

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



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

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P318192

Luminaire Tested: **GLEON-SA8A-827-U-T2**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P318192  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-12)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA8A-827-U-T2  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(8) 80 CRI, 2700K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 26943 lumens  
Efficiency: N/A  
Efficacy: 104.8 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G4

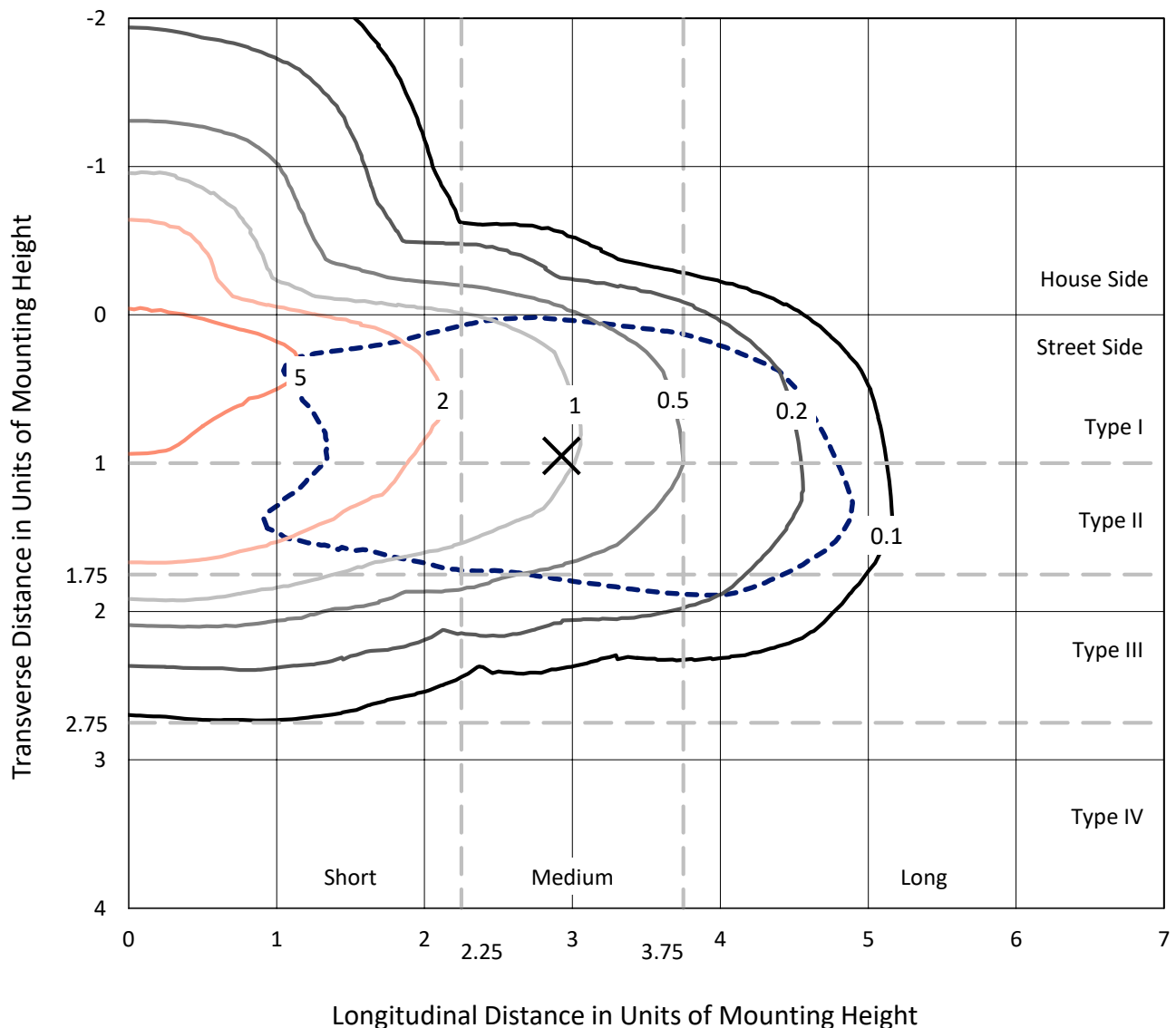
Input Watts (W): 257  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

