  | 3704.6  | 1681.0  | 200.0  |
| 40°   | 7673.6  | 7635.9  | 7130.0  | 6657.8  | 6444.0  | 6117.3  | 6079.6  | 5386.6  | 4193.7  | 2072.1  | 236.6  |
| 42.5° | 8184.4  | 8134.9  | 7643.9  | 7114.2  | 6720.2  | 6370.7  | 6346.0  | 5758.9  | 4629.3  | 2501.8  | 291.1  |
| 45°   | 8761.6  | 8669.5  | 8238.8  | 7763.6  | 7164.7  | 6633.1  | 6605.3  | 6090.5  | 5075.8  | 2963.1  | 357.4  |
| 47.5° | 9378.3  | 9298.2  | 8949.7  | 8616.0  | 7927.0  | 7065.7  | 7006.3  | 6372.7  | 5519.3  | 3495.7  | 441.5  |
| 50°   | 10006.0 | 10008.0 | 9746.6  | 9586.2  | 8858.6  | 7768.6  | 7684.4  | 6787.5  | 5985.6  | 4066.0  | 566.3  |
| 52.5° | 10736.6 | 10755.4 | 10751.5 | 10632.7 | 10068.4 | 8918.0  | 8805.1  | 7417.1  | 6527.1  | 4731.2  | 738.5  |
| 55°   | 11042.6 | 11076.2 | 11295.0 | 11558.3 | 11404.9 | 10375.3 | 10254.5 | 8503.2  | 7244.9  | 5472.8  | 994.0  |
| 57.5° | 10792.1 | 10829.7 | 11131.7 | 11593.0 | 11945.4 | 11651.4 | 11637.5 | 9916.9  | 8190.3  | 6371.7  | 1411.8 |
| 59°   | 10494.1 | 10489.1 | 10799.0 | 11288.1 | 11763.3 | 11954.3 | 11974.1 | 10873.3 | 9014.0  | 7002.3  | 1772.1 |
| 60°   | 10296.1 | 10300.0 | 10506.0 | 11007.9 | 11512.8 | 11844.5 | 11921.7 | 11436.6 | 9495.2  | 7455.8  | 2081.0 |
| 62.5° | 9531.8  | 9577.3  | 9740.7  | 10207.0 | 10686.1 | 11056.4 | 11188.1 | 11938.5 | 10872.3 | 8526.9  | 3155.2 |
| 65°   | 8701.2  | 8704.2  | 8936.8  | 9335.8  | 9795.1  | 10055.5 | 10138.7 | 11157.4 | 11792.0 | 9617.9  | 4563.9 |
| 67.5° | 7219.1  | 7279.5  | 7543.9  | 8190.3  | 8797.2  | 9126.9  | 9190.2  | 9712.0  | 11410.8 | 10328.8 | 5269.8 |
| 70°   | 5052.0  | 5131.2  | 5508.4  | 6346.9  | 7250.8  | 7792.4  | 7788.4  | 8073.5  | 10042.6 | 10012.0 | 4467.9 |
| 72.5° | 2522.5  | 2659.2  | 2967.1  | 3865.0  | 4959.9  | 5810.4  | 5989.5  | 6494.5  | 8067.6  | 8316.1  | 3333.4 |
| 75°   | 1114.7  | 1122.7  | 1297.9  | 1750.3  | 2465.1  | 3545.2  | 3705.6  | 5155.0  | 6189.5  | 5779.7  | 2407.7 |
| 77.5° | 648.5   | 654.4   | 686.1   | 786.1   | 998.9   | 1737.5  | 1917.6  | 3380.9  | 4373.9  | 3359.1  | 1570.2 |
| 80°   | 235.6   | 241.6   | 240.6   | 298.0   | 437.6   | 684.1   | 762.3   | 1638.5  | 2917.6  | 1769.1  | 822.7  |
| 82.5° | 144.5   | 144.5   | 139.6   | 140.6   | 159.4   | 262.4   | 287.1   | 698.0   | 1420.7  | 871.2   | 235.6  |
| 85°   | 71.3    | 75.2    | 80.2    | 90.1    | 106.9   | 129.7   | 137.6   | 200.0   | 478.2   | 210.9   | 56.4   |
| 87.5° | 42.6    | 43.6    | 47.5    | 57.4    | 71.3    | 93.1    | 99.0    | 135.6   | 171.3   | 141.6   | 13.9   |
| 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-SA5A-830-U-T3BC

