

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: P320168

Luminaire Tested: **GLEON-SA4C-830-U-SL4**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P320168  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-24)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA4C-830-U-SL4  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(4) 80 CRI, 3000K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 21544 lumens  
Efficiency: N/A  
Efficacy: 95.8 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G5

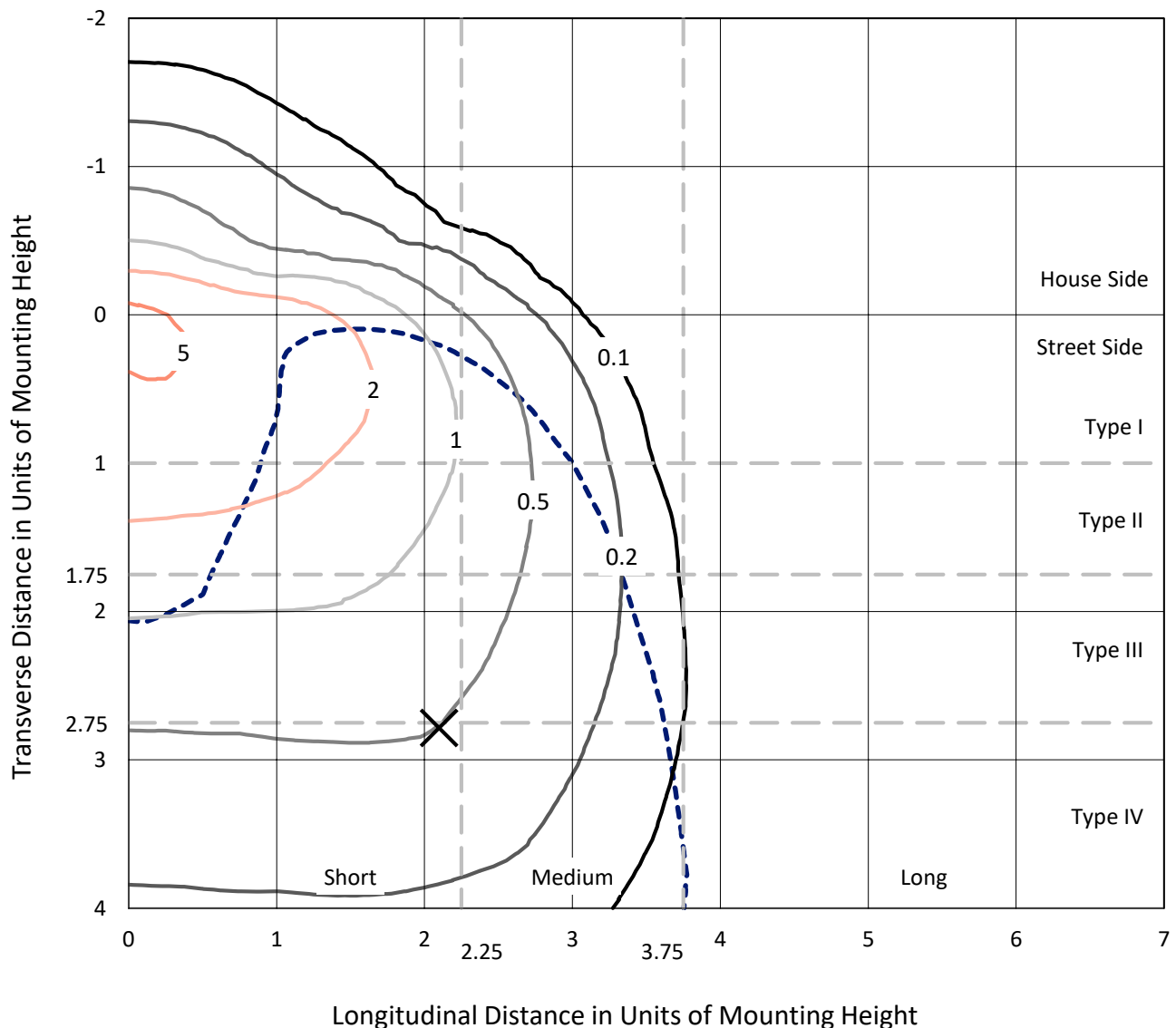
Input Watts (W): 225  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P320168  
 CATALOG NUMBER: GLEON-SA4C-830-U-SL4