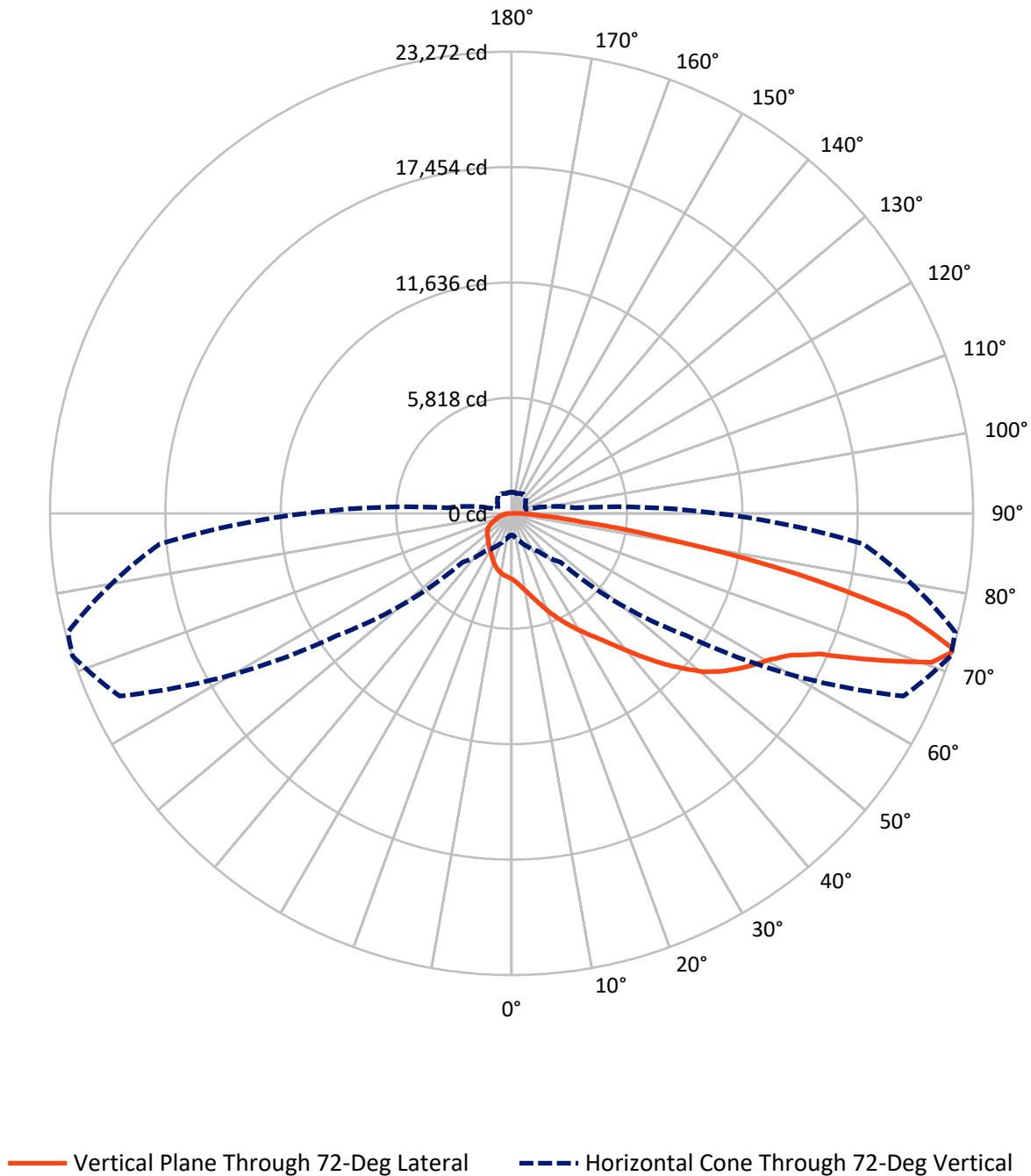
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 7.3 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4998.1   | 0.0    | 4998.1  |
|                    | % Fixture | 18.6     | 0.0    | 18.6    |
| <b>Street Side</b> | Lumens    | 21944.9  | 0.0    | 21944.9 |
|                    | % Fixture | 81.4     | 0.0    | 81.4    |
| <b>Total</b>       | Lumens    | 26943.0  | 0.0    | 26943.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 332.1   | 1.2       |
| 10°-20°   | 1073.3  | 4.0       |
| 20°-30°   | 1880.8  | 7.0       |
| 30°-40°   | 2788.6  | 10.4      |
| 40°-50°   | 4078.6  | 15.1      |
| 50°-60°   | 5612.1  | 20.8      |
| 60°-70°   | 6248.0  | 23.2      |
| 70°-80°   | 4233.6  | 15.7      |
| 80°-90°   | 695.8   | 2.6       |
| 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°    | 26943.0 | 100.0     |
| 0°-180°   | 26943.0 | 100.0     |

