

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: INVUE

Report Number: P674556

Luminaire Tested: **CCP-SA2D-735-U-T2R-HSS**

Issue Date: 04/16/2023

**Test Information**

Test Method: LM-79-08  
Report Number: P674556  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA2D-735-U-T2R-HSS  
Description: INVUE CLEAR CURVE POLE MOUNT Light Square Luminaire @800mA w/ T2R  
distribution lens and House Side Shield  
Light Source: (32) 3500K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 8906.7 lumens  
Efficiency: N/A  
Efficacy: 110.2 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B1 - U0 - G2

Input Watts (W): 80.8  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

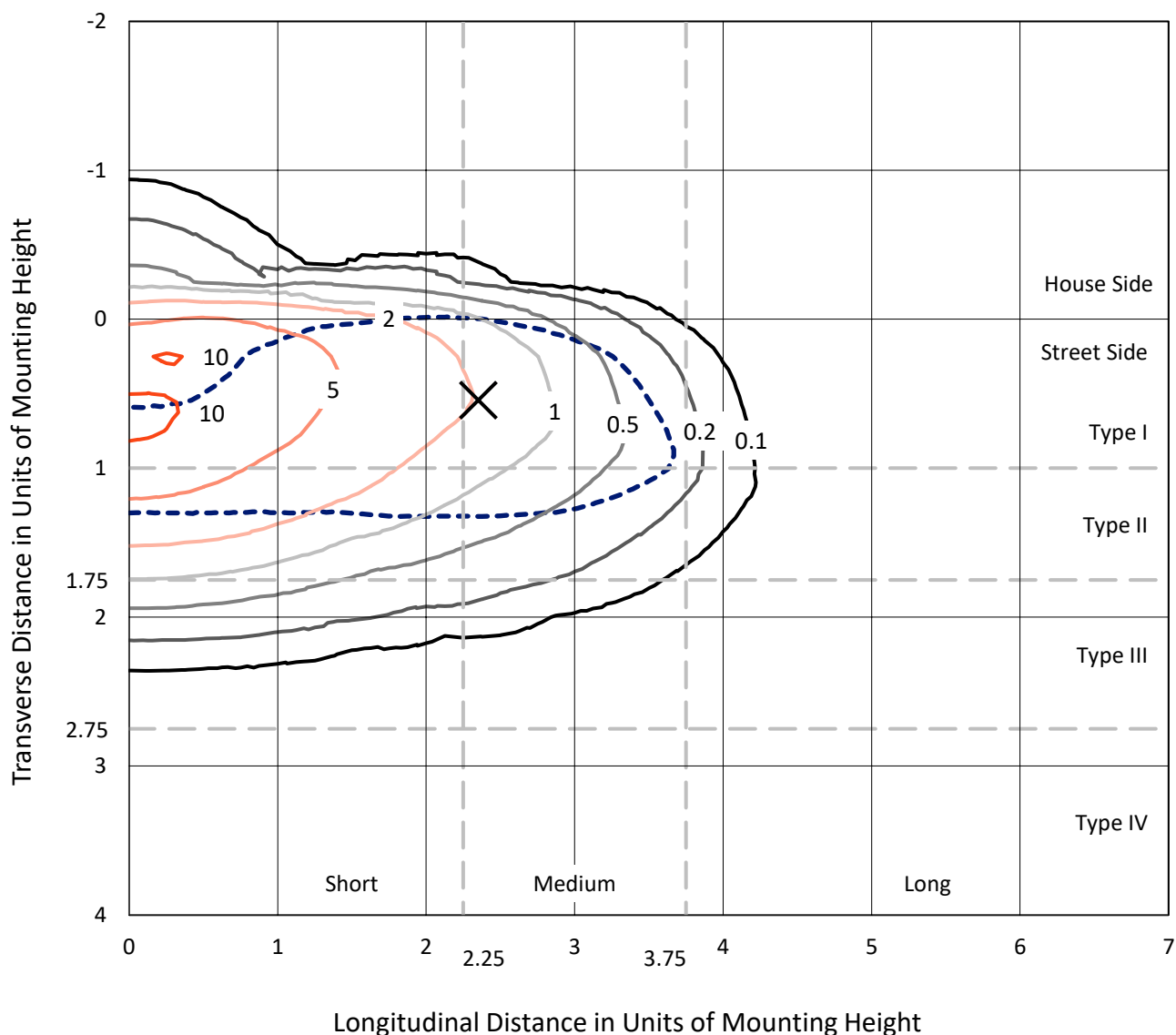
REPORT NUMBER: P674556

CATALOG NUMBER: CCP-SA2D-735-U-T2R-HSS

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

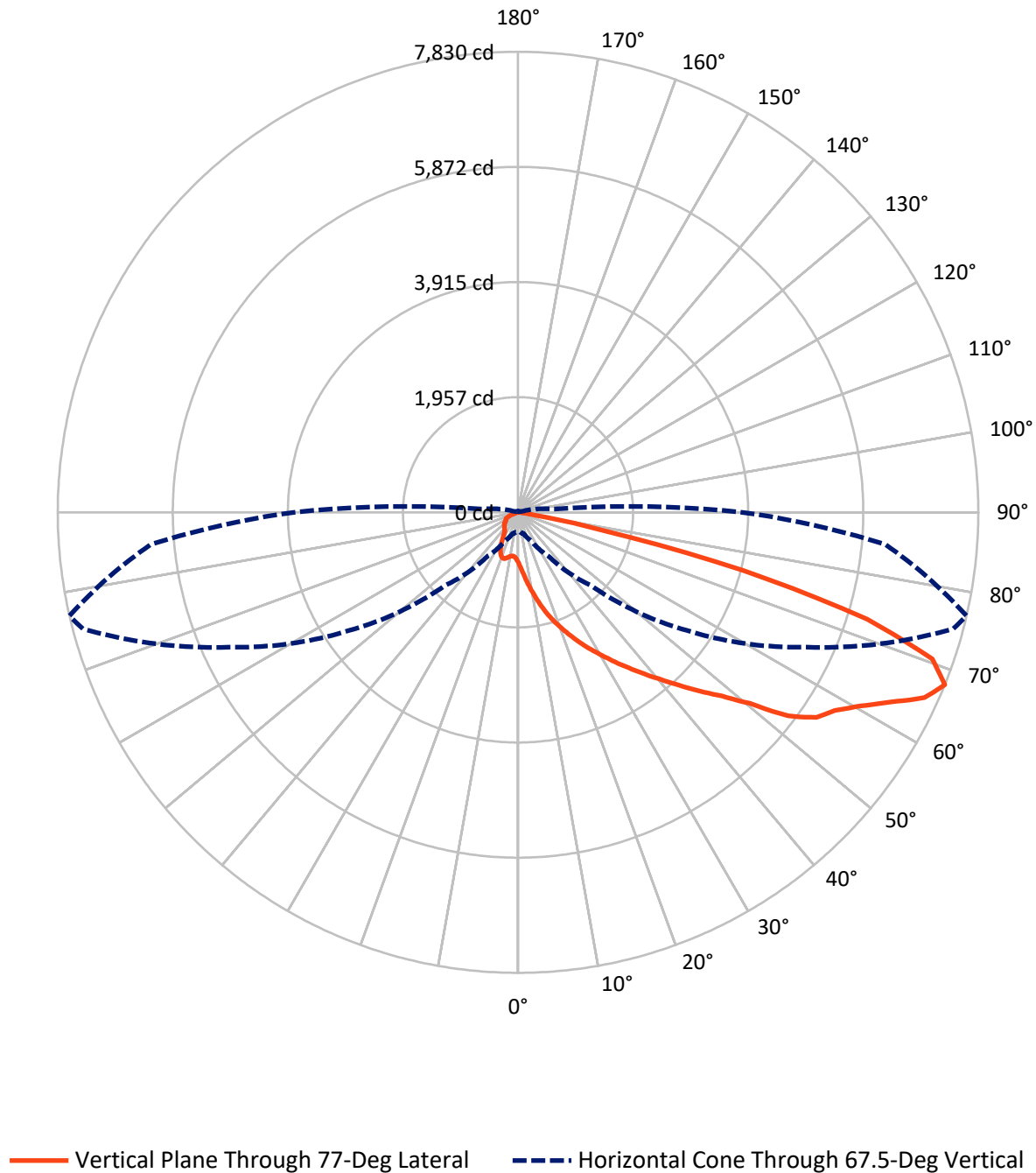
--- 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 11 fc  
 Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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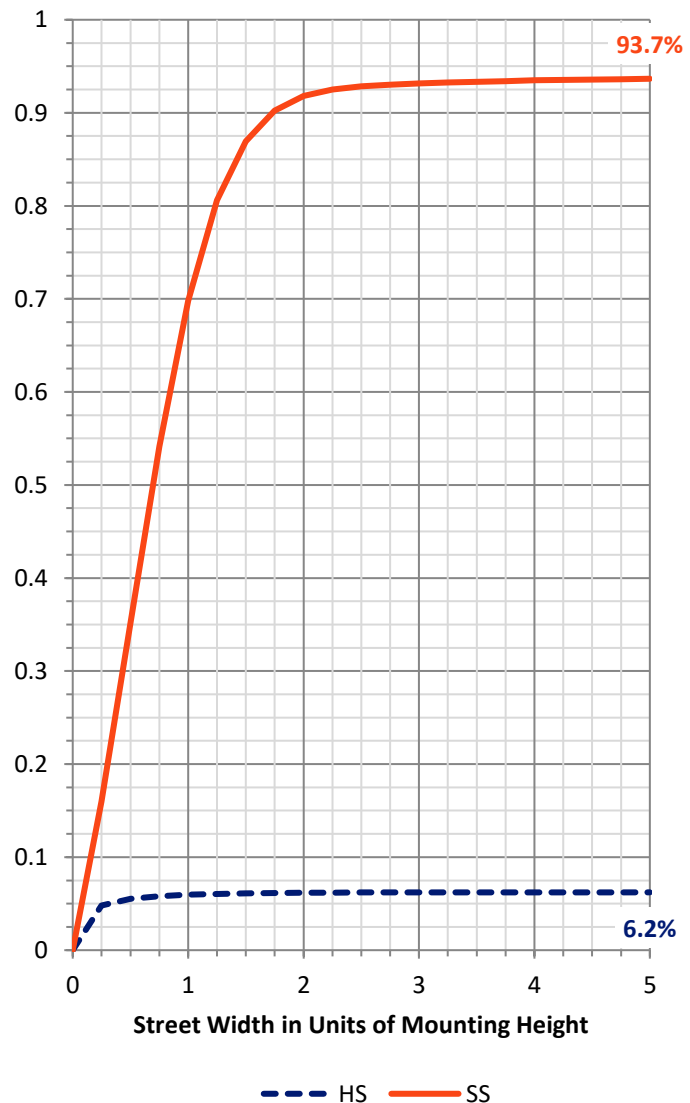
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 556.6    | 0.0    | 556.6  |
|                    | % Fixture | 6.2      | 0.0    | 6.2    |
| <b>Street Side</b> | Lumens    | 8350.1   | 0.0    | 8350.1 |
|                    | % Fixture | 93.8     | 0.0    | 93.8   |
| <b>Total</b>       | Lumens    | 8906.7   | 0.0    | 8906.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 100.3  | 1.1       |
| 10°-20°   | 370.8  | 4.2       |
| 20°-30°   | 724.4  | 8.1       |
| 30°-40°   | 1266.4 | 14.2      |
| 40°-50°   | 1846.9 | 20.7      |
| 50°-60°   | 2159.7 | 24.2      |
| 60°-70°   | 1750.7 | 19.7      |
| 70°-80°   | 657.7  | 7.4       |
| 80°-90°   | 29.9   | 0.3       |
| 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°    | 8906.7 | 100.0     |
| 0°-180°   | 8906.7 | 100.0     |



