

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: P319487

Luminaire Tested: **GLEON-SA3C-827-U-SL2**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319487  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-20)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA3C-827-U-SL2  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(3) 80 CRI, 2700K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 15551 lumens  
Efficiency: N/A  
Efficacy: 93.7 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G3

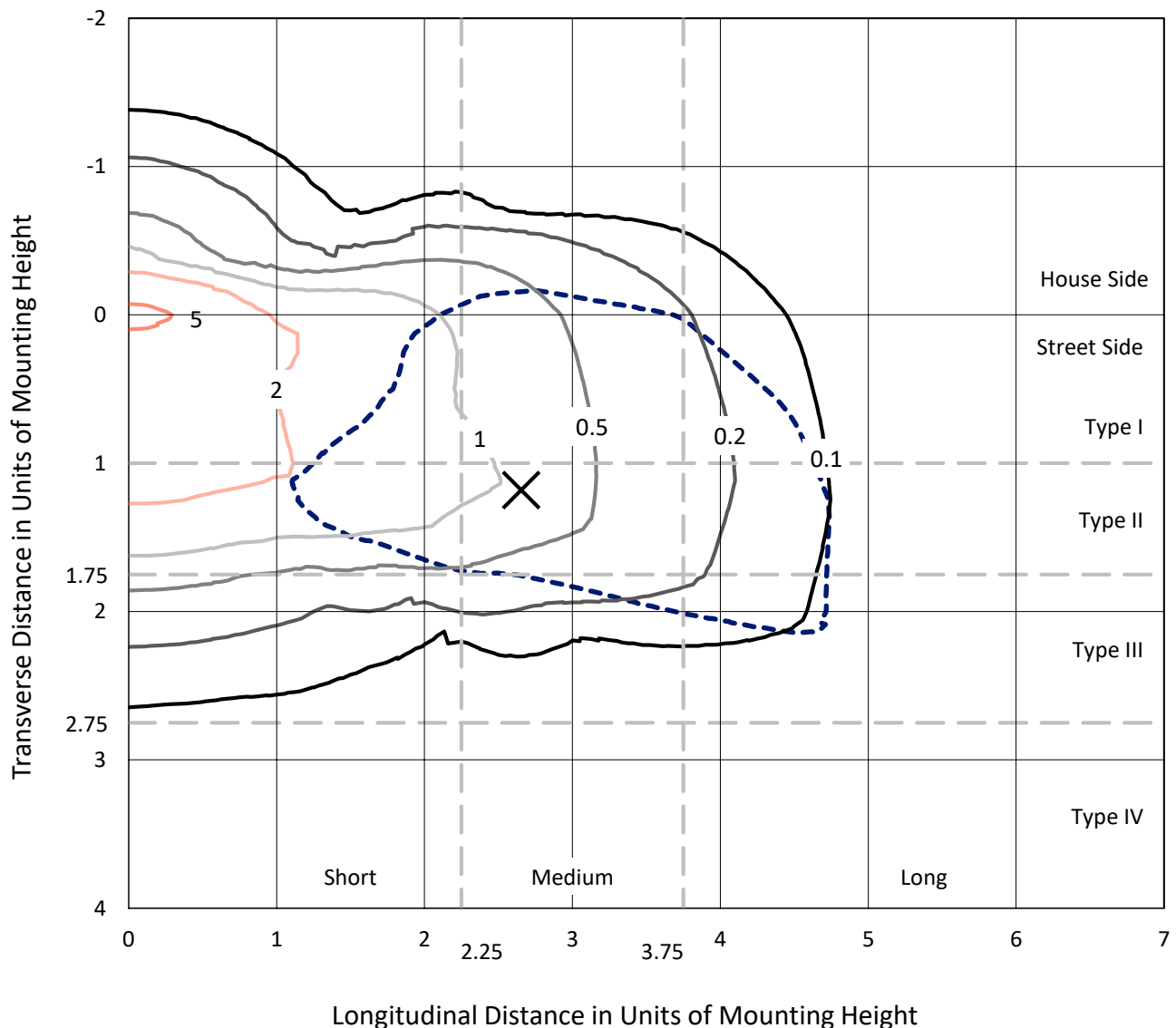
Input Watts (W): 166  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

