

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: P1438159

Luminaire Tested: **GALN-SB4C-735-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: P1438159  
 Test Lab: INNOVATION CENTER(G1)  
 Issue Date: 03/27/202  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: McGRAW-EDISON  
 Catalog Number: GALN-SB4C-735-U-T4LG-HSS  
 Description: GALLEON II AREA AND ROADWAY HIGH DENSITY LUMINAIRE 615mA 4xLight Square PACKAGE 70CRI 3500K FIXTURE w/ TYPE IV LOW GLARE WITH HOUSE SIDE SHIELD  
 Light Source: (104) 3500K CCT, 70 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**

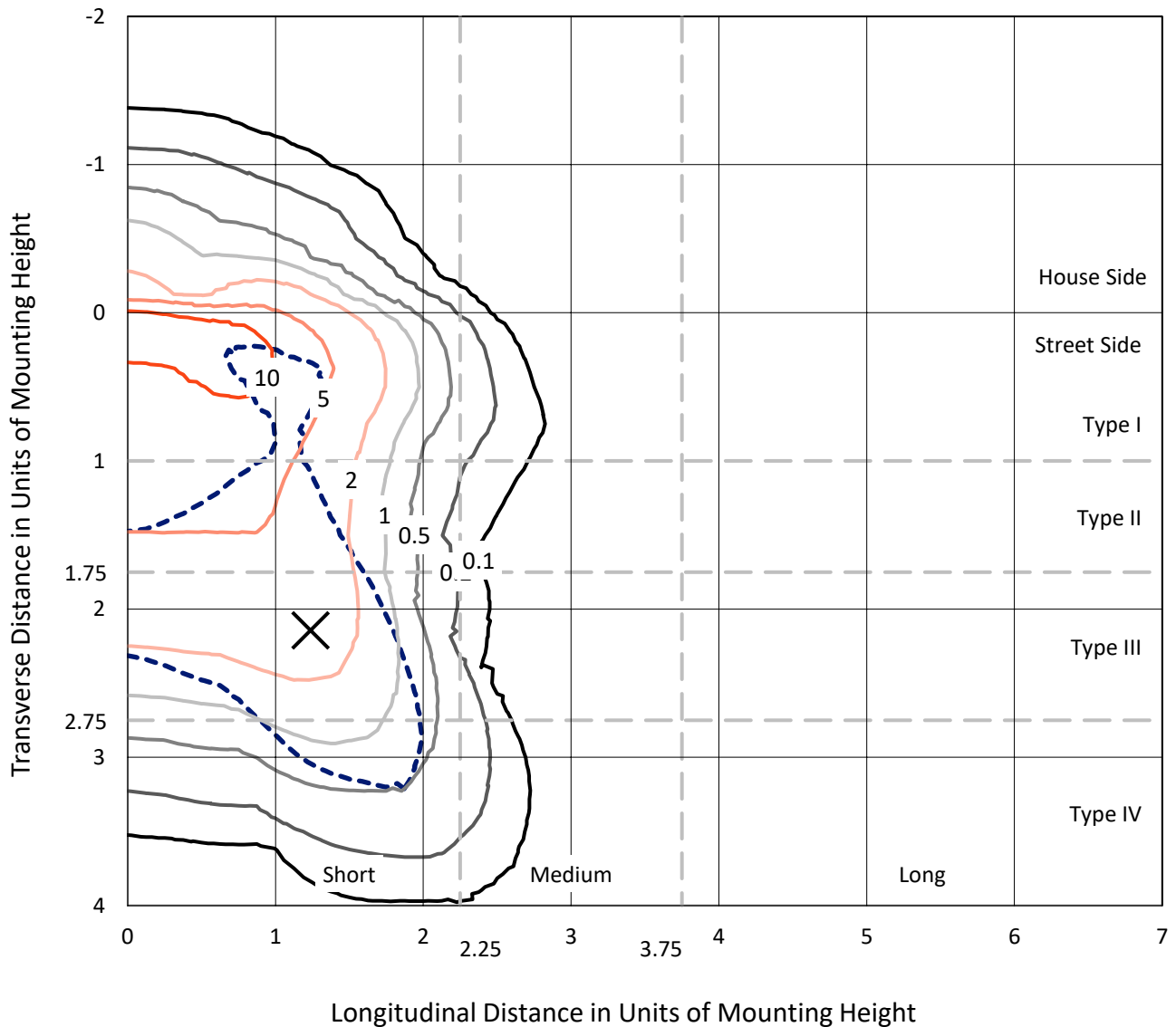
Lumens per Lamp: N/A  
 Luminaire Lumens: 21759.8 lumens  
 Efficiency: N/A  
 Efficacy: 108.4 lumens/watt  
 Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
 IES Classification: Type IV - Short  
 BUG Rating: B1 - U0 - G3

