

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: P324005

Luminaire Tested: **GLEON-SA1C-830-U-SL4-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P324005  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-25)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA1C-830-U-SL4-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(1) 80 CRI, 3000K, 1050mA LIGHTSQUARE WITH 16 LEDS AND TYPE IV SPILL  
LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4777 lumens  
Efficiency: N/A  
Efficacy: 81.0 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

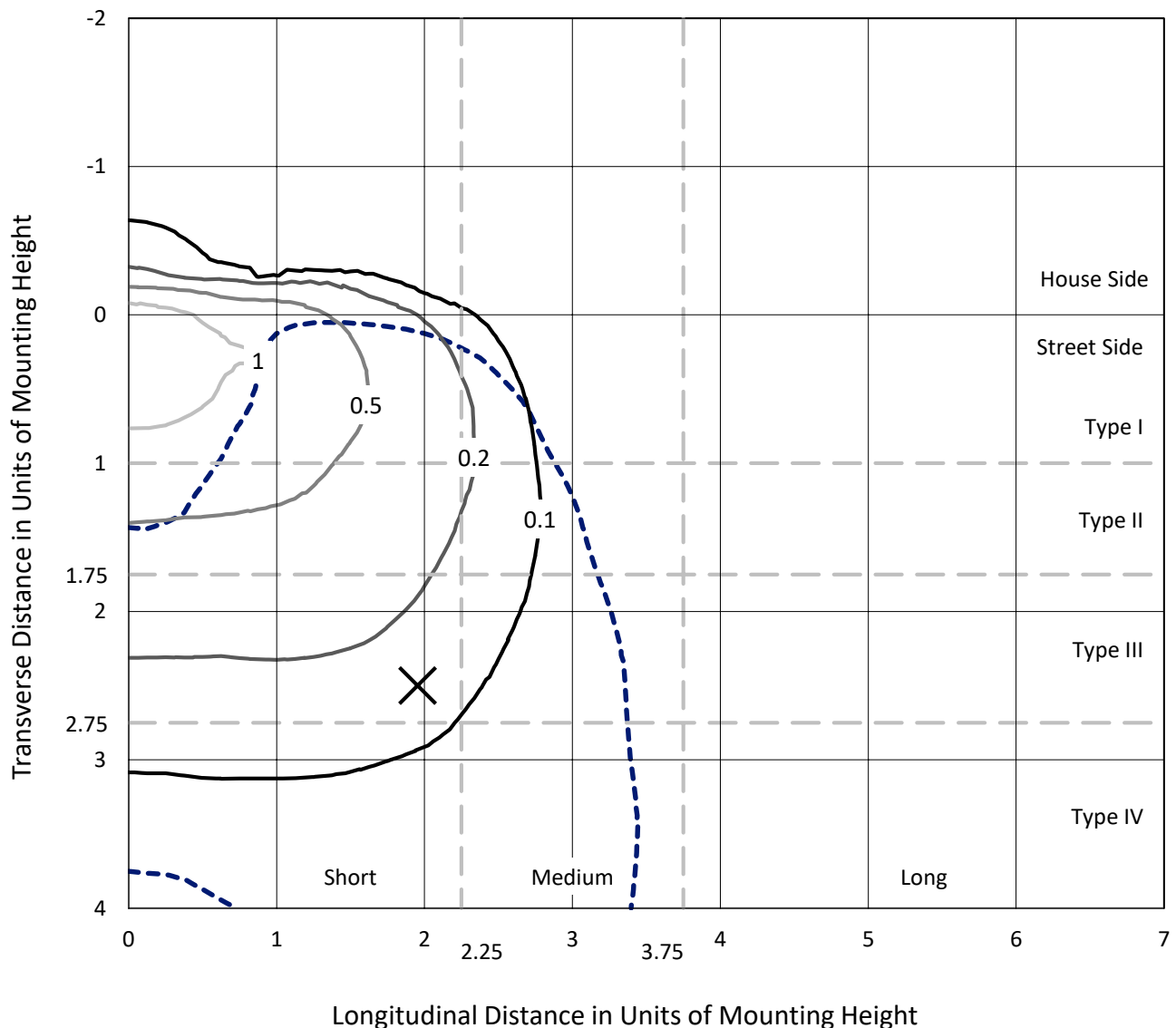
Input Watts (W): 59  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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 CATALOG NUMBER: GLEON-SA1C-830-U-SL4-HSS

