

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: INVUE

Report Number: P671955

Luminaire Tested: **CCP-SA-1A-735-U-AFL**

Issue Date: 04/16/2023

**Test Information**

Test Method: LM-79-08  
Report Number: P671955  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA-1A-735-U-AFL  
Description: INVUE CLEAR CURVE POLE MOUNT LIGHT SQUARE LUMINAIRE @350mA w/ AFL  
distribution lens  
Light Source: (16) 3500K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2723 lumens  
Efficiency: N/A  
Efficacy: 151.3 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

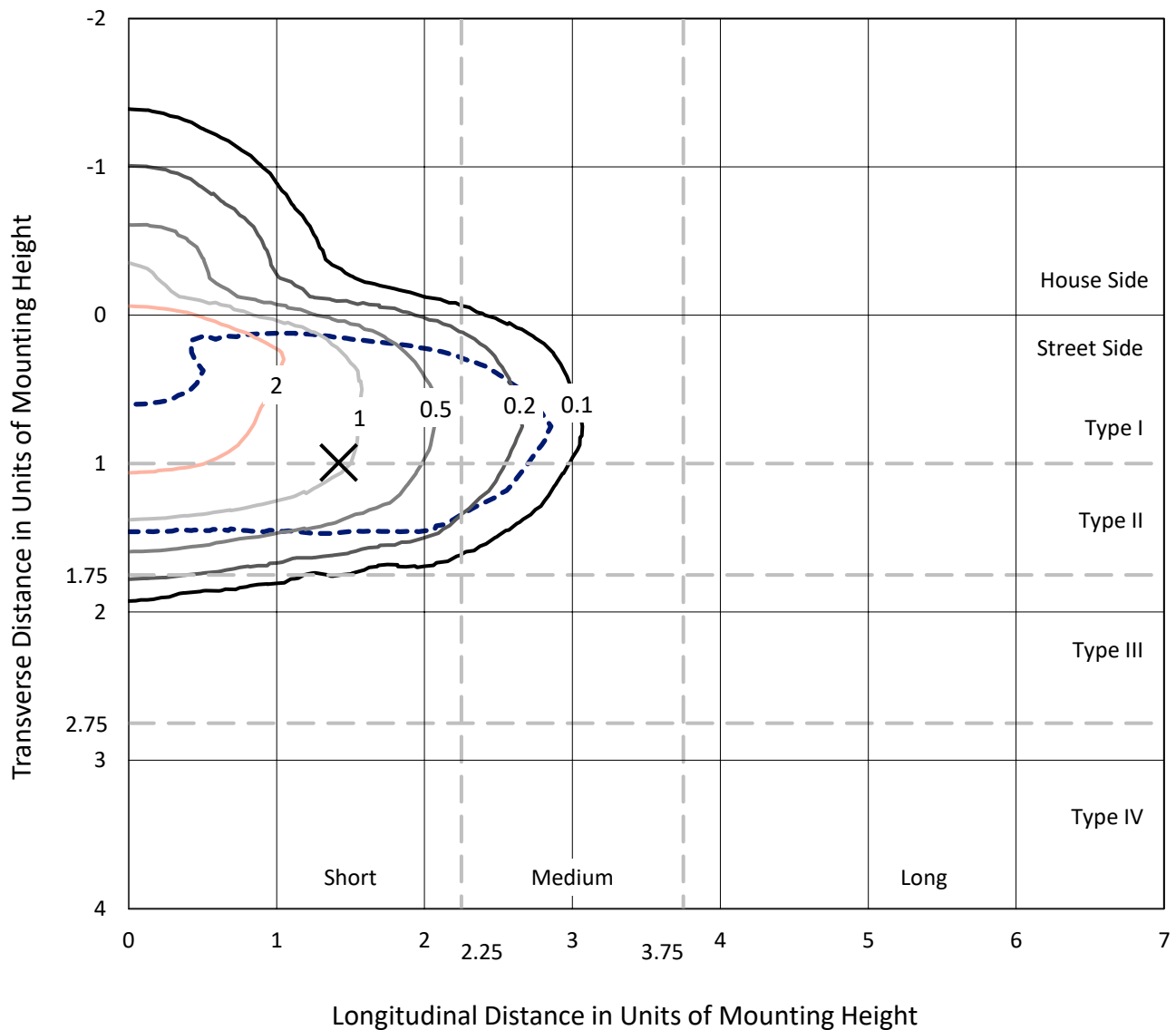
Input Watts (W): 18  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

