

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P385912

Luminaire Tested: **GWC-SA1C-730-U-SL4-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P385912  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-25)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GWC-SA1C-730-U-SL4-HSS  
Description: GALLEON WALL LUMINAIRE  
(1) 70 CRI, 3000K, 1050mA LIGHTSQUARE WITH 16 LEDS AND TYPE IV SPILL  
LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5584 lumens  
Efficiency: N/A  
Efficacy: 94.6 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

Input Watts (W): 59  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

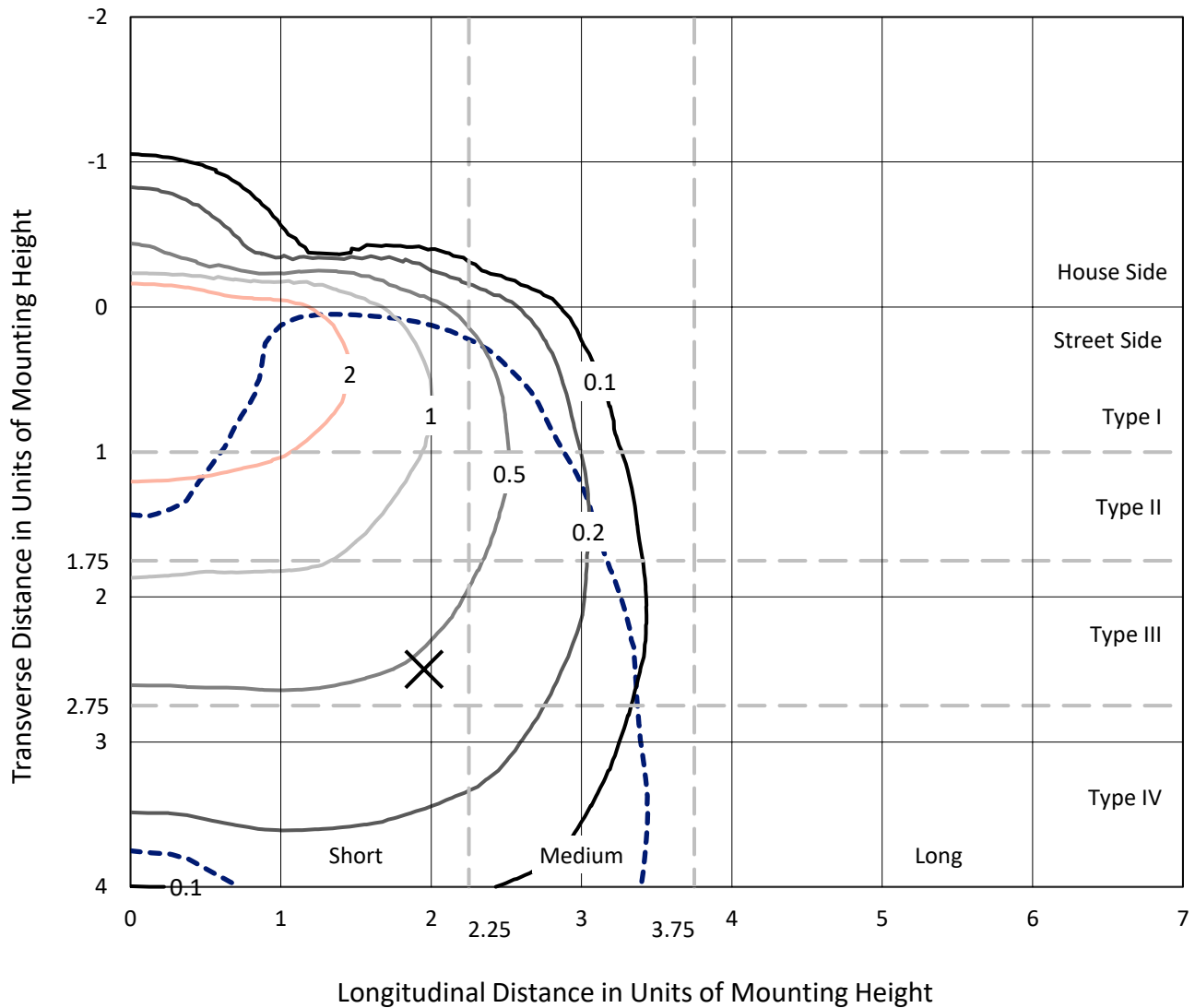


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## Iso-Footcandle Lines of Horizontal Illumination

