

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: P674404

Luminaire Tested: **CCP-SA-1B-735-U-AFL-HSS**

Issue Date: 04/16/2023



**Test Information**

Test Method: LM-79-08  
Report Number: P674404  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA-1B-735-U-AFL-HSS  
Description: INVUE CLEAR CURVE POLE MOUNT Light Square Luminaire @450mA w/ AFL  
distribution lens and House Side Shield  
Light Source: (16) 3500K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

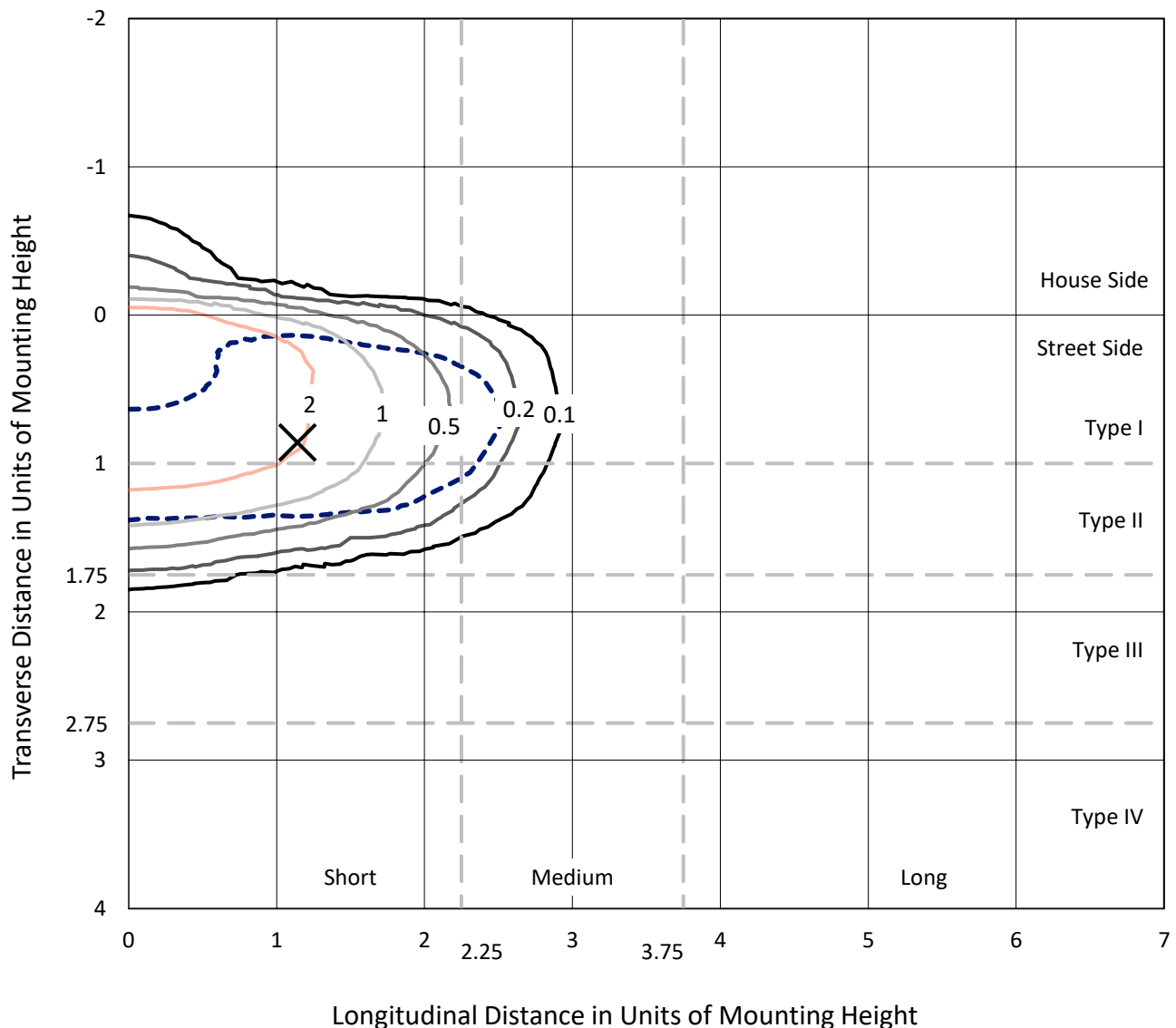
Lumens per Lamp: N/A  
Luminaire Lumens: 2824.7 lumens  
Efficiency: N/A  
Efficacy: 117.7 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B0 - U0 - G0