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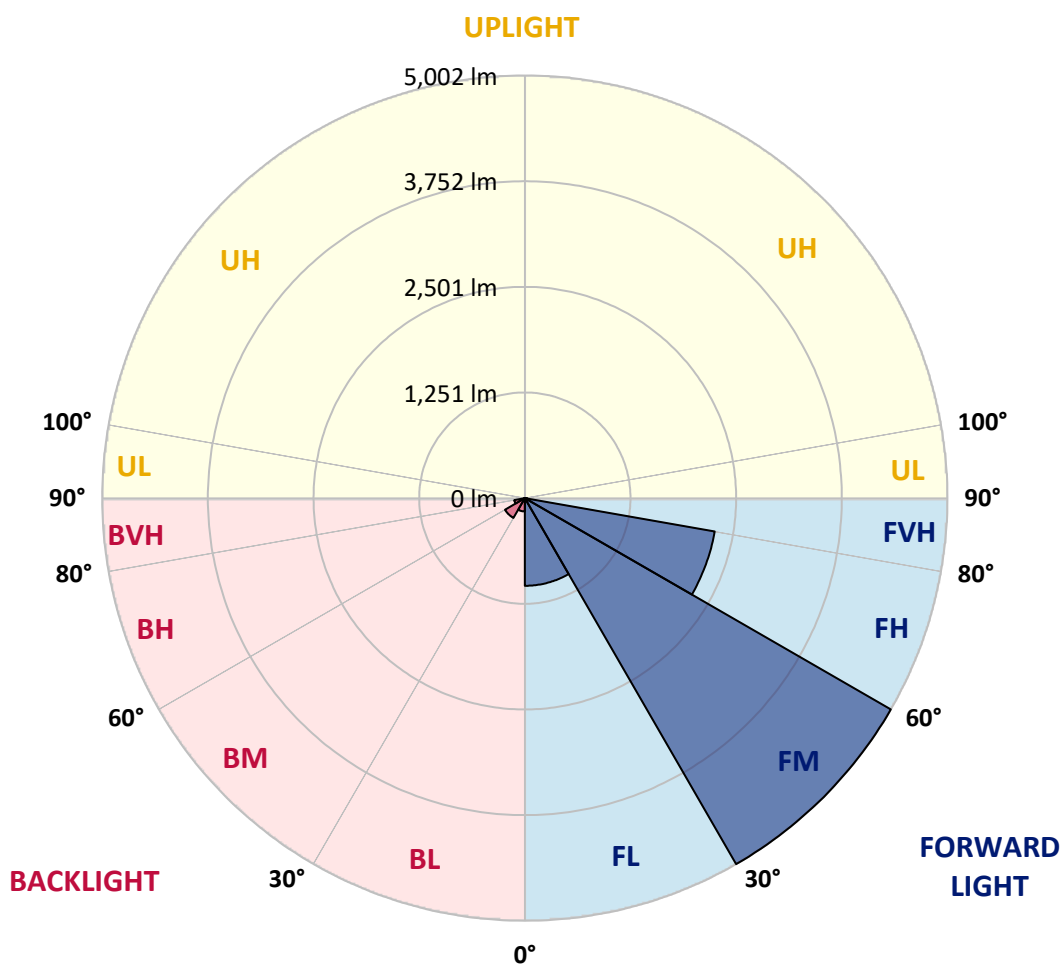
CATALOG NUMBER: CCP-SA2D-735-U-T2R-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1037.5 | 11.6      |                         |      |         |
| FM   | (30°-60°)   | 5002.2 | 56.2      |                         |      |         |
| FH   | (60°-80°)   | 2282.2 | 25.6      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 28.2   | 0.3       |                         |      | G1/100  |
| BL   | (0°-30°)    | 157.8  | 1.8       | B1/500                  |      |         |
| BM   | (30°-60°)   | 270.8  | 3.0       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 126.2  | 1.4       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 1.7    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type II Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 77°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 853.1  | 853.1  | 853.1  | 853.1  | 853.1  | 853.1  | 853.1  | 853.1  | 853.1  | 853.1  | 853.1  |
| 2.5°  | 1280.8 | 1234.2 | 1243.1 | 1223.8 | 1198.8 | 1140.9 | 1079.8 | 1018.7 | 964.1  | 952.0  | 897.3  |
| 5°    | 1640.3 | 1625.8 | 1610.5 | 1597.6 | 1545.4 | 1473.0 | 1362.9 | 1223.0 | 1096.7 | 1075.0 | 961.6  |
| 7.5°  | 1919.3 | 1897.6 | 1911.2 | 1871.8 | 1817.2 | 1747.2 | 1607.3 | 1457.7 | 1263.2 | 1231.0 | 1054.9 |
| 10°   | 2125.1 | 2113.0 | 2119.5 | 2101.0 | 2074.4 | 2004.5 | 1866.2 | 1678.9 | 1453.7 | 1392.6 | 1159.4 |
| 12.5° | 2279.5 | 2281.9 | 2310.0 | 2311.6 | 2289.9 | 2232.8 | 2086.5 | 1891.1 | 1626.6 | 1571.9 | 1275.2 |
| 15°   | 2392.0 | 2394.5 | 2429.0 | 2466.0 | 2490.9 | 2461.2 | 2328.5 | 2109.8 | 1830.0 | 1755.2 | 1396.6 |
| 17.5° | 2410.5 | 2412.1 | 2473.3 | 2548.0 | 2625.2 | 2650.9 | 2548.8 | 2326.9 | 2015.8 | 1930.5 | 1535.7 |
| 20°   | 2422.6 | 2436.3 | 2490.9 | 2577.0 | 2699.2 | 2778.8 | 2723.3 | 2535.2 | 2195.9 | 2097.0 | 1672.4 |
| 22.5° | 2568.9 | 2568.9 | 2601.1 | 2662.2 | 2759.5 | 2884.1 | 2872.9 | 2726.5 | 2371.1 | 2273.0 | 1808.3 |
| 25°   | 2879.3 | 2879.3 | 2847.9 | 2831.9 | 2884.1 | 2982.2 | 3010.4 | 2930.8 | 2571.3 | 2455.6 | 1951.4 |
| 27.5° | 3290.2 | 3290.2 | 3241.1 | 3122.9 | 3077.9 | 3118.9 | 3148.7 | 3108.5 | 2756.3 | 2642.1 | 2102.6 |
| 30°   | 3716.3 | 3730.8 | 3645.6 | 3495.2 | 3337.6 | 3306.2 | 3277.3 | 3268.5 | 2953.3 | 2824.6 | 2256.2 |
| 32.5° | 4144.1 | 4142.5 | 4036.3 | 3849.0 | 3643.1 | 3532.2 | 3438.1 | 3427.7 | 3162.3 | 3036.1 | 2401.7 |
| 35°   | 4485.8 | 4486.6 | 4374.8 | 4182.7 | 3944.7 | 3803.2 | 3652.0 | 3602.9 | 3391.5 | 3250.8 | 2575.4 |
| 37.5° | 4781.7 | 4764.8 | 4644.2 | 4461.7 | 4239.7 | 4093.4 | 3905.3 | 3777.4 | 3628.7 | 3485.6 | 2749.0 |
| 40°   | 4951.3 | 4928.8 | 4811.4 | 4637.8 | 4469.7 | 4357.9 | 4192.3 | 3988.1 | 3889.2 | 3734.8 | 2946.8 |
| 42.5° | 4976.3 | 4957.0 | 4879.0 | 4774.4 | 4636.9 | 4538.9 | 4494.6 | 4226.1 | 4162.6 | 4022.7 | 3183.2 |
| 45°   | 4906.3 | 4874.9 | 4849.2 | 4794.5 | 4755.9 | 4708.5 | 4768.8 | 4479.4 | 4476.1 | 4337.0 | 3417.2 |
| 47.5° | 4732.6 | 4690.0 | 4696.4 | 4756.8 | 4800.2 | 4842.8 | 5030.9 | 4811.4 | 4792.1 | 4661.9 | 3724.4 |
| 50°   | 4435.9 | 4415.0 | 4485.8 | 4604.8 | 4776.9 | 4947.3 | 5292.2 | 5150.7 | 5227.1 | 5104.9 | 4148.1 |
| 52.5° | 3832.9 | 3858.6 | 4070.1 | 4356.3 | 4653.8 | 4996.4 | 5537.5 | 5657.3 | 5852.7 | 5752.2 | 4574.2 |
| 55°   | 3109.3 | 3099.6 | 3381.8 | 3890.0 | 4365.2 | 4965.0 | 5644.4 | 5955.6 | 6262.7 | 6157.4 | 4811.4 |
| 57.5° | 2504.6 | 2521.5 | 2712.1 | 3214.6 | 3875.5 | 4723.0 | 5669.3 | 6111.6 | 6427.6 | 6357.6 | 5030.9 |
| 60°   | 1879.9 | 1895.9 | 2069.6 | 2507.0 | 3224.2 | 4218.0 | 5463.5 | 6166.3 | 6737.1 | 6684.1 | 5381.5 |
| 62.5° | 1196.4 | 1217.3 | 1391.8 | 1817.2 | 2464.4 | 3433.3 | 5001.2 | 6109.2 | 7060.4 | 7104.6 | 5859.9 |
| 65°   | 588.6  | 607.1  | 735.7  | 1061.3 | 1647.5 | 2567.3 | 4356.3 | 5891.3 | 7472.0 | 7598.3 | 6243.4 |
| 67.5° | 325.6  | 334.5  | 378.7  | 540.3  | 919.0  | 1760.9 | 3500.8 | 5425.7 | 7661.0 | 7829.8 | 6269.2 |
| 70°   | 253.3  | 255.7  | 272.6  | 315.2  | 447.9  | 1033.2 | 2490.1 | 4650.6 | 7269.4 | 7473.6 | 5747.3 |
| 72.5° | 213.1  | 216.3  | 224.3  | 238.8  | 279.8  | 537.9  | 1564.7 | 3594.1 | 6116.4 | 6208.9 | 4446.4 |
| 75°   | 156.0  | 160.8  | 183.3  | 196.2  | 221.1  | 326.4  | 689.9  | 2159.7 | 4042.0 | 3951.1 | 2487.7 |