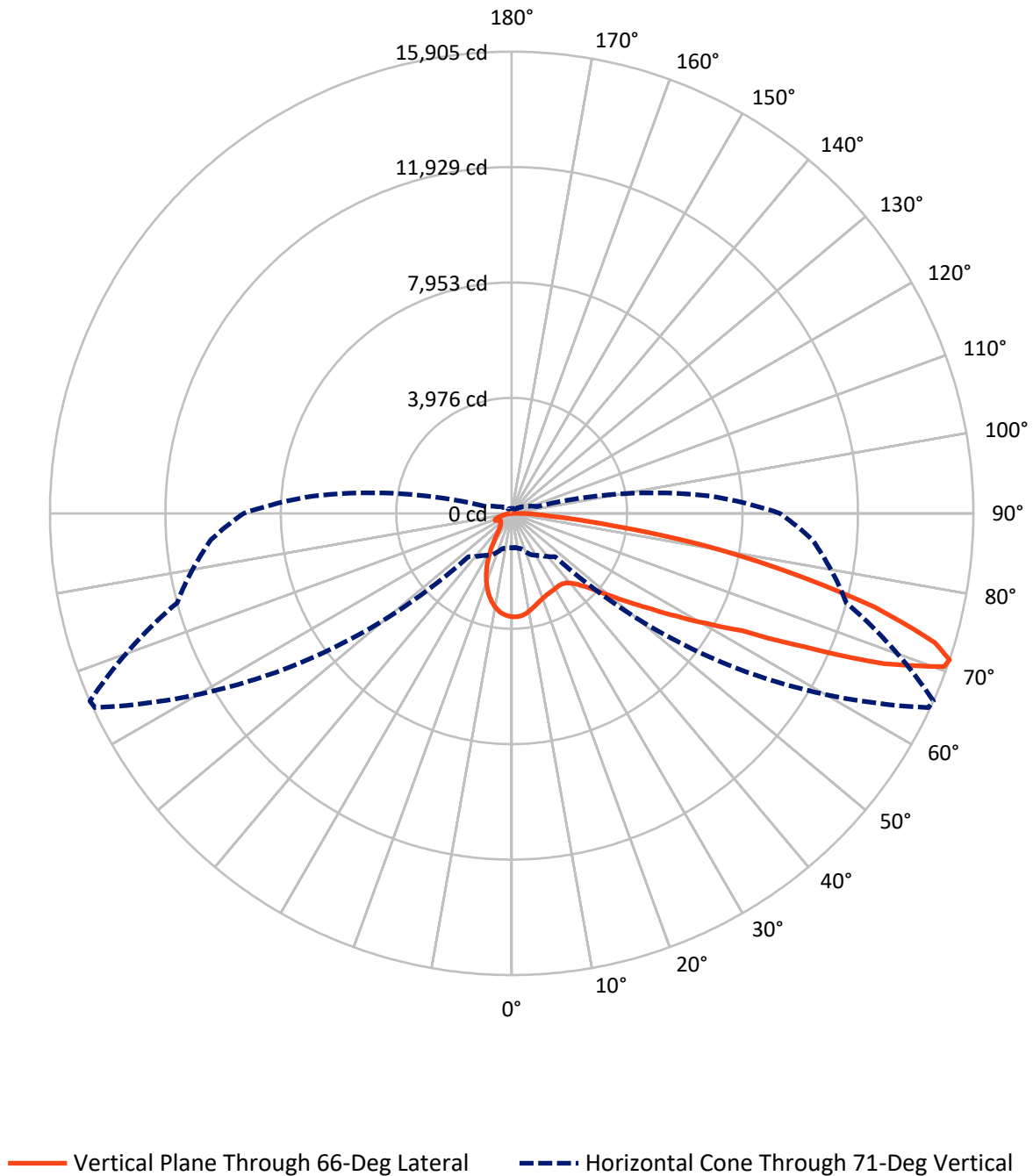
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 5.7 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA3C-827-U-SL2

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2882.0   | 0.0    | 2882.0  |
|                    | % Fixture | 18.5     | 0.0    | 18.5    |
| <b>Street Side</b> | Lumens    | 12669.0  | 0.0    | 12669.0 |
|                    | % Fixture | 81.5     | 0.0    | 81.5    |
| <b>Total</b>       | Lumens    | 15551.0  | 0.0    | 15551.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 313.6   | 2.0       |