Input Watts (W): 200.7  
 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

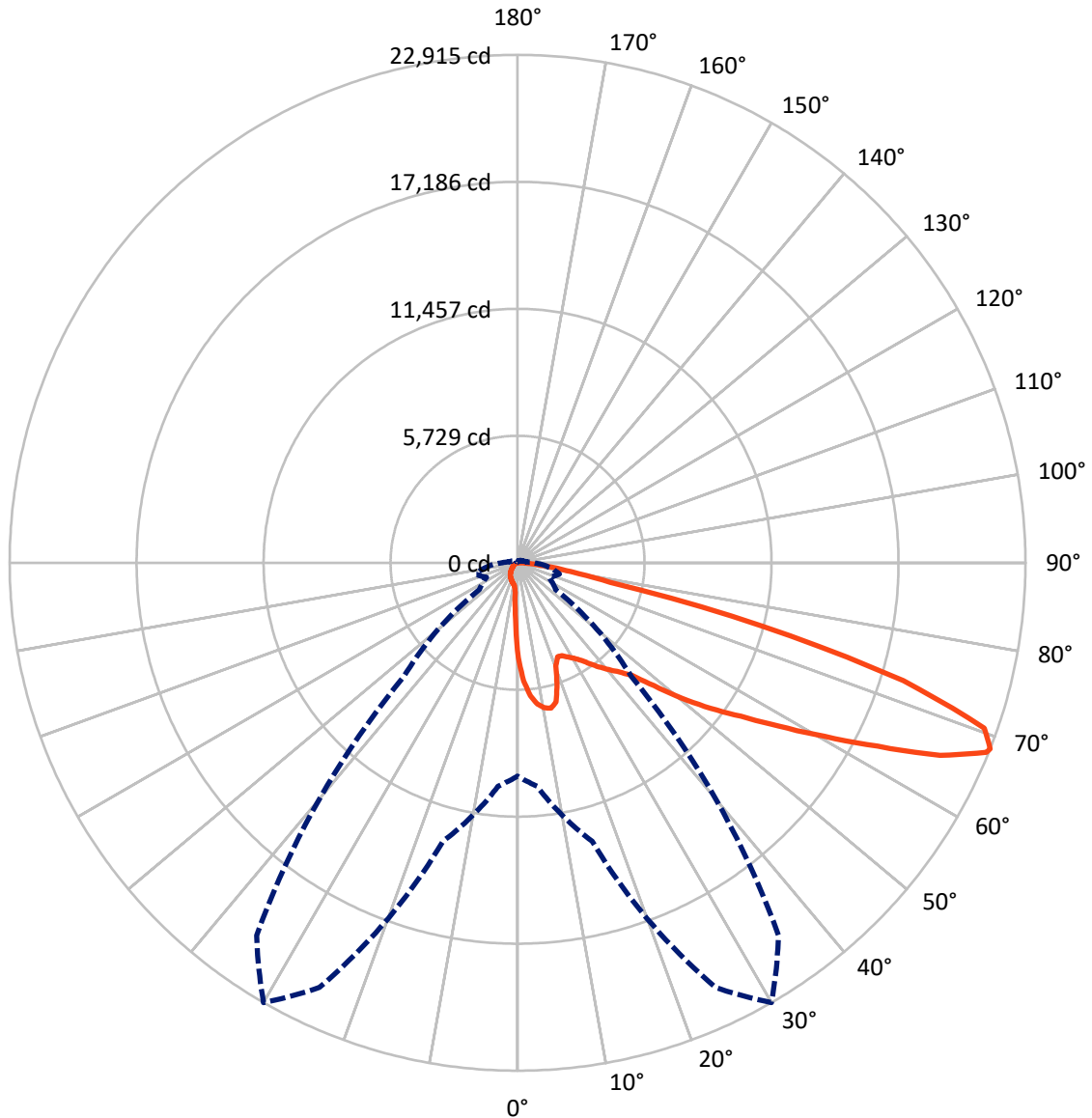
✕ Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 16.4 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    | 1660.8   | 0.0    | 1660.8  |
|                    | % Fixture | 7.6      | 0.0    | 7.6     |
| <b>Street Side</b> | Lumens    | 20099.0  | 0.0    | 20099.0 |
|                    | % Fixture | 92.4     | 0.0    | 92.4    |
| <b>Total</b>       | Lumens    | 21759.8  | 0.0    | 21759.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 370.2   | 1.7       |
| 10°-20°   | 1057.0  | 4.9       |
| 20°-30°   | 1661.1  | 7.6       |
| 30°-40°   | 2605.3  | 12.0      |
| 40°-50°   | 3894.1  | 17.9      |
| 50°-60°   | 5180.4  | 23.8      |
| 60°-70°   | 5007.9  | 23.0      |
| 70°-80°   | 1800.1  | 8.3       |
| 80°-90°   | 183.7   | 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°    | 21759.8 | 100.0     |
| 0°-180°   | 21759.8 | 100.0     |

