

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: P438427

Luminaire Tested: **IST-SA1C-827-U-SL2**

Issue Date: 12/10/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P438427  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-14)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/10/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: IST-SA1C-827-U-SL2  
Description: IMPACT ELITE LED TRAPEZOID LUMINAIRE  
(1) 80 CRI, 2700K, 615mA LIGHTSQUARE WITH 16 LEDS AND TYPE II SPILL LIGHT  
ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

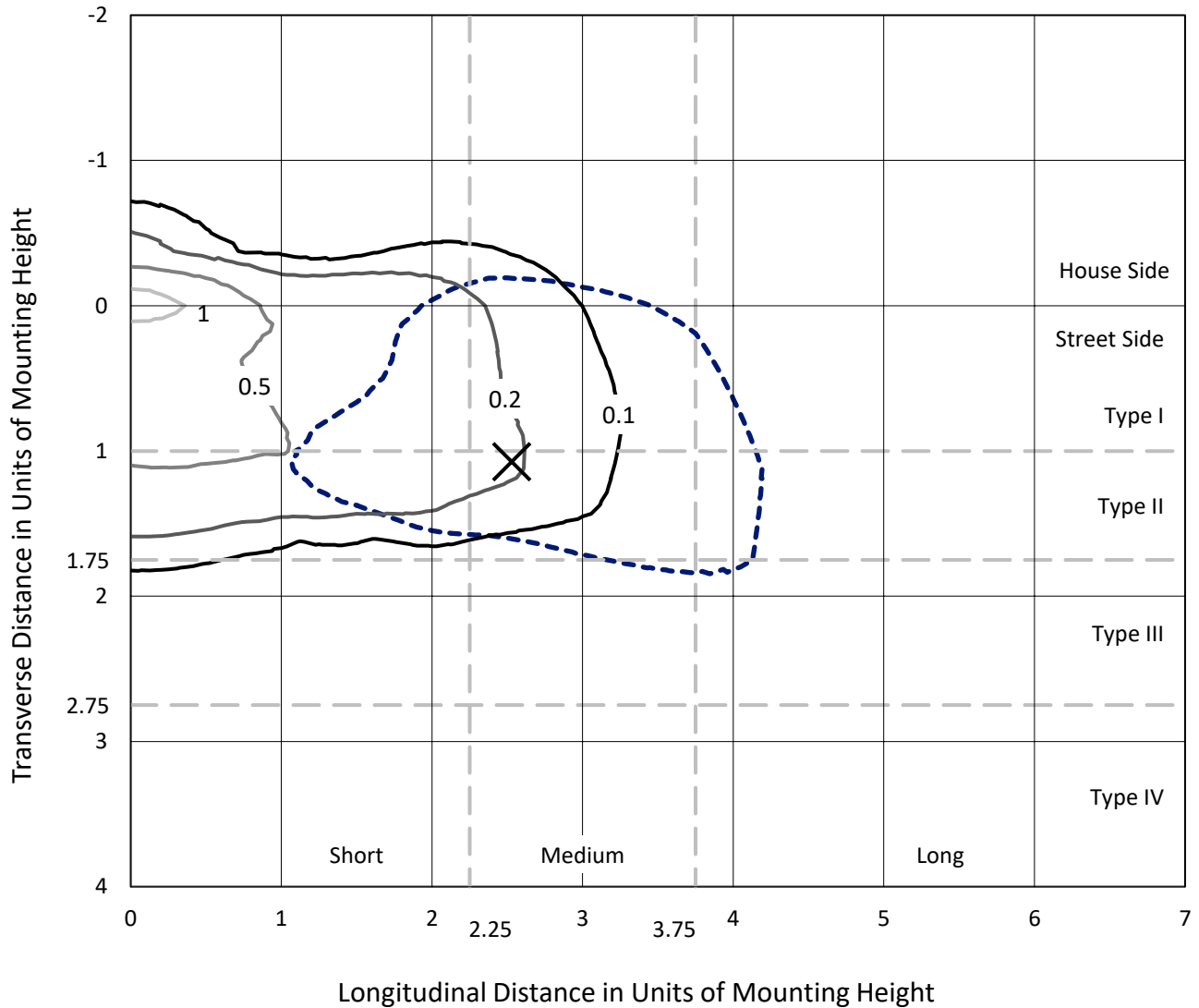
Lumens per Lamp: N/A  
Luminaire Lumens: 3313 lumens  
Efficiency: N/A  
Efficacy: 96.9 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G1  
  
Input Watts (W): 34.2  
Input Voltage (V): NR  
Input Current (Ain): NR  
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

