

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: P322084

Luminaire Tested: **GLEON-SA0B-830-U-T2-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P322084  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-13)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA0B-830-U-T2-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(10) 80 CRI, 3000K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 31975 lumens  
Efficiency: N/A  
Efficacy: 76.3 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B2 - U0 - G4

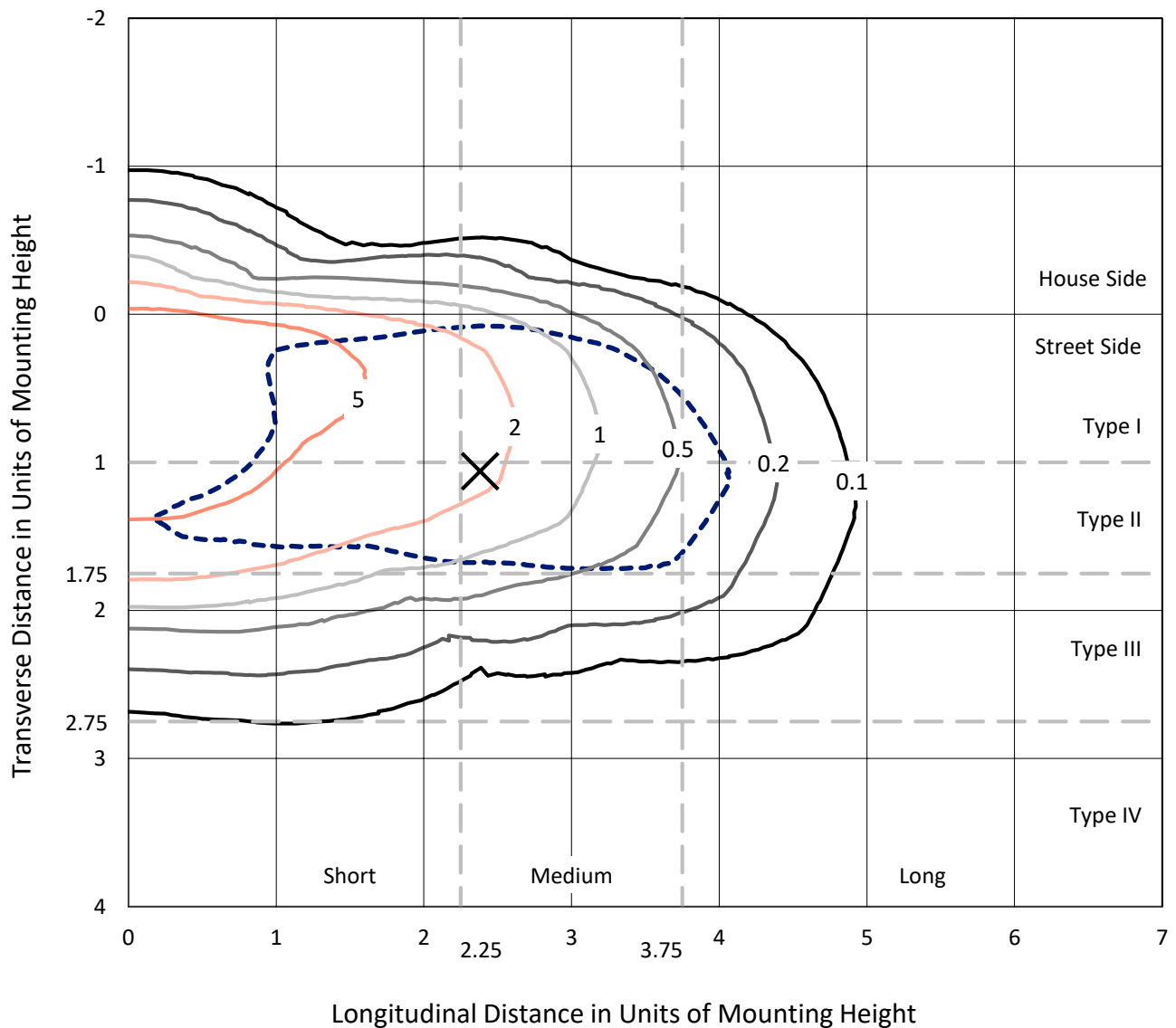
Input Watts (W): 419  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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### Iso-Footcandle Lines of Horizontal Illumination