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°  | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|------|------|------|------|------|------|------|------|------|------|
| 0°    | 93.1   | 93.1 | 93.1 | 93.1 | 93.1 | 93.1 | 93.1 | 93.1 | 93.1 | 93.1 | 93.1 |
| 2.5°  | 94.1   | 93.1 | 88.1 | 84.2 | 80.2 | 76.2 | 73.3 | 70.3 | 70.3 | 71.3 | 70.3 |
| 5°    | 94.1   | 90.1 | 82.2 | 75.2 | 69.3 | 64.4 | 59.4 | 55.4 | 54.5 | 54.5 | 55.4 |
| 7.5°  | 93.1   | 88.1 | 77.2 | 68.3 | 60.4 | 53.5 | 48.5 | 43.6 | 42.6 | 43.6 | 42.6 |
| 10°   | 92.1   | 86.1 | 73.3 | 62.4 | 51.5 | 44.6 | 37.6 | 32.7 | 32.7 | 32.7 | 33.7 |
| 12.5° | 92.1   | 83.2 | 69.3 | 56.4 | 44.6 | 36.6 | 29.7 | 24.8 | 23.8 | 23.8 | 23.8 |
| 15°   | 91.1   | 81.2 | 65.3 | 49.5 | 37.6 | 27.7 | 21.8 | 16.8 | 16.8 | 16.8 | 16.8 |
| 17.5° | 89.1   | 78.2 | 60.4 | 43.6 | 29.7 | 20.8 | 14.9 | 9.9  | 9.9  | 11.9 | 11.9 |
| 20°   | 87.1   | 75.2 | 54.5 | 35.6 | 24.8 | 15.8 | 9.9  | 5.9  | 5.9  | 8.9  | 9.9  |
| 22.5° | 88.1   | 75.2 | 50.5 | 31.7 | 19.8 | 11.9 | 7.9  | 5.0  | 4.0  | 6.9  | 8.9  |
| 25°   | 89.1   | 73.3 | 45.5 | 27.7 | 14.9 | 8.9  | 5.9  | 2.0  | 1.0  | 2.0  | 3.0  |
| 27.5° | 89.1   | 71.3 | 39.6 | 21.8 | 10.9 | 6.9  | 3.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 30°   | 88.1   | 68.3 | 34.7 | 17.8 | 7.9  | 4.0  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 32.5° | 87.1   | 65.3 | 31.7 | 13.9 | 6.9  | 2.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 35°   | 88.1   | 61.4 | 27.7 | 10.9 | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 2.0  |
| 37.5° | 91.1   | 57.4 | 23.8 | 8.9  | 3.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 40°   | 95.0   | 54.5 | 19.8 | 6.9  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 42.5° | 103.0  | 54.5 | 17.8 | 5.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 45°   | 112.9  | 54.5 | 14.9 | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 47.5° | 125.7  | 55.4 | 12.9 | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 50°   | 141.6  | 57.4 | 11.9 | 3.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 52.5° | 153.5  | 55.4 | 10.9 | 3.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 55°   | 174.2  | 53.5 | 9.9  | 2.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 57.5° | 202.0  | 50.5 | 9.9  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 59°   | 229.7  | 46.5 | 9.9  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 60°   | 261.4  | 44.6 | 8.9  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 62.5° | 431.6  | 39.6 | 7.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 65°   | 833.6  | 37.6 | 6.9  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 67.5° | 1347.4 | 37.6 | 5.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 70°   | 1416.7 | 37.6 | 4.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 72.5° | 942.5  | 30.7 | 3.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 75°   | 504.9  | 27.7 | 3.0  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 77.5° | 272.3  | 25.7 | 4.0  | 2.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 80°   | 119.8  | 18.8 | 5.0  | 3.0  | 2.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 82.5° | 47.5   | 12.9 | 5.9  | 5.0  | 4.0  | 2.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 85°   | 22.8   | 9.9  | 7.9  | 6.9  | 5.0  | 3.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 87.5° | 10.9   | 9.9  | 8.9  | 7.9  | 6.9  | 5.0  | 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

