

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: INVUE

Report Number: P868982

Luminaire Tested: **EMM2-HSN-SA3A-727-U-T3-HSS**

Issue Date: 08/22/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P868982  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/22/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: EMM2-HSN-SA3A-727-U-T3-HSS  
Description: EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 130W 70CRI 2700K  
FITXURE w/ TYPE III DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD  
Light Source: (30) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

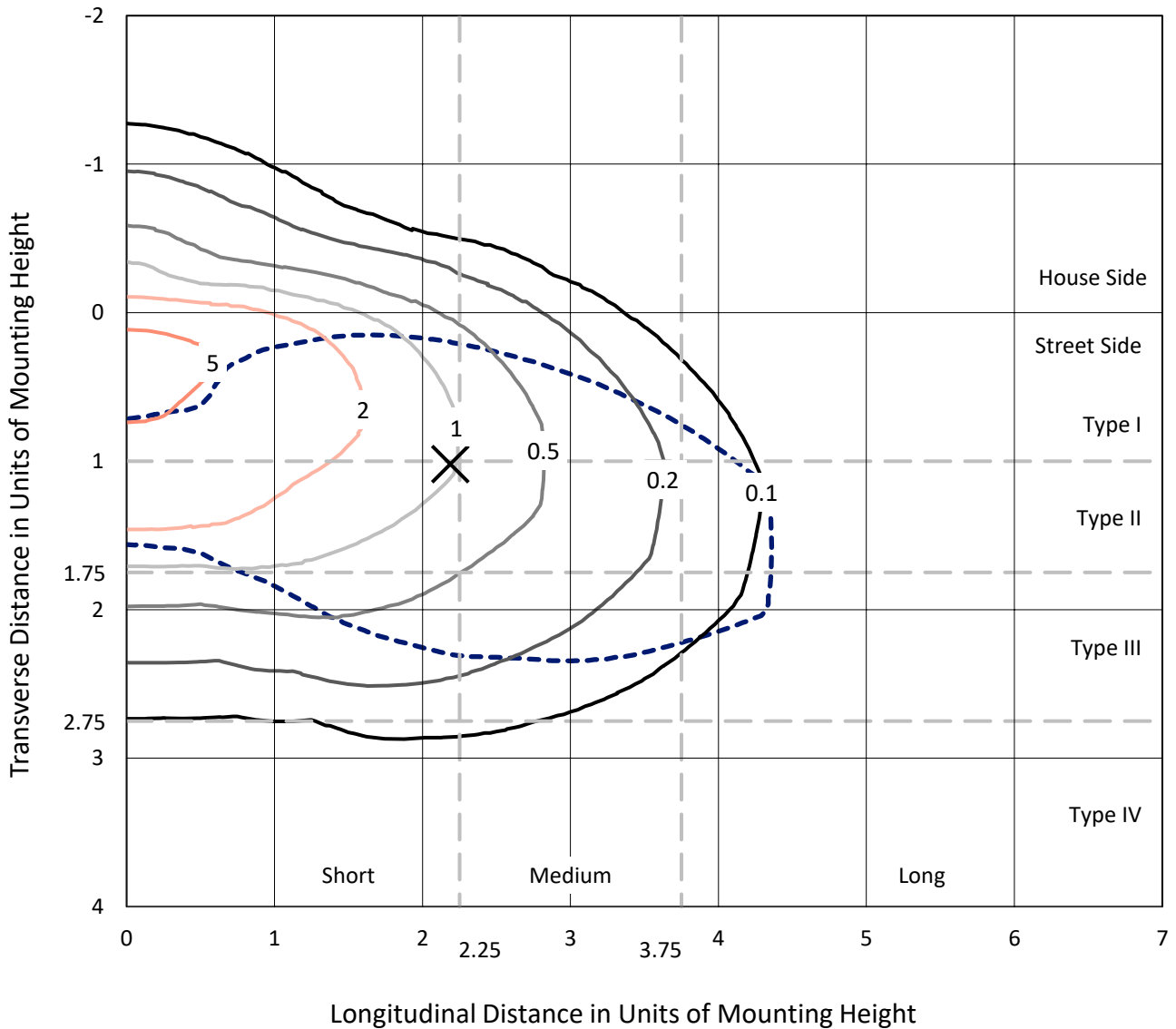
Lumens per Lamp: N/A  
Luminaire Lumens: 10885 lumens  
Efficiency: N/A  
Efficacy: 96.3 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.33' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B1 - U0 - G2

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: P868982  
 CATALOG NUMBER: EMM2-HSN-SA3A-727-U-T3-HSS