## Iso-Footcandle Lines of Horizontal Illumination

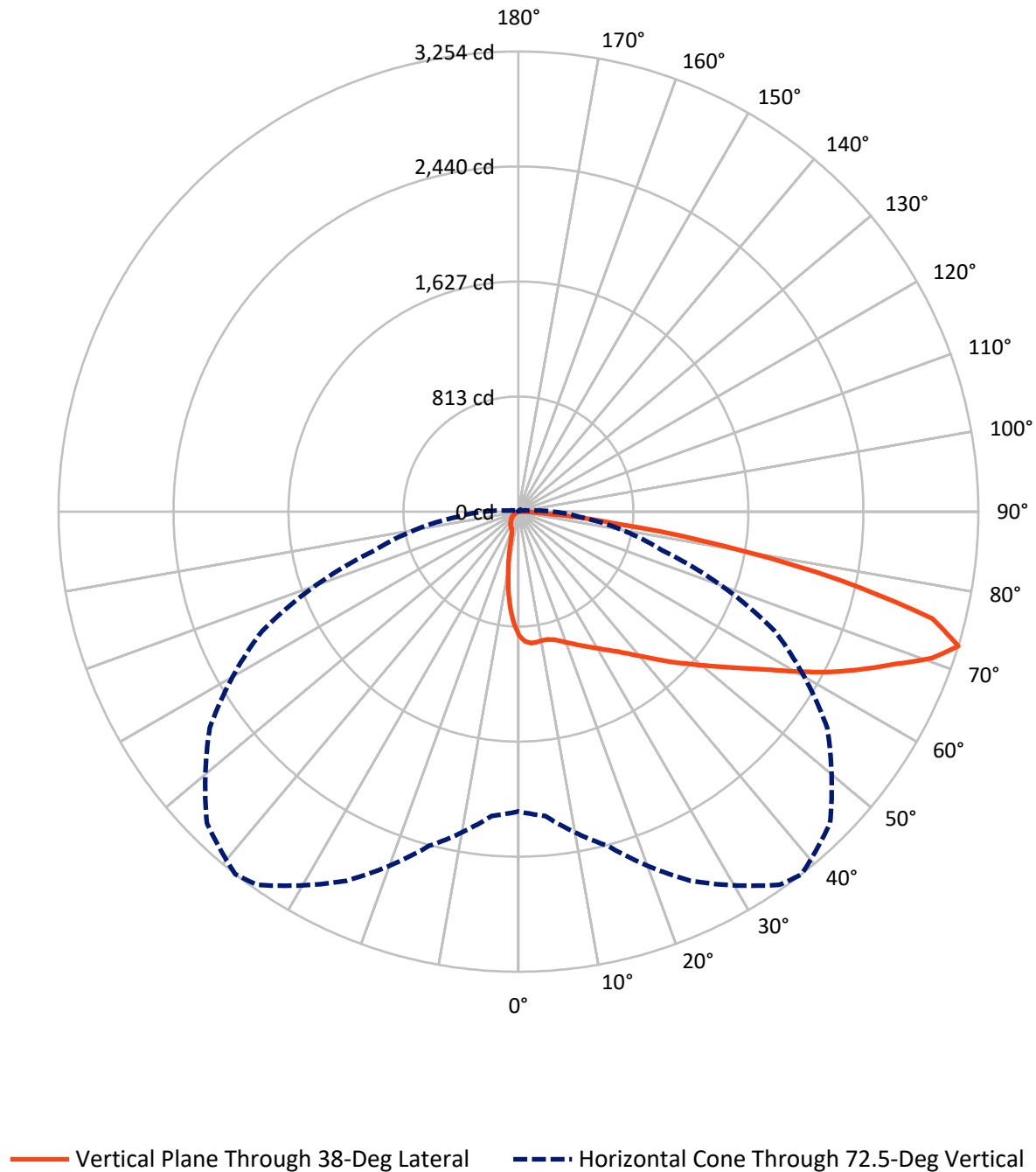
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.5 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 402.0    | 0.0    | 402.0  |
|                    | % Fixture | 8.4      | 0.0    | 8.4    |
| <b>Street Side</b> | Lumens    | 4375.0   | 0.0    | 4375.0 |
|                    | % Fixture | 91.6     | 0.0    | 91.6   |
| <b>Total</b>       | Lumens    | 4777.0   | 0.0    | 4777.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 74.9   | 1.6       |
| 10°-20°   | 183.1  | 3.8       |
| 20°-30°   | 291.1  | 6.1       |
| 30°-40°   | 437.7  | 9.2       |
| 40°-50°   | 667.8  | 14.0      |
| 50°-60°   | 943.8  | 19.8      |
| 60°-70°   | 1183.8 | 24.8      |
| 70°-80°   | 885.2  | 18.5      |
| 80°-90°   | 109.8  | 2.3       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 4777.0 | 100.0     |
| 0°-180°   | 4777.0 | 100.0     |