| 77.5° | 131.1  | 135.1  | 140.7  | 159.2  | 182.5  | 222.7  | 242.0  | 905.4  | 1645.1 | 1430.4 | 652.9  |
| 80°   | 89.2   | 94.1   | 109.4  | 119.0  | 154.4  | 147.1  | 100.5  | 242.8  | 330.5  | 269.4  | 125.4  |
| 82.5° | 63.5   | 67.5   | 75.6   | 97.3   | 111.8  | 78.0   | 54.7   | 74.0   | 79.6   | 75.6   | 41.0   |
| 85°   | 20.1   | 25.7   | 54.7   | 80.4   | 60.3   | 26.5   | 34.6   | 28.1   | 24.9   | 24.1   | 16.1   |
| 87.5° | 4.0    | 4.0    | 27.3   | 32.2   | 24.1   | 13.7   | 12.1   | 8.8    | 11.3   | 11.3   | 8.8    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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CATALOG NUMBER: CCP-SA2D-735-U-T2R-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 853.1  | 853.1  | 853.1 | 853.1 | 853.1 | 853.1 | 853.1 | 853.1 | 853.1 | 853.1 | 853.1 |
| 2.5°  | 871.6  | 835.4  | 783.1 | 734.1 | 684.2 | 648.9 | 623.9 | 599.0 | 589.4 | 585.3 | 574.9 |
| 5°    | 910.2  | 841.0  | 737.3 | 653.7 | 592.6 | 554.0 | 530.7 | 510.6 | 497.7 | 493.7 | 488.1 |
| 7.5°  | 965.7  | 866.0  | 717.2 | 620.7 | 559.6 | 517.8 | 480.0 | 436.6 | 402.0 | 388.4 | 382.7 |
| 10°   | 1026.0 | 903.8  | 720.4 | 614.3 | 533.1 | 441.4 | 357.0 | 287.0 | 256.5 | 245.2 | 237.2 |
| 12.5° | 1114.4 | 945.6  | 734.1 | 607.1 | 453.5 | 315.2 | 228.3 | 199.4 | 192.2 | 190.6 | 189.0 |
| 15°   | 1202.9 | 1004.3 | 756.6 | 558.8 | 338.5 | 214.7 | 189.8 | 179.3 | 175.3 | 171.3 | 171.3 |
| 17.5° | 1292.1 | 1060.5 | 765.5 | 464.7 | 234.0 | 185.7 | 172.9 | 164.0 | 157.6 | 154.4 | 152.0 |
| 20°   | 1392.6 | 1120.0 | 739.7 | 349.8 | 187.3 | 169.7 | 155.2 | 144.7 | 139.1 | 135.9 | 133.5 |
| 22.5° | 1501.2 | 1178.7 | 683.4 | 243.6 | 170.5 | 152.8 | 139.1 | 128.6 | 123.0 | 119.8 | 119.0 |
| 25°   | 1603.3 | 1229.4 | 593.4 | 183.3 | 153.6 | 136.7 | 123.8 | 115.0 | 111.0 | 107.7 | 106.9 |
| 27.5° | 1708.6 | 1272.8 | 476.0 | 161.6 | 139.9 | 123.8 | 111.0 | 103.7 | 99.7  | 97.3  | 96.5  |
| 30°   | 1811.5 | 1302.6 | 354.6 | 147.9 | 127.8 | 111.8 | 100.5 | 94.9  | 90.9  | 88.4  | 87.6  |
| 32.5° | 1917.7 | 1319.4 | 239.6 | 135.9 | 115.8 | 101.3 | 91.7  | 86.0  | 83.6  | 81.2  | 81.2  |
| 35°   | 2019.8 | 1317.0 | 172.9 | 124.6 | 106.1 | 91.7  | 82.8  | 78.8  | 78.0  | 75.6  | 75.6  |
| 37.5° | 2131.5 | 1300.1 | 147.1 | 114.2 | 95.7  | 82.8  | 75.6  | 73.2  | 72.4  | 70.8  | 70.0  |
| 40°   | 2258.6 | 1262.4 | 134.3 | 106.1 | 86.8  | 75.6  | 69.1  | 67.5  | 66.7  | 65.1  | 65.1  |
| 42.5° | 2397.7 | 1213.3 | 127.0 | 97.3  | 79.6  | 68.3  | 63.5  | 61.1  | 60.3  | 58.7  | 58.7  |
| 45°   | 2559.3 | 1166.7 | 122.2 | 88.4  | 73.2  | 62.7  | 57.9  | 55.5  | 54.7  | 53.1  | 53.1  |
| 47.5° | 2779.6 | 1140.1 | 114.2 | 80.4  | 65.9  | 57.1  | 52.3  | 50.7  | 49.0  | 47.4  | 47.4  |
| 50°   | 3082.7 | 1108.8 | 103.7 | 72.4  | 60.3  | 51.5  | 48.2  | 45.8  | 45.0  | 43.4  | 43.4  |
| 52.5° | 3332.0 | 1042.0 | 93.3  | 64.3  | 53.9  | 47.4  | 44.2  | 42.6  | 41.0  | 40.2  | 40.2  |
| 55°   | 3419.6 | 964.1  | 82.8  | 57.9  | 49.0  | 44.2  | 41.0  | 39.4  | 38.6  | 37.8  | 37.8  |
| 57.5° | 3559.5 | 939.1  | 73.2  | 51.5  | 44.2  | 41.0  | 37.8  | 37.0  | 36.2  | 35.4  | 34.6  |
| 60°   | 3798.3 | 953.6  | 64.3  | 45.8  | 40.2  | 37.0  | 34.6  | 33.8  | 32.2  | 30.6  | 30.6  |
| 62.5° | 4029.9 | 935.9  | 54.7  | 40.2  | 34.6  | 33.0  | 30.6  | 28.9  | 25.7  | 23.3  | 21.7  |
| 65°   | 4086.2 | 817.7  | 47.4  | 33.8  | 28.9  | 27.3  | 24.9  | 21.7  | 16.9  | 13.7  | 13.7  |
| 67.5° | 3813.6 | 621.5  | 41.0  | 28.9  | 24.1  | 22.5  | 17.7  | 14.5  | 10.5  | 8.0   | 8.0   |
| 70°   | 3147.0 | 394.0  | 33.8  | 22.5  | 20.1  | 15.3  | 11.3  | 10.5  | 7.2   | 6.4   | 5.6   |
| 72.5° | 2270.6 | 215.5  | 28.1  | 18.5  | 14.5  | 9.6   | 8.0   | 6.4   | 4.8   | 3.2   | 3.2   |
| 75°   | 1149.8 | 101.3  | 20.9  | 14.5  | 9.6   | 6.4   | 4.8   | 3.2   | 3.2   | 2.4   | 2.4   |
| 77.5° | 325.6  | 46.6   | 13.7  | 9.6   | 6.4   | 4.0   | 3.2   | 2.4   | 2.4   | 1.6   | 1.6   |
| 80°   | 64.3   | 23.3   | 8.8   | 6.4   | 4.8   | 3.2   | 2.4   | 1.6   | 1.6   | 0.8   | 0.8   |
| 82.5° | 23.3   | 12.1   | 6.4   | 4.8   | 4.0   | 3.2   | 1.6   | 0.8   | 0.8   | 0.0   | 0.0   |
| 85°   | 12.1   | 6.4    | 4.8   | 4.0   | 3.2   | 2.4   | 1.6   | 0.8   | 0.0   | 0.0   | 0.0   |
| 87.5° | 6.4    | 4.8    | 4.0   | 4.0   | 3.2   | 2.4   | 1.6   | 0.8   | 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   |



Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

STREETWORKS

Report Number: SP1-2101-121-7

Luminaire Tested: IFLD-S-SA2A-735-U-T2

Test Date: 03/04/2021

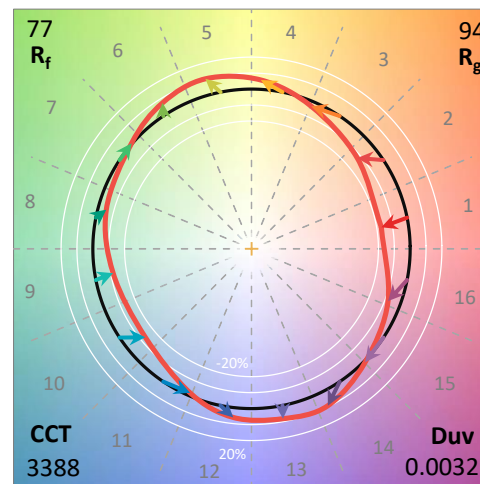
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/04/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-735-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3388   | CRI (Ra): | 73.1 |      |       |
| CIE u':                   | 0.2371 | R1:       | 68.9 | R9:  | -34.6 |
| CIE v':                   | 0.5177 | R2:       | 81.1 | R10: | 57.8  |
| Duv:                      | 0.0032 | R3:       | 93.1 | R11: | 68.6  |
| CIE x:                    | 0.4153 | R4:       | 71.6 | R12: | 53.9  |
| CIE y:                    | 0.4030 | R5:       | 69.4 | R13: | 70.9  |
| CIE z:                    | 0.1817 | R6:       | 75.0 | R14: | 96.2  |
| Peak Wavelength (nm):     | 590    | R7:       | 79.5 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 46.4 |      |       |
| Purity:                   | 45.7   |           |      |      |       |
| Rf:                       | 76.9   |           |      |      |       |
| Rg:                       | 94.4   |           |      |      |       |



