

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: P673747

Luminaire Tested: **CCP-SA2D-830-U-SL2-HSS**

Issue Date: 04/16/2023

**Test Information**

Test Method: LM-79-08  
Report Number: P673747  
Test Lab: INNOVATION CENTER(G1)  
Issue Date: 04/16/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: CCP-SA2D-830-U-SL2-HSS  
Description: INVUE CLEAR CURVE POLE MOUNT Light Square Luminaire @800mA w/ SL2  
distribution lens and House Side Shield  
Light Source: (32) 3000K CCT, 80 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 7126.4 lumens  
Efficiency: N/A  
Efficacy: 88.2 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G2

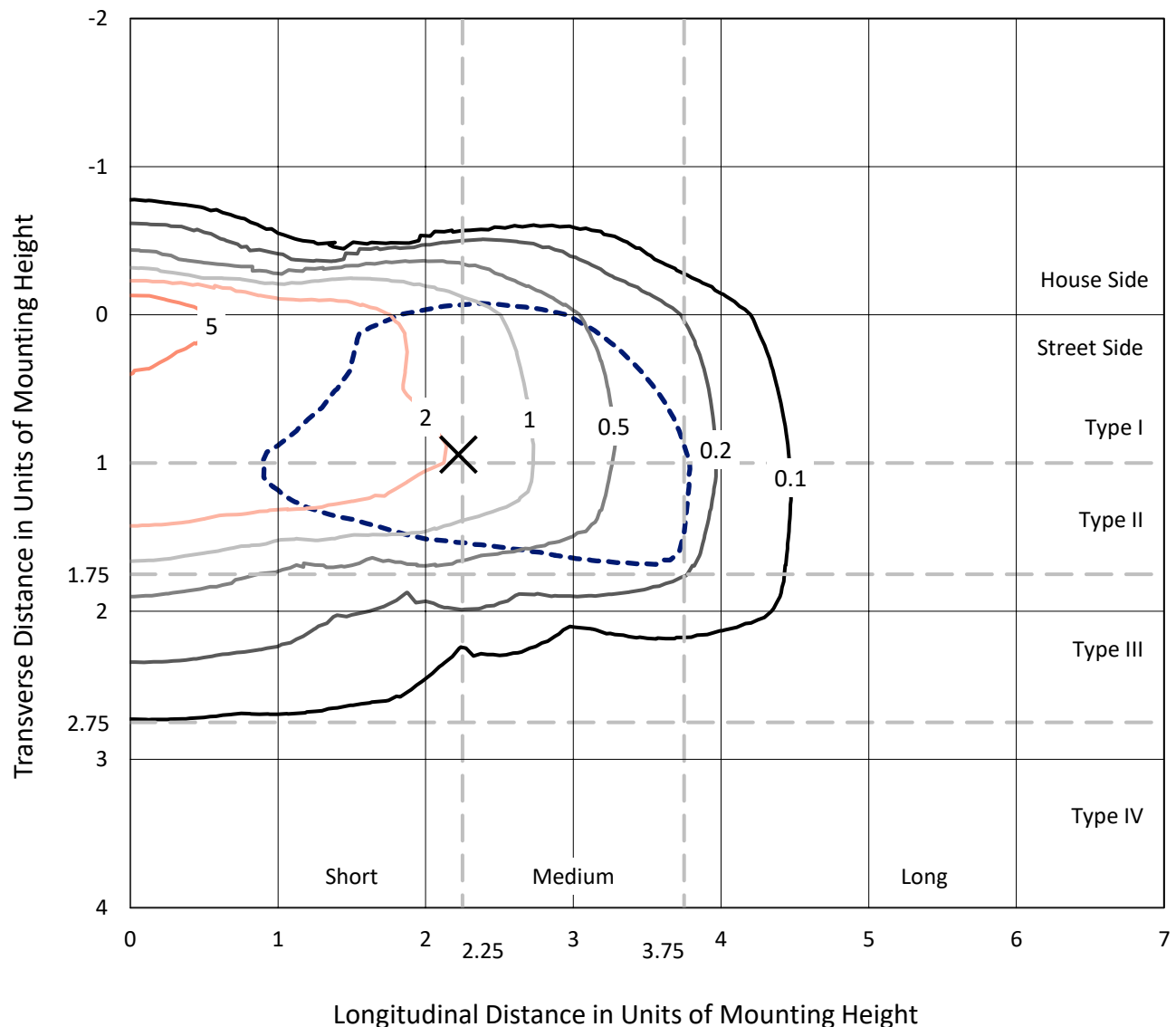
Input Watts (W): 80.8  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

