

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



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P630004

Luminaire Tested: GWS-SA1C-827-U-SL3-W-GRSWH

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P630004  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-33)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1C-827-U-SL3-W-GRSWH  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III SPILL LIGHT ELIMINATOR OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH  
Light Source: (16) 2700K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

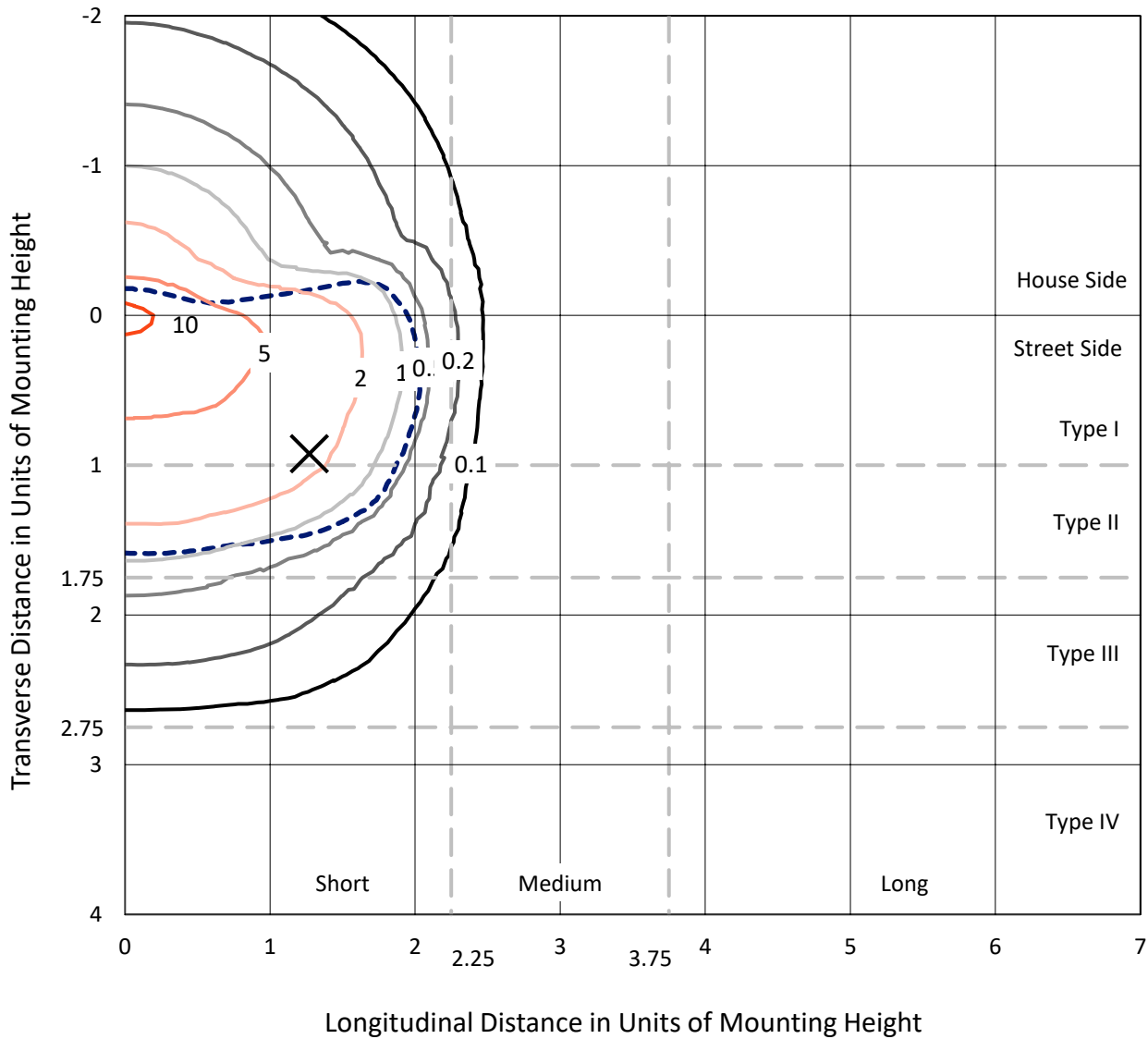
Lumens per Lamp: N/A  
Luminaire Lumens: 2959 lumens  
Efficiency: N/A  
Efficacy: 86.8 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1  
  
Input Watts (W): 34.1  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P630004  
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### Iso-Footcandle Lines of Horizontal Illumination