**Coefficient of Utilization**



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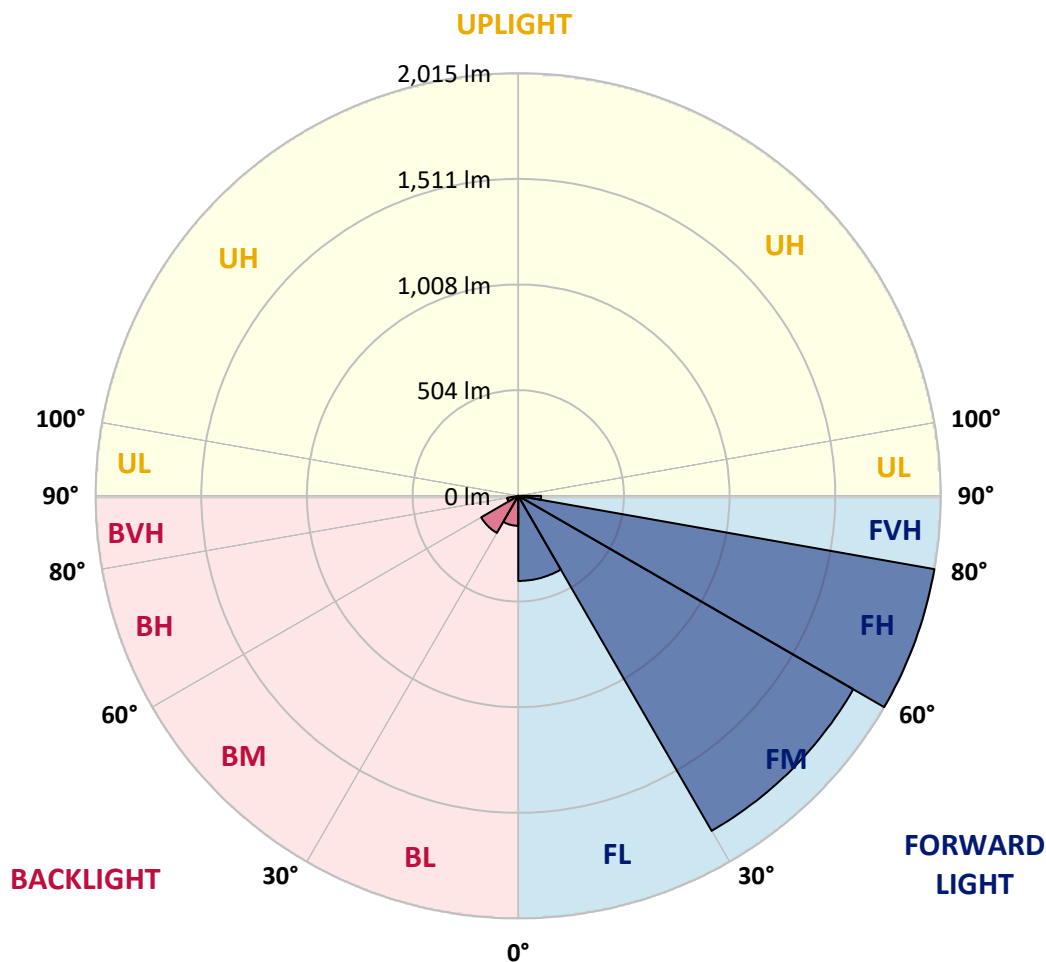
CATALOG NUMBER: GLEON-SA1C-830-U-SL4-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 405.9  | 8.5       |                         |      |         |
| FM   | (30°-60°)   | 1845.1 | 38.6      |                         |      |         |
| FH   | (60°-80°)   | 2015.3 | 42.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 108.7  | 2.3       |                         |      | G2/225  |
| BL   | (0°-30°)    | 143.1  | 3.0       | B1/500                  |      |         |
| BM   | (30°-60°)   | 204.1  | 4.3       | B0/220                  |      |         |
| BH   | (60°-80°)   | 53.7   | 1.1       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 1.0    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type IV Short





