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: P868457

Luminaire Tested: **EMM2-HTN-SA3A-727-U-T2U**

Issue Date: 08/22/2024

Report Generated By 670245763

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

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | P868457 |
| Test Lab: | INNOVATION CENTER(G3) |
| Issue Date: | 08/22/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | INVUE |
| Catalog Number: | EMM2-HTN-SA3A-727-U-T2U |
| Description: | EPIC MODERN TALL HOUSING DISCRETE LED ARRAYS 130W 70CRI 2700K FIXTURE w/ TYPE II URBAN DISTRIBUTION OPTIC |
| Light Source: | (30) 2700K CCT, 70 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 15705.4 lumens |
| Efficiency: | N/A |
| Efficacy: | 139.0 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 0.33' x H: 0') |
| IES Classification: | Type III - Medium |
| BUG Rating: | B3 - U0 - G3 |

| | |
|---|---|
| Input Watts (W): | 113 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | 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 |

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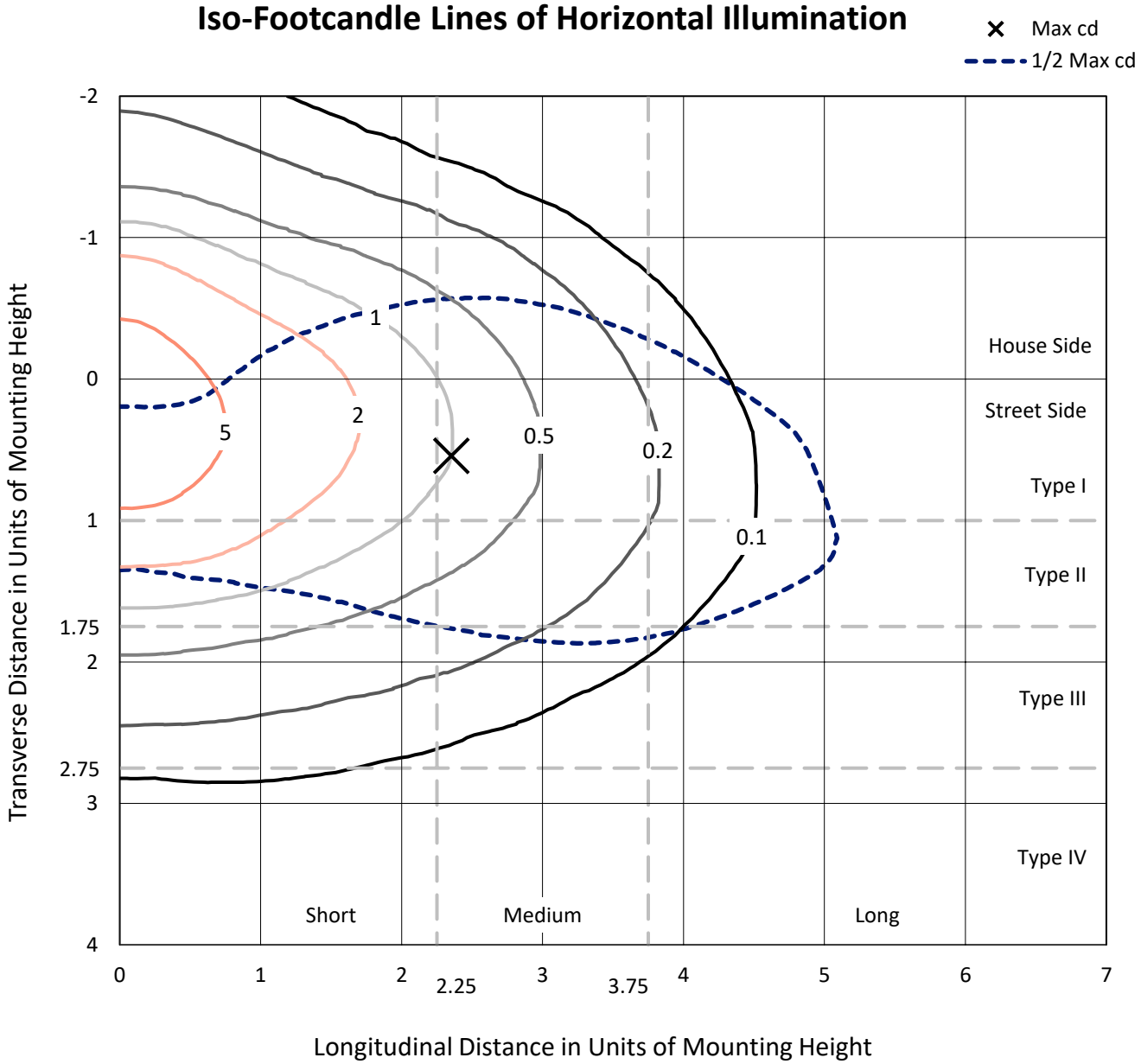
Scaled Data Report

REPORT NUMBER: P868457
CATALOG NUMBER: EMM2-HTN-SA3A-727-U-T2U

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 8.5 fc
Type III - Medium - N/A

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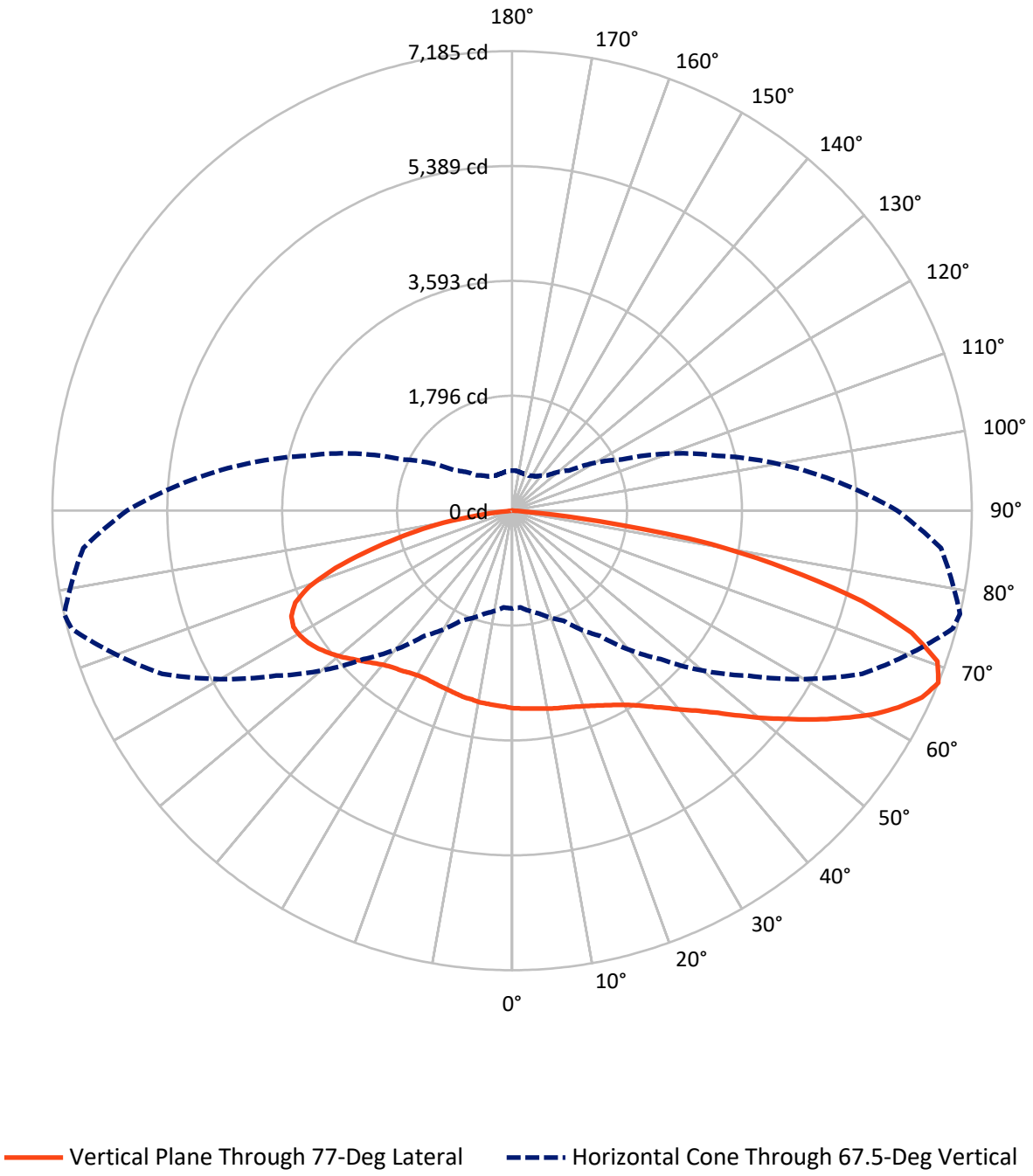
## Luminous Intensity Polar Plot



