

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-740-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-740-U-SL3  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 4000K, 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: 16194 lumens  
Efficiency: N/A  
Efficacy: 125.5 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

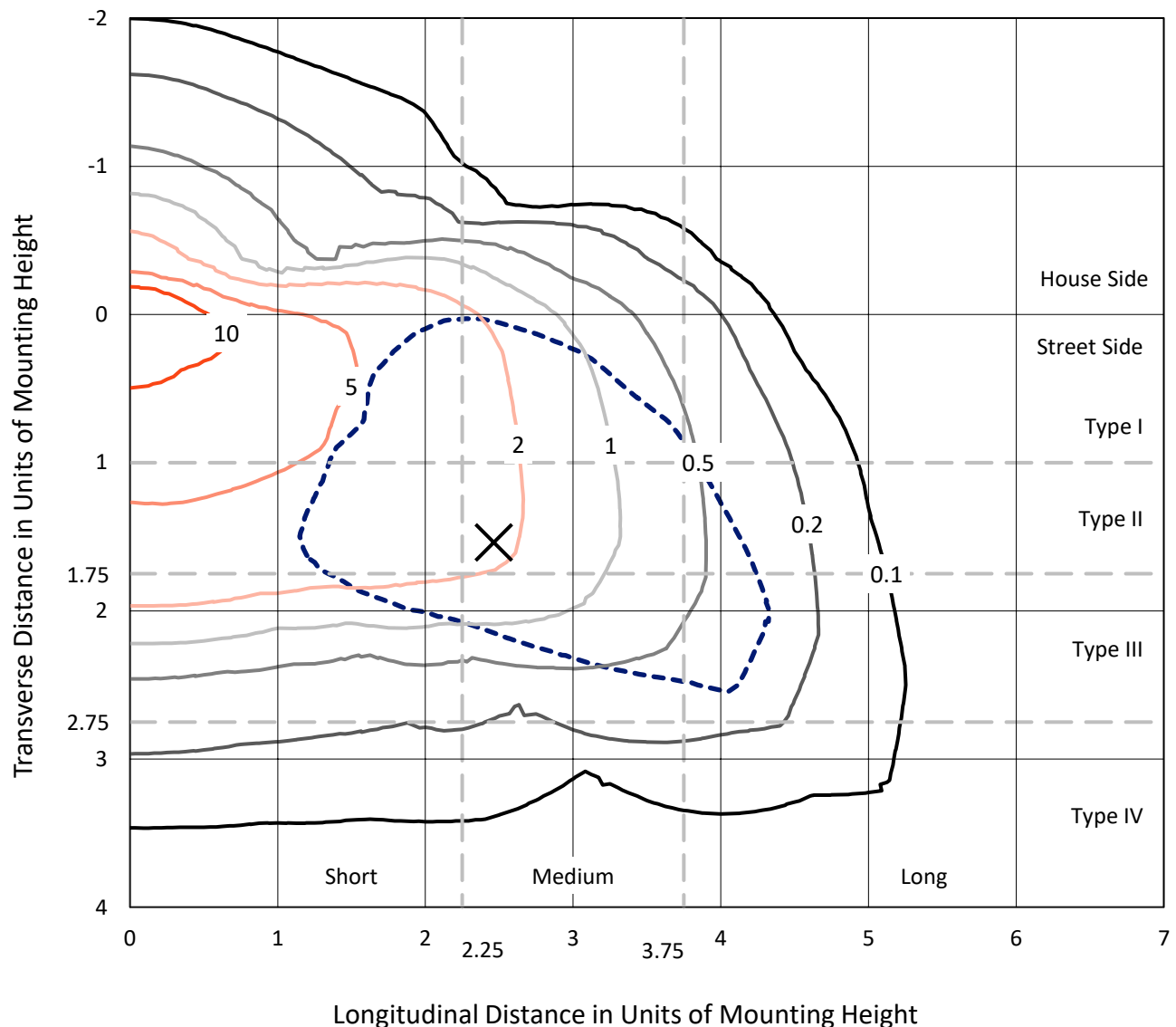


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

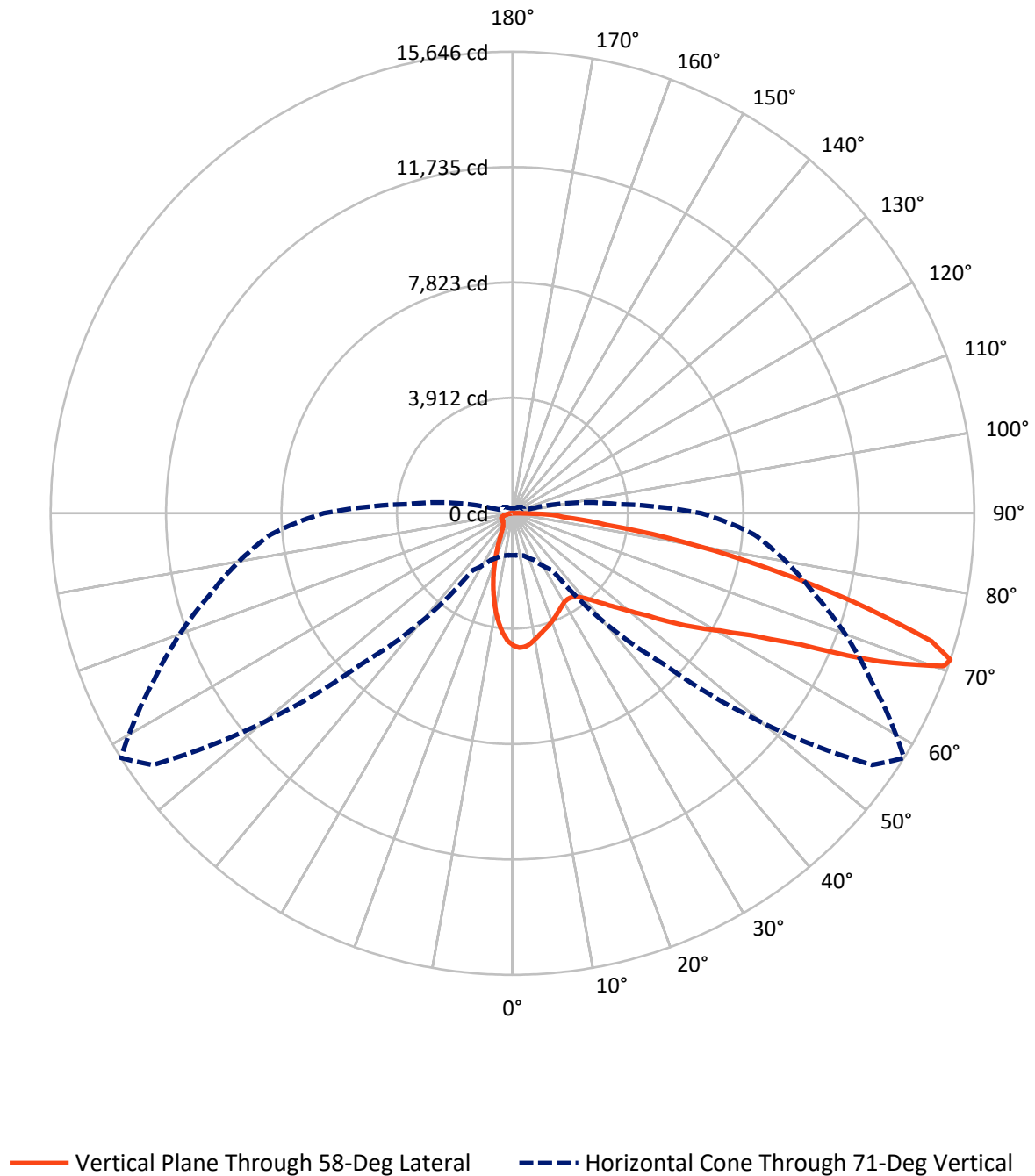


Based on 15 foot mounting height. Maximum calculated value = 19.9 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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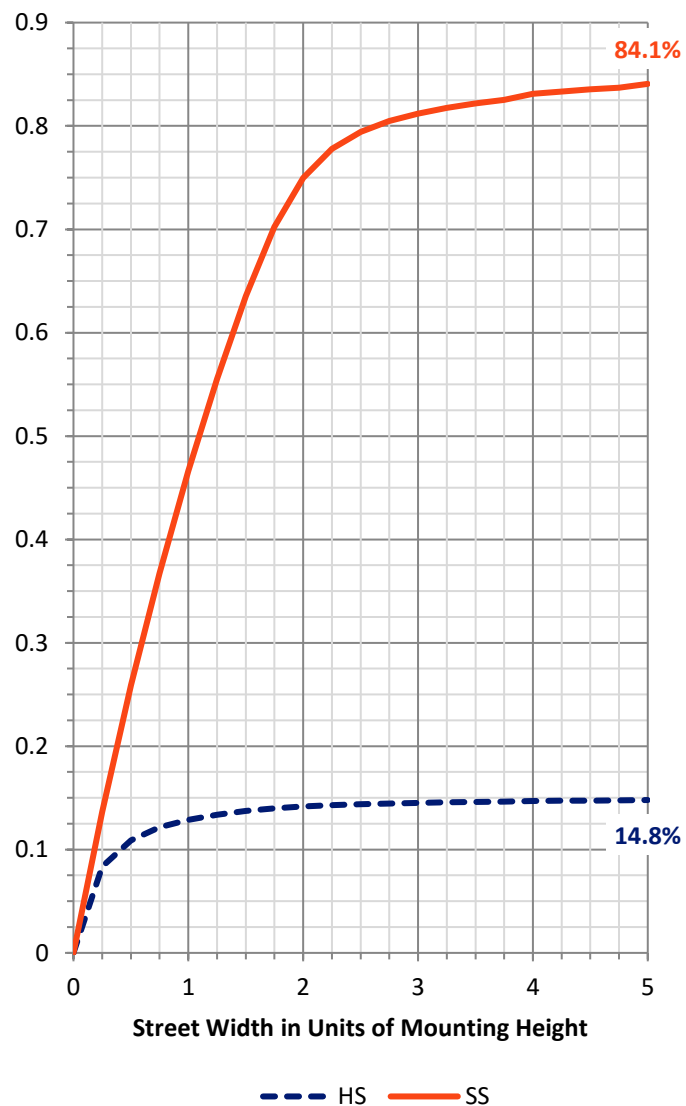
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2421.1   | 0.0    | 2421.1  |
|                    | % Fixture | 15.0     | 0.0    | 15.0    |
| <b>Street Side</b> | Lumens    | 13772.9  | 0.0    | 13772.9 |
|                    | % Fixture | 85.0     | 0.0    | 85.0    |
| <b>Total</b>       | Lumens    | 16194.0  | 0.0    | 16194.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 387.1   | 2.4       |
| 10°-20°   | 860.7   | 5.3       |
| 20°-30°   | 1093.9  | 6.8       |
| 30°-40°   | 1393.4  | 8.6       |
| 40°-50°   | 1975.9  | 12.2      |
| 50°-60°   | 3057.8  | 18.9      |
| 60°-70°   | 4162.8  | 25.7      |
| 70°-80°   | 2777.0  | 17.1      |
| 80°-90°   | 485.5   | 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°    | 16194.0 | 100.0     |
| 0°-180°   | 16194.0 | 100.0     |

**Coefficient of Utilization**



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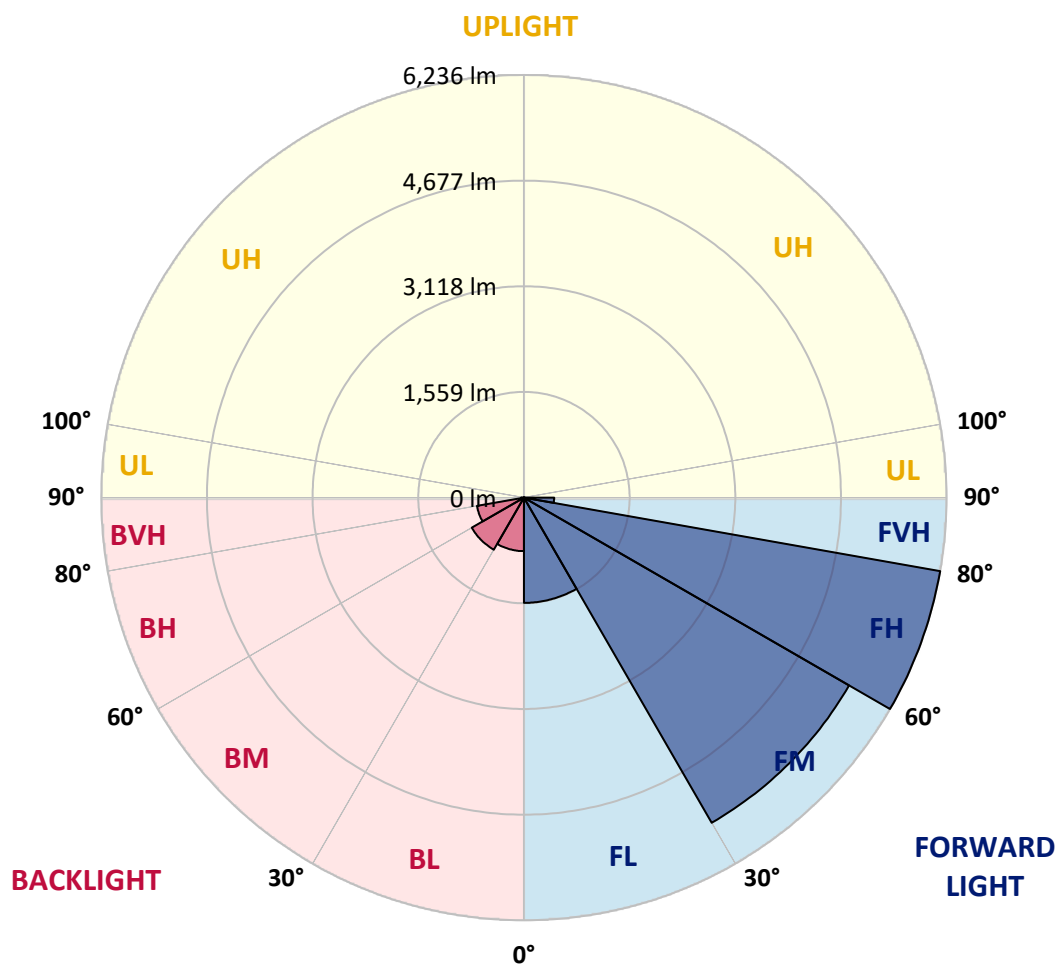
CATALOG NUMBER: GWC-SA2D-740-U-SL3