| 10°-20°   | 752.1   | 4.8       |
| 20°-30°   | 1010.3  | 6.5       |
| 30°-40°   | 1329.0  | 8.5       |
| 40°-50°   | 1933.3  | 12.4      |
| 50°-60°   | 3020.0  | 19.4      |
| 60°-70°   | 3783.1  | 24.3      |
| 70°-80°   | 2885.7  | 18.6      |
| 80°-90°   | 524.0   | 3.4       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 15551.0 | 100.0     |
| 0°-180°   | 15551.0 | 100.0     |

**Coefficient of Utilization**



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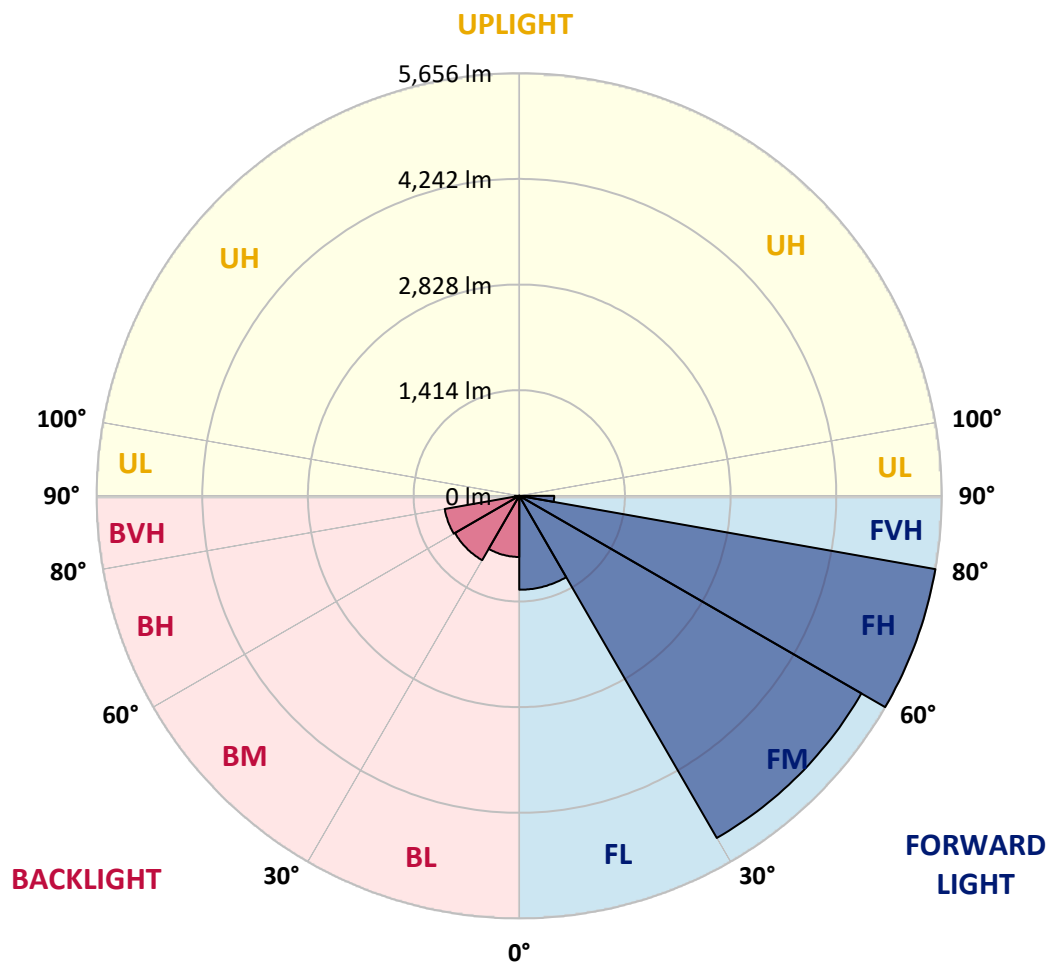
CATALOG NUMBER: GLEON-SA3C-827-U-SL2

