

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: P323668

Luminaire Tested: **GLEON-SA4A-830-U-SL3-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P323668  
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-SA4A-830-U-SL3-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(4) 80 CRI, 3000K, 615mA 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: 12762 lumens  
Efficiency: N/A  
Efficacy: 98.9 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G2

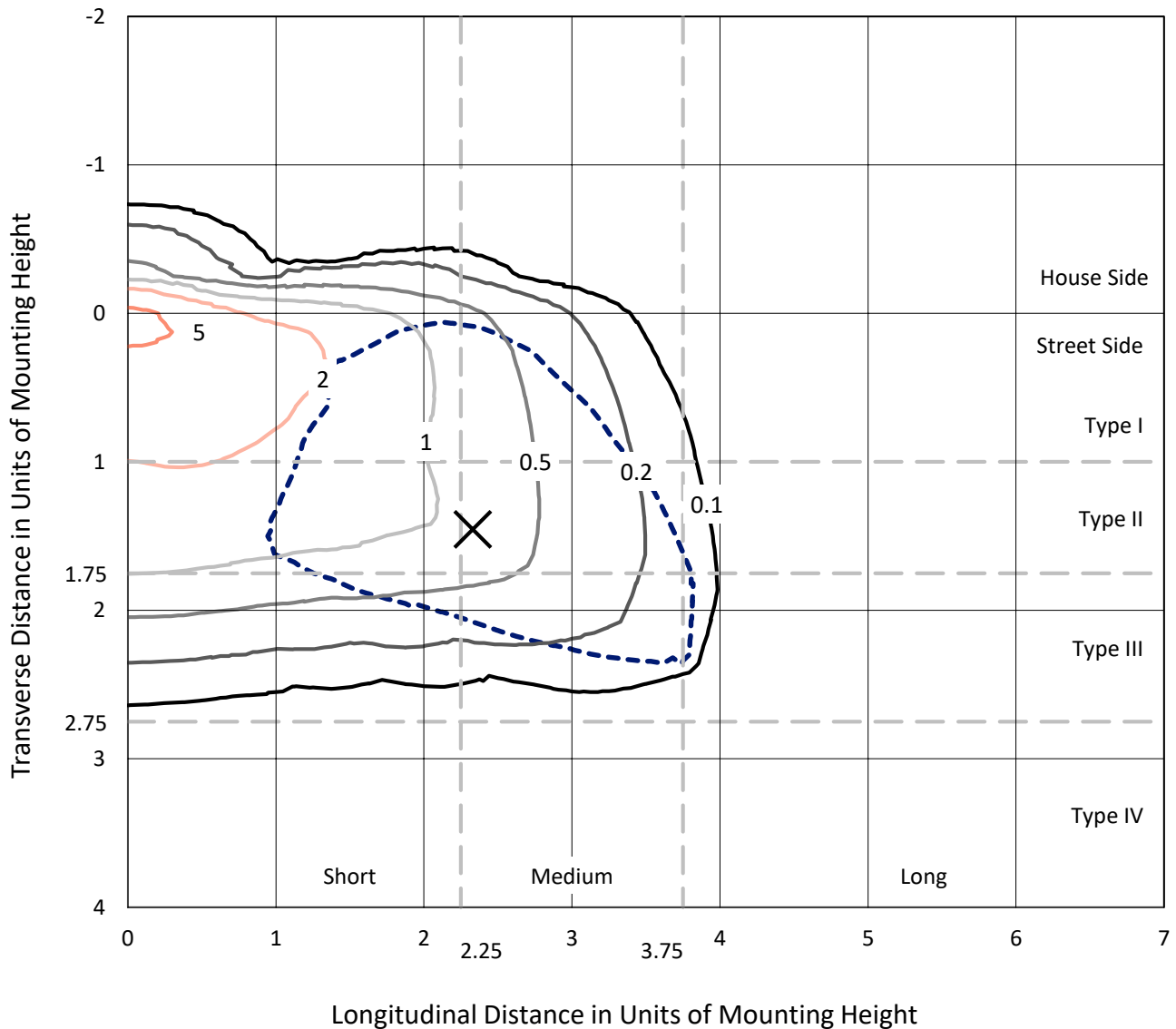
Input Watts (W): 129  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P323668  
 CATALOG NUMBER: GLEON-SA4A-830-U-SL3-HSS

