

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: P438270

Luminaire Tested: **ISW-SA1B-827-U-T4FT**

Issue Date: 12/10/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P438270  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-10)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/10/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: ISW-SA1B-827-U-T4FT  
Description: IMPACT ELITE LED WEDGE LUMINAIRE  
(1) 80 CRI, 2700K, 450mA LIGHTSQUARE WITH 16 LEDS AND TYPE IV FORWARD  
THROW OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2545 lumens  
Efficiency: N/A  
Efficacy: 100.2 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G1

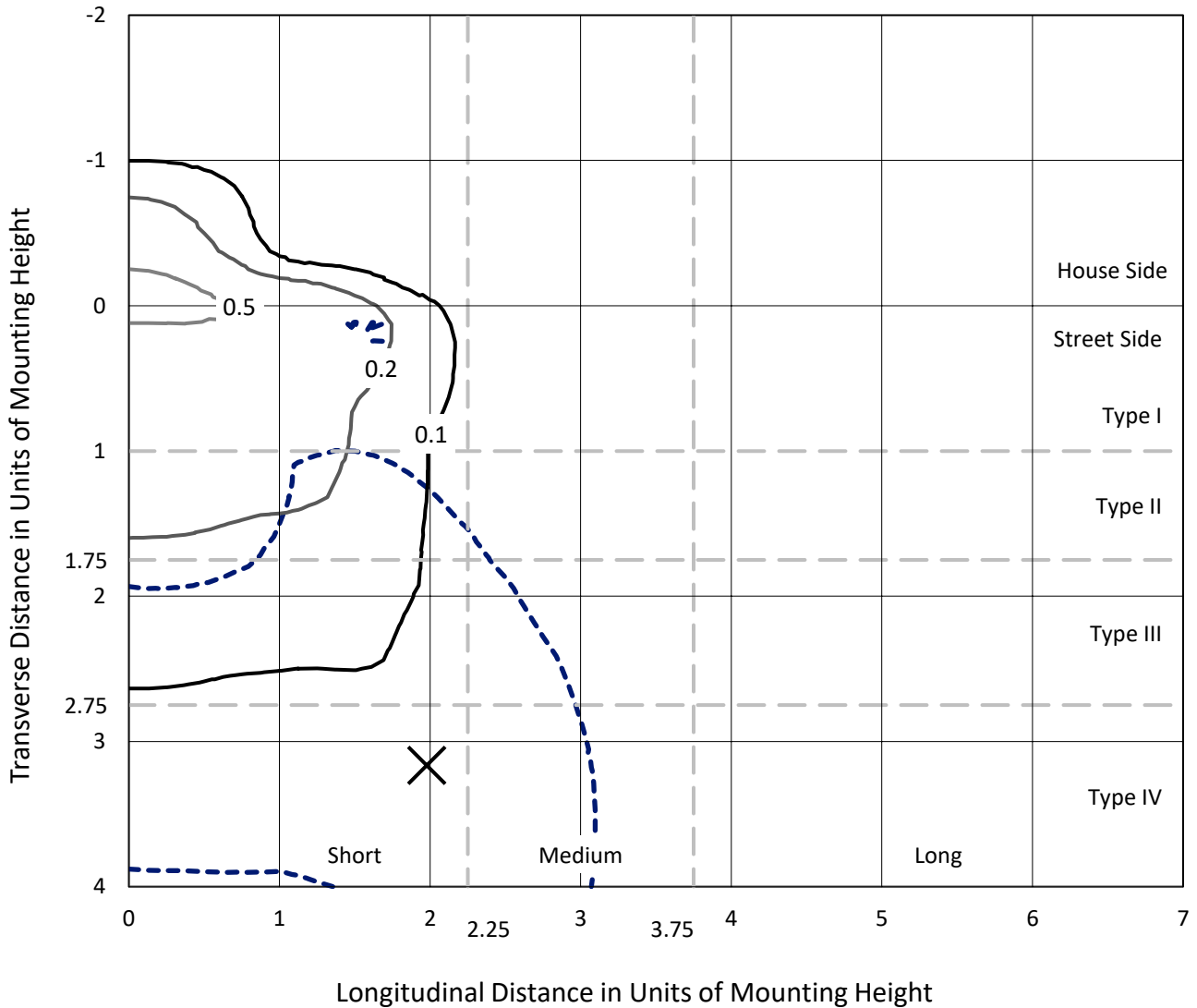
Input Watts (W): 25.4  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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### Iso-Footcandle Lines of Horizontal Illumination