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1257.5 | 8.1       |                         |      |         |
| FM   | (30°-60°)   | 5288.1 | 34.0      |                         |      |         |
| FH   | (60°-80°)   | 5656.1 | 36.4      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 467.3  | 3.0       |                         |      | G3/500  |
| BL   | (0°-30°)    | 818.4  | 5.3       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 994.2  | 6.4       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 1012.7 | 6.5       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 56.7   | 0.4       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**

Type III Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°     | 65°     | 66°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
| 0°    | 3562.4 | 3562.4 | 3562.4 | 3562.4 | 3562.4 | 3562.4 | 3562.4  | 3562.4  | 3562.4  | 3562.4  | 3562.4  |
| 2.5°  | 3496.4 | 3491.0 | 3507.1 | 3523.8 | 3530.2 | 3541.0 | 3557.1  | 3566.2  | 3565.7  | 3567.3  | 3561.9  |
| 5°    | 3264.4 | 3257.5 | 3289.7 | 3316.0 | 3366.5 | 3423.4 | 3492.6  | 3542.0  | 3543.1  | 3571.0  | 3578.5  |
| 7.5°  | 3044.8 | 3040.0 | 3077.1 | 3119.5 | 3178.0 | 3265.0 | 3377.2  | 3483.5  | 3489.9  | 3565.7  | 3592.0  |
| 10°   | 2868.7 | 2867.7 | 2903.6 | 2949.8 | 3018.0 | 3115.2 | 3244.0  | 3399.7  | 3409.4  | 3539.9  | 3594.1  |
| 12.5° | 2731.3 | 2733.4 | 2764.6 | 2817.2 | 2889.1 | 2990.6 | 3130.2  | 3305.8  | 3321.4  | 3499.1  | 3581.8  |
| 15°   | 2629.8 | 2638.4 | 2663.6 | 2716.8 | 2787.7 | 2890.8 | 3034.1  | 3218.8  | 3242.4  | 3453.4  | 3574.8  |
| 17.5° | 2571.8 | 2581.5 | 2599.2 | 2643.2 | 2709.8 | 2809.1 | 2945.0  | 3147.4  | 3168.9  | 3418.5  | 3575.3  |
| 20°   | 2554.6 | 2562.7 | 2572.9 | 2599.7 | 2656.1 | 2746.3 | 2874.6  | 3083.0  | 3106.1  | 3390.6  | 3580.7  |
| 22.5° | 2588.5 | 2594.4 | 2595.4 | 2593.3 | 2627.7 | 2701.2 | 2823.6  | 3035.7  | 3060.4  | 3372.4  | 3584.4  |
| 25°   | 2661.0 | 2669.0 | 2663.1 | 2643.2 | 2632.0 | 2677.1 | 2797.3  | 3004.6  | 3029.3  | 3358.9  | 3576.9  |
| 27.5° | 2769.9 | 2771.0 | 2766.2 | 2740.4 | 2687.3 | 2679.7 | 2789.3  | 2986.3  | 3009.9  | 3343.4  | 3561.4  |
| 30°   | 2918.1 | 2925.1 | 2916.5 | 2881.6 | 2794.6 | 2722.7 | 2798.9  | 2968.6  | 2990.1  | 3323.5  | 3536.1  |
| 32.5° | 3091.6 | 3108.7 | 3108.2 | 3071.7 | 2947.1 | 2818.8 | 2838.7  | 2957.9  | 2974.5  | 3302.6  | 3505.5  |
| 35°   | 3271.4 | 3295.0 | 3339.1 | 3323.5 | 3169.4 | 2970.8 | 2914.9  | 2975.0  | 2986.3  | 3299.9  | 3484.0  |
| 37.5° | 3458.3 | 3481.9 | 3572.6 | 3614.5 | 3434.1 | 3188.2 | 3035.2  | 3035.7  | 3041.1  | 3332.6  | 3482.4  |
| 40°   | 3653.7 | 3678.9 | 3815.3 | 3924.3 | 3777.2 | 3463.6 | 3229.0  | 3162.4  | 3156.5  | 3413.2  | 3514.1  |
| 42.5° | 3927.5 | 3950.1 | 4113.8 | 4252.9 | 4157.9 | 3816.4 | 3496.9  | 3357.9  | 3345.5  | 3571.0  | 3615.6  |
| 45°   | 4273.8 | 4293.2 | 4467.1 | 4615.9 | 4567.0 | 4219.1 | 3833.6  | 3626.9  | 3624.7  | 3834.1  | 3821.2  |
| 47.5° | 4685.7 | 4700.7 | 4856.9 | 5000.8 | 5018.5 | 4682.4 | 4256.7  | 4041.9  | 4007.0  | 4194.9  | 4139.6  |
| 50°   | 5114.7 | 5131.3 | 5237.6 | 5392.2 | 5523.8 | 5302.6 | 4801.1  | 4550.4  | 4503.6  | 4671.2  | 4590.6  |
| 52.5° | 5398.7 | 5420.7 | 5513.0 | 5709.0 | 6091.8 | 5982.3 | 5444.9  | 5166.7  | 5095.9  | 5248.3  | 5186.6  |
| 55°   | 5272.0 | 5321.4 | 5462.6 | 5776.7 | 6546.1 | 7020.7 | 6239.0  | 5885.7  | 5805.7  | 5932.4  | 5895.9  |
| 57.5° | 4695.9 | 4763.5 | 4956.3 | 5441.1 | 6610.0 | 7935.6 | 7439.5  | 6732.4  | 6676.0  | 6639.5  | 6656.1  |
| 60°   | 3643.0 | 3707.9 | 3946.9 | 4578.8 | 6164.9 | 8603.5 | 9246.2  | 7776.1  | 7694.5  | 7349.3  | 7364.3  |
| 62.5° | 2578.3 | 2545.5 | 2709.3 | 3171.6 | 5009.4 | 8681.9 | 11302.1 | 9172.1  | 8903.7  | 8098.8  | 8032.8  |
| 65°   | 1966.2 | 1958.7 | 2032.2 | 2179.3 | 3034.1 | 7743.9 | 12526.8 | 11518.4 | 11099.1 | 8980.4  | 8824.7  |
| 67.5° | 1615.6 | 1602.2 | 1674.6 | 1888.9 | 1953.8 | 4996.0 | 12553.6 | 14240.6 | 13828.8 | 10077.9 | 9740.7  |
| 70°   | 1328.3 | 1313.3 | 1380.9 | 1657.5 | 1805.6 | 2533.7 | 10565.4 | 15834.7 | 15812.7 | 11467.4 | 10432.3 |
| 71°   | 1190.9 | 1180.1 | 1261.2 | 1568.3 | 1774.0 | 2111.7 | 9122.2  | 15839.0 | 15905.0 | 11937.8 | 10391.5 |
| 72.5° | 969.7  | 973.4  | 1059.3 | 1396.0 | 1750.3 | 1864.7 | 6704.5  | 15100.7 | 15240.3 | 12386.1 | 10020.5 |
| 75°   | 644.3  | 647.5  | 760.3  | 1073.8 | 1697.2 | 1824.4 | 3684.8  | 12671.2 | 12927.8 | 12117.6 | 9143.7  |
| 77.5° | 432.8  | 431.7  | 508.5  | 736.6  | 1478.7 | 1824.4 | 2160.5  | 9477.1  | 9759.0  | 9641.9  | 7049.2  |
| 80°   | 298.0  | 295.8  | 350.1  | 508.5  | 1119.5 | 1846.5 | 1670.3  | 6641.6  | 6727.0  | 5207.0  | 2865.0  |
| 82.5° | 182.6  | 184.2  | 228.7  | 359.2  | 761.9  | 1661.8 | 1576.9  | 3621.5  | 3528.6  | 1460.4  | 715.7   |
| 85°   | 104.7  | 104.2  | 146.0  | 243.2  | 489.1  | 1402.4 | 1537.7  | 1558.7  | 1429.8  | 439.7   | 258.8   |
| 87.5° | 37.6   | 40.3   | 78.4   | 134.8  | 280.3  | 976.6  | 1304.7  | 810.7   | 730.7   | 198.7   | 117.0   |
| 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: P319487

