

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: P867972

Luminaire Tested: **MEM2-HSN-SA-130-730-U-T2U**

Issue Date: 08/21/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P867972  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: MEM2-HSN-SA-130-730-U-T2U  
Description: EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 130W 70CRI 3000K  
FITURE w/ TYPE II URBAN DISTRIBUTION OPTIC  
Light Source: (30) 3000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

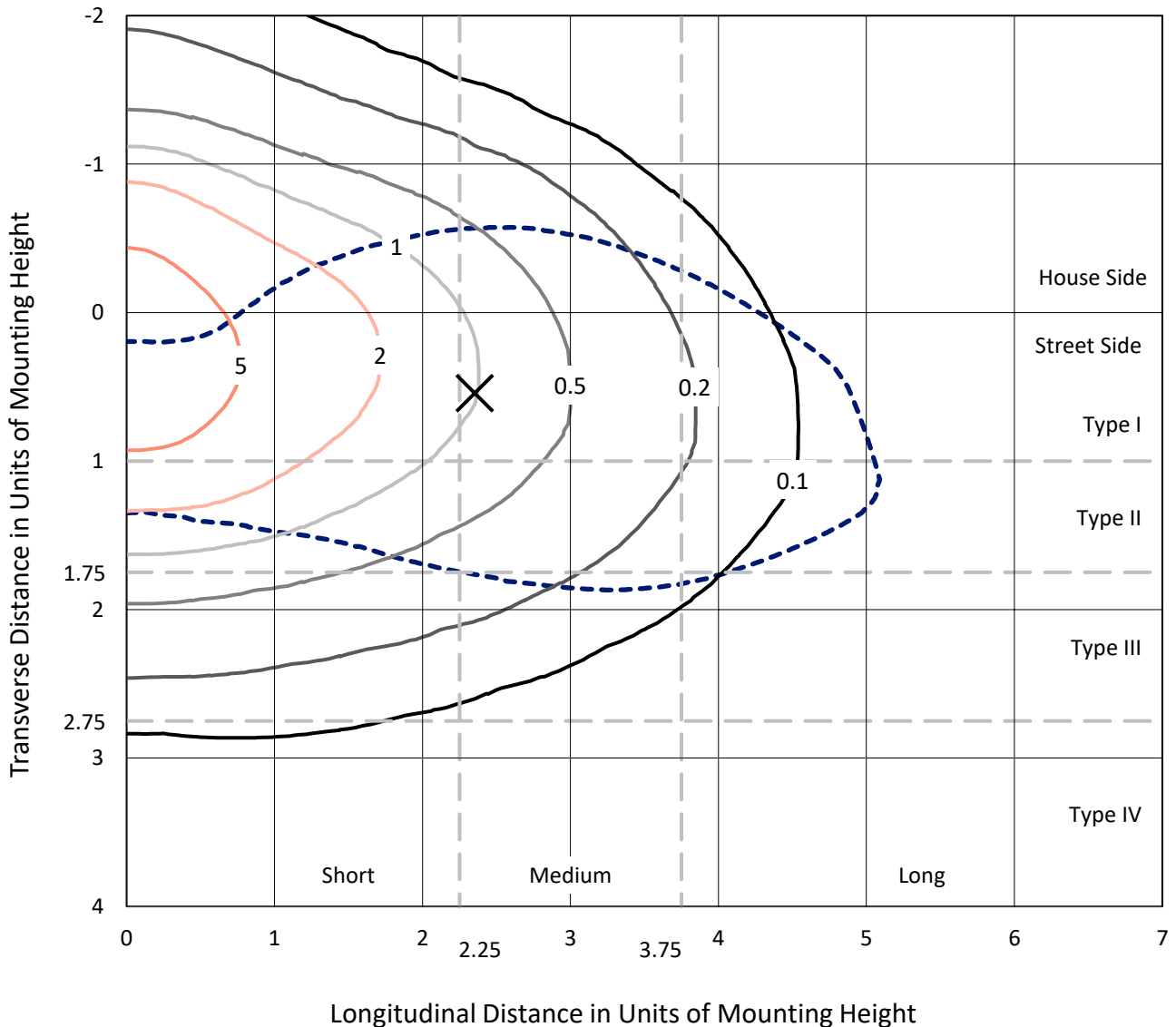
Lumens per Lamp: N/A  
Luminaire Lumens: 16045.6 lumens  
Efficiency: N/A  
Efficacy: 142.0 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.33' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G3