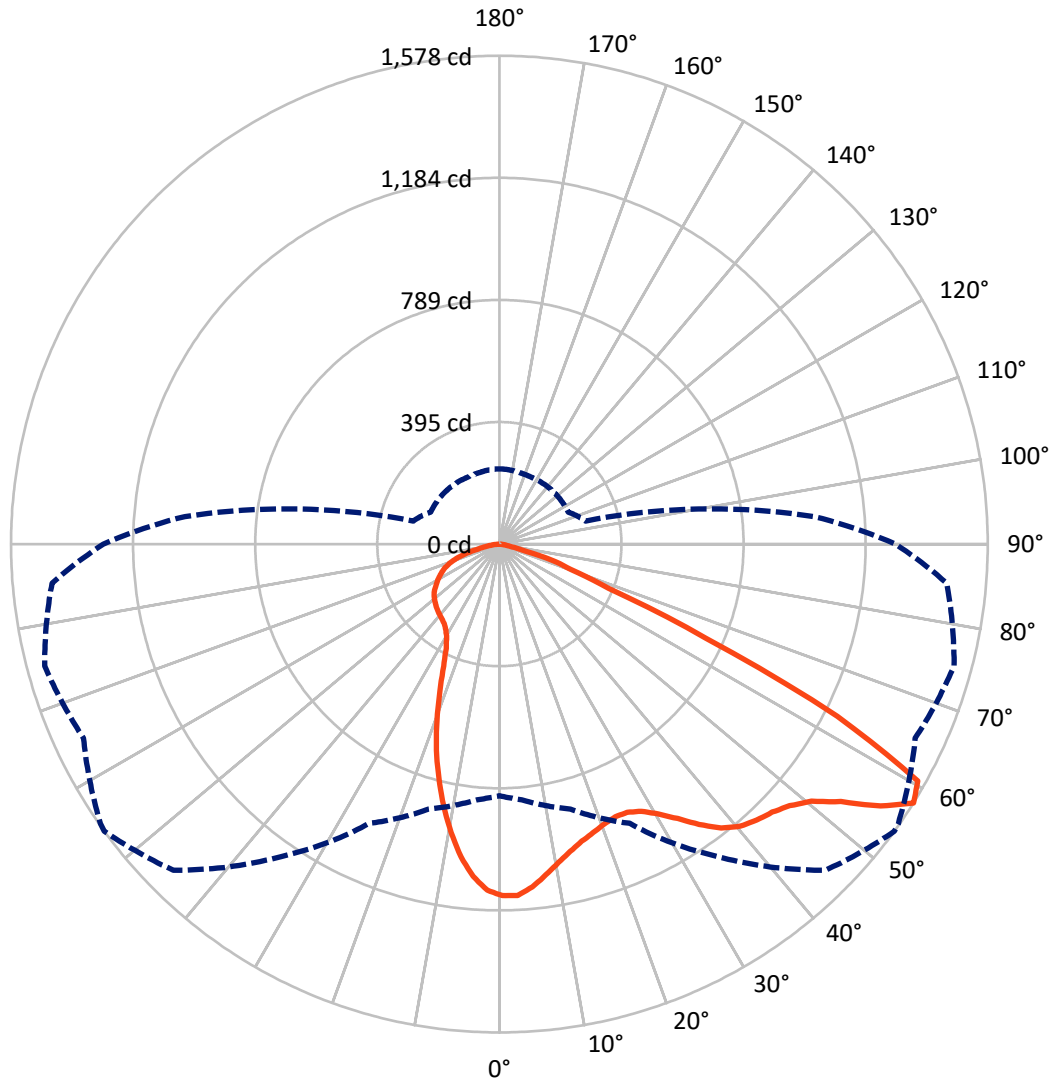
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 11.4 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 54-Deg Lateral    - - - Horizontal Cone Through 57.5-Deg Vertical

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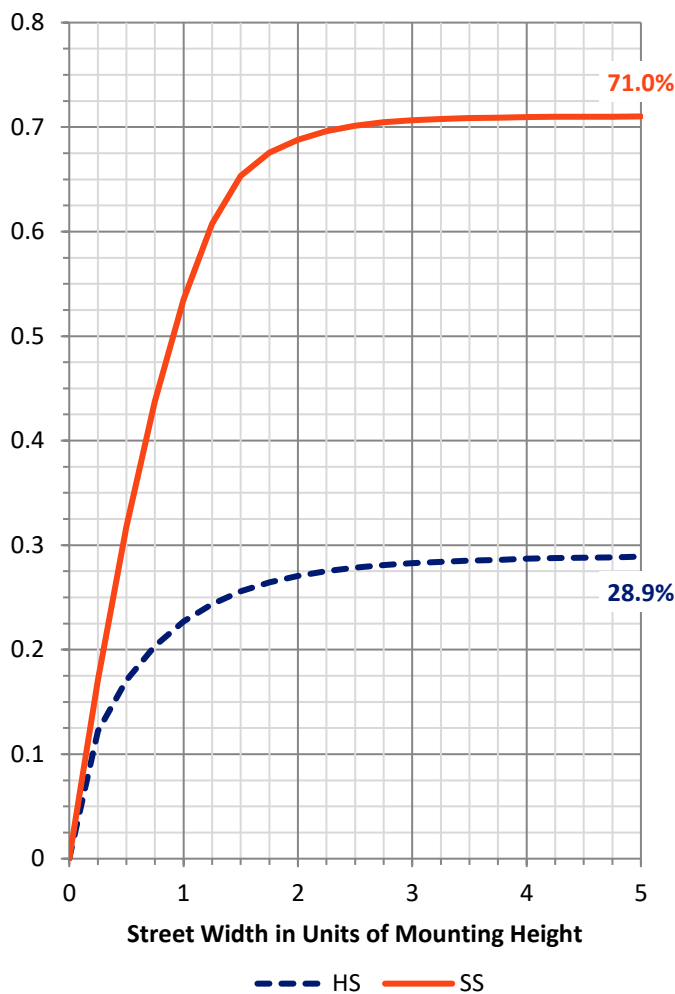
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 860.2    | 0.0    | 860.2  |
|                    | % Fixture | 29.1     | 0.0    | 29.1   |
| <b>Street Side</b> | Lumens    | 2098.8   | 0.0    | 2098.8 |
|                    | % Fixture | 70.9     | 0.0    | 70.9   |
| <b>Total</b>       | Lumens    | 2959.0   | 0.0    | 2959.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 99.9   | 3.4       |
| 10°-20°   | 238.3  | 8.1       |
| 20°-30°   | 329.7  | 11.1      |
| 30°-40°   | 458.2  | 15.5      |
| 40°-50°   | 605.1  | 20.4      |
| 50°-60°   | 719.1  | 24.3      |
| 60°-70°   | 398.4  | 13.5      |
| 70°-80°   | 99.2   | 3.4       |
| 80°-90°   | 11.3   | 0.4       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 2959.0 | 100.0     |
| 0°-180°   | 2959.0 | 100.0     |