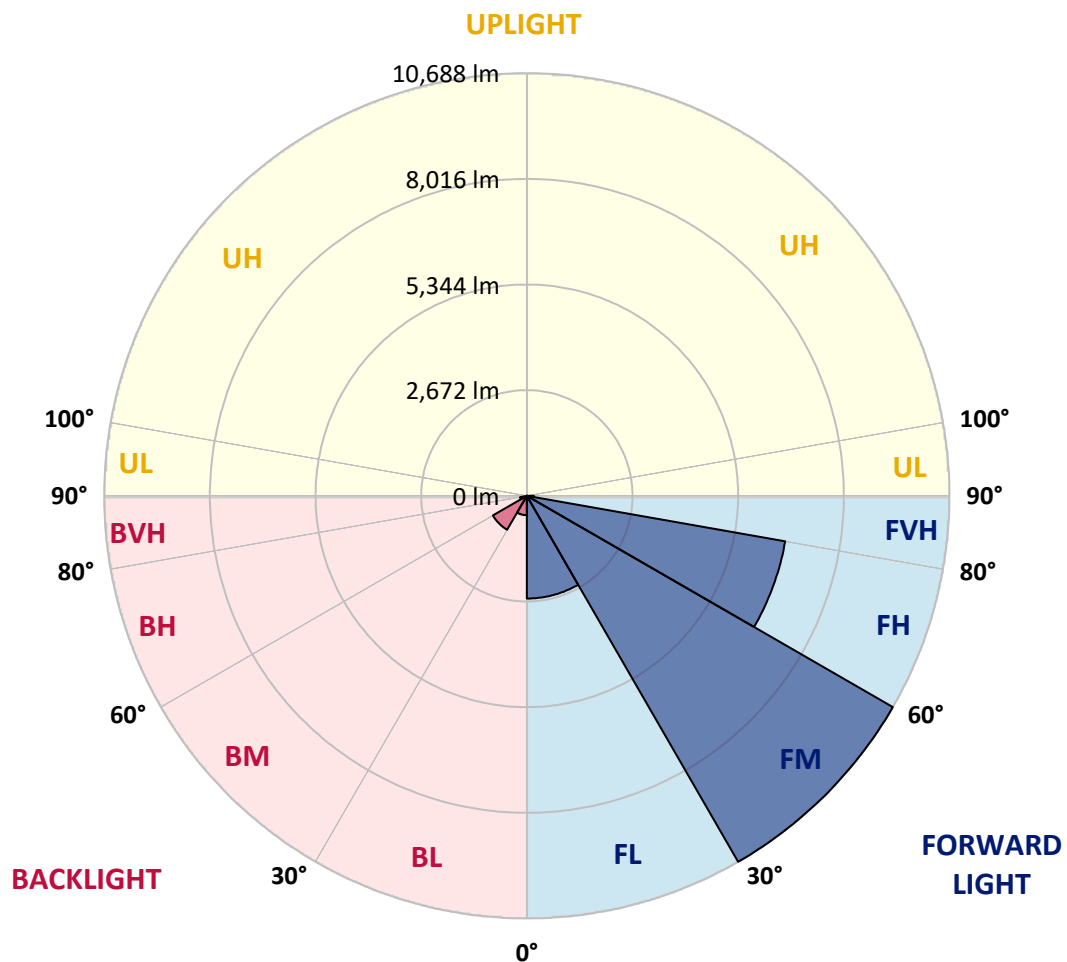


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|---------|-----------|-------------------------|------|---------|
|                |         |           | B                       | U    | G       |
| FL (0°-30°)    | 2598.1  | 11.9      |                         |      |         |
| FM (30°-60°)   | 10688.4 | 49.1      |                         |      |         |
| FH (60°-80°)   | 6635.3  | 30.5      |                         |      | G3/7500 |
| FVH (80°-90°)  | 177.2   | 0.8       |                         |      | G2/225  |
| BL (0°-30°)    | 490.2   | 2.3       | B1/500                  |      |         |
| BM (30°-60°)   | 991.4   | 4.6       | B1/1000                 |      |         |
| BH (60°-80°)   | 172.7   | 0.8       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 6.5     | 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-G3**  
 Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 30°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| 0°    | 4290.8  | 4290.8  | 4290.8  | 4290.8  | 4290.8  | 4290.8  | 4290.8  | 4290.8  | 4290.8  | 4290.8  | 4290.8 |
| 2.5°  | 5484.1  | 5484.1  | 5445.0  | 5392.8  | 5334.1  | 5314.6  | 5203.7  | 5047.2  | 4884.2  | 4695.1  | 4421.2 |
| 5°    | 6188.4  | 6181.8  | 6103.6  | 6103.6  | 6025.3  | 5953.6  | 5842.8  | 5614.5  | 5353.7  | 5014.6  | 4538.6 |
| 7.5°  | 6501.4  | 6514.4  | 6481.8  | 6481.8  | 6436.2  | 6384.0  | 6318.8  | 6097.1  | 5790.6  | 5334.1  | 4655.9 |
| 10°   | 6612.2  | 6618.7  | 6618.7  | 6664.4  | 6651.4  | 6644.8  | 6638.3  | 6514.4  | 6194.9  | 5660.2  | 4779.8 |
| 12.5° | 6344.9  | 6377.5  | 6468.8  | 6670.9  | 6736.1  | 6807.9  | 6905.7  | 6866.5  | 6644.8  | 6071.0  | 4969.0 |
| 15°   | 5484.1  | 5490.6  | 5744.9  | 6247.1  | 6514.4  | 6788.3  | 7166.5  | 7244.8  | 7101.3  | 6514.4  | 5164.6 |
| 17.5° | 4525.5  | 4545.1  | 4747.2  | 5308.0  | 5738.4  | 6371.0  | 7316.5  | 7636.0  | 7583.8  | 6951.3  | 5347.2 |
| 20°   | 4127.8  | 4153.8  | 4251.6  | 4603.8  | 4929.8  | 5516.7  | 7166.5  | 8007.7  | 8027.3  | 7388.2  | 5516.7 |
| 22.5° | 4036.5  | 4056.0  | 4134.3  | 4408.2  | 4610.3  | 5001.6  | 6657.9  | 8301.1  | 8529.4  | 7890.3  | 5718.9 |
| 25°   | 4010.4  | 4029.9  | 4147.3  | 4447.3  | 4636.4  | 4962.4  | 6194.9  | 8457.6  | 9122.8  | 8412.0  | 5914.5 |
| 27.5° | 3990.8  | 4016.9  | 4206.0  | 4590.7  | 4812.4  | 5125.5  | 6110.1  | 8490.3  | 9690.1  | 8966.3  | 6234.0 |
| 30°   | 4016.9  | 4056.0  | 4303.8  | 4740.7  | 4995.0  | 5347.2  | 6312.3  | 8522.9  | 10316.1 | 9598.8  | 6638.3 |
| 32.5° | 4121.2  | 4153.8  | 4453.8  | 4942.9  | 5236.3  | 5634.1  | 6657.9  | 8718.5  | 10909.5 | 10244.4 | 7023.0 |
| 35°   | 4238.6  | 4284.3  | 4642.9  | 5229.8  | 5581.9  | 6031.9  | 7127.4  | 9103.2  | 11476.8 | 10857.4 | 7420.8 |
| 37.5° | 4382.1  | 4434.2  | 4864.6  | 5555.8  | 5960.1  | 6468.8  | 7636.0  | 9637.9  | 11979.0 | 11359.5 | 7818.6 |
| 40°   | 4577.7  | 4636.4  | 5118.9  | 5901.4  | 6338.3  | 6847.0  | 8138.1  | 10166.1 | 12363.7 | 11659.4 | 8079.4 |
| 42.5° | 5347.2  | 5425.4  | 5627.6  | 6240.5  | 6729.6  | 7251.3  | 8633.7  | 10668.2 | 12507.1 | 11757.2 | 8131.6 |
| 45°   | 6781.8  | 6860.0  | 6807.9  | 6925.2  | 7251.3  | 7740.3  | 9175.0  | 11150.8 | 12526.7 | 11731.2 | 8105.5 |
| 47.5° | 8222.9  | 8314.2  | 8268.5  | 8203.3  | 8275.1  | 8509.8  | 9781.4  | 11457.3 | 12422.4 | 11718.1 | 8105.5 |
| 50°   | 9598.8  | 9546.6  | 9553.2  | 9533.6  | 9598.8  | 9722.7  | 10368.3 | 11516.0 | 12396.3 | 11842.0 | 8177.2 |
| 52.5° | 10335.7 | 10361.8 | 10524.8 | 10766.1 | 10909.5 | 11033.4 | 11039.9 | 11607.3 | 12207.2 | 11633.3 | 8092.5 |
| 55°   | 11059.5 | 11111.7 | 11489.9 | 11900.7 | 12220.2 | 12455.0 | 11711.6 | 11548.6 | 11079.1 | 10935.6 | 7649.1 |
| 57.5° | 11874.6 | 11946.3 | 12481.1 | 13328.8 | 13889.6 | 14013.5 | 12376.7 | 10453.1 | 9377.1  | 9937.9  | 6788.3 |
| 60°   | 12996.2 | 13081.0 | 13791.8 | 15063.4 | 15898.0 | 15643.7 | 12428.9 | 8712.0  | 7446.9  | 8249.0  | 5601.5 |
| 62.5° | 13876.5 | 14046.1 | 15330.7 | 17313.1 | 18232.5 | 17423.9 | 11457.3 | 6677.4  | 5203.7  | 5797.1  | 4088.6 |
| 65°   | 12937.5 | 13263.6 | 15356.8 | 19888.8 | 20951.8 | 19517.2 | 9931.4  | 4558.1  | 2934.4  | 3749.5  | 2614.9 |
| 67.5° | 10459.6 | 10916.0 | 13635.3 | 21140.9 | 22816.7 | 20619.2 | 7818.6  | 2419.3  | 1682.4  | 2178.0  | 1375.9 |
| 68°   | 9624.9  | 10120.5 | 13002.7 | 21140.9 | 22914.6 | 20521.4 | 7257.8  | 2093.2  | 1552.0  | 1956.3  | 1193.3 |
| 70°   | 6651.4  | 7003.5  | 9996.6  | 19954.1 | 22340.7 | 18708.6 | 4779.8  | 1199.9  | 1167.2  | 1343.3  | 789.0  |
| 72.5° | 3260.5  | 3638.7  | 5347.2  | 15813.3 | 18199.9 | 14378.7 | 2178.0  | 795.6   | 886.8   | 984.7   | 619.5  |
| 75°   | 1297.7  | 1375.9  | 2106.3  | 7799.0  | 11372.5 | 9175.0  | 1141.2  | 599.9   | 762.9   | 769.5   | 489.1  |
| 77.5° | 743.4   | 789.0   | 1167.2  | 2869.2  | 4264.7  | 4101.7  | 736.9   | 430.4   | 606.4   | 554.3   | 319.5  |
| 80°   | 417.3   | 423.9   | 658.6   | 1512.9  | 2438.8  | 2184.5  | 502.1   | 313.0   | 463.0   | 391.3   | 215.2  |
| 82.5° | 208.7   | 234.8   | 417.3   | 834.7   | 1356.4  | 1389.0  | 267.4   | 221.7   | 371.7   | 280.4   | 176.1  |
| 85°   | 150.0   | 163.0   | 300.0   | 463.0   | 626.0   | 939.0   | 163.0   | 110.9   | 280.4   | 189.1   | 123.9  |
| 87.5° | 78.3    | 97.8    | 189.1   | 228.2   | 254.3   | 319.5   | 78.3    | 52.2    | 156.5   | 110.9   | 65.2   |
| 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: P1438159