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

REPORT NUMBER: P867972  
 CATALOG NUMBER: MEM2-HSN-SA-130-730-U-T2U

### Iso-Footcandle Lines of Horizontal Illumination

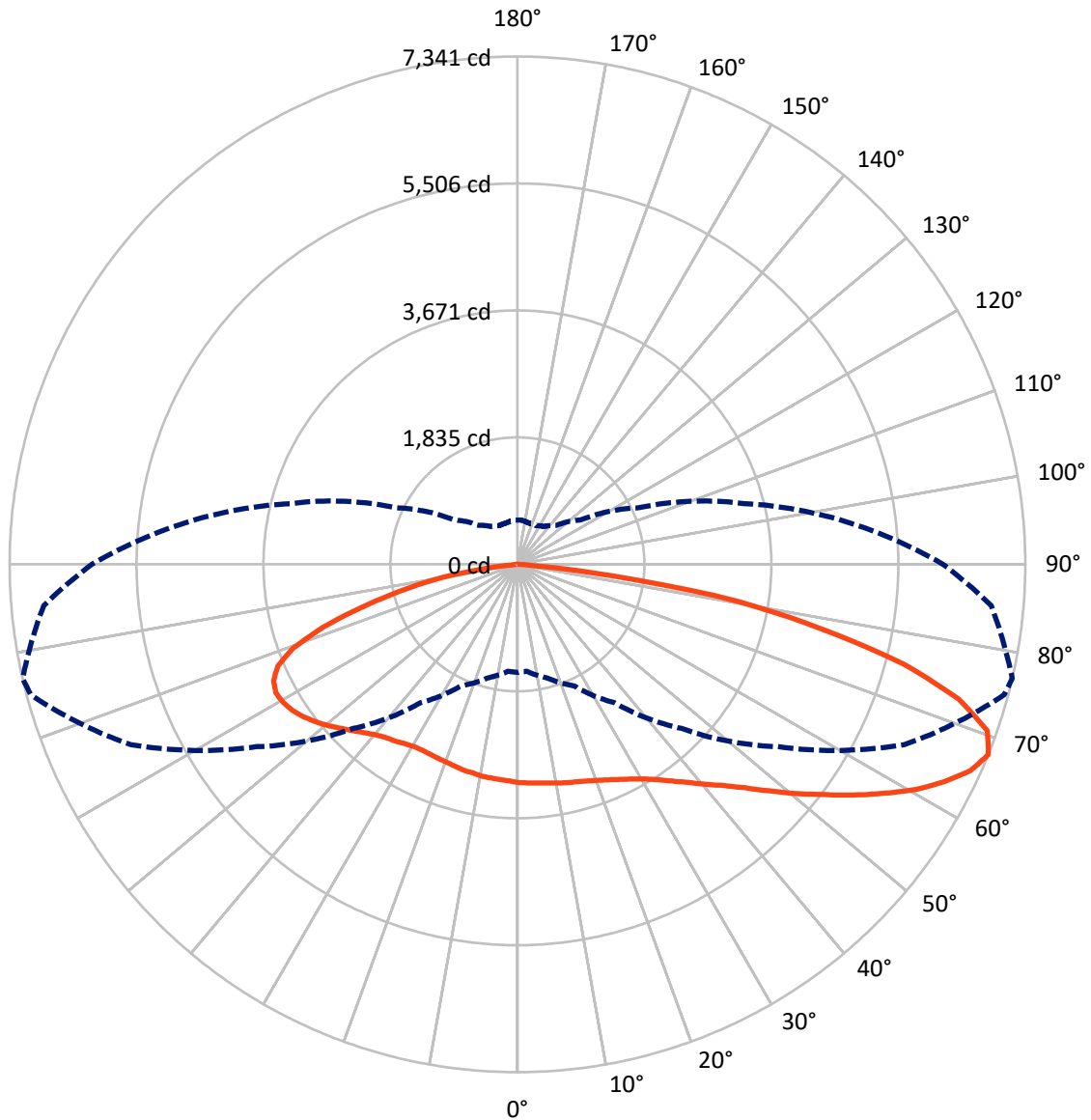
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 8.7 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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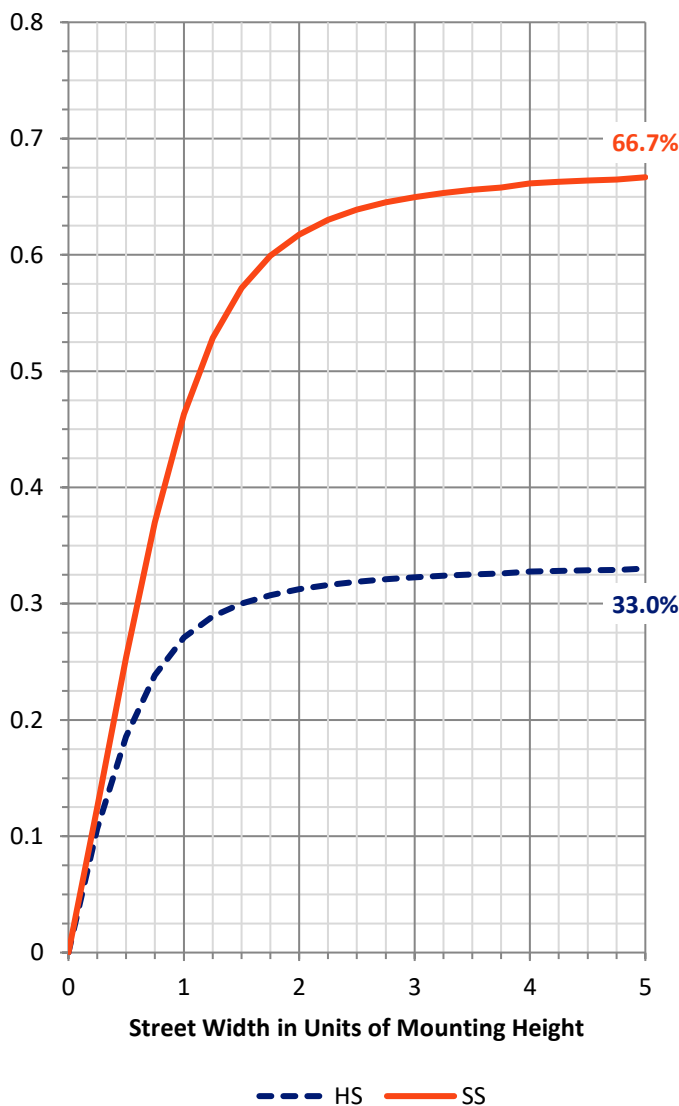
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 5335.7   | 0.0    | 5335.7  |
|                    | % Fixture | 33.3     | 0.0    | 33.3    |
| <b>Street Side</b> | Lumens    | 10709.9  | 0.0    | 10709.9 |
|                    | % Fixture | 66.7     | 0.0    | 66.7    |
| <b>Total</b>       | Lumens    | 16045.6  | 0.0    | 16045.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 303.2   | 1.9       |
| 10°-20°   | 919.6   | 5.7       |
| 20°-30°   | 1550.4  | 9.7       |
| 30°-40°   | 2200.0  | 13.7      |
| 40°-50°   | 2783.5  | 17.3      |
| 50°-60°   | 3049.2  | 19.0      |
| 60°-70°   | 2947.6  | 18.4      |
| 70°-80°   | 1982.4  | 12.4      |
| 80°-90°   | 309.8   | 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°    | 16045.6 | 100.0     |
| 0°-180°   | 16045.6 | 100.0     |