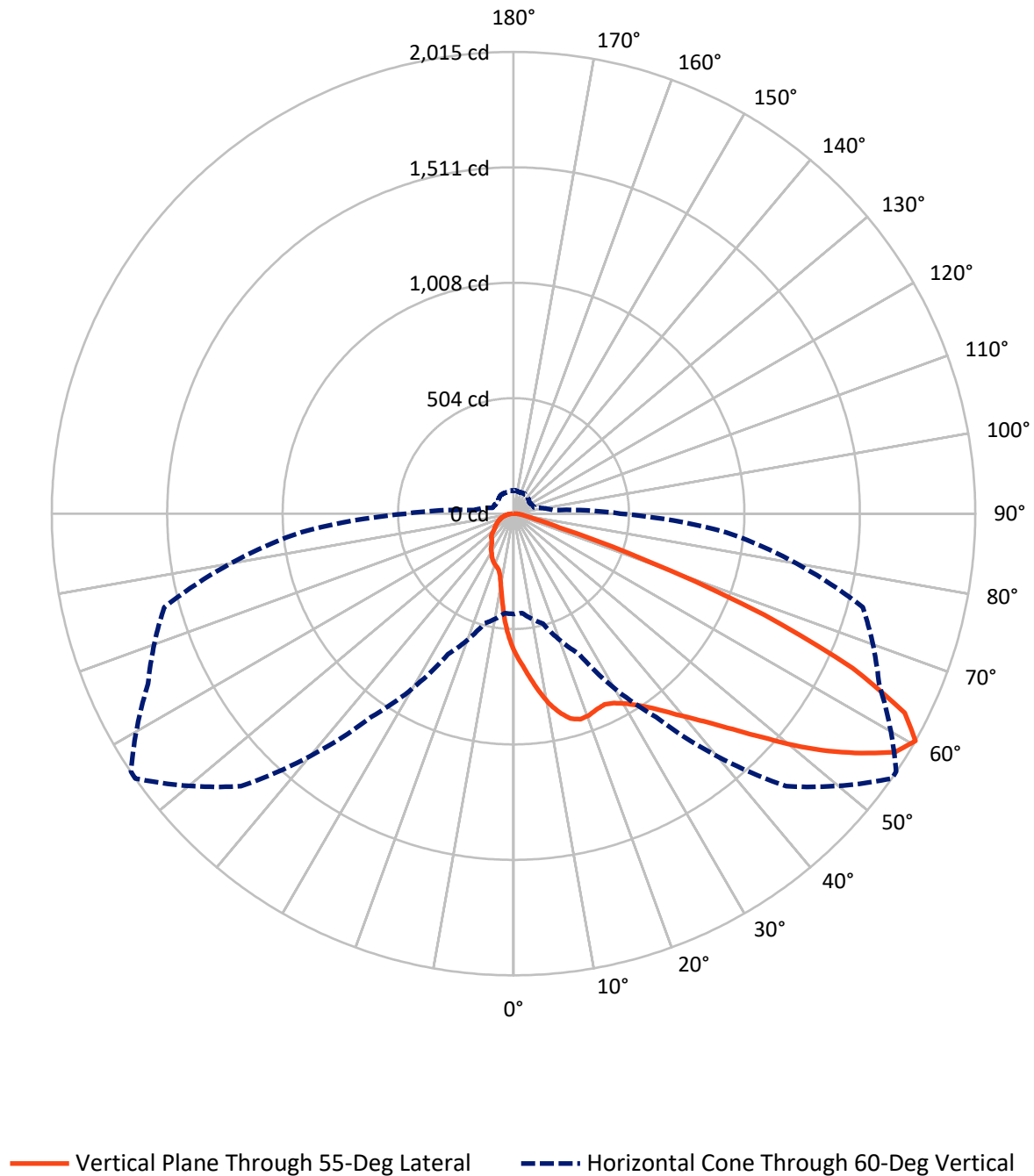
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 3.8 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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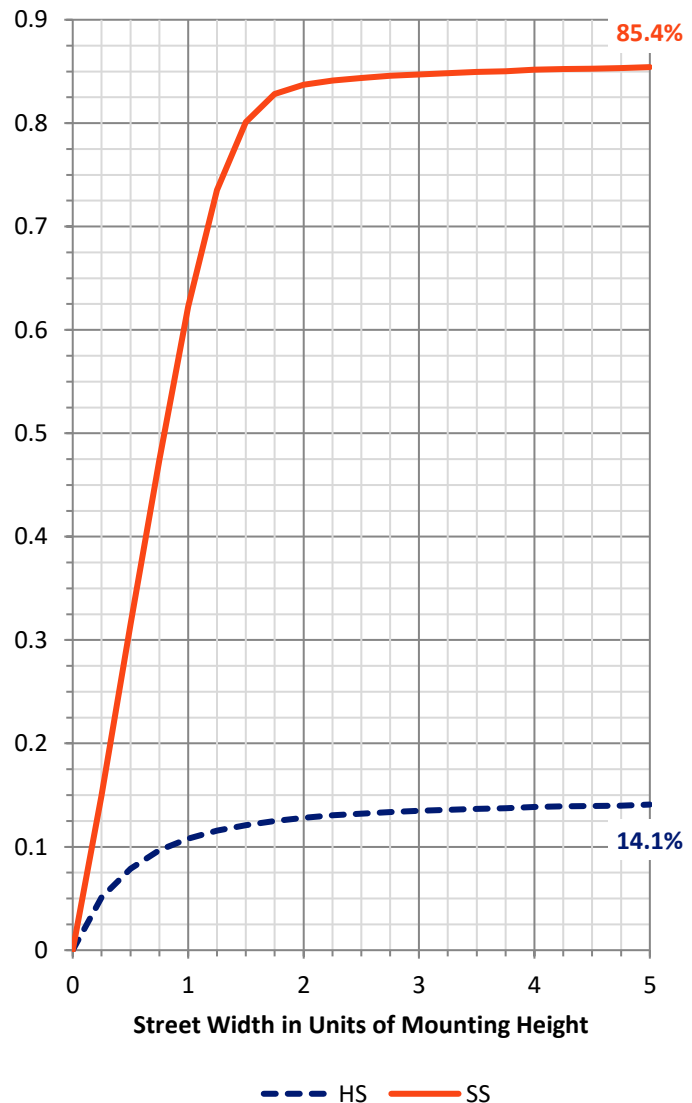
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 391.4    | 0.0    | 391.4  |
|                    | % Fixture | 14.4     | 0.0    | 14.4   |
| <b>Street Side</b> | Lumens    | 2331.6   | 0.0    | 2331.6 |
|                    | % Fixture | 85.6     | 0.0    | 85.6   |
| <b>Total</b>       | Lumens    | 2723.0   | 0.0    | 2723.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 56.5   | 2.1       |
| 10°-20°   | 160.1  | 5.9       |
| 20°-30°   | 260.7  | 9.6       |
| 30°-40°   | 389.6  | 14.3      |
| 40°-50°   | 572.7  | 21.0      |
| 50°-60°   | 671.2  | 24.6      |
| 60°-70°   | 442.6  | 16.3      |
| 70°-80°   | 140.9  | 5.2       |
| 80°-90°   | 28.7   | 1.1       |
| 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°    | 2723.0 | 100.0     |
| 0°-180°   | 2723.0 | 100.0     |