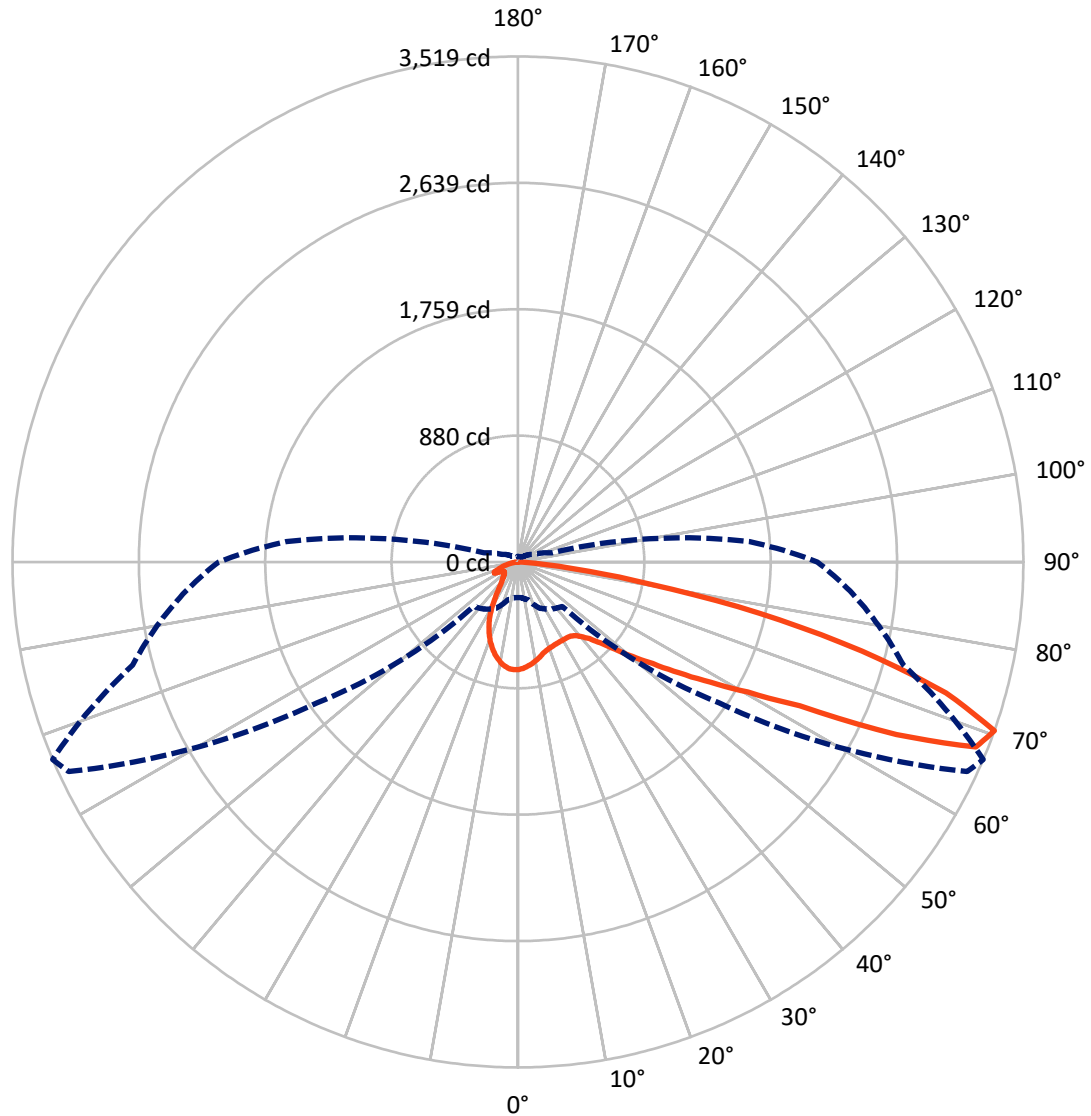
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.2 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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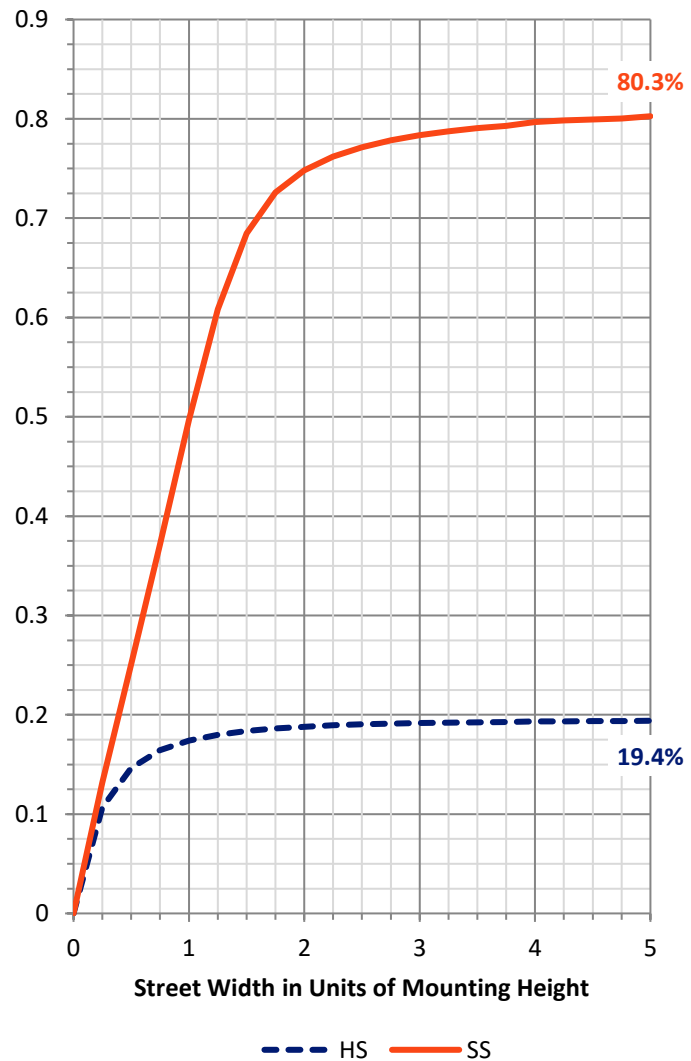
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 648.8    | 0.0    | 648.8  |
|                    | % Fixture | 19.6     | 0.0    | 19.6   |
| <b>Street Side</b> | Lumens    | 2664.2   | 0.0    | 2664.2 |
|                    | % Fixture | 80.4     | 0.0    | 80.4   |
| <b>Total</b>       | Lumens    | 3313.0   | 0.0    | 3313.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 65.7   | 2.0       |
| 10°-20°   | 159.0  | 4.8       |
| 20°-30°   | 219.2  | 6.6       |
| 30°-40°   | 296.0  | 8.9       |
| 40°-50°   | 439.2  | 13.3      |
| 50°-60°   | 676.0  | 20.4      |
| 60°-70°   | 835.8  | 25.2      |
| 70°-80°   | 559.9  | 16.9      |
| 80°-90°   | 62.4   | 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°    | 3313.0 | 100.0     |
| 0°-180°   | 3313.0 | 100.0     |

