

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: P867588

Luminaire Tested: **MEM2-HTN-SA-130-730-U-T2U-HSS**

Issue Date: 08/21/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P867588  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: MEM2-HTN-SA-130-730-U-T2U-HSS  
Description: EPIC MODERN TALL HOUSING DISCRETE LED ARRAYS 130W 70CRI 3000K  
FIXTURE w/ TYPE II URBAN DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD  
Light Source: (30) 3000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

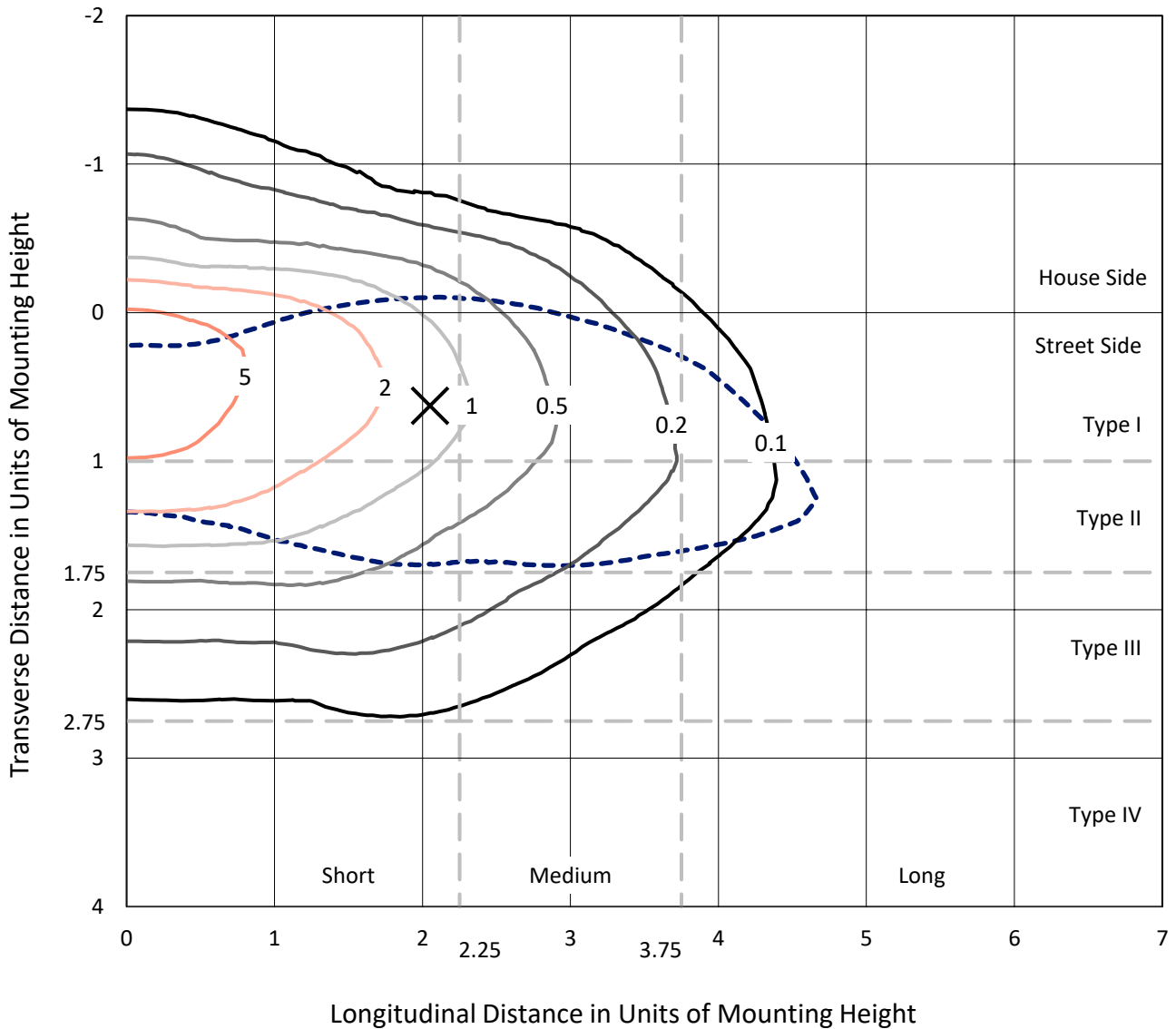
Lumens per Lamp: N/A  
Luminaire Lumens: 12191.8 lumens  
Efficiency: N/A  
Efficacy: 91.0 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.33' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G2

Input Watts (W): 134  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.99  
Total Harmonic Distortion (THDi): 6.70%  
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

