

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: P322405

Luminaire Tested: **GLEON-SA1C-830-U-T3-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P322405  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-15)  
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-T3-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(1) 80 CRI, 3000K, 1050mA LIGHTSQUARE WITH 16 LEDS AND TYPE III OPTICS  
WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4289 lumens  
Efficiency: N/A  
Efficacy: 72.7 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B1 - U0 - G1

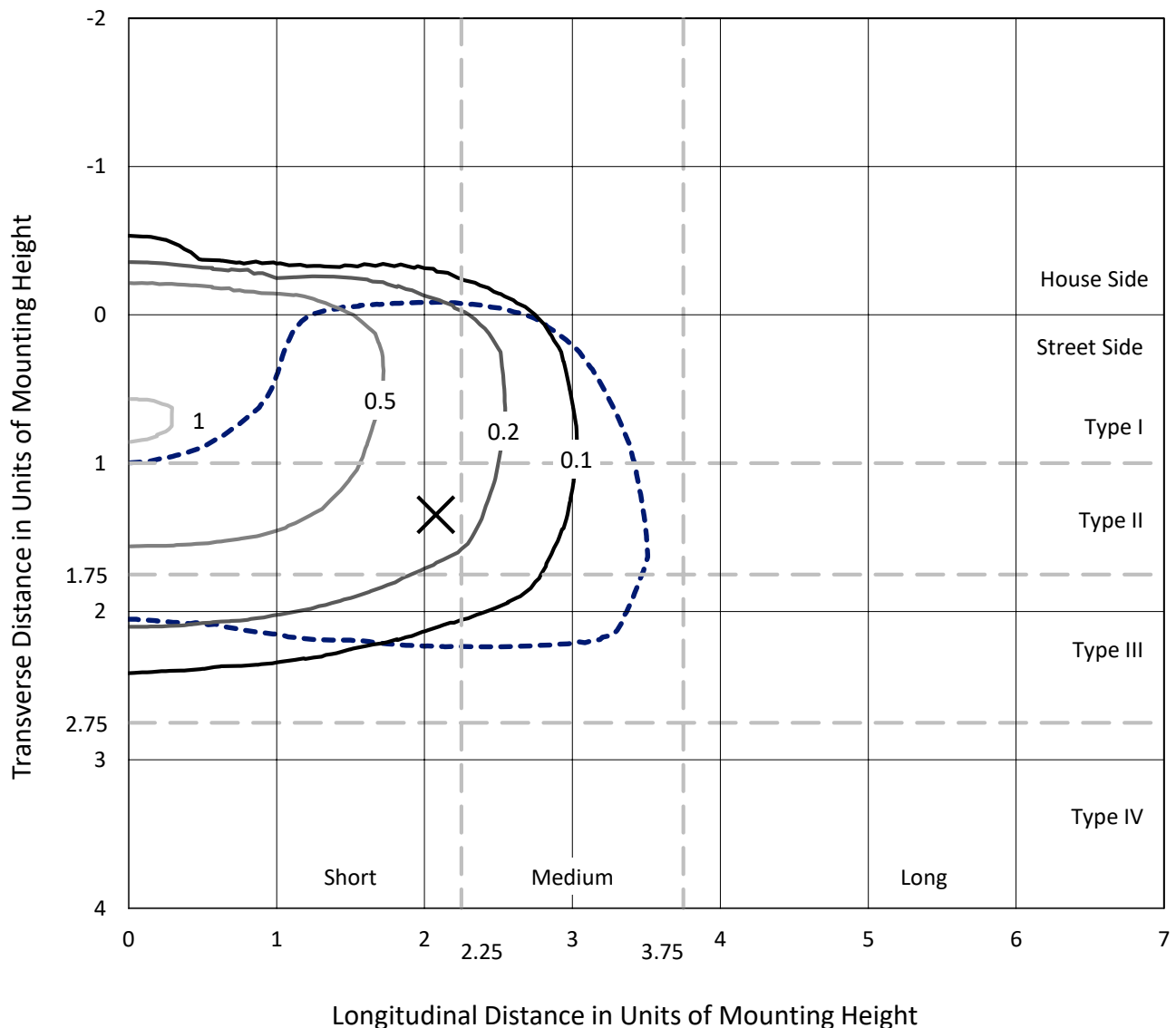
Input Watts (W): 59  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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 CATALOG NUMBER: GLEON-SA1C-830-U-T3-HSS

