

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: P1438360

Luminaire Tested: **GALN-SB9D-835-U-T4LG-HSS**

Issue Date: 03/27/202

This test was performed under the Supervised Manufacturer's Testing Program. The results of this test have not been influenced by sources from within Cooper Lighting Solutions or from external interests.

Report Generated By 670245763



**Test Information**

Test Method: LM-79-08  
 Report Number: P1438360  
 Test Lab: INNOVATION CENTER(G1)  
 Issue Date: 03/27/202  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: McGRAW-EDISON  
 Catalog Number: GALN-SB9D-835-U-T4LG-HSS  
 Description: GALLEON II AREA AND ROADWAY HIGH DENSITY LUMINAIRE 900mA 9xLight  
 Square PACKAGE 80CRI 3500K FIXTURE w/ TYPE IV LOW GLARE WITH HOUSE SIDE  
 SHIELD  
 Light Source: (234) 3500K CCT, 80 CRI LEDS  
 Ballast/Driver: ELECTRONIC DRIVER  
 Luminaire Equipment:

| <u>Sample No.</u> | <u>Condition</u> | <u>Description</u> |
|-------------------|------------------|--------------------|
| a                 | good             | reflector          |
| b                 | good             | lens               |
| c                 | good             | housing            |
| d                 | good             | cord               |

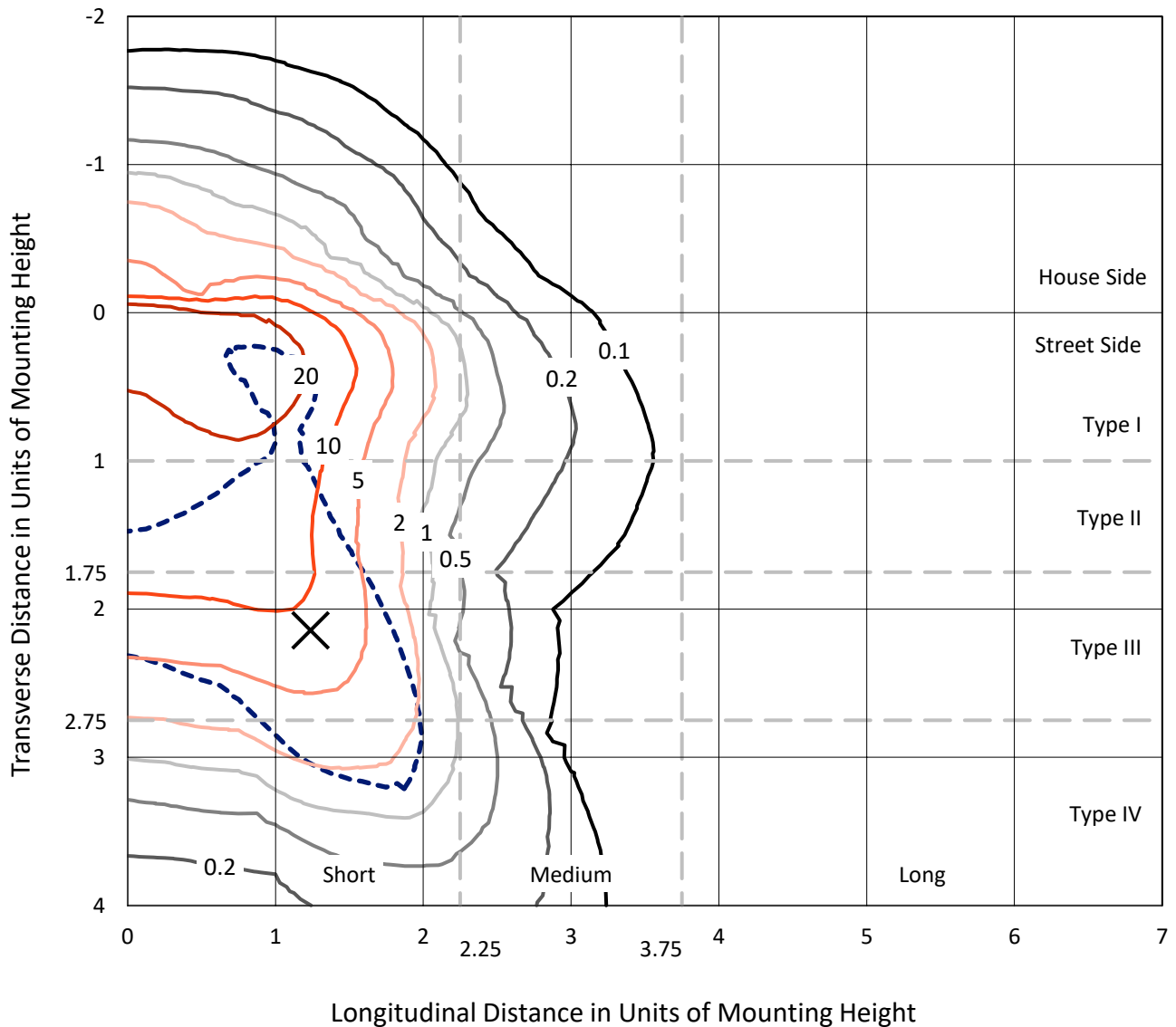
**Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 62360.6 lumens  
 Efficiency: N/A  
 Efficacy: 94.8 lumens/watt  
 Luminous Opening: Rectangular (W 1.5' x L: 1.5' x H: 0')  
 IES Classification: Type IV - Short  
 BUG Rating: B3 - U0 - G5  
  
 Input Watts (W): 658  
 Input Voltage (V): 120  
 Input Current (Ain): NR  
 Voltage Rise (V): NR  
 Power Factor: 0.97  
 Total Harmonic Distortion (THDi): NR  
 Frequency (hertz): 60  
 Stabilization Time: NR  
 Operation Time: NR  
 Ambient Temperature (°C): NR  
 Test Distance: 28.75 FT