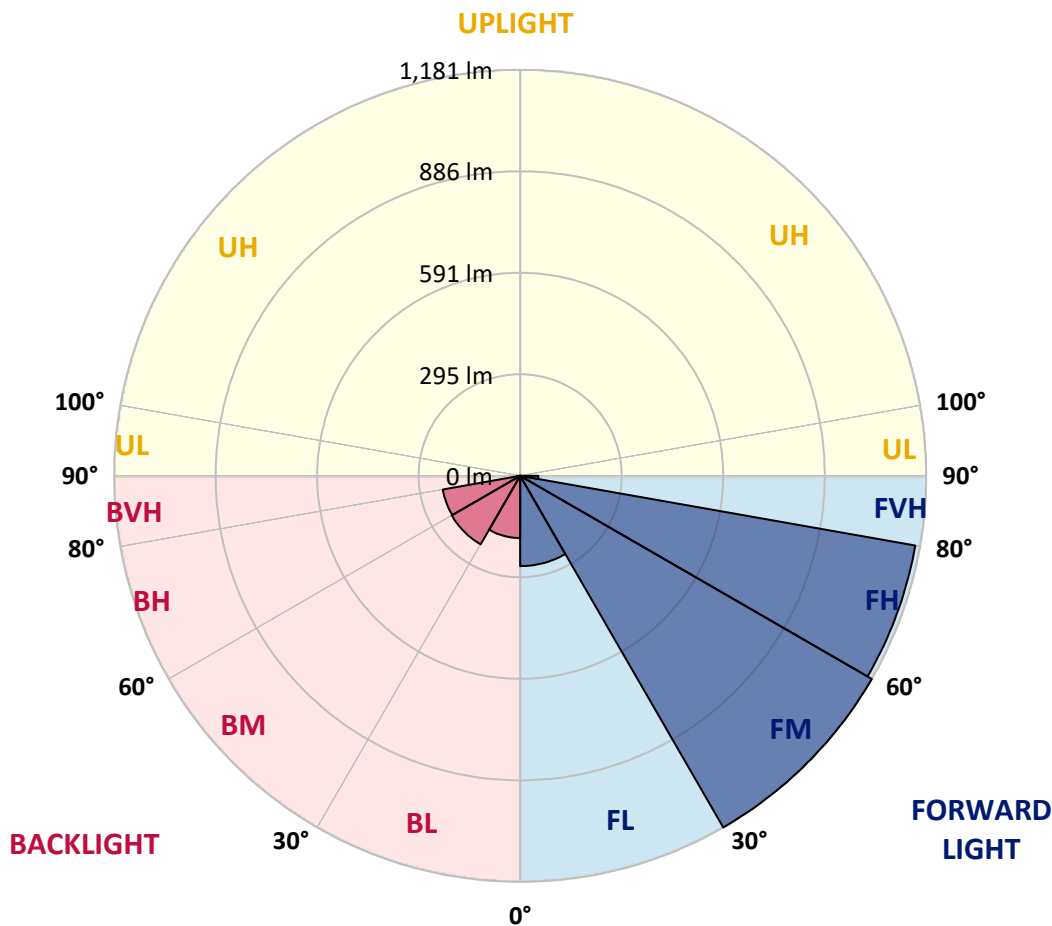


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 262.8  | 7.9       |                         |      |         |
| FM (30°-60°)   | 1181.1 | 35.7      |                         |      |         |
| FH (60°-80°)   | 1167.1 | 35.2      |                         |      | G1/1800 |
| FVH (80°-90°)  | 53.1   | 1.6       |                         |      | G1/100  |
| BL (0°-30°)    | 181.0  | 5.5       | B1/500                  |      |         |
| BM (30°-60°)   | 230.0  | 6.9       | B1/1000                 |      |         |
| BH (60°-80°)   | 228.5  | 6.9       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 9.3    | 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°    | 748.1  | 748.1  | 748.1  | 748.1  | 748.1  | 748.1  | 748.1  | 748.1  | 748.1  | 748.1  | 748.1  |
| 2.5°  | 707.3  | 712.1  | 713.3  | 716.9  | 721.7  | 726.5  | 732.5  | 739.7  | 740.9  | 744.5  | 751.7  |
| 5°    | 659.4  | 661.8  | 664.2  | 671.4  | 679.8  | 695.4  | 710.9  | 725.3  | 727.7  | 739.7  | 752.9  |
| 7.5°  | 615.0  | 621.0  | 622.2  | 628.2  | 641.4  | 660.6  | 682.2  | 707.3  | 714.5  | 731.3  | 751.7  |
| 10°   | 582.7  | 586.3  | 588.7  | 599.4  | 610.2  | 631.8  | 658.2  | 689.4  | 696.6  | 721.7  | 750.5  |
| 12.5° | 556.3  | 562.3  | 565.9  | 573.1  | 589.8  | 609.0  | 635.4  | 669.0  | 678.6  | 709.7  | 745.7  |
| 15°   | 541.9  | 546.7  | 547.9  | 556.3  | 569.5  | 588.7  | 613.8  | 652.2  | 659.4  | 697.7  | 745.7  |
| 17.5° | 538.3  | 539.5  | 540.7  | 545.5  | 556.3  | 571.9  | 598.2  | 637.8  | 646.2  | 693.0  | 745.7  |
| 20°   | 545.5  | 545.5  | 545.5  | 543.1  | 551.5  | 563.5  | 589.8  | 625.8  | 637.8  | 688.2  | 749.3  |
| 22.5° | 562.3  | 563.5  | 559.9  | 553.9  | 550.3  | 558.7  | 581.5  | 622.2  | 633.0  | 687.0  | 756.5  |
| 25°   | 586.3  | 587.5  | 585.1  | 576.7  | 559.9  | 558.7  | 577.9  | 618.6  | 628.2  | 685.8  | 755.3  |
| 27.5° | 618.6  | 625.8  | 618.6  | 609.0  | 587.5  | 568.3  | 581.5  | 616.2  | 627.0  | 685.8  | 757.7  |
| 30°   | 664.2  | 669.0  | 665.4  | 649.8  | 622.2  | 588.7  | 586.3  | 618.6  | 627.0  | 684.6  | 756.5  |
| 32.5° | 709.7  | 710.9  | 714.5  | 703.7  | 670.2  | 618.6  | 599.4  | 621.0  | 628.2  | 683.4  | 752.9  |
| 35°   | 744.5  | 751.7  | 767.3  | 768.5  | 728.9  | 661.8  | 627.0  | 630.6  | 633.0  | 687.0  | 749.3  |
