

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P321711

Luminaire Tested: **GLEON-SA7A-827-U-T3R-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P321711  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-11)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA7A-827-U-T3R-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(7) 80 CRI, 2700K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
ROADWAY OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 18637 lumens  
Efficiency: N/A  
Efficacy: 82.5 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B2 - U0 - G3

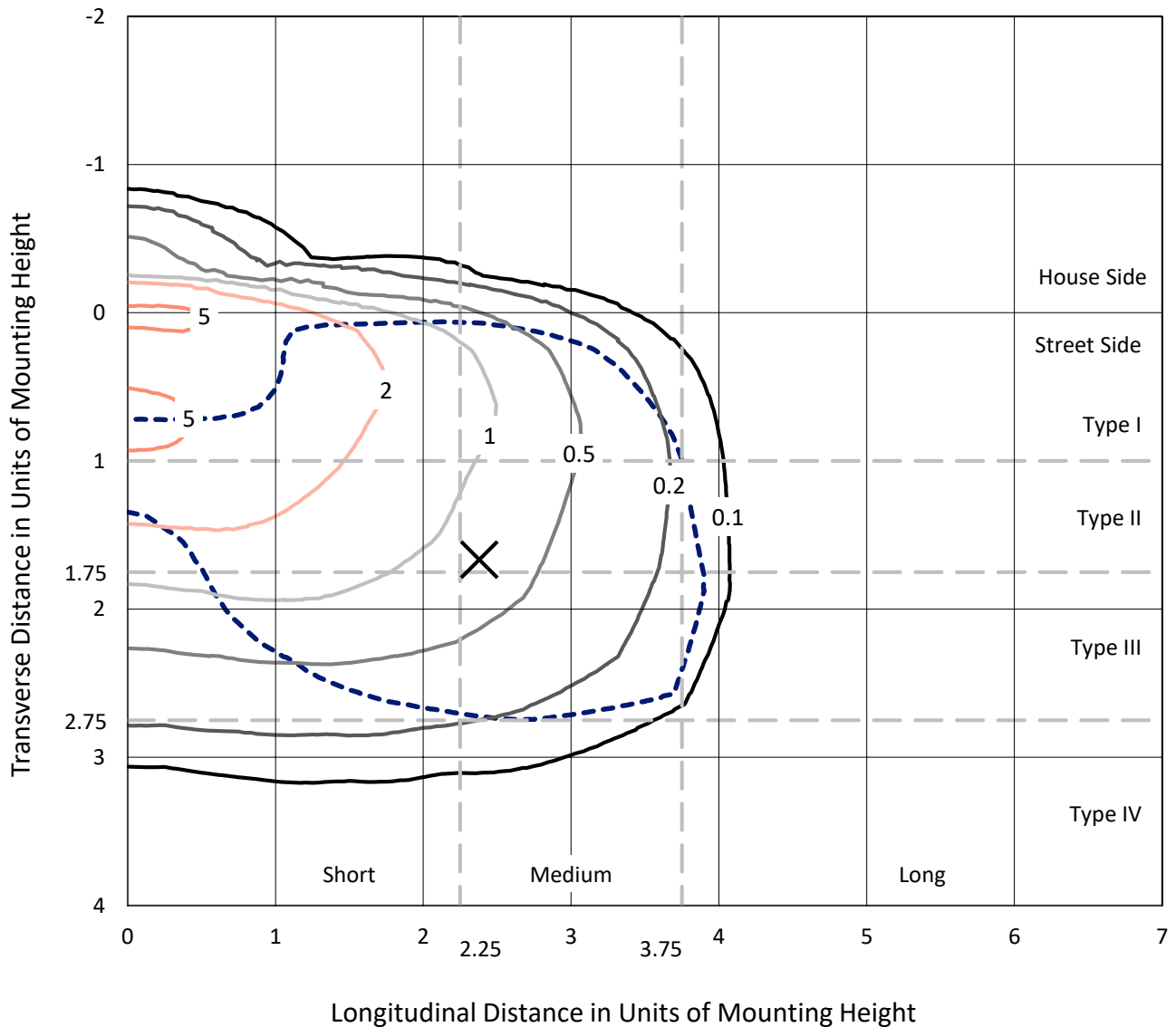
Input Watts (W): 226  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P321711  
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### Iso-Footcandle Lines of Horizontal Illumination