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1552.5 | 9.6       |                         |      |         |
| FM   | (30°-60°)   | 5539.1 | 34.2      |                         |      |         |
| FH   | (60°-80°)   | 6236.1 | 38.5      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 445.2  | 2.7       |                         |      | G3/500  |
| BL   | (0°-30°)    | 789.2  | 4.9       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 887.9  | 5.5       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 703.7  | 4.3       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 40.3   | 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°    | 4486.8 | 4486.8 | 4486.8 | 4486.8 | 4486.8 | 4486.8  | 4486.8  | 4486.8  | 4486.8  | 4486.8  | 4486.8 |
| 2.5°  | 4605.8 | 4599.6 | 4601.9 | 4597.4 | 4586.7 | 4575.9  | 4560.2  | 4563.0  | 4541.0  | 4508.3  | 4467.6 |
| 5°    | 4519.0 | 4516.7 | 4533.6 | 4543.2 | 4551.1 | 4544.9  | 4540.4  | 4546.1  | 4513.9  | 4468.8  | 4398.3 |
| 7.5°  | 4336.8 | 4312.0 | 4333.4 | 4365.5 | 4396.0 | 4419.1  | 4449.6  | 4453.5  | 4433.2  | 4385.8  | 4293.3 |
| 10°   | 4077.9 | 4054.2 | 4085.7 | 4136.0 | 4196.9 | 4252.2  | 4313.6  | 4324.9  | 4328.9  | 4286.0  | 4173.7 |
| 12.5° | 3809.3 | 3791.3 | 3822.9 | 3893.4 | 3994.4 | 4079.5  | 4177.7  | 4194.6  | 4229.6  | 4200.8  | 4063.2 |
| 15°   | 3569.0 | 3562.3 | 3600.6 | 3670.0 | 3786.2 | 3916.5  | 4058.1  | 4089.1  | 4148.4  | 4138.8  | 3976.9 |
| 17.5° | 3361.4 | 3359.8 | 3389.1 | 3461.9 | 3590.5 | 3755.2  | 3939.1  | 3991.5  | 4079.5  | 4090.8  | 3905.8 |
| 20°   | 3206.9 | 3203.5 | 3223.8 | 3277.4 | 3410.0 | 3596.7  | 3810.5  | 3882.7  | 4009.6  | 4049.1  | 3832.5 |
| 22.5° | 3124.0 | 3123.4 | 3124.0 | 3149.3 | 3257.7 | 3431.4  | 3685.2  | 3773.2  | 3941.3  | 4015.8  | 3751.2 |
| 25°   | 3109.9 | 3108.2 | 3095.8 | 3092.9 | 3154.4 | 3293.2  | 3561.1  | 3658.2  | 3876.5  | 3992.7  | 3674.0 |
| 27.5° | 3146.5 | 3148.8 | 3132.4 | 3105.9 | 3118.3 | 3202.4  | 3453.4  | 3557.2  | 3824.6  | 3988.2  | 3620.4 |
| 30°   | 3222.7 | 3221.6 | 3207.5 | 3179.8 | 3155.6 | 3168.5  | 3376.7  | 3480.5  | 3789.6  | 4007.9  | 3583.7 |
| 32.5° | 3306.7 | 3312.9 | 3310.1 | 3294.9 | 3258.8 | 3206.9  | 3353.6  | 3455.1  | 3779.4  | 4055.3  | 3567.9 |
| 35°   | 3407.7 | 3414.5 | 3434.8 | 3446.6 | 3404.3 | 3320.8  | 3403.2  | 3491.2  | 3808.8  | 4144.4  | 3593.3 |
| 37.5° | 3503.6 | 3521.1 | 3578.1 | 3628.3 | 3592.2 | 3499.1  | 3535.2  | 3597.8  | 3899.6  | 4284.9  | 3661.5 |
| 40°   | 3614.2 | 3629.4 | 3722.5 | 3829.1 | 3823.4 | 3727.0  | 3747.9  | 3789.6  | 4059.8  | 4486.3  | 3785.1 |
| 42.5° | 3723.0 | 3753.5 | 3888.3 | 4039.5 | 4082.9 | 3997.7  | 4031.0  | 4053.0  | 4285.4  | 4753.1  | 4000.6 |
| 45°   | 3868.0 | 3900.7 | 4088.0 | 4270.2 | 4371.7 | 4323.8  | 4376.8  | 4385.3  | 4569.2  | 5116.4  | 4313.6 |
| 47.5° | 4087.4 | 4124.7 | 4343.0 | 4534.2 | 4689.3 | 4694.4  | 4781.8  | 4778.5  | 4923.4  | 5532.1  | 4707.9 |
| 50°   | 4429.3 | 4482.9 | 4661.7 | 4840.5 | 5028.9 | 5133.8  | 5250.6  | 5234.2  | 5348.2  | 5974.9  | 5162.0 |
| 52.5° | 4877.2 | 4902.0 | 5034.6 | 5166.6 | 5400.7 | 5635.9  | 5803.4  | 5788.8  | 5829.9  | 6430.1  | 5677.6 |
| 55°   | 5341.4 | 5360.0 | 5414.8 | 5487.0 | 5801.7 | 6185.3  | 6539.6  | 6516.4  | 6412.1  | 6902.8  | 6187.0 |
| 57.5° | 5758.9 | 5796.7 | 5834.4 | 5864.3 | 6205.6 | 6759.6  | 7292.6  | 7294.3  | 7043.9  | 7412.8  | 6713.3 |
| 60°   | 5823.7 | 5857.0 | 6106.9 | 6342.7 | 6896.6 | 7525.6  | 8098.7  | 8081.8  | 7697.7  | 7966.2  | 7300.0 |
| 62.5° | 5147.9 | 5223.0 | 5640.4 | 6267.7 | 7562.3 | 8926.8  | 9127.1  | 9106.2  | 8479.5  | 8648.2  | 7983.1 |
| 65°   | 3689.2 | 3774.4 | 4278.1 | 5220.7 | 7239.6 | 10470.8 | 10983.0 | 10702.0 | 9545.6  | 9487.0  | 8783.0 |
| 67.5° | 2128.3 | 2148.6 | 2366.9 | 3124.0 | 5512.3 | 10551.4 | 13814.1 | 13421.0 | 11201.3 | 10438.6 | 9174.5 |
| 70°   | 1573.8 | 1573.3 | 1625.2 | 1922.4 | 2982.9 | 8611.5  | 15160.6 | 15513.2 | 12944.3 | 10751.7 | 8621.1 |
| 71°   | 1423.2 | 1424.9 | 1483.0 | 1749.8 | 2362.4 | 7208.0  | 14874.7 | 15646.3 | 13403.5 | 10597.1 | 8220.6 |
| 72.5° | 1217.3 | 1223.0 | 1303.6 | 1569.3 | 1987.3 | 4970.8  | 13642.7 | 14847.6 | 13621.2 | 10215.8 | 7593.9 |
| 75°   | 923.4  | 936.4  | 1048.1 | 1322.8 | 1816.4 | 2520.9  | 10012.7 | 11856.2 | 12100.4 | 9014.3  | 5642.7 |
| 77.5° | 658.9  | 673.5  | 799.9  | 1112.4 | 1726.7 | 1899.9  | 6705.4  | 8648.2  | 8904.8  | 5776.9  | 2545.2 |
| 80°   | 416.3  | 433.8  | 529.1  | 885.1  | 1622.3 | 1804.0  | 4213.8  | 5813.0  | 4855.7  | 1848.5  | 647.6  |