### Iso-Footcandle Lines of Horizontal Illumination

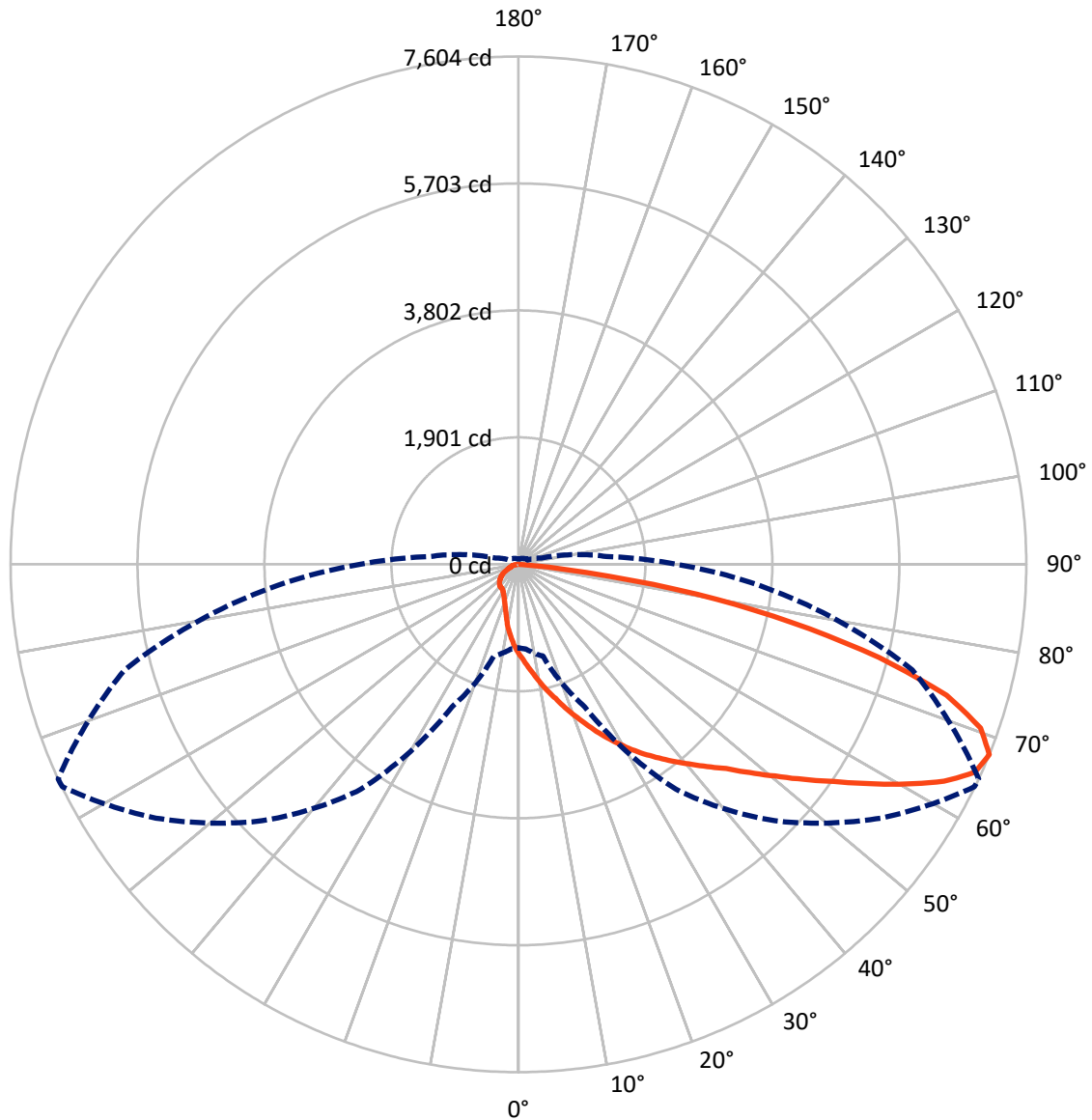
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 6.2 fc  
 Type III - Short - N/A

REPORT NUMBER: P868982  
CATALOG NUMBER: EMM2-HSN-SA3A-727-U-T3-HSS

### Luminous Intensity Polar Plot



— Vertical Plane Through 65-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