## Iso-Footcandle Lines of Horizontal Illumination

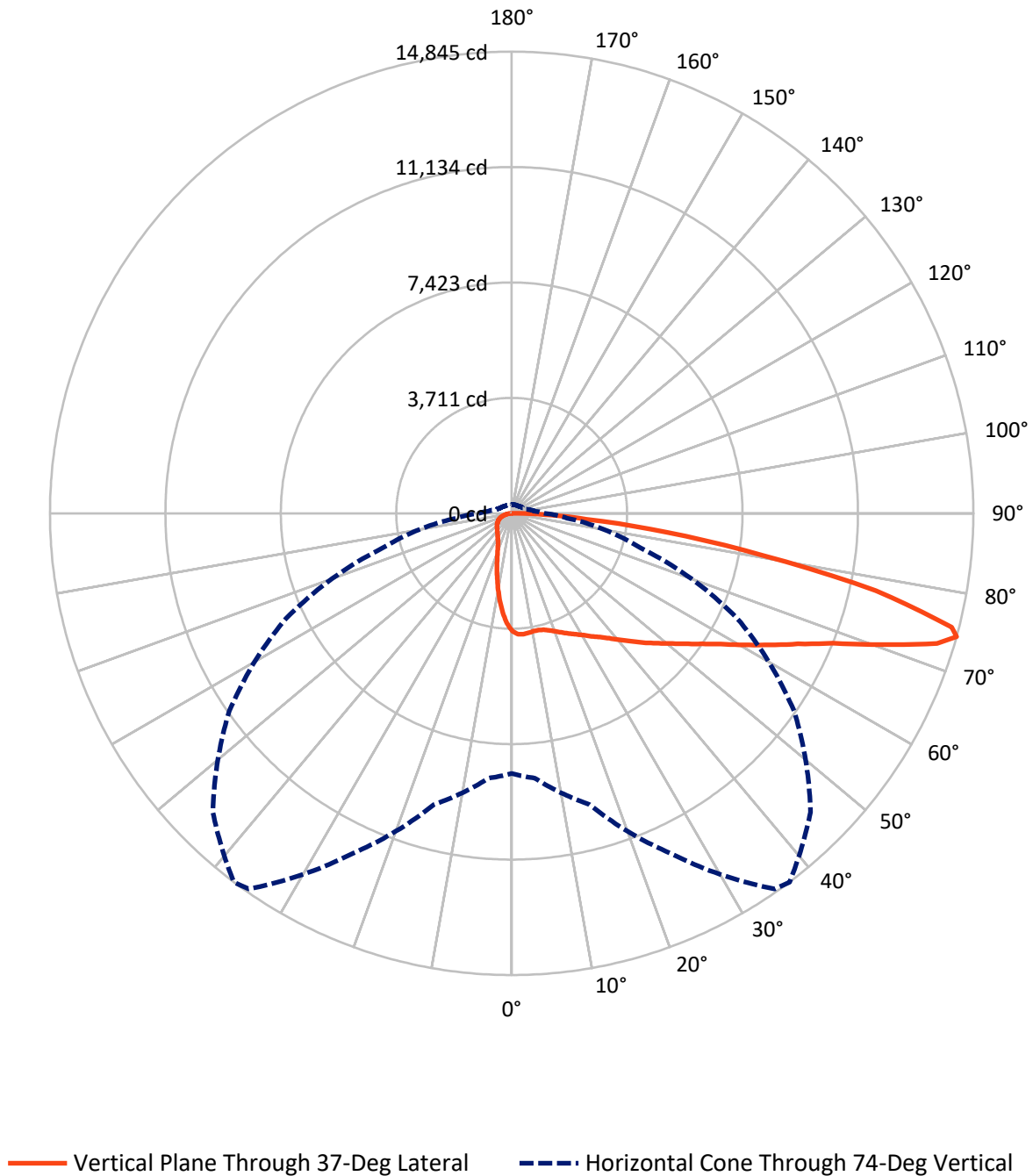
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6.2 fc  
 Type IV - Short - N/A