**Coefficient of Utilization**



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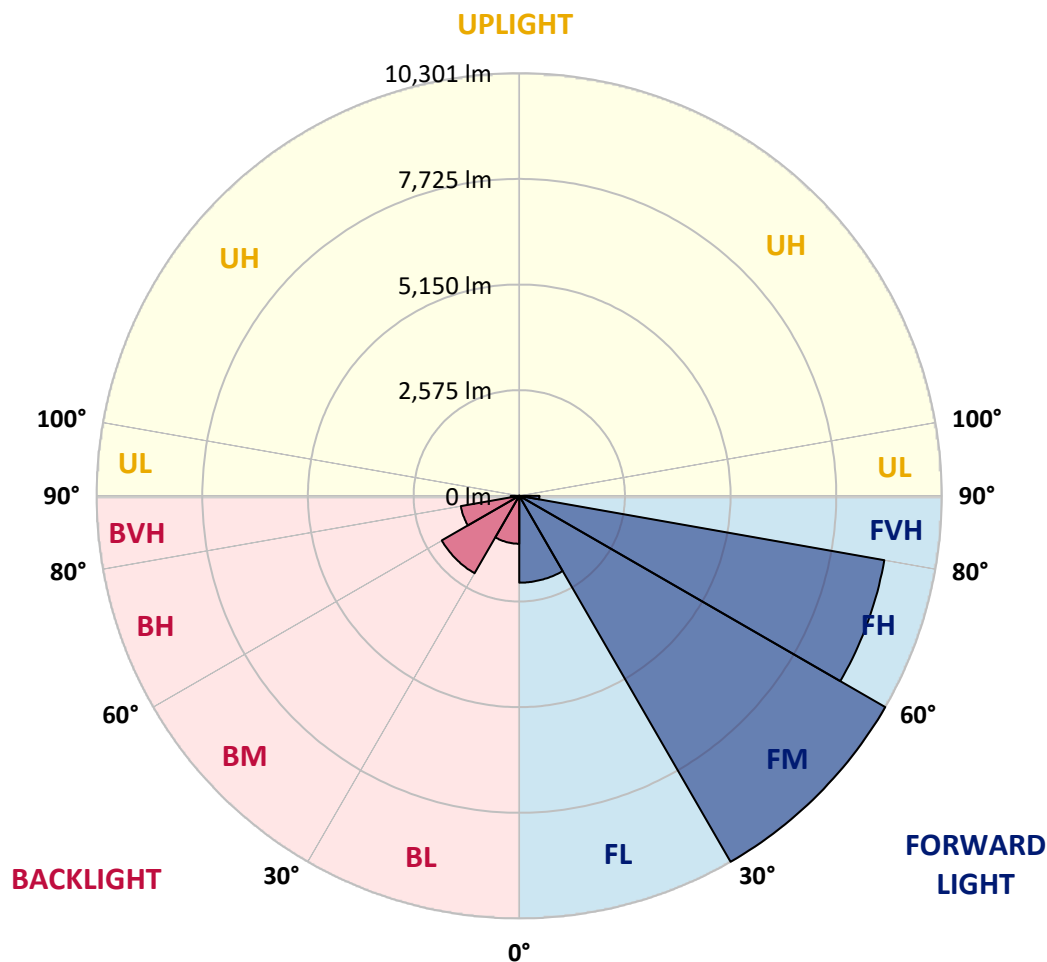
CATALOG NUMBER: GLEON-SA8A-827-U-T2

