

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: P319485

Luminaire Tested: **GLEON-SA1C-827-U-SL2**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319485  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-20)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA1C-827-U-SL2  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(1) 80 CRI, 2700K, 1050mA LIGHTSQUARE WITH 16 LEDS AND TYPE II SPILL  
LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5333 lumens  
Efficiency: N/A  
Efficacy: 90.4 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G2

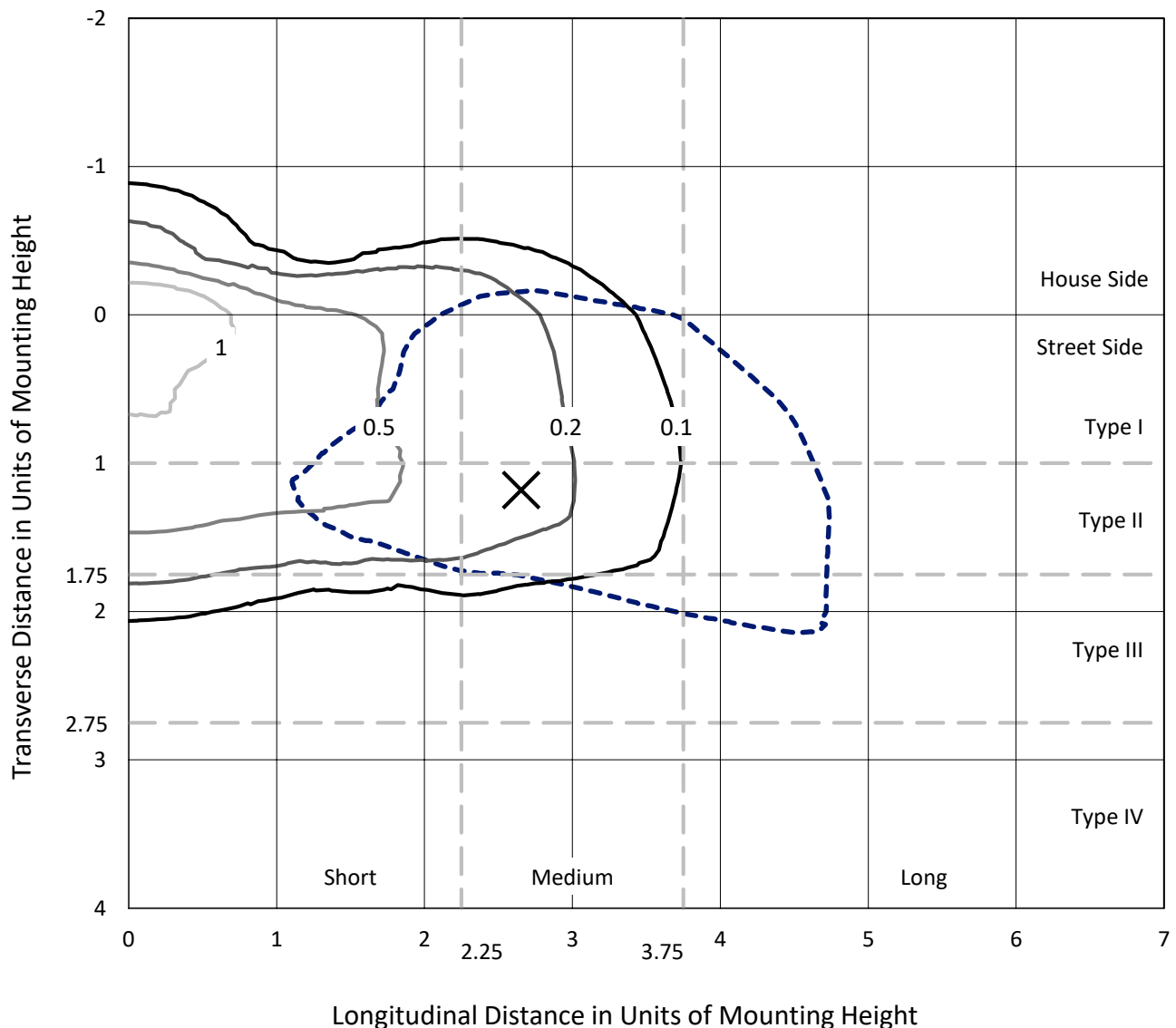
Input Watts (W): 59  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P319485  
 CATALOG NUMBER: GLEON-SA1C-827-U-SL2

