

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: P867979

Luminaire Tested: **MEM2-HSN-SA-130-740-U-T2U**

Issue Date: 08/21/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P867979  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: MEM2-HSN-SA-130-740-U-T2U  
Description: EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 130W 70CRI 4000K  
FITXURE w/ TYPE II URBAN DISTRIBUTION OPTIC  
Light Source: (30) 4000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

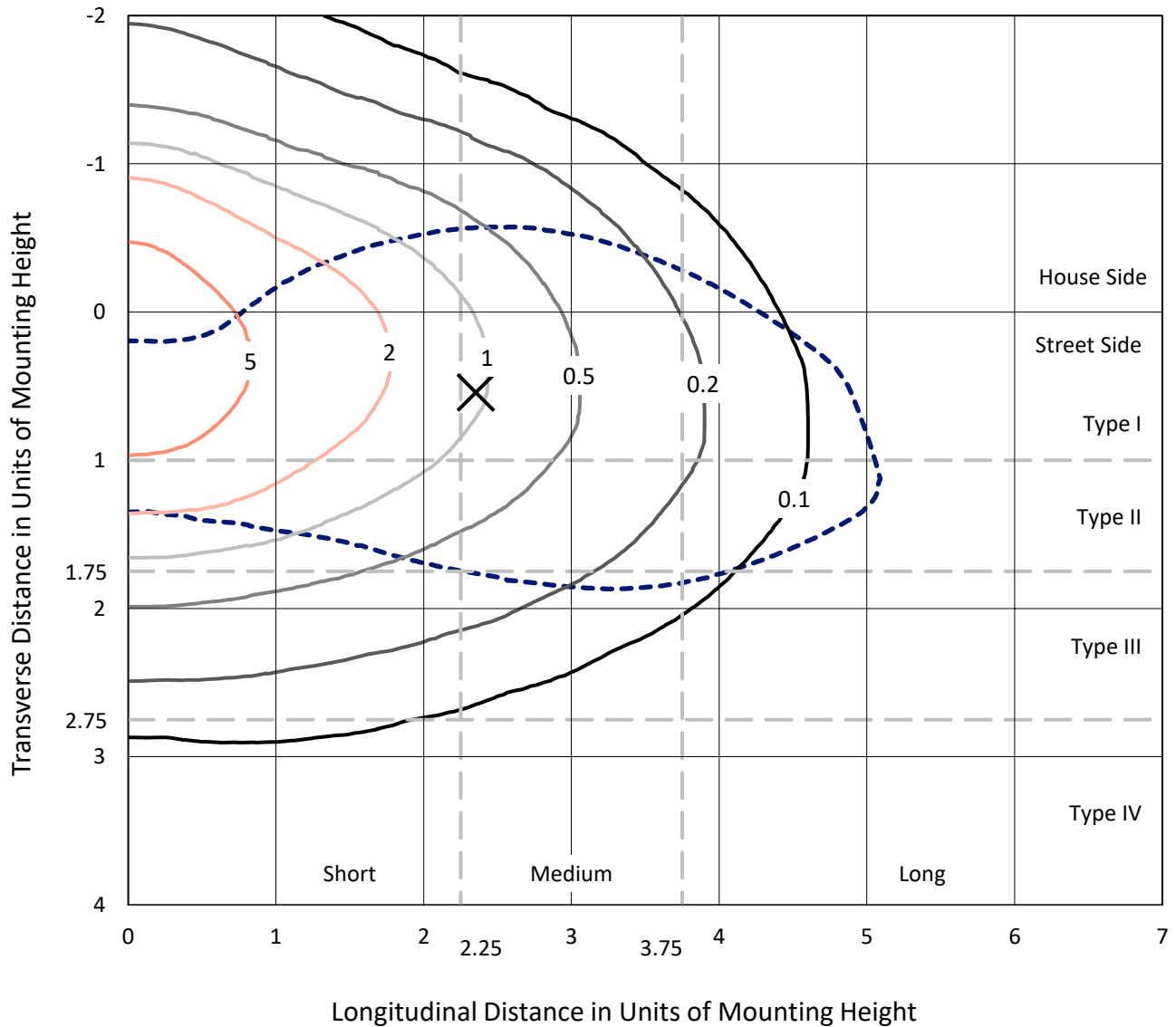
Lumens per Lamp: N/A  
Luminaire Lumens: 17013.7 lumens  
Efficiency: N/A  
Efficacy: 150.6 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.33' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G3

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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 CATALOG NUMBER: MEM2-HSN-SA-130-740-U-T2U

