

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: P322424

Luminaire Tested: **GLEON-SA0D-830-U-T3-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P322424  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-15)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA0D-830-U-T3-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(10) 80 CRI, 3000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 44474 lumens  
Efficiency: N/A  
Efficacy: 69.5 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B3 - U0 - G5

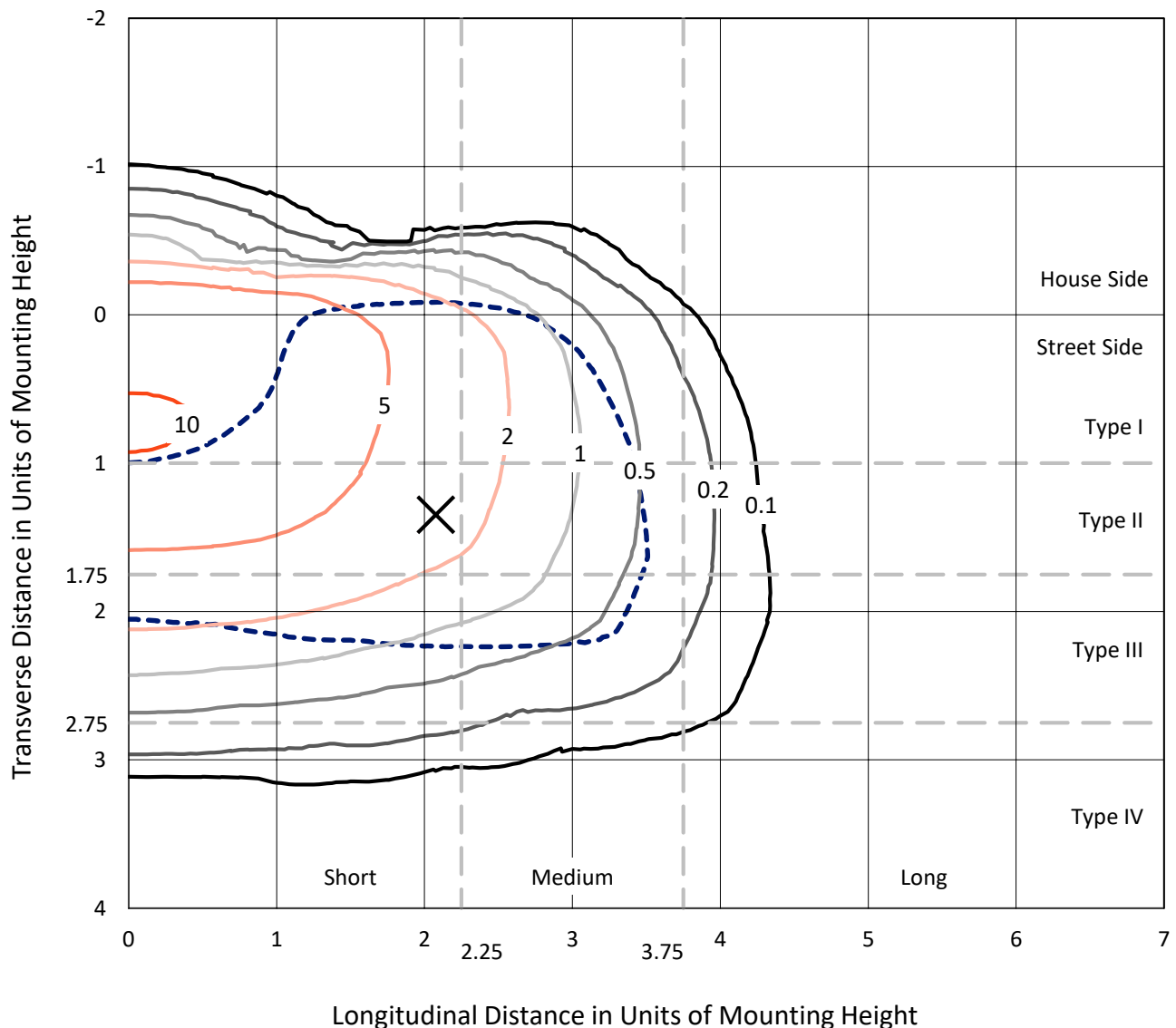
Input Watts (W): 640  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P322424  
 CATALOG NUMBER: GLEON-SA0D-830-U-T3-HSS