REPORT NUMBER: P868982  
 CATALOG NUMBER: EMM2-HSN-SA3A-727-U-T3-HSS

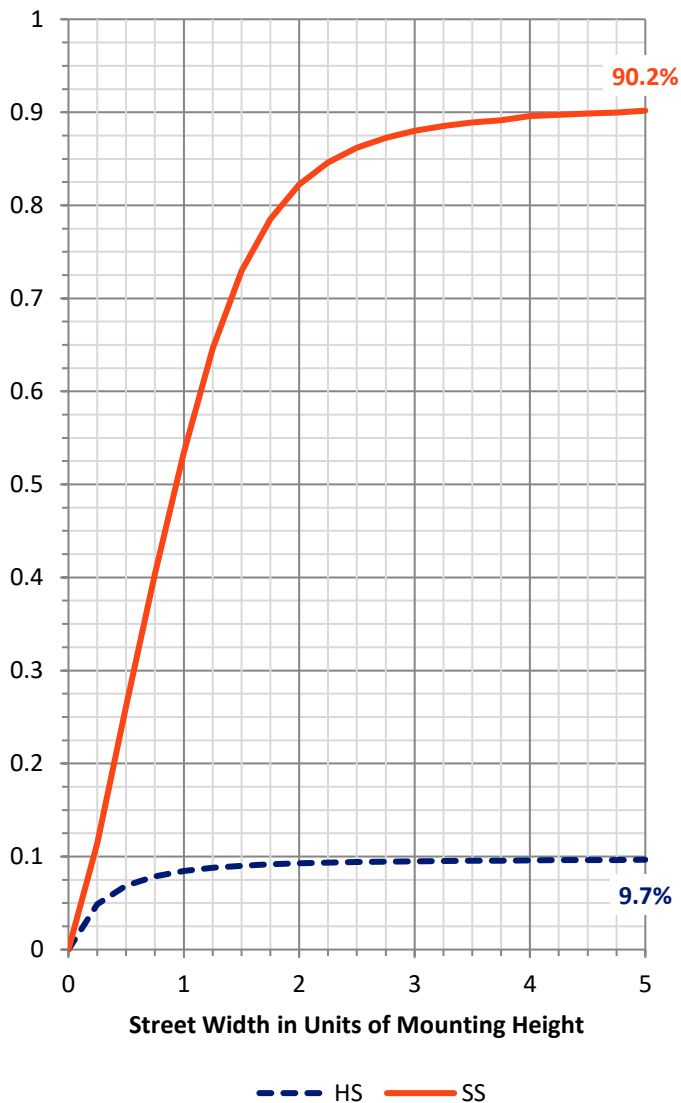
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1059.4   | 0.0    | 1059.4  |
|                    | % Fixture | 9.7      | 0.0    | 9.7     |
| <b>Street Side</b> | Lumens    | 9825.6   | 0.0    | 9825.6  |
|                    | % Fixture | 90.3     | 0.0    | 90.3    |
| <b>Total</b>       | Lumens    | 10885.0  | 0.0    | 10885.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 131.6   | 1.2       |
| 10°-20°   | 436.8   | 4.0       |
| 20°-30°   | 794.9   | 7.3       |
| 30°-40°   | 1230.3  | 11.3      |
| 40°-50°   | 1859.8  | 17.1      |
| 50°-60°   | 2419.4  | 22.2      |
| 60°-70°   | 2386.7  | 21.9      |
| 70°-80°   | 1452.8  | 13.3      |
| 80°-90°   | 172.7   | 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°    | 10885.0 | 100.0     |