## Iso-Footcandle Lines of Horizontal Illumination

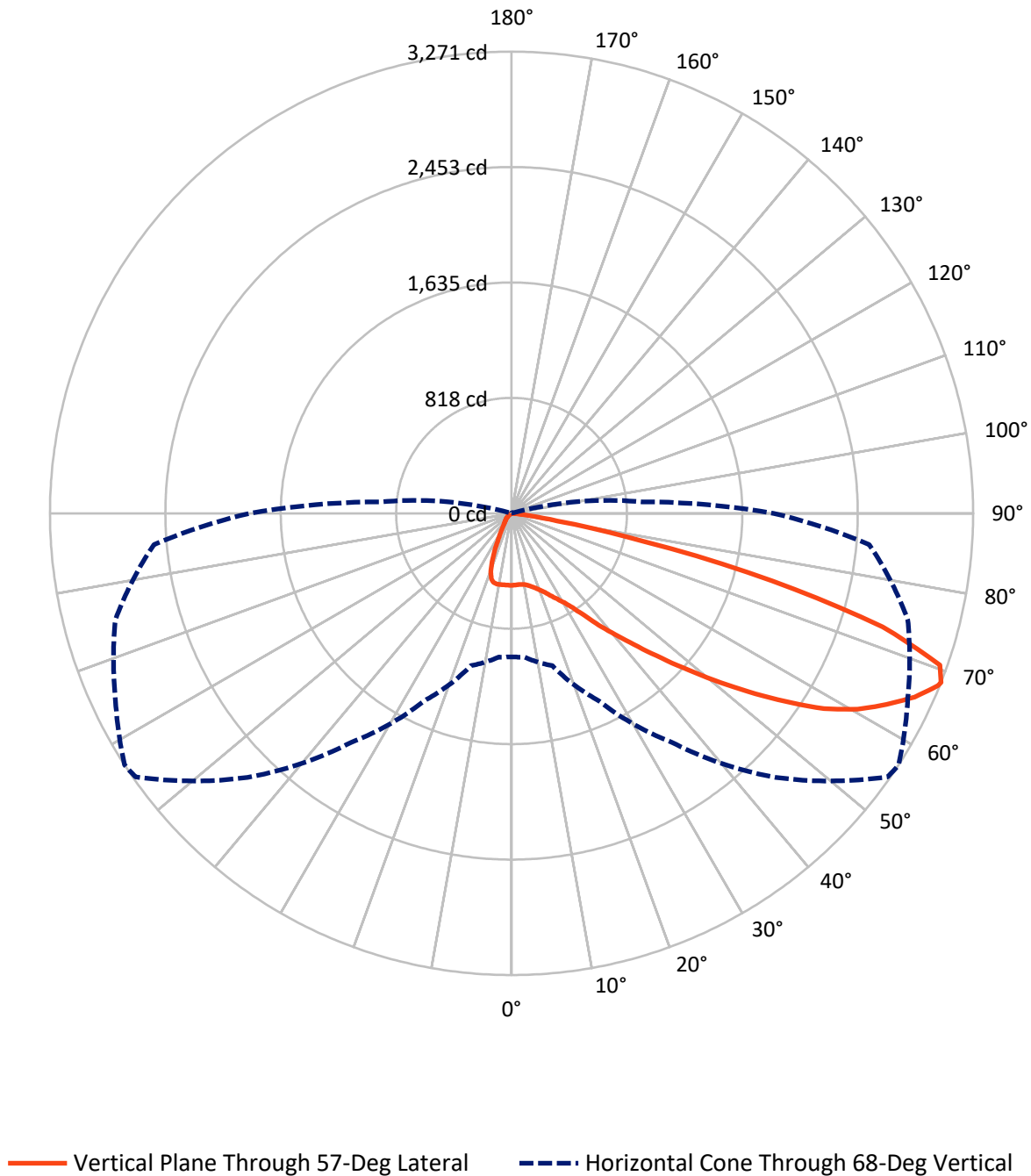
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.1 fc  
 Type III - Short - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA1C-830-U-T3-HSS