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### Iso-Footcandle Lines of Horizontal Illumination

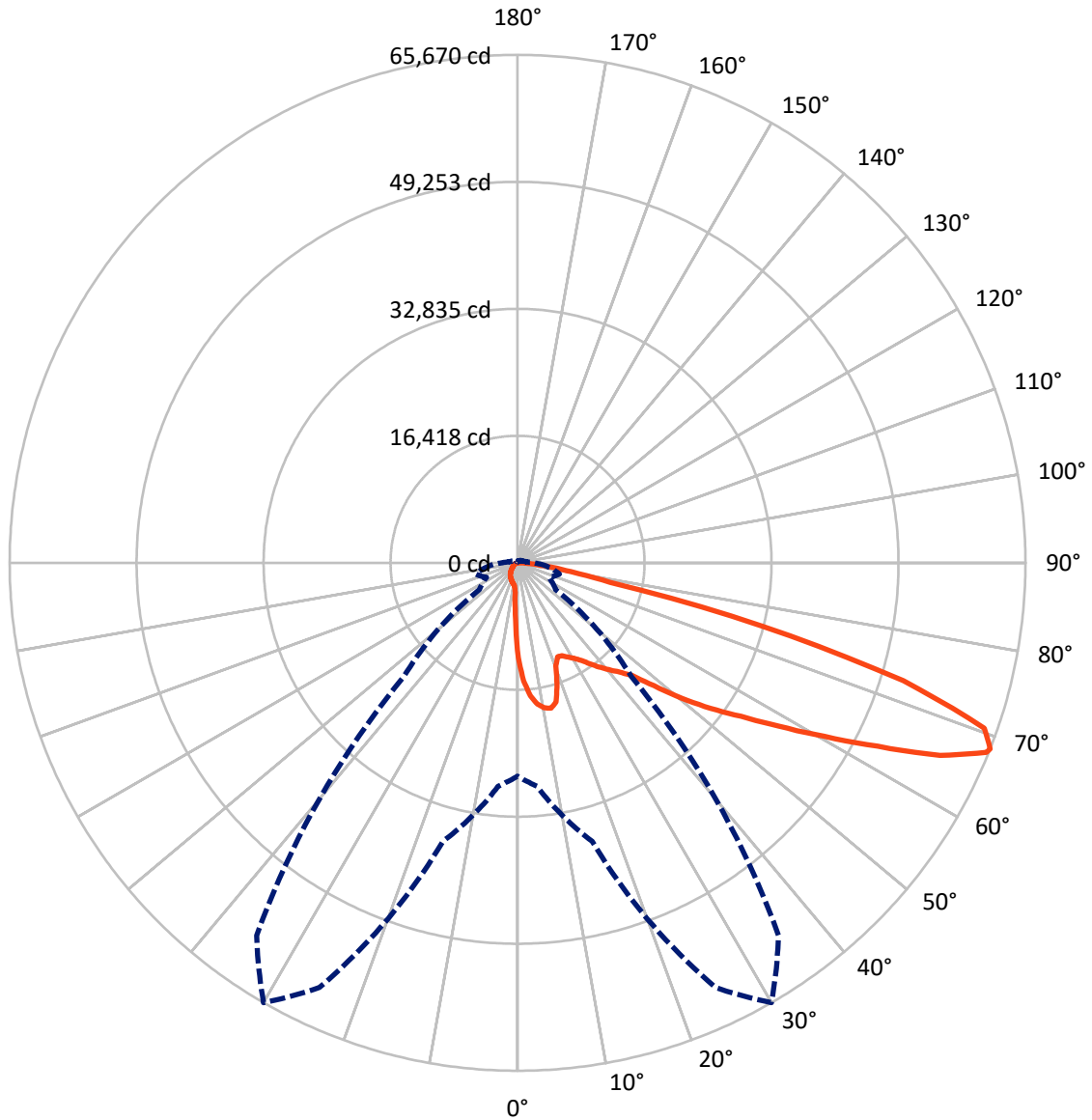
✕ Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 47 fc  
 Type IV - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 30-Deg Lateral      - - - Horizontal Cone Through 68-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4759.7   | 0.0    | 4759.7  |
|                    | % Fixture | 7.6      | 0.0    | 7.6     |
| <b>Street Side</b> | Lumens    | 57600.9  | 0.0    | 57600.9 |
|                    | % Fixture | 92.4     | 0.0    | 92.4    |
| <b>Total</b>       | Lumens    | 62360.6  | 0.0    | 62360.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1061.1  | 1.7       |
| 10°-20°   | 3029.3  | 4.9       |
| 20°-30°   | 4760.4  | 7.6       |
| 30°-40°   | 7466.3  | 12.0      |
| 40°-50°   | 11160.0 | 17.9      |
| 50°-60°   | 14846.4 | 23.8      |
| 60°-70°   | 14351.8 | 23.0      |
| 70°-80°   | 5158.9  | 8.3       |
| 80°-90°   | 526.5   | 0.8       |
| 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°    | 62360.6 | 100.0     |
| 0°-180°   | 62360.6 | 100.0     |