| 0°-180°   | 10885.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P868982

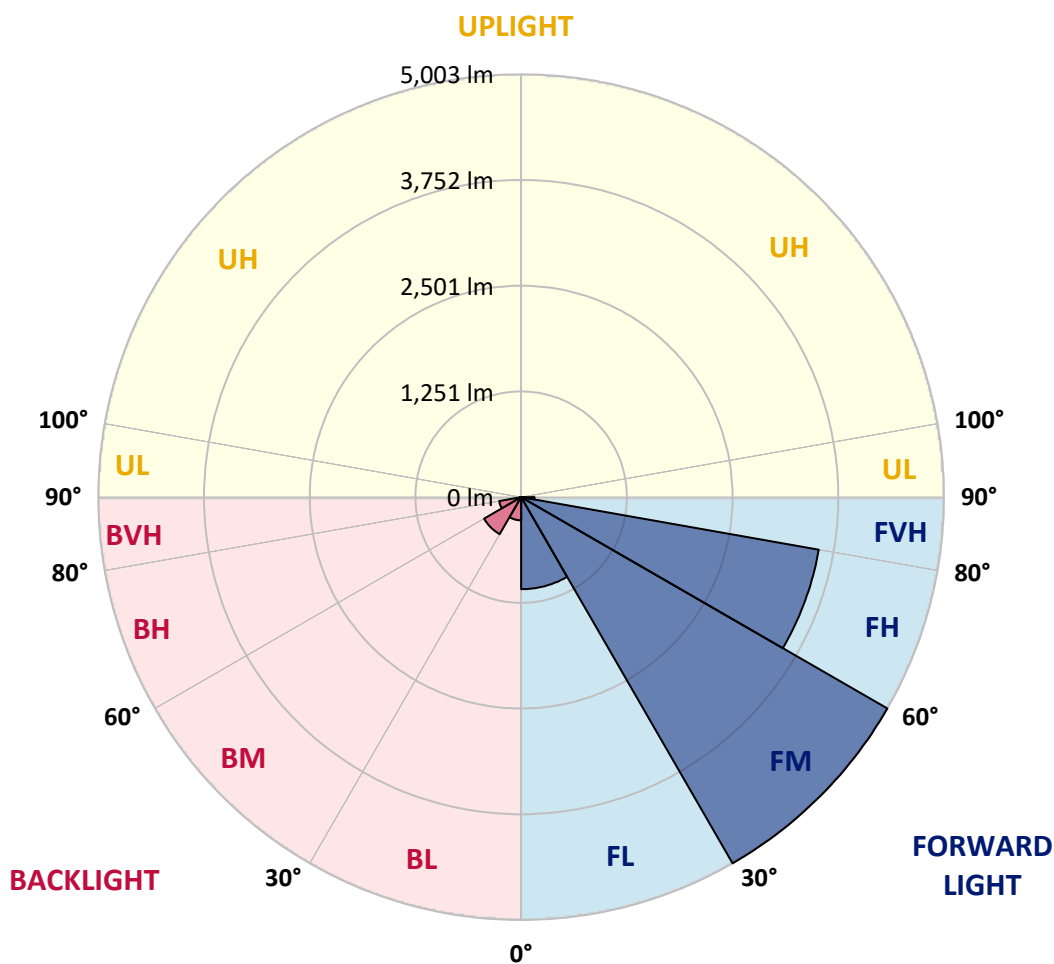
CATALOG NUMBER: EMM2-HSN-SA3A-727-U-T3-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1089.2 | 10.0      |                         |      |         |
| FM (30°-60°)   | 5002.8 | 46.0      |                         |      |         |
| FH (60°-80°)   | 3575.8 | 32.9      |                         |      | G2/5000 |
| FVH (80°-90°)  | 157.9  | 1.5       |                         |      | G2/225  |
| BL (0°-30°)    | 274.2  | 2.5       | B1/500                  |      |         |
| BM (30°-60°)   | 506.7  | 4.7       | B1/1000                 |      |         |
| BH (60°-80°)   | 263.8  | 2.4       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 14.8   | 0.1       |                         |      | 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 III Short