CATALOG NUMBER: GALN-SB4C-735-U-T4LG-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4290.8 | 4290.8 | 4290.8 | 4290.8 | 4290.8 | 4290.8 | 4290.8 | 4290.8 | 4290.8 | 4290.8 | 4290.8 |
| 2.5°  | 4290.8 | 4140.8 | 3834.3 | 3475.7 | 3195.3 | 2908.3 | 2673.6 | 2451.9 | 2347.5 | 2334.5 | 2360.6 |
| 5°    | 4271.2 | 3945.2 | 3247.4 | 2562.7 | 2001.9 | 1610.7 | 1395.5 | 1284.6 | 1225.9 | 1199.9 | 1206.4 |
| 7.5°  | 4232.1 | 3736.5 | 2621.4 | 1734.6 | 1297.7 | 1128.1 | 1076.0 | 1056.4 | 1049.9 | 1049.9 | 1049.9 |
| 10°   | 4193.0 | 3456.1 | 2008.4 | 1271.6 | 1062.9 | 1017.3 | 1004.2 | 1004.2 | 997.7  | 997.7  | 1004.2 |
| 12.5° | 4173.4 | 3195.3 | 1558.5 | 1062.9 | 991.2  | 971.6  | 958.6  | 952.1  | 952.1  | 952.1  | 958.6  |
| 15°   | 4127.8 | 2908.3 | 1258.5 | 984.7  | 945.5  | 919.5  | 912.9  | 906.4  | 906.4  | 906.4  | 906.4  |
| 17.5° | 4088.6 | 2627.9 | 1095.5 | 932.5  | 899.9  | 873.8  | 867.3  | 860.8  | 860.8  | 867.3  | 867.3  |
| 20°   | 4029.9 | 2360.6 | 984.7  | 880.3  | 854.2  | 828.2  | 821.6  | 815.1  | 821.6  | 821.6  | 821.6  |
| 22.5° | 3958.2 | 2138.9 | 919.5  | 841.2  | 808.6  | 782.5  | 782.5  | 782.5  | 782.5  | 782.5  | 789.0  |
| 25°   | 3912.6 | 1982.4 | 873.8  | 795.6  | 762.9  | 743.4  | 736.9  | 736.9  | 749.9  | 749.9  | 756.4  |
| 27.5° | 3984.3 | 1943.2 | 880.3  | 782.5  | 723.8  | 704.3  | 697.7  | 697.7  | 710.8  | 717.3  | 723.8  |
| 30°   | 4199.5 | 2015.0 | 958.6  | 821.6  | 697.7  | 665.1  | 658.6  | 658.6  | 678.2  | 684.7  | 691.2  |
| 32.5° | 4447.3 | 2164.9 | 1076.0 | 873.8  | 678.2  | 626.0  | 613.0  | 613.0  | 632.5  | 639.1  | 645.6  |
| 35°   | 4786.4 | 2399.7 | 1232.5 | 919.5  | 691.2  | 586.9  | 560.8  | 560.8  | 573.8  | 586.9  | 593.4  |
| 37.5° | 5223.3 | 2784.4 | 1415.0 | 952.1  | 691.2  | 541.2  | 508.6  | 502.1  | 515.2  | 515.2  | 521.7  |
| 40°   | 5679.7 | 3286.6 | 1604.1 | 952.1  | 658.6  | 495.6  | 463.0  | 443.4  | 449.9  | 443.4  | 449.9  |
| 42.5° | 5934.0 | 3690.8 | 1767.2 | 893.4  | 619.5  | 449.9  | 417.3  | 391.3  | 384.7  | 371.7  | 378.2  |
| 45°   | 6077.5 | 3873.4 | 1721.5 | 828.2  | 580.4  | 417.3  | 378.2  | 345.6  | 332.6  | 313.0  | 313.0  |
| 47.5° | 6077.5 | 3893.0 | 1473.7 | 776.0  | 541.2  | 391.3  | 339.1  | 306.5  | 286.9  | 267.4  | 273.9  |
| 50°   | 6005.8 | 3716.9 | 1167.2 | 723.8  | 495.6  | 365.2  | 306.5  | 280.4  | 254.3  | 241.3  | 241.3  |
| 52.5° | 5705.8 | 3143.1 | 893.4  | 658.6  | 443.4  | 332.6  | 273.9  | 247.8  | 221.7  | 215.2  | 215.2  |
| 55°   | 5190.7 | 2308.4 | 723.8  | 593.4  | 397.8  | 306.5  | 247.8  | 228.2  | 202.1  | 189.1  | 189.1  |
| 57.5° | 4219.0 | 1578.1 | 599.9  | 534.7  | 352.1  | 273.9  | 221.7  | 202.1  | 169.5  | 156.5  | 156.5  |
| 60°   | 3130.0 | 1030.3 | 508.6  | 469.5  | 300.0  | 247.8  | 195.6  | 169.5  | 143.5  | 130.4  | 123.9  |
| 62.5° | 2112.8 | 697.7  | 423.9  | 371.7  | 254.3  | 215.2  | 169.5  | 143.5  | 110.9  | 84.8   | 84.8   |
| 65°   | 1317.2 | 541.2  | 352.1  | 293.4  | 221.7  | 189.1  | 143.5  | 110.9  | 78.3   | 58.7   | 52.2   |
| 67.5° | 756.4  | 436.9  | 286.9  | 228.2  | 189.1  | 150.0  | 110.9  | 91.3   | 65.2   | 45.6   | 39.1   |
| 68°   | 697.7  | 417.3  | 267.4  | 215.2  | 176.1  | 143.5  | 104.3  | 84.8   | 58.7   | 39.1   | 39.1   |
| 70°   | 567.3  | 371.7  | 228.2  | 176.1  | 150.0  | 117.4  | 91.3   | 71.7   | 45.6   | 26.1   | 26.1   |
| 72.5° | 502.1  | 313.0  | 195.6  | 136.9  | 104.3  | 97.8   | 71.7   | 52.2   | 32.6   | 19.6   | 13.0   |
| 75°   | 410.8  | 247.8  | 156.5  | 104.3  | 71.7   | 71.7   | 52.2   | 32.6   | 13.0   | 0.0    | 0.0    |
| 77.5° | 267.4  | 182.6  | 123.9  | 65.2   | 39.1   | 45.6   | 32.6   | 13.0   | 0.0    | 0.0    | 0.0    |
| 80°   | 176.1  | 136.9  | 84.8   | 32.6   | 19.6   | 19.6   | 6.5    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 123.9  | 91.3   | 52.2   | 13.0   | 6.5    | 6.5    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 78.3   | 39.1   | 19.6   | 6.5    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 32.6   | 13.0   | 6.5    | 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: SP1-2407-184-5