CATALOG NUMBER: GLEON-SA3C-827-U-SL2

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3562.4 | 3562.4 | 3562.4 | 3562.4 | 3562.4 | 3562.4 | 3562.4 | 3562.4 | 3562.4 | 3562.4 | 3562.4 |
| 2.5°  | 3558.1 | 3561.4 | 3557.6 | 3536.1 | 3517.9 | 3488.3 | 3471.7 | 3448.6 | 3441.6 | 3438.4 | 3447.0 |
| 5°    | 3571.6 | 3572.6 | 3541.0 | 3484.6 | 3421.2 | 3346.6 | 3292.9 | 3226.9 | 3195.7 | 3182.3 | 3190.9 |
| 7.5°  | 3583.9 | 3579.1 | 3509.8 | 3401.9 | 3284.8 | 3154.9 | 3039.5 | 2933.7 | 2872.0 | 2846.7 | 2848.9 |
| 10°   | 3585.5 | 3565.1 | 3454.0 | 3287.0 | 3105.5 | 2914.9 | 2737.7 | 2574.5 | 2471.4 | 2404.3 | 2424.7 |
| 12.5° | 3568.9 | 3534.5 | 3371.8 | 3138.3 | 2886.5 | 2626.6 | 2387.1 | 2142.3 | 1995.2 | 1927.0 | 1929.1 |
| 15°   | 3556.0 | 3493.7 | 3270.9 | 2963.2 | 2625.0 | 2280.8 | 1953.8 | 1666.0 | 1509.3 | 1439.5 | 1406.7 |
| 17.5° | 3545.3 | 3449.7 | 3153.8 | 2766.2 | 2316.3 | 1879.7 | 1486.7 | 1230.1 | 1144.2 | 1123.8 | 1115.2 |
| 20°   | 3530.2 | 3403.0 | 3023.4 | 2538.0 | 1964.6 | 1430.9 | 1085.6 | 958.9  | 959.5  | 983.1  | 986.3  |
| 22.5° | 3509.3 | 3349.8 | 2884.3 | 2281.9 | 1587.1 | 1042.2 | 851.0  | 814.5  | 851.5  | 896.6  | 904.7  |
| 25°   | 3478.1 | 3287.0 | 2729.7 | 1998.9 | 1210.2 | 801.1  | 727.0  | 725.4  | 770.5  | 817.7  | 824.7  |
| 27.5° | 3434.1 | 3204.8 | 2557.9 | 1695.0 | 891.8  | 680.8  | 651.3  | 662.6  | 695.8  | 730.2  | 732.9  |
| 30°   | 3375.0 | 3109.3 | 2368.3 | 1374.5 | 699.1  | 606.2  | 603.0  | 613.2  | 633.6  | 657.7  | 659.9  |
| 32.5° | 3310.1 | 3012.1 | 2165.9 | 1064.2 | 598.7  | 565.9  | 569.1  | 574.0  | 583.6  | 593.3  | 595.4  |
| 35°   | 3251.0 | 2912.8 | 1958.7 | 808.6  | 550.9  | 539.6  | 537.5  | 536.4  | 537.5  | 534.2  | 534.8  |
| 37.5° | 3212.9 | 2830.6 | 1742.8 | 643.8  | 523.5  | 516.5  | 510.1  | 502.0  | 492.9  | 487.5  | 488.6  |
| 40°   | 3198.9 | 2769.4 | 1524.3 | 556.2  | 500.9  | 496.1  | 483.8  | 466.6  | 455.8  | 452.6  | 452.6  |
| 42.5° | 3236.5 | 2737.7 | 1313.3 | 512.2  | 482.1  | 474.1  | 453.7  | 433.8  | 425.8  | 425.2  | 424.7  |
| 45°   | 3351.4 | 2750.6 | 1112.5 | 488.1  | 465.0  | 449.4  | 422.6  | 405.9  | 400.5  | 401.6  | 401.1  |
| 47.5° | 3557.6 | 2831.7 | 940.7  | 471.9  | 447.8  | 427.4  | 397.3  | 383.9  | 377.5  | 377.5  | 378.0  |
| 50°   | 3908.2 | 3021.2 | 803.8  | 458.5  | 433.3  | 407.0  | 379.1  | 362.4  | 353.8  | 353.3  | 353.3  |
| 52.5° | 4418.8 | 3360.6 | 718.4  | 447.3  | 417.2  | 388.7  | 360.8  | 339.9  | 329.7  | 327.5  | 326.4  |
| 55°   | 5058.8 | 3847.0 | 694.8  | 439.7  | 395.7  | 368.9  | 338.8  | 317.9  | 306.6  | 301.7  | 301.2  |
| 57.5° | 5774.5 | 4438.7 | 741.5  | 430.6  | 373.7  | 345.2  | 314.6  | 294.8  | 283.0  | 277.0  | 276.5  |
| 60°   | 6498.8 | 5084.6 | 932.1  | 417.7  | 355.4  | 319.5  | 289.9  | 271.7  | 259.9  | 253.4  | 252.4  |
| 62.5° | 7224.2 | 5765.4 | 1321.3 | 416.6  | 342.6  | 294.8  | 264.7  | 249.1  | 237.9  | 230.9  | 229.3  |
| 65°   | 8042.5 | 6510.6 | 1763.8 | 445.1  | 338.3  | 272.2  | 238.9  | 226.6  | 216.9  | 210.5  | 209.9  |
| 67.5° | 8982.1 | 7352.0 | 1721.4 | 503.6  | 352.8  | 251.8  | 214.8  | 205.1  | 198.1  | 192.8  | 192.2  |
| 70°   | 9422.9 | 7220.4 | 1070.1 | 545.0  | 373.2  | 231.9  | 191.7  | 184.7  | 179.3  | 175.6  | 174.0  |
| 71°   | 9238.2 | 6855.9 | 897.2  | 540.1  | 371.0  | 223.4  | 182.6  | 177.2  | 171.8  | 168.6  | 167.0  |
| 72.5° | 8734.5 | 6252.4 | 748.5  | 502.6  | 346.8  | 207.8  | 170.7  | 165.4  | 160.5  | 156.8  | 155.7  |
| 75°   | 7837.9 | 5583.9 | 599.2  | 401.6  | 276.5  | 175.6  | 149.8  | 143.9  | 140.1  | 138.0  | 135.8  |
| 77.5° | 5761.6 | 3985.0 | 463.4  | 317.3  | 203.5  | 143.4  | 127.8  | 123.5  | 119.7  | 116.5  | 114.9  |
| 80°   | 2207.3 | 1543.6 | 311.9  | 236.8  | 149.3  | 113.3  | 103.1  | 100.9  | 97.2   | 95.0   | 95.0   |
| 82.5° | 594.4  | 461.2  | 166.4  | 143.4  | 99.9   | 82.7   | 78.9   | 77.9   | 74.6   | 70.3   | 70.9   |
| 85°   | 240.5  | 203.5  | 93.4   | 78.9   | 61.2   | 48.9   | 53.2   | 53.7   | 49.9   | 44.6   | 45.1   |
| 87.5° | 105.8  | 86.4   | 52.1   | 34.9   | 26.8   | 18.8   | 24.2   | 24.2   | 22.0   | 18.3   | 16.6   |
| 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

