

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: P437135

Luminaire Tested: **ISS-SA1B-730-U-SL2**

Issue Date: 12/9/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P437135  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-14)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/9/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: ISS-SA1B-730-U-SL2  
Description: IMPACT ELITE LED QUARTER SPHERE LUMINAIRE  
(1) 70 CRI, 3000K, 450mA LIGHTSQUARE WITH 16 LEDS AND TYPE II SPILL LIGHT  
ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

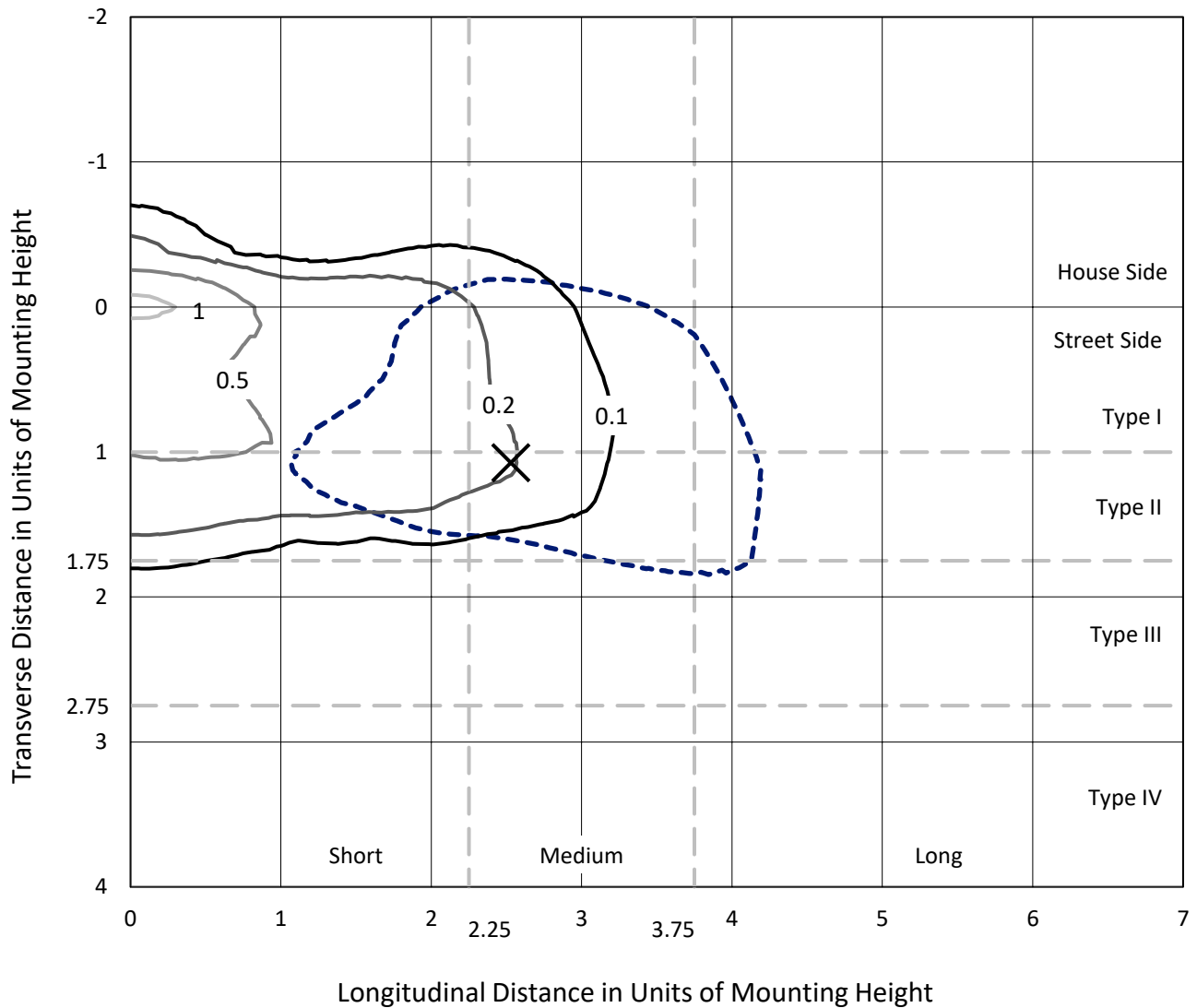
Lumens per Lamp: N/A  
Luminaire Lumens: 3143 lumens  
Efficiency: N/A  
Efficacy: 123.7 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G1  
  
Input Watts (W): 25.4  
Input Voltage (V): NR  
Input Current (Ain): 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

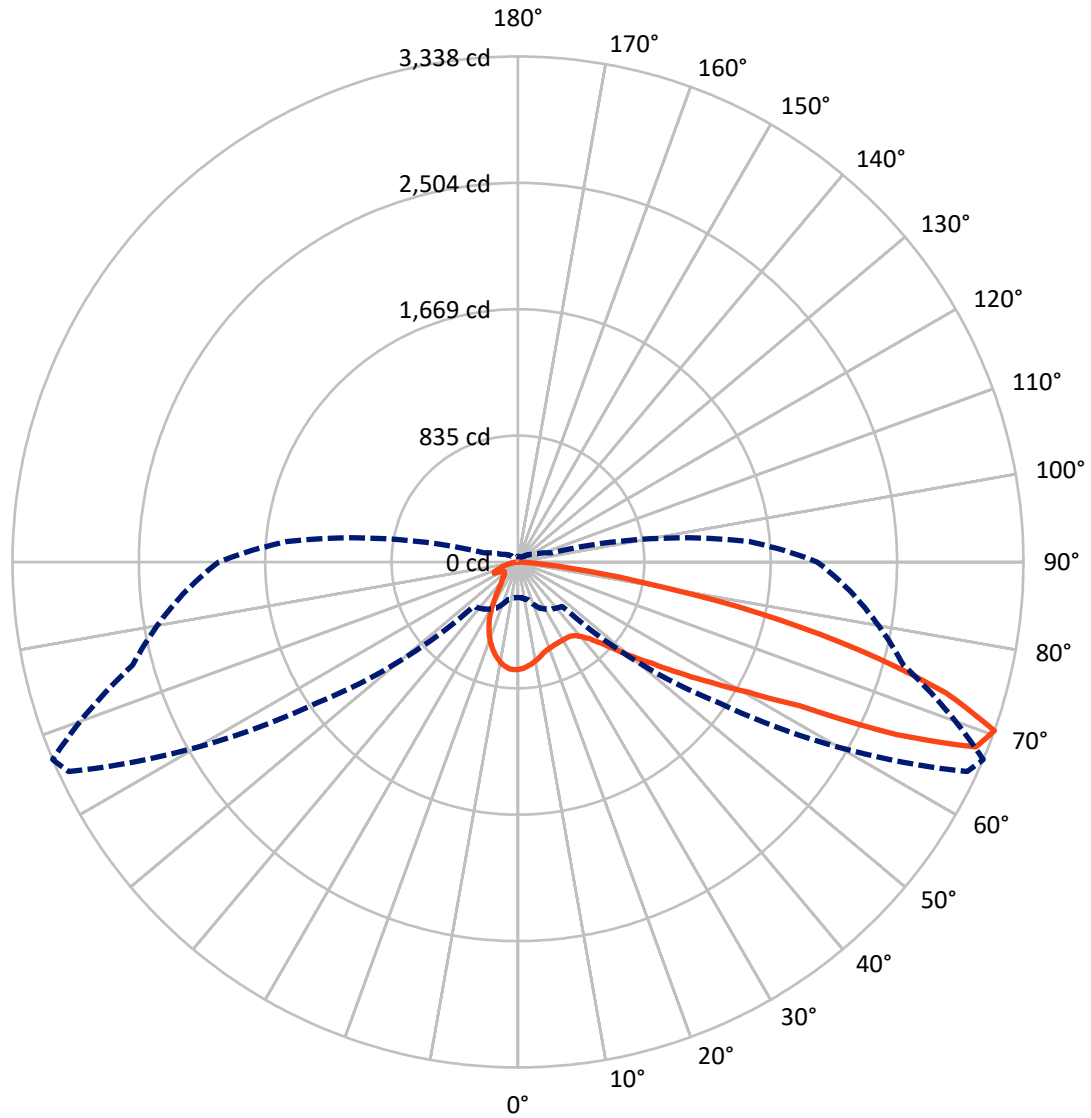
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.1 fc  
 Type III - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 67-Deg Lateral      - - - Horizontal Cone Through 70-Deg Vertical