Test Date: 10/10/2024

Luminaire Tested: GSS-SB1A-735-U-5WQ

Data in this report applies to families of products including GSS-SB1A-735-U-5WQ

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-184-5  
 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-735-U-5WQ**  
 Description: GALLEON II SITE SLIM 1SQ 350MA 5WQ HIGH DENSITY LIGHTSQUARE WITH 70 CRI 3500K CCT 26 LEDS

**Spectral Parameters**

CCT (K): 3369  
 CIE u': 0.2386  
 CIE v': 0.5156  
 Duv: 0.0013  
 CIE x: 0.4143  
 CIE y: 0.3980  
 CIE z: 0.1877  
 Peak Wavelength (nm): 590  
 Dominant Wavelength (nm): 580  
 Purity: 43.80166  
 Rf: 71.4  
 Rg: 96

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 70.1 |      |       |
| R1:       | 66.6 | R9:  | -40.2 |
| R2:       | 77.6 | R10: | 49.1  |
| R3:       | 88.5 | R11: | 66.3  |
| R4:       | 69.5 | R12: | 45.7  |
| R5:       | 66.4 | R13: | 68.0  |
| R6:       | 69.6 | R14: | 93.4  |
| R7:       | 77.5 | R15: | 57.6  |
| R8:       | 44.9 |      |       |



