

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: P870485

Luminaire Tested: **MEM2-HSN-SA-120-830-U-T4W-HSS**

Issue Date: 09/05/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P870485  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 09/05/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: MEM2-HSN-SA-120-830-U-T4W-HSS  
Description: EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 120W 80CRI 3000K  
FIXTURE w/ TYPE IV WIDE DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD  
Light Source: (20) 3000K CCT, 80 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

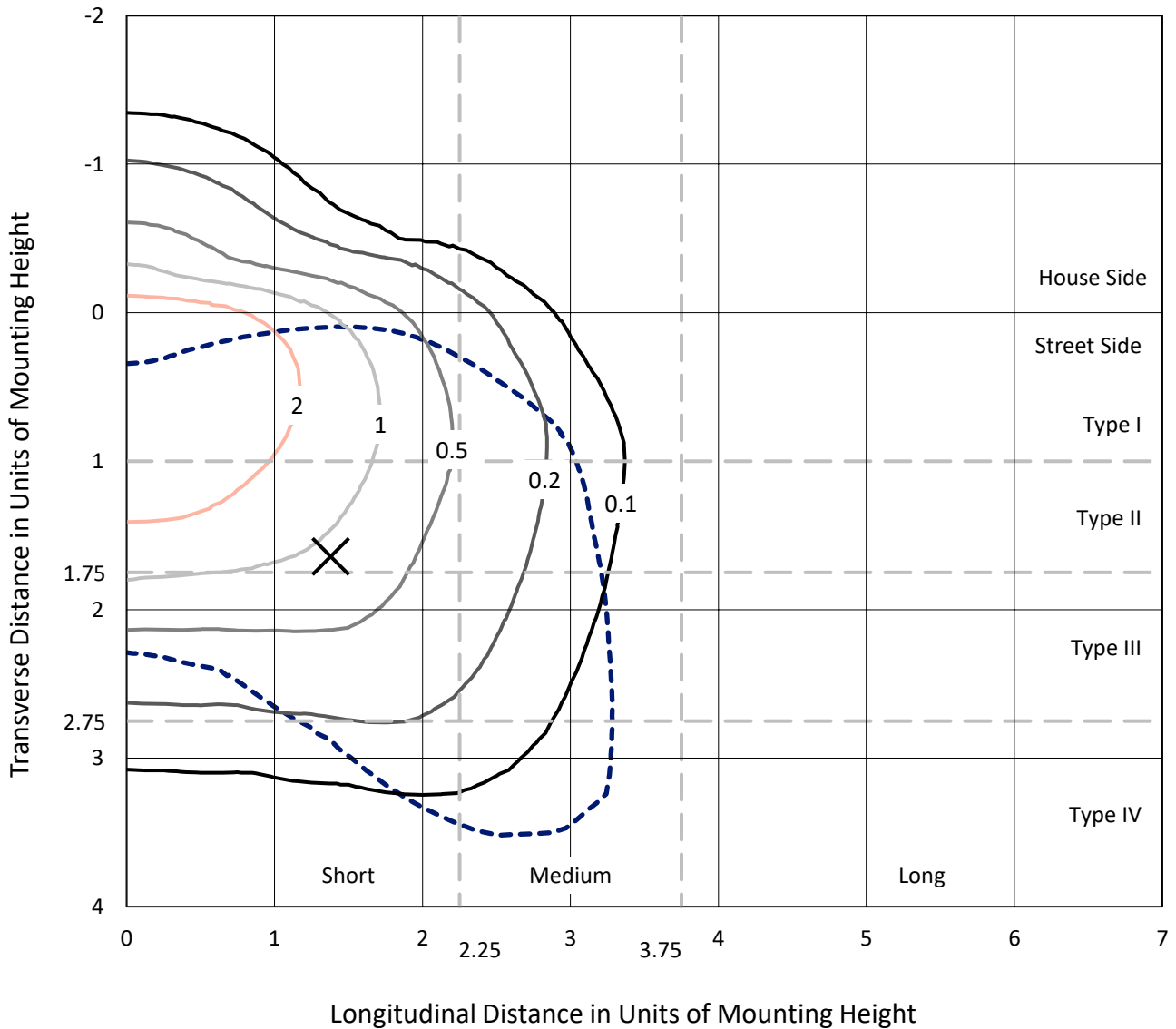
Lumens per Lamp: N/A  
Luminaire Lumens: 8498.1 lumens  
Efficiency: N/A  
Efficacy: 84.1 lumens/watt  
Luminous Opening: Rectangular (W 0.67' x L: 0.33' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

Input Watts (W): 101  
Input Voltage (V): 120  
Input Current (A<sub>in</sub>): NR  
Voltage Rise (V): NR  
Power Factor: 0.99  
Total Harmonic Distortion (THDi): 9.45%  
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