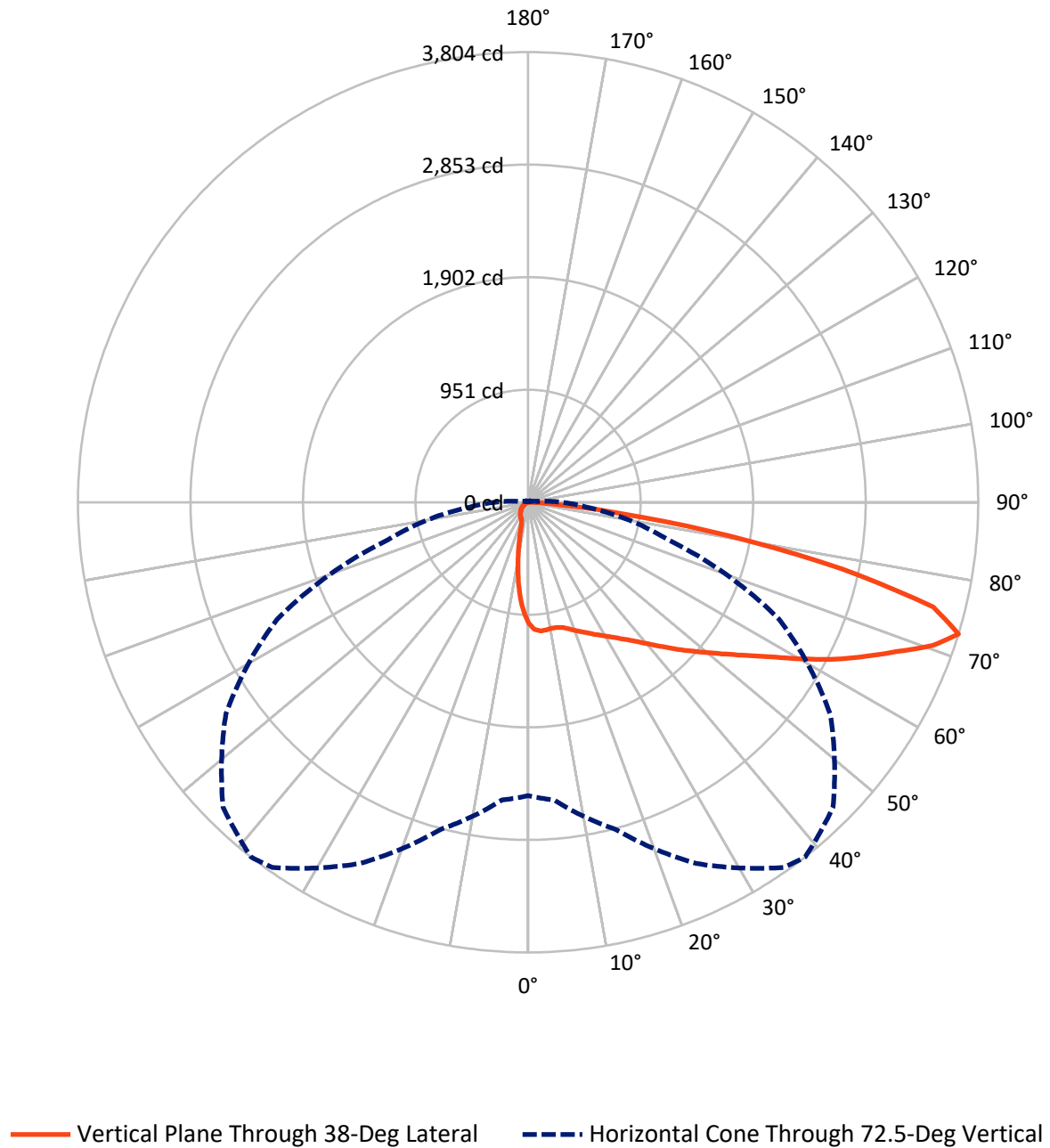
× Max cd  
 --- 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 4.8 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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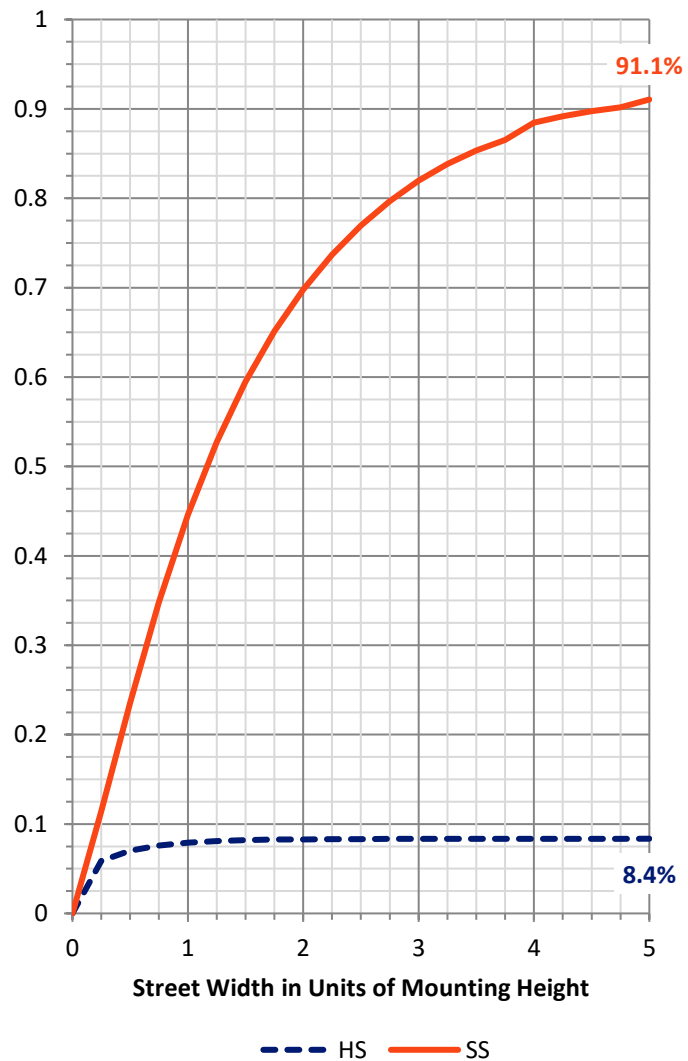
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 469.9    | 0.0    | 469.9  |
|                    | % Fixture | 8.4      | 0.0    | 8.4    |
| <b>Street Side</b> | Lumens    | 5114.1   | 0.0    | 5114.1 |
|                    | % Fixture | 91.6     | 0.0    | 91.6   |
| <b>Total</b>       | Lumens    | 5584.0   | 0.0    | 5584.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 87.5   | 1.6       |
| 10°-20°   | 214.0  | 3.8       |
| 20°-30°   | 340.3  | 6.1       |
| 30°-40°   | 511.7  | 9.2       |
| 40°-50°   | 780.6  | 14.0      |
| 50°-60°   | 1103.2 | 19.8      |
| 60°-70°   | 1383.8 | 24.8      |
| 70°-80°   | 1034.7 | 18.5      |
| 80°-90°   | 128.3  | 2.3       |
| 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°    | 5584.0 | 100.0     |
| 0°-180°   | 5584.0 | 100.0     |