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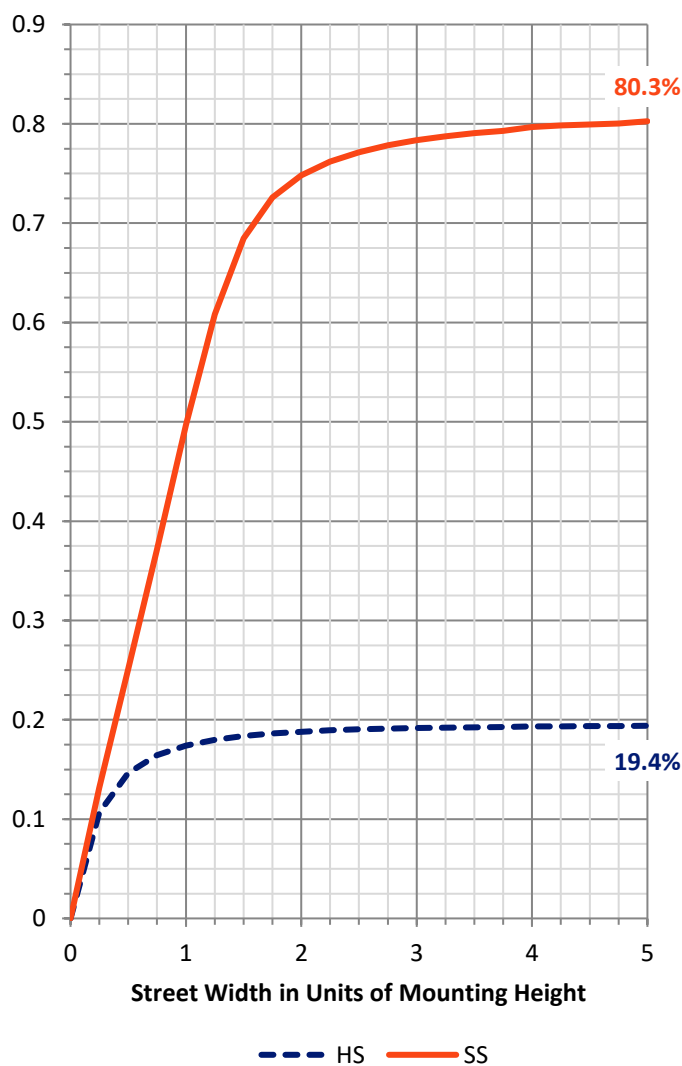
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 615.5    | 0.0    | 615.5  |
|                    | % Fixture | 19.6     | 0.0    | 19.6   |
| <b>Street Side</b> | Lumens    | 2527.4   | 0.0    | 2527.4 |
|                    | % Fixture | 80.4     | 0.0    | 80.4   |
| <b>Total</b>       | Lumens    | 3143.0   | 0.0    | 3143.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 62.3   | 2.0       |
| 10°-20°   | 150.8  | 4.8       |
| 20°-30°   | 207.9  | 6.6       |
| 30°-40°   | 280.8  | 8.9       |
| 40°-50°   | 416.7  | 13.3      |
| 50°-60°   | 641.3  | 20.4      |
| 60°-70°   | 792.9  | 25.2      |
| 70°-80°   | 531.1  | 16.9      |
| 80°-90°   | 59.2   | 1.9       |
| 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°    | 3143.0 | 100.0     |
| 0°-180°   | 3143.0 | 100.0     |

**Coefficient of Utilization**



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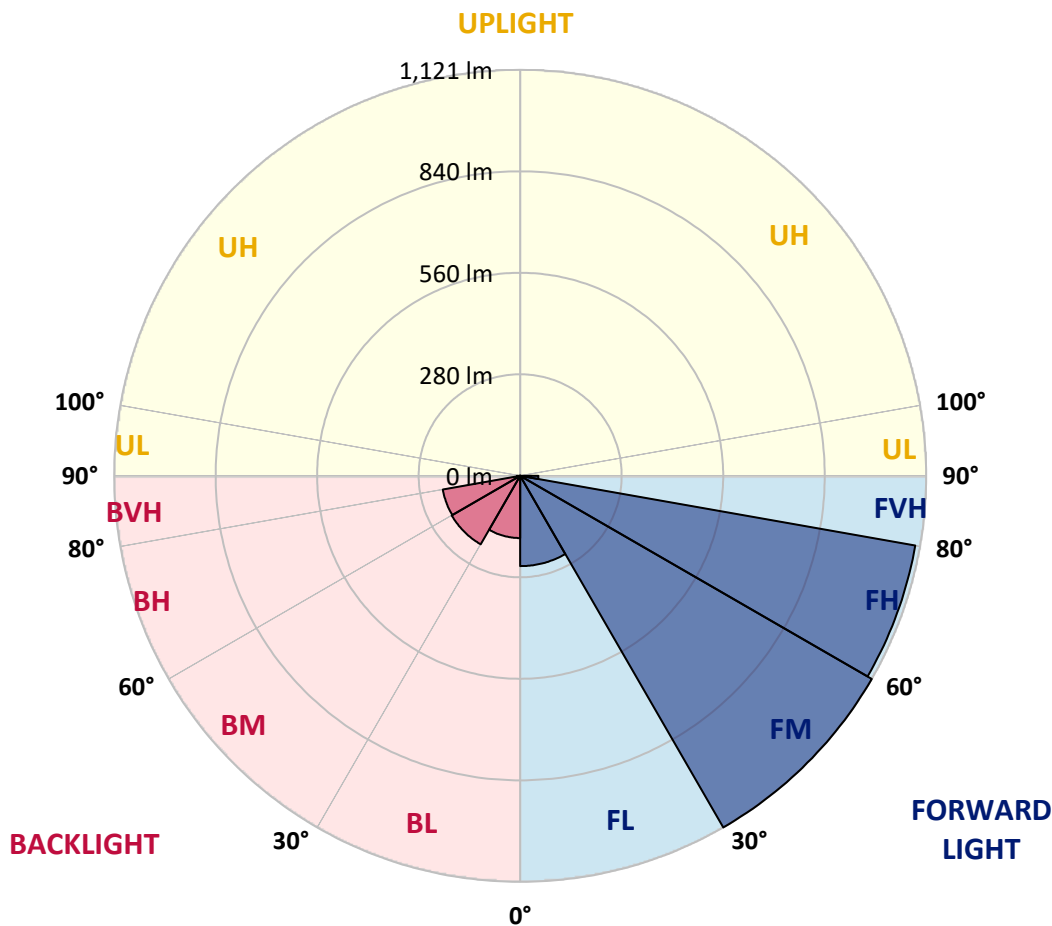
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 249.3  | 7.9       |                         |      |         |
| FM (30°-60°)   | 1120.5 | 35.7      |                         |      |         |
| FH (60°-80°)   | 1107.2 | 35.2      |                         |      | G1/1800 |
| FVH (80°-90°)  | 50.4   | 1.6       |                         |      | G1/100  |
| BL (0°-30°)    | 171.7  | 5.5       | B1/500                  |      |         |
| BM (30°-60°)   | 218.2  | 6.9       | B0/220                  |      |         |
| BH (60°-80°)   | 216.8  | 6.9       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 8.8    | 0.3       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 67°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 709.7  | 709.7  | 709.7  | 709.7  | 709.7  | 709.7  | 709.7  | 709.7  | 709.7  | 709.7  | 709.7  |
| 2.5°  | 671.0  | 675.6  | 676.7  | 680.1  | 684.7  | 689.2  | 694.9  | 701.8  | 702.9  | 706.3  | 713.1  |
| 5°    | 625.5  | 627.8  | 630.1  | 636.9  | 644.9  | 659.7  | 674.5  | 688.1  | 690.4  | 701.8  | 714.3  |
| 7.5°  | 583.5  | 589.2  | 590.3  | 596.0  | 608.5  | 626.7  | 647.2  | 671.0  | 677.9  | 693.8  | 713.1  |
| 10°   | 552.8  | 556.2  | 558.4  | 568.7  | 578.9  | 599.4  | 624.4  | 654.0  | 660.8  | 684.7  | 712.0  |
| 12.5° | 527.7  | 533.4  | 536.8  | 543.7  | 559.6  | 577.8  | 602.8  | 634.6  | 643.7  | 673.3  | 707.4  |
| 15°   | 514.1  | 518.6  | 519.8  | 527.7  | 540.2  | 558.4  | 582.3  | 618.7  | 625.5  | 661.9  | 707.4  |
| 17.5° | 510.7  | 511.8  | 513.0  | 517.5  | 527.7  | 542.5  | 567.5  | 605.1  | 613.0  | 657.4  | 707.4  |
| 20°   | 517.5  | 517.5  | 517.5  | 515.2  | 523.2  | 534.6  | 559.6  | 593.7  | 605.1  | 652.8  | 710.9  |
| 22.5° | 533.4  | 534.6  | 531.1  | 525.5  | 522.0  | 530.0  | 551.6  | 590.3  | 600.5  | 651.7  | 717.7  |
| 25°   | 556.2  | 557.3  | 555.0  | 547.1  | 531.1  | 530.0  | 548.2  | 586.9  | 596.0  | 650.6  | 716.5  |
| 27.5° | 586.9  | 593.7  | 586.9  | 577.8  | 557.3  | 539.1  | 551.6  | 584.6  | 594.8  | 650.6  | 718.8  |
| 30°   | 630.1  | 634.6  | 631.2  | 616.5  | 590.3  | 558.4  | 556.2  | 586.9  | 594.8  | 649.4  | 717.7  |
| 32.5° | 673.3  | 674.5  | 677.9  | 667.6  | 635.8  | 586.9  | 568.7  | 589.2  | 596.0  | 648.3  | 714.3  |
| 35°   | 706.3  | 713.1  | 727.9  | 729.0  | 691.5  | 627.8  | 594.8  | 598.3  | 600.5  | 651.7  | 710.9  |
| 37.5° | 748.4  | 750.7  | 774.5  | 792.7  | 759.8  | 684.7  | 631.2  | 615.3  | 616.5  | 663.1  | 716.5  |
| 40°   | 787.1  | 796.2  | 829.1  | 851.9  | 840.5  | 760.9  | 681.3  | 646.0  | 648.3  | 683.6  | 730.2  |
| 42.5° | 845.1  | 851.9  | 886.0  | 917.9  | 921.3  | 847.3  | 750.7  | 698.3  | 692.7  | 723.4  | 759.8  |
| 45°   | 896.2  | 904.2  | 947.4  | 994.1  | 1010.0 | 945.1  | 837.1  | 770.0  | 760.9  | 790.5  | 814.4  |
| 47.5° | 967.9  | 981.5  | 1015.7 | 1069.1 | 1122.6 | 1064.6 | 947.4  | 867.8  | 859.8  | 880.3  | 887.1  |
| 50°   | 1036.1 | 1044.1 | 1072.5 | 1137.4 | 1231.8 | 1214.7 | 1082.8 | 995.2  | 982.7  | 986.1  | 1002.0 |
| 52.5° | 1046.4 | 1049.8 | 1079.4 | 1147.6 | 1325.0 | 1397.8 | 1248.8 | 1138.5 | 1115.8 | 1119.2 | 1138.5 |
| 55°   | 969.0  | 982.7  | 1004.3 | 1099.8 | 1331.9 | 1601.4 | 1482.0 | 1327.3 | 1292.0 | 1279.5 | 1295.5 |
| 57.5° | 808.7  | 824.6  | 855.3  | 954.2  | 1253.4 | 1711.7 | 1864.1 | 1552.5 | 1497.9 | 1439.9 | 1459.2 |
| 60°   | 596.0  | 613.0  | 632.4  | 729.0  | 1054.3 | 1728.8 | 2244.0 | 1825.5 | 1744.7 | 1600.3 | 1610.5 |
| 62.5° | 457.2  | 457.2  | 474.3  | 514.1  | 705.2  | 1604.8 | 2466.9 | 2287.2 | 2089.3 | 1795.9 | 1783.4 |
| 65°   | 369.6  | 374.2  | 391.3  | 428.8  | 445.8  | 1139.6 | 2555.7 | 2958.3 | 2747.9 | 2030.2 | 1965.4 |
| 67.5° | 306.0  | 307.1  | 326.4  | 385.6  | 390.1  | 626.7  | 2317.9 | 3310.9 | 3260.8 | 2323.6 | 2158.7 |
| 70°   | 234.3  | 235.4  | 258.2  | 335.5  | 379.9  | 415.1  | 1621.9 | 3274.5 | 3338.2 | 2635.3 | 2200.8 |
| 72.5° | 155.8  | 162.6  | 189.9  | 266.1  | 378.7  | 391.3  | 880.3  | 2863.9 | 2956.0 | 2757.0 | 2059.8 |
| 75°   | 96.7   | 97.8   | 126.2  | 184.3  | 348.0  | 390.1  | 517.5  | 2231.5 | 2345.2 | 2287.2 | 1786.8 |
| 77.5° | 59.1   | 61.4   | 75.1   | 120.6  | 269.6  | 391.3  | 368.5  | 1535.4 | 1629.8 | 1501.3 | 1053.2 |
| 80°   | 36.4   | 36.4   | 43.2   | 72.8   | 175.2  | 350.3  | 317.3  | 892.8  | 883.7  | 555.0  | 299.1  |
| 82.5° | 13.6   | 14.8   | 22.7   | 39.8   | 88.7   | 271.8  | 278.7  | 403.8  | 371.9  | 163.8  | 106.9  |
| 85°   | 2.3    | 2.3    | 4.5    | 12.5   | 23.9   | 112.6  | 154.7  | 142.2  | 119.4  | 50.0   | 44.4   |
| 87.5° | 0.0    | 0.0    | 0.0    | 1.1    | 1.1    | 2.3    | 3.4    | 3.4    | 3.4    | 3.4    | 4.5    |
| 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: ISS-SA1B-730-U-SL2

