

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: McGRAW-EDISON

Report Number: P387059

Luminaire Tested: **GWC-SA2D-735-U-SL3**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P387059  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-22)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GWC-SA2D-735-U-SL3  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 3500K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 15212.6 lumens  
Efficiency: N/A  
Efficacy: 117.9 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B2 - U0 - G3

Input Watts (W): 129  
Input Voltage (V): NR  
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: 28.75 FT

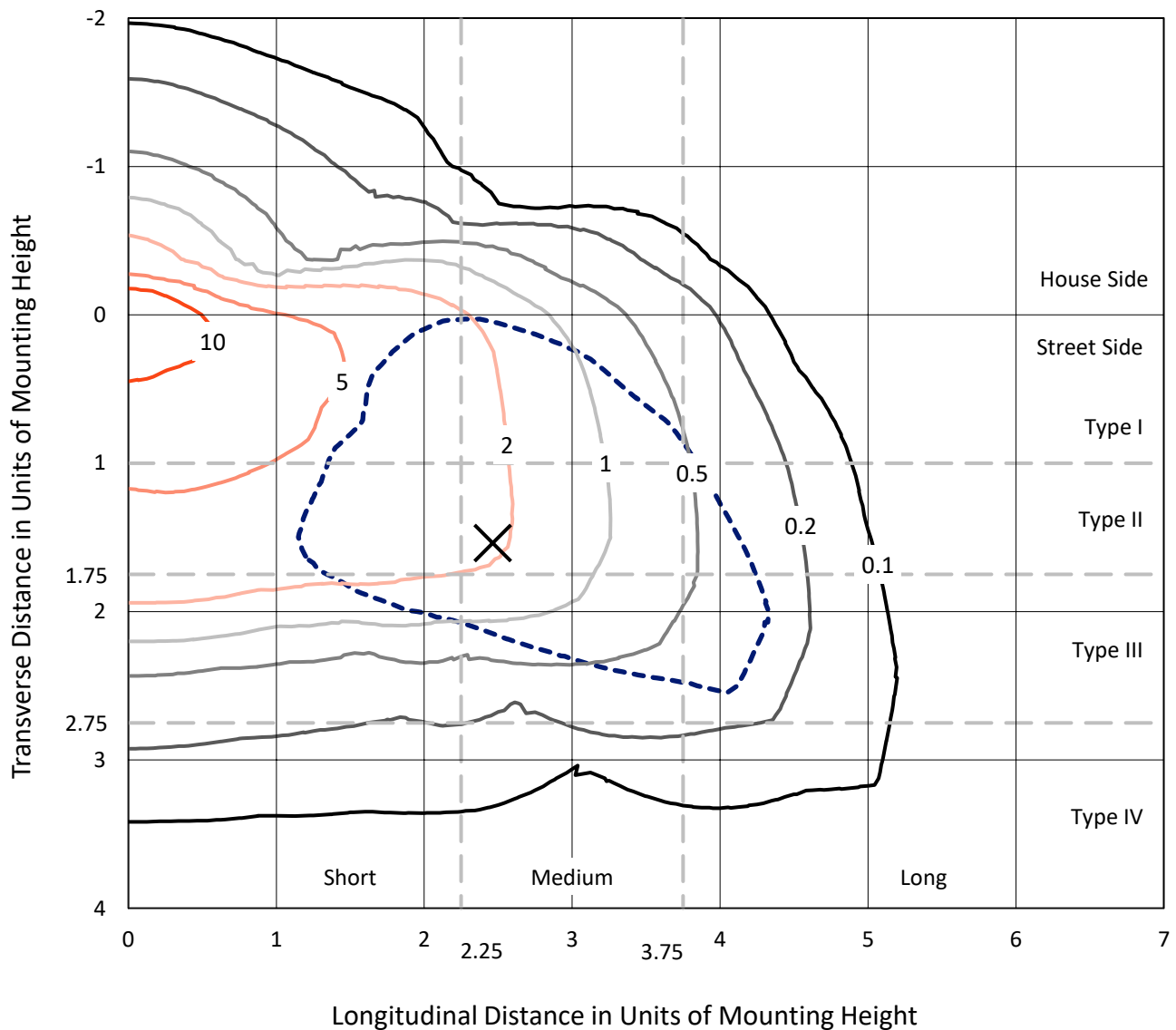


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

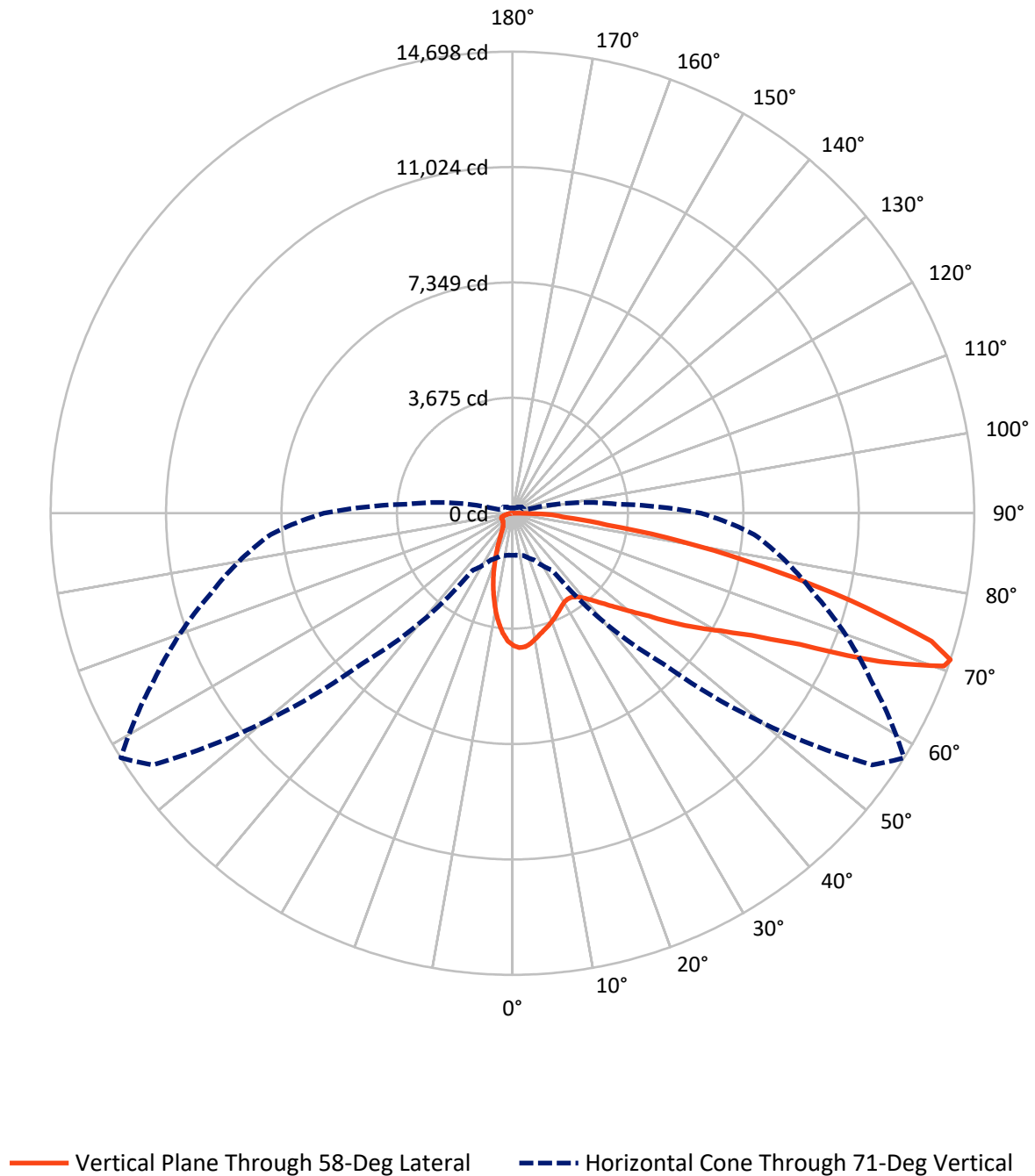


Based on 15 foot mounting height. Maximum calculated value = 18.7 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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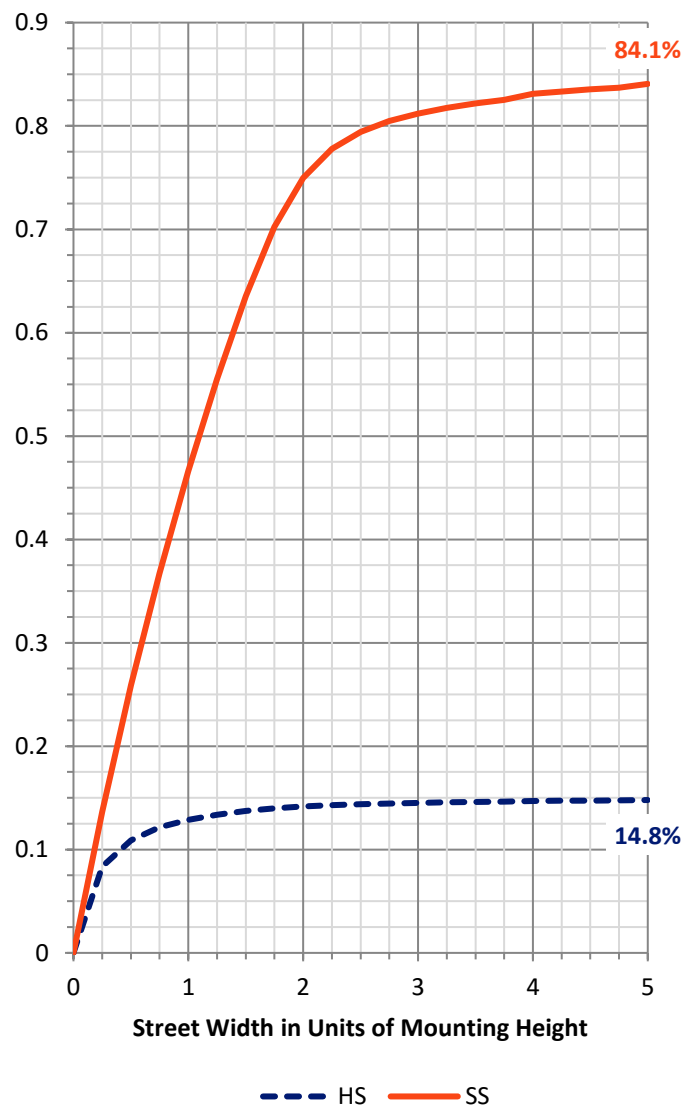
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2274.4   | 0.0    | 2274.4  |
|                    | % Fixture | 15.0     | 0.0    | 15.0    |
| <b>Street Side</b> | Lumens    | 12938.2  | 0.0    | 12938.2 |
|                    | % Fixture | 85.0     | 0.0    | 85.0    |