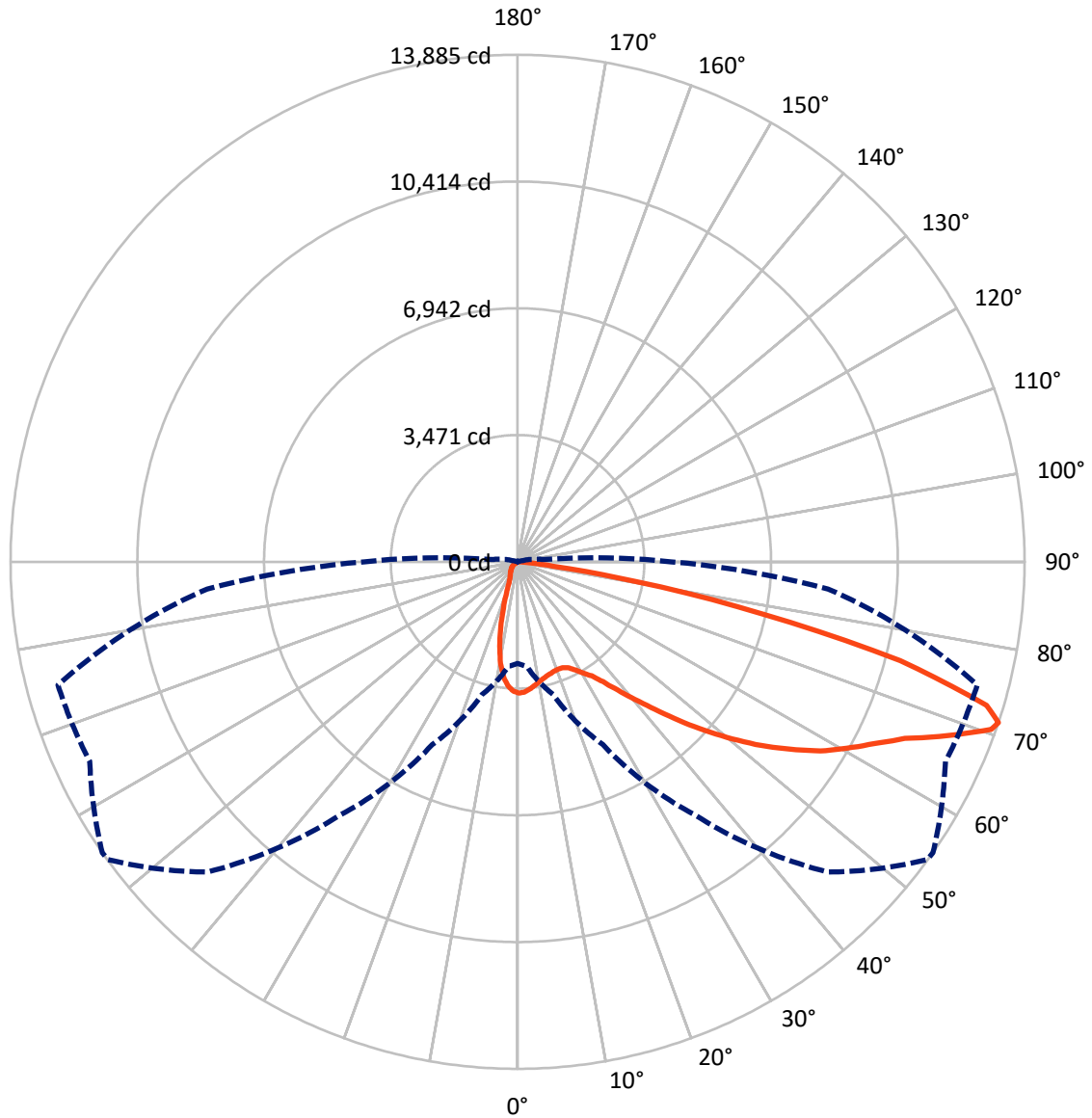
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 5.9 fc  
 Type III - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 55-Deg Lateral    - - - Horizontal Cone Through 71-Deg Vertical