**Coefficient of Utilization**



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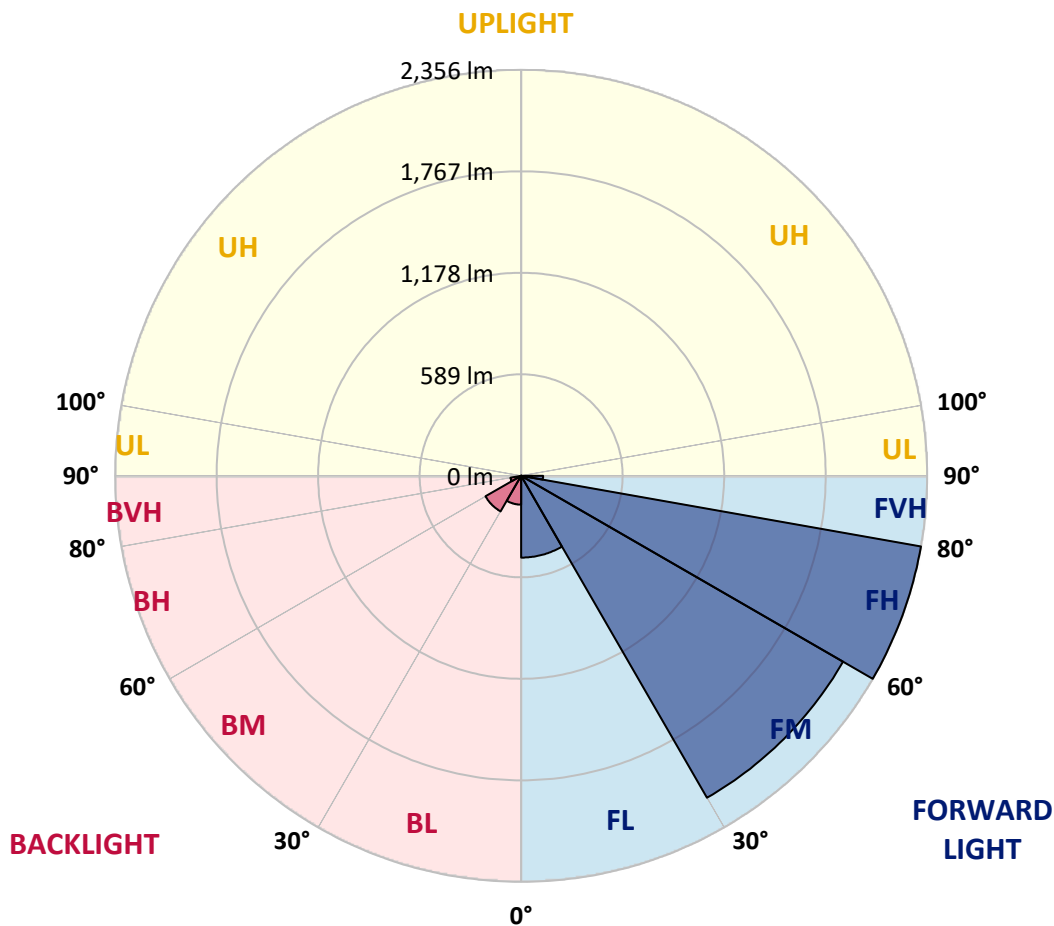
CATALOG NUMBER: GWC-SA1C-730-U-SL4-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 474.5  | 8.5       |                         |      |         |
| FM   | (30°-60°)   | 2156.8 | 38.6      |                         |      |         |
| FH   | (60°-80°)   | 2355.7 | 42.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 127.1  | 2.3       |                         |      | G2/225  |
| BL   | (0°-30°)    | 167.3  | 3.0       | B1/500                  |      |         |
| BM   | (30°-60°)   | 238.6  | 4.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 62.8   | 1.1       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 1.2    | 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 IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 38°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 |
| 2.5°  | 1090.0 | 1090.2 | 1087.6 | 1083.5 | 1078.1 | 1075.3 | 1070.7 | 1063.3 | 1055.4 | 1041.3 | 1026.0 |
| 5°    | 1112.2 | 1112.2 | 1109.0 | 1103.4 | 1094.8 | 1092.3 | 1083.5 | 1071.6 | 1055.4 | 1032.4 | 1006.7 |
| 7.5°  | 1109.9 | 1110.4 | 1106.0 | 1100.2 | 1091.6 | 1089.3 | 1078.6 | 1065.4 | 1045.2 | 1017.4 | 984.4  |
| 10°   | 1097.8 | 1099.0 | 1095.5 | 1092.7 | 1084.9 | 1082.3 | 1072.3 | 1059.1 | 1038.9 | 1009.3 | 971.5  |
| 12.5° | 1085.6 | 1086.7 | 1087.9 | 1090.4 | 1085.6 | 1084.6 | 1076.7 | 1065.6 | 1046.4 | 1015.5 | 972.8  |
| 15°   | 1077.7 | 1080.0 | 1088.3 | 1098.3 | 1099.5 | 1098.5 | 1093.4 | 1083.0 | 1063.5 | 1031.5 | 982.8  |
| 17.5° | 1077.7 | 1081.4 | 1098.8 | 1117.8 | 1124.5 | 1125.2 | 1120.8 | 1106.2 | 1083.0 | 1048.7 | 992.1  |
| 20°   | 1086.7 | 1091.8 | 1118.9 | 1145.8 | 1157.0 | 1157.0 | 1148.4 | 1128.0 | 1100.9 | 1064.2 | 998.4  |
| 22.5° | 1109.9 | 1116.6 | 1150.7 | 1181.8 | 1193.6 | 1191.1 | 1179.5 | 1149.8 | 1119.4 | 1081.8 | 1006.2 |
| 25°   | 1155.6 | 1160.7 | 1196.2 | 1227.5 | 1234.7 | 1228.9 | 1214.3 | 1176.2 | 1143.1 | 1105.7 | 1020.6 |
| 27.5° | 1214.5 | 1215.2 | 1251.8 | 1278.3 | 1273.9 | 1269.9 | 1251.6 | 1209.4 | 1177.2 | 1139.8 | 1045.4 |
| 30°   | 1279.2 | 1279.2 | 1311.4 | 1331.6 | 1318.2 | 1314.9 | 1296.6 | 1249.5 | 1220.8 | 1186.2 | 1080.7 |
| 32.5° | 1341.8 | 1344.6 | 1370.8 | 1383.6 | 1368.5 | 1365.2 | 1347.4 | 1300.3 | 1278.7 | 1256.9 | 1135.6 |
| 35°   | 1402.3 | 1404.4 | 1429.2 | 1436.2 | 1421.8 | 1422.7 | 1410.0 | 1370.1 | 1362.0 | 1359.2 | 1218.4 |
| 37.5° | 1461.0 | 1461.5 | 1486.7 | 1491.2 | 1484.0 | 1491.9 | 1493.0 | 1457.8 | 1472.8 | 1495.3 | 1335.1 |
| 40°   | 1514.6 | 1515.0 | 1540.1 | 1551.5 | 1563.7 | 1573.9 | 1583.0 | 1564.2 | 1614.1 | 1666.2 | 1474.0 |
| 42.5° | 1557.5 | 1562.3 | 1594.1 | 1615.7 | 1648.2 | 1667.6 | 1692.2 | 1691.3 | 1782.2 | 1860.6 | 1641.9 |
| 45°   | 1595.3 | 1603.6 | 1647.9 | 1685.7 | 1741.4 | 1772.5 | 1811.0 | 1841.1 | 1971.4 | 2076.9 | 1811.9 |
| 47.5° | 1645.1 | 1653.0 | 1703.6 | 1765.5 | 1839.7 | 1880.5 | 1944.3 | 2009.5 | 2179.5 | 2289.4 | 1977.9 |
| 50°   | 1715.4 | 1711.9 | 1761.8 | 1850.6 | 1945.9 | 1999.5 | 2090.4 | 2188.0 | 2385.8 | 2474.4 | 2075.6 |
| 52.5° | 1790.3 | 1788.9 | 1825.8 | 1943.1 | 2071.2 | 2133.8 | 2253.9 | 2372.6 | 2583.2 | 2602.0 | 2120.3 |
| 55°   | 1883.1 | 1873.1 | 1904.2 | 2048.7 | 2219.8 | 2287.1 | 2428.5 | 2555.4 | 2740.4 | 2673.9 | 2142.8 |
| 57.5° | 1980.2 | 1963.8 | 1993.5 | 2166.2 | 2387.5 | 2467.0 | 2621.9 | 2733.5 | 2845.0 | 2723.0 | 2142.6 |
| 60°   | 2080.7 | 2061.2 | 2096.4 | 2313.3 | 2595.7 | 2687.8 | 2831.6 | 2853.8 | 2942.7 | 2747.9 | 2126.8 |
| 62.5° | 2164.6 | 2153.0 | 2205.4 | 2470.5 | 2828.3 | 2918.8 | 2990.0 | 2963.3 | 3025.0 | 2767.1 | 2089.9 |
| 65°   | 2253.4 | 2254.1 | 2338.8 | 2653.9 | 3075.5 | 3136.5 | 3142.6 | 3105.2 | 3093.9 | 2763.2 | 1965.2 |
| 67.5° | 2373.6 | 2384.7 | 2525.9 | 2903.0 | 3316.0 | 3363.1 | 3362.6 | 3259.0 | 3144.2 | 2606.4 | 1688.5 |
| 70°   | 2500.6 | 2526.8 | 2741.6 | 3188.0 | 3578.5 | 3626.3 | 3601.7 | 3356.8 | 2960.5 | 2107.6 | 1195.0 |
| 72.5° | 2479.3 | 2524.8 | 2861.5 | 3367.7 | 3767.1 | 3803.5 | 3643.7 | 3116.4 | 2339.9 | 1224.9 | 508.8  |
| 75°   | 1912.8 | 1965.4 | 2623.8 | 3189.6 | 3569.3 | 3536.6 | 3130.7 | 2425.0 | 1278.7 | 341.8  | 114.6  |
| 77.5° | 1010.4 | 1038.5 | 1733.3 | 2429.9 | 2783.1 | 2714.7 | 2205.4 | 1345.3 | 389.8  | 84.6   | 51.5   |
| 80°   | 529.2  | 535.7  | 755.3  | 1378.7 | 1717.7 | 1718.2 | 1307.0 | 590.9  | 160.7  | 43.4   | 34.6   |