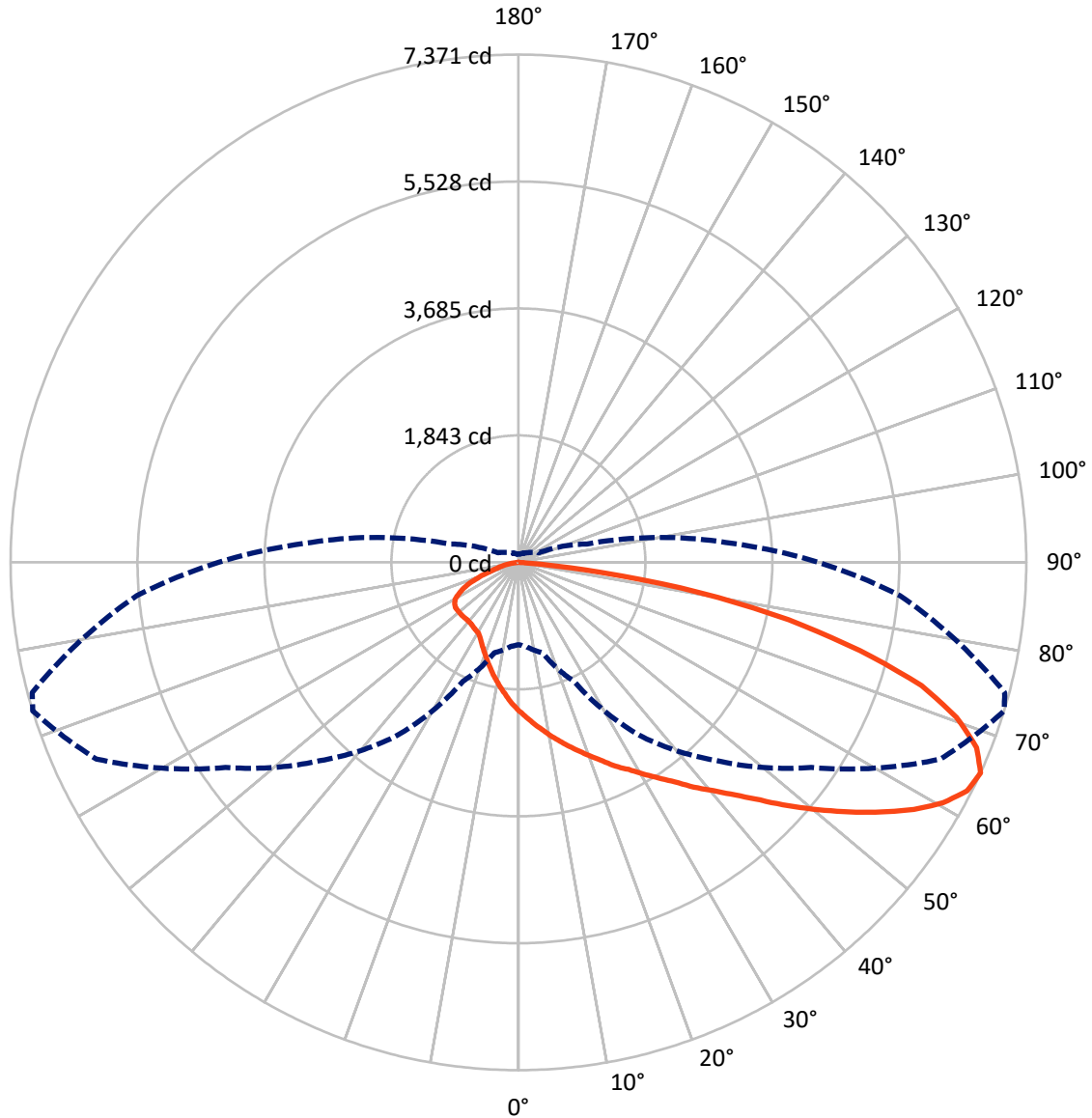
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 8.7 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 73-Deg Lateral      - - - Horizontal Cone Through 65-Deg Vertical