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 470.3    | 0.0    | 470.3  |
|                    | % Fixture | 11.0     | 0.0    | 11.0   |
| <b>Street Side</b> | Lumens    | 3818.7   | 0.0    | 3818.7 |
|                    | % Fixture | 89.0     | 0.0    | 89.0   |
| <b>Total</b>       | Lumens    | 4289.0   | 0.0    | 4289.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 47.7   | 1.1       |
| 10°-20°   | 132.2  | 3.1       |
| 20°-30°   | 228.0  | 5.3       |
| 30°-40°   | 393.5  | 9.2       |
| 40°-50°   | 673.1  | 15.7      |
| 50°-60°   | 1076.9 | 25.1      |
| 60°-70°   | 1244.3 | 29.0      |
| 70°-80°   | 475.4  | 11.1      |
| 80°-90°   | 17.8   | 0.4       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 4289.0 | 100.0     |
| 0°-180°   | 4289.0 | 100.0     |

**Coefficient of Utilization**



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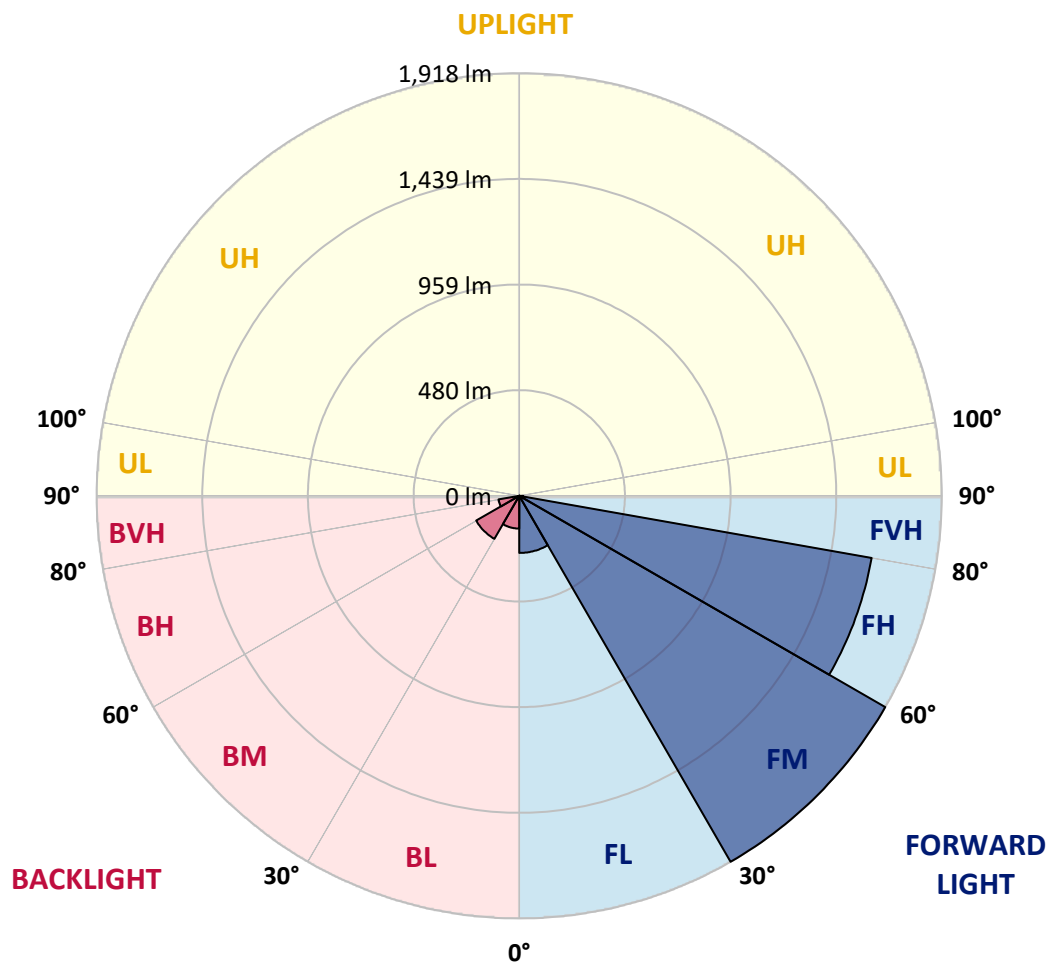
CATALOG NUMBER: GLEON-SA1C-830-U-T3-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 259.2  | 6.0       |                         |      |         |
| FM   | (30°-60°)   | 1918.0 | 44.7      |                         |      |         |
| FH   | (60°-80°)   | 1623.9 | 37.9      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 17.5   | 0.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 148.6  | 3.5       | B1/500                  |      |         |
| BM   | (30°-60°)   | 225.6  | 5.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 95.8   | 2.2       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.3    | 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-G1**