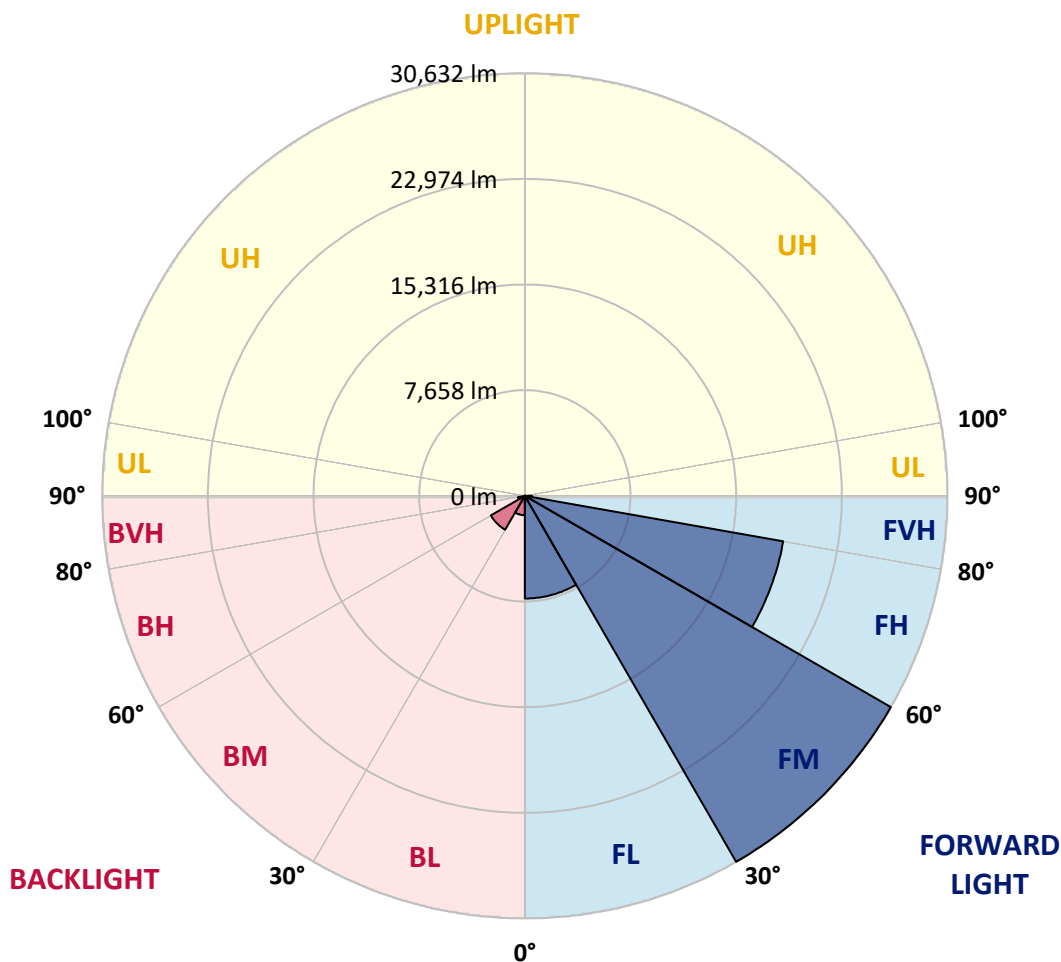


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |        |
|----------------|---------|-----------|-------------------------|------|--------|
|                |         |           | B                       | U    | G      |
| FL (0°-30°)    | 7445.9  | 11.9      |                         |      |        |
| FM (30°-60°)   | 30631.5 | 49.1      |                         |      |        |
| FH (60°-80°)   | 19015.7 | 30.5      |                         |      | G5     |
| FVH (80°-90°)  | 507.8   | 0.8       |                         |      | G4/750 |
| BL (0°-30°)    | 1404.9  | 2.3       | B3/2500                 |      |        |
| BM (30°-60°)   | 2841.1  | 4.6       | B3/5000                 |      |        |
| BH (60°-80°)   | 495.0   | 0.8       | B1/500                  |      | G1/500 |
| BVH (80°-90°)  | 18.7    | 0.0       |                         |      | G1/100 |
| UL (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |        |
| UH (100°-180°) | 0.0     | 0.0       |                         | U0/0 |        |