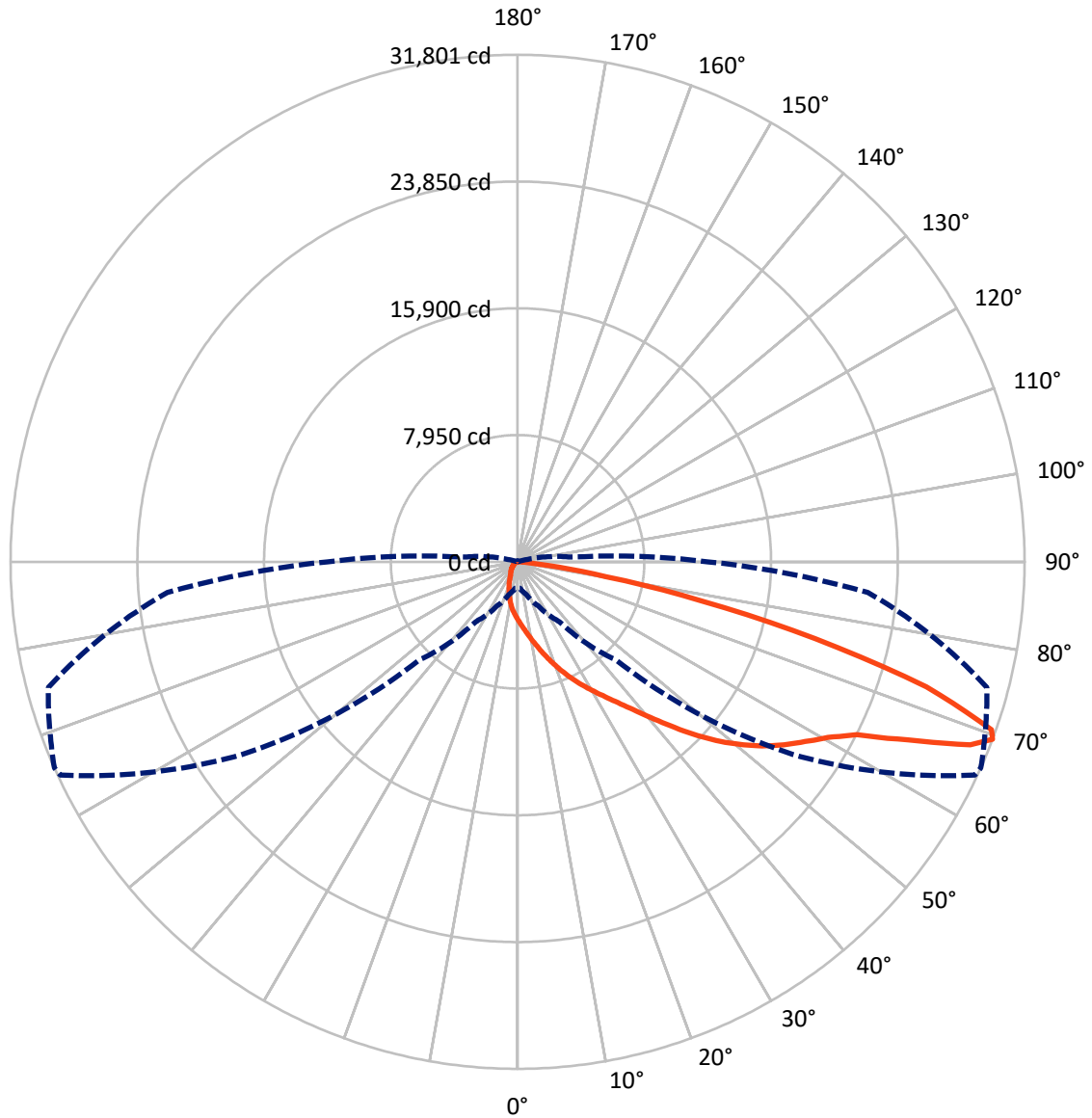
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 9.6 fc  
 Type II - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 66-Deg Lateral      - - - Horizontal Cone Through 69-Deg Vertical

