

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: P868899

Luminaire Tested: **EMM2-HSN-SA3B-750-U-T2U**

Issue Date: 08/22/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P868899  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/22/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: EMM2-HSN-SA3B-750-U-T2U  
Description: EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 150W 70CRI 5000K  
FITXURE w/ TYPE II URBAN DISTRIBUTION OPTIC  
Light Source: (30) 5000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

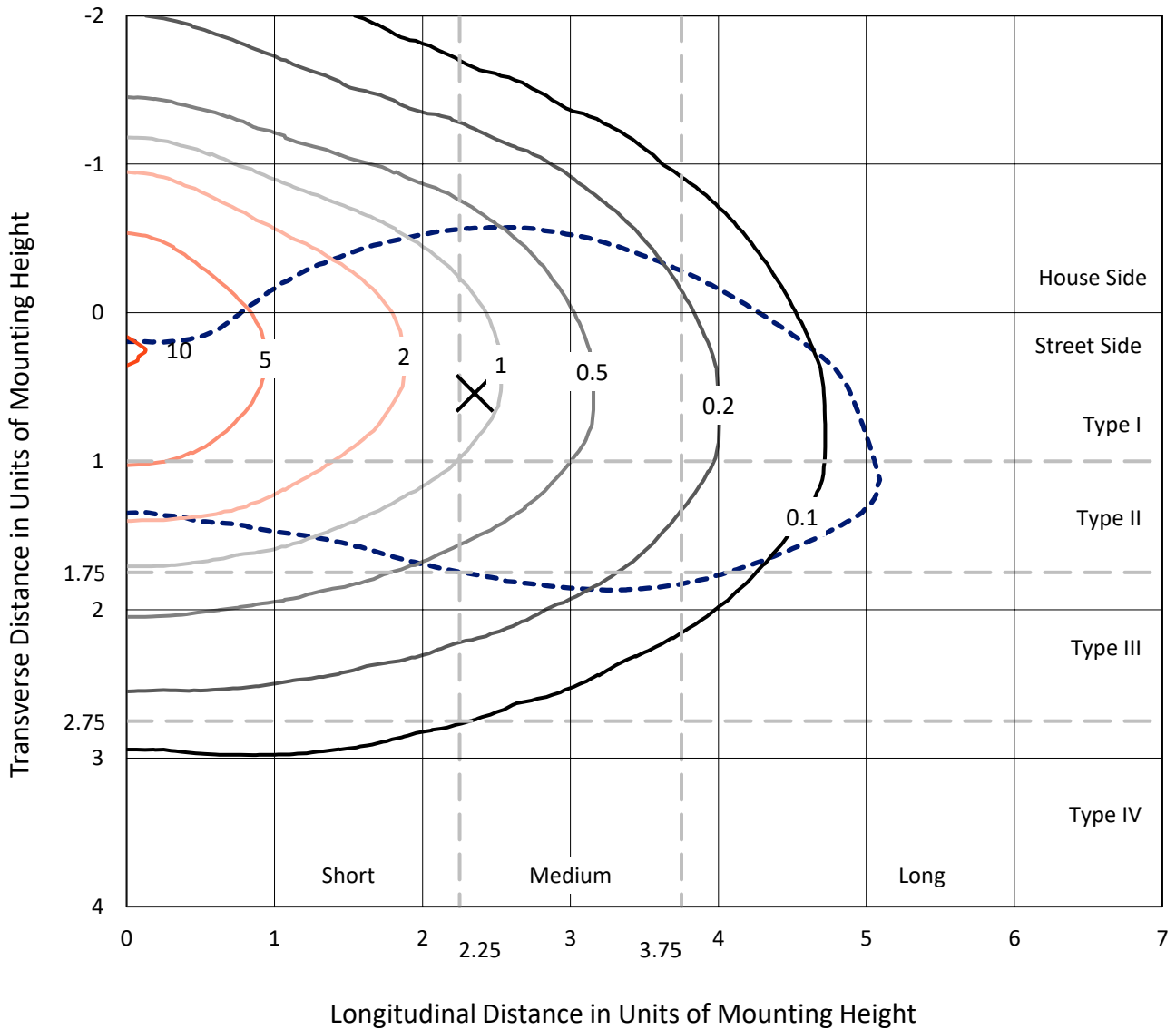
Lumens per Lamp: N/A  
Luminaire Lumens: 18975.1 lumens  
Efficiency: N/A  
Efficacy: 141.6 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.33' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G3

Input Watts (W): 134  
Input Voltage (V): 120  
Input Current (A<sub>in</sub>): 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