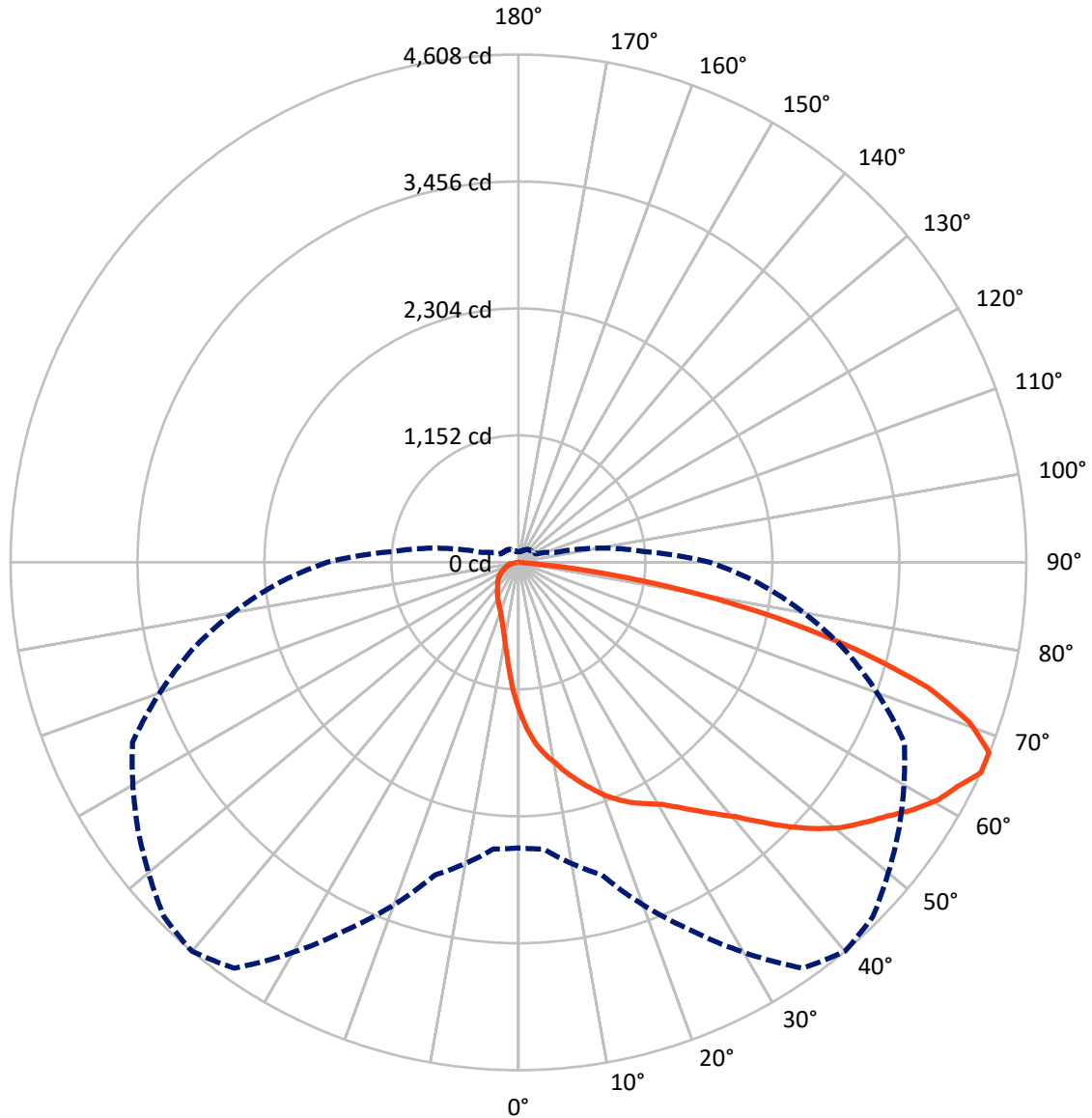
✕ Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 4.9 fc  
 Type IV - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 40-Deg Lateral      - - - Horizontal Cone Through 65-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1017.4   | 0.0    | 1017.4 |
|                    | % Fixture | 12.0     | 0.0    | 12.0   |
| <b>Street Side</b> | Lumens    | 7480.7   | 0.0    | 7480.7 |
|                    | % Fixture | 88.0     | 0.0    | 88.0   |
| <b>Total</b>       | Lumens    | 8498.1   | 0.0    | 8498.1 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 126.4  | 1.5       |
| 10°-20°   | 380.2  | 4.5       |
| 20°-30°   | 654.1  | 7.7       |
| 30°-40°   | 988.7  | 11.6      |
| 40°-50°   | 1445.7 | 17.0      |
| 50°-60°   | 1846.5 | 21.7      |
| 60°-70°   | 1842.8 | 21.7      |
| 70°-80°   | 1080.6 | 12.7      |
| 80°-90°   | 133.1  | 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°    | 8498.1 | 100.0     |
| 0°-180°   | 8498.1 | 100.0     |