REPORT NUMBER: P868982

CATALOG NUMBER: EMM2-HSN-SA3A-727-U-T3-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 64°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 |
| 2.5°  | 1571.8 | 1559.4 | 1568.7 | 1546.9 | 1522.1 | 1503.5 | 1466.2 | 1435.1 | 1432.0 | 1400.9 | 1366.8 |
| 5°    | 1873.1 | 1832.7 | 1835.8 | 1792.3 | 1739.5 | 1683.6 | 1624.6 | 1546.9 | 1546.9 | 1472.4 | 1394.7 |
| 7.5°  | 2143.4 | 2137.1 | 2109.2 | 2040.9 | 1978.7 | 1891.7 | 1783.0 | 1683.6 | 1661.9 | 1546.9 | 1425.8 |
| 10°   | 2404.3 | 2395.0 | 2370.1 | 2317.3 | 2211.7 | 2115.4 | 1978.7 | 1829.6 | 1801.7 | 1637.0 | 1463.1 |
| 12.5° | 2612.4 | 2615.5 | 2587.6 | 2544.1 | 2450.9 | 2336.0 | 2155.8 | 1969.4 | 1944.6 | 1724.0 | 1500.4 |
| 15°   | 2795.7 | 2792.6 | 2786.4 | 2749.1 | 2659.0 | 2553.4 | 2342.2 | 2124.7 | 2084.3 | 1817.2 | 1537.6 |
| 17.5° | 2935.5 | 2929.3 | 2916.8 | 2885.8 | 2842.3 | 2739.8 | 2537.9 | 2289.4 | 2255.2 | 1925.9 | 1581.1 |
| 20°   | 2975.9 | 2972.7 | 2972.7 | 2994.5 | 2975.9 | 2913.7 | 2733.6 | 2460.2 | 2422.9 | 2040.9 | 1640.1 |
| 22.5° | 3050.4 | 3047.3 | 3044.2 | 3065.9 | 3078.4 | 3072.1 | 2916.8 | 2634.2 | 2600.0 | 2174.4 | 1714.7 |
| 25°   | 3146.7 | 3140.5 | 3131.2 | 3152.9 | 3168.4 | 3205.7 | 3100.1 | 2839.2 | 2798.8 | 2329.7 | 1789.2 |
| 27.5° | 3274.1 | 3280.3 | 3267.8 | 3264.7 | 3264.7 | 3286.5 | 3261.6 | 3022.4 | 2985.2 | 2478.8 | 1876.2 |
| 30°   | 3441.8 | 3451.1 | 3429.4 | 3413.8 | 3385.9 | 3382.8 | 3389.0 | 3227.5 | 3174.7 | 2640.4 | 1966.3 |
| 32.5° | 3606.4 | 3615.8 | 3603.3 | 3581.6 | 3510.1 | 3482.2 | 3507.0 | 3401.4 | 3367.2 | 2817.4 | 2081.2 |
| 35°   | 3740.0 | 3761.8 | 3761.8 | 3718.3 | 3618.9 | 3603.3 | 3643.7 | 3572.3 | 3547.4 | 3025.6 | 2217.9 |
| 37.5° | 3920.2 | 3932.6 | 3920.2 | 3839.4 | 3715.2 | 3733.8 | 3795.9 | 3752.4 | 3736.9 | 3249.2 | 2379.4 |
| 40°   | 4305.4 | 4320.9 | 4240.1 | 4047.5 | 3848.7 | 3870.5 | 3979.2 | 3954.3 | 3929.5 | 3469.8 | 2528.5 |
| 42.5° | 4842.8 | 4805.5 | 4789.9 | 4361.3 | 4053.7 | 4041.3 | 4178.0 | 4143.8 | 4140.7 | 3693.4 | 2665.2 |
| 45°   | 5196.9 | 5209.3 | 5131.6 | 4724.7 | 4485.5 | 4252.6 | 4398.5 | 4386.1 | 4361.3 | 3920.2 | 2829.9 |
| 47.5° | 5442.3 | 5414.3 | 5221.7 | 5026.0 | 5072.6 | 4529.0 | 4643.9 | 4675.0 | 4659.5 | 4178.0 | 3031.8 |
| 50°   | 5544.8 | 5516.8 | 5389.5 | 5259.0 | 5314.9 | 4845.9 | 4895.6 | 4998.1 | 4982.5 | 4438.9 | 3202.6 |
| 52.5° | 5417.4 | 5383.3 | 5392.6 | 5426.7 | 5398.8 | 5094.4 | 5206.2 | 5367.7 | 5349.1 | 4743.3 | 3401.4 |
| 55°   | 4606.7 | 4696.8 | 5044.7 | 5392.6 | 5383.3 | 5283.8 | 5538.6 | 5774.6 | 5737.4 | 5060.2 | 3572.3 |
| 57.5° | 3715.2 | 3764.9 | 4206.0 | 5147.2 | 5333.5 | 5442.3 | 5917.5 | 6209.5 | 6197.1 | 5377.0 | 3727.6 |
| 60°   | 2954.1 | 3006.9 | 3342.4 | 4637.7 | 5218.6 | 5606.9 | 6305.8 | 6691.0 | 6678.6 | 5697.0 | 3839.4 |
| 62.5° | 2348.4 | 2348.4 | 2646.6 | 3904.6 | 4998.1 | 5703.2 | 6613.4 | 7175.6 | 7153.9 | 5954.8 | 3867.4 |
| 65°   | 1689.8 | 1711.6 | 1935.2 | 3140.5 | 4640.8 | 5678.4 | 6762.5 | 7520.4 | 7508.0 | 6100.8 | 3808.3 |
| 67.5° | 1248.7 | 1273.6 | 1422.7 | 2354.6 | 4112.8 | 5429.8 | 6625.8 | 7598.1 | 7604.3 | 6103.9 | 3615.8 |
| 70°   | 975.4  | 981.6  | 1093.4 | 1637.0 | 3370.4 | 4876.9 | 6113.2 | 7340.2 | 7340.2 | 5951.7 | 3330.0 |
| 72.5° | 742.4  | 748.6  | 844.9  | 1115.2 | 2481.9 | 4032.0 | 5346.0 | 6656.8 | 6703.4 | 5547.9 | 2907.5 |
| 75°   | 574.7  | 587.1  | 652.3  | 801.4  | 1556.3 | 2867.1 | 4392.3 | 5451.6 | 5578.9 | 4765.1 | 2395.0 |
| 77.5° | 444.2  | 456.6  | 509.4  | 587.1  | 907.0  | 1767.5 | 3087.7 | 4075.5 | 4190.4 | 3752.4 | 1848.3 |
| 80°   | 357.2  | 363.4  | 397.6  | 441.1  | 549.8  | 910.2  | 1885.5 | 2677.6 | 2711.8 | 2550.3 | 1223.9 |
| 82.5° | 164.6  | 177.1  | 214.3  | 242.3  | 273.4  | 422.5  | 804.5  | 990.9  | 1034.4 | 1012.7 | 503.2  |
| 85°   | 18.6   | 18.6   | 21.7   | 24.9   | 28.0   | 43.5   | 55.9   | 49.7   | 49.7   | 59.0   | 52.8   |
| 87.5° | 0.0    | 0.0    | 0.0    | 3.1    | 6.2    | 6.2    | 9.3    | 9.3    | 9.3    | 9.3    | 9.3    |
| 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: P868982

