

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: STREETWORKS

Report Number: P980812

Luminaire Tested: **UFLD-CA2-180-730-U-66**

Issue Date: 04/10/2025

**Test Information**

Test Method: LM-79-08  
Report Number: P980812  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/10/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: UFLD-CA2-180-730-U-66  
Description: UTILITY FLOOD MEDIUM SIZE 180W 70CRI 3000K LED FIXTURE NEMA 6  
Light Source: (2) 3000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 26151 lumens  
Efficiency: N/A  
Efficacy: 144.6 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.31' x H: 0')  
IES Classification: Type I - Short  
BUG Rating: B4 - U0 - G2

Input Watts (W): 180.8  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.99  
Total Harmonic Distortion (THDi): 2.8%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

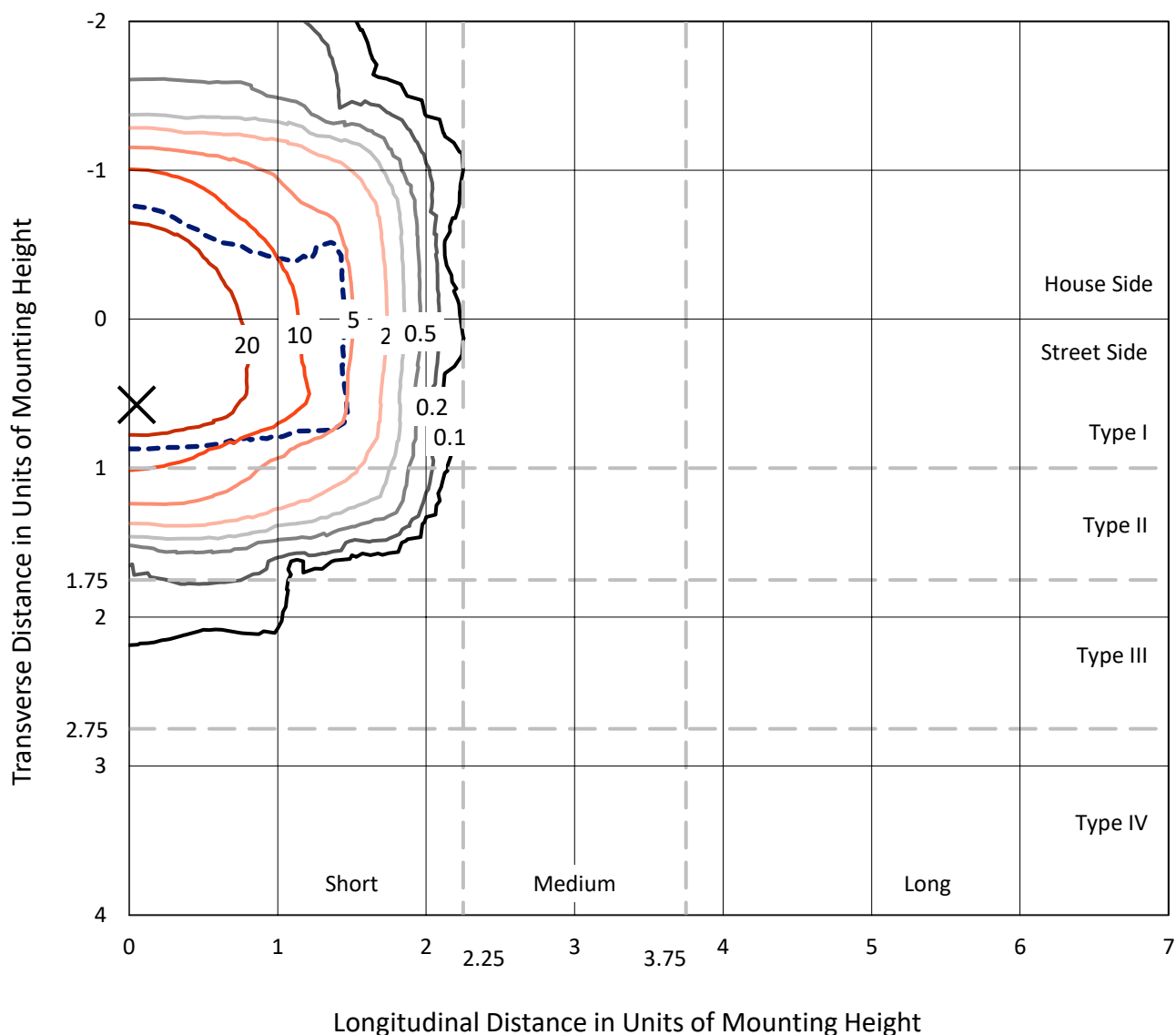
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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

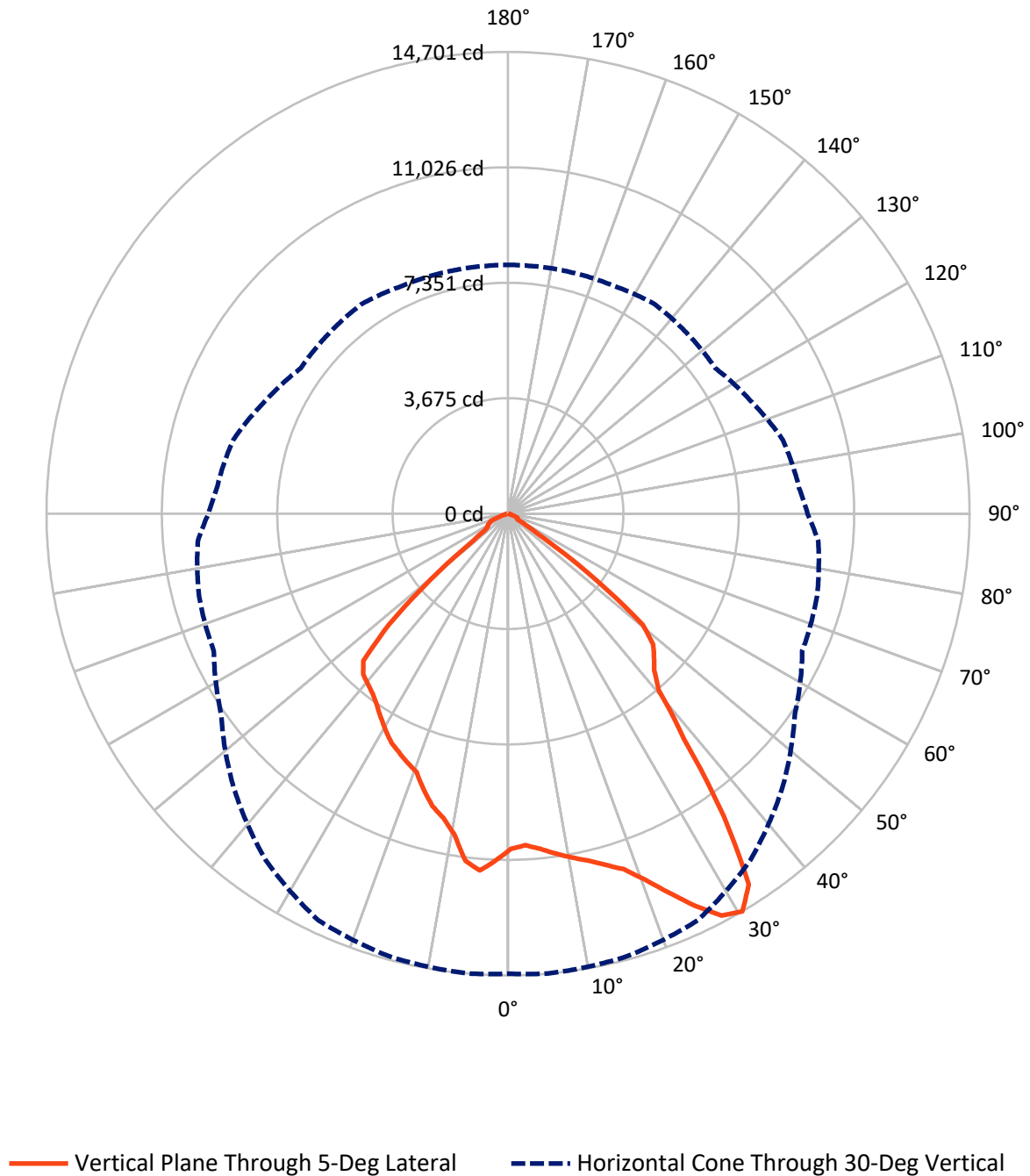


Based on 15 foot mounting height. Maximum calculated value = 48.6 fc

Type I - Short - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: UFLD-CA2-180-730-U-66