REPORT NUMBER: P868899  
 CATALOG NUMBER: EMM2-HSN-SA3B-750-U-T2U

### Iso-Footcandle Lines of Horizontal Illumination

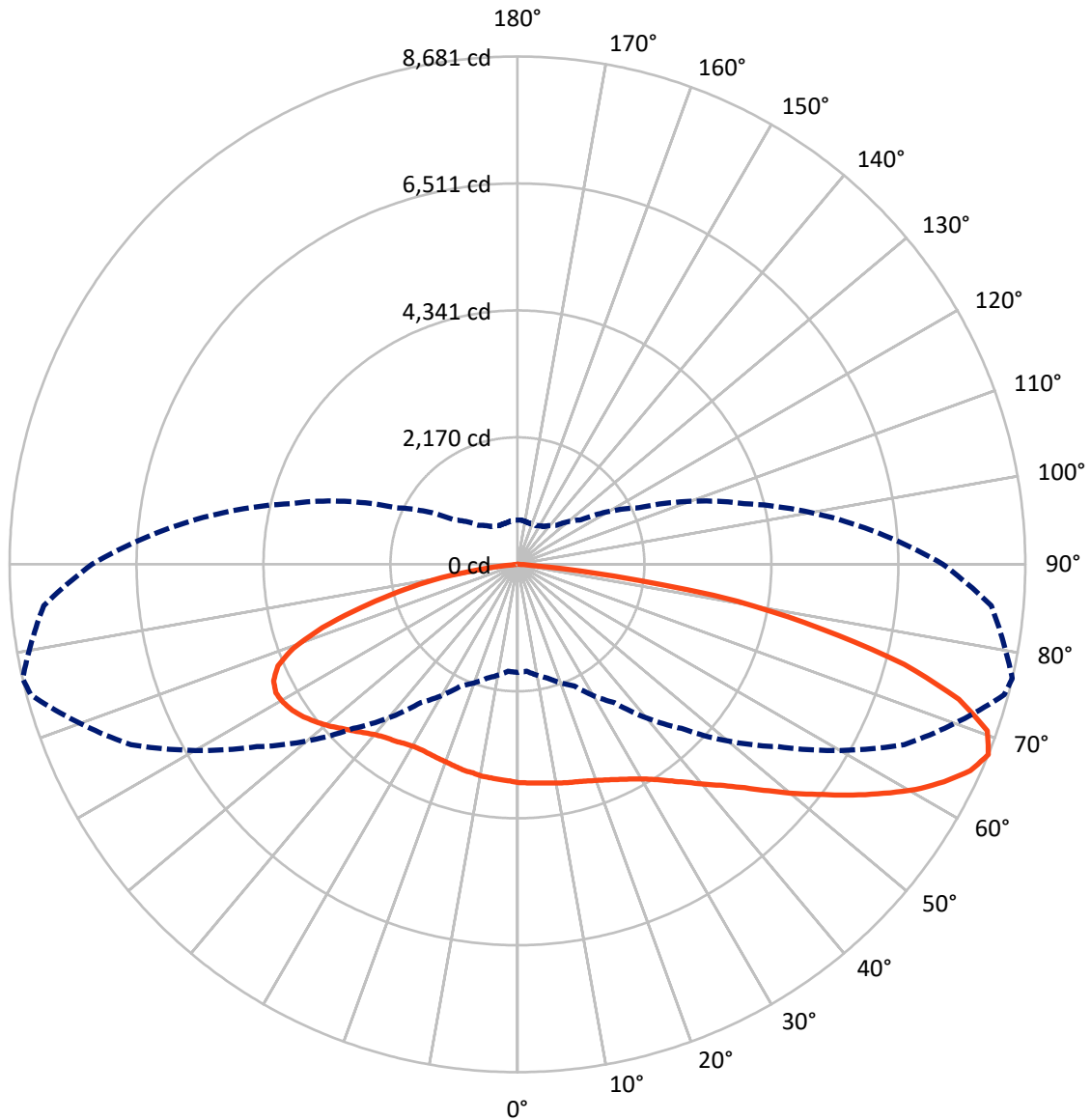
✕ Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 10.2 fc  
 Type III - Medium - N/A

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### Luminous Intensity Polar Plot



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

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 6309.9   | 0.0    | 6309.9  |
|                    | % Fixture | 33.3     | 0.0    | 33.3    |
| <b>Street Side</b> | Lumens    | 12665.2  | 0.0    | 12665.2 |
|                    | % Fixture | 66.7     | 0.0    | 66.7    |
| <b>Total</b>       | Lumens    | 18975.1  | 0.0    | 18975.1 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 358.6   | 1.9       |
| 10°-20°   | 1087.5  | 5.7       |
| 20°-30°   | 1833.4  | 9.7       |
| 30°-40°   | 2601.7  | 13.7      |
| 40°-50°   | 3291.7  | 17.3      |
| 50°-60°   | 3605.9  | 19.0      |
| 60°-70°   | 3485.7  | 18.4      |
| 70°-80°   | 2344.3  | 12.4      |
| 80°-90°   | 366.4   | 1.9       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 18975.1 | 100.0     |
| 0°-180°   | 18975.1 | 100.0     |