| 82.5° | 283.4  | 289.0  | 399.1  | 637.0  | 900.0  | 815.8  | 500.5  | 325.1  | 93.5   | 24.6   | 33.2   |
| 85°   | 68.2   | 69.3   | 226.3  | 291.0  | 353.9  | 252.8  | 148.7  | 273.0  | 25.3   | 14.4   | 26.9   |
| 87.5° | 26.2   | 26.7   | 83.9   | 125.9  | 90.2   | 58.4   | 69.6   | 101.8  | 3.2    | 5.6    | 4.2    |
| 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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CATALOG NUMBER: GWC-SA1C-730-U-SL4-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 | 1026.9 |
| 2.5°  | 1016.7 | 1010.6 | 995.8  | 977.0  | 960.3  | 948.3  | 930.2  | 918.3  | 910.5  | 910.2  | 907.2  |
| 5°    | 990.9  | 978.6  | 946.6  | 908.6  | 874.1  | 843.0  | 806.3  | 777.3  | 755.8  | 752.3  | 744.9  |
| 7.5°  | 963.3  | 943.2  | 894.0  | 834.6  | 776.7  | 717.7  | 649.3  | 606.9  | 570.5  | 553.1  | 551.2  |
| 10°   | 946.4  | 918.1  | 848.3  | 762.5  | 671.6  | 575.8  | 486.3  | 424.4  | 379.6  | 366.9  | 357.4  |
| 12.5° | 942.9  | 905.6  | 813.1  | 694.8  | 564.9  | 438.3  | 339.3  | 273.4  | 237.7  | 226.3  | 223.3  |
| 15°   | 946.4  | 899.8  | 783.4  | 627.8  | 456.9  | 311.0  | 227.7  | 189.5  | 176.0  | 172.8  | 172.5  |
| 17.5° | 948.5  | 892.8  | 749.8  | 553.3  | 352.0  | 222.2  | 174.4  | 163.3  | 161.2  | 160.9  | 161.4  |
| 20°   | 948.3  | 882.2  | 709.6  | 470.3  | 261.8  | 174.6  | 157.7  | 155.4  | 154.9  | 155.1  | 154.9  |
| 22.5° | 946.6  | 869.6  | 665.6  | 384.7  | 197.8  | 156.1  | 150.5  | 149.1  | 148.9  | 148.9  | 148.9  |
| 25°   | 949.7  | 859.7  | 617.1  | 302.9  | 163.0  | 147.5  | 144.0  | 142.9  | 142.6  | 142.6  | 142.2  |
| 27.5° | 960.6  | 854.1  | 564.0  | 233.1  | 147.3  | 139.8  | 137.1  | 136.8  | 136.1  | 135.9  | 136.4  |
| 30°   | 978.2  | 854.1  | 505.8  | 181.4  | 137.8  | 132.0  | 129.9  | 129.4  | 129.2  | 128.9  | 129.2  |
| 32.5° | 1009.3 | 860.6  | 442.2  | 150.7  | 128.7  | 123.1  | 121.8  | 122.4  | 121.8  | 121.8  | 121.8  |
| 35°   | 1065.4 | 880.1  | 375.7  | 131.5  | 119.2  | 114.6  | 113.2  | 114.1  | 113.6  | 113.6  | 113.4  |
| 37.5° | 1147.2 | 916.3  | 308.7  | 119.9  | 110.9  | 106.0  | 104.1  | 105.5  | 105.1  | 105.1  | 104.8  |
| 40°   | 1247.0 | 968.9  | 244.9  | 111.1  | 102.7  | 97.6   | 96.0   | 96.7   | 95.5   | 95.5   | 96.0   |
| 42.5° | 1370.1 | 1035.7 | 189.2  | 102.5  | 94.6   | 89.7   | 88.8   | 88.1   | 86.0   | 84.9   | 85.1   |
| 45°   | 1506.9 | 1105.3 | 147.5  | 94.2   | 87.0   | 83.0   | 81.6   | 79.8   | 76.3   | 74.0   | 74.2   |
| 47.5° | 1629.1 | 1158.8 | 119.9  | 86.0   | 80.0   | 77.0   | 74.9   | 71.4   | 66.3   | 63.5   | 63.8   |
| 50°   | 1693.4 | 1167.0 | 102.0  | 77.9   | 73.5   | 70.5   | 67.5   | 62.2   | 56.1   | 53.1   | 52.9   |
| 52.5° | 1709.8 | 1128.9 | 88.8   | 70.5   | 67.0   | 63.5   | 59.6   | 52.4   | 45.7   | 42.4   | 42.0   |
| 55°   | 1715.9 | 1070.9 | 77.0   | 63.5   | 60.1   | 56.1   | 51.0   | 42.9   | 36.6   | 33.4   | 33.2   |
| 57.5° | 1695.9 | 984.4  | 67.7   | 57.3   | 53.1   | 48.2   | 42.0   | 34.3   | 28.3   | 25.7   | 25.7   |
| 60°   | 1651.6 | 867.3  | 60.5   | 50.6   | 45.9   | 40.4   | 33.9   | 26.7   | 21.1   | 19.0   | 19.0   |
| 62.5° | 1563.3 | 715.7  | 53.8   | 43.6   | 39.2   | 33.4   | 27.4   | 20.2   | 14.8   | 13.7   | 13.9   |
| 65°   | 1396.5 | 542.9  | 47.1   | 37.3   | 33.4   | 27.6   | 21.3   | 14.4   | 10.0   | 10.0   | 10.4   |
| 67.5° | 1138.9 | 377.1  | 40.1   | 31.8   | 28.8   | 22.5   | 16.2   | 10.0   | 7.0    | 7.9    | 8.8    |
| 70°   | 753.9  | 211.5  | 34.3   | 26.2   | 24.6   | 17.9   | 12.1   | 6.7    | 5.6    | 7.4    | 9.0    |
| 72.5° | 284.5  | 82.3   | 28.8   | 21.1   | 21.3   | 13.7   | 8.6    | 5.1    | 5.1    | 8.1    | 10.7   |
| 75°   | 79.3   | 40.4   | 20.6   | 15.5   | 16.7   | 10.0   | 6.3    | 4.4    | 4.9    | 9.3    | 12.5   |
| 77.5° | 46.6   | 29.7   | 13.5   | 9.0    | 11.4   | 7.0    | 4.2    | 3.5    | 4.2    | 7.9    | 12.1   |
| 80°   | 37.6   | 15.8   | 7.9    | 4.6    | 6.3    | 3.9    | 2.8    | 2.1    | 1.2    | 3.0    | 6.3    |
| 82.5° | 37.6   | 9.5    | 3.7    | 3.2    | 3.2    | 2.1    | 1.4    | 0.9    | 0.2    | 0.0    | 1.6    |
| 85°   | 25.3   | 3.9    | 2.3    | 2.1    | 1.6    | 0.7    | 0.5    | 0.2    | 0.0    | 0.0    | 0.0    |
| 87.5° | 4.2    | 1.6    | 0.9    | 0.5    | 0.2    | 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    |