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 11566.4  | 0.0    | 11566.4 |
|                    | % Fixture | 44.2     | 0.0    | 44.2    |
| <b>Street Side</b> | Lumens    | 14584.7  | 0.0    | 14584.7 |
|                    | % Fixture | 55.8     | 0.0    | 55.8    |
| <b>Total</b>       | Lumens    | 26151.0  | 0.0    | 26151.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1044.2  | 4.0       |
| 10°-20°   | 3024.8  | 11.6      |
| 20°-30°   | 4820.2  | 18.4      |
| 30°-40°   | 6026.1  | 23.0      |
| 40°-50°   | 5913.6  | 22.6      |
| 50°-60°   | 4227.9  | 16.2      |
| 60°-70°   | 935.4   | 3.6       |
| 70°-80°   | 143.7   | 0.5       |
| 80°-90°   | 15.2    | 0.1       |
| 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°    | 26151.0 | 100.0     |
| 0°-180°   | 26151.0 | 100.0     |



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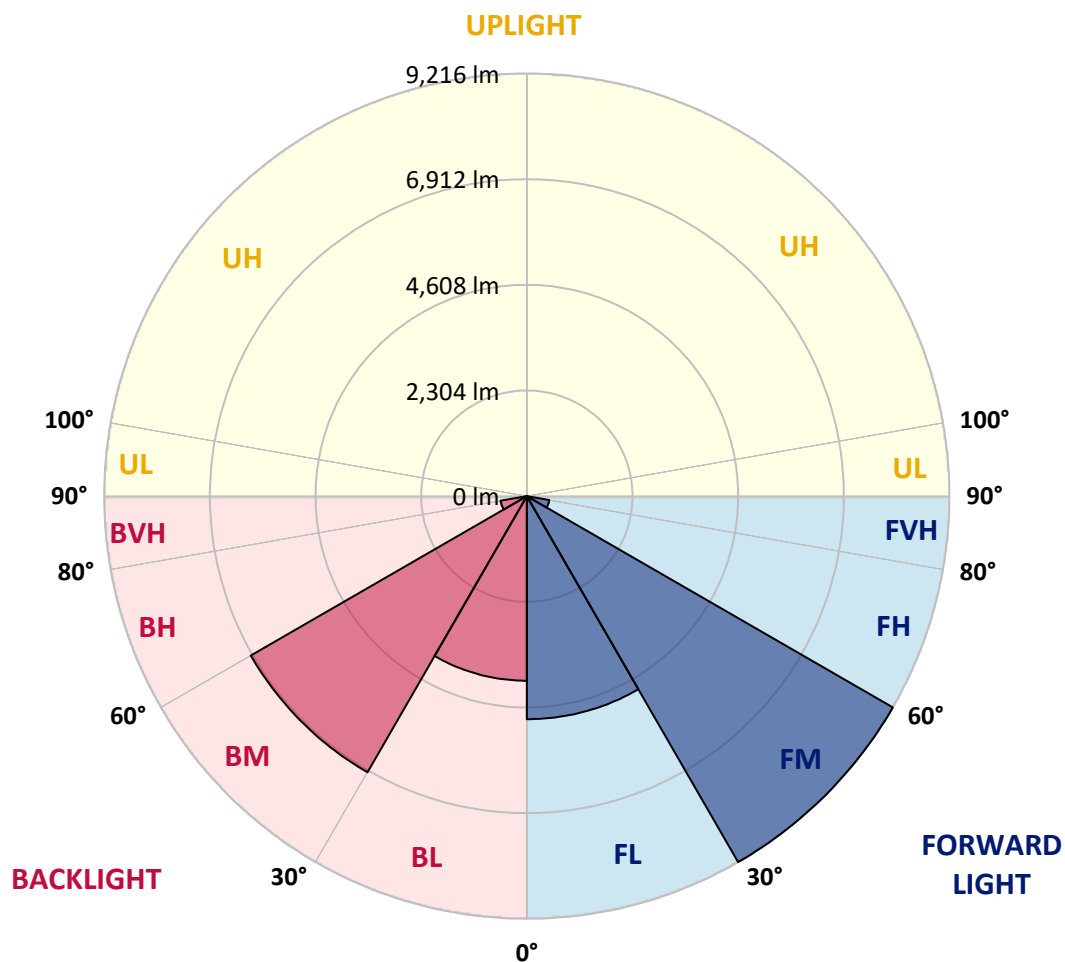
CATALOG NUMBER: UFLD-CA2-180-730-U-66

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 4863.9 | 18.6      |                         |      |         |
| FM   | (30°-60°)   | 9215.6 | 35.2      |                         |      |         |
| FH   | (60°-80°)   | 497.5  | 1.9       |                         |      | G0/660  |
| FVH  | (80°-90°)   | 7.7    | 0.0       |                         |      | G0/10   |
| BL   | (0°-30°)    | 4025.3 | 15.4      | B4/5000                 |      |         |
| BM   | (30°-60°)   | 6951.9 | 26.6      | B4/8500                 |      |         |
| BH   | (60°-80°)   | 581.6  | 2.2       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 7.5    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B4-U0-G2**

Type I Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     | 90°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 |
| 2.5°  | 10554.5 | 10571.6 | 10588.6 | 10614.2 | 10648.4 | 10665.4 | 10648.4 | 10631.3 | 10622.8 | 10639.8 | 10648.4 |
| 5°    | 10699.5 | 10725.1 | 10733.7 | 10750.7 | 10767.8 | 10750.7 | 10742.2 | 10725.1 | 10716.6 | 10725.1 | 10750.7 |
| 7.5°  | 10912.9 | 10929.9 | 10921.4 | 10912.9 | 10904.3 | 10844.6 | 10784.9 | 10759.3 | 10759.3 | 10784.9 | 10853.1 |
| 10°   | 11100.6 | 11134.7 | 11092.0 | 11057.9 | 10998.2 | 10904.3 | 10801.9 | 10742.2 | 10759.3 | 10810.5 | 10895.8 |
| 12.5° | 11339.5 | 11339.5 | 11296.8 | 11262.7 | 11126.2 | 11015.2 | 10878.7 | 10784.9 | 10784.9 | 10878.7 | 10972.6 |
| 15°   | 11629.6 | 11604.0 | 11586.9 | 11493.1 | 11330.9 | 11151.8 | 10981.1 | 10844.6 | 10819.0 | 10964.0 | 11023.8 |
| 17.5° | 11996.5 | 11902.6 | 11859.9 | 11697.8 | 11476.0 | 11245.6 | 11015.2 | 10904.3 | 10827.5 | 10981.1 | 10912.9 |
| 20°   | 12499.9 | 12431.6 | 12295.1 | 12039.1 | 11586.9 | 11288.3 | 11015.2 | 10870.2 | 10810.5 | 10895.8 | 10827.5 |
| 22.5° | 13148.3 | 13105.7 | 12798.5 | 12474.3 | 11877.0 | 11322.4 | 10972.6 | 10776.3 | 10759.3 | 10716.6 | 10571.6 |
| 25°   | 13941.8 | 13830.9 | 13515.2 | 13054.5 | 12312.2 | 11655.2 | 10964.0 | 10605.7 | 10546.0 | 10435.0 | 10179.1 |
| 27.5° | 14615.9 | 14496.4 | 14112.5 | 13702.9 | 12909.4 | 12150.0 | 11032.3 | 10400.9 | 10332.7 | 10255.9 | 9940.2  |
| 30°   | 14650.0 | 14701.2 | 14598.8 | 14291.7 | 13464.0 | 12354.8 | 11151.8 | 10341.2 | 10187.6 | 9914.6  | 9539.1  |
| 32.5° | 13958.9 | 14078.3 | 14325.8 | 14436.7 | 13882.1 | 12602.3 | 11254.1 | 10366.8 | 10085.2 | 9428.2  | 9121.1  |
| 35°   | 11595.4 | 11834.3 | 12849.7 | 13805.3 | 14001.6 | 12960.6 | 11339.5 | 10366.8 | 10051.1 | 9078.4  | 8839.5  |
| 37.5° | 8907.8  | 9104.0  | 9965.8  | 11697.8 | 13472.6 | 13182.5 | 11527.2 | 10307.1 | 10008.4 | 9104.0  | 8779.8  |
| 40°   | 7278.1  | 7389.0  | 7764.4  | 8941.9  | 11612.5 | 12815.6 | 11714.9 | 10375.3 | 9880.4  | 9121.1  | 8813.9  |
| 42.5° | 6834.4  | 6825.9  | 6749.1  | 7184.2  | 8856.6  | 11740.5 | 11842.9 | 10546.0 | 9667.1  | 9010.1  | 8754.2  |
| 45°   | 6535.8  | 6518.7  | 6450.4  | 6535.8  | 7005.0  | 9607.4  | 11749.0 | 10853.1 | 9402.6  | 8617.7  | 8447.0  |
| 47.5° | 6211.5  | 6220.1  | 6194.5  | 6228.6  | 6143.3  | 7295.1  | 11220.0 | 10981.1 | 8950.4  | 7960.7  | 7900.9  |
| 50°   | 5435.1  | 5563.1  | 5904.4  | 5938.5  | 5716.7  | 5887.3  | 9607.4  | 10921.4 | 8626.2  | 7773.0  | 7721.8  |
| 52.5° | 3378.8  | 3583.6  | 4590.4  | 5443.6  | 5315.6  | 5315.6  | 7329.3  | 11006.7 | 8046.0  | 7704.7  | 7738.8  |
| 55°   | 1194.5  | 1348.1  | 2457.3  | 3745.7  | 4761.0  | 4854.9  | 5793.5  | 9795.1  | 7977.7  | 7824.1  | 7858.3  |
| 57.5° | 298.6   | 366.9   | 750.8   | 1621.1  | 3208.2  | 4402.7  | 5179.1  | 8088.7  | 6058.0  | 5844.6  | 5930.0  |
| 60°   | 349.8   | 341.3   | 469.3   | 520.5   | 1245.7  | 3481.2  | 4667.2  | 5460.7  | 3907.8  | 3660.4  | 3703.0  |
| 62.5° | 375.4   | 349.8   | 366.9   | 460.7   | 204.8   | 1706.5  | 3720.1  | 3250.8  | 1612.6  | 1194.5  | 1262.8  |
| 65°   | 332.8   | 315.7   | 290.1   | 426.6   | 145.0   | 315.7   | 2192.8  | 955.6   | 230.4   | 366.9   | 332.8   |
| 67.5° | 221.8   | 230.4   | 238.9   | 341.3   | 136.5   | 136.5   | 290.1   | 238.9   | 162.1   | 332.8   | 290.1   |
| 70°   | 128.0   | 136.5   | 162.1   | 204.8   | 136.5   | 110.9   | 128.0   | 196.2   | 136.5   | 332.8   | 290.1   |
| 72.5° | 76.8    | 76.8    | 76.8    | 85.3    | 136.5   | 93.9    | 85.3    | 162.1   | 119.5   | 307.2   | 290.1   |
| 75°   | 59.7    | 59.7    | 59.7    | 51.2    | 119.5   | 59.7    | 59.7    | 128.0   | 102.4   | 221.8   | 221.8   |
| 77.5° | 51.2    | 51.2    | 51.2    | 42.7    | 68.3    | 51.2    | 51.2    | 93.9    | 93.9    | 110.9   | 128.0   |
| 80°   | 34.1    | 34.1    | 34.1    | 34.1    | 42.7    | 42.7    | 34.1    | 51.2    | 42.7    | 51.2    | 59.7    |
| 82.5° | 17.1    | 25.6    | 25.6    | 17.1    | 25.6    | 25.6    | 25.6    | 34.1    | 25.6    | 34.1    | 34.1    |
| 85°   | 8.5     | 8.5     | 8.5     | 8.5     | 8.5     | 8.5     | 8.5     | 17.1    | 8.5     | 8.5     | 17.1    |
| 87.5° | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |

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CATALOG NUMBER: UFLD-CA2-180-730-U-66

**CANDELA DISTRIBUTION (continued):**

|       | 95°     | 105°    | 115°    | 125°    | 135°    | 145°    | 155°    | 165°    | 175°    | 180°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 | 10673.9 |
| 2.5°  | 10665.4 | 10708.1 | 10767.8 | 10861.7 | 10895.8 | 10955.5 | 11006.7 | 11049.4 | 11049.4 | 11032.3 |
| 5°    | 10801.9 | 10921.4 | 11083.5 | 11228.5 | 11279.7 | 11339.5 | 11365.1 | 11407.7 | 11399.2 | 11390.7 |
| 7.5°  | 10921.4 | 11109.1 | 11279.7 | 11382.1 | 11365.1 | 11288.3 | 11237.1 | 11168.8 | 11143.2 | 11160.3 |
| 10°   | 11015.2 | 11185.9 | 11262.7 | 11194.4 | 10989.6 | 10810.5 | 10580.1 | 10426.5 | 10349.7 | 10375.3 |
| 12.5° | 11049.4 | 11109.1 | 11040.8 | 10665.4 | 10409.4 | 10238.8 | 10051.1 | 9948.7  | 9906.0  | 9914.6  |
| 15°   | 11057.9 | 10921.4 | 10546.0 | 10264.4 | 10076.7 | 9863.4  | 9709.8  | 9615.9  | 9615.9  | 9624.5  |
| 17.5° | 10878.7 | 10546.0 | 10221.7 | 10008.4 | 9743.9  | 9522.1  | 9436.8  | 9402.6  | 9189.3  | 9223.5  |
| 20°   | 10716.6 | 10238.8 | 10059.6 | 9726.9  | 9411.2  | 9266.1  | 8771.2  | 8720.0  | 8728.6  | 8737.1  |
| 22.5° | 10375.3 | 10017.0 | 9854.8  | 9419.7  | 9061.3  | 8660.3  | 8592.1  | 8540.9  | 8549.4  | 8549.4  |
| 25°   | 9906.0  | 9701.3  | 9479.4  | 9027.2  | 8592.1  | 8515.3  | 8464.1  | 8395.8  | 8361.7  | 8370.2  |
| 27.5° | 9641.5  | 9385.6  | 8976.0  | 8592.1  | 8310.5  | 8344.6  | 8284.9  | 8182.5  | 8182.5  | 8191.0  |
| 30°   | 9308.8  | 9061.3  | 8515.3  | 8063.1  | 8088.7  | 8139.8  | 7994.8  | 7943.6  | 7918.0  | 7918.0  |
| 32.5° | 8899.2  | 8557.9  | 8080.1  | 7653.5  | 7807.1  | 7790.0  | 7610.8  | 7627.9  | 7645.0  | 7627.9  |
| 35°   | 8592.1  | 8148.4  | 7747.4  | 7517.0  | 7457.3  | 7389.0  | 7295.1  | 7354.9  | 7380.5  | 7363.4  |
| 37.5° | 8515.3  | 7986.3  | 7568.2  | 7406.1  | 7175.7  | 7047.7  | 7073.3  | 7133.0  | 7167.2  | 7158.6  |
| 40°   | 8489.7  | 7824.1  | 7414.6  | 7244.0  | 6936.8  | 6825.9  | 6860.0  | 6979.4  | 7022.1  | 7013.6  |
| 42.5° | 8455.5  | 7713.2  | 7320.7  | 7116.0  | 6689.3  | 6612.6  | 6774.7  | 6885.6  | 6894.1  | 6885.6  |
| 45°   | 8276.4  | 7593.8  | 7261.0  | 6851.5  | 6313.9  | 6407.8  | 6612.6  | 6672.3  | 6569.9  | 6527.2  |
| 47.5° | 7858.3  | 7371.9  | 7081.8  | 6527.2  | 6006.8  | 6185.9  | 6211.5  | 5563.1  | 5187.7  | 5102.3  |
| 50°   | 7738.8  | 7380.5  | 6877.1  | 6143.3  | 5819.1  | 5998.2  | 4880.5  | 3728.6  | 3259.4  | 3165.5  |
| 52.5° | 7704.7  | 7295.1  | 6953.9  | 5742.3  | 5750.8  | 5059.7  | 3080.2  | 1825.9  | 1467.6  | 1399.3  |
| 55°   | 7790.0  | 7670.6  | 7081.8  | 5503.4  | 5349.8  | 3293.5  | 1433.4  | 861.8   | 887.4   | 861.8   |
| 57.5° | 5878.8  | 6416.3  | 7235.4  | 5127.9  | 3907.8  | 1587.0  | 904.4   | 836.2   | 776.4   | 759.4   |
| 60°   | 3668.9  | 4180.8  | 5298.6  | 4411.2  | 2005.1  | 947.1   | 921.5   | 776.4   | 750.8   | 742.3   |
| 62.5° | 1211.6  | 1860.0  | 3037.5  | 2901.0  | 554.6   | 938.6   | 930.0   | 691.1   | 691.1   | 691.1   |
| 65°   | 307.2   | 315.7   | 836.2   | 998.3   | 409.6   | 836.2   | 887.4   | 648.5   | 631.4   | 657.0   |
| 67.5° | 264.5   | 238.9   | 443.7   | 392.5   | 341.3   | 580.2   | 776.4   | 622.9   | 588.7   | 588.7   |
| 70°   | 264.5   | 281.6   | 435.1   | 366.9   | 213.3   | 315.7   | 563.1   | 384.0   | 341.3   | 315.7   |
| 72.5° | 247.4   | 273.0   | 384.0   | 332.8   | 145.0   | 153.6   | 247.4   | 128.0   | 119.5   | 102.4   |
| 75°   | 213.3   | 221.8   | 298.6   | 298.6   | 153.6   | 76.8    | 102.4   | 85.3    | 85.3    | 76.8    |
| 77.5° | 145.0   | 110.9   | 170.6   | 213.3   | 110.9   | 51.2    | 42.7    | 42.7    | 42.7    | 34.1    |
| 80°   | 76.8    | 42.7    | 42.7    | 34.1    | 42.7    | 42.7    | 25.6    | 34.1    | 34.1    | 25.6    |
| 82.5° | 42.7    | 25.6    | 25.6    | 17.1    | 17.1    | 25.6    | 17.1    | 17.1    | 17.1    | 17.1    |
| 85°   | 17.1    | 17.1    | 8.5     | 8.5     | 8.5     | 17.1    | 8.5     | 8.5     | 8.5     | 8.5     |
| 87.5° | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 8.5     | 8.5     |
| 90°   | 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