## Iso-Footcandle Lines of Horizontal Illumination

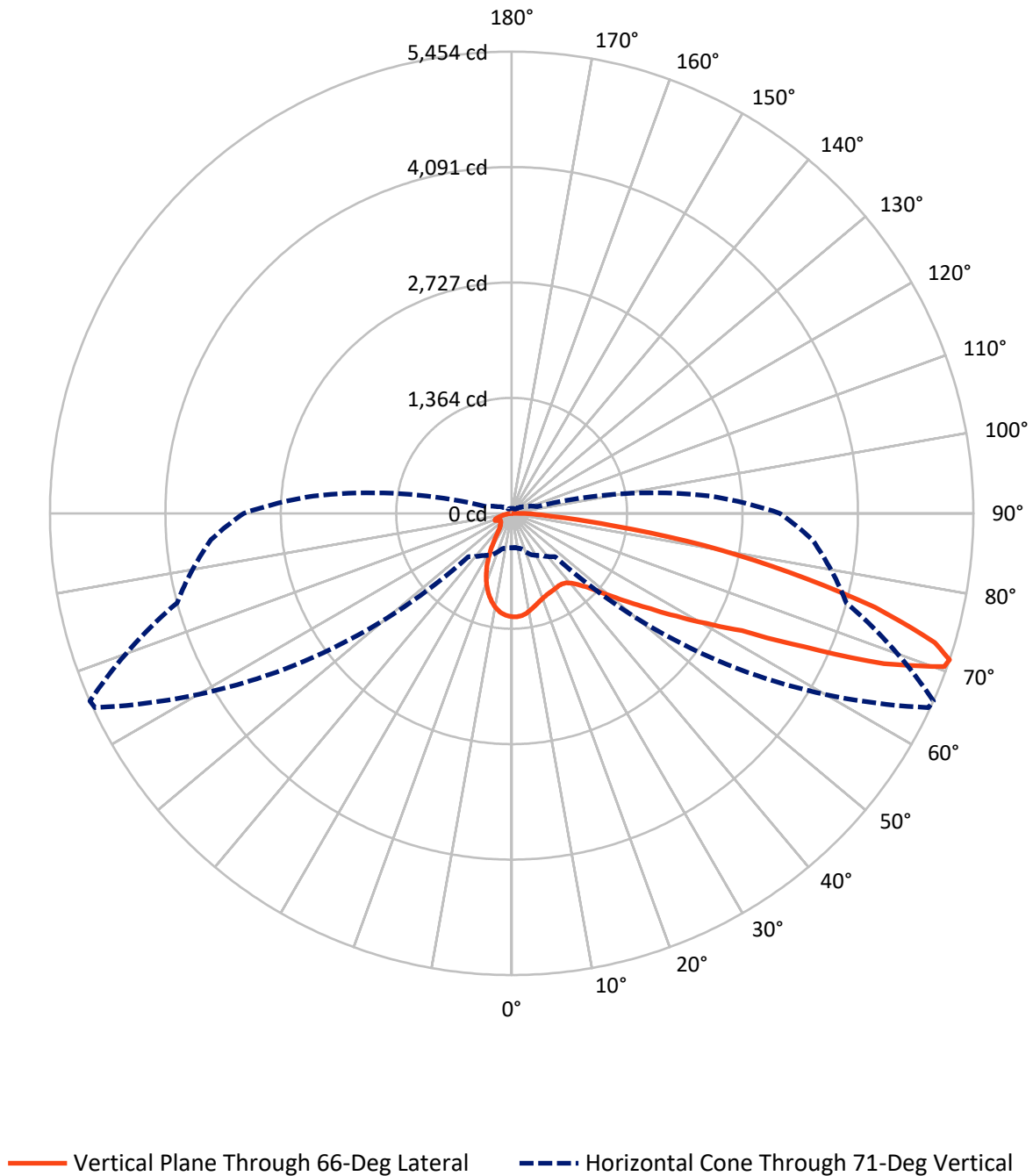
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 2 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA1C-827-U-SL2