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CATALOG NUMBER: GLEON-SA1C-830-U-SL4-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 38°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 878.5  | 878.5  | 878.5  | 878.5  | 878.5  | 878.5  | 878.5  | 878.5  | 878.5  | 878.5  | 878.5  |
| 2.5°  | 932.4  | 932.6  | 930.5  | 926.9  | 922.3  | 919.9  | 916.0  | 909.6  | 902.9  | 890.8  | 877.7  |
| 5°    | 951.5  | 951.5  | 948.7  | 943.9  | 936.6  | 934.4  | 926.9  | 916.8  | 902.9  | 883.2  | 861.2  |
| 7.5°  | 949.5  | 949.9  | 946.1  | 941.2  | 933.8  | 931.8  | 922.7  | 911.4  | 894.1  | 870.3  | 842.2  |
| 10°   | 939.2  | 940.2  | 937.2  | 934.8  | 928.1  | 925.9  | 917.4  | 906.1  | 888.8  | 863.4  | 831.1  |
| 12.5° | 928.7  | 929.7  | 930.7  | 932.8  | 928.7  | 927.9  | 921.1  | 911.6  | 895.1  | 868.8  | 832.2  |
| 15°   | 921.9  | 923.9  | 931.0  | 939.6  | 940.6  | 939.8  | 935.4  | 926.5  | 909.8  | 882.4  | 840.8  |
| 17.5° | 921.9  | 925.1  | 940.0  | 956.2  | 962.0  | 962.6  | 958.8  | 946.3  | 926.5  | 897.1  | 848.7  |
| 20°   | 929.7  | 934.0  | 957.2  | 980.2  | 989.8  | 989.8  | 982.4  | 965.0  | 941.8  | 910.4  | 854.1  |
| 22.5° | 949.5  | 955.3  | 984.4  | 1011.0 | 1021.1 | 1018.9 | 1009.0 | 983.6  | 957.6  | 925.5  | 860.8  |
| 25°   | 988.6  | 992.9  | 1023.3 | 1050.1 | 1056.2 | 1051.3 | 1038.8 | 1006.2 | 977.9  | 945.9  | 873.1  |
| 27.5° | 1039.0 | 1039.6 | 1070.9 | 1093.5 | 1089.8 | 1086.4 | 1070.7 | 1034.6 | 1007.0 | 975.1  | 894.3  |
| 30°   | 1094.3 | 1094.3 | 1121.9 | 1139.2 | 1127.7 | 1124.9 | 1109.2 | 1068.9 | 1044.3 | 1014.8 | 924.5  |
| 32.5° | 1147.9 | 1150.3 | 1172.7 | 1183.6 | 1170.7 | 1167.9 | 1152.7 | 1112.4 | 1093.9 | 1075.3 | 971.5  |
| 35°   | 1199.7 | 1201.5 | 1222.7 | 1228.6 | 1216.3 | 1217.1 | 1206.2 | 1172.1 | 1165.1 | 1162.8 | 1042.3 |
| 37.5° | 1249.9 | 1250.3 | 1271.9 | 1275.7 | 1269.5 | 1276.2 | 1277.2 | 1247.1 | 1260.0 | 1279.2 | 1142.1 |
| 40°   | 1295.7 | 1296.1 | 1317.5 | 1327.2 | 1337.7 | 1346.5 | 1354.2 | 1338.1 | 1380.8 | 1425.4 | 1261.0 |
| 42.5° | 1332.4 | 1336.6 | 1363.7 | 1382.2 | 1410.0 | 1426.6 | 1447.7 | 1446.9 | 1524.6 | 1591.7 | 1404.6 |
| 45°   | 1364.7 | 1371.9 | 1409.8 | 1442.1 | 1489.7 | 1516.3 | 1549.2 | 1575.0 | 1686.5 | 1776.8 | 1550.0 |
| 47.5° | 1407.4 | 1414.1 | 1457.4 | 1510.3 | 1573.8 | 1608.8 | 1663.3 | 1719.1 | 1864.5 | 1958.5 | 1692.1 |
| 50°   | 1467.5 | 1464.5 | 1507.2 | 1583.2 | 1664.7 | 1710.5 | 1788.3 | 1871.8 | 2041.0 | 2116.8 | 1775.6 |
| 52.5° | 1531.6 | 1530.4 | 1561.9 | 1662.3 | 1771.8 | 1825.4 | 1928.2 | 2029.7 | 2209.9 | 2225.9 | 1813.9 |
| 55°   | 1610.9 | 1602.4 | 1629.0 | 1752.6 | 1899.0 | 1956.5 | 2077.5 | 2186.1 | 2344.4 | 2287.4 | 1833.1 |
| 57.5° | 1694.1 | 1680.0 | 1705.4 | 1853.2 | 2042.4 | 2110.5 | 2243.0 | 2338.4 | 2433.9 | 2329.5 | 1832.9 |
| 60°   | 1780.0 | 1763.3 | 1793.5 | 1978.9 | 2220.6 | 2299.3 | 2422.4 | 2441.4 | 2517.4 | 2350.7 | 1819.4 |
| 62.5° | 1851.8 | 1841.9 | 1886.7 | 2113.5 | 2419.6 | 2496.9 | 2557.9 | 2535.0 | 2587.8 | 2367.2 | 1787.9 |
| 65°   | 1927.8 | 1928.4 | 2000.8 | 2270.4 | 2631.1 | 2683.2 | 2688.4 | 2656.5 | 2646.7 | 2363.8 | 1681.2 |
| 67.5° | 2030.5 | 2040.1 | 2160.9 | 2483.5 | 2836.8 | 2877.1 | 2876.7 | 2788.0 | 2689.8 | 2229.7 | 1444.5 |
| 70°   | 2139.2 | 2161.7 | 2345.4 | 2727.3 | 3061.4 | 3102.2 | 3081.2 | 2871.7 | 2532.7 | 1803.0 | 1022.3 |
| 72.5° | 2121.0 | 2159.9 | 2447.9 | 2881.0 | 3222.7 | 3253.8 | 3117.1 | 2666.0 | 2001.8 | 1047.9 | 435.3  |
| 75°   | 1636.3 | 1681.4 | 2244.6 | 2728.7 | 3053.4 | 3025.5 | 2678.3 | 2074.6 | 1093.9 | 292.4  | 98.0   |
| 77.5° | 864.4  | 888.4  | 1482.8 | 2078.7 | 2380.9 | 2322.4 | 1886.7 | 1150.9 | 333.5  | 72.4   | 44.0   |
| 80°   | 452.7  | 458.3  | 646.2  | 1179.4 | 1469.5 | 1469.9 | 1118.1 | 505.5  | 137.5  | 37.1   | 29.6   |
| 82.5° | 242.4  | 247.2  | 341.4  | 545.0  | 770.0  | 697.9  | 428.1  | 278.1  | 80.0   | 21.0   | 28.4   |
| 85°   | 58.3   | 59.3   | 193.6  | 249.0  | 302.7  | 216.2  | 127.2  | 233.5  | 21.6   | 12.3   | 23.0   |
| 87.5° | 22.4   | 22.8   | 71.8   | 107.7  | 77.2   | 50.0   | 59.5   | 87.1   | 2.8    | 4.8    | 3.6    |
| 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: P324005