Lumark

Report Number: SP1-2501-319-10

Test Date: 02/05/2025

Luminaire Tested: NFFLD-C55-7030-66

Data in this report applies to families of products including NFFLD-C55-7030-66

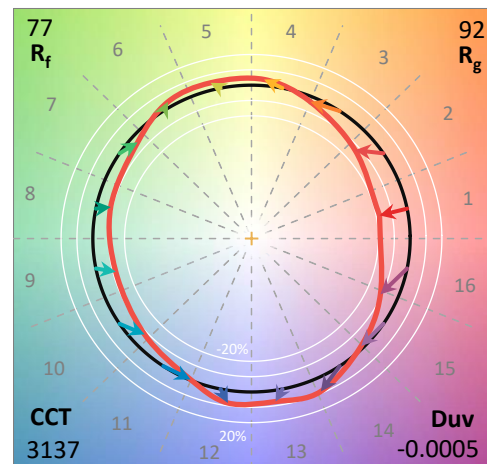
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2501-319-10  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 02/06/2025  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Lumark  
 Catalog Number: **NFFLD-C55-7030-66**  
 Description: LUMARK NIGHT FALCON 16900LM NEMA 6

### Spectral Parameters

CCT (K): 3137  
 CIE  $u'$ : 0.2461  
 CIE  $v'$ : 0.5180  
 Duv: -0.0005  
 CIE x: 0.4269  
 CIE y: 0.3993  
 CIE z: 0.1739  
 Peak Wavelength (nm): 591  
 Dominant Wavelength (nm): 582  
 Purity: 47.96229  
 R<sub>f</sub>: 76.5  
 R<sub>g</sub>: 91.7

CRI (Ra): 71.4  
 R1: 67.1  
 R2: 84.2  
 R3: 93.4  
 R4: 65.5  
 R5: 67.7  
 R6: 78.9  
 R7: 75.0  
 R8: 39.1  
 R9: -42.3  
 R10: 65.1  
 R11: 60.5  
 R12: 58.2  
 R13: 70.6  
 R14: 96.6  
 R15: 58.2



### Test Conditions

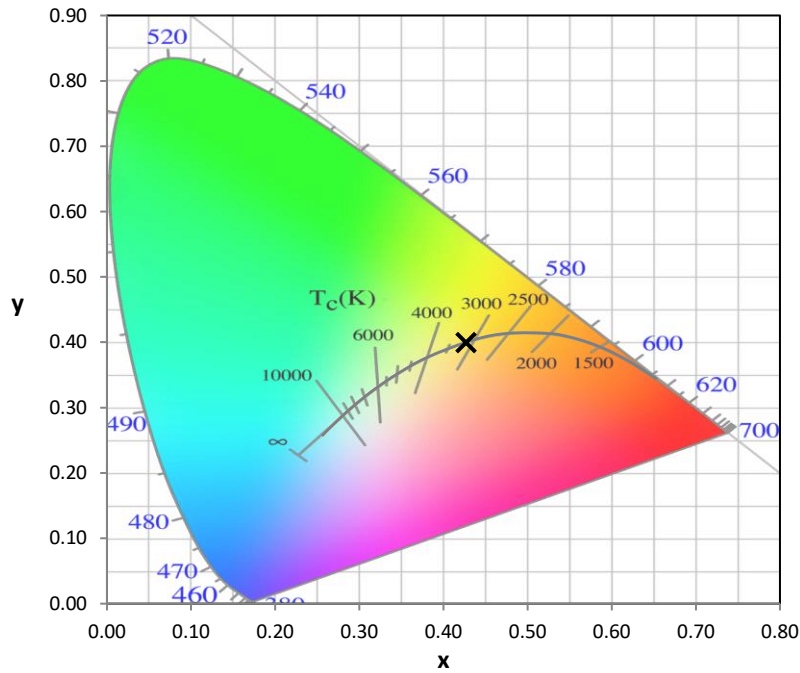
Stabilization Time: 39M  
 Operation Time: 1H 39M  
 Sphere Temperature (°C): 25.0

REPORT NUMBER: SP1-2501-319-10

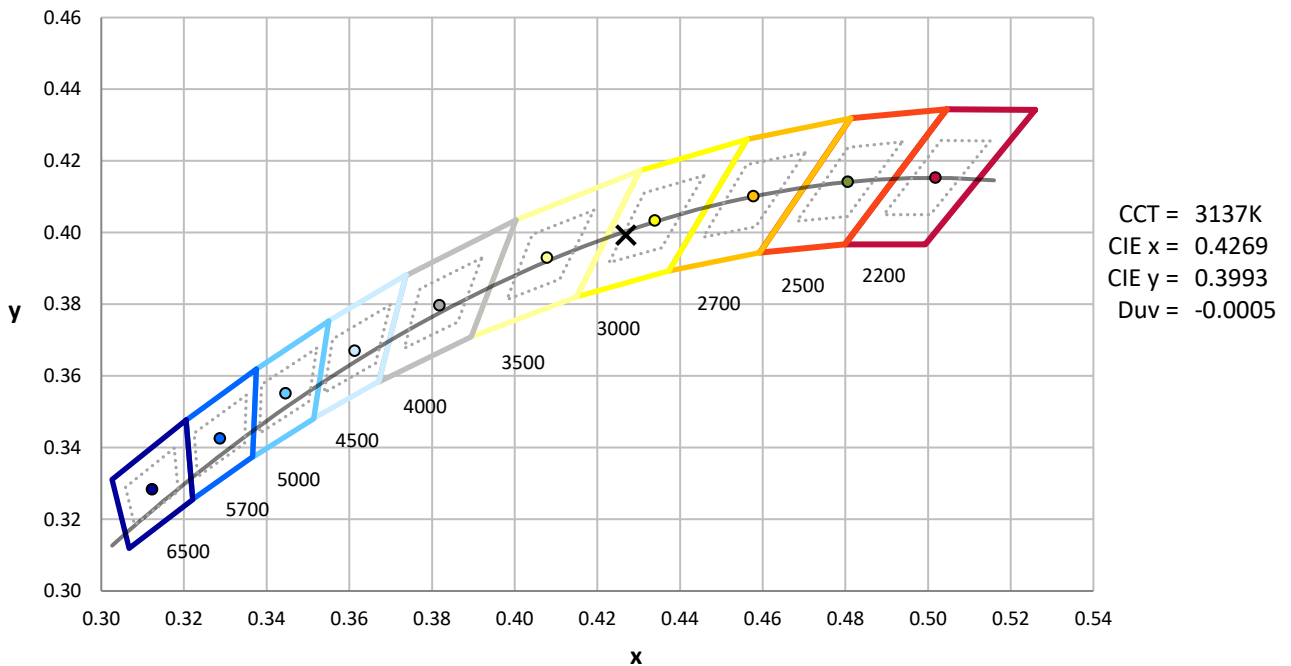
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 12/16/2024       | 6/16/2025            |
| Power Meter                    | INXT2011004           | 1/21/2025        | 1/21/2026            |
| AC Power Source                | IN0063                | 10/22/2024       | 10/22/2025           |
| DC Power Source                | IN0208                | 10/22/2024       | 10/22/2025           |
| Sphere Thermometer             | IN0085                | 10/22/2024       | 10/22/2025           |
| Room Thermometer               | IN0046                | 10/22/2024       | 10/22/2025           |

