

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: P437752

Luminaire Tested: **ISC-SA1E-827-U-T2-HSS**

Issue Date: 12/9/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P437752  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-7)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/9/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: ISC-SA1E-827-U-T2-HSS  
Description: IMPACT ELITE LED CYLINDER LUMINAIRE  
(1) 80 CRI, 2700K, 1050mA LIGHTSQUARE WITH 16 LEDS AND TYPE II OPTICS  
WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4056 lumens  
Efficiency: N/A  
Efficacy: 69.7 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B0 - U0 - G1

Input Watts (W): 58.2  
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

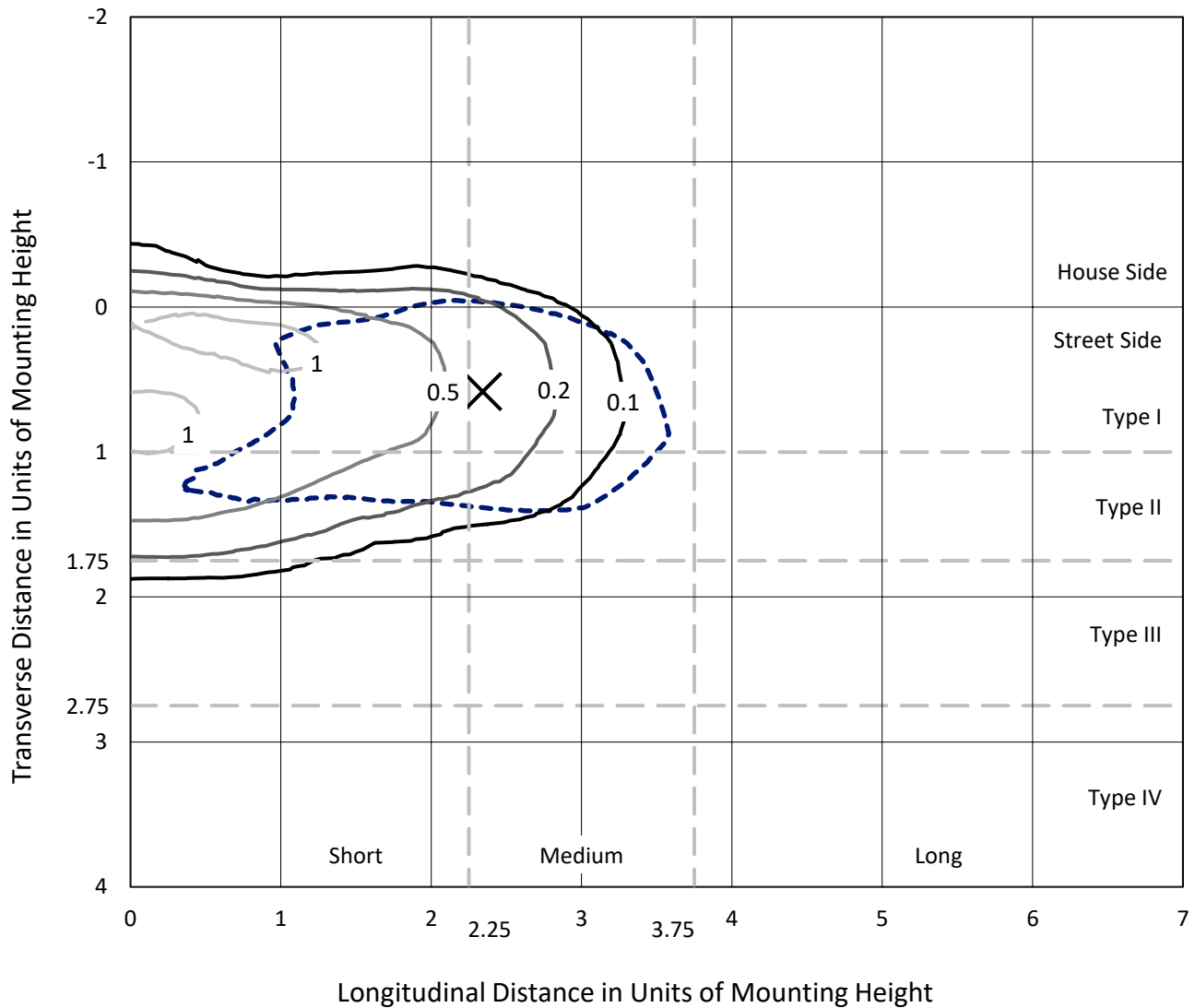


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

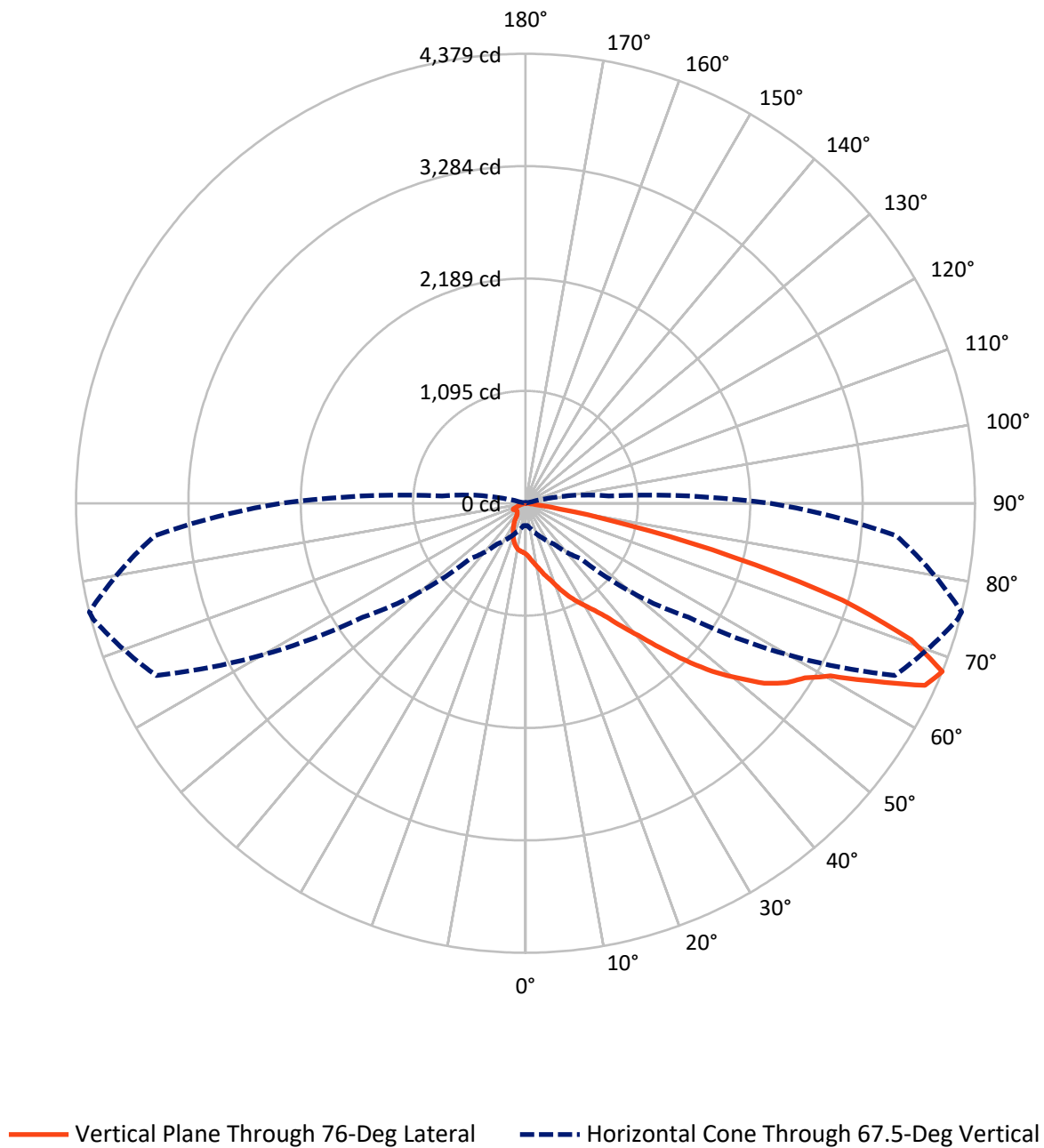


Based on 25 foot mounting height. Maximum calculated value = 1.2 fc  
 Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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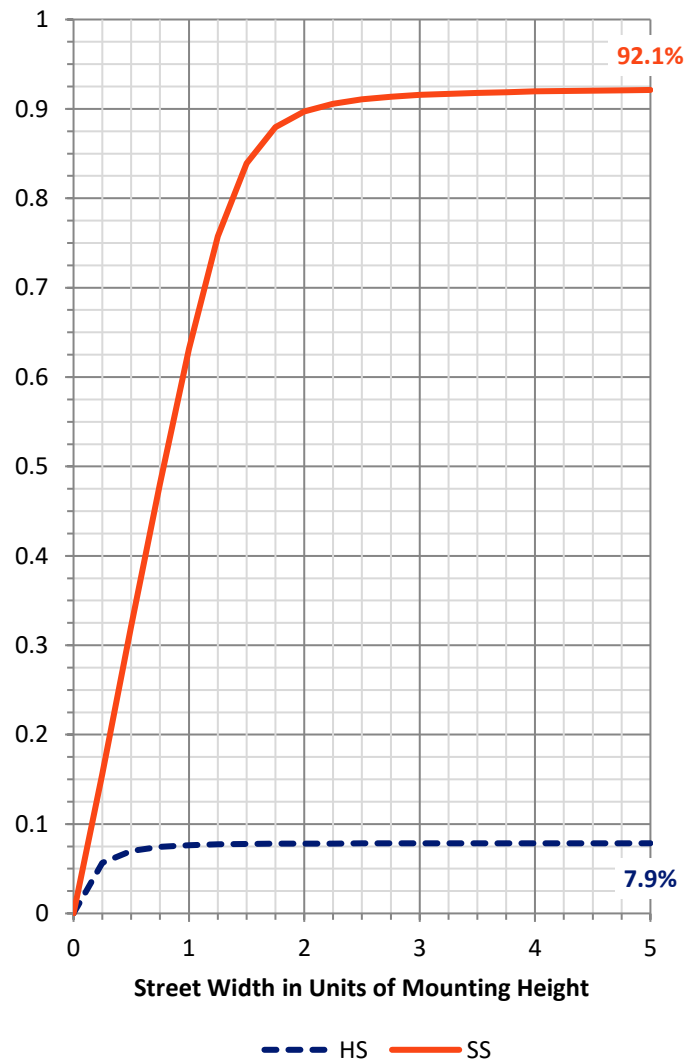
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 320.9    | 0.0    | 320.9  |
|                    | % Fixture | 7.9      | 0.0    | 7.9    |
| <b>Street Side</b> | Lumens    | 3735.1   | 0.0    | 3735.1 |
|                    | % Fixture | 92.1     | 0.0    | 92.1   |
| <b>Total</b>       | Lumens    | 4056.0   | 0.0    | 4056.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 47.3   | 1.2       |
| 10°-20°   | 131.8  | 3.2       |
| 20°-30°   | 227.5  | 5.6       |
| 30°-40°   | 405.2  | 10.0      |
| 40°-50°   | 721.5  | 17.8      |
| 50°-60°   | 1082.0 | 26.7      |
| 60°-70°   | 1024.8 | 25.3      |
| 70°-80°   | 399.4  | 9.8       |
| 80°-90°   | 16.6   | 0.4       |
| 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°    | 4056.0 | 100.0     |
| 0°-180°   | 4056.0 | 100.0     |