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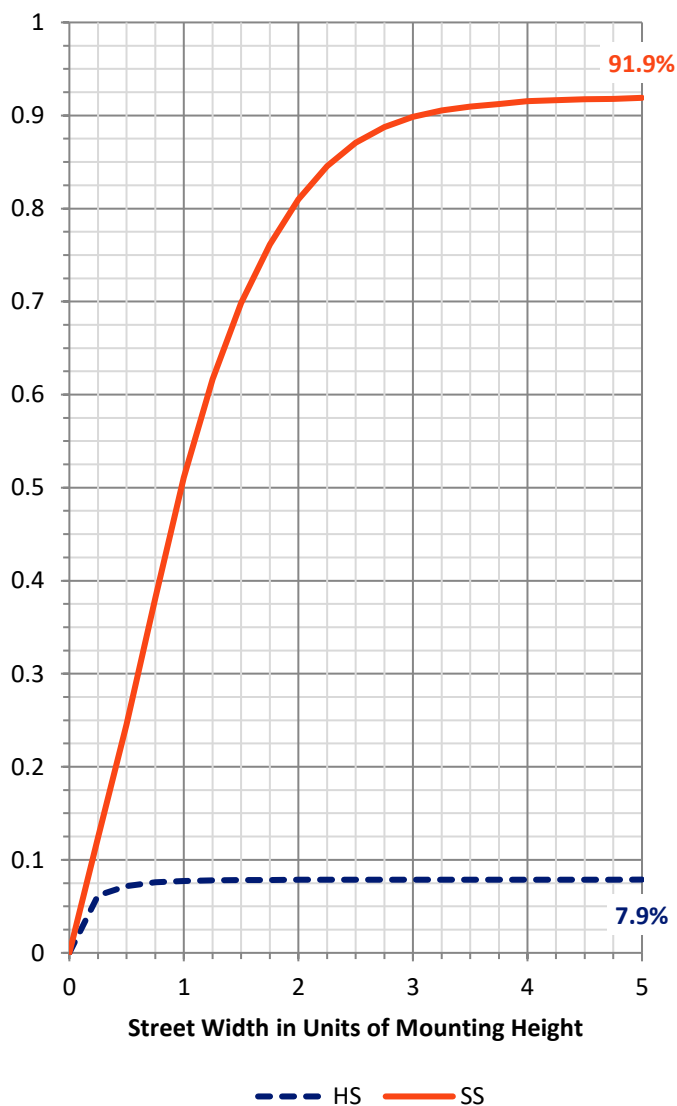
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1475.5   | 0.0    | 1475.5  |
|                    | % Fixture | 7.9      | 0.0    | 7.9     |
| <b>Street Side</b> | Lumens    | 17161.5  | 0.0    | 17161.5 |
|                    | % Fixture | 92.1     | 0.0    | 92.1    |
| <b>Total</b>       | Lumens    | 18637.0  | 0.0    | 18637.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 306.5   | 1.6       |
| 10°-20°   | 691.8   | 3.7       |
| 20°-30°   | 1111.8  | 6.0       |
| 30°-40°   | 1889.0  | 10.1      |
| 40°-50°   | 2932.0  | 15.7      |
| 50°-60°   | 3942.0  | 21.2      |
| 60°-70°   | 4822.4  | 25.9      |
| 70°-80°   | 2819.5  | 15.1      |
| 80°-90°   | 121.9   | 0.7       |
| 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°    | 18637.0 | 100.0     |
| 0°-180°   | 18637.0 | 100.0     |