### Iso-Footcandle Lines of Horizontal Illumination

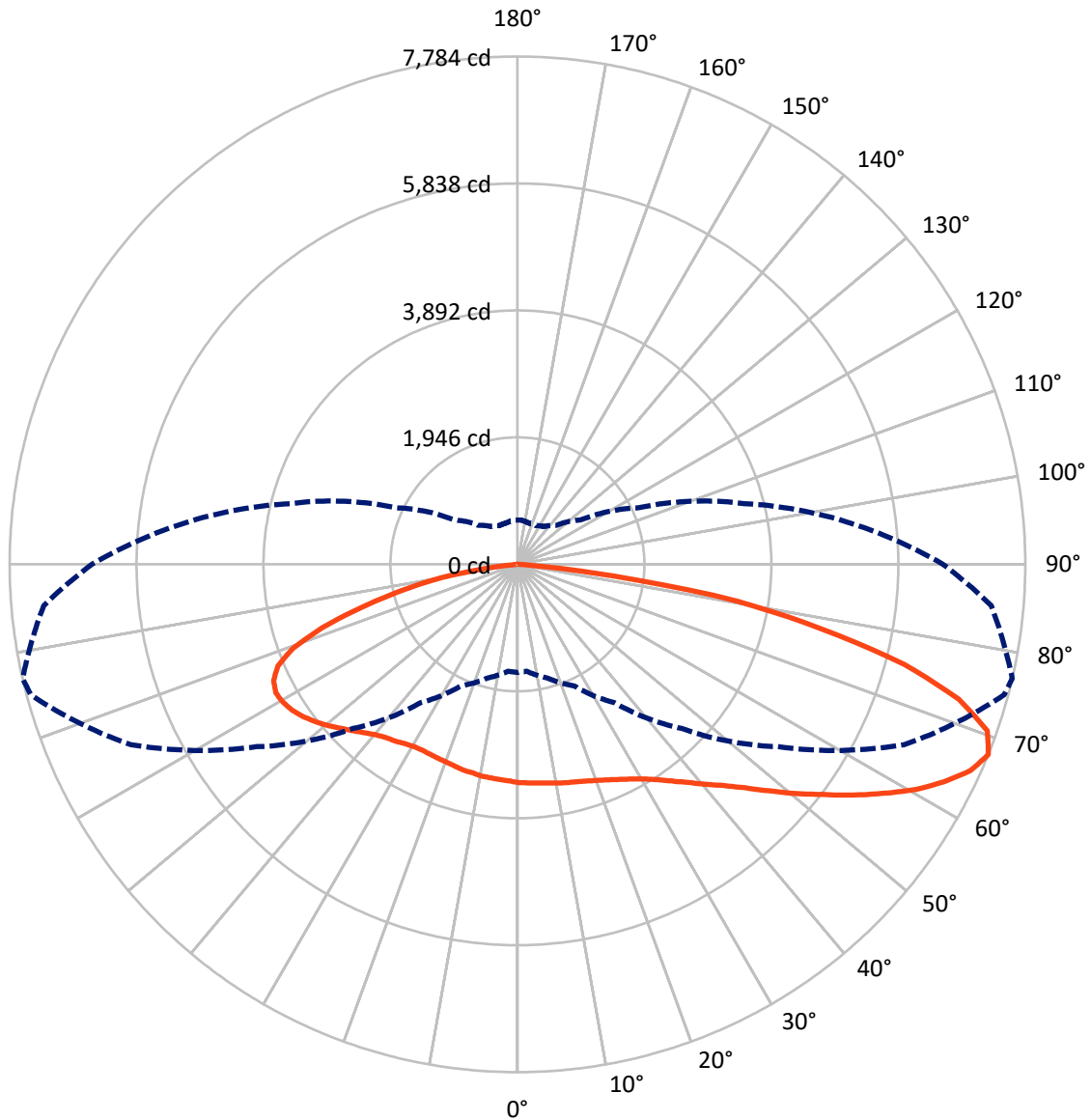
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 9.2 fc  
 Type III - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 77-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 5657.6   | 0.0    | 5657.6  |
|                    | % Fixture | 33.3     | 0.0    | 33.3    |
| <b>Street Side</b> | Lumens    | 11356.1  | 0.0    | 11356.1 |
|                    | % Fixture | 66.7     | 0.0    | 66.7    |
| <b>Total</b>       | Lumens    | 17013.7  | 0.0    | 17013.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 321.5   | 1.9       |
| 10°-20°   | 975.1   | 5.7       |
| 20°-30°   | 1643.9  | 9.7       |
| 30°-40°   | 2332.8  | 13.7      |
| 40°-50°   | 2951.4  | 17.3      |
| 50°-60°   | 3233.2  | 19.0      |
| 60°-70°   | 3125.4  | 18.4      |
| 70°-80°   | 2102.0  | 12.4      |
| 80°-90°   | 328.5   | 1.9       |
| 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°    | 17013.7 | 100.0     |
| 0°-180°   | 17013.7 | 100.0     |



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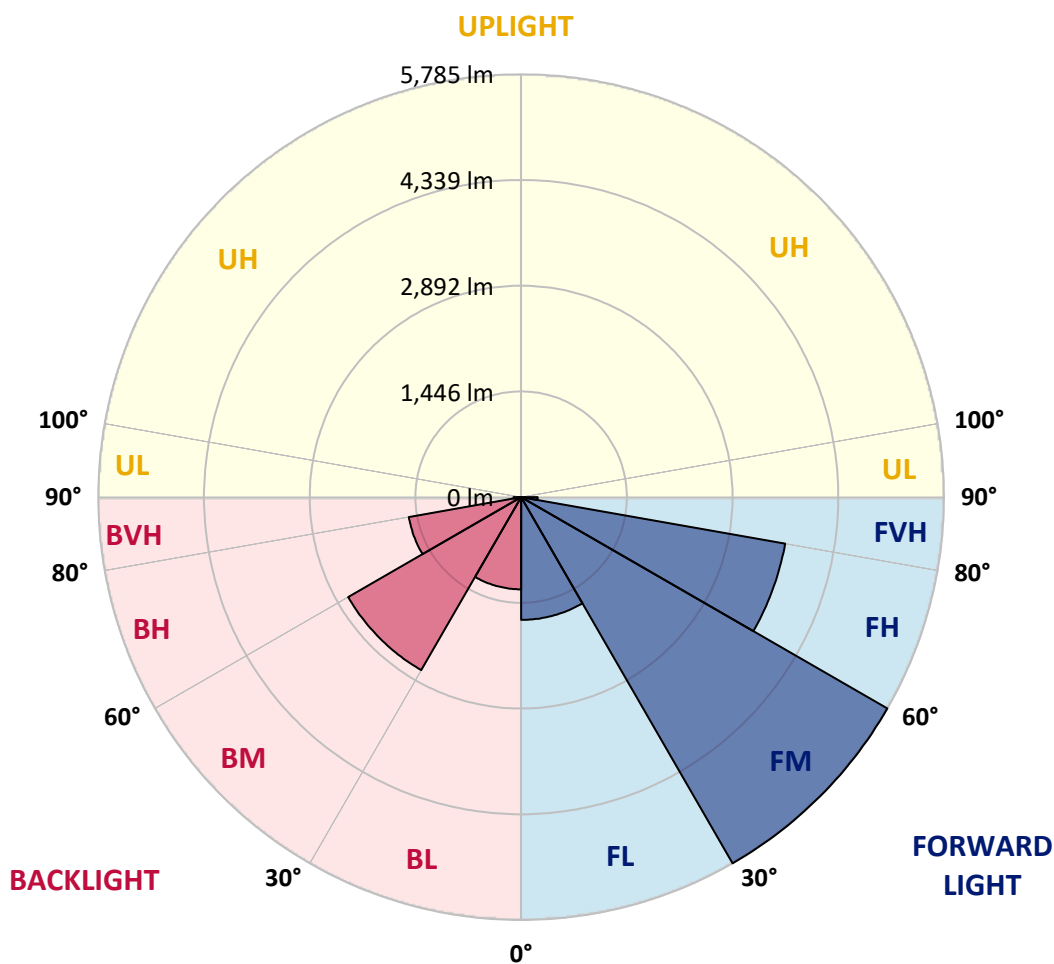
CATALOG NUMBER: MEM2-HSN-SA-130-740-U-T2U