**Coefficient of Utilization**



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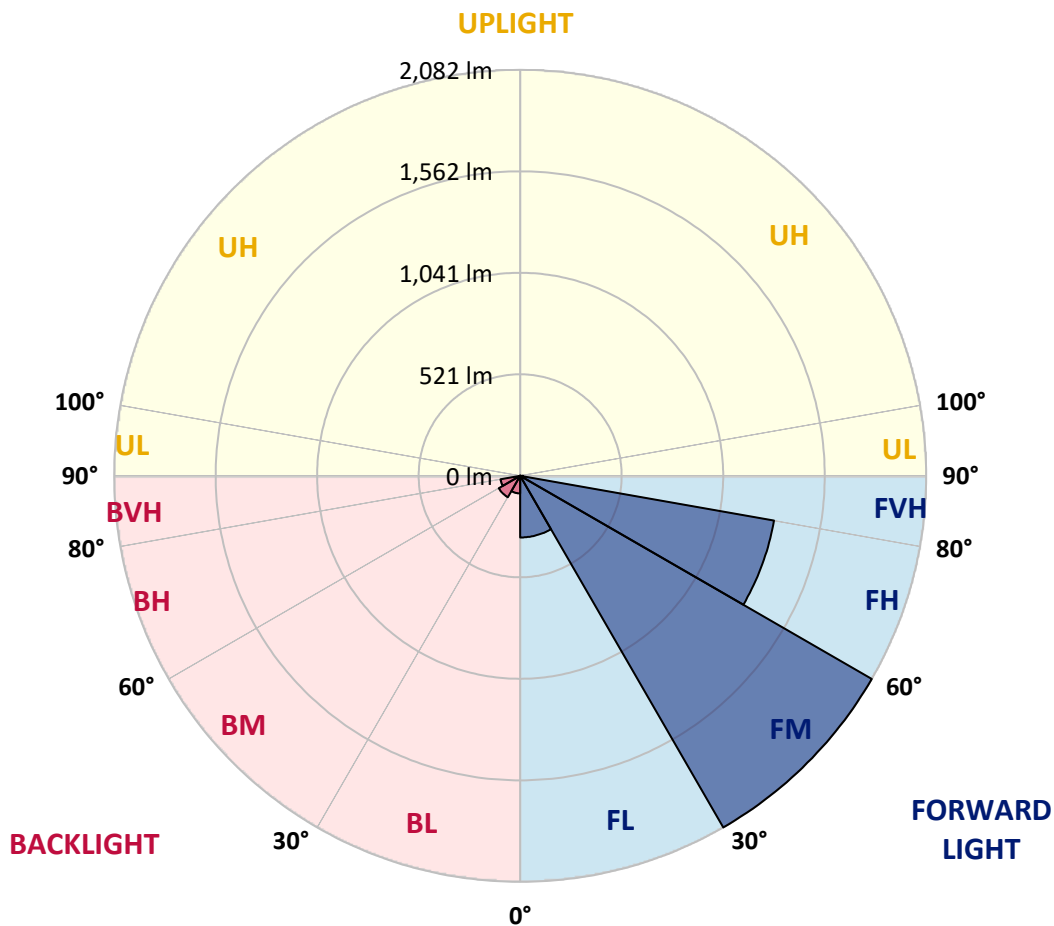
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 316.2  | 7.8       |                         |      |         |
| FM   | (30°-60°)   | 2082.0 | 51.3      |                         |      |         |
| FH   | (60°-80°)   | 1321.8 | 32.6      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 15.1   | 0.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 90.3   | 2.2       | B0/110                  |      |         |
| BM   | (30°-60°)   | 126.7  | 3.1       | B0/220                  |      |         |
| BH   | (60°-80°)   | 102.5  | 2.5       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 1.5    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B0-U0-G1**