**Coefficient of Utilization**



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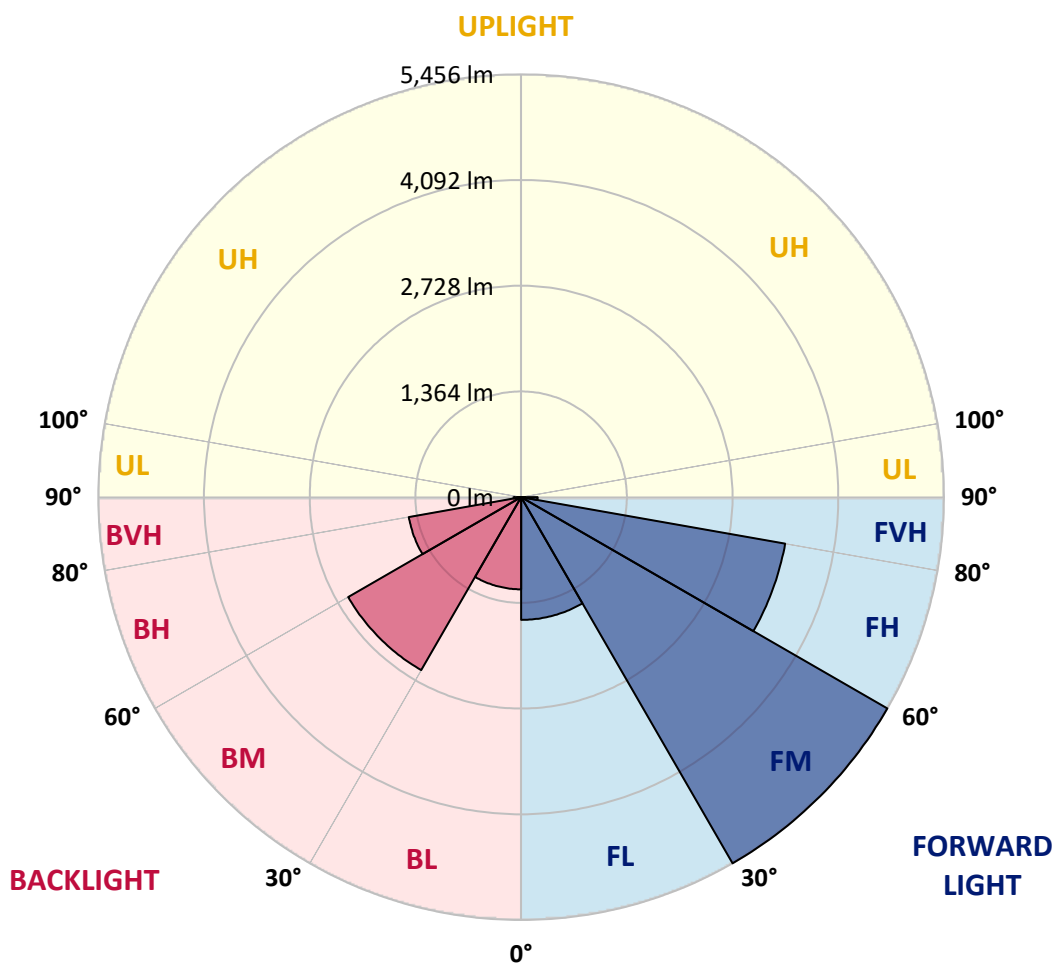
CATALOG NUMBER: MEM2-HSN-SA-130-730-U-T2U

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1583.7 | 9.9       |                         |      |         |
| FM (30°-60°)   | 5455.7 | 34.0      |                         |      |         |
| FH (60°-80°)   | 3458.3 | 21.6      |                         |      | G2/5000 |
| FVH (80°-90°)  | 212.1  | 1.3       |                         |      | G2/225  |
| BL (0°-30°)    | 1189.4 | 7.4       | B3/2500                 |      |         |
| BM (30°-60°)   | 2577.0 | 16.1      | B3/5000                 |      |         |
| BH (60°-80°)   | 1471.6 | 9.2       | B3/2500                 |      | G3/2500 |
| BVH (80°-90°)  | 97.7   | 0.6       |                         |      | 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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CATALOG NUMBER: MEM2-HSN-SA-130-730-U-T2U