## Iso-Footcandle Lines of Horizontal Illumination

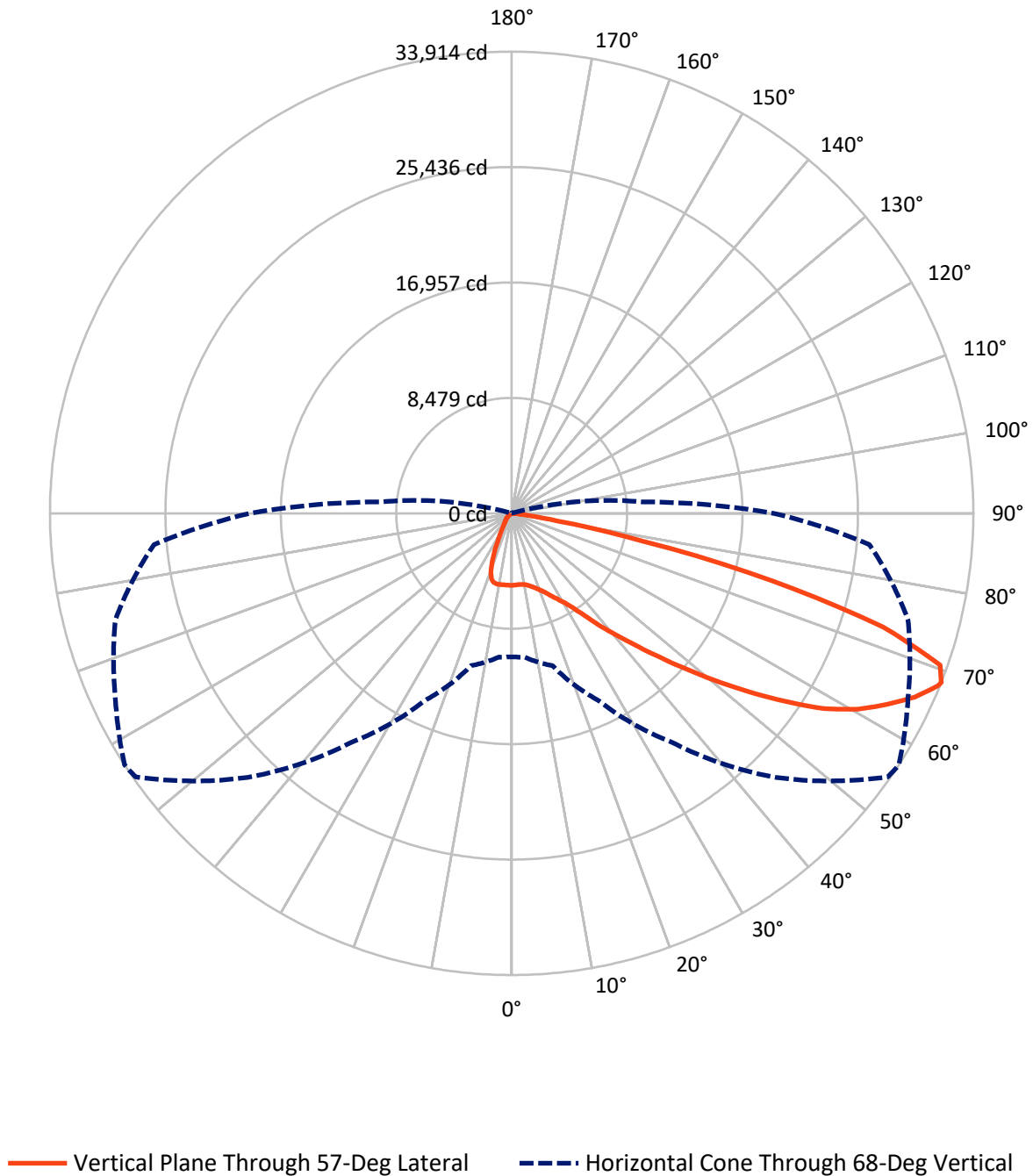
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 10.9 fc  
 Type III - Short - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA0D-830-U-T3-HSS