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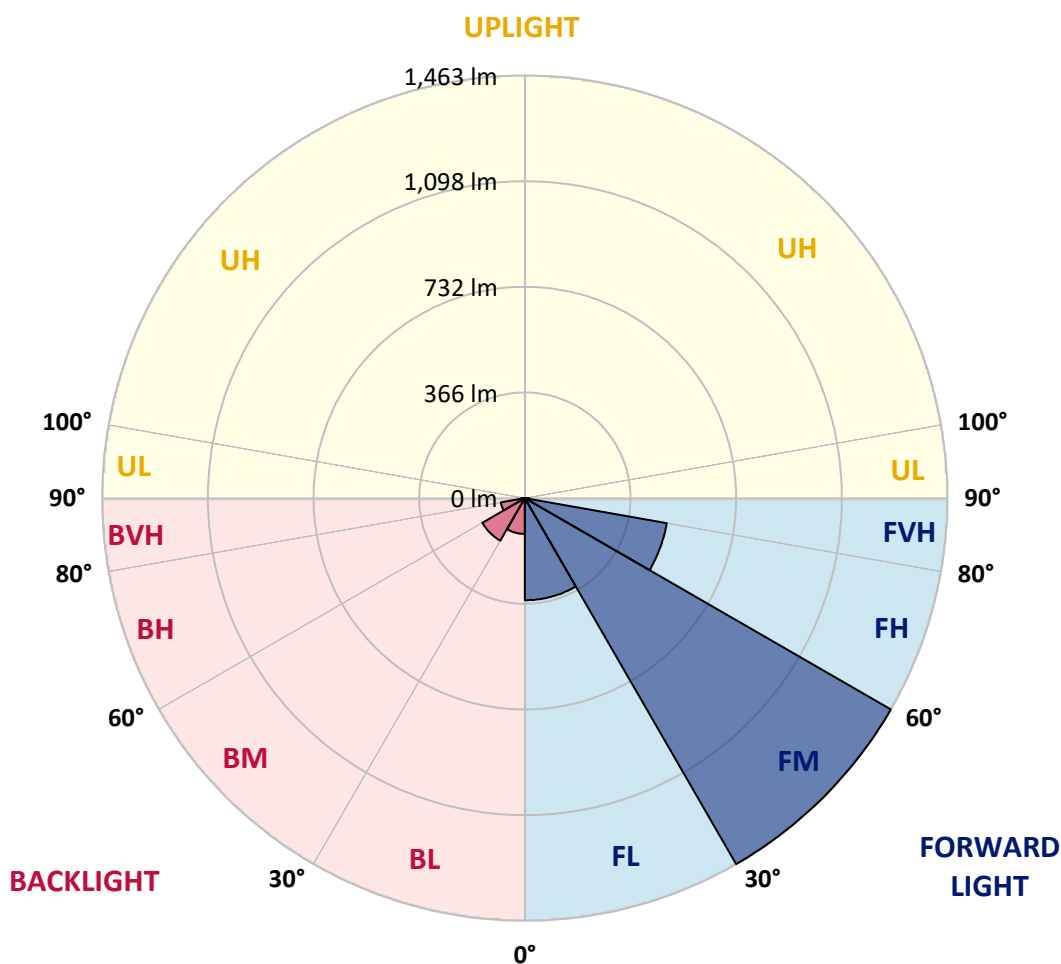
CATALOG NUMBER: CCP-SA-1A-735-U-AFL