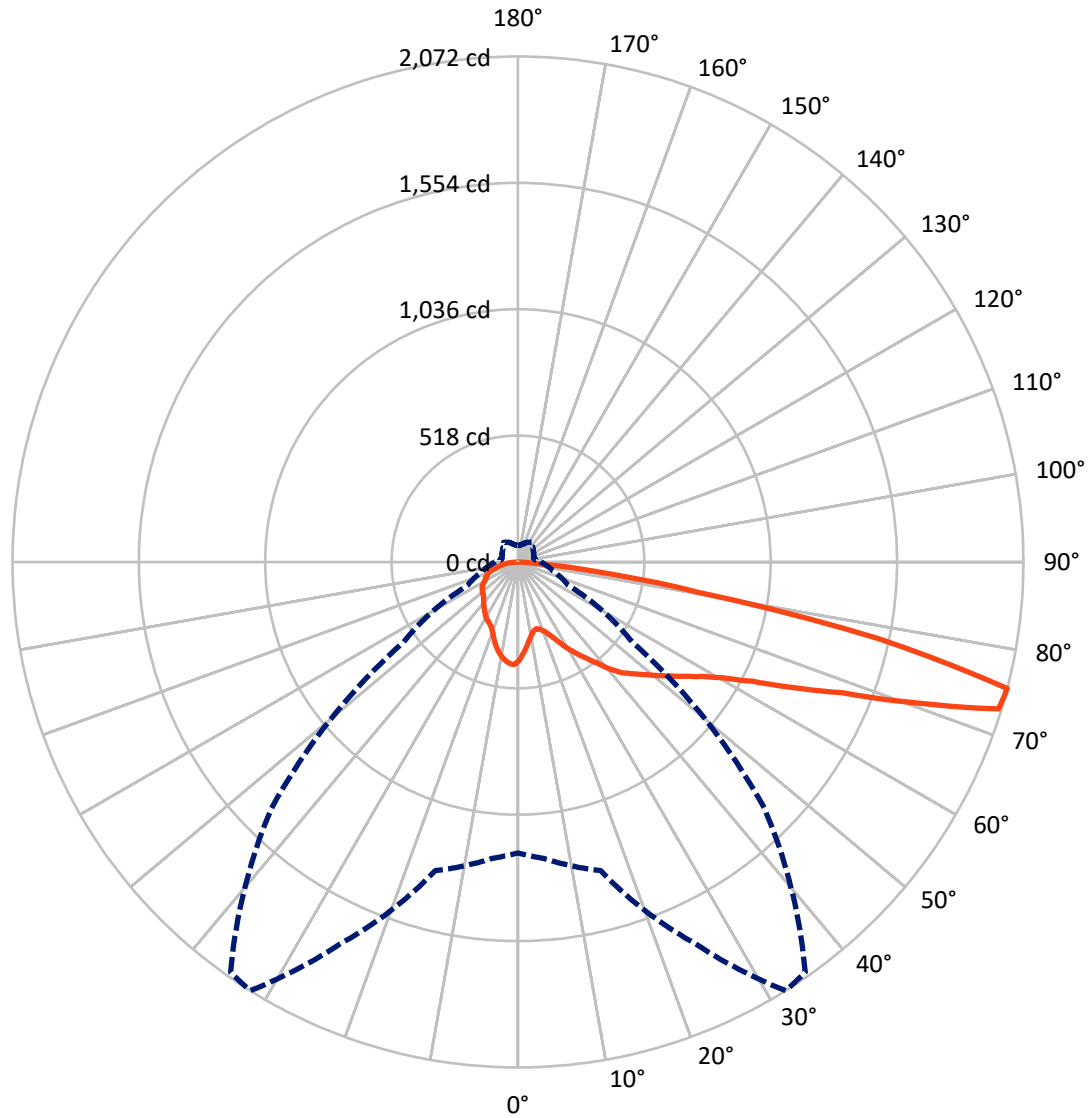
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 0.6 fc  
 Type IV - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 32-Deg Lateral      - - - Horizontal Cone Through 75-Deg Vertical