**Coefficient of Utilization**



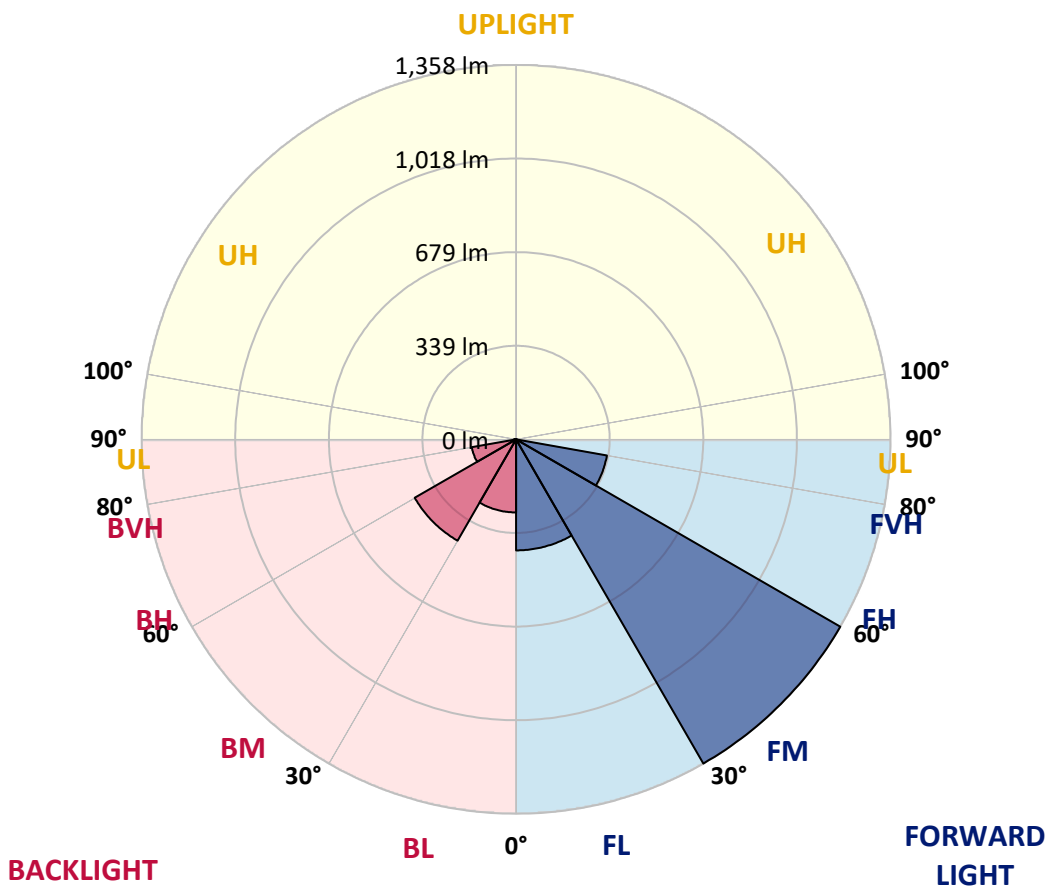
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|----------------|--------|-----------|-------------------------|------|--------|
|                |        |           | B                       | U    | G      |
| FL (0°-30°)    | 402.8  | 13.6      |                         |      |        |
| FM (30°-60°)   | 1357.9 | 45.9      |                         |      |        |
| FH (60°-80°)   | 334.6  | 11.3      |                         |      | G0/660 |
| FVH (80°-90°)  | 3.5    | 0.1       |                         |      | G0/10  |
| BL (0°-30°)    | 265.1  | 9.0       | B1/500                  |      |        |
| BM (30°-60°)   | 424.4  | 14.3      | B1/1000                 |      |        |
| BH (60°-80°)   | 163.0  | 5.5       | B1/500                  |      | G1/500 |
| BVH (80°-90°)  | 7.8    | 0.3       |                         |      | G0/10  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