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1679.3 | 9.9       |                         |      |         |
| FM (30°-60°)   | 5784.9 | 34.0      |                         |      |         |
| FH (60°-80°)   | 3667.0 | 21.6      |                         |      | G2/5000 |
| FVH (80°-90°)  | 224.9  | 1.3       |                         |      | G2/225  |
| BL (0°-30°)    | 1261.2 | 7.4       | B3/2500                 |      |         |
| BM (30°-60°)   | 2732.5 | 16.1      | B3/5000                 |      |         |
| BH (60°-80°)   | 1560.4 | 9.2       | B3/2500                 |      | G3/2500 |
| BVH (80°-90°)  | 103.6  | 0.6       |                         |      | G2/225  |
| 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°    | 75°    | 77°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 |
| 2.5°  | 3419.1 | 3415.8 | 3398.9 | 3405.7 | 3385.5 | 3398.9 | 3378.7 | 3361.9 | 3358.5 | 3355.2 | 3358.5 |
| 5°    | 3526.8 | 3510.0 | 3493.2 | 3483.1 | 3466.2 | 3459.5 | 3425.8 | 3392.2 | 3372.0 | 3368.6 | 3361.9 |
| 7.5°  | 3651.3 | 3644.6 | 3621.0 | 3607.6 | 3560.5 | 3536.9 | 3489.8 | 3429.2 | 3398.9 | 3385.5 | 3368.6 |
| 10°   | 3779.2 | 3796.0 | 3765.7 | 3738.8 | 3685.0 | 3634.5 | 3553.7 | 3476.3 | 3415.8 | 3409.0 | 3372.0 |
| 12.5° | 3937.4 | 3934.0 | 3913.8 | 3866.7 | 3802.8 | 3732.1 | 3634.5 | 3526.8 | 3446.0 | 3432.6 | 3378.7 |
| 15°   | 4078.7 | 4075.3 | 4048.4 | 4004.7 | 3920.5 | 3833.0 | 3701.8 | 3577.3 | 3476.3 | 3456.1 | 3392.2 |
| 17.5° | 4210.0 | 4203.2 | 4186.4 | 4139.3 | 4035.0 | 3927.3 | 3799.4 | 3634.5 | 3513.3 | 3489.8 | 3402.3 |
| 20°   | 4324.4 | 4331.1 | 4310.9 | 4263.8 | 4166.2 | 4051.8 | 3890.3 | 3708.5 | 3560.5 | 3533.5 | 3432.6 |
| 22.5° | 4448.9 | 4452.3 | 4442.2 | 4425.3 | 4300.8 | 4179.7 | 4004.7 | 3792.7 | 3614.3 | 3587.4 | 3466.2 |
| 25°   | 4580.1 | 4583.5 | 4590.2 | 4580.1 | 4438.8 | 4307.5 | 4122.5 | 3897.0 | 3688.3 | 3651.3 | 3513.3 |
| 27.5° | 4731.6 | 4734.9 | 4748.4 | 4728.2 | 4576.8 | 4438.8 | 4253.7 | 4008.0 | 3765.7 | 3725.4 | 3553.7 |
| 30°   | 4903.2 | 4916.7 | 4906.6 | 4899.8 | 4724.8 | 4590.2 | 4384.9 | 4122.5 | 3866.7 | 3816.2 | 3624.4 |
| 32.5° | 5108.5 | 5105.1 | 5084.9 | 5064.7 | 4886.4 | 4745.0 | 4533.0 | 4270.5 | 3991.2 | 3934.0 | 3738.8 |
| 35°   | 5256.6 | 5256.6 | 5226.3 | 5216.2 | 5051.3 | 4903.2 | 4694.6 | 4435.4 | 4132.6 | 4078.7 | 3860.0 |
| 37.5° | 5347.4 | 5360.9 | 5337.3 | 5344.1 | 5185.9 | 5047.9 | 4856.1 | 4603.7 | 4287.4 | 4240.2 | 4008.0 |
| 40°   | 5381.1 | 5414.7 | 5434.9 | 5461.8 | 5303.7 | 5185.9 | 5027.7 | 4785.4 | 4485.9 | 4432.1 | 4186.4 |
| 42.5° | 5387.8 | 5438.3 | 5509.0 | 5566.2 | 5387.8 | 5290.2 | 5192.6 | 4970.5 | 4681.1 | 4634.0 | 4381.6 |
| 45°   | 5354.1 | 5330.6 | 5502.2 | 5509.0 | 5434.9 | 5374.3 | 5337.3 | 5192.6 | 4963.8 | 4886.4 | 4623.9 |
| 47.5° | 5098.4 | 5071.5 | 5118.6 | 5334.0 | 5377.7 | 5411.4 | 5485.4 | 5451.7 | 5246.5 | 5185.9 | 4903.2 |
| 50°   | 4684.5 | 4671.0 | 4859.5 | 5091.7 | 5236.4 | 5408.0 | 5606.5 | 5700.8 | 5559.4 | 5522.4 | 5256.6 |
| 52.5° | 4001.3 | 3964.3 | 4347.9 | 4798.9 | 5051.3 | 5374.3 | 5690.7 | 5956.5 | 5912.8 | 5858.9 | 5559.4 |
| 55°   | 3567.2 | 3567.2 | 3826.3 | 4388.3 | 4815.7 | 5253.2 | 5744.5 | 6225.8 | 6303.2 | 6242.6 | 5906.1 |
| 57.5° | 3102.8 | 3139.8 | 3409.0 | 3796.0 | 4475.8 | 5031.1 | 5737.8 | 6451.2 | 6680.1 | 6622.9 | 6272.9 |
| 60°   | 2705.7 | 2736.0 | 2890.8 | 3281.1 | 4075.3 | 4738.3 | 5663.8 | 6636.3 | 7030.1 | 7009.9 | 6595.9 |
| 62.5° | 2301.8 | 2338.9 | 2463.4 | 2830.2 | 3547.0 | 4401.8 | 5509.0 | 6737.3 | 7359.9 | 7339.7 | 6922.4 |
| 65°   | 1978.8 | 1982.1 | 2106.7 | 2412.9 | 3018.6 | 3994.6 | 5236.4 | 6717.1 | 7615.6 | 7629.1 | 7198.3 |
| 67.5° | 1655.7 | 1645.6 | 1807.2 | 2056.2 | 2587.9 | 3557.1 | 4872.9 | 6538.7 | 7723.3 | 7783.9 | 7289.2 |
| 70°   | 1218.2 | 1231.7 | 1457.2 | 1733.1 | 2187.4 | 3052.3 | 4364.8 | 6192.1 | 7548.3 | 7642.5 | 7080.5 |
| 72.5° | 915.4  | 942.3  | 1161.0 | 1447.1 | 1827.3 | 2547.5 | 3809.5 | 5589.7 | 7060.3 | 7073.8 | 6444.5 |
| 75°   | 743.7  | 750.5  | 945.6  | 1201.4 | 1497.5 | 2042.7 | 3059.0 | 4667.6 | 5970.0 | 6124.8 | 5475.3 |
| 77.5° | 632.7  | 625.9  | 720.2  | 969.2  | 1208.1 | 1632.2 | 2305.2 | 3550.4 | 4687.8 | 4758.5 | 4287.4 |
| 80°   | 538.4  | 535.1  | 568.7  | 784.1  | 945.6  | 1164.4 | 1578.3 | 2473.5 | 3345.1 | 3422.5 | 3045.6 |
| 82.5° | 282.7  | 302.9  | 296.1  | 484.6  | 535.1  | 612.5  | 757.2  | 1124.0 | 1460.5 | 1480.7 | 1400.0 |
| 85°   | 13.5   | 13.5   | 13.5   | 20.2   | 33.7   | 53.8   | 104.3  | 104.3  | 114.4  | 218.7  | 249.0  |
| 87.5° | 3.4    | 3.4    | 6.7    | 6.7    | 6.7    | 10.1   | 10.1   | 13.5   | 13.5   | 13.5   | 13.5   |
| 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: P867979