| 82.5° | 244.3  | 257.8  | 328.3  | 578.2  | 1325.1 | 1737.4  | 2479.2  | 3222.1  | 1889.7  | 558.5   | 294.5  |
| 85°   | 141.6  | 147.8  | 204.8  | 368.4  | 962.3  | 1639.8  | 1821.5  | 1801.2  | 820.2   | 273.0   | 139.3  |
| 87.5° | 66.0   | 73.3   | 121.3  | 192.4  | 534.2  | 1188.6  | 1439.6  | 1243.8  | 509.9   | 128.0   | 65.4   |
| 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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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4486.8 | 4486.8 | 4486.8 | 4486.8 | 4486.8 | 4486.8 | 4486.8 | 4486.8 | 4486.8 | 4486.8 | 4486.8 |
| 2.5°  | 4447.9 | 4438.3 | 4398.3 | 4362.7 | 4325.5 | 4277.0 | 4223.4 | 4216.6 | 4183.9 | 4190.1 | 4178.8 |
| 5°    | 4359.9 | 4335.6 | 4239.2 | 4151.7 | 4048.5 | 3956.0 | 3855.6 | 3809.3 | 3742.8 | 3738.3 | 3721.3 |
| 7.5°  | 4234.1 | 4189.0 | 4039.5 | 3873.6 | 3707.8 | 3549.9 | 3393.6 | 3290.9 | 3186.0 | 3141.5 | 3137.5 |
| 10°   | 4092.5 | 4015.8 | 3795.8 | 3550.4 | 3311.2 | 3080.5 | 2857.1 | 2691.9 | 2542.9 | 2472.4 | 2469.6 |
| 12.5° | 3958.3 | 3844.9 | 3543.1 | 3209.1 | 2882.0 | 2583.0 | 2276.7 | 2059.5 | 1872.8 | 1810.2 | 1783.7 |
| 15°   | 3844.3 | 3684.7 | 3297.1 | 2870.1 | 2473.0 | 2057.8 | 1709.2 | 1480.8 | 1308.1 | 1248.3 | 1237.1 |
| 17.5° | 3733.8 | 3528.4 | 3045.0 | 2527.7 | 2047.7 | 1591.3 | 1242.1 | 1072.3 | 980.4  | 956.1  | 955.6  |
| 20°   | 3623.8 | 3367.7 | 2781.6 | 2177.4 | 1636.4 | 1190.2 | 955.0  | 878.9  | 847.8  | 845.0  | 840.5  |
| 22.5° | 3499.1 | 3197.3 | 2504.6 | 1826.0 | 1277.1 | 935.8  | 811.7  | 781.3  | 777.3  | 787.5  | 787.5  |
| 25°   | 3382.3 | 3028.1 | 2223.7 | 1481.9 | 993.4  | 780.7  | 724.9  | 718.7  | 729.4  | 747.4  | 749.1  |
| 27.5° | 3273.4 | 2865.0 | 1949.5 | 1176.1 | 795.9  | 687.6  | 664.5  | 671.8  | 691.0  | 711.9  | 712.5  |
| 30°   | 3183.8 | 2711.0 | 1683.3 | 926.8  | 672.4  | 618.2  | 614.3  | 629.0  | 649.8  | 666.2  | 670.1  |
| 32.5° | 3114.4 | 2579.6 | 1426.0 | 745.2  | 591.7  | 566.4  | 569.7  | 582.1  | 595.1  | 604.1  | 610.4  |
| 35°   | 3082.2 | 2466.8 | 1188.6 | 628.4  | 540.4  | 526.3  | 530.8  | 537.6  | 543.2  | 550.0  | 555.1  |
| 37.5° | 3087.9 | 2379.4 | 976.5  | 555.6  | 506.0  | 498.7  | 498.7  | 498.7  | 498.7  | 502.0  | 502.6  |
| 40°   | 3140.3 | 2329.2 | 803.8  | 509.4  | 482.9  | 475.0  | 468.8  | 463.1  | 458.6  | 460.9  | 459.7  |
| 42.5° | 3274.6 | 2324.6 | 677.5  | 480.0  | 464.3  | 451.3  | 438.9  | 431.0  | 425.3  | 427.6  | 428.7  |
| 45°   | 3502.5 | 2381.0 | 592.3  | 459.2  | 446.8  | 427.0  | 411.2  | 402.8  | 398.8  | 406.1  | 407.3  |
| 47.5° | 3797.5 | 2504.0 | 540.4  | 443.9  | 430.4  | 404.5  | 387.5  | 379.6  | 380.8  | 391.5  | 394.3  |
| 50°   | 4177.7 | 2703.7 | 515.6  | 434.4  | 419.1  | 385.3  | 367.8  | 361.0  | 364.4  | 379.6  | 383.0  |
| 52.5° | 4595.1 | 2991.4 | 518.4  | 431.5  | 411.8  | 371.2  | 352.6  | 344.7  | 350.3  | 364.4  | 367.2  |
| 55°   | 5076.9 | 3337.2 | 565.2  | 435.5  | 401.1  | 362.1  | 340.1  | 326.6  | 331.1  | 344.1  | 346.4  |
| 57.5° | 5612.2 | 3733.2 | 659.4  | 434.4  | 387.5  | 353.7  | 327.2  | 306.9  | 310.3  | 318.2  | 320.4  |
| 60°   | 6169.5 | 4211.5 | 805.5  | 437.7  | 381.3  | 343.5  | 309.7  | 284.3  | 283.2  | 289.9  | 291.1  |
| 62.5° | 6838.5 | 4764.9 | 972.5  | 440.0  | 385.3  | 330.6  | 286.6  | 261.7  | 258.4  | 260.0  | 261.2  |
| 65°   | 7527.9 | 5165.4 | 909.9  | 431.0  | 397.7  | 319.8  | 266.3  | 239.7  | 233.5  | 232.4  | 233.0  |
| 67.5° | 7549.3 | 4736.2 | 638.0  | 412.9  | 402.8  | 314.2  | 251.0  | 221.1  | 211.0  | 207.0  | 206.5  |
| 70°   | 6770.3 | 3847.7 | 497.0  | 393.7  | 382.5  | 305.2  | 236.9  | 205.9  | 190.7  | 184.5  | 183.9  |
| 71°   | 6390.1 | 3542.0 | 471.0  | 384.1  | 367.2  | 296.2  | 230.7  | 199.1  | 183.3  | 176.6  | 175.4  |
| 72.5° | 5793.8 | 3175.3 | 439.4  | 368.9  | 337.9  | 273.0  | 218.9  | 189.5  | 173.2  | 165.3  | 163.6  |
| 75°   | 4158.0 | 2076.4 | 377.4  | 328.9  | 279.8  | 217.7  | 191.8  | 170.4  | 156.3  | 146.7  | 145.5  |
| 77.5° | 1602.0 | 826.4  | 285.4  | 273.6  | 214.4  | 170.4  | 157.9  | 147.2  | 137.1  | 127.5  | 126.9  |
| 80°   | 495.3  | 369.5  | 208.2  | 205.9  | 155.1  | 126.9  | 123.0  | 120.2  | 116.2  | 106.1  | 103.8  |
| 82.5° | 264.6  | 212.1  | 143.3  | 133.1  | 101.5  | 84.6   | 89.1   | 90.3   | 90.8   | 80.1   | 79.0   |
| 85°   | 126.4  | 112.3  | 80.7   | 75.6   | 59.2   | 47.4   | 54.7   | 59.2   | 59.8   | 49.1   | 45.7   |
| 87.5° | 60.4   | 58.7   | 37.8   | 28.8   | 22.0   | 15.8   | 19.2   | 23.7   | 25.9   | 18.6   | 16.4   |
| 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: SP1-2104-224-3