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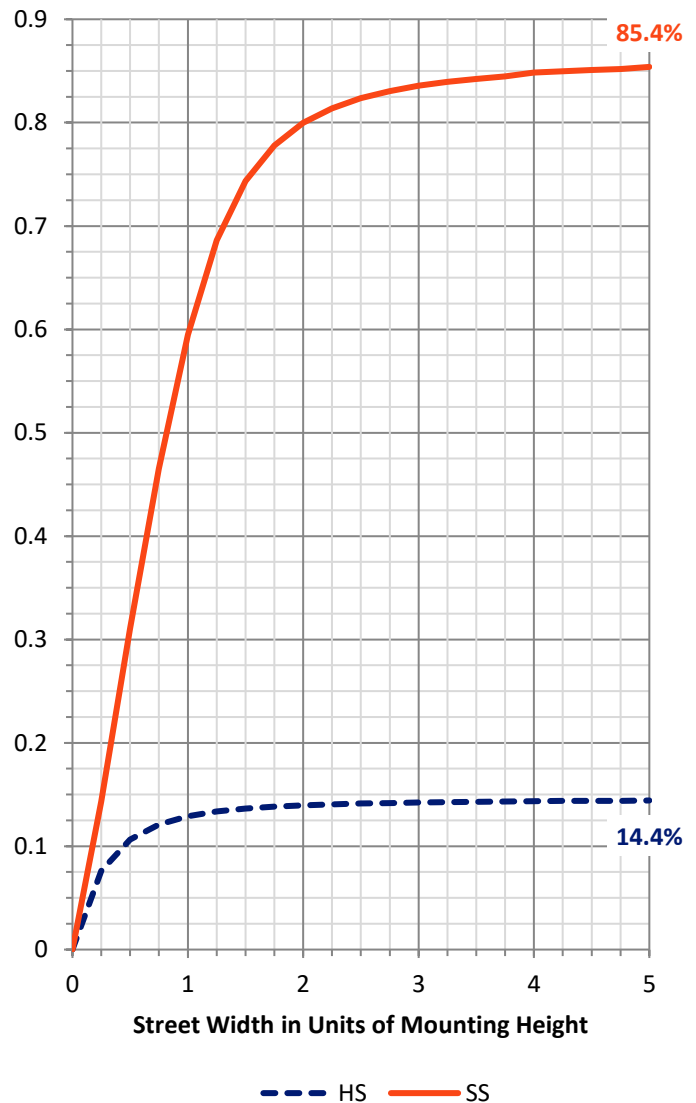
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1772.9   | 0.0    | 1772.9  |
|                    | % Fixture | 14.5     | 0.0    | 14.5    |
| <b>Street Side</b> | Lumens    | 10418.9  | 0.0    | 10418.9 |
|                    | % Fixture | 85.5     | 0.0    | 85.5    |
| <b>Total</b>       | Lumens    | 12191.8  | 0.0    | 12191.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 208.8   | 1.7       |
| 10°-20°   | 634.5   | 5.2       |
| 20°-30°   | 1062.6  | 8.7       |
| 30°-40°   | 1602.9  | 13.1      |
| 40°-50°   | 2264.9  | 18.6      |
| 50°-60°   | 2548.5  | 20.9      |
| 60°-70°   | 2285.3  | 18.7      |
| 70°-80°   | 1389.9  | 11.4      |
| 80°-90°   | 194.5   | 1.6       |
| 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°    | 12191.8 | 100.0     |