Type III Short





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CATALOG NUMBER: GLEON-SA1C-830-U-T3-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 57°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 509.6  | 509.6  | 509.6  | 509.6  | 509.6  | 509.6  | 509.6  | 509.6  | 509.6  | 509.6  | 509.6  |
| 2.5°  | 497.7  | 499.9  | 501.5  | 502.5  | 503.8  | 506.4  | 507.2  | 508.4  | 509.0  | 509.0  | 510.5  |
| 5°    | 478.0  | 480.4  | 483.9  | 486.7  | 492.4  | 499.7  | 505.0  | 507.0  | 510.7  | 513.9  | 515.7  |
| 7.5°  | 459.8  | 462.6  | 466.7  | 473.3  | 483.1  | 494.8  | 505.8  | 508.6  | 515.7  | 522.6  | 526.1  |
| 10°   | 448.0  | 450.2  | 455.5  | 465.0  | 477.8  | 494.2  | 509.6  | 513.1  | 525.3  | 536.8  | 543.3  |
| 12.5° | 443.9  | 446.0  | 451.4  | 462.2  | 478.0  | 497.3  | 518.6  | 523.6  | 541.5  | 558.3  | 567.4  |
| 15°   | 449.8  | 450.2  | 456.1  | 466.2  | 481.9  | 504.8  | 533.4  | 539.5  | 562.0  | 583.9  | 595.2  |
| 17.5° | 472.5  | 470.7  | 473.7  | 478.2  | 490.6  | 514.7  | 549.0  | 558.1  | 588.1  | 613.9  | 624.6  |
| 20°   | 529.3  | 529.3  | 522.4  | 510.3  | 510.5  | 530.1  | 570.1  | 580.4  | 617.1  | 646.9  | 656.7  |
| 22.5° | 626.5  | 624.6  | 610.8  | 581.0  | 553.7  | 556.7  | 595.8  | 609.2  | 652.0  | 683.9  | 687.1  |
| 25°   | 743.3  | 741.0  | 719.8  | 677.8  | 630.3  | 599.7  | 630.7  | 646.1  | 693.6  | 721.8  | 715.1  |
| 27.5° | 867.0  | 865.2  | 844.1  | 791.9  | 724.4  | 668.2  | 672.3  | 686.9  | 736.0  | 763.8  | 742.5  |
| 30°   | 986.8  | 987.5  | 966.6  | 913.0  | 836.6  | 755.6  | 725.0  | 733.5  | 777.1  | 805.3  | 774.9  |
| 32.5° | 1100.8 | 1101.6 | 1083.6 | 1023.8 | 952.4  | 857.3  | 798.0  | 795.8  | 825.0  | 852.8  | 817.9  |
| 35°   | 1202.4 | 1204.5 | 1192.1 | 1145.6 | 1070.0 | 970.4  | 892.7  | 887.5  | 892.9  | 924.4  | 883.8  |
| 37.5° | 1300.4 | 1301.6 | 1292.3 | 1253.1 | 1189.9 | 1094.7 | 1012.4 | 1004.9 | 993.1  | 1017.3 | 970.8  |
| 40°   | 1407.7 | 1404.6 | 1393.9 | 1358.4 | 1304.0 | 1232.0 | 1141.0 | 1128.0 | 1107.5 | 1129.0 | 1085.2 |
| 42.5° | 1507.4 | 1504.0 | 1505.8 | 1465.7 | 1419.8 | 1373.2 | 1290.8 | 1268.5 | 1256.6 | 1281.3 | 1225.5 |