Luminaire Tested: CCW-SA-2A-740-U-SL4

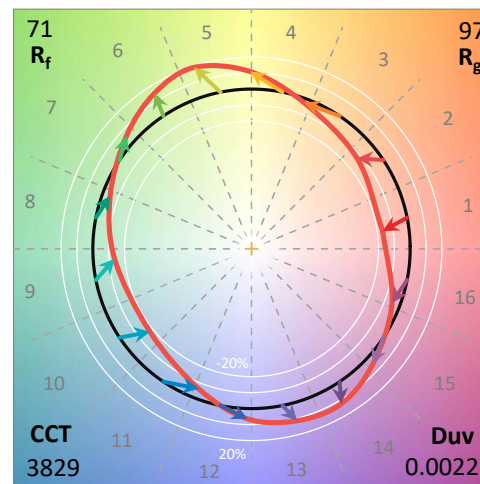
Test Date: 04/26/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-3  
 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-740-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3829   | CRI (Ra): | 69.8 |      |       |
| CIE u':                   | 0.2271 | R1:       | 67.2 | R9:  | -35.1 |
| CIE v':                   | 0.5076 | R2:       | 75.2 | R10: | 43.1  |
| Duv:                      | 0.0022 | R3:       | 83.2 | R11: | 69.0  |
| CIE x:                    | 0.3900 | R4:       | 71.0 | R12: | 44.3  |
| CIE y:                    | 0.3873 | R5:       | 67.4 | R13: | 67.6  |
| CIE z:                    | 0.2227 | R6:       | 66.8 | R14: | 90.3  |
| Peak Wavelength (nm):     | 440    | R7:       | 77.6 |      |       |
| Dominant Wavelength (nm): | 578    | R8:       | 50.3 |      |       |
| Purity:                   | 33.4   |           |      |      |       |
| Rf:                       | 70.6   |           |      |      |       |
| Rg:                       | 96.7   |           |      |      |       |



### Test Conditions

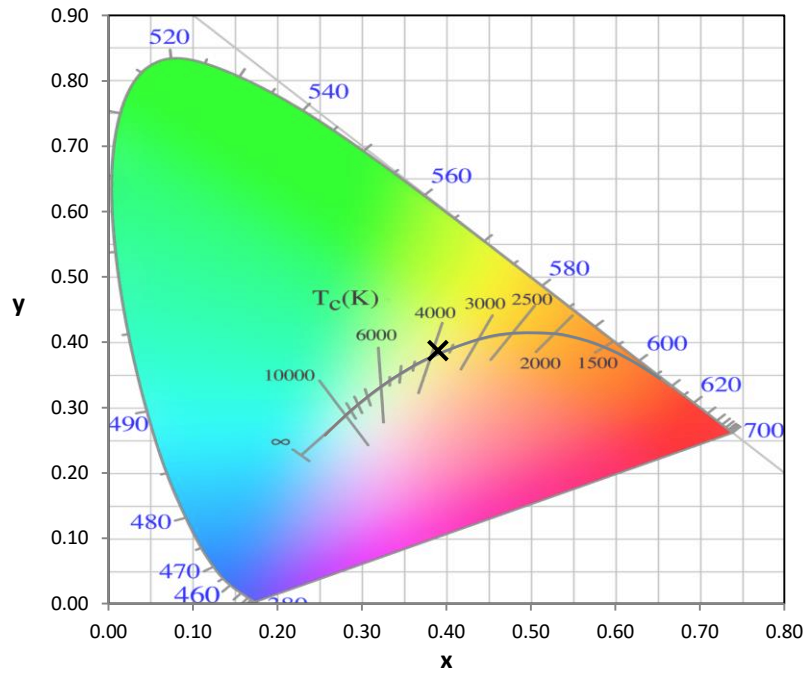
Stabilization Time: 62M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/39%  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2104-224-3

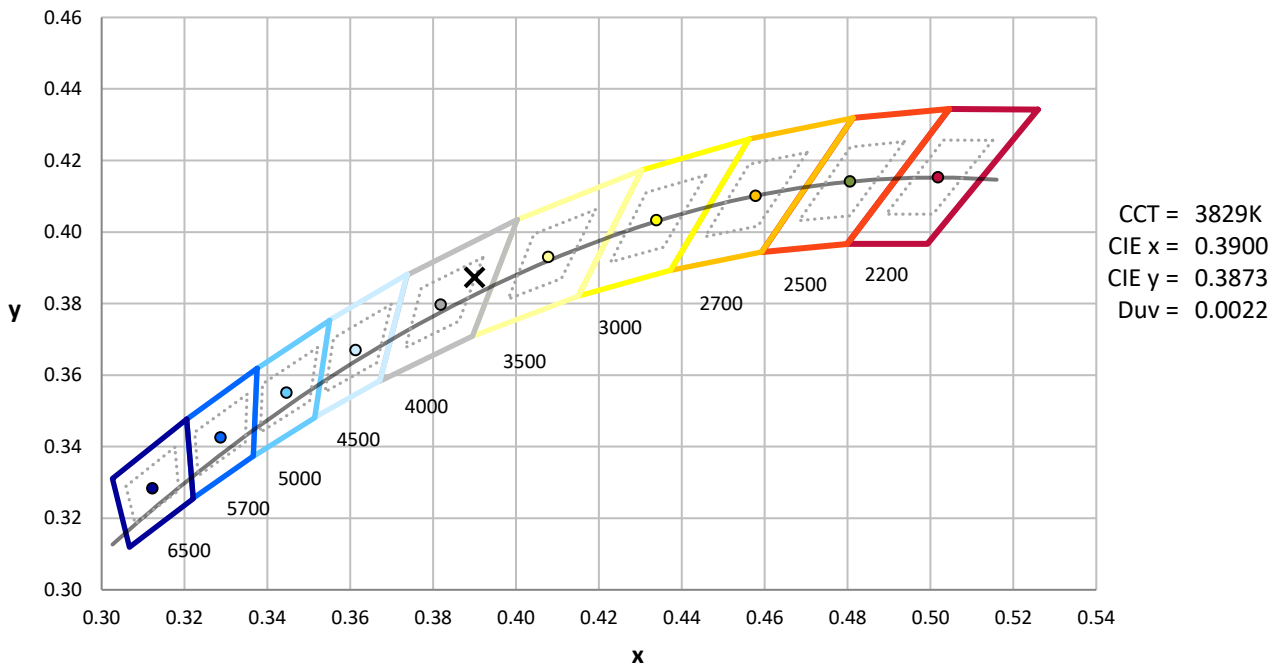
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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



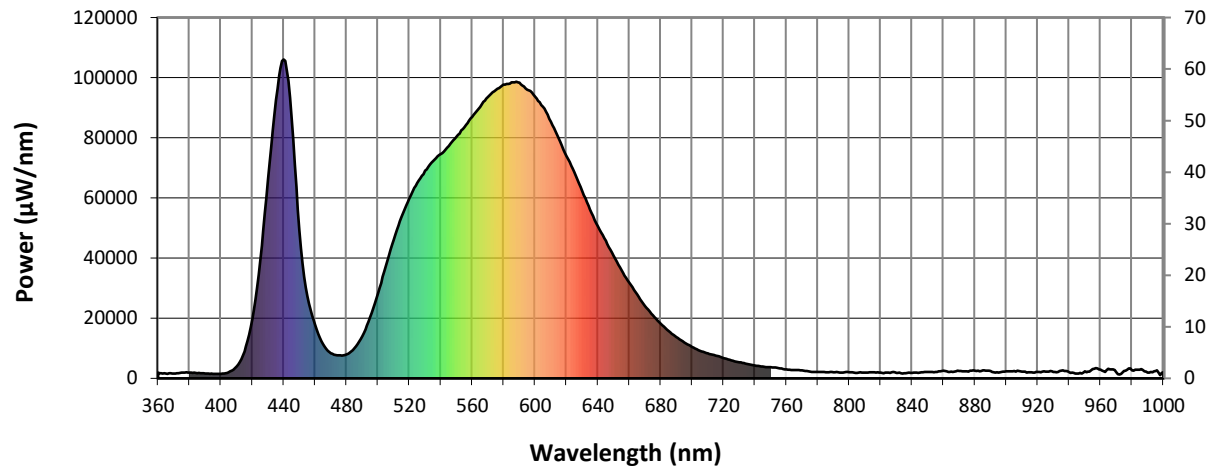
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 4000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