| 37.5° | 788.9  | 791.3  | 816.4  | 835.6  | 800.9  | 721.7  | 665.4  | 648.6  | 649.8  | 698.9  | 755.3  |
| 40°   | 829.6  | 839.2  | 874.0  | 898.0  | 886.0  | 802.1  | 718.1  | 681.0  | 683.4  | 720.5  | 769.7  |
| 42.5° | 890.8  | 898.0  | 933.9  | 967.5  | 971.1  | 893.2  | 791.3  | 736.1  | 730.1  | 762.5  | 800.9  |
| 45°   | 944.7  | 953.1  | 998.7  | 1047.8 | 1064.6 | 996.3  | 882.4  | 811.6  | 802.1  | 833.2  | 858.4  |
| 47.5° | 1020.2 | 1034.6 | 1070.6 | 1126.9 | 1183.3 | 1122.2 | 998.7  | 914.7  | 906.4  | 927.9  | 935.1  |
| 50°   | 1092.2 | 1100.6 | 1130.5 | 1198.9 | 1298.4 | 1280.4 | 1141.3 | 1049.0 | 1035.8 | 1039.4 | 1056.2 |
| 52.5° | 1103.0 | 1106.6 | 1137.7 | 1209.7 | 1396.7 | 1473.4 | 1316.4 | 1200.1 | 1176.1 | 1179.7 | 1200.1 |
| 55°   | 1021.4 | 1035.8 | 1058.6 | 1159.3 | 1403.9 | 1688.0 | 1562.1 | 1399.1 | 1361.9 | 1348.7 | 1365.5 |
| 57.5° | 852.4  | 869.2  | 901.6  | 1005.9 | 1321.2 | 1804.3 | 1965.0 | 1636.5 | 1578.9 | 1517.8 | 1538.2 |
| 60°   | 628.2  | 646.2  | 666.6  | 768.5  | 1111.4 | 1822.3 | 2365.4 | 1924.2 | 1839.1 | 1686.8 | 1697.6 |
| 62.5° | 482.0  | 482.0  | 499.9  | 541.9  | 743.3  | 1691.6 | 2600.4 | 2411.0 | 2202.3 | 1893.0 | 1879.8 |
| 65°   | 389.6  | 394.4  | 412.4  | 452.0  | 470.0  | 1201.3 | 2693.9 | 3118.3 | 2896.5 | 2140.0 | 2071.7 |
| 67.5° | 322.5  | 323.7  | 344.1  | 406.4  | 411.2  | 660.6  | 2443.3 | 3489.9 | 3437.2 | 2449.3 | 2275.5 |
| 70°   | 247.0  | 248.2  | 272.1  | 353.7  | 400.4  | 437.6  | 1709.6 | 3451.6 | 3518.7 | 2777.8 | 2319.8 |
| 72.5° | 164.2  | 171.4  | 200.2  | 280.5  | 399.2  | 412.4  | 927.9  | 3018.8 | 3115.9 | 2906.1 | 2171.2 |
| 75°   | 101.9  | 103.1  | 133.1  | 194.2  | 366.9  | 411.2  | 545.5  | 2352.2 | 2472.1 | 2411.0 | 1883.4 |
| 77.5° | 62.3   | 64.7   | 79.1   | 127.1  | 284.1  | 412.4  | 388.4  | 1618.5 | 1718.0 | 1582.5 | 1110.2 |
| 80°   | 38.4   | 38.4   | 45.6   | 76.7   | 184.6  | 369.3  | 334.5  | 941.1  | 931.5  | 585.1  | 315.3  |
| 82.5° | 14.4   | 15.6   | 24.0   | 42.0   | 93.5   | 286.5  | 293.7  | 425.6  | 392.0  | 172.6  | 112.7  |
| 85°   | 2.4    | 2.4    | 4.8    | 13.2   | 25.2   | 118.7  | 163.0  | 149.9  | 125.9  | 52.8   | 46.8   |
| 87.5° | 0.0    | 0.0    | 0.0    | 1.2    | 1.2    | 2.4    | 3.6    | 3.6    | 3.6    | 3.6    | 4.8    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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 CATALOG NUMBER: IST-SA1C-827-U-SL2