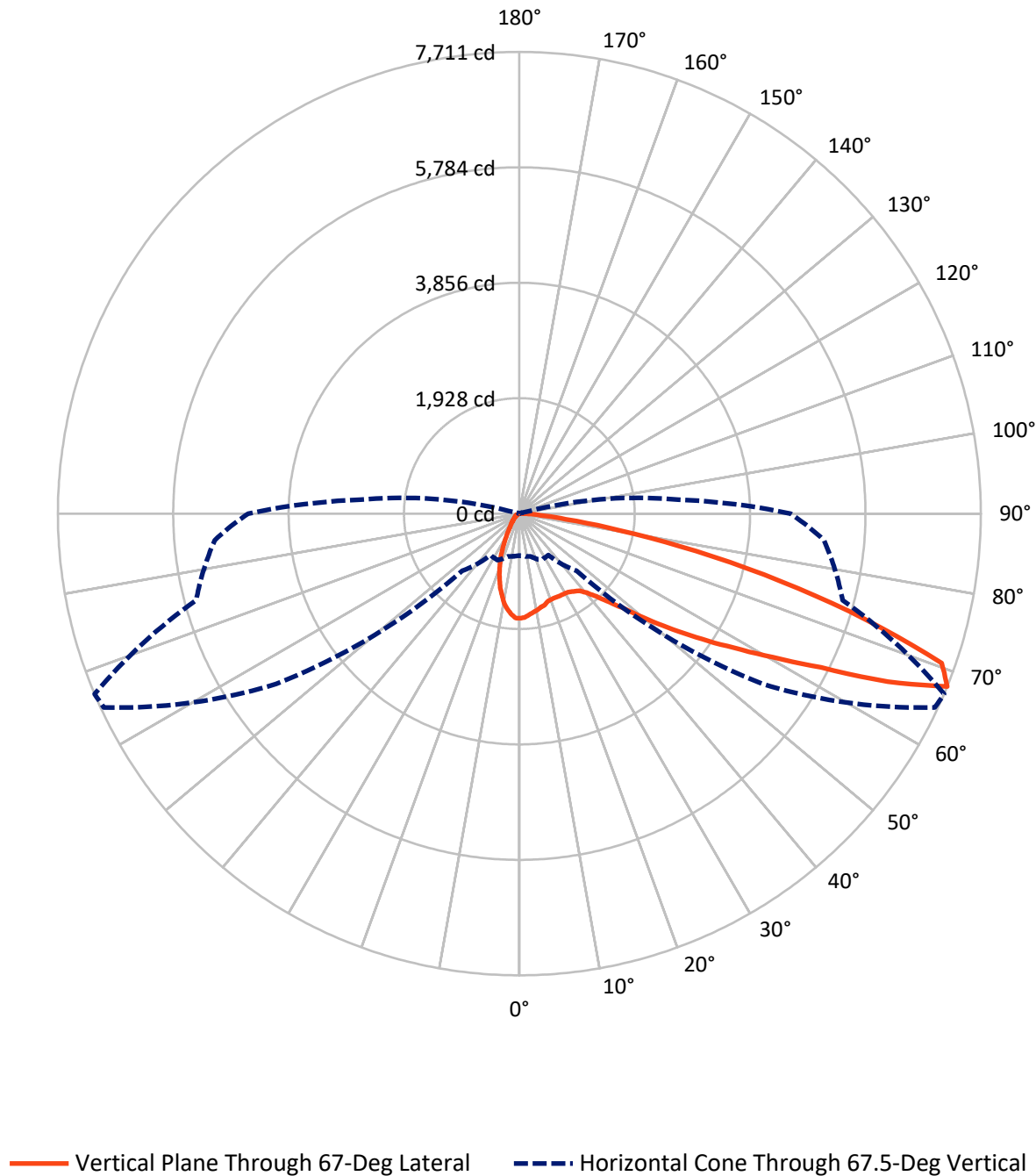
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 7.8 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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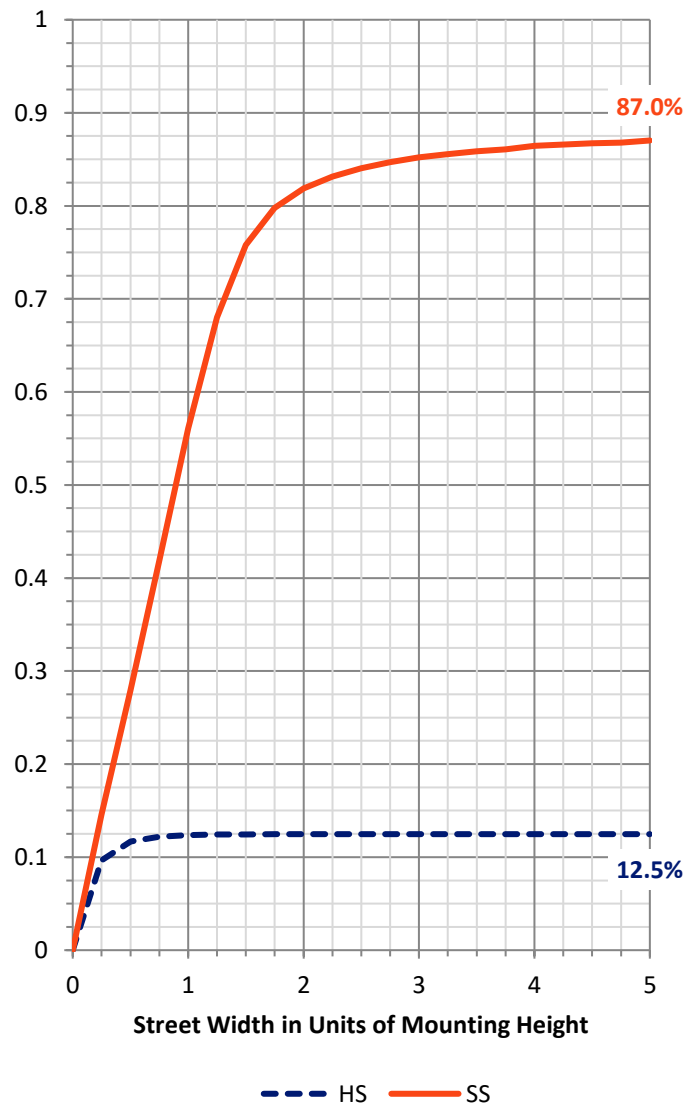
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 896.9    | 0.0    | 896.9  |
|                    | % Fixture | 12.6     | 0.0    | 12.6   |
| <b>Street Side</b> | Lumens    | 6229.5   | 0.0    | 6229.5 |
|                    | % Fixture | 87.4     | 0.0    | 87.4   |
| <b>Total</b>       | Lumens    | 7126.4   | 0.0    | 7126.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 147.3  | 2.1       |
| 10°-20°   | 327.2  | 4.6       |
| 20°-30°   | 465.2  | 6.5       |
| 30°-40°   | 677.4  | 9.5       |
| 40°-50°   | 1048.4 | 14.7      |
| 50°-60°   | 1609.0 | 22.6      |
| 60°-70°   | 1744.2 | 24.5      |
| 70°-80°   | 984.0  | 13.8      |
| 80°-90°   | 123.6  | 1.7       |
| 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°    | 7126.4 | 100.0     |
| 0°-180°   | 7126.4 | 100.0     |