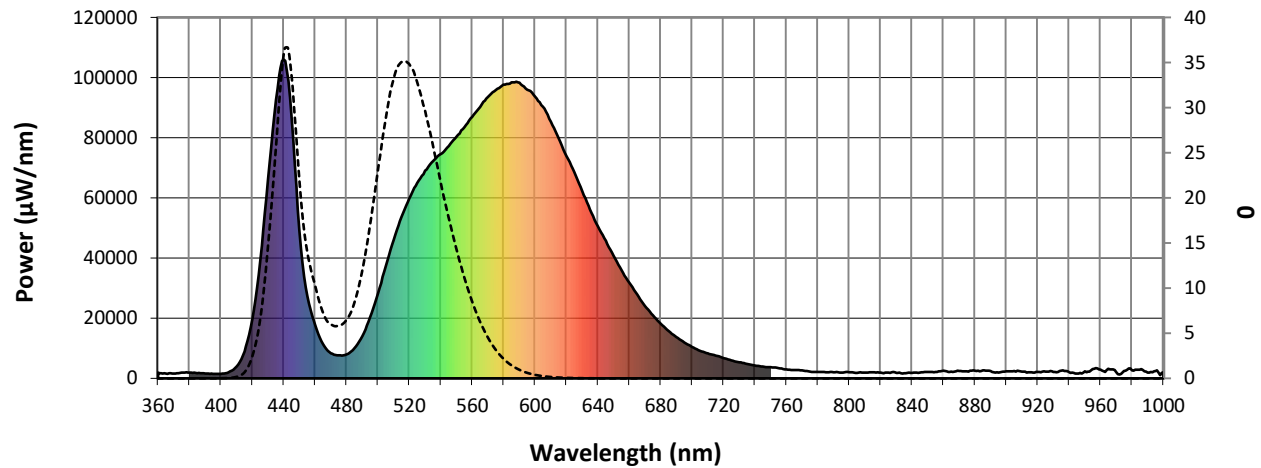


#####

| 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       | 1901             | 0.0              | 490       | 14057            | 2.0              | 620       | 73853            | 19.2             | 750       | 3678             | 0.0              | 880       | 2528             | 0.0              |
| 365       | 1585             | 0.0              | 495       | 20304            | 3.7              | 625       | 68653            | 15.1             | 755       | 3385             | 0.0              | 885       | 2638             | 0.0              |
| 370       | 1604             | 0.0              | 500       | 28346            | 6.3              | 630       | 62254            | 11.3             | 760       | 2963             | 0.0              | 890       | 2417             | 0.0              |
| 375       | 1905             | 0.0              | 505       | 37228            | 10.4             | 635       | 56177            | 8.4              | 765       | 2782             | 0.0              | 895       | 1902             | 0.0              |
| 380       | 1882             | 0.0              | 510       | 46037            | 15.8             | 640       | 50521            | 6.0              | 770       | 2657             | 0.0              | 900       | 2330             | 0.0              |
| 385       | 1693             | 0.0              | 515       | 53619            | 22.2             | 645       | 45727            | 4.4              | 775       | 2259             | 0.0              | 905       | 2456             | 0.0              |
| 390       | 1640             | 0.0              | 520       | 59890            | 29.0             | 650       | 40814            | 3.0              | 780       | 2169             | 0.0              | 910       | 2205             | 0.0              |
| 395       | 1513             | 0.0              | 525       | 64946            | 34.9             | 655       | 35925            | 2.1              | 785       | 2065             | 0.0              | 915       | 2002             | 0.0              |
| 400       | 1481             | 0.0              | 530       | 69048            | 40.7             | 660       | 31824            | 1.3              | 790       | 2054             | 0.0              | 920       | 2125             | 0.0              |
| 405       | 2044             | 0.0              | 535       | 72246            | 44.8             | 665       | 27860            | 0.9              | 795       | 1908             | 0.0              | 925       | 2266             | 0.0              |
| 410       | 3966             | 0.0              | 540       | 74621            | 48.6             | 670       | 24069            | 0.5              | 800       | 2026             | 0.0              | 930       | 2159             | 0.0              |
| 415       | 8943             | 0.0              | 545       | 77288            | 51.4             | 675       | 20926            | 0.4              | 805       | 1766             | 0.0              | 935       | 2581             | 0.0              |
| 420       | 19566            | 0.1              | 550       | 80334            | 54.6             | 680       | 18170            | 0.2              | 810       | 1913             | 0.0              | 940       | 2052             | 0.0              |
| 425       | 39243            | 0.2              | 555       | 83561            | 57.1             | 685       | 15785            | 0.1              | 815       | 2019             | 0.0              | 945       | 1631             | 0.0              |
| 430       | 66113            | 0.5              | 560       | 86964            | 59.1             | 690       | 13770            | 0.1              | 820       | 1876             | 0.0              | 950       | 2301             | 0.0              |
| 435       | 92550            | 1.1              | 565       | 90264            | 60.0             | 695       | 11953            | 0.1              | 825       | 1869             | 0.0              | 955       | 3077             | 0.0              |
| 440       | 106034           | 1.7              | 570       | 93519            | 60.8             | 700       | 10452            | 0.0              | 830       | 1862             | 0.0              | 960       | 2911             | 0.0              |
| 445       | 86383            | 1.8              | 575       | 95920            | 59.7             | 705       | 9162             | 0.0              | 835       | 1663             | 0.0              | 965       | 3163             | 0.0              |
| 450       | 49216            | 1.3              | 580       | 97650            | 58.0             | 710       | 8266             | 0.0              | 840       | 1843             | 0.0              | 970       | 1995             | 0.0              |
| 455       | 27376            | 0.9              | 585       | 98486            | 54.7             | 715       | 7583             | 0.0              | 845       | 1921             | 0.0              | 975       | 2418             | 0.0              |
| 460       | 17830            | 0.7              | 590       | 98332            | 50.8             | 720       | 6750             | 0.0              | 850       | 2105             | 0.0              | 980       | 2674             | 0.0              |
| 465       | 11374            | 0.6              | 595       | 96023            | 45.5             | 725       | 5965             | 0.0              | 855       | 2096             | 0.0              | 985       | 2850             | 0.0              |
| 470       | 8344             | 0.5              | 600       | 93650            | 40.4             | 730       | 5310             | 0.0              | 860       | 2601             | 0.0              | 990       | 1972             | 0.0              |
| 475       | 7639             | 0.6              | 605       | 90313            | 35.0             | 735       | 4838             | 0.0              | 865       | 2199             | 0.0              | 995       | 2443             | 0.0              |
| 480       | 7991             | 0.8              | 610       | 85305            | 29.3             | 740       | 4280             | 0.0              | 870       | 2491             | 0.0              | 1000      | 1979             | 0.0              |
| 485       | 9994             | 1.2              | 615       | 79870            | 24.1             | 745       | 3928             | 0.0              | 875       | 2370             | 0.0              |           |                  |                  |

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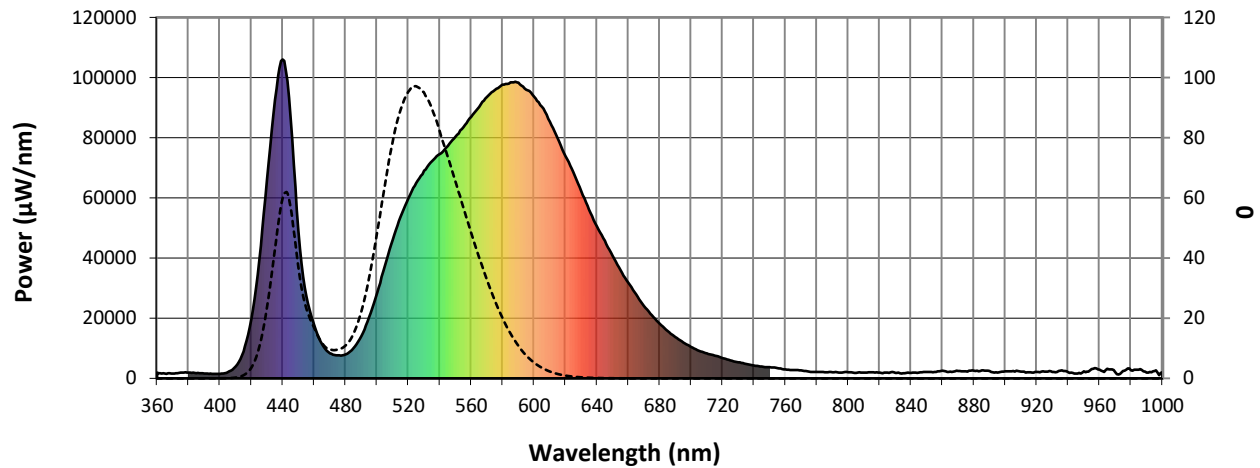
### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 7682.8**
**S/P: 1.42**