Type II Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 76°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 493.2  | 493.2  | 493.2  | 493.2  | 493.2  | 493.2  | 493.2  | 493.2  | 493.2  | 493.2  | 493.2  |
| 2.5°  | 584.3  | 578.6  | 574.8  | 572.9  | 569.1  | 557.7  | 548.3  | 531.2  | 516.0  | 516.0  | 506.5  |
| 5°    | 637.4  | 635.5  | 627.9  | 624.1  | 622.3  | 614.7  | 597.6  | 576.7  | 552.1  | 550.2  | 527.4  |
| 7.5°  | 652.6  | 654.5  | 654.5  | 658.3  | 660.2  | 656.4  | 641.2  | 622.3  | 590.0  | 586.2  | 552.1  |
| 10°   | 646.9  | 646.9  | 652.6  | 664.0  | 679.2  | 686.8  | 684.9  | 669.7  | 631.7  | 627.9  | 580.5  |
| 12.5° | 626.0  | 629.8  | 639.3  | 658.3  | 686.8  | 709.5  | 722.8  | 717.1  | 679.2  | 675.4  | 618.5  |
| 15°   | 597.6  | 601.4  | 618.5  | 645.0  | 683.0  | 726.6  | 756.9  | 774.0  | 736.1  | 732.3  | 658.3  |
| 17.5° | 557.7  | 561.5  | 580.5  | 620.4  | 673.5  | 734.2  | 793.0  | 827.1  | 794.9  | 783.5  | 700.0  |
| 20°   | 542.6  | 546.4  | 561.5  | 593.8  | 656.4  | 734.2  | 825.2  | 889.7  | 865.1  | 855.6  | 753.2  |
| 22.5° | 603.3  | 601.4  | 588.1  | 591.9  | 639.3  | 728.5  | 849.9  | 967.5  | 948.6  | 935.3  | 810.1  |
| 25°   | 713.3  | 720.9  | 701.9  | 658.3  | 650.7  | 722.8  | 867.0  | 1028.2 | 1026.3 | 1013.1 | 868.9  |
| 27.5° | 840.4  | 844.2  | 823.3  | 777.8  | 715.2  | 734.2  | 885.9  | 1088.9 | 1098.4 | 1087.0 | 914.4  |
| 30°   | 944.8  | 958.0  | 942.9  | 901.1  | 834.7  | 783.5  | 899.2  | 1144.0 | 1176.2 | 1161.0 | 958.0  |
| 32.5° | 1094.6 | 1100.3 | 1085.1 | 1024.4 | 956.1  | 878.4  | 923.9  | 1191.4 | 1261.6 | 1248.3 | 1009.3 |
| 35°   | 1252.1 | 1259.7 | 1231.2 | 1164.8 | 1081.4 | 994.1  | 982.7  | 1255.9 | 1384.9 | 1358.3 | 1087.0 |
| 37.5° | 1392.5 | 1400.1 | 1386.8 | 1305.2 | 1223.6 | 1130.7 | 1087.0 | 1343.2 | 1534.8 | 1517.7 | 1183.8 |
| 40°   | 1504.4 | 1523.4 | 1519.6 | 1449.4 | 1373.5 | 1290.0 | 1236.9 | 1445.6 | 1707.4 | 1692.2 | 1307.1 |
| 42.5° | 1618.2 | 1631.5 | 1623.9 | 1572.7 | 1519.6 | 1468.4 | 1402.0 | 1587.9 | 1929.4 | 1921.8 | 1460.8 |
| 45°   | 1760.5 | 1781.4 | 1771.9 | 1730.2 | 1665.7 | 1654.3 | 1591.7 | 1758.6 | 2193.1 | 2181.7 | 1646.7 |
| 47.5° | 1971.1 | 1990.1 | 1974.9 | 1918.0 | 1844.0 | 1823.1 | 1770.0 | 1952.1 | 2451.1 | 2445.4 | 1830.7 |
| 50°   | 2084.9 | 2103.9 | 2143.7 | 2153.2 | 2103.9 | 1992.0 | 1929.4 | 2136.1 | 2682.5 | 2673.0 | 2007.1 |
| 52.5° | 2045.1 | 2062.2 | 2158.9 | 2250.0 | 2358.1 | 2263.3 | 2122.9 | 2335.3 | 2895.0 | 2912.1 | 2179.8 |
| 55°   | 1874.3 | 1897.1 | 2035.6 | 2181.7 | 2443.5 | 2570.6 | 2409.3 | 2561.1 | 3061.9 | 3086.6 | 2293.6 |
| 57.5° | 1529.1 | 1555.6 | 1734.0 | 1959.7 | 2312.6 | 2648.4 | 2764.1 | 2872.2 | 3175.8 | 3208.0 | 2439.7 |
| 60°   | 916.3  | 958.0  | 1142.1 | 1441.8 | 1931.3 | 2464.3 | 3016.4 | 3319.9 | 3397.7 | 3412.9 | 2750.8 |