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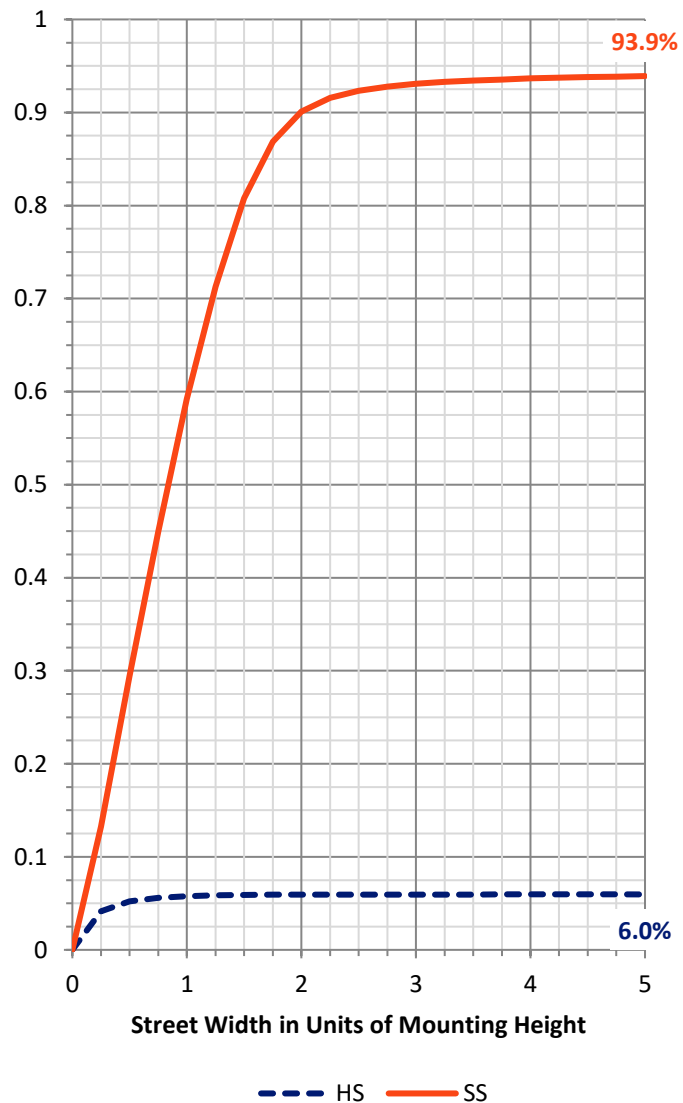
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1918.0   | 0.0    | 1918.0  |
|                    | % Fixture | 6.0      | 0.0    | 6.0     |
| <b>Street Side</b> | Lumens    | 30056.9  | 0.0    | 30056.9 |
|                    | % Fixture | 94.0     | 0.0    | 94.0    |
| <b>Total</b>       | Lumens    | 31975.0  | 0.0    | 31975.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 351.7   | 1.1       |
| 10°-20°   | 1046.9  | 3.3       |
| 20°-30°   | 1823.0  | 5.7       |
| 30°-40°   | 3198.4  | 10.0      |
| 40°-50°   | 5353.6  | 16.7      |
| 50°-60°   | 7869.3  | 24.6      |
| 60°-70°   | 8079.7  | 25.3      |
| 70°-80°   | 3988.7  | 12.5      |
| 80°-90°   | 263.7   | 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°    | 31975.0 | 100.0     |
| 0°-180°   | 31975.0 | 100.0     |