REPORT NUMBER: P320168  
CATALOG NUMBER: GLEON-SA4C-830-U-SL4

## Luminous Intensity Polar Plot



REPORT NUMBER: P320168

CATALOG NUMBER: GLEON-SA4C-830-U-SL4

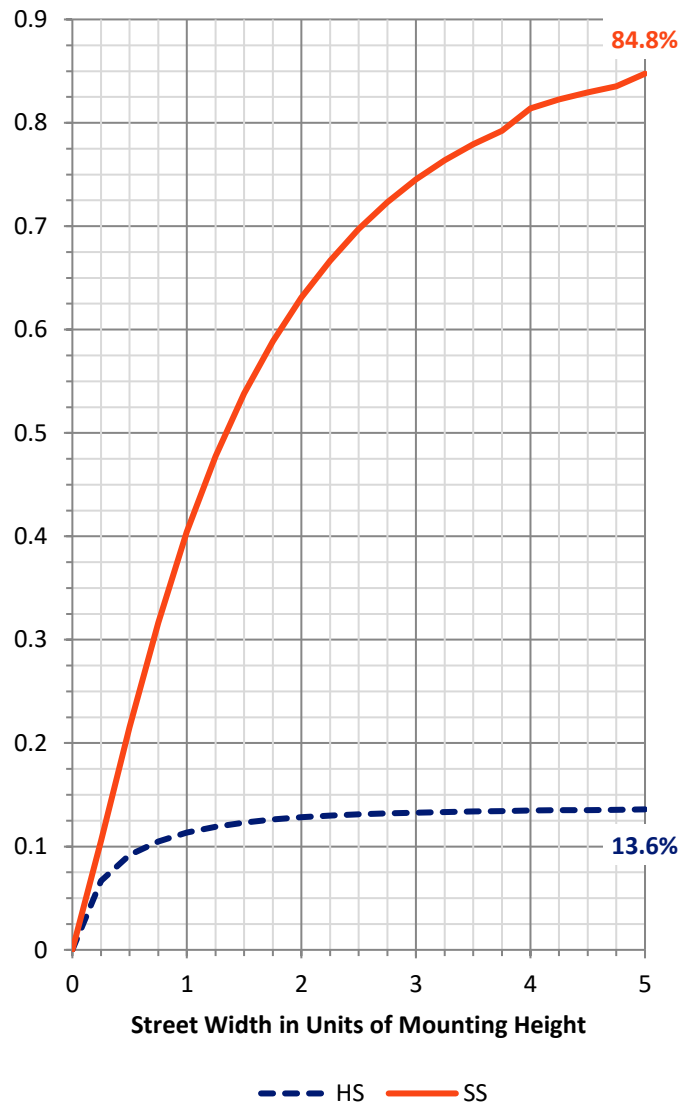
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2964.3   | 0.0    | 2964.3  |
|                    | % Fixture | 13.8     | 0.0    | 13.8    |
| <b>Street Side</b> | Lumens    | 18579.7  | 0.0    | 18579.7 |
|                    | % Fixture | 86.2     | 0.0    | 86.2    |
| <b>Total</b>       | Lumens    | 21544.0  | 0.0    | 21544.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 334.3   | 1.6       |
| 10°-20°   | 856.8   | 4.0       |
| 20°-30°   | 1320.2  | 6.1       |
| 30°-40°   | 1919.8  | 8.9       |
| 40°-50°   | 2825.6  | 13.1      |
| 50°-60°   | 3968.1  | 18.4      |
| 60°-70°   | 5022.4  | 23.3      |
| 70°-80°   | 4422.4  | 20.5      |
| 80°-90°   | 874.4   | 4.1       |
| 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°    | 21544.0 | 100.0     |
| 0°-180°   | 21544.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P320168