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 77°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 |
| 2.5°  | 3224.6 | 3221.4 | 3205.5 | 3211.9 | 3192.8 | 3205.5 | 3186.5 | 3170.6 | 3167.4 | 3164.3 | 3167.4 |
| 5°    | 3326.1 | 3310.3 | 3294.4 | 3284.9 | 3269.0 | 3262.7 | 3230.9 | 3199.2 | 3180.1 | 3177.0 | 3170.6 |
| 7.5°  | 3443.6 | 3437.2 | 3415.0 | 3402.3 | 3357.9 | 3335.7 | 3291.2 | 3234.1 | 3205.5 | 3192.8 | 3177.0 |
| 10°   | 3564.2 | 3580.0 | 3551.5 | 3526.1 | 3475.3 | 3427.7 | 3351.5 | 3278.5 | 3221.4 | 3215.0 | 3180.1 |
| 12.5° | 3713.3 | 3710.2 | 3691.1 | 3646.7 | 3586.4 | 3519.7 | 3427.7 | 3326.1 | 3250.0 | 3237.3 | 3186.5 |
| 15°   | 3846.6 | 3843.5 | 3818.1 | 3776.8 | 3697.5 | 3614.9 | 3491.2 | 3373.7 | 3278.5 | 3259.5 | 3199.2 |
| 17.5° | 3970.4 | 3964.1 | 3948.2 | 3903.8 | 3805.4 | 3703.8 | 3583.2 | 3427.7 | 3313.4 | 3291.2 | 3208.7 |
| 20°   | 4078.3 | 4084.7 | 4065.6 | 4021.2 | 3929.1 | 3821.2 | 3668.9 | 3497.5 | 3357.9 | 3332.5 | 3237.3 |
| 22.5° | 4195.7 | 4198.9 | 4189.4 | 4173.5 | 4056.1 | 3941.8 | 3776.8 | 3576.9 | 3408.6 | 3383.3 | 3269.0 |
| 25°   | 4319.5 | 4322.7 | 4329.0 | 4319.5 | 4186.2 | 4062.4 | 3887.9 | 3675.2 | 3478.5 | 3443.6 | 3313.4 |
| 27.5° | 4462.3 | 4465.5 | 4478.2 | 4459.2 | 4316.4 | 4186.2 | 4011.7 | 3780.0 | 3551.5 | 3513.4 | 3351.5 |
| 30°   | 4624.2 | 4636.9 | 4627.4 | 4621.0 | 4456.0 | 4329.0 | 4135.4 | 3887.9 | 3646.7 | 3599.1 | 3418.2 |
| 32.5° | 4817.8 | 4814.6 | 4795.6 | 4776.6 | 4608.3 | 4475.0 | 4275.1 | 4027.5 | 3764.1 | 3710.2 | 3526.1 |
| 35°   | 4957.5 | 4957.5 | 4928.9 | 4919.4 | 4763.9 | 4624.2 | 4427.4 | 4183.1 | 3897.4 | 3846.6 | 3640.3 |
| 37.5° | 5043.1 | 5055.8 | 5033.6 | 5040.0 | 4890.8 | 4760.7 | 4579.8 | 4341.7 | 4043.4 | 3999.0 | 3780.0 |
| 40°   | 5074.9 | 5106.6 | 5125.7 | 5151.1 | 5001.9 | 4890.8 | 4741.6 | 4513.1 | 4230.7 | 4179.9 | 3948.2 |
| 42.5° | 5081.2 | 5128.8 | 5195.5 | 5249.4 | 5081.2 | 4989.2 | 4897.2 | 4687.7 | 4414.7 | 4370.3 | 4132.3 |
| 45°   | 5049.5 | 5027.3 | 5189.1 | 5195.5 | 5125.7 | 5068.5 | 5033.6 | 4897.2 | 4681.3 | 4608.3 | 4360.8 |
| 47.5° | 4808.3 | 4782.9 | 4827.3 | 5030.5 | 5071.7 | 5103.5 | 5173.3 | 5141.5 | 4947.9 | 4890.8 | 4624.2 |
| 50°   | 4417.9 | 4405.2 | 4583.0 | 4801.9 | 4938.4 | 5100.3 | 5287.5 | 5376.4 | 5243.1 | 5208.2 | 4957.5 |
| 52.5° | 3773.6 | 3738.7 | 4100.5 | 4525.8 | 4763.9 | 5068.5 | 5366.9 | 5617.6 | 5576.3 | 5525.6 | 5243.1 |
| 55°   | 3364.2 | 3364.2 | 3608.6 | 4138.6 | 4541.7 | 4954.3 | 5417.7 | 5871.5 | 5944.5 | 5887.4 | 5570.0 |
| 57.5° | 2926.2 | 2961.1 | 3215.0 | 3580.0 | 4221.1 | 4744.8 | 5411.3 | 6084.2 | 6300.0 | 6246.0 | 5915.9 |
| 60°   | 2551.7 | 2580.3 | 2726.3 | 3094.4 | 3843.5 | 4468.7 | 5341.5 | 6258.7 | 6630.0 | 6611.0 | 6220.6 |
| 62.5° | 2170.9 | 2205.8 | 2323.2 | 2669.2 | 3345.2 | 4151.3 | 5195.5 | 6353.9 | 6941.1 | 6922.0 | 6528.5 |
| 65°   | 1866.2 | 1869.4 | 1986.8 | 2275.6 | 2846.9 | 3767.3 | 4938.4 | 6334.9 | 7182.3 | 7195.0 | 6788.7 |
| 67.5° | 1561.5 | 1552.0 | 1704.3 | 1939.2 | 2440.6 | 3354.7 | 4595.6 | 6166.7 | 7283.8 | 7341.0 | 6874.4 |
| 70°   | 1148.9 | 1161.6 | 1374.3 | 1634.5 | 2063.0 | 2878.6 | 4116.4 | 5839.8 | 7118.8 | 7207.7 | 6677.7 |
| 72.5° | 863.3  | 888.7  | 1095.0 | 1364.7 | 1723.4 | 2402.6 | 3592.7 | 5271.7 | 6658.6 | 6671.3 | 6077.8 |
| 75°   | 701.4  | 707.8  | 891.8  | 1133.0 | 1412.3 | 1926.5 | 2885.0 | 4402.0 | 5630.3 | 5776.3 | 5163.8 |
| 77.5° | 596.7  | 590.3  | 679.2  | 914.1  | 1139.4 | 1539.3 | 2174.0 | 3348.3 | 4421.1 | 4487.7 | 4043.4 |
| 80°   | 507.8  | 504.6  | 536.4  | 739.5  | 891.8  | 1098.1 | 1488.5 | 2332.7 | 3154.7 | 3227.7 | 2872.3 |
| 82.5° | 266.6  | 285.6  | 279.3  | 457.0  | 504.6  | 577.6  | 714.1  | 1060.0 | 1377.4 | 1396.5 | 1320.3 |
| 85°   | 12.7   | 12.7   | 12.7   | 19.0   | 31.7   | 50.8   | 98.4   | 98.4   | 107.9  | 206.3  | 234.9  |
| 87.5° | 3.2    | 3.2    | 6.3    | 6.3    | 6.3    | 9.5    | 9.5    | 12.7   | 12.7   | 12.7   | 12.7   |
| 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: P867972