**Coefficient of Utilization**



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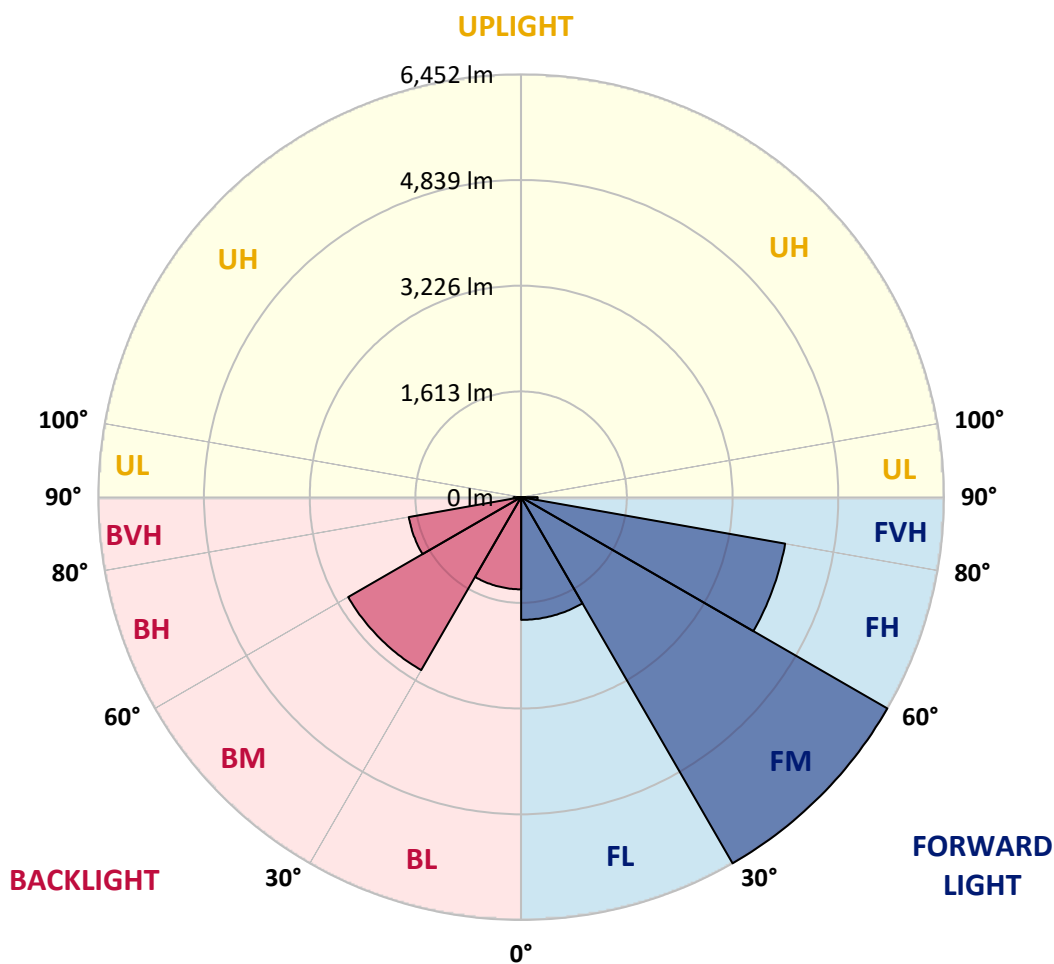
CATALOG NUMBER: EMM2-HSN-SA3B-750-U-T2U

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1872.9 | 9.9       |                         |      |         |
| FM (30°-60°)   | 6451.7 | 34.0      |                         |      |         |
| FH (60°-80°)   | 4089.7 | 21.6      |                         |      | G2/5000 |
| FVH (80°-90°)  | 250.9  | 1.3       |                         |      | G3/500  |
| BL (0°-30°)    | 1406.6 | 7.4       | B3/2500                 |      |         |
| BM (30°-60°)   | 3047.5 | 16.1      | B3/5000                 |      |         |
| BH (60°-80°)   | 1740.3 | 9.2       | B3/2500                 |      | G3/2500 |
| BVH (80°-90°)  | 115.5  | 0.6       |                         |      | G2/225  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**

Type III Medium





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CATALOG NUMBER: EMM2-HSN-SA3B-750-U-T2U