| 0°-180°   | 12191.8 | 100.0     |



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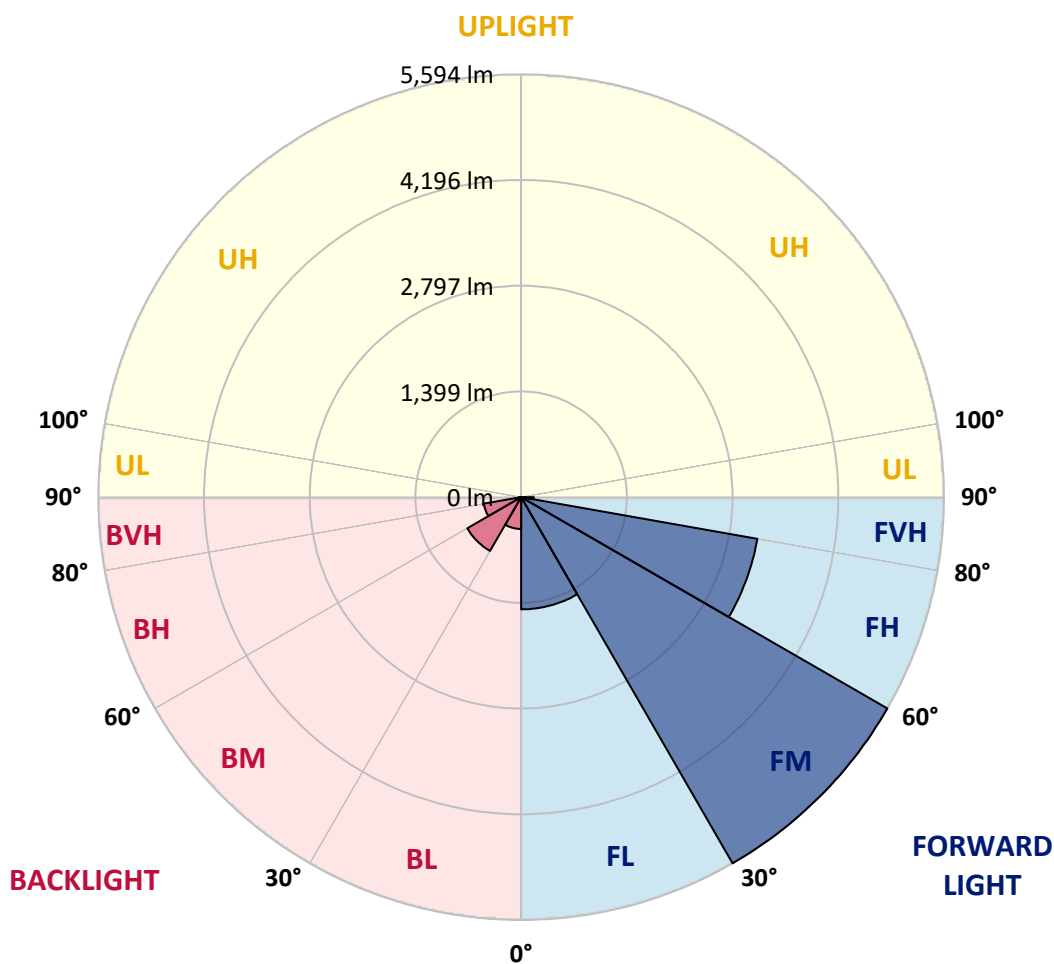
CATALOG NUMBER: MEM2-HTN-SA-130-730-U-T2U-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1484.7 | 12.2      |                         |      |         |
| FM (30°-60°)   | 5594.1 | 45.9      |                         |      |         |
| FH (60°-80°)   | 3173.0 | 26.0      |                         |      | G2/5000 |
| FVH (80°-90°)  | 167.1  | 1.4       |                         |      | G2/225  |
| BL (0°-30°)    | 421.2  | 3.5       | B1/500                  |      |         |
| BM (30°-60°)   | 822.1  | 6.7       | B1/1000                 |      |         |
| BH (60°-80°)   | 502.2  | 4.1       | B2/1000                 |      | G2/1000 |
| BVH (80°-90°)  | 27.4   | 0.2       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G2**

Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 73°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 |
| 2.5°  | 2496.4 | 2482.1 | 2460.6 | 2442.6 | 2410.3 | 2367.3 | 2331.4 | 2284.8 | 2252.5 | 2241.8 | 2195.1 |
| 5°    | 2858.7 | 2840.8 | 2815.6 | 2772.6 | 2686.5 | 2636.3 | 2543.1 | 2435.4 | 2349.4 | 2331.4 | 2223.8 |
| 7.5°  | 3231.7 | 3224.5 | 3167.2 | 3102.6 | 2998.6 | 2887.4 | 2743.9 | 2575.3 | 2449.8 | 2421.1 | 2256.1 |
| 10°   | 3547.4 | 3515.1 | 3482.8 | 3421.8 | 3310.6 | 3152.8 | 2966.3 | 2733.2 | 2557.4 | 2510.8 | 2288.4 |
| 12.5° | 3737.5 | 3726.7 | 3698.0 | 3626.3 | 3518.7 | 3382.4 | 3160.0 | 2887.4 | 2661.4 | 2596.9 | 2320.7 |
| 15°   | 3877.3 | 3888.1 | 3859.4 | 3812.8 | 3701.6 | 3572.5 | 3357.3 | 3048.8 | 2772.6 | 2697.3 | 2356.5 |
| 17.5° | 4010.1 | 4002.9 | 3999.3 | 3945.5 | 3845.1 | 3715.9 | 3497.1 | 3181.5 | 2883.8 | 2801.3 | 2392.4 |
| 20°   | 4085.4 | 4089.0 | 4081.8 | 4060.3 | 3963.4 | 3837.9 | 3633.4 | 3339.3 | 3005.8 | 2912.5 | 2439.0 |
| 22.5° | 4124.8 | 4139.2 | 4153.5 | 4149.9 | 4071.0 | 3974.2 | 3762.6 | 3464.9 | 3131.3 | 3034.4 | 2496.4 |
| 25°   | 4149.9 | 4160.7 | 4193.0 | 4236.0 | 4164.3 | 4085.4 | 3906.0 | 3615.5 | 3278.3 | 3167.2 | 2564.6 |
| 27.5° | 4171.5 | 4185.8 | 4225.3 | 4289.8 | 4232.4 | 4185.8 | 4031.6 | 3744.6 | 3403.9 | 3303.5 | 2643.5 |
| 30°   | 4311.4 | 4329.3 | 4329.3 | 4361.6 | 4297.0 | 4286.2 | 4171.5 | 3898.9 | 3561.7 | 3454.1 | 2743.9 |
| 32.5° | 4680.8 | 4644.9 | 4580.4 | 4548.1 | 4393.8 | 4397.4 | 4307.8 | 4053.1 | 3730.3 | 3622.7 | 2869.5 |
| 35°   | 5000.0 | 5000.0 | 4921.1 | 4817.1 | 4569.6 | 4519.4 | 4465.6 | 4257.5 | 3913.2 | 3809.2 | 3034.4 |
| 37.5° | 5308.5 | 5312.1 | 5229.6 | 5139.9 | 4856.5 | 4677.2 | 4648.5 | 4454.8 | 4139.2 | 4017.2 | 3206.6 |
| 40°   | 5502.2 | 5523.7 | 5502.2 | 5434.0 | 5161.4 | 4953.4 | 4827.9 | 4677.2 | 4354.4 | 4261.1 | 3403.9 |
| 42.5° | 5534.5 | 5577.5 | 5656.4 | 5677.9 | 5383.8 | 5200.9 | 5057.4 | 4906.8 | 4612.6 | 4508.6 | 3629.9 |
| 45°   | 5452.0 | 5466.3 | 5642.1 | 5667.2 | 5548.8 | 5398.2 | 5301.3 | 5175.8 | 4921.1 | 4831.4 | 3880.9 |
| 47.5° | 5226.0 | 5197.3 | 5258.3 | 5477.1 | 5523.7 | 5516.5 | 5541.6 | 5480.7 | 5279.8 | 5165.0 | 4157.1 |
| 50°   | 4741.8 | 4752.5 | 4949.8 | 5215.2 | 5376.6 | 5559.6 | 5721.0 | 5789.1 | 5642.1 | 5527.3 | 4454.8 |
| 52.5° | 3859.4 | 3909.6 | 4286.2 | 4913.9 | 5193.7 | 5530.9 | 5850.1 | 6079.7 | 6018.7 | 5907.5 | 4748.9 |
| 55°   | 3170.7 | 3246.1 | 3622.7 | 4429.7 | 4942.6 | 5391.0 | 5925.4 | 6384.5 | 6395.3 | 6309.2 | 5018.0 |
| 57.5° | 2482.1 | 2543.1 | 2941.2 | 3680.1 | 4583.9 | 5172.2 | 5936.2 | 6646.4 | 6768.3 | 6667.9 | 5254.7 |
| 60°   | 1944.1 | 1987.1 | 2220.2 | 3066.7 | 4142.8 | 4860.1 | 5857.3 | 6854.4 | 7084.0 | 7008.6 | 5459.1 |
| 62.5° | 1474.2 | 1506.5 | 1714.5 | 2424.7 | 3601.2 | 4494.3 | 5591.8 | 6929.7 | 7306.3 | 7234.6 | 5573.9 |
| 65°   | 1194.4 | 1223.1 | 1359.4 | 1904.6 | 3066.7 | 4071.0 | 5190.1 | 6757.6 | 7370.9 | 7306.3 | 5559.6 |
| 67.5° | 975.6  | 986.4  | 1097.6 | 1484.9 | 2593.3 | 3594.0 | 4601.9 | 6309.2 | 7173.6 | 7170.0 | 5394.6 |
| 70°   | 789.1  | 817.8  | 911.1  | 1183.6 | 2155.7 | 3045.2 | 3916.8 | 5606.2 | 6746.8 | 6782.7 | 5064.6 |
| 72.5° | 670.7  | 677.9  | 760.4  | 979.2  | 1757.5 | 2471.3 | 3242.5 | 4795.6 | 6119.1 | 6147.8 | 4548.1 |
| 75°   | 566.7  | 577.5  | 638.5  | 792.7  | 1427.6 | 1962.0 | 2607.6 | 3873.8 | 5122.0 | 5243.9 | 3830.7 |
| 77.5° | 487.8  | 491.4  | 534.4  | 652.8  | 1015.1 | 1474.2 | 1911.8 | 2905.3 | 4010.1 | 4096.1 | 3009.3 |
| 80°   | 383.8  | 391.0  | 437.6  | 516.5  | 706.6  | 957.7  | 1319.9 | 1987.1 | 2679.4 | 2776.2 | 2083.9 |
| 82.5° | 179.3  | 200.9  | 211.6  | 283.4  | 369.4  | 473.5  | 624.1  | 828.6  | 1212.3 | 1208.8 | 972.0  |
| 85°   | 17.9   | 14.3   | 14.3   | 21.5   | 32.3   | 32.3   | 39.5   | 46.6   | 93.3   | 111.2  | 86.1   |
| 87.5° | 0.0    | 0.0    | 0.0    | 3.6    | 7.2    | 7.2    | 7.2    | 10.8   | 10.8   | 10.8   | 10.8   |
| 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: P867588