CATALOG NUMBER: MEM2-HSN-SA-130-730-U-T2U

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 | 3154.7 |
| 2.5°  | 3161.1 | 3148.4 | 3129.4 | 3132.5 | 3129.4 | 3129.4 | 3113.5 | 3100.8 | 3097.6 | 3104.0 | 3116.7 |
| 5°    | 3164.3 | 3145.2 | 3116.7 | 3107.1 | 3097.6 | 3091.3 | 3065.9 | 3046.8 | 3037.3 | 3043.7 | 3046.8 |
| 7.5°  | 3164.3 | 3135.7 | 3104.0 | 3084.9 | 3059.5 | 3040.5 | 3011.9 | 2986.5 | 2973.8 | 2977.0 | 2983.4 |
| 10°   | 3157.9 | 3126.2 | 3100.8 | 3062.7 | 3021.4 | 2999.2 | 2954.8 | 2923.1 | 2907.2 | 2910.4 | 2894.5 |
| 12.5° | 3157.9 | 3123.0 | 3072.2 | 3037.3 | 2980.2 | 2932.6 | 2897.7 | 2862.8 | 2850.1 | 2837.4 | 2831.0 |
| 15°   | 3161.1 | 3116.7 | 3065.9 | 2992.9 | 2926.2 | 2875.5 | 2831.0 | 2808.8 | 2789.8 | 2783.4 | 2786.6 |
| 17.5° | 3161.1 | 3116.7 | 3040.5 | 2954.8 | 2878.6 | 2815.2 | 2777.1 | 2751.7 | 2745.3 | 2739.0 | 2739.0 |
| 20°   | 3177.0 | 3119.8 | 3018.3 | 2916.7 | 2821.5 | 2754.8 | 2719.9 | 2704.1 | 2704.1 | 2694.5 | 2694.5 |
| 22.5° | 3202.4 | 3126.2 | 3005.6 | 2885.0 | 2773.9 | 2700.9 | 2662.8 | 2643.8 | 2653.3 | 2646.9 | 2643.8 |
| 25°   | 3230.9 | 3148.4 | 2989.7 | 2840.5 | 2710.4 | 2634.2 | 2596.2 | 2583.5 | 2580.3 | 2564.4 | 2586.6 |
| 27.5° | 3253.1 | 3164.3 | 2980.2 | 2796.1 | 2653.3 | 2564.4 | 2516.8 | 2494.6 | 2478.7 | 2485.1 | 2478.7 |
| 30°   | 3313.4 | 3208.7 | 2983.4 | 2758.0 | 2589.8 | 2481.9 | 2424.8 | 2399.4 | 2393.0 | 2393.0 | 2393.0 |
| 32.5° | 3396.0 | 3265.8 | 3005.6 | 2742.2 | 2529.5 | 2402.6 | 2332.7 | 2307.3 | 2301.0 | 2288.3 | 2294.6 |
| 35°   | 3500.7 | 3351.5 | 3040.5 | 2716.8 | 2481.9 | 2310.5 | 2234.3 | 2199.4 | 2189.9 | 2177.2 | 2177.2 |
| 37.5° | 3618.1 | 3437.2 | 3065.9 | 2704.1 | 2418.4 | 2215.3 | 2129.6 | 2085.2 | 2078.8 | 2066.1 | 2072.5 |
| 40°   | 3767.3 | 3554.6 | 3107.1 | 2678.7 | 2345.4 | 2129.6 | 2015.4 | 1942.4 | 1958.2 | 1964.6 | 1977.3 |
| 42.5° | 3935.5 | 3703.8 | 3170.6 | 2653.3 | 2288.3 | 2040.7 | 1872.5 | 1799.5 | 1818.6 | 1812.2 | 1824.9 |
| 45°   | 4164.0 | 3878.4 | 3250.0 | 2643.8 | 2218.5 | 1932.8 | 1726.5 | 1644.0 | 1637.7 | 1628.2 | 1634.5 |
| 47.5° | 4402.0 | 4087.8 | 3326.1 | 2624.7 | 2142.3 | 1799.5 | 1561.5 | 1456.8 | 1431.4 | 1418.7 | 1406.0 |
| 50°   | 4649.6 | 4297.3 | 3415.0 | 2612.0 | 2040.7 | 1650.4 | 1396.5 | 1275.9 | 1228.3 | 1212.4 | 1196.5 |
| 52.5° | 4928.9 | 4522.6 | 3491.2 | 2580.3 | 1929.7 | 1494.9 | 1247.3 | 1110.8 | 1056.9 | 1025.1 | 1028.3 |
| 55°   | 5224.1 | 4728.9 | 3561.0 | 2542.2 | 1802.7 | 1348.9 | 1098.1 | 983.9  | 929.9  | 920.4  | 920.4  |
| 57.5° | 5497.0 | 4941.6 | 3611.8 | 2475.6 | 1675.8 | 1206.0 | 974.4  | 876.0  | 850.6  | 863.3  | 863.3  |
| 60°   | 5776.3 | 5113.0 | 3637.2 | 2402.6 | 1545.6 | 1085.4 | 888.7  | 809.3  | 796.6  | 822.0  | 825.2  |
| 62.5° | 6001.6 | 5249.4 | 3630.8 | 2301.0 | 1402.8 | 980.7  | 806.1  | 742.7  | 749.0  | 793.4  | 803.0  |
| 65°   | 6163.5 | 5316.1 | 3551.5 | 2148.7 | 1266.3 | 888.7  | 733.1  | 672.8  | 672.8  | 704.6  | 714.1  |
| 67.5° | 6150.8 | 5230.4 | 3392.8 | 1936.0 | 1120.3 | 796.6  | 666.5  | 618.9  | 618.9  | 641.1  | 637.9  |
| 70°   | 5890.6 | 4935.2 | 3091.3 | 1678.9 | 977.5  | 717.3  | 609.4  | 574.5  | 571.3  | 580.8  | 577.6  |
| 72.5° | 5265.3 | 4335.4 | 2621.5 | 1386.9 | 844.2  | 637.9  | 552.2  | 520.5  | 514.2  | 501.5  | 491.9  |
| 75°   | 4344.9 | 3561.0 | 2047.1 | 1104.5 | 714.1  | 561.8  | 498.3  | 469.7  | 444.3  | 460.2  | 450.7  |
| 77.5° | 3370.6 | 2732.6 | 1523.4 | 856.9  | 580.8  | 488.8  | 444.3  | 412.6  | 406.2  | 463.4  | 444.3  |
| 80°   | 2459.7 | 1888.4 | 1075.9 | 612.5  | 450.7  | 396.7  | 371.3  | 345.9  | 438.0  | 587.2  | 584.0  |
| 82.5° | 1091.8 | 910.9  | 491.9  | 292.0  | 209.5  | 174.6  | 146.0  | 165.0  | 276.1  | 269.8  | 279.3  |
| 85°   | 98.4   | 101.6  | 54.0   | 34.9   | 22.2   | 19.0   | 12.7   | 12.7   | 9.5    | 9.5    | 9.5    |
| 87.5° | 12.7   | 12.7   | 9.5    | 9.5    | 6.3    | 6.3    | 6.3    | 6.3    | 3.2    | 3.2    | 3.2    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-157-4