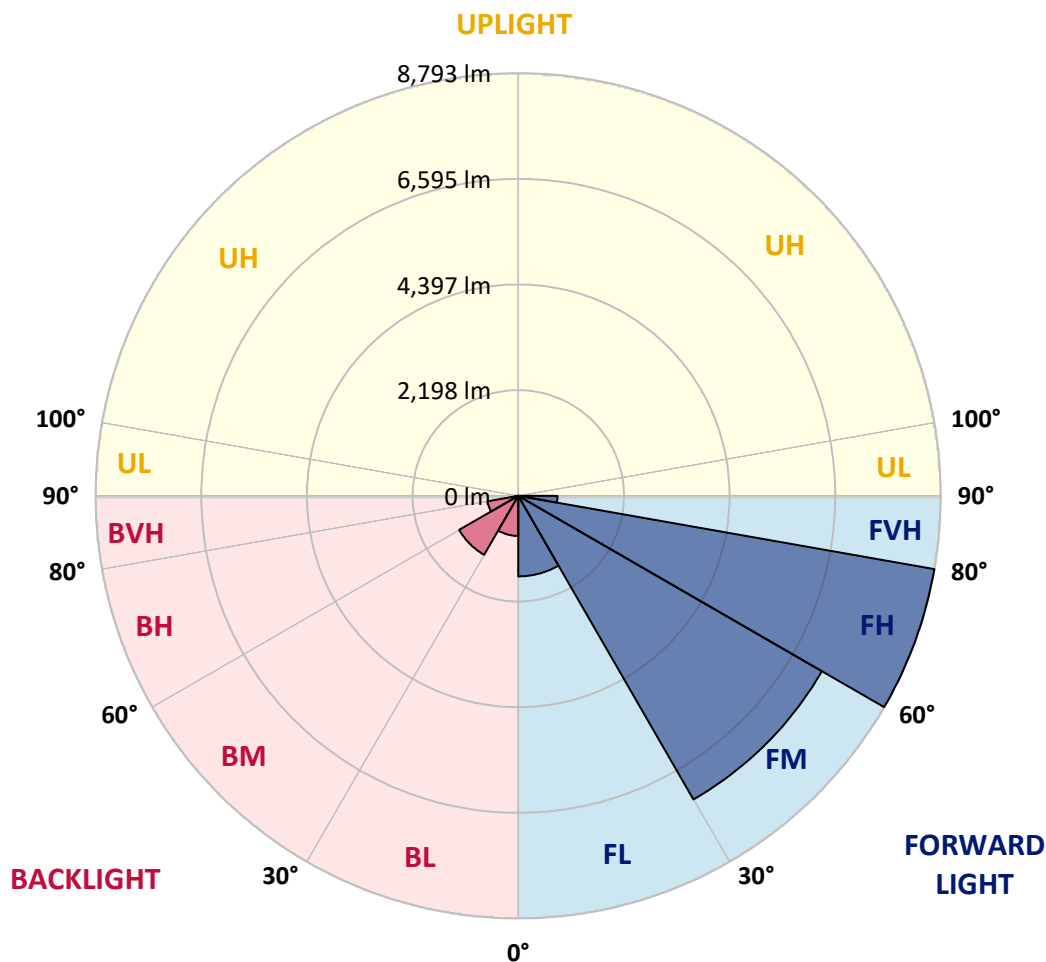
CATALOG NUMBER: GLEON-SA4C-830-U-SL4

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1676.4 | 7.8       |                         |      |          |
| FM   | (30°-60°)   | 7295.0 | 33.9      |                         |      |          |
| FH   | (60°-80°)   | 8793.2 | 40.8      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 815.2  | 3.8       |                         |      | G5       |
| BL   | (0°-30°)    | 835.0  | 3.9       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 1418.5 | 6.6       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 651.6  | 3.0       | B2/1000                 |      | G2/1000  |
| BVH  | (80°-90°)   | 59.2   | 0.3       |                         |      | G1/100   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |          |

**BUG Rating: B2-U0-G5**

Type IV Short





REPORT NUMBER: P320168

CATALOG NUMBER: GLEON-SA4C-830-U-SL4

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°     | 35°     | 37°     | 45°     | 55°     | 65°     | 75°     | 85°    |
|-------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|--------|
| 0°    | 3796.0 | 3796.0 | 3796.0 | 3796.0  | 3796.0  | 3796.0  | 3796.0  | 3796.0  | 3796.0  | 3796.0  | 3796.0 |
| 2.5°  | 3925.7 | 3926.5 | 3925.7 | 3919.7  | 3905.2  | 3893.1  | 3883.2  | 3868.8  | 3836.9  | 3812.7  | 3776.2 |
| 5°    | 3962.9 | 3958.4 | 3955.3 | 3944.0  | 3921.2  | 3907.5  | 3888.6  | 3861.2  | 3808.9  | 3760.3  | 3701.1 |
| 7.5°  | 3945.5 | 3940.2 | 3933.3 | 3919.7  | 3893.9  | 3882.5  | 3855.9  | 3820.3  | 3757.3  | 3693.5  | 3608.5 |
| 10°   | 3891.6 | 3890.1 | 3887.0 | 3884.0  | 3862.0  | 3852.9  | 3828.6  | 3790.7  | 3728.4  | 3651.0  | 3551.6 |
| 12.5° | 3831.6 | 3835.4 | 3847.6 | 3863.5  | 3853.6  | 3849.1  | 3833.9  | 3808.1  | 3744.4  | 3660.9  | 3541.0 |
| 15°   | 3793.7 | 3804.3 | 3836.9 | 3878.7  | 3887.0  | 3885.5  | 3881.7  | 3865.0  | 3797.5  | 3704.9  | 3565.3 |
| 17.5° | 3780.8 | 3798.2 | 3860.5 | 3929.5  | 3953.8  | 3959.1  | 3960.6  | 3931.8  | 3856.7  | 3758.8  | 3590.3 |
| 20°   | 3804.3 | 3826.3 | 3917.4 | 4012.3  | 4051.0  | 4054.0  | 4047.2  | 3997.1  | 3912.8  | 3805.1  | 3604.0 |
| 22.5° | 3875.7 | 3895.4 | 4009.2 | 4116.2  | 4160.2  | 4164.8  | 4144.3  | 4068.4  | 3972.0  | 3859.7  | 3622.9 |
| 25°   | 4013.0 | 4037.3 | 4151.1 | 4258.1  | 4280.9  | 4281.7  | 4252.1  | 4158.0  | 4049.4  | 3936.4  | 3663.9 |
| 27.5° | 4192.1 | 4216.4 | 4318.8 | 4423.6  | 4411.4  | 4404.6  | 4364.4  | 4270.3  | 4150.4  | 4041.8  | 3736.8 |
| 30°   | 4391.7 | 4418.3 | 4515.4 | 4589.8  | 4560.9  | 4547.3  | 4514.6  | 4393.2  | 4290.8  | 4186.0  | 3848.3 |
| 32.5° | 4598.1 | 4622.4 | 4707.4 | 4758.2  | 4721.8  | 4715.7  | 4666.4  | 4555.6  | 4473.7  | 4406.1  | 4028.9 |