**Coefficient of Utilization**

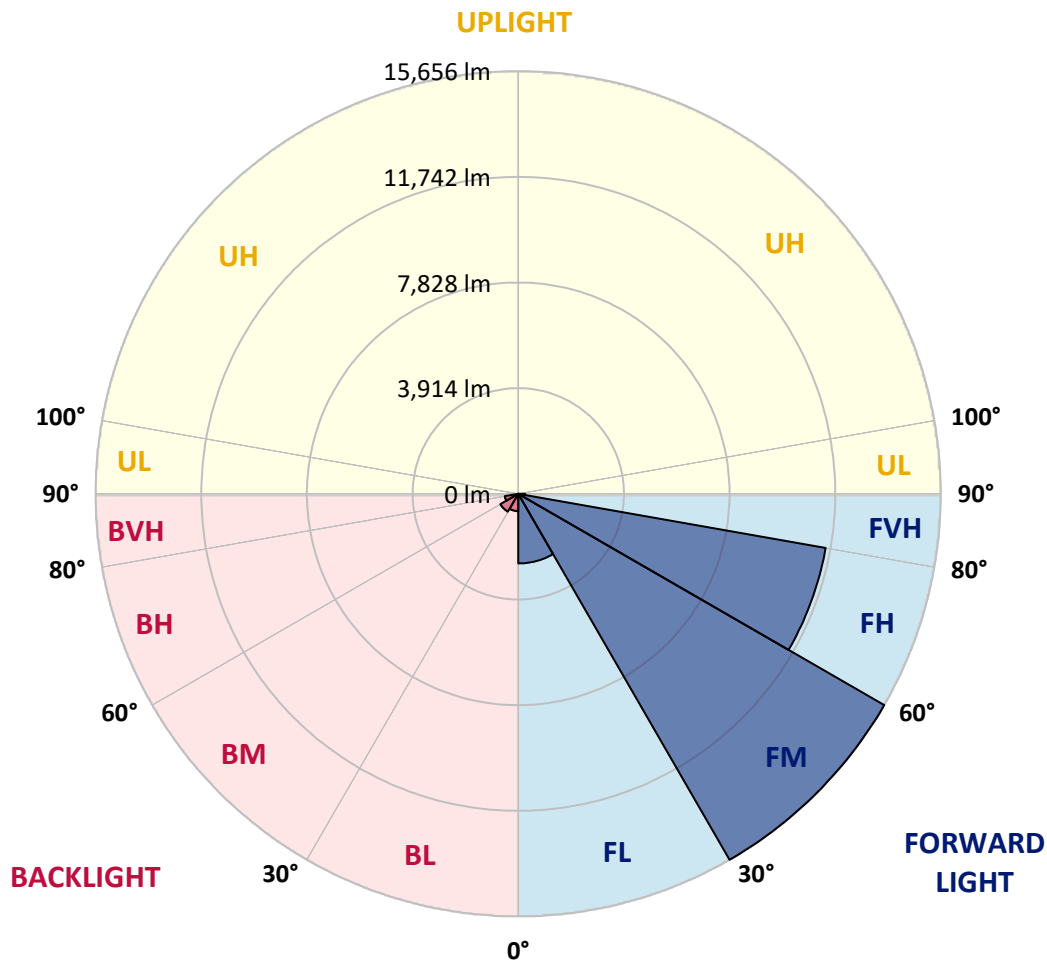


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|----------------|---------|-----------|-------------------------|------|----------|
|                |         |           | B                       | U    | G        |
| FL (0°-30°)    | 2580.1  | 8.1       |                         |      |          |
| FM (30°-60°)   | 15656.5 | 49.0      |                         |      |          |
| FH (60°-80°)   | 11563.0 | 36.2      |                         |      | G4/12000 |
| FVH (80°-90°)  | 257.4   | 0.8       |                         |      | G3/500   |
| BL (0°-30°)    | 641.5   | 2.0       | B2/1000                 |      |          |
| BM (30°-60°)   | 764.7   | 2.4       | B1/1000                 |      |          |
| BH (60°-80°)   | 505.5   | 1.6       | B2/1000                 |      | G2/1000  |
| BVH (80°-90°)  | 6.4     | 0.0       |                         |      | G0/10    |
| UL (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B2-U0-G4**  
 Type II Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 66°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3638.9  | 3638.9  | 3638.9  | 3638.9  | 3638.9  | 3638.9  | 3638.9  | 3638.9  | 3638.9  | 3638.9  | 3638.9  |
| 2.5°  | 4282.8  | 4264.6  | 4257.0  | 4223.6  | 4165.9  | 4121.8  | 4036.8  | 3938.0  | 3919.8  | 3824.1  | 3707.2  |
| 5°    | 4838.6  | 4823.5  | 4812.8  | 4765.7  | 4706.5  | 4595.7  | 4440.7  | 4257.0  | 4222.0  | 4039.8  | 3805.9  |
| 7.5°  | 5225.9  | 5253.3  | 5253.3  | 5222.9  | 5148.5  | 5064.9  | 4875.1  | 4624.5  | 4580.5  | 4301.0  | 3938.0  |
| 10°   | 5452.2  | 5485.6  | 5511.4  | 5537.3  | 5526.6  | 5493.2  | 5314.0  | 5031.5  | 4978.4  | 4607.8  | 4091.4  |
| 12.5° | 5473.5  | 5506.9  | 5579.8  | 5687.6  | 5792.4  | 5868.3  | 5756.0  | 5482.6  | 5421.8  | 4963.2  | 4273.7  |