Invue

Report Number: SP1-2407-157-9

Test Date: 10/03/2024

Luminaire Tested: EMM2-HTN-SA1A-827-U-5WQ

Data applicable to all product families utilizing light square engine

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/03/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Invue  
 Catalog Number: **EMM2-HTN-SA1A-827-U-5WQ**  
 Description: Epic Modern Light Square 40W 5WQ Optic

### Spectral Parameters

CCT (K): 2764  
 CIE  $u'$ : 0.2591  
 CIE  $v'$ : 0.5290  
 Duv: 0.0020  
 CIE x: 0.4581  
 CIE y: 0.4156  
 CIE z: 0.1263  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 583  
 Purity: 62.2537  
 R<sub>f</sub>: 84.7  
 R<sub>g</sub>: 94.6

CRI (Ra): 80.9  
 R1: 78.8  
 R2: 89.9  
 R3: 96.2  
 R4: 79.1  
 R5: 79.1  
 R6: 88.8  
 R7: 81.3  
 R8: 54.3  
 R9: -1.5  
 R10: 77.9  
 R11: 78.9  
 R12: 71.6  
 R13: 81.2  
 R14: 98.5  
 R15: 69.9



### Test Conditions

Stabilization Time: 81M  
 Operation Time: 2H 21M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-157-9

| 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: SP1-2407-157-9

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-2407-157-9

### Photopic Flux vs. Wavelength



**Photopic Lumens: 4337.9**

| λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 0             | 0.0           | 490    | 18018         | 2.6           | 620    | 87426         | 22.8          | 750    | 2680          | 0.0           | 880    | 58            | 0.0           |
| 365    | 0             | 0.0           | 495    | 22295         | 3.9           | 625    | 83013         | 18.2          | 755    | 2287          | 0.0           | 885    | 46            | 0.0           |
| 370    | 0             | 0.0           | 500    | 26478         | 5.8           | 630    | 78077         | 14.1          | 760    | 1944          | 0.0           | 890    | 45            | 0.0           |
| 375    | 0             | 0.0           | 505    | 30524         | 8.5           | 635    | 72080         | 10.7          | 765    | 1653          | 0.0           | 895    | 41            | 0.0           |
| 380    | 0             | 0.0           | 510    | 33611         | 11.5          | 640    | 66249         | 7.9           | 770    | 1413          | 0.0           | 900    | 38            | 0.0           |
| 385    | 0             | 0.0           | 515    | 36490         | 15.2          | 645    | 59973         | 5.7           | 775    | 1198          | 0.0           | 905    | 33            | 0.0           |
| 390    | 0             | 0.0           | 520    | 38610         | 18.7          | 650    | 53972         | 3.9           | 780    | 1025          | 0.0           | 910    | 30            | 0.0           |
| 395    | 0             | 0.0           | 525    | 40511         | 21.9          | 655    | 48369         | 2.7           | 785    | 874           | 0.0           | 915    | 23            | 0.0           |
| 400    | 48            | 0.0           | 530    | 42223         | 24.9          | 660    | 42641         | 1.8           | 790    | 747           | 0.0           | 920    | 24            | 0.0           |
| 405    | 201           | 0.0           | 535    | 44137         | 27.6          | 665    | 37602         | 1.1           | 795    | 639           | 0.0           | 925    | 22            | 0.0           |
| 410    | 457           | 0.0           | 540    | 46032         | 30.0          | 670    | 32798         | 0.7           | 800    | 547           | 0.0           | 930    | 22            | 0.0           |
| 415    | 925           | 0.0           | 545    | 48553         | 32.5          | 675    | 28558         | 0.5           | 805    | 473           | 0.0           | 935    | 17            | 0.0           |
| 420    | 1816          | 0.0           | 550    | 51408         | 34.9          | 680    | 24782         | 0.3           | 810    | 401           | 0.0           | 940    | 13            | 0.0           |
| 425    | 3217          | 0.0           | 555    | 54711         | 37.4          | 685    | 21386         | 0.2           | 815    | 351           | 0.0           | 945    | 6             | 0.0           |
| 430    | 5520          | 0.0           | 560    | 58847         | 40.0          | 690    | 18413         | 0.1           | 820    | 307           | 0.0           | 950    | 10            | 0.0           |
| 435    | 9225          | 0.1           | 565    | 63386         | 42.4          | 695    | 15721         | 0.1           | 825    | 261           | 0.0           | 955    | 11            | 0.0           |
| 440    | 15522         | 0.2           | 570    | 68196         | 44.3          | 700    | 13432         | 0.0           | 830    | 228           | 0.0           | 960    | 8             | 0.0           |
| 445    | 27642         | 0.6           | 575    | 73613         | 46.0          | 705    | 11513         | 0.0           | 835    | 193           | 0.0           | 965    | 12            | 0.0           |
| 450    | 36602         | 0.9           | 580    | 79207         | 47.1          | 710    | 9780          | 0.0           | 840    | 174           | 0.0           | 970    | 3             | 0.0           |
| 455    | 28292         | 0.9           | 585    | 84248         | 47.0          | 715    | 8356          | 0.0           | 845    | 151           | 0.0           | 975    | 8             | 0.0           |
| 460    | 21166         | 0.9           | 590    | 88397         | 45.7          | 720    | 7161          | 0.0           | 850    | 123           | 0.0           | 980    | 2             | 0.0           |
| 465    | 19092         | 1.0           | 595    | 91428         | 43.4          | 725    | 6067          | 0.0           | 855    | 106           | 0.0           | 985    | 13            | 0.0           |
| 470    | 14951         | 0.9           | 600    | 93452         | 40.3          | 730    | 5164          | 0.0           | 860    | 95            | 0.0           | 990    | 16            | 0.0           |
| 475    | 12606         | 1.0           | 605    | 93959         | 36.4          | 735    | 4393          | 0.0           | 865    | 82            | 0.0           | 995    | 20            | 0.0           |
| 480    | 13323         | 1.3           | 610    | 93079         | 32.0          | 740    | 3694          | 0.0           | 870    | 77            | 0.0           | 1000   | 0             | 0.0           |
| 485    | 15164         | 1.8           | 615    | 90707         | 27.3          | 745    | 3157          | 0.0           | 875    | 65            | 0.0           |        |               |               |