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4876.8   | 0.0    | 4876.8  |
|                    | % Fixture | 11.0     | 0.0    | 11.0    |
| <b>Street Side</b> | Lumens    | 39597.2  | 0.0    | 39597.2 |
|                    | % Fixture | 89.0     | 0.0    | 89.0    |
| <b>Total</b>       | Lumens    | 44474.0  | 0.0    | 44474.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 494.6   | 1.1       |
| 10°-20°   | 1370.5  | 3.1       |
| 20°-30°   | 2364.2  | 5.3       |
| 30°-40°   | 4080.5  | 9.2       |
| 40°-50°   | 6979.8  | 15.7      |
| 50°-60°   | 11167.1 | 25.1      |
| 60°-70°   | 12902.3 | 29.0      |
| 70°-80°   | 4930.2  | 11.1      |
| 80°-90°   | 184.8   | 0.4       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 44474.0 | 100.0     |
| 0°-180°   | 44474.0 | 100.0     |

**Coefficient of Utilization**



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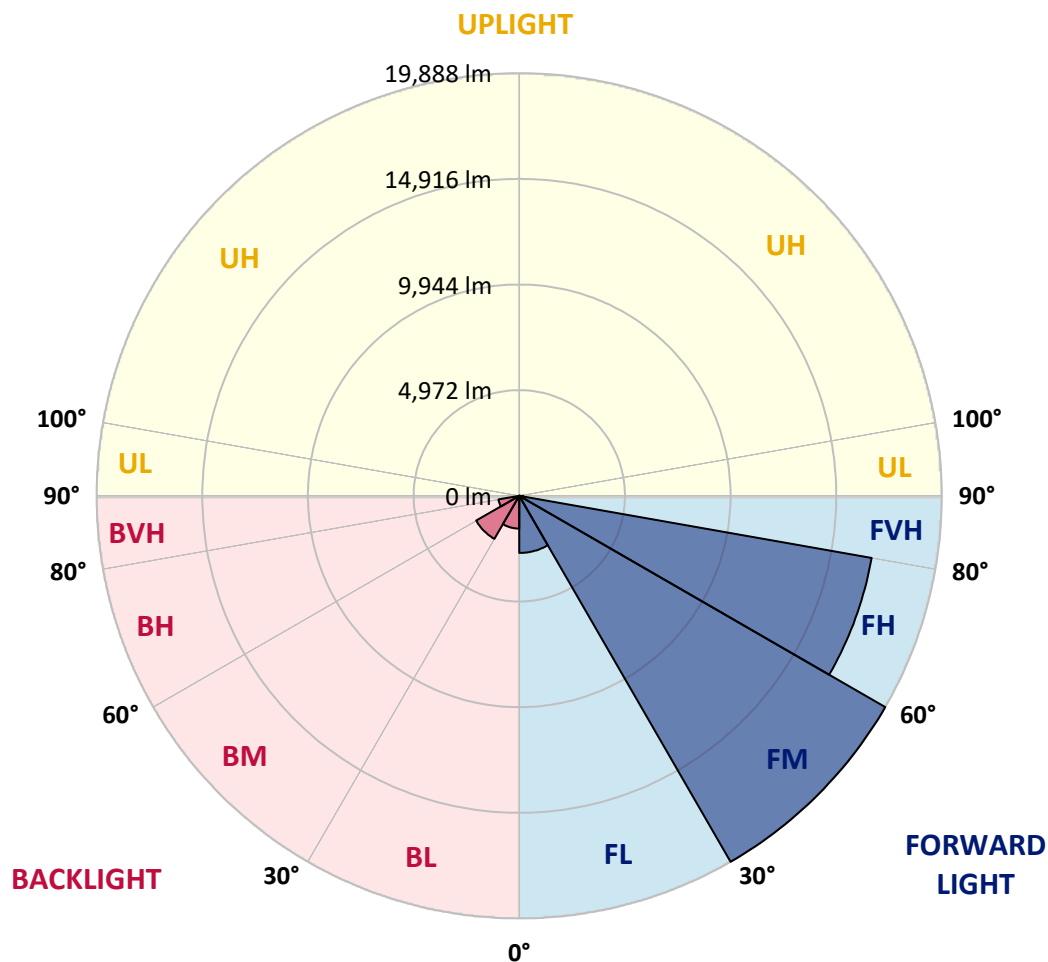
CATALOG NUMBER: GLEON-SA0D-830-U-T3-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 2688.0  | 6.0       |                         |      |         |
| FM   | (30°-60°)   | 19888.4 | 44.7      |                         |      |         |
| FH   | (60°-80°)   | 16839.3 | 37.9      |                         |      | G5      |
| FVH  | (80°-90°)   | 181.4   | 0.4       |                         |      | G2/225  |
| BL   | (0°-30°)    | 1541.2  | 3.5       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 2339.0  | 5.3       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 993.2   | 2.2       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 3.4     | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G5**