CATALOG NUMBER: MEM2-HSN-SA-130-740-U-T2U

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 | 3345.1 |
| 2.5°  | 3351.8 | 3338.4 | 3318.2 | 3321.5 | 3318.2 | 3318.2 | 3301.3 | 3287.9 | 3284.5 | 3291.2 | 3304.7 |
| 5°    | 3355.2 | 3335.0 | 3304.7 | 3294.6 | 3284.5 | 3277.8 | 3250.9 | 3230.7 | 3220.6 | 3227.3 | 3230.7 |
| 7.5°  | 3355.2 | 3324.9 | 3291.2 | 3271.0 | 3244.1 | 3223.9 | 3193.6 | 3166.7 | 3153.3 | 3156.6 | 3163.4 |
| 10°   | 3348.4 | 3314.8 | 3287.9 | 3247.5 | 3203.7 | 3180.2 | 3133.1 | 3099.4 | 3082.6 | 3086.0 | 3069.1 |
| 12.5° | 3348.4 | 3311.4 | 3257.6 | 3220.6 | 3160.0 | 3109.5 | 3072.5 | 3035.5 | 3022.0 | 3008.6 | 3001.8 |
| 15°   | 3351.8 | 3304.7 | 3250.9 | 3173.5 | 3102.8 | 3048.9 | 3001.8 | 2978.3 | 2958.1 | 2951.3 | 2954.7 |
| 17.5° | 3351.8 | 3304.7 | 3223.9 | 3133.1 | 3052.3 | 2985.0 | 2944.6 | 2917.7 | 2911.0 | 2904.2 | 2904.2 |
| 20°   | 3368.6 | 3308.1 | 3200.4 | 3092.7 | 2991.7 | 2921.1 | 2884.0 | 2867.2 | 2867.2 | 2857.1 | 2857.1 |
| 22.5° | 3395.6 | 3314.8 | 3186.9 | 3059.0 | 2941.2 | 2863.8 | 2823.5 | 2803.3 | 2813.4 | 2806.6 | 2803.3 |
| 25°   | 3425.8 | 3338.4 | 3170.1 | 3011.9 | 2873.9 | 2793.2 | 2752.8 | 2739.3 | 2736.0 | 2719.1 | 2742.7 |
| 27.5° | 3449.4 | 3355.2 | 3160.0 | 2964.8 | 2813.4 | 2719.1 | 2668.7 | 2645.1 | 2628.3 | 2635.0 | 2628.3 |
| 30°   | 3513.3 | 3402.3 | 3163.4 | 2924.4 | 2746.1 | 2631.6 | 2571.1 | 2544.1 | 2537.4 | 2537.4 | 2537.4 |
| 32.5° | 3600.8 | 3462.9 | 3186.9 | 2907.6 | 2682.1 | 2547.5 | 2473.5 | 2446.6 | 2439.8 | 2426.4 | 2433.1 |
| 35°   | 3711.9 | 3553.7 | 3223.9 | 2880.7 | 2631.6 | 2449.9 | 2369.2 | 2332.1 | 2322.0 | 2308.6 | 2308.6 |
| 37.5° | 3836.4 | 3644.6 | 3250.9 | 2867.2 | 2564.3 | 2349.0 | 2258.1 | 2211.0 | 2204.3 | 2190.8 | 2197.5 |
| 40°   | 3994.6 | 3769.1 | 3294.6 | 2840.3 | 2486.9 | 2258.1 | 2136.9 | 2059.5 | 2076.4 | 2083.1 | 2096.6 |
| 42.5° | 4172.9 | 3927.3 | 3361.9 | 2813.4 | 2426.4 | 2163.9 | 1985.5 | 1908.1 | 1928.3 | 1921.6 | 1935.0 |
| 45°   | 4415.2 | 4112.4 | 3446.0 | 2803.3 | 2352.3 | 2049.5 | 1830.7 | 1743.2 | 1736.5 | 1726.4 | 1733.1 |
| 47.5° | 4667.6 | 4334.5 | 3526.8 | 2783.1 | 2271.6 | 1908.1 | 1655.7 | 1544.7 | 1517.7 | 1504.3 | 1490.8 |
| 50°   | 4930.1 | 4556.6 | 3621.0 | 2769.6 | 2163.9 | 1749.9 | 1480.7 | 1352.8 | 1302.4 | 1285.5 | 1268.7 |
| 52.5° | 5226.3 | 4795.5 | 3701.8 | 2736.0 | 2046.1 | 1585.0 | 1322.6 | 1177.8 | 1120.6 | 1087.0 | 1090.3 |
| 55°   | 5539.2 | 5014.3 | 3775.8 | 2695.6 | 1911.5 | 1430.2 | 1164.4 | 1043.2 | 986.0  | 975.9  | 975.9  |
| 57.5° | 5828.7 | 5239.7 | 3829.7 | 2624.9 | 1776.9 | 1278.8 | 1033.1 | 928.8  | 901.9  | 915.4  | 915.4  |
| 60°   | 6124.8 | 5421.5 | 3856.6 | 2547.5 | 1638.9 | 1150.9 | 942.3  | 858.1  | 844.7  | 871.6  | 875.0  |
| 62.5° | 6363.7 | 5566.2 | 3849.9 | 2439.8 | 1487.5 | 1039.9 | 854.8  | 787.5  | 794.2  | 841.3  | 851.4  |
| 65°   | 6535.4 | 5636.8 | 3765.7 | 2278.3 | 1342.7 | 942.3  | 777.4  | 713.4  | 713.4  | 747.1  | 757.2  |
| 67.5° | 6521.9 | 5546.0 | 3597.5 | 2052.8 | 1187.9 | 844.7  | 706.7  | 656.2  | 656.2  | 679.8  | 676.4  |
| 70°   | 6245.9 | 5233.0 | 3277.8 | 1780.2 | 1036.5 | 760.6  | 646.1  | 609.1  | 605.7  | 615.8  | 612.5  |
| 72.5° | 5583.0 | 4597.0 | 2779.7 | 1470.6 | 895.2  | 676.4  | 585.6  | 551.9  | 545.2  | 531.7  | 521.6  |
| 75°   | 4607.1 | 3775.8 | 2170.6 | 1171.1 | 757.2  | 595.7  | 528.3  | 498.1  | 471.1  | 488.0  | 477.9  |
| 77.5° | 3573.9 | 2897.5 | 1615.3 | 908.6  | 615.8  | 518.3  | 471.1  | 437.5  | 430.8  | 491.3  | 471.1  |
| 80°   | 2608.1 | 2002.3 | 1140.8 | 649.5  | 477.9  | 420.7  | 393.7  | 366.8  | 464.4  | 622.6  | 619.2  |
| 82.5° | 1157.7 | 965.8  | 521.6  | 309.6  | 222.1  | 185.1  | 154.8  | 175.0  | 292.8  | 286.0  | 296.1  |
| 85°   | 104.3  | 107.7  | 57.2   | 37.0   | 23.6   | 20.2   | 13.5   | 13.5   | 10.1   | 10.1   | 10.1   |
| 87.5° | 13.5   | 13.5   | 10.1   | 10.1   | 6.7    | 6.7    | 6.7    | 6.7    | 3.4    | 3.4    | 3.4    |
| 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

Streetworks

Report Number: SP1-2407-157-5

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-40-740-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-40-740-U-5WQ-2

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-5  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 08/20/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Streetworks  
 Catalog Number: **MEM2-HTN-SA-40-740-U-5WQ-2**  
 Description: Epic Modern Light Square 40W 5WQ Optic and Flare Trim

**Spectral Parameters**

CCT (K): 3915  
 CIE u': 0.2262  
 CIE v': 0.5044  
 Duv: 0.0010  
 CIE x: 0.3850  
 CIE y: 0.3816  
 CIE z: 0.2334  
 Peak Wavelength (nm): 449  
 Dominant Wavelength (nm): 578  
 Purity: 30.05482  
 R<sub>f</sub>: 73.2  
 R<sub>g</sub>: 93.9

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.0 |      |       |
| R1:       | 67.6 | R9:  | -38.4 |
| R2:       | 78.3 | R10: | 48.9  |
| R3:       | 87.1 | R11: | 65.3  |
| R4:       | 69.7 | R12: | 40.4  |
| R5:       | 67.4 | R13: | 69.3  |
| R6:       | 69.3 | R14: | 92.6  |
| R7:       | 79.7 | R15: | 59.9  |
| R8:       | 48.7 |      |       |



**Test Conditions**

Stabilization Time: 21M  
 Operation Time: 1H 21M  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2407-157-5