**Test Conditions**

Stabilization Time: 21M  
 Operation Time: 1H 21M  
 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 4-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               | 119                         | NR                      | 620               | 778                         | NR                      | 750               | 19                          | NR                      | 880               | 1                           | NR                      |
| 365               | 0                           | NR                      | 495               | 173                         | NR                      | 625               | 711                         | NR                      | 755               | 16                          | NR                      | 885               | 0                           | NR                      |
| 370               | 0                           | NR                      | 500               | 239                         | NR                      | 630               | 648                         | NR                      | 760               | 14                          | NR                      | 890               | 0                           | NR                      |
| 375               | 0                           | NR                      | 505               | 313                         | NR                      | 635               | 582                         | NR                      | 765               | 12                          | NR                      | 895               | 0                           | NR                      |
| 380               | 0                           | NR                      | 510               | 383                         | NR                      | 640               | 520                         | NR                      | 770               | 11                          | NR                      | 900               | 0                           | NR                      |
| 385               | 0                           | NR                      | 515               | 448                         | NR                      | 645               | 460                         | NR                      | 775               | 9                           | NR                      | 905               | 0                           | NR                      |
| 390               | 2                           | NR                      | 520               | 500                         | NR                      | 650               | 406                         | NR                      | 780               | 8                           | NR                      | 910               | 0                           | NR                      |
| 395               | 4                           | NR                      | 525               | 539                         | NR                      | 655               | 355                         | NR                      | 785               | 7                           | NR                      | 915               | 0                           | NR                      |
| 400               | 6                           | NR                      | 530               | 575                         | NR                      | 660               | 309                         | NR                      | 790               | 6                           | NR                      | 920               | 0                           | NR                      |
| 405               | 11                          | NR                      | 535               | 606                         | NR                      | 665               | 269                         | NR                      | 795               | 5                           | NR                      | 925               | 0                           | NR                      |
| 410               | 22                          | NR                      | 540               | 633                         | NR                      | 670               | 231                         | NR                      | 800               | 4                           | NR                      | 930               | 0                           | NR                      |
| 415               | 45                          | NR                      | 545               | 666                         | NR                      | 675               | 199                         | NR                      | 805               | 4                           | NR                      | 935               | 0                           | NR                      |
| 420               | 96                          | NR                      | 550               | 701                         | NR                      | 680               | 171                         | NR                      | 810               | 3                           | NR                      | 940               | 0                           | NR                      |
| 425               | 193                         | NR                      | 555               | 743                         | NR                      | 685               | 147                         | NR                      | 815               | 3                           | NR                      | 945               | 0                           | NR                      |
| 430               | 341                         | NR                      | 560               | 788                         | NR                      | 690               | 126                         | NR                      | 820               | 3                           | NR                      | 950               | 0                           | NR                      |
| 435               | 547                         | NR                      | 565               | 837                         | NR                      | 695               | 107                         | NR                      | 825               | 2                           | NR                      | 955               | 0                           | NR                      |
| 440               | 799                         | NR                      | 570               | 887                         | NR                      | 700               | 92                          | NR                      | 830               | 2                           | NR                      | 960               | 0                           | NR                      |
| 445               | 831                         | NR                      | 575               | 931                         | NR                      | 705               | 78                          | NR                      | 835               | 2                           | NR                      | 965               | 0                           | NR                      |
| 450               | 461                         | NR                      | 580               | 967                         | NR                      | 710               | 67                          | NR                      | 840               | 2                           | NR                      | 970               | 0                           | NR                      |
| 455               | 256                         | NR                      | 585               | 990                         | NR                      | 715               | 57                          | NR                      | 845               | 1                           | NR                      | 975               | 0                           | NR                      |
| 460               | 176                         | NR                      | 590               | 1000                        | NR                      | 720               | 49                          | NR                      | 850               | 1                           | NR                      | 980               | 0                           | NR                      |
| 465               | 107                         | NR                      | 595               | 994                         | NR                      | 725               | 42                          | NR                      | 855               | 1                           | NR                      | 985               | 0                           | NR                      |
| 470               | 74                          | NR                      | 600               | 973                         | NR                      | 730               | 36                          | NR                      | 860               | 1                           | NR                      | 990               | 0                           | NR                      |
| 475               | 67                          | NR                      | 605               | 938                         | NR                      | 735               | 31                          | NR                      | 865               | 1                           | NR                      | 995               | 0                           | NR                      |
| 480               | 68                          | NR                      | 610               | 892                         | NR                      | 740               | 26                          | NR                      | 870               | 1                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 84                          | NR                      | 615               | 838                         | NR                      | 745               | 22                          | NR                      | 875               | 1                           | NR                      |                   |                             |                         |

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.29**

| 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    | 119                      | NR            | 620    | 778                      | NR            | 750    | 19                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 173                      | NR            | 625    | 711                      | NR            | 755    | 16                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 239                      | NR            | 630    | 648                      | NR            | 760    | 14                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 313                      | NR            | 635    | 582                      | NR            | 765    | 12                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 383                      | NR            | 640    | 520                      | NR            | 770    | 11                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 448                      | NR            | 645    | 460                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 500                      | NR            | 650    | 406                      | NR            | 780    | 8                        | NR            | 910    | 0                        | NR            |
| 395    | 4                        | NR            | 525    | 539                      | NR            | 655    | 355                      | NR            | 785    | 7                        | NR            | 915    | 0                        | NR            |
| 400    | 6                        | NR            | 530    | 575                      | NR            | 660    | 309                      | NR            | 790    | 6                        | NR            | 920    | 0                        | NR            |
| 405    | 11                       | NR            | 535    | 606                      | NR            | 665    | 269                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 22                       | NR            | 540    | 633                      | NR            | 670    | 231                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 45                       | NR            | 545    | 666                      | NR            | 675    | 199                      | NR            | 805    | 4                        | NR            | 935    | 0                        | NR            |
| 420    | 96                       | NR            | 550    | 701                      | NR            | 680    | 171                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 193                      | NR            | 555    | 743                      | NR            | 685    | 147                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 341                      | NR            | 560    | 788                      | NR            | 690    | 126                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 547                      | NR            | 565    | 837                      | NR            | 695    | 107                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 799                      | NR            | 570    | 887                      | NR            | 700    | 92                       | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 831                      | NR            | 575    | 931                      | NR            | 705    | 78                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 461                      | NR            | 580    | 967                      | NR            | 710    | 67                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 256                      | NR            | 585    | 990                      | NR            | 715    | 57                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 176                      | NR            | 590    | 1000                     | NR            | 720    | 49                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 107                      | NR            | 595    | 994                      | NR            | 725    | 42                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 74                       | NR            | 600    | 973                      | NR            | 730    | 36                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 67                       | NR            | 605    | 938                      | NR            | 735    | 31                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 68                       | NR            | 610    | 892                      | NR            | 740    | 26                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 84                       | NR            | 615    | 838                      | NR            | 745    | 22                       | NR            | 875    | 1                        | NR            |        |                          |               |

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Melanopic Flux vs. Wavelength



