

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: STREETWORKS

Report Number: P870388

Luminaire Tested: **MEM2-HSN-SA-130-840-U-T3**

Issue Date: 09/05/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P870388  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 09/05/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: MEM2-HSN-SA-130-840-U-T3  
Description: EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 130W 80CRI 4000K  
FITXURE w/ TYPE III DISTRIBUTION OPTIC  
Light Source: (30) 4000K CCT, 80 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

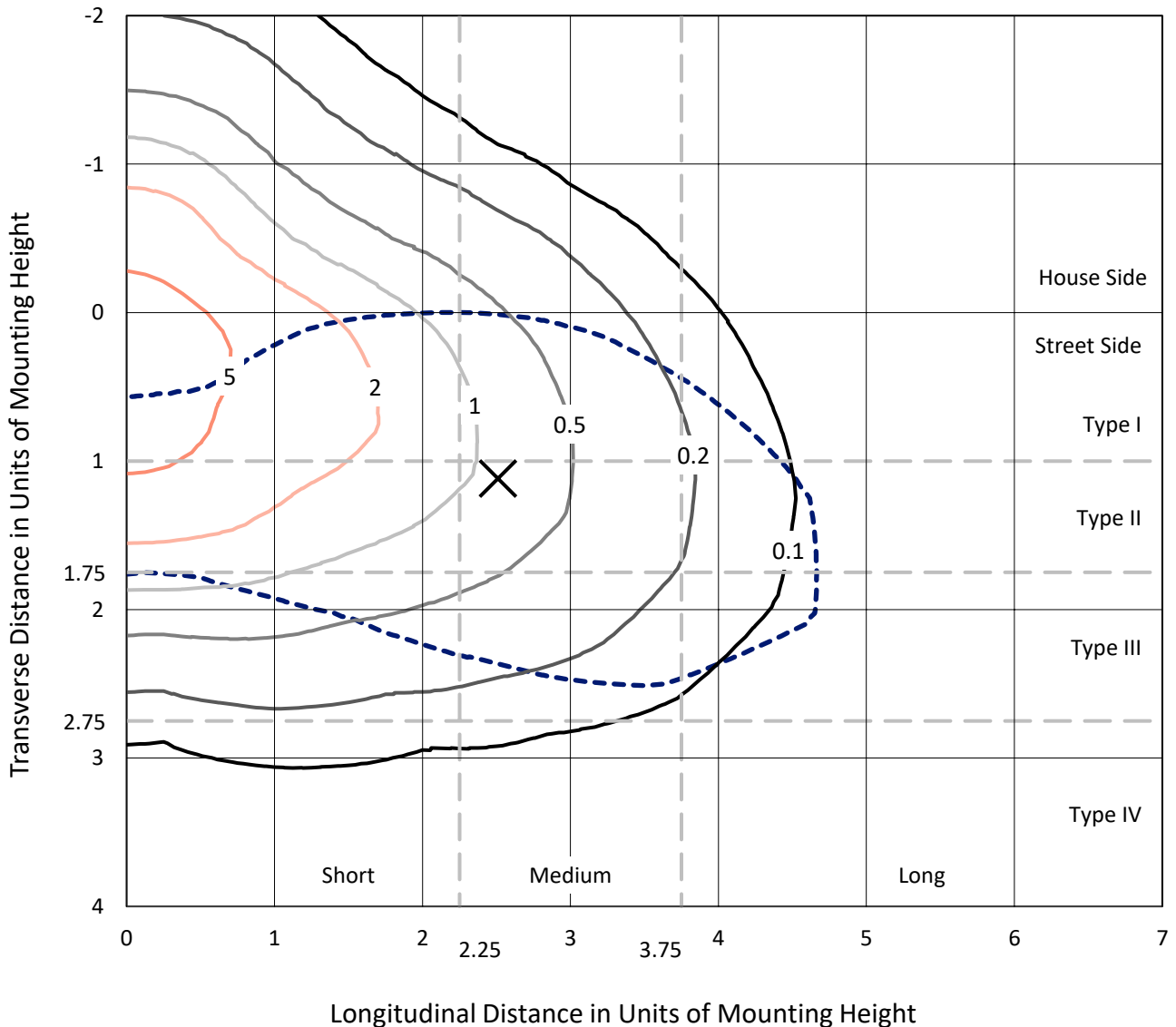
Lumens per Lamp: N/A  
Luminaire Lumens: 16080.2 lumens  
Efficiency: N/A  
Efficacy: 142.3 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.33' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G3

Input Watts (W): 113  
Input Voltage (V): 120  
Input Current (A<sub>in</sub>): NR  
Voltage Rise (V): NR  
Power Factor: 0.99  
Total Harmonic Distortion (THDi): 7.77%  
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

