

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

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Peachtree City, GA 30269

Scaled data based on original data using  
LM-79-2024 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: STREETWORKS

Report Number: P1461548

Luminaire Tested: USSL-150-730-U-T2R

Issue Date: 06/10/2026

**Test Information**

Test Method: LM-79-2024  
Report Number: P1461548  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 6/11/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: USSL-150-730-U-T2R  
Description: USSL DISCRETE LED 1 SQUARE 150W 70CRI 3000K FIXTURE w/ TYPE II ROADWAY DISTRIBUTION OPTIC  
Light Source: (40) 3000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 20525.7 lumens  
Efficiency: N/A  
Efficacy: 135.0 lumens/watt  
Luminous Opening: Rectangular (W 0.67' x L: 0.67' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G3

Input Watts (W): 152  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.98  
Total Harmonic Distortion (THDi): 2.75%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

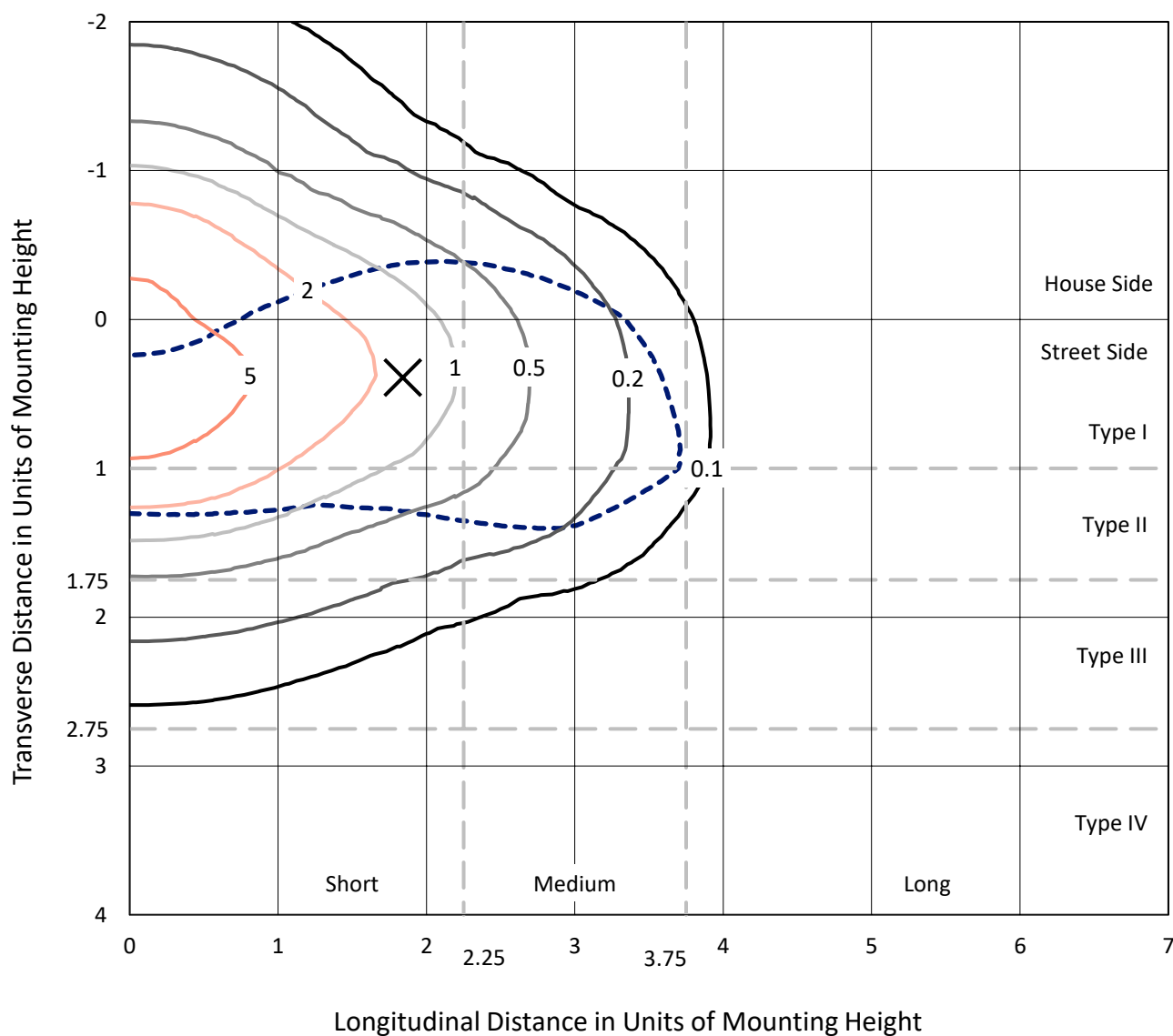
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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd



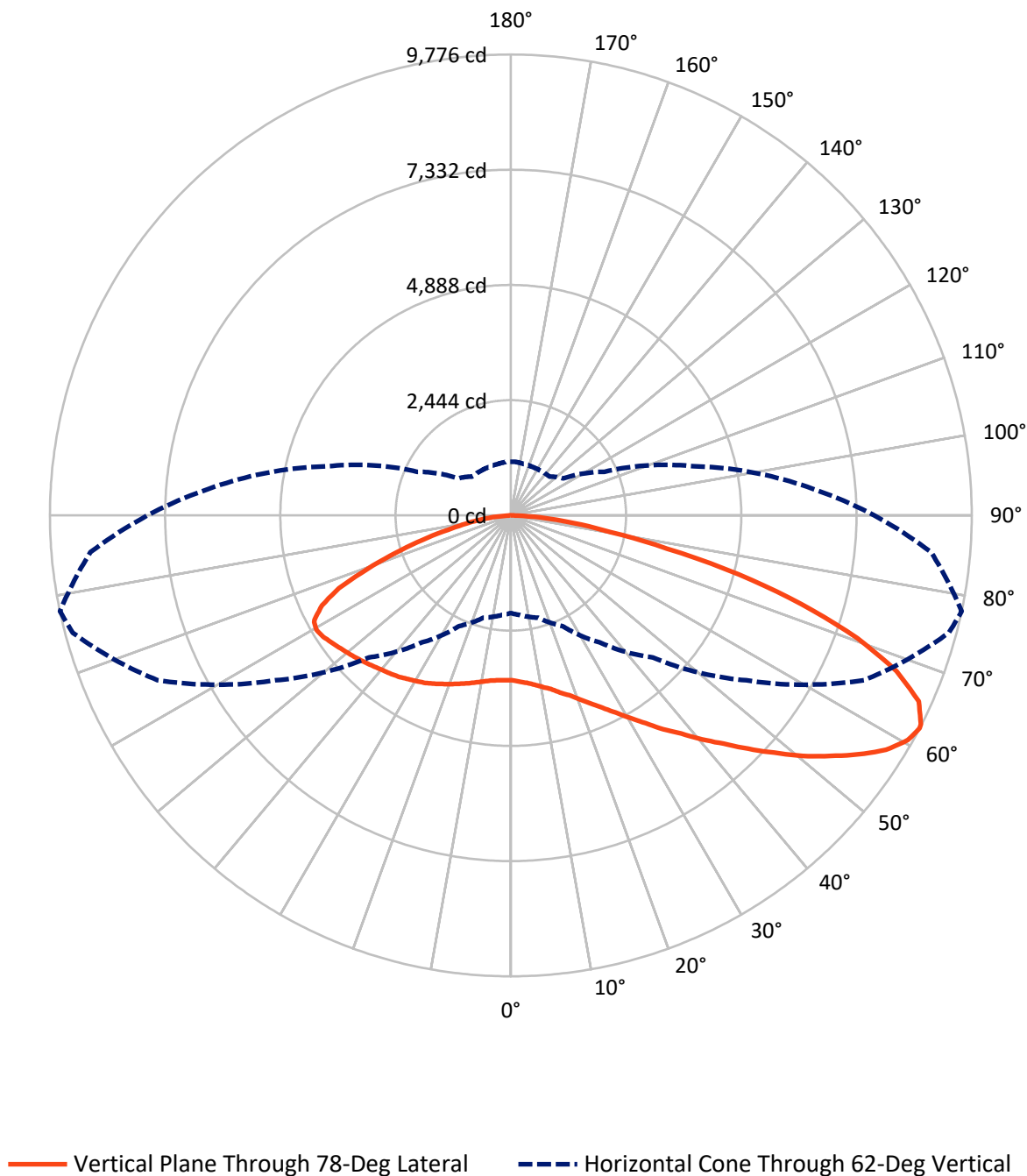
Based on 25 foot mounting height. Maximum calculated value = 8.6 fc

Type II - Short - N/A

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CATALOG NUMBER: USSL-150-730-U-T2R

## Luminous Intensity Polar Plot



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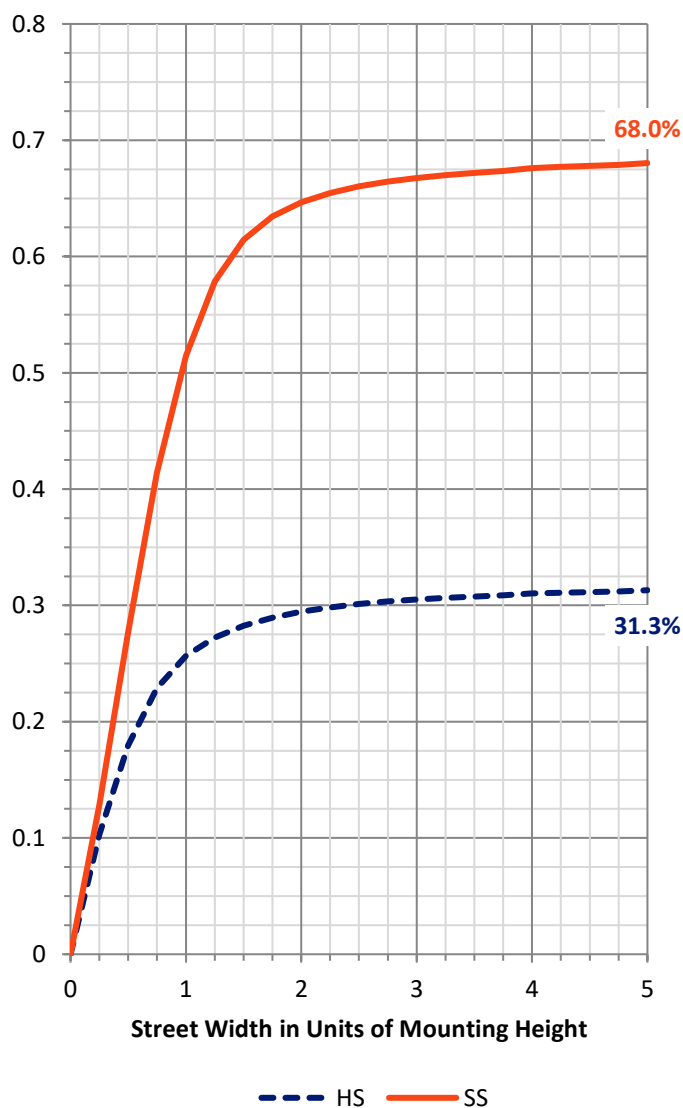
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 6503.9   | 0.0    | 6503.9  |
|                    | % Fixture | 31.7     | 0.0    | 31.7    |
| <b>Street Side</b> | Lumens    | 14021.8  | 0.0    | 14021.8 |
|                    | % Fixture | 68.3     | 0.0    | 68.3    |
| <b>Total</b>       | Lumens    | 20525.7  | 0.0    | 20525.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 347.0   | 1.7       |
| 10°-20°   | 1157.5  | 5.6       |
| 20°-30°   | 2200.8  | 10.7      |
| 30°-40°   | 3318.7  | 16.2      |
| 40°-50°   | 4021.9  | 19.6      |
| 50°-60°   | 3980.8  | 19.4      |
| 60°-70°   | 3308.0  | 16.1      |
| 70°-80°   | 1779.4  | 8.7       |
| 80°-90°   | 411.7   | 2.0       |
| 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°    | 20525.7 | 100.0     |
| 0°-180°   | 20525.7 | 100.0     |