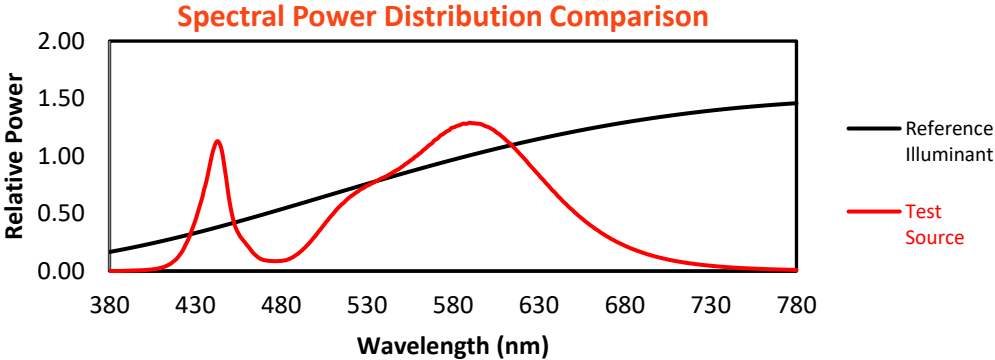
Melanopic Lumens: NR

M/P: 2.36

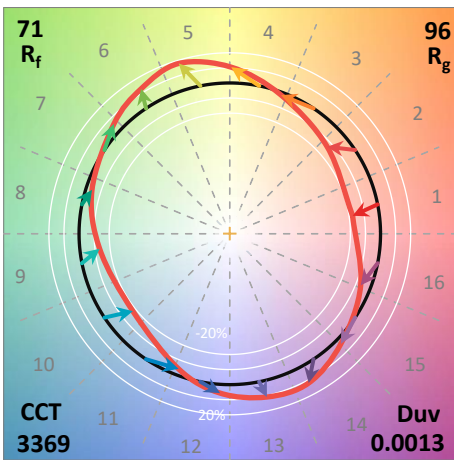
| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 119                      | NR            | 620    | 778                      | NR            | 750    | 19                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 173                      | NR            | 625    | 711                      | NR            | 755    | 16                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 239                      | NR            | 630    | 648                      | NR            | 760    | 14                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 313                      | NR            | 635    | 582                      | NR            | 765    | 12                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 383                      | NR            | 640    | 520                      | NR            | 770    | 11                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 448                      | NR            | 645    | 460                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 500                      | NR            | 650    | 406                      | NR            | 780    | 8                        | NR            | 910    | 0                        | NR            |
| 395    | 4                        | NR            | 525    | 539                      | NR            | 655    | 355                      | NR            | 785    | 7                        | NR            | 915    | 0                        | NR            |
| 400    | 6                        | NR            | 530    | 575                      | NR            | 660    | 309                      | NR            | 790    | 6                        | NR            | 920    | 0                        | NR            |
| 405    | 11                       | NR            | 535    | 606                      | NR            | 665    | 269                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 22                       | NR            | 540    | 633                      | NR            | 670    | 231                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 45                       | NR            | 545    | 666                      | NR            | 675    | 199                      | NR            | 805    | 4                        | NR            | 935    | 0                        | NR            |
| 420    | 96                       | NR            | 550    | 701                      | NR            | 680    | 171                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 193                      | NR            | 555    | 743                      | NR            | 685    | 147                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 341                      | NR            | 560    | 788                      | NR            | 690    | 126                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 547                      | NR            | 565    | 837                      | NR            | 695    | 107                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 799                      | NR            | 570    | 887                      | NR            | 700    | 92                       | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 831                      | NR            | 575    | 931                      | NR            | 705    | 78                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 461                      | NR            | 580    | 967                      | NR            | 710    | 67                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 256                      | NR            | 585    | 990                      | NR            | 715    | 57                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 176                      | NR            | 590    | 1000                     | NR            | 720    | 49                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 107                      | NR            | 595    | 994                      | NR            | 725    | 42                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 74                       | NR            | 600    | 973                      | NR            | 730    | 36                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 67                       | NR            | 605    | 938                      | NR            | 735    | 31                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 68                       | NR            | 610    | 892                      | NR            | 740    | 26                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 84                       | NR            | 615    | 838                      | NR            | 745    | 22                       | NR            | 875    | 1                        | NR            |        |                          |               |