## Iso-Footcandle Lines of Horizontal Illumination

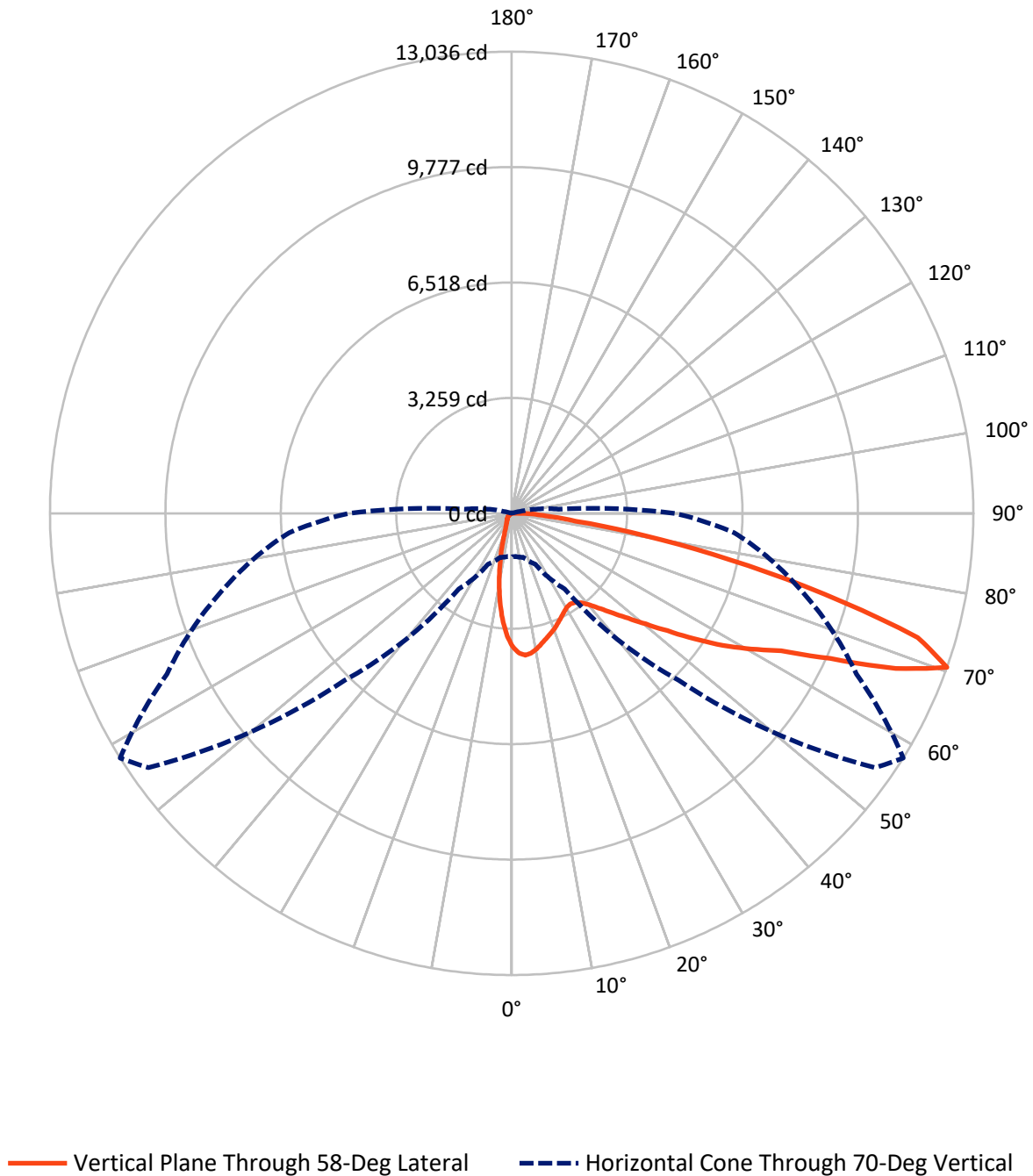
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6.1 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    | 1092.2   | 0.0    | 1092.2  |
|                    | % Fixture | 8.6      | 0.0    | 8.6     |
| <b>Street Side</b> | Lumens    | 11669.9  | 0.0    | 11669.9 |
|                    | % Fixture | 91.4     | 0.0    | 91.4    |
| <b>Total</b>       | Lumens    | 12762.0  | 0.0    | 12762.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 308.3   | 2.4       |
| 10°-20°   | 647.0   | 5.1       |
| 20°-30°   | 850.6   | 6.7       |
| 30°-40°   | 1126.5  | 8.8       |
| 40°-50°   | 1683.8  | 13.2      |
| 50°-60°   | 2697.3  | 21.1      |
| 60°-70°   | 3400.0  | 26.6      |
| 70°-80°   | 1833.9  | 14.4      |
| 80°-90°   | 214.7   | 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°    | 12762.0 | 100.0     |
| 0°-180°   | 12762.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P323668