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### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 5286.7**
**S/P: 1.22**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 75.9                           | 620               | 87426                                | 0.4                            | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 93.2                           | 625               | 83013                                | 0.2                            | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 107.8                          | 630               | 78077                                | 0.1                            | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 118.7                          | 635               | 72080                                | 0.1                            | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 122.2                          | 640               | 66249                                | 0.1                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 120.8                          | 645               | 59973                                | 0.0                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 113.9                          | 650               | 53972                                | 0.0                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 104.1                          | 655               | 48369                                | 0.0                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 92.4                           | 660               | 42641                                | 0.0                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 80.5                           | 665               | 37602                                | 0.0                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.1                            | 540               | 46032                                | 68.2                           | 670               | 32798                                | 0.0                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.3                            | 545               | 48553                                | 57.1                           | 675               | 28558                                | 0.0                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 1.1                            | 550               | 51408                                | 46.7                           | 680               | 24782                                | 0.0                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 2.5                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.0                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 5.9                            | 560               | 58847                                | 29.4                           | 690               | 18413                                | 0.0                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 12.5                           | 565               | 63386                                | 22.5                           | 695               | 15721                                | 0.0                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 26.3                           | 570               | 68196                                | 16.9                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 55.2                           | 575               | 73613                                | 12.4                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 85.4                           | 580               | 79207                                | 9.0                            | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 75.1                           | 585               | 84248                                | 6.3                            | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 63.2                           | 590               | 88397                                | 4.4                            | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 63.2                           | 595               | 91428                                | 3.0                            | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 54.2                           | 600               | 93452                                | 2.0                            | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 48.8                           | 605               | 93959                                | 1.3                            | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 54.2                           | 610               | 93079                                | 0.9                            | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 63.3                           | 615               | 90707                                | 0.5                            | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 9797**

**M/P: 2.26**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 0                | 0.0              | 490       | 18018            | 27.7             | 620       | 87426            | 1.1              | 750       | 2680             | 0.0              | 880       | 58               | 0.0              |
| 365       | 0                | 0.0              | 495       | 22295            | 36.0             | 625       | 83013            | 0.7              | 755       | 2287             | 0.0              | 885       | 46               | 0.0              |
| 370       | 0                | 0.0              | 500       | 26478            | 44.2             | 630       | 78077            | 0.4              | 760       | 1944             | 0.0              | 890       | 45               | 0.0              |
| 375       | 0                | 0.0              | 505       | 30524            | 51.8             | 635       | 72080            | 0.3              | 765       | 1653             | 0.0              | 895       | 41               | 0.0              |
| 380       | 0                | 0.0              | 510       | 33611            | 57.0             | 640       | 66249            | 0.2              | 770       | 1413             | 0.0              | 900       | 38               | 0.0              |
| 385       | 0                | 0.0              | 515       | 36490            | 60.5             | 645       | 59973            | 0.1              | 775       | 1198             | 0.0              | 905       | 33               | 0.0              |
| 390       | 0                | 0.0              | 520       | 38610            | 61.4             | 650       | 53972            | 0.1              | 780       | 1025             | 0.0              | 910       | 30               | 0.0              |
| 395       | 0                | 0.0              | 525       | 40511            | 60.6             | 655       | 48369            | 0.0              | 785       | 874              | 0.0              | 915       | 23               | 0.0              |
| 400       | 48               | 0.0              | 530       | 42223            | 58.2             | 660       | 42641            | 0.0              | 790       | 747              | 0.0              | 920       | 24               | 0.0              |
| 405       | 201              | 0.0              | 535       | 44137            | 55.0             | 665       | 37602            | 0.0              | 795       | 639              | 0.0              | 925       | 22               | 0.0              |
| 410       | 457              | 0.0              | 540       | 46032            | 50.9             | 670       | 32798            | 0.0              | 800       | 547              | 0.0              | 930       | 22               | 0.0              |
| 415       | 925              | 0.1              | 545       | 48553            | 46.6             | 675       | 28558            | 0.0              | 805       | 473              | 0.0              | 935       | 17               | 0.0              |
| 420       | 1816             | 0.3              | 550       | 51408            | 42.0             | 680       | 24782            | 0.0              | 810       | 401              | 0.0              | 940       | 13               | 0.0              |
| 425       | 3217             | 0.8              | 555       | 54711            | 37.4             | 685       | 21386            | 0.0              | 815       | 351              | 0.0              | 945       | 6                | 0.0              |
| 430       | 5520             | 1.9              | 560       | 58847            | 32.9             | 690       | 18413            | 0.0              | 820       | 307              | 0.0              | 950       | 10               | 0.0              |
| 435       | 9225             | 4.1              | 565       | 63386            | 28.4             | 695       | 15721            | 0.0              | 825       | 261              | 0.0              | 955       | 11               | 0.0              |
| 440       | 15522            | 8.7              | 570       | 68196            | 24.1             | 700       | 13432            | 0.0              | 830       | 228              | 0.0              | 960       | 8                | 0.0              |
| 445       | 27642            | 18.5             | 575       | 73613            | 20.0             | 705       | 11513            | 0.0              | 835       | 193              | 0.0              | 965       | 12               | 0.0              |
| 450       | 36602            | 28.3             | 580       | 79207            | 16.3             | 710       | 9780             | 0.0              | 840       | 174              | 0.0              | 970       | 3                | 0.0              |
| 455       | 28292            | 24.7             | 585       | 84248            | 12.9             | 715       | 8356             | 0.0              | 845       | 151              | 0.0              | 975       | 8                | 0.0              |
| 460       | 21166            | 20.4             | 590       | 88397            | 9.8              | 720       | 7161             | 0.0              | 850       | 123              | 0.0              | 980       | 2                | 0.0              |
| 465       | 19092            | 20.1             | 595       | 91428            | 7.3              | 725       | 6067             | 0.0              | 855       | 106              | 0.0              | 985       | 13               | 0.0              |
| 470       | 14951            | 17.2             | 600       | 93452            | 5.3              | 730       | 5164             | 0.0              | 860       | 95               | 0.0              | 990       | 16               | 0.0              |
| 475       | 12606            | 15.7             | 605       | 93959            | 3.7              | 735       | 4393             | 0.0              | 865       | 82               | 0.0              | 995       | 20               | 0.0              |
| 480       | 13323            | 18.0             | 610       | 93079            | 2.5              | 740       | 3694             | 0.0              | 870       | 77               | 0.0              | 1000      | 0                | 0.0              |
| 485       | 15164            | 21.9             | 615       | 90707            | 1.7              | 745       | 3157             | 0.0              | 875       | 65               | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 84.7$   
 $R_g = 94.6$   
 $CIE R_a = 80.9$   
 $R_g = -1.5$