| 15°   | 5355.0  | 5389.9  | 5502.3  | 5711.9  | 5965.5  | 6187.3  | 6223.7  | 5982.2  | 5920.0  | 5386.9  | 4501.5  |
| 17.5° | 5148.5  | 5171.2  | 5332.2  | 5622.3  | 6020.2  | 6427.2  | 6647.4  | 6518.4  | 6460.6  | 5871.4  | 4755.1  |
| 20°   | 4995.1  | 5011.8  | 5153.0  | 5464.4  | 5986.8  | 6577.6  | 7048.4  | 7087.9  | 7027.1  | 6390.8  | 5030.0  |
| 22.5° | 5257.8  | 5288.2  | 5292.7  | 5440.1  | 5895.7  | 6652.0  | 7400.7  | 7648.3  | 7602.7  | 6942.1  | 5300.3  |
| 25°   | 5976.2  | 6011.1  | 5895.7  | 5804.6  | 5973.1  | 6685.4  | 7703.0  | 8222.4  | 8185.9  | 7535.9  | 5572.2  |
| 27.5° | 6925.4  | 6961.8  | 6813.0  | 6541.1  | 6378.6  | 6811.5  | 7971.8  | 8805.5  | 8804.0  | 8164.6  | 5865.3  |
| 30°   | 7857.9  | 7894.3  | 7742.4  | 7470.6  | 7097.0  | 7168.4  | 8204.1  | 9416.1  | 9425.2  | 8813.1  | 6176.6  |
| 32.5° | 8835.9  | 8881.5  | 8725.1  | 8375.8  | 7985.4  | 7785.0  | 8530.7  | 10029.6 | 10081.3 | 9564.9  | 6527.5  |
| 35°   | 9947.6  | 9953.7  | 9733.5  | 9367.5  | 8917.9  | 8609.6  | 9054.6  | 10717.6 | 10840.6 | 10495.9 | 6972.5  |
| 37.5° | 11038.1 | 11082.1 | 10901.4 | 10324.3 | 9911.2  | 9561.9  | 9833.7  | 11577.2 | 11751.9 | 11633.4 | 7554.1  |
| 40°   | 11846.0 | 11938.7 | 11912.9 | 11290.2 | 10898.3 | 10649.3 | 10801.2 | 12599.3 | 12821.1 | 12957.7 | 8287.7  |
| 42.5° | 12353.3 | 12423.1 | 12541.6 | 12166.5 | 11811.1 | 11852.1 | 11943.2 | 13790.0 | 14063.4 | 14467.3 | 9130.6  |
| 45°   | 12935.0 | 12968.4 | 13067.1 | 12901.5 | 12661.6 | 13074.7 | 13155.2 | 15131.0 | 15418.1 | 16090.9 | 10066.1 |
| 47.5° | 13645.7 | 13724.7 | 13752.0 | 13600.2 | 13490.8 | 14156.0 | 14323.1 | 16350.6 | 16753.0 | 17829.8 | 11056.3 |
| 50°   | 14550.9 | 14572.1 | 14619.2 | 14520.5 | 14411.2 | 15085.5 | 15371.0 | 17630.8 | 17996.9 | 19574.8 | 12032.8 |
| 52.5° | 15436.3 | 15512.2 | 15676.2 | 15614.0 | 15569.9 | 15876.7 | 16305.0 | 18785.1 | 19193.6 | 21029.7 | 13007.9 |