CATALOG NUMBER: EMM2-HSN-SA3A-727-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 | 1345.0 |
| 2.5°  | 1348.1 | 1326.4 | 1286.0 | 1251.8 | 1220.8 | 1189.7 | 1174.2 | 1136.9 | 1127.6 | 1133.8 | 1112.1 |
| 5°    | 1354.4 | 1310.9 | 1227.0 | 1149.3 | 1084.1 | 1022.0 | 969.2  | 913.3  | 900.8  | 882.2  | 872.9  |
| 7.5°  | 1363.7 | 1298.4 | 1168.0 | 1046.8 | 947.4  | 857.3  | 792.1  | 748.6  | 714.5  | 705.1  | 702.0  |
| 10°   | 1376.1 | 1282.9 | 1102.7 | 950.5  | 813.9  | 720.7  | 661.6  | 630.6  | 618.2  | 608.8  | 611.9  |
| 12.5° | 1385.4 | 1267.4 | 1040.6 | 841.8  | 708.2  | 624.4  | 596.4  | 571.6  | 565.3  | 562.2  | 562.2  |
| 15°   | 1397.8 | 1251.8 | 966.1  | 745.5  | 618.2  | 568.5  | 540.5  | 531.2  | 531.2  | 528.1  | 528.1  |
| 17.5° | 1413.4 | 1239.4 | 903.9  | 671.0  | 565.3  | 518.8  | 506.3  | 493.9  | 493.9  | 493.9  | 490.8  |
| 20°   | 1444.4 | 1233.2 | 848.0  | 608.8  | 518.8  | 487.7  | 469.1  | 459.7  | 456.6  | 453.5  | 453.5  |
| 22.5° | 1475.5 | 1233.2 | 785.9  | 562.2  | 487.7  | 453.5  | 434.9  | 425.6  | 422.5  | 422.5  | 422.5  |
| 25°   | 1519.0 | 1230.1 | 736.2  | 521.9  | 459.7  | 419.4  | 400.7  | 391.4  | 385.2  | 385.2  | 382.1  |
| 27.5° | 1568.7 | 1230.1 | 692.7  | 490.8  | 428.7  | 388.3  | 366.5  | 357.2  | 347.9  | 347.9  | 344.8  |
| 30°   | 1618.4 | 1236.3 | 655.4  | 465.9  | 397.6  | 360.3  | 332.4  | 320.0  | 313.7  | 310.6  | 310.6  |
| 32.5° | 1683.6 | 1255.0 | 630.6  | 447.3  | 369.7  | 332.4  | 304.4  | 292.0  | 285.8  | 282.7  | 282.7  |
| 35°   | 1783.0 | 1301.5 | 633.7  | 438.0  | 351.0  | 307.5  | 279.6  | 264.0  | 260.9  | 260.9  | 257.8  |
| 37.5° | 1888.6 | 1345.0 | 643.0  | 431.8  | 332.4  | 288.9  | 260.9  | 245.4  | 242.3  | 242.3  | 242.3  |
| 40°   | 1978.7 | 1382.3 | 655.4  | 428.7  | 316.8  | 270.2  | 245.4  | 233.0  | 226.8  | 226.8  | 226.8  |
| 42.5° | 2068.8 | 1404.1 | 658.5  | 419.4  | 307.5  | 254.7  | 233.0  | 220.5  | 214.3  | 217.4  | 217.4  |
| 45°   | 2158.9 | 1419.6 | 649.2  | 406.9  | 298.2  | 242.3  | 220.5  | 208.1  | 201.9  | 201.9  | 201.9  |
| 47.5° | 2267.6 | 1453.8 | 633.7  | 388.3  | 292.0  | 233.0  | 208.1  | 195.7  | 192.6  | 192.6  | 192.6  |
| 50°   | 2376.3 | 1481.7 | 621.3  | 366.5  | 276.5  | 220.5  | 198.8  | 183.3  | 180.2  | 180.2  | 180.2  |
| 52.5° | 2466.4 | 1494.1 | 605.7  | 338.6  | 260.9  | 208.1  | 186.4  | 170.8  | 164.6  | 164.6  | 164.6  |
| 55°   | 2534.8 | 1497.2 | 584.0  | 316.8  | 239.2  | 195.7  | 174.0  | 158.4  | 152.2  | 149.1  | 149.1  |
| 57.5° | 2590.7 | 1494.1 | 562.2  | 295.1  | 220.5  | 180.2  | 158.4  | 146.0  | 136.7  | 133.6  | 133.6  |
| 60°   | 2621.7 | 1484.8 | 531.2  | 267.1  | 195.7  | 164.6  | 146.0  | 130.5  | 124.3  | 121.1  | 121.1  |
| 62.5° | 2603.1 | 1460.0 | 487.7  | 223.7  | 177.1  | 149.1  | 133.6  | 121.1  | 111.8  | 108.7  | 108.7  |
| 65°   | 2516.1 | 1410.3 | 431.8  | 183.3  | 158.4  | 133.6  | 121.1  | 108.7  | 96.3   | 93.2   | 93.2   |
| 67.5° | 2363.9 | 1326.4 | 357.2  | 155.3  | 146.0  | 121.1  | 108.7  | 96.3   | 87.0   | 80.8   | 80.8   |
| 70°   | 2152.7 | 1214.6 | 279.6  | 133.6  | 130.5  | 111.8  | 99.4   | 87.0   | 77.7   | 71.4   | 71.4   |
| 72.5° | 1851.4 | 1031.3 | 208.1  | 114.9  | 114.9  | 102.5  | 90.1   | 80.8   | 71.4   | 65.2   | 65.2   |
| 75°   | 1497.2 | 779.7  | 158.4  | 105.6  | 102.5  | 93.2   | 80.8   | 71.4   | 65.2   | 59.0   | 59.0   |
| 77.5° | 1093.4 | 518.8  | 130.5  | 96.3   | 96.3   | 83.9   | 74.6   | 65.2   | 59.0   | 55.9   | 55.9   |
| 80°   | 664.8  | 298.2  | 93.2   | 74.6   | 74.6   | 71.4   | 62.1   | 55.9   | 52.8   | 46.6   | 43.5   |
| 82.5° | 270.2  | 114.9  | 49.7   | 37.3   | 37.3   | 34.2   | 21.7   | 18.6   | 18.6   | 18.6   | 15.5   |
| 85°   | 28.0   | 18.6   | 12.4   | 9.3    | 9.3    | 9.3    | 6.2    | 6.2    | 6.2    | 6.2    | 6.2    |
| 87.5° | 9.3    | 9.3    | 6.2    | 6.2    | 6.2    | 6.2    | 3.1    | 3.1    | 3.1    | 3.1    | 3.1    |
| 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: SP1-2407-157-3