| 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: SP1-2407-157-5

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**

| 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    | 112                      | NR            | 620    | 618                      | NR            | 750    | 15                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 153                      | NR            | 625    | 563                      | NR            | 755    | 13                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 216                      | NR            | 630    | 510                      | NR            | 760    | 11                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 291                      | NR            | 635    | 456                      | NR            | 765    | 9                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 366                      | NR            | 640    | 407                      | NR            | 770    | 8                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 436                      | NR            | 645    | 359                      | NR            | 775    | 7                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 492                      | NR            | 650    | 316                      | NR            | 780    | 6                        | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 536                      | NR            | 655    | 277                      | NR            | 785    | 5                        | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 567                      | NR            | 660    | 240                      | NR            | 790    | 4                        | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 596                      | NR            | 665    | 208                      | NR            | 795    | 4                        | NR            | 925    | 0                        | NR            |
| 410    | 12                       | NR            | 540    | 619                      | NR            | 670    | 179                      | NR            | 800    | 3                        | NR            | 930    | 0                        | NR            |
| 415    | 25                       | NR            | 545    | 644                      | NR            | 675    | 154                      | NR            | 805    | 3                        | NR            | 935    | 0                        | NR            |
| 420    | 51                       | NR            | 550    | 671                      | NR            | 680    | 133                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 100                      | NR            | 555    | 701                      | NR            | 685    | 114                      | NR            | 815    | 2                        | NR            | 945    | 0                        | NR            |
| 430    | 180                      | NR            | 560    | 735                      | NR            | 690    | 98                       | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 315                      | NR            | 565    | 768                      | NR            | 695    | 83                       | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 514                      | NR            | 570    | 798                      | NR            | 700    | 71                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 828                      | NR            | 575    | 825                      | NR            | 705    | 61                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 992                      | NR            | 580    | 843                      | NR            | 710    | 52                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 652                      | NR            | 585    | 848                      | NR            | 715    | 44                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 382                      | NR            | 590    | 844                      | NR            | 720    | 38                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 282                      | NR            | 595    | 826                      | NR            | 725    | 32                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 180                      | NR            | 600    | 800                      | NR            | 730    | 28                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 119                      | NR            | 605    | 762                      | NR            | 735    | 24                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 101                      | NR            | 610    | 719                      | NR            | 740    | 20                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 98                       | NR            | 615    | 669                      | NR            | 745    | 17                       | NR            | 875    | 0                        | NR            |        |                          |               |

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**Scotopic Flux vs. Wavelength**



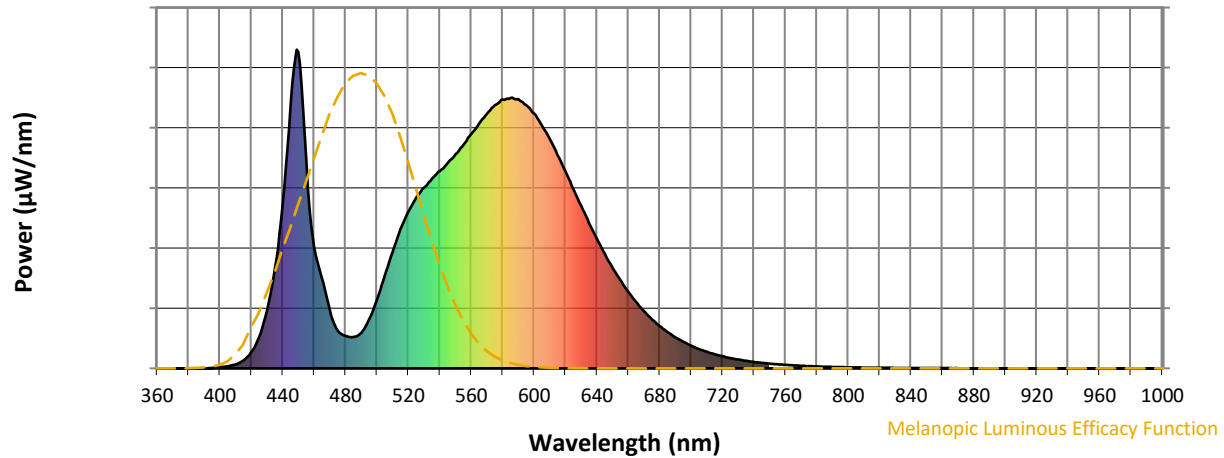
**Scotopic Lumens: NR**

**S/P: 1.49**

| $\lambda$ (nm) | Power $W/\text{nm}$ | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power $W/\text{nm}$ | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power $W/\text{nm}$ | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power $W/\text{nm}$ | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power $W/\text{nm}$ | Lumens ( $\phi/\text{nm}$ ) |
|----------------|---------------------|-----------------------------|----------------|---------------------|-----------------------------|----------------|---------------------|-----------------------------|----------------|---------------------|-----------------------------|----------------|---------------------|-----------------------------|
| 360            | 0                   | NR                          | 490            | 112                 | NR                          | 620            | 618                 | NR                          | 750            | 15                  | NR                          | 880            | 0                   | NR                          |
| 365            | 0                   | NR                          | 495            | 153                 | NR                          | 625            | 563                 | NR                          | 755            | 13                  | NR                          | 885            | 0                   | NR                          |
| 370            | 0                   | NR                          | 500            | 216                 | NR                          | 630            | 510                 | NR                          | 760            | 11                  | NR                          | 890            | 0                   | NR                          |
| 375            | 0                   | NR                          | 505            | 291                 | NR                          | 635            | 456                 | NR                          | 765            | 9                   | NR                          | 895            | 0                   | NR                          |