| 55°   | 15691.4 | 15756.7 | 16323.2 | 16710.5 | 17068.9 | 16851.7 | 17198.0 | 19819.3 | 20261.3 | 22329.8 | 13946.4 |
| 57.5° | 14672.4 | 14804.5 | 15785.6 | 16794.0 | 18280.9 | 18367.4 | 18425.1 | 20880.9 | 21277.3 | 23326.0 | 14923.0 |
| 60°   | 12096.6 | 12122.4 | 13732.3 | 15462.1 | 18080.4 | 19690.2 | 20217.2 | 22021.5 | 22354.1 | 24254.0 | 16092.4 |
| 62.5° | 7693.8  | 7956.6  | 9722.9  | 12165.0 | 15960.2 | 19498.9 | 22384.4 | 23746.7 | 23868.2 | 25367.2 | 17769.0 |
| 65°   | 3664.7  | 3834.8  | 5107.5  | 7516.2  | 11560.5 | 17049.2 | 23880.4 | 26867.7 | 26922.4 | 27573.9 | 20009.2 |
| 67.5° | 2029.0  | 2111.0  | 2717.0  | 4045.9  | 6758.3  | 12057.1 | 23275.9 | 30564.3 | 30615.9 | 29827.7 | 21974.4 |
| 69°   | 1587.1  | 1656.9  | 2133.8  | 3049.6  | 4582.0  | 8665.8  | 21063.2 | 31647.1 | 31800.5 | 30473.2 | 22044.2 |
| 70°   | 1347.1  | 1415.4  | 1837.7  | 2575.8  | 3684.4  | 6696.0  | 18748.6 | 31378.3 | 31540.8 | 30412.4 | 21523.3 |
| 72.5° | 824.7   | 864.2   | 1224.1  | 1813.4  | 2469.4  | 3368.5  | 11562.0 | 26536.6 | 26811.5 | 27897.4 | 18498.0 |
| 75°   | 555.9   | 577.1   | 765.4   | 1251.4  | 1766.3  | 1734.4  | 6006.5  | 18704.6 | 19299.9 | 21701.0 | 13662.4 |
| 77.5° | 397.9   | 417.6   | 513.3   | 809.5   | 1237.8  | 1145.1  | 2720.0  | 11624.3 | 11751.9 | 13015.4 | 7450.8  |
| 80°   | 226.3   | 244.5   | 363.0   | 481.4   | 839.9   | 763.9   | 1081.3  | 5552.4  | 5616.2  | 5581.3  | 2487.7  |
| 82.5° | 118.5   | 133.6   | 199.0   | 317.4   | 539.1   | 499.7   | 449.5   | 1858.9  | 1868.0  | 1553.7  | 545.2   |
| 85°   | 22.8    | 27.3    | 98.7    | 217.2   | 277.9   | 217.2   | 183.8   | 435.9   | 445.0   | 393.3   | 135.2   |
| 87.5° | 0.0     | 1.5     | 39.5    | 48.6    | 54.7    | 56.2    | 59.2    | 85.0    | 91.1    | 123.0   | 36.4    |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