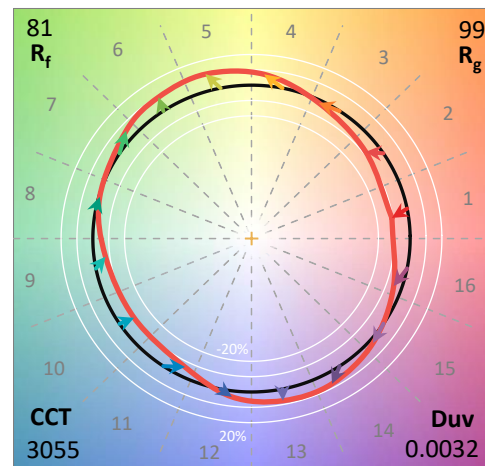
### Test Information

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

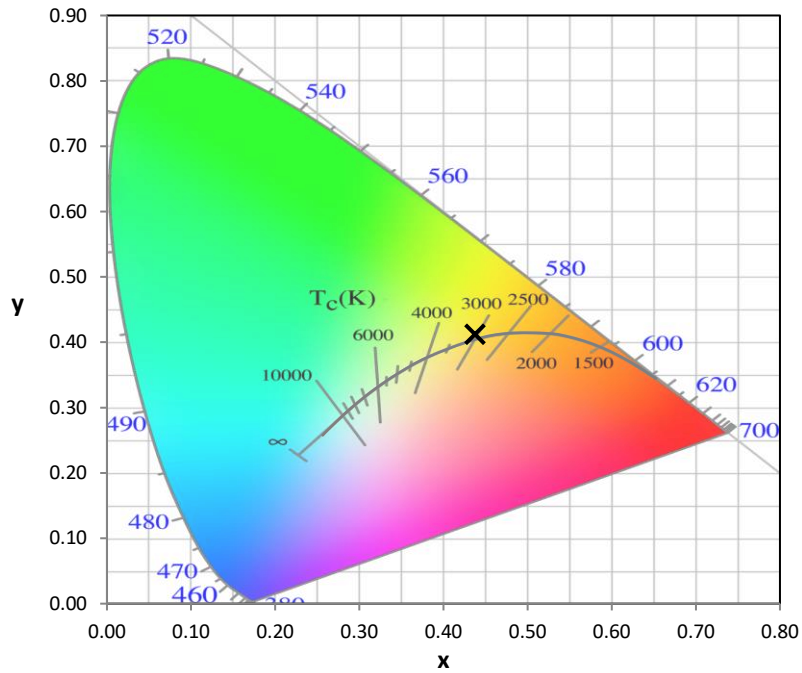
Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-184-9