**Coefficient of Utilization**



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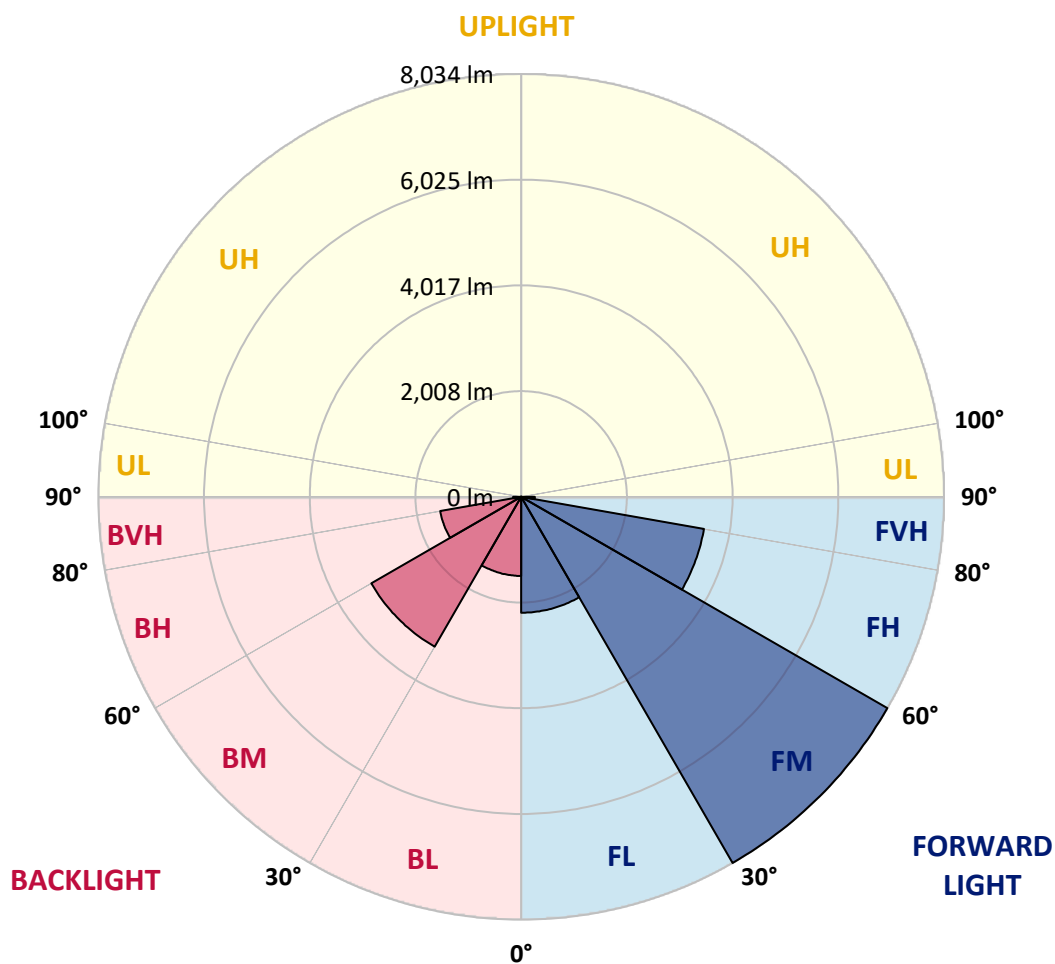
CATALOG NUMBER: USSL-150-730-U-T2R