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**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3638.9  | 3638.9 | 3638.9 | 3638.9 | 3638.9 | 3638.9 | 3638.9 | 3638.9 | 3638.9 | 3638.9 | 3638.9 |
| 2.5°  | 3655.6  | 3600.9 | 3496.1 | 3374.6 | 3280.4 | 3187.8 | 3114.9 | 3039.0 | 3011.6 | 2998.0 | 2996.4 |
| 5°    | 3692.0  | 3576.6 | 3354.9 | 3127.0 | 2940.2 | 2764.1 | 2638.0 | 2518.0 | 2461.8 | 2436.0 | 2425.4 |
| 7.5°  | 3752.8  | 3567.5 | 3210.6 | 2862.8 | 2594.0 | 2373.8 | 2199.1 | 2068.5 | 2003.2 | 1975.9 | 1965.2 |
| 10°   | 3824.1  | 3555.3 | 3042.0 | 2583.3 | 2240.1 | 2012.3 | 1839.2 | 1710.1 | 1638.7 | 1608.3 | 1593.1 |
| 12.5° | 3907.7  | 3534.1 | 2847.6 | 2300.9 | 1937.9 | 1710.1 | 1500.5 | 1341.0 | 1259.0 | 1224.1 | 1207.4 |
| 15°   | 4010.9  | 3512.8 | 2644.1 | 2035.1 | 1672.1 | 1394.2 | 1164.9 | 1057.0 | 1040.3 | 1034.2 | 1035.8 |
| 17.5° | 4112.7  | 3479.4 | 2422.4 | 1772.3 | 1392.7 | 1088.9 | 972.0  | 965.9  | 968.9  | 968.9  | 968.9  |
| 20°   | 4203.8  | 3403.5 | 2180.9 | 1547.6 | 1126.9 | 918.8  | 894.5  | 883.9  | 876.3  | 870.2  | 862.6  |
| 22.5° | 4275.2  | 3301.7 | 1948.5 | 1324.3 | 920.3  | 841.4  | 803.4  | 770.0  | 742.7  | 724.4  | 715.3  |
| 25°   | 4323.8  | 3166.5 | 1735.9 | 1110.2 | 827.7  | 765.4  | 697.1  | 640.9  | 598.4  | 572.6  | 561.9  |
| 27.5° | 4360.3  | 3020.7 | 1546.1 | 929.5  | 763.9  | 677.3  | 587.7  | 520.9  | 476.9  | 454.1  | 445.0  |
| 30°   | 4386.1  | 2855.2 | 1379.0 | 817.1  | 692.5  | 584.7  | 489.0  | 423.7  | 391.8  | 379.7  | 373.6  |
| 32.5° | 4410.4  | 2671.4 | 1221.1 | 763.9  | 625.7  | 499.7  | 410.1  | 359.9  | 340.2  | 325.0  | 320.5  |
| 35°   | 4471.1  | 2501.3 | 1070.7 | 707.7  | 557.4  | 426.8  | 352.3  | 315.9  | 296.2  | 287.0  | 284.0  |
| 37.5° | 4615.4  | 2375.3 | 926.4  | 650.0  | 489.0  | 369.0  | 308.3  | 282.5  | 264.3  | 255.1  | 252.1  |
| 40°   | 4847.8  | 2311.5 | 804.9  | 587.7  | 422.2  | 325.0  | 279.4  | 255.1  | 235.4  | 221.7  | 218.7  |
| 42.5° | 5189.5  | 2320.6 | 719.9  | 525.5  | 369.0  | 290.1  | 252.1  | 223.3  | 202.0  | 189.8  | 186.8  |
| 45°   | 5604.1  | 2387.4 | 660.6  | 464.7  | 325.0  | 262.7  | 221.7  | 191.4  | 171.6  | 161.0  | 157.9  |
| 47.5° | 6053.6  | 2495.3 | 612.0  | 410.1  | 290.1  | 236.9  | 191.4  | 159.5  | 142.8  | 133.6  | 132.1  |
| 50°   | 6527.5  | 2600.1 | 561.9  | 356.9  | 259.7  | 211.1  | 161.0  | 132.1  | 118.5  | 110.9  | 107.8  |
| 52.5° | 7007.4  | 2721.5 | 516.4  | 308.3  | 233.9  | 180.7  | 133.6  | 107.8  | 97.2   | 91.1   | 88.1   |
| 55°   | 7523.7  | 2812.7 | 472.3  | 270.3  | 208.1  | 153.4  | 110.9  | 89.6   | 80.5   | 72.9   | 71.4   |
| 57.5° | 8131.2  | 2953.9 | 426.8  | 233.9  | 177.7  | 127.6  | 91.1   | 71.4   | 63.8   | 56.2   | 54.7   |