REPORT NUMBER: SP1-2501-319-10

**CIE 1931 Chromaticity Diagram**



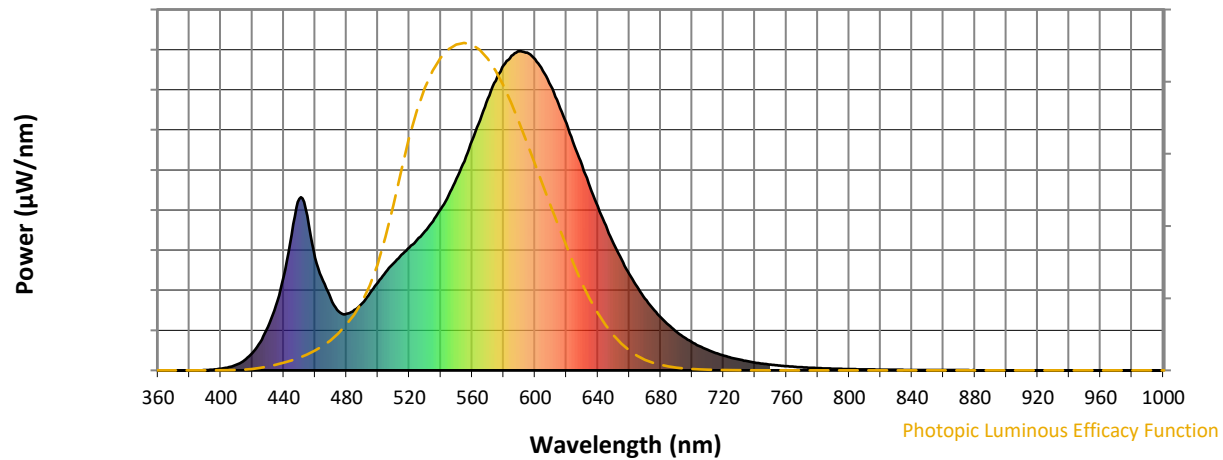
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 4-step quadrangle

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### Photopic Flux vs. Wavelength

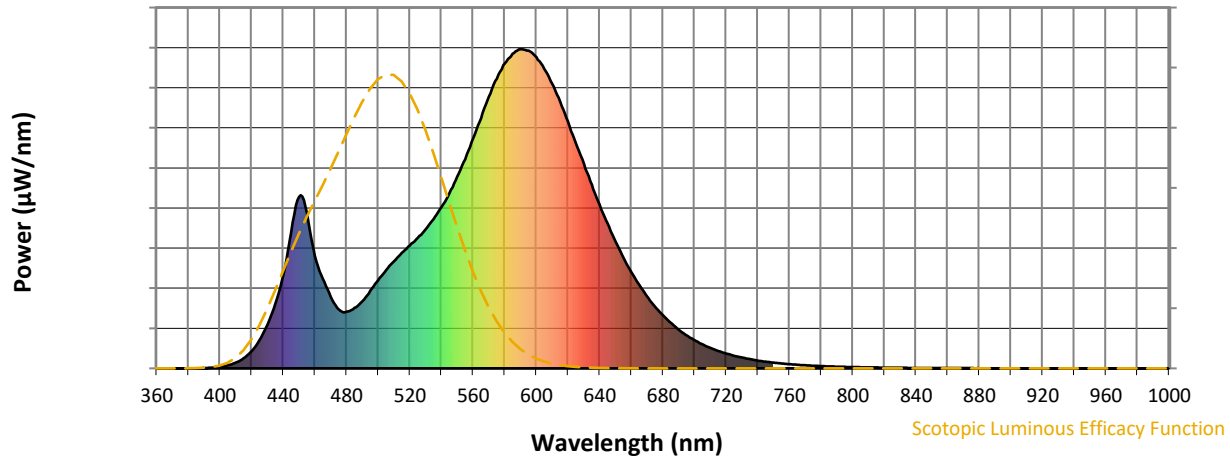


### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | 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               | 211                           | NR                             | 620               | 774                           | NR                             | 750               | 18                            | NR                             | 880               | 1                             | NR                             |
| 365               | 0                             | NR                             | 495               | 243                           | NR                             | 625               | 705                           | NR                             | 755               | 15                            | NR                             | 885               | 0                             | NR                             |
| 370               | 0                             | NR                             | 500               | 276                           | NR                             | 630               | 642                           | NR                             | 760               | 13                            | NR                             | 890               | 0                             | NR                             |
| 375               | 0                             | NR                             | 505               | 308                           | NR                             | 635               | 575                           | NR                             | 765               | 11                            | NR                             | 895               | 0                             | NR                             |
| 380               | 0                             | NR                             | 510               | 336                           | NR                             | 640               | 513                           | NR                             | 770               | 10                            | NR                             | 900               | 0                             | NR                             |
| 385               | 0                             | NR                             | 515               | 362                           | NR                             | 645               | 454                           | NR                             | 775               | 8                             | NR                             | 905               | 0                             | NR                             |
| 390               | 1                             | NR                             | 520               | 385                           | NR                             | 650               | 397                           | NR                             | 780               | 7                             | NR                             | 910               | 0                             | NR                             |
| 395               | 3                             | NR                             | 525               | 410                           | NR                             | 655               | 348                           | NR                             | 785               | 6                             | NR                             | 915               | 0                             | NR                             |
| 400               | 5                             | NR                             | 530               | 437                           | NR                             | 660               | 301                           | NR                             | 790               | 5                             | NR                             | 920               | 0                             | NR                             |
| 405               | 10                            | NR                             | 535               | 468                           | NR                             | 665               | 261                           | NR                             | 795               | 5                             | NR                             | 925               | 0                             | NR                             |
| 410               | 18                            | NR                             | 540               | 505                           | NR                             | 670               | 225                           | NR                             | 800               | 4                             | NR                             | 930               | 0                             | NR                             |
| 415               | 32                            | NR                             | 545               | 549                           | NR                             | 675               | 193                           | NR                             | 805               | 3                             | NR                             | 935               | 0                             | NR                             |
| 420               | 54                            | NR                             | 550               | 600                           | NR                             | 680               | 166                           | NR                             | 810               | 3                             | NR                             | 940               | 0                             | NR                             |
| 425               | 89                            | NR                             | 555               | 655                           | NR                             | 685               | 142                           | NR                             | 815               | 3                             | NR                             | 945               | 0                             | NR                             |
| 430               | 137                           | NR                             | 560               | 721                           | NR                             | 690               | 121                           | NR                             | 820               | 2                             | NR                             | 950               | 0                             | NR                             |
| 435               | 204                           | NR                             | 565               | 784                           | NR                             | 695               | 103                           | NR                             | 825               | 2                             | NR                             | 955               | 0                             | NR                             |
| 440               | 293                           | NR                             | 570               | 851                           | NR                             | 700               | 88                            | NR                             | 830               | 2                             | NR                             | 960               | 0                             | NR                             |
| 445               | 425                           | NR                             | 575               | 907                           | NR                             | 705               | 75                            | NR                             | 835               | 1                             | NR                             | 965               | 0                             | NR                             |
| 450               | 537                           | NR                             | 580               | 956                           | NR                             | 710               | 64                            | NR                             | 840               | 1                             | NR                             | 970               | 0                             | NR                             |
| 455               | 484                           | NR                             | 585               | 986                           | NR                             | 715               | 54                            | NR                             | 845               | 1                             | NR                             | 975               | 0                             | NR                             |
| 460               | 353                           | NR                             | 590               | 1000                          | NR                             | 720               | 46                            | NR                             | 850               | 1                             | NR                             | 980               | 0                             | NR                             |
| 465               | 281                           | NR                             | 595               | 996                           | NR                             | 725               | 39                            | NR                             | 855               | 1                             | NR                             | 985               | 0                             | NR                             |
| 470               | 224                           | NR                             | 600               | 974                           | NR                             | 730               | 34                            | NR                             | 860               | 1                             | NR                             | 990               | 0                             | NR                             |
| 475               | 184                           | NR                             | 605               | 938                           | NR                             | 735               | 29                            | NR                             | 865               | 1                             | NR                             | 995               | 0                             | NR                             |
| 480               | 177                           | NR                             | 610               | 891                           | NR                             | 740               | 24                            | NR                             | 870               | 1                             | NR                             | 1000              | 0                             | NR                             |
| 485               | 189                           | NR                             | 615               | 835                           | NR                             | 745               | 21                            | NR                             | 875               | 1                             | NR                             |                   |                               |                                |

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### Scotopic Flux vs. Wavelength