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 77°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 |
| 2.5°  | 3813.3 | 3809.5 | 3790.7 | 3798.3 | 3775.7 | 3790.7 | 3768.2 | 3749.5 | 3745.7 | 3742.0 | 3745.7 |
| 5°    | 3933.4 | 3914.6 | 3895.8 | 3884.6 | 3865.8 | 3858.3 | 3820.8 | 3783.2 | 3760.7 | 3757.0 | 3749.5 |
| 7.5°  | 4072.2 | 4064.7 | 4038.5 | 4023.4 | 3970.9 | 3944.6 | 3892.1 | 3824.5 | 3790.7 | 3775.7 | 3757.0 |
| 10°   | 4214.9 | 4233.6 | 4199.9 | 4169.8 | 4109.8 | 4053.5 | 3963.4 | 3877.1 | 3809.5 | 3802.0 | 3760.7 |
| 12.5° | 4391.3 | 4387.5 | 4365.0 | 4312.4 | 4241.1 | 4162.3 | 4053.5 | 3933.4 | 3843.3 | 3828.3 | 3768.2 |
| 15°   | 4548.9 | 4545.1 | 4515.1 | 4466.3 | 4372.5 | 4274.9 | 4128.5 | 3989.7 | 3877.1 | 3854.6 | 3783.2 |
| 17.5° | 4695.3 | 4687.8 | 4669.0 | 4616.5 | 4500.1 | 4380.0 | 4237.4 | 4053.5 | 3918.4 | 3892.1 | 3794.5 |
| 20°   | 4822.9 | 4830.4 | 4807.9 | 4755.3 | 4646.5 | 4518.9 | 4338.7 | 4136.0 | 3970.9 | 3940.9 | 3828.3 |
| 22.5° | 4961.8 | 4965.5 | 4954.2 | 4935.5 | 4796.6 | 4661.5 | 4466.3 | 4229.9 | 4031.0 | 4000.9 | 3865.8 |
| 25°   | 5108.1 | 5111.9 | 5119.4 | 5108.1 | 4950.5 | 4804.1 | 4597.7 | 4346.2 | 4113.5 | 4072.2 | 3918.4 |
| 27.5° | 5277.0 | 5280.8 | 5295.8 | 5273.3 | 5104.4 | 4950.5 | 4744.1 | 4470.1 | 4199.9 | 4154.8 | 3963.4 |
| 30°   | 5468.4 | 5483.5 | 5472.2 | 5464.7 | 5269.5 | 5119.4 | 4890.4 | 4597.7 | 4312.4 | 4256.1 | 4042.2 |
| 32.5° | 5697.4 | 5693.6 | 5671.1 | 5648.6 | 5449.7 | 5292.0 | 5055.6 | 4762.8 | 4451.3 | 4387.5 | 4169.8 |
| 35°   | 5862.5 | 5862.5 | 5828.7 | 5817.5 | 5633.6 | 5468.4 | 5235.7 | 4946.7 | 4609.0 | 4548.9 | 4304.9 |
| 37.5° | 5963.9 | 5978.9 | 5952.6 | 5960.1 | 5783.7 | 5629.8 | 5415.9 | 5134.4 | 4781.6 | 4729.1 | 4470.1 |
| 40°   | 6001.4 | 6038.9 | 6061.4 | 6091.5 | 5915.1 | 5783.7 | 5607.3 | 5337.1 | 5003.0 | 4943.0 | 4669.0 |
| 42.5° | 6008.9 | 6065.2 | 6144.0 | 6207.8 | 6008.9 | 5900.1 | 5791.2 | 5543.5 | 5220.7 | 5168.2 | 4886.7 |
| 45°   | 5971.4 | 5945.1 | 6136.5 | 6144.0 | 6061.4 | 5993.9 | 5952.6 | 5791.2 | 5536.0 | 5449.7 | 5156.9 |
| 47.5° | 5686.1 | 5656.1 | 5708.6 | 5948.9 | 5997.6 | 6035.2 | 6117.7 | 6080.2 | 5851.3 | 5783.7 | 5468.4 |
| 50°   | 5224.5 | 5209.5 | 5419.6 | 5678.6 | 5840.0 | 6031.4 | 6252.9 | 6358.0 | 6200.3 | 6159.0 | 5862.5 |
| 52.5° | 4462.6 | 4421.3 | 4849.2 | 5352.1 | 5633.6 | 5993.9 | 6346.7 | 6643.2 | 6594.4 | 6534.4 | 6200.3 |
| 55°   | 3978.4 | 3978.4 | 4267.4 | 4894.2 | 5370.9 | 5858.8 | 6406.7 | 6943.5 | 7029.8 | 6962.2 | 6586.9 |
| 57.5° | 3460.5 | 3501.8 | 3802.0 | 4233.6 | 4991.8 | 5611.1 | 6399.2 | 7194.9 | 7450.1 | 7386.3 | 6996.0 |
| 60°   | 3017.6 | 3051.4 | 3224.0 | 3659.4 | 4545.1 | 5284.5 | 6316.7 | 7401.3 | 7840.5 | 7818.0 | 7356.3 |
| 62.5° | 2567.2 | 2608.5 | 2747.4 | 3156.5 | 3955.9 | 4909.2 | 6144.0 | 7513.9 | 8208.3 | 8185.8 | 7720.4 |
| 65°   | 2206.9 | 2210.6 | 2349.5 | 2691.1 | 3366.6 | 4455.1 | 5840.0 | 7491.4 | 8493.5 | 8508.5 | 8028.1 |
| 67.5° | 1846.6 | 1835.3 | 2015.5 | 2293.2 | 2886.2 | 3967.2 | 5434.7 | 7292.5 | 8613.6 | 8681.2 | 8129.5 |
| 70°   | 1358.7 | 1373.7 | 1625.1 | 1932.9 | 2439.6 | 3404.2 | 4867.9 | 6905.9 | 8418.5 | 8523.6 | 7896.8 |
| 72.5° | 1020.9 | 1050.9 | 1294.9 | 1613.9 | 2038.0 | 2841.2 | 4248.6 | 6234.1 | 7874.3 | 7889.3 | 7187.4 |
| 75°   | 829.5  | 837.0  | 1054.7 | 1339.9 | 1670.2 | 2278.2 | 3411.7 | 5205.7 | 6658.2 | 6830.9 | 6106.5 |
| 77.5° | 705.6  | 698.1  | 803.2  | 1080.9 | 1347.4 | 1820.3 | 2571.0 | 3959.6 | 5228.2 | 5307.0 | 4781.6 |
| 80°   | 600.5  | 596.8  | 634.3  | 874.5  | 1054.7 | 1298.6 | 1760.3 | 2758.6 | 3730.7 | 3817.0 | 3396.7 |
| 82.5° | 315.3  | 337.8  | 330.3  | 540.5  | 596.8  | 683.1  | 844.5  | 1253.6 | 1628.9 | 1651.4 | 1561.3 |
| 85°   | 15.0   | 15.0   | 15.0   | 22.5   | 37.5   | 60.1   | 116.3  | 116.3  | 127.6  | 244.0  | 277.7  |
| 87.5° | 3.8    | 3.8    | 7.5    | 7.5    | 7.5    | 11.3   | 11.3   | 15.0   | 15.0   | 15.0   | 15.0   |
| 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: P868899