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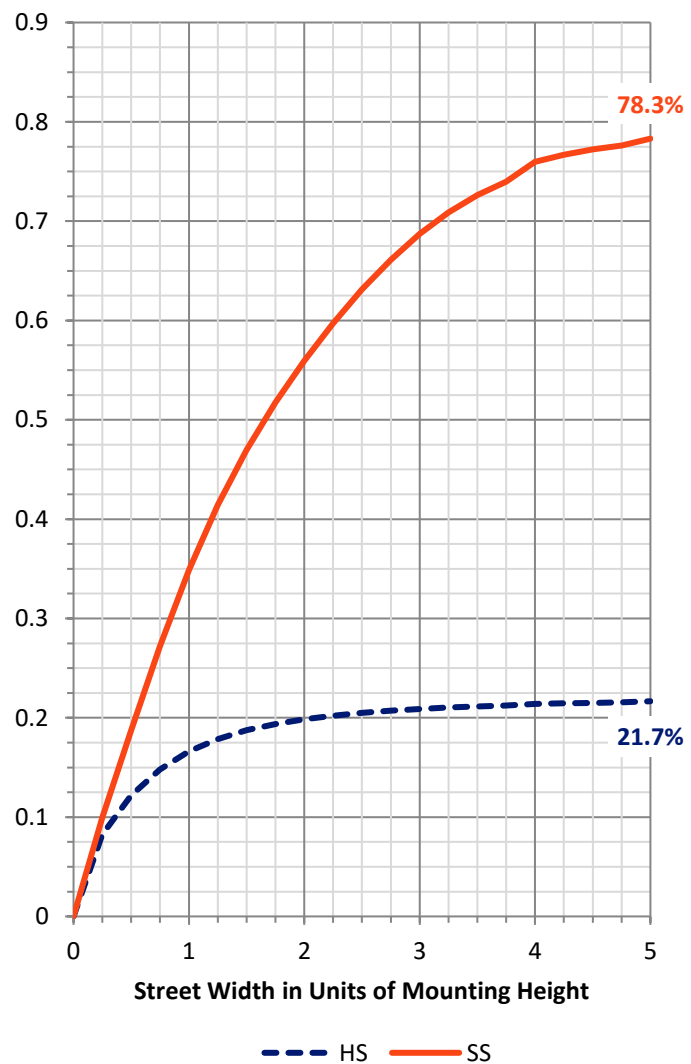
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 557.6    | 0.0    | 557.6  |
|                    | % Fixture | 21.9     | 0.0    | 21.9   |
| <b>Street Side</b> | Lumens    | 1987.4   | 0.0    | 1987.4 |
|                    | % Fixture | 78.1     | 0.0    | 78.1   |
| <b>Total</b>       | Lumens    | 2545.0   | 0.0    | 2545.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 36.8   | 1.4       |
| 10°-20°   | 100.6  | 4.0       |
| 20°-30°   | 166.4  | 6.5       |
| 30°-40°   | 248.1  | 9.7       |
| 40°-50°   | 353.2  | 13.9      |
| 50°-60°   | 485.9  | 19.1      |
| 60°-70°   | 612.3  | 24.1      |
| 70°-80°   | 495.0  | 19.5      |
| 80°-90°   | 46.8   | 1.8       |
| 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°    | 2545.0 | 100.0     |
| 0°-180°   | 2545.0 | 100.0     |