| 35°   | 4809.8 | 4827.3 | 4910.8 | 4939.6  | 4891.0  | 4889.5  | 4875.9  | 4774.2  | 4722.6  | 4754.4  | 4291.5 |
| 37.5° | 5026.1 | 5030.7 | 5102.0 | 5103.5  | 5089.1  | 5095.2  | 5109.6  | 5045.9  | 5060.3  | 5159.7  | 4633.0 |
| 40°   | 5218.9 | 5231.0 | 5282.6 | 5298.6  | 5323.6  | 5344.9  | 5417.0  | 5375.2  | 5486.8  | 5662.8  | 5058.0 |
| 42.5° | 5361.6 | 5385.1 | 5467.8 | 5508.8  | 5590.0  | 5623.4  | 5725.1  | 5763.8  | 5988.4  | 6252.5  | 5563.4 |
| 45°   | 5482.2 | 5518.7 | 5651.5 | 5735.7  | 5873.1  | 5931.5  | 6077.2  | 6207.0  | 6555.3  | 6892.2  | 6095.4 |
| 47.5° | 5612.8 | 5659.0 | 5825.2 | 5986.1  | 6172.8  | 6238.8  | 6503.7  | 6698.0  | 7160.1  | 7535.8  | 6597.0 |
| 50°   | 5804.8 | 5840.4 | 6002.8 | 6255.5  | 6488.5  | 6573.5  | 6940.1  | 7218.6  | 7774.8  | 8149.0  | 7031.9 |
| 52.5° | 6072.6 | 6059.0 | 6196.3 | 6550.7  | 6863.4  | 6968.1  | 7406.0  | 7772.6  | 8397.9  | 8703.7  | 7399.2 |
| 55°   | 6342.0 | 6319.3 | 6415.7 | 6859.6  | 7300.5  | 7410.6  | 7919.0  | 8328.8  | 8990.6  | 9203.1  | 7680.7 |
| 57.5° | 6641.8 | 6598.6 | 6679.8 | 7207.9  | 7798.4  | 7929.6  | 8493.5  | 8920.0  | 9573.4  | 9606.8  | 7859.8 |
| 60°   | 6950.7 | 6892.2 | 6983.3 | 7639.7  | 8430.5  | 8585.3  | 9165.9  | 9496.8  | 10122.8 | 9930.1  | 7917.5 |
| 62.5° | 7220.8 | 7179.9 | 7320.3 | 8121.6  | 9143.1  | 9313.1  | 9826.1  | 10109.9 | 10664.7 | 10064.4 | 7709.6 |
| 65°   | 7456.9 | 7463.7 | 7706.5 | 8663.5  | 9937.7  | 10119.0 | 10583.5 | 10865.8 | 11091.2 | 9984.7  | 7223.1 |
| 67.5° | 7738.4 | 7777.1 | 8191.5 | 9376.8  | 10937.9 | 11136.7 | 11685.4 | 11689.9 | 11329.5 | 9517.2  | 6265.4 |
| 70°   | 8149.0 | 8228.6 | 8858.5 | 10366.4 | 12360.0 | 12633.2 | 13056.7 | 12174.1 | 10994.8 | 8249.9  | 4929.8 |
| 72.5° | 8513.2 | 8662.0 | 9568.1 | 11498.7 | 14093.4 | 14300.5 | 13858.9 | 11894.8 | 9596.2  | 6182.7  | 3071.2 |
| 74°   | 8365.2 | 8549.7 | 9697.1 | 12056.5 | 14746.0 | 14845.4 | 13587.9 | 11079.8 | 8001.0  | 4281.7  | 1784.9 |
| 75°   | 8046.5 | 8246.9 | 9508.9 | 12051.2 | 14663.3 | 14607.9 | 12933.8 | 10148.6 | 6589.4  | 2920.2  | 1187.7 |
| 77.5° | 6493.8 | 6705.6 | 8012.4 | 10328.5 | 12023.1 | 11970.7 | 9935.4  | 6808.0  | 2886.1  | 957.7   | 603.3  |
| 80°   | 3775.5 | 3937.1 | 4973.8 | 6559.1  | 8107.2  | 8202.1  | 6534.0  | 3368.7  | 1135.3  | 538.1   | 409.0  |
| 82.5° | 1677.1 | 1788.7 | 2402.6 | 3348.2  | 4892.6  | 5014.7  | 3421.8  | 1765.2  | 701.2   | 327.1   | 245.9  |
| 85°   | 1100.4 | 1183.1 | 1458.6 | 1594.4  | 2329.8  | 2413.3  | 1674.9  | 1374.4  | 462.9   | 179.9   | 180.6  |
| 87.5° | 791.5  | 871.2  | 1083.7 | 946.3   | 1069.3  | 1012.4  | 911.4   | 1271.9  | 185.9   | 102.5   | 60.7   |
| 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: P320168