CATALOG NUMBER: MEM2-HTN-SA-130-730-U-T2U-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 | 2162.8 |
| 2.5°  | 2173.6 | 2141.3 | 2083.9 | 2030.1 | 1994.3 | 1965.6 | 1918.9 | 1890.3 | 1868.7 | 1840.0 | 1836.4 |
| 5°    | 2166.4 | 2109.0 | 1994.3 | 1897.4 | 1804.2 | 1725.3 | 1642.8 | 1592.5 | 1538.7 | 1513.6 | 1535.2 |
| 7.5°  | 2173.6 | 2080.4 | 1901.0 | 1754.0 | 1614.1 | 1488.5 | 1380.9 | 1312.8 | 1262.6 | 1237.5 | 1241.0 |
| 10°   | 2177.2 | 2055.2 | 1822.1 | 1617.7 | 1438.3 | 1291.3 | 1169.3 | 1076.0 | 1015.1 | 1000.7 | 982.8  |
| 12.5° | 2170.0 | 2023.0 | 1743.2 | 1484.9 | 1269.7 | 1108.3 | 964.9  | 893.1  | 832.1  | 803.4  | 803.4  |
| 15°   | 2177.2 | 1997.9 | 1660.7 | 1363.0 | 1119.1 | 932.6  | 810.6  | 731.7  | 695.8  | 670.7  | 674.3  |
| 17.5° | 2177.2 | 1976.3 | 1581.8 | 1244.6 | 972.0  | 799.9  | 688.7  | 624.1  | 588.2  | 573.9  | 570.3  |
| 20°   | 2202.3 | 1958.4 | 1506.5 | 1133.4 | 842.9  | 681.5  | 591.8  | 541.6  | 512.9  | 498.6  | 491.4  |
| 22.5° | 2220.2 | 1944.1 | 1438.3 | 1025.8 | 735.3  | 595.4  | 520.1  | 473.5  | 451.9  | 444.8  | 444.8  |
| 25°   | 2252.5 | 1940.5 | 1377.3 | 921.8  | 649.2  | 530.8  | 462.7  | 426.8  | 408.9  | 401.7  | 401.7  |
| 27.5° | 2299.1 | 1947.6 | 1319.9 | 832.1  | 584.7  | 466.3  | 416.1  | 387.4  | 376.6  | 373.0  | 369.4  |
| 30°   | 2367.3 | 1979.9 | 1284.1 | 764.0  | 523.7  | 426.8  | 380.2  | 362.3  | 355.1  | 351.5  | 351.5  |
| 32.5° | 2457.0 | 2037.3 | 1269.7 | 728.1  | 487.8  | 394.5  | 355.1  | 340.7  | 333.6  | 333.6  | 330.0  |
| 35°   | 2568.2 | 2101.9 | 1259.0 | 695.8  | 462.7  | 373.0  | 337.2  | 322.8  | 319.2  | 319.2  | 319.2  |
| 37.5° | 2700.9 | 2170.0 | 1241.0 | 674.3  | 448.4  | 355.1  | 322.8  | 308.5  | 308.5  | 308.5  | 308.5  |
| 40°   | 2847.9 | 2270.5 | 1237.5 | 660.0  | 437.6  | 344.3  | 308.5  | 294.1  | 294.1  | 294.1  | 294.1  |
| 42.5° | 3012.9 | 2378.1 | 1233.9 | 649.2  | 430.4  | 337.2  | 294.1  | 279.8  | 279.8  | 279.8  | 279.8  |
| 45°   | 3213.8 | 2514.4 | 1241.0 | 642.0  | 430.4  | 330.0  | 283.4  | 265.4  | 261.8  | 261.8  | 261.8  |
| 47.5° | 3411.1 | 2643.5 | 1248.2 | 634.9  | 423.2  | 319.2  | 269.0  | 251.1  | 247.5  | 243.9  | 243.9  |
| 50°   | 3622.7 | 2776.2 | 1248.2 | 627.7  | 416.1  | 308.5  | 258.3  | 233.1  | 229.6  | 226.0  | 226.0  |
| 52.5° | 3830.7 | 2887.4 | 1251.8 | 616.9  | 398.1  | 290.5  | 240.3  | 218.8  | 211.6  | 208.0  | 204.4  |
| 55°   | 4031.6 | 3005.8 | 1255.4 | 599.0  | 376.6  | 272.6  | 229.6  | 204.4  | 193.7  | 186.5  | 186.5  |
| 57.5° | 4182.2 | 3102.6 | 1237.5 | 563.1  | 347.9  | 254.7  | 211.6  | 186.5  | 172.2  | 165.0  | 165.0  |
| 60°   | 4325.7 | 3163.6 | 1205.2 | 509.3  | 319.2  | 236.7  | 197.3  | 168.6  | 154.2  | 147.1  | 147.1  |
| 62.5° | 4383.1 | 3174.3 | 1129.8 | 416.1  | 283.4  | 218.8  | 179.3  | 154.2  | 143.5  | 139.9  | 139.9  |
| 65°   | 4350.8 | 3127.7 | 1029.4 | 330.0  | 251.1  | 197.3  | 165.0  | 143.5  | 129.1  | 118.4  | 118.4  |
| 67.5° | 4175.1 | 2966.3 | 893.1  | 261.8  | 218.8  | 179.3  | 150.6  | 129.1  | 114.8  | 104.0  | 104.0  |
| 70°   | 3841.5 | 2708.0 | 695.8  | 208.0  | 190.1  | 157.8  | 136.3  | 118.4  | 104.0  | 93.3   | 93.3   |
| 72.5° | 3350.1 | 2349.4 | 505.7  | 175.8  | 165.0  | 139.9  | 122.0  | 107.6  | 93.3   | 86.1   | 86.1   |
| 75°   | 2761.8 | 1811.3 | 358.7  | 150.6  | 147.1  | 125.5  | 111.2  | 96.8   | 86.1   | 78.9   | 78.9   |
| 77.5° | 2073.2 | 1262.6 | 279.8  | 132.7  | 129.1  | 114.8  | 100.4  | 89.7   | 78.9   | 75.3   | 71.7   |
| 80°   | 1380.9 | 781.9  | 211.6  | 100.4  | 96.8   | 89.7   | 82.5   | 75.3   | 64.6   | 57.4   | 57.4   |
| 82.5° | 616.9  | 330.0  | 107.6  | 57.4   | 50.2   | 43.0   | 35.9   | 25.1   | 25.1   | 21.5   | 21.5   |
| 85°   | 64.6   | 43.0   | 21.5   | 14.3   | 14.3   | 10.8   | 10.8   | 10.8   | 7.2    | 7.2    | 7.2    |
| 87.5° | 10.8   | 10.8   | 7.2    | 7.2    | 7.2    | 3.6    | 3.6    | 3.6    | 3.6    | 3.6    | 3.6    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-157-4