Type III Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 57°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 5284.7  | 5284.7  | 5284.7  | 5284.7  | 5284.7  | 5284.7  | 5284.7  | 5284.7  | 5284.7  | 5284.7  | 5284.7  |
| 2.5°  | 5160.6  | 5183.7  | 5200.6  | 5211.1  | 5223.7  | 5251.0  | 5259.4  | 5272.1  | 5278.4  | 5278.4  | 5293.1  |
| 5°    | 4956.6  | 4981.9  | 5017.6  | 5047.1  | 5105.9  | 5181.6  | 5236.3  | 5257.3  | 5295.2  | 5328.8  | 5347.8  |
| 7.5°  | 4767.4  | 4796.8  | 4838.9  | 4908.3  | 5009.2  | 5131.2  | 5244.7  | 5274.2  | 5347.8  | 5419.3  | 5455.0  |
| 10°   | 4645.4  | 4668.5  | 4723.2  | 4822.0  | 4954.5  | 5124.9  | 5284.7  | 5320.4  | 5446.6  | 5566.5  | 5633.8  |
| 12.5° | 4603.3  | 4624.4  | 4681.1  | 4792.6  | 4956.6  | 5156.4  | 5377.2  | 5429.8  | 5614.8  | 5789.4  | 5884.0  |
| 15°   | 4664.3  | 4668.5  | 4729.5  | 4834.7  | 4996.6  | 5234.2  | 5530.7  | 5593.8  | 5827.2  | 6054.4  | 6172.1  |
| 17.5° | 4899.8  | 4880.9  | 4912.5  | 4958.7  | 5087.0  | 5337.3  | 5692.7  | 5787.3  | 6098.5  | 6365.6  | 6477.0  |
| 20°   | 5488.7  | 5488.7  | 5417.2  | 5291.0  | 5293.1  | 5497.1  | 5911.4  | 6018.6  | 6399.2  | 6708.4  | 6809.3  |
| 22.5° | 6496.0  | 6477.0  | 6334.0  | 6024.9  | 5741.0  | 5772.6  | 6178.4  | 6317.2  | 6760.9  | 7091.1  | 7124.8  |
| 25°   | 7707.3  | 7684.1  | 7463.3  | 7028.0  | 6535.9  | 6218.4  | 6540.1  | 6700.0  | 7192.0  | 7484.4  | 7415.0  |
| 27.5° | 8990.1  | 8971.1  | 8752.4  | 8212.0  | 7511.7  | 6929.2  | 6971.2  | 7122.7  | 7631.6  | 7919.7  | 7698.9  |
| 30°   | 10232.9 | 10239.2 | 10022.6 | 9467.4  | 8674.6  | 7835.5  | 7518.0  | 7606.3  | 8058.5  | 8350.8  | 8035.3  |
| 32.5° | 11414.7 | 11423.2 | 11236.0 | 10615.6 | 9875.4  | 8889.1  | 8275.1  | 8251.9  | 8554.8  | 8842.9  | 8481.1  |
| 35°   | 12468.3 | 12489.4 | 12361.1 | 11879.5 | 11095.1 | 10062.6 | 9257.1  | 9202.5  | 9259.2  | 9585.2  | 9164.6  |
| 37.5° | 13484.0 | 13496.7 | 13399.9 | 12994.1 | 12337.9 | 11351.7 | 10497.9 | 10420.1 | 10298.1 | 10548.3 | 10066.8 |
| 40°   | 14596.5 | 14565.0 | 14453.5 | 14085.5 | 13521.9 | 12775.3 | 11831.1 | 11696.5 | 11484.1 | 11707.1 | 11252.8 |
| 42.5° | 15631.1 | 15595.4 | 15614.3 | 15197.9 | 14722.7 | 14239.0 | 13385.2 | 13153.9 | 13029.8 | 13286.4 | 12708.1 |