**BUG Rating: B3-U0-G5**  
 Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 30°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 |
| 2.5°  | 15716.7 | 15716.7 | 15604.6 | 15455.1 | 15286.9 | 15230.8 | 14913.1 | 14464.6 | 13997.4 | 13455.4 | 12670.5 |
| 5°    | 17735.0 | 17716.3 | 17492.1 | 17492.1 | 17267.8 | 17062.2 | 16744.6 | 16090.5 | 15342.9 | 14371.2 | 13006.9 |
| 7.5°  | 18632.0 | 18669.4 | 18576.0 | 18576.0 | 18445.2 | 18295.7 | 18108.8 | 17473.4 | 16595.0 | 15286.9 | 13343.3 |
| 10°   | 18949.7 | 18968.4 | 18968.4 | 19099.3 | 19061.9 | 19043.2 | 19024.5 | 18669.4 | 17753.7 | 16221.3 | 13698.4 |
| 12.5° | 18183.5 | 18277.0 | 18538.6 | 19117.9 | 19304.8 | 19510.4 | 19790.7 | 19678.6 | 19043.2 | 17398.6 | 14240.3 |
| 15°   | 15716.7 | 15735.4 | 16464.2 | 17903.2 | 18669.4 | 19454.3 | 20538.2 | 20762.5 | 20351.4 | 18669.4 | 14801.0 |
| 17.5° | 12969.6 | 13025.6 | 13604.9 | 15212.1 | 16445.5 | 18258.3 | 20968.1 | 21883.8 | 21734.3 | 19921.5 | 15324.3 |
| 20°   | 11829.6 | 11904.3 | 12184.7 | 13193.8 | 14128.2 | 15810.1 | 20538.2 | 22949.0 | 23005.1 | 21173.6 | 15810.1 |
| 22.5° | 11567.9 | 11624.0 | 11848.3 | 12633.2 | 13212.5 | 14333.8 | 19080.6 | 23790.0 | 24444.1 | 22612.6 | 16389.5 |
| 25°   | 11493.2 | 11549.3 | 11885.6 | 12745.3 | 13287.2 | 14221.7 | 17753.7 | 24238.5 | 26144.7 | 24107.7 | 16950.1 |
| 27.5° | 11437.1 | 11511.9 | 12053.8 | 13156.4 | 13791.8 | 14688.9 | 17510.8 | 24331.9 | 27770.5 | 25696.2 | 17865.8 |
| 30°   | 11511.9 | 11624.0 | 12334.2 | 13586.3 | 14315.1 | 15324.3 | 18090.1 | 24425.4 | 29564.6 | 27508.9 | 19024.5 |
| 32.5° | 11810.9 | 11904.3 | 12764.0 | 14165.6 | 15006.6 | 16146.5 | 19080.6 | 24986.0 | 31265.2 | 29359.0 | 20127.1 |
| 35°   | 12147.3 | 12278.1 | 13305.9 | 14987.9 | 15997.0 | 17286.5 | 20426.1 | 26088.6 | 32891.1 | 31115.7 | 21267.1 |
| 37.5° | 12558.4 | 12707.9 | 13941.3 | 15922.3 | 17080.9 | 18538.6 | 21883.8 | 27621.0 | 34330.1 | 32554.7 | 22407.0 |
| 40°   | 13119.1 | 13287.2 | 14670.2 | 16912.7 | 18164.8 | 19622.5 | 23322.8 | 29134.8 | 35432.7 | 33414.3 | 23154.6 |
| 42.5° | 15324.3 | 15548.5 | 16127.8 | 17884.5 | 19286.1 | 20781.2 | 24743.1 | 30573.8 | 35843.8 | 33694.7 | 23304.1 |
| 45°   | 19435.6 | 19659.9 | 19510.4 | 19846.8 | 20781.2 | 22182.8 | 26294.2 | 31956.7 | 35899.9 | 33619.9 | 23229.3 |
| 47.5° | 23565.7 | 23827.3 | 23696.5 | 23509.6 | 23715.2 | 24388.0 | 28032.2 | 32835.0 | 35600.9 | 33582.5 | 23229.3 |
| 50°   | 27508.9 | 27359.4 | 27378.1 | 27322.0 | 27508.9 | 27864.0 | 29714.1 | 33003.2 | 35526.1 | 33937.6 | 23434.9 |
| 52.5° | 29620.7 | 29695.4 | 30162.6 | 30854.1 | 31265.2 | 31620.3 | 31639.0 | 33264.8 | 34984.1 | 33339.6 | 23191.9 |
| 55°   | 31695.0 | 31844.5 | 32928.5 | 34105.8 | 35021.5 | 35694.3 | 33563.9 | 33096.7 | 31751.1 | 31340.0 | 21921.2 |
| 57.5° | 34031.1 | 34236.6 | 35769.1 | 38198.5 | 39805.7 | 40160.8 | 35470.0 | 29957.0 | 26873.5 | 28480.7 | 19454.3 |
| 60°   | 37245.4 | 37488.4 | 39525.4 | 43169.5 | 45561.6 | 44832.8 | 35619.5 | 24967.3 | 21341.8 | 23640.5 | 16053.1 |
| 62.5° | 39768.3 | 40254.2 | 43935.8 | 49616.9 | 52252.0 | 49934.6 | 32835.0 | 19136.6 | 14913.1 | 16613.7 | 11717.4 |
| 65°   | 37077.2 | 38011.6 | 44010.5 | 56998.7 | 60044.9 | 55933.5 | 28462.0 | 13063.0 | 8409.7  | 10745.7 | 7493.9  |
| 67.5° | 29975.7 | 31283.9 | 39076.8 | 60586.9 | 65389.7 | 59091.8 | 22407.0 | 6933.3  | 4821.5  | 6241.8  | 3943.2  |
| 68°   | 27583.7 | 29004.0 | 37264.1 | 60586.9 | 65670.0 | 58811.5 | 20799.9 | 5998.9  | 4447.8  | 5606.4  | 3419.9  |
| 70°   | 19061.9 | 20071.0 | 28648.9 | 57185.6 | 64025.5 | 53616.2 | 13698.4 | 3438.6  | 3345.2  | 3849.8  | 2261.3  |
| 72.5° | 9344.1  | 10428.0 | 15324.3 | 45318.7 | 52158.5 | 41207.3 | 6241.8  | 2279.9  | 2541.6  | 2821.9  | 1775.4  |
| 75°   | 3718.9  | 3943.2  | 6036.3  | 22351.0 | 32592.1 | 26294.2 | 3270.4  | 1719.3  | 2186.5  | 2205.2  | 1401.6  |
| 77.5° | 2130.4  | 2261.3  | 3345.2  | 8222.8  | 12222.0 | 11754.8 | 2111.8  | 1233.4  | 1738.0  | 1588.5  | 915.7   |
| 80°   | 1196.0  | 1214.7  | 1887.5  | 4335.6  | 6989.4  | 6260.5  | 1439.0  | 897.0   | 1326.9  | 1121.3  | 616.7   |
| 82.5° | 598.0   | 672.8   | 1196.0  | 2392.1  | 3887.1  | 3980.6  | 766.2   | 635.4   | 1065.2  | 803.6   | 504.6   |
| 85°   | 429.8   | 467.2   | 859.7   | 1326.9  | 1794.1  | 2691.1  | 467.2   | 317.7   | 803.6   | 542.0   | 355.1   |
| 87.5° | 224.3   | 280.3   | 542.0   | 654.1   | 728.8   | 915.7   | 224.3   | 149.5   | 448.5   | 317.7   | 186.9   |
| 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: P1438360