| 62.5° | 508.4  | 498.9  | 646.9  | 893.5  | 1331.8 | 2001.4 | 2978.5 | 3864.4 | 3817.0 | 3817.0 | 3282.0 |
| 65°   | 305.4  | 314.9  | 390.8  | 531.2  | 774.0  | 1320.4 | 2656.0 | 4200.2 | 4262.8 | 4276.1 | 3712.6 |
| 67.5° | 216.3  | 218.2  | 273.2  | 364.2  | 483.8  | 760.7  | 1936.9 | 3968.8 | 4359.6 | 4378.5 | 3627.3 |
| 70°   | 140.4  | 142.3  | 195.4  | 259.9  | 345.3  | 419.3  | 1183.8 | 3270.6 | 3993.4 | 3983.9 | 3208.0 |
| 72.5° | 85.4   | 89.2   | 123.3  | 191.6  | 265.6  | 237.1  | 637.4  | 2363.8 | 3164.4 | 3228.9 | 2517.5 |
| 75°   | 53.1   | 56.9   | 74.0   | 132.8  | 185.9  | 161.3  | 280.8  | 1578.4 | 2041.3 | 2090.6 | 1625.8 |
| 77.5° | 30.4   | 34.1   | 47.4   | 75.9   | 132.8  | 111.9  | 132.8  | 829.0  | 988.4  | 1020.6 | 652.6  |
| 80°   | 11.4   | 13.3   | 24.7   | 37.9   | 81.6   | 68.3   | 60.7   | 280.8  | 314.9  | 352.9  | 199.2  |
| 82.5° | 1.9    | 3.8    | 11.4   | 22.8   | 32.3   | 32.3   | 26.6   | 85.4   | 87.3   | 93.0   | 53.1   |
| 85°   | 0.0    | 0.0    | 3.8    | 5.7    | 5.7    | 5.7    | 9.5    | 17.1   | 26.6   | 26.6   | 15.2   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 1.9    | 1.9    | 1.9    | 3.8    | 3.8    | 3.8    | 3.8    |
| 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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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 493.2  | 493.2  | 493.2 | 493.2 | 493.2 | 493.2 | 493.2 | 493.2 | 493.2 | 493.2 | 493.2 |
| 2.5°  | 497.0  | 493.2  | 478.1 | 462.9 | 451.5 | 442.0 | 426.8 | 426.8 | 421.2 | 415.5 | 417.4 |
| 5°    | 510.3  | 498.9  | 470.5 | 442.0 | 415.5 | 390.8 | 369.9 | 360.5 | 347.2 | 343.4 | 341.5 |
| 7.5°  | 527.4  | 506.5  | 459.1 | 413.6 | 369.9 | 337.7 | 311.1 | 294.1 | 278.9 | 275.1 | 277.0 |
| 10°   | 548.3  | 517.9  | 445.8 | 375.6 | 322.5 | 282.7 | 252.3 | 239.0 | 222.0 | 216.3 | 210.6 |
| 12.5° | 578.6  | 531.2  | 425.0 | 333.9 | 275.1 | 235.2 | 191.6 | 159.4 | 148.0 | 144.2 | 144.2 |
| 15°   | 603.3  | 538.8  | 398.4 | 294.1 | 235.2 | 172.6 | 136.6 | 130.9 | 129.0 | 129.0 | 129.0 |
| 17.5° | 631.7  | 544.5  | 366.1 | 256.1 | 182.1 | 127.1 | 119.5 | 119.5 | 117.6 | 117.6 | 115.7 |
| 20°   | 662.1  | 546.4  | 332.0 | 222.0 | 129.0 | 113.8 | 108.1 | 106.2 | 102.4 | 100.5 | 100.5 |
| 22.5° | 696.2  | 544.5  | 294.1 | 182.1 | 113.8 | 104.3 | 94.9  | 91.1  | 87.3  | 83.5  | 83.5  |
| 25°   | 724.7  | 540.7  | 259.9 | 130.9 | 104.3 | 91.1  | 81.6  | 75.9  | 72.1  | 70.2  | 68.3  |
| 27.5° | 749.4  | 519.8  | 225.8 | 111.9 | 94.9  | 81.6  | 70.2  | 64.5  | 60.7  | 58.8  | 58.8  |
| 30°   | 751.3  | 485.7  | 197.3 | 104.3 | 87.3  | 72.1  | 60.7  | 56.9  | 55.0  | 53.1  | 53.1  |
| 32.5° | 762.6  | 451.5  | 166.9 | 98.6  | 77.8  | 64.5  | 55.0  | 51.2  | 47.4  | 47.4  | 47.4  |
| 35°   | 785.4  | 421.2  | 129.0 | 89.2  | 70.2  | 56.9  | 49.3  | 45.5  | 43.6  | 41.7  | 41.7  |
| 37.5° | 821.4  | 400.3  | 106.2 | 81.6  | 64.5  | 51.2  | 45.5  | 41.7  | 39.8  | 37.9  | 37.9  |