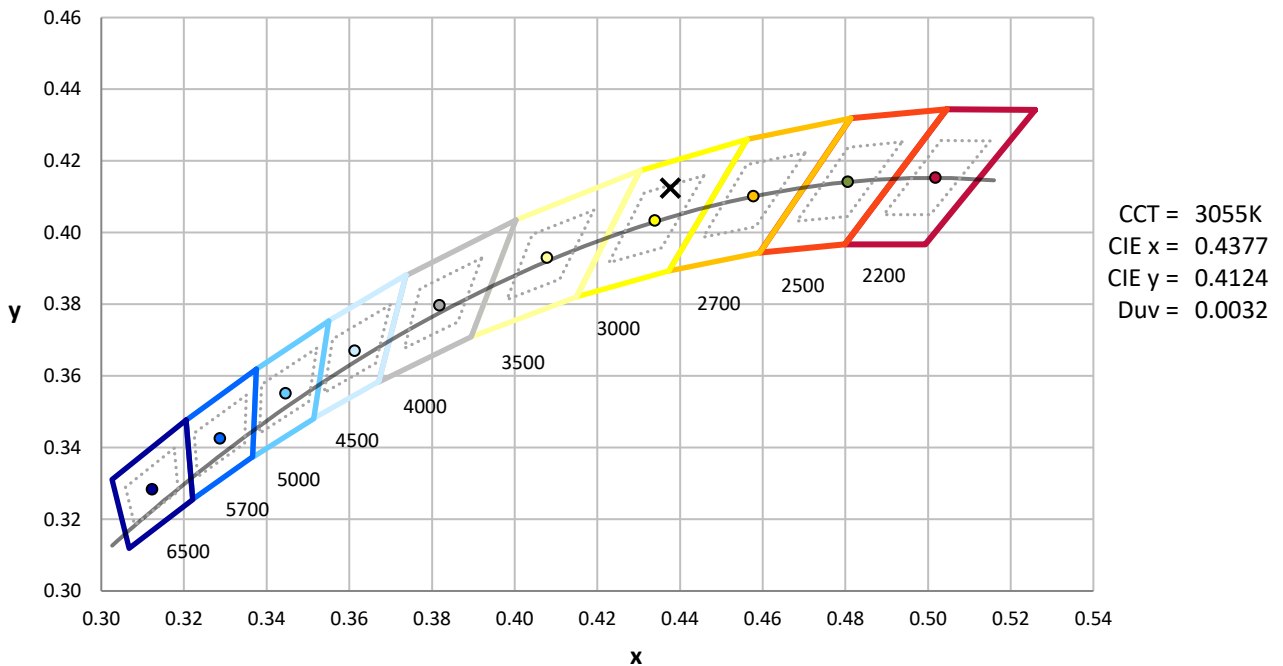
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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

REPORT NUMBER: SP1-2407-184-9

### Photopic Flux vs. Wavelength



### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | 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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### Scotopic Flux vs. Wavelength