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2117.9  | 7.9       |                         |      |          |
| FM   | (30°-60°)   | 10300.6 | 38.2      |                         |      |          |
| FH   | (60°-80°)   | 9035.5  | 33.5      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 490.8   | 1.8       |                         |      | G3/500   |
| BL   | (0°-30°)    | 1168.4  | 4.3       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 2178.7  | 8.1       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1446.0  | 5.4       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 205.0   | 0.8       |                         |      | G2/225   |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B3-U0-G4**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 72°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3314.7  | 3314.7  | 3314.7  | 3314.7  | 3314.7  | 3314.7  | 3314.7  | 3314.7  | 3314.7  | 3314.7  | 3314.7  |
| 2.5°  | 3661.7  | 3656.1  | 3636.6  | 3636.6  | 3599.5  | 3568.0  | 3508.6  | 3468.7  | 3421.4  | 3404.7  | 3349.0  |
| 5°    | 4016.0  | 4017.9  | 3993.8  | 3977.1  | 3922.3  | 3855.5  | 3754.4  | 3662.6  | 3570.7  | 3533.6  | 3419.5  |
| 7.5°  | 4313.8  | 4310.1  | 4303.6  | 4289.7  | 4238.7  | 4170.0  | 4033.7  | 3897.3  | 3761.8  | 3706.2  | 3509.5  |
| 10°   | 4504.9  | 4513.3  | 4518.9  | 4525.3  | 4504.0  | 4454.8  | 4325.9  | 4159.8  | 3982.6  | 3906.6  | 3617.1  |
| 12.5° | 4601.4  | 4616.3  | 4642.2  | 4686.8  | 4722.0  | 4716.5  | 4622.8  | 4446.5  | 4235.9  | 4140.3  | 3751.6  |
| 15°   | 4658.0  | 4677.5  | 4718.3  | 4798.1  | 4897.4  | 4953.9  | 4928.9  | 4769.3  | 4534.6  | 4416.8  | 3915.8  |
| 17.5° | 4693.3  | 4709.0  | 4772.1  | 4878.8  | 5026.3  | 5176.6  | 5242.5  | 5108.9  | 4872.3  | 4737.8  | 4104.2  |
| 20°   | 4717.4  | 4729.4  | 4808.3  | 4933.5  | 5124.6  | 5364.0  | 5547.7  | 5514.3  | 5244.3  | 5069.9  | 4300.8  |
| 22.5° | 4771.2  | 4781.4  | 4856.5  | 4982.7  | 5194.2  | 5503.1  | 5841.8  | 5891.9  | 5636.7  | 5439.1  | 4511.4  |
| 25°   | 4921.5  | 4921.5  | 4984.6  | 5072.7  | 5271.2  | 5623.8  | 6090.4  | 6312.1  | 6037.5  | 5807.4  | 4706.3  |
| 27.5° | 5208.1  | 5205.4  | 5228.5  | 5259.2  | 5409.5  | 5746.2  | 6312.1  | 6683.2  | 6453.1  | 6201.7  | 4895.5  |
| 30°   | 5547.7  | 5566.2  | 5569.0  | 5554.2  | 5624.7  | 5899.3  | 6517.1  | 7074.7  | 6871.5  | 6600.6  | 5089.4  |
| 32.5° | 5984.6  | 5996.7  | 5982.8  | 5933.6  | 5923.4  | 6116.4  | 6718.4  | 7484.7  | 7324.2  | 7017.2  | 5266.6  |
| 35°   | 6539.4  | 6516.2  | 6472.6  | 6372.4  | 6276.9  | 6406.7  | 6948.5  | 7894.8  | 7832.6  | 7520.9  | 5510.6  |