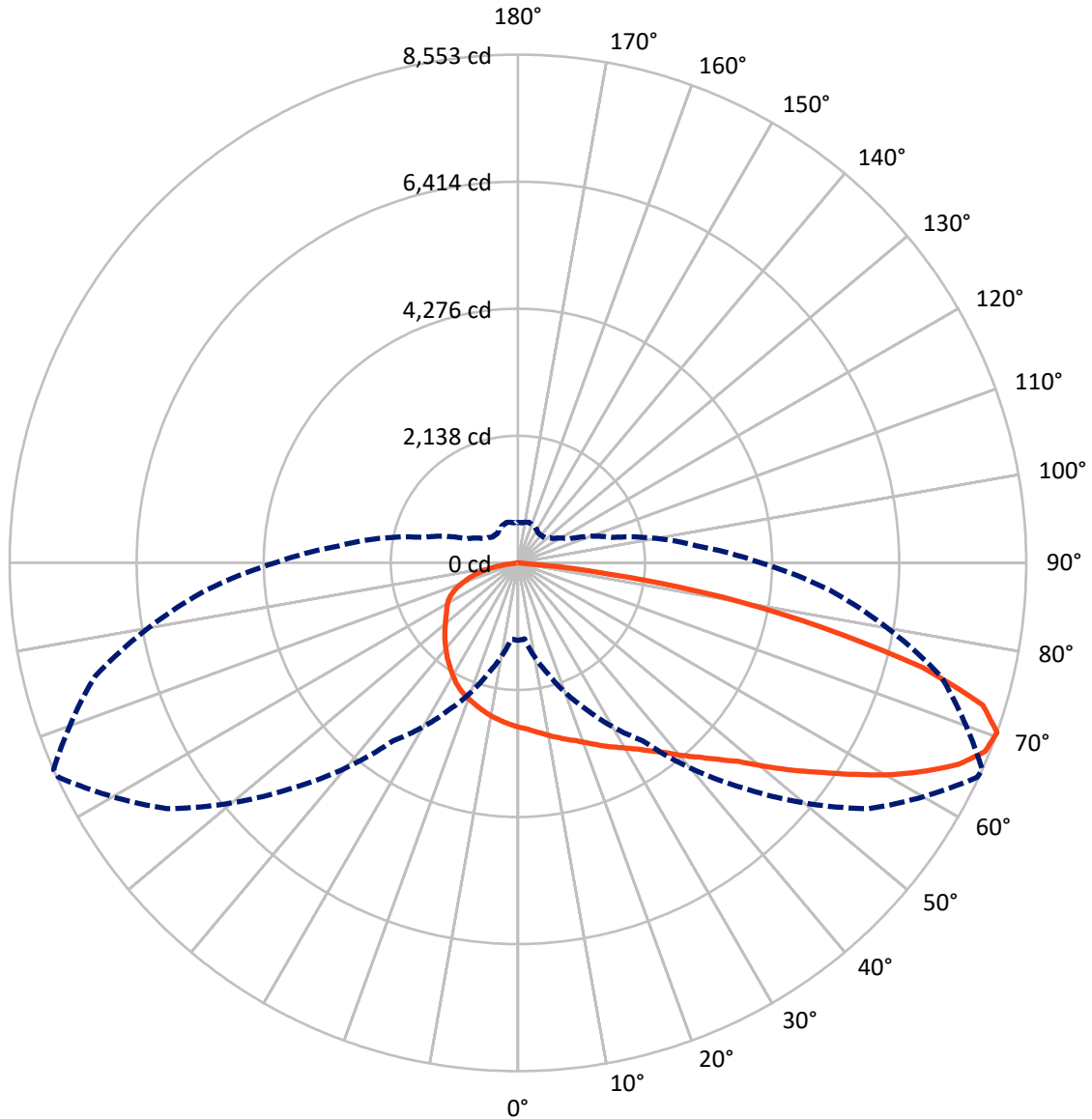
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 7.4 fc  
 Type III - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 66-Deg Lateral      - - - Horizontal Cone Through 70-Deg Vertical

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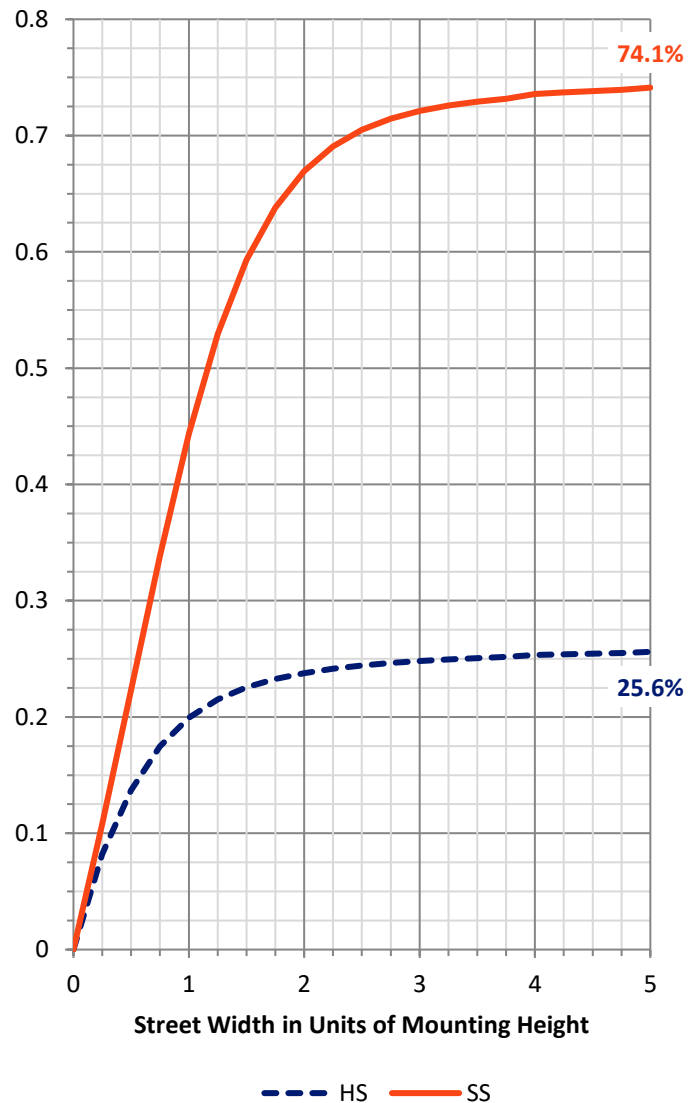
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4144.0   | 0.0    | 4144.0  |
|                    | % Fixture | 25.8     | 0.0    | 25.8    |
| <b>Street Side</b> | Lumens    | 11936.2  | 0.0    | 11936.2 |
|                    | % Fixture | 74.2     | 0.0    | 74.2    |
| <b>Total</b>       | Lumens    | 16080.2  | 0.0    | 16080.2 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 264.8   | 1.6       |
| 10°-20°   | 788.6   | 4.9       |
| 20°-30°   | 1324.6  | 8.2       |
| 30°-40°   | 1995.7  | 12.4      |
| 40°-50°   | 2709.4  | 16.8      |
| 50°-60°   | 3219.6  | 20.0      |
| 60°-70°   | 3285.8  | 20.4      |
| 70°-80°   | 2197.7  | 13.7      |
| 80°-90°   | 294.0   | 1.8       |
| 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°    | 16080.2 | 100.0     |
| 0°-180°   | 16080.2 | 100.0     |