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-40-727-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-40-727-U-5WQ-2

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 08/20/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Streetworks  
 Catalog Number: **MEM2-HTN-SA-40-727-U-5WQ-2**  
 Description: Epic Modern Light Square 40W 5WQ Optic and Flare Trim

**Spectral Parameters**

CCT (K): 2747  
 CIE u': 0.2606  
 CIE v': 0.5257  
 Duv: -0.0005  
 CIE x: 0.4552  
 CIE y: 0.4082  
 CIE z: 0.1366  
 Peak Wavelength (nm): 597  
 Dominant Wavelength (nm): 584  
 Purity: 59.16856  
 R<sub>f</sub>: 75.5  
 R<sub>g</sub>: 93.6

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.7 |      |       |
| R1:       | 68.1 | R9:  | -35.3 |
| R2:       | 83.9 | R10: | 64.2  |
| R3:       | 94.7 | R11: | 61.7  |
| R4:       | 66.3 | R12: | 53.9  |
| R5:       | 67.4 | R13: | 71.2  |
| R6:       | 78.7 | R14: | 97.6  |
| R7:       | 75.0 | R15: | 59.3  |
| R8:       | 39.4 |      |       |



**Test Conditions**

Stabilization Time: 22M  
 Operation Time: 1H 22M  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2407-157-3

| 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: SP1-2407-157-3

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-2407-157-3

**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 103                      | NR            | 620    | 846                      | NR            | 750    | 20                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 130                      | NR            | 625    | 784                      | NR            | 755    | 17                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 171                      | NR            | 630    | 720                      | NR            | 760    | 15                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 221                      | NR            | 635    | 652                      | NR            | 765    | 13                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 268                      | NR            | 640    | 587                      | NR            | 770    | 11                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 313                      | NR            | 645    | 521                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 350                      | NR            | 650    | 461                      | NR            | 780    | 8                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 381                      | NR            | 655    | 406                      | NR            | 785    | 7                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 407                      | NR            | 660    | 353                      | NR            | 790    | 6                        | NR            | 920    | 0                        | NR            |
| 405    | 2                        | NR            | 535    | 435                      | NR            | 665    | 307                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 462                      | NR            | 670    | 264                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 9                        | NR            | 545    | 496                      | NR            | 675    | 227                      | NR            | 805    | 4                        | NR            | 935    | 0                        | NR            |
| 420    | 20                       | NR            | 550    | 534                      | NR            | 680    | 196                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 38                       | NR            | 555    | 582                      | NR            | 685    | 167                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 69                       | NR            | 560    | 638                      | NR            | 690    | 144                      | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 120                      | NR            | 565    | 700                      | NR            | 695    | 122                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 193                      | NR            | 570    | 767                      | NR            | 700    | 103                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 316                      | NR            | 575    | 836                      | NR            | 705    | 88                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 469                      | NR            | 580    | 898                      | NR            | 710    | 74                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 431                      | NR            | 585    | 947                      | NR            | 715    | 63                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 264                      | NR            | 590    | 982                      | NR            | 720    | 54                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 197                      | NR            | 595    | 997                      | NR            | 725    | 46                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 155                      | NR            | 600    | 997                      | NR            | 730    | 39                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 108                      | NR            | 605    | 978                      | NR            | 735    | 33                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 90                       | NR            | 610    | 947                      | NR            | 740    | 28                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 92                       | NR            | 615    | 900                      | NR            | 745    | 24                       | NR            | 875    | 1                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2407-157-3

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.13**

| 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    | 103                      | NR            | 620    | 846                      | NR            | 750    | 20                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 130                      | NR            | 625    | 784                      | NR            | 755    | 17                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 171                      | NR            | 630    | 720                      | NR            | 760    | 15                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 221                      | NR            | 635    | 652                      | NR            | 765    | 13                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 268                      | NR            | 640    | 587                      | NR            | 770    | 11                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 313                      | NR            | 645    | 521                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 350                      | NR            | 650    | 461                      | NR            | 780    | 8                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 381                      | NR            | 655    | 406                      | NR            | 785    | 7                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 407                      | NR            | 660    | 353                      | NR            | 790    | 6                        | NR            | 920    | 0                        | NR            |
| 405    | 2                        | NR            | 535    | 435                      | NR            | 665    | 307                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 462                      | NR            | 670    | 264                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 9                        | NR            | 545    | 496                      | NR            | 675    | 227                      | NR            | 805    | 4                        | NR            | 935    | 0                        | NR            |
| 420    | 20                       | NR            | 550    | 534                      | NR            | 680    | 196                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 38                       | NR            | 555    | 582                      | NR            | 685    | 167                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 69                       | NR            | 560    | 638                      | NR            | 690    | 144                      | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 120                      | NR            | 565    | 700                      | NR            | 695    | 122                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 193                      | NR            | 570    | 767                      | NR            | 700    | 103                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 316                      | NR            | 575    | 836                      | NR            | 705    | 88                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 469                      | NR            | 580    | 898                      | NR            | 710    | 74                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 431                      | NR            | 585    | 947                      | NR            | 715    | 63                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 264                      | NR            | 590    | 982                      | NR            | 720    | 54                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 197                      | NR            | 595    | 997                      | NR            | 725    | 46                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 155                      | NR            | 600    | 997                      | NR            | 730    | 39                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 108                      | NR            | 605    | 978                      | NR            | 735    | 33                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 90                       | NR            | 610    | 947                      | NR            | 740    | 28                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 92                       | NR            | 615    | 900                      | NR            | 745    | 24                       | NR            | 875    | 1                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2407-157-3