**Coefficient of Utilization**



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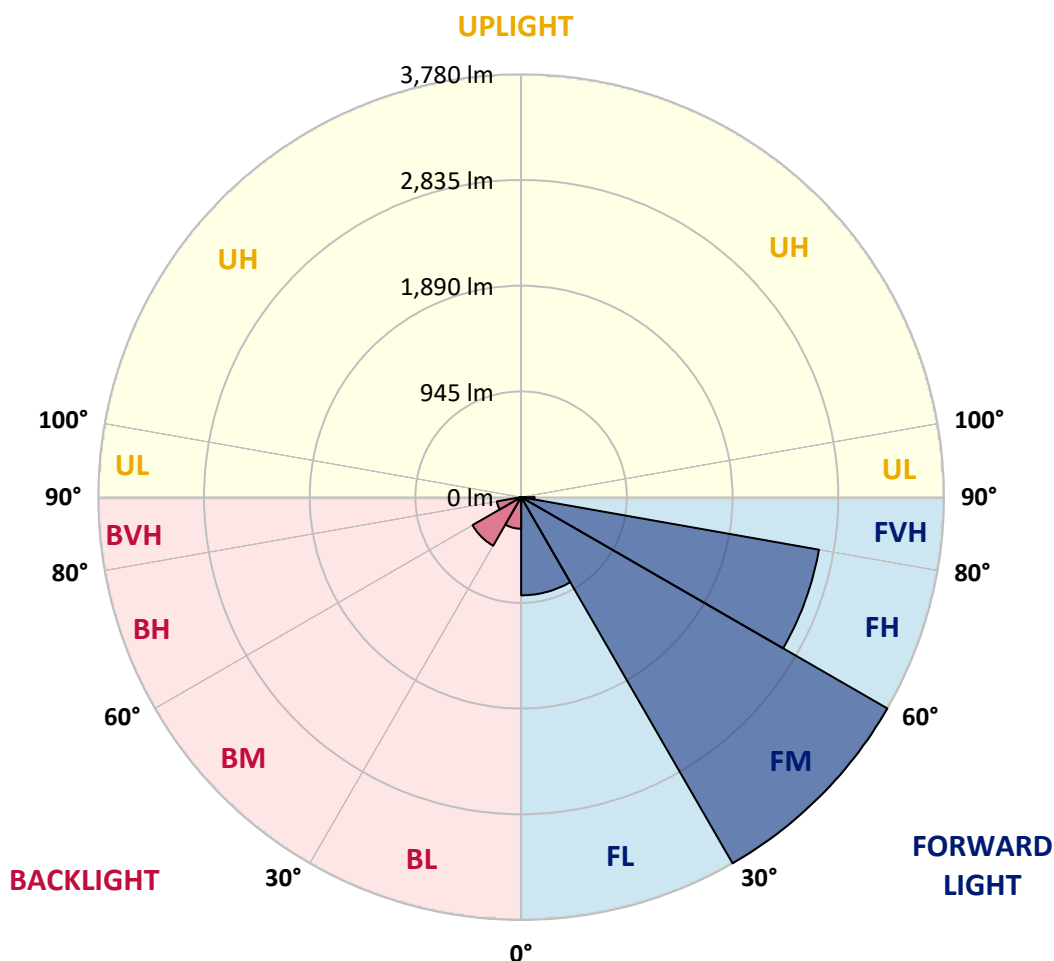
CATALOG NUMBER: MEM2-HSN-SA-120-830-U-T4W-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 877.7  | 10.3      |                         |      |         |
| FM (30°-60°)   | 3779.6 | 44.5      |                         |      |         |
| FH (60°-80°)   | 2703.1 | 31.8      |                         |      | G2/5000 |
| FVH (80°-90°)  | 120.3  | 1.4       |                         |      | G2/225  |
| BL (0°-30°)    | 283.0  | 3.3       | B1/500                  |      |         |
| BM (30°-60°)   | 501.3  | 5.9       | B1/1000                 |      |         |
| BH (60°-80°)   | 220.3  | 2.6       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 12.8   | 0.2       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 40°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 |
| 2.5°  | 1576.0 | 1568.8 | 1554.4 | 1542.5 | 1525.7 | 1511.3 | 1496.9 | 1470.6 | 1437.1 | 1408.3 | 1372.4 |
| 5°    | 1731.7 | 1719.7 | 1710.1 | 1695.7 | 1667.0 | 1655.0 | 1645.4 | 1590.4 | 1532.9 | 1473.0 | 1394.0 |
| 7.5°  | 1841.8 | 1851.4 | 1832.3 | 1810.7 | 1774.8 | 1760.4 | 1746.0 | 1691.0 | 1619.1 | 1532.9 | 1420.3 |
| 10°   | 1968.8 | 1971.2 | 1947.2 | 1920.9 | 1882.6 | 1853.8 | 1834.7 | 1767.6 | 1688.6 | 1592.8 | 1449.0 |
| 12.5° | 2090.9 | 2090.9 | 2076.6 | 2038.2 | 1987.9 | 1961.6 | 1928.1 | 1851.4 | 1755.6 | 1643.0 | 1482.6 |
| 15°   | 2189.1 | 2193.9 | 2181.9 | 2153.2 | 2098.1 | 2062.2 | 2028.7 | 1940.0 | 1817.9 | 1700.5 | 1508.9 |
| 17.5° | 2277.8 | 2275.4 | 2268.2 | 2241.8 | 2189.1 | 2160.4 | 2126.9 | 2028.7 | 1889.7 | 1746.0 | 1549.6 |
| 20°   | 2337.6 | 2337.6 | 2335.2 | 2320.9 | 2282.5 | 2261.0 | 2220.3 | 2117.3 | 1968.8 | 1813.1 | 1592.8 |
| 22.5° | 2383.1 | 2380.7 | 2380.7 | 2383.1 | 2361.6 | 2340.0 | 2323.3 | 2220.3 | 2050.2 | 1870.6 | 1635.9 |
| 25°   | 2421.5 | 2419.1 | 2426.3 | 2431.0 | 2421.5 | 2416.7 | 2397.5 | 2318.5 | 2150.8 | 1937.6 | 1679.0 |
| 27.5° | 2471.8 | 2478.9 | 2476.5 | 2476.5 | 2474.2 | 2478.9 | 2476.5 | 2409.5 | 2249.0 | 2009.5 | 1724.5 |
| 30°   | 2550.8 | 2562.8 | 2555.6 | 2546.0 | 2546.0 | 2548.4 | 2560.4 | 2517.3 | 2364.0 | 2098.1 | 1774.8 |
| 32.5° | 2735.2 | 2723.2 | 2672.9 | 2639.4 | 2644.2 | 2646.6 | 2658.6 | 2634.6 | 2478.9 | 2198.7 | 1827.5 |
| 35°   | 2946.0 | 2931.6 | 2876.5 | 2799.9 | 2773.5 | 2764.0 | 2761.6 | 2747.2 | 2603.5 | 2306.5 | 1889.7 |
| 37.5° | 3219.0 | 3223.8 | 3142.4 | 3032.2 | 2953.2 | 2893.3 | 2881.3 | 2850.2 | 2711.3 | 2404.7 | 1954.4 |
| 40°   | 3496.9 | 3477.7 | 3408.2 | 3300.5 | 3144.8 | 3034.6 | 2998.7 | 2955.6 | 2833.4 | 2507.7 | 2016.7 |
| 42.5° | 3765.1 | 3729.2 | 3638.2 | 3520.8 | 3338.8 | 3219.0 | 3137.6 | 3082.5 | 2946.0 | 2620.3 | 2076.6 |
| 45°   | 4114.8 | 4011.8 | 3848.9 | 3743.6 | 3516.0 | 3417.8 | 3343.6 | 3221.4 | 3080.1 | 2732.8 | 2148.4 |
| 47.5° | 4390.2 | 4191.5 | 4043.0 | 3997.4 | 3700.5 | 3609.4 | 3542.4 | 3372.3 | 3216.6 | 2859.8 | 2222.7 |