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 988.4    | 0.0    | 988.4  |
|                    | % Fixture | 18.5     | 0.0    | 18.5   |
| <b>Street Side</b> | Lumens    | 4344.6   | 0.0    | 4344.6 |
|                    | % Fixture | 81.5     | 0.0    | 81.5   |
| <b>Total</b>       | Lumens    | 5333.0   | 0.0    | 5333.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 107.5  | 2.0       |
| 10°-20°   | 257.9  | 4.8       |
| 20°-30°   | 346.5  | 6.5       |
| 30°-40°   | 455.8  | 8.5       |
| 40°-50°   | 663.0  | 12.4      |
| 50°-60°   | 1035.7 | 19.4      |
| 60°-70°   | 1297.4 | 24.3      |
| 70°-80°   | 989.6  | 18.6      |
| 80°-90°   | 179.7  | 3.4       |
| 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°    | 5333.0 | 100.0     |
| 0°-180°   | 5333.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P319485

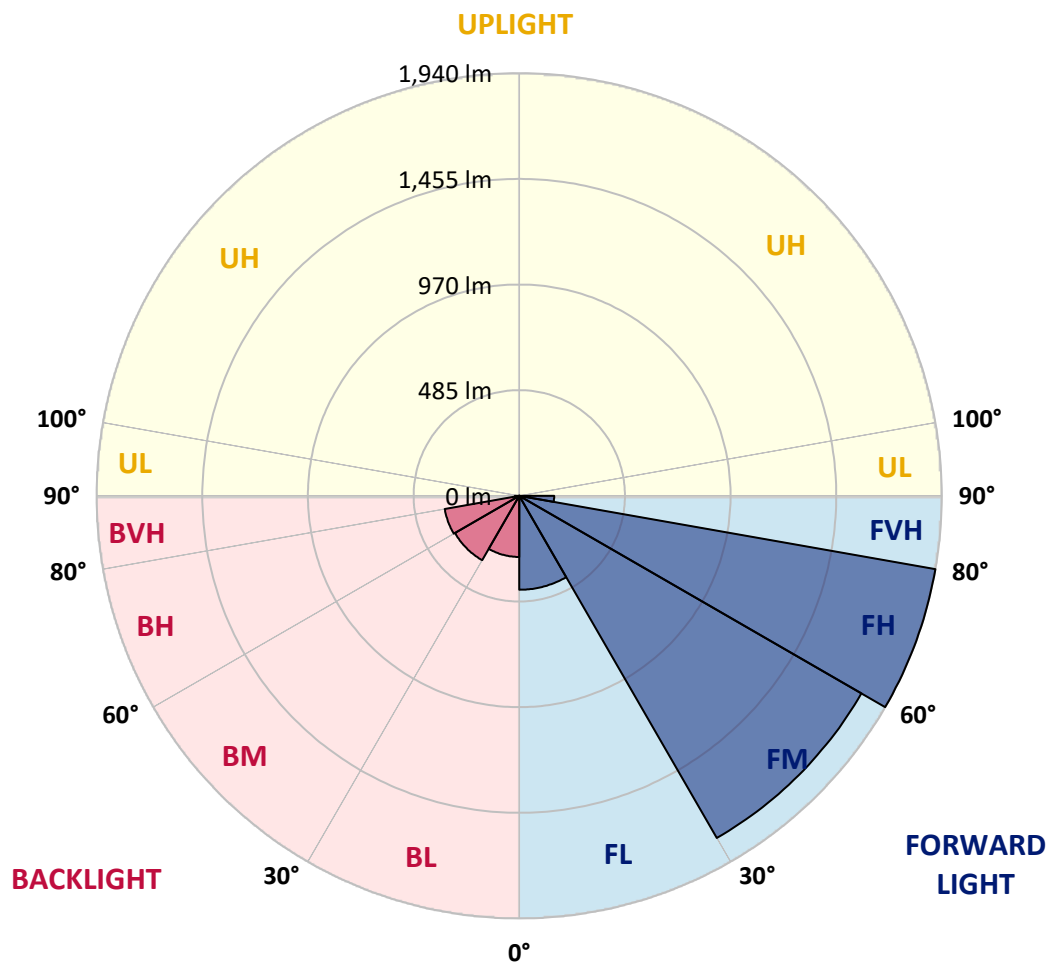
CATALOG NUMBER: GLEON-SA1C-827-U-SL2

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 431.2  | 8.1       |                         |      |         |
| FM   | (30°-60°)   | 1813.5 | 34.0      |                         |      |         |
| FH   | (60°-80°)   | 1939.7 | 36.4      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 160.2  | 3.0       |                         |      | G2/225  |
| BL   | (0°-30°)    | 280.7  | 5.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 341.0  | 6.4       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 347.3  | 6.5       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 19.5   | 0.4       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type III Medium