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 709.7  | 709.7  | 709.7 | 709.7 | 709.7 | 709.7 | 709.7 | 709.7 | 709.7 | 709.7 | 709.7 |
| 2.5°  | 713.1  | 715.4  | 714.3 | 710.9 | 707.4 | 705.2 | 699.5 | 696.1 | 697.2 | 697.2 | 698.3 |
| 5°    | 715.4  | 718.8  | 713.1 | 706.3 | 693.8 | 680.1 | 667.6 | 660.8 | 651.7 | 655.1 | 652.8 |
| 7.5°  | 718.8  | 721.1  | 710.9 | 690.4 | 668.8 | 646.0 | 624.4 | 605.1 | 590.3 | 583.5 | 588.0 |
| 10°   | 716.5  | 720.0  | 700.6 | 669.9 | 636.9 | 600.5 | 567.5 | 535.7 | 515.2 | 501.6 | 505.0 |
| 12.5° | 715.4  | 712.0  | 685.8 | 640.3 | 594.8 | 544.8 | 494.8 | 456.1 | 422.0 | 408.3 | 410.6 |
| 15°   | 710.9  | 708.6  | 667.6 | 609.6 | 547.1 | 476.6 | 410.6 | 360.5 | 319.6 | 306.0 | 310.5 |
| 17.5° | 713.1  | 706.3  | 646.0 | 572.1 | 486.8 | 400.4 | 319.6 | 270.7 | 250.2 | 245.7 | 244.5 |
| 20°   | 710.9  | 698.3  | 624.4 | 531.1 | 423.1 | 310.5 | 237.7 | 211.5 | 211.5 | 218.4 | 219.5 |
| 22.5° | 713.1  | 691.5  | 600.5 | 484.5 | 350.3 | 233.2 | 185.4 | 178.6 | 188.8 | 203.6 | 203.6 |
| 25°   | 713.1  | 683.6  | 574.4 | 432.2 | 274.1 | 177.4 | 158.1 | 158.1 | 171.7 | 185.4 | 184.3 |
| 27.5° | 708.6  | 667.6  | 544.8 | 376.5 | 203.6 | 146.7 | 138.8 | 142.2 | 151.3 | 162.6 | 161.5 |
| 30°   | 697.2  | 651.7  | 508.4 | 311.6 | 154.7 | 129.7 | 128.5 | 129.7 | 134.2 | 141.0 | 139.9 |
| 32.5° | 687.0  | 633.5  | 473.1 | 242.3 | 130.8 | 120.6 | 119.4 | 120.6 | 121.7 | 124.0 | 124.0 |
| 35°   | 680.1  | 617.6  | 431.1 | 186.5 | 118.3 | 114.9 | 112.6 | 112.6 | 110.3 | 111.5 | 111.5 |
| 37.5° | 672.2  | 602.8  | 387.8 | 145.6 | 111.5 | 109.2 | 106.9 | 103.5 | 103.5 | 101.2 | 101.2 |
| 40°   | 672.2  | 591.4  | 343.5 | 122.8 | 106.9 | 105.8 | 101.2 | 96.7  | 94.4  | 94.4  | 94.4  |
| 42.5° | 690.4  | 591.4  | 302.5 | 112.6 | 102.4 | 101.2 | 95.5  | 91.0  | 88.7  | 88.7  | 88.7  |
| 45°   | 721.1  | 598.3  | 260.5 | 105.8 | 99.0  | 96.7  | 89.9  | 85.3  | 83.0  | 83.0  | 81.9  |
| 47.5° | 774.5  | 626.7  | 222.9 | 102.4 | 95.5  | 92.1  | 84.2  | 79.6  | 77.3  | 77.3  | 77.3  |
| 50°   | 864.4  | 683.6  | 192.2 | 99.0  | 92.1  | 86.4  | 79.6  | 75.1  | 72.8  | 72.8  | 71.7  |
| 52.5° | 988.4  | 768.9  | 177.4 | 96.7  | 87.6  | 80.8  | 75.1  | 70.5  | 68.2  | 67.1  | 67.1  |
| 55°   | 1137.4 | 897.4  | 175.2 | 95.5  | 83.0  | 76.2  | 70.5  | 66.0  | 63.7  | 62.6  | 62.6  |
| 57.5° | 1300.0 | 1038.4 | 191.1 | 93.3  | 78.5  | 70.5  | 66.0  | 61.4  | 59.1  | 58.0  | 58.0  |
| 60°   | 1457.0 | 1193.1 | 242.3 | 91.0  | 75.1  | 66.0  | 60.3  | 56.9  | 54.6  | 53.5  | 53.5  |
| 62.5° | 1638.9 | 1355.7 | 354.9 | 92.1  | 72.8  | 61.4  | 55.7  | 52.3  | 51.2  | 50.0  | 50.0  |
| 65°   | 1839.1 | 1542.3 | 453.8 | 101.2 | 73.9  | 56.9  | 51.2  | 48.9  | 46.6  | 45.5  | 45.5  |
| 67.5° | 2016.5 | 1662.8 | 378.7 | 117.1 | 80.8  | 53.5  | 45.5  | 44.4  | 42.1  | 40.9  | 42.1  |
| 70°   | 1976.7 | 1535.4 | 233.2 | 118.3 | 81.9  | 51.2  | 40.9  | 38.7  | 36.4  | 36.4  | 36.4  |
| 72.5° | 1802.7 | 1354.6 | 162.6 | 102.4 | 72.8  | 45.5  | 35.3  | 33.0  | 31.8  | 31.8  | 31.8  |
| 75°   | 1517.2 | 1116.9 | 129.7 | 83.0  | 56.9  | 37.5  | 29.6  | 28.4  | 27.3  | 26.2  | 26.2  |
| 77.5° | 830.3  | 607.4  | 96.7  | 63.7  | 42.1  | 28.4  | 25.0  | 22.7  | 21.6  | 21.6  | 21.6  |
| 80°   | 243.4  | 208.1  | 60.3  | 45.5  | 27.3  | 20.5  | 19.3  | 17.1  | 15.9  | 15.9  | 15.9  |
| 82.5° | 102.4  | 86.4   | 36.4  | 25.0  | 18.2  | 13.6  | 12.5  | 11.4  | 10.2  | 9.1   | 10.2  |
| 85°   | 39.8   | 42.1   | 22.7  | 14.8  | 10.2  | 6.8   | 5.7   | 4.5   | 4.5   | 3.4   | 4.5   |
| 87.5° | 4.5    | 5.7    | 4.5   | 3.4   | 2.3   | 1.1   | 1.1   | 1.1   | 1.1   | 1.1   | 1.1   |
| 90°   | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Signify Classified - Internal  
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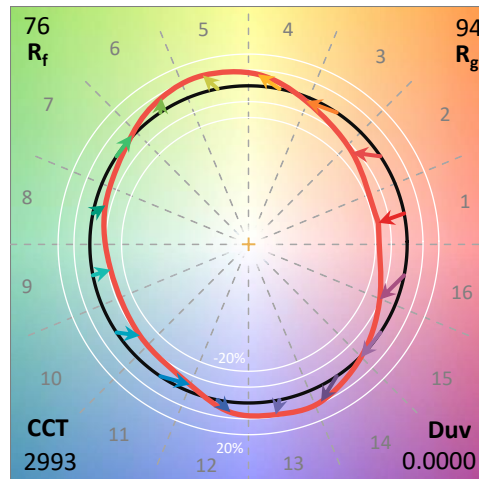
**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-2-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGRAW-EDISON  
 Catalog Number: **SA1C-730-U-5WQ**  
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-2-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. (1) 70 CRI, 3000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2993   | CRI (Ra): | 71.8 | R9:  | -38.3 |
| CIE u':                   | 0.2508 | R1:       | 67.5 | R10: | 62.5  |
| CIE v':                   | 0.5215 | R2:       | 82.9 | R11: | 63.7  |
| Duv:                      | 0.0000 | R3:       | 94.7 | R12: | 57.8  |
| CIE x:                    | 0.4374 | R4:       | 67.7 | R13: | 70.4  |
| CIE y:                    | 0.4043 | R5:       | 67.9 | R14: | 97.3  |
| CIE z:                    | 0.1583 | R6:       | 77.6 |      |       |
| Peak Wavelength (nm):     | 593    | R7:       | 76.0 |      |       |
| Dominant Wavelength (nm): | 582    | R8:       | 40.5 |      |       |
| Purity:                   | 53     |           |      |      |       |
| Rf:                       | 75.7   |           |      |      |       |
| Rg:                       | 93.9   |           |      |      |       |