| 45°   | 16924.4 | 16905.5 | 16968.6 | 16606.9 | 16222.1 | 15870.9 | 15166.4 | 14914.0 | 14859.4 | 15160.1 | 14468.2 |
| 47.5° | 18200.9 | 18247.2 | 18442.8 | 18289.3 | 18133.6 | 17824.5 | 17052.7 | 16939.2 | 16972.8 | 17336.6 | 16325.1 |
| 50°   | 19265.0 | 19319.7 | 19855.9 | 20032.6 | 20257.6 | 20076.8 | 19302.9 | 19233.5 | 19366.0 | 19694.0 | 18322.9 |
| 52.5° | 20034.7 | 20146.1 | 20812.8 | 21626.6 | 22446.8 | 22568.7 | 21797.0 | 21733.9 | 21912.6 | 21963.1 | 19866.5 |
| 55°   | 20568.8 | 20667.7 | 21422.6 | 22911.5 | 24581.2 | 25107.0 | 24627.5 | 24383.6 | 24349.9 | 23851.5 | 21489.9 |
| 57.5° | 20663.5 | 20653.0 | 21738.1 | 23742.2 | 26255.2 | 27611.6 | 27308.8 | 27069.0 | 26379.3 | 25597.0 | 23351.0 |
| 60°   | 20129.3 | 20190.3 | 21450.0 | 24030.3 | 27306.7 | 29506.3 | 29529.5 | 29218.2 | 28143.6 | 27294.0 | 25155.3 |
| 62.5° | 18484.8 | 18733.0 | 20005.3 | 23275.3 | 27294.0 | 30269.7 | 31157.1 | 30919.5 | 29634.6 | 28684.1 | 26984.9 |
| 65°   | 15818.3 | 15906.6 | 17120.0 | 20688.7 | 25449.8 | 29950.0 | 32622.9 | 32534.6 | 30978.4 | 30034.2 | 27924.9 |
| 67.5° | 11551.4 | 11360.1 | 12634.5 | 16291.5 | 21546.7 | 28086.8 | 33674.3 | 33785.8 | 32015.1 | 30311.8 | 26923.9 |
| 68°   | 10542.0 | 10598.8 | 11591.4 | 15204.2 | 20524.7 | 27428.6 | 33743.7 | 33914.1 | 32118.2 | 30130.9 | 26377.2 |
| 70°   | 6283.6  | 6392.9  | 7278.3  | 10468.4 | 15614.3 | 23704.3 | 32995.1 | 33384.1 | 31504.1 | 28265.6 | 22814.8 |
| 72.5° | 1604.5  | 1734.9  | 2571.9  | 4685.3  | 8918.6  | 16701.5 | 27853.4 | 28511.6 | 27352.9 | 22930.4 | 15401.9 |
| 75°   | 660.3   | 694.0   | 919.0   | 1543.6  | 3322.6  | 7524.3  | 18358.7 | 19767.6 | 18962.2 | 13728.0 | 6960.7  |
| 77.5° | 456.3   | 479.5   | 590.9   | 855.9   | 1438.4  | 2550.9  | 9000.6  | 10018.4 | 9025.8  | 4685.3  | 1518.3  |
| 80°   | 328.1   | 347.0   | 422.7   | 569.9   | 826.5   | 910.6   | 2933.6  | 3392.0  | 2693.9  | 1028.3  | 376.4   |
| 82.5° | 195.6   | 210.3   | 315.4   | 405.9   | 502.6   | 435.3   | 729.7   | 828.6   | 780.2   | 511.0   | 168.2   |
| 85°   | 96.7    | 113.6   | 212.4   | 290.2   | 271.3   | 183.0   | 222.9   | 248.1   | 307.0   | 311.2   | 90.4    |
| 87.5° | 6.3     | 12.6    | 124.1   | 174.5   | 75.7    | 42.1    | 65.2    | 79.9    | 109.4   | 153.5   | 37.9    |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