REPORT NUMBER: P319485

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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 66°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 |
| 2.5°  | 1199.0 | 1197.2 | 1202.7 | 1208.4 | 1210.6 | 1214.3 | 1219.8 | 1223.0 | 1222.8 | 1223.3 | 1221.5 |
| 5°    | 1119.5 | 1117.1 | 1128.2 | 1137.2 | 1154.5 | 1174.0 | 1197.8 | 1214.7 | 1215.1 | 1224.6 | 1227.2 |
| 7.5°  | 1044.2 | 1042.5 | 1055.2 | 1069.8 | 1089.9 | 1119.7 | 1158.2 | 1194.6 | 1196.8 | 1222.8 | 1231.8 |
| 10°   | 983.8  | 983.4  | 995.8  | 1011.6 | 1035.0 | 1068.3 | 1112.5 | 1165.9 | 1169.2 | 1214.0 | 1232.6 |
| 12.5° | 936.7  | 937.4  | 948.1  | 966.1  | 990.8  | 1025.6 | 1073.5 | 1133.7 | 1139.0 | 1200.0 | 1228.3 |
| 15°   | 901.9  | 904.8  | 913.5  | 931.7  | 956.0  | 991.3  | 1040.5 | 1103.8 | 1111.9 | 1184.3 | 1225.9 |
| 17.5° | 882.0  | 885.3  | 891.4  | 906.5  | 929.3  | 963.4  | 1009.9 | 1079.4 | 1086.7 | 1172.3 | 1226.1 |
| 20°   | 876.1  | 878.8  | 882.3  | 891.5  | 910.9  | 941.8  | 985.8  | 1057.3 | 1065.2 | 1162.8 | 1227.9 |
| 22.5° | 887.7  | 889.7  | 890.1  | 889.3  | 901.1  | 926.3  | 968.3  | 1041.1 | 1049.5 | 1156.5 | 1229.2 |
| 25°   | 912.5  | 915.3  | 913.3  | 906.5  | 902.6  | 918.1  | 959.3  | 1030.4 | 1038.8 | 1151.9 | 1226.7 |
| 27.5° | 949.9  | 950.3  | 948.6  | 939.8  | 921.6  | 919.0  | 956.5  | 1024.1 | 1032.2 | 1146.6 | 1221.3 |
| 30°   | 1000.7 | 1003.1 | 1000.2 | 988.2  | 958.4  | 933.7  | 959.9  | 1018.0 | 1025.4 | 1139.8 | 1212.7 |
| 32.5° | 1060.2 | 1066.1 | 1065.9 | 1053.4 | 1010.7 | 966.7  | 973.5  | 1014.4 | 1020.1 | 1132.6 | 1202.2 |
| 35°   | 1121.9 | 1130.0 | 1145.1 | 1139.8 | 1086.9 | 1018.8 | 999.6  | 1020.3 | 1024.1 | 1131.6 | 1194.8 |
| 37.5° | 1186.0 | 1194.1 | 1225.2 | 1239.5 | 1177.7 | 1093.4 | 1040.9 | 1041.1 | 1042.9 | 1142.9 | 1194.3 |
| 40°   | 1253.0 | 1261.6 | 1308.4 | 1345.8 | 1295.3 | 1187.8 | 1107.3 | 1084.5 | 1082.5 | 1170.5 | 1205.1 |
| 42.5° | 1346.9 | 1354.6 | 1410.8 | 1458.5 | 1425.9 | 1308.8 | 1199.2 | 1151.5 | 1147.3 | 1224.6 | 1239.9 |