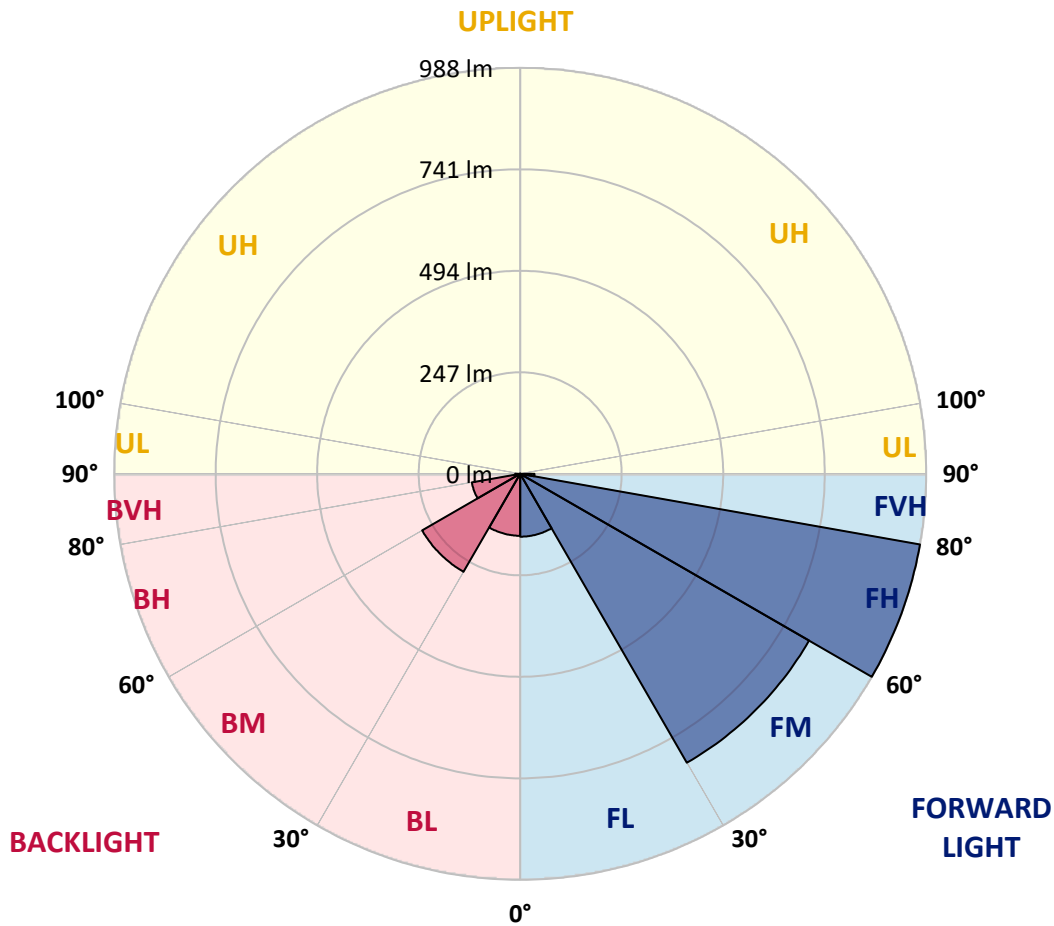
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 153.0  | 6.0       |                         |      |         |
| FM (30°-60°)   | 811.7  | 31.9      |                         |      |         |
| FH (60°-80°)   | 987.9  | 38.8      |                         |      | G1/1800 |
| FVH (80°-90°)  | 34.7   | 1.4       |                         |      | G1/100  |
| BL (0°-30°)    | 150.7  | 5.9       | B1/500                  |      |         |
| BM (30°-60°)   | 275.4  | 10.8      | B1/1000                 |      |         |
| BH (60°-80°)   | 119.4  | 4.7       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 12.0   | 0.5       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 32°    | 35°    | 45°    | 55°    | 65°   | 75°   | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|--------|
| 0°    | 405.1  | 405.1  | 405.1  | 405.1  | 405.1  | 405.1  | 405.1  | 405.1  | 405.1 | 405.1 | 405.1  |
| 2.5°  | 370.0  | 372.8  | 373.7  | 375.5  | 379.2  | 377.4  | 382.0  | 387.6  | 395.0 | 398.7 | 406.1  |
| 5°    | 338.5  | 338.5  | 341.3  | 345.9  | 352.4  | 352.4  | 360.7  | 370.9  | 383.9 | 394.0 | 407.0  |
| 7.5°  | 310.8  | 310.8  | 313.6  | 319.1  | 325.6  | 330.2  | 340.4  | 356.1  | 373.7 | 393.1 | 409.8  |
| 10°   | 287.7  | 288.6  | 290.4  | 296.0  | 304.3  | 308.9  | 323.7  | 341.3  | 364.4 | 389.4 | 412.5  |
| 12.5° | 279.3  | 278.4  | 277.5  | 282.1  | 288.6  | 292.3  | 308.9  | 331.1  | 358.0 | 388.5 | 418.1  |
| 15°   | 285.8  | 284.0  | 281.2  | 281.2  | 284.0  | 285.8  | 299.7  | 322.8  | 352.4 | 387.6 | 424.6  |
| 17.5° | 302.5  | 300.6  | 294.1  | 287.7  | 289.5  | 290.4  | 299.7  | 318.2  | 349.6 | 391.3 | 433.8  |
| 20°   | 325.6  | 322.8  | 311.7  | 303.4  | 301.5  | 301.5  | 307.1  | 321.0  | 351.5 | 398.7 | 445.8  |
| 22.5° | 353.3  | 350.6  | 337.6  | 322.8  | 321.0  | 320.0  | 322.8  | 332.1  | 357.0 | 407.0 | 464.3  |
| 25°   | 390.3  | 387.6  | 371.8  | 353.3  | 346.9  | 345.9  | 343.2  | 348.7  | 366.3 | 418.1 | 477.3  |
| 27.5° | 430.1  | 431.0  | 412.5  | 387.6  | 381.1  | 378.3  | 370.9  | 370.0  | 377.4 | 427.3 | 499.5  |
| 30°   | 467.1  | 465.3  | 445.8  | 425.5  | 416.2  | 412.5  | 400.5  | 395.0  | 390.3 | 441.2 | 525.4  |