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 2202.7 | 10.7      |                         |      |         |
| FM   | (30°-60°)   | 8033.8 | 39.1      |                         |      |         |
| FH   | (60°-80°)   | 3526.3 | 17.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 259.0  | 1.3       |                         |      | G3/500  |
| BL   | (0°-30°)    | 1502.6 | 7.3       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 3287.5 | 16.0      | B3/5000                 |      |         |
| BH   | (60°-80°)   | 1561.1 | 7.6       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 152.7  | 0.7       |                         |      | 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 II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 78°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 |
| 2.5°  | 3592.4 | 3590.5 | 3594.3 | 3592.4 | 3580.0 | 3568.6 | 3558.1 | 3535.3 | 3528.6 | 3528.6 | 3502.9 |
| 5°    | 3744.7 | 3762.8 | 3758.1 | 3725.7 | 3697.1 | 3670.5 | 3642.9 | 3601.0 | 3578.1 | 3567.6 | 3529.6 |
| 7.5°  | 4001.8 | 3992.3 | 3979.9 | 3937.1 | 3889.5 | 3823.8 | 3760.9 | 3694.3 | 3633.3 | 3624.8 | 3575.3 |
| 10°   | 4307.5 | 4293.2 | 4261.8 | 4204.6 | 4118.9 | 4025.6 | 3917.1 | 3815.2 | 3715.2 | 3700.0 | 3635.2 |
| 12.5° | 4654.0 | 4678.8 | 4628.3 | 4526.4 | 4409.3 | 4259.8 | 4114.2 | 3953.3 | 3820.0 | 3778.1 | 3713.3 |
| 15°   | 5112.0 | 5092.0 | 5052.0 | 4914.9 | 4730.2 | 4538.8 | 4327.4 | 4111.3 | 3931.4 | 3898.0 | 3794.3 |
| 17.5° | 5586.2 | 5543.3 | 5486.2 | 5330.0 | 5109.2 | 4830.2 | 4578.8 | 4298.9 | 4071.3 | 4008.5 | 3886.6 |
| 20°   | 6097.5 | 6099.4 | 5986.1 | 5807.1 | 5534.8 | 5190.1 | 4859.7 | 4516.9 | 4235.1 | 4160.8 | 4002.8 |
| 22.5° | 6626.9 | 6635.4 | 6511.6 | 6298.4 | 5998.4 | 5608.1 | 5188.2 | 4782.6 | 4420.8 | 4331.3 | 4120.8 |
| 25°   | 7166.7 | 7168.6 | 7052.5 | 6823.0 | 6465.0 | 6042.2 | 5557.6 | 5067.3 | 4635.9 | 4519.8 | 4269.4 |
| 27.5° | 7653.3 | 7671.3 | 7553.3 | 7304.8 | 6936.3 | 6482.1 | 5933.7 | 5386.2 | 4862.5 | 4734.0 | 4424.6 |
| 30°   | 8043.6 | 8035.1 | 7939.8 | 7719.0 | 7357.1 | 6882.0 | 6348.8 | 5734.7 | 5138.7 | 4982.5 | 4609.3 |
| 32.5° | 8335.9 | 8331.2 | 8222.6 | 8011.3 | 7691.3 | 7280.0 | 6751.6 | 6090.8 | 5448.1 | 5254.8 | 4805.4 |
| 35°   | 8491.1 | 8496.8 | 8412.1 | 8216.0 | 7959.8 | 7590.4 | 7150.5 | 6530.7 | 5744.2 | 5570.0 | 5050.1 |
| 37.5° | 8586.3 | 8595.9 | 8465.4 | 8308.3 | 8096.0 | 7838.0 | 7509.5 | 6925.8 | 6118.4 | 5870.9 | 5278.6 |
| 40°   | 8468.3 | 8480.7 | 8394.0 | 8211.2 | 8111.2 | 7972.2 | 7792.3 | 7342.9 | 6507.8 | 6245.0 | 5530.0 |
| 42.5° | 8065.5 | 8076.0 | 8083.6 | 7985.5 | 7973.2 | 7988.4 | 7984.6 | 7692.3 | 6910.6 | 6617.3 | 5825.2 |
| 45°   | 7527.6 | 7543.8 | 7620.9 | 7650.4 | 7727.5 | 7891.3 | 8057.0 | 8022.7 | 7367.6 | 7059.1 | 6159.4 |
| 47.5° | 6864.9 | 6941.1 | 7038.2 | 7221.0 | 7432.4 | 7698.0 | 8007.4 | 8280.7 | 7818.0 | 7520.9 | 6511.6 |
| 50°   | 5861.3 | 5928.0 | 6245.0 | 6619.2 | 6999.1 | 7460.0 | 7863.7 | 8429.2 | 8275.9 | 8019.8 | 6934.4 |
| 52.5° | 4818.8 | 4877.8 | 5249.1 | 5867.1 | 6421.2 | 7101.0 | 7659.9 | 8464.5 | 8709.2 | 8476.8 | 7371.4 |
| 55°   | 3886.6 | 3952.3 | 4272.2 | 4907.3 | 5688.0 | 6543.1 | 7424.7 | 8419.7 | 9085.3 | 8948.2 | 7870.3 |
| 57.5° | 3078.2 | 3098.2 | 3373.4 | 3933.3 | 4872.1 | 5844.2 | 7095.3 | 8357.8 | 9391.9 | 9381.4 | 8326.4 |
| 60°   | 2425.1 | 2459.4 | 2688.8 | 3163.0 | 3933.3 | 5013.9 | 6639.2 | 8315.9 | 9575.6 | 9675.6 | 8743.4 |
| 62°   | 2071.8 | 2120.4 | 2248.0 | 2587.9 | 3288.7 | 4259.8 | 6097.5 | 8268.3 | 9616.6 | 9775.6 | 8948.2 |
| 62.5° | 2011.9 | 2027.1 | 2167.1 | 2492.7 | 3125.9 | 4109.4 | 5970.8 | 8259.8 | 9605.1 | 9761.3 | 8966.2 |
| 65°   | 1694.8 | 1707.2 | 1807.2 | 1999.5 | 2470.8 | 3249.6 | 5105.3 | 8038.9 | 9354.7 | 9506.1 | 8840.6 |
| 67.5° | 1451.1 | 1467.2 | 1523.4 | 1670.0 | 1968.1 | 2602.2 | 4237.9 | 7395.2 | 8806.3 | 8825.3 | 8327.4 |
| 70°   | 1238.7 | 1240.6 | 1313.0 | 1397.7 | 1609.1 | 2042.3 | 3306.8 | 6369.8 | 7903.7 | 7795.1 | 7344.8 |
| 72.5° | 1029.3 | 1042.6 | 1105.4 | 1194.9 | 1313.0 | 1629.1 | 2528.9 | 5195.8 | 6633.5 | 6449.8 | 5989.9 |
| 75°   | 854.1  | 856.0  | 903.6  | 977.8  | 1082.6 | 1295.9 | 1936.6 | 3844.7 | 5111.1 | 5001.6 | 4465.5 |
| 77.5° | 698.9  | 717.0  | 744.6  | 805.5  | 862.6  | 1037.8 | 1456.8 | 2756.4 | 3521.0 | 3384.8 | 2925.0 |
| 80°   | 560.8  | 577.9  | 608.4  | 638.9  | 672.2  | 764.6  | 1112.1 | 1900.5 | 2332.7 | 2146.1 | 1819.5 |
| 82.5° | 434.2  | 445.6  | 466.5  | 495.1  | 505.6  | 558.9  | 767.4  | 1277.8 | 1434.9 | 1354.9 | 1035.9 |
| 85°   | 274.2  | 278.0  | 280.9  | 304.7  | 331.3  | 360.9  | 457.0  | 672.2  | 785.5  | 730.3  | 479.9  |
| 87.5° | 82.8   | 72.4   | 91.4   | 107.6  | 107.6  | 103.8  | 127.6  | 176.1  | 173.3  | 148.5  | 84.7   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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CATALOG NUMBER: USSL-150-730-U-T2R