| <b>Total</b>       | Lumens    | 15212.6  | 0.0    | 15212.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 363.6   | 2.4       |
| 10°-20°   | 808.5   | 5.3       |
| 20°-30°   | 1027.6  | 6.8       |
| 30°-40°   | 1308.9  | 8.6       |
| 40°-50°   | 1856.1  | 12.2      |
| 50°-60°   | 2872.4  | 18.9      |
| 60°-70°   | 3910.5  | 25.7      |
| 70°-80°   | 2608.7  | 17.1      |
| 80°-90°   | 456.1   | 3.0       |
| 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°    | 15212.6 | 100.0     |
| 0°-180°   | 15212.6 | 100.0     |

**Coefficient of Utilization**



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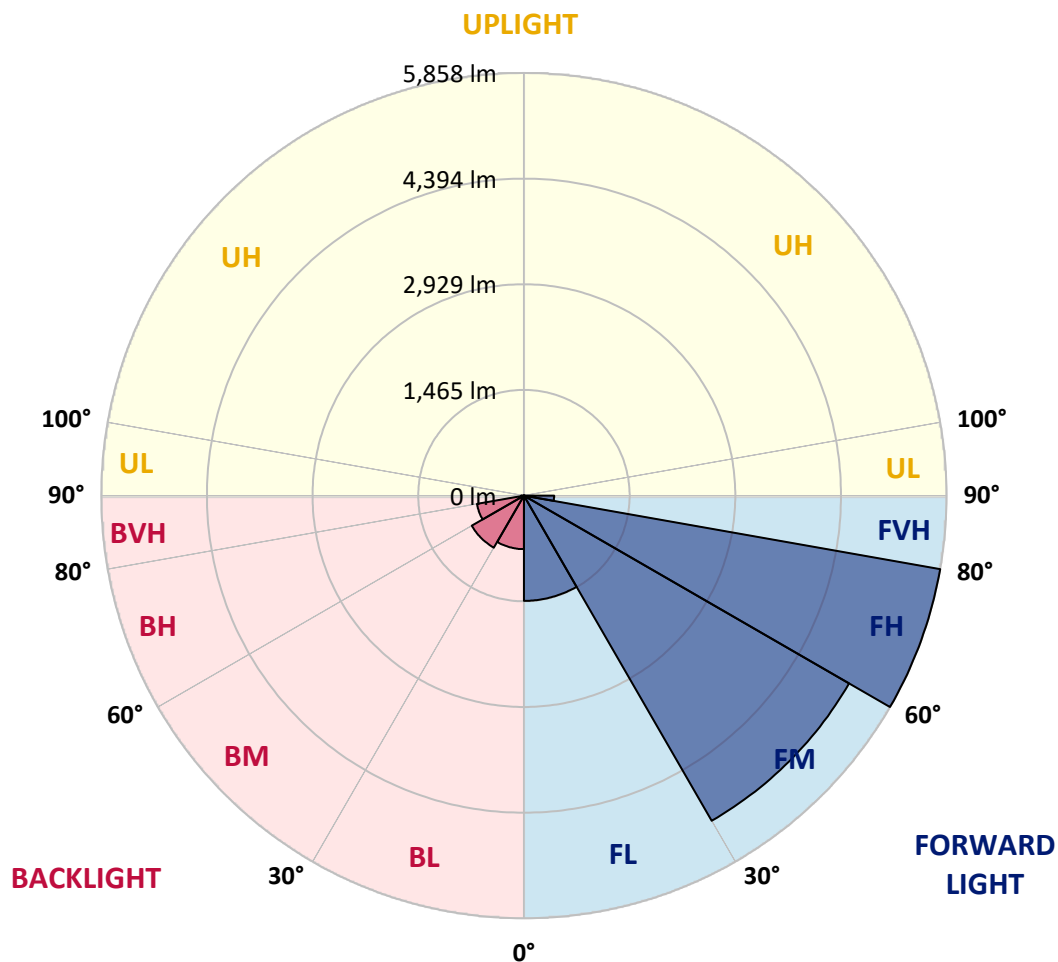
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1458.4 | 9.6       |                         |      |         |
| FM   | (30°-60°)   | 5203.4 | 34.2      |                         |      |         |
| FH   | (60°-80°)   | 5858.2 | 38.5      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 418.2  | 2.7       |                         |      | G3/500  |
| BL   | (0°-30°)    | 741.4  | 4.9       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 834.1  | 5.5       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 661.0  | 4.3       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 37.9   | 0.2       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G3**