**Coefficient of Utilization**



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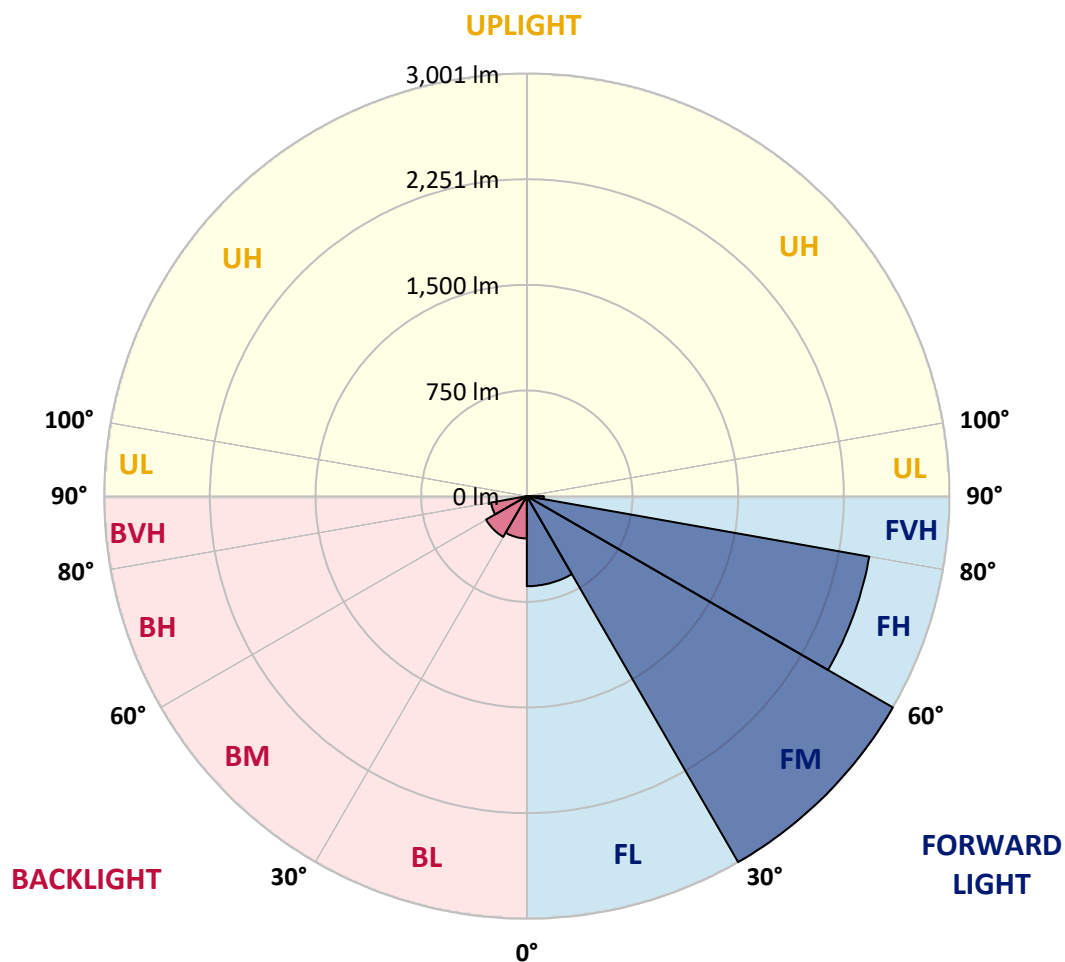
CATALOG NUMBER: CCP-SA2D-830-U-SL2-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 639.4  | 9.0       |                         |      |         |
| FM   | (30°-60°)   | 3000.8 | 42.1      |                         |      |         |
| FH   | (60°-80°)   | 2469.2 | 34.6      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 120.1  | 1.7       |                         |      | G2/225  |
| BL   | (0°-30°)    | 300.2  | 4.2       | B1/500                  |      |         |
| BM   | (30°-60°)   | 334.1  | 4.7       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 259.1  | 3.6       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 3.5    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 67°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 |
| 2.5°  | 1672.4 | 1681.0 | 1693.0 | 1710.2 | 1722.2 | 1715.4 | 1720.5 | 1749.7 | 1734.2 | 1748.0 | 1741.1 |
| 5°    | 1579.7 | 1588.3 | 1605.5 | 1603.7 | 1617.5 | 1643.2 | 1677.6 | 1715.4 | 1698.2 | 1739.4 | 1754.9 |
| 7.5°  | 1483.6 | 1480.1 | 1480.1 | 1516.2 | 1545.4 | 1581.4 | 1600.3 | 1662.1 | 1663.8 | 1699.9 | 1737.7 |
| 10°   | 1396.0 | 1406.3 | 1423.5 | 1437.2 | 1464.7 | 1516.2 | 1571.1 | 1619.2 | 1638.1 | 1710.2 | 1720.5 |
| 12.5° | 1342.8 | 1347.9 | 1368.5 | 1380.5 | 1416.6 | 1466.4 | 1524.8 | 1586.6 | 1602.0 | 1675.9 | 1725.7 |
| 15°   | 1320.4 | 1332.5 | 1339.3 | 1361.6 | 1380.5 | 1426.9 | 1469.8 | 1540.2 | 1584.9 | 1643.2 | 1705.1 |
| 17.5° | 1337.6 | 1332.5 | 1335.9 | 1342.8 | 1365.1 | 1406.3 | 1452.6 | 1523.0 | 1538.5 | 1636.4 | 1729.1 |
| 20°   | 1359.9 | 1361.6 | 1351.3 | 1347.9 | 1342.8 | 1382.2 | 1420.0 | 1511.0 | 1528.2 | 1636.4 | 1744.5 |
| 22.5° | 1420.0 | 1401.1 | 1420.0 | 1392.5 | 1365.1 | 1382.2 | 1418.3 | 1512.7 | 1524.8 | 1634.7 | 1760.0 |
| 25°   | 1493.9 | 1497.3 | 1502.4 | 1444.1 | 1404.6 | 1392.5 | 1430.3 | 1517.9 | 1528.2 | 1648.4 | 1766.9 |
| 27.5° | 1598.6 | 1614.1 | 1588.3 | 1559.1 | 1480.1 | 1420.0 | 1428.6 | 1514.5 | 1533.3 | 1641.5 | 1784.0 |
| 30°   | 1739.4 | 1727.4 | 1730.8 | 1663.8 | 1586.6 | 1492.1 | 1468.1 | 1523.0 | 1536.8 | 1650.1 | 1816.7 |
| 32.5° | 1861.3 | 1847.6 | 1871.6 | 1847.6 | 1725.7 | 1595.2 | 1514.5 | 1540.2 | 1555.7 | 1670.7 | 1844.1 |
| 35°   | 1936.9 | 1954.0 | 1991.8 | 2017.6 | 1914.5 | 1729.1 | 1591.7 | 1586.6 | 1593.4 | 1681.0 | 1864.7 |
| 37.5° | 2053.6 | 2084.5 | 2115.4 | 2180.7 | 2091.4 | 1893.9 | 1713.6 | 1646.7 | 1634.7 | 1730.8 | 1875.0 |
| 40°   | 2180.7 | 2172.1 | 2263.1 | 2340.4 | 2336.9 | 2125.7 | 1883.6 | 1753.1 | 1736.0 | 1809.8 | 1943.7 |
| 42.5° | 2287.1 | 2278.6 | 2379.9 | 2506.9 | 2520.7 | 2349.0 | 2077.7 | 1904.2 | 1888.8 | 1931.7 | 2027.9 |
| 45°   | 2426.2 | 2433.1 | 2553.3 | 2704.4 | 2754.2 | 2644.3 | 2340.4 | 2120.6 | 2112.0 | 2098.3 | 2187.6 |
| 47.5° | 2549.9 | 2587.6 | 2690.7 | 2869.2 | 3049.5 | 2949.9 | 2649.4 | 2436.5 | 2376.4 | 2345.5 | 2434.8 |
| 50°   | 2635.7 | 2670.1 | 2795.4 | 2986.0 | 3315.7 | 3379.2 | 2996.3 | 2773.1 | 2774.8 | 2699.2 | 2747.3 |
| 52.5° | 2635.7 | 2634.0 | 2735.3 | 2986.0 | 3501.1 | 3827.4 | 3459.9 | 3197.2 | 3210.9 | 3131.9 | 3135.4 |
| 55°   | 2381.6 | 2376.4 | 2500.1 | 2766.2 | 3480.5 | 4258.3 | 4162.2 | 3734.6 | 3700.3 | 3547.5 | 3562.9 |
| 57.5° | 1918.0 | 1930.0 | 2024.4 | 2343.8 | 3212.6 | 4459.2 | 4998.4 | 4339.0 | 4222.3 | 3906.3 | 3906.3 |
| 60°   | 1399.4 | 1389.1 | 1459.5 | 1682.7 | 2573.9 | 4383.7 | 5685.2 | 5051.6 | 4867.9 | 4203.4 | 4158.8 |
| 62.5° | 1064.6 | 1062.9 | 1081.8 | 1157.3 | 1632.9 | 3822.2 | 5980.6 | 5958.3 | 5659.5 | 4495.3 | 4431.8 |
| 65°   | 860.3  | 863.7  | 889.4  | 942.7  | 997.6  | 2606.5 | 5824.3 | 7040.0 | 6767.0 | 4929.7 | 4722.0 |
| 67.5° | 702.3  | 710.9  | 741.8  | 856.8  | 844.8  | 1349.6 | 4960.6 | 7659.9 | 7711.4 | 5592.5 | 5111.7 |
| 70°   | 540.9  | 554.6  | 590.7  | 753.8  | 813.9  | 898.0  | 3439.3 | 7350.8 | 7488.2 | 6004.6 | 4876.5 |
| 72.5° | 367.5  | 365.7  | 443.0  | 611.3  | 822.5  | 822.5  | 1914.5 | 5920.5 | 6051.0 | 5535.9 | 4236.0 |
| 75°   | 199.2  | 211.2  | 293.6  | 461.9  | 753.8  | 795.0  | 1090.3 | 4332.2 | 4515.9 | 4304.7 | 3276.2 |
| 77.5° | 108.2  | 109.9  | 163.1  | 302.2  | 626.7  | 758.9  | 728.0  | 2946.5 | 3018.6 | 2596.2 | 1794.3 |