| 32.5° | 484.7  | 487.5  | 478.2  | 458.8  | 451.4  | 444.9  | 431.0  | 421.8  | 415.3 | 462.5 | 556.8  |
| 35°   | 514.3  | 515.2  | 511.5  | 499.5  | 484.7  | 480.1  | 467.1  | 460.6  | 446.8 | 488.4 | 594.8  |
| 37.5° | 543.9  | 546.7  | 545.7  | 538.3  | 525.4  | 520.8  | 509.7  | 506.9  | 479.1 | 520.8 | 641.9  |
| 40°   | 588.3  | 583.7  | 577.2  | 580.0  | 575.3  | 572.6  | 567.9  | 558.7  | 524.5 | 555.9 | 688.2  |
| 42.5° | 636.4  | 628.1  | 604.9  | 612.3  | 618.8  | 621.6  | 628.1  | 617.9  | 571.6 | 608.6 | 726.1  |
| 45°   | 675.2  | 668.8  | 638.2  | 640.1  | 653.0  | 662.3  | 692.8  | 687.3  | 632.7 | 666.0 | 777.0  |
| 47.5° | 697.4  | 691.9  | 670.6  | 679.9  | 688.2  | 701.1  | 760.3  | 755.7  | 690.0 | 728.0 | 838.0  |
| 50°   | 728.9  | 719.6  | 699.3  | 715.9  | 730.7  | 740.9  | 826.0  | 824.2  | 739.1 | 791.8 | 907.4  |
| 52.5° | 746.5  | 737.2  | 735.4  | 758.5  | 776.1  | 789.9  | 896.3  | 890.7  | 787.2 | 855.6 | 973.1  |
| 55°   | 770.5  | 772.4  | 784.4  | 802.0  | 826.9  | 850.1  | 964.7  | 937.0  | 831.6 | 918.5 | 1037.8 |
| 57.5° | 823.2  | 821.4  | 844.5  | 852.8  | 885.2  | 914.8  | 1046.1 | 986.0  | 868.5 | 963.8 | 1068.3 |
| 60°   | 893.5  | 897.2  | 905.5  | 926.8  | 962.0  | 1007.3 | 1124.8 | 1036.9 | 892.6 | 996.2 | 1062.8 |
| 62.5° | 1026.7 | 1005.4 | 1001.7 | 1007.3 | 1076.7 | 1129.4 | 1201.5 | 1082.2 | 902.8 | 997.1 | 1004.5 |
| 65°   | 1161.8 | 1153.4 | 1124.8 | 1138.6 | 1239.5 | 1287.6 | 1300.5 | 1111.8 | 882.4 | 939.8 | 875.0  |
| 67.5° | 1301.4 | 1300.5 | 1270.0 | 1309.8 | 1430.9 | 1487.4 | 1410.6 | 1106.3 | 815.8 | 805.7 | 672.5  |
| 70°   | 1444.8 | 1451.3 | 1451.3 | 1564.1 | 1729.7 | 1744.5 | 1533.6 | 1053.5 | 683.6 | 570.7 | 393.1  |
| 72.5° | 1507.7 | 1511.4 | 1544.7 | 1795.4 | 2059.9 | 2064.5 | 1603.9 | 894.4  | 466.2 | 304.3 | 197.9  |
| 75°   | 1192.3 | 1220.0 | 1309.8 | 1728.8 | 2071.9 | 2053.4 | 1429.1 | 572.6  | 227.5 | 151.7 | 110.1  |
| 77.5° | 468.0  | 478.2  | 660.4  | 1100.7 | 1509.6 | 1528.1 | 925.0  | 228.5  | 115.6 | 96.2  | 79.5   |
| 80°   | 132.3  | 138.7  | 234.0  | 437.5  | 745.5  | 824.2  | 368.1  | 99.0   | 77.7  | 70.3  | 57.3   |
| 82.5° | 47.2   | 53.6   | 86.9   | 167.4  | 318.2  | 335.8  | 99.9   | 49.0   | 49.9  | 45.3  | 35.1   |