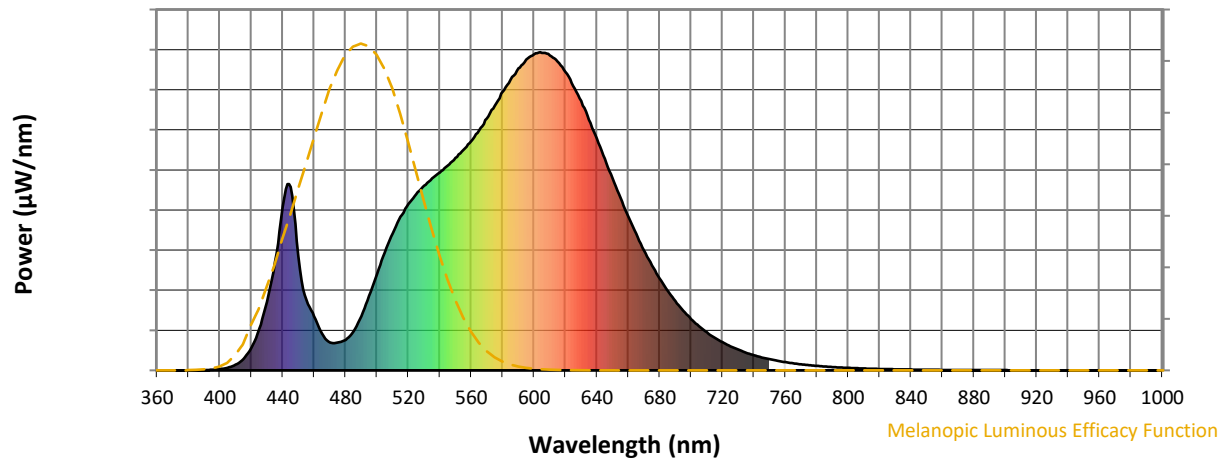
Scotopic Lumens: NR

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

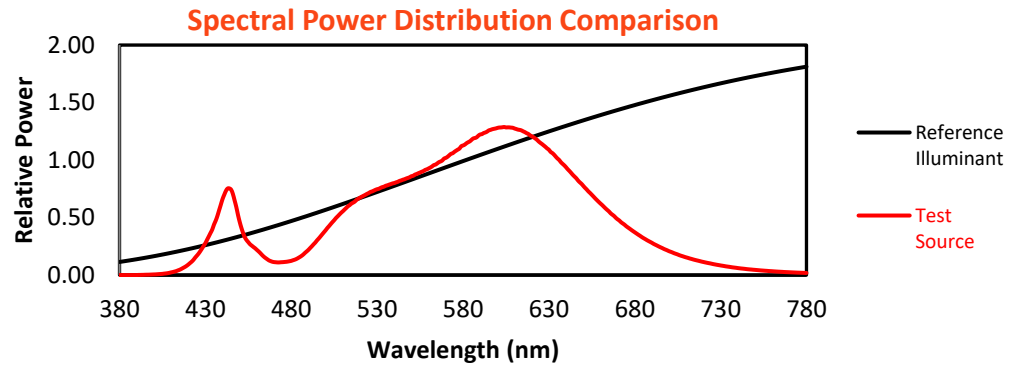
| λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 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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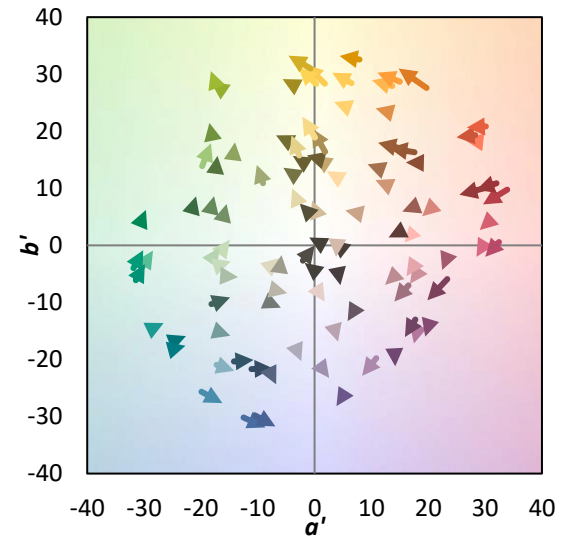
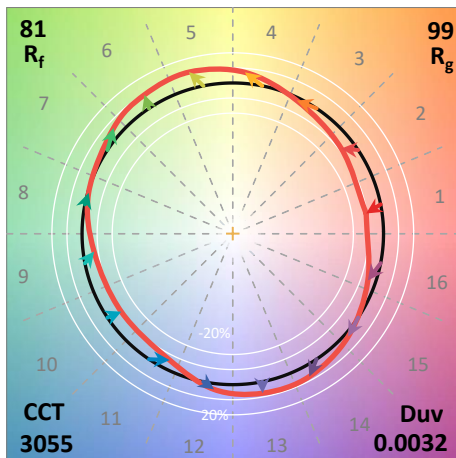
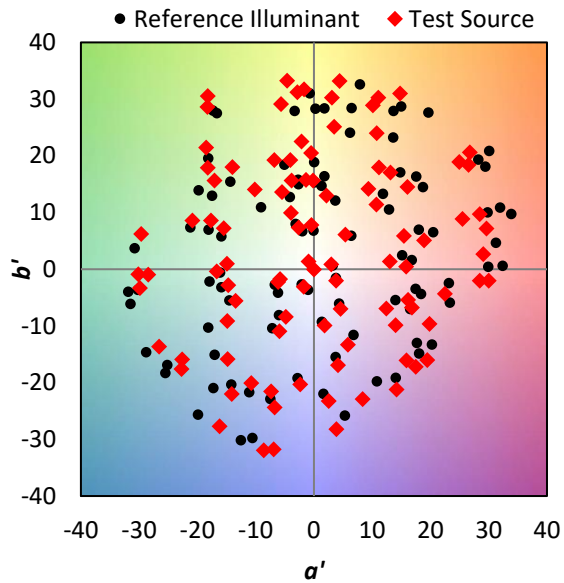
TM-30-18