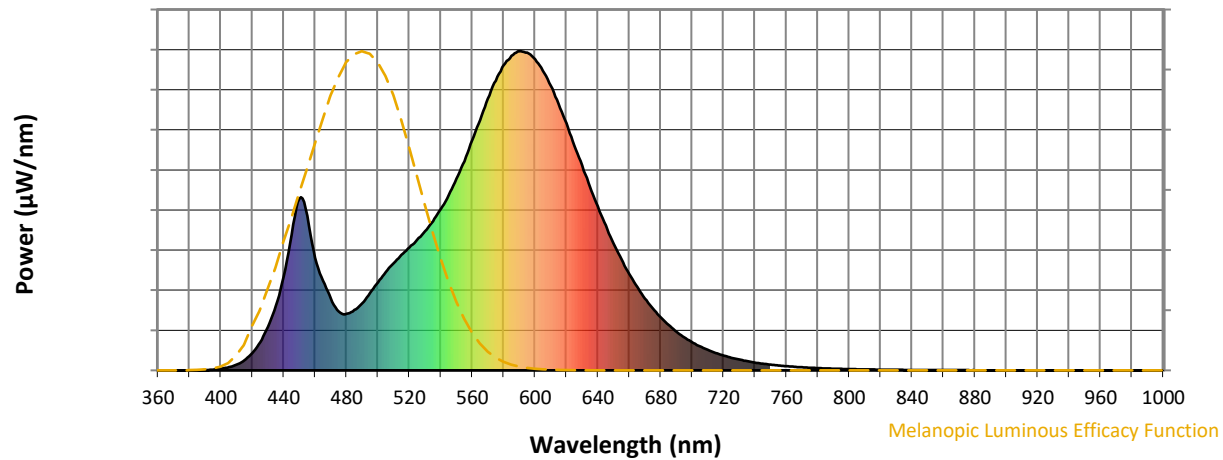
Scotopic Lumens: NR

S/P: 1.31

| 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       | 211                         | NR               | 620       | 774                         | NR               | 750       | 18                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 243                         | NR               | 625       | 705                         | NR               | 755       | 15                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 276                         | NR               | 630       | 642                         | NR               | 760       | 13                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 308                         | NR               | 635       | 575                         | NR               | 765       | 11                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 336                         | NR               | 640       | 513                         | NR               | 770       | 10                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 362                         | NR               | 645       | 454                         | NR               | 775       | 8                           | NR               | 905       | 0                           | NR               |
| 390       | 1                           | NR               | 520       | 385                         | NR               | 650       | 397                         | NR               | 780       | 7                           | NR               | 910       | 0                           | NR               |
| 395       | 3                           | NR               | 525       | 410                         | NR               | 655       | 348                         | NR               | 785       | 6                           | NR               | 915       | 0                           | NR               |
| 400       | 5                           | NR               | 530       | 437                         | NR               | 660       | 301                         | NR               | 790       | 5                           | NR               | 920       | 0                           | NR               |
| 405       | 10                          | NR               | 535       | 468                         | NR               | 665       | 261                         | NR               | 795       | 5                           | NR               | 925       | 0                           | NR               |
| 410       | 18                          | NR               | 540       | 505                         | NR               | 670       | 225                         | NR               | 800       | 4                           | NR               | 930       | 0                           | NR               |
| 415       | 32                          | NR               | 545       | 549                         | NR               | 675       | 193                         | NR               | 805       | 3                           | NR               | 935       | 0                           | NR               |
| 420       | 54                          | NR               | 550       | 600                         | NR               | 680       | 166                         | NR               | 810       | 3                           | NR               | 940       | 0                           | NR               |
| 425       | 89                          | NR               | 555       | 655                         | NR               | 685       | 142                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 137                         | NR               | 560       | 721                         | NR               | 690       | 121                         | NR               | 820       | 2                           | NR               | 950       | 0                           | NR               |
| 435       | 204                         | NR               | 565       | 784                         | NR               | 695       | 103                         | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 293                         | NR               | 570       | 851                         | NR               | 700       | 88                          | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 425                         | NR               | 575       | 907                         | NR               | 705       | 75                          | NR               | 835       | 1                           | NR               | 965       | 0                           | NR               |
| 450       | 537                         | NR               | 580       | 956                         | NR               | 710       | 64                          | NR               | 840       | 1                           | NR               | 970       | 0                           | NR               |
| 455       | 484                         | NR               | 585       | 986                         | NR               | 715       | 54                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 353                         | NR               | 590       | 1000                        | NR               | 720       | 46                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 281                         | NR               | 595       | 996                         | NR               | 725       | 39                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 224                         | NR               | 600       | 974                         | NR               | 730       | 34                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 184                         | NR               | 605       | 938                         | NR               | 735       | 29                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 177                         | NR               | 610       | 891                         | NR               | 740       | 24                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 189                         | NR               | 615       | 835                         | NR               | 745       | 21                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.52

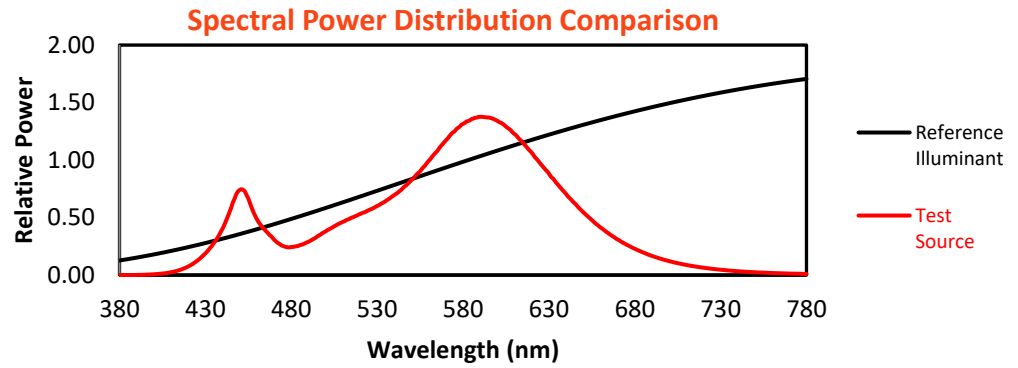
| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 211                         | NR               | 620       | 774                         | NR               | 750       | 18                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 243                         | NR               | 625       | 705                         | NR               | 755       | 15                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 276                         | NR               | 630       | 642                         | NR               | 760       | 13                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 308                         | NR               | 635       | 575                         | NR               | 765       | 11                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 336                         | NR               | 640       | 513                         | NR               | 770       | 10                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 362                         | NR               | 645       | 454                         | NR               | 775       | 8                           | NR               | 905       | 0                           | NR               |
| 390       | 1                           | NR               | 520       | 385                         | NR               | 650       | 397                         | NR               | 780       | 7                           | NR               | 910       | 0                           | NR               |
| 395       | 3                           | NR               | 525       | 410                         | NR               | 655       | 348                         | NR               | 785       | 6                           | NR               | 915       | 0                           | NR               |
| 400       | 5                           | NR               | 530       | 437                         | NR               | 660       | 301                         | NR               | 790       | 5                           | NR               | 920       | 0                           | NR               |
| 405       | 10                          | NR               | 535       | 468                         | NR               | 665       | 261                         | NR               | 795       | 5                           | NR               | 925       | 0                           | NR               |
| 410       | 18                          | NR               | 540       | 505                         | NR               | 670       | 225                         | NR               | 800       | 4                           | NR               | 930       | 0                           | NR               |
| 415       | 32                          | NR               | 545       | 549                         | NR               | 675       | 193                         | NR               | 805       | 3                           | NR               | 935       | 0                           | NR               |
| 420       | 54                          | NR               | 550       | 600                         | NR               | 680       | 166                         | NR               | 810       | 3                           | NR               | 940       | 0                           | NR               |
| 425       | 89                          | NR               | 555       | 655                         | NR               | 685       | 142                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 137                         | NR               | 560       | 721                         | NR               | 690       | 121                         | NR               | 820       | 2                           | NR               | 950       | 0                           | NR               |
| 435       | 204                         | NR               | 565       | 784                         | NR               | 695       | 103                         | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 293                         | NR               | 570       | 851                         | NR               | 700       | 88                          | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 425                         | NR               | 575       | 907                         | NR               | 705       | 75                          | NR               | 835       | 1                           | NR               | 965       | 0                           | NR               |
| 450       | 537                         | NR               | 580       | 956                         | NR               | 710       | 64                          | NR               | 840       | 1                           | NR               | 970       | 0                           | NR               |
| 455       | 484                         | NR               | 585       | 986                         | NR               | 715       | 54                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 353                         | NR               | 590       | 1000                        | NR               | 720       | 46                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 281                         | NR               | 595       | 996                         | NR               | 725       | 39                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 224                         | NR               | 600       | 974                         | NR               | 730       | 34                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 184                         | NR               | 605       | 938                         | NR               | 735       | 29                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 177                         | NR               | 610       | 891                         | NR               | 740       | 24                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 189                         | NR               | 615       | 835                         | NR               | 745       | 21                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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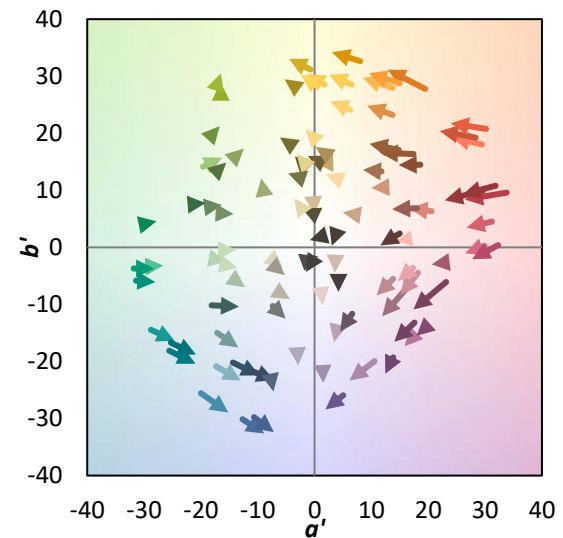
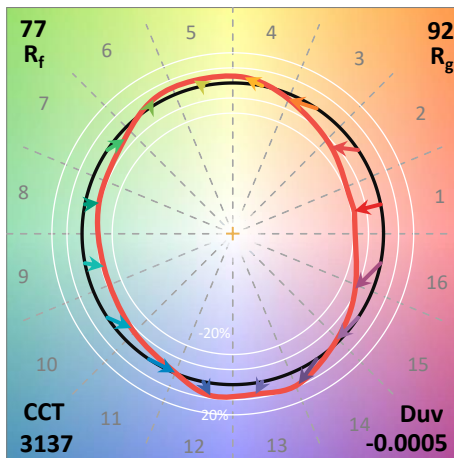
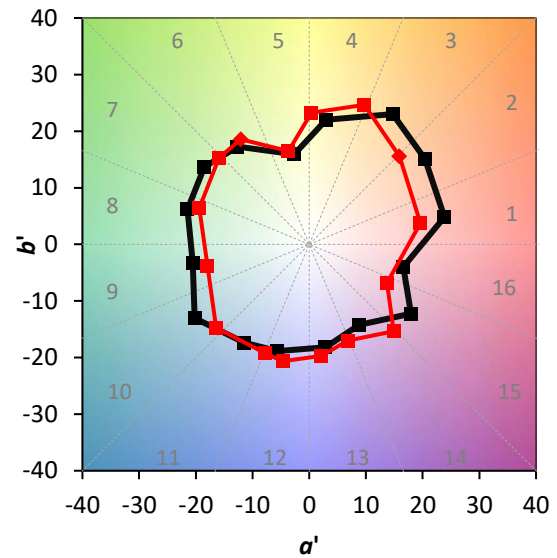
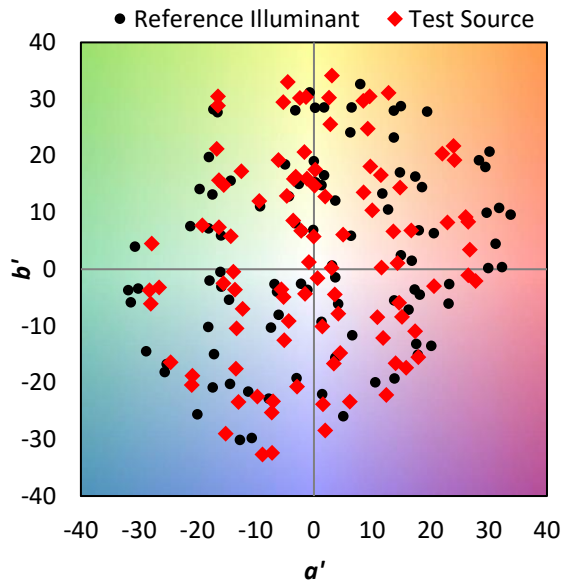
TM-30-18

