

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: P323699

Luminaire Tested: **GLEON-SA5D-830-U-SL3-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P323699  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-23)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA5D-830-U-SL3-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(5) 80 CRI, 3000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 26327 lumens  
Efficiency: N/A  
Efficacy: 82.3 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B2 - U0 - G4

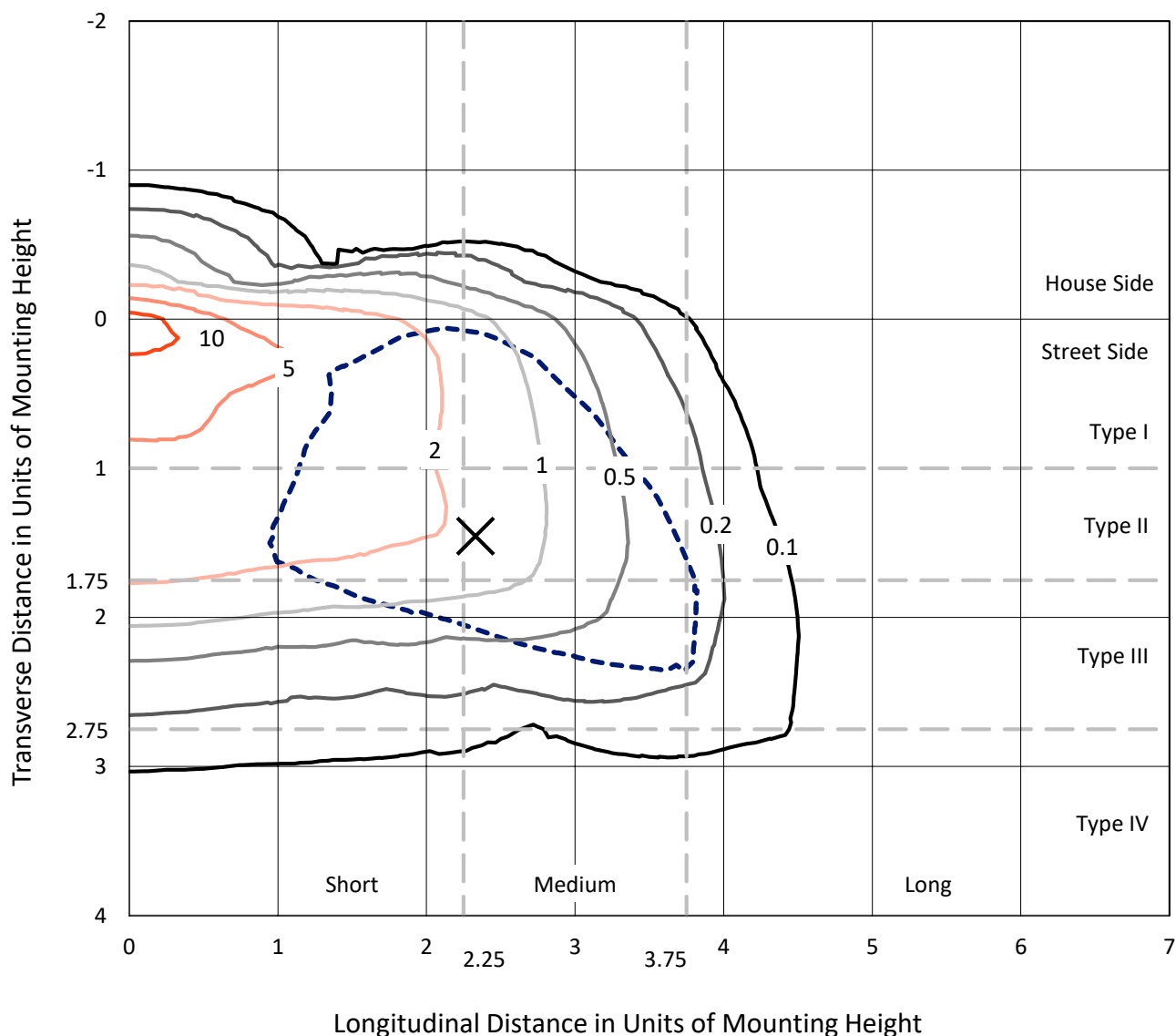
Input Watts (W): 320  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P323699  
 CATALOG NUMBER: GLEON-SA5D-830-U-SL3-HSS

## Iso-Footcandle Lines of Horizontal Illumination

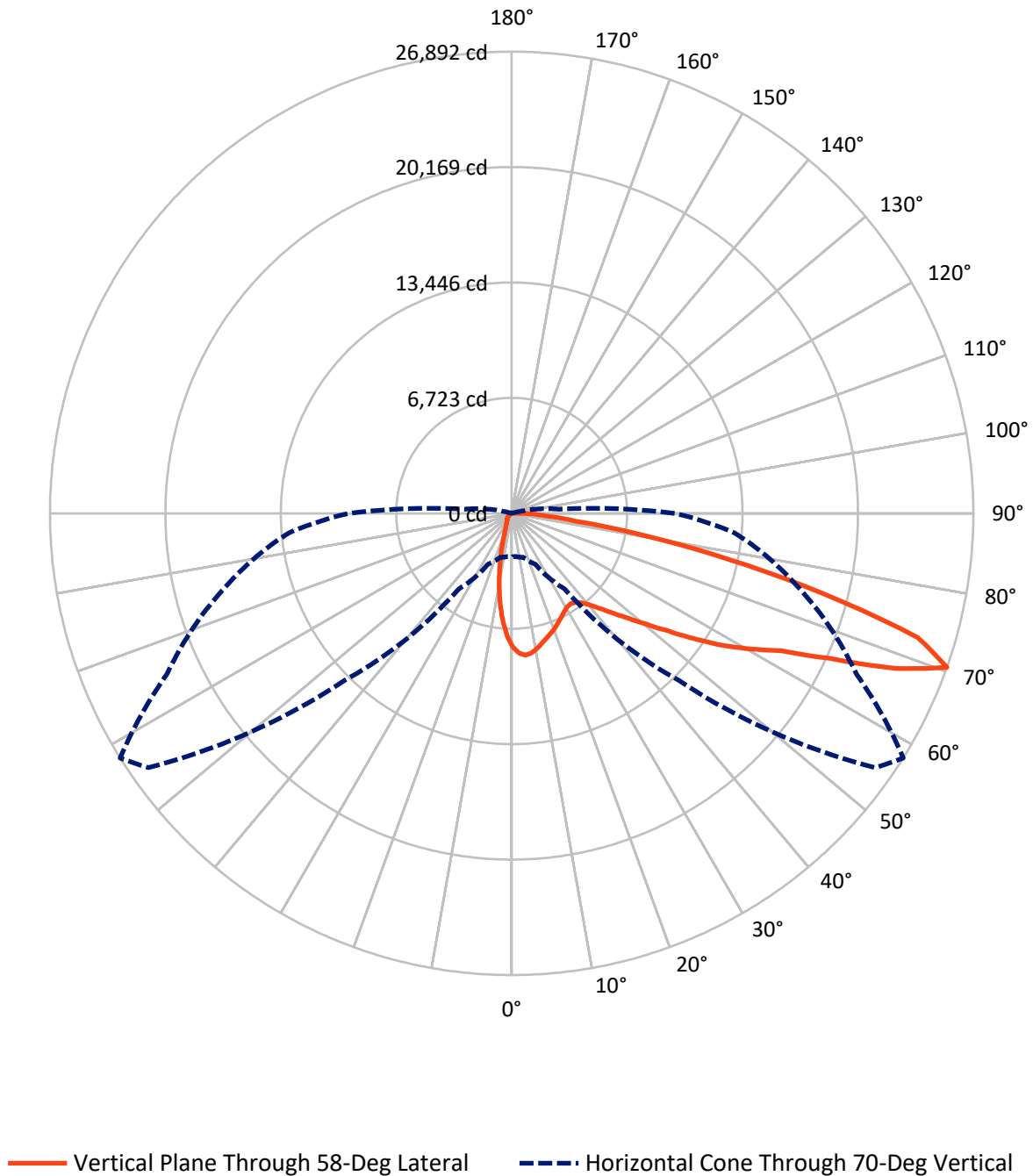
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 12.6 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2253.0   | 0.0    | 2253.0  |
|                    | % Fixture | 8.6      | 0.0    | 8.6     |
| <b>Street Side</b> | Lumens    | 24074.0  | 0.0    | 24074.0 |
|                    | % Fixture | 91.4     | 0.0    | 91.4    |
| <b>Total</b>       | Lumens    | 26327.0  | 0.0    | 26327.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 635.9   | 2.4       |
| 10°-20°   | 1334.7  | 5.1       |
| 20°-30°   | 1754.7  | 6.7       |
| 30°-40°   | 2323.9  | 8.8       |
| 40°-50°   | 3473.5  | 13.2      |
| 50°-60°   | 5564.4  | 21.1      |
| 60°-70°   | 7013.9  | 26.6      |
| 70°-80°   | 3783.2  | 14.4      |
| 80°-90°   | 442.8   | 1.7       |