| 40°   | 868.9  | 388.9  | 96.8  | 74.0  | 56.9  | 47.4  | 41.7  | 37.9  | 34.1  | 32.3  | 32.3  |
| 42.5° | 950.5  | 388.9  | 89.2  | 66.4  | 51.2  | 43.6  | 37.9  | 34.1  | 30.4  | 28.5  | 28.5  |
| 45°   | 1045.3 | 404.1  | 83.5  | 58.8  | 45.5  | 39.8  | 34.1  | 28.5  | 24.7  | 22.8  | 22.8  |
| 47.5° | 1149.6 | 432.5  | 77.8  | 53.1  | 41.7  | 36.0  | 30.4  | 22.8  | 19.0  | 17.1  | 17.1  |
| 50°   | 1271.1 | 474.3  | 74.0  | 47.4  | 37.9  | 32.3  | 24.7  | 17.1  | 15.2  | 13.3  | 13.3  |
| 52.5° | 1373.5 | 516.0  | 68.3  | 43.6  | 34.1  | 28.5  | 19.0  | 15.2  | 11.4  | 11.4  | 11.4  |
| 55°   | 1470.3 | 561.5  | 64.5  | 39.8  | 32.3  | 22.8  | 15.2  | 11.4  | 9.5   | 9.5   | 9.5   |
| 57.5° | 1599.3 | 618.5  | 58.8  | 36.0  | 26.6  | 17.1  | 13.3  | 9.5   | 7.6   | 7.6   | 7.6   |
| 60°   | 1863.0 | 745.6  | 51.2  | 32.3  | 22.8  | 15.2  | 11.4  | 9.5   | 7.6   | 5.7   | 5.7   |
| 62.5° | 2291.7 | 952.3  | 43.6  | 28.5  | 17.1  | 13.3  | 9.5   | 7.6   | 5.7   | 3.8   | 3.8   |
| 65°   | 2563.0 | 1003.6 | 36.0  | 22.8  | 13.3  | 9.5   | 7.6   | 5.7   | 3.8   | 1.9   | 1.9   |
| 67.5° | 2388.5 | 815.8  | 28.5  | 17.1  | 11.4  | 7.6   | 5.7   | 3.8   | 1.9   | 0.0   | 0.0   |
| 70°   | 2016.6 | 616.6  | 20.9  | 11.4  | 9.5   | 5.7   | 3.8   | 1.9   | 0.0   | 0.0   | 0.0   |
| 72.5° | 1593.6 | 468.6  | 19.0  | 9.5   | 7.6   | 3.8   | 3.8   | 1.9   | 0.0   | 0.0   | 0.0   |
| 75°   | 1045.3 | 240.9  | 15.2  | 9.5   | 5.7   | 3.8   | 1.9   | 1.9   | 0.0   | 0.0   | 0.0   |
| 77.5° | 411.7  | 91.1   | 11.4  | 7.6   | 5.7   | 3.8   | 1.9   | 1.9   | 0.0   | 0.0   | 0.0   |
| 80°   | 111.9  | 30.4   | 5.7   | 3.8   | 3.8   | 1.9   | 1.9   | 1.9   | 0.0   | 0.0   | 0.0   |
| 82.5° | 28.5   | 13.3   | 3.8   | 3.8   | 1.9   | 1.9   | 1.9   | 1.9   | 1.9   | 0.0   | 0.0   |
| 85°   | 9.5    | 3.8    | 3.8   | 1.9   | 1.9   | 1.9   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 3.8    | 3.8    | 3.8   | 1.9   | 1.9   | 1.9   | 0.0   | 0.0   | 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:  $4\pi$   
 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  
 R<sub>f</sub>: 84.7  
 R<sub>g</sub>: 94.6

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



### 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           |



REPORT NUMBER: SP1-2407-157-9

### 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           |        |               |               |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 5286.7

S/P: 1.22

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 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                            |                   |                                      |                                |

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TM-30-18

### 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)