| 80°   | 56.7   | 58.4   | 85.9   | 197.5  | 432.7  | 704.0  | 606.1  | 1756.6 | 1687.9 | 995.9  | 592.4  |
| 82.5° | 25.8   | 27.5   | 42.9   | 123.6  | 276.4  | 554.6  | 523.7  | 848.2  | 783.0  | 278.2  | 180.3  |
| 85°   | 10.3   | 10.3   | 18.9   | 73.8   | 161.4  | 273.0  | 448.2  | 425.8  | 355.4  | 84.1   | 89.3   |
| 87.5° | 3.4    | 3.4    | 5.2    | 29.2   | 65.2   | 163.1  | 238.7  | 224.9  | 154.5  | 30.9   | 48.1   |
| 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°    | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 | 1748.0 |
| 2.5°  | 1734.2 | 1753.1 | 1748.0 | 1744.5 | 1711.9 | 1708.5 | 1705.1 | 1674.1 | 1684.5 | 1658.7 | 1675.9 |
| 5°    | 1744.5 | 1754.9 | 1727.4 | 1675.9 | 1629.5 | 1578.0 | 1538.5 | 1511.0 | 1461.2 | 1442.3 | 1438.9 |
| 7.5°  | 1734.2 | 1734.2 | 1677.6 | 1595.2 | 1504.2 | 1420.0 | 1313.6 | 1238.0 | 1181.3 | 1138.4 | 1153.9 |
| 10°   | 1720.5 | 1699.9 | 1641.5 | 1495.6 | 1330.7 | 1203.7 | 1050.9 | 939.2  | 855.1  | 827.6  | 810.5  |
| 12.5° | 1720.5 | 1684.5 | 1554.0 | 1354.8 | 1141.9 | 949.5  | 767.5  | 621.6  | 540.9  | 492.8  | 485.9  |
| 15°   | 1705.1 | 1651.8 | 1490.4 | 1222.6 | 958.1  | 697.1  | 489.4  | 364.0  | 295.3  | 276.4  | 269.6  |
| 17.5° | 1708.5 | 1645.0 | 1396.0 | 1066.3 | 743.5  | 463.6  | 298.8  | 230.1  | 212.9  | 204.3  | 206.0  |
| 20°   | 1715.4 | 1645.0 | 1311.8 | 913.5  | 535.7  | 288.5  | 206.0  | 194.0  | 185.4  | 182.0  | 183.7  |
| 22.5° | 1737.7 | 1612.3 | 1226.0 | 757.2  | 362.3  | 207.8  | 182.0  | 170.0  | 163.1  | 158.0  | 156.3  |
| 25°   | 1741.1 | 1607.2 | 1143.6 | 602.7  | 249.0  | 175.1  | 159.7  | 146.0  | 137.4  | 130.5  | 128.8  |
| 27.5° | 1736.0 | 1584.9 | 1028.5 | 448.2  | 187.2  | 156.3  | 135.6  | 121.9  | 109.9  | 104.7  | 103.0  |
| 30°   | 1754.9 | 1543.7 | 930.7  | 322.8  | 158.0  | 135.6  | 115.0  | 99.6   | 89.3   | 82.4   | 82.4   |
| 32.5° | 1756.6 | 1507.6 | 822.5  | 230.1  | 144.2  | 120.2  | 97.9   | 80.7   | 70.4   | 67.0   | 67.0   |
| 35°   | 1758.3 | 1475.0 | 702.3  | 175.1  | 128.8  | 103.0  | 80.7   | 67.0   | 60.1   | 54.9   | 54.9   |
| 37.5° | 1763.4 | 1450.9 | 592.4  | 147.7  | 115.0  | 87.6   | 67.0   | 54.9   | 48.1   | 46.4   | 46.4   |
| 40°   | 1773.7 | 1418.3 | 477.3  | 130.5  | 99.6   | 73.8   | 56.7   | 46.4   | 39.5   | 37.8   | 36.1   |
| 42.5° | 1801.2 | 1409.7 | 381.2  | 116.8  | 89.3   | 61.8   | 46.4   | 37.8   | 32.6   | 29.2   | 27.5   |
| 45°   | 1914.5 | 1432.0 | 295.3  | 108.2  | 75.6   | 51.5   | 39.5   | 30.9   | 24.0   | 22.3   | 20.6   |
| 47.5° | 2100.0 | 1505.9 | 233.5  | 96.2   | 63.5   | 42.9   | 32.6   | 24.0   | 18.9   | 17.2   | 15.5   |
| 50°   | 2381.6 | 1674.1 | 190.6  | 85.9   | 53.2   | 36.1   | 25.8   | 18.9   | 13.7   | 12.0   | 12.0   |
| 52.5° | 2750.8 | 1900.8 | 164.8  | 75.6   | 42.9   | 30.9   | 20.6   | 13.7   | 10.3   | 8.6    | 8.6    |
| 55°   | 3128.5 | 2168.7 | 154.5  | 65.2   | 36.1   | 25.8   | 15.5   | 10.3   | 6.9    | 5.2    | 5.2    |
| 57.5° | 3475.4 | 2342.1 | 149.4  | 53.2   | 30.9   | 18.9   | 12.0   | 6.9    | 3.4    | 1.7    | 1.7    |
| 60°   | 3691.7 | 2469.2 | 133.9  | 42.9   | 24.0   | 15.5   | 8.6    | 3.4    | 1.7    | 0.0    | 0.0    |
| 62.5° | 3976.7 | 2597.9 | 109.9  | 32.6   | 17.2   | 10.3   | 5.2    | 1.7    | 0.0    | 0.0    | 0.0    |
| 65°   | 4352.8 | 2742.2 | 85.9   | 25.8   | 13.7   | 6.9    | 3.4    | 1.7    | 0.0    | 0.0    | 0.0    |
| 67.5° | 4533.1 | 2666.6 | 58.4   | 18.9   | 8.6    | 3.4    | 1.7    | 0.0    | 0.0    | 0.0    | 0.0    |
| 70°   | 4172.5 | 2245.9 | 41.2   | 13.7   | 5.2    | 1.7    | 1.7    | 0.0    | 0.0    | 0.0    | 0.0    |
| 72.5° | 3508.0 | 1760.0 | 30.9   | 8.6    | 3.4    | 1.7    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 75°   | 2585.9 | 1100.6 | 24.0   | 6.9    | 3.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 77.5° | 1371.9 | 410.4  | 17.2   | 5.2    | 1.7    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 405.2  | 120.2  | 12.0   | 3.4    | 1.7    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 133.9  | 36.1   | 6.9    | 3.4    | 1.7    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 68.7   | 13.7   | 3.4    | 3.4    | 1.7    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 39.5   | 5.2    | 3.4    | 3.4    | 1.7    | 0.0    | 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    |

LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2012-088-3

Luminaire Tested: WIS-SA830-2D-U-SL4

Test Date: 01/11/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/11/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **WIS-SA-830-2D-U-SL4**  
 Description: INVUE. WALL PACK LIGHT SQUARE SL4 OPTICS 2-SQUARE.

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 3049   | CRI (Ra): | 81.7 |      |      |
| CIE u':                   | 0.2482 | R1:       | 79.6 | R9:  | 1.9  |
| CIE v':                   | 0.5224 | R2:       | 90.6 | R10: | 79.3 |
| Duv:                      | 0.0015 | R3:       | 95.7 | R11: | 78.7 |
| CIE x:                    | 0.4354 | R4:       | 79.4 | R12: | 72.2 |
| CIE y:                    | 0.4072 | R5:       | 80.2 | R13: | 82.2 |
| CIE z:                    | 0.1574 | R6:       | 89.0 | R14: | 98.1 |
| Peak Wavelength (nm):     | 601    | R7:       | 82.2 |      |      |
| Dominant Wavelength (nm): | 582    | R8:       | 57.0 |      |      |
| Purity:                   | 53     |           |      |      |      |
| Rf:                       | 85.1   |           |      |      |      |
| Rg:                       | 94.3   |           |      |      |      |



### Test Conditions

Stabilization Time: 83M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.6/29%  
 Sphere Temperature (°C): 25.6

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 7/29/2020        | 1/29/2021            |
| 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 3000K 4-step quadrangle

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### Photopic Flux vs. Wavelength