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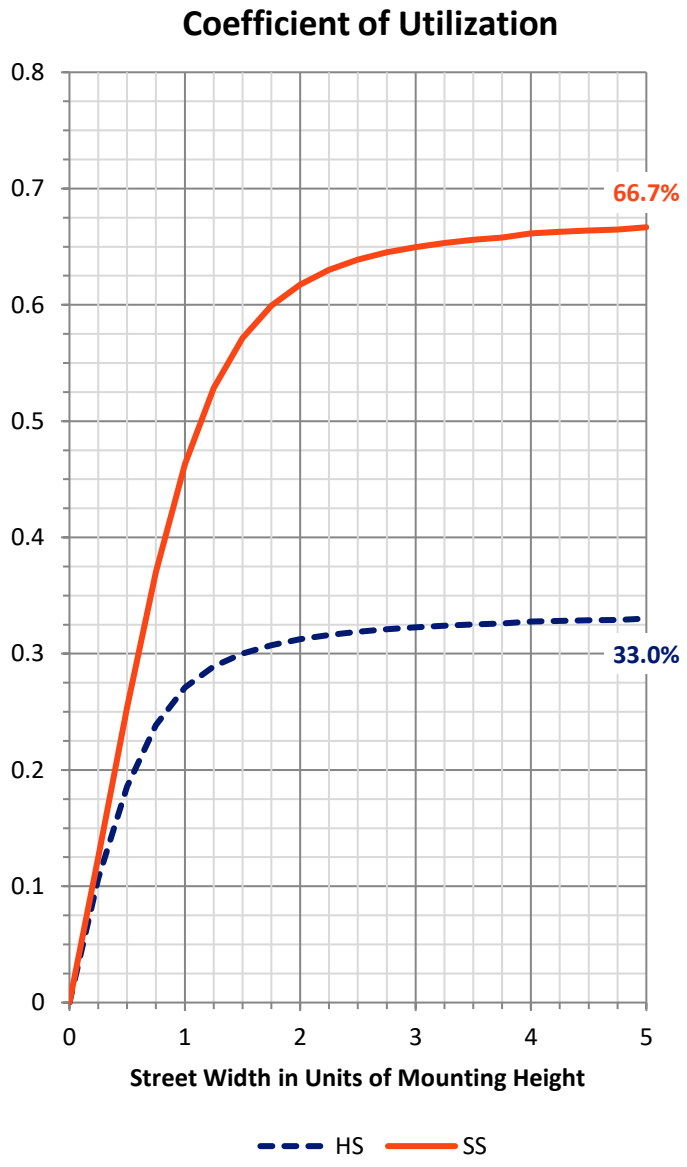
REPORT NUMBER: P868457
CATALOG NUMBER: EMM2-HTN-SA3A-727-U-T2U

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 5222.6 | 0.0 | 5222.6 |
| | % Fixture | 33.3 | 0.0 | 33.3 |
| **Street Side** | Lumens | 10482.8 | 0.0 | 10482.8 |
| | % Fixture | 66.7 | 0.0 | 66.7 |
| **Total** | Lumens | 15705.4 | 0.0 | 15705.4 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 296.8 | 1.9 |
| 10°-20° | 900.1 | 5.7 |
| 20°-30° | 1517.5 | 9.7 |
| 30°-40° | 2153.4 | 13.7 |
| 40°-50° | 2724.5 | 17.3 |
| 50°-60° | 2984.6 | 19.0 |
| 60°-70° | 2885.0 | 18.4 |
| 70°-80° | 1940.4 | 12.4 |
| 80°-90° | 303.2 | 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° | 15705.4 | 100.0 |
| 0°-180° | 15705.4 | 100.0 |



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REPORT NUMBER: P868457
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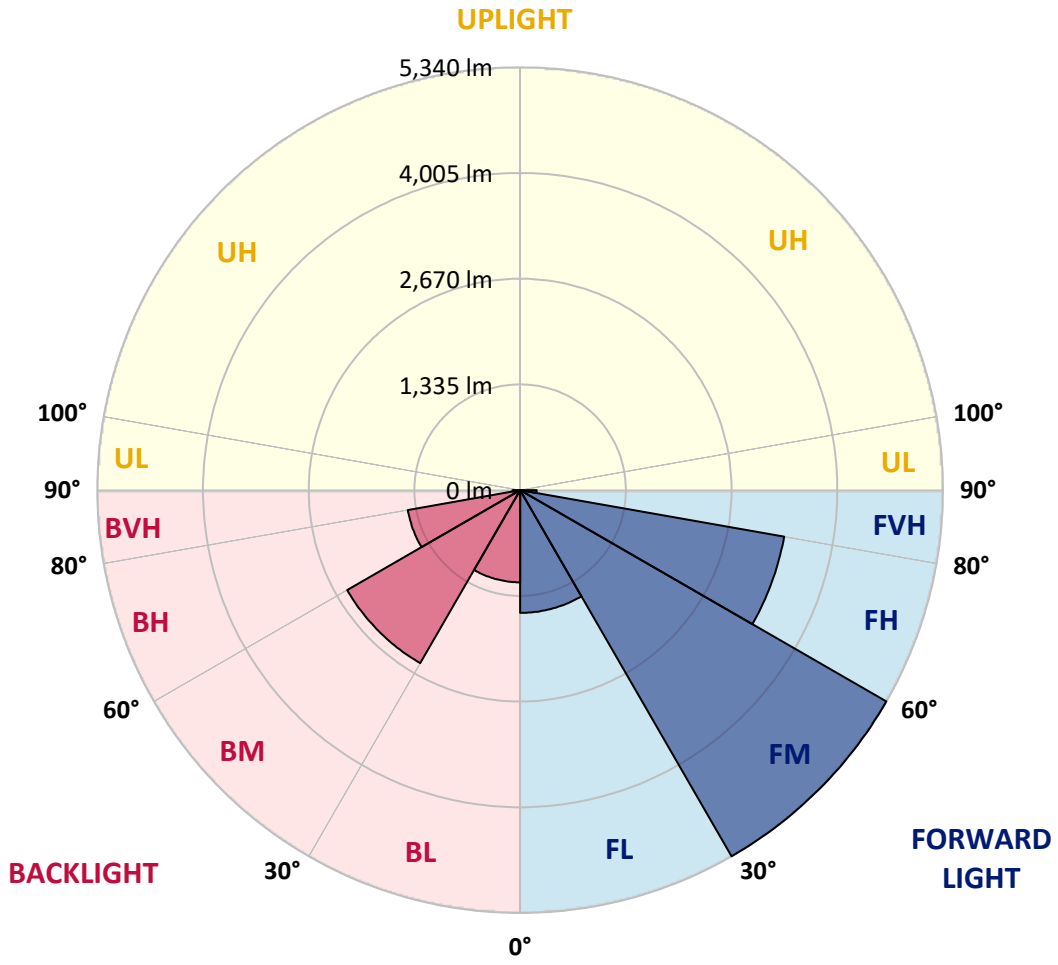
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1550.1 | 9.9 | | | |
| FM | (30°-60°) | 5340.0 | 34.0 | | | |
| FH | (60°-80°) | 3385.0 | 21.6 | | | G2/5000 |
| FVH | (80°-90°) | 207.6 | 1.3 | | | G2/225 |
| BL | (0°-30°) | 1164.2 | 7.4 | B3/2500 | | |
| BM | (30°-60°) | 2522.4 | 16.1 | B3/5000 | | |
| BH | (60°-80°) | 1440.4 | 9.2 | B3/2500 | | G3/2500 |
| BVH | (80°-90°) | 95.6 | 0.6 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B3-U0-G3**
Type III Medium