### Test Conditions

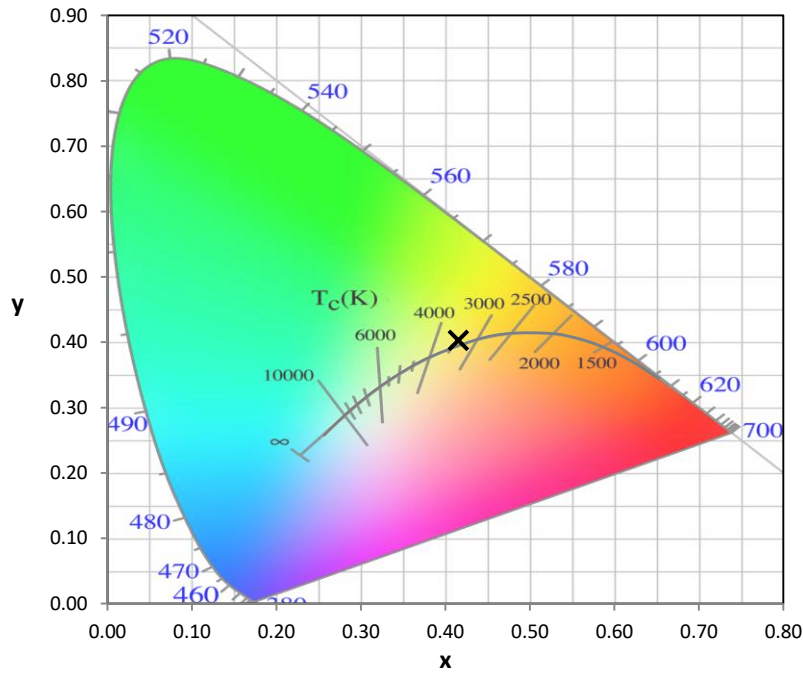
Stabilization Time: 81M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0/30%  
 Sphere Temperature (°C): 24.1

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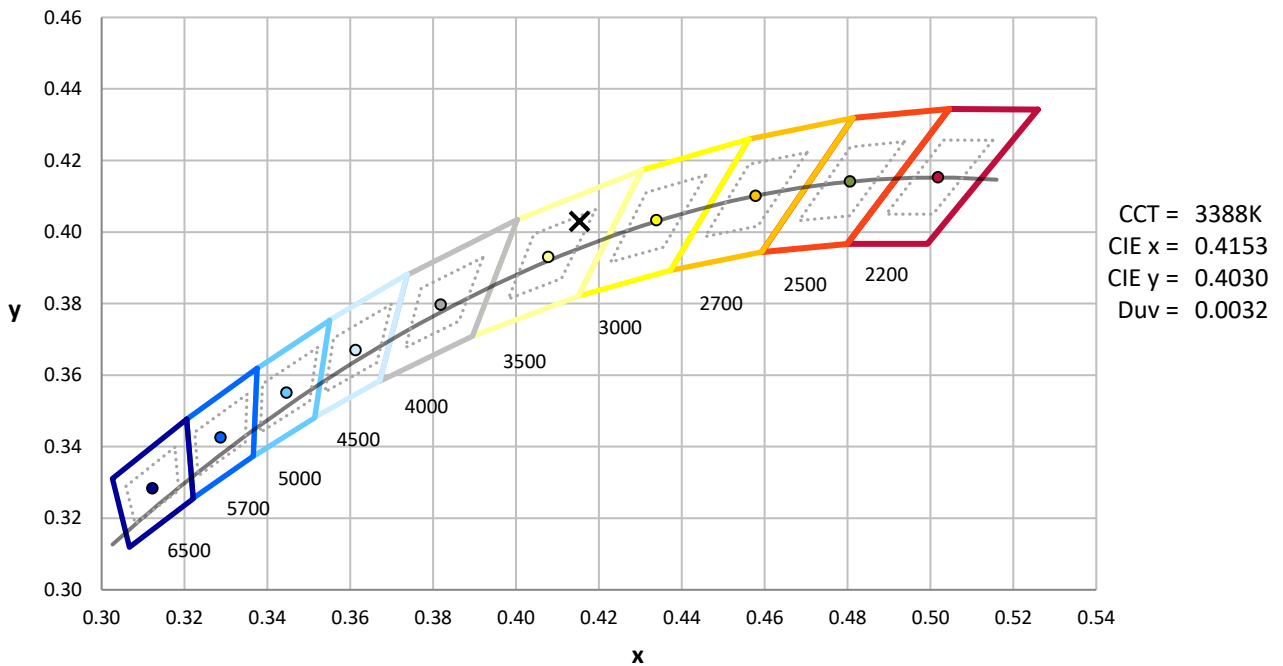
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

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**CIE 1931 Chromaticity Diagram**



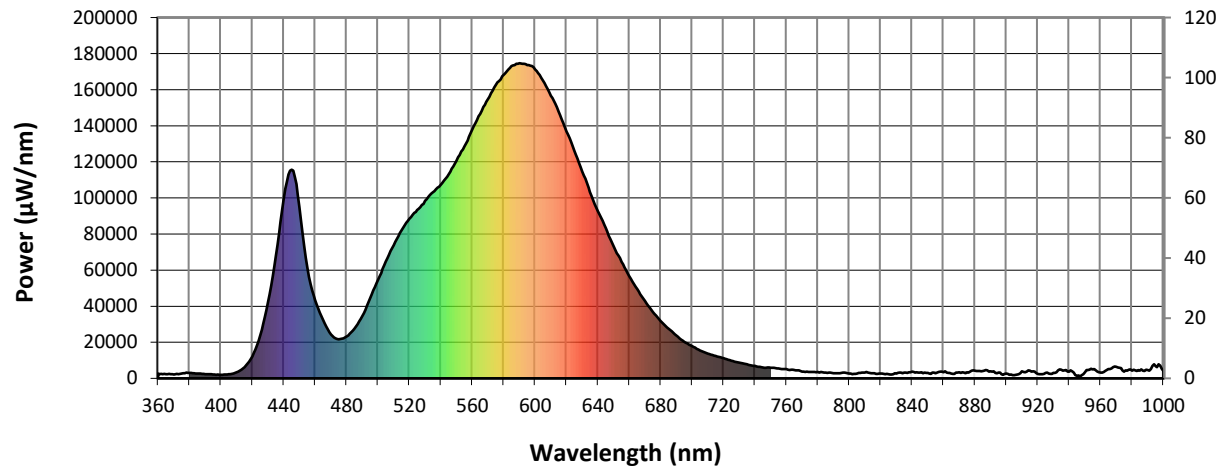
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3500K 4-step quadrangle

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### Photopic Flux vs. Wavelength