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| 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       | 2750             | 0.0              | 490       | 47173            | 6.7              | 620       | 161309           | 42.0             | 750       | 8155             | 0.0              | 880       | 3493             | 0.0              |
| 365       | 2250             | 0.0              | 495       | 54281            | 9.8              | 625       | 153301           | 33.8             | 755       | 7110             | 0.0              | 885       | 4023             | 0.0              |
| 370       | 2449             | 0.0              | 500       | 61837            | 13.6             | 630       | 143292           | 25.9             | 760       | 6829             | 0.0              | 890       | 2983             | 0.0              |
| 375       | 2752             | 0.0              | 505       | 68833            | 19.3             | 635       | 132368           | 19.9             | 765       | 6022             | 0.0              | 895       | 2605             | 0.0              |
| 380       | 2834             | 0.0              | 510       | 74324            | 25.5             | 640       | 122334           | 14.6             | 770       | 5682             | 0.0              | 900       | 3576             | 0.0              |
| 385       | 2613             | 0.0              | 515       | 79410            | 32.9             | 645       | 112200           | 10.8             | 775       | 5247             | 0.0              | 905       | 2786             | 0.0              |
| 390       | 2589             | 0.0              | 520       | 83815            | 40.6             | 650       | 102448           | 7.5              | 780       | 4493             | 0.0              | 910       | 2480             | 0.0              |
| 395       | 2344             | 0.0              | 525       | 87774            | 47.1             | 655       | 91886            | 5.3              | 785       | 4667             | 0.0              | 915       | 2633             | 0.0              |
| 400       | 2067             | 0.0              | 530       | 91247            | 53.7             | 660       | 81865            | 3.4              | 790       | 3736             | 0.0              | 920       | 2726             | 0.0              |
| 405       | 2087             | 0.0              | 535       | 94694            | 58.7             | 665       | 72448            | 2.3              | 795       | 3568             | 0.0              | 925       | 3905             | 0.0              |
| 410       | 2663             | 0.0              | 540       | 98431            | 64.1             | 670       | 63654            | 1.4              | 800       | 3190             | 0.0              | 930       | 2414             | 0.0              |
| 415       | 3760             | 0.0              | 545       | 103765           | 69.1             | 675       | 55284            | 0.9              | 805       | 3215             | 0.0              | 935       | 3414             | 0.0              |
| 420       | 5815             | 0.0              | 550       | 109130           | 74.2             | 680       | 47949            | 0.6              | 810       | 3108             | 0.0              | 940       | 2725             | 0.0              |
| 425       | 9591             | 0.1              | 555       | 115271           | 78.7             | 685       | 42173            | 0.4              | 815       | 3889             | 0.0              | 945       | 4070             | 0.0              |
| 430       | 15806            | 0.1              | 560       | 123390           | 83.9             | 690       | 36755            | 0.2              | 820       | 2869             | 0.0              | 950       | 2640             | 0.0              |
| 435       | 26035            | 0.3              | 565       | 131926           | 87.7             | 695       | 31630            | 0.1              | 825       | 2776             | 0.0              | 955       | 2231             | 0.0              |
| 440       | 41509            | 0.7              | 570       | 141815           | 92.2             | 700       | 27642            | 0.1              | 830       | 2538             | 0.0              | 960       | 3598             | 0.0              |
| 445       | 62857            | 1.3              | 575       | 151359           | 94.2             | 705       | 24213            | 0.1              | 835       | 3283             | 0.0              | 965       | 1098             | 0.0              |
| 450       | 81434            | 2.1              | 580       | 160364           | 95.3             | 710       | 21007            | 0.0              | 840       | 2477             | 0.0              | 970       | 3057             | 0.0              |
| 455       | 77103            | 2.6              | 585       | 166836           | 92.7             | 715       | 18986            | 0.0              | 845       | 3781             | 0.0              | 975       | 152              | 0.0              |
| 460       | 62408            | 2.6              | 590       | 172885           | 89.4             | 720       | 16766            | 0.0              | 850       | 3525             | 0.0              | 980       | 1629             | 0.0              |
| 465       | 52134            | 2.7              | 595       | 176548           | 83.7             | 725       | 14792            | 0.0              | 855       | 4413             | 0.0              | 985       | 5600             | 0.0              |
| 470       | 44297            | 2.8              | 600       | 178427           | 76.9             | 730       | 12553            | 0.0              | 860       | 3598             | 0.0              | 990       | 5671             | 0.0              |
| 475       | 38679            | 3.0              | 605       | 177729           | 68.8             | 735       | 11291            | 0.0              | 865       | 3617             | 0.0              | 995       | 1881             | 0.0              |
| 480       | 38032            | 3.6              | 610       | 174846           | 60.1             | 740       | 9818             | 0.0              | 870       | 3567             | 0.0              | 1000      | 3484             | 0.0              |
| 485       | 41652            | 4.9              | 615       | 169274           | 51.1             | 745       | 8656             | 0.0              | 875       | 4346             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 4584.8