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Scaled Data Report

REPORT NUMBER: P868457
CATALOG NUMBER: EMM2-HTN-SA3A-727-U-T2U

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 77° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | *3087.8* | 3087.8 |
| 2.5° | 3156.2 | 3153.1 | 3137.5 | 3143.8 | 3125.1 | 3137.5 | 3118.9 | 3103.4 | 3100.3 | *3097.2* | 3100.3 |
| 5° | 3255.6 | 3240.1 | 3224.5 | 3215.2 | 3199.7 | 3193.5 | 3162.4 | 3131.3 | 3112.7 | *3109.6* | 3103.4 |
| 7.5° | 3370.5 | 3364.3 | 3342.6 | 3330.1 | 3286.7 | 3264.9 | 3221.4 | 3165.5 | 3137.5 | *3125.1* | 3109.6 |
| 10° | 3488.6 | 3504.1 | 3476.2 | 3451.3 | 3401.6 | 3355.0 | 3280.4 | 3209.0 | 3153.1 | *3146.9* | 3112.7 |
| 12.5° | 3634.6 | 3631.5 | 3612.8 | 3569.3 | 3510.3 | 3445.1 | 3355.0 | 3255.6 | 3181.0 | *3168.6* | 3118.9 |
| 15° | 3765.1 | 3762.0 | 3737.1 | 3696.7 | 3619.1 | 3538.3 | 3417.1 | 3302.2 | 3209.0 | *3190.4* | 3131.3 |
| 17.5° | 3886.2 | 3880.0 | 3864.5 | 3821.0 | 3724.7 | 3625.3 | 3507.2 | 3355.0 | 3243.2 | *3221.4* | 3140.7 |
| 20° | 3991.8 | 3998.0 | 3979.4 | 3935.9 | 3845.8 | 3740.2 | 3591.1 | 3423.3 | 3286.7 | *3261.8* | 3168.6 |
| 22.5° | 4106.8 | 4109.9 | 4100.6 | 4085.0 | 3970.1 | 3858.3 | 3696.7 | 3501.0 | 3336.4 | *3311.5* | 3199.7 |
| 25° | 4227.9 | 4231.0 | 4237.2 | 4227.9 | 4097.5 | 3976.3 | 3805.4 | 3597.3 | 3404.7 | *3370.5* | 3243.2 |
| 27.5° | 4367.7 | 4370.8 | 4383.2 | 4364.6 | 4224.8 | 4097.5 | 3926.6 | 3699.8 | 3476.2 | *3438.9* | 3280.4 |
| 30° | 4526.1 | 4538.6 | 4529.3 | 4523.0 | 4361.5 | 4237.2 | 4047.7 | 3805.4 | 3569.3 | *3522.8* | 3345.7 |
| 32.5° | 4715.6 | 4712.5 | 4693.9 | 4675.3 | 4510.6 | 4380.1 | 4184.4 | 3942.1 | 3684.3 | *3631.5* | 3451.3 |
| 35° | 4852.3 | 4852.3 | 4824.4 | 4815.0 | 4662.8 | 4526.1 | 4333.5 | 4094.3 | 3814.8 | *3765.1* | 3563.1 |
| 37.5° | 4936.2 | 4948.6 | 4926.9 | 4933.1 | 4787.1 | 4659.7 | 4482.7 | 4249.7 | 3957.7 | *3914.2* | 3699.8 |
| 40° | 4967.3 | 4998.3 | 5017.0 | 5041.8 | 4895.8 | 4787.1 | 4641.1 | 4417.4 | 4140.9 | *4091.2* | 3864.5 |
| 42.5° | 4973.5 | 5020.1 | 5085.3 | 5138.1 | 4973.5 | 4883.4 | 4793.3 | 4588.3 | 4321.1 | *4277.6* | 4044.6 |
| 45° | 4942.4 | 4920.7 | 5079.1 | 5085.3 | 5017.0 | 4961.1 | 4926.9 | 4793.3 | 4582.1 | *4510.6* | 4268.3 |
| 47.5° | 4706.3 | 4681.5 | 4725.0 | 4923.8 | 4964.2 | 4995.2 | 5063.6 | 5032.5 | 4843.0 | *4787.1* | 4526.1 |
| 50° | 4324.2 | 4311.8 | 4485.8 | 4700.1 | 4833.7 | 4992.1 | 5175.4 | 5262.4 | 5131.9 | *5097.7* | 4852.3 |
| 52.5° | 3693.6 | 3659.4 | 4013.6 | 4429.8 | 4662.8 | 4961.1 | 5253.1 | 5498.5 | 5458.1 | *5408.4* | 5131.9 |
| 55° | 3292.9 | 3292.9 | 3532.1 | 4050.9 | 4445.4 | 4849.2 | 5302.8 | 5747.0 | 5818.4 | *5762.5* | 5451.9 |
| 57.5° | 2864.2 | 2898.3 | 3146.9 | 3504.1 | 4131.6 | 4644.2 | 5296.6 | 5955.1 | 6166.4 | *6113.6* | 5790.5 |
| 60° | 2497.6 | 2525.6 | 2668.5 | 3028.8 | 3762.0 | 4373.9 | 5228.2 | 6126.0 | 6489.4 | *6470.8* | 6088.7 |
| 62.5° | 2124.8 | 2159.0 | 2273.9 | 2612.6 | 3274.2 | 4063.3 | 5085.3 | 6219.2 | 6793.9 | *6775.2* | 6390.0 |
| 65° | 1826.6 | 1829.7 | 1944.7 | 2227.3 | 2786.5 | 3687.4 | 4833.7 | 6200.5 | 7030.0 | *7042.4* | 6644.8 |
| 67.5° | *1528.4* | *1519.1* | *1668.2* | *1898.1* | *2388.9* | *3283.6* | *4498.2* | *6035.9* | *7129.4* | *7185.3* | *6728.6* |
| 70° | 1124.5 | 1137.0 | 1345.1 | 1599.8 | 2019.2 | 2817.6 | 4029.1 | 5715.9 | 6967.8 | *7054.8* | 6536.0 |
| 72.5° | 845.0 | 869.8 | 1071.7 | 1335.8 | 1686.8 | 2351.6 | 3516.5 | 5159.9 | 6517.4 | *6529.8* | 5948.9 |
| 75° | 686.5 | 692.7 | 872.9 | 1109.0 | 1382.4 | 1885.6 | 2823.8 | 4308.7 | 5510.9 | *5653.8* | 5054.2 |
| 77.5° | 584.0 | 577.8 | 664.8 | 894.7 | 1115.2 | 1506.6 | 2127.9 | 3277.3 | 4327.3 | *4392.6* | 3957.7 |
| 80° | 497.0 | 493.9 | 525.0 | 723.8 | 872.9 | 1074.8 | 1456.9 | 2283.3 | 3087.8 | *3159.3* | 2811.4 |
| 82.5° | 260.9 | 279.6 | 273.4 | 447.3 | 493.9 | 565.4 | 699.0 | 1037.6 | 1348.2 | *1366.9* | 1292.3 |
| 85° | 12.4 | 12.4 | 12.4 | 18.6 | 31.1 | 49.7 | 96.3 | 96.3 | 105.6 | *201.9* | 229.9 |
| 87.5° | 3.1 | 3.1 | 6.2 | 6.2 | 6.2 | 9.3 | 9.3 | 12.4 | 12.4 | *12.4* | 12.4 |
| 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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Scaled Data Report