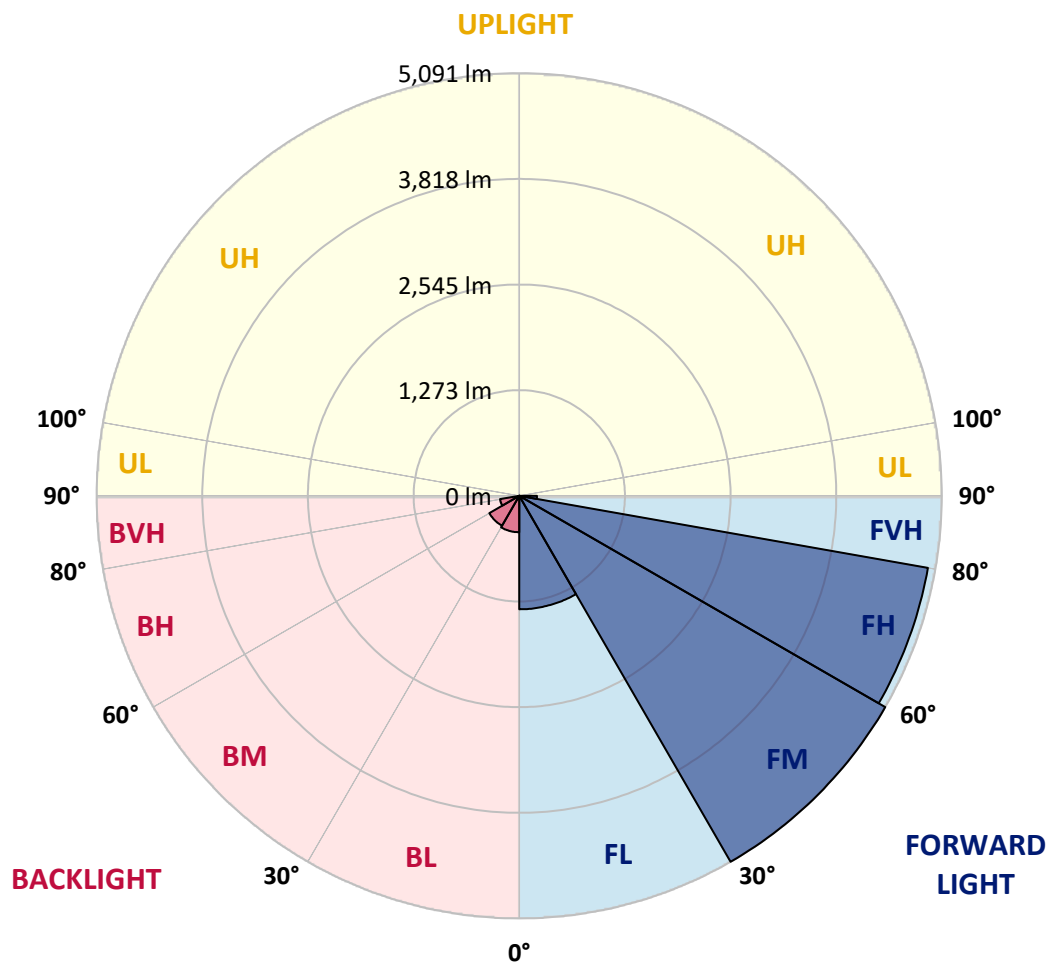
CATALOG NUMBER: GLEON-SA4A-830-U-SL3-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1367.1 | 10.7      |                         |      |         |
| FM   | (30°-60°)   | 5091.0 | 39.9      |                         |      |         |
| FH   | (60°-80°)   | 4999.0 | 39.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 212.8  | 1.7       |                         |      | G2/225  |
| BL   | (0°-30°)    | 438.8  | 3.4       | B1/500                  |      |         |
| BM   | (30°-60°)   | 416.6  | 3.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 234.9  | 1.8       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 1.9    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type III Medium