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 748.1  | 748.1  | 748.1 | 748.1 | 748.1 | 748.1 | 748.1 | 748.1 | 748.1 | 748.1 | 748.1 |
| 2.5°  | 751.7  | 754.1  | 752.9 | 749.3 | 745.7 | 743.3 | 737.3 | 733.7 | 734.9 | 734.9 | 736.1 |
| 5°    | 754.1  | 757.7  | 751.7 | 744.5 | 731.3 | 716.9 | 703.7 | 696.6 | 687.0 | 690.6 | 688.2 |
| 7.5°  | 757.7  | 760.1  | 749.3 | 727.7 | 704.9 | 681.0 | 658.2 | 637.8 | 622.2 | 615.0 | 619.8 |
| 10°   | 755.3  | 758.9  | 738.5 | 706.1 | 671.4 | 633.0 | 598.2 | 564.7 | 543.1 | 528.7 | 532.3 |
| 12.5° | 754.1  | 750.5  | 722.9 | 675.0 | 627.0 | 574.3 | 521.5 | 480.8 | 444.8 | 430.4 | 432.8 |
| 15°   | 749.3  | 746.9  | 703.7 | 642.6 | 576.7 | 502.3 | 432.8 | 380.0 | 336.9 | 322.5 | 327.3 |
| 17.5° | 751.7  | 744.5  | 681.0 | 603.0 | 513.1 | 422.0 | 336.9 | 285.3 | 263.8 | 259.0 | 257.8 |
| 20°   | 749.3  | 736.1  | 658.2 | 559.9 | 446.0 | 327.3 | 250.6 | 223.0 | 223.0 | 230.2 | 231.4 |
| 22.5° | 751.7  | 728.9  | 633.0 | 510.7 | 369.3 | 245.8 | 195.4 | 188.2 | 199.0 | 214.6 | 214.6 |
| 25°   | 751.7  | 720.5  | 605.4 | 455.6 | 288.9 | 187.0 | 166.6 | 166.6 | 181.0 | 195.4 | 194.2 |
| 27.5° | 746.9  | 703.7  | 574.3 | 396.8 | 214.6 | 154.7 | 146.3 | 149.9 | 159.5 | 171.4 | 170.2 |
| 30°   | 734.9  | 687.0  | 535.9 | 328.5 | 163.0 | 136.7 | 135.5 | 136.7 | 141.5 | 148.7 | 147.5 |
| 32.5° | 724.1  | 667.8  | 498.7 | 255.4 | 137.9 | 127.1 | 125.9 | 127.1 | 128.3 | 130.7 | 130.7 |
| 35°   | 716.9  | 651.0  | 454.4 | 196.6 | 124.7 | 121.1 | 118.7 | 118.7 | 116.3 | 117.5 | 117.5 |
| 37.5° | 708.5  | 635.4  | 408.8 | 153.5 | 117.5 | 115.1 | 112.7 | 109.1 | 109.1 | 106.7 | 106.7 |
| 40°   | 708.5  | 623.4  | 362.1 | 129.5 | 112.7 | 111.5 | 106.7 | 101.9 | 99.5  | 99.5  | 99.5  |
| 42.5° | 727.7  | 623.4  | 318.9 | 118.7 | 107.9 | 106.7 | 100.7 | 95.9  | 93.5  | 93.5  | 93.5  |
| 45°   | 760.1  | 630.6  | 274.5 | 111.5 | 104.3 | 101.9 | 94.7  | 89.9  | 87.5  | 87.5  | 86.3  |
| 47.5° | 816.4  | 660.6  | 235.0 | 107.9 | 100.7 | 97.1  | 88.7  | 83.9  | 81.5  | 81.5  | 81.5  |
| 50°   | 911.1  | 720.5  | 202.6 | 104.3 | 97.1  | 91.1  | 83.9  | 79.1  | 76.7  | 76.7  | 75.5  |
| 52.5° | 1041.8 | 810.4  | 187.0 | 101.9 | 92.3  | 85.1  | 79.1  | 74.3  | 71.9  | 70.7  | 70.7  |
| 55°   | 1198.9 | 945.9  | 184.6 | 100.7 | 87.5  | 80.3  | 74.3  | 69.5  | 67.1  | 65.9  | 65.9  |
| 57.5° | 1370.3 | 1094.6 | 201.4 | 98.3  | 82.7  | 74.3  | 69.5  | 64.7  | 62.3  | 61.1  | 61.1  |
| 60°   | 1535.8 | 1257.6 | 255.4 | 95.9  | 79.1  | 69.5  | 63.5  | 59.9  | 57.5  | 56.3  | 56.3  |
| 62.5° | 1727.6 | 1429.1 | 374.1 | 97.1  | 76.7  | 64.7  | 58.7  | 55.1  | 53.9  | 52.8  | 52.8  |
| 65°   | 1938.6 | 1625.7 | 478.4 | 106.7 | 77.9  | 59.9  | 53.9  | 51.6  | 49.2  | 48.0  | 48.0  |
| 67.5° | 2125.6 | 1752.8 | 399.2 | 123.5 | 85.1  | 56.3  | 48.0  | 46.8  | 44.4  | 43.2  | 44.4  |
| 70°   | 2083.7 | 1618.5 | 245.8 | 124.7 | 86.3  | 53.9  | 43.2  | 40.8  | 38.4  | 38.4  | 38.4  |
| 72.5° | 1900.2 | 1427.9 | 171.4 | 107.9 | 76.7  | 48.0  | 37.2  | 34.8  | 33.6  | 33.6  | 33.6  |
| 75°   | 1599.3 | 1177.3 | 136.7 | 87.5  | 59.9  | 39.6  | 31.2  | 30.0  | 28.8  | 27.6  | 27.6  |
| 77.5° | 875.2  | 640.2  | 101.9 | 67.1  | 44.4  | 30.0  | 26.4  | 24.0  | 22.8  | 22.8  | 22.8  |
| 80°   | 256.6  | 219.4  | 63.5  | 48.0  | 28.8  | 21.6  | 20.4  | 18.0  | 16.8  | 16.8  | 16.8  |
| 82.5° | 107.9  | 91.1   | 38.4  | 26.4  | 19.2  | 14.4  | 13.2  | 12.0  | 10.8  | 9.6   | 10.8  |
| 85°   | 42.0   | 44.4   | 24.0  | 15.6  | 10.8  | 7.2   | 6.0   | 4.8   | 4.8   | 3.6   | 4.8   |
| 87.5° | 4.8    | 6.0    | 4.8   | 3.6   | 2.4   | 1.2   | 1.2   | 1.2   | 1.2   | 1.2   | 1.2   |
| 90°   | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/03/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Invue  
 Catalog Number: **EMM2-HTN-SA1A-827-U-5WQ**  
 Description: Epic Modern Light Square 40W 5WQ Optic