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-40-730-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-40-730-U-5WQ-2

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 08/20/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Streetworks  
 Catalog Number: **MEM2-HTN-SA-40-730-U-5WQ-2**  
 Description: Epic Modern Light Square 40W 5WQ Optic and Flare Trim

**Spectral Parameters**

CCT (K): 3057  
 CIE u': 0.2487  
 CIE v': 0.5199  
 Duv: -0.0002  
 CIE x: 0.4326  
 CIE y: 0.4020  
 CIE z: 0.1654  
 Peak Wavelength (nm): 593  
 Dominant Wavelength (nm): 582  
 Purity: 50.50735  
 Rf: 74.6  
 Rg: 94

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.7 |      |       |
| R1:       | 68.1 | R9:  | -34.8 |
| R2:       | 82.0 | R10: | 58.5  |
| R3:       | 93.5 | R11: | 62.5  |
| R4:       | 67.5 | R12: | 47.5  |
| R5:       | 67.2 | R13: | 70.7  |
| R6:       | 74.9 | R14: | 96.4  |
| R7:       | 77.4 | R15: | 60.0  |
| R8:       | 43.1 |      |       |



**Test Conditions**

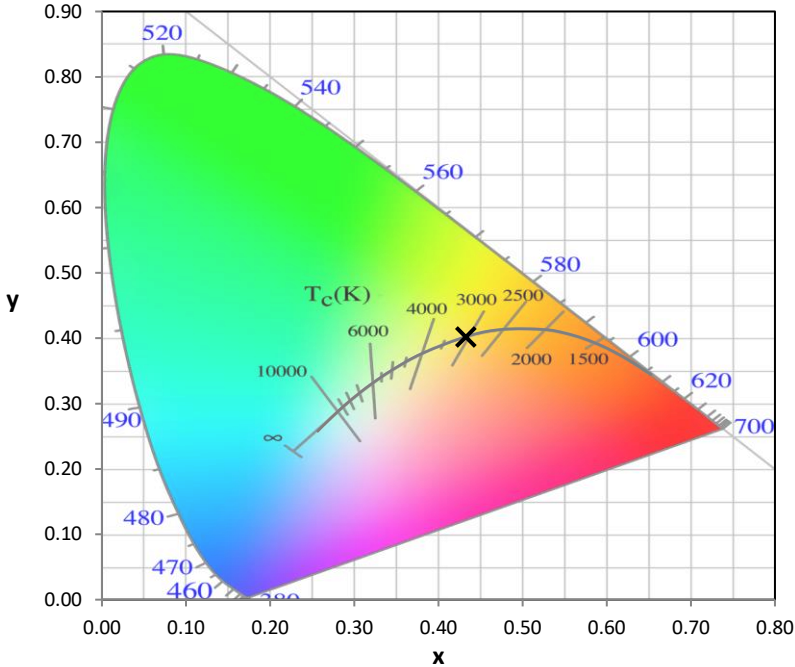
Stabilization Time: 21M  
 Operation Time: 1H 21M  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2407-157-4