CATALOG NUMBER: GALN-SB9D-835-U-T4LG-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°    | 115°    | 125°    | 135°    | 145°    | 155°    | 165°    | 175°    | 180°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 | 12296.8 |
| 2.5°  | 12296.8 | 11867.0 | 10988.6 | 9960.8  | 9157.2  | 8334.9  | 7662.1  | 7026.7  | 6727.7  | 6690.3  | 6765.1  |
| 5°    | 12240.7 | 11306.3 | 9306.7  | 7344.4  | 5737.3  | 4616.0  | 3999.3  | 3681.6  | 3513.4  | 3438.6  | 3457.3  |
| 7.5°  | 12128.6 | 10708.3 | 7512.6  | 4971.0  | 3718.9  | 3233.0  | 3083.5  | 3027.5  | 3008.8  | 3008.8  | 3008.8  |
| 10°   | 12016.5 | 9904.7  | 5755.9  | 3644.2  | 3046.2  | 2915.3  | 2878.0  | 2878.0  | 2859.3  | 2859.3  | 2878.0  |
| 12.5° | 11960.4 | 9157.2  | 4466.5  | 3046.2  | 2840.6  | 2784.5  | 2747.2  | 2728.5  | 2728.5  | 2728.5  | 2747.2  |
| 15°   | 11829.6 | 8334.9  | 3606.8  | 2821.9  | 2709.8  | 2635.0  | 2616.3  | 2597.6  | 2597.6  | 2597.6  | 2597.6  |
| 17.5° | 11717.4 | 7531.3  | 3139.6  | 2672.4  | 2579.0  | 2504.2  | 2485.5  | 2466.8  | 2466.8  | 2485.5  | 2485.5  |
| 20°   | 11549.3 | 6765.1  | 2821.9  | 2522.9  | 2448.1  | 2373.4  | 2354.7  | 2336.0  | 2354.7  | 2354.7  | 2354.7  |
| 22.5° | 11343.7 | 6129.7  | 2635.0  | 2410.8  | 2317.3  | 2242.6  | 2242.6  | 2242.6  | 2242.6  | 2242.6  | 2261.3  |
| 25°   | 11212.9 | 5681.2  | 2504.2  | 2279.9  | 2186.5  | 2130.4  | 2111.8  | 2111.8  | 2149.1  | 2149.1  | 2167.8  |
| 27.5° | 11418.4 | 5569.1  | 2522.9  | 2242.6  | 2074.4  | 2018.3  | 1999.6  | 1999.6  | 2037.0  | 2055.7  | 2074.4  |
| 30°   | 12035.1 | 5774.6  | 2747.2  | 2354.7  | 1999.6  | 1906.2  | 1887.5  | 1887.5  | 1943.6  | 1962.3  | 1980.9  |
| 32.5° | 12745.3 | 6204.5  | 3083.5  | 2504.2  | 1943.6  | 1794.1  | 1756.7  | 1756.7  | 1812.7  | 1831.4  | 1850.1  |
| 35°   | 13717.1 | 6877.2  | 3532.1  | 2635.0  | 1980.9  | 1681.9  | 1607.2  | 1607.2  | 1644.6  | 1681.9  | 1700.6  |
| 37.5° | 14969.2 | 7979.8  | 4055.3  | 2728.5  | 1980.9  | 1551.1  | 1457.7  | 1439.0  | 1476.4  | 1476.4  | 1495.0  |
| 40°   | 16277.3 | 9418.8  | 4597.3  | 2728.5  | 1887.5  | 1420.3  | 1326.9  | 1270.8  | 1289.5  | 1270.8  | 1289.5  |
| 42.5° | 17006.2 | 10577.5 | 5064.5  | 2560.3  | 1775.4  | 1289.5  | 1196.0  | 1121.3  | 1102.6  | 1065.2  | 1083.9  |
| 45°   | 17417.3 | 11100.7 | 4933.7  | 2373.4  | 1663.2  | 1196.0  | 1083.9  | 990.5   | 953.1   | 897.0   | 897.0   |
| 47.5° | 17417.3 | 11156.8 | 4223.5  | 2223.9  | 1551.1  | 1121.3  | 971.8   | 878.3   | 822.3   | 766.2   | 784.9   |
| 50°   | 17211.8 | 10652.2 | 3345.2  | 2074.4  | 1420.3  | 1046.5  | 878.3   | 803.6   | 728.8   | 691.5   | 691.5   |
| 52.5° | 16352.1 | 9007.7  | 2560.3  | 1887.5  | 1270.8  | 953.1   | 784.9   | 710.1   | 635.4   | 616.7   | 616.7   |
| 55°   | 14875.7 | 6615.6  | 2074.4  | 1700.6  | 1140.0  | 878.3   | 710.1   | 654.1   | 579.3   | 542.0   | 542.0   |
| 57.5° | 12091.2 | 4522.5  | 1719.3  | 1532.4  | 1009.2  | 784.9   | 635.4   | 579.3   | 485.9   | 448.5   | 448.5   |
| 60°   | 8970.3  | 2952.7  | 1457.7  | 1345.5  | 859.7   | 710.1   | 560.6   | 485.9   | 411.1   | 373.8   | 355.1   |
| 62.5° | 6054.9  | 1999.6  | 1214.7  | 1065.2  | 728.8   | 616.7   | 485.9   | 411.1   | 317.7   | 242.9   | 242.9   |
| 65°   | 3775.0  | 1551.1  | 1009.2  | 841.0   | 635.4   | 542.0   | 411.1   | 317.7   | 224.3   | 168.2   | 149.5   |
| 67.5° | 2167.8  | 1252.1  | 822.3   | 654.1   | 542.0   | 429.8   | 317.7   | 261.6   | 186.9   | 130.8   | 112.1   |
| 68°   | 1999.6  | 1196.0  | 766.2   | 616.7   | 504.6   | 411.1   | 299.0   | 242.9   | 168.2   | 112.1   | 112.1   |
| 70°   | 1625.9  | 1065.2  | 654.1   | 504.6   | 429.8   | 336.4   | 261.6   | 205.6   | 130.8   | 74.8    | 74.8    |
| 72.5° | 1439.0  | 897.0   | 560.6   | 392.5   | 299.0   | 280.3   | 205.6   | 149.5   | 93.4    | 56.1    | 37.4    |
| 75°   | 1177.4  | 710.1   | 448.5   | 299.0   | 205.6   | 205.6   | 149.5   | 93.4    | 37.4    | 0.0     | 0.0     |
| 77.5° | 766.2   | 523.3   | 355.1   | 186.9   | 112.1   | 130.8   | 93.4    | 37.4    | 0.0     | 0.0     | 0.0     |
| 80°   | 504.6   | 392.5   | 242.9   | 93.4    | 56.1    | 56.1    | 18.7    | 0.0     | 0.0     | 0.0     | 0.0     |
| 82.5° | 355.1   | 261.6   | 149.5   | 37.4    | 18.7    | 18.7    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |
| 85°   | 224.3   | 112.1   | 56.1    | 18.7    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |
| 87.5° | 93.4    | 37.4    | 18.7    | 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     |