Input Watts (W): 24  
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

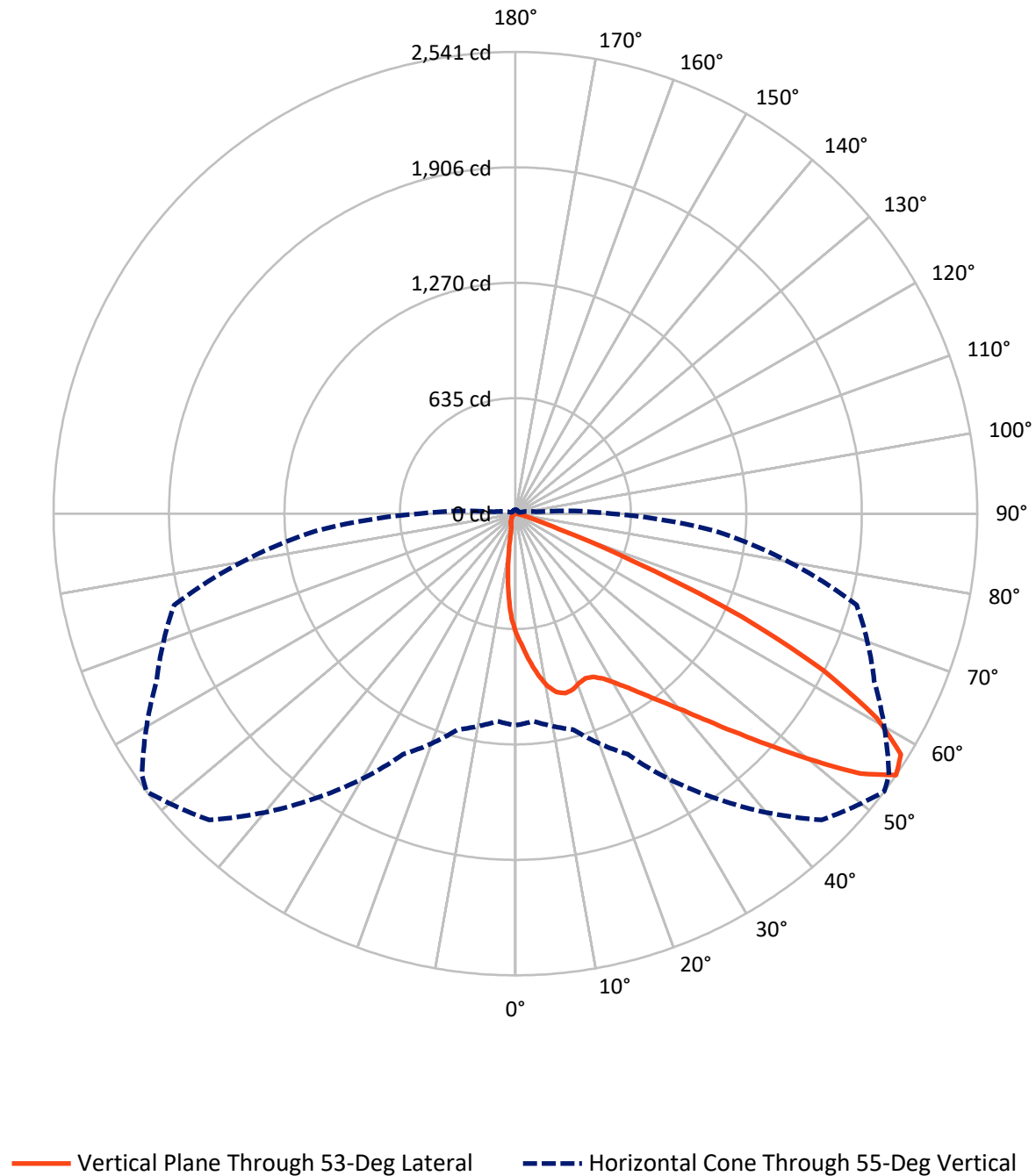
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 4.3 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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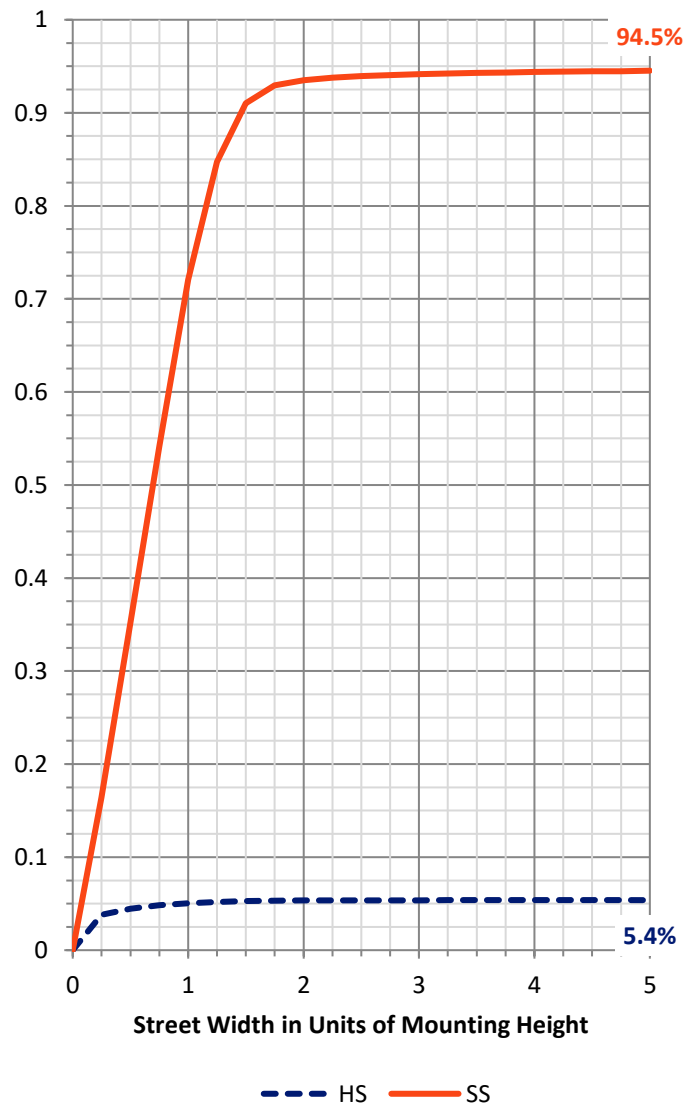
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 152.7    | 0.0    | 152.7  |
|                    | % Fixture | 5.4      | 0.0    | 5.4    |
| <b>Street Side</b> | Lumens    | 2672.0   | 0.0    | 2672.0 |
|                    | % Fixture | 94.6     | 0.0    | 94.6   |
| <b>Total</b>       | Lumens    | 2824.7   | 0.0    | 2824.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 59.1   | 2.1       |
| 10°-20°   | 154.4  | 5.5       |
| 20°-30°   | 258.5  | 9.2       |
| 30°-40°   | 422.9  | 15.0      |
| 40°-50°   | 679.7  | 24.1      |
| 50°-60°   | 767.4  | 27.2      |
| 60°-70°   | 409.4  | 14.5      |
| 70°-80°   | 67.3   | 2.4       |
| 80°-90°   | 6.0    | 0.2       |
| 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°    | 2824.7 | 100.0     |
| 0°-180°   | 2824.7 | 100.0     |