CATALOG NUMBER: GLEON-SA4C-830-U-SL4

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3796.0 | 3796.0 | 3796.0 | 3796.0 | 3796.0 | 3796.0 | 3796.0 | 3796.0 | 3796.0 | 3796.0 | 3796.0 |
| 2.5°  | 3760.3 | 3748.2 | 3720.8 | 3669.2 | 3640.4 | 3616.1 | 3575.9 | 3552.4 | 3541.7 | 3541.0 | 3545.5 |
| 5°    | 3667.0 | 3638.9 | 3568.3 | 3481.8 | 3412.7 | 3349.7 | 3271.6 | 3224.5 | 3191.1 | 3171.4 | 3176.7 |
| 7.5°  | 3558.4 | 3514.4 | 3403.6 | 3265.5 | 3154.7 | 3032.5 | 2911.9 | 2839.8 | 2783.6 | 2741.9 | 2749.5 |
| 10°   | 3484.1 | 3423.4 | 3261.7 | 3062.9 | 2878.5 | 2700.9 | 2534.7 | 2435.3 | 2356.4 | 2295.6 | 2300.2 |
| 12.5° | 3459.0 | 3377.1 | 3153.2 | 2887.6 | 2628.8 | 2386.0 | 2168.9 | 2016.4 | 1935.2 | 1866.1 | 1871.4 |
| 15°   | 3462.8 | 3352.8 | 3062.1 | 2729.7 | 2404.2 | 2098.3 | 1835.0 | 1656.7 | 1546.6 | 1498.8 | 1499.6 |
| 17.5° | 3465.9 | 3324.7 | 2966.5 | 2560.5 | 2181.8 | 1829.7 | 1543.6 | 1363.0 | 1259.0 | 1215.0 | 1215.7 |
| 20°   | 3456.0 | 3279.2 | 2848.1 | 2366.2 | 1949.6 | 1583.0 | 1306.1 | 1152.8 | 1073.8 | 1039.7 | 1039.7 |
| 22.5° | 3443.1 | 3225.3 | 2714.6 | 2171.2 | 1720.4 | 1369.0 | 1136.1 | 1019.2 | 973.7  | 950.9  | 950.1  |
| 25°   | 3449.2 | 3185.1 | 2578.0 | 1970.8 | 1509.4 | 1198.3 | 1023.0 | 945.6  | 915.2  | 900.8  | 900.0  |
| 27.5° | 3481.8 | 3166.1 | 2452.0 | 1771.2 | 1325.0 | 1070.0 | 947.1  | 892.5  | 872.7  | 863.6  | 863.6  |
| 30°   | 3541.0 | 3166.1 | 2320.7 | 1601.3 | 1171.7 | 975.2  | 888.7  | 851.5  | 837.8  | 831.7  | 831.7  |
| 32.5° | 3644.2 | 3183.5 | 2194.0 | 1432.8 | 1049.5 | 900.8  | 840.1  | 815.0  | 804.4  | 801.4  | 801.4  |
| 35°   | 3821.8 | 3242.7 | 2070.3 | 1273.4 | 950.9  | 840.1  | 793.8  | 779.4  | 771.8  | 771.0  | 773.3  |
| 37.5° | 4071.4 | 3363.4 | 1954.1 | 1155.8 | 881.1  | 790.8  | 755.1  | 743.7  | 739.2  | 743.0  | 746.0  |
| 40°   | 4385.6 | 3527.3 | 1848.7 | 1049.5 | 827.9  | 751.3  | 719.4  | 711.8  | 709.6  | 714.9  | 719.4  |
| 42.5° | 4765.1 | 3748.9 | 1762.1 | 972.9  | 787.0  | 717.9  | 689.1  | 680.0  | 677.7  | 683.8  | 689.8  |
| 45°   | 5175.6 | 3987.2 | 1701.4 | 916.0  | 755.1  | 692.9  | 662.5  | 652.6  | 648.1  | 651.1  | 658.0  |
| 47.5° | 5549.0 | 4212.6 | 1677.1 | 875.8  | 724.7  | 671.6  | 639.0  | 626.8  | 619.3  | 617.7  | 623.0  |
| 50°   | 5863.9 | 4380.3 | 1688.5 | 851.5  | 700.5  | 648.1  | 616.2  | 602.6  | 591.2  | 584.3  | 588.1  |
| 52.5° | 6093.1 | 4485.8 | 1699.2 | 840.9  | 681.5  | 622.3  | 591.2  | 578.3  | 563.1  | 551.7  | 551.7  |
| 55°   | 6259.3 | 4510.1 | 1675.6 | 832.5  | 667.1  | 594.2  | 563.1  | 551.0  | 535.8  | 522.9  | 521.4  |
| 57.5° | 6324.6 | 4441.8 | 1588.4 | 820.4  | 657.2  | 567.6  | 533.5  | 524.4  | 511.5  | 496.3  | 495.6  |
| 60°   | 6236.6 | 4230.8 | 1419.9 | 794.6  | 644.3  | 545.6  | 503.9  | 497.8  | 491.8  | 477.3  | 476.6  |
| 62.5° | 5882.9 | 3767.9 | 1202.1 | 742.2  | 618.5  | 522.1  | 476.6  | 479.6  | 480.4  | 470.5  | 469.0  |
| 65°   | 5241.7 | 3131.9 | 989.6  | 673.9  | 579.8  | 494.0  | 448.5  | 462.9  | 471.3  | 469.8  | 467.5  |
| 67.5° | 4309.7 | 2437.6 | 838.6  | 601.8  | 528.9  | 455.3  | 418.1  | 434.8  | 441.7  | 447.0  | 445.5  |
| 70°   | 3198.7 | 1718.9 | 693.6  | 525.9  | 467.5  | 409.8  | 378.7  | 387.0  | 382.5  | 388.6  | 390.8  |
| 72.5° | 1783.4 | 1031.3 | 565.4  | 450.0  | 403.7  | 356.7  | 334.7  | 333.2  | 323.3  | 323.3  | 323.3  |
| 74°   | 1070.0 | 756.6  | 497.1  | 403.0  | 365.0  | 321.8  | 302.8  | 296.0  | 286.9  | 287.6  | 286.9  |
| 75°   | 860.6  | 650.4  | 456.1  | 371.9  | 337.7  | 301.3  | 282.3  | 273.2  | 266.4  | 266.4  | 265.6  |
| 77.5° | 543.4  | 494.0  | 367.3  | 296.0  | 270.2  | 248.2  | 235.3  | 223.1  | 223.1  | 222.4  | 221.6  |
| 80°   | 410.6  | 393.1  | 286.1  | 223.9  | 207.2  | 190.5  | 182.1  | 176.8  | 176.8  | 179.1  | 178.3  |
| 82.5° | 281.5  | 296.0  | 201.1  | 156.3  | 148.0  | 135.8  | 134.3  | 135.1  | 132.8  | 129.8  | 129.0  |
| 85°   | 205.7  | 222.4  | 135.8  | 98.7   | 90.3   | 82.7   | 88.8   | 91.8   | 88.0   | 81.2   | 78.2   |
| 87.5° | 78.9   | 145.7  | 72.9   | 41.0   | 37.9   | 32.6   | 37.9   | 39.5   | 42.5   | 33.4   | 34.2   |
| 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