S/P: 0.52

| 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       | 2750             | 0.0              | 490       | 47173            | 72.6             | 620       | 161309           | 2.0              | 750       | 8155             | 0.0              | 880       | 3493             | 0.0              |
| 365       | 2250             | 0.0              | 495       | 54281            | 87.7             | 625       | 153301           | 1.3              | 755       | 7110             | 0.0              | 885       | 4023             | 0.0              |
| 370       | 2449             | 0.0              | 500       | 61837            | 103.4            | 630       | 143292           | 0.8              | 760       | 6829             | 0.0              | 890       | 2983             | 0.0              |
| 375       | 2752             | 0.0              | 505       | 68833            | 117.0            | 635       | 132368           | 0.5              | 765       | 6022             | 0.0              | 895       | 2605             | 0.0              |
| 380       | 2834             | 0.0              | 510       | 74324            | 126.0            | 640       | 122334           | 0.3              | 770       | 5682             | 0.0              | 900       | 3576             | 0.0              |
| 385       | 2613             | 0.0              | 515       | 79410            | 131.6            | 645       | 112200           | 0.2              | 775       | 5247             | 0.0              | 905       | 2786             | 0.0              |
| 390       | 2589             | 0.0              | 520       | 83815            | 133.2            | 650       | 102448           | 0.1              | 780       | 4493             | 0.0              | 910       | 2480             | 0.0              |
| 395       | 2344             | 0.0              | 525       | 87774            | 131.3            | 655       | 91886            | 0.1              | 785       | 4667             | 0.0              | 915       | 2633             | 0.0              |
| 400       | 2067             | 0.0              | 530       | 91247            | 125.8            | 660       | 81865            | 0.0              | 790       | 3736             | 0.0              | 920       | 2726             | 0.0              |
| 405       | 2087             | 0.1              | 535       | 94694            | 118.0            | 665       | 72448            | 0.0              | 795       | 3568             | 0.0              | 925       | 3905             | 0.0              |
| 410       | 2663             | 0.2              | 540       | 98431            | 108.8            | 670       | 63654            | 0.0              | 800       | 3190             | 0.0              | 930       | 2414             | 0.0              |
| 415       | 3760             | 0.4              | 545       | 103765           | 99.5             | 675       | 55284            | 0.0              | 805       | 3215             | 0.0              | 935       | 3414             | 0.0              |
| 420       | 5815             | 1.0              | 550       | 109130           | 89.2             | 680       | 47949            | 0.0              | 810       | 3108             | 0.0              | 940       | 2725             | 0.0              |
| 425       | 9591             | 2.3              | 555       | 115271           | 78.8             | 685       | 42173            | 0.0              | 815       | 3889             | 0.0              | 945       | 4070             | 0.0              |
| 430       | 15806            | 5.4              | 560       | 123390           | 69.0             | 690       | 36755            | 0.0              | 820       | 2869             | 0.0              | 950       | 2640             | 0.0              |
| 435       | 26035            | 11.6             | 565       | 131926           | 59.2             | 695       | 31630            | 0.0              | 825       | 2776             | 0.0              | 955       | 2231             | 0.0              |
| 440       | 41509            | 23.2             | 570       | 141815           | 50.0             | 700       | 27642            | 0.0              | 830       | 2538             | 0.0              | 960       | 3598             | 0.0              |
| 445       | 62857            | 42.1             | 575       | 151359           | 41.2             | 705       | 24213            | 0.0              | 835       | 3283             | 0.0              | 965       | 1098             | 0.0              |
| 450       | 81434            | 63.1             | 580       | 160364           | 33.0             | 710       | 21007            | 0.0              | 840       | 2477             | 0.0              | 970       | 3057             | 0.0              |
| 455       | 77103            | 67.4             | 585       | 166836           | 25.5             | 715       | 18986            | 0.0              | 845       | 3781             | 0.0              | 975       | 152              | 0.0              |
| 460       | 62408            | 60.3             | 590       | 172885           | 19.3             | 720       | 16766            | 0.0              | 850       | 3525             | 0.0              | 980       | 1629             | 0.0              |
| 465       | 52134            | 55.1             | 595       | 176548           | 14.1             | 725       | 14792            | 0.0              | 855       | 4413             | 0.0              | 985       | 5600             | 0.0              |
| 470       | 44297            | 51.0             | 600       | 178427           | 10.1             | 730       | 12553            | 0.0              | 860       | 3598             | 0.0              | 990       | 5671             | 0.0              |
| 475       | 38679            | 48.4             | 605       | 177729           | 7.0              | 735       | 11291            | 0.0              | 865       | 3617             | 0.0              | 995       | 1881             | 0.0              |
| 480       | 38032            | 51.4             | 610       | 174846           | 4.7              | 740       | 9818             | 0.0              | 870       | 3567             | 0.0              | 1000      | 3484             | 0.0              |
| 485       | 41652            | 60.4             | 615       | 169274           | 3.1              | 745       | 8656             | 0.0              | 875       | 4346             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 12033.4 S/P: 1.36**

| 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       | 2750             | 0.0              | 490       | 47173            | 39.3             | 620       | 161309           | 0.1              | 750       | 8155             | 0.0              | 880       | 3493             | 0.0              |
| 365       | 2250             | 0.0              | 495       | 54281            | 44.8             | 625       | 153301           | 0.1              | 755       | 7110             | 0.0              | 885       | 4023             | 0.0              |
| 370       | 2449             | 0.0              | 500       | 61837            | 49.7             | 630       | 143292           | 0.0              | 760       | 6829             | 0.0              | 890       | 2983             | 0.0              |
| 375       | 2752             | 0.0              | 505       | 68833            | 52.8             | 635       | 132368           | 0.0              | 765       | 6022             | 0.0              | 895       | 2605             | 0.0              |
| 380       | 2834             | 0.0              | 510       | 74324            | 53.4             | 640       | 122334           | 0.0              | 770       | 5682             | 0.0              | 900       | 3576             | 0.0              |
| 385       | 2613             | 0.0              | 515       | 79410            | 51.9             | 645       | 112200           | 0.0              | 775       | 5247             | 0.0              | 905       | 2786             | 0.0              |
| 390       | 2589             | 0.0              | 520       | 83815            | 48.8             | 650       | 102448           | 0.0              | 780       | 4493             | 0.0              | 910       | 2480             | 0.0              |
| 395       | 2344             | 0.0              | 525       | 87774            | 44.5             | 655       | 91886            | 0.0              | 785       | 4667             | 0.0              | 915       | 2633             | 0.0              |
| 400       | 2067             | 0.0              | 530       | 91247            | 39.4             | 660       | 81865            | 0.0              | 790       | 3736             | 0.0              | 920       | 2726             | 0.0              |
| 405       | 2087             | 0.0              | 535       | 94694            | 34.1             | 665       | 72448            | 0.0              | 795       | 3568             | 0.0              | 925       | 3905             | 0.0              |
| 410       | 2663             | 0.1              | 540       | 98431            | 28.8             | 670       | 63654            | 0.0              | 800       | 3190             | 0.0              | 930       | 2414             | 0.0              |
| 415       | 3760             | 0.2              | 545       | 103765           | 24.1             | 675       | 55284            | 0.0              | 805       | 3215             | 0.0              | 935       | 3414             | 0.0              |
| 420       | 5815             | 0.7              | 550       | 109130           | 19.6             | 680       | 47949            | 0.0              | 810       | 3108             | 0.0              | 940       | 2725             | 0.0              |
| 425       | 9591             | 1.5              | 555       | 115271           | 15.5             | 685       | 42173            | 0.0              | 815       | 3889             | 0.0              | 945       | 4070             | 0.0              |
| 430       | 15806            | 3.3              | 560       | 123390           | 12.2             | 690       | 36755            | 0.0              | 820       | 2869             | 0.0              | 950       | 2640             | 0.0              |
| 435       | 26035            | 6.9              | 565       | 131926           | 9.3              | 695       | 31630            | 0.0              | 825       | 2776             | 0.0              | 955       | 2231             | 0.0              |
| 440       | 41509            | 13.9             | 570       | 141815           | 6.9              | 700       | 27642            | 0.0              | 830       | 2538             | 0.0              | 960       | 3598             | 0.0              |
| 445       | 62857            | 24.8             | 575       | 151359           | 5.0              | 705       | 24213            | 0.0              | 835       | 3283             | 0.0              | 965       | 1098             | 0.0              |
| 450       | 81434            | 37.5             | 580       | 160364           | 3.6              | 710       | 21007            | 0.0              | 840       | 2477             | 0.0              | 970       | 3057             | 0.0              |
| 455       | 77103            | 40.4             | 585       | 166836           | 2.5              | 715       | 18986            | 0.0              | 845       | 3781             | 0.0              | 975       | 152              | 0.0              |
| 460       | 62408            | 36.8             | 590       | 172885           | 1.7              | 720       | 16766            | 0.0              | 850       | 3525             | 0.0              | 980       | 1629             | 0.0              |
| 465       | 52134            | 34.1             | 595       | 176548           | 1.1              | 725       | 14792            | 0.0              | 855       | 4413             | 0.0              | 985       | 5600             | 0.0              |
| 470       | 44297            | 31.7             | 600       | 178427           | 0.8              | 730       | 12553            | 0.0              | 860       | 3598             | 0.0              | 990       | 5671             | 0.0              |
| 475       | 38679            | 29.5             | 605       | 177729           | 0.5              | 735       | 11291            | 0.0              | 865       | 3617             | 0.0              | 995       | 1881             | 0.0              |
| 480       | 38032            | 30.6             | 610       | 174846           | 0.3              | 740       | 9818             | 0.0              | 870       | 3567             | 0.0              | 1000      | 3484             | 0.0              |
| 485       | 41652            | 34.3             | 615       | 169274           | 0.2              | 745       | 8656             | 0.0              | 875       | 4346             | 0.0              |           |                  |                  |