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR M/P: 2.04

| 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    | 103                      | NR            | 620    | 846                      | NR            | 750    | 20                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 130                      | NR            | 625    | 784                      | NR            | 755    | 17                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 171                      | NR            | 630    | 720                      | NR            | 760    | 15                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 221                      | NR            | 635    | 652                      | NR            | 765    | 13                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 268                      | NR            | 640    | 587                      | NR            | 770    | 11                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 313                      | NR            | 645    | 521                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 350                      | NR            | 650    | 461                      | NR            | 780    | 8                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 381                      | NR            | 655    | 406                      | NR            | 785    | 7                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 407                      | NR            | 660    | 353                      | NR            | 790    | 6                        | NR            | 920    | 0                        | NR            |
| 405    | 2                        | NR            | 535    | 435                      | NR            | 665    | 307                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 462                      | NR            | 670    | 264                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 9                        | NR            | 545    | 496                      | NR            | 675    | 227                      | NR            | 805    | 4                        | NR            | 935    | 0                        | NR            |
| 420    | 20                       | NR            | 550    | 534                      | NR            | 680    | 196                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 38                       | NR            | 555    | 582                      | NR            | 685    | 167                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 69                       | NR            | 560    | 638                      | NR            | 690    | 144                      | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 120                      | NR            | 565    | 700                      | NR            | 695    | 122                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 193                      | NR            | 570    | 767                      | NR            | 700    | 103                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 316                      | NR            | 575    | 836                      | NR            | 705    | 88                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 469                      | NR            | 580    | 898                      | NR            | 710    | 74                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 431                      | NR            | 585    | 947                      | NR            | 715    | 63                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 264                      | NR            | 590    | 982                      | NR            | 720    | 54                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 197                      | NR            | 595    | 997                      | NR            | 725    | 46                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 155                      | NR            | 600    | 997                      | NR            | 730    | 39                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 108                      | NR            | 605    | 978                      | NR            | 735    | 33                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 90                       | NR            | 610    | 947                      | NR            | 740    | 28                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 92                       | NR            | 615    | 900                      | NR            | 745    | 24                       | NR            | 875    | 1                        | NR            |        |                          |               |

**Summary**

$R_f = 75.5$   
 $R_g = 93.6$   
 $CIE R_a = 71.7$   
 $R_g = -35.3$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 87 | CES76 = 63 |
| CES02 = 63 | CES27 = 90 | CES52 = 85 | CES77 = 79 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 66 |
| CES04 = 71 | CES29 = 71 | CES54 = 86 | CES79 = 87 |
| CES05 = 50 | CES30 = 85 | CES55 = 84 | CES80 = 85 |
| CES06 = 52 | CES31 = 74 | CES56 = 75 | CES81 = 67 |
| CES07 = 42 | CES32 = 66 | CES57 = 75 | CES82 = 93 |
| CES08 = 41 | CES33 = 80 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 79 | CES59 = 85 | CES84 = 89 |
| CES10 = 77 | CES35 = 89 | CES60 = 90 | CES85 = 72 |
| CES11 = 60 | CES36 = 93 | CES61 = 81 | CES86 = 59 |
| CES12 = 66 | CES37 = 88 | CES62 = 91 | CES87 = 77 |
| CES13 = 43 | CES38 = 93 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 97 | CES64 = 67 | CES89 = 65 |
| CES15 = 72 | CES40 = 93 | CES65 = 66 | CES90 = 80 |
| CES16 = 48 | CES41 = 93 | CES66 = 63 | CES91 = 80 |
| CES17 = 51 | CES42 = 89 | CES67 = 61 | CES92 = 55 |
| CES18 = 57 | CES43 = 78 | CES68 = 68 | CES93 = 72 |
| CES19 = 73 | CES44 = 99 | CES69 = 78 | CES94 = 48 |
| CES20 = 67 | CES45 = 85 | CES70 = 63 | CES95 = 66 |
| CES21 = 88 | CES46 = 81 | CES71 = 61 | CES96 = 76 |
| CES22 = 80 | CES47 = 86 | CES72 = 86 | CES97 = 81 |
| CES23 = 92 | CES48 = 74 | CES73 = 56 | CES98 = 76 |
| CES24 = 91 | CES49 = 79 | CES74 = 93 | CES99 = 64 |
| CES25 = 73 | CES50 = 86 | CES75 = 66 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)