| 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       | 1901             | 0.0              | 490       | 14057            | 21.6             | 620       | 73853            | 0.9              | 750       | 3678             | 0.0              | 880       | 2528             | 0.0              |
| 365       | 1585             | 0.0              | 495       | 20304            | 32.8             | 625       | 68653            | 0.6              | 755       | 3385             | 0.0              | 885       | 2638             | 0.0              |
| 370       | 1604             | 0.0              | 500       | 28346            | 47.4             | 630       | 62254            | 0.4              | 760       | 2963             | 0.0              | 890       | 2417             | 0.0              |
| 375       | 1905             | 0.0              | 505       | 37228            | 63.3             | 635       | 56177            | 0.2              | 765       | 2782             | 0.0              | 895       | 1902             | 0.0              |
| 380       | 1882             | 0.0              | 510       | 46037            | 78.0             | 640       | 50521            | 0.1              | 770       | 2657             | 0.0              | 900       | 2330             | 0.0              |
| 385       | 1693             | 0.0              | 515       | 53619            | 88.9             | 645       | 45727            | 0.1              | 775       | 2259             | 0.0              | 905       | 2456             | 0.0              |
| 390       | 1640             | 0.0              | 520       | 59890            | 95.2             | 650       | 40814            | 0.0              | 780       | 2169             | 0.0              | 910       | 2205             | 0.0              |
| 395       | 1513             | 0.0              | 525       | 64946            | 97.2             | 655       | 35925            | 0.0              | 785       | 2065             | 0.0              | 915       | 2002             | 0.0              |
| 400       | 1481             | 0.0              | 530       | 69048            | 95.2             | 660       | 31824            | 0.0              | 790       | 2054             | 0.0              | 920       | 2125             | 0.0              |
| 405       | 2044             | 0.1              | 535       | 72246            | 90.0             | 665       | 27860            | 0.0              | 795       | 1908             | 0.0              | 925       | 2266             | 0.0              |
| 410       | 3966             | 0.2              | 540       | 74621            | 82.5             | 670       | 24069            | 0.0              | 800       | 2026             | 0.0              | 930       | 2159             | 0.0              |
| 415       | 8943             | 0.9              | 545       | 77288            | 74.1             | 675       | 20926            | 0.0              | 805       | 1766             | 0.0              | 935       | 2581             | 0.0              |
| 420       | 19566            | 3.2              | 550       | 80334            | 65.7             | 680       | 18170            | 0.0              | 810       | 1913             | 0.0              | 940       | 2052             | 0.0              |
| 425       | 39243            | 9.6              | 555       | 83561            | 57.1             | 685       | 15785            | 0.0              | 815       | 2019             | 0.0              | 945       | 1631             | 0.0              |
| 430       | 66113            | 22.5             | 560       | 86964            | 48.6             | 690       | 13770            | 0.0              | 820       | 1876             | 0.0              | 950       | 2301             | 0.0              |
| 435       | 92550            | 41.4             | 565       | 90264            | 40.5             | 695       | 11953            | 0.0              | 825       | 1869             | 0.0              | 955       | 3077             | 0.0              |
| 440       | 106034           | 59.3             | 570       | 93519            | 33.0             | 700       | 10452            | 0.0              | 830       | 1862             | 0.0              | 960       | 2911             | 0.0              |
| 445       | 86383            | 57.8             | 575       | 95920            | 26.1             | 705       | 9162             | 0.0              | 835       | 1663             | 0.0              | 965       | 3163             | 0.0              |
| 450       | 49216            | 38.1             | 580       | 97650            | 20.1             | 710       | 8266             | 0.0              | 840       | 1843             | 0.0              | 970       | 1995             | 0.0              |
| 455       | 27376            | 23.9             | 585       | 98486            | 15.1             | 715       | 7583             | 0.0              | 845       | 1921             | 0.0              | 975       | 2418             | 0.0              |
| 460       | 17830            | 17.2             | 590       | 98332            | 10.9             | 720       | 6750             | 0.0              | 850       | 2105             | 0.0              | 980       | 2674             | 0.0              |
| 465       | 11374            | 12.0             | 595       | 96023            | 7.7              | 725       | 5965             | 0.0              | 855       | 2096             | 0.0              | 985       | 2850             | 0.0              |
| 470       | 8344             | 9.6              | 600       | 93650            | 5.3              | 730       | 5310             | 0.0              | 860       | 2601             | 0.0              | 990       | 1972             | 0.0              |
| 475       | 7639             | 9.6              | 605       | 90313            | 3.5              | 735       | 4838             | 0.0              | 865       | 2199             | 0.0              | 995       | 2443             | 0.0              |
| 480       | 7991             | 10.8             | 610       | 85305            | 2.3              | 740       | 4280             | 0.0              | 870       | 2491             | 0.0              | 1000      | 1979             | 0.0              |
| 485       | 9994             | 14.5             | 615       | 79870            | 1.5              | 745       | 3928             | 0.0              | 875       | 2370             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 2823**

**M/P: 0.52**

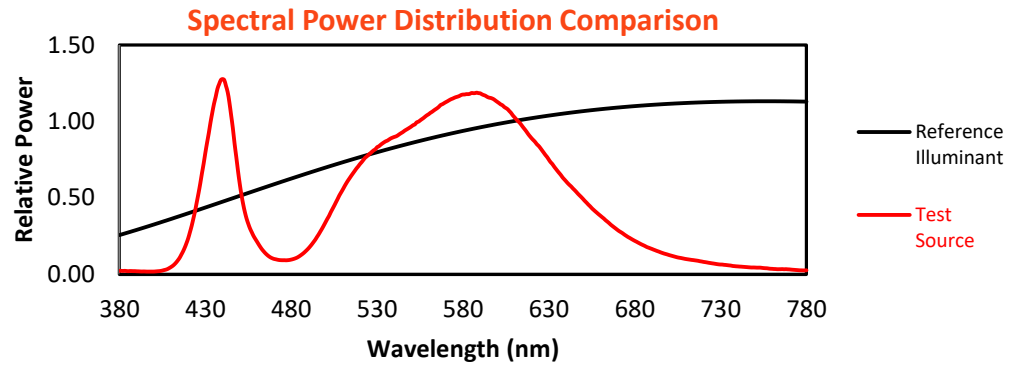
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1901             | 0.0              | 490       | 14057            | 11.7             | 620       | 73853            | 0.1              | 750       | 3678             | 0.0              | 880       | 2528             | 0.0              |
| 365       | 1585             | 0.0              | 495       | 20304            | 16.8             | 625       | 68653            | 0.0              | 755       | 3385             | 0.0              | 885       | 2638             | 0.0              |
| 370       | 1604             | 0.0              | 500       | 28346            | 22.8             | 630       | 62254            | 0.0              | 760       | 2963             | 0.0              | 890       | 2417             | 0.0              |
| 375       | 1905             | 0.0              | 505       | 37228            | 28.6             | 635       | 56177            | 0.0              | 765       | 2782             | 0.0              | 895       | 1902             | 0.0              |
| 380       | 1882             | 0.0              | 510       | 46037            | 33.1             | 640       | 50521            | 0.0              | 770       | 2657             | 0.0              | 900       | 2330             | 0.0              |
| 385       | 1693             | 0.0              | 515       | 53619            | 35.0             | 645       | 45727            | 0.0              | 775       | 2259             | 0.0              | 905       | 2456             | 0.0              |
| 390       | 1640             | 0.0              | 520       | 59890            | 34.9             | 650       | 40814            | 0.0              | 780       | 2169             | 0.0              | 910       | 2205             | 0.0              |
| 395       | 1513             | 0.0              | 525       | 64946            | 32.9             | 655       | 35925            | 0.0              | 785       | 2065             | 0.0              | 915       | 2002             | 0.0              |
| 400       | 1481             | 0.0              | 530       | 69048            | 29.8             | 660       | 31824            | 0.0              | 790       | 2054             | 0.0              | 920       | 2125             | 0.0              |
| 405       | 2044             | 0.0              | 535       | 72246            | 26.0             | 665       | 27860            | 0.0              | 795       | 1908             | 0.0              | 925       | 2266             | 0.0              |
| 410       | 3966             | 0.2              | 540       | 74621            | 21.8             | 670       | 24069            | 0.0              | 800       | 2026             | 0.0              | 930       | 2159             | 0.0              |
| 415       | 8943             | 0.6              | 545       | 77288            | 18.0             | 675       | 20926            | 0.0              | 805       | 1766             | 0.0              | 935       | 2581             | 0.0              |
| 420       | 19566            | 2.2              | 550       | 80334            | 14.4             | 680       | 18170            | 0.0              | 810       | 1913             | 0.0              | 940       | 2052             | 0.0              |
| 425       | 39243            | 6.1              | 555       | 83561            | 11.3             | 685       | 15785            | 0.0              | 815       | 2019             | 0.0              | 945       | 1631             | 0.0              |
| 430       | 66113            | 14.0             | 560       | 86964            | 8.6              | 690       | 13770            | 0.0              | 820       | 1876             | 0.0              | 950       | 2301             | 0.0              |
| 435       | 92550            | 24.7             | 565       | 90264            | 6.3              | 695       | 11953            | 0.0              | 825       | 1869             | 0.0              | 955       | 3077             | 0.0              |
| 440       | 106034           | 35.4             | 570       | 93519            | 4.6              | 700       | 10452            | 0.0              | 830       | 1862             | 0.0              | 960       | 2911             | 0.0              |
| 445       | 86383            | 34.1             | 575       | 95920            | 3.2              | 705       | 9162             | 0.0              | 835       | 1663             | 0.0              | 965       | 3163             | 0.0              |
| 450       | 49216            | 22.7             | 580       | 97650            | 2.2              | 710       | 8266             | 0.0              | 840       | 1843             | 0.0              | 970       | 1995             | 0.0              |
| 455       | 27376            | 14.3             | 585       | 98486            | 1.5              | 715       | 7583             | 0.0              | 845       | 1921             | 0.0              | 975       | 2418             | 0.0              |
| 460       | 17830            | 10.5             | 590       | 98332            | 1.0              | 720       | 6750             | 0.0              | 850       | 2105             | 0.0              | 980       | 2674             | 0.0              |
| 465       | 11374            | 7.4              | 595       | 96023            | 0.6              | 725       | 5965             | 0.0              | 855       | 2096             | 0.0              | 985       | 2850             | 0.0              |
| 470       | 8344             | 6.0              | 600       | 93650            | 0.4              | 730       | 5310             | 0.0              | 860       | 2601             | 0.0              | 990       | 1972             | 0.0              |
| 475       | 7639             | 5.8              | 605       | 90313            | 0.2              | 735       | 4838             | 0.0              | 865       | 2199             | 0.0              | 995       | 2443             | 0.0              |
| 480       | 7991             | 6.4              | 610       | 85305            | 0.2              | 740       | 4280             | 0.0              | 870       | 2491             | 0.0              | 1000      | 1979             | 0.0              |
| 485       | 9994             | 8.2              | 615       | 79870            | 0.1              | 745       | 3928             | 0.0              | 875       | 2370             | 0.0              |           |                  |                  |