| 45°   | 1465.7 | 1472.3 | 1531.9 | 1582.9 | 1566.2 | 1446.9 | 1314.7 | 1243.8 | 1243.0 | 1314.9 | 1310.4 |
| 47.5° | 1606.9 | 1612.0 | 1665.6 | 1715.0 | 1721.0 | 1605.8 | 1459.8 | 1386.1 | 1374.1 | 1438.6 | 1419.6 |
| 50°   | 1754.0 | 1759.7 | 1796.2 | 1849.2 | 1894.3 | 1818.4 | 1646.5 | 1560.5 | 1544.5 | 1601.9 | 1574.3 |
| 52.5° | 1851.4 | 1859.0 | 1890.6 | 1957.8 | 2089.1 | 2051.6 | 1867.2 | 1771.9 | 1747.6 | 1799.8 | 1778.7 |
| 55°   | 1807.9 | 1824.9 | 1873.3 | 1981.0 | 2244.9 | 2407.7 | 2139.6 | 2018.4 | 1991.0 | 2034.4 | 2021.9 |
| 57.5° | 1610.4 | 1633.6 | 1699.7 | 1865.9 | 2266.8 | 2721.4 | 2551.3 | 2308.8 | 2289.4 | 2276.9 | 2282.6 |
| 60°   | 1249.3 | 1271.6 | 1353.5 | 1570.2 | 2114.2 | 2950.5 | 3170.9 | 2666.7 | 2638.7 | 2520.3 | 2525.5 |
| 62.5° | 884.2  | 872.9  | 929.1  | 1087.6 | 1717.9 | 2977.3 | 3875.9 | 3145.5 | 3053.4 | 2777.4 | 2754.7 |
| 65°   | 674.3  | 671.7  | 696.9  | 747.4  | 1040.5 | 2655.7 | 4295.9 | 3950.1 | 3806.3 | 3079.7 | 3026.3 |
| 67.5° | 554.0  | 549.4  | 574.3  | 647.8  | 670.0  | 1713.3 | 4305.1 | 4883.6 | 4742.4 | 3456.1 | 3340.4 |
| 70°   | 455.5  | 450.4  | 473.6  | 568.4  | 619.2  | 868.9  | 3623.3 | 5430.3 | 5422.7 | 3932.6 | 3577.6 |
| 71°   | 408.4  | 404.7  | 432.5  | 537.8  | 608.4  | 724.2  | 3128.3 | 5431.8 | 5454.4 | 4093.9 | 3563.6 |
| 72.5° | 332.5  | 333.8  | 363.3  | 478.7  | 600.3  | 639.5  | 2299.2 | 5178.6 | 5226.5 | 4247.6 | 3436.4 |
| 75°   | 221.0  | 222.1  | 260.7  | 368.3  | 582.0  | 625.7  | 1263.7 | 4345.4 | 4433.4 | 4155.6 | 3135.7 |
| 77.5° | 148.4  | 148.0  | 174.4  | 252.6  | 507.1  | 625.7  | 740.9  | 3250.0 | 3346.7 | 3306.6 | 2417.4 |
| 80°   | 102.2  | 101.5  | 120.1  | 174.4  | 383.9  | 633.2  | 572.8  | 2277.7 | 2306.9 | 1785.7 | 982.5  |
| 82.5° | 62.6   | 63.2   | 78.4   | 123.2  | 261.3  | 569.9  | 540.8  | 1241.9 | 1210.1 | 500.8  | 245.4  |
| 85°   | 35.9   | 35.7   | 50.1   | 83.4   | 167.7  | 480.9  | 527.3  | 534.5  | 490.3  | 150.8  | 88.7   |
| 87.5° | 12.9   | 13.8   | 26.9   | 46.2   | 96.1   | 334.9  | 447.4  | 278.0  | 250.6  | 68.1   | 40.1   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P319485