**Summary**

$R_f = 71.4$   
 $R_g = 96$   
 $CIE R_a = 70.1$   
 $R_9 = -40.2$



**Color Vector Graphics**

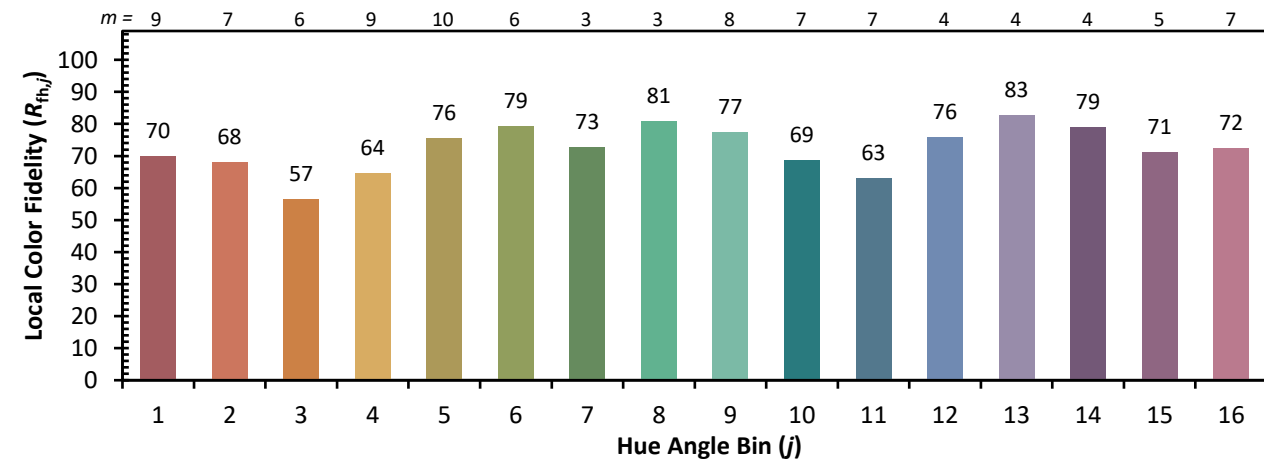
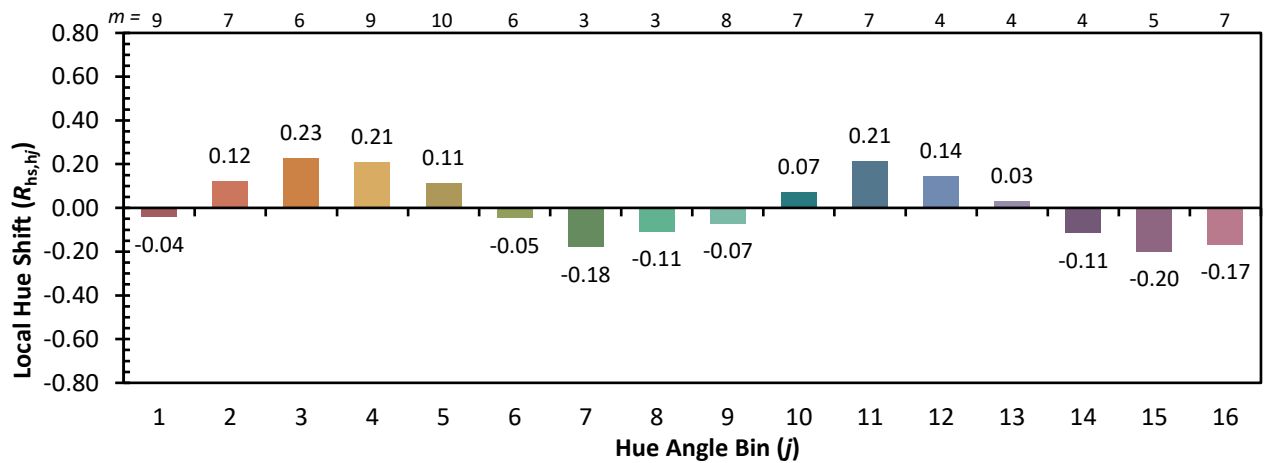
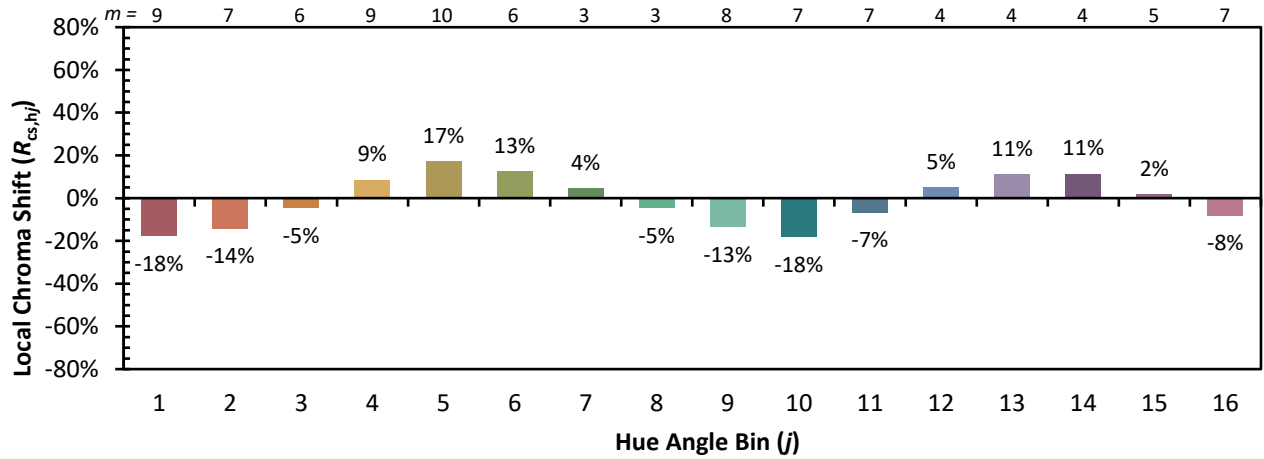


Individual Sample Fidelity Index ( $R_{f,i}$ )

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 57 | CES51 = 84 | CES76 = 50 |
| CES02 = 62 | CES27 = 80 | CES52 = 86 | CES77 = 74 |
| CES03 = 31 | CES28 = 81 | CES53 = 72 | CES78 = 54 |
| CES04 = 70 | CES29 = 50 | CES54 = 79 | CES79 = 81 |
| CES05 = 48 | CES30 = 55 | CES55 = 78 | CES80 = 79 |
| CES06 = 51 | CES31 = 56 | CES56 = 67 | CES81 = 74 |
| CES07 = 40 | CES32 = 54 | CES57 = 65 | CES82 = 91 |
| CES08 = 39 | CES33 = 60 | CES58 = 68 | CES83 = 86 |
| CES09 = 29 | CES34 = 69 | CES59 = 85 | CES84 = 89 |
| CES10 = 75 | CES35 = 83 | CES60 = 91 | CES85 = 83 |
| CES11 = 58 | CES36 = 88 | CES61 = 85 | CES86 = 66 |
| CES12 = 64 | CES37 = 78 | CES62 = 78 | CES87 = 77 |
| CES13 = 43 | CES38 = 64 | CES63 = 71 | CES88 = 75 |
| CES14 = 74 | CES39 = 92 | CES64 = 70 | CES89 = 68 |
| CES15 = 71 | CES40 = 86 | CES65 = 64 | CES90 = 72 |
| CES16 = 47 | CES41 = 81 | CES66 = 65 | CES91 = 95 |
| CES17 = 50 | CES42 = 79 | CES67 = 63 | CES92 = 62 |
| CES18 = 56 | CES43 = 71 | CES68 = 69 | CES93 = 78 |
| CES19 = 72 | CES44 = 98 | CES69 = 80 | CES94 = 51 |
| CES20 = 65 | CES45 = 80 | CES70 = 60 | CES95 = 70 |
| CES21 = 87 | CES46 = 75 | CES71 = 58 | CES96 = 76 |
| CES22 = 79 | CES47 = 71 | CES72 = 85 | CES97 = 82 |
| CES23 = 92 | CES48 = 61 | CES73 = 51 | CES98 = 72 |
| CES24 = 91 | CES49 = 74 | CES74 = 94 | CES99 = 60 |
| CES25 = 72 | CES50 = 83 | CES75 = 57 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)