**Coefficient of Utilization**



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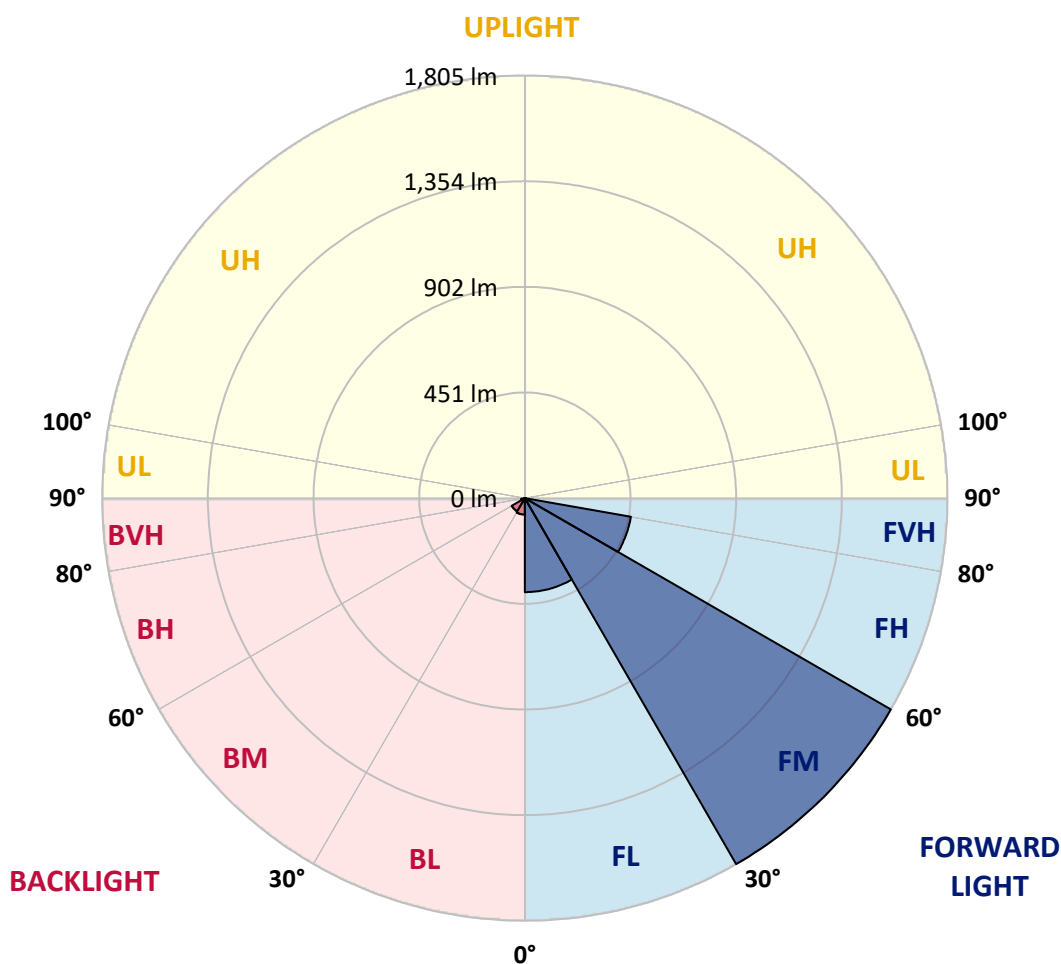
CATALOG NUMBER: CCP-SA-1B-735-U-AFL-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 401.5  | 14.2      |                         |      |        |
| FM   | (30°-60°)   | 1805.0 | 63.9      |                         |      |        |
| FH   | (60°-80°)   | 459.9  | 16.3      |                         |      | G0/660 |
| FVH  | (80°-90°)   | 5.5    | 0.2       |                         |      | G0/10  |
| BL   | (0°-30°)    | 70.5   | 2.5       | B0/110                  |      |        |
| BM   | (30°-60°)   | 65.0   | 2.3       | B0/220                  |      |        |
| BH   | (60°-80°)   | 16.7   | 0.6       | B0/110                  |      | G0/110 |
| BVH  | (80°-90°)   | 0.5    | 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-G0**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 53°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 661.0  | 661.0  | 661.0  | 661.0  | 661.0  | 661.0  | 661.0  | 661.0  | 661.0  | 661.0  | 661.0  |
| 2.5°  | 792.7  | 788.0  | 790.7  | 783.6  | 770.4  | 754.1  | 729.6  | 730.8  | 711.5  | 694.7  | 671.4  |
| 5°    | 923.6  | 918.7  | 917.2  | 898.9  | 880.6  | 851.1  | 814.7  | 808.8  | 773.4  | 730.6  | 681.8  |
| 7.5°  | 992.7  | 988.5  | 991.7  | 985.0  | 966.9  | 940.2  | 894.2  | 889.7  | 835.0  | 770.2  | 698.4  |
| 10°   | 961.0  | 959.5  | 973.1  | 989.0  | 1003.6 | 1000.4 | 963.5  | 956.5  | 895.2  | 813.7  | 715.5  |
| 12.5° | 875.9  | 880.6  | 897.9  | 927.1  | 972.1  | 1014.5 | 1008.5 | 1009.8 | 956.5  | 861.0  | 734.3  |
| 15°   | 825.9  | 831.6  | 841.5  | 856.6  | 912.0  | 987.2  | 1025.6 | 1038.0 | 1015.4 | 913.7  | 756.6  |
| 17.5° | 821.7  | 826.4  | 827.9  | 833.5  | 866.0  | 943.4  | 1018.7 | 1042.2 | 1067.9 | 963.5  | 781.6  |
| 20°   | 854.1  | 856.1  | 854.8  | 850.6  | 862.3  | 919.7  | 996.9  | 1030.5 | 1111.2 | 1016.4 | 803.6  |
| 22.5° | 915.2  | 912.2  | 908.5  | 892.9  | 892.2  | 926.4  | 985.0  | 1020.2 | 1137.0 | 1060.2 | 818.2  |
| 25°   | 990.9  | 984.8  | 979.6  | 957.5  | 947.1  | 961.2  | 995.6  | 1023.9 | 1160.2 | 1102.8 | 828.6  |
| 27.5° | 1073.6 | 1075.6 | 1062.7 | 1033.0 | 1016.7 | 1013.7 | 1028.6 | 1049.6 | 1182.8 | 1140.9 | 834.3  |
| 30°   | 1162.0 | 1163.0 | 1146.1 | 1115.4 | 1100.6 | 1081.5 | 1080.5 | 1093.2 | 1207.0 | 1184.7 | 839.7  |
| 32.5° | 1262.7 | 1265.4 | 1237.9 | 1206.0 | 1180.0 | 1155.3 | 1143.2 | 1153.8 | 1250.6 | 1241.9 | 850.9  |
| 35°   | 1408.2 | 1396.3 | 1359.2 | 1311.0 | 1274.1 | 1241.7 | 1223.1 | 1230.0 | 1308.5 | 1310.5 | 873.1  |
| 37.5° | 1558.2 | 1557.0 | 1515.9 | 1446.3 | 1385.9 | 1345.6 | 1313.9 | 1325.3 | 1389.9 | 1402.3 | 908.8  |
| 40°   | 1698.0 | 1701.2 | 1665.6 | 1605.0 | 1527.3 | 1458.0 | 1424.1 | 1431.7 | 1498.1 | 1513.6 | 952.1  |