CATALOG NUMBER: GLEON-SA1C-827-U-SL2

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 | 1221.7 |
| 2.5°  | 1220.2 | 1221.3 | 1220.0 | 1212.7 | 1206.4 | 1196.3 | 1190.6 | 1182.7 | 1180.3 | 1179.2 | 1182.1 |
| 5°    | 1224.8 | 1225.2 | 1214.3 | 1195.0 | 1173.3 | 1147.7 | 1129.3 | 1106.6 | 1095.9 | 1091.3 | 1094.3 |
| 7.5°  | 1229.1 | 1227.4 | 1203.6 | 1166.6 | 1126.5 | 1081.9 | 1042.3 | 1006.1 | 984.9  | 976.2  | 977.0  |
| 10°   | 1229.6 | 1222.6 | 1184.5 | 1127.2 | 1065.0 | 999.6  | 938.9  | 882.9  | 847.5  | 824.5  | 831.5  |
| 12.5° | 1223.9 | 1212.1 | 1156.3 | 1076.2 | 989.9  | 900.8  | 818.6  | 734.7  | 684.2  | 660.8  | 661.6  |
| 15°   | 1219.5 | 1198.1 | 1121.7 | 1016.2 | 900.2  | 782.2  | 670.0  | 571.3  | 517.6  | 493.6  | 482.4  |
| 17.5° | 1215.8 | 1183.0 | 1081.6 | 948.6  | 794.3  | 644.6  | 509.8  | 421.8  | 392.4  | 385.4  | 382.4  |
| 20°   | 1210.6 | 1167.0 | 1036.8 | 870.4  | 673.7  | 490.7  | 372.3  | 328.9  | 329.0  | 337.1  | 338.2  |
| 22.5° | 1203.5 | 1148.8 | 989.1  | 782.5  | 544.3  | 357.4  | 291.8  | 279.3  | 292.0  | 307.5  | 310.3  |
| 25°   | 1192.8 | 1127.2 | 936.1  | 685.5  | 415.0  | 274.7  | 249.3  | 248.8  | 264.2  | 280.4  | 282.8  |
| 27.5° | 1177.7 | 1099.1 | 877.2  | 581.3  | 305.8  | 233.5  | 223.3  | 227.2  | 238.6  | 250.4  | 251.3  |
| 30°   | 1157.4 | 1066.3 | 812.2  | 471.4  | 239.7  | 207.9  | 206.8  | 210.3  | 217.3  | 225.6  | 226.3  |
| 32.5° | 1135.1 | 1033.0 | 742.8  | 364.9  | 205.3  | 194.1  | 195.2  | 196.8  | 200.1  | 203.5  | 204.2  |
| 35°   | 1114.9 | 998.9  | 671.7  | 277.3  | 188.9  | 185.0  | 184.3  | 183.9  | 184.3  | 183.2  | 183.4  |
| 37.5° | 1101.8 | 970.7  | 597.7  | 220.8  | 179.5  | 177.1  | 174.9  | 172.2  | 169.0  | 167.2  | 167.6  |
| 40°   | 1097.0 | 949.7  | 522.7  | 190.8  | 171.8  | 170.1  | 165.9  | 160.0  | 156.3  | 155.2  | 155.2  |
| 42.5° | 1109.9 | 938.9  | 450.4  | 175.7  | 165.3  | 162.6  | 155.6  | 148.8  | 146.0  | 145.8  | 145.6  |
| 45°   | 1149.3 | 943.3  | 381.5  | 167.4  | 159.5  | 154.1  | 144.9  | 139.2  | 137.4  | 137.7  | 137.5  |
| 47.5° | 1220.0 | 971.1  | 322.6  | 161.8  | 153.6  | 146.6  | 136.3  | 131.7  | 129.4  | 129.4  | 129.6  |
| 50°   | 1340.3 | 1036.1 | 275.6  | 157.2  | 148.6  | 139.6  | 130.0  | 124.3  | 121.3  | 121.2  | 121.2  |
| 52.5° | 1515.4 | 1152.5 | 246.4  | 153.4  | 143.1  | 133.3  | 123.7  | 116.6  | 113.1  | 112.3  | 111.9  |
| 55°   | 1734.9 | 1319.3 | 238.3  | 150.8  | 135.7  | 126.5  | 116.2  | 109.0  | 105.1  | 103.5  | 103.3  |
| 57.5° | 1980.3 | 1522.2 | 254.3  | 147.7  | 128.2  | 118.4  | 107.9  | 101.1  | 97.0   | 95.0   | 94.8   |
| 60°   | 2228.7 | 1743.7 | 319.6  | 143.3  | 121.9  | 109.6  | 99.4   | 93.2   | 89.1   | 86.9   | 86.5   |
| 62.5° | 2477.4 | 1977.2 | 453.1  | 142.9  | 117.5  | 101.1  | 90.8   | 85.4   | 81.6   | 79.2   | 78.6   |
| 65°   | 2758.0 | 2232.7 | 604.9  | 152.6  | 116.0  | 93.4   | 81.9   | 77.7   | 74.4   | 72.2   | 72.0   |
| 67.5° | 3080.3 | 2521.3 | 590.3  | 172.7  | 121.0  | 86.4   | 73.7   | 70.3   | 67.9   | 66.1   | 65.9   |
| 70°   | 3231.4 | 2476.1 | 367.0  | 186.9  | 128.0  | 79.5   | 65.7   | 63.3   | 61.5   | 60.2   | 59.7   |
| 71°   | 3168.1 | 2351.1 | 307.7  | 185.2  | 127.2  | 76.6   | 62.6   | 60.8   | 58.9   | 57.8   | 57.3   |
| 72.5° | 2995.4 | 2144.2 | 256.7  | 172.3  | 118.9  | 71.3   | 58.6   | 56.7   | 55.1   | 53.8   | 53.4   |
| 75°   | 2687.9 | 1914.9 | 205.5  | 137.7  | 94.8   | 60.2   | 51.4   | 49.3   | 48.1   | 47.3   | 46.6   |
| 77.5° | 1975.9 | 1366.6 | 158.9  | 108.8  | 69.8   | 49.2   | 43.8   | 42.3   | 41.1   | 40.0   | 39.4   |
| 80°   | 756.9  | 529.4  | 107.0  | 81.2   | 51.2   | 38.9   | 35.4   | 34.6   | 33.3   | 32.6   | 32.6   |
| 82.5° | 203.8  | 158.2  | 57.1   | 49.2   | 34.2   | 28.4   | 27.1   | 26.7   | 25.6   | 24.1   | 24.3   |
| 85°   | 82.5   | 69.8   | 32.0   | 27.1   | 21.0   | 16.8   | 18.2   | 18.4   | 17.1   | 15.3   | 15.5   |
| 87.5° | 36.3   | 29.6   | 17.9   | 12.0   | 9.2    | 6.4    | 8.3    | 8.3    | 7.5    | 6.3    | 5.7    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2019: 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:  $4\pi$   
 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  
 R<sub>f</sub>: 84.7  
 R<sub>g</sub>: 94.6