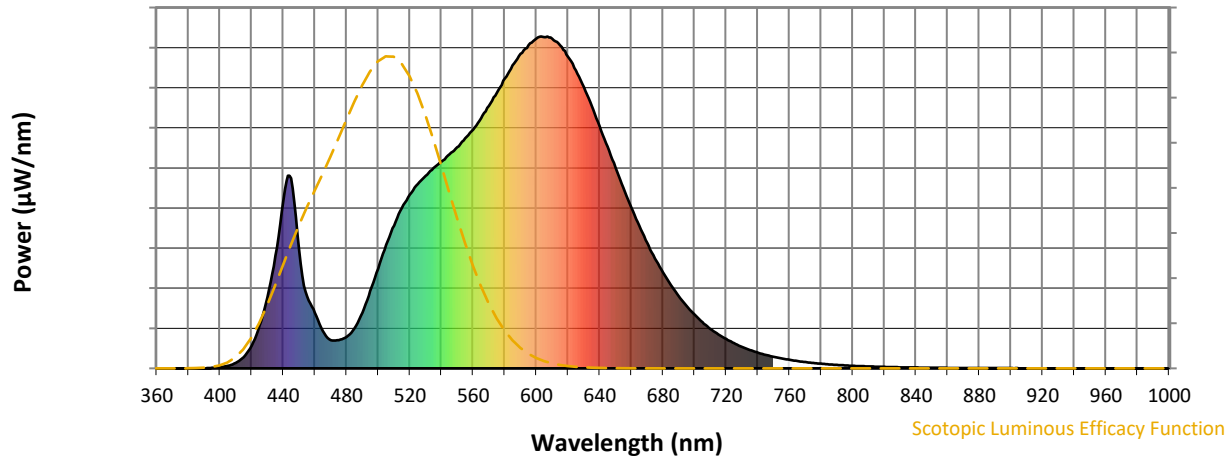


### Photopic Lumens: NR

| λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</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

### 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

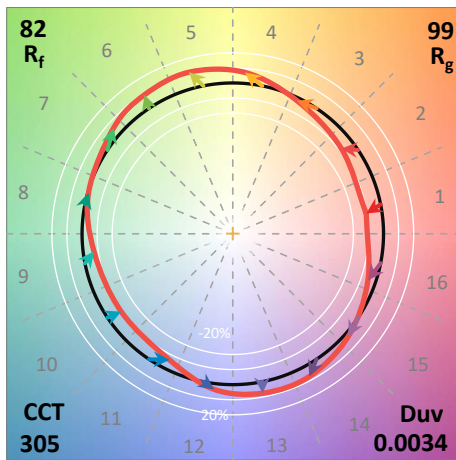
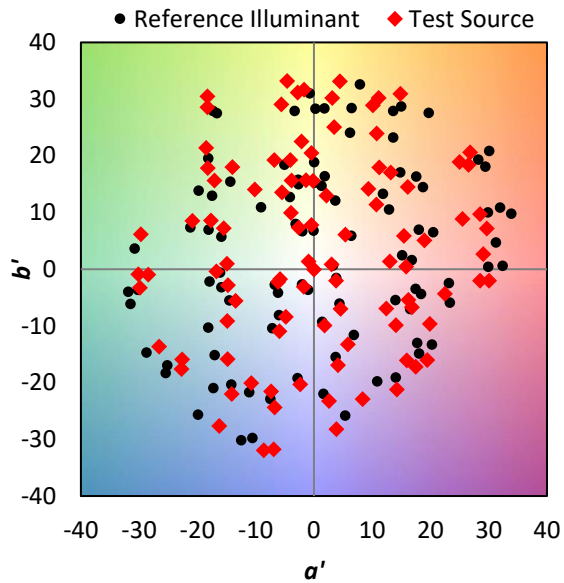
TM-30-18