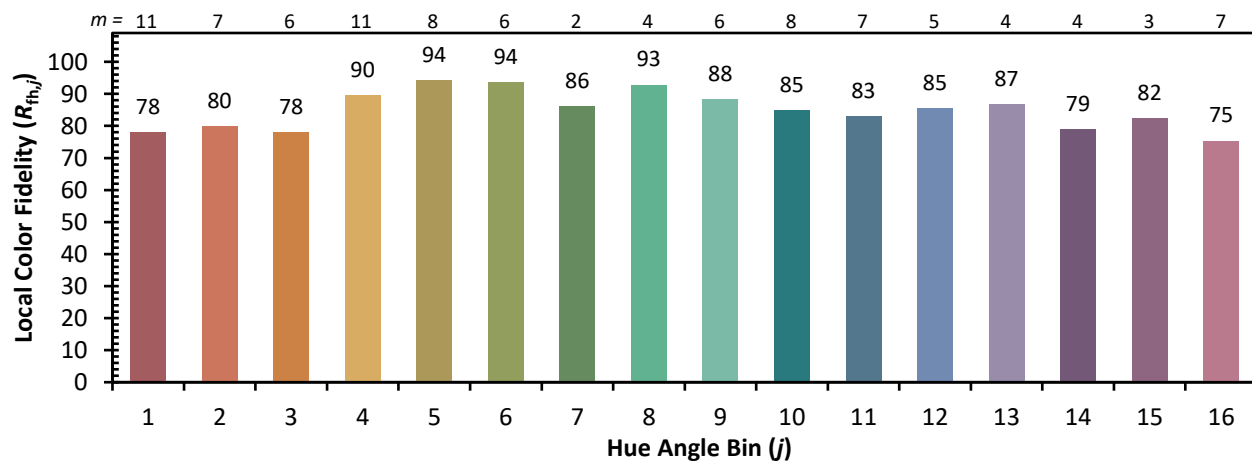
### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 95 | CES76 = 81 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 71 | CES29 = 87 | CES54 = 91 | CES79 = 89 |
| CES05 = 50 | CES30 = 94 | CES55 = 90 | CES80 = 89 |
| CES06 = 52 | CES31 = 89 | CES56 = 86 | CES81 = 69 |
| CES07 = 43 | CES32 = 82 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 91 | CES58 = 86 | CES83 = 93 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 77 | CES35 = 96 | CES60 = 94 | CES85 = 76 |
| CES11 = 60 | CES36 = 90 | CES61 = 89 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 94 | CES87 = 84 |
| CES13 = 44 | CES38 = 98 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 82 | CES89 = 73 |
| CES15 = 72 | CES40 = 95 | CES65 = 78 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 81 | CES91 = 82 |
| CES17 = 50 | CES42 = 97 | CES67 = 80 | CES92 = 64 |
| CES18 = 57 | CES43 = 91 | CES68 = 83 | CES93 = 78 |
| CES19 = 73 | CES44 = 99 | CES69 = 88 | CES94 = 59 |
| CES20 = 67 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 89 | CES71 = 79 | CES96 = 83 |
| CES22 = 79 | CES47 = 92 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 83 | CES73 = 75 | CES98 = 83 |
| CES24 = 91 | CES49 = 90 | CES74 = 91 | CES99 = 74 |
| CES25 = 72 | CES50 = 94 | CES75 = 81 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**


(END OF REPORT)