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 353.4  | 13.0      |                         |      |        |
| FM   | (30°-60°)   | 1463.4 | 53.7      |                         |      |        |
| FH   | (60°-80°)   | 499.0  | 18.3      |                         |      | G0/660 |
| FVH  | (80°-90°)   | 15.7   | 0.6       |                         |      | G1/100 |
| BL   | (0°-30°)    | 123.9  | 4.6       | B1/500                  |      |        |
| BM   | (30°-60°)   | 170.1  | 6.2       | B0/220                  |      |        |
| BH   | (60°-80°)   | 84.5   | 3.1       | B0/110                  |      | G0/110 |
| BVH  | (80°-90°)   | 12.9   | 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 II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 56°    | 65°    | 75°    | 85°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 0°    | 603.9  | 603.9  | 603.9  | 603.9  | 603.9  | 603.9  | 603.9  | 603.9  | 603.9  | 603.9  | 603.9 |
| 2.5°  | 702.8  | 700.2  | 700.2  | 693.7  | 684.0  | 670.6  | 654.6  | 650.7  | 644.6  | 629.0  | 608.8 |
| 5°    | 809.9  | 807.2  | 803.4  | 792.0  | 774.0  | 747.2  | 713.4  | 707.3  | 685.4  | 653.2  | 616.9 |
| 7.5°  | 880.8  | 879.2  | 878.0  | 868.2  | 850.4  | 824.0  | 778.8  | 771.9  | 734.8  | 681.5  | 624.6 |
| 10°   | 873.5  | 878.2  | 886.5  | 893.4  | 897.0  | 883.4  | 840.9  | 832.8  | 786.9  | 714.2  | 636.1 |
| 12.5° | 805.0  | 811.7  | 827.1  | 855.3  | 887.9  | 914.1  | 890.1  | 885.5  | 842.5  | 749.0  | 650.5 |
| 15°   | 754.1  | 756.9  | 764.4  | 785.3  | 833.8  | 903.9  | 928.2  | 924.0  | 894.4  | 793.6  | 667.1 |
| 17.5° | 738.3  | 739.5  | 741.3  | 748.2  | 781.3  | 863.8  | 943.8  | 947.7  | 944.7  | 839.9  | 685.8 |
| 20°   | 746.2  | 747.0  | 747.2  | 748.4  | 764.2  | 830.3  | 939.6  | 946.3  | 988.9  | 886.3  | 704.4 |
| 22.5° | 776.6  | 775.6  | 774.2  | 769.7  | 778.6  | 824.4  | 928.6  | 939.2  | 1023.1 | 928.6  | 721.5 |
| 25°   | 829.7  | 828.3  | 818.6  | 809.2  | 812.9  | 845.7  | 922.6  | 934.1  | 1049.7 | 968.4  | 734.2 |
| 27.5° | 892.8  | 891.5  | 881.6  | 863.6  | 859.7  | 881.2  | 936.4  | 943.6  | 1069.3 | 1003.7 | 739.7 |
| 30°   | 958.4  | 958.4  | 946.1  | 925.4  | 912.8  | 921.8  | 961.9  | 967.6  | 1084.1 | 1037.9 | 743.2 |
| 32.5° | 1029.8 | 1031.8 | 1012.8 | 989.1  | 975.1  | 969.8  | 997.6  | 1002.6 | 1105.6 | 1078.2 | 750.7 |
| 35°   | 1121.6 | 1117.2 | 1094.1 | 1063.0 | 1040.5 | 1028.4 | 1041.8 | 1047.6 | 1137.2 | 1128.3 | 762.8 |
| 37.5° | 1224.8 | 1217.1 | 1188.7 | 1151.4 | 1112.1 | 1092.0 | 1100.8 | 1102.2 | 1183.9 | 1193.6 | 784.7 |
| 40°   | 1310.0 | 1308.7 | 1284.6 | 1249.3 | 1199.7 | 1172.7 | 1168.3 | 1169.1 | 1248.9 | 1271.0 | 817.8 |
| 42.5° | 1381.9 | 1376.7 | 1372.4 | 1360.0 | 1307.5 | 1263.1 | 1245.3 | 1245.5 | 1319.3 | 1350.9 | 851.2 |
| 45°   | 1413.7 | 1412.7 | 1425.5 | 1457.5 | 1419.8 | 1367.5 | 1342.2 | 1345.8 | 1400.0 | 1433.0 | 883.4 |
| 47.5° | 1400.0 | 1400.8 | 1435.2 | 1519.0 | 1541.3 | 1501.3 | 1456.5 | 1454.3 | 1478.2 | 1496.0 | 911.8 |
| 50°   | 1278.5 | 1291.3 | 1384.2 | 1524.8 | 1621.1 | 1641.0 | 1590.5 | 1582.4 | 1546.7 | 1546.1 | 929.1 |
| 52.5° | 1186.7 | 1186.1 | 1243.1 | 1466.5 | 1649.3 | 1767.1 | 1721.7 | 1703.6 | 1603.3 | 1574.3 | 930.5 |
| 55°   | 1062.8 | 1062.0 | 1104.4 | 1296.2 | 1593.2 | 1855.1 | 1845.5 | 1822.8 | 1655.2 | 1583.6 | 921.1 |
| 57.5° | 804.8  | 819.8  | 862.0  | 1037.7 | 1415.6 | 1841.1 | 1963.7 | 1944.7 | 1705.9 | 1579.4 | 919.3 |
| 60°   | 437.9  | 436.2  | 497.3  | 676.3  | 1083.9 | 1682.1 | 2015.2 | 2014.2 | 1759.8 | 1577.9 | 930.1 |
| 62.5° | 201.9  | 199.9  | 212.2  | 301.2  | 621.5  | 1347.5 | 1915.7 | 1929.9 | 1809.7 | 1563.4 | 929.1 |
| 65°   | 151.0  | 145.8  | 129.3  | 140.1  | 237.8  | 804.4  | 1627.2 | 1665.1 | 1732.8 | 1504.2 | 886.1 |
| 67.5° | 134.6  | 129.7  | 110.3  | 103.4  | 119.4  | 283.8  | 1180.4 | 1215.3 | 1449.0 | 1393.3 | 816.5 |
| 70°   | 123.3  | 119.0  | 99.7   | 88.8   | 89.6   | 125.7  | 617.9  | 686.6  | 1062.0 | 1162.8 | 695.9 |
| 72.5° | 112.5  | 108.7  | 91.2   | 78.2   | 75.4   | 83.1   | 210.6  | 254.0  | 660.5  | 847.4  | 518.8 |
| 75°   | 101.0  | 97.5   | 82.1   | 70.1   | 64.7   | 61.6   | 100.3  | 108.0  | 349.3  | 467.9  | 278.5 |