REPORT NUMBER: P323668

CATALOG NUMBER: GLEON-SA4A-830-U-SL3-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°     | 58°     | 65°     | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|--------|--------|
| 0°    | 3769.8 | 3769.8 | 3769.8 | 3769.8 | 3769.8 | 3769.8 | 3769.8  | 3769.8  | 3769.8  | 3769.8 | 3769.8 |
| 2.5°  | 4082.4 | 4072.3 | 4068.6 | 4062.2 | 4037.8 | 4013.9 | 3966.7  | 3953.4  | 3923.7  | 3853.1 | 3778.3 |
| 5°    | 4085.6 | 4085.0 | 4096.2 | 4093.5 | 4085.0 | 4073.9 | 4039.9  | 4022.4  | 3972.0  | 3871.2 | 3734.3 |
| 7.5°  | 3888.7 | 3898.8 | 3923.7 | 3943.9 | 3967.2 | 3997.5 | 4001.7  | 3984.8  | 3943.4  | 3834.6 | 3653.1 |
| 10°   | 3624.4 | 3640.4 | 3675.4 | 3715.2 | 3776.2 | 3836.7 | 3890.8  | 3888.7  | 3874.4  | 3767.2 | 3555.4 |
| 12.5° | 3359.6 | 3378.2 | 3418.5 | 3477.4 | 3563.9 | 3662.6 | 3759.2  | 3772.5  | 3796.4  | 3706.7 | 3465.2 |
| 15°   | 3127.7 | 3143.7 | 3183.5 | 3255.6 | 3362.8 | 3495.5 | 3637.2  | 3661.6  | 3723.1  | 3659.5 | 3389.9 |
| 17.5° | 2930.9 | 2940.9 | 2970.1 | 3050.3 | 3174.4 | 3335.2 | 3519.4  | 3567.1  | 3658.9  | 3622.3 | 3324.6 |
| 20°   | 2793.4 | 2795.0 | 2814.1 | 2870.4 | 2994.5 | 3174.4 | 3397.3  | 3465.8  | 3591.0  | 3590.5 | 3257.2 |
| 22.5° | 2725.5 | 2720.2 | 2723.9 | 2756.3 | 2847.5 | 3021.1 | 3275.3  | 3356.4  | 3530.0  | 3563.4 | 3188.8 |
| 25°   | 2712.8 | 2708.5 | 2697.9 | 2702.1 | 2757.3 | 2886.8 | 3152.1  | 3246.1  | 3476.4  | 3547.0 | 3129.3 |
| 27.5° | 2752.6 | 2756.8 | 2738.8 | 2719.7 | 2723.9 | 2799.8 | 3042.8  | 3151.6  | 3432.9  | 3547.0 | 3087.4 |
| 30°   | 2832.7 | 2834.8 | 2821.5 | 2796.6 | 2763.2 | 2775.4 | 2966.9  | 3075.7  | 3411.1  | 3571.4 | 3060.9 |
| 32.5° | 2921.3 | 2933.0 | 2931.4 | 2911.2 | 2863.5 | 2814.1 | 2948.9  | 3048.1  | 3409.5  | 3625.5 | 3058.2 |
| 35°   | 3031.2 | 3044.4 | 3066.7 | 3062.5 | 3012.6 | 2931.4 | 3010.5  | 3088.5  | 3440.8  | 3714.6 | 3086.9 |
| 37.5° | 3147.9 | 3168.1 | 3215.8 | 3238.6 | 3206.3 | 3114.5 | 3148.4  | 3204.1  | 3524.7  | 3859.0 | 3159.6 |
| 40°   | 3260.9 | 3283.7 | 3370.8 | 3460.5 | 3436.0 | 3341.6 | 3357.5  | 3402.1  | 3673.8  | 4066.5 | 3297.5 |