**Test Conditions**

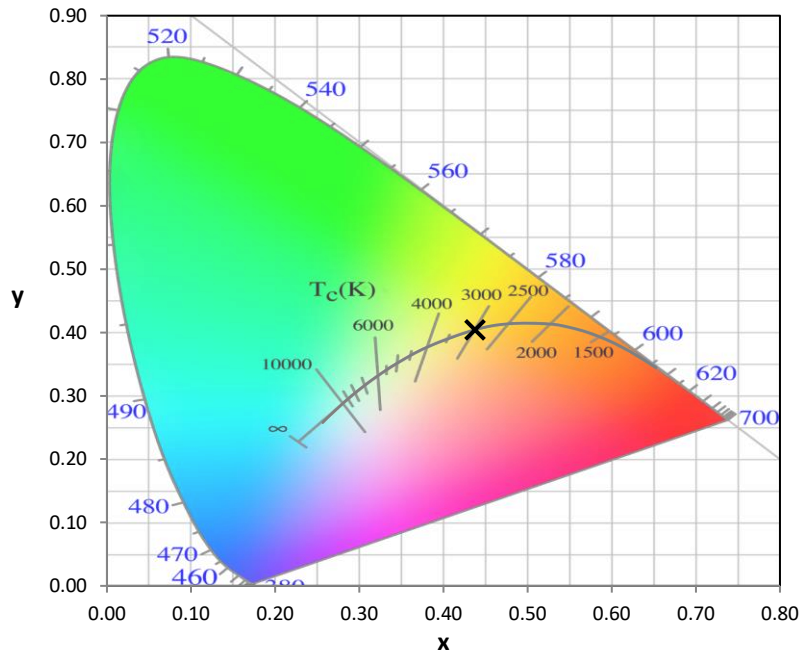
Stabilization Time: 53M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0./44%  
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-2-R4

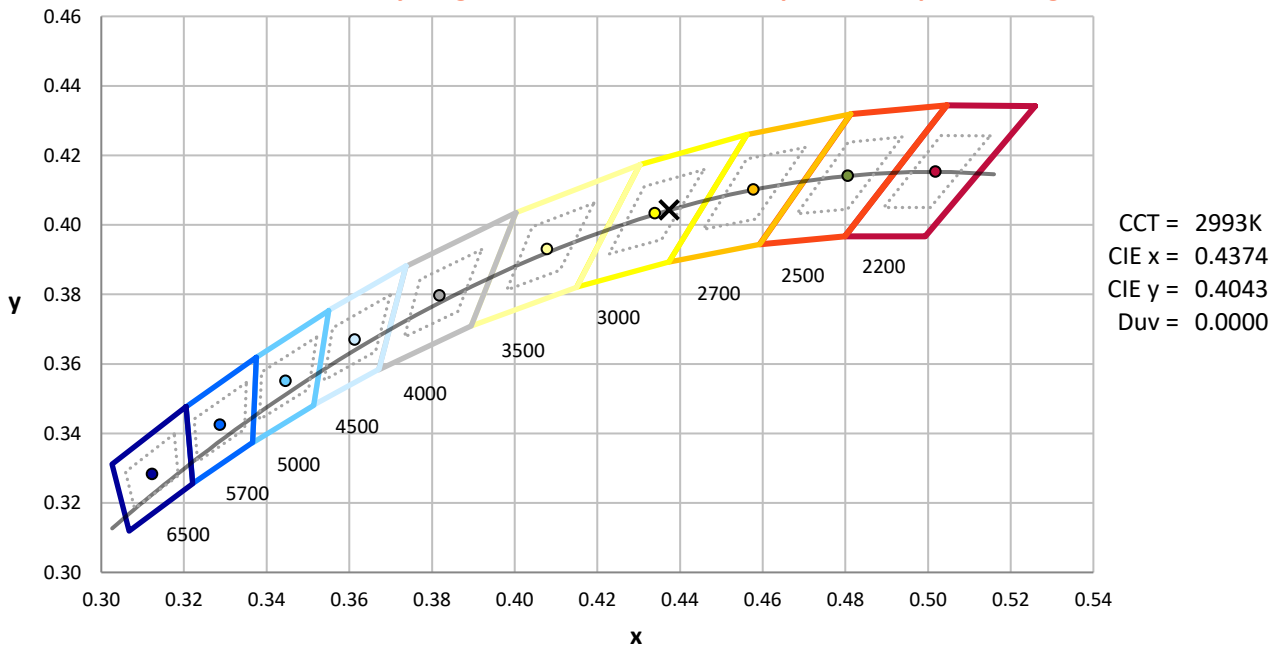
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

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CIE 1931 Chromaticity Diagram