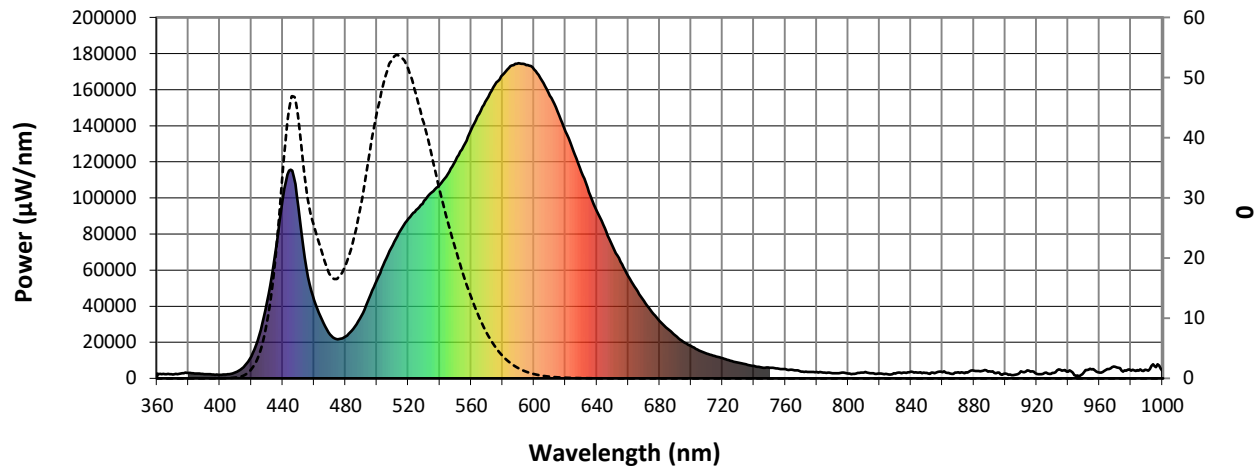


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2672             | 0.0              | 490       | 34553            | 4.9              | 620       | 136720           | 35.6             | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 8.0              | 625       | 126308           | 27.9             | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 12.1             | 630       | 114625           | 20.7             | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 18.1             | 635       | 103216           | 15.5             | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 25.4             | 640       | 92605            | 11.1             | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 33.9             | 645       | 83234            | 8.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 43.0             | 650       | 73263            | 5.4              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 50.1             | 655       | 64627            | 3.7              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 57.9             | 660       | 56614            | 2.4              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 64.0             | 665       | 49537            | 1.6              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.0              | 540       | 107316           | 69.9             | 670       | 42866            | 0.9              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.0              | 545       | 113101           | 75.3             | 675       | 36708            | 0.6              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 0.0              | 550       | 120690           | 82.0             | 680       | 31814            | 0.4              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 0.1              | 555       | 128583           | 87.8             | 685       | 27485            | 0.2              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 0.3              | 560       | 137796           | 93.6             | 690       | 23698            | 0.1              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 0.8              | 565       | 146577           | 97.5             | 695       | 20309            | 0.1              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 1.6              | 570       | 154581           | 100.5            | 700       | 17890            | 0.1              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 2.4              | 575       | 162633           | 101.2            | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 2.5              | 580       | 168101           | 99.9             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 2.1              | 585       | 173145           | 96.2             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 1.8              | 590       | 174675           | 90.3             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 1.7              | 595       | 173724           | 82.3             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 1.5              | 600       | 171241           | 73.8             | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 1.7              | 605       | 165134           | 64.0             | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 2.2              | 610       | 156652           | 53.8             | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 3.3              | 615       | 147879           | 44.6             | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



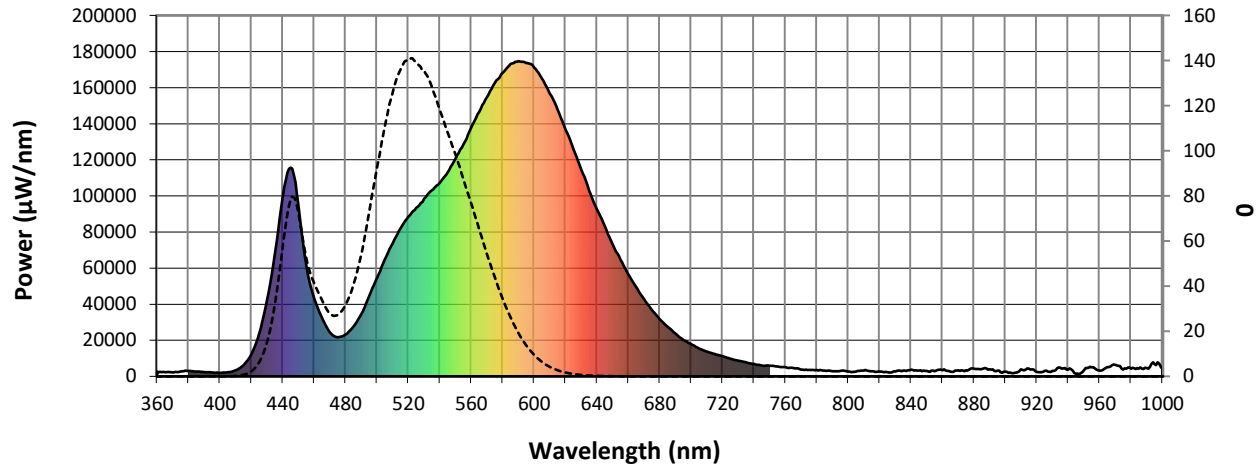
Scotopic Lumens: 12126

S/P: 1.36

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2672             | 0.0              | 490       | 34553            | 53.2             | 620       | 136720           | 1.7              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 71.7             | 625       | 126308           | 1.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 91.4             | 630       | 114625           | 0.6              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 110.0            | 635       | 103216           | 0.4              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 125.1            | 640       | 92605            | 0.2              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 135.7            | 645       | 83234            | 0.1              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 140.8            | 650       | 73263            | 0.1              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 139.6            | 655       | 64627            | 0.1              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 135.7            | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.1              | 535       | 103269           | 128.7            | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.2              | 540       | 107316           | 118.6            | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.6              | 545       | 113101           | 108.4            | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 2.0              | 550       | 120690           | 98.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 5.9              | 555       | 128583           | 87.9             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 14.3             | 560       | 137796           | 77.0             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 30.5             | 565       | 146577           | 65.8             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 55.5             | 570       | 154581           | 54.6             | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 77.4             | 575       | 162633           | 44.3             | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 73.6             | 580       | 168101           | 34.6             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 53.7             | 585       | 173145           | 26.5             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 41.9             | 590       | 174675           | 19.5             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 34.3             | 595       | 173724           | 13.9             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 27.9             | 600       | 171241           | 9.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 27.1             | 605       | 165134           | 6.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 31.3             | 610       | 156652           | 4.2              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 40.0             | 615       | 147879           | 2.7              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: 4490.7

M/P: 0.5

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2672             | 0.0              | 490       | 34553            | 28.8             | 620       | 136720           | 0.1              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 36.6             | 625       | 126308           | 0.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 43.9             | 630       | 114625           | 0.0              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 49.6             | 635       | 103216           | 0.0              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 53.0             | 640       | 92605            | 0.0              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 53.5             | 645       | 83234            | 0.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 51.6             | 650       | 73263            | 0.0              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 47.3             | 655       | 64627            | 0.0              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 42.5             | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 37.2             | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.1              | 540       | 107316           | 31.4             | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.4              | 545       | 113101           | 26.3             | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 1.4              | 550       | 120690           | 21.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 3.7              | 555       | 128583           | 17.3             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 8.9              | 560       | 137796           | 13.6             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 18.2             | 565       | 146577           | 10.3             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 33.2             | 570       | 154581           | 7.6              | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 45.6             | 575       | 162633           | 5.4              | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 43.8             | 580       | 168101           | 3.8              | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 32.2             | 585       | 173145           | 2.6              | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 25.6             | 590       | 174675           | 1.7              | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 21.2             | 595       | 173724           | 1.1              | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 17.4             | 600       | 171241           | 0.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 16.6             | 605       | 165134           | 0.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 18.6             | 610       | 156652           | 0.3              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 22.7             | 615       | 147879           | 0.2              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

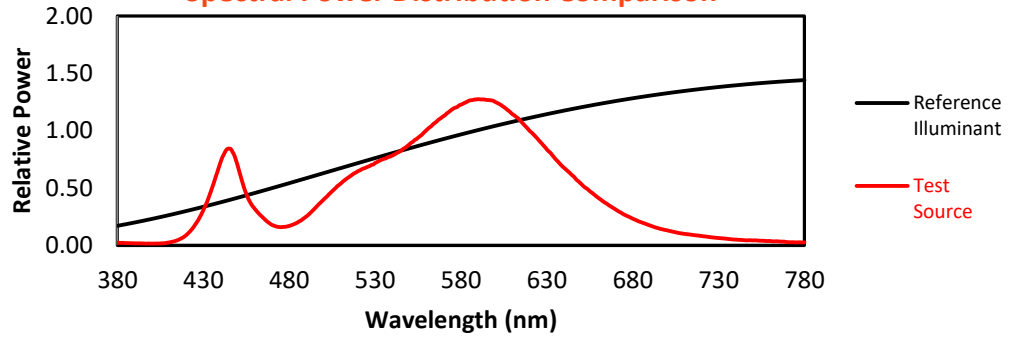
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TM-30-18