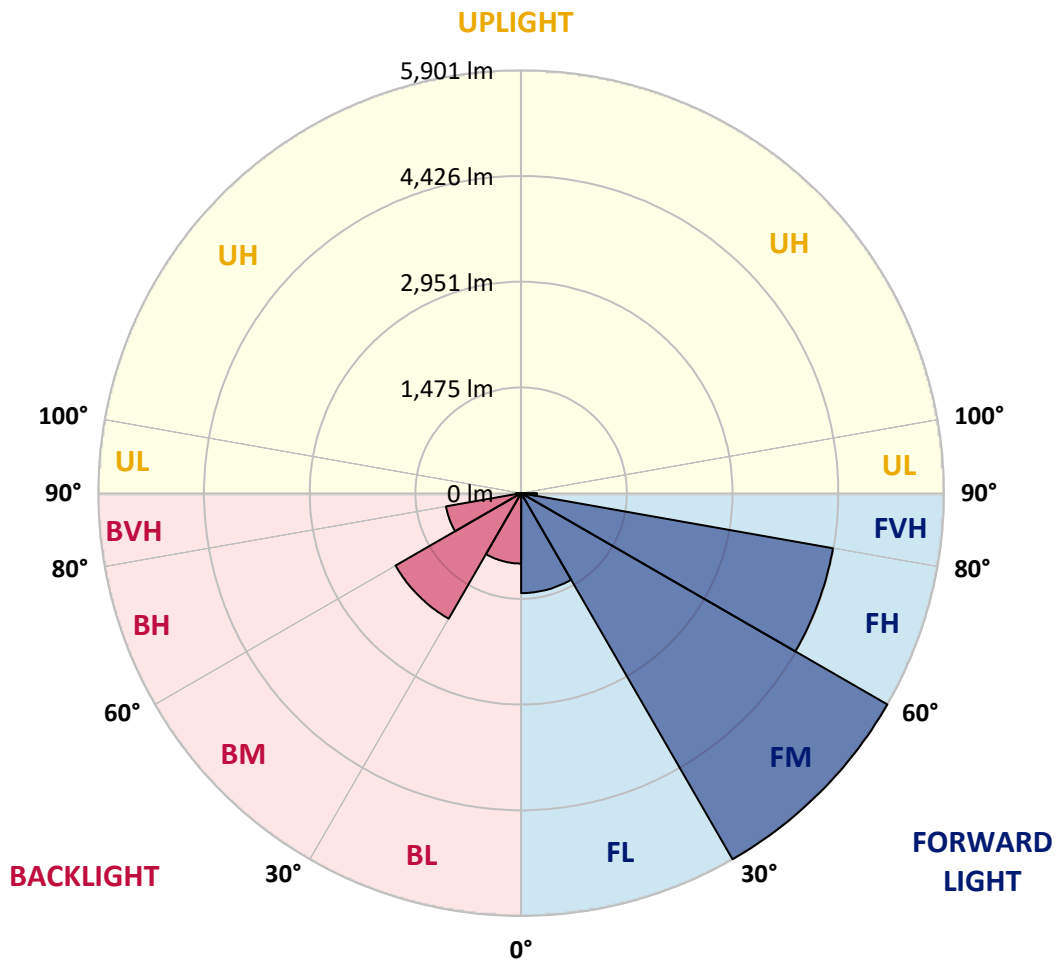


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1395.5 | 8.7       |                         |      |         |
| FM (30°-60°)   | 5901.1 | 36.7      |                         |      |         |
| FH (60°-80°)   | 4419.4 | 27.5      |                         |      | G2/5000 |
| FVH (80°-90°)  | 220.2  | 1.4       |                         |      | G2/225  |
| BL (0°-30°)    | 982.6  | 6.1       | B2/1000                 |      |         |
| BM (30°-60°)   | 2023.5 | 12.6      | B2/2500                 |      |         |
| BH (60°-80°)   | 1064.1 | 6.6       | B3/2500                 |      | G3/2500 |
| BVH (80°-90°)  | 73.8   | 0.5       |                         |      | 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°    | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 |
| 2.5°  | 2865.7 | 2852.9 | 2843.4 | 2849.8 | 2830.6 | 2837.0 | 2814.6 | 2798.6 | 2795.4 | 2789.1 | 2782.7 |
| 5°    | 2955.2 | 2955.2 | 2939.2 | 2939.2 | 2916.8 | 2913.6 | 2881.7 | 2846.6 | 2846.6 | 2824.2 | 2798.6 |
| 7.5°  | 3051.0 | 3044.6 | 3025.5 | 3022.3 | 2996.7 | 2990.3 | 2955.2 | 2900.9 | 2897.7 | 2856.1 | 2817.8 |
| 10°   | 3118.1 | 3121.3 | 3108.5 | 3108.5 | 3089.4 | 3073.4 | 3022.3 | 2964.8 | 2958.4 | 2904.1 | 2843.4 |
| 12.5° | 3169.2 | 3175.6 | 3172.4 | 3172.4 | 3156.5 | 3156.5 | 3098.9 | 3022.3 | 3015.9 | 2945.6 | 2859.3 |
| 15°   | 3223.5 | 3220.3 | 3229.9 | 3233.1 | 3226.7 | 3217.2 | 3175.6 | 3086.2 | 3083.0 | 2990.3 | 2881.7 |
| 17.5° | 3271.5 | 3268.3 | 3271.5 | 3287.4 | 3290.6 | 3290.6 | 3249.1 | 3156.5 | 3143.7 | 3044.6 | 2900.9 |
| 20°   | 3300.2 | 3306.6 | 3319.4 | 3338.6 | 3348.1 | 3373.7 | 3338.6 | 3239.5 | 3226.7 | 3102.1 | 2942.4 |
| 22.5° | 3408.8 | 3389.7 | 3399.3 | 3412.0 | 3424.8 | 3460.0 | 3428.0 | 3325.8 | 3316.2 | 3188.4 | 2990.3 |
| 25°   | 3594.1 | 3594.1 | 3571.8 | 3549.4 | 3533.4 | 3549.4 | 3523.9 | 3424.8 | 3418.4 | 3265.1 | 3044.6 |
| 27.5° | 3916.8 | 3916.8 | 3868.9 | 3785.8 | 3680.4 | 3651.6 | 3632.5 | 3530.2 | 3511.1 | 3348.1 | 3079.8 |
| 30°   | 4325.7 | 4338.5 | 4252.3 | 4111.7 | 3916.8 | 3789.0 | 3741.1 | 3629.3 | 3619.7 | 3431.2 | 3134.1 |
| 32.5° | 4763.4 | 4789.0 | 4725.1 | 4520.6 | 4201.1 | 3952.0 | 3875.3 | 3760.3 | 3737.9 | 3530.2 | 3204.4 |
| 35°   | 5156.4 | 5181.9 | 5095.7 | 4904.0 | 4495.1 | 4188.4 | 4035.0 | 3904.0 | 3891.3 | 3658.0 | 3309.8 |
| 37.5° | 5475.9 | 5482.3 | 5427.9 | 5194.7 | 4741.1 | 4386.4 | 4233.1 | 4076.6 | 4051.0 | 3811.4 | 3421.6 |
| 40°   | 5814.5 | 5840.1 | 5785.8 | 5498.2 | 4964.7 | 4600.5 | 4431.2 | 4284.2 | 4261.9 | 3971.1 | 3527.0 |
| 42.5° | 6169.1 | 6165.9 | 6165.9 | 5760.2 | 5188.3 | 4779.4 | 4645.2 | 4482.3 | 4469.5 | 4134.1 | 3642.1 |
| 45°   | 6386.4 | 6399.2 | 6364.0 | 5916.8 | 5517.4 | 4964.7 | 4852.9 | 4734.7 | 4712.3 | 4360.9 | 3792.2 |
| 47.5° | 6440.7 | 6411.9 | 6252.2 | 6038.2 | 5888.0 | 5156.4 | 5114.9 | 5044.6 | 4993.5 | 4610.1 | 3977.5 |