| 50°   | 4339.9 | 4217.8 | 4181.9 | 4141.2 | 3839.4 | 3784.3 | 3722.0 | 3544.8 | 3355.6 | 2993.9 | 2294.5 |
| 52.5° | 4210.6 | 4225.0 | 4270.5 | 4201.0 | 3961.5 | 3923.2 | 3882.5 | 3729.2 | 3494.5 | 3104.1 | 2359.2 |
| 55°   | 4107.6 | 4136.4 | 4258.5 | 4237.0 | 4107.6 | 4064.5 | 4035.8 | 3911.2 | 3628.6 | 3204.7 | 2414.3 |
| 57.5° | 3920.8 | 3896.9 | 4050.1 | 4299.2 | 4263.3 | 4229.8 | 4201.0 | 4102.8 | 3765.1 | 3276.5 | 2450.2 |
| 60°   | 3626.2 | 3537.6 | 3743.6 | 4222.6 | 4371.1 | 4375.9 | 4359.1 | 4246.5 | 3875.3 | 3276.5 | 2431.0 |
| 62.5° | 3211.8 | 3128.0 | 3381.9 | 3966.3 | 4428.6 | 4474.1 | 4464.5 | 4296.8 | 3923.2 | 3204.7 | 2356.8 |
| 65°   | 2591.5 | 2610.7 | 2938.8 | 3676.5 | 4495.6 | 4608.2 | 4548.3 | 4215.4 | 3863.3 | 3065.7 | 2189.1 |
| 67.5° | 2069.4 | 2126.9 | 2421.5 | 3300.5 | 4464.5 | 4605.8 | 4522.0 | 3985.5 | 3607.0 | 2871.7 | 1932.9 |
| 70°   | 1633.5 | 1671.8 | 1916.1 | 2792.7 | 4191.5 | 4339.9 | 4234.6 | 3633.4 | 3173.5 | 2572.4 | 1607.1 |
| 72.5° | 1276.6 | 1312.5 | 1520.9 | 2234.6 | 3717.2 | 3889.7 | 3757.9 | 3159.2 | 2632.2 | 2181.9 | 1276.6 |
| 75°   | 970.0  | 996.4  | 1152.1 | 1722.1 | 2960.4 | 3175.9 | 3080.1 | 2529.2 | 2055.0 | 1726.9 | 977.2  |
| 77.5° | 625.1  | 661.1  | 835.9  | 1207.1 | 2090.9 | 2349.6 | 2361.6 | 1889.7 | 1477.8 | 1247.9 | 718.5  |
| 80°   | 414.4  | 428.7  | 536.5  | 785.6  | 1286.2 | 1487.4 | 1556.8 | 1276.6 | 943.7  | 795.2  | 517.3  |
| 82.5° | 172.4  | 191.6  | 256.3  | 395.2  | 644.3  | 646.7  | 740.1  | 538.9  | 383.2  | 337.7  | 218.0  |
| 85°   | 4.8    | 9.6    | 7.2    | 19.2   | 16.8   | 26.3   | 31.1   | 43.1   | 31.1   | 33.5   | 33.5   |
| 87.5° | 0.0    | 0.0    | 2.4    | 2.4    | 4.8    | 4.8    | 4.8    | 4.8    | 4.8    | 7.2    | 4.8    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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CATALOG NUMBER: MEM2-HSN-SA-120-830-U-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 | 1350.8 |
| 2.5°  | 1355.6 | 1334.1 | 1291.0 | 1257.4 | 1221.5 | 1195.2 | 1171.2 | 1144.9 | 1128.1 | 1130.5 | 1113.7 |
| 5°    | 1355.6 | 1314.9 | 1228.7 | 1152.1 | 1082.6 | 1032.3 | 977.2  | 934.1  | 903.0  | 898.2  | 912.5  |
| 7.5°  | 1362.8 | 1295.8 | 1166.4 | 1051.5 | 955.7  | 876.6  | 819.1  | 776.0  | 754.5  | 740.1  | 737.7  |
| 10°   | 1370.0 | 1281.4 | 1108.9 | 962.8  | 843.1  | 756.9  | 706.6  | 658.7  | 634.7  | 632.3  | 625.1  |
| 12.5° | 1374.8 | 1264.6 | 1056.2 | 874.2  | 749.7  | 668.2  | 617.9  | 579.6  | 560.5  | 560.5  | 558.1  |
| 15°   | 1391.6 | 1259.8 | 1001.2 | 807.2  | 677.8  | 598.8  | 555.7  | 524.5  | 512.6  | 505.4  | 503.0  |
| 17.5° | 1405.9 | 1250.2 | 953.3  | 740.1  | 613.1  | 543.7  | 503.0  | 481.4  | 469.4  | 464.7  | 462.3  |
| 20°   | 1427.5 | 1245.5 | 907.7  | 685.0  | 565.2  | 498.2  | 467.0  | 447.9  | 440.7  | 435.9  | 435.9  |
| 22.5° | 1449.0 | 1240.7 | 862.2  | 637.1  | 524.5  | 464.7  | 435.9  | 419.1  | 412.0  | 409.6  | 407.2  |