| 380            | 0                   | NR                          | 510            | 366                 | NR                          | 640            | 407                 | NR                          | 770            | 8                   | NR                          | 900            | 0                   | NR                          |
| 385            | 0                   | NR                          | 515            | 436                 | NR                          | 645            | 359                 | NR                          | 775            | 7                   | NR                          | 905            | 0                   | NR                          |
| 390            | 0                   | NR                          | 520            | 492                 | NR                          | 650            | 316                 | NR                          | 780            | 6                   | NR                          | 910            | 0                   | NR                          |
| 395            | 2                   | NR                          | 525            | 536                 | NR                          | 655            | 277                 | NR                          | 785            | 5                   | NR                          | 915            | 0                   | NR                          |
| 400            | 4                   | NR                          | 530            | 567                 | NR                          | 660            | 240                 | NR                          | 790            | 4                   | NR                          | 920            | 0                   | NR                          |
| 405            | 7                   | NR                          | 535            | 596                 | NR                          | 665            | 208                 | NR                          | 795            | 4                   | NR                          | 925            | 0                   | NR                          |
| 410            | 12                  | NR                          | 540            | 619                 | NR                          | 670            | 179                 | NR                          | 800            | 3                   | NR                          | 930            | 0                   | NR                          |
| 415            | 25                  | NR                          | 545            | 644                 | NR                          | 675            | 154                 | NR                          | 805            | 3                   | NR                          | 935            | 0                   | NR                          |
| 420            | 51                  | NR                          | 550            | 671                 | NR                          | 680            | 133                 | NR                          | 810            | 3                   | NR                          | 940            | 0                   | NR                          |
| 425            | 100                 | NR                          | 555            | 701                 | NR                          | 685            | 114                 | NR                          | 815            | 2                   | NR                          | 945            | 0                   | NR                          |
| 430            | 180                 | NR                          | 560            | 735                 | NR                          | 690            | 98                  | NR                          | 820            | 2                   | NR                          | 950            | 0                   | NR                          |
| 435            | 315                 | NR                          | 565            | 768                 | NR                          | 695            | 83                  | NR                          | 825            | 2                   | NR                          | 955            | 0                   | NR                          |
| 440            | 514                 | NR                          | 570            | 798                 | NR                          | 700            | 71                  | NR                          | 830            | 1                   | NR                          | 960            | 0                   | NR                          |
| 445            | 828                 | NR                          | 575            | 825                 | NR                          | 705            | 61                  | NR                          | 835            | 1                   | NR                          | 965            | 0                   | NR                          |
| 450            | 992                 | NR                          | 580            | 843                 | NR                          | 710            | 52                  | NR                          | 840            | 1                   | NR                          | 970            | 0                   | NR                          |
| 455            | 652                 | NR                          | 585            | 848                 | NR                          | 715            | 44                  | NR                          | 845            | 1                   | NR                          | 975            | 0                   | NR                          |
| 460            | 382                 | NR                          | 590            | 844                 | NR                          | 720            | 38                  | NR                          | 850            | 1                   | NR                          | 980            | 0                   | NR                          |
| 465            | 282                 | NR                          | 595            | 826                 | NR                          | 725            | 32                  | NR                          | 855            | 1                   | NR                          | 985            | 0                   | NR                          |
| 470            | 180                 | NR                          | 600            | 800                 | NR                          | 730            | 28                  | NR                          | 860            | 1                   | NR                          | 990            | 0                   | NR                          |
| 475            | 119                 | NR                          | 605            | 762                 | NR                          | 735            | 24                  | NR                          | 865            | 1                   | NR                          | 995            | 0                   | NR                          |
| 480            | 101                 | NR                          | 610            | 719                 | NR                          | 740            | 20                  | NR                          | 870            | 1                   | NR                          | 1000           | 0                   | NR                          |
| 485            | 98                  | NR                          | 615            | 669                 | NR                          | 745            | 17                  | NR                          | 875            | 0                   | NR                          |                |                     |                             |