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-30-730-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-30-730-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-30-730-U-5WQ-2**  
 Description: Epic Modern Light Square 30W 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

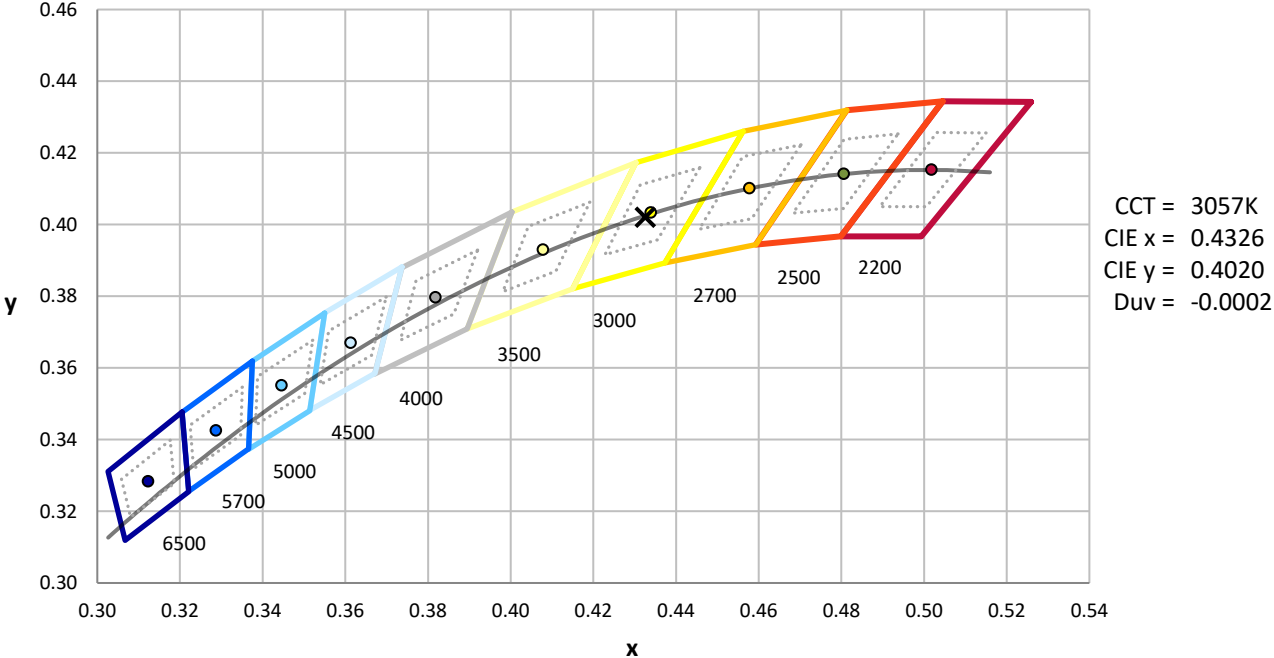
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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