CATALOG NUMBER: EMM2-HSN-SA3B-750-U-T2U

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 | 3730.7 |
| 2.5°  | 3738.2 | 3723.2 | 3700.7 | 3704.4 | 3700.7 | 3700.7 | 3681.9 | 3666.9 | 3663.1 | 3670.6 | 3685.7 |
| 5°    | 3742.0 | 3719.4 | 3685.7 | 3674.4 | 3663.1 | 3655.6 | 3625.6 | 3603.1 | 3591.8 | 3599.3 | 3603.1 |
| 7.5°  | 3742.0 | 3708.2 | 3670.6 | 3648.1 | 3618.1 | 3595.6 | 3561.8 | 3531.8 | 3516.8 | 3520.5 | 3528.0 |
| 10°   | 3734.5 | 3696.9 | 3666.9 | 3621.9 | 3573.1 | 3546.8 | 3494.2 | 3456.7 | 3437.9 | 3441.7 | 3422.9 |
| 12.5° | 3734.5 | 3693.2 | 3633.1 | 3591.8 | 3524.3 | 3468.0 | 3426.7 | 3385.4 | 3370.4 | 3355.4 | 3347.9 |
| 15°   | 3738.2 | 3685.7 | 3625.6 | 3539.3 | 3460.5 | 3400.4 | 3347.9 | 3321.6 | 3299.1 | 3291.6 | 3295.3 |
| 17.5° | 3738.2 | 3685.7 | 3595.6 | 3494.2 | 3404.2 | 3329.1 | 3284.1 | 3254.0 | 3246.5 | 3239.0 | 3239.0 |
| 20°   | 3757.0 | 3689.4 | 3569.3 | 3449.2 | 3336.6 | 3257.8 | 3216.5 | 3197.7 | 3197.7 | 3186.5 | 3186.5 |
| 22.5° | 3787.0 | 3696.9 | 3554.3 | 3411.7 | 3280.3 | 3194.0 | 3148.9 | 3126.4 | 3137.7 | 3130.2 | 3126.4 |
| 25°   | 3820.8 | 3723.2 | 3535.5 | 3359.1 | 3205.2 | 3115.2 | 3070.1 | 3055.1 | 3051.4 | 3032.6 | 3058.9 |
| 27.5° | 3847.0 | 3742.0 | 3524.3 | 3306.6 | 3137.7 | 3032.6 | 2976.3 | 2950.0 | 2931.3 | 2938.8 | 2931.3 |
| 30°   | 3918.4 | 3794.5 | 3528.0 | 3261.5 | 3062.6 | 2935.0 | 2867.5 | 2837.4 | 2829.9 | 2829.9 | 2829.9 |
| 32.5° | 4015.9 | 3862.1 | 3554.3 | 3242.8 | 2991.3 | 2841.2 | 2758.6 | 2728.6 | 2721.1 | 2706.1 | 2713.6 |
| 35°   | 4139.8 | 3963.4 | 3595.6 | 3212.8 | 2935.0 | 2732.3 | 2642.3 | 2601.0 | 2589.7 | 2574.7 | 2574.7 |
| 37.5° | 4278.7 | 4064.7 | 3625.6 | 3197.7 | 2860.0 | 2619.7 | 2518.4 | 2465.9 | 2458.4 | 2443.3 | 2450.9 |
| 40°   | 4455.1 | 4203.6 | 3674.4 | 3167.7 | 2773.6 | 2518.4 | 2383.3 | 2297.0 | 2315.7 | 2323.2 | 2338.3 |
| 42.5° | 4654.0 | 4380.0 | 3749.5 | 3137.7 | 2706.1 | 2413.3 | 2214.4 | 2128.1 | 2150.6 | 2143.1 | 2158.1 |
| 45°   | 4924.2 | 4586.4 | 3843.3 | 3126.4 | 2623.5 | 2285.7 | 2041.8 | 1944.2 | 1936.7 | 1925.4 | 1932.9 |
| 47.5° | 5205.7 | 4834.1 | 3933.4 | 3103.9 | 2533.4 | 2128.1 | 1846.6 | 1722.7 | 1692.7 | 1677.7 | 1662.7 |
| 50°   | 5498.5 | 5081.9 | 4038.5 | 3088.9 | 2413.3 | 1951.7 | 1651.4 | 1508.8 | 1452.5 | 1433.7 | 1415.0 |
| 52.5° | 5828.7 | 5348.3 | 4128.5 | 3051.4 | 2282.0 | 1767.8 | 1475.0 | 1313.6 | 1249.8 | 1212.3 | 1216.0 |
| 55°   | 6177.8 | 5592.3 | 4211.1 | 3006.3 | 2131.8 | 1595.1 | 1298.6 | 1163.5 | 1099.7 | 1088.4 | 1088.4 |
| 57.5° | 6500.6 | 5843.8 | 4271.2 | 2927.5 | 1981.7 | 1426.2 | 1152.2 | 1035.9 | 1005.9 | 1020.9 | 1020.9 |
| 60°   | 6830.9 | 6046.4 | 4301.2 | 2841.2 | 1827.8 | 1283.6 | 1050.9 | 957.1  | 942.1  | 972.1  | 975.8  |
| 62.5° | 7097.3 | 6207.8 | 4293.7 | 2721.1 | 1658.9 | 1159.7 | 953.3  | 878.3  | 885.8  | 938.3  | 949.6  |
| 65°   | 7288.7 | 6286.6 | 4199.9 | 2540.9 | 1497.5 | 1050.9 | 867.0  | 795.7  | 795.7  | 833.2  | 844.5  |
| 67.5° | 7273.7 | 6185.3 | 4012.2 | 2289.5 | 1324.9 | 942.1  | 788.2  | 731.9  | 731.9  | 758.1  | 754.4  |
| 70°   | 6966.0 | 5836.3 | 3655.6 | 1985.5 | 1156.0 | 848.2  | 720.6  | 679.3  | 675.6  | 686.8  | 683.1  |
| 72.5° | 6226.6 | 5126.9 | 3100.2 | 1640.2 | 998.4  | 754.4  | 653.1  | 615.5  | 608.0  | 593.0  | 581.7  |
| 75°   | 5138.2 | 4211.1 | 2420.8 | 1306.1 | 844.5  | 664.3  | 589.3  | 555.5  | 525.5  | 544.2  | 533.0  |
| 77.5° | 3985.9 | 3231.5 | 1801.5 | 1013.4 | 686.8  | 578.0  | 525.5  | 487.9  | 480.4  | 548.0  | 525.5  |
| 80°   | 2908.7 | 2233.2 | 1272.3 | 724.4  | 533.0  | 469.2  | 439.1  | 409.1  | 517.9  | 694.3  | 690.6  |
| 82.5° | 1291.1 | 1077.2 | 581.7  | 345.3  | 247.7  | 206.4  | 172.6  | 195.2  | 326.5  | 319.0  | 330.3  |
| 85°   | 116.3  | 120.1  | 63.8   | 41.3   | 26.3   | 22.5   | 15.0   | 15.0   | 11.3   | 11.3   | 11.3   |
| 87.5° | 15.0   | 15.0   | 11.3   | 11.3   | 7.5    | 7.5    | 7.5    | 7.5    | 3.8    | 3.8    | 3.8    |
| 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: SP1-2407-157-6