**Spectral Parameters**

CCT (K): 2764  
 CIE u': 0.2591  
 CIE v': 0.5290  
 Duv: 0.0020  
 CIE x: 0.4581  
 CIE y: 0.4156  
 CIE z: 0.1263  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 583  
 Purity: 62.2537  
 Rf: 84.7  
 Rg: 94.6

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 80.9 |      |      |
| R1:       | 78.8 | R9:  | -1.5 |
| R2:       | 89.9 | R10: | 77.9 |
| R3:       | 96.2 | R11: | 78.9 |
| R4:       | 79.1 | R12: | 71.6 |
| R5:       | 79.1 | R13: | 81.2 |
| R6:       | 88.8 | R14: | 98.5 |
| R7:       | 81.3 | R15: | 69.9 |
| R8:       | 54.3 |      |      |



**Test Conditions**

Stabilization Time: 81M  
 Operation Time: 2H 21M  
 Sphere Temperature (°C): 25.2

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

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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 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: 4337.9**

| $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360            | 0                                 | 0.0                         | 490            | 18018                             | 2.6                         | 620            | 87426                             | 22.8                        | 750            | 2680                              | 0.0                         | 880            | 58                                | 0.0                         |
| 365            | 0                                 | 0.0                         | 495            | 22295                             | 3.9                         | 625            | 83013                             | 18.2                        | 755            | 2287                              | 0.0                         | 885            | 46                                | 0.0                         |
| 370            | 0                                 | 0.0                         | 500            | 26478                             | 5.8                         | 630            | 78077                             | 14.1                        | 760            | 1944                              | 0.0                         | 890            | 45                                | 0.0                         |
| 375            | 0                                 | 0.0                         | 505            | 30524                             | 8.5                         | 635            | 72080                             | 10.7                        | 765            | 1653                              | 0.0                         | 895            | 41                                | 0.0                         |
| 380            | 0                                 | 0.0                         | 510            | 33611                             | 11.5                        | 640            | 66249                             | 7.9                         | 770            | 1413                              | 0.0                         | 900            | 38                                | 0.0                         |
| 385            | 0                                 | 0.0                         | 515            | 36490                             | 15.2                        | 645            | 59973                             | 5.7                         | 775            | 1198                              | 0.0                         | 905            | 33                                | 0.0                         |
| 390            | 0                                 | 0.0                         | 520            | 38610                             | 18.7                        | 650            | 53972                             | 3.9                         | 780            | 1025                              | 0.0                         | 910            | 30                                | 0.0                         |
| 395            | 0                                 | 0.0                         | 525            | 40511                             | 21.9                        | 655            | 48369                             | 2.7                         | 785            | 874                               | 0.0                         | 915            | 23                                | 0.0                         |
| 400            | 48                                | 0.0                         | 530            | 42223                             | 24.9                        | 660            | 42641                             | 1.8                         | 790            | 747                               | 0.0                         | 920            | 24                                | 0.0                         |
| 405            | 201                               | 0.0                         | 535            | 44137                             | 27.6                        | 665            | 37602                             | 1.1                         | 795            | 639                               | 0.0                         | 925            | 22                                | 0.0                         |
| 410            | 457                               | 0.0                         | 540            | 46032                             | 30.0                        | 670            | 32798                             | 0.7                         | 800            | 547                               | 0.0                         | 930            | 22                                | 0.0                         |
| 415            | 925                               | 0.0                         | 545            | 48553                             | 32.5                        | 675            | 28558                             | 0.5                         | 805            | 473                               | 0.0                         | 935            | 17                                | 0.0                         |
| 420            | 1816                              | 0.0                         | 550            | 51408                             | 34.9                        | 680            | 24782                             | 0.3                         | 810            | 401                               | 0.0                         | 940            | 13                                | 0.0                         |
| 425            | 3217                              | 0.0                         | 555            | 54711                             | 37.4                        | 685            | 21386                             | 0.2                         | 815            | 351                               | 0.0                         | 945            | 6                                 | 0.0                         |
| 430            | 5520                              | 0.0                         | 560            | 58847                             | 40.0                        | 690            | 18413                             | 0.1                         | 820            | 307                               | 0.0                         | 950            | 10                                | 0.0                         |
| 435            | 9225                              | 0.1                         | 565            | 63386                             | 42.4                        | 695            | 15721                             | 0.1                         | 825            | 261                               | 0.0                         | 955            | 11                                | 0.0                         |
| 440            | 15522                             | 0.2                         | 570            | 68196                             | 44.3                        | 700            | 13432                             | 0.0                         | 830            | 228                               | 0.0                         | 960            | 8                                 | 0.0                         |
| 445            | 27642                             | 0.6                         | 575            | 73613                             | 46.0                        | 705            | 11513                             | 0.0                         | 835            | 193                               | 0.0                         | 965            | 12                                | 0.0                         |