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2012-088-7

Luminaire Tested: WIS-SA-730-2A-U-SL3-HSS

Test Date: 01/20/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/20/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **WIS-SA-730-2A-U-SL3-HSS**  
 Description: INVUE WALL PACK

SHIELD

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2978   | CRI (Ra): | 72.4 |      |       |
| CIE u':                   | 0.2511 | R1:       | 68.2 | R9:  | -36.8 |
| CIE v':                   | 0.5225 | R2:       | 83.1 | R10: | 63.2  |
| Duv:                      | 0.0005 | R3:       | 94.9 | R11: | 65.5  |
| CIE x:                    | 0.4391 | R4:       | 68.7 | R12: | 58.5  |
| CIE y:                    | 0.4060 | R5:       | 68.6 | R13: | 71.0  |
| CIE z:                    | 0.1549 | R6:       | 78.2 | R14: | 97.4  |
| Peak Wavelength (nm):     | 596    | R7:       | 76.3 |      |       |
| Dominant Wavelength (nm): | 582    | R8:       | 41.2 |      |       |
| Purity:                   | 54     |           |      |      |       |
|                           |        |           |      |      |       |
| Rf:                       | 76.2   |           |      |      |       |
| Rg:                       | 94.2   |           |      |      |       |



### Test Conditions

Stabilization Time: 82M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.6/28%  
 Sphere Temperature (°C): 25.5

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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       | 1195             | 0.0              | 490       | 13880            | 2.0              | 620       | 66879            | 17.4             | 750       | 2571             | 0.0              | 880       | 1235             | 0.0              |
| 365       | 985              | 0.0              | 495       | 17408            | 3.2              | 625       | 62111            | 13.7             | 755       | 2394             | 0.0              | 885       | 1368             | 0.0              |
| 370       | 1066             | 0.0              | 500       | 21285            | 4.7              | 630       | 56551            | 10.2             | 760       | 2199             | 0.0              | 890       | 1027             | 0.0              |
| 375       | 1227             | 0.0              | 505       | 24779            | 6.9              | 635       | 50866            | 7.6              | 765       | 2031             | 0.0              | 895       | 822              | 0.0              |
| 380       | 1176             | 0.0              | 510       | 27951            | 9.6              | 640       | 45859            | 5.5              | 770       | 1735             | 0.0              | 900       | 1068             | 0.0              |
| 385       | 1115             | 0.0              | 515       | 30815            | 12.8             | 645       | 40924            | 3.9              | 775       | 1538             | 0.0              | 905       | 823              | 0.0              |
| 390       | 1039             | 0.0              | 520       | 33040            | 16.0             | 650       | 36434            | 2.7              | 780       | 1455             | 0.0              | 910       | 531              | 0.0              |
| 395       | 908              | 0.0              | 525       | 35159            | 18.9             | 655       | 32132            | 1.8              | 785       | 1506             | 0.0              | 915       | 1184             | 0.0              |
| 400       | 903              | 0.0              | 530       | 37292            | 22.0             | 660       | 27953            | 1.2              | 790       | 1154             | 0.0              | 920       | 1320             | 0.0              |
| 405       | 911              | 0.0              | 535       | 39123            | 24.3             | 665       | 24284            | 0.8              | 795       | 1232             | 0.0              | 925       | 1757             | 0.0              |
| 410       | 1264             | 0.0              | 540       | 41391            | 27.0             | 670       | 20822            | 0.5              | 800       | 1247             | 0.0              | 930       | 1279             | 0.0              |
| 415       | 2142             | 0.0              | 545       | 44515            | 29.6             | 675       | 17848            | 0.3              | 805       | 1043             | 0.0              | 935       | 1399             | 0.0              |
| 420       | 4052             | 0.0              | 550       | 47864            | 32.5             | 680       | 15278            | 0.2              | 810       | 1235             | 0.0              | 940       | 1325             | 0.0              |
| 425       | 7647             | 0.0              | 555       | 52101            | 35.6             | 685       | 13213            | 0.1              | 815       | 1173             | 0.0              | 945       | 612              | 0.0              |
| 430       | 13366            | 0.1              | 560       | 56892            | 38.7             | 690       | 11304            | 0.1              | 820       | 948              | 0.0              | 950       | 1094             | 0.0              |
| 435       | 22367            | 0.3              | 565       | 62242            | 41.4             | 695       | 9794             | 0.0              | 825       | 846              | 0.0              | 955       | 1493             | 0.0              |
| 440       | 34007            | 0.5              | 570       | 67731            | 44.0             | 700       | 8390             | 0.0              | 830       | 987              | 0.0              | 960       | 385              | 0.0              |
| 445       | 41889            | 0.9              | 575       | 72883            | 45.3             | 705       | 7303             | 0.0              | 835       | 1395             | 0.0              | 965       | 585              | 0.0              |
| 450       | 36090            | 0.9              | 580       | 77104            | 45.8             | 710       | 6501             | 0.0              | 840       | 1079             | 0.0              | 970       | 1360             | 0.0              |
| 455       | 23459            | 0.8              | 585       | 80305            | 44.6             | 715       | 5811             | 0.0              | 845       | 1430             | 0.0              | 975       | 805              | 0.0              |
| 460       | 17429            | 0.7              | 590       | 82039            | 42.4             | 720       | 5196             | 0.0              | 850       | 984              | 0.0              | 980       | 813              | 0.0              |
| 465       | 13265            | 0.7              | 595       | 82883            | 39.3             | 725       | 4576             | 0.0              | 855       | 1315             | 0.0              | 985       | 214              | 0.0              |
| 470       | 9887             | 0.6              | 600       | 82307            | 35.5             | 730       | 4031             | 0.0              | 860       | 1245             | 0.0              | 990       | 1247             | 0.0              |
| 475       | 8912             | 0.7              | 605       | 79818            | 30.9             | 735       | 3393             | 0.0              | 865       | 1445             | 0.0              | 995       | 597              | 0.0              |
| 480       | 9543             | 0.9              | 610       | 76405            | 26.2             | 740       | 3117             | 0.0              | 870       | 998              | 0.0              | 1000      | 1691             | 0.0              |
| 485       | 11169            | 1.3              | 615       | 71967            | 21.7             | 745       | 2946             | 0.0              | 875       | 1326             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 1728.4**
**S/P: 0.45**