| 45°   | 1632.2 | 1630.3 | 1636.4 | 1601.5 | 1564.4 | 1530.6 | 1462.6 | 1438.3 | 1433.0 | 1462.0 | 1395.3 |
| 47.5° | 1755.3 | 1759.7 | 1778.6 | 1763.8 | 1748.8 | 1719.0 | 1644.5 | 1633.6 | 1636.8 | 1671.9 | 1574.4 |
| 50°   | 1857.9 | 1863.2 | 1914.9 | 1931.9 | 1953.6 | 1936.2 | 1861.5 | 1854.8 | 1867.6 | 1899.3 | 1767.0 |
| 52.5° | 1932.1 | 1942.9 | 2007.2 | 2085.6 | 2164.7 | 2176.5 | 2102.1 | 2096.0 | 2113.2 | 2118.1 | 1915.9 |
| 55°   | 1983.6 | 1993.2 | 2066.0 | 2209.5 | 2370.6 | 2421.3 | 2375.0 | 2351.5 | 2348.3 | 2300.2 | 2072.5 |
| 57.5° | 1992.8 | 1991.7 | 2096.4 | 2289.7 | 2532.0 | 2662.8 | 2633.6 | 2610.5 | 2544.0 | 2468.5 | 2251.9 |
| 60°   | 1941.2 | 1947.1 | 2068.6 | 2317.4 | 2633.4 | 2845.5 | 2847.8 | 2817.8 | 2714.1 | 2632.2 | 2425.9 |
| 62.5° | 1782.6 | 1806.6 | 1929.3 | 2244.6 | 2632.2 | 2919.2 | 3004.7 | 2981.8 | 2857.9 | 2766.2 | 2602.4 |
| 65°   | 1525.5 | 1534.0 | 1651.0 | 1995.2 | 2454.3 | 2888.3 | 3146.1 | 3137.6 | 2987.5 | 2896.4 | 2693.0 |
| 67.5° | 1114.0 | 1095.5 | 1218.4 | 1571.1 | 2077.9 | 2708.6 | 3247.5 | 3258.2 | 3087.5 | 2923.2 | 2596.5 |
| 68°   | 1016.7 | 1022.1 | 1117.9 | 1466.3 | 1979.4 | 2645.2 | 3254.2 | 3270.6 | 3097.4 | 2905.8 | 2543.8 |
| 70°   | 606.0  | 616.5  | 701.9  | 1009.6 | 1505.8 | 2286.0 | 3182.0 | 3219.5 | 3038.2 | 2725.9 | 2200.2 |
| 72.5° | 154.7  | 167.3  | 248.0  | 451.8  | 860.1  | 1610.7 | 2686.1 | 2749.6 | 2637.9 | 2211.4 | 1485.3 |
| 75°   | 63.7   | 66.9   | 88.6   | 148.9  | 320.4  | 725.6  | 1770.5 | 1906.4 | 1828.7 | 1323.9 | 671.3  |
| 77.5° | 44.0   | 46.2   | 57.0   | 82.5   | 138.7  | 246.0  | 868.0  | 966.2  | 870.4  | 451.8  | 146.4  |
| 80°   | 31.6   | 33.5   | 40.8   | 55.0   | 79.7   | 87.8   | 282.9  | 327.1  | 259.8  | 99.2   | 36.3   |
| 82.5° | 18.9   | 20.3   | 30.4   | 39.1   | 48.5   | 42.0   | 70.4   | 79.9   | 75.2   | 49.3   | 16.2   |
| 85°   | 9.3    | 11.0   | 20.5   | 28.0   | 26.2   | 17.6   | 21.5   | 23.9   | 29.6   | 30.0   | 8.7    |
| 87.5° | 0.6    | 1.2    | 12.0   | 16.8   | 7.3    | 4.1    | 6.3    | 7.7    | 10.5   | 14.8   | 3.7    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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CATALOG NUMBER: GLEON-SA1C-830-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 509.6  | 509.6  | 509.6 | 509.6 | 509.6 | 509.6 | 509.6 | 509.6 | 509.6 | 509.6 | 509.6 |