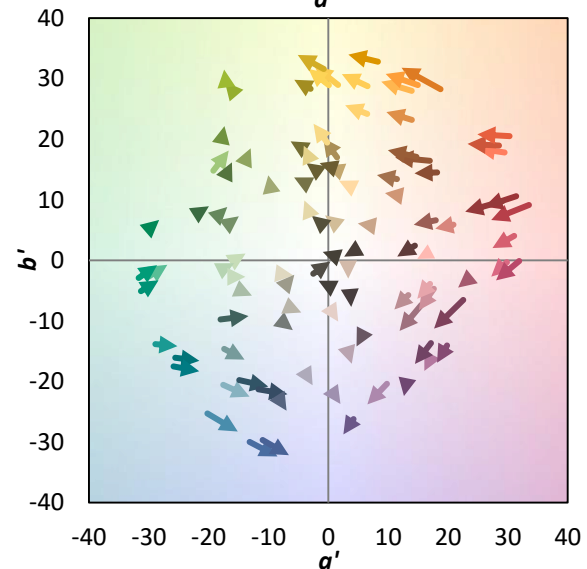
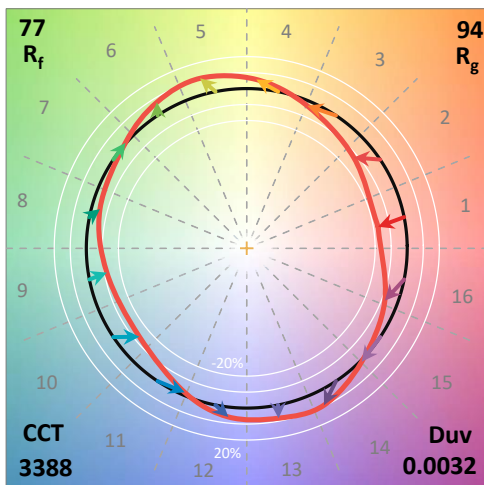
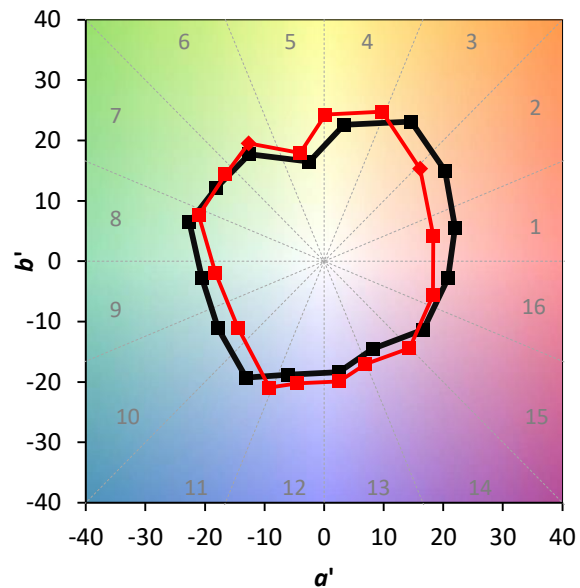
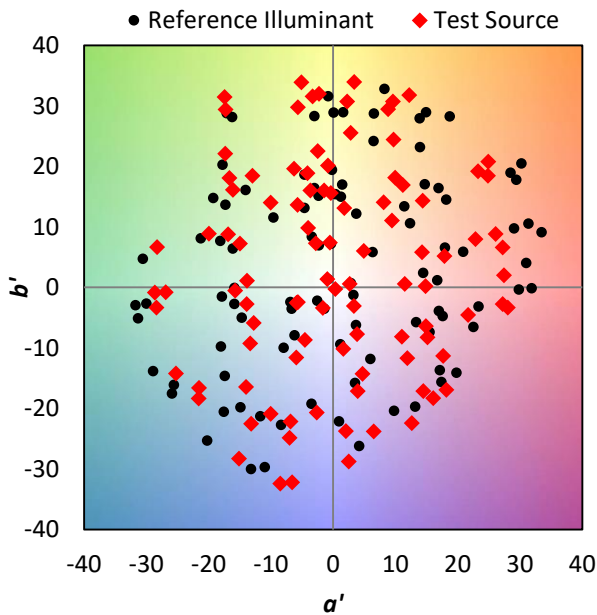
### Summary