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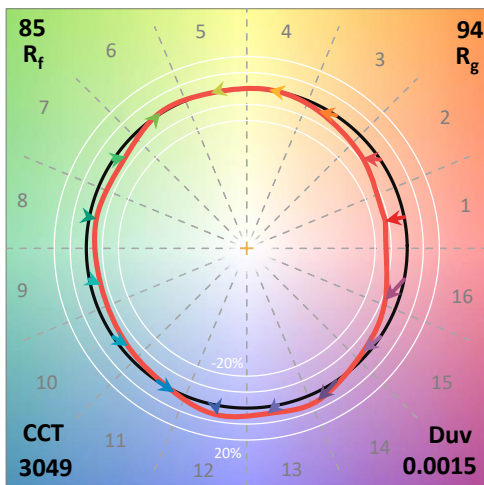
TM-30-18

### Summary

$R_f = 85.1$   
 $R_g = 94.3$   
 CIE  $R_a = 81.7$   
 $R_g = 1.9$



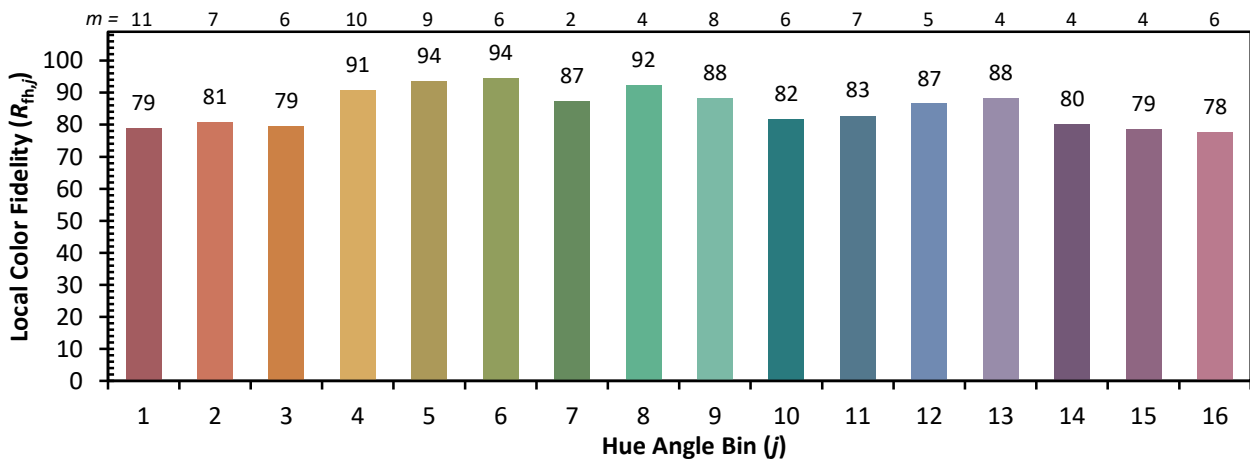
### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 85 | CES51 = 93 | CES76 = 82 |
| CES02 = 63 | CES27 = 94 | CES52 = 93 | CES77 = 85 |
| CES03 = 31 | CES28 = 95 | CES53 = 89 | CES78 = 82 |
| CES04 = 70 | CES29 = 90 | CES54 = 90 | CES79 = 91 |
| CES05 = 49 | CES30 = 96 | CES55 = 89 | CES80 = 90 |
| CES06 = 51 | CES31 = 91 | CES56 = 86 | CES81 = 72 |
| CES07 = 42 | CES32 = 85 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 95 | CES58 = 86 | CES83 = 95 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 76 | CES35 = 96 | CES60 = 92 | CES85 = 77 |
| CES11 = 59 | CES36 = 87 | CES61 = 88 | CES86 = 68 |
| CES12 = 65 | CES37 = 96 | CES62 = 90 | CES87 = 84 |
| CES13 = 43 | CES38 = 94 | CES63 = 88 | CES88 = 87 |
| CES14 = 74 | CES39 = 98 | CES64 = 81 | CES89 = 75 |
| CES15 = 71 | CES40 = 96 | CES65 = 79 | CES90 = 88 |
| CES16 = 47 | CES41 = 97 | CES66 = 80 | CES91 = 79 |
| CES17 = 50 | CES42 = 98 | CES67 = 78 | CES92 = 65 |
| CES18 = 56 | CES43 = 92 | CES68 = 82 | CES93 = 78 |
| CES19 = 72 | CES44 = 99 | CES69 = 87 | CES94 = 61 |
| CES20 = 66 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 90 | CES71 = 77 | CES96 = 83 |
| CES22 = 79 | CES47 = 95 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 84 | CES73 = 75 | CES98 = 84 |
| CES24 = 91 | CES49 = 91 | CES74 = 92 | CES99 = 75 |
| CES25 = 72 | CES50 = 94 | CES75 = 80 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)