| 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°    | 26327.0 | 100.0     |
| 0°-180°   | 26327.0 | 100.0     |

**Coefficient of Utilization**



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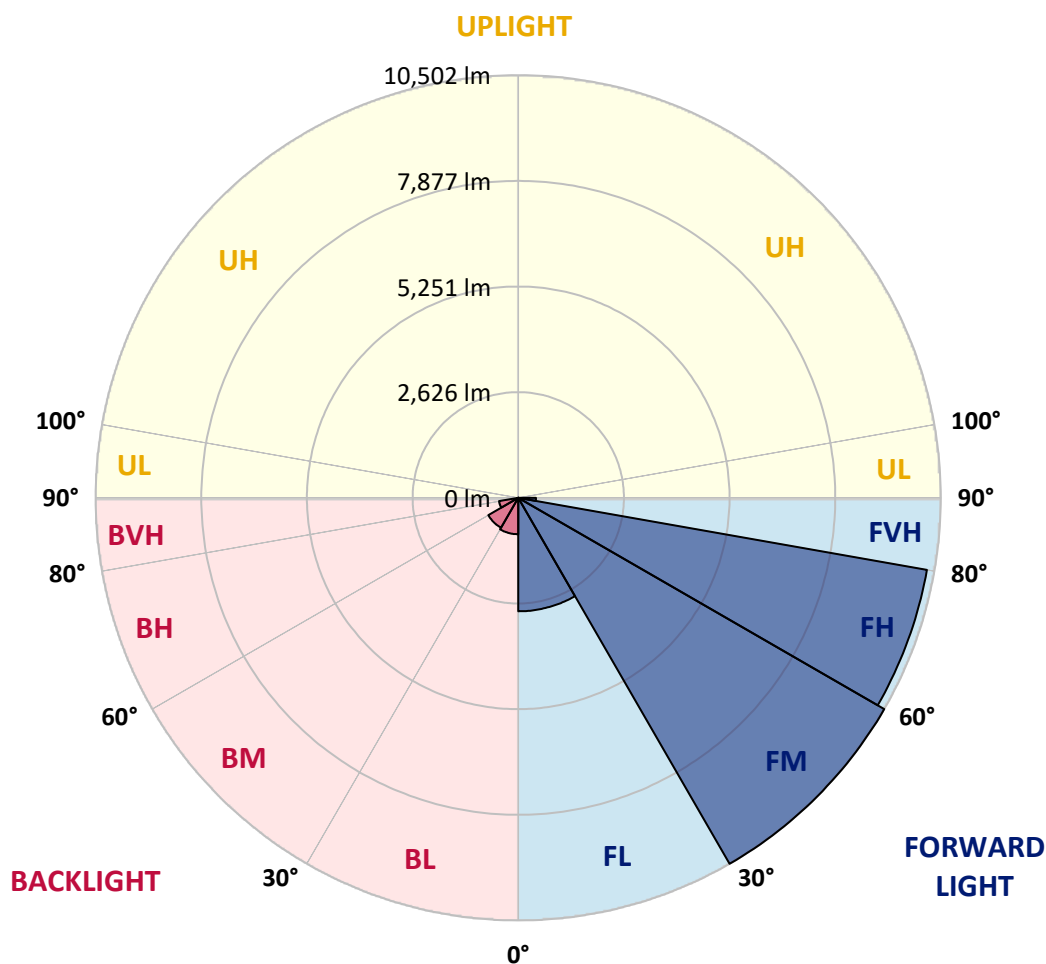
CATALOG NUMBER: GLEON-SA5D-830-U-SL3-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2820.2  | 10.7      |                         |      |          |
| FM   | (30°-60°)   | 10502.2 | 39.9      |                         |      |          |
| FH   | (60°-80°)   | 10312.6 | 39.2      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 439.0   | 1.7       |                         |      | G3/500   |
| BL   | (0°-30°)    | 905.2   | 3.4       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 859.5   | 3.3       | B1/1000                 |      |          |
| BH   | (60°-80°)   | 484.5   | 1.8       | B1/500                  |      | G1/500   |
| BVH  | (80°-90°)   | 3.8     | 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 III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 58°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 7776.9  | 7776.9  | 7776.9  | 7776.9  | 7776.9  | 7776.9  | 7776.9  | 7776.9  | 7776.9  | 7776.9  | 7776.9  |
| 2.5°  | 8421.7  | 8400.9  | 8393.2  | 8380.1  | 8329.7  | 8280.4  | 8183.0  | 8155.6  | 8094.3  | 7948.7  | 7794.4  |
| 5°    | 8428.2  | 8427.1  | 8450.1  | 8444.6  | 8427.1  | 8404.1  | 8334.1  | 8298.0  | 8194.0  | 7986.0  | 7703.5  |
| 7.5°  | 8022.1  | 8042.9  | 8094.3  | 8135.9  | 8184.1  | 8246.5  | 8255.3  | 8220.2  | 8134.8  | 7910.4  | 7536.0  |