REPORT NUMBER: P868457
CATALOG NUMBER: EMM2-HTN-SA3A-727-U-T2U

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 |
| 2.5° | 3094.1 | 3081.6 | 3063.0 | 3066.1 | 3063.0 | 3063.0 | 3047.5 | 3035.0 | 3031.9 | 3038.1 | 3050.6 |
| 5° | 3097.2 | 3078.5 | 3050.6 | 3041.2 | 3031.9 | 3025.7 | 3000.9 | 2982.2 | 2972.9 | 2979.1 | 2982.2 |
| 7.5° | 3097.2 | 3069.2 | 3038.1 | 3019.5 | 2994.6 | 2976.0 | 2948.1 | 2923.2 | 2910.8 | 2913.9 | 2920.1 |
| 10° | 3091.0 | 3059.9 | 3035.0 | 2997.8 | 2957.4 | 2935.6 | 2892.1 | 2861.1 | 2845.5 | 2848.6 | 2833.1 |
| 12.5° | 3091.0 | 3056.8 | 3007.1 | 2972.9 | 2917.0 | 2870.4 | 2836.2 | 2802.0 | 2789.6 | 2777.2 | 2771.0 |
| 15° | 3094.1 | 3050.6 | 3000.9 | 2929.4 | 2864.2 | 2814.5 | 2771.0 | 2749.2 | 2730.6 | 2724.4 | 2727.5 |
| 17.5° | 3094.1 | 3050.6 | 2976.0 | 2892.1 | 2817.6 | 2755.5 | 2718.2 | 2693.3 | 2687.1 | 2680.9 | 2680.9 |
| 20° | 3109.6 | 3053.7 | 2954.3 | 2854.9 | 2761.7 | 2696.4 | 2662.3 | 2646.7 | 2646.7 | 2637.4 | 2637.4 |
| 22.5° | 3134.4 | 3059.9 | 2941.8 | 2823.8 | 2715.1 | 2643.6 | 2606.3 | 2587.7 | 2597.0 | 2590.8 | 2587.7 |
| 25° | 3162.4 | 3081.6 | 2926.3 | 2780.3 | 2652.9 | 2578.4 | 2541.1 | 2528.7 | 2525.6 | 2510.0 | 2531.8 |
| 27.5° | 3184.1 | 3097.2 | 2917.0 | 2736.8 | 2597.0 | 2510.0 | 2463.4 | 2441.7 | 2426.2 | 2432.4 | 2426.2 |
| 30° | 3243.2 | 3140.7 | 2920.1 | 2699.5 | 2534.9 | 2429.3 | 2373.4 | 2348.5 | 2342.3 | 2342.3 | 2342.3 |
| 32.5° | 3323.9 | 3196.6 | 2941.8 | 2684.0 | 2475.9 | 2351.6 | 2283.3 | 2258.4 | 2252.2 | 2239.8 | 2246.0 |
| 35° | 3426.5 | 3280.4 | 2976.0 | 2659.1 | 2429.3 | 2261.5 | 2187.0 | 2152.8 | 2143.5 | 2131.0 | 2131.0 |
| 37.5° | 3541.4 | 3364.3 | 3000.9 | 2646.7 | 2367.1 | 2168.3 | 2084.4 | 2041.0 | 2034.7 | 2022.3 | 2028.5 |
| 40° | 3687.4 | 3479.3 | 3041.2 | 2621.9 | 2295.7 | 2084.4 | 1972.6 | 1901.2 | 1916.7 | 1922.9 | 1935.3 |
| 42.5° | 3852.0 | 3625.3 | 3103.4 | 2597.0 | 2239.8 | 1997.5 | 1832.8 | 1761.4 | 1780.0 | 1773.8 | 1786.2 |
| 45° | 4075.7 | 3796.1 | 3181.0 | 2587.7 | 2171.4 | 1891.8 | 1689.9 | 1609.2 | 1602.9 | 1593.6 | 1599.8 |
| 47.5° | 4308.7 | 4001.1 | 3255.6 | 2569.1 | 2096.9 | 1761.4 | 1528.4 | 1425.9 | 1401.0 | 1388.6 | 1376.2 |
| 50° | 4551.0 | 4206.2 | 3342.6 | 2556.6 | 1997.5 | 1615.4 | 1366.9 | 1248.8 | 1202.2 | 1186.7 | 1171.1 |
| 52.5° | 4824.4 | 4426.7 | 3417.1 | 2525.6 | 1888.7 | 1463.2 | 1220.8 | 1087.3 | 1034.5 | 1003.4 | 1006.5 |
| 55° | 5113.3 | 4628.7 | 3485.5 | 2488.3 | 1764.5 | 1320.3 | 1074.8 | 963.0 | 910.2 | 900.9 | 900.9 |
| 57.5° | 5380.4 | 4836.8 | 3535.2 | 2423.1 | 1640.2 | 1180.5 | 953.7 | 857.4 | 832.5 | 845.0 | 845.0 |
| 60° | 5653.8 | 5004.5 | 3560.0 | 2351.6 | 1512.9 | 1062.4 | 869.8 | 792.2 | 779.7 | 804.6 | 807.7 |
| 62.5° | 5874.4 | 5138.1 | 3553.8 | 2252.2 | 1373.1 | 959.9 | 789.0 | 726.9 | 733.1 | 776.6 | 785.9 |
| 65° | 6032.8 | 5203.4 | 3476.2 | 2103.1 | 1239.5 | 869.8 | 717.6 | 658.6 | 658.6 | 689.6 | 699.0 |
| 67.5° | *6020.4* | *5119.5* | *3320.8* | *1895.0* | *1096.6* | *779.7* | *652.4* | *605.8* | *605.8* | *627.5* | *624.4* |
| 70° | 5765.6 | 4830.6 | 3025.7 | 1643.3 | 956.8 | 702.1 | 596.4 | 562.3 | 559.2 | 568.5 | 565.4 |
| 72.5° | 5153.7 | 4243.5 | 2566.0 | 1357.5 | 826.3 | 624.4 | 540.5 | 509.5 | 503.3 | 490.8 | 481.5 |
| 75° | 4252.8 | 3485.5 | 2003.7 | 1081.1 | 699.0 | 549.8 | 487.7 | 459.8 | 434.9 | 450.4 | 441.1 |
| 77.5° | 3299.1 | 2674.7 | 1491.1 | 838.8 | 568.5 | 478.4 | 434.9 | 403.8 | 397.6 | 453.5 | 434.9 |
| 80° | 2407.5 | 1848.4 | 1053.1 | 599.6 | 441.1 | 388.3 | 363.5 | 338.6 | 428.7 | 574.7 | 571.6 |
| 82.5° | 1068.6 | 891.6 | 481.5 | 285.8 | 205.0 | 170.9 | 142.9 | 161.5 | 270.3 | 264.1 | 273.4 |
| 85° | 96.3 | 99.4 | 52.8 | 34.2 | 21.7 | 18.6 | 12.4 | 12.4 | 9.3 | 9.3 | 9.3 |
| 87.5° | 12.4 | 12.4 | 9.3 | 9.3 | 6.2 | 6.2 | 6.2 | 6.2 | 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 |