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Melanopic Flux vs. Wavelength



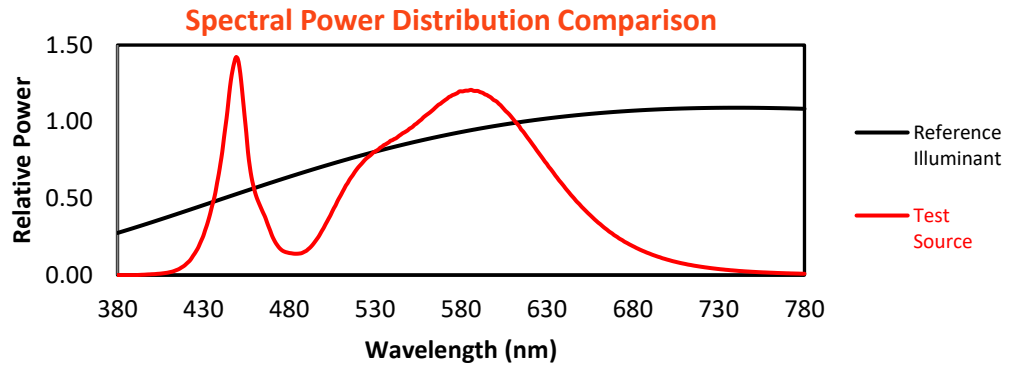
Melanopic Lumens: NR

M/P: 2.88

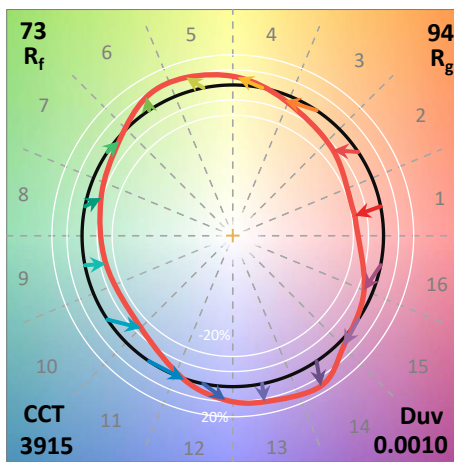
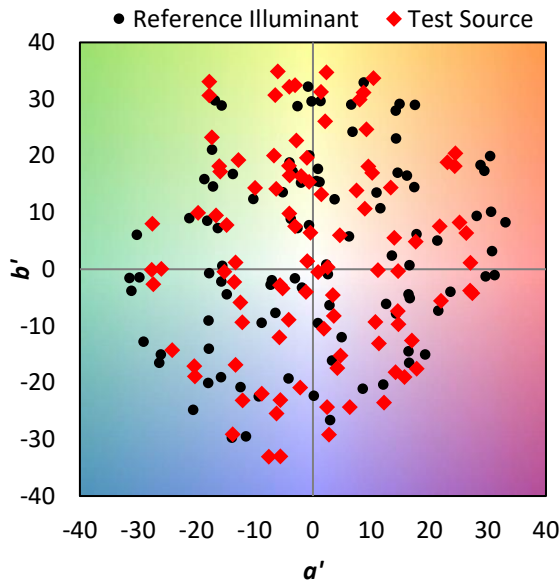
| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 112                      | NR            | 620    | 618                      | NR            | 750    | 15                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 153                      | NR            | 625    | 563                      | NR            | 755    | 13                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 216                      | NR            | 630    | 510                      | NR            | 760    | 11                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 291                      | NR            | 635    | 456                      | NR            | 765    | 9                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 366                      | NR            | 640    | 407                      | NR            | 770    | 8                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 436                      | NR            | 645    | 359                      | NR            | 775    | 7                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 492                      | NR            | 650    | 316                      | NR            | 780    | 6                        | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 536                      | NR            | 655    | 277                      | NR            | 785    | 5                        | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 567                      | NR            | 660    | 240                      | NR            | 790    | 4                        | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 596                      | NR            | 665    | 208                      | NR            | 795    | 4                        | NR            | 925    | 0                        | NR            |
| 410    | 12                       | NR            | 540    | 619                      | NR            | 670    | 179                      | NR            | 800    | 3                        | NR            | 930    | 0                        | NR            |
| 415    | 25                       | NR            | 545    | 644                      | NR            | 675    | 154                      | NR            | 805    | 3                        | NR            | 935    | 0                        | NR            |
| 420    | 51                       | NR            | 550    | 671                      | NR            | 680    | 133                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 100                      | NR            | 555    | 701                      | NR            | 685    | 114                      | NR            | 815    | 2                        | NR            | 945    | 0                        | NR            |
| 430    | 180                      | NR            | 560    | 735                      | NR            | 690    | 98                       | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 315                      | NR            | 565    | 768                      | NR            | 695    | 83                       | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 514                      | NR            | 570    | 798                      | NR            | 700    | 71                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 828                      | NR            | 575    | 825                      | NR            | 705    | 61                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 992                      | NR            | 580    | 843                      | NR            | 710    | 52                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 652                      | NR            | 585    | 848                      | NR            | 715    | 44                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 382                      | NR            | 590    | 844                      | NR            | 720    | 38                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 282                      | NR            | 595    | 826                      | NR            | 725    | 32                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 180                      | NR            | 600    | 800                      | NR            | 730    | 28                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 119                      | NR            | 605    | 762                      | NR            | 735    | 24                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 101                      | NR            | 610    | 719                      | NR            | 740    | 20                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 98                       | NR            | 615    | 669                      | NR            | 745    | 17                       | NR            | 875    | 0                        | NR            |        |                          |               |