| 42.5° | 3371.8 | 3405.8 | 3533.7 | 3681.2 | 3710.4 | 3635.0 | 3643.5  | 3679.1  | 3895.1  | 4352.0 | 3523.1 |
| 45°   | 3504.5 | 3542.7 | 3732.2 | 3914.2 | 3992.2 | 3959.3 | 3995.4  | 4018.7  | 4184.3  | 4729.3 | 3827.1 |
| 47.5° | 3699.3 | 3743.3 | 3975.7 | 4183.2 | 4320.1 | 4341.4 | 4414.1  | 4429.4  | 4549.9  | 5168.7 | 4223.6 |
| 50°   | 4079.2 | 4091.4 | 4301.6 | 4489.9 | 4687.4 | 4814.7 | 4897.5  | 4909.2  | 4992.5  | 5648.9 | 4718.7 |
| 52.5° | 4557.3 | 4565.3 | 4684.2 | 4810.5 | 5034.9 | 5295.0 | 5488.7  | 5505.1  | 5522.6  | 6117.0 | 5207.4 |
| 55°   | 5032.3 | 5031.2 | 5109.8 | 5184.1 | 5440.9 | 5818.7 | 6239.0  | 6249.1  | 6123.3  | 6561.1 | 5581.0 |
| 57.5° | 5328.9 | 5357.6 | 5477.0 | 5572.5 | 5931.2 | 6415.7 | 6998.9  | 7036.1  | 6754.3  | 6890.1 | 5950.3 |
| 60°   | 5234.5 | 5248.3 | 5513.1 | 5866.5 | 6542.0 | 7264.3 | 7767.9  | 7777.4  | 7228.7  | 7218.6 | 6417.3 |
| 62.5° | 4459.7 | 4467.1 | 4883.2 | 5611.8 | 6851.4 | 8364.9 | 8695.5  | 8540.0  | 7774.2  | 7674.5 | 6976.1 |
| 65°   | 3056.6 | 3104.9 | 3452.5 | 4353.0 | 6283.1 | 9055.2 | 10131.4 | 9874.1  | 8605.8  | 8331.4 | 7481.3 |
| 67.5° | 1800.0 | 1789.9 | 1961.9 | 2625.2 | 4614.7 | 8596.8 | 11947.9 | 11692.1 | 9739.8  | 8771.3 | 7333.2 |
| 70°   | 1229.5 | 1222.6 | 1288.5 | 1589.3 | 2605.0 | 6668.8 | 12519.4 | 13035.8 | 10741.2 | 8475.2 | 6311.2 |
| 72.5° | 877.7  | 881.4  | 978.5  | 1234.9 | 1635.5 | 3885.5 | 10766.1 | 11988.2 | 10427.5 | 7388.4 | 4797.2 |
| 75°   | 595.9  | 606.0  | 745.1  | 1013.0 | 1433.9 | 1976.7 | 7640.0  | 9113.1  | 8491.1  | 5369.8 | 2757.3 |
| 77.5° | 320.5  | 331.7  | 495.6  | 816.2  | 1296.4 | 1373.4 | 4914.5  | 6271.9  | 5333.7  | 2414.0 | 799.2  |
| 80°   | 133.7  | 140.1  | 231.9  | 593.3  | 1120.2 | 1206.2 | 2891.6  | 3803.3  | 2272.8  | 476.0  | 178.3  |
| 82.5° | 57.8   | 61.0   | 96.6   | 354.0  | 837.4  | 1018.3 | 1531.0  | 1829.7  | 688.8   | 104.5  | 89.7   |
| 85°   | 11.1   | 11.7   | 39.8   | 187.3  | 534.4  | 574.7  | 992.3   | 972.7   | 309.4   | 45.1   | 65.3   |
| 87.5° | 0.0    | 0.0    | 9.6    | 58.9   | 157.1  | 313.1  | 605.5   | 598.1   | 105.1   | 21.8   | 24.4   |
| 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: P323668