CATALOG NUMBER: GLEON-SA1C-830-U-SL4-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 878.5  | 878.5 | 878.5 | 878.5 | 878.5 | 878.5 | 878.5 | 878.5 | 878.5 | 878.5 | 878.5 |
| 2.5°  | 869.7  | 864.6 | 851.9 | 835.8 | 821.5 | 811.2 | 795.7 | 785.6 | 778.9 | 778.7 | 776.1 |
| 5°    | 847.7  | 837.2 | 809.8 | 777.3 | 747.7 | 721.2 | 689.8 | 665.0 | 646.6 | 643.6 | 637.2 |
| 7.5°  | 824.1  | 806.9 | 764.8 | 714.0 | 664.4 | 614.0 | 555.5 | 519.2 | 488.0 | 473.2 | 471.6 |
| 10°   | 809.6  | 785.4 | 725.7 | 652.3 | 574.5 | 492.6 | 416.0 | 363.1 | 324.8 | 313.9 | 305.7 |
| 12.5° | 806.7  | 774.7 | 695.6 | 594.4 | 483.3 | 375.0 | 290.2 | 233.9 | 203.4 | 193.6 | 191.1 |
| 15°   | 809.6  | 769.8 | 670.2 | 537.0 | 390.8 | 266.0 | 194.8 | 162.1 | 150.6 | 147.8 | 147.6 |
| 17.5° | 811.4  | 763.8 | 641.4 | 473.4 | 301.2 | 190.1 | 149.2 | 139.7 | 137.9 | 137.7 | 138.1 |
| 20°   | 811.2  | 754.7 | 607.1 | 402.3 | 224.0 | 149.4 | 134.9 | 132.9 | 132.5 | 132.7 | 132.5 |
| 22.5° | 809.8  | 744.0 | 569.4 | 329.1 | 169.2 | 133.5 | 128.8 | 127.6 | 127.4 | 127.4 | 127.4 |
| 25°   | 812.4  | 735.4 | 527.9 | 259.1 | 139.5 | 126.2 | 123.2 | 122.2 | 122.0 | 122.0 | 121.6 |
| 27.5° | 821.7  | 730.7 | 482.5 | 199.4 | 126.0 | 119.6 | 117.2 | 117.1 | 116.5 | 116.3 | 116.7 |
| 30°   | 836.8  | 730.7 | 432.7 | 155.1 | 117.8 | 112.9 | 111.1 | 110.7 | 110.5 | 110.3 | 110.5 |
| 32.5° | 863.4  | 736.2 | 378.3 | 129.0 | 110.1 | 105.3 | 104.2 | 104.8 | 104.2 | 104.2 | 104.2 |
| 35°   | 911.4  | 752.9 | 321.4 | 112.5 | 102.0 | 98.0  | 96.8  | 97.6  | 97.2  | 97.2  | 97.0  |
| 37.5° | 981.4  | 783.8 | 264.1 | 102.6 | 94.8  | 90.7  | 89.1  | 90.3  | 89.9  | 89.9  | 89.7  |
| 40°   | 1066.7 | 828.9 | 209.5 | 95.0  | 87.9  | 83.5  | 82.1  | 82.7  | 81.7  | 81.7  | 82.1  |
| 42.5° | 1172.1 | 886.0 | 161.9 | 87.7  | 80.9  | 76.8  | 76.0  | 75.4  | 73.6  | 72.6  | 72.8  |
| 45°   | 1289.1 | 945.5 | 126.2 | 80.5  | 74.4  | 71.0  | 69.8  | 68.2  | 65.3  | 63.3  | 63.5  |
| 47.5° | 1393.7 | 991.4 | 102.6 | 73.6  | 68.4  | 65.9  | 64.1  | 61.1  | 56.7  | 54.4  | 54.6  |
| 50°   | 1448.6 | 998.3 | 87.3  | 66.7  | 62.9  | 60.3  | 57.7  | 53.2  | 48.0  | 45.4  | 45.2  |
| 52.5° | 1462.7 | 965.8 | 76.0  | 60.3  | 57.3  | 54.4  | 51.0  | 44.8  | 39.1  | 36.3  | 35.9  |
| 55°   | 1467.9 | 916.2 | 65.9  | 54.4  | 51.4  | 48.0  | 43.6  | 36.7  | 31.3  | 28.6  | 28.4  |
| 57.5° | 1450.8 | 842.2 | 57.9  | 49.0  | 45.4  | 41.3  | 35.9  | 29.4  | 24.2  | 22.0  | 22.0  |
| 60°   | 1412.9 | 742.0 | 51.8  | 43.2  | 39.3  | 34.5  | 29.0  | 22.8  | 18.1  | 16.3  | 16.3  |
| 62.5° | 1337.4 | 612.2 | 46.0  | 37.3  | 33.5  | 28.6  | 23.4  | 17.3  | 12.7  | 11.7  | 11.9  |
| 65°   | 1194.7 | 464.4 | 40.3  | 31.9  | 28.6  | 23.6  | 18.3  | 12.3  | 8.5   | 8.5   | 8.9   |
| 67.5° | 974.3  | 322.6 | 34.3  | 27.2  | 24.6  | 19.2  | 13.9  | 8.5   | 6.0   | 6.7   | 7.5   |
| 70°   | 645.0  | 180.9 | 29.4  | 22.4  | 21.0  | 15.3  | 10.3  | 5.8   | 4.8   | 6.3   | 7.7   |
| 72.5° | 243.4  | 70.4  | 24.6  | 18.1  | 18.3  | 11.7  | 7.3   | 4.4   | 4.4   | 6.9   | 9.1   |
| 75°   | 67.8   | 34.5  | 17.7  | 13.3  | 14.3  | 8.5   | 5.4   | 3.8   | 4.2   | 7.9   | 10.7  |
| 77.5° | 39.9   | 25.4  | 11.5  | 7.7   | 9.7   | 6.0   | 3.6   | 3.0   | 3.6   | 6.7   | 10.3  |
| 80°   | 32.1   | 13.5  | 6.7   | 4.0   | 5.4   | 3.4   | 2.4   | 1.8   | 1.0   | 2.6   | 5.4   |
| 82.5° | 32.1   | 8.1   | 3.2   | 2.8   | 2.8   | 1.8   | 1.2   | 0.8   | 0.2   | 0.0   | 1.4   |
| 85°   | 21.6   | 3.4   | 2.0   | 1.8   | 1.4   | 0.6   | 0.4   | 0.2   | 0.0   | 0.0   | 0.0   |
| 87.5° | 3.6    | 1.4   | 0.8   | 0.4   | 0.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