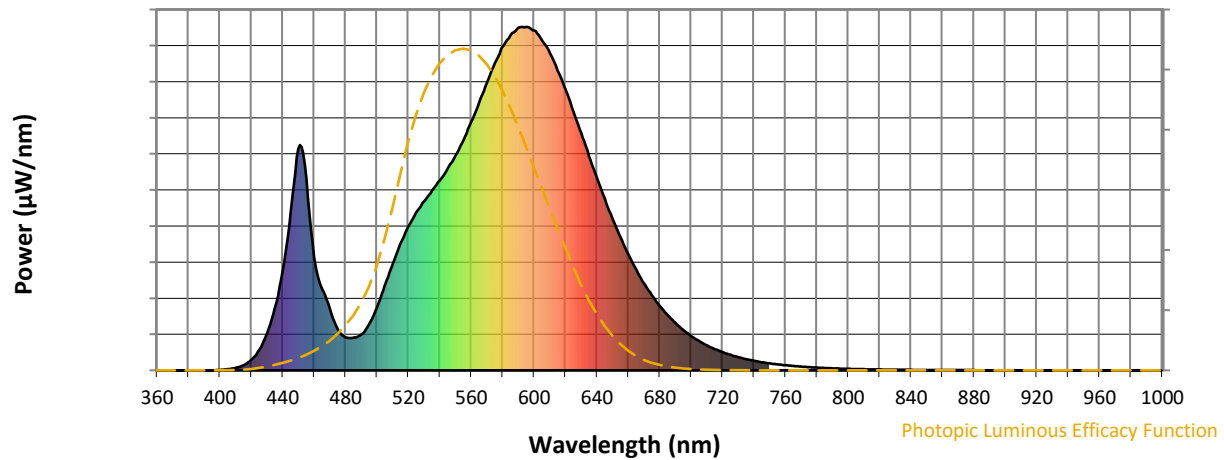
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



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                   |                |                          |                      |

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**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                   |                |                          |                      |

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Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.27

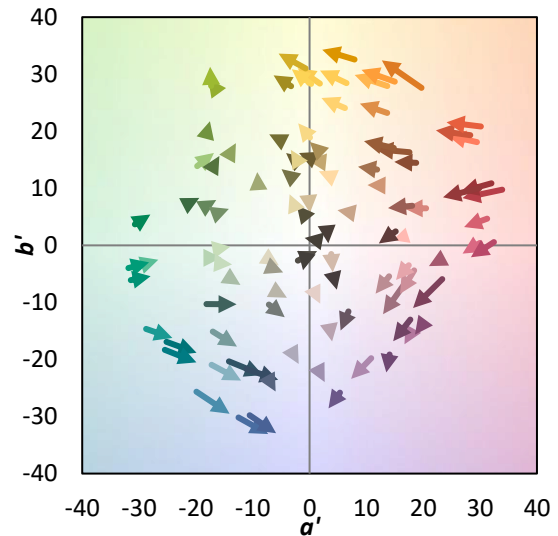
| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 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 ( $R_{f,i}$ )**

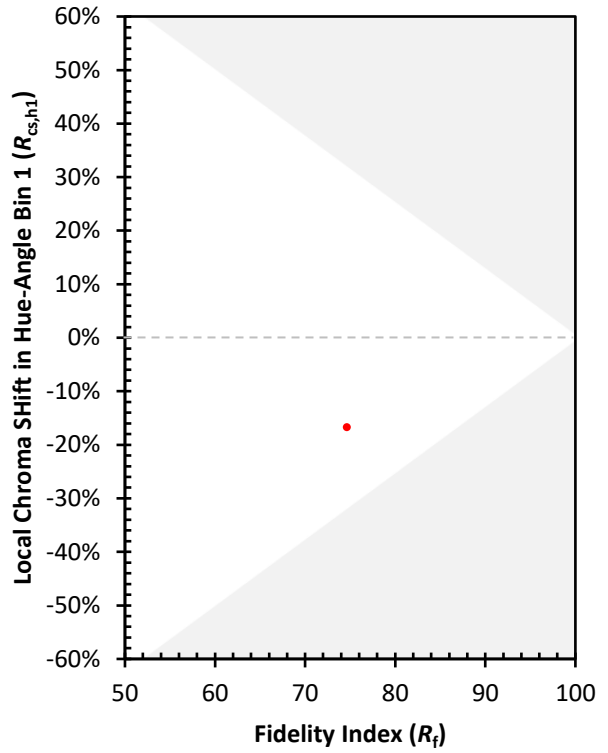
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 65 | CES51 = 87 | CES76 = 58 |
| CES02 = 62 | CES27 = 89 | CES52 = 85 | CES77 = 76 |
| CES03 = 31 | CES28 = 84 | CES53 = 77 | CES78 = 61 |
| CES04 = 71 | CES29 = 68 | CES54 = 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)