CATALOG NUMBER: GLEON-SA4A-830-U-SL3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3769.8 | 3769.8 | 3769.8 | 3769.8 | 3769.8 | 3769.8 | 3769.8 | 3769.8 | 3769.8 | 3769.8 | 3769.8 |
| 2.5°  | 3740.1 | 3703.5 | 3626.6 | 3531.6 | 3458.9 | 3378.7 | 3315.1 | 3234.4 | 3199.4 | 3201.0 | 3181.9 |
| 5°    | 3656.3 | 3580.9 | 3410.6 | 3195.7 | 3030.1 | 2859.2 | 2712.2 | 2565.8 | 2479.3 | 2451.1 | 2424.6 |
| 7.5°  | 3536.3 | 3416.9 | 3145.2 | 2814.1 | 2533.9 | 2260.1 | 2021.8 | 1812.2 | 1679.6 | 1614.8 | 1590.9 |
| 10°   | 3401.0 | 3233.3 | 2840.1 | 2403.9 | 2003.8 | 1633.4 | 1324.5 | 1056.0 | 948.8  | 876.1  | 857.6  |
| 12.5° | 3282.2 | 3055.0 | 2541.9 | 1983.1 | 1508.1 | 1061.3 | 766.8  | 599.6  | 526.9  | 498.3  | 493.5  |
| 15°   | 3170.2 | 2888.4 | 2254.8 | 1602.1 | 1044.3 | 653.2  | 487.7  | 430.9  | 413.9  | 409.1  | 409.1  |
| 17.5° | 3064.6 | 2729.7 | 1974.1 | 1226.9 | 690.9  | 458.0  | 403.8  | 391.1  | 385.8  | 385.3  | 385.8  |
| 20°   | 2954.2 | 2571.1 | 1698.1 | 898.9  | 482.4  | 387.9  | 373.1  | 366.2  | 364.6  | 364.6  | 364.6  |
| 22.5° | 2848.6 | 2412.4 | 1429.6 | 642.1  | 386.9  | 354.0  | 346.5  | 341.7  | 340.2  | 339.6  | 338.6  |
| 25°   | 2747.2 | 2261.7 | 1167.5 | 453.7  | 339.6  | 324.2  | 317.9  | 311.5  | 306.7  | 304.1  | 302.5  |
| 27.5° | 2663.9 | 2127.4 | 923.4  | 364.0  | 306.7  | 293.5  | 285.5  | 275.9  | 264.3  | 259.0  | 256.8  |
| 30°   | 2597.6 | 2004.8 | 711.6  | 307.3  | 275.9  | 262.7  | 250.5  | 234.0  | 217.0  | 208.0  | 207.5  |
| 32.5° | 2545.6 | 1884.4 | 540.2  | 271.7  | 248.4  | 231.9  | 214.4  | 193.7  | 174.1  | 164.0  | 163.4  |
| 35°   | 2520.1 | 1778.3 | 412.9  | 245.7  | 223.9  | 203.2  | 181.5  | 158.7  | 139.6  | 130.0  | 129.0  |
| 37.5° | 2537.1 | 1688.6 | 322.1  | 223.9  | 203.2  | 179.4  | 153.9  | 130.0  | 113.0  | 104.5  | 104.0  |
| 40°   | 2599.2 | 1631.3 | 261.6  | 205.4  | 185.7  | 156.5  | 129.0  | 106.7  | 92.3   | 85.4   | 84.9   |
| 42.5° | 2731.3 | 1610.0 | 223.4  | 190.0  | 168.8  | 135.3  | 107.2  | 88.1   | 74.8   | 70.0   | 69.0   |
| 45°   | 2952.1 | 1641.3 | 197.4  | 175.1  | 151.2  | 115.2  | 88.6   | 72.2   | 60.5   | 56.8   | 56.3   |
| 47.5° | 3246.1 | 1723.6 | 178.8  | 160.8  | 135.3  | 97.1   | 73.8   | 58.4   | 49.4   | 45.6   | 45.1   |
| 50°   | 3625.0 | 1854.1 | 163.4  | 146.5  | 120.5  | 82.3   | 61.0   | 46.2   | 38.2   | 35.6   | 35.6   |
| 52.5° | 4037.3 | 2009.6 | 149.6  | 133.2  | 105.6  | 68.5   | 49.4   | 35.6   | 30.2   | 27.1   | 27.1   |
| 55°   | 4378.0 | 2145.5 | 134.8  | 123.1  | 87.6   | 56.8   | 37.7   | 27.1   | 22.3   | 20.7   | 20.7   |
| 57.5° | 4718.1 | 2290.3 | 117.8  | 105.6  | 70.0   | 46.2   | 28.7   | 20.2   | 16.5   | 15.4   | 15.4   |
| 60°   | 5159.1 | 2467.6 | 101.4  | 86.0   | 55.2   | 35.0   | 21.2   | 14.3   | 12.2   | 11.7   | 11.7   |
| 62.5° | 5644.1 | 2571.6 | 86.5   | 69.0   | 43.0   | 26.0   | 15.4   | 9.6    | 9.0    | 9.0    | 8.5    |
| 65°   | 5940.8 | 2424.6 | 72.7   | 55.2   | 33.4   | 19.6   | 10.1   | 6.9    | 8.0    | 7.4    | 6.4    |
| 67.5° | 5562.4 | 1898.2 | 59.4   | 43.0   | 26.0   | 14.9   | 6.4    | 4.8    | 8.5    | 6.9    | 5.3    |
| 70°   | 4605.6 | 1328.8 | 46.2   | 30.2   | 20.7   | 12.7   | 4.2    | 3.2    | 9.0    | 6.9    | 4.2    |
| 72.5° | 3446.7 | 889.4  | 36.6   | 20.2   | 15.4   | 11.1   | 3.7    | 1.6    | 8.0    | 5.8    | 3.7    |
| 75°   | 1883.3 | 358.2  | 29.2   | 12.7   | 9.6    | 8.0    | 2.7    | 1.1    | 5.3    | 4.2    | 2.7    |
| 77.5° | 495.6  | 94.5   | 21.2   | 8.5    | 5.3    | 3.2    | 1.6    | 0.5    | 2.7    | 2.1    | 1.1    |
| 80°   | 126.3  | 36.6   | 13.8   | 5.8    | 3.7    | 1.6    | 0.0    | 0.0    | 0.5    | 0.0    | 0.0    |
| 82.5° | 67.4   | 15.4   | 8.5    | 4.2    | 2.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 50.9   | 10.1   | 4.8    | 2.7    | 0.5    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 19.6   | 3.2    | 1.6    | 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           |