| 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       | 1195             | 0.0              | 490       | 13880            | 21.4             | 620       | 66879            | 0.8              | 750       | 2571             | 0.0              | 880       | 1235             | 0.0              |
| 365       | 985              | 0.0              | 495       | 17408            | 28.1             | 625       | 62111            | 0.5              | 755       | 2394             | 0.0              | 885       | 1368             | 0.0              |
| 370       | 1066             | 0.0              | 500       | 21285            | 35.6             | 630       | 56551            | 0.3              | 760       | 2199             | 0.0              | 890       | 1027             | 0.0              |
| 375       | 1227             | 0.0              | 505       | 24779            | 42.1             | 635       | 50866            | 0.2              | 765       | 2031             | 0.0              | 895       | 822              | 0.0              |
| 380       | 1176             | 0.0              | 510       | 27951            | 47.4             | 640       | 45859            | 0.1              | 770       | 1735             | 0.0              | 900       | 1068             | 0.0              |
| 385       | 1115             | 0.0              | 515       | 30815            | 51.1             | 645       | 40924            | 0.1              | 775       | 1538             | 0.0              | 905       | 823              | 0.0              |
| 390       | 1039             | 0.0              | 520       | 33040            | 52.5             | 650       | 36434            | 0.0              | 780       | 1455             | 0.0              | 910       | 531              | 0.0              |
| 395       | 908              | 0.0              | 525       | 35159            | 52.6             | 655       | 32132            | 0.0              | 785       | 1506             | 0.0              | 915       | 1184             | 0.0              |
| 400       | 903              | 0.0              | 530       | 37292            | 51.4             | 660       | 27953            | 0.0              | 790       | 1154             | 0.0              | 920       | 1320             | 0.0              |
| 405       | 911              | 0.0              | 535       | 39123            | 48.8             | 665       | 24284            | 0.0              | 795       | 1232             | 0.0              | 925       | 1757             | 0.0              |
| 410       | 1264             | 0.1              | 540       | 41391            | 45.7             | 670       | 20822            | 0.0              | 800       | 1247             | 0.0              | 930       | 1279             | 0.0              |
| 415       | 2142             | 0.2              | 545       | 44515            | 42.7             | 675       | 17848            | 0.0              | 805       | 1043             | 0.0              | 935       | 1399             | 0.0              |
| 420       | 4052             | 0.7              | 550       | 47864            | 39.1             | 680       | 15278            | 0.0              | 810       | 1235             | 0.0              | 940       | 1325             | 0.0              |
| 425       | 7647             | 1.9              | 555       | 52101            | 35.6             | 685       | 13213            | 0.0              | 815       | 1173             | 0.0              | 945       | 612              | 0.0              |
| 430       | 13366            | 4.5              | 560       | 56892            | 31.8             | 690       | 11304            | 0.0              | 820       | 948              | 0.0              | 950       | 1094             | 0.0              |
| 435       | 22367            | 10.0             | 565       | 62242            | 27.9             | 695       | 9794             | 0.0              | 825       | 846              | 0.0              | 955       | 1493             | 0.0              |
| 440       | 34007            | 19.0             | 570       | 67731            | 23.9             | 700       | 8390             | 0.0              | 830       | 987              | 0.0              | 960       | 385              | 0.0              |
| 445       | 41889            | 28.0             | 575       | 72883            | 19.8             | 705       | 7303             | 0.0              | 835       | 1395             | 0.0              | 965       | 585              | 0.0              |
| 450       | 36090            | 28.0             | 580       | 77104            | 15.9             | 710       | 6501             | 0.0              | 840       | 1079             | 0.0              | 970       | 1360             | 0.0              |
| 455       | 23459            | 20.5             | 585       | 80305            | 12.3             | 715       | 5811             | 0.0              | 845       | 1430             | 0.0              | 975       | 805              | 0.0              |
| 460       | 17429            | 16.8             | 590       | 82039            | 9.1              | 720       | 5196             | 0.0              | 850       | 984              | 0.0              | 980       | 813              | 0.0              |
| 465       | 13265            | 14.0             | 595       | 82883            | 6.6              | 725       | 4576             | 0.0              | 855       | 1315             | 0.0              | 985       | 214              | 0.0              |
| 470       | 9887             | 11.4             | 600       | 82307            | 4.6              | 730       | 4031             | 0.0              | 860       | 1245             | 0.0              | 990       | 1247             | 0.0              |
| 475       | 8912             | 11.1             | 605       | 79818            | 3.1              | 735       | 3393             | 0.0              | 865       | 1445             | 0.0              | 995       | 597              | 0.0              |
| 480       | 9543             | 12.9             | 610       | 76405            | 2.1              | 740       | 3117             | 0.0              | 870       | 998              | 0.0              | 1000      | 1691             | 0.0              |
| 485       | 11169            | 16.2             | 615       | 71967            | 1.3              | 745       | 2946             | 0.0              | 875       | 1326             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 4752**
**S/P: 1.23**