Cooper Lighting Solutions Photometric Lab
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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: SP1-2407-157-3

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

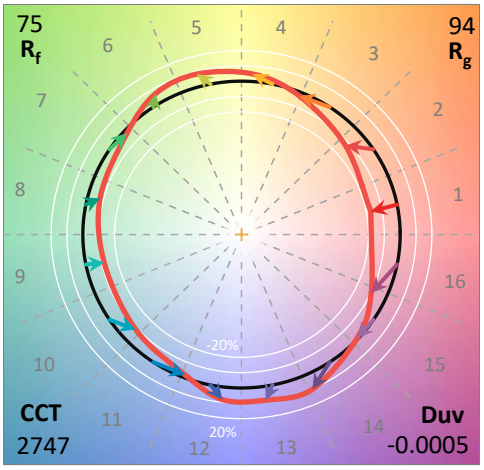
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-157-3 |
| 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-40-727-U-5WQ-2** |
| Description: | Epic Modern Light Square 40W 5WQ Optic and Flare Trim |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 2747 | CRI (Ra): | 71.7 | | |
| CIE u': | 0.2606 | R1: | 68.1 | R9: | -35.3 |
| CIE v': | 0.5257 | R2: | 83.9 | R10: | 64.2 |
| Duv: | -0.0005 | R3: | 94.7 | R11: | 61.7 |
| CIE x: | 0.4552 | R4: | 66.3 | R12: | 53.9 |
| CIE y: | 0.4082 | R5: | 67.4 | R13: | 71.2 |
| CIE z: | 0.1366 | R6: | 78.7 | R14: | 97.6 |
| Peak Wavelength (nm): | 597 | R7: | 75.0 | R15: | 59.3 |
| Dominant Wavelength (nm): | 584 | R8: | 39.4 | | |
| Purity: | 59.16856 | | | | |
| Rf: | 75.5 | | | | |
| Rg: | 93.6 | | | | |




## 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 |

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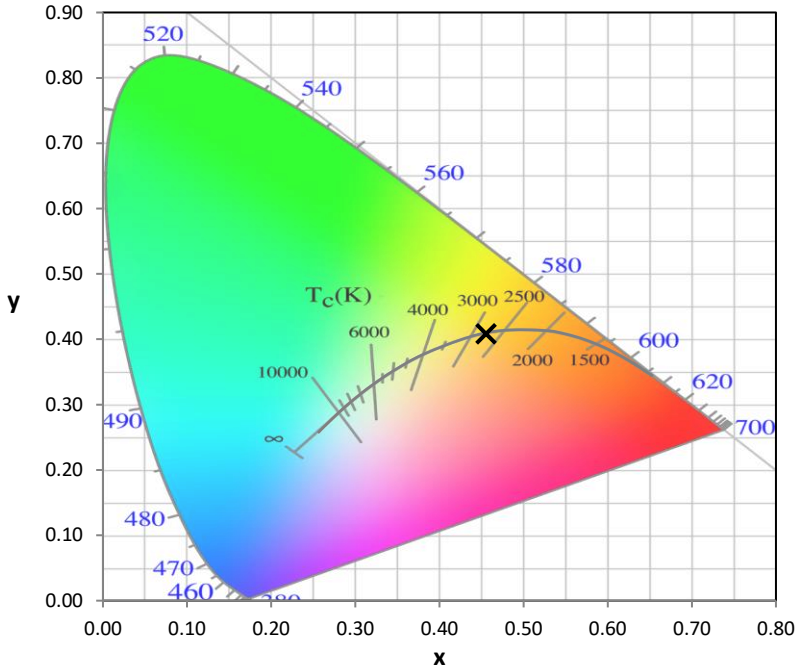
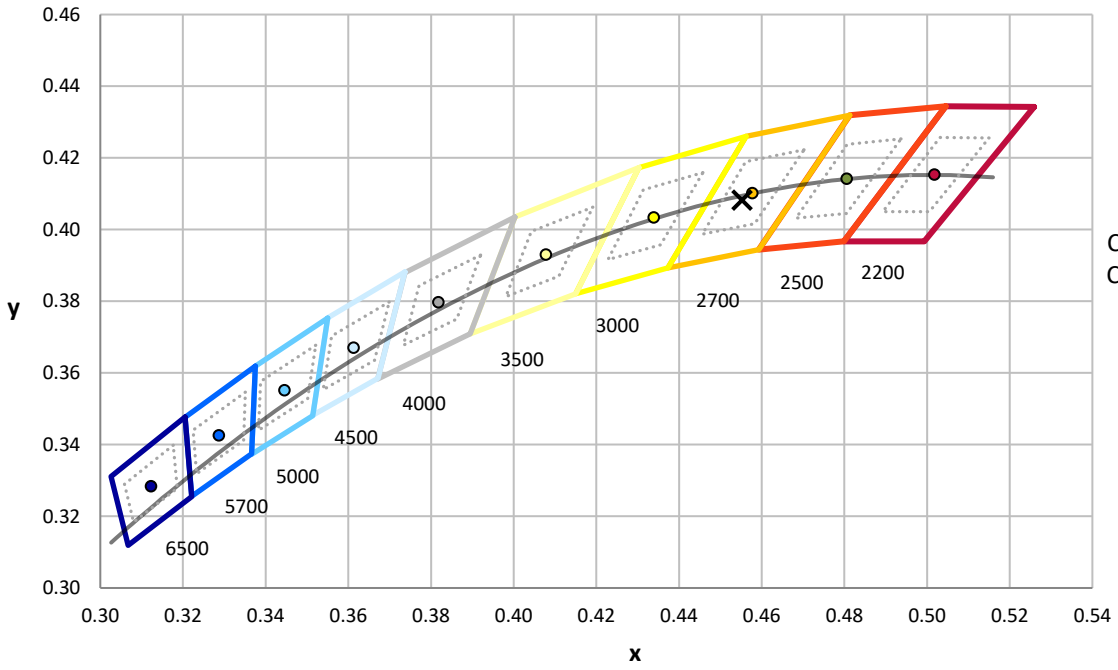
**CIE 1931 Chromaticity Diagram**