REPORT NUMBER: P322424

CATALOG NUMBER: GLEON-SA0D-830-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 5284.7  | 5284.7  | 5284.7 | 5284.7 | 5284.7 | 5284.7 | 5284.7 | 5284.7 | 5284.7 | 5284.7 | 5284.7 |
| 2.5°  | 5299.4  | 5301.5  | 5286.8 | 5280.5 | 5284.7 | 5259.4 | 5248.9 | 5253.1 | 5253.1 | 5259.4 | 5248.9 |
| 5°    | 5352.0  | 5352.0  | 5326.7 | 5293.1 | 5274.2 | 5225.8 | 5194.3 | 5185.8 | 5179.5 | 5175.3 | 5166.9 |
| 7.5°  | 5465.5  | 5452.9  | 5408.8 | 5335.2 | 5272.1 | 5166.9 | 5087.0 | 5044.9 | 5023.9 | 5015.5 | 5009.2 |
| 10°   | 5648.5  | 5625.4  | 5551.8 | 5415.1 | 5270.0 | 5082.8 | 4908.3 | 4784.2 | 4681.1 | 4639.1 | 4613.8 |
| 12.5° | 5894.5  | 5860.9  | 5736.8 | 5509.7 | 5255.2 | 4910.4 | 4531.8 | 4168.0 | 3829.5 | 3690.7 | 3621.3 |
| 15°   | 6178.4  | 6130.1  | 5934.5 | 5589.6 | 5169.0 | 4521.3 | 3699.1 | 3061.9 | 2592.9 | 2416.3 | 2340.6 |
| 17.5° | 6466.5  | 6403.4  | 6106.9 | 5640.1 | 4910.4 | 3715.9 | 2595.0 | 1959.9 | 1646.6 | 1562.5 | 1533.0 |
| 20°   | 6756.7  | 6664.2  | 6256.2 | 5602.2 | 4325.7 | 2679.1 | 1711.8 | 1432.1 | 1341.7 | 1316.4 | 1308.0 |
| 22.5° | 7032.2  | 6889.2  | 6390.8 | 5455.0 | 3425.7 | 1798.0 | 1354.3 | 1266.0 | 1236.5 | 1221.8 | 1217.6 |
| 25°   | 7272.0  | 7072.2  | 6508.6 | 5000.8 | 2424.7 | 1358.5 | 1219.7 | 1190.3 | 1152.4 | 1125.1 | 1127.2 |
| 27.5° | 7497.0  | 7255.1  | 6580.1 | 4252.1 | 1617.2 | 1160.8 | 1129.3 | 1089.3 | 1019.9 | 980.0  | 980.0  |
| 30°   | 7768.3  | 7499.1  | 6632.7 | 3272.2 | 1190.3 | 1026.2 | 1001.0 | 940.0  | 845.4  | 792.8  | 792.8  |
| 32.5° | 8176.2  | 7869.2  | 6599.0 | 2296.4 | 986.3  | 902.2  | 843.3  | 759.2  | 656.1  | 605.6  | 603.5  |
| 35°   | 8800.8  | 8441.2  | 6359.3 | 1505.7 | 870.6  | 784.4  | 689.8  | 586.7  | 496.3  | 454.2  | 452.1  |
| 37.5° | 9642.0  | 9206.7  | 5820.9 | 1076.7 | 780.2  | 675.0  | 561.5  | 447.9  | 380.6  | 353.3  | 351.2  |
| 40°   | 10733.4 | 10096.2 | 5051.3 | 872.7  | 696.1  | 569.9  | 433.2  | 347.0  | 300.7  | 279.7  | 281.8  |
| 42.5° | 12043.5 | 11048.8 | 4128.1 | 752.9  | 614.1  | 469.0  | 338.6  | 273.4  | 243.9  | 229.2  | 225.0  |
| 45°   | 13498.8 | 11988.9 | 3160.7 | 670.8  | 532.0  | 378.5  | 265.0  | 216.6  | 193.5  | 185.1  | 185.1  |
| 47.5° | 15099.1 | 12903.6 | 2313.2 | 599.3  | 443.7  | 292.3  | 212.4  | 176.6  | 157.7  | 151.4  | 149.3  |
| 50°   | 16552.2 | 13538.7 | 1667.6 | 523.6  | 363.8  | 231.3  | 172.4  | 147.2  | 134.6  | 126.2  | 126.2  |
| 52.5° | 17763.5 | 13738.5 | 1228.1 | 441.6  | 294.4  | 185.1  | 143.0  | 126.2  | 113.6  | 107.2  | 107.2  |
| 55°   | 18829.7 | 13656.5 | 912.7  | 363.8  | 237.6  | 151.4  | 122.0  | 107.2  | 96.7   | 90.4   | 90.4   |
| 57.5° | 19851.7 | 13391.5 | 681.4  | 296.5  | 191.4  | 122.0  | 103.0  | 90.4   | 79.9   | 75.7   | 75.7   |
| 60°   | 20686.6 | 12949.9 | 506.8  | 239.7  | 153.5  | 98.8   | 86.2   | 73.6   | 65.2   | 58.9   | 58.9   |