| 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       | 1195             | 0.0              | 490       | 13880            | 11.5             | 620       | 66879            | 0.1              | 750       | 2571             | 0.0              | 880       | 1235             | 0.0              |
| 365       | 985              | 0.0              | 495       | 17408            | 14.4             | 625       | 62111            | 0.0              | 755       | 2394             | 0.0              | 885       | 1368             | 0.0              |
| 370       | 1066             | 0.0              | 500       | 21285            | 17.1             | 630       | 56551            | 0.0              | 760       | 2199             | 0.0              | 890       | 1027             | 0.0              |
| 375       | 1227             | 0.0              | 505       | 24779            | 19.0             | 635       | 50866            | 0.0              | 765       | 2031             | 0.0              | 895       | 822              | 0.0              |
| 380       | 1176             | 0.0              | 510       | 27951            | 20.1             | 640       | 45859            | 0.0              | 770       | 1735             | 0.0              | 900       | 1068             | 0.0              |
| 385       | 1115             | 0.0              | 515       | 30815            | 20.1             | 645       | 40924            | 0.0              | 775       | 1538             | 0.0              | 905       | 823              | 0.0              |
| 390       | 1039             | 0.0              | 520       | 33040            | 19.2             | 650       | 36434            | 0.0              | 780       | 1455             | 0.0              | 910       | 531              | 0.0              |
| 395       | 908              | 0.0              | 525       | 35159            | 17.8             | 655       | 32132            | 0.0              | 785       | 1506             | 0.0              | 915       | 1184             | 0.0              |
| 400       | 903              | 0.0              | 530       | 37292            | 16.1             | 660       | 27953            | 0.0              | 790       | 1154             | 0.0              | 920       | 1320             | 0.0              |
| 405       | 911              | 0.0              | 535       | 39123            | 14.1             | 665       | 24284            | 0.0              | 795       | 1232             | 0.0              | 925       | 1757             | 0.0              |
| 410       | 1264             | 0.0              | 540       | 41391            | 12.1             | 670       | 20822            | 0.0              | 800       | 1247             | 0.0              | 930       | 1279             | 0.0              |
| 415       | 2142             | 0.1              | 545       | 44515            | 10.3             | 675       | 17848            | 0.0              | 805       | 1043             | 0.0              | 935       | 1399             | 0.0              |
| 420       | 4052             | 0.5              | 550       | 47864            | 8.6              | 680       | 15278            | 0.0              | 810       | 1235             | 0.0              | 940       | 1325             | 0.0              |
| 425       | 7647             | 1.2              | 555       | 52101            | 7.0              | 685       | 13213            | 0.0              | 815       | 1173             | 0.0              | 945       | 612              | 0.0              |
| 430       | 13366            | 2.8              | 560       | 56892            | 5.6              | 690       | 11304            | 0.0              | 820       | 948              | 0.0              | 950       | 1094             | 0.0              |
| 435       | 22367            | 6.0              | 565       | 62242            | 4.4              | 695       | 9794             | 0.0              | 825       | 846              | 0.0              | 955       | 1493             | 0.0              |
| 440       | 34007            | 11.4             | 570       | 67731            | 3.3              | 700       | 8390             | 0.0              | 830       | 987              | 0.0              | 960       | 385              | 0.0              |
| 445       | 41889            | 16.5             | 575       | 72883            | 2.4              | 705       | 7303             | 0.0              | 835       | 1395             | 0.0              | 965       | 585              | 0.0              |
| 450       | 36090            | 16.6             | 580       | 77104            | 1.7              | 710       | 6501             | 0.0              | 840       | 1079             | 0.0              | 970       | 1360             | 0.0              |
| 455       | 23459            | 12.3             | 585       | 80305            | 1.2              | 715       | 5811             | 0.0              | 845       | 1430             | 0.0              | 975       | 805              | 0.0              |
| 460       | 17429            | 10.3             | 590       | 82039            | 0.8              | 720       | 5196             | 0.0              | 850       | 984              | 0.0              | 980       | 813              | 0.0              |
| 465       | 13265            | 8.7              | 595       | 82883            | 0.5              | 725       | 4576             | 0.0              | 855       | 1315             | 0.0              | 985       | 214              | 0.0              |
| 470       | 9887             | 7.1              | 600       | 82307            | 0.3              | 730       | 4031             | 0.0              | 860       | 1245             | 0.0              | 990       | 1247             | 0.0              |
| 475       | 8912             | 6.8              | 605       | 79818            | 0.2              | 735       | 3393             | 0.0              | 865       | 1445             | 0.0              | 995       | 597              | 0.0              |
| 480       | 9543             | 7.7              | 610       | 76405            | 0.1              | 740       | 3117             | 0.0              | 870       | 998              | 0.0              | 1000      | 1691             | 0.0              |
| 485       | 11169            | 9.2              | 615       | 71967            | 0.1              | 745       | 2946             | 0.0              | 875       | 1326             | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 76.2$   
 $R_g = 94.2$   
 CIE  $R_a = 72.4$   
 $R_g = -36.8$