### Summary

$R_f = 76.5$   
 $R_g = 91.7$   
 $CIE R_a = 71.4$   
 $R_g = -42.3$

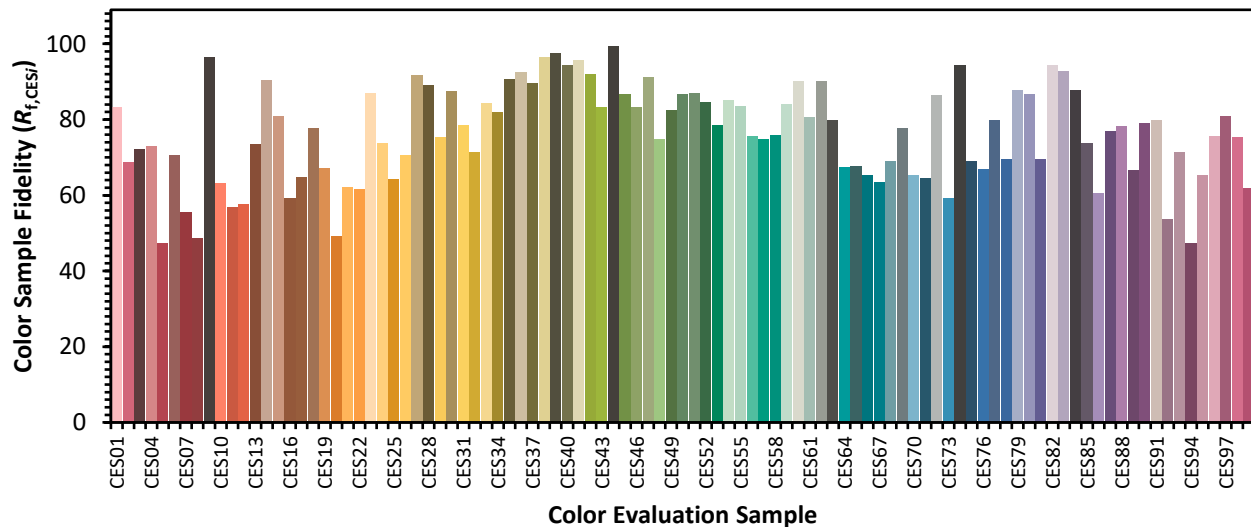


### Color Vector Graphics

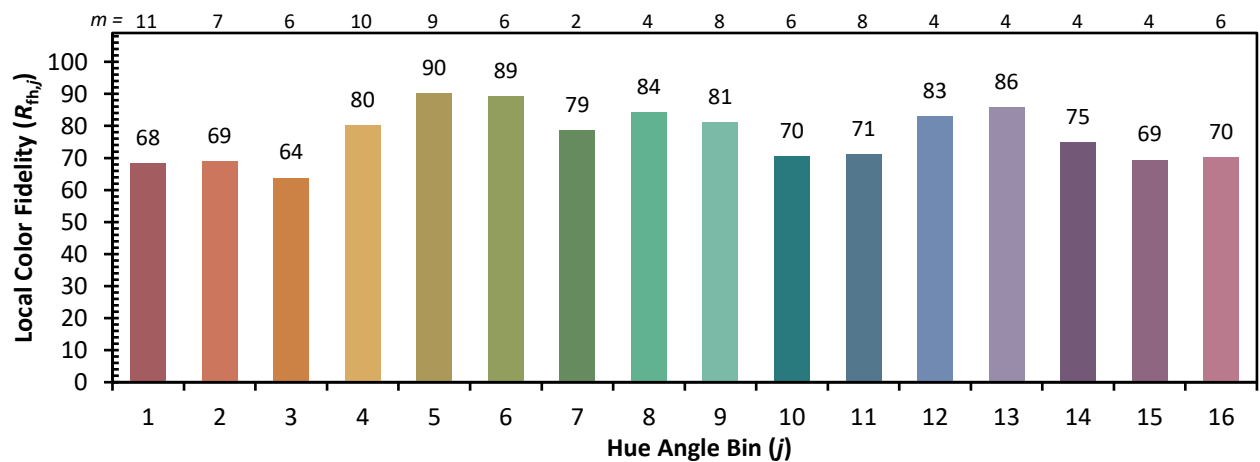
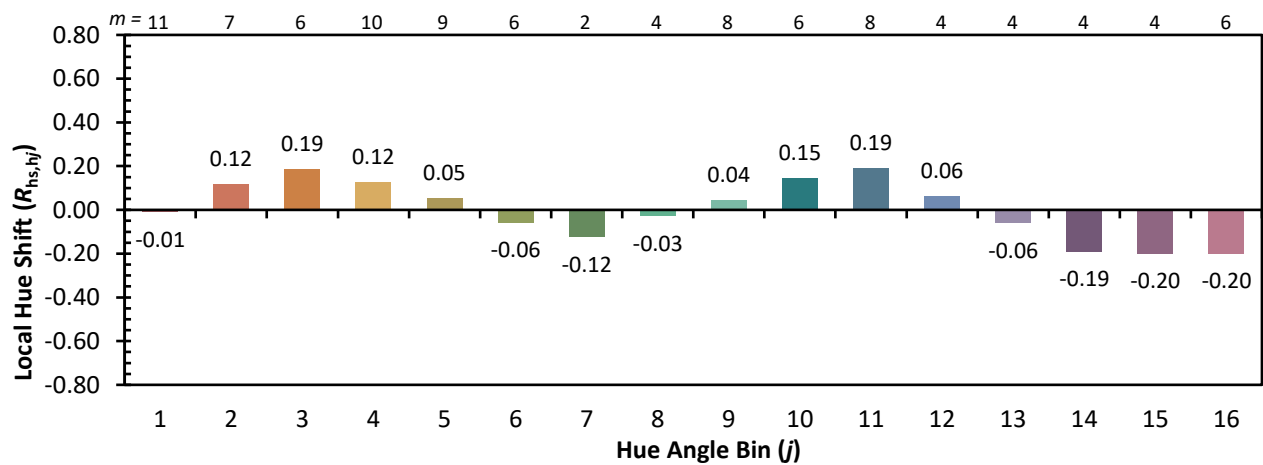
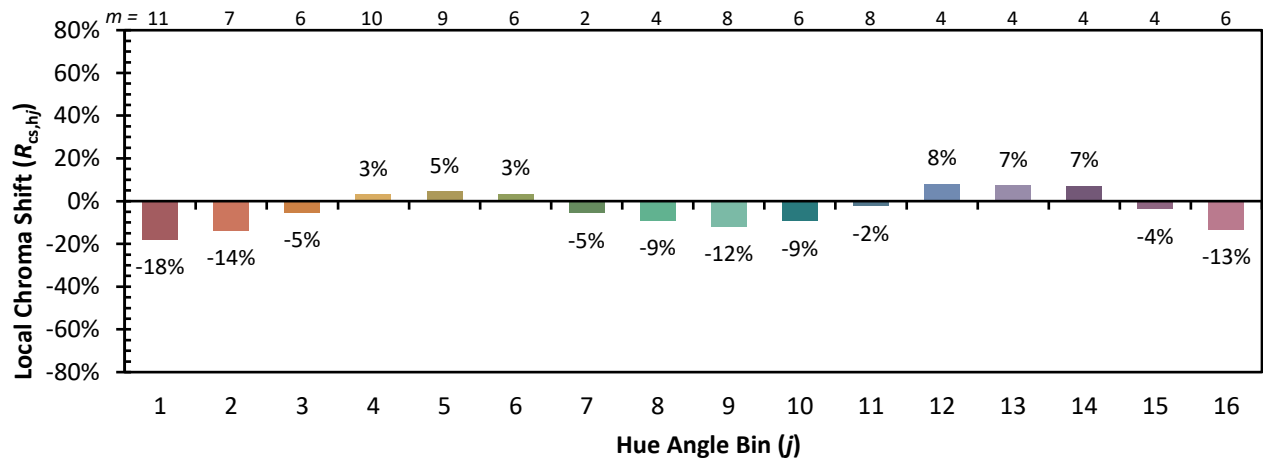


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

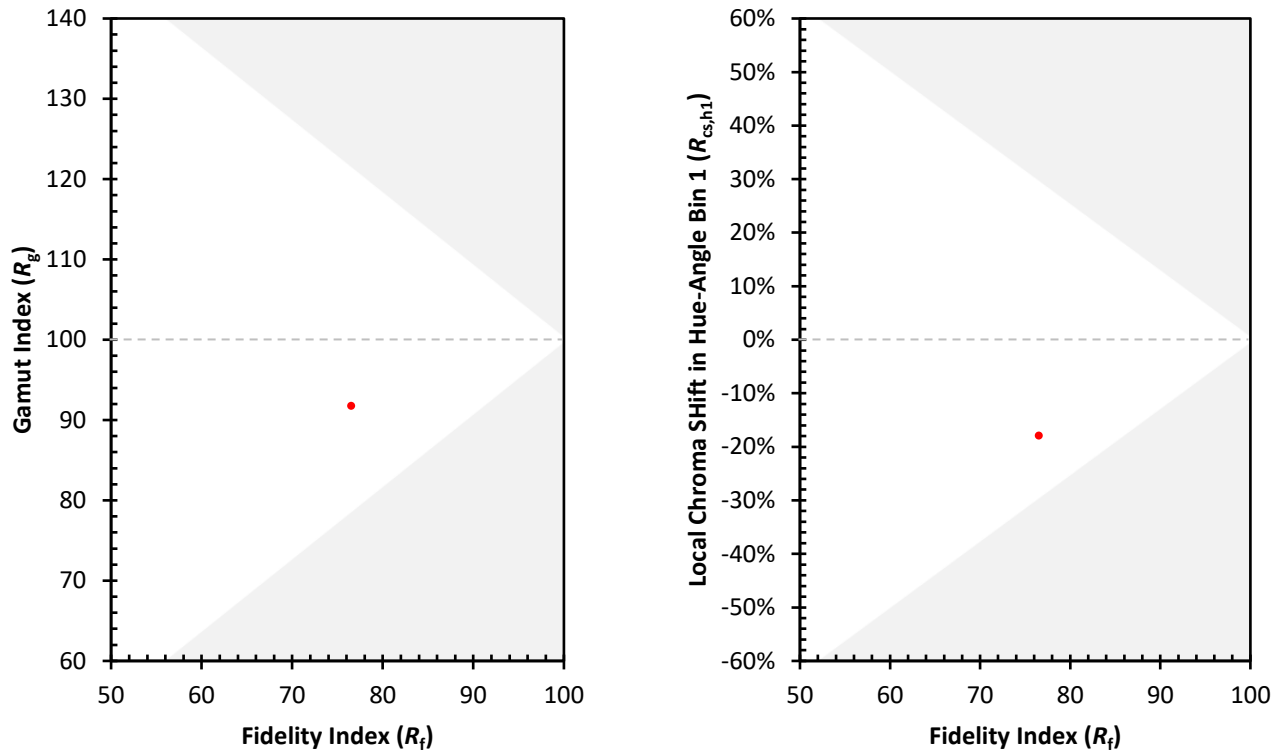
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 71 | CES51 = 87 | CES76 = 67 |
| CES02 = 62 | CES27 = 92 | CES52 = 85 | CES77 = 80 |
| CES03 = 31 | CES28 = 89 | CES53 = 79 | CES78 = 70 |
| CES04 = 71 | CES29 = 75 | CES54 = 85 | CES79 = 88 |
| CES05 = 49 | CES30 = 88 | CES55 = 84 | CES80 = 87 |
| CES06 = 51 | CES31 = 79 | CES56 = 76 | CES81 = 70 |
| CES07 = 41 | CES32 = 71 | CES57 = 75 | CES82 = 94 |
| CES08 = 40 | CES33 = 84 | CES58 = 76 | CES83 = 93 |
| CES09 = 29 | CES34 = 82 | CES59 = 84 | CES84 = 88 |