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



### 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

| 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         | 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           |        |               |               |

REPORT NUMBER: SP1-2407-157-9

### 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                            |                   |                                      |                                |

REPORT NUMBER: SP1-2407-157-9

### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 9797**

**M/P: 2.26**

| 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       | 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              |           |                  |                  |

REPORT NUMBER: SP1-2407-157-9

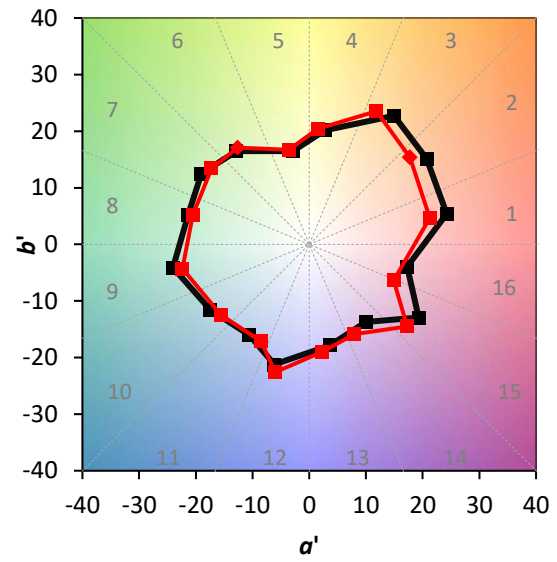
TM-30-18

### 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)