| 50°   | 6367.2 | 6322.5 | 6229.8 | 6092.5 | 6025.4 | 5386.4 | 5380.0 | 5415.2 | 5380.0 | 4913.6 | 4191.6 |
| 52.5° | 6092.5 | 6086.1 | 6070.1 | 6102.0 | 5993.4 | 5568.5 | 5680.3 | 5801.7 | 5795.3 | 5223.5 | 4415.2 |
| 55°   | 5514.2 | 5555.7 | 5747.4 | 5948.7 | 5872.0 | 5693.1 | 6015.8 | 6249.0 | 6223.5 | 5587.7 | 4645.2 |
| 57.5° | 4923.2 | 4964.7 | 5210.7 | 5689.9 | 5753.8 | 5827.3 | 6392.8 | 6757.0 | 6715.4 | 5983.8 | 4856.1 |
| 60°   | 4408.8 | 4364.1 | 4610.1 | 5300.2 | 5587.7 | 5948.7 | 6766.6 | 7271.3 | 7236.2 | 6380.0 | 5073.3 |
| 62.5° | 3594.1 | 3638.9 | 4031.8 | 4731.5 | 5354.5 | 6025.4 | 7073.3 | 7737.8 | 7715.4 | 6744.2 | 5249.0 |
| 65°   | 2843.4 | 2782.7 | 3373.7 | 4134.1 | 4951.9 | 5999.8 | 7338.4 | 8175.5 | 8159.5 | 7102.0 | 5383.2 |
| 67.5° | 1932.8 | 1891.3 | 2670.8 | 3539.8 | 4405.6 | 5795.3 | 7399.1 | 8469.4 | 8475.8 | 7312.9 | 5418.4 |
| 70°   | 1303.5 | 1284.3 | 1920.1 | 2722.0 | 3648.5 | 5354.5 | 7210.6 | 8530.1 | 8552.5 | 7367.2 | 5261.8 |
| 72.5° | 961.6  | 958.4  | 1405.7 | 1942.4 | 2715.6 | 4520.6 | 6696.3 | 8133.9 | 8175.5 | 6983.8 | 4801.8 |
| 75°   | 757.2  | 766.7  | 1003.2 | 1380.1 | 1811.4 | 3344.9 | 5632.4 | 6974.2 | 7038.1 | 6031.8 | 3987.1 |
| 77.5° | 619.8  | 619.8  | 702.9  | 990.4  | 1210.8 | 2076.6 | 4051.0 | 5105.3 | 5233.1 | 4654.8 | 3070.2 |
| 80°   | 501.6  | 511.2  | 520.8  | 690.1  | 801.9  | 1185.3 | 2357.8 | 3405.6 | 3498.3 | 3242.7 | 2217.2 |
| 82.5° | 274.8  | 293.9  | 284.3  | 357.8  | 402.5  | 549.5  | 936.1  | 1377.0 | 1517.5 | 1351.4 | 1006.4 |
| 85°   | 19.2   | 12.8   | 22.4   | 28.8   | 35.1   | 54.3   | 73.5   | 102.2  | 95.8   | 137.4  | 70.3   |
| 87.5° | 3.2    | 3.2    | 3.2    | 6.4    | 6.4    | 9.6    | 12.8   | 12.8   | 12.8   | 12.8   | 12.8   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 | 2766.7 |
| 2.5°  | 2779.5 | 2763.5 | 2737.9 | 2731.5 | 2722.0 | 2709.2 | 2696.4 | 2677.2 | 2670.8 | 2677.2 | 2683.6 |
| 5°    | 2782.7 | 2760.3 | 2718.8 | 2693.2 | 2667.6 | 2645.3 | 2619.7 | 2594.2 | 2578.2 | 2581.4 | 2594.2 |
| 7.5°  | 2792.2 | 2760.3 | 2696.4 | 2654.9 | 2613.3 | 2578.2 | 2536.7 | 2507.9 | 2488.7 | 2491.9 | 2501.5 |
| 10°   | 2805.0 | 2760.3 | 2683.6 | 2613.3 | 2555.8 | 2504.7 | 2463.2 | 2428.0 | 2408.9 | 2405.7 | 2408.9 |
| 12.5° | 2808.2 | 2757.1 | 2654.9 | 2568.6 | 2498.3 | 2431.2 | 2386.5 | 2354.6 | 2335.4 | 2325.8 | 2332.2 |
| 15°   | 2817.8 | 2747.5 | 2626.1 | 2520.7 | 2434.4 | 2364.1 | 2309.8 | 2271.5 | 2258.7 | 2252.3 | 2249.1 |
| 17.5° | 2830.6 | 2744.3 | 2600.6 | 2472.8 | 2370.5 | 2290.7 | 2242.7 | 2204.4 | 2188.4 | 2182.0 | 2188.4 |
| 20°   | 2849.8 | 2747.5 | 2571.8 | 2424.8 | 2313.0 | 2233.2 | 2178.8 | 2140.5 | 2127.7 | 2124.5 | 2121.3 |
| 22.5° | 2875.3 | 2753.9 | 2549.4 | 2380.1 | 2249.1 | 2169.3 | 2115.0 | 2089.4 | 2079.8 | 2083.0 | 2083.0 |