### Summary

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



### Color Vector Graphics

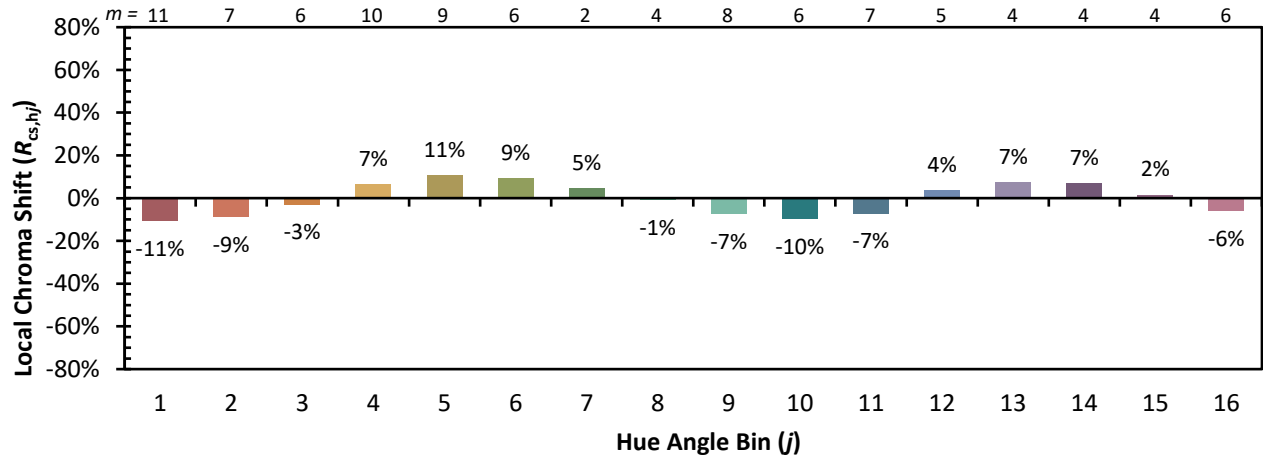


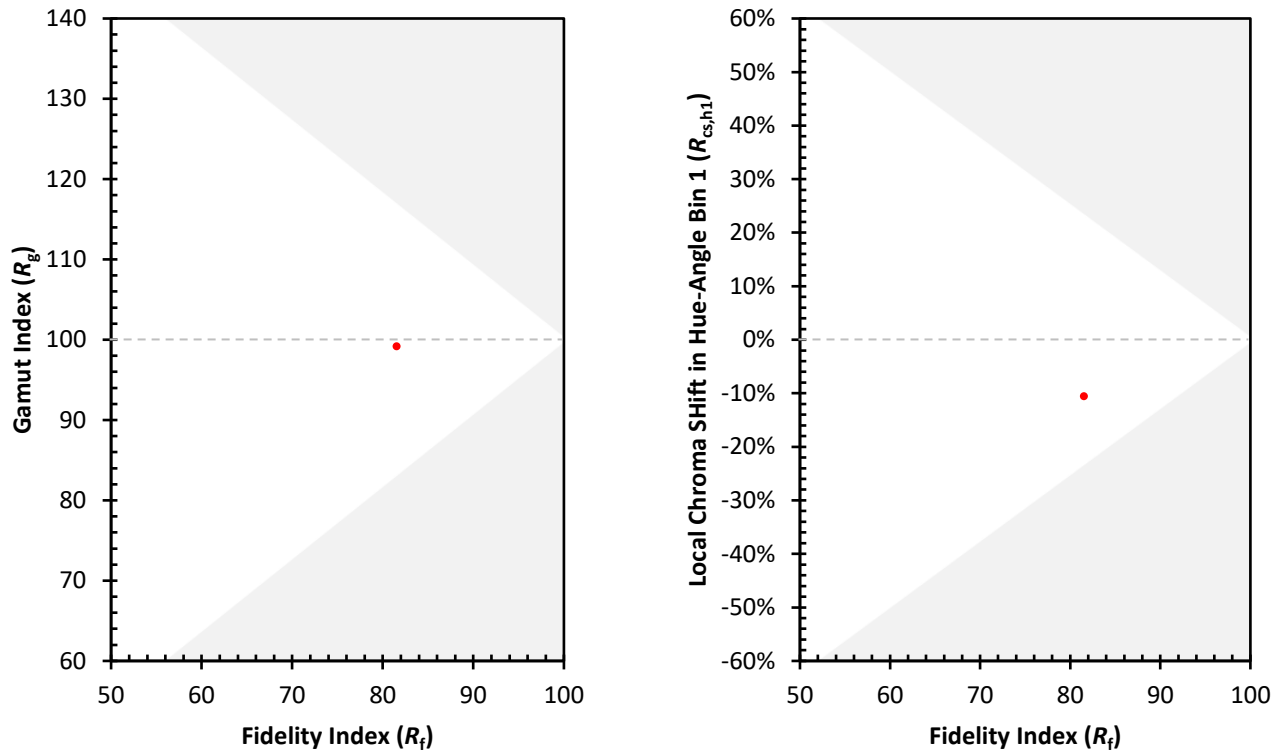


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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)