### Summary

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



### Color Vector Graphics

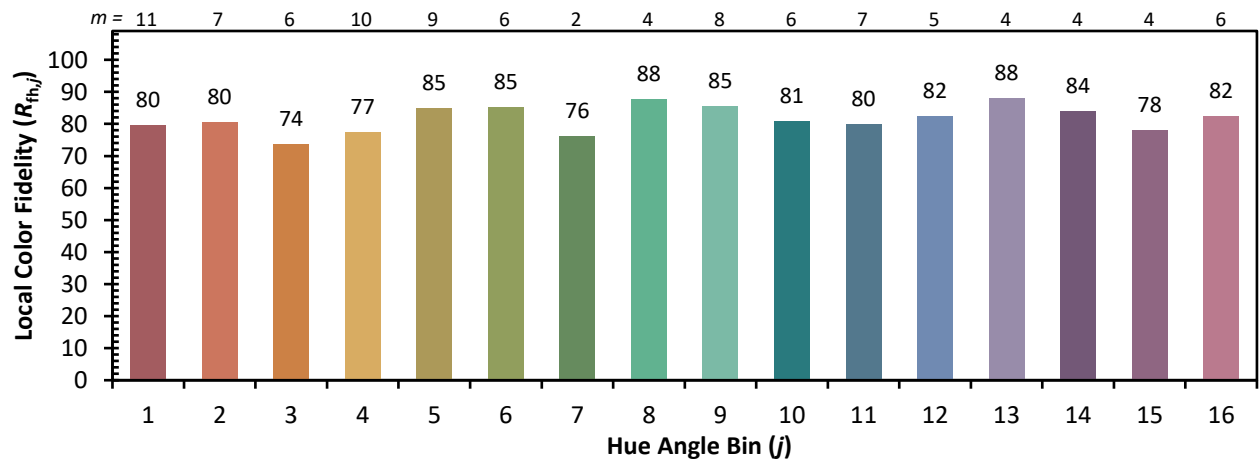
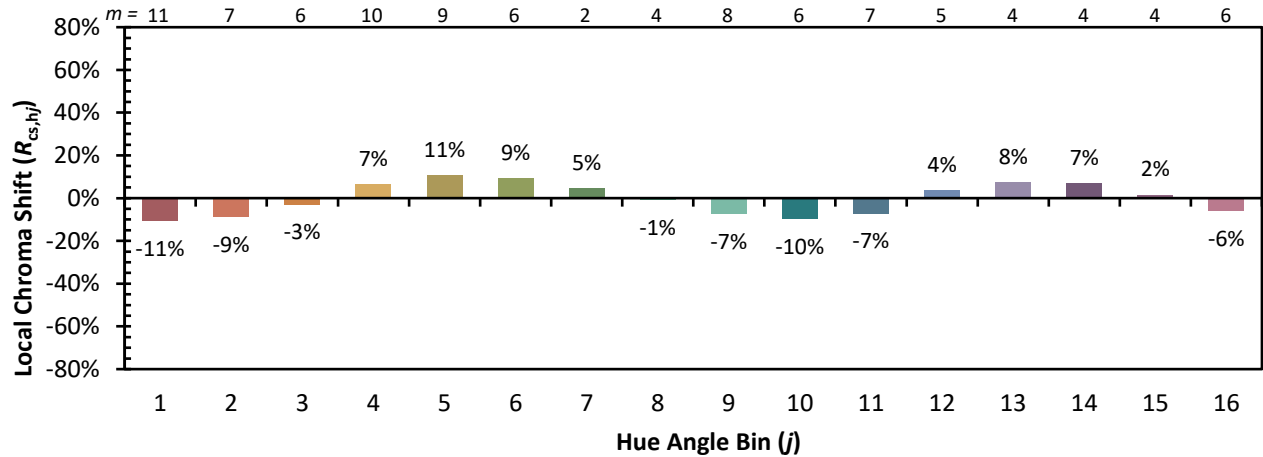