| 25°   | 2900.9 | 2760.3 | 2517.5 | 2319.4 | 2182.0 | 2099.0 | 2060.6 | 2041.5 | 2047.9 | 2060.6 | 2060.6 |
| 27.5° | 2923.2 | 2757.1 | 2472.8 | 2255.5 | 2102.2 | 2025.5 | 1996.7 | 1999.9 | 2015.9 | 2038.3 | 2041.5 |
| 30°   | 2952.0 | 2757.1 | 2424.8 | 2175.7 | 2012.7 | 1939.2 | 1932.8 | 1958.4 | 1984.0 | 2006.3 | 2006.3 |
| 32.5° | 2996.7 | 2776.3 | 2386.5 | 2095.8 | 1920.1 | 1862.6 | 1891.3 | 1926.5 | 1955.2 | 1977.6 | 1984.0 |
| 35°   | 3073.4 | 2817.8 | 2360.9 | 2015.9 | 1830.6 | 1789.1 | 1843.4 | 1900.9 | 1920.1 | 1936.0 | 1939.2 |
| 37.5° | 3146.9 | 2856.1 | 2329.0 | 1939.2 | 1738.0 | 1722.0 | 1795.5 | 1856.2 | 1859.4 | 1869.0 | 1869.0 |
| 40°   | 3217.2 | 2884.9 | 2287.5 | 1856.2 | 1648.5 | 1648.5 | 1734.8 | 1785.9 | 1779.5 | 1769.9 | 1773.1 |
| 42.5° | 3293.8 | 2900.9 | 2239.5 | 1779.5 | 1575.0 | 1575.0 | 1645.3 | 1690.0 | 1686.8 | 1699.6 | 1709.2 |
| 45°   | 3386.5 | 2932.8 | 2175.7 | 1709.2 | 1498.4 | 1485.6 | 1543.1 | 1581.4 | 1629.3 | 1686.8 | 1702.8 |
| 47.5° | 3514.3 | 2977.5 | 2124.5 | 1632.5 | 1434.5 | 1389.7 | 1412.1 | 1492.0 | 1546.3 | 1594.2 | 1600.6 |
| 50°   | 3648.5 | 3041.4 | 2079.8 | 1552.7 | 1357.8 | 1277.9 | 1297.1 | 1386.5 | 1418.5 | 1437.7 | 1447.2 |
| 52.5° | 3792.2 | 3092.6 | 2041.5 | 1485.6 | 1277.9 | 1162.9 | 1188.5 | 1274.7 | 1297.1 | 1313.1 | 1316.3 |
| 55°   | 3916.8 | 3134.1 | 1993.5 | 1421.7 | 1191.7 | 1054.3 | 1086.2 | 1169.3 | 1191.7 | 1210.8 | 1210.8 |
| 57.5° | 4047.8 | 3172.4 | 1961.6 | 1367.4 | 1099.0 | 964.8  | 987.2  | 1070.3 | 1102.2 | 1108.6 | 1118.2 |
| 60°   | 4156.4 | 3207.6 | 1932.8 | 1316.3 | 1012.7 | 885.0  | 900.9  | 974.4  | 1012.7 | 1015.9 | 1022.3 |
| 62.5° | 4233.1 | 3229.9 | 1916.9 | 1252.4 | 926.5  | 805.1  | 817.9  | 891.3  | 936.1  | 945.7  | 948.9  |
| 65°   | 4281.0 | 3242.7 | 1888.1 | 1169.3 | 853.0  | 738.0  | 738.0  | 811.5  | 856.2  | 878.6  | 885.0  |
| 67.5° | 4258.7 | 3220.3 | 1811.4 | 1073.4 | 785.9  | 670.9  | 667.7  | 741.2  | 779.5  | 792.3  | 795.5  |
| 70°   | 4086.1 | 3089.4 | 1654.9 | 955.2  | 715.6  | 610.2  | 603.8  | 670.9  | 706.0  | 677.3  | 680.5  |
| 72.5° | 3734.7 | 2792.2 | 1440.9 | 837.0  | 642.2  | 552.7  | 546.3  | 603.8  | 607.0  | 607.0  | 603.8  |
| 75°   | 3146.9 | 2281.1 | 1150.1 | 712.4  | 565.5  | 492.0  | 495.2  | 539.9  | 543.1  | 559.1  | 549.5  |
| 77.5° | 2412.1 | 1690.0 | 897.7  | 568.7  | 479.2  | 437.7  | 453.7  | 469.6  | 492.0  | 514.4  | 492.0  |
| 80°   | 1753.9 | 1166.1 | 623.0  | 424.9  | 370.6  | 370.6  | 377.0  | 393.0  | 424.9  | 447.3  | 424.9  |
| 82.5° | 750.8  | 514.4  | 287.5  | 210.9  | 182.1  | 178.9  | 182.1  | 182.1  | 223.6  | 230.0  | 201.3  |
| 85°   | 57.5   | 47.9   | 35.1   | 35.1   | 28.8   | 16.0   | 16.0   | 12.8   | 9.6    | 9.6    | 9.6    |
| 87.5° | 12.8   | 9.6    | 9.6    | 9.6    | 6.4    | 6.4    | 6.4    | 6.4    | 6.4    | 6.4    | 6.4    |
| 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