| 77.5° | 87.8   | 85.8   | 73.2   | 61.8   | 57.2   | 46.6   | 66.7   | 70.1   | 149.6  | 183.7  | 132.6 |
| 80°   | 76.4   | 74.8   | 65.3   | 56.0   | 51.3   | 35.9   | 46.0   | 48.4   | 73.8   | 91.8   | 74.2  |
| 82.5° | 49.7   | 53.7   | 54.1   | 48.2   | 45.2   | 28.8   | 30.4   | 32.2   | 48.9   | 54.1   | 32.4  |
| 85°   | 20.5   | 24.9   | 37.3   | 33.2   | 31.4   | 24.5   | 20.1   | 20.5   | 30.0   | 31.6   | 11.6  |
| 87.5° | 9.3    | 10.3   | 18.4   | 18.6   | 16.2   | 9.3    | 10.1   | 11.1   | 15.4   | 15.2   | 5.1   |
| 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°    | 603.9 | 603.9 | 603.9 | 603.9 | 603.9 | 603.9 | 603.9 | 603.9 | 603.9 | 603.9 | 603.9 |
| 2.5°  | 603.3 | 594.2 | 578.1 | 557.3 | 542.5 | 531.7 | 519.8 | 511.1 | 501.5 | 493.0 | 494.4 |
| 5°    | 601.9 | 584.4 | 548.1 | 509.6 | 472.1 | 441.3 | 415.6 | 396.7 | 377.1 | 369.4 | 368.5 |
| 7.5°  | 603.1 | 573.3 | 513.7 | 450.8 | 393.7 | 354.4 | 324.6 | 306.7 | 295.4 | 288.9 | 289.3 |
| 10°   | 602.7 | 562.9 | 476.6 | 389.8 | 327.4 | 291.5 | 273.3 | 267.4 | 266.4 | 267.2 | 268.4 |
| 12.5° | 603.3 | 548.6 | 435.0 | 334.9 | 279.8 | 261.5 | 262.3 | 267.6 | 271.0 | 273.1 | 274.5 |
| 15°   | 605.9 | 537.0 | 392.3 | 291.7 | 255.0 | 255.6 | 264.1 | 272.3 | 277.3 | 279.7 | 280.8 |
| 17.5° | 609.6 | 522.4 | 354.4 | 258.9 | 244.5 | 253.6 | 264.7 | 273.5 | 277.3 | 278.7 | 279.7 |
| 20°   | 610.0 | 505.6 | 316.2 | 236.4 | 237.6 | 249.5 | 259.1 | 266.2 | 271.0 | 272.5 | 273.3 |
| 22.5° | 608.2 | 482.9 | 276.9 | 220.1 | 229.7 | 241.6 | 249.9 | 257.9 | 251.6 | 246.5 | 245.1 |
| 25°   | 600.7 | 454.3 | 243.3 | 206.6 | 219.9 | 230.9 | 240.4 | 231.5 | 228.5 | 224.6 | 225.0 |
| 27.5° | 584.6 | 418.6 | 211.8 | 194.0 | 208.2 | 224.0 | 217.1 | 215.9 | 212.2 | 208.2 | 208.2 |
| 30°   | 563.3 | 380.9 | 185.3 | 180.8 | 194.2 | 202.1 | 203.7 | 201.9 | 199.7 | 194.6 | 195.0 |
| 32.5° | 544.1 | 341.0 | 166.6 | 169.7 | 185.3 | 185.3 | 192.2 | 192.2 | 184.3 | 169.9 | 169.9 |
| 35°   | 525.2 | 303.5 | 152.8 | 160.4 | 170.7 | 174.1 | 183.5 | 171.1 | 159.9 | 153.3 | 153.0 |
| 37.5° | 510.4 | 271.6 | 143.7 | 152.6 | 156.5 | 165.0 | 165.2 | 156.1 | 152.4 | 146.4 | 145.8 |
| 40°   | 501.7 | 244.7 | 138.1 | 148.6 | 149.0 | 156.9 | 143.9 | 146.4 | 145.6 | 141.1 | 140.5 |
| 42.5° | 496.9 | 224.0 | 134.0 | 145.3 | 143.3 | 135.6 | 133.2 | 137.6 | 138.9 | 136.6 | 135.6 |
| 45°   | 493.2 | 207.8 | 130.6 | 133.6 | 138.7 | 124.7 | 123.7 | 127.1 | 130.1 | 129.9 | 129.1 |
| 47.5° | 491.2 | 196.6 | 127.7 | 126.3 | 127.3 | 118.2 | 116.2 | 117.8 | 121.6 | 123.9 | 123.7 |
| 50°   | 483.5 | 187.9 | 123.3 | 118.8 | 112.5 | 112.5 | 111.5 | 111.5 | 116.0 | 120.8 | 121.2 |
| 52.5° | 469.9 | 177.6 | 117.0 | 111.7 | 104.4 | 107.6 | 108.0 | 107.2 | 111.9 | 117.0 | 117.4 |
| 55°   | 454.9 | 169.9 | 108.5 | 105.2 | 97.7  | 103.0 | 104.8 | 104.0 | 107.2 | 110.7 | 110.5 |
| 57.5° | 455.1 | 169.7 | 101.2 | 98.7  | 91.4  | 97.3  | 101.6 | 101.8 | 101.6 | 104.2 | 104.2 |
| 60°   | 466.5 | 173.7 | 95.5  | 90.0  | 84.1  | 91.2  | 98.3  | 98.3  | 96.9  | 100.7 | 101.0 |
| 62.5° | 469.9 | 173.3 | 92.0  | 81.7  | 77.6  | 85.7  | 93.3  | 94.5  | 93.5  | 98.9  | 99.5  |
| 65°   | 440.3 | 164.0 | 88.4  | 74.2  | 71.6  | 79.5  | 87.2  | 90.6  | 89.6  | 96.5  | 97.3  |
| 67.5° | 399.2 | 152.0 | 82.9  | 67.5  | 65.5  | 73.6  | 80.9  | 84.5  | 84.3  | 93.3  | 93.7  |
| 70°   | 344.2 | 137.2 | 76.0  | 60.6  | 59.6  | 66.7  | 73.2  | 77.0  | 78.7  | 89.2  | 89.0  |
| 72.5° | 266.6 | 117.6 | 65.5  | 53.3  | 53.1  | 59.6  | 65.3  | 69.5  | 72.8  | 82.9  | 82.9  |
| 75°   | 171.9 | 92.6  | 53.5  | 46.2  | 45.4  | 51.5  | 57.4  | 62.2  | 72.4  | 88.4  | 88.2  |
| 77.5° | 105.0 | 70.7  | 43.0  | 38.5  | 38.3  | 43.8  | 49.7  | 57.8  | 79.1  | 78.7  | 76.6  |
| 80°   | 63.0  | 50.7  | 34.3  | 30.8  | 30.8  | 35.9  | 42.4  | 62.0  | 65.7  | 75.0  | 70.9  |
| 82.5° | 32.8  | 31.2  | 25.7  | 22.7  | 23.7  | 28.2  | 38.7  | 49.5  | 53.7  | 45.6  | 41.8  |
| 85°   | 13.4  | 16.6  | 15.8  | 14.4  | 15.0  | 19.5  | 37.3  | 39.7  | 31.8  | 33.4  | 33.6  |
| 87.5° | 4.5   | 7.3   | 7.3   | 5.7   | 6.3   | 13.8  | 22.1  | 13.2  | 16.0  | 9.5   | 7.1   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-2