| CES10 = 76 | CES35 = 91 | CES60 = 90 | CES85 = 74 |
| CES11 = 59 | CES36 = 92 | CES61 = 81 | CES86 = 60 |
| CES12 = 65 | CES37 = 90 | CES62 = 90 | CES87 = 77 |
| CES13 = 43 | CES38 = 96 | CES63 = 80 | CES88 = 78 |
| CES14 = 74 | CES39 = 98 | CES64 = 67 | CES89 = 67 |
| CES15 = 71 | CES40 = 94 | CES65 = 68 | CES90 = 79 |
| CES16 = 47 | CES41 = 96 | CES66 = 65 | CES91 = 80 |
| CES17 = 50 | CES42 = 92 | CES67 = 64 | CES92 = 54 |
| CES18 = 56 | CES43 = 83 | CES68 = 69 | CES93 = 71 |
| CES19 = 73 | CES44 = 99 | CES69 = 78 | CES94 = 47 |
| CES20 = 66 | CES45 = 87 | CES70 = 65 | CES95 = 65 |
| CES21 = 87 | CES46 = 83 | CES71 = 65 | CES96 = 76 |
| CES22 = 79 | CES47 = 91 | CES72 = 87 | CES97 = 81 |
| CES23 = 92 | CES48 = 75 | CES73 = 59 | CES98 = 75 |
| CES24 = 91 | CES49 = 83 | CES74 = 94 | CES99 = 62 |
| CES25 = 72 | CES50 = 87 | CES75 = 69 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)