Streetworks

Report Number: SP1-2407-157-8

Test Date: 09/05/2024

Luminaire Tested: MEM2-HTN-SA-40-840-U-5WQ

Data in this report applies to families of products including MEM2-HTN-SA-40-840-U-5WQ

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-8  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 09/05/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Streetworks  
 Catalog Number: **MEM2-HTN-SA-40-840-U-5WQ**  
 Description: Epic Modern Light Square 40W 5WQ Optic

**Spectral Parameters**

CCT (K): 3996  
 CIE u': 0.2245  
 CIE v': 0.5031  
 Duv: 0.0012  
 CIE x: 0.3815  
 CIE y: 0.3799  
 CIE z: 0.2386  
 Peak Wavelength (nm): 449  
 Dominant Wavelength (nm): 578  
 Purity: 28.49233  
 Rf: 82.6  
 Rg: 95.1

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 80.6 |      |      |
| R1:       | 78.1 | R9:  | -5.8 |
| R2:       | 87.1 | R10: | 70.3 |
| R3:       | 94.5 | R11: | 78.7 |
| R4:       | 79.7 | R12: | 60.5 |
| R5:       | 78.7 | R13: | 80.2 |
| R6:       | 82.7 | R14: | 97.2 |
| R7:       | 84.3 | R15: | 70.6 |
| R8:       | 59.5 |      |      |



**Test Conditions**

Stabilization Time: 29M  
 Operation Time: 1H 29M  
 Sphere Temperature (°C): 24.3

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

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**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 4000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) |
|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|
| 360               | 0                           | NR                      | 490               | 289                         | NR                      | 620               | 725                         | NR                      | 750               | 17                          | NR                      | 880               | 0                           | NR                      |
| 365               | 0                           | NR                      | 495               | 351                         | NR                      | 625               | 673                         | NR                      | 755               | 15                          | NR                      | 885               | 0                           | NR                      |
| 370               | 0                           | NR                      | 500               | 414                         | NR                      | 630               | 619                         | NR                      | 760               | 13                          | NR                      | 890               | 0                           | NR                      |
| 375               | 0                           | NR                      | 505               | 470                         | NR                      | 635               | 562                         | NR                      | 765               | 11                          | NR                      | 895               | 0                           | NR                      |
| 380               | 0                           | NR                      | 510               | 513                         | NR                      | 640               | 506                         | NR                      | 770               | 9                           | NR                      | 900               | 0                           | NR                      |
| 385               | 0                           | NR                      | 515               | 546                         | NR                      | 645               | 452                         | NR                      | 775               | 8                           | NR                      | 905               | 0                           | NR                      |
| 390               | 0                           | NR                      | 520               | 571                         | NR                      | 650               | 400                         | NR                      | 780               | 7                           | NR                      | 910               | 0                           | NR                      |
| 395               | 1                           | NR                      | 525               | 592                         | NR                      | 655               | 352                         | NR                      | 785               | 6                           | NR                      | 915               | 0                           | NR                      |
| 400               | 3                           | NR                      | 530               | 606                         | NR                      | 660               | 307                         | NR                      | 790               | 5                           | NR                      | 920               | 0                           | NR                      |
| 405               | 6                           | NR                      | 535               | 624                         | NR                      | 665               | 267                         | NR                      | 795               | 4                           | NR                      | 925               | 0                           | NR                      |
| 410               | 12                          | NR                      | 540               | 642                         | NR                      | 670               | 231                         | NR                      | 800               | 4                           | NR                      | 930               | 0                           | NR                      |
| 415               | 22                          | NR                      | 545               | 663                         | NR                      | 675               | 199                         | NR                      | 805               | 3                           | NR                      | 935               | 0                           | NR                      |
| 420               | 44                          | NR                      | 550               | 686                         | NR                      | 680               | 171                         | NR                      | 810               | 3                           | NR                      | 940               | 0                           | NR                      |
| 425               | 83                          | NR                      | 555               | 713                         | NR                      | 685               | 146                         | NR                      | 815               | 2                           | NR                      | 945               | 0                           | NR                      |
| 430               | 150                         | NR                      | 560               | 745                         | NR                      | 690               | 125                         | NR                      | 820               | 2                           | NR                      | 950               | 0                           | NR                      |
| 435               | 267                         | NR                      | 565               | 774                         | NR                      | 695               | 106                         | NR                      | 825               | 2                           | NR                      | 955               | 0                           | NR                      |
| 440               | 466                         | NR                      | 570               | 806                         | NR                      | 700               | 90                          | NR                      | 830               | 1                           | NR                      | 960               | 0                           | NR                      |
| 445               | 804                         | NR                      | 575               | 835                         | NR                      | 705               | 76                          | NR                      | 835               | 1                           | NR                      | 965               | 0                           | NR                      |
| 450               | 1000                        | NR                      | 580               | 858                         | NR                      | 710               | 65                          | NR                      | 840               | 1                           | NR                      | 970               | 0                           | NR                      |
| 455               | 715                         | NR                      | 585               | 875                         | NR                      | 715               | 55                          | NR                      | 845               | 1                           | NR                      | 975               | 0                           | NR                      |
| 460               | 492                         | NR                      | 590               | 884                         | NR                      | 720               | 47                          | NR                      | 850               | 1                           | NR                      | 980               | 0                           | NR                      |
| 465               | 402                         | NR                      | 595               | 880                         | NR                      | 725               | 40                          | NR                      | 855               | 1                           | NR                      | 985               | 0                           | NR                      |
| 470               | 288                         | NR                      | 600               | 868                         | NR                      | 730               | 34                          | NR                      | 860               | 1                           | NR                      | 990               | 0                           | NR                      |
| 475               | 226                         | NR                      | 605               | 844                         | NR                      | 735               | 28                          | NR                      | 865               | 1                           | NR                      | 995               | 0                           | NR                      |
| 480               | 227                         | NR                      | 610               | 814                         | NR                      | 740               | 24                          | NR                      | 870               | 0                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 248                         | NR                      | 615               | 771                         | NR                      | 745               | 20                          | NR                      | 875               | 0                           | NR                      |                   |                             |                         |