| 10°   | 7476.9  | 7509.8  | 7582.0  | 7664.1  | 7790.0  | 7914.8  | 8026.5  | 8022.1  | 7992.5  | 7771.4  | 7334.6  |
| 12.5° | 6930.7  | 6969.0  | 7052.2  | 7173.7  | 7352.1  | 7555.7  | 7755.0  | 7782.3  | 7831.6  | 7646.6  | 7148.5  |
| 15°   | 6452.3  | 6485.1  | 6567.2  | 6716.1  | 6937.2  | 7210.9  | 7503.2  | 7553.5  | 7680.5  | 7549.2  | 6993.1  |
| 17.5° | 6046.1  | 6066.9  | 6127.1  | 6292.4  | 6548.6  | 6880.3  | 7260.2  | 7358.7  | 7548.1  | 7472.5  | 6858.4  |
| 20°   | 5762.6  | 5765.9  | 5805.3  | 5921.3  | 6177.5  | 6548.6  | 7008.4  | 7149.6  | 7408.0  | 7406.9  | 6719.4  |
| 22.5° | 5622.5  | 5611.5  | 5619.2  | 5686.0  | 5874.3  | 6232.2  | 6756.6  | 6924.1  | 7282.1  | 7351.0  | 6578.2  |
| 25°   | 5596.2  | 5587.4  | 5565.5  | 5574.3  | 5688.2  | 5955.3  | 6502.6  | 6696.4  | 7171.5  | 7317.1  | 6455.5  |
| 27.5° | 5678.3  | 5687.1  | 5649.8  | 5610.4  | 5619.2  | 5775.7  | 6277.1  | 6501.5  | 7081.7  | 7317.1  | 6369.1  |
| 30°   | 5843.6  | 5848.0  | 5820.6  | 5769.2  | 5700.2  | 5725.4  | 6120.6  | 6345.0  | 7036.8  | 7367.4  | 6314.3  |
| 32.5° | 6026.4  | 6050.5  | 6047.2  | 6005.6  | 5907.1  | 5805.3  | 6083.3  | 6288.1  | 7033.6  | 7479.1  | 6308.9  |
| 35°   | 6253.0  | 6280.4  | 6326.4  | 6317.6  | 6214.7  | 6047.2  | 6210.3  | 6371.3  | 7098.1  | 7663.0  | 6368.0  |
| 37.5° | 6493.9  | 6535.5  | 6634.0  | 6681.1  | 6614.3  | 6424.9  | 6495.0  | 6609.9  | 7271.1  | 7960.8  | 6517.9  |
| 40°   | 6727.0  | 6774.1  | 6953.6  | 7138.7  | 7088.3  | 6893.4  | 6926.3  | 7018.2  | 7578.7  | 8388.8  | 6802.6  |