**BUG Rating: B1-U0-G1**  
 Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 54°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 |
| 2.5°  | 1114.8 | 1117.0 | 1118.5 | 1123.9 | 1128.4 | 1132.5 | 1136.8 | 1136.8 | 1136.5 | 1135.8 | 1134.3 |
| 5°    | 1070.7 | 1073.2 | 1076.8 | 1084.1 | 1094.0 | 1101.1 | 1112.7 | 1113.7 | 1118.8 | 1120.8 | 1119.8 |
| 7.5°  | 1019.5 | 1020.3 | 1024.8 | 1034.5 | 1050.2 | 1062.8 | 1079.5 | 1081.6 | 1093.7 | 1100.8 | 1099.6 |
| 10°   | 963.5  | 961.0  | 969.1  | 983.3  | 1003.8 | 1025.1 | 1046.6 | 1048.4 | 1067.9 | 1081.3 | 1080.3 |
| 12.5° | 912.4  | 912.6  | 920.7  | 938.0  | 963.5  | 989.9  | 1018.8 | 1022.8 | 1046.9 | 1064.1 | 1062.3 |
| 15°   | 869.6  | 870.6  | 880.5  | 900.0  | 929.1  | 960.5  | 996.5  | 1000.3 | 1030.7 | 1053.5 | 1048.4 |
| 17.5° | 835.4  | 836.4  | 845.0  | 867.3  | 898.4  | 936.4  | 980.3  | 984.1  | 1021.8 | 1048.9 | 1038.5 |
| 20°   | 811.8  | 811.3  | 819.7  | 840.9  | 873.1  | 914.4  | 966.1  | 971.6  | 1019.0 | 1050.7 | 1031.9 |
| 22.5° | 802.2  | 801.9  | 808.0  | 825.5  | 855.6  | 897.4  | 957.5  | 965.1  | 1022.0 | 1058.5 | 1027.9 |
| 25°   | 807.0  | 806.0  | 811.3  | 824.2  | 848.3  | 890.8  | 960.0  | 968.1  | 1035.0 | 1074.7 | 1028.6 |
| 27.5° | 821.9  | 820.7  | 825.2  | 836.9  | 855.1  | 897.7  | 977.7  | 987.1  | 1062.3 | 1104.4 | 1038.8 |
| 30°   | 844.7  | 844.0  | 848.5  | 859.7  | 875.6  | 920.5  | 1011.7 | 1022.3 | 1104.6 | 1150.5 | 1060.8 |
| 32.5° | 871.3  | 870.1  | 878.2  | 891.1  | 909.6  | 962.0  | 1057.3 | 1071.2 | 1154.8 | 1209.7 | 1097.8 |
| 35°   | 901.2  | 900.2  | 911.4  | 930.1  | 956.7  | 1019.8 | 1112.5 | 1127.7 | 1205.9 | 1276.9 | 1146.9 |
| 37.5° | 930.4  | 930.4  | 951.9  | 979.7  | 1013.2 | 1082.6 | 1164.4 | 1174.0 | 1241.4 | 1336.4 | 1199.6 |
| 40°   | 956.2  | 957.7  | 990.1  | 1031.9 | 1074.5 | 1139.3 | 1198.6 | 1206.7 | 1257.1 | 1377.4 | 1245.5 |
| 42.5° | 984.8  | 986.1  | 1023.8 | 1078.5 | 1129.2 | 1185.2 | 1219.4 | 1223.4 | 1260.1 | 1397.9 | 1277.9 |
| 45°   | 1007.6 | 1009.4 | 1056.2 | 1114.8 | 1176.8 | 1219.6 | 1235.8 | 1239.4 | 1264.4 | 1409.1 | 1301.4 |
| 47.5° | 1019.5 | 1022.0 | 1075.7 | 1143.9 | 1209.0 | 1250.5 | 1262.9 | 1264.4 | 1282.2 | 1428.6 | 1329.8 |
| 50°   | 1017.5 | 1022.6 | 1083.1 | 1158.3 | 1232.8 | 1281.7 | 1306.5 | 1309.0 | 1318.4 | 1457.2 | 1363.0 |
| 52.5° | 1035.5 | 1037.7 | 1098.8 | 1175.5 | 1266.7 | 1339.2 | 1382.2 | 1385.8 | 1381.5 | 1478.7 | 1382.7 |
| 55°   | 1005.6 | 1016.5 | 1079.3 | 1173.0 | 1318.4 | 1428.1 | 1494.4 | 1492.7 | 1438.7 | 1502.8 | 1415.7 |
| 57.5° | 813.3  | 829.3  | 886.8  | 995.7  | 1233.3 | 1490.4 | 1578.3 | 1574.0 | 1483.0 | 1521.3 | 1451.4 |
| 60°   | 563.1  | 565.6  | 617.5  | 694.8  | 951.9  | 1316.6 | 1553.7 | 1563.1 | 1491.1 | 1498.0 | 1385.3 |
| 62.5° | 450.4  | 449.6  | 454.4  | 456.4  | 605.4  | 925.5  | 1226.5 | 1260.6 | 1238.9 | 1167.2 | 981.8  |
| 65°   | 384.5  | 387.3  | 401.5  | 394.1  | 395.1  | 521.3  | 732.8  | 737.6  | 722.4  | 696.6  | 519.3  |
| 67.5° | 300.9  | 305.7  | 330.8  | 359.4  | 350.3  | 335.6  | 380.2  | 377.9  | 297.9  | 230.5  | 190.5  |
| 70°   | 188.5  | 191.5  | 218.3  | 282.2  | 305.0  | 275.6  | 244.4  | 243.4  | 159.6  | 131.2  | 143.9  |
| 72.5° | 109.9  | 110.4  | 118.0  | 157.3  | 202.4  | 188.5  | 179.8  | 173.3  | 102.6  | 104.6  | 114.7  |
| 75°   | 60.5   | 60.5   | 60.3   | 67.9   | 79.8   | 70.7   | 68.4   | 66.6   | 68.6   | 77.8   | 85.4   |
| 77.5° | 12.7   | 12.9   | 13.7   | 18.0   | 23.3   | 28.4   | 35.7   | 36.0   | 44.8   | 51.9   | 58.0   |
| 80°   | 5.8    | 6.1    | 7.6    | 9.6    | 12.4   | 16.5   | 21.8   | 22.0   | 27.1   | 32.7   | 36.7   |
| 82.5° | 3.0    | 3.3    | 4.1    | 5.1    | 6.6    | 8.6    | 12.2   | 12.2   | 16.2   | 19.3   | 21.8   |
| 85°   | 1.0    | 1.0    | 1.5    | 2.0    | 2.8    | 3.5    | 4.8    | 4.8    | 7.1    | 9.4    | 10.9   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.3    | 0.5    | 1.0    | 1.0    | 1.3    | 1.5    | 2.5    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P630004