**Coefficient of Utilization**

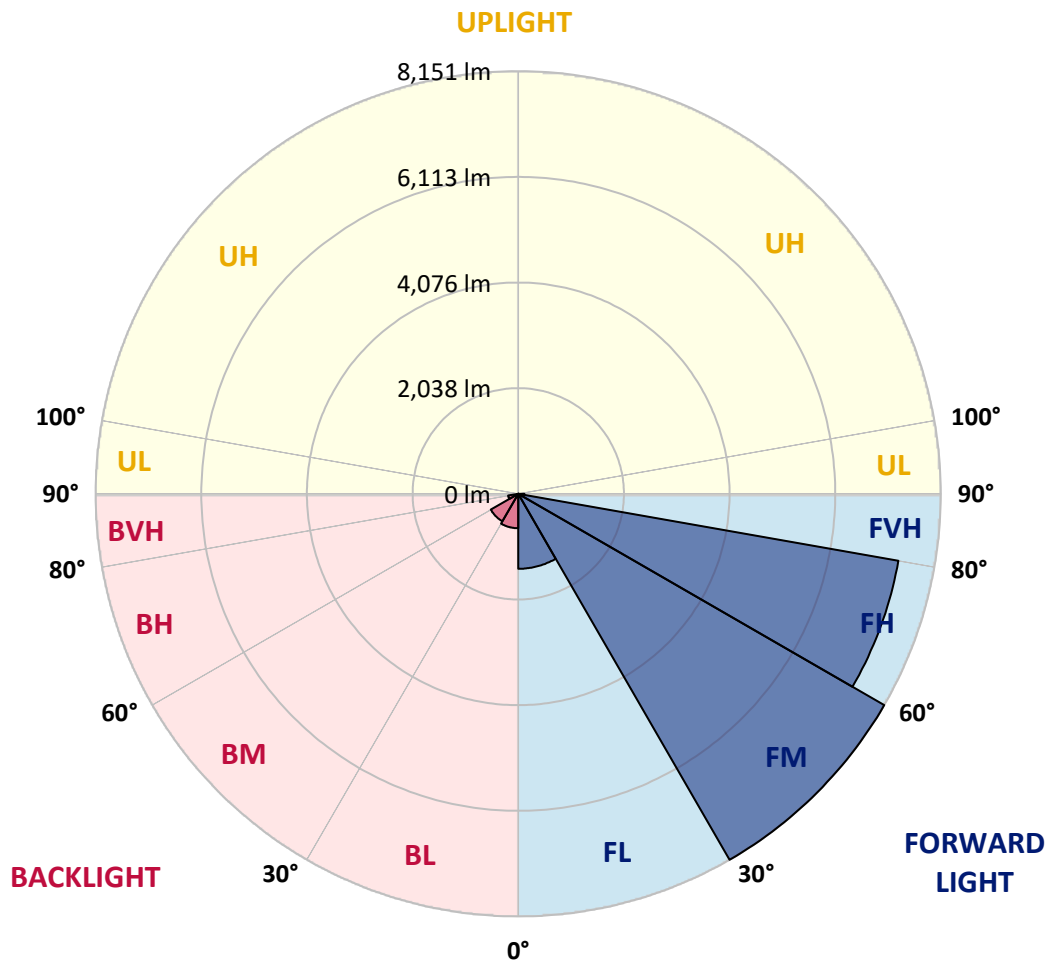


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1446.0 | 7.8       |                         |      |         |
| FM (30°-60°)   | 8151.3 | 43.7      |                         |      |         |
| FH (60°-80°)   | 7444.2 | 39.9      |                         |      | G3/7500 |
| FVH (80°-90°)  | 120.0  | 0.6       |                         |      | G2/225  |
| BL (0°-30°)    | 664.1  | 3.6       | B2/1000                 |      |         |
| BM (30°-60°)   | 611.8  | 3.3       | B1/1000                 |      |         |
| BH (60°-80°)   | 197.7  | 1.1       | 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: B2-U0-G3**  
 Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°     | 45°     | 54°     | 55°     | 65°     | 75°     | 85°    |
|-------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|--------|
| 0°    | 3594.2 | 3594.2 | 3594.2 | 3594.2 | 3594.2  | 3594.2  | 3594.2  | 3594.2  | 3594.2  | 3594.2  | 3594.2 |
| 2.5°  | 3488.8 | 3493.0 | 3508.0 | 3514.7 | 3530.6  | 3557.4  | 3570.8  | 3571.6  | 3593.4  | 3601.7  | 3608.4 |
| 5°    | 3241.9 | 3267.0 | 3292.1 | 3318.9 | 3367.4  | 3431.9  | 3495.5  | 3501.3  | 3571.6  | 3623.5  | 3651.1 |
| 7.5°  | 3029.3 | 3051.9 | 3082.1 | 3124.7 | 3193.4  | 3294.6  | 3400.9  | 3413.5  | 3546.5  | 3664.5  | 3726.4 |
| 10°   | 2810.9 | 2829.3 | 2872.9 | 2935.6 | 3030.2  | 3165.8  | 3308.9  | 3329.8  | 3523.9  | 3719.7  | 3828.5 |
| 12.5° | 2577.5 | 2588.3 | 2641.1 | 2731.4 | 2870.3  | 3042.7  | 3231.0  | 3258.6  | 3509.7  | 3783.3  | 3949.0 |
| 15°   | 2400.0 | 2405.1 | 2455.3 | 2549.0 | 2708.0  | 2932.3  | 3170.8  | 3204.2  | 3513.0  | 3859.5  | 4080.4 |