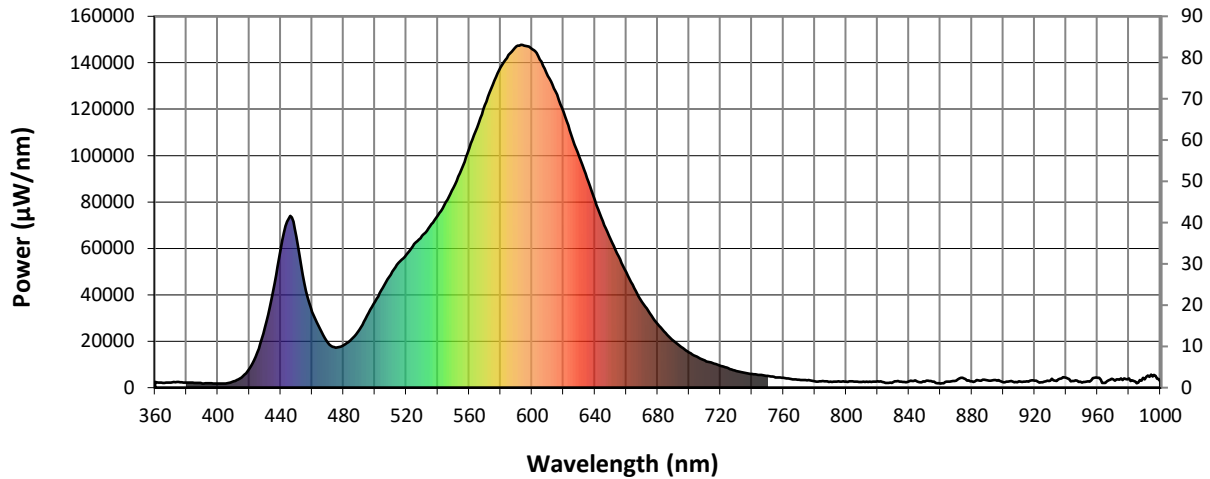
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 3000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**

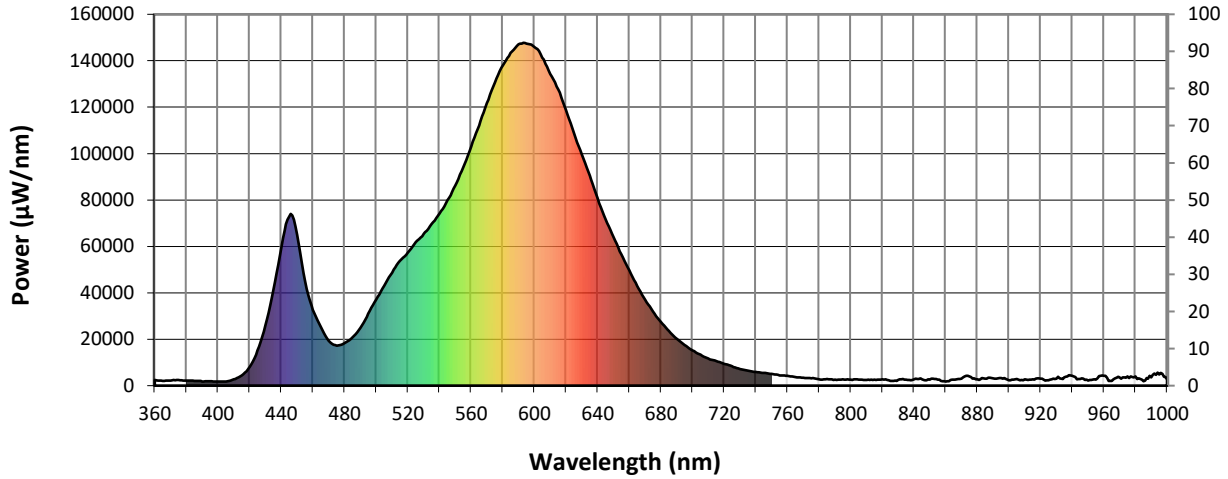


#####

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 2397          | NR            | 490    | 24908         | NR            | 620    | 118784        | NR            | 750    | 5037          | NR            | 880    | 2677          | NR            |
| 365    | 2084          | NR            | 495    | 30998         | NR            | 625    | 108951        | NR            | 755    | 4413          | NR            | 885    | 2940          | NR            |
| 370    | 2143          | NR            | 500    | 37103         | NR            | 630    | 99573         | NR            | 760    | 4189          | NR            | 890    | 3116          | NR            |
| 375    | 2413          | NR            | 505    | 42987         | NR            | 635    | 90444         | NR            | 765    | 3677          | NR            | 895    | 3345          | NR            |
| 380    | 2172          | NR            | 510    | 48702         | NR            | 640    | 80749         | NR            | 770    | 3366          | NR            | 900    | 2312          | NR            |
| 385    | 1997          | NR            | 515    | 53741         | NR            | 645    | 71664         | NR            | 775    | 3211          | NR            | 905    | 2829          | NR            |
| 390    | 1830          | NR            | 520    | 57283         | NR            | 650    | 63936         | NR            | 780    | 2682          | NR            | 910    | 2783          | NR            |
| 395    | 1861          | NR            | 525    | 61876         | NR            | 655    | 56611         | NR            | 785    | 2804          | NR            | 915    | 2662          | NR            |
| 400    | 1717          | NR            | 530    | 65398         | NR            | 660    | 49763         | NR            | 790    | 2581          | NR            | 920    | 3047          | NR            |
| 405    | 1761          | NR            | 535    | 69597         | NR            | 665    | 42891         | NR            | 795    | 2711          | NR            | 925    | 2256          | NR            |
| 410    | 2680          | NR            | 540    | 74214         | NR            | 670    | 36939         | NR            | 800    | 2609          | NR            | 930    | 2976          | NR            |
| 415    | 4374          | NR            | 545    | 79911         | NR            | 675    | 31946         | NR            | 805    | 2581          | NR            | 935    | 3503          | NR            |
| 420    | 8071          | NR            | 550    | 86153         | NR            | 680    | 27385         | NR            | 810    | 2404          | NR            | 940    | 4226          | NR            |
| 425    | 15169         | NR            | 555    | 93952         | NR            | 685    | 23504         | NR            | 815    | 2556          | NR            | 945    | 2930          | NR            |
| 430    | 26038         | NR            | 560    | 102904        | NR            | 690    | 20210         | NR            | 820    | 2742          | NR            | 950    | 2115          | NR            |
| 435    | 41316         | NR            | 565    | 112009        | NR            | 695    | 17459         | NR            | 825    | 2014          | NR            | 955    | 2634          | NR            |
| 440    | 59674         | NR            | 570    | 121662        | NR            | 700    | 15207         | NR            | 830    | 2488          | NR            | 960    | 4200          | NR            |
| 445    | 72751         | NR            | 575    | 130476        | NR            | 705    | 13322         | NR            | 835    | 2625          | NR            | 965    | 1982          | NR            |
| 450    | 65091         | NR            | 580    | 137926        | NR            | 710    | 11676         | NR            | 840    | 2754          | NR            | 970    | 3613          | NR            |
| 455    | 44894         | NR            | 585    | 143406        | NR            | 715    | 10626         | NR            | 845    | 2708          | NR            | 975    | 4034          | NR            |
| 460    | 32712         | NR            | 590    | 147039        | NR            | 720    | 9416          | NR            | 850    | 2608          | NR            | 980    | 3922          | NR            |
| 465    | 25296         | NR            | 595    | 147365        | NR            | 725    | 8333          | NR            | 855    | 2605          | NR            | 985    | 1909          | NR            |
| 470    | 19318         | NR            | 600    | 145800        | NR            | 730    | 7134          | NR            | 860    | 1765          | NR            | 990    | 3617          | NR            |
| 475    | 17265         | NR            | 605    | 141363        | NR            | 735    | 6437          | NR            | 865    | 2581          | NR            | 995    | 4767          | NR            |
| 480    | 18260         | NR            | 610    | 134199        | NR            | 740    | 5834          | NR            | 870    | 3016          | NR            | 1000   | 2528          | NR            |
| 485    | 20845         | NR            | 615    | 127683        | NR            | 745    | 5500          | NR            | 875    | 3952          | NR            |        |               |               |

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Scotopic Flux vs. Wavelength