CATALOG NUMBER: GWS-SA1C-827-U-SL3-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 | 1136.0 |
| 2.5°  | 1131.0 | 1123.1 | 1123.4 | 1124.9 | 1120.1 | 1112.7 | 1107.9 | 1101.8 | 1098.0 | 1097.3 | 1100.1 |
| 5°    | 1114.8 | 1105.6 | 1099.3 | 1092.7 | 1079.0 | 1062.8 | 1050.2 | 1039.8 | 1032.9 | 1030.4 | 1027.4 |
| 7.5°  | 1092.5 | 1080.6 | 1064.6 | 1046.1 | 1021.3 | 992.4  | 972.1  | 953.1  | 940.0  | 936.2  | 934.4  |
| 10°   | 1070.2 | 1052.9 | 1024.6 | 990.1  | 948.8  | 909.8  | 873.1  | 845.0  | 822.7  | 810.0  | 814.1  |
| 12.5° | 1047.1 | 1025.8 | 981.5  | 928.6  | 871.1  | 812.3  | 764.2  | 717.6  | 681.6  | 663.6  | 658.3  |
| 15°   | 1026.9 | 998.0  | 936.2  | 864.5  | 788.0  | 714.0  | 644.4  | 574.5  | 528.9  | 504.1  | 497.2  |
| 17.5° | 1009.6 | 972.1  | 888.3  | 799.1  | 707.7  | 602.3  | 516.7  | 451.9  | 420.7  | 407.0  | 406.0  |
| 20°   | 992.7  | 946.8  | 840.9  | 728.7  | 615.0  | 497.0  | 420.5  | 390.1  | 378.9  | 374.1  | 373.9  |
| 22.5° | 977.5  | 920.2  | 791.0  | 658.3  | 522.8  | 417.7  | 375.6  | 362.5  | 359.4  | 359.4  | 358.9  |
| 25°   | 964.5  | 893.6  | 739.9  | 583.6  | 439.5  | 371.8  | 352.3  | 346.8  | 348.0  | 350.3  | 350.6  |
| 27.5° | 959.2  | 872.9  | 690.5  | 506.8  | 382.0  | 345.2  | 336.4  | 335.6  | 339.2  | 342.7  | 343.2  |
| 30°   | 964.8  | 858.7  | 639.8  | 433.4  | 347.5  | 329.0  | 325.0  | 326.5  | 330.8  | 334.3  | 334.3  |
| 32.5° | 982.0  | 851.6  | 588.2  | 379.7  | 327.5  | 317.6  | 316.4  | 317.9  | 321.2  | 323.2  | 323.5  |
| 35°   | 1011.2 | 854.4  | 534.7  | 343.5  | 314.6  | 309.3  | 309.0  | 310.0  | 311.3  | 312.6  | 312.8  |
| 37.5° | 1047.9 | 866.8  | 477.5  | 322.4  | 306.2  | 303.2  | 302.7  | 302.4  | 302.7  | 302.7  | 302.9  |
| 40°   | 1083.8 | 885.5  | 426.3  | 310.0  | 300.4  | 297.9  | 296.6  | 294.8  | 294.6  | 294.1  | 293.8  |
| 42.5° | 1110.4 | 900.0  | 385.5  | 301.2  | 295.1  | 292.0  | 290.5  | 287.7  | 287.5  | 287.2  | 287.0  |
| 45°   | 1130.5 | 912.1  | 351.6  | 292.6  | 289.5  | 286.7  | 283.4  | 280.9  | 281.4  | 281.9  | 281.9  |
| 47.5° | 1153.0 | 922.8  | 326.8  | 284.5  | 282.7  | 279.9  | 275.8  | 274.1  | 275.8  | 277.6  | 277.6  |
| 50°   | 1180.4 | 937.7  | 306.5  | 276.3  | 275.6  | 272.3  | 268.7  | 268.0  | 270.0  | 272.5  | 272.5  |
| 52.5° | 1200.4 | 950.6  | 292.0  | 268.2  | 268.2  | 263.9  | 260.9  | 260.6  | 262.9  | 265.5  | 265.7  |
| 55°   | 1237.9 | 980.8  | 287.0  | 258.9  | 257.9  | 254.6  | 252.3  | 250.5  | 253.3  | 255.6  | 255.6  |
| 57.5° | 1280.2 | 1020.8 | 288.2  | 245.4  | 244.2  | 243.2  | 241.4  | 239.4  | 240.1  | 242.7  | 242.9  |
| 60°   | 1190.5 | 943.3  | 274.3  | 232.0  | 231.3  | 230.8  | 228.5  | 224.9  | 225.9  | 228.0  | 228.2  |
| 62.5° | 831.6  | 626.9  | 221.9  | 215.3  | 217.8  | 217.6  | 214.5  | 210.5  | 210.7  | 213.5  | 213.5  |
| 65°   | 431.6  | 339.2  | 194.8  | 200.1  | 203.9  | 202.4  | 197.3  | 193.8  | 193.3  | 196.8  | 196.1  |
| 67.5° | 186.2  | 185.2  | 177.3  | 184.1  | 188.2  | 184.9  | 179.6  | 173.8  | 174.3  | 175.5  | 174.5  |
| 70°   | 150.0  | 154.5  | 157.8  | 165.1  | 168.4  | 162.4  | 156.5  | 153.2  | 150.5  | 150.2  | 148.4  |
| 72.5° | 119.8  | 126.1  | 133.5  | 141.1  | 142.1  | 136.0  | 128.7  | 125.6  | 121.3  | 121.1  | 119.3  |
| 75°   | 90.2   | 95.5   | 101.3  | 107.4  | 107.4  | 101.6  | 96.8   | 95.2   | 90.2   | 88.7   | 87.1   |
| 77.5° | 61.6   | 64.8   | 69.4   | 70.9   | 72.4   | 70.2   | 65.4   | 62.8   | 57.0   | 55.5   | 53.4   |
| 80°   | 38.8   | 41.0   | 43.8   | 44.8   | 46.4   | 43.6   | 39.8   | 37.0   | 32.9   | 31.7   | 30.6   |
| 82.5° | 23.3   | 24.8   | 26.6   | 27.1   | 28.4   | 26.3   | 22.8   | 20.8   | 18.5   | 17.5   | 16.7   |
| 85°   | 11.9   | 12.7   | 13.7   | 13.9   | 13.7   | 11.7   | 10.4   | 9.4    | 7.9    | 7.6    | 7.1    |
| 87.5° | 3.0    | 3.5    | 3.8    | 3.5    | 3.3    | 2.5    | 1.8    | 1.3    | 0.5    | 0.5    | 0.3    |
| 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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1121 Highway 74 South  
Peachtree City, GA 30269