| 2.5°  | 511.1  | 511.3  | 509.8 | 509.2 | 509.6 | 507.2 | 506.2 | 506.6 | 506.6 | 507.2 | 506.2 |
| 5°    | 516.1  | 516.1  | 513.7 | 510.5 | 508.6 | 504.0 | 500.9 | 500.1 | 499.5 | 499.1 | 498.3 |
| 7.5°  | 527.1  | 525.9  | 521.6 | 514.5 | 508.4 | 498.3 | 490.6 | 486.5 | 484.5 | 483.7 | 483.1 |
| 10°   | 544.7  | 542.5  | 535.4 | 522.2 | 508.2 | 490.2 | 473.3 | 461.4 | 451.4 | 447.4 | 445.0 |
| 12.5° | 568.5  | 565.2  | 553.2 | 531.3 | 506.8 | 473.5 | 437.0 | 402.0 | 369.3 | 355.9 | 349.2 |
| 15°   | 595.8  | 591.2  | 572.3 | 539.1 | 498.5 | 436.0 | 356.7 | 295.3 | 250.1 | 233.0 | 225.7 |
| 17.5° | 623.6  | 617.5  | 588.9 | 543.9 | 473.5 | 358.4 | 250.3 | 189.0 | 158.8 | 150.7 | 147.8 |
| 20°   | 651.6  | 642.7  | 603.3 | 540.3 | 417.2 | 258.4 | 165.1 | 138.1 | 129.4 | 127.0 | 126.1 |
| 22.5° | 678.2  | 664.4  | 616.3 | 526.1 | 330.4 | 173.4 | 130.6 | 122.1 | 119.2 | 117.8 | 117.4 |
| 25°   | 701.3  | 682.0  | 627.7 | 482.3 | 233.8 | 131.0 | 117.6 | 114.8 | 111.1 | 108.5 | 108.7 |
| 27.5° | 723.0  | 699.7  | 634.6 | 410.1 | 156.0 | 111.9 | 108.9 | 105.1 | 98.4  | 94.5  | 94.5  |
| 30°   | 749.2  | 723.2  | 639.6 | 315.6 | 114.8 | 99.0  | 96.5  | 90.7  | 81.5  | 76.5  | 76.5  |
| 32.5° | 788.5  | 758.9  | 636.4 | 221.5 | 95.1  | 87.0  | 81.3  | 73.2  | 63.3  | 58.4  | 58.2  |
| 35°   | 848.7  | 814.1  | 613.3 | 145.2 | 84.0  | 75.6  | 66.5  | 56.6  | 47.9  | 43.8  | 43.6  |
| 37.5° | 929.9  | 887.9  | 561.4 | 103.8 | 75.2  | 65.1  | 54.1  | 43.2  | 36.7  | 34.1  | 33.9  |
| 40°   | 1035.1 | 973.7  | 487.1 | 84.2  | 67.1  | 55.0  | 41.8  | 33.5  | 29.0  | 27.0  | 27.2  |
| 42.5° | 1161.5 | 1065.5 | 398.1 | 72.6  | 59.2  | 45.2  | 32.7  | 26.4  | 23.5  | 22.1  | 21.7  |
| 45°   | 1301.8 | 1156.2 | 304.8 | 64.7  | 51.3  | 36.5  | 25.6  | 20.9  | 18.7  | 17.8  | 17.8  |
| 47.5° | 1456.1 | 1244.4 | 223.1 | 57.8  | 42.8  | 28.2  | 20.5  | 17.0  | 15.2  | 14.6  | 14.4  |
| 50°   | 1596.3 | 1305.7 | 160.8 | 50.5  | 35.1  | 22.3  | 16.6  | 14.2  | 13.0  | 12.2  | 12.2  |
| 52.5° | 1713.1 | 1324.9 | 118.4 | 42.6  | 28.4  | 17.8  | 13.8  | 12.2  | 11.0  | 10.3  | 10.3  |