| 25°   | 1475.4 | 1238.3 | 823.9  | 596.4  | 488.6  | 438.3  | 412.0  | 397.6  | 388.0  | 383.2  | 383.2  |
| 27.5° | 1501.7 | 1240.7 | 785.6  | 555.7  | 457.5  | 414.4  | 388.0  | 371.2  | 364.1  | 354.5  | 356.9  |
| 30°   | 1537.7 | 1243.1 | 754.5  | 522.1  | 431.1  | 390.4  | 366.5  | 344.9  | 335.3  | 330.5  | 330.5  |
| 32.5° | 1573.6 | 1252.6 | 723.3  | 491.0  | 404.8  | 371.2  | 342.5  | 323.3  | 311.4  | 309.0  | 306.6  |
| 35°   | 1611.9 | 1259.8 | 694.6  | 464.7  | 383.2  | 349.7  | 320.9  | 301.8  | 292.2  | 289.8  | 289.8  |
| 37.5° | 1655.0 | 1271.8 | 673.0  | 440.7  | 361.7  | 328.1  | 301.8  | 282.6  | 275.4  | 273.0  | 273.0  |
| 40°   | 1700.5 | 1291.0 | 656.3  | 419.1  | 344.9  | 309.0  | 285.0  | 268.3  | 263.5  | 261.1  | 261.1  |
| 42.5° | 1746.0 | 1307.7 | 641.9  | 402.4  | 328.1  | 292.2  | 273.0  | 256.3  | 249.1  | 249.1  | 249.1  |
| 45°   | 1789.2 | 1319.7 | 627.5  | 385.6  | 311.4  | 280.2  | 258.7  | 244.3  | 237.1  | 237.1  | 237.1  |
| 47.5° | 1827.5 | 1331.7 | 606.0  | 368.8  | 294.6  | 263.5  | 246.7  | 232.3  | 225.1  | 225.1  | 225.1  |
| 50°   | 1868.2 | 1338.9 | 582.0  | 347.3  | 277.8  | 251.5  | 234.7  | 218.0  | 213.2  | 210.8  | 210.8  |
| 52.5° | 1901.7 | 1338.9 | 550.9  | 325.7  | 258.7  | 234.7  | 220.4  | 206.0  | 198.8  | 194.0  | 194.0  |
| 55°   | 1925.7 | 1338.9 | 517.3  | 299.4  | 239.5  | 220.4  | 206.0  | 191.6  | 182.0  | 174.8  | 174.8  |
| 57.5° | 1940.0 | 1331.7 | 479.0  | 268.3  | 220.4  | 201.2  | 191.6  | 174.8  | 155.7  | 141.3  | 136.5  |
| 60°   | 1928.1 | 1310.1 | 438.3  | 234.7  | 198.8  | 184.4  | 177.2  | 155.7  | 129.3  | 122.2  | 122.2  |
| 62.5° | 1877.8 | 1259.8 | 397.6  | 206.0  | 182.0  | 167.7  | 160.5  | 136.5  | 117.4  | 110.2  | 110.2  |
| 65°   | 1736.5 | 1137.7 | 347.3  | 179.6  | 162.9  | 153.3  | 143.7  | 122.2  | 105.4  | 95.8   | 95.8   |
| 67.5° | 1530.5 | 982.0  | 289.8  | 158.1  | 146.1  | 138.9  | 131.7  | 110.2  | 93.4   | 83.8   | 83.8   |
| 70°   | 1240.7 | 792.8  | 246.7  | 138.9  | 129.3  | 124.5  | 117.4  | 100.6  | 81.4   | 74.2   | 74.2   |
| 72.5° | 974.8  | 622.7  | 206.0  | 124.5  | 119.8  | 110.2  | 105.4  | 88.6   | 74.2   | 67.1   | 67.1   |
| 75°   | 725.7  | 464.7  | 182.0  | 110.2  | 110.2  | 98.2   | 95.8   | 79.0   | 64.7   | 59.9   | 59.9   |
| 77.5° | 534.1  | 344.9  | 158.1  | 95.8   | 95.8   | 86.2   | 81.4   | 69.5   | 59.9   | 55.1   | 55.1   |
| 80°   | 361.7  | 234.7  | 117.4  | 71.9   | 71.9   | 69.5   | 64.7   | 59.9   | 50.3   | 45.5   | 43.1   |
| 82.5° | 153.3  | 98.2   | 57.5   | 35.9   | 33.5   | 26.3   | 21.6   | 16.8   | 16.8   | 14.4   | 14.4   |
| 85°   | 26.3   | 12.0   | 12.0   | 9.6    | 7.2    | 7.2    | 7.2    | 4.8    | 4.8    | 4.8    | 4.8    |
| 87.5° | 4.8    | 4.8    | 4.8    | 4.8    | 4.8    | 4.8    | 2.4    | 2.4    | 2.4    | 2.4    | 2.4    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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