Type III Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°     | 58°     | 65°     | 75°     | 85°    |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|--------|
| 0°    | 4214.9 | 4214.9 | 4214.9 | 4214.9 | 4214.9 | 4214.9 | 4214.9  | 4214.9  | 4214.9  | 4214.9  | 4214.9 |
| 2.5°  | 4326.7 | 4320.8 | 4323.0 | 4318.8 | 4308.7 | 4298.6 | 4283.8  | 4286.5  | 4265.8  | 4235.1  | 4196.8 |
| 5°    | 4245.1 | 4243.0 | 4258.8 | 4267.9 | 4275.3 | 4269.5 | 4265.2  | 4270.6  | 4240.3  | 4198.0  | 4131.7 |
| 7.5°  | 4074.0 | 4050.7 | 4070.8 | 4100.9 | 4129.6 | 4151.3 | 4179.9  | 4183.6  | 4164.5  | 4120.0  | 4033.1 |
| 10°   | 3830.8 | 3808.5 | 3838.1 | 3885.3 | 3942.5 | 3994.5 | 4052.2  | 4062.8  | 4066.5  | 4026.2  | 3920.7 |
| 12.5° | 3578.4 | 3561.5 | 3591.2 | 3657.4 | 3752.3 | 3832.3 | 3924.5  | 3940.4  | 3973.3  | 3946.2  | 3816.9 |
| 15°   | 3352.7 | 3346.4 | 3382.4 | 3447.6 | 3556.7 | 3679.1 | 3812.2  | 3841.3  | 3897.0  | 3888.0  | 3735.9 |
| 17.5° | 3157.7 | 3156.2 | 3183.7 | 3252.1 | 3372.9 | 3527.6 | 3700.4  | 3749.6  | 3832.3  | 3842.9  | 3669.1 |
| 20°   | 3012.5 | 3009.3 | 3028.4 | 3078.8 | 3203.3 | 3378.7 | 3579.6  | 3647.4  | 3766.6  | 3803.7  | 3600.2 |
| 22.5° | 2934.7 | 2934.1 | 2934.7 | 2958.4 | 3060.3 | 3223.4 | 3461.9  | 3544.5  | 3702.4  | 3772.4  | 3523.9 |
| 25°   | 2921.4 | 2919.8 | 2908.2 | 2905.5 | 2963.2 | 3093.6 | 3345.3  | 3436.5  | 3641.6  | 3750.7  | 3451.3 |
| 27.5° | 2955.8 | 2958.0 | 2942.6 | 2917.7 | 2929.3 | 3008.3 | 3244.1  | 3341.6  | 3592.8  | 3746.5  | 3401.0 |
| 30°   | 3027.4 | 3026.4 | 3013.1 | 2987.1 | 2964.4 | 2976.5 | 3172.1  | 3269.6  | 3559.9  | 3765.0  | 3366.5 |
| 32.5° | 3106.3 | 3112.1 | 3109.5 | 3095.2 | 3061.3 | 3012.5 | 3150.4  | 3245.7  | 3550.3  | 3809.5  | 3351.7 |
| 35°   | 3201.2 | 3207.6 | 3226.6 | 3237.7 | 3198.0 | 3119.5 | 3196.9  | 3279.6  | 3578.0  | 3893.2  | 3375.5 |
| 37.5° | 3291.3 | 3307.7 | 3361.2 | 3408.4 | 3374.5 | 3287.0 | 3320.9  | 3379.8  | 3663.3  | 4025.2  | 3439.6 |
| 40°   | 3395.2 | 3409.4 | 3496.9 | 3597.0 | 3591.7 | 3501.1 | 3520.8  | 3559.9  | 3813.8  | 4214.4  | 3555.7 |
| 42.5° | 3497.4 | 3526.0 | 3652.6 | 3794.7 | 3835.5 | 3755.4 | 3786.7  | 3807.4  | 4025.7  | 4465.0  | 3758.1 |
| 45°   | 3633.6 | 3664.3 | 3840.2 | 4011.4 | 4106.7 | 4061.8 | 4111.5  | 4119.5  | 4292.3  | 4806.3  | 4052.2 |
| 47.5° | 3839.7 | 3874.7 | 4079.8 | 4259.4 | 4405.1 | 4409.9 | 4492.0  | 4488.9  | 4625.0  | 5196.8  | 4422.6 |
| 50°   | 4160.9 | 4211.2 | 4379.2 | 4547.1 | 4724.1 | 4822.7 | 4932.4  | 4917.0  | 5024.1  | 5612.8  | 4849.2 |
| 52.5° | 4581.6 | 4604.9 | 4729.5 | 4853.5 | 5073.4 | 5294.3 | 5451.7  | 5438.0  | 5476.6  | 6040.4  | 5333.5 |
| 55°   | 5017.7 | 5035.2 | 5086.6 | 5154.5 | 5450.1 | 5810.4 | 6143.3  | 6121.5  | 6023.5  | 6484.4  | 5812.0 |
| 57.5° | 5409.9 | 5445.4 | 5480.8 | 5508.9 | 5829.5 | 6349.9 | 6850.6  | 6852.2  | 6617.0  | 6963.5  | 6306.4 |
| 60°   | 5470.7 | 5502.0 | 5736.8 | 5958.3 | 6478.6 | 7069.5 | 7607.9  | 7592.0  | 7231.2  | 7483.4  | 6857.6 |
| 62.5° | 4835.9 | 4906.5 | 5298.6 | 5887.8 | 7104.0 | 8385.8 | 8573.9  | 8554.3  | 7965.6  | 8124.1  | 7499.3 |
| 65°   | 3465.6 | 3545.6 | 4018.8 | 4904.3 | 6800.8 | 9836.2 | 10317.4 | 10053.4 | 8967.1  | 8912.0  | 8250.7 |
| 67.5° | 1999.3 | 2018.4 | 2223.5 | 2934.7 | 5178.2 | 9911.9 | 12976.9 | 12607.6 | 10522.4 | 9806.0  | 8618.5 |
| 70°   | 1478.4 | 1477.9 | 1526.7 | 1805.9 | 2802.1 | 8089.6 | 14241.8 | 14573.0 | 12159.8 | 10100.1 | 8098.6 |
| 71°   | 1336.9 | 1338.5 | 1393.1 | 1643.8 | 2219.2 | 6771.2 | 13973.2 | 14698.0 | 12591.2 | 9954.9  | 7722.4 |
| 72.5° | 1143.5 | 1148.9 | 1224.6 | 1474.2 | 1866.9 | 4669.5 | 12815.9 | 13947.7 | 12795.7 | 9596.7  | 7133.7 |
| 75°   | 867.4  | 879.6  | 984.6  | 1242.6 | 1706.3 | 2368.1 | 9405.9  | 11137.6 | 11367.0 | 8468.0  | 5300.7 |
| 77.5° | 619.0  | 632.7  | 751.4  | 1045.0 | 1622.1 | 1784.8 | 6299.0  | 8124.1  | 8365.1  | 5426.8  | 2390.9 |
| 80°   | 391.1  | 407.5  | 497.0  | 831.5  | 1524.0 | 1694.7 | 3958.4  | 5460.7  | 4561.4  | 1736.5  | 608.4  |
| 82.5° | 229.5  | 242.2  | 308.4  | 543.2  | 1244.8 | 1632.1 | 2328.9  | 3026.8  | 1775.2  | 524.7   | 276.7  |
| 85°   | 133.0  | 138.8  | 192.4  | 346.1  | 904.0  | 1540.4 | 1711.1  | 1692.0  | 770.5   | 256.5   | 130.9  |
| 87.5° | 62.0   | 68.9   | 113.9  | 180.7  | 501.8  | 1116.6 | 1352.4  | 1168.4  | 479.0   | 120.2   | 61.4   |
| 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: GWC-SA2D-735-U-SL3