| 450            | 36602                             | 0.9                         | 580            | 79207                             | 47.1                        | 710            | 9780                              | 0.0                         | 840            | 174                               | 0.0                         | 970            | 3                                 | 0.0                         |
| 455            | 28292                             | 0.9                         | 585            | 84248                             | 47.0                        | 715            | 8356                              | 0.0                         | 845            | 151                               | 0.0                         | 975            | 8                                 | 0.0                         |
| 460            | 21166                             | 0.9                         | 590            | 88397                             | 45.7                        | 720            | 7161                              | 0.0                         | 850            | 123                               | 0.0                         | 980            | 2                                 | 0.0                         |
| 465            | 19092                             | 1.0                         | 595            | 91428                             | 43.4                        | 725            | 6067                              | 0.0                         | 855            | 106                               | 0.0                         | 985            | 13                                | 0.0                         |
| 470            | 14951                             | 0.9                         | 600            | 93452                             | 40.3                        | 730            | 5164                              | 0.0                         | 860            | 95                                | 0.0                         | 990            | 16                                | 0.0                         |
| 475            | 12606                             | 1.0                         | 605            | 93959                             | 36.4                        | 735            | 4393                              | 0.0                         | 865            | 82                                | 0.0                         | 995            | 20                                | 0.0                         |
| 480            | 13323                             | 1.3                         | 610            | 93079                             | 32.0                        | 740            | 3694                              | 0.0                         | 870            | 77                                | 0.0                         | 1000           | 0                                 | 0.0                         |
| 485            | 15164                             | 1.8                         | 615            | 90707                             | 27.3                        | 745            | 3157                              | 0.0                         | 875            | 65                                | 0.0                         |                |                                   |                             |

REPORT NUMBER: SP1-2407-157-9

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 5286.7**

**S/P: 1.22**

| 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    | 0             | 0.0           | 490    | 18018         | 75.9          | 620    | 87426         | 0.4           | 750    | 2680          | 0.0           | 880    | 58            | 0.0           |
| 365    | 0             | 0.0           | 495    | 22295         | 93.2          | 625    | 83013         | 0.2           | 755    | 2287          | 0.0           | 885    | 46            | 0.0           |
| 370    | 0             | 0.0           | 500    | 26478         | 107.8         | 630    | 78077         | 0.1           | 760    | 1944          | 0.0           | 890    | 45            | 0.0           |
| 375    | 0             | 0.0           | 505    | 30524         | 118.7         | 635    | 72080         | 0.1           | 765    | 1653          | 0.0           | 895    | 41            | 0.0           |
| 380    | 0             | 0.0           | 510    | 33611         | 122.2         | 640    | 66249         | 0.1           | 770    | 1413          | 0.0           | 900    | 38            | 0.0           |
| 385    | 0             | 0.0           | 515    | 36490         | 120.8         | 645    | 59973         | 0.0           | 775    | 1198          | 0.0           | 905    | 33            | 0.0           |
| 390    | 0             | 0.0           | 520    | 38610         | 113.9         | 650    | 53972         | 0.0           | 780    | 1025          | 0.0           | 910    | 30            | 0.0           |
| 395    | 0             | 0.0           | 525    | 40511         | 104.1         | 655    | 48369         | 0.0           | 785    | 874           | 0.0           | 915    | 23            | 0.0           |
| 400    | 48            | 0.0           | 530    | 42223         | 92.4          | 660    | 42641         | 0.0           | 790    | 747           | 0.0           | 920    | 24            | 0.0           |
| 405    | 201           | 0.0           | 535    | 44137         | 80.5          | 665    | 37602         | 0.0           | 795    | 639           | 0.0           | 925    | 22            | 0.0           |
| 410    | 457           | 0.1           | 540    | 46032         | 68.2          | 670    | 32798         | 0.0           | 800    | 547           | 0.0           | 930    | 22            | 0.0           |
| 415    | 925           | 0.3           | 545    | 48553         | 57.1          | 675    | 28558         | 0.0           | 805    | 473           | 0.0           | 935    | 17            | 0.0           |
| 420    | 1816          | 1.1           | 550    | 51408         | 46.7          | 680    | 24782         | 0.0           | 810    | 401           | 0.0           | 940    | 13            | 0.0           |
| 425    | 3217          | 2.5           | 555    | 54711         | 37.4          | 685    | 21386         | 0.0           | 815    | 351           | 0.0           | 945    | 6             | 0.0           |
| 430    | 5520          | 5.9           | 560    | 58847         | 29.4          | 690    | 18413         | 0.0           | 820    | 307           | 0.0           | 950    | 10            | 0.0           |
| 435    | 9225          | 12.5          | 565    | 63386         | 22.5          | 695    | 15721         | 0.0           | 825    | 261           | 0.0           | 955    | 11            | 0.0           |
| 440    | 15522         | 26.3          | 570    | 68196         | 16.9          | 700    | 13432         | 0.0           | 830    | 228           | 0.0           | 960    | 8             | 0.0           |
| 445    | 27642         | 55.2          | 575    | 73613         | 12.4          | 705    | 11513         | 0.0           | 835    | 193           | 0.0           | 965    | 12            | 0.0           |
| 450    | 36602         | 85.4          | 580    | 79207         | 9.0           | 710    | 9780          | 0.0           | 840    | 174           | 0.0           | 970    | 3             | 0.0           |
| 455    | 28292         | 75.1          | 585    | 84248         | 6.3           | 715    | 8356          | 0.0           | 845    | 151           | 0.0           | 975    | 8             | 0.0           |
| 460    | 21166         | 63.2          | 590    | 88397         | 4.4           | 720    | 7161          | 0.0           | 850    | 123           | 0.0           | 980    | 2             | 0.0           |
| 465    | 19092         | 63.2          | 595    | 91428         | 3.0           | 725    | 6067          | 0.0           | 855    | 106           | 0.0           | 985    | 13            | 0.0           |
| 470    | 14951         | 54.2          | 600    | 93452         | 2.0           | 730    | 5164          | 0.0           | 860    | 95            | 0.0           | 990    | 16            | 0.0           |
| 475    | 12606         | 48.8          | 605    | 93959         | 1.3           | 735    | 4393          | 0.0           | 865    | 82            | 0.0           | 995    | 20            | 0.0           |
| 480    | 13323         | 54.2          | 610    | 93079         | 0.9           | 740    | 3694          | 0.0           | 870    | 77            | 0.0           | 1000   | 0             | 0.0           |
| 485    | 15164         | 63.3          | 615    | 90707         | 0.5           | 745    | 3157          | 0.0           | 875    | 65            | 0.0           |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 9797**