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

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-157-7

Test Date: 09/05/2024

Luminaire Tested: MEM2-HTN-SA-40-830-U-5WQ

Data in this report applies to families of products including MEM2-HTN-SA-40-830-U-5WQ

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 09/05/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Streetworks  
 Catalog Number: **MEM2-HTN-SA-40-830-U-5WQ**  
 Description: Epic Modern Light Square 40W 5WQ Optic

**Spectral Parameters**

CCT (K): 3126  
 CIE u': 0.2465  
 CIE v': 0.5182  
 Duv: -0.0004  
 CIE x: 0.4277  
 CIE y: 0.3997  
 CIE z: 0.1727  
 Peak Wavelength (nm): 601  
 Dominant Wavelength (nm): 582  
 Purity: 48.31913  
 Rf: 84.4  
 Rg: 94.7

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 82.6 |      |      |
| R1:       | 81.4 | R9:  | 5.1  |
| R2:       | 92.2 | R10: | 82.2 |
| R3:       | 94.9 | R11: | 79.8 |
| R4:       | 80.1 | R12: | 70.4 |
| R5:       | 81.8 | R13: | 84.2 |
| R6:       | 90.5 | R14: | 97.9 |
| R7:       | 81.8 | R15: | 73.6 |
| R8:       | 58.0 |      |      |



**Test Conditions**

Stabilization Time: 22M  
 Operation Time: 1H 22M  
 Sphere Temperature (°C): 24.3