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

McGraw-Edison

Report Number: SP1-2407-184-10

Test Date: 10/11/2024

Luminaire Tested: GSS-SB1A-835-U-5WQ

Data in this report applies to families of products including GSS-SB1A-835-U-5WQ

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-184-10  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/15/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGraw-Edison  
 Catalog Number: **GSS-SB1A-835-U-5WQ**  
 Description: GALLEON II SITE SLIM 1SQ 350MA 5WQ HIGH DENSITY LIGHTSQUARE WITH 80 CRI 3500K CCT 26 LEDS

**Spectral Parameters**

CCT (K): 3411  
 CIE u': 0.2360  
 CIE v': 0.5189  
 Duv: 0.0044  
 CIE x: 0.4154  
 CIE y: 0.4059  
 CIE z: 0.1787  
 Peak Wavelength (nm): 601  
 Dominant Wavelength (nm): 579  
 Purity: 46.51914  
 Rf: 86.6  
 Rg: 95.9

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 83.5 |      |      |
| R1:       | 81.1 | R9:  | 6.3  |
| R2:       | 88.9 | R10: | 75.4 |
| R3:       | 97.2 | R11: | 84.1 |
| R4:       | 83.8 | R12: | 69.7 |
| R5:       | 81.7 | R13: | 82.8 |
| R6:       | 86.9 | R14: | 98.5 |
| R7:       | 86.1 | R15: | 72.6 |
| R8:       | 62.2 |      |      |



**Test Conditions**  
 Stabilization Time: 35M  
 Operation Time: 1H 35M  
 Sphere Temperature (°C): 25.2

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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 3500K 7-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) |
|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|
| 360               | 0                           | NR                      | 490               | 311                         | NR                      | 620               | 903                         | NR                      | 750               | 26                          | NR                      | 880               | 1                           | NR                      |
| 365               | 0                           | NR                      | 495               | 376                         | NR                      | 625               | 851                         | NR                      | 755               | 22                          | NR                      | 885               | 1                           | NR                      |
| 370               | 0                           | NR                      | 500               | 438                         | NR                      | 630               | 797                         | NR                      | 760               | 19                          | NR                      | 890               | 0                           | NR                      |
| 375               | 0                           | NR                      | 505               | 491                         | NR                      | 635               | 735                         | NR                      | 765               | 16                          | NR                      | 895               | 0                           | NR                      |
| 380               | 0                           | NR                      | 510               | 533                         | NR                      | 640               | 672                         | NR                      | 770               | 14                          | NR                      | 900               | 0                           | NR                      |
| 385               | 0                           | NR                      | 515               | 566                         | NR                      | 645               | 607                         | NR                      | 775               | 12                          | NR                      | 905               | 0                           | NR                      |
| 390               | 0                           | NR                      | 520               | 592                         | NR                      | 650               | 546                         | NR                      | 780               | 10                          | NR                      | 910               | 0                           | NR                      |
| 395               | 1                           | NR                      | 525               | 608                         | NR                      | 655               | 487                         | NR                      | 785               | 9                           | NR                      | 915               | 0                           | NR                      |
| 400               | 3                           | NR                      | 530               | 625                         | NR                      | 660               | 429                         | NR                      | 790               | 7                           | NR                      | 920               | 0                           | NR                      |
| 405               | 6                           | NR                      | 535               | 642                         | NR                      | 665               | 378                         | NR                      | 795               | 6                           | NR                      | 925               | 0                           | NR                      |
| 410               | 12                          | NR                      | 540               | 657                         | NR                      | 670               | 329                         | NR                      | 800               | 5                           | NR                      | 930               | 0                           | NR                      |
| 415               | 22                          | NR                      | 545               | 677                         | NR                      | 675               | 286                         | NR                      | 805               | 5                           | NR                      | 935               | 0                           | NR                      |
| 420               | 43                          | NR                      | 550               | 701                         | NR                      | 680               | 248                         | NR                      | 810               | 4                           | NR                      | 940               | 0                           | NR                      |
| 425               | 80                          | NR                      | 555               | 728                         | NR                      | 685               | 213                         | NR                      | 815               | 3                           | NR                      | 945               | 0                           | NR                      |
| 430               | 140                         | NR                      | 560               | 757                         | NR                      | 690               | 184                         | NR                      | 820               | 3                           | NR                      | 950               | 0                           | NR                      |
| 435               | 243                         | NR                      | 565               | 793                         | NR                      | 695               | 156                         | NR                      | 825               | 3                           | NR                      | 955               | 0                           | NR                      |
| 440               | 412                         | NR                      | 570               | 831                         | NR                      | 700               | 134                         | NR                      | 830               | 2                           | NR                      | 960               | 0                           | NR                      |
| 445               | 610                         | NR                      | 575               | 872                         | NR                      | 705               | 114                         | NR                      | 835               | 2                           | NR                      | 965               | 0                           | NR                      |
| 450               | 597                         | NR                      | 580               | 911                         | NR                      | 710               | 97                          | NR                      | 840               | 2                           | NR                      | 970               | 0                           | NR                      |
| 455               | 412                         | NR                      | 585               | 944                         | NR                      | 715               | 83                          | NR                      | 845               | 1                           | NR                      | 975               | 0                           | NR                      |
| 460               | 330                         | NR                      | 590               | 974                         | NR                      | 720               | 70                          | NR                      | 850               | 1                           | NR                      | 980               | 0                           | NR                      |
| 465               | 274                         | NR                      | 595               | 992                         | NR                      | 725               | 60                          | NR                      | 855               | 1                           | NR                      | 985               | 0                           | NR                      |
| 470               | 211                         | NR                      | 600               | 999                         | NR                      | 730               | 51                          | NR                      | 860               | 1                           | NR                      | 990               | 0                           | NR                      |
| 475               | 200                         | NR                      | 605               | 992                         | NR                      | 735               | 43                          | NR                      | 865               | 1                           | NR                      | 995               | 0                           | NR                      |
| 480               | 220                         | NR                      | 610               | 975                         | NR                      | 740               | 36                          | NR                      | 870               | 1                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 255                         | NR                      | 615               | 944                         | NR                      | 745               | 31                          | NR                      | 875               | 1                           | NR                      |                   |                             |                         |