| 42.5° | 6955.8  | 7025.9  | 7289.7  | 7594.1  | 7654.3  | 7498.8  | 7516.3  | 7589.7  | 8035.2  | 8977.8  | 7267.8  |
| 45°   | 7229.5  | 7308.3  | 7699.1  | 8074.6  | 8235.6  | 8167.7  | 8242.1  | 8290.3  | 8631.8  | 9756.1  | 7895.1  |
| 47.5° | 7631.3  | 7722.1  | 8201.6  | 8629.7  | 8912.1  | 8955.9  | 9105.9  | 9137.6  | 9386.1  | 10662.5 | 8712.9  |
| 50°   | 8415.1  | 8440.3  | 8873.8  | 9262.4  | 9669.6  | 9932.4  | 10103.1 | 10127.2 | 10299.1 | 11653.3 | 9734.2  |
| 52.5° | 9401.4  | 9417.9  | 9663.1  | 9923.6  | 10386.7 | 10923.1 | 11322.7 | 11356.6 | 11392.7 | 12618.8 | 10742.5 |
| 55°   | 10381.2 | 10379.0 | 10541.0 | 10694.3 | 11224.1 | 12003.6 | 12870.6 | 12891.4 | 12631.9 | 13535.1 | 11513.1 |
| 57.5° | 10993.2 | 11052.3 | 11298.6 | 11495.6 | 12235.7 | 13235.1 | 14438.2 | 14514.9 | 13933.6 | 14213.8 | 12275.1 |
| 60°   | 10798.3 | 10826.8 | 11373.0 | 12102.1 | 13495.7 | 14985.6 | 16024.5 | 16044.2 | 14912.2 | 14891.4 | 13238.4 |
| 62.5° | 9200.0  | 9215.3  | 10073.6 | 11576.6 | 14133.9 | 17256.0 | 17938.0 | 17617.3 | 16037.6 | 15831.8 | 14391.2 |
| 65°   | 6305.6  | 6405.2  | 7122.2  | 8980.0  | 12961.5 | 18680.3 | 20900.3 | 20369.4 | 17753.0 | 17187.1 | 15433.3 |
| 67.5° | 3713.3  | 3692.5  | 4047.2  | 5415.6  | 9519.7  | 17734.4 | 24647.6 | 24119.9 | 20092.4 | 18094.6 | 15127.9 |
| 70°   | 2536.5  | 2522.2  | 2658.0  | 3278.7  | 5374.0  | 13757.3 | 25826.6 | 26891.7 | 22158.2 | 17483.7 | 13019.5 |
| 72.5° | 1810.7  | 1818.3  | 2018.7  | 2547.4  | 3373.9  | 8015.5  | 22209.6 | 24730.8 | 21511.2 | 15241.7 | 9896.2  |