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

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 3000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) |
|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|
| 360               | 0                           | NR                      | 490               | 258                         | NR                      | 620               | 908                         | NR                      | 750               | 26                          | NR                      | 880               | 1                           | NR                      |
| 365               | 0                           | NR                      | 495               | 297                         | NR                      | 625               | 857                         | NR                      | 755               | 22                          | NR                      | 885               | 0                           | NR                      |
| 370               | 0                           | NR                      | 500               | 345                         | NR                      | 630               | 801                         | NR                      | 760               | 19                          | NR                      | 890               | 0                           | NR                      |
| 375               | 0                           | NR                      | 505               | 391                         | NR                      | 635               | 738                         | NR                      | 765               | 16                          | NR                      | 895               | 0                           | NR                      |
| 380               | 0                           | NR                      | 510               | 426                         | NR                      | 640               | 675                         | NR                      | 770               | 14                          | NR                      | 900               | 0                           | NR                      |
| 385               | 0                           | NR                      | 515               | 456                         | NR                      | 645               | 610                         | NR                      | 775               | 12                          | NR                      | 905               | 0                           | NR                      |
| 390               | 0                           | NR                      | 520               | 480                         | NR                      | 650               | 547                         | NR                      | 780               | 10                          | NR                      | 910               | 0                           | NR                      |
| 395               | 0                           | NR                      | 525               | 500                         | NR                      | 655               | 488                         | NR                      | 785               | 9                           | NR                      | 915               | 0                           | NR                      |
| 400               | 0                           | NR                      | 530               | 517                         | NR                      | 660               | 429                         | NR                      | 790               | 7                           | NR                      | 920               | 0                           | NR                      |
| 405               | 2                           | NR                      | 535               | 538                         | NR                      | 665               | 378                         | NR                      | 795               | 6                           | NR                      | 925               | 0                           | NR                      |
| 410               | 4                           | NR                      | 540               | 558                         | NR                      | 670               | 328                         | NR                      | 800               | 5                           | NR                      | 930               | 0                           | NR                      |
| 415               | 9                           | NR                      | 545               | 584                         | NR                      | 675               | 285                         | NR                      | 805               | 5                           | NR                      | 935               | 0                           | NR                      |
| 420               | 16                          | NR                      | 550               | 611                         | NR                      | 680               | 247                         | NR                      | 810               | 4                           | NR                      | 940               | 0                           | NR                      |
| 425               | 31                          | NR                      | 555               | 646                         | NR                      | 685               | 212                         | NR                      | 815               | 3                           | NR                      | 945               | 0                           | NR                      |
| 430               | 56                          | NR                      | 560               | 687                         | NR                      | 690               | 183                         | NR                      | 820               | 3                           | NR                      | 950               | 0                           | NR                      |
| 435               | 101                         | NR                      | 565               | 731                         | NR                      | 695               | 156                         | NR                      | 825               | 3                           | NR                      | 955               | 0                           | NR                      |
| 440               | 178                         | NR                      | 570               | 780                         | NR                      | 700               | 133                         | NR                      | 830               | 2                           | NR                      | 960               | 0                           | NR                      |
| 445               | 323                         | NR                      | 575               | 832                         | NR                      | 705               | 114                         | NR                      | 835               | 2                           | NR                      | 965               | 0                           | NR                      |
| 450               | 566                         | NR                      | 580               | 883                         | NR                      | 710               | 96                          | NR                      | 840               | 2                           | NR                      | 970               | 0                           | NR                      |
| 455               | 645                         | NR                      | 585               | 927                         | NR                      | 715               | 82                          | NR                      | 845               | 1                           | NR                      | 975               | 0                           | NR                      |
| 460               | 457                         | NR                      | 590               | 963                         | NR                      | 720               | 70                          | NR                      | 850               | 1                           | NR                      | 980               | 0                           | NR                      |
| 465               | 365                         | NR                      | 595               | 985                         | NR                      | 725               | 59                          | NR                      | 855               | 1                           | NR                      | 985               | 0                           | NR                      |
| 470               | 317                         | NR                      | 600               | 998                         | NR                      | 730               | 50                          | NR                      | 860               | 1                           | NR                      | 990               | 0                           | NR                      |
| 475               | 244                         | NR                      | 605               | 994                         | NR                      | 735               | 43                          | NR                      | 865               | 1                           | NR                      | 995               | 0                           | NR                      |
| 480               | 218                         | NR                      | 610               | 978                         | NR                      | 740               | 36                          | NR                      | 870               | 1                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 233                         | NR                      | 615               | 947                         | NR                      | 745               | 31                          | NR                      | 875               | 1                           | NR                      |                   |                             |                         |

REPORT NUMBER: SP1-2407-157-7

Scotopic Flux vs. Wavelength



Scotopic Lumens: NR S/P: 1.42

| 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    | 258                      | NR            | 620    | 908                      | NR            | 750    | 26                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 297                      | NR            | 625    | 857                      | NR            | 755    | 22                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 345                      | NR            | 630    | 801                      | NR            | 760    | 19                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 391                      | NR            | 635    | 738                      | NR            | 765    | 16                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 426                      | NR            | 640    | 675                      | NR            | 770    | 14                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 456                      | NR            | 645    | 610                      | NR            | 775    | 12                       | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 480                      | NR            | 650    | 547                      | NR            | 780    | 10                       | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 500                      | NR            | 655    | 488                      | NR            | 785    | 9                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 517                      | NR            | 660    | 429                      | NR            | 790    | 7                        | NR            | 920    | 0                        | NR            |
| 405    | 2                        | NR            | 535    | 538                      | NR            | 665    | 378                      | NR            | 795    | 6                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 558                      | NR            | 670    | 328                      | NR            | 800    | 5                        | NR            | 930    | 0                        | NR            |
| 415    | 9                        | NR            | 545    | 584                      | NR            | 675    | 285                      | NR            | 805    | 5                        | NR            | 935    | 0                        | NR            |
| 420    | 16                       | NR            | 550    | 611                      | NR            | 680    | 247                      | NR            | 810    | 4                        | NR            | 940    | 0                        | NR            |
| 425    | 31                       | NR            | 555    | 646                      | NR            | 685    | 212                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 56                       | NR            | 560    | 687                      | NR            | 690    | 183                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 101                      | NR            | 565    | 731                      | NR            | 695    | 156                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 178                      | NR            | 570    | 780                      | NR            | 700    | 133                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 323                      | NR            | 575    | 832                      | NR            | 705    | 114                      | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 566                      | NR            | 580    | 883                      | NR            | 710    | 96                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 645                      | NR            | 585    | 927                      | NR            | 715    | 82                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 457                      | NR            | 590    | 963                      | NR            | 720    | 70                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 365                      | NR            | 595    | 985                      | NR            | 725    | 59                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 317                      | NR            | 600    | 998                      | NR            | 730    | 50                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 244                      | NR            | 605    | 994                      | NR            | 735    | 43                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 218                      | NR            | 610    | 978                      | NR            | 740    | 36                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 233                      | NR            | 615    | 947                      | NR            | 745    | 31                       | NR            | 875    | 1                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2407-157-7