| 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: SP1-2407-157-4

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2407-157-4

**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) |
|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|
| 360            | 0                        | NR                   | 490            | 104                      | NR                   | 620            | 818                      | NR                   | 750            | 20                       | NR                   | 880            | 1                        | NR                   |
| 365            | 0                        | NR                   | 495            | 135                      | NR                   | 625            | 755                      | NR                   | 755            | 17                       | NR                   | 885            | 0                        | NR                   |
| 370            | 0                        | NR                   | 500            | 184                      | NR                   | 630            | 691                      | NR                   | 760            | 15                       | NR                   | 890            | 0                        | NR                   |
| 375            | 0                        | NR                   | 505            | 247                      | NR                   | 635            | 625                      | NR                   | 765            | 13                       | NR                   | 895            | 0                        | NR                   |
| 380            | 0                        | NR                   | 510            | 309                      | NR                   | 640            | 561                      | NR                   | 770            | 11                       | NR                   | 900            | 0                        | NR                   |
| 385            | 0                        | NR                   | 515            | 369                      | NR                   | 645            | 499                      | NR                   | 775            | 9                        | NR                   | 905            | 0                        | NR                   |
| 390            | 0                        | NR                   | 520            | 419                      | NR                   | 650            | 441                      | NR                   | 780            | 8                        | NR                   | 910            | 0                        | NR                   |
| 395            | 0                        | NR                   | 525            | 460                      | NR                   | 655            | 388                      | NR                   | 785            | 7                        | NR                   | 915            | 0                        | NR                   |
| 400            | 1                        | NR                   | 530            | 492                      | NR                   | 660            | 338                      | NR                   | 790            | 6                        | NR                   | 920            | 0                        | NR                   |
| 405            | 3                        | NR                   | 535            | 524                      | NR                   | 665            | 294                      | NR                   | 795            | 5                        | NR                   | 925            | 0                        | NR                   |
| 410            | 7                        | NR                   | 540            | 553                      | NR                   | 670            | 253                      | NR                   | 800            | 4                        | NR                   | 930            | 0                        | NR                   |
| 415            | 15                       | NR                   | 545            | 588                      | NR                   | 675            | 218                      | NR                   | 805            | 4                        | NR                   | 935            | 0                        | NR                   |
| 420            | 31                       | NR                   | 550            | 625                      | NR                   | 680            | 188                      | NR                   | 810            | 3                        | NR                   | 940            | 0                        | NR                   |
| 425            | 60                       | NR                   | 555            | 670                      | NR                   | 685            | 161                      | NR                   | 815            | 3                        | NR                   | 945            | 0                        | NR                   |
| 430            | 107                      | NR                   | 560            | 723                      | NR                   | 690            | 139                      | NR                   | 820            | 3                        | NR                   | 950            | 0                        | NR                   |
| 435            | 183                      | NR                   | 565            | 780                      | NR                   | 695            | 118                      | NR                   | 825            | 2                        | NR                   | 955            | 0                        | NR                   |
| 440            | 289                      | NR                   | 570            | 837                      | NR                   | 700            | 100                      | NR                   | 830            | 2                        | NR                   | 960            | 0                        | NR                   |
| 445            | 460                      | NR                   | 575            | 894                      | NR                   | 705            | 85                       | NR                   | 835            | 2                        | NR                   | 965            | 0                        | NR                   |
| 450            | 646                      | NR                   | 580            | 942                      | NR                   | 710            | 73                       | NR                   | 840            | 1                        | NR                   | 970            | 0                        | NR                   |
| 455            | 561                      | NR                   | 585            | 976                      | NR                   | 715            | 62                       | NR                   | 845            | 1                        | NR                   | 975            | 0                        | NR                   |
| 460            | 331                      | NR                   | 590            | 998                      | NR                   | 720            | 53                       | NR                   | 850            | 1                        | NR                   | 980            | 0                        | NR                   |
| 465            | 238                      | NR                   | 595            | 1000                     | NR                   | 725            | 45                       | NR                   | 855            | 1                        | NR                   | 985            | 0                        | NR                   |
| 470            | 178                      | NR                   | 600            | 990                      | NR                   | 730            | 39                       | NR                   | 860            | 1                        | NR                   | 990            | 0                        | NR                   |
| 475            | 120                      | NR                   | 605            | 962                      | NR                   | 735            | 33                       | NR                   | 865            | 1                        | NR                   | 995            | 0                        | NR                   |
| 480            | 96                       | NR                   | 610            | 925                      | NR                   | 740            | 28                       | NR                   | 870            | 1                        | NR                   | 1000           | 0                        | NR                   |
| 485            | 95                       | NR                   | 615            | 873                      | NR                   | 745            | 24                       | NR                   | 875            | 1                        | NR                   |                |                          |                      |

REPORT NUMBER: SP1-2407-157-4

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.23**

| $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) |
|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|
| 360            | 0                        | NR                   | 490            | 104                      | NR                   | 620            | 818                      | NR                   | 750            | 20                       | NR                   | 880            | 1                        | NR                   |
| 365            | 0                        | NR                   | 495            | 135                      | NR                   | 625            | 755                      | NR                   | 755            | 17                       | NR                   | 885            | 0                        | NR                   |
| 370            | 0                        | NR                   | 500            | 184                      | NR                   | 630            | 691                      | NR                   | 760            | 15                       | NR                   | 890            | 0                        | NR                   |
| 375            | 0                        | NR                   | 505            | 247                      | NR                   | 635            | 625                      | NR                   | 765            | 13                       | NR                   | 895            | 0                        | NR                   |
| 380            | 0                        | NR                   | 510            | 309                      | NR                   | 640            | 561                      | NR                   | 770            | 11                       | NR                   | 900            | 0                        | NR                   |
| 385            | 0                        | NR                   | 515            | 369                      | NR                   | 645            | 499                      | NR                   | 775            | 9                        | NR                   | 905            | 0                        | NR                   |
| 390            | 0                        | NR                   | 520            | 419                      | NR                   | 650            | 441                      | NR                   | 780            | 8                        | NR                   | 910            | 0                        | NR                   |
| 395            | 0                        | NR                   | 525            | 460                      | NR                   | 655            | 388                      | NR                   | 785            | 7                        | NR                   | 915            | 0                        | NR                   |
| 400            | 1                        | NR                   | 530            | 492                      | NR                   | 660            | 338                      | NR                   | 790            | 6                        | NR                   | 920            | 0                        | NR                   |
| 405            | 3                        | NR                   | 535            | 524                      | NR                   | 665            | 294                      | NR                   | 795            | 5                        | NR                   | 925            | 0                        | NR                   |
| 410            | 7                        | NR                   | 540            | 553                      | NR                   | 670            | 253                      | NR                   | 800            | 4                        | NR                   | 930            | 0                        | NR                   |
| 415            | 15                       | NR                   | 545            | 588                      | NR                   | 675            | 218                      | NR                   | 805            | 4                        | NR                   | 935            | 0                        | NR                   |
| 420            | 31                       | NR                   | 550            | 625                      | NR                   | 680            | 188                      | NR                   | 810            | 3                        | NR                   | 940            | 0                        | NR                   |
| 425            | 60                       | NR                   | 555            | 670                      | NR                   | 685            | 161                      | NR                   | 815            | 3                        | NR                   | 945            | 0                        | NR                   |
| 430            | 107                      | NR                   | 560            | 723                      | NR                   | 690            | 139                      | NR                   | 820            | 3                        | NR                   | 950            | 0                        | NR                   |
| 435            | 183                      | NR                   | 565            | 780                      | NR                   | 695            | 118                      | NR                   | 825            | 2                        | NR                   | 955            | 0                        | NR                   |
| 440            | 289                      | NR                   | 570            | 837                      | NR                   | 700            | 100                      | NR                   | 830            | 2                        | NR                   | 960            | 0                        | NR                   |
| 445            | 460                      | NR                   | 575            | 894                      | NR                   | 705            | 85                       | NR                   | 835            | 2                        | NR                   | 965            | 0                        | NR                   |
| 450            | 646                      | NR                   | 580            | 942                      | NR                   | 710            | 73                       | NR                   | 840            | 1                        | NR                   | 970            | 0                        | NR                   |
| 455            | 561                      | NR                   | 585            | 976                      | NR                   | 715            | 62                       | NR                   | 845            | 1                        | NR                   | 975            | 0                        | NR                   |
| 460            | 331                      | NR                   | 590            | 998                      | NR                   | 720            | 53                       | NR                   | 850            | 1                        | NR                   | 980            | 0                        | NR                   |
| 465            | 238                      | NR                   | 595            | 1000                     | NR                   | 725            | 45                       | NR                   | 855            | 1                        | NR                   | 985            | 0                        | NR                   |
| 470            | 178                      | NR                   | 600            | 990                      | NR                   | 730            | 39                       | NR                   | 860            | 1                        | NR                   | 990            | 0                        | NR                   |
| 475            | 120                      | NR                   | 605            | 962                      | NR                   | 735            | 33                       | NR                   | 865            | 1                        | NR                   | 995            | 0                        | NR                   |
| 480            | 96                       | NR                   | 610            | 925                      | NR                   | 740            | 28                       | NR                   | 870            | 1                        | NR                   | 1000           | 0                        | NR                   |
| 485            | 95                       | NR                   | 615            | 873                      | NR                   | 745            | 24                       | NR                   | 875            | 1                        | NR                   |                |                          |                      |