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4214.9 | 4214.9 | 4214.9 | 4214.9 | 4214.9 | 4214.9 | 4214.9 | 4214.9 | 4214.9 | 4214.9 | 4214.9 |
| 2.5°  | 4178.3 | 4169.3 | 4131.7 | 4098.3 | 4063.3 | 4017.8 | 3967.4 | 3961.0 | 3930.3 | 3936.2 | 3925.5 |
| 5°    | 4095.7 | 4072.8 | 3982.3 | 3900.1 | 3803.1 | 3716.2 | 3621.9 | 3578.4 | 3516.0 | 3511.7 | 3495.8 |
| 7.5°  | 3977.5 | 3935.1 | 3794.7 | 3638.8 | 3483.1 | 3334.8 | 3187.9 | 3091.5 | 2992.9 | 2951.1 | 2947.3 |
| 10°   | 3844.5 | 3772.4 | 3565.8 | 3335.2 | 3110.5 | 2893.8 | 2683.9 | 2528.8 | 2388.8 | 2322.6 | 2319.9 |
| 12.5° | 3718.4 | 3611.9 | 3328.4 | 3014.6 | 2707.3 | 2426.5 | 2138.7 | 1934.7 | 1759.3 | 1700.5 | 1675.6 |
| 15°   | 3611.3 | 3461.4 | 3097.3 | 2696.2 | 2323.1 | 1933.1 | 1605.6 | 1391.1 | 1228.8 | 1172.6 | 1162.1 |
| 17.5° | 3507.5 | 3314.6 | 2860.5 | 2374.5 | 1923.6 | 1494.9 | 1166.8 | 1007.3 | 921.0  | 898.2  | 897.7  |
| 20°   | 3404.2 | 3163.6 | 2613.0 | 2045.4 | 1537.2 | 1118.1 | 897.1  | 825.6  | 796.4  | 793.8  | 789.6  |
| 22.5° | 3287.0 | 3003.5 | 2352.8 | 1715.3 | 1199.7 | 879.1  | 762.5  | 733.9  | 730.2  | 739.8  | 739.8  |
| 25°   | 3177.3 | 2844.6 | 2088.9 | 1392.1 | 933.2  | 733.4  | 681.0  | 675.1  | 685.2  | 702.1  | 703.7  |
| 27.5° | 3075.0 | 2691.4 | 1831.3 | 1104.8 | 747.7  | 645.9  | 624.2  | 631.1  | 649.1  | 668.8  | 669.3  |
| 30°   | 2990.8 | 2546.7 | 1581.3 | 870.6  | 631.6  | 580.7  | 577.1  | 590.9  | 610.4  | 625.8  | 629.5  |
| 32.5° | 2925.6 | 2423.3 | 1339.6 | 700.0  | 555.8  | 532.1  | 535.2  | 546.8  | 559.0  | 567.5  | 573.4  |
| 35°   | 2895.4 | 2317.3 | 1116.6 | 590.3  | 507.6  | 494.4  | 498.6  | 505.0  | 510.3  | 516.7  | 521.5  |
| 37.5° | 2900.8 | 2235.2 | 917.3  | 521.9  | 475.3  | 468.5  | 468.5  | 468.5  | 468.5  | 471.6  | 472.1  |
| 40°   | 2950.0 | 2188.0 | 755.1  | 478.5  | 453.6  | 446.2  | 440.4  | 435.0  | 430.8  | 433.0  | 431.8  |
| 42.5° | 3076.1 | 2183.7 | 636.4  | 450.9  | 436.2  | 423.9  | 412.3  | 404.9  | 399.5  | 401.7  | 402.7  |
| 45°   | 3290.2 | 2236.7 | 556.4  | 431.4  | 419.7  | 401.1  | 386.3  | 378.4  | 374.6  | 381.5  | 382.6  |
| 47.5° | 3567.3 | 2352.2 | 507.6  | 417.0  | 404.3  | 380.0  | 364.0  | 356.6  | 357.7  | 367.8  | 370.4  |
| 50°   | 3924.5 | 2539.8 | 484.4  | 408.1  | 393.7  | 361.9  | 345.5  | 339.1  | 342.3  | 356.6  | 359.8  |
| 52.5° | 4316.6 | 2810.1 | 487.0  | 405.3  | 386.8  | 348.7  | 331.2  | 323.8  | 329.1  | 342.3  | 344.9  |
| 55°   | 4769.2 | 3134.9 | 530.9  | 409.1  | 376.8  | 340.2  | 319.5  | 306.8  | 311.0  | 323.2  | 325.4  |
| 57.5° | 5272.1 | 3506.9 | 619.4  | 408.1  | 364.0  | 332.3  | 307.4  | 288.3  | 291.5  | 298.9  | 301.0  |
| 60°   | 5795.6 | 3956.3 | 756.7  | 411.2  | 358.2  | 322.7  | 290.9  | 267.1  | 266.0  | 272.3  | 273.5  |
| 62.5° | 6424.0 | 4476.1 | 913.6  | 413.3  | 361.9  | 310.6  | 269.2  | 245.8  | 242.7  | 244.2  | 245.4  |
| 65°   | 7071.7 | 4852.3 | 854.8  | 404.9  | 373.6  | 300.4  | 250.2  | 225.2  | 219.3  | 218.3  | 218.9  |
| 67.5° | 7091.8 | 4449.2 | 599.3  | 387.9  | 378.4  | 295.2  | 235.8  | 207.7  | 198.2  | 194.5  | 194.0  |
| 70°   | 6360.0 | 3614.5 | 466.9  | 369.8  | 359.3  | 286.7  | 222.5  | 193.4  | 179.1  | 173.3  | 172.8  |
| 71°   | 6002.8 | 3327.3 | 442.5  | 360.8  | 344.9  | 278.2  | 216.7  | 187.0  | 172.2  | 165.9  | 164.8  |
| 72.5° | 5442.7 | 2982.9 | 412.8  | 346.5  | 317.4  | 256.5  | 205.6  | 178.0  | 162.7  | 155.3  | 153.7  |
| 75°   | 3906.0 | 1950.6 | 354.5  | 309.0  | 262.8  | 204.5  | 180.2  | 160.1  | 146.8  | 137.8  | 136.7  |
| 77.5° | 1504.9 | 776.3  | 268.1  | 257.0  | 201.4  | 160.1  | 148.3  | 138.3  | 128.8  | 119.8  | 119.2  |
| 80°   | 465.3  | 347.1  | 195.6  | 193.4  | 145.7  | 119.2  | 115.5  | 112.9  | 109.2  | 99.7   | 97.5   |
| 82.5° | 248.6  | 199.2  | 134.6  | 125.0  | 95.3   | 79.5   | 83.7   | 84.8   | 85.3   | 75.2   | 74.2   |
| 85°   | 118.7  | 105.5  | 75.8   | 71.0   | 55.6   | 44.5   | 51.4   | 55.6   | 56.2   | 46.1   | 42.9   |
| 87.5° | 56.7   | 55.1   | 35.5   | 27.1   | 20.7   | 14.8   | 18.0   | 22.3   | 24.3   | 17.5   | 15.4   |
| 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)

INVUE

Report Number: SP1-2104-224-2

Luminaire Tested: CCW-SA-2A-735-U-SL4

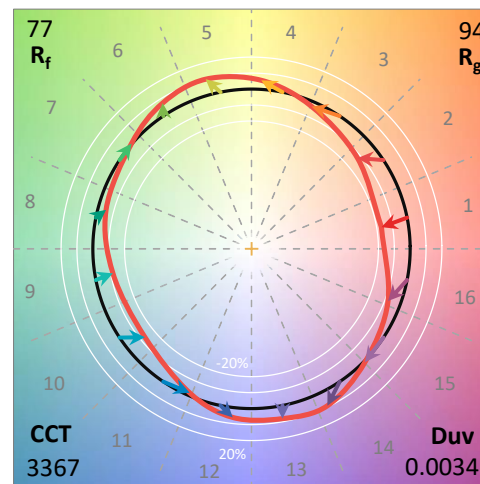
Test Date: 04/26/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/26/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-735-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3367   | CRI (Ra): | 73.3 |      |       |
| CIE u':                   | 0.2376 | R1:       | 69.1 | R9:  | -34.3 |
| CIE v':                   | 0.5184 | R2:       | 81.3 | R10: | 58.3  |
| Duv:                      | 0.0034 | R3:       | 93.4 | R11: | 69.1  |
| CIE x:                    | 0.4168 | R4:       | 71.8 | R12: | 54.2  |
| CIE y:                    | 0.4041 | R5:       | 69.6 | R13: | 71.1  |
| CIE z:                    | 0.1791 | R6:       | 75.4 | R14: | 96.4  |
| Peak Wavelength (nm):     | 590    | R7:       | 79.5 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 46.4 |      |       |
| Purity:                   | 46.5   |           |      |      |       |
| Rf:                       | 77.2   |           |      |      |       |
| Rg:                       | 94.4   |           |      |      |       |