| 60°   | 8951.3  | 3119.5 | 378.2  | 206.5  | 145.8  | 104.8  | 74.4   | 57.7   | 48.6   | 42.5   | 41.0   |
| 62.5° | 10032.7 | 3303.2 | 317.4  | 180.7  | 118.5  | 85.0   | 59.2   | 45.6   | 34.9   | 27.3   | 27.3   |
| 65°   | 11404.1 | 3602.4 | 259.7  | 151.9  | 97.2   | 69.9   | 45.6   | 33.4   | 19.7   | 12.1   | 12.1   |
| 67.5° | 12204.4 | 3654.0 | 209.6  | 124.5  | 79.0   | 59.2   | 38.0   | 22.8   | 6.1    | 1.5    | 0.0    |
| 69°   | 11947.8 | 3354.9 | 177.7  | 106.3  | 68.3   | 56.2   | 34.9   | 16.7   | 3.0    | 0.0    | 0.0    |
| 70°   | 11464.8 | 3067.8 | 156.4  | 94.2   | 62.3   | 53.2   | 33.4   | 12.1   | 3.0    | 0.0    | 0.0    |
| 72.5° | 9473.8  | 2183.9 | 118.5  | 69.9   | 45.6   | 47.1   | 30.4   | 7.6    | 3.0    | 0.0    | 0.0    |
| 75°   | 6901.1  | 1327.4 | 85.0   | 48.6   | 28.9   | 34.9   | 21.3   | 3.0    | 1.5    | 0.0    | 0.0    |
| 77.5° | 3839.3  | 625.7  | 53.2   | 27.3   | 18.2   | 21.3   | 10.6   | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 1246.9  | 170.1  | 24.3   | 15.2   | 10.6   | 12.1   | 4.6    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 230.8   | 48.6   | 13.7   | 7.6    | 3.0    | 3.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 50.1    | 19.7   | 7.6    | 3.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 16.7    | 6.1    | 1.5    | 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: SP1-2408-195-9

Test Date: 08/07/2024

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

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

**Test Information**

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

**Spectral Parameters**

CCT (K): 3050  
 CIE u': 0.2476  
 CIE v': 0.5251  
 Duv: 0.0034  
 CIE x: 0.4383  
 CIE y: 0.4131  
 CIE z: 0.1487  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 581  
 Purity: 55.55201  
 Rf: 81.5  
 Rg: 99.2

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



**Test Conditions**

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

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

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 3000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

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

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.27**

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

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 2.32**

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

**Summary**

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



**Color Vector Graphics**





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

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



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)