| 75°   | 1229.4  | 1250.2  | 1537.0  | 2089.8  | 2957.9  | 4077.8  | 15760.6 | 18799.6 | 17516.6 | 11077.4 | 5688.2  |
| 77.5° | 661.2   | 684.2   | 1022.5  | 1683.7  | 2674.4  | 2833.1  | 10138.2 | 12938.5 | 11003.0 | 4979.9  | 1648.6  |
| 80°   | 275.9   | 289.0   | 478.4   | 1223.9  | 2310.9  | 2488.3  | 5965.1  | 7845.8  | 4688.7  | 982.0   | 367.8   |
| 82.5° | 119.3   | 125.9   | 199.2   | 730.2   | 1727.5  | 2100.8  | 3158.3  | 3774.6  | 1420.9  | 215.7   | 185.0   |
| 85°   | 23.0    | 24.1    | 82.1    | 386.4   | 1102.4  | 1185.6  | 2047.1  | 2006.6  | 638.2   | 93.1    | 134.7   |
| 87.5° | 0.0     | 0.0     | 19.7    | 121.5   | 324.0   | 645.9   | 1249.1  | 1233.7  | 216.8   | 44.9    | 50.4    |
| 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: P323699

CATALOG NUMBER: GLEON-SA5D-830-U-SL3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 7776.9  | 7776.9 | 7776.9 | 7776.9 | 7776.9 | 7776.9 | 7776.9 | 7776.9 | 7776.9 | 7776.9 | 7776.9 |
| 2.5°  | 7715.6  | 7640.0 | 7481.3 | 7285.3 | 7135.4 | 6970.1 | 6838.7 | 6672.3 | 6600.1 | 6603.3 | 6563.9 |
| 5°    | 7542.6  | 7387.2 | 7035.7 | 6592.4 | 6250.8 | 5898.3 | 5595.1 | 5293.0 | 5114.5 | 5056.5 | 5001.8 |
| 7.5°  | 7295.2  | 7048.9 | 6488.4 | 5805.3 | 5227.3 | 4662.4 | 4170.9 | 3738.5 | 3464.8 | 3331.2 | 3282.0 |
| 10°   | 7016.0  | 6670.1 | 5858.9 | 4959.1 | 4133.7 | 3369.5 | 2732.4 | 2178.5 | 1957.4 | 1807.4 | 1769.1 |
| 12.5° | 6770.8  | 6302.3 | 5243.7 | 4091.0 | 3111.2 | 2189.4 | 1581.9 | 1237.0 | 1087.1 | 1027.9 | 1018.1 |
| 15°   | 6539.8  | 5958.5 | 4651.5 | 3305.0 | 2154.4 | 1347.6 | 1006.0 | 888.9  | 853.9  | 844.0  | 844.0  |