| 42.5° | 1789.3 | 1787.6 | 1790.3 | 1773.0 | 1695.1 | 1613.4 | 1562.4 | 1566.6 | 1623.8 | 1631.9 | 1006.3 |
| 45°   | 1831.4 | 1824.7 | 1848.0 | 1902.9 | 1872.0 | 1786.1 | 1728.0 | 1722.8 | 1754.2 | 1752.0 | 1055.5 |
| 47.5° | 1795.0 | 1782.7 | 1836.1 | 1968.5 | 2028.4 | 2002.4 | 1919.3 | 1909.9 | 1883.1 | 1865.3 | 1106.8 |
| 50°   | 1614.1 | 1608.7 | 1723.0 | 1937.3 | 2126.7 | 2202.4 | 2141.3 | 2106.4 | 1998.2 | 1949.0 | 1133.7 |
| 52.5° | 1442.1 | 1427.0 | 1504.2 | 1778.2 | 2082.9 | 2363.3 | 2375.9 | 2313.8 | 2093.8 | 1973.0 | 1124.6 |
| 55°   | 1164.9 | 1146.4 | 1230.5 | 1460.9 | 1909.4 | 2383.8 | 2540.7 | 2508.3 | 2177.4 | 1943.3 | 1106.0 |
| 57.5° | 707.6  | 689.3  | 813.0  | 1046.4 | 1527.0 | 2213.0 | 2500.1 | 2533.1 | 2241.8 | 1910.6 | 1093.9 |
| 60°   | 297.5  | 285.9  | 334.4  | 499.4  | 975.1  | 1818.8 | 2284.8 | 2367.0 | 2253.9 | 1865.8 | 1098.9 |
| 62.5° | 154.7  | 149.5  | 152.2  | 200.0  | 394.3  | 1197.6 | 1901.7 | 2044.8 | 2131.6 | 1846.0 | 1103.8 |
| 65°   | 116.1  | 112.1  | 103.5  | 109.9  | 153.2  | 517.7  | 1366.6 | 1558.2 | 1866.6 | 1795.8 | 1070.4 |
| 67.5° | 95.3   | 91.6   | 85.4   | 83.4   | 90.3   | 179.7  | 697.7  | 946.6  | 1462.7 | 1581.7 | 950.6  |
| 70°   | 76.0   | 74.7   | 72.8   | 69.0   | 67.8   | 87.1   | 250.2  | 385.8  | 967.2  | 1115.4 | 689.0  |
| 72.5° | 63.4   | 63.6   | 61.4   | 58.2   | 53.7   | 56.2   | 99.7   | 131.9  | 468.0  | 534.8  | 288.6  |
| 75°   | 53.0   | 53.0   | 53.7   | 49.3   | 44.8   | 38.6   | 55.4   | 64.3   | 150.2  | 123.5  | 61.6   |
| 77.5° | 41.6   | 42.1   | 45.3   | 41.6   | 35.9   | 24.3   | 30.2   | 34.4   | 44.5   | 35.6   | 22.5   |
| 80°   | 33.2   | 32.7   | 31.4   | 37.4   | 32.2   | 17.1   | 14.4   | 15.8   | 20.8   | 17.1   | 11.1   |
| 82.5° | 23.3   | 23.0   | 22.0   | 25.2   | 25.0   | 12.6   | 9.4    | 9.7    | 12.6   | 10.9   | 6.9    |
| 85°   | 5.7    | 6.7    | 14.1   | 11.9   | 10.4   | 7.4    | 5.7    | 6.2    | 8.2    | 7.2    | 3.7    |
| 87.5° | 2.5    | 2.5    | 6.4    | 7.7    | 4.9    | 3.2    | 2.5    | 2.7    | 4.2    | 4.2    | 2.2    |
| 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°    | 661.0 | 661.0 | 661.0 | 661.0 | 661.0 | 661.0 | 661.0 | 661.0 | 661.0 | 661.0 | 661.0 |
| 2.5°  | 663.3 | 647.2 | 626.9 | 605.4 | 583.3 | 556.9 | 540.0 | 526.2 | 515.3 | 506.9 | 503.9 |
| 5°    | 665.7 | 634.8 | 588.8 | 531.6 | 473.4 | 419.0 | 376.9 | 345.7 | 320.0 | 305.9 | 299.7 |
| 7.5°  | 665.5 | 624.4 | 541.3 | 445.5 | 350.9 | 272.5 | 216.8 | 182.4 | 159.4 | 150.0 | 144.3 |
| 10°   | 665.3 | 610.8 | 487.1 | 349.9 | 234.6 | 157.9 | 116.3 | 97.0  | 88.6  | 85.4  | 84.9  |
| 12.5° | 672.4 | 595.2 | 426.4 | 257.6 | 147.3 | 98.3  | 80.9  | 76.5  | 74.5  | 73.5  | 73.3  |
| 15°   | 676.4 | 580.9 | 362.6 | 181.9 | 99.2  | 77.7  | 72.3  | 70.3  | 69.5  | 69.0  | 68.8  |