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




CCT = 2747K
CIE x = 0.4552
CIE y = 0.4082
Duv = -0.0005

Point lies inside the ANSI 2700K 4-step quadrangle

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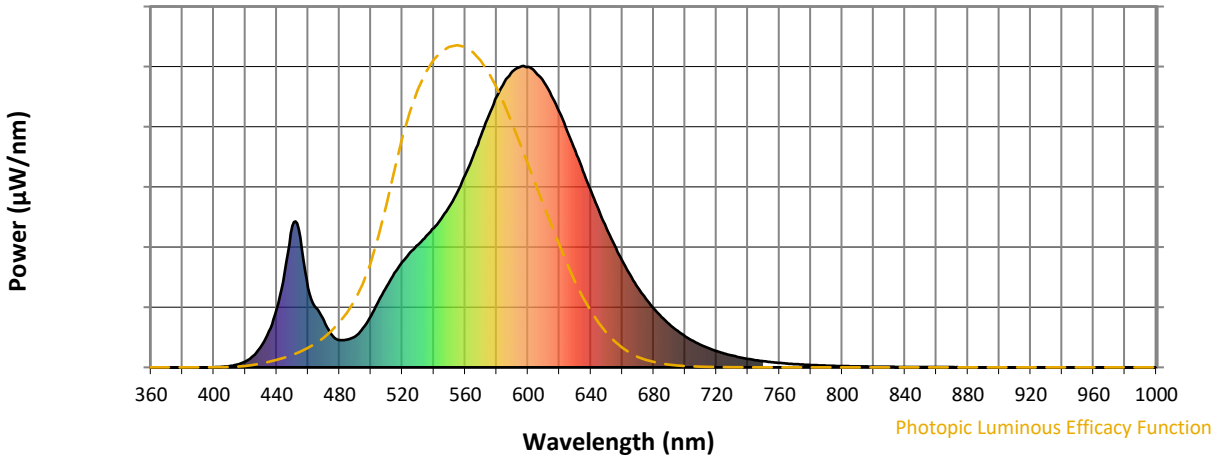
## Photopic Flux vs. Wavelength




## Photopic Lumens: NR

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/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 | | | |

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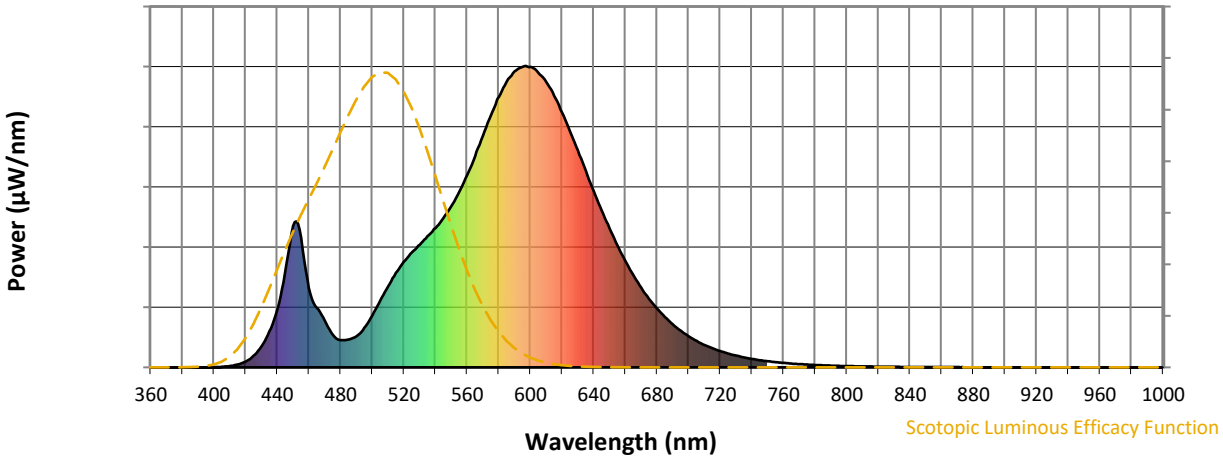
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.13**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/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 | | | |

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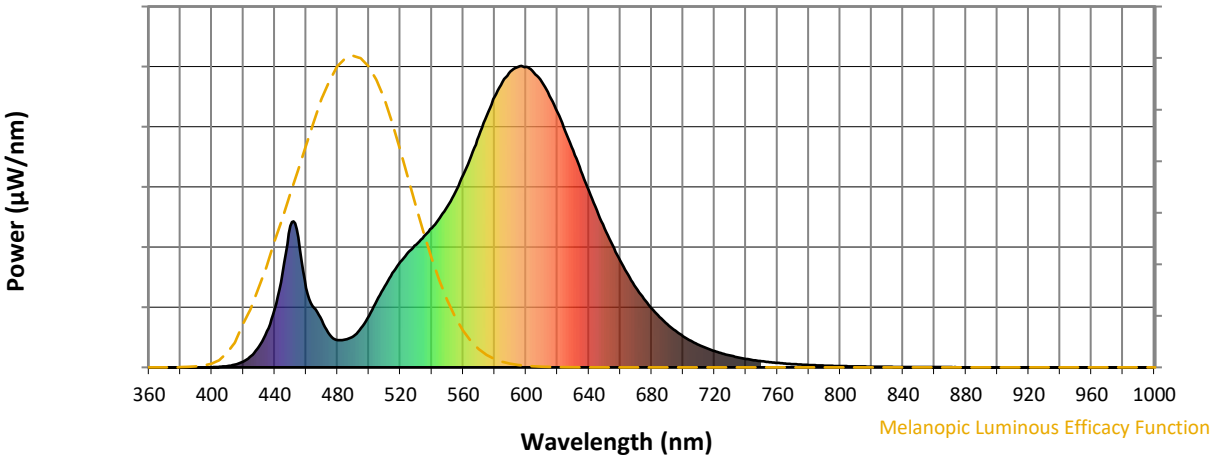
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.04**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/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 | | | |

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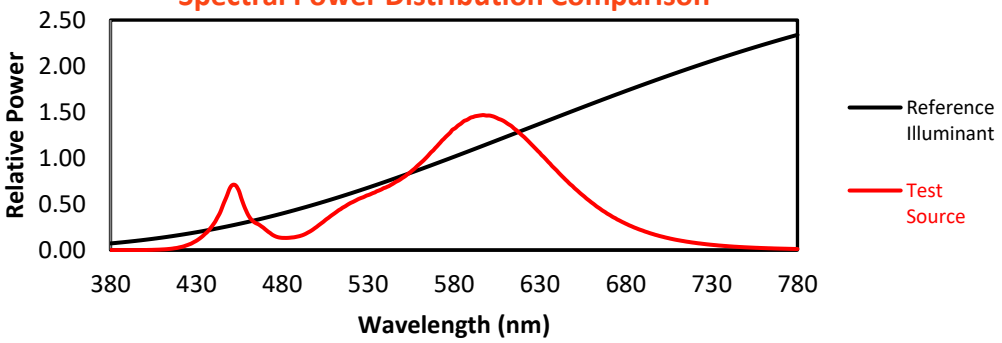
# TM-30-18