| 85°   | 6.5    | 5.5    | 12.0   | 30.5   | 70.3   | 59.2   | 16.6   | 12.9   | 20.3  | 21.3  | 14.8   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.9    | 0.9    | 0.9    | 0.0    | 0.0    | 0.0   | 0.9   | 0.9    |
| 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°    | 405.1 | 405.1 | 405.1 | 405.1 | 405.1 | 405.1 | 405.1 | 405.1 | 405.1 | 405.1 | 405.1 |
| 2.5°  | 407.9 | 409.8 | 413.5 | 415.3 | 417.2 | 420.9 | 419.9 | 421.8 | 421.8 | 420.9 | 422.7 |
| 5°    | 411.6 | 416.2 | 420.9 | 422.7 | 423.6 | 423.6 | 419.0 | 416.2 | 415.3 | 414.4 | 415.3 |
| 7.5°  | 415.3 | 421.8 | 426.4 | 425.5 | 421.8 | 415.3 | 409.8 | 405.1 | 400.5 | 398.7 | 400.5 |
| 10°   | 421.8 | 428.3 | 431.0 | 424.6 | 414.4 | 404.2 | 395.9 | 389.4 | 382.0 | 381.1 | 382.0 |
| 12.5° | 427.3 | 435.7 | 435.7 | 420.9 | 407.0 | 393.1 | 380.2 | 370.0 | 360.7 | 358.0 | 358.0 |
| 15°   | 436.6 | 443.1 | 436.6 | 416.2 | 396.8 | 379.2 | 360.7 | 347.8 | 336.7 | 332.1 | 333.0 |
| 17.5° | 446.8 | 451.4 | 434.7 | 408.8 | 385.7 | 362.6 | 338.5 | 321.0 | 312.6 | 308.0 | 308.9 |
| 20°   | 458.8 | 459.7 | 434.7 | 399.6 | 369.1 | 338.5 | 312.6 | 299.7 | 294.1 | 291.4 | 292.3 |
| 22.5° | 474.5 | 470.8 | 432.0 | 387.6 | 347.8 | 314.5 | 290.4 | 286.7 | 286.7 | 286.7 | 289.5 |
| 25°   | 491.2 | 481.0 | 427.3 | 371.8 | 320.0 | 285.8 | 276.6 | 281.2 | 284.9 | 284.9 | 286.7 |
| 27.5° | 507.8 | 491.2 | 418.1 | 348.7 | 287.7 | 265.5 | 269.2 | 276.6 | 280.3 | 280.3 | 282.1 |
| 30°   | 528.2 | 503.2 | 407.0 | 317.3 | 257.1 | 251.6 | 260.8 | 270.1 | 275.6 | 275.6 | 277.5 |
| 32.5° | 554.1 | 513.4 | 390.3 | 284.9 | 236.8 | 239.6 | 249.7 | 259.9 | 266.4 | 268.2 | 269.2 |
| 35°   | 582.7 | 527.2 | 367.2 | 248.8 | 222.9 | 230.3 | 238.6 | 247.9 | 253.4 | 255.3 | 255.3 |
| 37.5° | 612.3 | 541.1 | 336.7 | 218.3 | 210.9 | 221.1 | 229.4 | 234.0 | 237.7 | 237.7 | 237.7 |
| 40°   | 641.9 | 548.5 | 296.9 | 194.2 | 198.9 | 213.7 | 221.1 | 219.2 | 218.3 | 215.5 | 216.4 |
| 42.5° | 672.5 | 554.1 | 254.4 | 176.7 | 186.8 | 205.3 | 210.9 | 206.3 | 198.9 | 194.2 | 195.2 |
| 45°   | 705.8 | 562.4 | 219.2 | 163.7 | 174.8 | 197.9 | 203.5 | 194.2 | 185.0 | 177.6 | 175.7 |
| 47.5° | 743.7 | 576.3 | 187.8 | 151.7 | 167.4 | 193.3 | 198.9 | 185.9 | 173.9 | 163.7 | 161.9 |
| 50°   | 795.5 | 597.5 | 163.7 | 143.4 | 162.8 | 190.5 | 195.2 | 178.5 | 164.6 | 151.7 | 150.8 |