| 17.5° | 680.6 | 558.6 | 301.9 | 131.7 | 79.4  | 70.5  | 67.3  | 66.1  | 65.6  | 65.6  | 65.6  |
| 20°   | 681.3 | 534.6 | 241.8 | 97.0  | 70.5  | 65.8  | 62.6  | 61.4  | 60.6  | 60.1  | 60.1  |
| 22.5° | 675.9 | 506.1 | 190.1 | 78.7  | 65.3  | 61.4  | 57.9  | 55.9  | 54.7  | 54.4  | 54.4  |
| 25°   | 662.3 | 465.8 | 145.8 | 69.0  | 61.1  | 56.9  | 52.7  | 50.5  | 49.5  | 49.5  | 49.5  |
| 27.5° | 642.7 | 418.3 | 112.6 | 61.4  | 55.7  | 51.5  | 47.8  | 45.8  | 45.5  | 45.3  | 45.5  |
| 30°   | 620.5 | 372.5 | 86.1  | 54.4  | 49.3  | 45.8  | 42.8  | 41.8  | 42.3  | 42.3  | 42.6  |
| 32.5° | 598.2 | 326.7 | 67.3  | 49.0  | 43.6  | 40.6  | 39.1  | 39.1  | 39.8  | 39.8  | 39.8  |
| 35°   | 579.1 | 281.9 | 56.4  | 44.5  | 39.6  | 37.1  | 36.4  | 37.1  | 37.6  | 37.9  | 37.9  |
| 37.5° | 568.5 | 243.3 | 49.7  | 40.6  | 36.4  | 34.4  | 34.2  | 34.9  | 35.9  | 36.6  | 36.9  |
| 40°   | 564.5 | 213.6 | 45.8  | 37.6  | 33.4  | 32.2  | 31.9  | 32.9  | 34.6  | 35.9  | 36.1  |
| 42.5° | 564.8 | 187.3 | 42.3  | 34.6  | 31.4  | 29.7  | 29.7  | 31.2  | 32.9  | 34.2  | 34.2  |
| 45°   | 566.5 | 164.8 | 38.9  | 31.7  | 29.7  | 26.7  | 27.0  | 29.0  | 30.2  | 31.4  | 31.4  |
| 47.5° | 568.0 | 146.8 | 35.1  | 28.5  | 25.7  | 24.3  | 24.7  | 26.2  | 28.0  | 29.9  | 29.9  |
| 50°   | 559.3 | 133.9 | 31.4  | 25.0  | 22.5  | 22.0  | 23.0  | 24.3  | 26.7  | 28.7  | 29.0  |
| 52.5° | 538.5 | 122.3 | 28.2  | 22.3  | 20.3  | 20.5  | 21.8  | 22.5  | 24.5  | 24.7  | 25.0  |
| 55°   | 529.4 | 116.3 | 25.7  | 20.3  | 18.6  | 19.3  | 20.0  | 20.3  | 19.8  | 18.6  | 18.6  |
| 57.5° | 527.4 | 112.4 | 23.3  | 18.3  | 17.1  | 18.1  | 17.8  | 16.3  | 14.8  | 13.4  | 13.1  |
| 60°   | 529.4 | 106.9 | 21.3  | 15.8  | 15.6  | 15.8  | 15.1  | 12.4  | 10.4  | 9.4   | 8.9   |
| 62.5° | 518.0 | 99.0  | 19.6  | 13.6  | 13.6  | 13.4  | 11.4  | 8.4   | 6.7   | 5.9   | 5.7   |
| 65°   | 480.4 | 83.4  | 17.8  | 11.4  | 11.1  | 10.6  | 7.7   | 5.7   | 4.5   | 3.7   | 3.5   |
| 67.5° | 406.4 | 64.6  | 16.1  | 9.4   | 8.9   | 7.4   | 4.9   | 3.7   | 2.5   | 2.2   | 2.0   |
| 70°   | 277.2 | 40.1  | 13.6  | 7.4   | 6.7   | 4.7   | 3.0   | 2.2   | 1.5   | 1.2   | 1.0   |
| 72.5° | 100.5 | 23.3  | 11.4  | 5.7   | 4.5   | 3.0   | 1.7   | 1.0   | 0.7   | 0.7   | 0.5   |
| 75°   | 23.8  | 16.3  | 8.7   | 4.2   | 3.0   | 1.7   | 1.0   | 0.7   | 0.5   | 0.5   | 0.2   |
| 77.5° | 10.9  | 12.6  | 5.7   | 2.5   | 2.0   | 1.2   | 0.7   | 0.5   | 0.2   | 0.2   | 0.0   |
| 80°   | 6.2   | 8.9   | 2.7   | 1.7   | 1.5   | 1.0   | 0.5   | 0.2   | 0.2   | 0.0   | 0.0   |
| 82.5° | 3.2   | 4.9   | 2.0   | 1.5   | 1.2   | 0.7   | 0.5   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 2.2   | 2.5   | 1.5   | 1.2   | 1.0   | 0.7   | 0.5   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 1.7   | 1.7   | 1.5   | 1.2   | 1.0   | 0.7   | 0.2   | 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   |