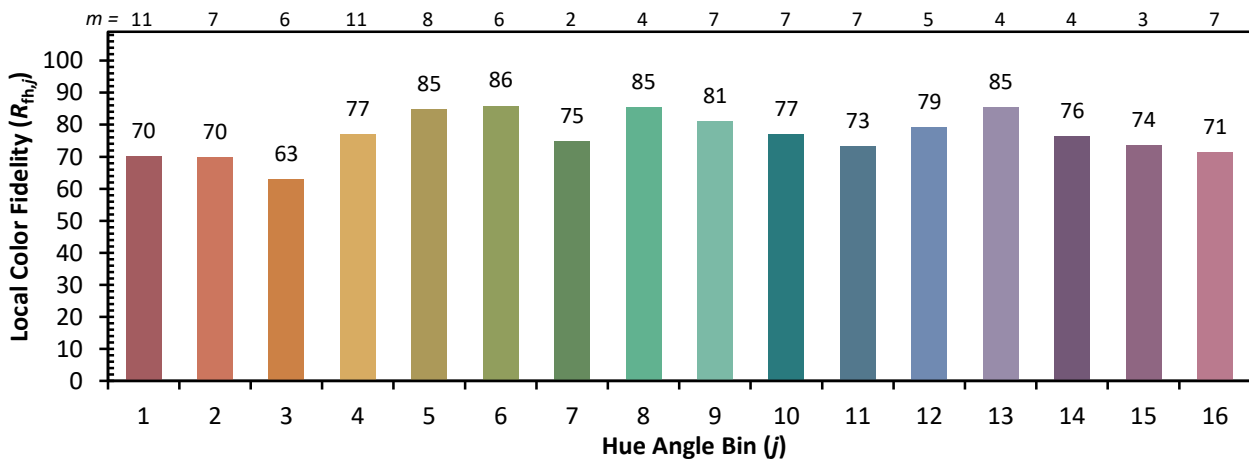
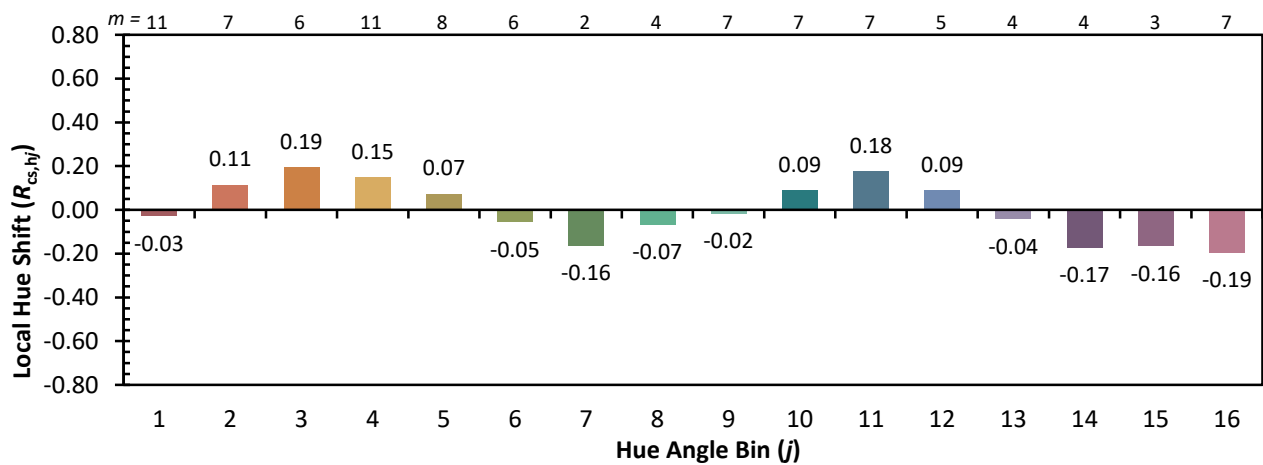
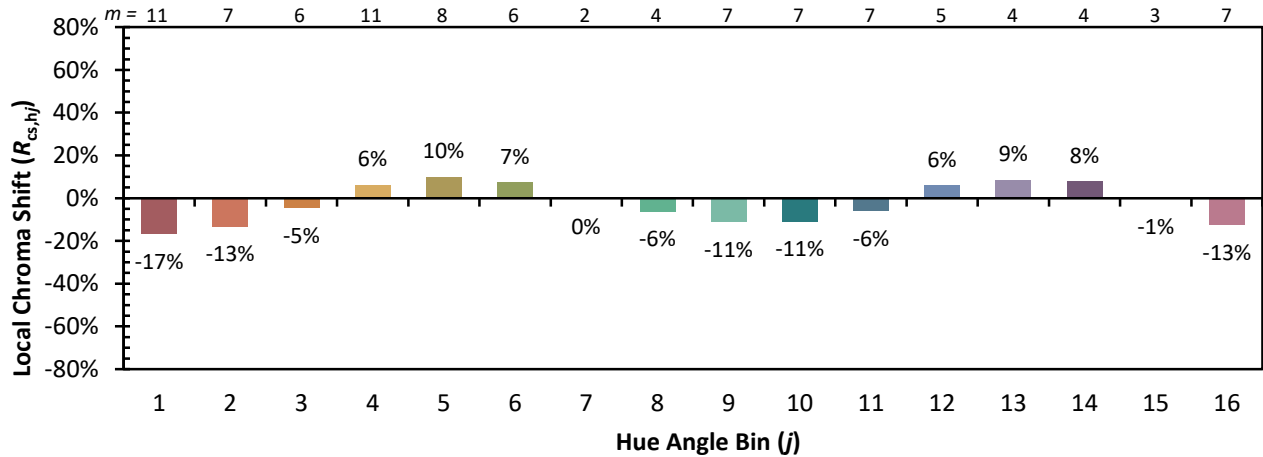
### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 88 | CES76 = 65 |
| CES02 = 63 | CES27 = 88 | CES52 = 87 | CES77 = 81 |
| CES03 = 31 | CES28 = 88 | CES53 = 79 | CES78 = 67 |
| CES04 = 71 | CES29 = 66 | CES54 = 85 | CES79 = 87 |
| CES05 = 49 | CES30 = 73 | CES55 = 84 | CES80 = 87 |
| CES06 = 51 | CES31 = 70 | CES56 = 76 | CES81 = 70 |
| CES07 = 41 | CES32 = 66 | CES57 = 75 | CES82 = 94 |
| CES08 = 40 | CES33 = 73 | CES58 = 77 | CES83 = 90 |
| CES09 = 29 | CES34 = 80 | CES59 = 86 | CES84 = 89 |
| CES10 = 76 | CES35 = 90 | CES60 = 93 | CES85 = 77 |
| CES11 = 59 | CES36 = 97 | CES61 = 85 | CES86 = 61 |
| CES12 = 65 | CES37 = 88 | CES62 = 90 | CES87 = 78 |
| CES13 = 43 | CES38 = 81 | CES63 = 77 | CES88 = 78 |
| CES14 = 74 | CES39 = 95 | CES64 = 73 | CES89 = 67 |
| CES15 = 71 | CES40 = 91 | CES65 = 69 | CES90 = 76 |
| CES16 = 47 | CES41 = 88 | CES66 = 71 | CES91 = 89 |
| CES17 = 50 | CES42 = 89 | CES67 = 69 | CES92 = 58 |
| CES18 = 56 | CES43 = 80 | CES68 = 73 | CES93 = 75 |
| CES19 = 73 | CES44 = 99 | CES69 = 82 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 67 | CES95 = 69 |
| CES21 = 87 | CES46 = 81 | CES71 = 68 | CES96 = 77 |
| CES22 = 79 | CES47 = 81 | CES72 = 88 | CES97 = 83 |
| CES23 = 92 | CES48 = 69 | CES73 = 60 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 95 | CES99 = 63 |
| CES25 = 73 | CES50 = 87 | CES75 = 69 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)