**M/P: 2.26**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 27.7                           | 620               | 87426                                | 1.1                            | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 36.0                           | 625               | 83013                                | 0.7                            | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 44.2                           | 630               | 78077                                | 0.4                            | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 51.8                           | 635               | 72080                                | 0.3                            | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 57.0                           | 640               | 66249                                | 0.2                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 60.5                           | 645               | 59973                                | 0.1                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 61.4                           | 650               | 53972                                | 0.1                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 60.6                           | 655               | 48369                                | 0.0                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 58.2                           | 660               | 42641                                | 0.0                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 55.0                           | 665               | 37602                                | 0.0                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.0                            | 540               | 46032                                | 50.9                           | 670               | 32798                                | 0.0                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.1                            | 545               | 48553                                | 46.6                           | 675               | 28558                                | 0.0                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 0.3                            | 550               | 51408                                | 42.0                           | 680               | 24782                                | 0.0                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 0.8                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.0                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 1.9                            | 560               | 58847                                | 32.9                           | 690               | 18413                                | 0.0                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 4.1                            | 565               | 63386                                | 28.4                           | 695               | 15721                                | 0.0                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 8.7                            | 570               | 68196                                | 24.1                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 18.5                           | 575               | 73613                                | 20.0                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 28.3                           | 580               | 79207                                | 16.3                           | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 24.7                           | 585               | 84248                                | 12.9                           | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 20.4                           | 590               | 88397                                | 9.8                            | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 20.1                           | 595               | 91428                                | 7.3                            | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 17.2                           | 600               | 93452                                | 5.3                            | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 15.7                           | 605               | 93959                                | 3.7                            | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 18.0                           | 610               | 93079                                | 2.5                            | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 21.9                           | 615               | 90707                                | 1.7                            | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

**Summary**

$R_f = 84.7$   
 $R_g = 94.6$   
 $CIE R_a = 80.9$   
 $R_g = -1.5$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 95 | CES76 = 81 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 71 | CES29 = 87 | CES54 = 91 | CES79 = 89 |
| CES05 = 50 | CES30 = 94 | CES55 = 90 | CES80 = 89 |
| CES06 = 52 | CES31 = 89 | CES56 = 86 | CES81 = 69 |
| CES07 = 43 | CES32 = 82 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 91 | CES58 = 86 | CES83 = 93 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 77 | CES35 = 96 | CES60 = 94 | CES85 = 76 |
| CES11 = 60 | CES36 = 90 | CES61 = 89 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 94 | CES87 = 84 |
| CES13 = 44 | CES38 = 98 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 82 | CES89 = 73 |
| CES15 = 72 | CES40 = 95 | CES65 = 78 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 81 | CES91 = 82 |
| CES17 = 50 | CES42 = 97 | CES67 = 80 | CES92 = 64 |
| CES18 = 57 | CES43 = 91 | CES68 = 83 | CES93 = 78 |
| CES19 = 73 | CES44 = 99 | CES69 = 88 | CES94 = 59 |
| CES20 = 67 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 89 | CES71 = 79 | CES96 = 83 |
| CES22 = 79 | CES47 = 92 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 83 | CES73 = 75 | CES98 = 83 |
| CES24 = 91 | CES49 = 90 | CES74 = 91 | CES99 = 74 |
| CES25 = 72 | CES50 = 94 | CES75 = 81 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)