REPORT NUMBER: SP1-2407-157-4

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.27

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 104                      | NR            | 620    | 818                      | NR            | 750    | 20                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 135                      | NR            | 625    | 755                      | NR            | 755    | 17                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 184                      | NR            | 630    | 691                      | NR            | 760    | 15                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 247                      | NR            | 635    | 625                      | NR            | 765    | 13                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 309                      | NR            | 640    | 561                      | NR            | 770    | 11                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 369                      | NR            | 645    | 499                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 419                      | NR            | 650    | 441                      | NR            | 780    | 8                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 460                      | NR            | 655    | 388                      | NR            | 785    | 7                        | NR            | 915    | 0                        | NR            |
| 400    | 1                        | NR            | 530    | 492                      | NR            | 660    | 338                      | NR            | 790    | 6                        | NR            | 920    | 0                        | NR            |
| 405    | 3                        | NR            | 535    | 524                      | NR            | 665    | 294                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 7                        | NR            | 540    | 553                      | NR            | 670    | 253                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 15                       | NR            | 545    | 588                      | NR            | 675    | 218                      | NR            | 805    | 4                        | NR            | 935    | 0                        | NR            |
| 420    | 31                       | NR            | 550    | 625                      | NR            | 680    | 188                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 60                       | NR            | 555    | 670                      | NR            | 685    | 161                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 107                      | NR            | 560    | 723                      | NR            | 690    | 139                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 183                      | NR            | 565    | 780                      | NR            | 695    | 118                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 289                      | NR            | 570    | 837                      | NR            | 700    | 100                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 460                      | NR            | 575    | 894                      | NR            | 705    | 85                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 646                      | NR            | 580    | 942                      | NR            | 710    | 73                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 561                      | NR            | 585    | 976                      | NR            | 715    | 62                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 331                      | NR            | 590    | 998                      | NR            | 720    | 53                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 238                      | NR            | 595    | 1000                     | NR            | 725    | 45                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 178                      | NR            | 600    | 990                      | NR            | 730    | 39                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 120                      | NR            | 605    | 962                      | NR            | 735    | 33                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 96                       | NR            | 610    | 925                      | NR            | 740    | 28                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 95                       | NR            | 615    | 873                      | NR            | 745    | 24                       | NR            | 875    | 1                        | NR            |        |                          |               |

**Summary**

$R_f = 74.6$   
 $R_g = 94$   
 $CIE R_a = 71.7$   
 $R_9 = -34.8$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 65 | CES51 = 87 | CES76 = 58 |
| CES02 = 62 | CES27 = 89 | CES52 = 85 | CES77 = 76 |
| CES03 = 31 | CES28 = 84 | CES53 = 77 | CES78 = 61 |
| CES04 = 71 | CES29 = 68 | CES54 = 85 | CES79 = 86 |
| CES05 = 49 | CES30 = 83 | CES55 = 84 | CES80 = 83 |
| CES06 = 51 | CES31 = 71 | CES56 = 74 | CES81 = 73 |
| CES07 = 41 | CES32 = 64 | CES57 = 74 | CES82 = 93 |
| CES08 = 40 | CES33 = 78 | CES58 = 75 | CES83 = 91 |
| CES09 = 29 | CES34 = 75 | CES59 = 85 | CES84 = 88 |
| CES10 = 76 | CES35 = 87 | CES60 = 90 | CES85 = 75 |
| CES11 = 59 | CES36 = 92 | CES61 = 81 | CES86 = 64 |
| CES12 = 65 | CES37 = 84 | CES62 = 89 | CES87 = 77 |
| CES13 = 43 | CES38 = 92 | CES63 = 75 | CES88 = 80 |
| CES14 = 74 | CES39 = 96 | CES64 = 65 | CES89 = 67 |
| CES15 = 71 | CES40 = 92 | CES65 = 64 | CES90 = 80 |
| CES16 = 47 | CES41 = 93 | CES66 = 60 | CES91 = 78 |
| CES17 = 50 | CES42 = 86 | CES67 = 58 | CES92 = 56 |
| CES18 = 56 | CES43 = 77 | CES68 = 66 | CES93 = 73 |
| CES19 = 73 | CES44 = 99 | CES69 = 75 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 60 | CES95 = 66 |
| CES21 = 87 | CES46 = 81 | CES71 = 56 | CES96 = 76 |
| CES22 = 79 | CES47 = 86 | CES72 = 85 | CES97 = 82 |
| CES23 = 92 | CES48 = 75 | CES73 = 52 | CES98 = 76 |
| CES24 = 91 | CES49 = 79 | CES74 = 95 | CES99 = 64 |
| CES25 = 73 | CES50 = 86 | CES75 = 60 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)