| 17.5° | 6322.0  | 5631.2 | 4072.3 | 2531.0 | 1425.3 | 944.7  | 833.1  | 806.8  | 795.9  | 794.8  | 795.9  |
| 20°   | 6094.3  | 5303.9 | 3503.1 | 1854.5 | 995.1  | 800.2  | 769.6  | 755.4  | 752.1  | 752.1  | 752.1  |
| 22.5° | 5876.4  | 4976.6 | 2949.2 | 1324.6 | 798.0  | 730.2  | 714.9  | 705.0  | 701.7  | 700.6  | 698.4  |
| 25°   | 5667.4  | 4665.7 | 2408.4 | 936.0  | 700.6  | 668.9  | 655.7  | 642.6  | 632.7  | 627.3  | 624.0  |
| 27.5° | 5495.5  | 4388.7 | 1904.8 | 751.0  | 632.7  | 605.4  | 589.0  | 569.3  | 545.2  | 534.2  | 529.8  |
| 30°   | 5358.6  | 4135.8 | 1468.0 | 633.8  | 569.3  | 541.9  | 516.7  | 482.8  | 447.7  | 429.1  | 428.0  |
| 32.5° | 5251.4  | 3887.3 | 1114.4 | 560.5  | 512.3  | 478.4  | 442.3  | 399.6  | 359.1  | 338.3  | 337.2  |
| 35°   | 5198.8  | 3668.4 | 851.7  | 506.9  | 462.0  | 419.3  | 374.4  | 327.3  | 287.9  | 268.2  | 266.0  |
| 37.5° | 5233.8  | 3483.4 | 664.5  | 462.0  | 419.3  | 370.0  | 317.5  | 268.2  | 233.2  | 215.7  | 214.6  |
| 40°   | 5361.9  | 3365.2 | 539.7  | 423.7  | 383.2  | 322.9  | 266.0  | 220.0  | 190.5  | 176.2  | 175.2  |
| 42.5° | 5634.5  | 3321.4 | 460.9  | 391.9  | 348.1  | 279.2  | 221.1  | 181.7  | 154.4  | 144.5  | 142.3  |
| 45°   | 6089.9  | 3386.0 | 407.2  | 361.3  | 312.0  | 237.6  | 182.8  | 148.9  | 124.8  | 117.1  | 116.0  |
| 47.5° | 6696.4  | 3555.6 | 368.9  | 331.7  | 279.2  | 200.3  | 152.2  | 120.4  | 101.8  | 94.1   | 93.1   |
| 50°   | 7478.0  | 3824.9 | 337.2  | 302.1  | 248.5  | 169.7  | 125.9  | 95.2   | 78.8   | 73.3   | 73.3   |