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 | 3498.1 |
| 2.5°  | 3501.9 | 3505.8 | 3495.3 | 3484.8 | 3471.5 | 3474.3 | 3463.9 | 3467.7 | 3462.0 | 3452.4 | 3449.6 |
| 5°    | 3526.7 | 3516.2 | 3500.0 | 3488.6 | 3477.2 | 3478.1 | 3462.0 | 3466.7 | 3463.9 | 3457.2 | 3448.6 |
| 7.5°  | 3561.9 | 3543.8 | 3523.8 | 3512.4 | 3496.2 | 3495.3 | 3483.9 | 3479.1 | 3476.2 | 3471.5 | 3469.6 |
| 10°   | 3612.4 | 3586.7 | 3565.7 | 3546.7 | 3527.7 | 3525.8 | 3508.6 | 3505.8 | 3501.0 | 3500.0 | 3492.4 |
| 12.5° | 3679.0 | 3643.8 | 3613.3 | 3588.6 | 3563.8 | 3558.1 | 3540.0 | 3527.7 | 3521.0 | 3515.3 | 3510.5 |
| 15°   | 3749.5 | 3705.7 | 3666.7 | 3627.6 | 3599.1 | 3581.0 | 3550.5 | 3534.3 | 3523.8 | 3511.5 | 3510.5 |
| 17.5° | 3826.6 | 3775.2 | 3715.2 | 3662.9 | 3621.0 | 3588.6 | 3548.6 | 3524.8 | 3510.5 | 3497.2 | 3492.4 |
| 20°   | 3922.8 | 3853.3 | 3769.5 | 3699.0 | 3636.2 | 3585.7 | 3533.4 | 3494.3 | 3462.9 | 3445.8 | 3441.0 |
| 22.5° | 4019.0 | 3934.2 | 3821.9 | 3727.6 | 3641.0 | 3572.4 | 3494.3 | 3437.2 | 3398.2 | 3376.3 | 3372.5 |
| 25°   | 4133.2 | 4028.5 | 3877.1 | 3747.6 | 3631.4 | 3540.0 | 3440.1 | 3370.6 | 3324.9 | 3296.3 | 3298.2 |
| 27.5° | 4259.8 | 4125.6 | 3927.6 | 3748.6 | 3608.6 | 3482.9 | 3371.5 | 3284.9 | 3242.0 | 3203.9 | 3205.8 |
| 30°   | 4398.9 | 4228.4 | 3960.9 | 3742.8 | 3558.1 | 3408.6 | 3275.3 | 3182.0 | 3128.7 | 3083.0 | 3081.1 |
| 32.5° | 4556.0 | 4335.1 | 3992.3 | 3732.4 | 3501.0 | 3317.2 | 3164.9 | 3062.1 | 2992.6 | 2952.6 | 2948.8 |
| 35°   | 4723.5 | 4457.9 | 4032.3 | 3709.5 | 3430.5 | 3206.8 | 3044.0 | 2914.5 | 2848.8 | 2783.1 | 2780.2 |
| 37.5° | 4896.8 | 4564.5 | 4058.9 | 3664.8 | 3327.7 | 3069.7 | 2878.3 | 2739.3 | 2621.2 | 2569.8 | 2564.1 |
| 40°   | 5095.8 | 4693.1 | 4073.2 | 3602.9 | 3195.4 | 2905.0 | 2707.9 | 2516.5 | 2401.3 | 2343.2 | 2336.5 |
| 42.5° | 5296.7 | 4832.1 | 4097.0 | 3527.7 | 3041.1 | 2719.3 | 2459.4 | 2280.4 | 2184.2 | 2112.8 | 2122.3 |
| 45°   | 5547.1 | 4989.2 | 4121.8 | 3432.4 | 2862.1 | 2488.9 | 2221.3 | 2048.0 | 1960.4 | 1907.1 | 1906.2 |
| 47.5° | 5812.8 | 5151.0 | 4144.6 | 3315.3 | 2667.9 | 2258.5 | 1993.8 | 1839.5 | 1772.9 | 1735.7 | 1729.1 |
| 50°   | 6087.0 | 5335.8 | 4159.9 | 3169.7 | 2449.8 | 2002.3 | 1780.5 | 1664.3 | 1600.5 | 1572.9 | 1564.4 |
| 52.5° | 6425.0 | 5541.4 | 4168.4 | 3016.4 | 2209.9 | 1783.3 | 1607.2 | 1515.8 | 1473.0 | 1447.2 | 1450.1 |
| 55°   | 6763.0 | 5764.2 | 4176.1 | 2829.7 | 1974.7 | 1572.9 | 1458.7 | 1394.9 | 1376.8 | 1366.3 | 1361.6 |
| 57.5° | 7150.5 | 6034.6 | 4179.9 | 2633.6 | 1751.0 | 1404.4 | 1334.9 | 1292.0 | 1274.9 | 1292.0 | 1297.8 |
| 60°   | 7505.7 | 6281.2 | 4139.9 | 2403.2 | 1538.6 | 1263.5 | 1221.6 | 1195.9 | 1193.0 | 1201.6 | 1206.4 |
| 62°   | 7706.6 | 6435.5 | 4021.8 | 2190.9 | 1367.3 | 1165.4 | 1140.7 | 1127.3 | 1123.5 | 1138.8 | 1136.8 |
| 62.5° | 7738.9 | 6452.6 | 3976.1 | 2125.2 | 1337.7 | 1147.3 | 1122.6 | 1104.5 | 1105.4 | 1121.6 | 1117.8 |
| 65°   | 7717.0 | 6390.7 | 3599.1 | 1813.8 | 1165.4 | 1035.9 | 1023.5 | 1012.1 | 1015.0 | 1032.1 | 1030.2 |
| 67.5° | 7310.5 | 5985.1 | 3093.5 | 1509.1 | 1022.6 | 939.8  | 926.4  | 917.9  | 935.0  | 952.1  | 961.7  |
| 70°   | 6496.4 | 5152.0 | 2435.6 | 1242.5 | 894.1  | 837.9  | 835.0  | 826.5  | 856.0  | 864.5  | 872.2  |
| 72.5° | 5312.9 | 4144.6 | 1883.3 | 1022.6 | 778.8  | 734.1  | 734.1  | 745.5  | 754.1  | 768.4  | 770.3  |
| 75°   | 3924.7 | 3125.9 | 1439.6 | 852.2  | 670.3  | 637.0  | 638.9  | 645.5  | 639.8  | 637.0  | 639.8  |
| 77.5° | 2585.0 | 2045.2 | 1077.8 | 698.9  | 575.1  | 540.8  | 533.2  | 538.0  | 559.9  | 594.1  | 597.0  |
| 80°   | 1561.5 | 1315.8 | 797.9  | 570.3  | 470.4  | 427.5  | 436.1  | 456.1  | 550.3  | 582.7  | 585.6  |
| 82.5° | 911.2  | 808.4  | 600.8  | 444.6  | 361.8  | 320.9  | 338.0  | 438.0  | 493.2  | 318.0  | 353.2  |
| 85°   | 418.9  | 390.4  | 363.7  | 272.3  | 218.0  | 200.9  | 243.7  | 378.9  | 334.2  | 146.6  | 113.3  |
| 87.5° | 74.3   | 76.2   | 75.2   | 59.0   | 42.8   | 40.0   | 82.8   | 107.6  | 67.6   | 17.1   | 11.4   |
| 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

McGraw-Edison

Report Number: SP2-2501-321-4

Test Date: 04/10/2025

Luminaire Tested: GKO-PB1E-730-U-T4W

Data in this report applies to families of products including GKO-PB1E-730-U-T4W

### Test Information

Test Method: LM-79-2019  
 Report Number: SP2-2501-321-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP2 - 165CM SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/10/2025  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGraw-Edison  
 Catalog Number: **GKO-PB1E-730-U-T4W**  
 Description: Gekko Wedge Wall Pack Fixture 1 SQ w/ T4W distribution

### Spectral Parameters

CCT (K): 3072  
 CIE  $u'$ : 0.2482  
 CIE  $v'$ : 0.5193  
 Duv: -0.0004  
 CIE x: 0.4313  
 CIE y: 0.4010  
 CIE z: 0.1677  
 Peak Wavelength (nm): 593  
 Dominant Wavelength (nm): 582  
 Purity: 49.8225  
 R<sub>f</sub>: 74.7  
 R<sub>g</sub>: 94.2

CRI (Ra): 71.7  
 R1: 68.1  
 R2: 82.1  
 R3: 93.4  
 R4: 67.3  
 R5: 67.2  
 R6: 74.9  
 R7: 77.5  
 R8: 43.4  
 R9: -33.9  
 R10: 58.6  
 R11: 62.0  
 R12: 48.5  
 R13: 70.7  
 R14: 96.4  
 R15: 60.2