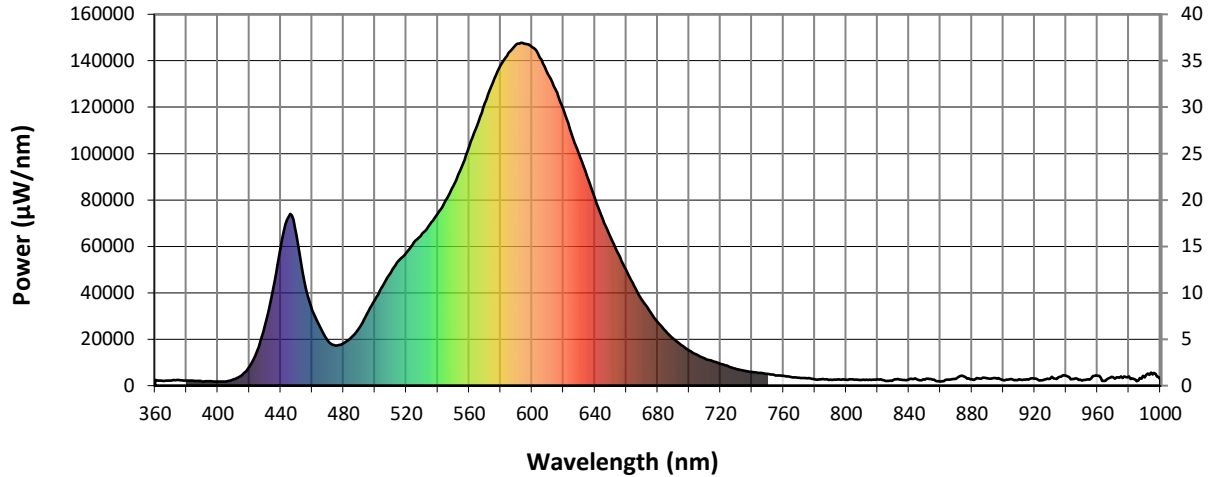
Scotopic Lumens: 8494.8

S/P: 1.23

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 2397          | NR            | 490    | 24908         | NR            | 620    | 118784        | NR            | 750    | 5037          | NR            | 880    | 2677          | NR            |
| 365    | 2084          | NR            | 495    | 30998         | NR            | 625    | 108951        | NR            | 755    | 4413          | NR            | 885    | 2940          | NR            |
| 370    | 2143          | NR            | 500    | 37103         | NR            | 630    | 99573         | NR            | 760    | 4189          | NR            | 890    | 3116          | NR            |
| 375    | 2413          | NR            | 505    | 42987         | NR            | 635    | 90444         | NR            | 765    | 3677          | NR            | 895    | 3345          | NR            |
| 380    | 2172          | NR            | 510    | 48702         | NR            | 640    | 80749         | NR            | 770    | 3366          | NR            | 900    | 2312          | NR            |
| 385    | 1997          | NR            | 515    | 53741         | NR            | 645    | 71664         | NR            | 775    | 3211          | NR            | 905    | 2829          | NR            |
| 390    | 1830          | NR            | 520    | 57283         | NR            | 650    | 63936         | NR            | 780    | 2682          | NR            | 910    | 2783          | NR            |
| 395    | 1861          | NR            | 525    | 61876         | NR            | 655    | 56611         | NR            | 785    | 2804          | NR            | 915    | 2662          | NR            |
| 400    | 1717          | NR            | 530    | 65398         | NR            | 660    | 49763         | NR            | 790    | 2581          | NR            | 920    | 3047          | NR            |
| 405    | 1761          | NR            | 535    | 69597         | NR            | 665    | 42891         | NR            | 795    | 2711          | NR            | 925    | 2256          | NR            |
| 410    | 2680          | NR            | 540    | 74214         | NR            | 670    | 36939         | NR            | 800    | 2609          | NR            | 930    | 2976          | NR            |
| 415    | 4374          | NR            | 545    | 79911         | NR            | 675    | 31946         | NR            | 805    | 2581          | NR            | 935    | 3503          | NR            |
| 420    | 8071          | NR            | 550    | 86153         | NR            | 680    | 27385         | NR            | 810    | 2404          | NR            | 940    | 4226          | NR            |
| 425    | 15169         | NR            | 555    | 93952         | NR            | 685    | 23504         | NR            | 815    | 2556          | NR            | 945    | 2930          | NR            |
| 430    | 26038         | NR            | 560    | 102904        | NR            | 690    | 20210         | NR            | 820    | 2742          | NR            | 950    | 2115          | NR            |
| 435    | 41316         | NR            | 565    | 112009        | NR            | 695    | 17459         | NR            | 825    | 2014          | NR            | 955    | 2634          | NR            |
| 440    | 59674         | NR            | 570    | 121662        | NR            | 700    | 15207         | NR            | 830    | 2488          | NR            | 960    | 4200          | NR            |
| 445    | 72751         | NR            | 575    | 130476        | NR            | 705    | 13322         | NR            | 835    | 2625          | NR            | 965    | 1982          | NR            |
| 450    | 65091         | NR            | 580    | 137926        | NR            | 710    | 11676         | NR            | 840    | 2754          | NR            | 970    | 3613          | NR            |
| 455    | 44894         | NR            | 585    | 143406        | NR            | 715    | 10626         | NR            | 845    | 2708          | NR            | 975    | 4034          | NR            |
| 460    | 32712         | NR            | 590    | 147039        | NR            | 720    | 9416          | NR            | 850    | 2608          | NR            | 980    | 3922          | NR            |
| 465    | 25296         | NR            | 595    | 147365        | NR            | 725    | 8333          | NR            | 855    | 2605          | NR            | 985    | 1909          | NR            |
| 470    | 19318         | NR            | 600    | 145800        | NR            | 730    | 7134          | NR            | 860    | 1765          | NR            | 990    | 3617          | NR            |
| 475    | 17265         | NR            | 605    | 141363        | NR            | 735    | 6437          | NR            | 865    | 2581          | NR            | 995    | 4767          | NR            |
| 480    | 18260         | NR            | 610    | 134199        | NR            | 740    | 5834          | NR            | 870    | 3016          | NR            | 1000   | 2528          | NR            |
| 485    | 20845         | NR            | 615    | 127683        | NR            | 745    | 5500          | NR            | 875    | 3952          | NR            |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 3101.5 M/P: 0.45**

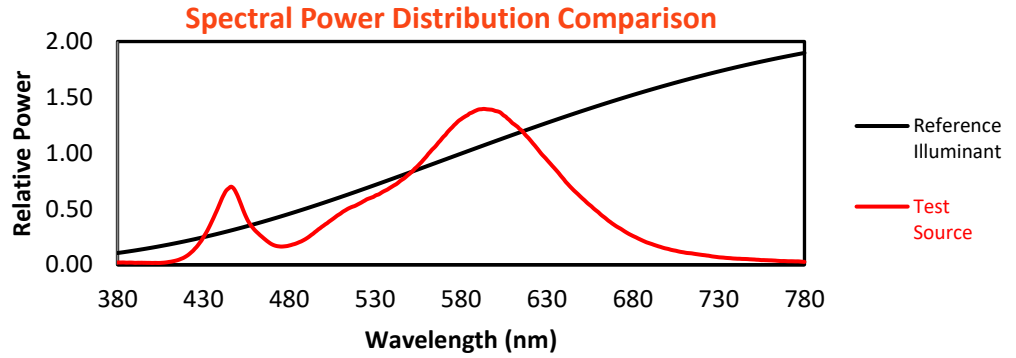
| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 2397          | NR            | 490    | 24908         | NR            | 620    | 118784        | NR            | 750    | 5037          | NR            | 880    | 2677          | NR            |
| 365    | 2084          | NR            | 495    | 30998         | NR            | 625    | 108951        | NR            | 755    | 4413          | NR            | 885    | 2940          | NR            |
| 370    | 2143          | NR            | 500    | 37103         | NR            | 630    | 99573         | NR            | 760    | 4189          | NR            | 890    | 3116          | NR            |
| 375    | 2413          | NR            | 505    | 42987         | NR            | 635    | 90444         | NR            | 765    | 3677          | NR            | 895    | 3345          | NR            |
| 380    | 2172          | NR            | 510    | 48702         | NR            | 640    | 80749         | NR            | 770    | 3366          | NR            | 900    | 2312          | NR            |
| 385    | 1997          | NR            | 515    | 53741         | NR            | 645    | 71664         | NR            | 775    | 3211          | NR            | 905    | 2829          | NR            |
| 390    | 1830          | NR            | 520    | 57283         | NR            | 650    | 63936         | NR            | 780    | 2682          | NR            | 910    | 2783          | NR            |
| 395    | 1861          | NR            | 525    | 61876         | NR            | 655    | 56611         | NR            | 785    | 2804          | NR            | 915    | 2662          | NR            |
| 400    | 1717          | NR            | 530    | 65398         | NR            | 660    | 49763         | NR            | 790    | 2581          | NR            | 920    | 3047          | NR            |
| 405    | 1761          | NR            | 535    | 69597         | NR            | 665    | 42891         | NR            | 795    | 2711          | NR            | 925    | 2256          | NR            |
| 410    | 2680          | NR            | 540    | 74214         | NR            | 670    | 36939         | NR            | 800    | 2609          | NR            | 930    | 2976          | NR            |
| 415    | 4374          | NR            | 545    | 79911         | NR            | 675    | 31946         | NR            | 805    | 2581          | NR            | 935    | 3503          | NR            |
| 420    | 8071          | NR            | 550    | 86153         | NR            | 680    | 27385         | NR            | 810    | 2404          | NR            | 940    | 4226          | NR            |
| 425    | 15169         | NR            | 555    | 93952         | NR            | 685    | 23504         | NR            | 815    | 2556          | NR            | 945    | 2930          | NR            |
| 430    | 26038         | NR            | 560    | 102904        | NR            | 690    | 20210         | NR            | 820    | 2742          | NR            | 950    | 2115          | NR            |
| 435    | 41316         | NR            | 565    | 112009        | NR            | 695    | 17459         | NR            | 825    | 2014          | NR            | 955    | 2634          | NR            |
| 440    | 59674         | NR            | 570    | 121662        | NR            | 700    | 15207         | NR            | 830    | 2488          | NR            | 960    | 4200          | NR            |
| 445    | 72751         | NR            | 575    | 130476        | NR            | 705    | 13322         | NR            | 835    | 2625          | NR            | 965    | 1982          | NR            |
| 450    | 65091         | NR            | 580    | 137926        | NR            | 710    | 11676         | NR            | 840    | 2754          | NR            | 970    | 3613          | NR            |
| 455    | 44894         | NR            | 585    | 143406        | NR            | 715    | 10626         | NR            | 845    | 2708          | NR            | 975    | 4034          | NR            |
| 460    | 32712         | NR            | 590    | 147039        | NR            | 720    | 9416          | NR            | 850    | 2608          | NR            | 980    | 3922          | NR            |
| 465    | 25296         | NR            | 595    | 147365        | NR            | 725    | 8333          | NR            | 855    | 2605          | NR            | 985    | 1909          | NR            |
| 470    | 19318         | NR            | 600    | 145800        | NR            | 730    | 7134          | NR            | 860    | 1765          | NR            | 990    | 3617          | NR            |
| 475    | 17265         | NR            | 605    | 141363        | NR            | 735    | 6437          | NR            | 865    | 2581          | NR            | 995    | 4767          | NR            |
| 480    | 18260         | NR            | 610    | 134199        | NR            | 740    | 5834          | NR            | 870    | 3016          | NR            | 1000   | 2528          | NR            |
| 485    | 20845         | NR            | 615    | 127683        | NR            | 745    | 5500          | NR            | 875    | 3952          | NR            |        |               |               |