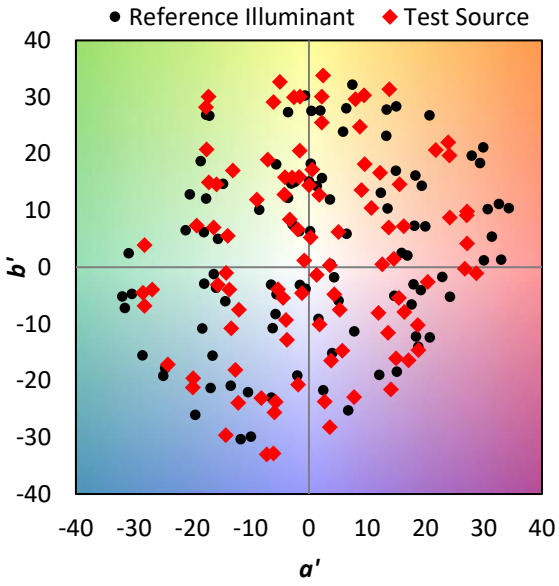
## Summary

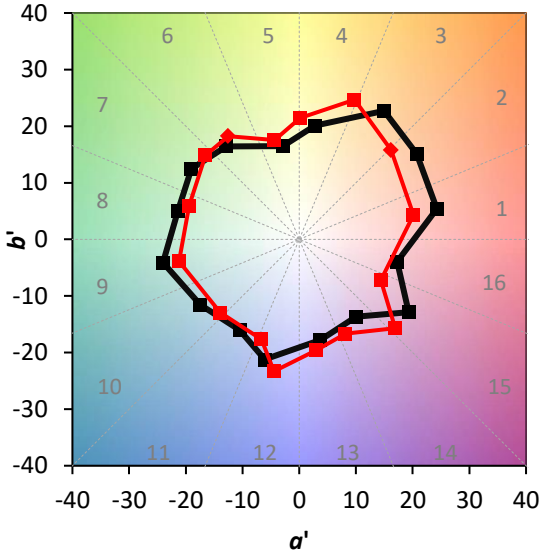
$R_f$ = 75.5
$R_g$ = 93.6
CIE $R_a$ = 71.7
$R_9$ = -35.3

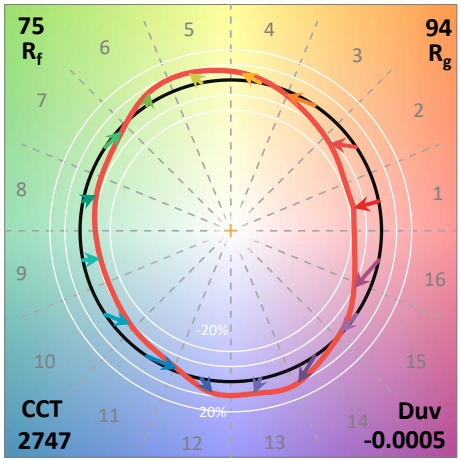
## Spectral Power Distribution Comparison

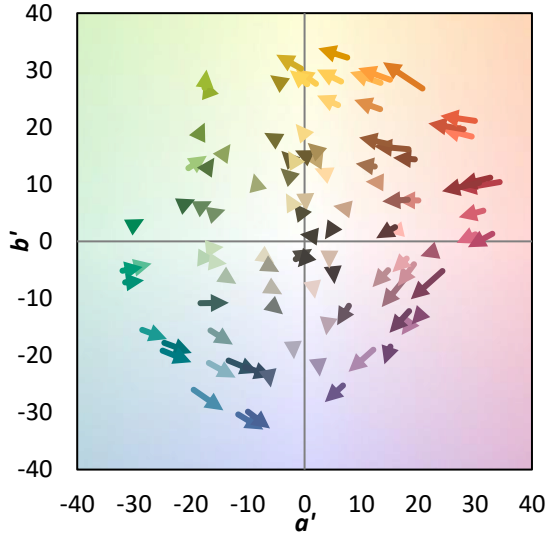



## Color Vector Graphics



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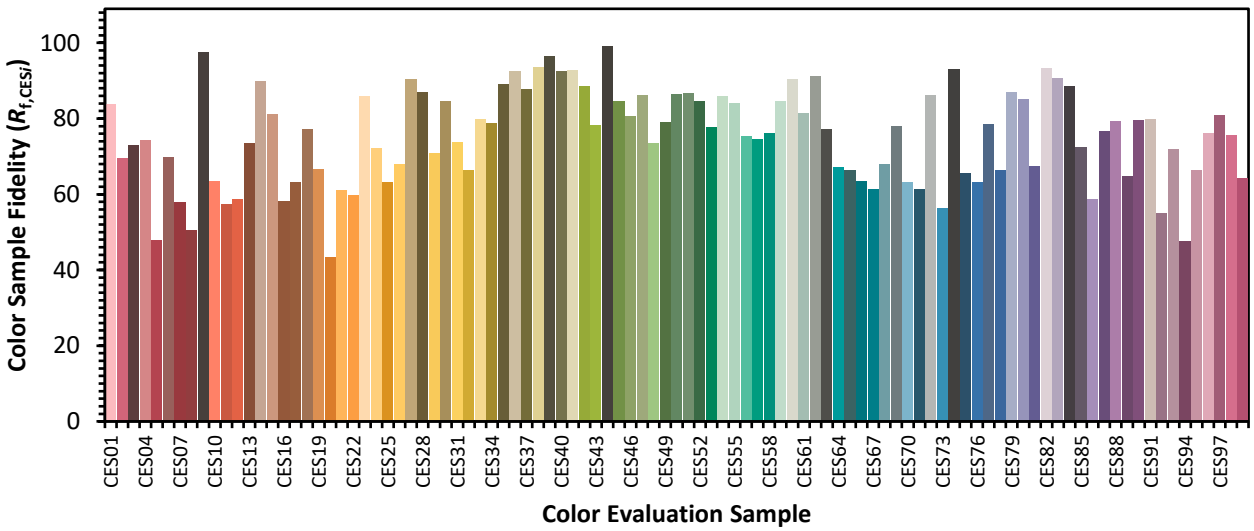
# TM-30-18