### Test Conditions

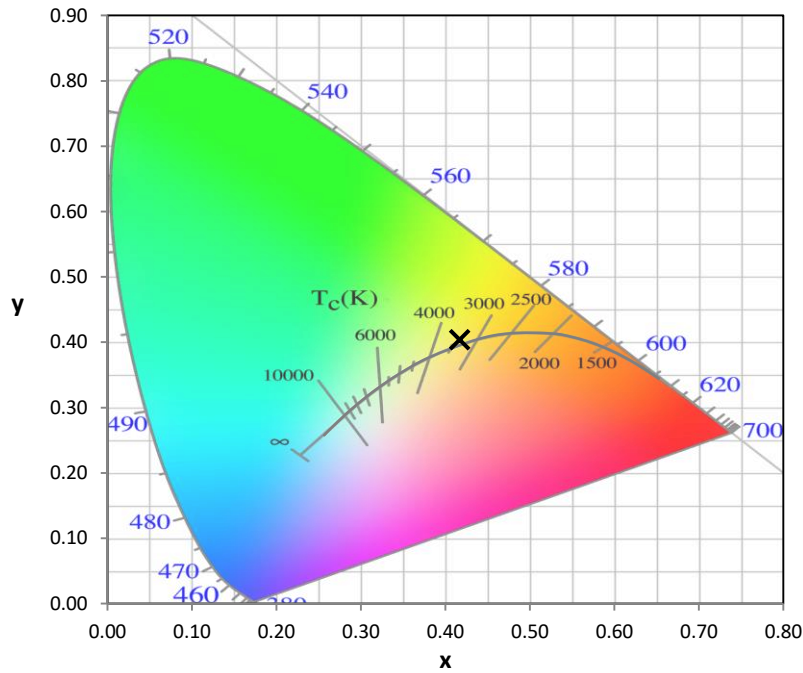
Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.9/38%  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2104-224-2

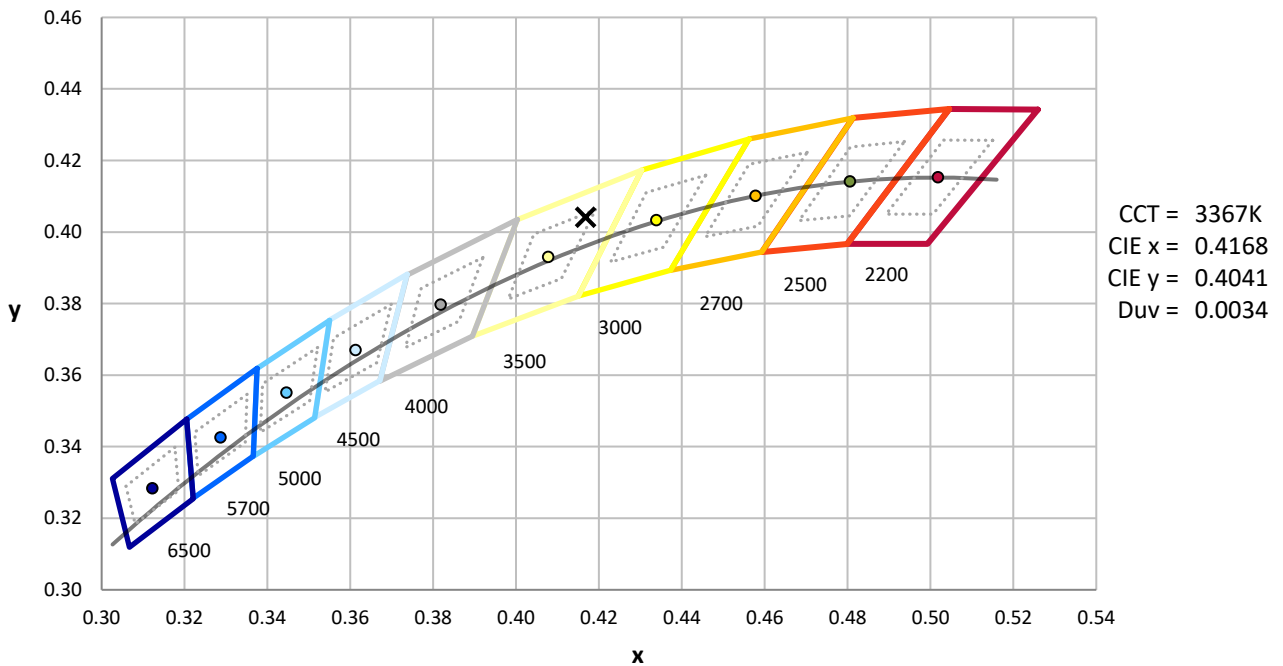
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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



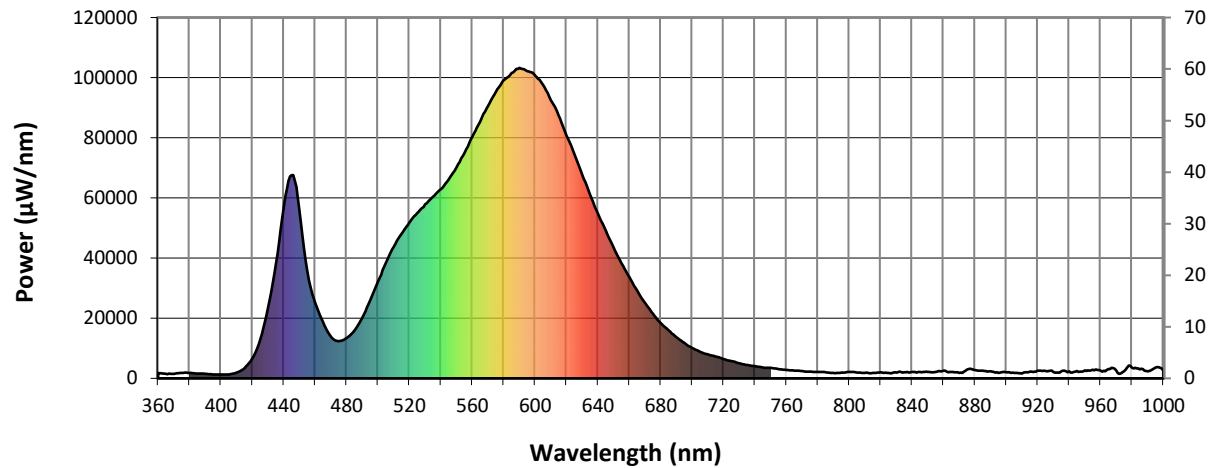
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3500K 4-step quadrangle

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### Photopic Flux vs. Wavelength