| 17.5° | 2354.9 | 2357.4 | 2384.1 | 2448.6 | 2589.2  | 2833.5  | 3123.1  | 3164.1  | 3523.1  | 3934.0  | 4212.6 |
| 20°   | 2538.1 | 2520.6 | 2492.9 | 2482.9 | 2543.1  | 2774.1  | 3094.6  | 3140.6  | 3536.5  | 4000.1  | 4331.5 |
| 22.5° | 3041.1 | 2989.2 | 2874.5 | 2721.4 | 2628.5  | 2778.3  | 3102.2  | 3148.2  | 3579.1  | 4081.3  | 4468.7 |
| 25°   | 3787.5 | 3715.6 | 3520.6 | 3219.3 | 2929.8  | 2898.8  | 3164.9  | 3211.8  | 3662.0  | 4178.3  | 4600.1 |
| 27.5° | 4636.9 | 4565.8 | 4327.3 | 3897.1 | 3403.4  | 3137.3  | 3308.9  | 3352.4  | 3785.0  | 4264.5  | 4700.5 |
| 30°   | 5450.3 | 5430.2 | 5149.1 | 4660.3 | 3999.2  | 3523.9  | 3494.6  | 3531.4  | 3876.2  | 4316.4  | 4780.0 |
| 32.5° | 6139.9 | 6108.1 | 5882.1 | 5406.8 | 4681.3  | 3988.4  | 3713.0  | 3723.9  | 3944.8  | 4383.3  | 4883.8 |
| 35°   | 6779.2 | 6739.9 | 6541.6 | 6092.2 | 5380.9  | 4555.7  | 4049.5  | 4033.6  | 4094.6  | 4518.1  | 5034.4 |
| 37.5° | 7337.4 | 7373.4 | 7153.3 | 6725.7 | 6008.5  | 5145.7  | 4503.0  | 4455.3  | 4329.0  | 4737.3  | 5252.8 |
| 40°   | 7804.3 | 7804.3 | 7689.7 | 7333.2 | 6686.3  | 5755.8  | 5016.0  | 4953.2  | 4681.3  | 5075.4  | 5529.8 |
| 42.5° | 7972.5 | 8008.5 | 8051.2 | 7849.5 | 7293.0  | 6390.1  | 5587.6  | 5522.3  | 5177.5  | 5554.9  | 5879.6 |
| 45°   | 7982.6 | 8039.5 | 8257.9 | 8257.1 | 7841.2  | 7020.2  | 6231.9  | 6201.0  | 5813.5  | 6170.8  | 6313.1 |
| 47.5° | 7841.2 | 7912.3 | 8272.1 | 8476.3 | 8275.5  | 7606.8  | 6936.5  | 6898.0  | 6560.8  | 6925.7  | 6766.7 |
| 50°   | 7622.7 | 7701.4 | 8119.8 | 8562.5 | 8570.9  | 8117.3  | 7678.8  | 7621.1  | 7383.4  | 7788.4  | 7235.3 |
| 52.5° | 7231.9 | 7384.2 | 7983.4 | 8582.6 | 8765.0  | 8558.3  | 8385.1  | 8360.0  | 8303.9  | 8619.4  | 7608.5 |