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-40-750-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-40-750-U-5WQ-2

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-6  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 08/20/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Streetworks  
 Catalog Number: **MEM2-HTN-SA-40-750-U-5WQ-2**  
 Description: Epic Modern Light Square 40W 5WQ Optic and Flare Trim

**Spectral Parameters**

CCT (K): 5094  
 CIE u': 0.2082  
 CIE v': 0.4867  
 Duv: 0.0032  
 CIE x: 0.3430  
 CIE y: 0.3564  
 CIE z: 0.3006  
 Peak Wavelength (nm): 451  
 Dominant Wavelength (nm): 568  
 Purity: 9.86439  
 Rf: 73.7  
 Rg: 93

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 72.0 |      |       |
| R1:       | 68.6 | R9:  | -39.6 |
| R2:       | 78.1 | R10: | 47.6  |
| R3:       | 84.6 | R11: | 68.2  |
| R4:       | 71.6 | R12: | 41.4  |
| R5:       | 69.6 | R13: | 70.4  |
| R6:       | 69.4 | R14: | 91.4  |
| R7:       | 80.9 | R15: | 61.4  |
| R8:       | 53.1 |      |       |



**Test Conditions**

Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 24.2

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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 5000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 114                      | NR            | 620    | 361                      | NR            | 750    | 9                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 145                      | NR            | 625    | 326                      | NR            | 755    | 8                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 197                      | NR            | 630    | 294                      | NR            | 760    | 7                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 259                      | NR            | 635    | 261                      | NR            | 765    | 6                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 319                      | NR            | 640    | 232                      | NR            | 770    | 5                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 373                      | NR            | 645    | 204                      | NR            | 775    | 4                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 414                      | NR            | 650    | 179                      | NR            | 780    | 4                        | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 445                      | NR            | 655    | 157                      | NR            | 785    | 3                        | NR            | 915    | 0                        | NR            |
| 400    | 3                        | NR            | 530    | 465                      | NR            | 660    | 136                      | NR            | 790    | 3                        | NR            | 920    | 0                        | NR            |
| 405    | 5                        | NR            | 535    | 482                      | NR            | 665    | 118                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 9                        | NR            | 540    | 493                      | NR            | 670    | 102                      | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 18                       | NR            | 545    | 505                      | NR            | 675    | 87                       | NR            | 805    | 2                        | NR            | 935    | 0                        | NR            |
| 420    | 36                       | NR            | 550    | 515                      | NR            | 680    | 75                       | NR            | 810    | 2                        | NR            | 940    | 0                        | NR            |
| 425    | 72                       | NR            | 555    | 527                      | NR            | 685    | 65                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 134                      | NR            | 560    | 540                      | NR            | 690    | 56                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 242                      | NR            | 565    | 550                      | NR            | 695    | 48                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 407                      | NR            | 570    | 557                      | NR            | 700    | 41                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 684                      | NR            | 575    | 561                      | NR            | 705    | 35                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 988                      | NR            | 580    | 559                      | NR            | 710    | 30                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 828                      | NR            | 585    | 551                      | NR            | 715    | 26                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 473                      | NR            | 590    | 537                      | NR            | 720    | 22                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 333                      | NR            | 595    | 516                      | NR            | 725    | 19                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 232                      | NR            | 600    | 491                      | NR            | 730    | 16                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 146                      | NR            | 605    | 461                      | NR            | 735    | 14                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 113                      | NR            | 610    | 429                      | NR            | 740    | 12                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 106                      | NR            | 615    | 395                      | NR            | 745    | 10                       | NR            | 875    | 0                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2407-157-6