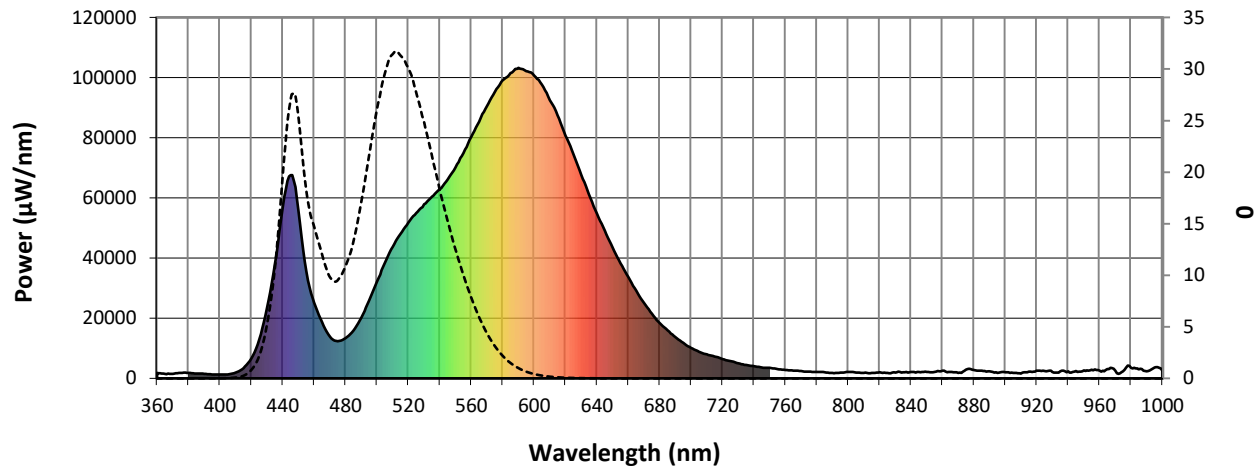


#####

| 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       | 1840             | 0.0              | 490       | 20271            | 2.9              | 620       | 80709            | 21.0             | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 4.7              | 625       | 74695            | 16.5             | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 7.1              | 630       | 67709            | 12.3             | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 10.7             | 635       | 61156            | 9.2              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 15.0             | 640       | 54795            | 6.5              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 19.9             | 645       | 49111            | 4.7              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 25.1             | 650       | 43533            | 3.2              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 29.5             | 655       | 38234            | 2.2              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 34.1             | 660       | 33754            | 1.4              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 37.5             | 665       | 29162            | 0.9              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.0              | 540       | 62857            | 41.0             | 670       | 25117            | 0.5              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.0              | 545       | 66165            | 44.0             | 675       | 21511            | 0.4              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 0.0              | 550       | 70124            | 47.7             | 680       | 18435            | 0.2              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 0.1              | 555       | 74973            | 51.2             | 685       | 16004            | 0.1              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 0.2              | 560       | 80227            | 54.5             | 690       | 13701            | 0.1              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 0.5              | 565       | 85358            | 56.8             | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 0.9              | 570       | 90422            | 58.8             | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 1.4              | 575       | 95259            | 59.3             | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 1.5              | 580       | 99033            | 58.8             | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 1.2              | 585       | 101572           | 56.4             | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 1.0              | 590       | 103264           | 53.4             | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 1.0              | 595       | 102194           | 48.4             | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 0.9              | 600       | 100645           | 43.4             | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 1.0              | 605       | 97644            | 37.8             | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 1.3              | 610       | 92487            | 31.8             | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 1.9              | 615       | 87436            | 26.4             | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



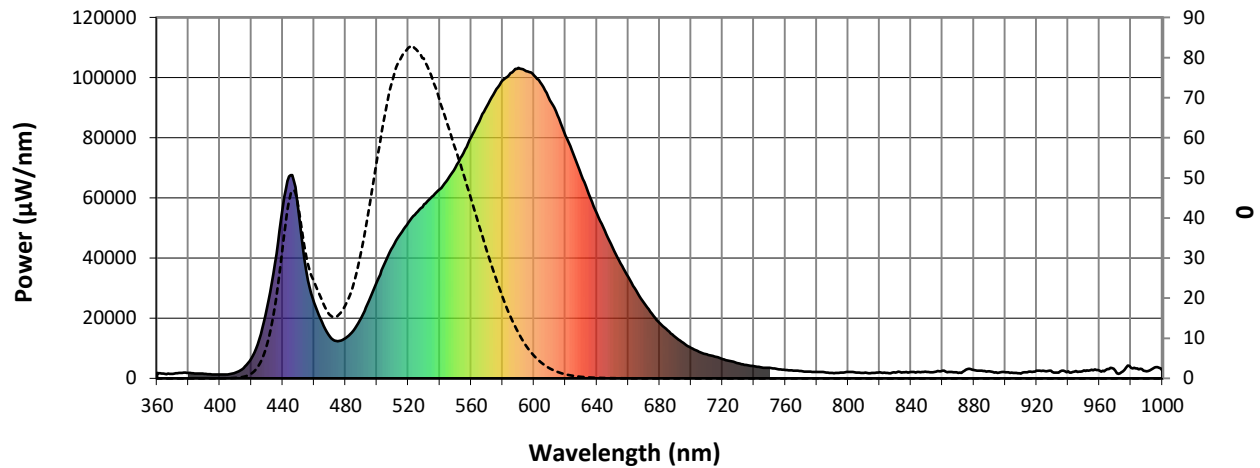
Scotopic Lumens: 7088.7

S/P: 1.35

| 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       | 1840             | 0.0              | 490       | 20271            | 31.2             | 620       | 80709            | 1.0              | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 41.9             | 625       | 74695            | 0.6              | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 53.9             | 630       | 67709            | 0.4              | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 65.2             | 635       | 61156            | 0.2              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 74.1             | 640       | 54795            | 0.1              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 79.5             | 645       | 49111            | 0.1              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 82.4             | 650       | 43533            | 0.1              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 82.1             | 655       | 38234            | 0.0              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 79.8             | 660       | 33754            | 0.0              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 75.3             | 665       | 29162            | 0.0              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.1              | 540       | 62857            | 69.5             | 670       | 25117            | 0.0              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.4              | 545       | 66165            | 63.4             | 675       | 21511            | 0.0              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 1.1              | 550       | 70124            | 57.3             | 680       | 18435            | 0.0              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 3.2              | 555       | 74973            | 51.2             | 685       | 16004            | 0.0              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 8.0              | 560       | 80227            | 44.8             | 690       | 13701            | 0.0              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 17.1             | 565       | 85358            | 38.3             | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 31.7             | 570       | 90422            | 31.9             | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 45.3             | 575       | 95259            | 25.9             | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 43.4             | 580       | 99033            | 20.4             | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 31.1             | 585       | 101572           | 15.5             | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 24.4             | 590       | 103264           | 11.5             | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 19.8             | 595       | 102194           | 8.1              | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 15.9             | 600       | 100645           | 5.7              | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 15.5             | 605       | 97644            | 3.8              | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 18.1             | 610       | 92487            | 2.5              | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 23.0             | 615       | 87436            | 1.6              | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: 2621

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       | 1840             | 0.0              | 490       | 20271            | 16.9             | 620       | 80709            | 0.1              | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 21.4             | 625       | 74695            | 0.0              | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 25.9             | 630       | 67709            | 0.0              | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 29.4             | 635       | 61156            | 0.0              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 31.4             | 640       | 54795            | 0.0              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 31.3             | 645       | 49111            | 0.0              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 30.2             | 650       | 43533            | 0.0              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 27.8             | 655       | 38234            | 0.0              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 25.0             | 660       | 33754            | 0.0              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 21.7             | 665       | 29162            | 0.0              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.1              | 540       | 62857            | 18.4             | 670       | 25117            | 0.0              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.2              | 545       | 66165            | 15.4             | 675       | 21511            | 0.0              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 0.8              | 550       | 70124            | 12.6             | 680       | 18435            | 0.0              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 2.0              | 555       | 74973            | 10.1             | 685       | 16004            | 0.0              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 4.9              | 560       | 80227            | 7.9              | 690       | 13701            | 0.0              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 10.2             | 565       | 85358            | 6.0              | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 18.9             | 570       | 90422            | 4.4              | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 26.7             | 575       | 95259            | 3.2              | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 25.8             | 580       | 99033            | 2.2              | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 18.6             | 585       | 101572           | 1.5              | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 14.9             | 590       | 103264           | 1.0              | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 12.2             | 595       | 102194           | 0.7              | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 9.9              | 600       | 100645           | 0.4              | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 9.5              | 605       | 97644            | 0.3              | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 10.8             | 610       | 92487            | 0.2              | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 13.1             | 615       | 87436            | 0.1              | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

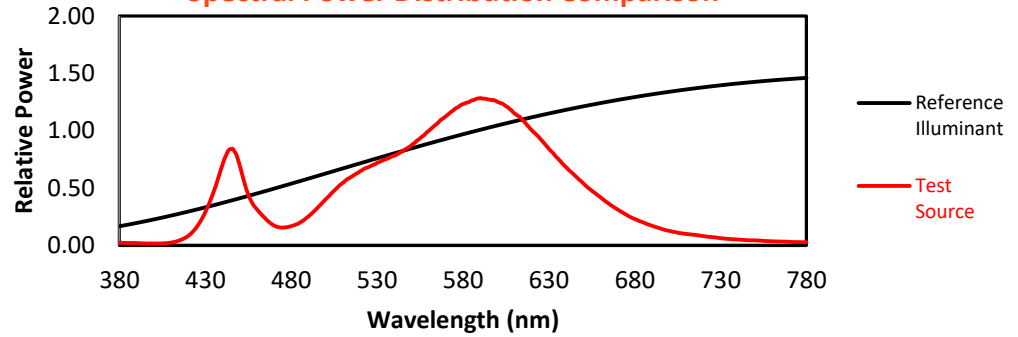
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TM-30-18