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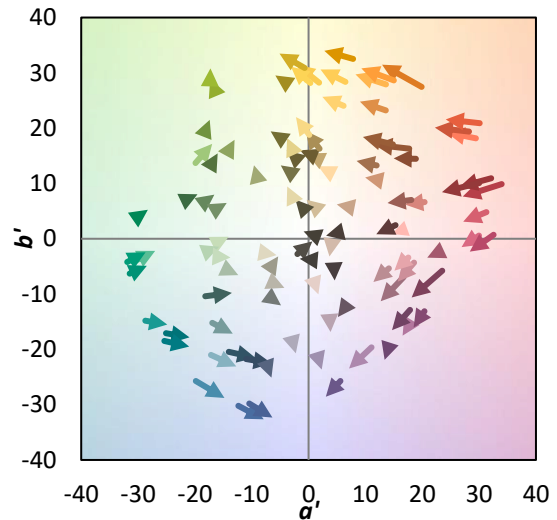
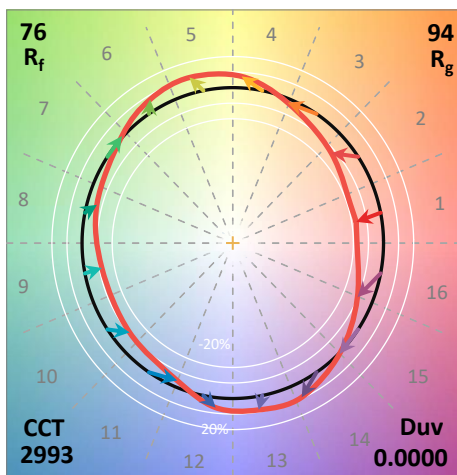
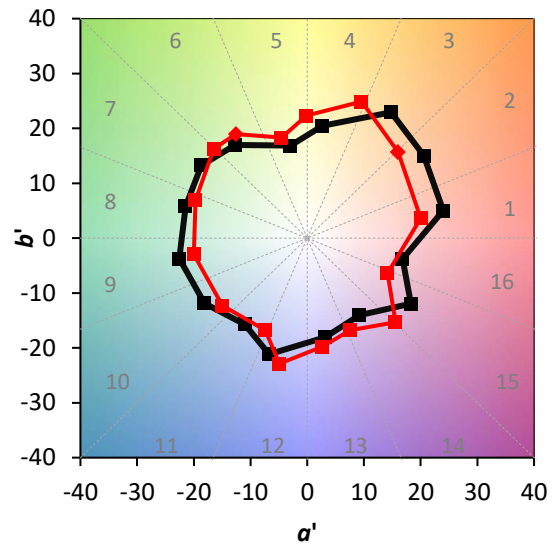
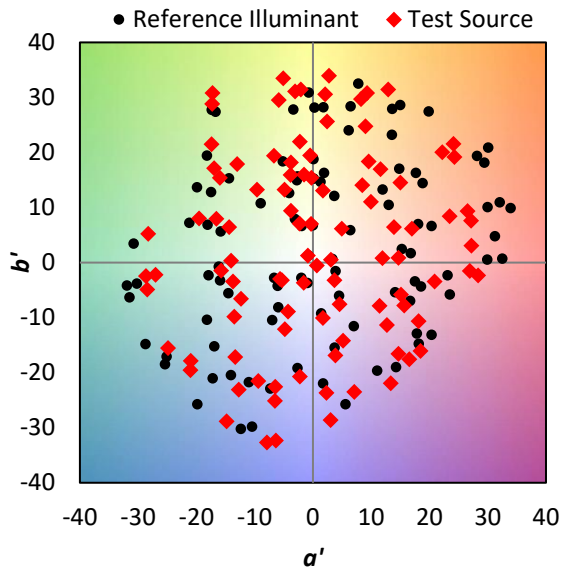
TM-30-18