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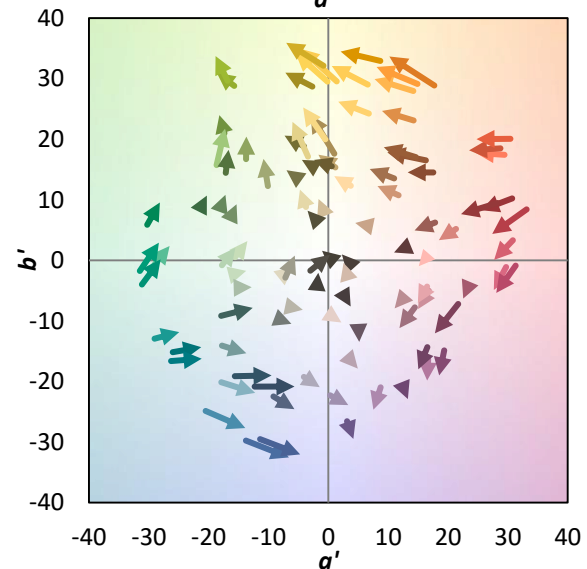
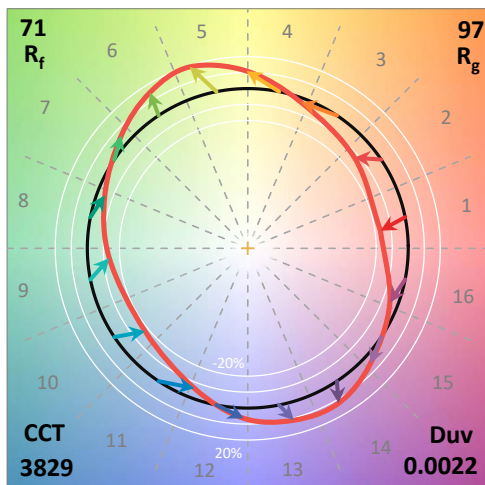
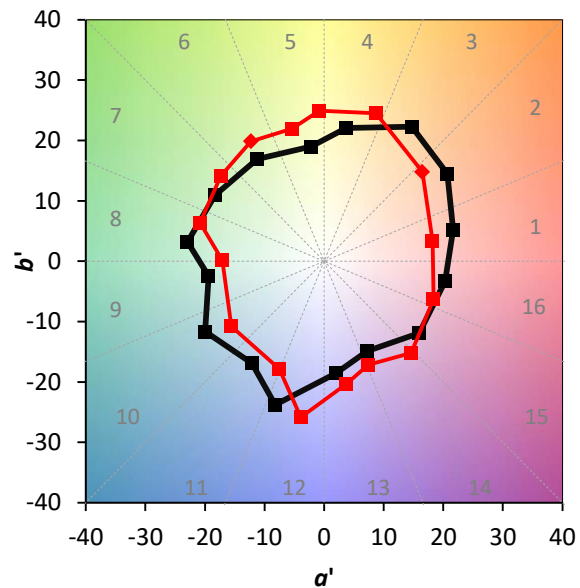
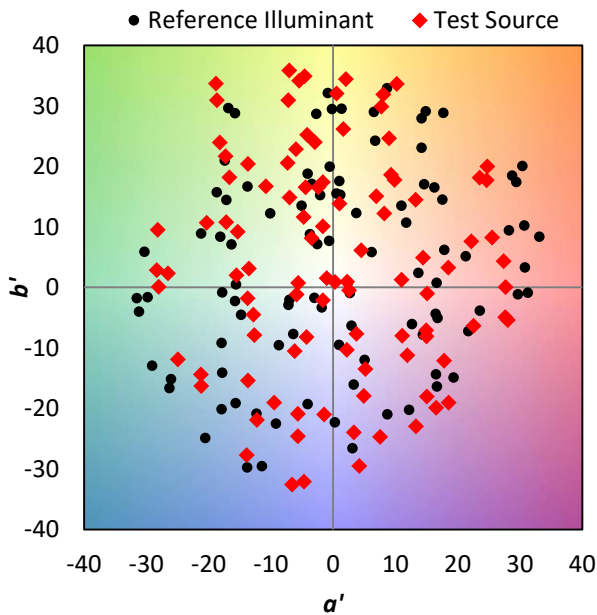
TM-30-18