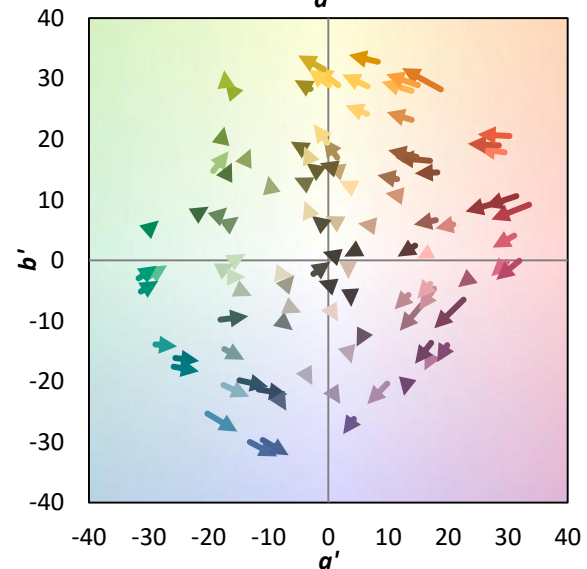
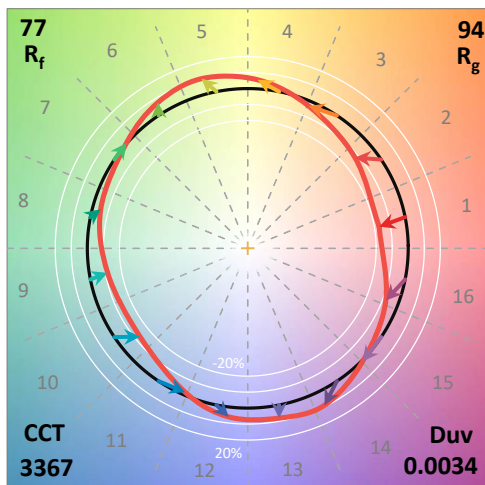
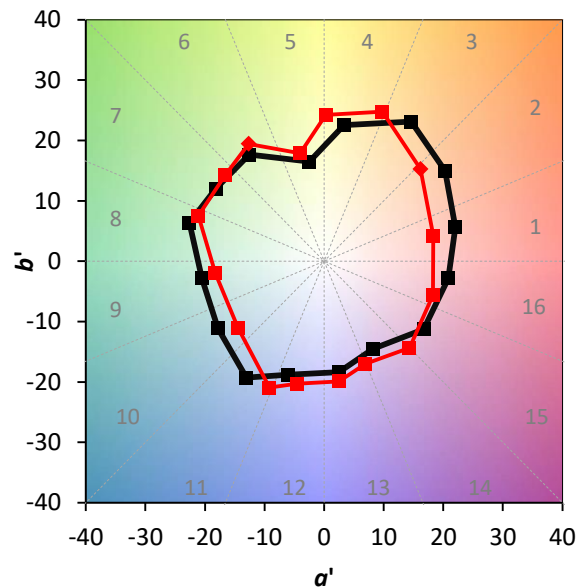
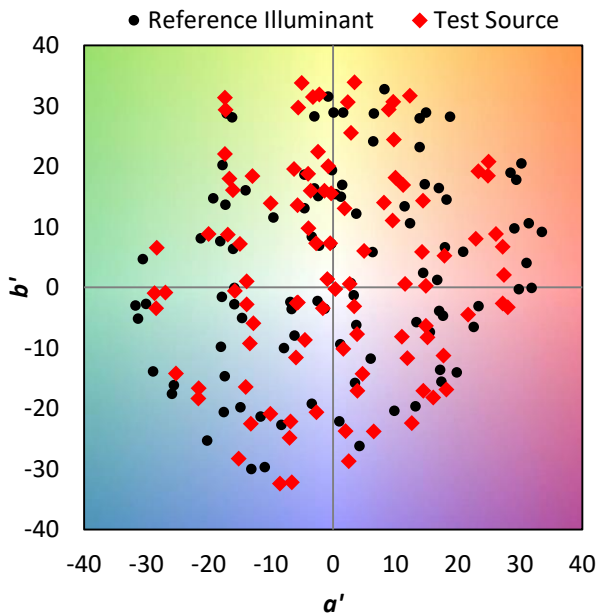
### Summary