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

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2408-195-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 08/07/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW EDISON  
 Catalog Number: **GALN-SB1A-830-U-5WQ**  
 Description: GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS

### Spectral Parameters

CCT (K): 3050  
 CIE  $u'$ : 0.2476  
 CIE  $v'$ : 0.5251  
 Duv: 0.0034  
 CIE x: 0.4383  
 CIE y: 0.4131  
 CIE z: 0.1487  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 581  
 Purity: 55.55201  
 R<sub>f</sub>: 81.5  
 R<sub>g</sub>: 99.2

CRI (Ra): 81.0  
 R1: 79.6  
 R2: 85.6  
 R3: 92.0  
 R4: 82.6  
 R5: 78.9  
 R6: 81.7  
 R7: 85.2  
 R8: 62.0  
 R9: 7.1  
 R10: 67.0  
 R11: 82.7  
 R12: 63.2  
 R13: 80.3  
 R14: 95.0  
 R15: 71.7



### Test Conditions

Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 24.2

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| 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           |

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**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 3000K 4-step quadrangle

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### Photopic Flux vs. Wavelength



### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 168                                  | NR                             | 620               | 940                                  | NR                             | 750               | 35                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 233                                  | NR                             | 625               | 897                                  | NR                             | 755               | 30                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 300                                  | NR                             | 630               | 847                                  | NR                             | 760               | 26                                   | NR                             | 890               | 1                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 372                                  | NR                             | 635               | 790                                  | NR                             | 765               | 22                                   | NR                             | 895               | 1                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 430                                  | NR                             | 640               | 730                                  | NR                             | 770               | 19                                   | NR                             | 900               | 1                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 483                                  | NR                             | 645               | 668                                  | NR                             | 775               | 16                                   | NR                             | 905               | 1                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 524                                  | NR                             | 650               | 605                                  | NR                             | 780               | 14                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 2                                    | NR                             | 525               | 555                                  | NR                             | 655               | 545                                  | NR                             | 785               | 12                                   | NR                             | 915               | 0                                    | NR                             |
| 400               | 4                                    | NR                             | 530               | 581                                  | NR                             | 660               | 485                                  | NR                             | 790               | 10                                   | NR                             | 920               | 0                                    | NR                             |
| 405               | 7                                    | NR                             | 535               | 604                                  | NR                             | 665               | 430                                  | NR                             | 795               | 9                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 17                                   | NR                             | 540               | 623                                  | NR                             | 670               | 378                                  | NR                             | 800               | 8                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 34                                   | NR                             | 545               | 645                                  | NR                             | 675               | 331                                  | NR                             | 805               | 7                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 68                                   | NR                             | 550               | 667                                  | NR                             | 680               | 290                                  | NR                             | 810               | 6                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 128                                  | NR                             | 555               | 693                                  | NR                             | 685               | 251                                  | NR                             | 815               | 5                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 214                                  | NR                             | 560               | 719                                  | NR                             | 690               | 218                                  | NR                             | 820               | 4                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 339                                  | NR                             | 565               | 754                                  | NR                             | 695               | 188                                  | NR                             | 825               | 4                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 507                                  | NR                             | 570               | 791                                  | NR                             | 700               | 162                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 573                                  | NR                             | 575               | 830                                  | NR                             | 705               | 139                                  | NR                             | 835               | 3                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 356                                  | NR                             | 580               | 873                                  | NR                             | 710               | 119                                  | NR                             | 840               | 3                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 217                                  | NR                             | 585               | 913                                  | NR                             | 715               | 102                                  | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 168                                  | NR                             | 590               | 948                                  | NR                             | 720               | 88                                   | NR                             | 850               | 2                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 113                                  | NR                             | 595               | 974                                  | NR                             | 725               | 76                                   | NR                             | 855               | 2                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 85                                   | NR                             | 600               | 994                                  | NR                             | 730               | 65                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 85                                   | NR                             | 605               | 998                                  | NR                             | 735               | 55                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 94                                   | NR                             | 610               | 994                                  | NR                             | 740               | 47                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 120                                  | NR                             | 615               | 973                                  | NR                             | 745               | 41                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.27