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.66**

| 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    | 289                      | NR            | 620    | 725                      | NR            | 750    | 17                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 351                      | NR            | 625    | 673                      | NR            | 755    | 15                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 414                      | NR            | 630    | 619                      | NR            | 760    | 13                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 470                      | NR            | 635    | 562                      | NR            | 765    | 11                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 513                      | NR            | 640    | 506                      | NR            | 770    | 9                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 546                      | NR            | 645    | 452                      | NR            | 775    | 8                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 571                      | NR            | 650    | 400                      | NR            | 780    | 7                        | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 592                      | NR            | 655    | 352                      | NR            | 785    | 6                        | NR            | 915    | 0                        | NR            |
| 400    | 3                        | NR            | 530    | 606                      | NR            | 660    | 307                      | NR            | 790    | 5                        | NR            | 920    | 0                        | NR            |
| 405    | 6                        | NR            | 535    | 624                      | NR            | 665    | 267                      | NR            | 795    | 4                        | NR            | 925    | 0                        | NR            |
| 410    | 12                       | NR            | 540    | 642                      | NR            | 670    | 231                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 22                       | NR            | 545    | 663                      | NR            | 675    | 199                      | NR            | 805    | 3                        | NR            | 935    | 0                        | NR            |
| 420    | 44                       | NR            | 550    | 686                      | NR            | 680    | 171                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 83                       | NR            | 555    | 713                      | NR            | 685    | 146                      | NR            | 815    | 2                        | NR            | 945    | 0                        | NR            |
| 430    | 150                      | NR            | 560    | 745                      | NR            | 690    | 125                      | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 267                      | NR            | 565    | 774                      | NR            | 695    | 106                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 466                      | NR            | 570    | 806                      | NR            | 700    | 90                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 804                      | NR            | 575    | 835                      | NR            | 705    | 76                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 1000                     | NR            | 580    | 858                      | NR            | 710    | 65                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 715                      | NR            | 585    | 875                      | NR            | 715    | 55                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 492                      | NR            | 590    | 884                      | NR            | 720    | 47                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 402                      | NR            | 595    | 880                      | NR            | 725    | 40                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 288                      | NR            | 600    | 868                      | NR            | 730    | 34                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 226                      | NR            | 605    | 844                      | NR            | 735    | 28                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 227                      | NR            | 610    | 814                      | NR            | 740    | 24                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 248                      | NR            | 615    | 771                      | NR            | 745    | 20                       | NR            | 875    | 0                        | NR            |        |                          |               |

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**Melanopic Flux vs. Wavelength**