| 55°   | 6395.9 | 6565.0 | 7641.2 | 8589.3 | 8944.9  | 8949.1  | 9047.0  | 9053.7  | 9166.7  | 9396.0  | 7886.3 |
| 57.5° | 6001.0 | 6096.4 | 7043.7 | 8621.1 | 9211.9  | 9392.7  | 9721.5  | 9773.4  | 9948.3  | 10133.3 | 8203.5 |
| 60°   | 5752.4 | 5865.4 | 6749.1 | 8577.6 | 9631.2  | 9974.3  | 10346.6 | 10364.2 | 10551.7 | 10893.9 | 8632.8 |
| 62.5° | 5554.1 | 5665.4 | 6563.3 | 8410.2 | 10102.3 | 10673.8 | 10957.5 | 10959.2 | 11099.8 | 11800.2 | 9120.7 |
| 65°   | 5064.5 | 5158.3 | 6187.6 | 8221.9 | 10413.6 | 11365.9 | 11667.2 | 11656.3 | 11770.9 | 12755.9 | 9687.2 |
| 67.5° | 4356.6 | 4428.5 | 5420.2 | 7508.1 | 10296.4 | 11995.2 | 12738.3 | 12702.3 | 12563.4 | 13581.9 | 9909.8 |
| 70°   | 3368.3 | 3394.2 | 4272.0 | 6257.0 | 9198.5  | 12237.1 | 13773.5 | 13755.1 | 13049.6 | 13433.7 | 9093.9 |
| 71°   | 2784.2 | 2869.5 | 3764.9 | 5522.3 | 8462.9  | 12013.6 | 13873.9 | 13884.8 | 12927.4 | 13030.4 | 8532.4 |
| 72.5° | 1616.8 | 1689.6 | 2728.9 | 4241.1 | 7185.1  | 11081.4 | 13353.4 | 13432.1 | 12356.7 | 11852.1 | 7288.0 |
| 75°   | 346.5  | 370.7  | 1011.7 | 2052.8 | 3952.4  | 7766.7  | 10540.0 | 10820.3 | 10071.3 | 8062.9  | 4392.6 |
| 77.5° | 241.0  | 260.3  | 433.5  | 931.4  | 1306.3  | 3837.7  | 6547.4  | 6863.7  | 6016.9  | 3030.2  | 1405.9 |
| 80°   | 190.8  | 212.6  | 338.1  | 460.3  | 353.1   | 1237.7  | 3067.0  | 3260.3  | 2006.7  | 676.2   | 236.8  |
| 82.5° | 106.3  | 126.4  | 263.6  | 248.5  | 135.6   | 235.2   | 858.6   | 970.7   | 401.7   | 136.4   | 56.1   |
| 85°   | 31.0   | 37.7   | 169.9  | 180.8  | 57.7    | 45.2    | 146.4   | 181.6   | 76.2    | 36.0    | 25.1   |
| 87.5° | 0.0    | 0.0    | 82.0   | 69.5   | 16.7    | 6.7     | 13.4    | 15.1    | 15.1    | 15.1    | 16.7   |
| 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: P321711