| 52.5° | 8328.6  | 4145.7 | 308.7  | 274.8  | 217.8  | 141.2  | 101.8  | 73.3   | 62.4   | 55.8   | 55.8   |
| 55°   | 9031.4  | 4425.9 | 278.1  | 254.0  | 180.6  | 117.1  | 77.7   | 55.8   | 46.0   | 42.7   | 42.7   |
| 57.5° | 9733.1  | 4724.8 | 243.0  | 217.8  | 144.5  | 95.2   | 59.1   | 41.6   | 33.9   | 31.7   | 31.7   |
| 60°   | 10642.8 | 5090.4 | 209.1  | 177.3  | 113.9  | 72.3   | 43.8   | 29.6   | 25.2   | 24.1   | 24.1   |
| 62.5° | 11643.4 | 5305.0 | 178.4  | 142.3  | 88.7   | 53.6   | 31.7   | 19.7   | 18.6   | 18.6   | 17.5   |
| 65°   | 12255.4 | 5001.8 | 150.0  | 113.9  | 69.0   | 40.5   | 20.8   | 14.2   | 16.4   | 15.3   | 13.1   |
| 67.5° | 11474.8 | 3915.8 | 122.6  | 88.7   | 53.6   | 30.7   | 13.1   | 9.9    | 17.5   | 14.2   | 10.9   |
| 70°   | 9501.1  | 2741.2 | 95.2   | 62.4   | 42.7   | 26.3   | 8.8    | 6.6    | 18.6   | 14.2   | 8.8    |
| 72.5° | 7110.2  | 1834.7 | 75.5   | 41.6   | 31.7   | 23.0   | 7.7    | 3.3    | 16.4   | 12.0   | 7.7    |
| 75°   | 3885.2  | 738.9  | 60.2   | 26.3   | 19.7   | 16.4   | 5.5    | 2.2    | 10.9   | 8.8    | 5.5    |
| 77.5° | 1022.5  | 194.9  | 43.8   | 17.5   | 10.9   | 6.6    | 3.3    | 1.1    | 5.5    | 4.4    | 2.2    |
| 80°   | 260.5   | 75.5   | 28.5   | 12.0   | 7.7    | 3.3    | 0.0    | 0.0    | 1.1    | 0.0    | 0.0    |
| 82.5° | 139.0   | 31.7   | 17.5   | 8.8    | 4.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 105.1   | 20.8   | 9.9    | 5.5    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 40.5    | 6.6    | 3.3    | 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)