Luminaire Tested: CCW-SA-2A-735-U-SL4

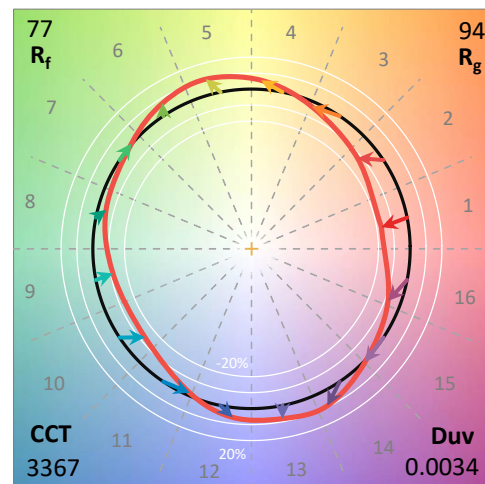
Test Date: 04/26/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/26/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-735-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3367   | CRI (Ra): | 73.3 |      |       |
| CIE u':                   | 0.2376 | R1:       | 69.1 | R9:  | -34.3 |
| CIE v':                   | 0.5184 | R2:       | 81.3 | R10: | 58.3  |
| Duv:                      | 0.0034 | R3:       | 93.4 | R11: | 69.1  |
| CIE x:                    | 0.4168 | R4:       | 71.8 | R12: | 54.2  |
| CIE y:                    | 0.4041 | R5:       | 69.6 | R13: | 71.1  |
| CIE z:                    | 0.1791 | R6:       | 75.4 | R14: | 96.4  |
| Peak Wavelength (nm):     | 590    | R7:       | 79.5 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 46.4 |      |       |
| Purity:                   | 46.5   |           |      |      |       |
| Rf:                       | 77.2   |           |      |      |       |
| Rg:                       | 94.4   |           |      |      |       |



### Test Conditions

Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.9/38%  
 Sphere Temperature (°C): 24.2

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

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**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 3500K 4-step quadrangle

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### Photopic Flux vs. Wavelength

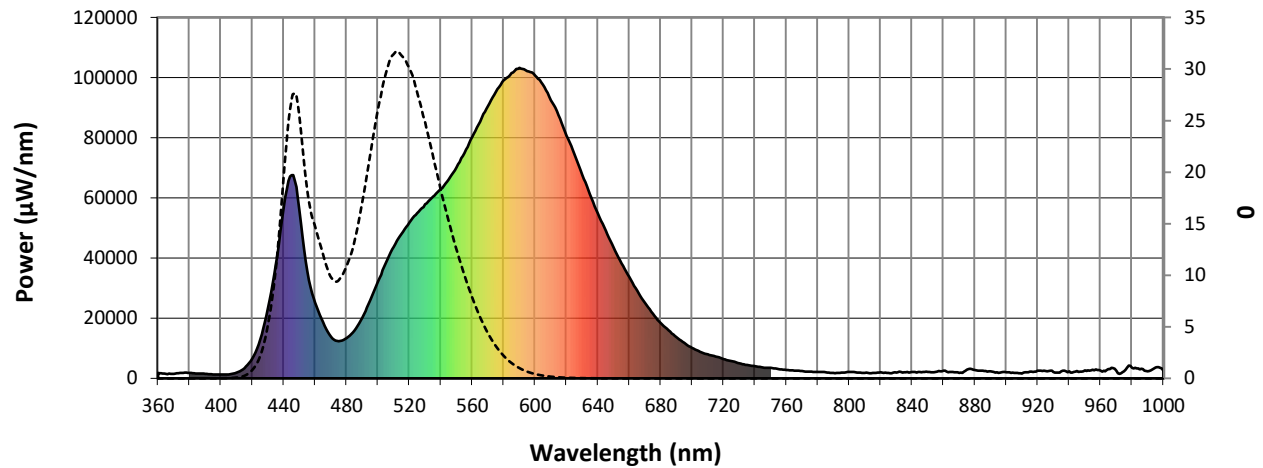


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1840             | 0.0              | 490       | 20271            | 2.9              | 620       | 80709            | 21.0             | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 4.7              | 625       | 74695            | 16.5             | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 7.1              | 630       | 67709            | 12.3             | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 10.7             | 635       | 61156            | 9.2              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 15.0             | 640       | 54795            | 6.5              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 19.9             | 645       | 49111            | 4.7              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 25.1             | 650       | 43533            | 3.2              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 29.5             | 655       | 38234            | 2.2              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 34.1             | 660       | 33754            | 1.4              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 37.5             | 665       | 29162            | 0.9              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.0              | 540       | 62857            | 41.0             | 670       | 25117            | 0.5              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.0              | 545       | 66165            | 44.0             | 675       | 21511            | 0.4              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 0.0              | 550       | 70124            | 47.7             | 680       | 18435            | 0.2              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 0.1              | 555       | 74973            | 51.2             | 685       | 16004            | 0.1              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 0.2              | 560       | 80227            | 54.5             | 690       | 13701            | 0.1              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 0.5              | 565       | 85358            | 56.8             | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 0.9              | 570       | 90422            | 58.8             | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 1.4              | 575       | 95259            | 59.3             | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 1.5              | 580       | 99033            | 58.8             | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 1.2              | 585       | 101572           | 56.4             | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 1.0              | 590       | 103264           | 53.4             | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 1.0              | 595       | 102194           | 48.4             | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 0.9              | 600       | 100645           | 43.4             | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 1.0              | 605       | 97644            | 37.8             | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 1.3              | 610       | 92487            | 31.8             | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 1.9              | 615       | 87436            | 26.4             | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