**Summary**

$R_f = 75.7$   
 $R_g = 93.9$   
 CIE  $R_a = 71.8$   
 $R_g = -38.3$



**Color Vector Graphics**



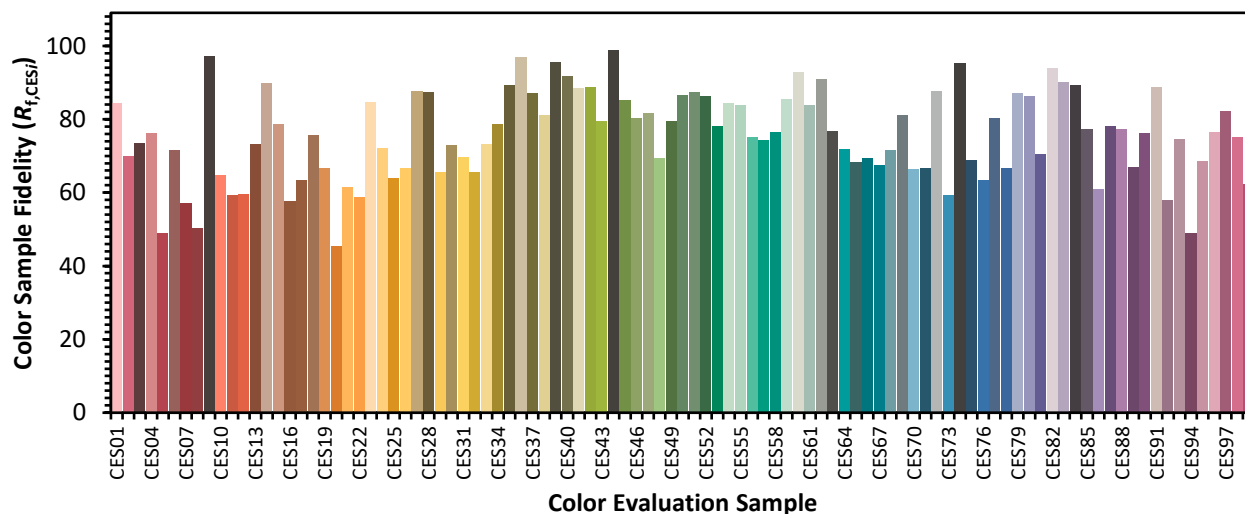


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

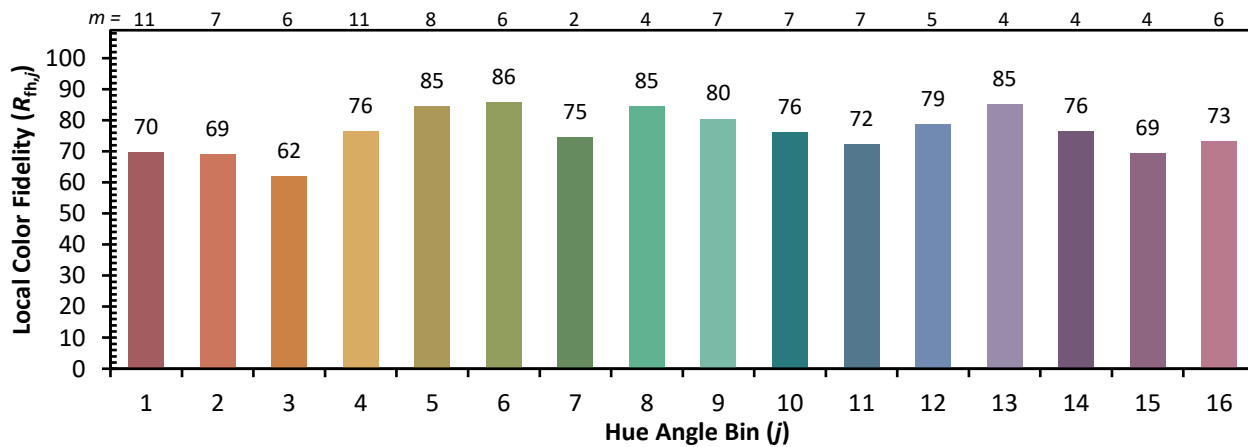
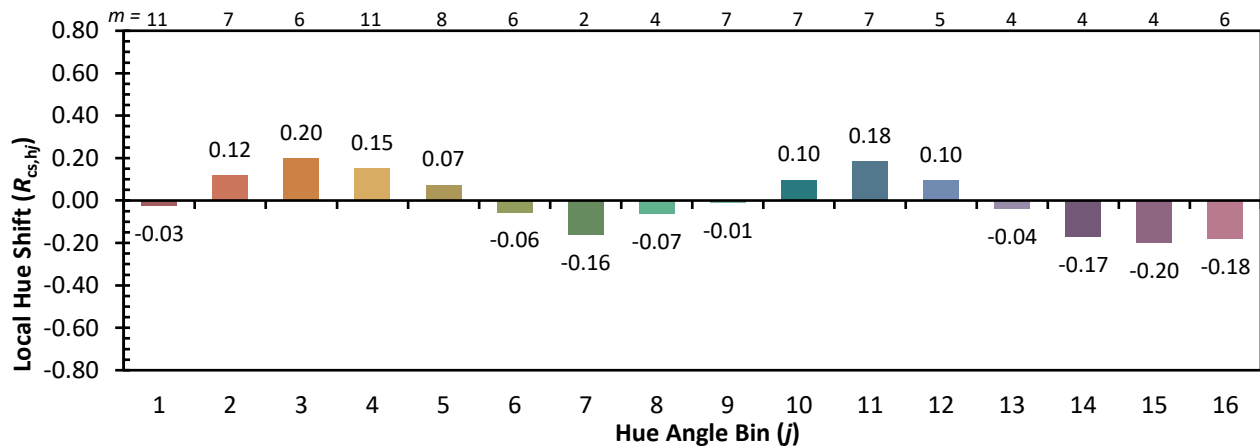
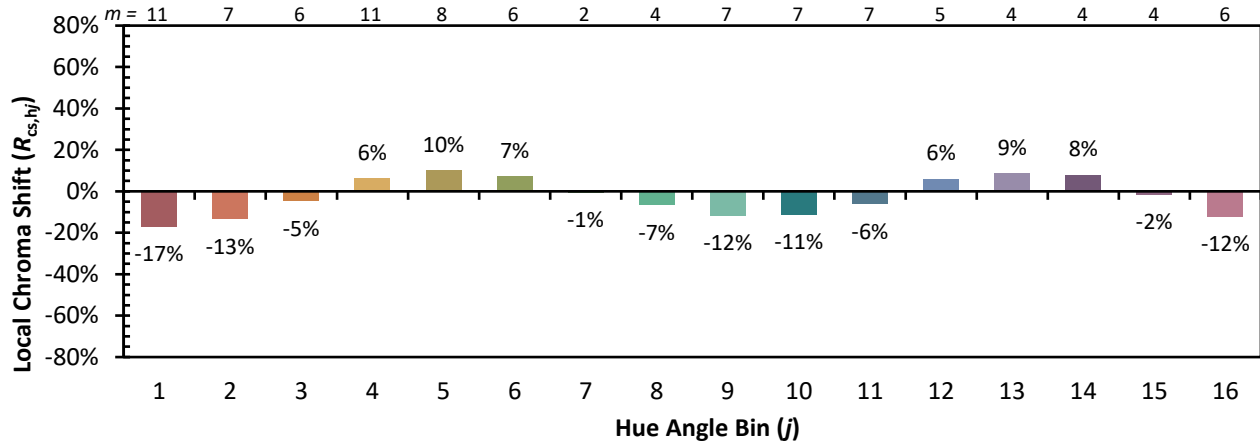
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| CES01 = 86 | CES26 = 67 | CES51 = 87 | CES76 = 63 |
| CES02 = 63 | CES27 = 88 | CES52 = 86 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 67 |
| CES04 = 71 | CES29 = 66 | CES54 = 84 | CES79 = 87 |
| CES05 = 49 | CES30 = 73 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 70 | CES56 = 75 | CES81 = 71 |
| CES07 = 41 | CES32 = 65 | CES57 = 74 | CES82 = 94 |
| CES08 = 40 | CES33 = 73 | CES58 = 76 | CES83 = 90 |
| CES09 = 29 | CES34 = 79 | CES59 = 85 | CES84 = 89 |
| CES10 = 76 | CES35 = 89 | CES60 = 93 | CES85 = 77 |
| CES11 = 59 | CES36 = 97 | CES61 = 84 | CES86 = 61 |
| CES12 = 65 | CES37 = 87 | CES62 = 91 | CES87 = 78 |
| CES13 = 43 | CES38 = 81 | CES63 = 77 | CES88 = 77 |
| CES14 = 74 | CES39 = 95 | CES64 = 72 | CES89 = 67 |
| CES15 = 71 | CES40 = 92 | CES65 = 68 | CES90 = 76 |
| CES16 = 47 | CES41 = 88 | CES66 = 69 | CES91 = 89 |
| CES17 = 50 | CES42 = 89 | CES67 = 67 | CES92 = 58 |
| CES18 = 56 | CES43 = 79 | CES68 = 72 | CES93 = 74 |
| CES19 = 73 | CES44 = 99 | CES69 = 81 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 66 | CES95 = 68 |
| CES21 = 87 | CES46 = 80 | CES71 = 67 | CES96 = 76 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 82 |
| CES23 = 92 | CES48 = 69 | CES73 = 59 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 95 | CES99 = 62 |
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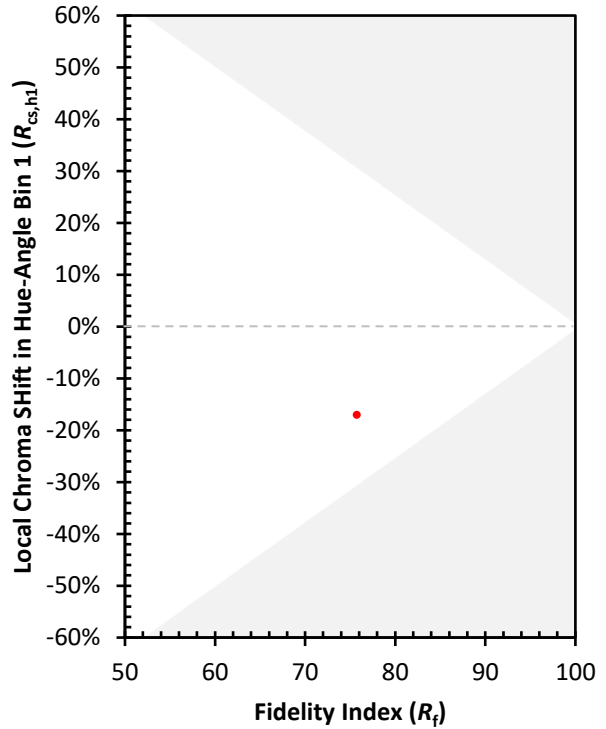
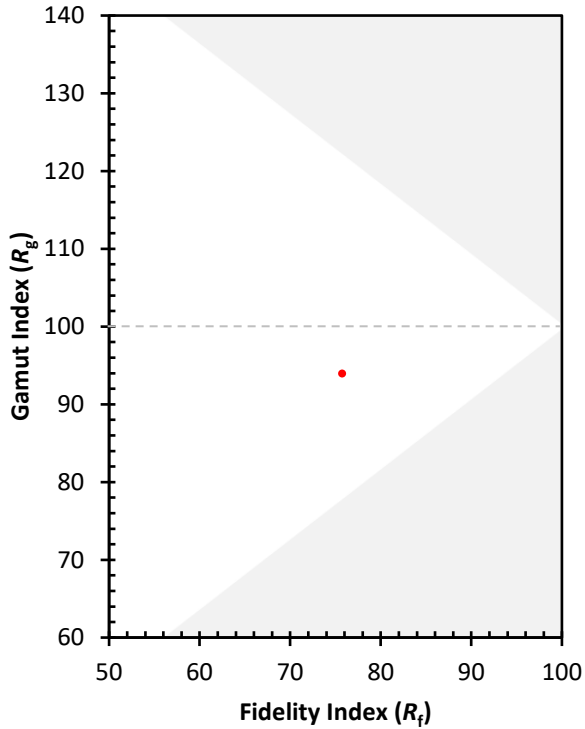
Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)