### Test Conditions

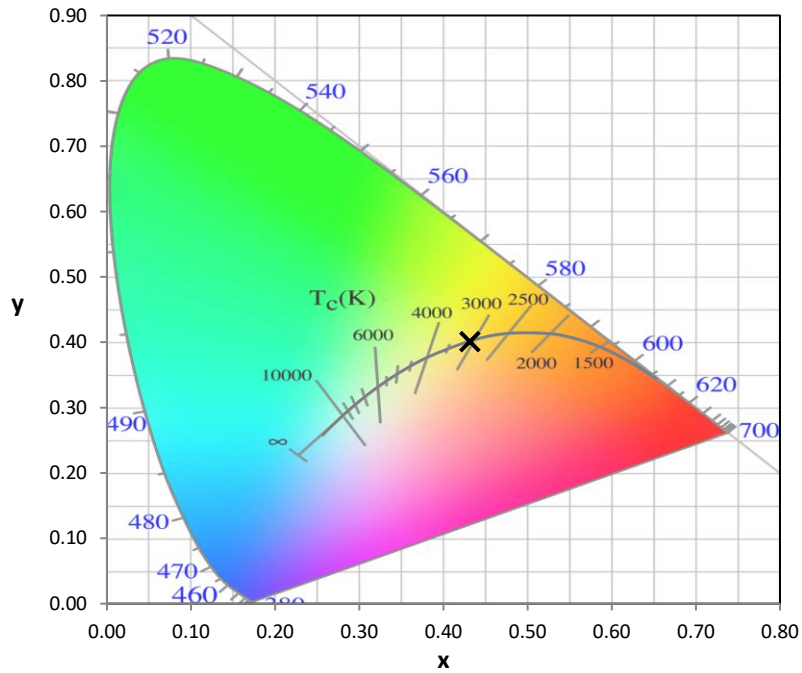
Stabilization Time: 30M  
 Operation Time: 1H 30M  
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP2-2501-321-4

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN2187                | 1/6/2025         | 7/6/2025             |
| Power Meter                    | INXT2011002           | 1/21/2025        | 1/21/2026            |
| AC Power Source                | IN0458                | 10/22/2024       | 10/22/2025           |
| DC Power Source                | IN0212                | 10/22/2024       | 10/22/2025           |
| Sphere Thermometer             | IN4036B               | 10/22/2024       | 10/22/2025           |
| Room Thermometer               | IN0046                | 10/22/2024       | 10/22/2025           |

REPORT NUMBER: SP2-2501-321-4

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP2-2501-321-4

### Photopic Flux vs. Wavelength



### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 114                                  | NR                             | 620               | 817                                  | NR                             | 750               | 22                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 141                                  | NR                             | 625               | 756                                  | NR                             | 755               | 19                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 189                                  | NR                             | 630               | 693                                  | NR                             | 760               | 16                                   | NR                             | 890               | 0                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 247                                  | NR                             | 635               | 628                                  | NR                             | 765               | 14                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 307                                  | NR                             | 640               | 564                                  | NR                             | 770               | 12                                   | NR                             | 900               | 0                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 366                                  | NR                             | 645               | 504                                  | NR                             | 775               | 10                                   | NR                             | 905               | 0                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 415                                  | NR                             | 650               | 446                                  | NR                             | 780               | 9                                    | NR                             | 910               | 0                                    | NR                             |
| 395               | 2                                    | NR                             | 525               | 455                                  | NR                             | 655               | 393                                  | NR                             | 785               | 8                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 3                                    | NR                             | 530               | 491                                  | NR                             | 660               | 344                                  | NR                             | 790               | 7                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 6                                    | NR                             | 535               | 523                                  | NR                             | 665               | 300                                  | NR                             | 795               | 6                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 11                                   | NR                             | 540               | 556                                  | NR                             | 670               | 260                                  | NR                             | 800               | 5                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 21                                   | NR                             | 545               | 591                                  | NR                             | 675               | 226                                  | NR                             | 805               | 4                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 41                                   | NR                             | 550               | 632                                  | NR                             | 680               | 195                                  | NR                             | 810               | 4                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 76                                   | NR                             | 555               | 679                                  | NR                             | 685               | 167                                  | NR                             | 815               | 3                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 129                                  | NR                             | 560               | 732                                  | NR                             | 690               | 144                                  | NR                             | 820               | 3                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 205                                  | NR                             | 565               | 787                                  | NR                             | 695               | 123                                  | NR                             | 825               | 2                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 307                                  | NR                             | 570               | 847                                  | NR                             | 700               | 105                                  | NR                             | 830               | 2                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 451                                  | NR                             | 575               | 900                                  | NR                             | 705               | 90                                   | NR                             | 835               | 2                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 603                                  | NR                             | 580               | 944                                  | NR                             | 710               | 77                                   | NR                             | 840               | 2                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 544                                  | NR                             | 585               | 977                                  | NR                             | 715               | 66                                   | NR                             | 845               | 1                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 348                                  | NR                             | 590               | 997                                  | NR                             | 720               | 56                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 249                                  | NR                             | 595               | 998                                  | NR                             | 725               | 48                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 191                                  | NR                             | 600               | 986                                  | NR                             | 730               | 41                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 133                                  | NR                             | 605               | 960                                  | NR                             | 735               | 35                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 107                                  | NR                             | 610               | 921                                  | NR                             | 740               | 30                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 104                                  | NR                             | 615               | 874                                  | NR                             | 745               | 26                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.24

| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 114                         | NR               | 620       | 817                         | NR               | 750       | 22                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 141                         | NR               | 625       | 756                         | NR               | 755       | 19                          | NR               | 885       | 1                           | NR               |
| 370       | 0                           | NR               | 500       | 189                         | NR               | 630       | 693                         | NR               | 760       | 16                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 247                         | NR               | 635       | 628                         | NR               | 765       | 14                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 307                         | NR               | 640       | 564                         | NR               | 770       | 12                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 366                         | NR               | 645       | 504                         | NR               | 775       | 10                          | NR               | 905       | 0                           | NR               |
| 390       | 0                           | NR               | 520       | 415                         | NR               | 650       | 446                         | NR               | 780       | 9                           | NR               | 910       | 0                           | NR               |
| 395       | 2                           | NR               | 525       | 455                         | NR               | 655       | 393                         | NR               | 785       | 8                           | NR               | 915       | 0                           | NR               |
| 400       | 3                           | NR               | 530       | 491                         | NR               | 660       | 344                         | NR               | 790       | 7                           | NR               | 920       | 0                           | NR               |
| 405       | 6                           | NR               | 535       | 523                         | NR               | 665       | 300                         | NR               | 795       | 6                           | NR               | 925       | 0                           | NR               |
| 410       | 11                          | NR               | 540       | 556                         | NR               | 670       | 260                         | NR               | 800       | 5                           | NR               | 930       | 0                           | NR               |
| 415       | 21                          | NR               | 545       | 591                         | NR               | 675       | 226                         | NR               | 805       | 4                           | NR               | 935       | 0                           | NR               |
| 420       | 41                          | NR               | 550       | 632                         | NR               | 680       | 195                         | NR               | 810       | 4                           | NR               | 940       | 0                           | NR               |
| 425       | 76                          | NR               | 555       | 679                         | NR               | 685       | 167                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 129                         | NR               | 560       | 732                         | NR               | 690       | 144                         | NR               | 820       | 3                           | NR               | 950       | 0                           | NR               |
| 435       | 205                         | NR               | 565       | 787                         | NR               | 695       | 123                         | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 307                         | NR               | 570       | 847                         | NR               | 700       | 105                         | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 451                         | NR               | 575       | 900                         | NR               | 705       | 90                          | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 603                         | NR               | 580       | 944                         | NR               | 710       | 77                          | NR               | 840       | 2                           | NR               | 970       | 0                           | NR               |
| 455       | 544                         | NR               | 585       | 977                         | NR               | 715       | 66                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 348                         | NR               | 590       | 997                         | NR               | 720       | 56                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 249                         | NR               | 595       | 998                         | NR               | 725       | 48                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 191                         | NR               | 600       | 986                         | NR               | 730       | 41                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 133                         | NR               | 605       | 960                         | NR               | 735       | 35                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 107                         | NR               | 610       | 921                         | NR               | 740       | 30                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 104                         | NR               | 615       | 874                         | NR               | 745       | 26                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.3

| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|
| 360               | 0                                      | NR                             | 490               | 114                                    | NR                             | 620               | 817                                    | NR                             | 750               | 22                                     | NR                             | 880               | 1                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 141                                    | NR                             | 625               | 756                                    | NR                             | 755               | 19                                     | NR                             | 885               | 1                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 189                                    | NR                             | 630               | 693                                    | NR                             | 760               | 16                                     | NR                             | 890               | 0                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 247                                    | NR                             | 635               | 628                                    | NR                             | 765               | 14                                     | NR                             | 895               | 0                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 307                                    | NR                             | 640               | 564                                    | NR                             | 770               | 12                                     | NR                             | 900               | 0                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 366                                    | NR                             | 645               | 504                                    | NR                             | 775               | 10                                     | NR                             | 905               | 0                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 415                                    | NR                             | 650               | 446                                    | NR                             | 780               | 9                                      | NR                             | 910               | 0                                      | NR                             |
| 395               | 2                                      | NR                             | 525               | 455                                    | NR                             | 655               | 393                                    | NR                             | 785               | 8                                      | NR                             | 915               | 0                                      | NR                             |
| 400               | 3                                      | NR                             | 530               | 491                                    | NR                             | 660               | 344                                    | NR                             | 790               | 7                                      | NR                             | 920               | 0                                      | NR                             |
| 405               | 6                                      | NR                             | 535               | 523                                    | NR                             | 665               | 300                                    | NR                             | 795               | 6                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 11                                     | NR                             | 540               | 556                                    | NR                             | 670               | 260                                    | NR                             | 800               | 5                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 21                                     | NR                             | 545               | 591                                    | NR                             | 675               | 226                                    | NR                             | 805               | 4                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 41                                     | NR                             | 550               | 632                                    | NR                             | 680               | 195                                    | NR                             | 810               | 4                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 76                                     | NR                             | 555               | 679                                    | NR                             | 685               | 167                                    | NR                             | 815               | 3                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 129                                    | NR                             | 560               | 732                                    | NR                             | 690               | 144                                    | NR                             | 820               | 3                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 205                                    | NR                             | 565               | 787                                    | NR                             | 695               | 123                                    | NR                             | 825               | 2                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 307                                    | NR                             | 570               | 847                                    | NR                             | 700               | 105                                    | NR                             | 830               | 2                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 451                                    | NR                             | 575               | 900                                    | NR                             | 705               | 90                                     | NR                             | 835               | 2                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 603                                    | NR                             | 580               | 944                                    | NR                             | 710               | 77                                     | NR                             | 840               | 2                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 544                                    | NR                             | 585               | 977                                    | NR                             | 715               | 66                                     | NR                             | 845               | 1                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 348                                    | NR                             | 590               | 997                                    | NR                             | 720               | 56                                     | NR                             | 850               | 1                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 249                                    | NR                             | 595               | 998                                    | NR                             | 725               | 48                                     | NR                             | 855               | 1                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 191                                    | NR                             | 600               | 986                                    | NR                             | 730               | 41                                     | NR                             | 860               | 1                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 133                                    | NR                             | 605               | 960                                    | NR                             | 735               | 35                                     | NR                             | 865               | 1                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 107                                    | NR                             | 610               | 921                                    | NR                             | 740               | 30                                     | NR                             | 870               | 1                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 104                                    | NR                             | 615               | 874                                    | NR                             | 745               | 26                                     | NR                             | 875               | 1                                      | NR                             |                   |                                        |                                |

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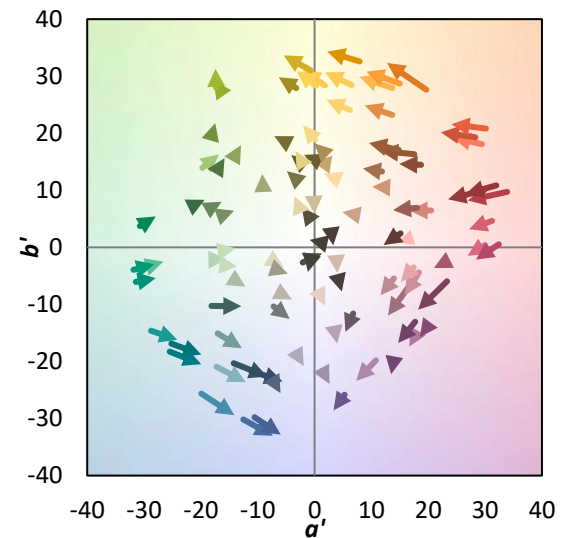
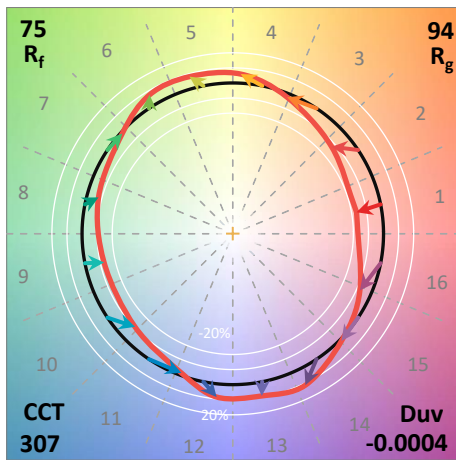
TM-30-18