$R_f = 76.9$   
 $R_g = 94.4$   
 CIE  $R_a = 73.1$   
 $R_g = -34.6$

### Spectral Power Distribution Comparison



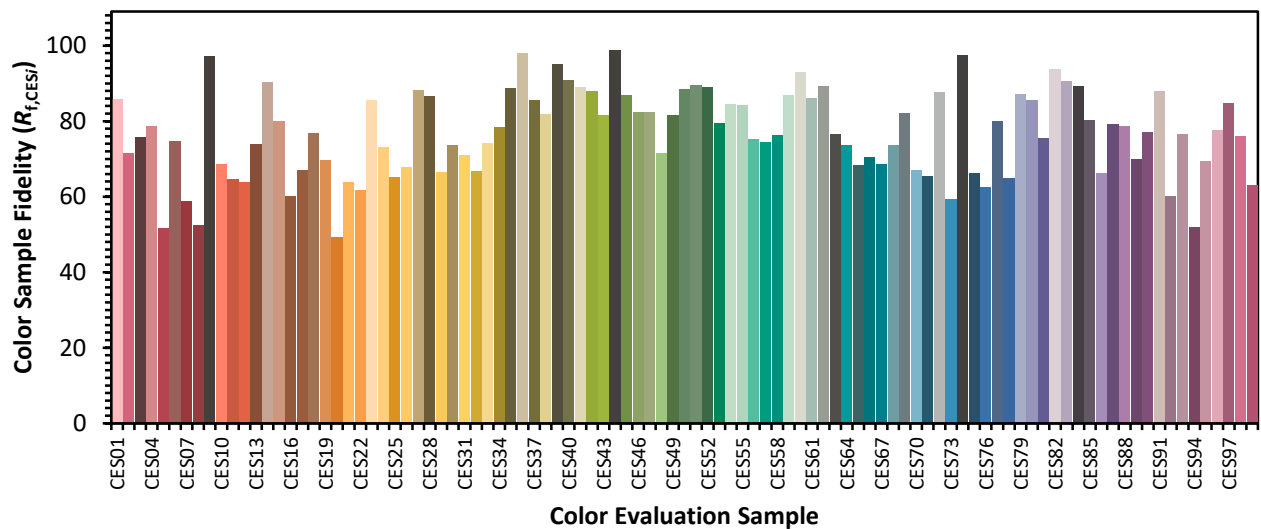
### Color Vector Graphics

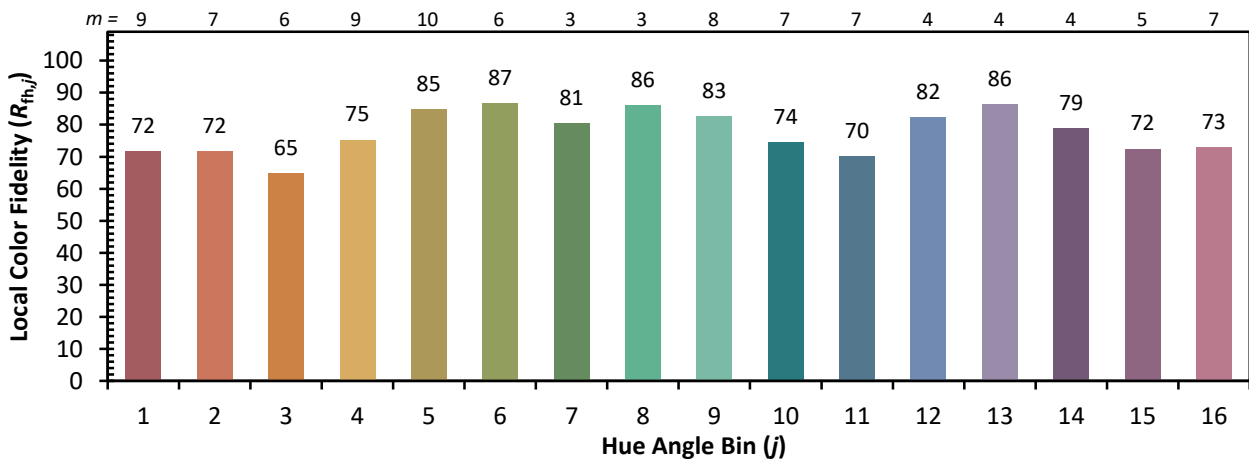
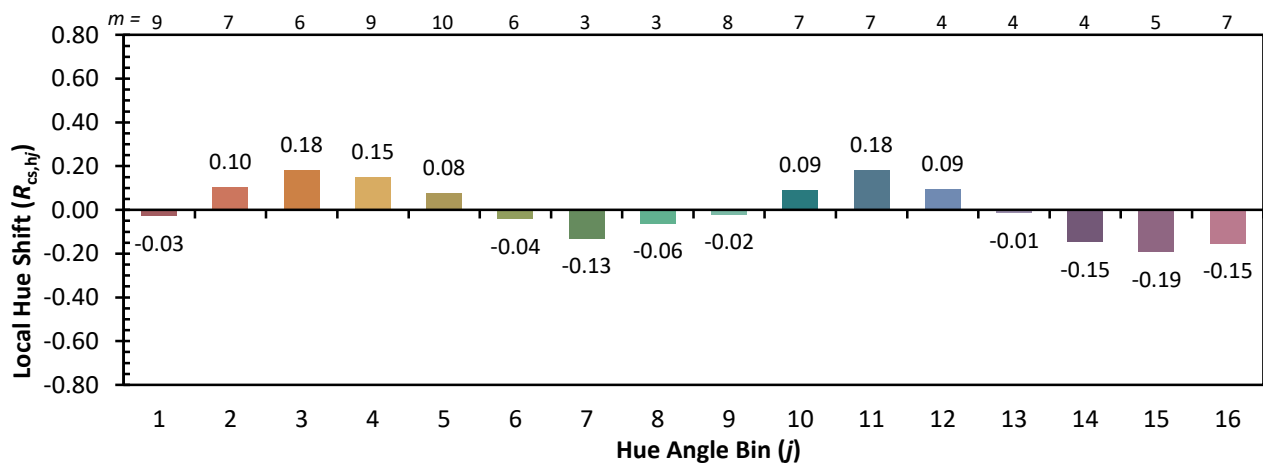
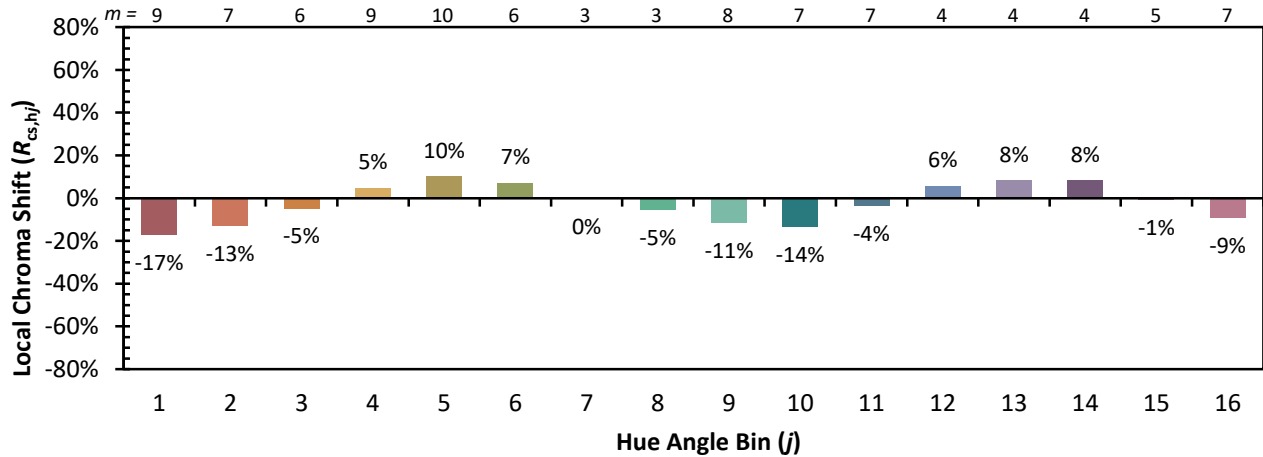




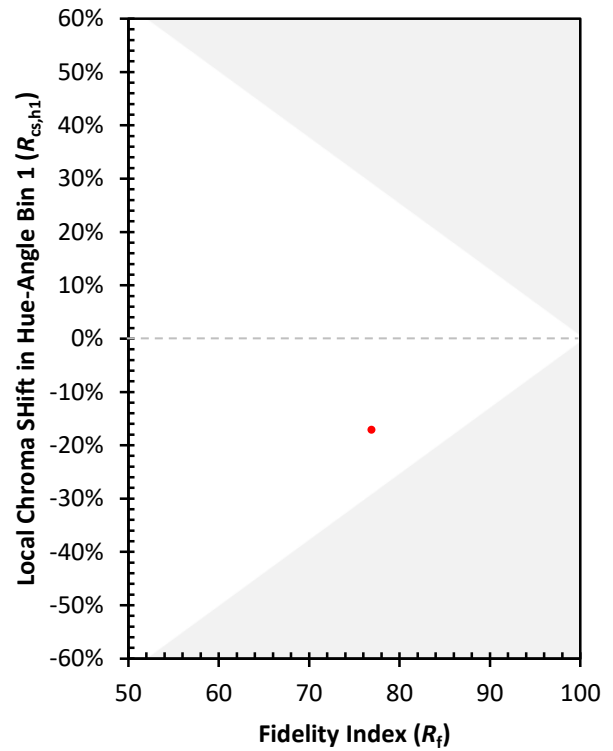
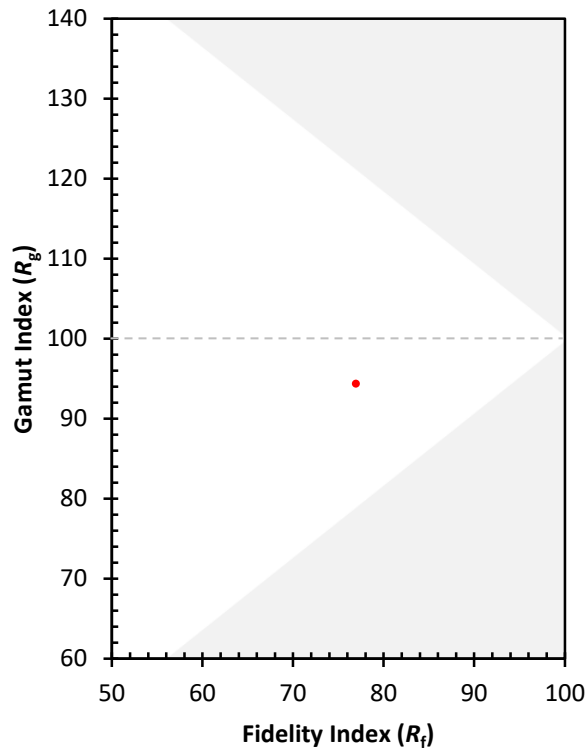
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 88 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 84 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 75 | CES81 = 75 |
| CES07 = 40 | CES32 = 67 | CES57 = 74 | CES82 = 94 |
| CES08 = 39 | CES33 = 74 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 78 | CES59 = 87 | CES84 = 89 |
| CES10 = 75 | CES35 = 89 | CES60 = 93 | CES85 = 80 |
| CES11 = 58 | CES36 = 98 | CES61 = 86 | CES86 = 66 |
| CES12 = 64 | CES37 = 86 | CES62 = 89 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 68 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 88 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 82 | CES94 = 52 |
| CES20 = 65 | CES45 = 87 | CES70 = 67 | CES95 = 69 |
| CES21 = 86 | CES46 = 82 | CES71 = 66 | CES96 = 78 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 59 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 88 | CES75 = 66 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)