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Invue

Report Number: SP1-2407-157-9

Test Date: 10/03/2024

Luminaire Tested: EMM2-HTN-SA1A-827-U-5WQ

Data applicable to all product families utilizing light square engine

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/03/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Invue  
 Catalog Number: **EMM2-HTN-SA1A-827-U-5WQ**  
 Description: Epic Modern Light Square 40W 5WQ Optic

**Spectral Parameters**

CCT (K): 2764  
 CIE u': 0.2591  
 CIE v': 0.5290  
 Duv: 0.0020  
 CIE x: 0.4581  
 CIE y: 0.4156  
 CIE z: 0.1263  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 583  
 Purity: 62.2537  
 Rf: 84.7  
 Rg: 94.6

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



**Test Conditions**

Stabilization Time: 81M  
 Operation Time: 2H 21M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-157-9

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

REPORT NUMBER: SP1-2407-157-9

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-2407-157-9

**Photopic Flux vs. Wavelength**



**Photopic Lumens: 4337.9**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 2.6                            | 620               | 87426                                | 22.8                           | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 3.9                            | 625               | 83013                                | 18.2                           | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 5.8                            | 630               | 78077                                | 14.1                           | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 8.5                            | 635               | 72080                                | 10.7                           | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 11.5                           | 640               | 66249                                | 7.9                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 15.2                           | 645               | 59973                                | 5.7                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 18.7                           | 650               | 53972                                | 3.9                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 21.9                           | 655               | 48369                                | 2.7                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 24.9                           | 660               | 42641                                | 1.8                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 27.6                           | 665               | 37602                                | 1.1                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.0                            | 540               | 46032                                | 30.0                           | 670               | 32798                                | 0.7                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.0                            | 545               | 48553                                | 32.5                           | 675               | 28558                                | 0.5                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 0.0                            | 550               | 51408                                | 34.9                           | 680               | 24782                                | 0.3                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 0.0                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.2                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 0.0                            | 560               | 58847                                | 40.0                           | 690               | 18413                                | 0.1                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 0.1                            | 565               | 63386                                | 42.4                           | 695               | 15721                                | 0.1                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 0.2                            | 570               | 68196                                | 44.3                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 0.6                            | 575               | 73613                                | 46.0                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 0.9                            | 580               | 79207                                | 47.1                           | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 0.9                            | 585               | 84248                                | 47.0                           | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 0.9                            | 590               | 88397                                | 45.7                           | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 1.0                            | 595               | 91428                                | 43.4                           | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 0.9                            | 600               | 93452                                | 40.3                           | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 1.0                            | 605               | 93959                                | 36.4                           | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 1.3                            | 610               | 93079                                | 32.0                           | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 1.8                            | 615               | 90707                                | 27.3                           | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 5286.7**

**S/P: 1.22**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 75.9                           | 620               | 87426                                | 0.4                            | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 93.2                           | 625               | 83013                                | 0.2                            | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 107.8                          | 630               | 78077                                | 0.1                            | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 118.7                          | 635               | 72080                                | 0.1                            | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 122.2                          | 640               | 66249                                | 0.1                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 120.8                          | 645               | 59973                                | 0.0                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 113.9                          | 650               | 53972                                | 0.0                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 104.1                          | 655               | 48369                                | 0.0                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 92.4                           | 660               | 42641                                | 0.0                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 80.5                           | 665               | 37602                                | 0.0                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.1                            | 540               | 46032                                | 68.2                           | 670               | 32798                                | 0.0                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.3                            | 545               | 48553                                | 57.1                           | 675               | 28558                                | 0.0                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 1.1                            | 550               | 51408                                | 46.7                           | 680               | 24782                                | 0.0                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 2.5                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.0                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 5.9                            | 560               | 58847                                | 29.4                           | 690               | 18413                                | 0.0                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 12.5                           | 565               | 63386                                | 22.5                           | 695               | 15721                                | 0.0                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 26.3                           | 570               | 68196                                | 16.9                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 55.2                           | 575               | 73613                                | 12.4                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 85.4                           | 580               | 79207                                | 9.0                            | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 75.1                           | 585               | 84248                                | 6.3                            | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 63.2                           | 590               | 88397                                | 4.4                            | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 63.2                           | 595               | 91428                                | 3.0                            | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 54.2                           | 600               | 93452                                | 2.0                            | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 48.8                           | 605               | 93959                                | 1.3                            | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 54.2                           | 610               | 93079                                | 0.9                            | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 63.3                           | 615               | 90707                                | 0.5                            | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 9797**