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 168                                  | NR                             | 620               | 940                                  | NR                             | 750               | 35                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 233                                  | NR                             | 625               | 897                                  | NR                             | 755               | 30                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 300                                  | NR                             | 630               | 847                                  | NR                             | 760               | 26                                   | NR                             | 890               | 1                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 372                                  | NR                             | 635               | 790                                  | NR                             | 765               | 22                                   | NR                             | 895               | 1                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 430                                  | NR                             | 640               | 730                                  | NR                             | 770               | 19                                   | NR                             | 900               | 1                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 483                                  | NR                             | 645               | 668                                  | NR                             | 775               | 16                                   | NR                             | 905               | 1                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 524                                  | NR                             | 650               | 605                                  | NR                             | 780               | 14                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 2                                    | NR                             | 525               | 555                                  | NR                             | 655               | 545                                  | NR                             | 785               | 12                                   | NR                             | 915               | 0                                    | NR                             |
| 400               | 4                                    | NR                             | 530               | 581                                  | NR                             | 660               | 485                                  | NR                             | 790               | 10                                   | NR                             | 920               | 0                                    | NR                             |
| 405               | 7                                    | NR                             | 535               | 604                                  | NR                             | 665               | 430                                  | NR                             | 795               | 9                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 17                                   | NR                             | 540               | 623                                  | NR                             | 670               | 378                                  | NR                             | 800               | 8                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 34                                   | NR                             | 545               | 645                                  | NR                             | 675               | 331                                  | NR                             | 805               | 7                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 68                                   | NR                             | 550               | 667                                  | NR                             | 680               | 290                                  | NR                             | 810               | 6                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 128                                  | NR                             | 555               | 693                                  | NR                             | 685               | 251                                  | NR                             | 815               | 5                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 214                                  | NR                             | 560               | 719                                  | NR                             | 690               | 218                                  | NR                             | 820               | 4                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 339                                  | NR                             | 565               | 754                                  | NR                             | 695               | 188                                  | NR                             | 825               | 4                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 507                                  | NR                             | 570               | 791                                  | NR                             | 700               | 162                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 573                                  | NR                             | 575               | 830                                  | NR                             | 705               | 139                                  | NR                             | 835               | 3                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 356                                  | NR                             | 580               | 873                                  | NR                             | 710               | 119                                  | NR                             | 840               | 3                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 217                                  | NR                             | 585               | 913                                  | NR                             | 715               | 102                                  | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 168                                  | NR                             | 590               | 948                                  | NR                             | 720               | 88                                   | NR                             | 850               | 2                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 113                                  | NR                             | 595               | 974                                  | NR                             | 725               | 76                                   | NR                             | 855               | 2                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 85                                   | NR                             | 600               | 994                                  | NR                             | 730               | 65                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 85                                   | NR                             | 605               | 998                                  | NR                             | 735               | 55                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 94                                   | NR                             | 610               | 994                                  | NR                             | 740               | 47                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 120                                  | NR                             | 615               | 973                                  | NR                             | 745               | 41                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