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.48**

| $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) |
|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|
| 360            | 0                        | NR                   | 490            | 311                      | NR                   | 620            | 903                      | NR                   | 750            | 26                       | NR                   | 880            | 1                        | NR                   |
| 365            | 0                        | NR                   | 495            | 376                      | NR                   | 625            | 851                      | NR                   | 755            | 22                       | NR                   | 885            | 1                        | NR                   |
| 370            | 0                        | NR                   | 500            | 438                      | NR                   | 630            | 797                      | NR                   | 760            | 19                       | NR                   | 890            | 0                        | NR                   |
| 375            | 0                        | NR                   | 505            | 491                      | NR                   | 635            | 735                      | NR                   | 765            | 16                       | NR                   | 895            | 0                        | NR                   |
| 380            | 0                        | NR                   | 510            | 533                      | NR                   | 640            | 672                      | NR                   | 770            | 14                       | NR                   | 900            | 0                        | NR                   |
| 385            | 0                        | NR                   | 515            | 566                      | NR                   | 645            | 607                      | NR                   | 775            | 12                       | NR                   | 905            | 0                        | NR                   |
| 390            | 0                        | NR                   | 520            | 592                      | NR                   | 650            | 546                      | NR                   | 780            | 10                       | NR                   | 910            | 0                        | NR                   |
| 395            | 1                        | NR                   | 525            | 608                      | NR                   | 655            | 487                      | NR                   | 785            | 9                        | NR                   | 915            | 0                        | NR                   |
| 400            | 3                        | NR                   | 530            | 625                      | NR                   | 660            | 429                      | NR                   | 790            | 7                        | NR                   | 920            | 0                        | NR                   |
| 405            | 6                        | NR                   | 535            | 642                      | NR                   | 665            | 378                      | NR                   | 795            | 6                        | NR                   | 925            | 0                        | NR                   |
| 410            | 12                       | NR                   | 540            | 657                      | NR                   | 670            | 329                      | NR                   | 800            | 5                        | NR                   | 930            | 0                        | NR                   |
| 415            | 22                       | NR                   | 545            | 677                      | NR                   | 675            | 286                      | NR                   | 805            | 5                        | NR                   | 935            | 0                        | NR                   |
| 420            | 43                       | NR                   | 550            | 701                      | NR                   | 680            | 248                      | NR                   | 810            | 4                        | NR                   | 940            | 0                        | NR                   |
| 425            | 80                       | NR                   | 555            | 728                      | NR                   | 685            | 213                      | NR                   | 815            | 3                        | NR                   | 945            | 0                        | NR                   |
| 430            | 140                      | NR                   | 560            | 757                      | NR                   | 690            | 184                      | NR                   | 820            | 3                        | NR                   | 950            | 0                        | NR                   |
| 435            | 243                      | NR                   | 565            | 793                      | NR                   | 695            | 156                      | NR                   | 825            | 3                        | NR                   | 955            | 0                        | NR                   |
| 440            | 412                      | NR                   | 570            | 831                      | NR                   | 700            | 134                      | NR                   | 830            | 2                        | NR                   | 960            | 0                        | NR                   |
| 445            | 610                      | NR                   | 575            | 872                      | NR                   | 705            | 114                      | NR                   | 835            | 2                        | NR                   | 965            | 0                        | NR                   |
| 450            | 597                      | NR                   | 580            | 911                      | NR                   | 710            | 97                       | NR                   | 840            | 2                        | NR                   | 970            | 0                        | NR                   |
| 455            | 412                      | NR                   | 585            | 944                      | NR                   | 715            | 83                       | NR                   | 845            | 1                        | NR                   | 975            | 0                        | NR                   |
| 460            | 330                      | NR                   | 590            | 974                      | NR                   | 720            | 70                       | NR                   | 850            | 1                        | NR                   | 980            | 0                        | NR                   |
| 465            | 274                      | NR                   | 595            | 992                      | NR                   | 725            | 60                       | NR                   | 855            | 1                        | NR                   | 985            | 0                        | NR                   |
| 470            | 211                      | NR                   | 600            | 999                      | NR                   | 730            | 51                       | NR                   | 860            | 1                        | NR                   | 990            | 0                        | NR                   |
| 475            | 200                      | NR                   | 605            | 992                      | NR                   | 735            | 43                       | NR                   | 865            | 1                        | NR                   | 995            | 0                        | NR                   |
| 480            | 220                      | NR                   | 610            | 975                      | NR                   | 740            | 36                       | NR                   | 870            | 1                        | NR                   | 1000           | 0                        | NR                   |
| 485            | 255                      | NR                   | 615            | 944                      | NR                   | 745            | 31                       | NR                   | 875            | 1                        | NR                   |                |                          |                      |