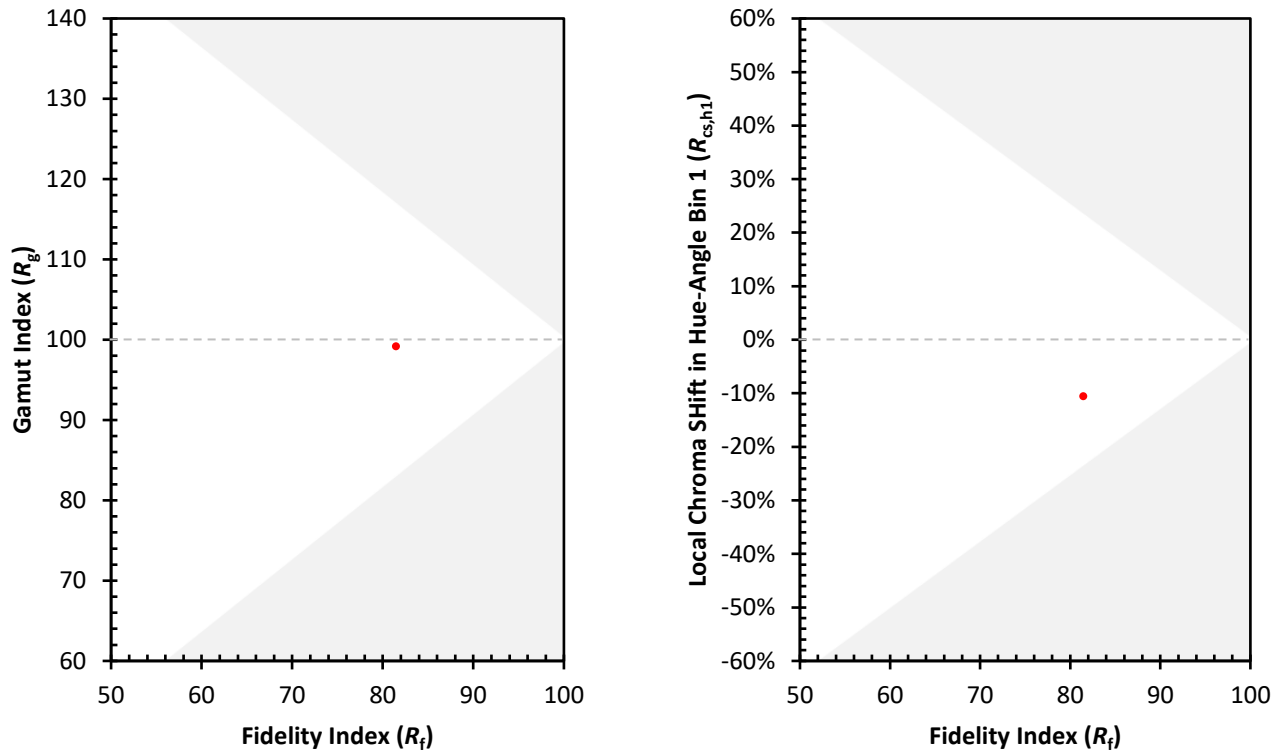
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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)