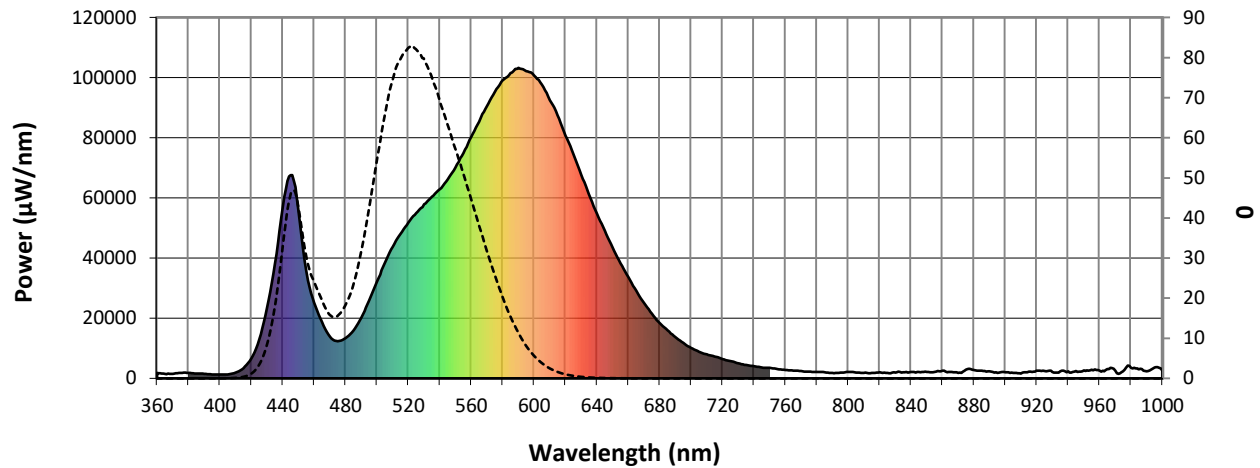
Scotopic Lumens: 7088.7

S/P: 1.35

| 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       | 1840             | 0.0              | 490       | 20271            | 31.2             | 620       | 80709            | 1.0              | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 41.9             | 625       | 74695            | 0.6              | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 53.9             | 630       | 67709            | 0.4              | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 65.2             | 635       | 61156            | 0.2              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 74.1             | 640       | 54795            | 0.1              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 79.5             | 645       | 49111            | 0.1              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 82.4             | 650       | 43533            | 0.1              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 82.1             | 655       | 38234            | 0.0              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 79.8             | 660       | 33754            | 0.0              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 75.3             | 665       | 29162            | 0.0              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.1              | 540       | 62857            | 69.5             | 670       | 25117            | 0.0              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.4              | 545       | 66165            | 63.4             | 675       | 21511            | 0.0              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 1.1              | 550       | 70124            | 57.3             | 680       | 18435            | 0.0              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 3.2              | 555       | 74973            | 51.2             | 685       | 16004            | 0.0              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 8.0              | 560       | 80227            | 44.8             | 690       | 13701            | 0.0              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 17.1             | 565       | 85358            | 38.3             | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 31.7             | 570       | 90422            | 31.9             | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 45.3             | 575       | 95259            | 25.9             | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 43.4             | 580       | 99033            | 20.4             | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 31.1             | 585       | 101572           | 15.5             | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 24.4             | 590       | 103264           | 11.5             | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 19.8             | 595       | 102194           | 8.1              | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 15.9             | 600       | 100645           | 5.7              | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 15.5             | 605       | 97644            | 3.8              | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 18.1             | 610       | 92487            | 2.5              | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 23.0             | 615       | 87436            | 1.6              | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: 2621

M/P: 0.5

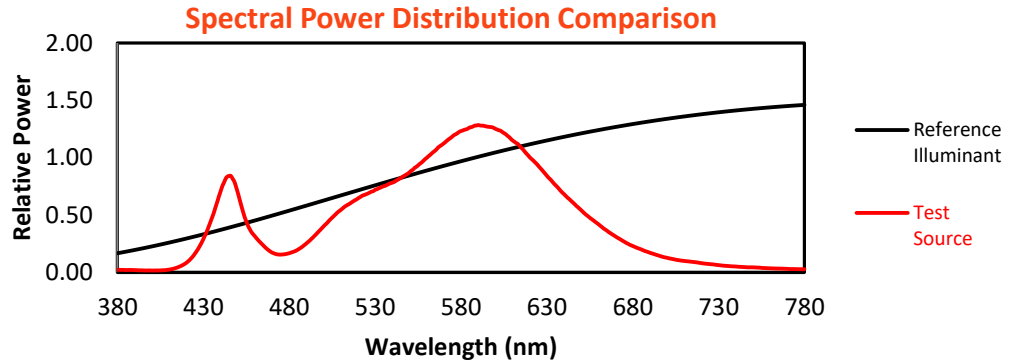
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1840             | 0.0              | 490       | 20271            | 16.9             | 620       | 80709            | 0.1              | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 21.4             | 625       | 74695            | 0.0              | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 25.9             | 630       | 67709            | 0.0              | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 29.4             | 635       | 61156            | 0.0              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 31.4             | 640       | 54795            | 0.0              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 31.3             | 645       | 49111            | 0.0              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 30.2             | 650       | 43533            | 0.0              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 27.8             | 655       | 38234            | 0.0              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 25.0             | 660       | 33754            | 0.0              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 21.7             | 665       | 29162            | 0.0              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.1              | 540       | 62857            | 18.4             | 670       | 25117            | 0.0              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.2              | 545       | 66165            | 15.4             | 675       | 21511            | 0.0              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 0.8              | 550       | 70124            | 12.6             | 680       | 18435            | 0.0              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 2.0              | 555       | 74973            | 10.1             | 685       | 16004            | 0.0              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 4.9              | 560       | 80227            | 7.9              | 690       | 13701            | 0.0              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 10.2             | 565       | 85358            | 6.0              | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 18.9             | 570       | 90422            | 4.4              | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 26.7             | 575       | 95259            | 3.2              | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 25.8             | 580       | 99033            | 2.2              | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 18.6             | 585       | 101572           | 1.5              | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 14.9             | 590       | 103264           | 1.0              | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 12.2             | 595       | 102194           | 0.7              | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 9.9              | 600       | 100645           | 0.4              | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 9.5              | 605       | 97644            | 0.3              | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 10.8             | 610       | 92487            | 0.2              | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 13.1             | 615       | 87436            | 0.1              | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