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.81**

| 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    | 114                      | NR            | 620    | 361                      | NR            | 750    | 9                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 145                      | NR            | 625    | 326                      | NR            | 755    | 8                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 197                      | NR            | 630    | 294                      | NR            | 760    | 7                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 259                      | NR            | 635    | 261                      | NR            | 765    | 6                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 319                      | NR            | 640    | 232                      | NR            | 770    | 5                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 373                      | NR            | 645    | 204                      | NR            | 775    | 4                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 414                      | NR            | 650    | 179                      | NR            | 780    | 4                        | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 445                      | NR            | 655    | 157                      | NR            | 785    | 3                        | NR            | 915    | 0                        | NR            |
| 400    | 3                        | NR            | 530    | 465                      | NR            | 660    | 136                      | NR            | 790    | 3                        | NR            | 920    | 0                        | NR            |
| 405    | 5                        | NR            | 535    | 482                      | NR            | 665    | 118                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 9                        | NR            | 540    | 493                      | NR            | 670    | 102                      | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 18                       | NR            | 545    | 505                      | NR            | 675    | 87                       | NR            | 805    | 2                        | NR            | 935    | 0                        | NR            |
| 420    | 36                       | NR            | 550    | 515                      | NR            | 680    | 75                       | NR            | 810    | 2                        | NR            | 940    | 0                        | NR            |
| 425    | 72                       | NR            | 555    | 527                      | NR            | 685    | 65                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 134                      | NR            | 560    | 540                      | NR            | 690    | 56                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 242                      | NR            | 565    | 550                      | NR            | 695    | 48                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 407                      | NR            | 570    | 557                      | NR            | 700    | 41                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 684                      | NR            | 575    | 561                      | NR            | 705    | 35                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 988                      | NR            | 580    | 559                      | NR            | 710    | 30                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 828                      | NR            | 585    | 551                      | NR            | 715    | 26                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 473                      | NR            | 590    | 537                      | NR            | 720    | 22                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 333                      | NR            | 595    | 516                      | NR            | 725    | 19                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 232                      | NR            | 600    | 491                      | NR            | 730    | 16                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 146                      | NR            | 605    | 461                      | NR            | 735    | 14                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 113                      | NR            | 610    | 429                      | NR            | 740    | 12                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 106                      | NR            | 615    | 395                      | NR            | 745    | 10                       | NR            | 875    | 0                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2407-157-6

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 3.73

| 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    | 114                      | NR            | 620    | 361                      | NR            | 750    | 9                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 145                      | NR            | 625    | 326                      | NR            | 755    | 8                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 197                      | NR            | 630    | 294                      | NR            | 760    | 7                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 259                      | NR            | 635    | 261                      | NR            | 765    | 6                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 319                      | NR            | 640    | 232                      | NR            | 770    | 5                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 373                      | NR            | 645    | 204                      | NR            | 775    | 4                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 414                      | NR            | 650    | 179                      | NR            | 780    | 4                        | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 445                      | NR            | 655    | 157                      | NR            | 785    | 3                        | NR            | 915    | 0                        | NR            |
| 400    | 3                        | NR            | 530    | 465                      | NR            | 660    | 136                      | NR            | 790    | 3                        | NR            | 920    | 0                        | NR            |
| 405    | 5                        | NR            | 535    | 482                      | NR            | 665    | 118                      | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 9                        | NR            | 540    | 493                      | NR            | 670    | 102                      | NR            | 800    | 2                        | NR            | 930    | 0                        | NR            |
| 415    | 18                       | NR            | 545    | 505                      | NR            | 675    | 87                       | NR            | 805    | 2                        | NR            | 935    | 0                        | NR            |
| 420    | 36                       | NR            | 550    | 515                      | NR            | 680    | 75                       | NR            | 810    | 2                        | NR            | 940    | 0                        | NR            |
| 425    | 72                       | NR            | 555    | 527                      | NR            | 685    | 65                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 134                      | NR            | 560    | 540                      | NR            | 690    | 56                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 242                      | NR            | 565    | 550                      | NR            | 695    | 48                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 407                      | NR            | 570    | 557                      | NR            | 700    | 41                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 684                      | NR            | 575    | 561                      | NR            | 705    | 35                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 988                      | NR            | 580    | 559                      | NR            | 710    | 30                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 828                      | NR            | 585    | 551                      | NR            | 715    | 26                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 473                      | NR            | 590    | 537                      | NR            | 720    | 22                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 333                      | NR            | 595    | 516                      | NR            | 725    | 19                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 232                      | NR            | 600    | 491                      | NR            | 730    | 16                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 146                      | NR            | 605    | 461                      | NR            | 735    | 14                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 113                      | NR            | 610    | 429                      | NR            | 740    | 12                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 106                      | NR            | 615    | 395                      | NR            | 745    | 10                       | NR            | 875    | 0                        | NR            |        |                          |               |