$R_f = 77.2$   
 $R_g = 94.4$   
 CIE  $R_a = 73.3$   
 $R_g = -34.3$

### Spectral Power Distribution Comparison



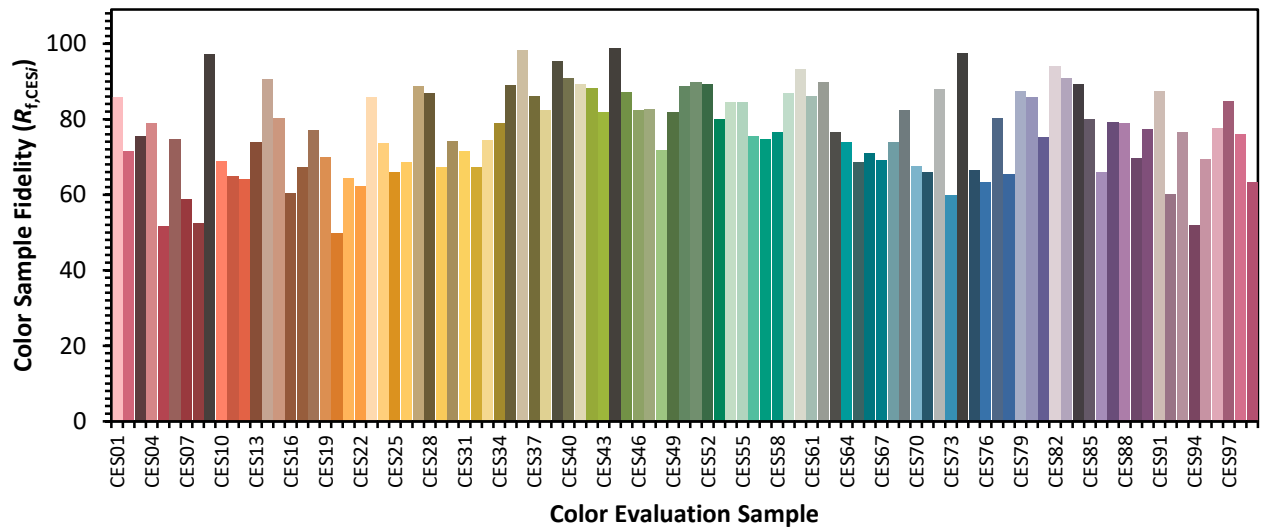
### Color Vector Graphics



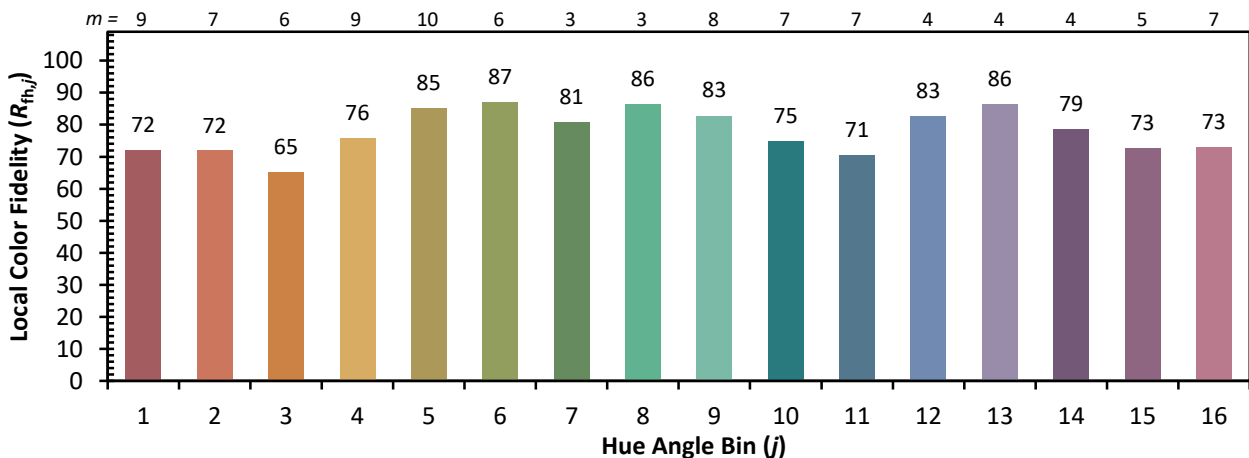
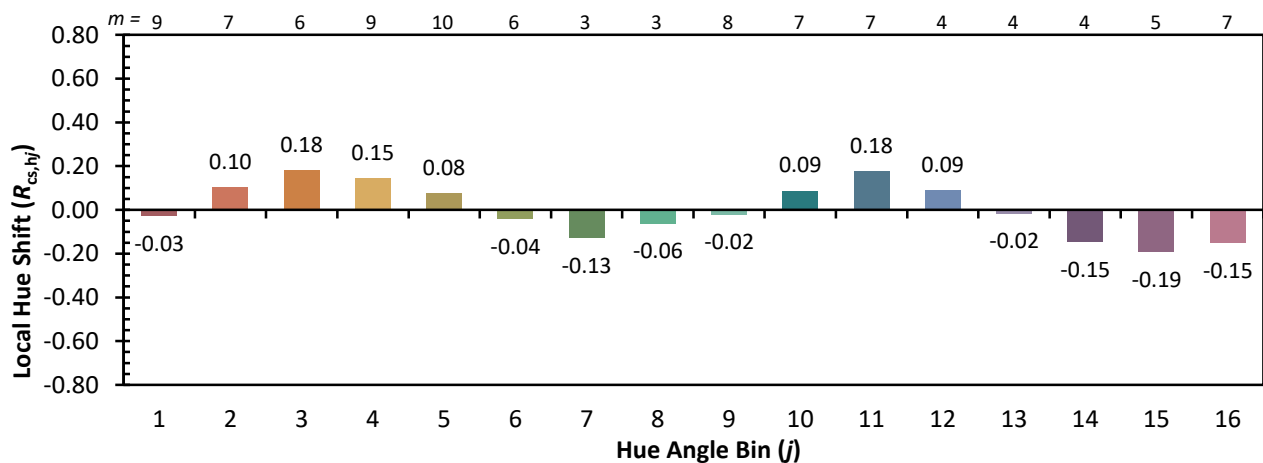
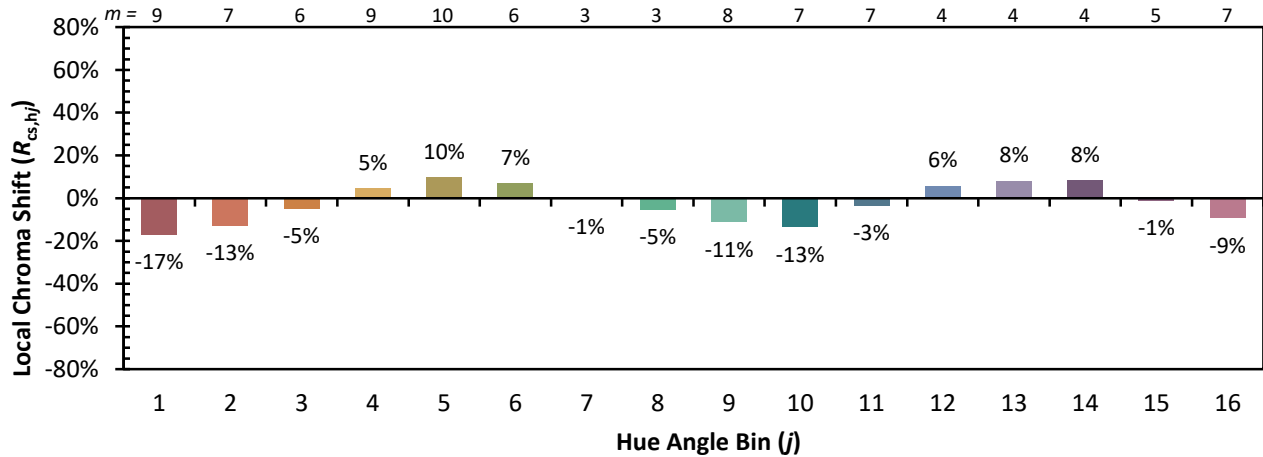


Individual Sample Fidelity Index ( $R_{f,i}$ )

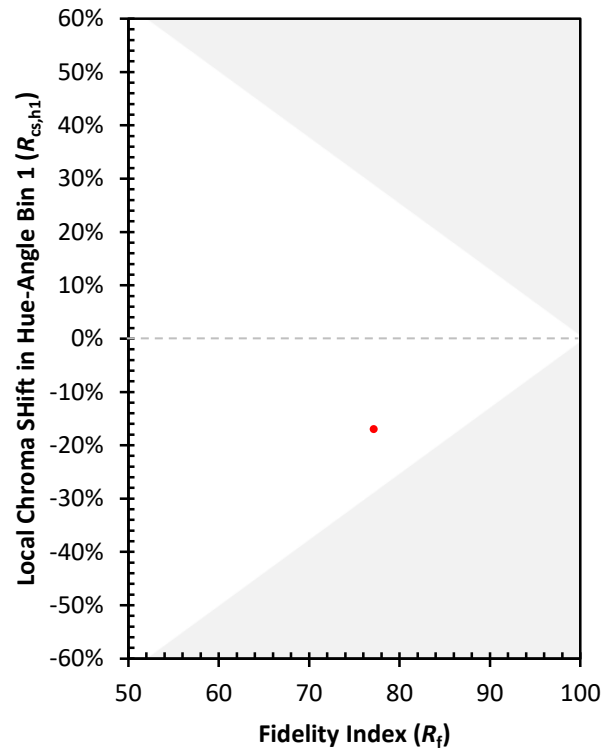
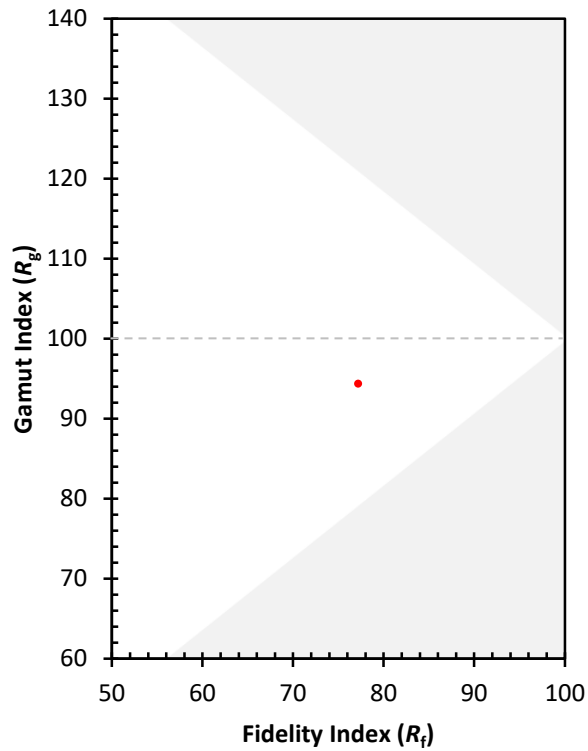
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 69 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 89 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 85 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 76 | CES81 = 75 |
| CES07 = 41 | CES32 = 67 | CES57 = 75 | CES82 = 94 |
| CES08 = 39 | CES33 = 75 | CES58 = 77 | CES83 = 91 |
| CES09 = 29 | CES34 = 79 | 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 = 90 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 69 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 87 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 76 |
| 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 = 83 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 60 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 89 | CES75 = 67 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)