**Summary**

$R_f = 73.2$   
 $R_g = 93.9$   
 $CIE R_a = 71.0$   
 $R_g = -38.4$



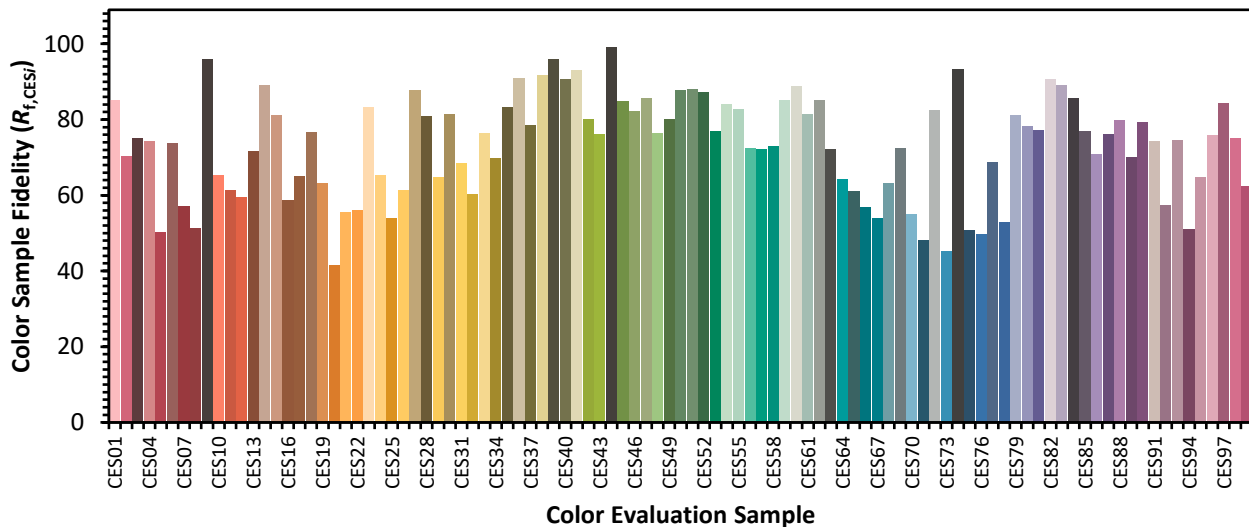
**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 61 | CES51 = 88 | CES76 = 50 |
| CES02 = 61 | CES27 = 88 | CES52 = 87 | CES77 = 69 |
| CES03 = 30 | CES28 = 81 | CES53 = 77 | CES78 = 53 |
| CES04 = 70 | CES29 = 65 | CES54 = 84 | CES79 = 81 |
| CES05 = 47 | CES30 = 81 | CES55 = 83 | CES80 = 78 |
| CES06 = 50 | CES31 = 69 | CES56 = 73 | CES81 = 77 |
| CES07 = 40 | CES32 = 60 | CES57 = 72 | CES82 = 91 |
| CES08 = 39 | CES33 = 76 | CES58 = 73 | CES83 = 89 |
| CES09 = 29 | CES34 = 70 | CES59 = 85 | CES84 = 86 |
| CES10 = 74 | CES35 = 83 | CES60 = 89 | CES85 = 77 |
| CES11 = 57 | CES36 = 91 | CES61 = 81 | CES86 = 71 |
| CES12 = 63 | CES37 = 79 | CES62 = 85 | CES87 = 76 |
| CES13 = 42 | CES38 = 92 | CES63 = 72 | CES88 = 80 |
| CES14 = 74 | CES39 = 96 | CES64 = 64 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 61 | CES90 = 79 |
| CES16 = 46 | CES41 = 93 | CES66 = 57 | CES91 = 74 |
| CES17 = 49 | CES42 = 80 | CES67 = 54 | CES92 = 57 |
| CES18 = 56 | CES43 = 76 | CES68 = 63 | CES93 = 74 |
| CES19 = 72 | CES44 = 99 | CES69 = 73 | CES94 = 51 |
| CES20 = 65 | CES45 = 85 | CES70 = 55 | CES95 = 65 |
| CES21 = 86 | CES46 = 82 | CES71 = 48 | CES96 = 76 |
| CES22 = 78 | CES47 = 86 | CES72 = 83 | CES97 = 84 |
| CES23 = 92 | CES48 = 77 | CES73 = 45 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 93 | CES99 = 62 |
| CES25 = 72 | CES50 = 88 | CES75 = 51 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)