CATALOG NUMBER: GLEON-SA7A-827-U-T3R-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3594.2 | 3594.2 | 3594.2 | 3594.2 | 3594.2 | 3594.2 | 3594.2 | 3594.2 | 3594.2 | 3594.2 | 3594.2 |
| 2.5°  | 3608.4 | 3614.3 | 3593.4 | 3565.8 | 3536.5 | 3500.5 | 3462.8 | 3433.5 | 3432.7 | 3418.5 | 3404.3 |
| 5°    | 3652.8 | 3649.4 | 3591.7 | 3503.8 | 3400.1 | 3292.1 | 3189.2 | 3072.9 | 3034.4 | 2986.7 | 2970.8 |
| 7.5°  | 3734.8 | 3711.4 | 3589.2 | 3396.7 | 3169.1 | 2943.2 | 2709.7 | 2474.5 | 2374.1 | 2283.7 | 2267.8 |
| 10°   | 3837.7 | 3793.4 | 3573.3 | 3236.0 | 2818.5 | 2401.7 | 2049.4 | 1729.7 | 1589.2 | 1481.2 | 1476.2 |
| 12.5° | 3944.8 | 3877.1 | 3528.9 | 2993.4 | 2359.0 | 1773.3 | 1367.4 | 1052.7 | 935.6  | 860.3  | 867.0  |
| 15°   | 4057.0 | 3955.7 | 3433.5 | 2666.2 | 1836.0 | 1203.4 | 840.2  | 655.2  | 608.4  | 589.1  | 594.2  |
| 17.5° | 4171.6 | 4010.1 | 3300.5 | 2272.0 | 1319.7 | 776.6  | 581.6  | 529.7  | 529.7  | 533.9  | 535.6  |
| 20°   | 4271.2 | 4039.4 | 3104.7 | 1830.2 | 894.6  | 565.7  | 508.8  | 501.3  | 505.4  | 512.1  | 513.0  |
| 22.5° | 4370.0 | 4041.1 | 2849.4 | 1382.5 | 626.0  | 495.4  | 484.5  | 481.2  | 483.7  | 491.2  | 492.1  |
| 25°   | 4450.3 | 4021.0 | 2529.8 | 983.3  | 499.6  | 467.0  | 461.9  | 460.3  | 461.9  | 471.1  | 471.1  |
| 27.5° | 4482.9 | 3948.2 | 2139.8 | 691.2  | 447.7  | 435.2  | 433.5  | 435.2  | 437.7  | 444.4  | 445.2  |
| 30°   | 4486.3 | 3821.0 | 1714.7 | 500.4  | 405.9  | 392.5  | 395.8  | 401.7  | 399.2  | 397.5  | 399.2  |
| 32.5° | 4494.6 | 3673.7 | 1300.4 | 411.7  | 370.7  | 349.8  | 345.6  | 345.6  | 335.6  | 329.7  | 326.4  |
| 35°   | 4522.3 | 3500.5 | 943.1  | 369.9  | 334.7  | 310.5  | 294.6  | 276.2  | 256.9  | 246.9  | 244.4  |
| 37.5° | 4565.8 | 3318.9 | 675.3  | 342.3  | 302.9  | 275.3  | 245.2  | 212.6  | 184.9  | 177.4  | 177.4  |
| 40°   | 4645.3 | 3131.4 | 499.6  | 320.5  | 277.8  | 243.5  | 198.3  | 155.7  | 130.5  | 126.4  | 126.4  |
| 42.5° | 4770.8 | 2933.9 | 398.3  | 301.3  | 256.1  | 210.9  | 151.5  | 113.0  | 94.6   | 92.1   | 91.2   |
| 45°   | 4901.4 | 2716.4 | 348.1  | 282.9  | 232.6  | 173.2  | 112.1  | 83.7   | 72.8   | 70.3   | 70.3   |
| 47.5° | 5031.9 | 2484.6 | 323.9  | 265.3  | 210.0  | 134.7  | 83.7   | 66.1   | 61.1   | 61.1   | 61.9   |
| 50°   | 5142.4 | 2242.7 | 306.3  | 246.0  | 180.8  | 102.1  | 66.1   | 56.1   | 54.4   | 57.7   | 58.6   |
| 52.5° | 5170.0 | 2005.1 | 284.5  | 221.8  | 144.8  | 77.8   | 54.4   | 49.4   | 49.4   | 49.4   | 49.4   |
| 55°   | 5153.2 | 1821.0 | 256.1  | 191.6  | 107.1  | 61.9   | 46.9   | 43.5   | 42.7   | 42.7   | 42.7   |