| 52.5° | 848.2 | 613.3 | 147.1 | 136.0 | 157.2 | 185.0 | 190.5 | 173.0 | 156.3 | 142.4 | 140.6 |
| 55°   | 887.0 | 611.4 | 132.3 | 128.6 | 149.8 | 177.6 | 185.9 | 166.5 | 145.2 | 132.3 | 130.4 |
| 57.5° | 903.7 | 573.5 | 120.2 | 122.1 | 141.5 | 168.3 | 178.5 | 156.3 | 136.9 | 125.8 | 124.9 |
| 60°   | 875.0 | 512.4 | 111.9 | 114.7 | 132.3 | 156.3 | 164.6 | 148.9 | 131.3 | 121.2 | 120.2 |
| 62.5° | 825.1 | 444.0 | 105.4 | 109.1 | 123.0 | 145.2 | 156.3 | 139.7 | 123.9 | 116.5 | 115.6 |
| 65°   | 706.7 | 369.1 | 99.0  | 102.7 | 114.7 | 134.1 | 148.9 | 134.1 | 118.4 | 111.0 | 110.1 |
| 67.5° | 533.7 | 265.5 | 92.5  | 96.2  | 107.3 | 125.8 | 142.4 | 126.7 | 110.1 | 104.5 | 104.5 |
| 70°   | 318.2 | 162.8 | 84.2  | 89.7  | 98.0  | 115.6 | 132.3 | 116.5 | 99.9  | 98.0  | 96.2  |
| 72.5° | 155.4 | 103.6 | 76.8  | 81.4  | 87.9  | 102.7 | 117.5 | 103.6 | 86.9  | 82.3  | 81.4  |
| 75°   | 93.4  | 74.9  | 66.6  | 72.1  | 76.8  | 86.0  | 99.0  | 88.8  | 75.8  | 68.4  | 67.5  |
| 77.5° | 67.5  | 56.4  | 56.4  | 62.0  | 62.0  | 71.2  | 85.1  | 75.8  | 63.8  | 59.2  | 58.3  |
| 80°   | 48.1  | 42.5  | 46.2  | 49.9  | 48.1  | 60.1  | 72.1  | 63.8  | 51.8  | 48.1  | 47.2  |
| 82.5° | 31.4  | 29.6  | 35.1  | 34.2  | 34.2  | 46.2  | 59.2  | 48.1  | 37.9  | 31.4  | 29.6  |
| 85°   | 12.9  | 14.8  | 20.3  | 19.4  | 19.4  | 25.9  | 30.5  | 25.0  | 17.6  | 13.9  | 13.9  |
| 87.5° | 0.0   | 0.9   | 2.8   | 1.8   | 1.8   | 2.8   | 0.9   | 0.9   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



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



CCT = 2764K  
 CIE x = 0.4581  
 CIE y = 0.4156  
 Duv = 0.0020

Point lies inside the ANSI 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: 4337.9**

| 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         | 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**

| $\lambda$<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                                | 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                            |                   |                                      |                                |

REPORT NUMBER: SP1-2407-157-9

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 9797**

**M/P: 2.26**

| $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /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)