| 55°   | 1815.9 | 1317.0 | 88.0  | 35.1  | 22.9  | 14.6  | 11.8  | 10.3  | 9.3   | 8.7   | 8.7   |
| 57.5° | 1914.5 | 1291.5 | 65.7  | 28.6  | 18.5  | 11.8  | 9.9   | 8.7   | 7.7   | 7.3   | 7.3   |
| 60°   | 1995.0 | 1248.9 | 48.9  | 23.1  | 14.8  | 9.5   | 8.3   | 7.1   | 6.3   | 5.7   | 5.7   |
| 62.5° | 2060.3 | 1201.8 | 35.9  | 19.1  | 11.8  | 7.5   | 6.5   | 5.9   | 4.7   | 4.1   | 4.1   |
| 65°   | 2060.7 | 1123.7 | 27.0  | 15.8  | 9.1   | 5.9   | 4.9   | 4.7   | 3.0   | 2.4   | 2.2   |
| 67.5° | 1911.6 | 968.8  | 20.7  | 13.6  | 7.1   | 4.5   | 3.7   | 3.9   | 1.6   | 1.0   | 0.8   |
| 68°   | 1857.5 | 929.5  | 19.5  | 13.4  | 6.7   | 4.3   | 3.4   | 3.9   | 1.4   | 0.8   | 0.6   |
| 70°   | 1566.1 | 739.4  | 15.6  | 13.0  | 5.9   | 3.2   | 2.8   | 3.9   | 1.2   | 0.6   | 0.4   |
| 72.5° | 1001.6 | 429.1  | 11.6  | 10.3  | 4.5   | 2.4   | 1.8   | 3.4   | 1.2   | 0.4   | 0.2   |
| 75°   | 426.3  | 133.0  | 7.9   | 7.3   | 2.6   | 1.8   | 1.2   | 2.2   | 0.8   | 0.2   | 0.0   |
| 77.5° | 89.8   | 30.0   | 4.7   | 4.5   | 1.8   | 1.2   | 0.8   | 0.6   | 0.2   | 0.0   | 0.0   |
| 80°   | 23.1   | 8.7    | 2.4   | 2.2   | 1.0   | 0.6   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 7.3    | 3.4    | 1.4   | 1.0   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 3.7    | 2.0    | 0.8   | 0.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 2.0    | 0.6    | 0.2   | 0.0   | 0.0   | 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

| 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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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.27

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (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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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: NR**
**M/P: 2.32**

| $\lambda$<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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TM-30-18

### Summary

$R_f = 81.5$   
 $R_g = 99.2$   
 $CIE R_a = 81.0$   
 $R_9 = 7.1$



### 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)