| 57.5° | 5210.1 | 1712.2 | 205.0  | 149.0  | 77.0   | 50.2   | 41.0   | 38.5   | 36.8   | 36.0   | 36.0   |
| 60°   | 5324.8 | 1641.0 | 146.4  | 107.1  | 57.7   | 41.8   | 35.1   | 32.6   | 30.1   | 28.5   | 28.5   |
| 62.5° | 5477.1 | 1579.1 | 108.8  | 79.5   | 44.4   | 33.5   | 29.3   | 26.8   | 23.4   | 21.8   | 21.8   |
| 65°   | 5594.3 | 1468.6 | 82.8   | 59.4   | 33.5   | 26.8   | 22.6   | 21.8   | 16.7   | 15.1   | 14.2   |
| 67.5° | 5415.2 | 1226.0 | 66.9   | 43.5   | 25.1   | 20.9   | 17.6   | 16.7   | 10.0   | 8.4    | 8.4    |
| 70°   | 4644.4 | 853.6  | 53.6   | 31.8   | 18.4   | 16.7   | 14.2   | 10.9   | 7.5    | 6.7    | 6.7    |
| 71°   | 4211.8 | 713.0  | 48.5   | 26.8   | 15.9   | 15.9   | 13.4   | 9.2    | 6.7    | 5.9    | 5.9    |
| 72.5° | 3498.8 | 506.3  | 41.0   | 20.9   | 14.2   | 16.7   | 14.2   | 8.4    | 6.7    | 5.9    | 5.0    |
| 75°   | 2031.0 | 211.7  | 28.5   | 14.2   | 10.9   | 20.1   | 18.4   | 7.5    | 5.0    | 4.2    | 4.2    |
| 77.5° | 610.9  | 77.8   | 15.9   | 9.2    | 8.4    | 17.6   | 20.9   | 6.7    | 2.5    | 0.8    | 0.8    |
| 80°   | 111.3  | 33.5   | 10.0   | 5.9    | 5.9    | 10.9   | 15.9   | 3.3    | 0.0    | 0.0    | 0.0    |
| 82.5° | 39.3   | 16.7   | 5.9    | 3.3    | 2.5    | 5.0    | 7.5    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 22.6   | 11.7   | 3.3    | 1.7    | 0.0    | 0.8    | 1.7    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 15.1   | 3.3    | 0.0    | 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    |



Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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: 4π  
 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  
 Rf: 84.7  
 Rg: 94.6

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



**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           |

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CIE 1931 Chromaticity Diagram



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



CCT = 2764K  
 CIE x = 0.4581  
 CIE y = 0.4156  
 Duv = 0.0020

Point lies inside the ANSI 2700K 4-step quadrangle

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**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**

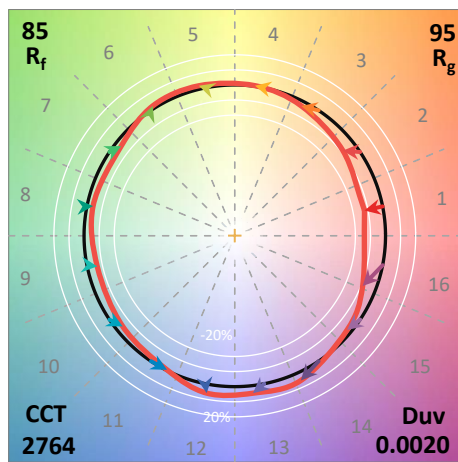
| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 0             | 0.0           | 490    | 18018         | 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           |        |               |               |

**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)