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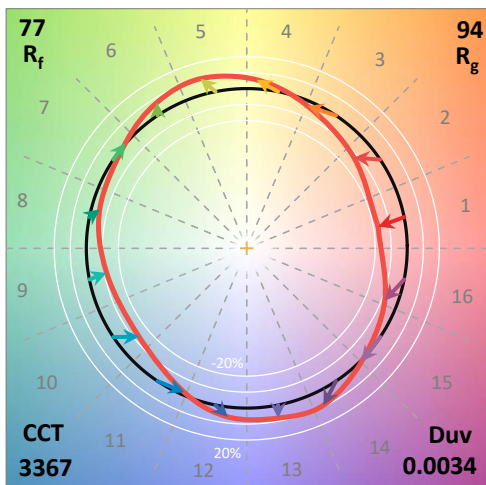
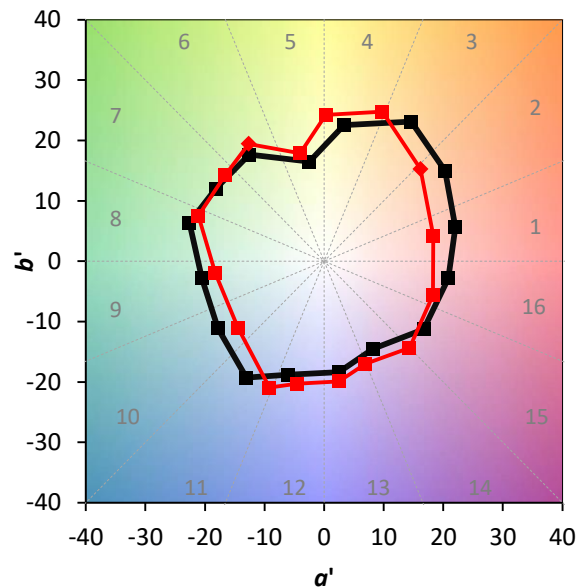
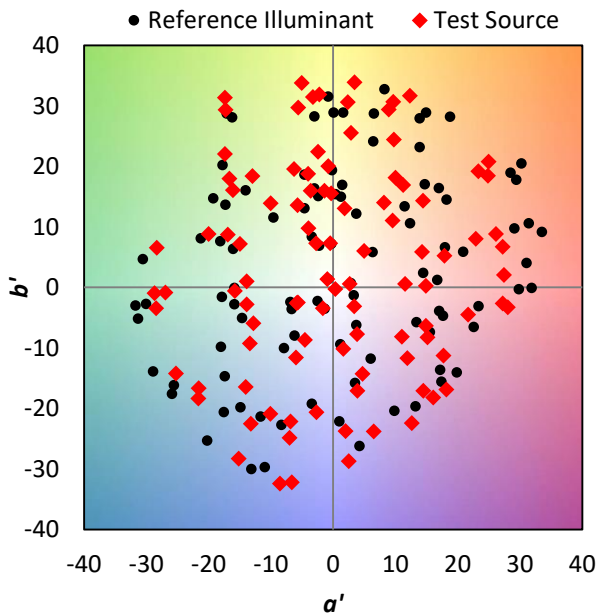
TM-30-18

### Summary

$R_f = 77.2$   
 $R_g = 94.4$   
 CIE  $R_a = 73.3$   
 $R_g = -34.3$



### Color Vector Graphics

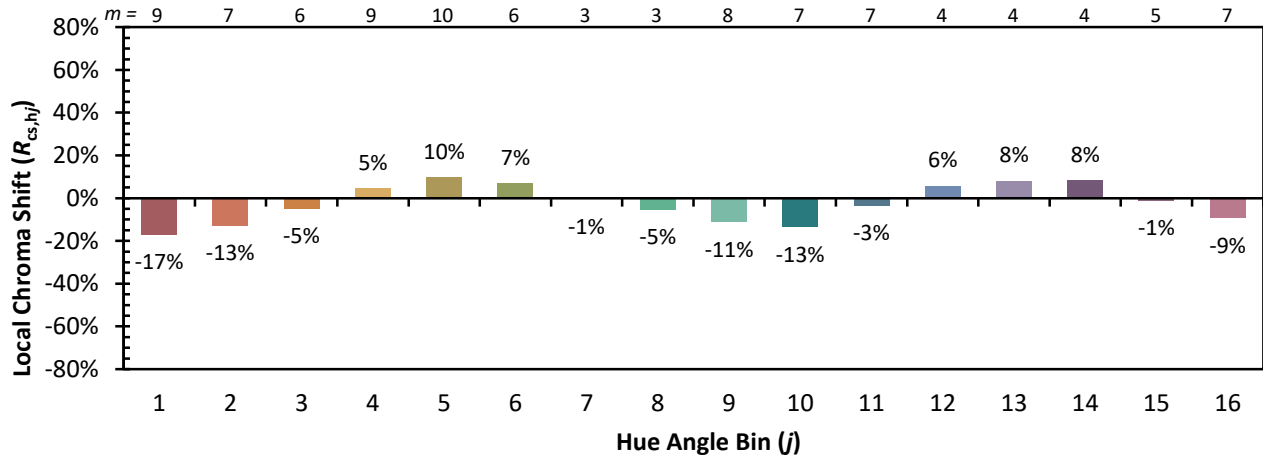


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 69 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 89 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 85 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 76 | CES81 = 75 |
| CES07 = 41 | CES32 = 67 | CES57 = 75 | CES82 = 94 |
| CES08 = 39 | CES33 = 75 | CES58 = 77 | CES83 = 91 |
| CES09 = 29 | CES34 = 79 | CES59 = 87 | CES84 = 89 |
| CES10 = 75 | CES35 = 89 | CES60 = 93 | CES85 = 80 |
| CES11 = 58 | CES36 = 98 | CES61 = 86 | CES86 = 66 |
| CES12 = 64 | CES37 = 86 | CES62 = 90 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 69 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 87 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 76 |
| CES19 = 72 | CES44 = 99 | CES69 = 82 | CES94 = 52 |
| CES20 = 65 | CES45 = 87 | CES70 = 67 | CES95 = 69 |
| CES21 = 86 | CES46 = 82 | CES71 = 66 | CES96 = 78 |
| CES22 = 79 | CES47 = 83 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 60 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 89 | CES75 = 67 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)