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-2

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

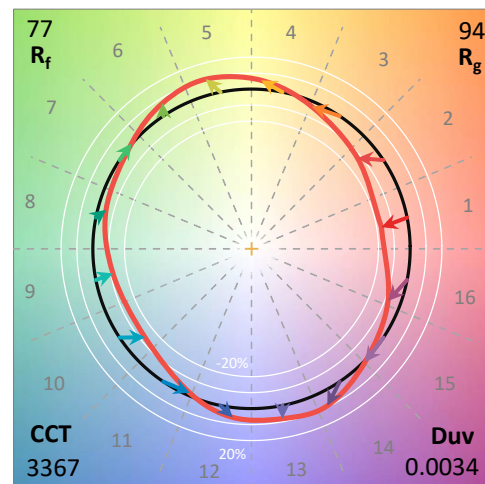
Test Date: 04/26/2021

### 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

REPORT NUMBER: SP1-2104-224-2

| 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

REPORT NUMBER: SP1-2104-224-2

### Photopic Flux vs. Wavelength

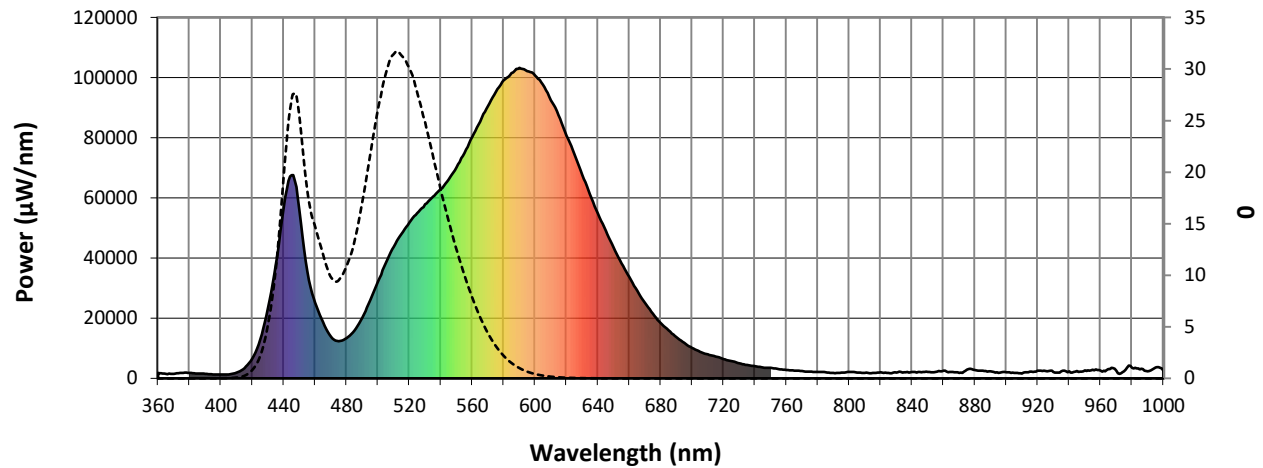


#####

| 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



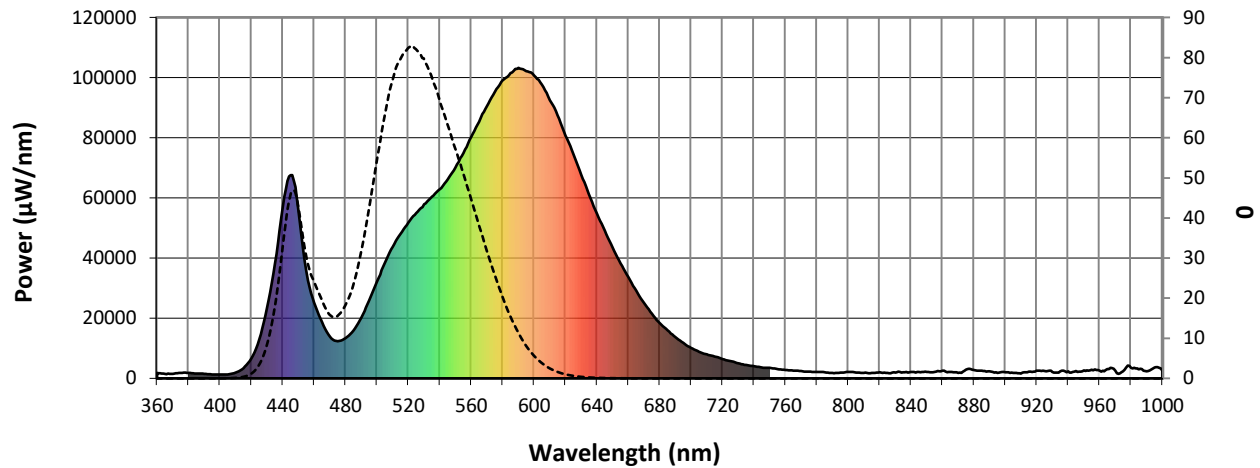
Scotopic Lumens: 7088.7

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              |           |                  |                  |

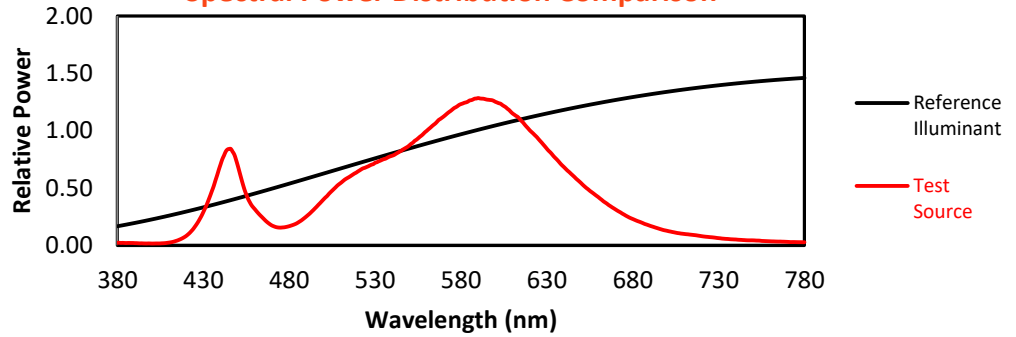
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TM-30-18