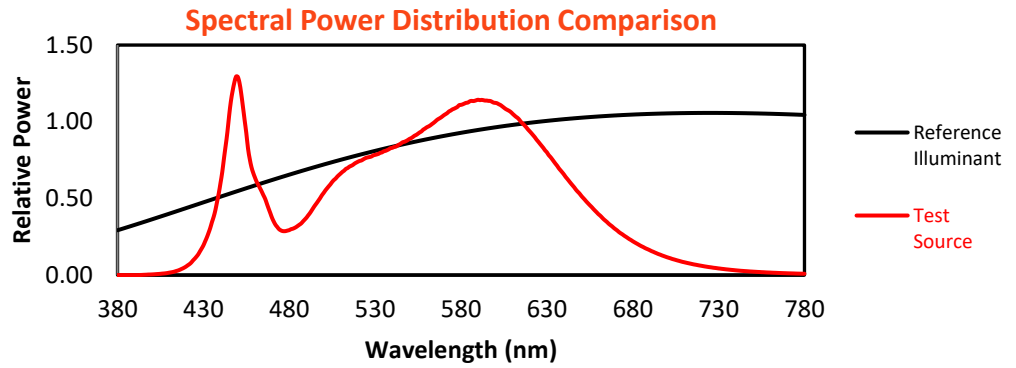
**Melanopic Lumens: NR**

**M/P: 3.37**

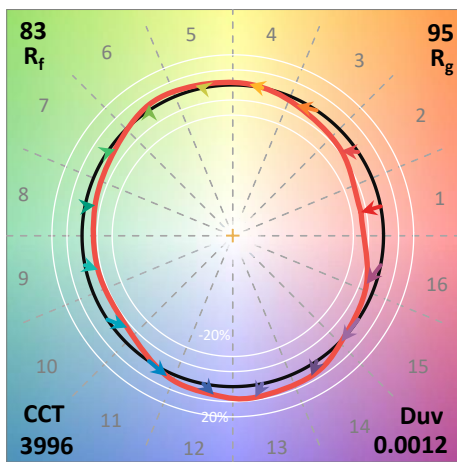
| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 289                      | NR            | 620    | 725                      | NR            | 750    | 17                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 351                      | NR            | 625    | 673                      | NR            | 755    | 15                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 414                      | NR            | 630    | 619                      | NR            | 760    | 13                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 470                      | NR            | 635    | 562                      | NR            | 765    | 11                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 513                      | NR            | 640    | 506                      | NR            | 770    | 9                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 546                      | NR            | 645    | 452                      | NR            | 775    | 8                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 571                      | NR            | 650    | 400                      | NR            | 780    | 7                        | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 592                      | NR            | 655    | 352                      | NR            | 785    | 6                        | NR            | 915    | 0                        | NR            |
| 400    | 3                        | NR            | 530    | 606                      | NR            | 660    | 307                      | NR            | 790    | 5                        | NR            | 920    | 0                        | NR            |
| 405    | 6                        | NR            | 535    | 624                      | NR            | 665    | 267                      | NR            | 795    | 4                        | NR            | 925    | 0                        | NR            |
| 410    | 12                       | NR            | 540    | 642                      | NR            | 670    | 231                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 22                       | NR            | 545    | 663                      | NR            | 675    | 199                      | NR            | 805    | 3                        | NR            | 935    | 0                        | NR            |
| 420    | 44                       | NR            | 550    | 686                      | NR            | 680    | 171                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 83                       | NR            | 555    | 713                      | NR            | 685    | 146                      | NR            | 815    | 2                        | NR            | 945    | 0                        | NR            |
| 430    | 150                      | NR            | 560    | 745                      | NR            | 690    | 125                      | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 267                      | NR            | 565    | 774                      | NR            | 695    | 106                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 466                      | NR            | 570    | 806                      | NR            | 700    | 90                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 804                      | NR            | 575    | 835                      | NR            | 705    | 76                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 1000                     | NR            | 580    | 858                      | NR            | 710    | 65                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 715                      | NR            | 585    | 875                      | NR            | 715    | 55                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 492                      | NR            | 590    | 884                      | NR            | 720    | 47                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 402                      | NR            | 595    | 880                      | NR            | 725    | 40                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 288                      | NR            | 600    | 868                      | NR            | 730    | 34                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 226                      | NR            | 605    | 844                      | NR            | 735    | 28                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 227                      | NR            | 610    | 814                      | NR            | 740    | 24                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 248                      | NR            | 615    | 771                      | NR            | 745    | 20                       | NR            | 875    | 0                        | NR            |        |                          |               |

**Summary**

$R_f = 82.6$   
 $R_g = 95.1$   
 CIE  $R_a = 80.6$   
 $R_g = -5.8$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 79 | CES51 = 94 | CES76 = 72 |
| CES02 = 61 | CES27 = 93 | CES52 = 94 | CES77 = 82 |
| CES03 = 31 | CES28 = 90 | CES53 = 88 | CES78 = 71 |
| CES04 = 69 | CES29 = 83 | CES54 = 89 | CES79 = 91 |
| CES05 = 48 | CES30 = 95 | CES55 = 88 | CES80 = 88 |
| CES06 = 50 | CES31 = 86 | CES56 = 84 | CES81 = 80 |
| CES07 = 40 | CES32 = 78 | CES57 = 84 | CES82 = 95 |
| CES08 = 39 | CES33 = 90 | CES58 = 84 | CES83 = 95 |
| CES09 = 29 | CES34 = 85 | CES59 = 90 | CES84 = 90 |
| CES10 = 74 | CES35 = 92 | CES60 = 91 | CES85 = 78 |
| CES11 = 57 | CES36 = 85 | CES61 = 87 | CES86 = 73 |
| CES12 = 63 | CES37 = 91 | CES62 = 87 | CES87 = 83 |
| CES13 = 42 | CES38 = 95 | CES63 = 84 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 78 | CES89 = 76 |
| CES15 = 71 | CES40 = 94 | CES65 = 75 | CES90 = 87 |
| CES16 = 46 | CES41 = 98 | CES66 = 75 | CES91 = 72 |
| CES17 = 49 | CES42 = 92 | CES67 = 73 | CES92 = 62 |
| CES18 = 56 | CES43 = 88 | CES68 = 77 | CES93 = 78 |
| CES19 = 71 | CES44 = 99 | CES69 = 82 | CES94 = 60 |
| CES20 = 65 | CES45 = 93 | CES70 = 72 | CES95 = 70 |
| CES21 = 86 | CES46 = 90 | CES71 = 67 | CES96 = 82 |
| CES22 = 78 | CES47 = 95 | CES72 = 89 | CES97 = 90 |
| CES23 = 91 | CES48 = 84 | CES73 = 65 | CES98 = 84 |
| CES24 = 90 | CES49 = 89 | CES74 = 93 | CES99 = 73 |
| CES25 = 71 | CES50 = 94 | CES75 = 69 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)