| 37.5° | 7134.1  | 7135.0  | 7081.2  | 6853.9  | 6722.2  | 6777.8  | 7265.8  | 8359.6  | 8447.7  | 8120.2  | 5823.2  |
| 40°   | 7610.9  | 7635.9  | 7669.3  | 7370.6  | 7199.9  | 7276.9  | 7669.3  | 8898.6  | 9175.0  | 8830.8  | 6230.5  |
| 42.5° | 7943.9  | 7972.7  | 8067.3  | 7879.9  | 7702.7  | 7845.6  | 8144.3  | 9473.7  | 9991.4  | 9650.9  | 6707.3  |
| 45°   | 8296.5  | 8312.2  | 8379.0  | 8298.3  | 8185.1  | 8507.1  | 8679.6  | 10069.3 | 10855.1 | 10524.8 | 7240.7  |
| 47.5° | 8667.6  | 8684.3  | 8752.9  | 8699.1  | 8639.7  | 9124.9  | 9238.1  | 10630.6 | 11682.6 | 11485.0 | 7810.4  |
| 50°   | 9125.8  | 9137.0  | 9201.9  | 9104.5  | 9123.1  | 9590.6  | 9737.2  | 11145.5 | 12550.0 | 12347.8 | 8381.8  |
| 52.5° | 9751.1  | 9753.9  | 9843.9  | 9755.8  | 9668.5  | 9932.0  | 10166.7 | 11630.6 | 13230.0 | 13134.5 | 8953.3  |
| 55°   | 10240.9 | 10270.6 | 10565.6 | 10547.1 | 10497.0 | 10241.9 | 10525.7 | 12092.6 | 13836.7 | 13882.2 | 9560.0  |
| 57.5° | 9928.3  | 10044.3 | 10641.7 | 11062.9 | 11472.9 | 11012.8 | 11010.9 | 12613.1 | 14400.8 | 14616.0 | 10227.0 |
| 60°   | 8695.4  | 8853.1  | 9733.5  | 10667.7 | 11950.7 | 12354.3 | 12018.4 | 13248.6 | 14970.4 | 15343.3 | 11062.9 |
| 62.5° | 6210.1  | 6469.8  | 7662.8  | 9154.6  | 11295.7 | 13243.0 | 14068.7 | 14257.0 | 15745.0 | 16185.7 | 12149.2 |
| 65°   | 3139.4  | 3336.0  | 4336.1  | 6133.1  | 9024.7  | 12662.3 | 16297.0 | 16464.9 | 17091.1 | 17482.6 | 13821.9 |
| 67.5° | 1907.4  | 1981.6  | 2469.6  | 3411.2  | 5532.8  | 9863.4  | 17024.3 | 20145.1 | 19696.1 | 19903.9 | 16207.0 |
| 70°   | 1405.5  | 1460.2  | 1764.5  | 2265.5  | 3182.0  | 5788.0  | 14792.3 | 22771.5 | 22476.4 | 22453.3 | 17969.7 |
| 72°   | 1094.7  | 1134.6  | 1403.6  | 1830.4  | 2326.7  | 3472.4  | 10721.5 | 21802.0 | 23272.4 | 23155.5 | 17808.2 |
| 72.5° | 1038.1  | 1073.4  | 1318.3  | 1722.7  | 2198.7  | 3147.7  | 9639.8  | 21148.0 | 23214.9 | 23162.0 | 17599.5 |
| 75°   | 817.3   | 842.4   | 975.9   | 1332.2  | 1720.9  | 1785.8  | 5282.4  | 16388.8 | 20594.1 | 21450.4 | 15829.4 |
| 77.5° | 676.3   | 680.0   | 750.5   | 969.5   | 1341.5  | 1262.6  | 2594.8  | 11370.9 | 14746.8 | 15688.4 | 11213.2 |
| 80°   | 551.1   | 555.7   | 589.1   | 680.0   | 1014.9  | 934.2   | 1232.0  | 6538.5  | 8256.6  | 8266.8  | 5332.5  |
| 82.5° | 438.8   | 439.7   | 476.8   | 497.3   | 729.2   | 667.9   | 706.0   | 3069.8  | 3607.8  | 3470.5  | 1916.6  |
| 85°   | 308.9   | 302.4   | 465.7   | 408.2   | 476.8   | 428.6   | 389.6   | 1215.3  | 1491.8  | 1426.8  | 600.2   |
| 87.5° | 103.0   | 106.7   | 206.9   | 264.4   | 278.3   | 243.1   | 173.5   | 465.7   | 563.1   | 558.5   | 190.2   |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |

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CATALOG NUMBER: GLEON-SA8A-827-U-T2

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3314.7  | 3314.7 | 3314.7 | 3314.7 | 3314.7 | 3314.7 | 3314.7 | 3314.7 | 3314.7 | 3314.7 | 3314.7 |
| 2.5°  | 3331.4  | 3301.7 | 3258.1 | 3209.9 | 3171.8 | 3132.9 | 3104.1 | 3089.3 | 3072.6 | 3058.6 | 3075.3 |
| 5°    | 3366.6  | 3311.0 | 3218.2 | 3127.3 | 3060.5 | 3001.1 | 2958.5 | 2936.2 | 2915.8 | 2901.9 | 2903.7 |
| 7.5°  | 3424.2  | 3334.2 | 3178.3 | 3045.7 | 2952.9 | 2888.9 | 2845.3 | 2830.4 | 2817.4 | 2813.7 | 2818.4 |
| 10°   | 3485.4  | 3352.7 | 3125.4 | 2949.2 | 2843.4 | 2790.5 | 2771.1 | 2781.3 | 2790.5 | 2798.9 | 2808.2 |
| 12.5° | 3555.0  | 3369.4 | 3048.4 | 2836.0 | 2746.0 | 2725.6 | 2745.1 | 2789.6 | 2822.1 | 2841.6 | 2853.6 |
| 15°   | 3645.9  | 3384.3 | 2959.4 | 2722.8 | 2662.5 | 2685.7 | 2751.6 | 2828.6 | 2885.2 | 2921.3 | 2926.9 |
| 17.5° | 3729.4  | 3383.3 | 2845.3 | 2608.7 | 2594.8 | 2662.5 | 2761.8 | 2870.3 | 2946.4 | 2997.4 | 3007.6 |
| 20°   | 3815.7  | 3358.3 | 2712.6 | 2497.4 | 2526.1 | 2637.5 | 2766.4 | 2897.2 | 2989.1 | 3048.4 | 3062.4 |
| 22.5° | 3896.4  | 3314.7 | 2567.0 | 2396.3 | 2468.6 | 2604.1 | 2748.8 | 2881.5 | 2973.3 | 3021.5 | 3036.4 |
| 25°   | 3951.1  | 3238.6 | 2419.5 | 2310.9 | 2417.6 | 2563.3 | 2691.3 | 2798.0 | 2866.6 | 2890.7 | 2894.4 |
| 27.5° | 3978.9  | 3139.4 | 2280.3 | 2236.7 | 2364.7 | 2496.5 | 2584.6 | 2637.5 | 2656.9 | 2655.1 | 2651.4 |
| 30°   | 3982.6  | 3008.5 | 2160.6 | 2176.4 | 2303.5 | 2398.1 | 2439.9 | 2429.7 | 2404.6 | 2361.9 | 2365.6 |
| 32.5° | 3970.6  | 2861.0 | 2060.4 | 2118.9 | 2225.6 | 2278.4 | 2280.3 | 2231.1 | 2164.3 | 2096.6 | 2078.1 |
| 35°   | 3974.3  | 2716.3 | 1972.3 | 2053.9 | 2130.9 | 2154.1 | 2132.8 | 2060.4 | 1969.5 | 1882.3 | 1863.8 |
| 37.5° | 4015.1  | 2590.2 | 1896.2 | 1978.8 | 2026.1 | 2031.7 | 2001.1 | 1925.0 | 1858.2 | 1772.8 | 1765.4 |
| 40°   | 4112.5  | 2500.2 | 1823.9 | 1894.4 | 1921.3 | 1924.1 | 1880.5 | 1826.7 | 1832.2 | 1786.8 | 1785.8 |
| 42.5° | 4287.9  | 2461.2 | 1759.9 | 1806.2 | 1822.9 | 1828.5 | 1795.1 | 1760.8 | 1809.0 | 1779.3 | 1769.1 |
| 45°   | 4514.2  | 2470.5 | 1706.1 | 1720.0 | 1750.6 | 1776.6 | 1756.1 | 1714.4 | 1733.0 | 1604.0 | 1561.3 |
| 47.5° | 4775.8  | 2529.9 | 1663.4 | 1645.7 | 1698.6 | 1747.8 | 1716.3 | 1653.2 | 1587.3 | 1459.3 | 1435.2 |
| 50°   | 5082.0  | 2621.7 | 1624.4 | 1572.5 | 1642.0 | 1708.8 | 1677.3 | 1587.3 | 1488.0 | 1425.9 | 1417.5 |
| 52.5° | 5401.1  | 2733.9 | 1585.4 | 1491.8 | 1570.6 | 1679.1 | 1663.4 | 1572.5 | 1450.0 | 1388.8 | 1377.6 |
| 55°   | 5762.9  | 2847.1 | 1536.3 | 1398.1 | 1493.6 | 1665.2 | 1656.9 | 1518.7 | 1421.2 | 1386.9 | 1378.6 |
| 57.5° | 6212.8  | 2976.1 | 1471.3 | 1300.6 | 1421.2 | 1615.1 | 1589.2 | 1486.2 | 1391.6 | 1365.6 | 1362.8 |
| 60°   | 6799.2  | 3166.3 | 1377.6 | 1196.7 | 1333.1 | 1538.1 | 1532.6 | 1438.9 | 1344.2 | 1325.7 | 1322.0 |
| 62.5° | 7678.6  | 3480.8 | 1248.7 | 1092.8 | 1234.8 | 1407.3 | 1458.4 | 1374.9 | 1294.1 | 1293.2 | 1295.1 |