### Summary

$R_f = 70.6$   
 $R_g = 96.7$   
 $CIE R_a = 69.8$   
 $R_g = -35.1$



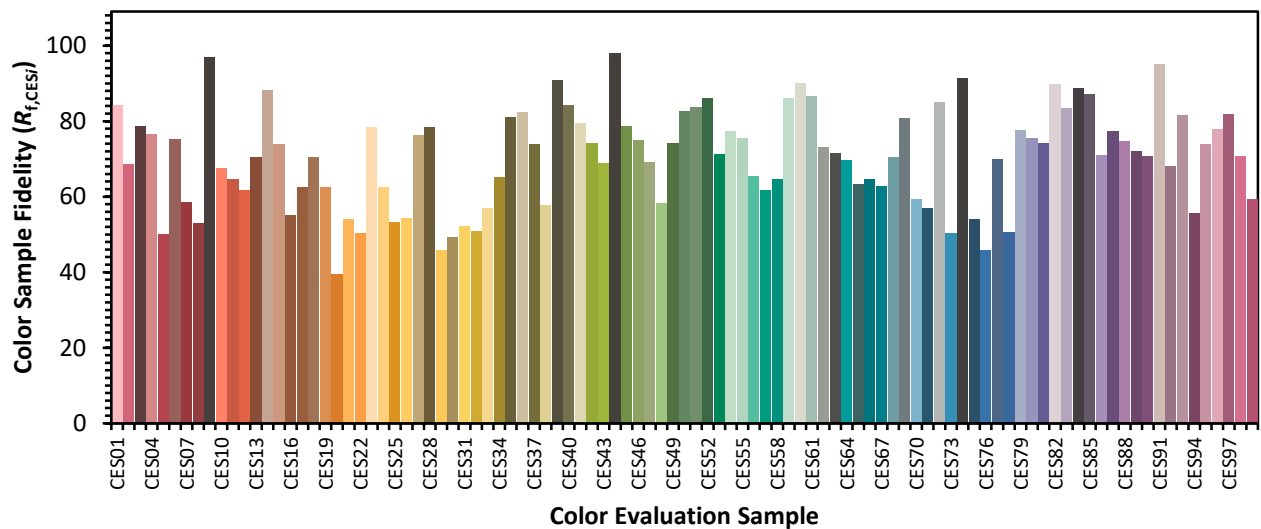
### Color Vector Graphics



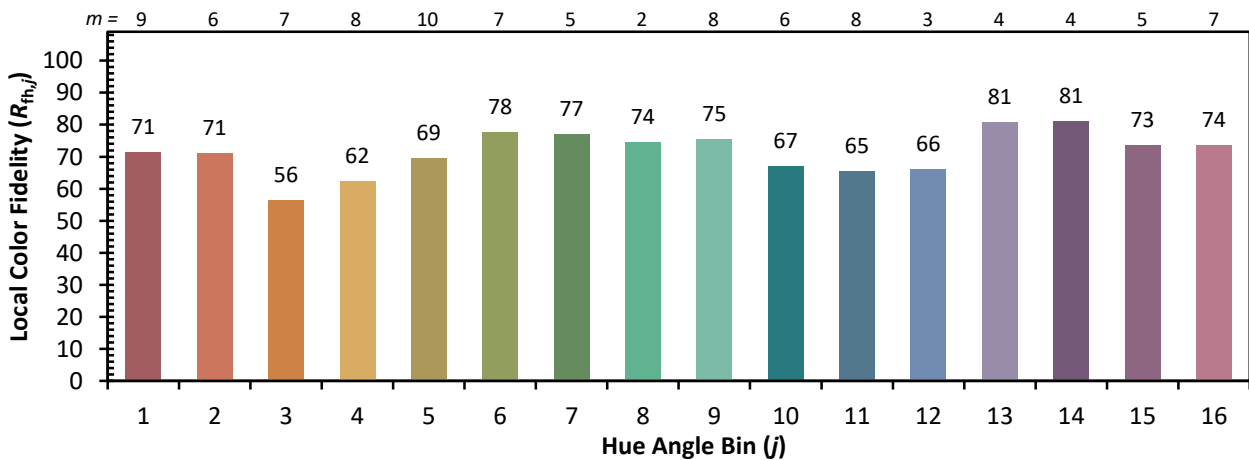
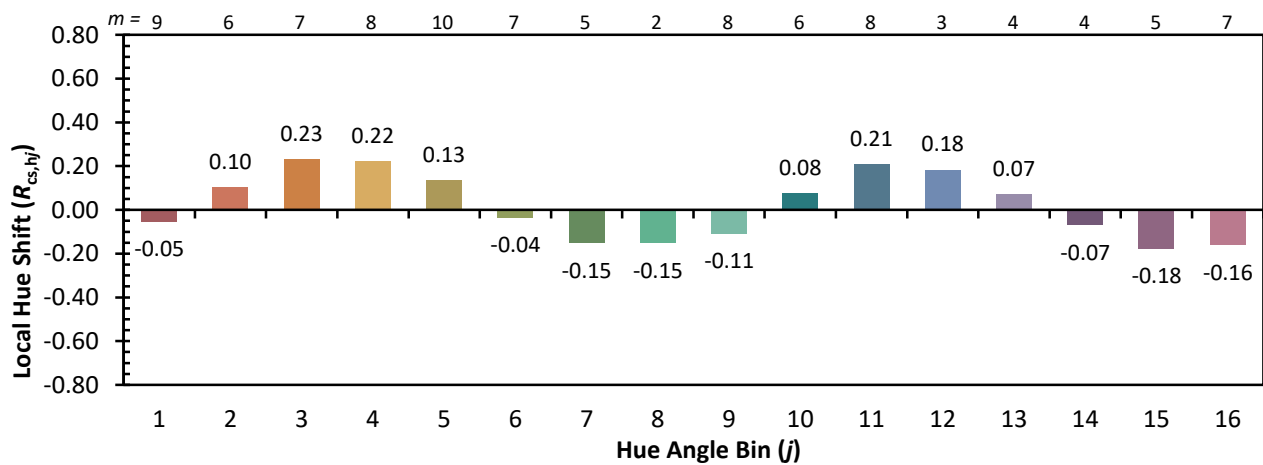
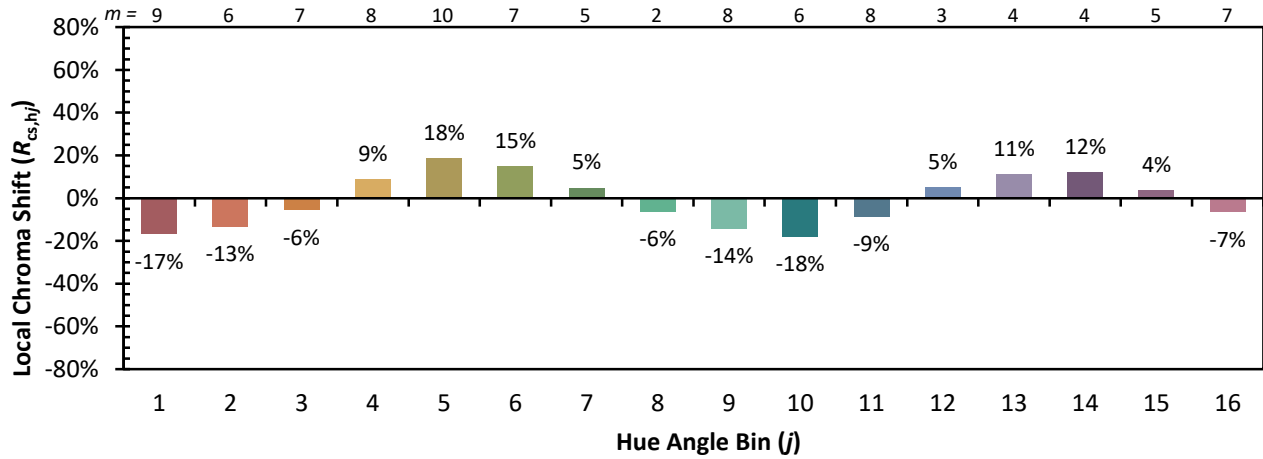


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

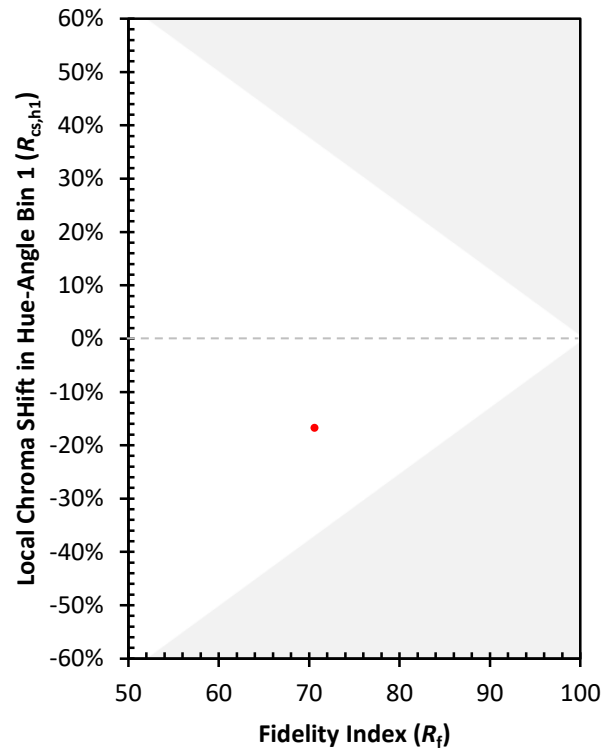
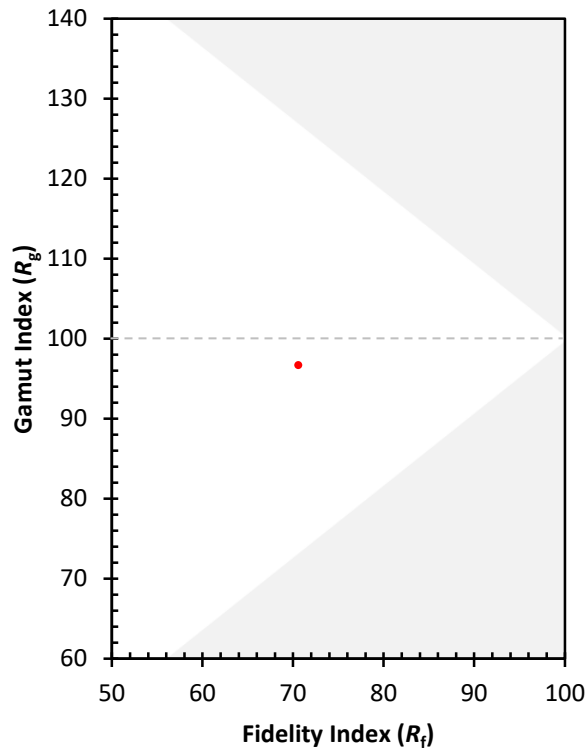
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 84 | CES76 = 46 |
| CES02 = 61 | CES27 = 76 | CES52 = 86 | CES77 = 70 |
| CES03 = 30 | CES28 = 78 | CES53 = 71 | CES78 = 50 |
| CES04 = 70 | CES29 = 46 | CES54 = 77 | CES79 = 77 |
| CES05 = 47 | CES30 = 49 | CES55 = 76 | CES80 = 75 |
| CES06 = 50 | CES31 = 52 | CES56 = 65 | CES81 = 74 |
| CES07 = 40 | CES32 = 51 | CES57 = 62 | CES82 = 90 |
| CES08 = 39 | CES33 = 57 | CES58 = 65 | CES83 = 84 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 89 |
| CES10 = 74 | CES35 = 81 | CES60 = 90 | CES85 = 87 |
| CES11 = 57 | CES36 = 82 | CES61 = 87 | CES86 = 71 |
| CES12 = 63 | CES37 = 74 | CES62 = 73 | CES87 = 77 |
| CES13 = 42 | CES38 = 58 | CES63 = 72 | CES88 = 75 |
| CES14 = 74 | CES39 = 91 | CES64 = 70 | CES89 = 72 |
| CES15 = 71 | CES40 = 84 | CES65 = 63 | CES90 = 71 |
| CES16 = 46 | CES41 = 79 | CES66 = 65 | CES91 = 95 |
| CES17 = 49 | CES42 = 74 | CES67 = 63 | CES92 = 68 |
| CES18 = 56 | CES43 = 69 | CES68 = 70 | CES93 = 82 |
| CES19 = 72 | CES44 = 98 | CES69 = 81 | CES94 = 56 |
| CES20 = 65 | CES45 = 79 | CES70 = 59 | CES95 = 74 |
| CES21 = 86 | CES46 = 75 | CES71 = 57 | CES96 = 78 |
| CES22 = 78 | CES47 = 69 | CES72 = 85 | CES97 = 82 |
| CES23 = 92 | CES48 = 58 | CES73 = 50 | CES98 = 71 |
| CES24 = 91 | CES49 = 74 | CES74 = 91 | CES99 = 59 |
| CES25 = 72 | CES50 = 83 | CES75 = 54 |            |



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)