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Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.88

| λ (nm) | Power W <sup>2</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>2</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>2</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>2</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>2</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 311                      | NR            | 620    | 903                      | NR            | 750    | 26                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 376                      | NR            | 625    | 851                      | NR            | 755    | 22                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 438                      | NR            | 630    | 797                      | NR            | 760    | 19                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 491                      | NR            | 635    | 735                      | NR            | 765    | 16                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 533                      | NR            | 640    | 672                      | NR            | 770    | 14                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 566                      | NR            | 645    | 607                      | NR            | 775    | 12                       | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 592                      | NR            | 650    | 546                      | NR            | 780    | 10                       | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 608                      | NR            | 655    | 487                      | NR            | 785    | 9                        | NR            | 915    | 0                        | NR            |
| 400    | 3                        | NR            | 530    | 625                      | NR            | 660    | 429                      | NR            | 790    | 7                        | NR            | 920    | 0                        | NR            |
| 405    | 6                        | NR            | 535    | 642                      | NR            | 665    | 378                      | NR            | 795    | 6                        | NR            | 925    | 0                        | NR            |
| 410    | 12                       | NR            | 540    | 657                      | NR            | 670    | 329                      | NR            | 800    | 5                        | NR            | 930    | 0                        | NR            |
| 415    | 22                       | NR            | 545    | 677                      | NR            | 675    | 286                      | NR            | 805    | 5                        | NR            | 935    | 0                        | NR            |
| 420    | 43                       | NR            | 550    | 701                      | NR            | 680    | 248                      | NR            | 810    | 4                        | NR            | 940    | 0                        | NR            |
| 425    | 80                       | NR            | 555    | 728                      | NR            | 685    | 213                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 140                      | NR            | 560    | 757                      | NR            | 690    | 184                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 243                      | NR            | 565    | 793                      | NR            | 695    | 156                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 412                      | NR            | 570    | 831                      | NR            | 700    | 134                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 610                      | NR            | 575    | 872                      | NR            | 705    | 114                      | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 597                      | NR            | 580    | 911                      | NR            | 710    | 97                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 412                      | NR            | 585    | 944                      | NR            | 715    | 83                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 330                      | NR            | 590    | 974                      | NR            | 720    | 70                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 274                      | NR            | 595    | 992                      | NR            | 725    | 60                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 211                      | NR            | 600    | 999                      | NR            | 730    | 51                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 200                      | NR            | 605    | 992                      | NR            | 735    | 43                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 220                      | NR            | 610    | 975                      | NR            | 740    | 36                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 255                      | NR            | 615    | 944                      | NR            | 745    | 31                       | NR            | 875    | 1                        | NR            |        |                          |               |

**Summary**

$R_f = 86.6$   
 $R_g = 95.9$   
 $CIE R_a = 83.5$   
 $R_9 = 6.3$



**Color Vector Graphics**



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

|            |             |            |            |
|------------|-------------|------------|------------|
| CES01 = 86 | CES26 = 85  | CES51 = 97 | CES76 = 81 |
| CES02 = 62 | CES27 = 95  | CES52 = 96 | CES77 = 87 |
| CES03 = 31 | CES28 = 94  | CES53 = 91 | CES78 = 80 |
| CES04 = 70 | CES29 = 87  | CES54 = 92 | CES79 = 93 |
| CES05 = 49 | CES30 = 93  | CES55 = 92 | CES80 = 91 |
| CES06 = 51 | CES31 = 89  | CES56 = 88 | CES81 = 77 |
| CES07 = 41 | CES32 = 84  | CES57 = 87 | CES82 = 96 |
| CES08 = 40 | CES33 = 91  | CES58 = 88 | CES83 = 95 |
| CES09 = 29 | CES34 = 91  | CES59 = 93 | CES84 = 92 |
| CES10 = 75 | CES35 = 95  | CES60 = 94 | CES85 = 80 |
| CES11 = 58 | CES36 = 90  | CES61 = 91 | CES86 = 72 |
| CES12 = 64 | CES37 = 95  | CES62 = 95 | CES87 = 86 |
| CES13 = 43 | CES38 = 100 | CES63 = 88 | CES88 = 88 |
| CES14 = 74 | CES39 = 97  | CES64 = 85 | CES89 = 77 |
| CES15 = 71 | CES40 = 94  | CES65 = 80 | CES90 = 88 |
| CES16 = 47 | CES41 = 97  | CES66 = 84 | CES91 = 81 |
| CES17 = 49 | CES42 = 96  | CES67 = 82 | CES92 = 67 |
| CES18 = 56 | CES43 = 93  | CES68 = 85 | CES93 = 81 |
| CES19 = 72 | CES44 = 99  | CES69 = 89 | CES94 = 63 |
| CES20 = 66 | CES45 = 95  | CES70 = 81 | CES95 = 76 |
| CES21 = 86 | CES46 = 91  | CES71 = 79 | CES96 = 84 |
| CES22 = 78 | CES47 = 93  | CES72 = 93 | CES97 = 92 |
| CES23 = 91 | CES48 = 85  | CES73 = 76 | CES98 = 86 |
| CES24 = 90 | CES49 = 92  | CES74 = 95 | CES99 = 77 |
| CES25 = 72 | CES50 = 96  | CES75 = 80 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)