REPORT NUMBER: SP1-2408-195-9

**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

REPORT NUMBER: SP1-2408-195-9

### 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                             |                   |                                      |                                |

REPORT NUMBER: SP1-2408-195-9

### 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            |        |                          |               |

REPORT NUMBER: SP1-2408-195-9

### 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                             |                   |                                      |                                |

REPORT NUMBER: SP1-2408-195-9

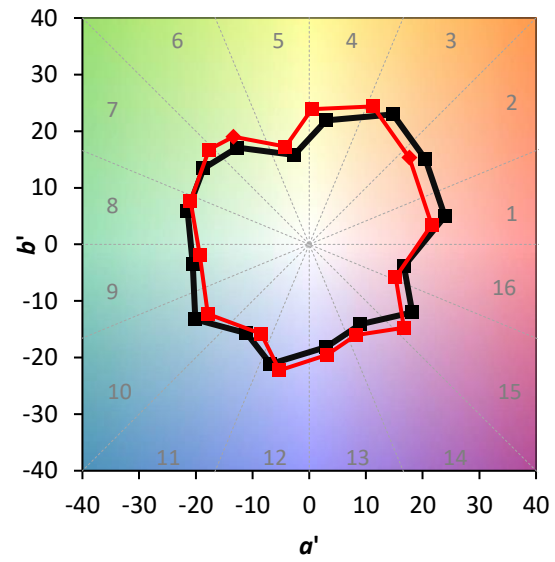
TM-30-18

### Summary

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



### 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)