| 62.5° | 21363.7 | 12462.0 | 372.2  | 197.7  | 122.0  | 77.8   | 67.3   | 61.0   | 48.4   | 42.1   | 42.1   |
| 65°   | 21368.0 | 11652.4 | 279.7  | 164.0  | 94.6   | 61.0   | 50.5   | 48.4   | 31.5   | 25.2   | 23.1   |
| 67.5° | 19822.3 | 10045.7 | 214.5  | 140.9  | 73.6   | 46.3   | 37.9   | 40.0   | 16.8   | 10.5   | 8.4    |
| 68°   | 19260.8 | 9637.8  | 201.9  | 138.8  | 69.4   | 44.2   | 35.7   | 40.0   | 14.7   | 8.4    | 6.3    |
| 70°   | 16238.9 | 7667.3  | 161.9  | 134.6  | 61.0   | 33.6   | 29.4   | 40.0   | 12.6   | 6.3    | 4.2    |
| 72.5° | 10386.4 | 4449.8  | 119.9  | 107.2  | 46.3   | 25.2   | 18.9   | 35.7   | 12.6   | 4.2    | 2.1    |
| 75°   | 4420.4  | 1379.5  | 82.0   | 75.7   | 27.3   | 18.9   | 12.6   | 23.1   | 8.4    | 2.1    | 0.0    |
| 77.5° | 931.6   | 311.2   | 48.4   | 46.3   | 18.9   | 12.6   | 8.4    | 6.3    | 2.1    | 0.0    | 0.0    |
| 80°   | 239.7   | 90.4    | 25.2   | 23.1   | 10.5   | 6.3    | 4.2    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 75.7    | 35.7    | 14.7   | 10.5   | 4.2    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 37.9    | 21.0    | 8.4    | 4.2    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 21.0    | 6.3     | 2.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0     | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

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

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

### Test Information

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

### Spectral Parameters

CCT (K): 3050  
 CIE  $u'$ : 0.2476  
 CIE  $v'$ : 0.5251  
 Duv: 0.0034  
 CIE x: 0.4383  
 CIE y: 0.4131  
 CIE z: 0.1487  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 581  
 Purity: 55.55201  
 R<sub>f</sub>: 81.5  
 R<sub>g</sub>: 99.2

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



### Test Conditions

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

REPORT NUMBER: SP1-2408-195-9

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

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**CIE 1931 Chromaticity Diagram**



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



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

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.27

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

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### Melanopic Flux vs. Wavelength


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

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

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TM-30-18

### Summary

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



### Color Vector Graphics



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

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



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)