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.79

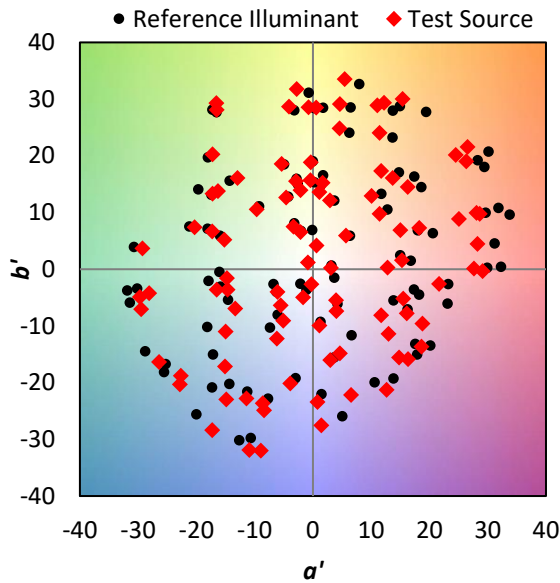
| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 258                      | NR            | 620    | 908                      | NR            | 750    | 26                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 297                      | NR            | 625    | 857                      | NR            | 755    | 22                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 345                      | NR            | 630    | 801                      | NR            | 760    | 19                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 391                      | NR            | 635    | 738                      | NR            | 765    | 16                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 426                      | NR            | 640    | 675                      | NR            | 770    | 14                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 456                      | NR            | 645    | 610                      | NR            | 775    | 12                       | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 480                      | NR            | 650    | 547                      | NR            | 780    | 10                       | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 500                      | NR            | 655    | 488                      | NR            | 785    | 9                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 517                      | NR            | 660    | 429                      | NR            | 790    | 7                        | NR            | 920    | 0                        | NR            |
| 405    | 2                        | NR            | 535    | 538                      | NR            | 665    | 378                      | NR            | 795    | 6                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 558                      | NR            | 670    | 328                      | NR            | 800    | 5                        | NR            | 930    | 0                        | NR            |
| 415    | 9                        | NR            | 545    | 584                      | NR            | 675    | 285                      | NR            | 805    | 5                        | NR            | 935    | 0                        | NR            |
| 420    | 16                       | NR            | 550    | 611                      | NR            | 680    | 247                      | NR            | 810    | 4                        | NR            | 940    | 0                        | NR            |
| 425    | 31                       | NR            | 555    | 646                      | NR            | 685    | 212                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 56                       | NR            | 560    | 687                      | NR            | 690    | 183                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 101                      | NR            | 565    | 731                      | NR            | 695    | 156                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 178                      | NR            | 570    | 780                      | NR            | 700    | 133                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 323                      | NR            | 575    | 832                      | NR            | 705    | 114                      | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 566                      | NR            | 580    | 883                      | NR            | 710    | 96                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 645                      | NR            | 585    | 927                      | NR            | 715    | 82                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 457                      | NR            | 590    | 963                      | NR            | 720    | 70                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 365                      | NR            | 595    | 985                      | NR            | 725    | 59                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 317                      | NR            | 600    | 998                      | NR            | 730    | 50                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 244                      | NR            | 605    | 994                      | NR            | 735    | 43                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 218                      | NR            | 610    | 978                      | NR            | 740    | 36                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 233                      | NR            | 615    | 947                      | NR            | 745    | 31                       | NR            | 875    | 1                        | NR            |        |                          |               |

**Summary**

$R_f = 84.4$   
 $R_g = 94.7$   
 $CIE R_a = 82.6$   
 $R_9 = 5.1$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 86 | CES51 = 93 | CES76 = 82 |
| CES02 = 63 | CES27 = 92 | CES52 = 93 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 70 | CES29 = 92 | CES54 = 89 | CES79 = 90 |
| CES05 = 49 | CES30 = 91 | CES55 = 86 | CES80 = 89 |
| CES06 = 51 | CES31 = 93 | CES56 = 85 | CES81 = 72 |
| CES07 = 42 | CES32 = 85 | CES57 = 83 | CES82 = 95 |
| CES08 = 41 | CES33 = 97 | CES58 = 84 | CES83 = 94 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 91 |
| CES10 = 76 | CES35 = 96 | CES60 = 90 | CES85 = 74 |
| CES11 = 59 | CES36 = 81 | CES61 = 87 | CES86 = 68 |
| CES12 = 65 | CES37 = 96 | CES62 = 83 | CES87 = 84 |
| CES13 = 43 | CES38 = 86 | CES63 = 87 | CES88 = 88 |
| CES14 = 74 | CES39 = 98 | CES64 = 79 | CES89 = 75 |
| CES15 = 71 | CES40 = 96 | CES65 = 78 | CES90 = 89 |
| CES16 = 47 | CES41 = 96 | CES66 = 77 | CES91 = 73 |
| CES17 = 50 | CES42 = 97 | CES67 = 76 | CES92 = 63 |
| CES18 = 56 | CES43 = 91 | CES68 = 80 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 85 | CES94 = 61 |
| CES20 = 66 | CES45 = 93 | CES70 = 78 | CES95 = 73 |
| CES21 = 87 | CES46 = 90 | CES71 = 74 | CES96 = 84 |
| CES22 = 79 | CES47 = 94 | CES72 = 91 | CES97 = 88 |
| CES23 = 92 | CES48 = 83 | CES73 = 74 | CES98 = 85 |
| CES24 = 91 | CES49 = 91 | CES74 = 90 | CES99 = 76 |
| CES25 = 72 | CES50 = 93 | CES75 = 78 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)