**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 | |



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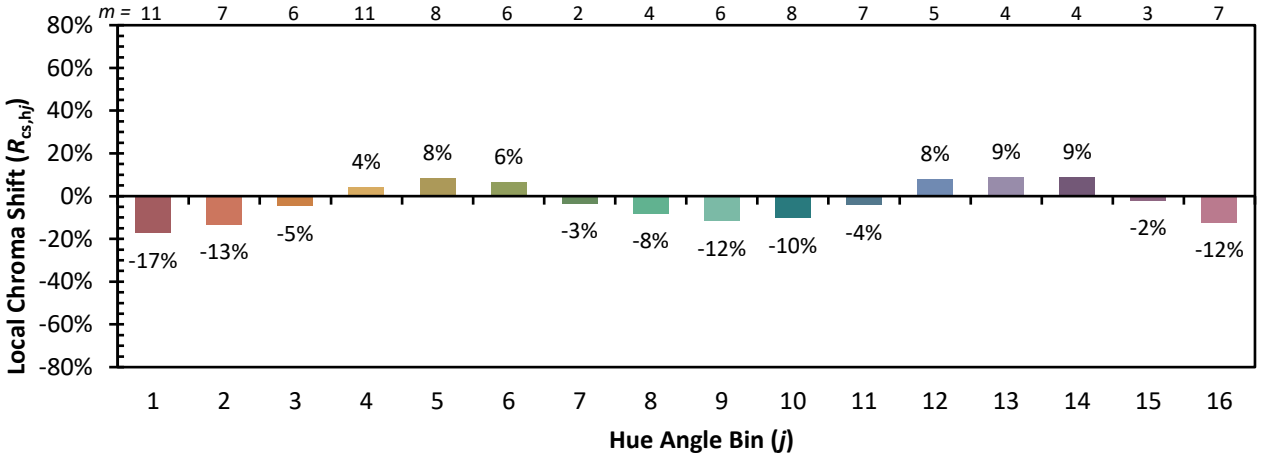
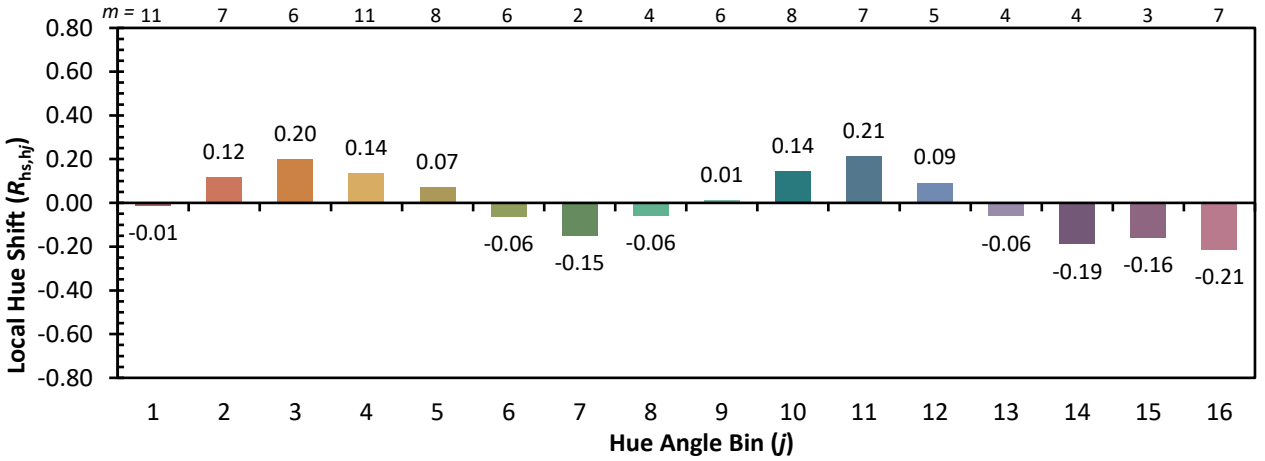
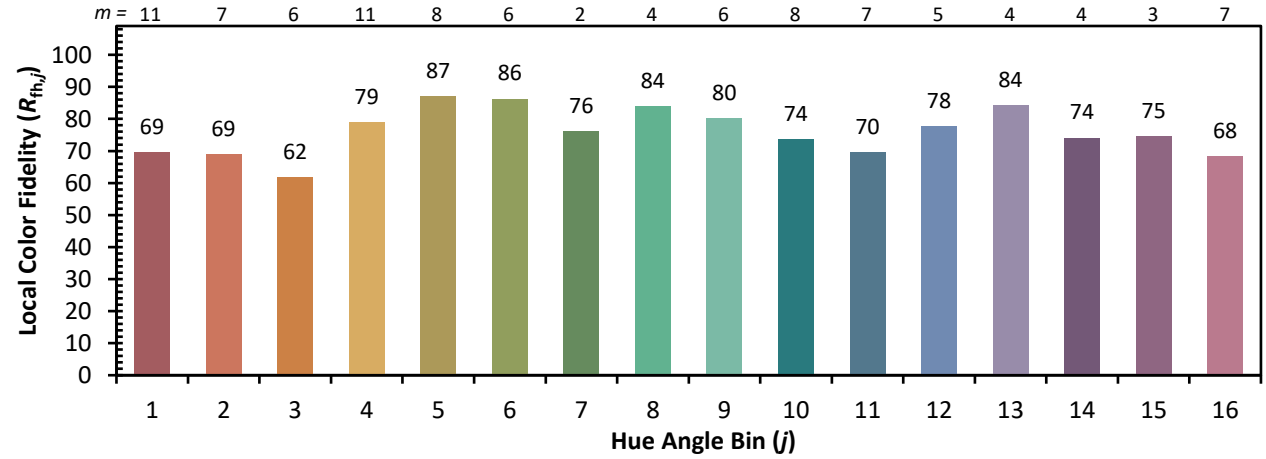
**TM-30-18**

## Color Rendition by Hue-Angle Bin



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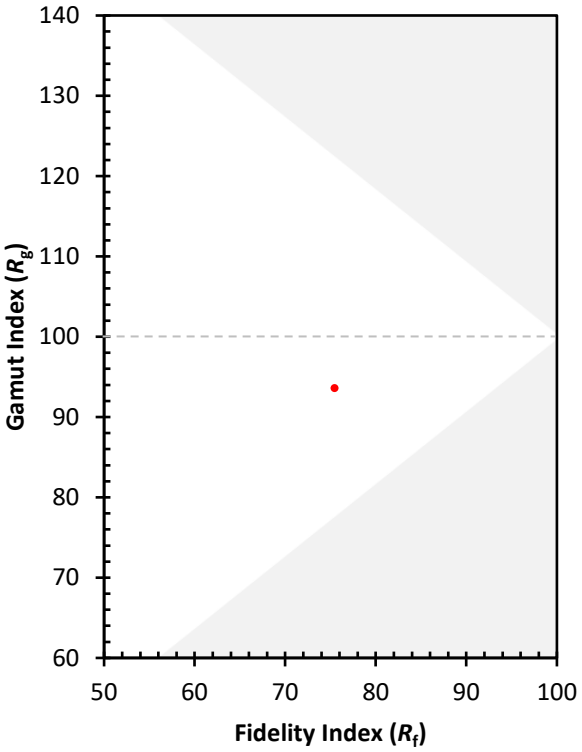
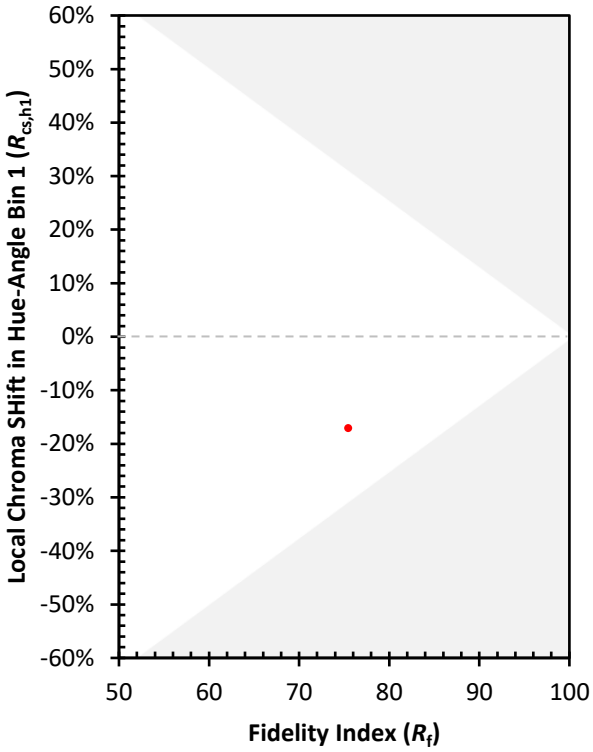
## Measure Comparisons




(END OF REPORT)