**Summary**

$R_f = 73.7$   
 $R_g = 93$   
 $CIE R_a = 72.0$   
 $R_9 = -39.6$



**Color Vector Graphics**



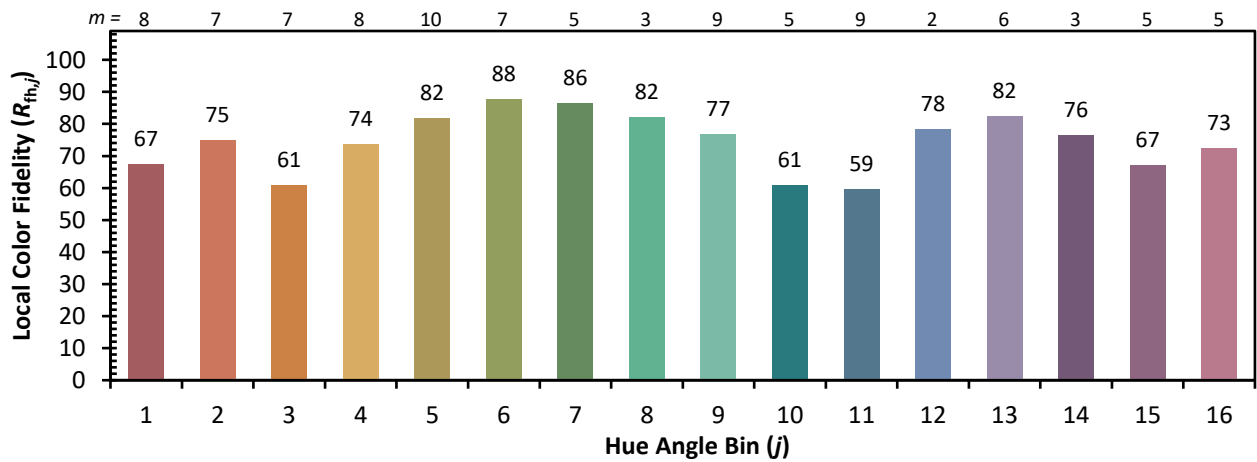


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 62 | CES51 = 90 | CES76 = 50 |
| CES02 = 59 | CES27 = 88 | CES52 = 89 | CES77 = 67 |
| CES03 = 30 | CES28 = 80 | CES53 = 79 | CES78 = 53 |
| CES04 = 69 | CES29 = 69 | CES54 = 84 | CES79 = 80 |
| CES05 = 46 | CES30 = 88 | CES55 = 83 | CES80 = 77 |
| CES06 = 50 | CES31 = 72 | CES56 = 74 | CES81 = 78 |
| CES07 = 38 | CES32 = 62 | CES57 = 73 | CES82 = 90 |
| CES08 = 38 | CES33 = 82 | CES58 = 73 | CES83 = 90 |
| CES09 = 29 | CES34 = 69 | CES59 = 86 | CES84 = 85 |
| CES10 = 72 | CES35 = 83 | CES60 = 88 | CES85 = 77 |
| CES11 = 56 | CES36 = 87 | CES61 = 82 | CES86 = 75 |
| CES12 = 61 | CES37 = 78 | CES62 = 81 | CES87 = 76 |
| CES13 = 41 | CES38 = 98 | CES63 = 73 | CES88 = 81 |
| CES14 = 74 | CES39 = 96 | CES64 = 63 | CES89 = 72 |
| CES15 = 70 | CES40 = 91 | CES65 = 60 | CES90 = 80 |
| CES16 = 46 | CES41 = 96 | CES66 = 56 | CES91 = 71 |
| CES17 = 49 | CES42 = 79 | CES67 = 53 | CES92 = 58 |
| CES18 = 55 | CES43 = 78 | CES68 = 63 | CES93 = 74 |
| CES19 = 71 | CES44 = 99 | CES69 = 72 | CES94 = 52 |
| CES20 = 63 | CES45 = 86 | CES70 = 55 | CES95 = 64 |
| CES21 = 85 | CES46 = 85 | CES71 = 46 | CES96 = 76 |
| CES22 = 77 | CES47 = 89 | CES72 = 82 | CES97 = 86 |
| CES23 = 91 | CES48 = 80 | CES73 = 45 | CES98 = 76 |
| CES24 = 90 | CES49 = 83 | CES74 = 90 | CES99 = 62 |
| CES25 = 71 | CES50 = 89 | CES75 = 48 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)