**M/P: 2.26**

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 0             | 0.0           | 490    | 18018         | 27.7          | 620    | 87426         | 1.1           | 750    | 2680          | 0.0           | 880    | 58            | 0.0           |
| 365    | 0             | 0.0           | 495    | 22295         | 36.0          | 625    | 83013         | 0.7           | 755    | 2287          | 0.0           | 885    | 46            | 0.0           |
| 370    | 0             | 0.0           | 500    | 26478         | 44.2          | 630    | 78077         | 0.4           | 760    | 1944          | 0.0           | 890    | 45            | 0.0           |
| 375    | 0             | 0.0           | 505    | 30524         | 51.8          | 635    | 72080         | 0.3           | 765    | 1653          | 0.0           | 895    | 41            | 0.0           |
| 380    | 0             | 0.0           | 510    | 33611         | 57.0          | 640    | 66249         | 0.2           | 770    | 1413          | 0.0           | 900    | 38            | 0.0           |
| 385    | 0             | 0.0           | 515    | 36490         | 60.5          | 645    | 59973         | 0.1           | 775    | 1198          | 0.0           | 905    | 33            | 0.0           |
| 390    | 0             | 0.0           | 520    | 38610         | 61.4          | 650    | 53972         | 0.1           | 780    | 1025          | 0.0           | 910    | 30            | 0.0           |
| 395    | 0             | 0.0           | 525    | 40511         | 60.6          | 655    | 48369         | 0.0           | 785    | 874           | 0.0           | 915    | 23            | 0.0           |
| 400    | 48            | 0.0           | 530    | 42223         | 58.2          | 660    | 42641         | 0.0           | 790    | 747           | 0.0           | 920    | 24            | 0.0           |
| 405    | 201           | 0.0           | 535    | 44137         | 55.0          | 665    | 37602         | 0.0           | 795    | 639           | 0.0           | 925    | 22            | 0.0           |
| 410    | 457           | 0.0           | 540    | 46032         | 50.9          | 670    | 32798         | 0.0           | 800    | 547           | 0.0           | 930    | 22            | 0.0           |
| 415    | 925           | 0.1           | 545    | 48553         | 46.6          | 675    | 28558         | 0.0           | 805    | 473           | 0.0           | 935    | 17            | 0.0           |
| 420    | 1816          | 0.3           | 550    | 51408         | 42.0          | 680    | 24782         | 0.0           | 810    | 401           | 0.0           | 940    | 13            | 0.0           |
| 425    | 3217          | 0.8           | 555    | 54711         | 37.4          | 685    | 21386         | 0.0           | 815    | 351           | 0.0           | 945    | 6             | 0.0           |
| 430    | 5520          | 1.9           | 560    | 58847         | 32.9          | 690    | 18413         | 0.0           | 820    | 307           | 0.0           | 950    | 10            | 0.0           |
| 435    | 9225          | 4.1           | 565    | 63386         | 28.4          | 695    | 15721         | 0.0           | 825    | 261           | 0.0           | 955    | 11            | 0.0           |
| 440    | 15522         | 8.7           | 570    | 68196         | 24.1          | 700    | 13432         | 0.0           | 830    | 228           | 0.0           | 960    | 8             | 0.0           |
| 445    | 27642         | 18.5          | 575    | 73613         | 20.0          | 705    | 11513         | 0.0           | 835    | 193           | 0.0           | 965    | 12            | 0.0           |
| 450    | 36602         | 28.3          | 580    | 79207         | 16.3          | 710    | 9780          | 0.0           | 840    | 174           | 0.0           | 970    | 3             | 0.0           |
| 455    | 28292         | 24.7          | 585    | 84248         | 12.9          | 715    | 8356          | 0.0           | 845    | 151           | 0.0           | 975    | 8             | 0.0           |
| 460    | 21166         | 20.4          | 590    | 88397         | 9.8           | 720    | 7161          | 0.0           | 850    | 123           | 0.0           | 980    | 2             | 0.0           |
| 465    | 19092         | 20.1          | 595    | 91428         | 7.3           | 725    | 6067          | 0.0           | 855    | 106           | 0.0           | 985    | 13            | 0.0           |
| 470    | 14951         | 17.2          | 600    | 93452         | 5.3           | 730    | 5164          | 0.0           | 860    | 95            | 0.0           | 990    | 16            | 0.0           |
| 475    | 12606         | 15.7          | 605    | 93959         | 3.7           | 735    | 4393          | 0.0           | 865    | 82            | 0.0           | 995    | 20            | 0.0           |
| 480    | 13323         | 18.0          | 610    | 93079         | 2.5           | 740    | 3694          | 0.0           | 870    | 77            | 0.0           | 1000   | 0             | 0.0           |
| 485    | 15164         | 21.9          | 615    | 90707         | 1.7           | 745    | 3157          | 0.0           | 875    | 65            | 0.0           |        |               |               |

**Summary**

$R_f = 84.7$   
 $R_g = 94.6$   
 CIE  $R_a = 80.9$   
 $R_g = -1.5$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 95 | CES76 = 81 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 71 | CES29 = 87 | CES54 = 91 | CES79 = 89 |
| CES05 = 50 | CES30 = 94 | CES55 = 90 | CES80 = 89 |
| CES06 = 52 | CES31 = 89 | CES56 = 86 | CES81 = 69 |
| CES07 = 43 | CES32 = 82 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 91 | CES58 = 86 | CES83 = 93 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 77 | CES35 = 96 | CES60 = 94 | CES85 = 76 |
| CES11 = 60 | CES36 = 90 | CES61 = 89 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 94 | CES87 = 84 |
| CES13 = 44 | CES38 = 98 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 82 | CES89 = 73 |
| CES15 = 72 | CES40 = 95 | CES65 = 78 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 81 | CES91 = 82 |
| CES17 = 50 | CES42 = 97 | CES67 = 80 | CES92 = 64 |
| CES18 = 57 | CES43 = 91 | CES68 = 83 | CES93 = 78 |
| CES19 = 73 | CES44 = 99 | CES69 = 88 | CES94 = 59 |
| CES20 = 67 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 89 | CES71 = 79 | CES96 = 83 |
| CES22 = 79 | CES47 = 92 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 83 | CES73 = 75 | CES98 = 83 |
| CES24 = 91 | CES49 = 90 | CES74 = 91 | CES99 = 74 |
| CES25 = 72 | CES50 = 94 | CES75 = 81 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)