### Summary

$R_f = 74.7$   
 $R_g = 94.2$   
 $CIE R_a = 71.7$   
 $R_g = -33.9$



### Color Vector Graphics

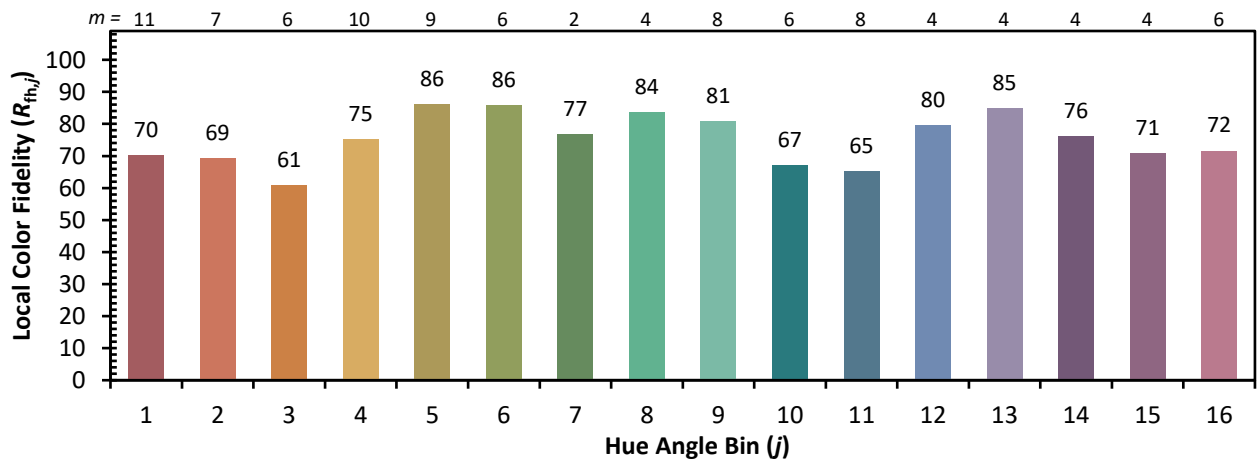
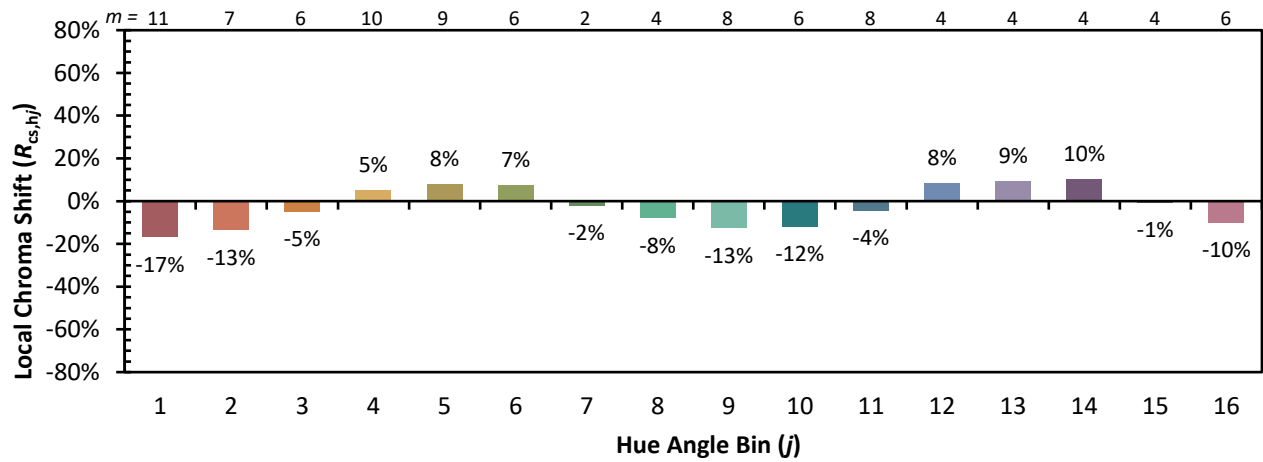


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 65 | CES51 = 86 | CES76 = 58 |
| CES02 = 62 | CES27 = 89 | CES52 = 85 | CES77 = 76 |
| CES03 = 31 | CES28 = 84 | CES53 = 77 | CES78 = 62 |
| CES04 = 71 | CES29 = 68 | CES54 = 85 | CES79 = 85 |
| CES05 = 49 | CES30 = 83 | CES55 = 84 | CES80 = 84 |
| CES06 = 51 | CES31 = 71 | CES56 = 74 | CES81 = 73 |
| CES07 = 41 | CES32 = 64 | CES57 = 74 | CES82 = 93 |
| CES08 = 40 | CES33 = 78 | CES58 = 75 | CES83 = 91 |
| CES09 = 29 | CES34 = 75 | CES59 = 85 | CES84 = 88 |
| CES10 = 76 | CES35 = 87 | CES60 = 90 | CES85 = 76 |
| CES11 = 59 | CES36 = 94 | CES61 = 81 | CES86 = 64 |
| CES12 = 65 | CES37 = 84 | CES62 = 89 | CES87 = 77 |
| CES13 = 43 | CES38 = 92 | CES63 = 75 | CES88 = 80 |
| CES14 = 74 | CES39 = 96 | CES64 = 65 | CES89 = 67 |
| CES15 = 71 | CES40 = 92 | CES65 = 65 | CES90 = 79 |
| CES16 = 47 | CES41 = 93 | CES66 = 60 | CES91 = 80 |
| CES17 = 50 | CES42 = 86 | CES67 = 58 | CES92 = 57 |
| CES18 = 56 | CES43 = 78 | CES68 = 66 | CES93 = 74 |
| CES19 = 73 | CES44 = 99 | CES69 = 75 | CES94 = 50 |
| CES20 = 66 | CES45 = 85 | CES70 = 60 | CES95 = 67 |
| CES21 = 87 | CES46 = 81 | CES71 = 57 | CES96 = 77 |
| CES22 = 79 | CES47 = 86 | CES72 = 85 | CES97 = 83 |
| CES23 = 92 | CES48 = 75 | CES73 = 52 | CES98 = 76 |
| CES24 = 91 | CES49 = 79 | CES74 = 95 | CES99 = 64 |
| CES25 = 73 | CES50 = 86 | CES75 = 60 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)