| 65°   | 9042.3  | 3953.9 | 1108.6 | 1001.9 | 1135.5 | 1296.9 | 1372.1 | 1309.0 | 1243.1 | 1261.7 | 1264.5 |
| 67.5° | 10623.2 | 4346.3 | 971.3  | 912.9  | 1034.4 | 1192.1 | 1294.1 | 1243.1 | 1175.4 | 1223.6 | 1224.6 |
| 70°   | 11149.2 | 3995.6 | 850.7  | 824.7  | 929.6  | 1091.0 | 1209.7 | 1170.8 | 1102.1 | 1150.4 | 1145.7 |
| 72°   | 10375.5 | 3225.6 | 772.8  | 757.9  | 850.7  | 1007.5 | 1134.6 | 1103.0 | 1035.3 | 1067.8 | 1055.7 |
| 72.5° | 10131.5 | 3075.3 | 753.3  | 741.2  | 829.4  | 986.2  | 1115.1 | 1086.3 | 1018.6 | 1046.5 | 1035.3 |
| 75°   | 9037.7  | 2670.9 | 647.5  | 650.3  | 723.6  | 882.2  | 1005.6 | 996.4  | 926.8  | 929.6  | 925.9  |
| 77.5° | 6555.2  | 1958.4 | 545.5  | 564.0  | 616.0  | 775.6  | 895.2  | 889.7  | 813.6  | 799.7  | 796.9  |
| 80°   | 3041.9  | 999.1  | 444.4  | 452.7  | 506.5  | 648.5  | 763.5  | 756.1  | 694.9  | 677.2  | 667.0  |
| 82.5° | 1041.8  | 475.0  | 334.0  | 339.5  | 392.4  | 522.3  | 662.4  | 657.7  | 606.7  | 572.4  | 551.1  |
| 85°   | 372.0   | 236.6  | 233.8  | 228.2  | 280.2  | 411.0  | 577.0  | 552.0  | 476.8  | 406.3  | 404.5  |
| 87.5° | 120.6   | 101.1  | 120.6  | 119.7  | 163.3  | 278.3  | 419.3  | 357.2  | 346.0  | 287.6  | 282.0  |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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

Report Prepared for

Cooper Lighting Solutions

Invue

Report Number: SP1-2407-157-9

Test Date: 10/03/2024

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

Data applicable to all product families utilizing light square engine

### Test Information

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

### Spectral Parameters

CCT (K): 2764  
 CIE  $u'$ : 0.2591  
 CIE  $v'$ : 0.5290  
 Duv: 0.0020  
 CIE x: 0.4581  
 CIE y: 0.4156  
 CIE z: 0.1263  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 583  
 Purity: 62.2537  
 R<sub>f</sub>: 84.7  
 R<sub>g</sub>: 94.6

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



### Test Conditions

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

REPORT NUMBER: SP1-2407-157-9

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

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**CIE 1931 Chromaticity Diagram**



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



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### Photopic Flux vs. Wavelength



**Photopic Lumens: 4337.9**

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

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 5286.7

S/P: 1.22

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

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 9797**

**M/P: 2.26**

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

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TM-30-18

### Summary

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



### Color Vector Graphics



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

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



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)