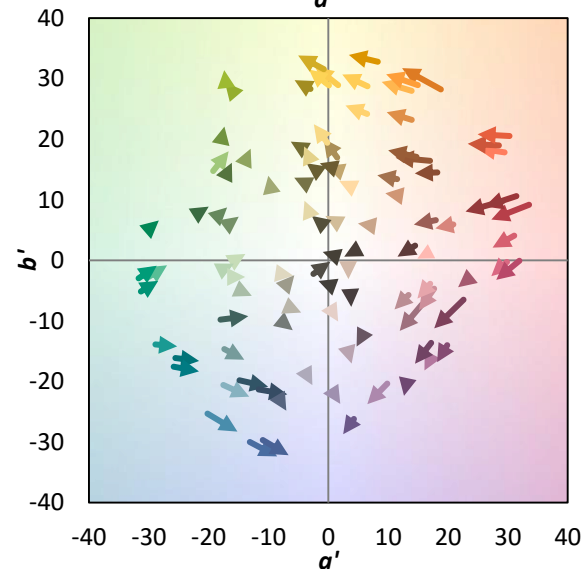
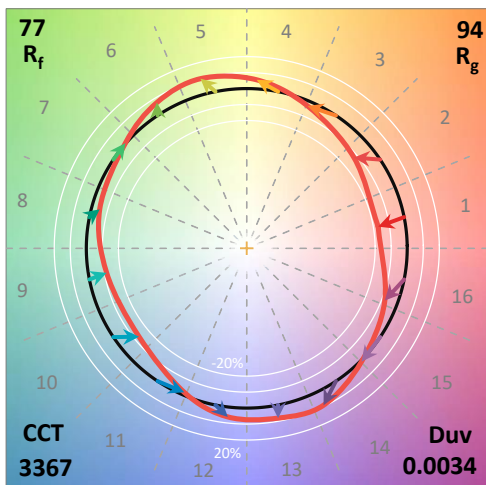
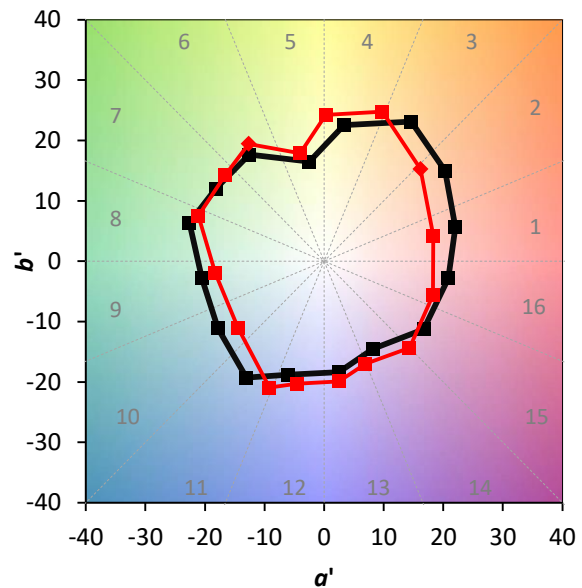
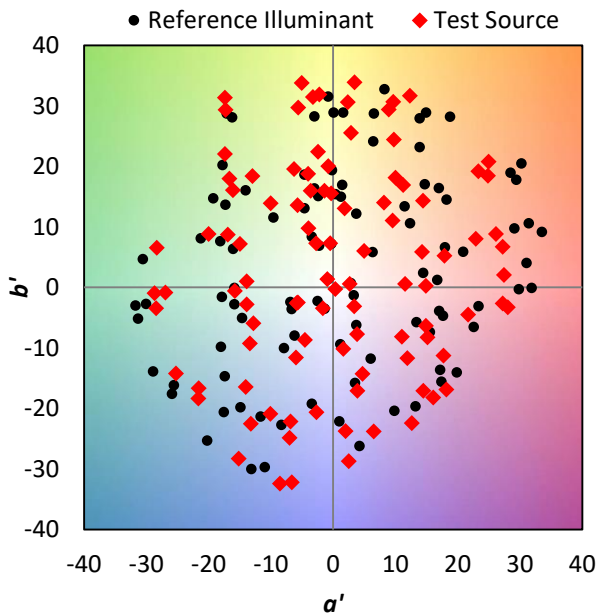
### Summary

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

### Spectral Power Distribution Comparison

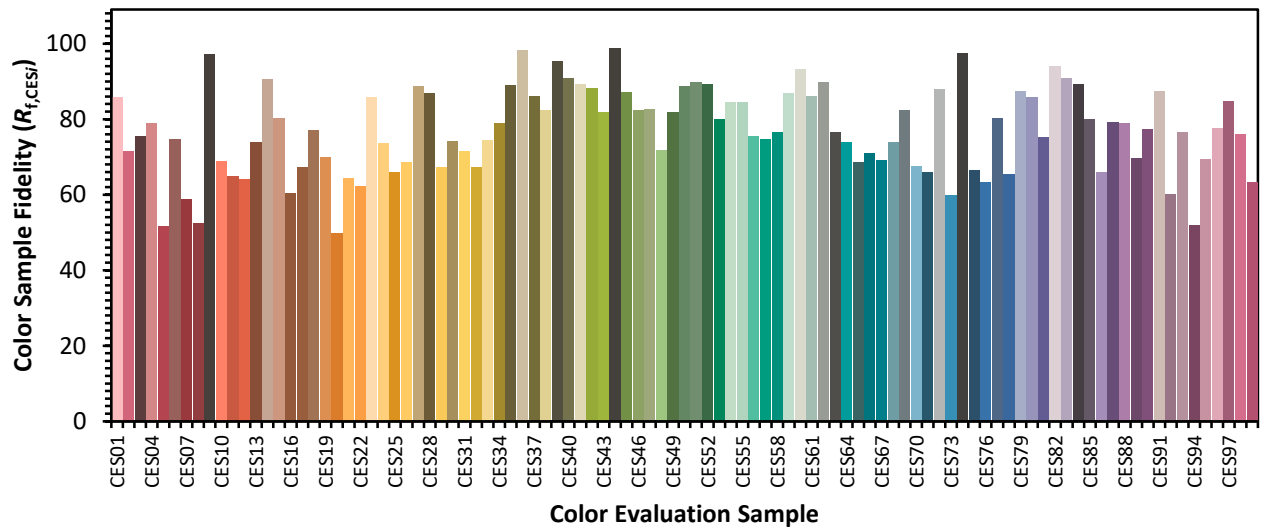


### Color Vector Graphics



**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)