REPORT NUMBER: SP1-2408-195-9

### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.32

| λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 168                         | NR               | 620       | 940                         | NR               | 750       | 35                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 233                         | NR               | 625       | 897                         | NR               | 755       | 30                          | NR               | 885       | 1                           | NR               |
| 370       | 0                           | NR               | 500       | 300                         | NR               | 630       | 847                         | NR               | 760       | 26                          | NR               | 890       | 1                           | NR               |
| 375       | 0                           | NR               | 505       | 372                         | NR               | 635       | 790                         | NR               | 765       | 22                          | NR               | 895       | 1                           | NR               |
| 380       | 0                           | NR               | 510       | 430                         | NR               | 640       | 730                         | NR               | 770       | 19                          | NR               | 900       | 1                           | NR               |
| 385       | 0                           | NR               | 515       | 483                         | NR               | 645       | 668                         | NR               | 775       | 16                          | NR               | 905       | 1                           | NR               |
| 390       | 0                           | NR               | 520       | 524                         | NR               | 650       | 605                         | NR               | 780       | 14                          | NR               | 910       | 0                           | NR               |
| 395       | 2                           | NR               | 525       | 555                         | NR               | 655       | 545                         | NR               | 785       | 12                          | NR               | 915       | 0                           | NR               |
| 400       | 4                           | NR               | 530       | 581                         | NR               | 660       | 485                         | NR               | 790       | 10                          | NR               | 920       | 0                           | NR               |
| 405       | 7                           | NR               | 535       | 604                         | NR               | 665       | 430                         | NR               | 795       | 9                           | NR               | 925       | 0                           | NR               |
| 410       | 17                          | NR               | 540       | 623                         | NR               | 670       | 378                         | NR               | 800       | 8                           | NR               | 930       | 0                           | NR               |
| 415       | 34                          | NR               | 545       | 645                         | NR               | 675       | 331                         | NR               | 805       | 7                           | NR               | 935       | 0                           | NR               |
| 420       | 68                          | NR               | 550       | 667                         | NR               | 680       | 290                         | NR               | 810       | 6                           | NR               | 940       | 0                           | NR               |
| 425       | 128                         | NR               | 555       | 693                         | NR               | 685       | 251                         | NR               | 815       | 5                           | NR               | 945       | 0                           | NR               |
| 430       | 214                         | NR               | 560       | 719                         | NR               | 690       | 218                         | NR               | 820       | 4                           | NR               | 950       | 0                           | NR               |
| 435       | 339                         | NR               | 565       | 754                         | NR               | 695       | 188                         | NR               | 825       | 4                           | NR               | 955       | 0                           | NR               |
| 440       | 507                         | NR               | 570       | 791                         | NR               | 700       | 162                         | NR               | 830       | 3                           | NR               | 960       | 0                           | NR               |
| 445       | 573                         | NR               | 575       | 830                         | NR               | 705       | 139                         | NR               | 835       | 3                           | NR               | 965       | 0                           | NR               |
| 450       | 356                         | NR               | 580       | 873                         | NR               | 710       | 119                         | NR               | 840       | 3                           | NR               | 970       | 0                           | NR               |
| 455       | 217                         | NR               | 585       | 913                         | NR               | 715       | 102                         | NR               | 845       | 2                           | NR               | 975       | 0                           | NR               |
| 460       | 168                         | NR               | 590       | 948                         | NR               | 720       | 88                          | NR               | 850       | 2                           | NR               | 980       | 0                           | NR               |
| 465       | 113                         | NR               | 595       | 974                         | NR               | 725       | 76                          | NR               | 855       | 2                           | NR               | 985       | 0                           | NR               |
| 470       | 85                          | NR               | 600       | 994                         | NR               | 730       | 65                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 85                          | NR               | 605       | 998                         | NR               | 735       | 55                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 94                          | NR               | 610       | 994                         | NR               | 740       | 47                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 120                         | NR               | 615       | 973                         | NR               | 745       | 41                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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TM-30-18

### Summary

$R_f = 81.5$   
 $R_g = 99.2$   
 $CIE R_a = 81.0$   
 $R_g = 7.1$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 51 | CES31 = 71 | CES56 = 78 | CES81 = 78 |
| CES07 = 42 | CES32 = 70 | CES57 = 76 | CES82 = 95 |
| CES08 = 41 | CES33 = 71 | CES58 = 78 | CES83 = 90 |
| CES09 = 29 | CES34 = 82 | CES59 = 92 | CES84 = 94 |
| CES10 = 76 | CES35 = 90 | CES60 = 95 | CES85 = 86 |
| CES11 = 59 | CES36 = 93 | CES61 = 93 | CES86 = 72 |
| CES12 = 65 | CES37 = 87 | CES62 = 83 | CES87 = 85 |
| CES13 = 43 | CES38 = 75 | CES63 = 77 | CES88 = 83 |
| CES14 = 74 | CES39 = 94 | CES64 = 83 | CES89 = 75 |
| CES15 = 71 | CES40 = 89 | CES65 = 77 | CES90 = 81 |
| CES16 = 47 | CES41 = 85 | CES66 = 80 | CES91 = 96 |
| CES17 = 50 | CES42 = 86 | CES67 = 79 | CES92 = 73 |
| CES18 = 56 | CES43 = 81 | CES68 = 84 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 91 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 78 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 76 | CES96 = 84 |
| CES22 = 79 | CES47 = 77 | CES72 = 92 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 71 | CES98 = 81 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 74 |
| CES25 = 72 | CES50 = 89 | CES75 = 74 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)