

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: McGRAW-EDISON

Report Number: P510442

Luminaire Tested: **CTN-CA10-210-750-U-T5**

Issue Date: 4/6/2021

**Test Information**

Test Method: LM-79-08  
Report Number: P510442  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2102-151-3)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 4/6/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: CTN-CA10-210-750-U-T5  
Description: CELESTEON HIGH MAST LUMINAIRE  
Light Source: (10) 5000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 36665 lumens  
Efficiency: N/A  
Efficacy: 172.2 lumens/watt  
Luminous Opening: Circular (Dia: 2.08' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B5 - U0 - G5

Input Watts (W): 212.9  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

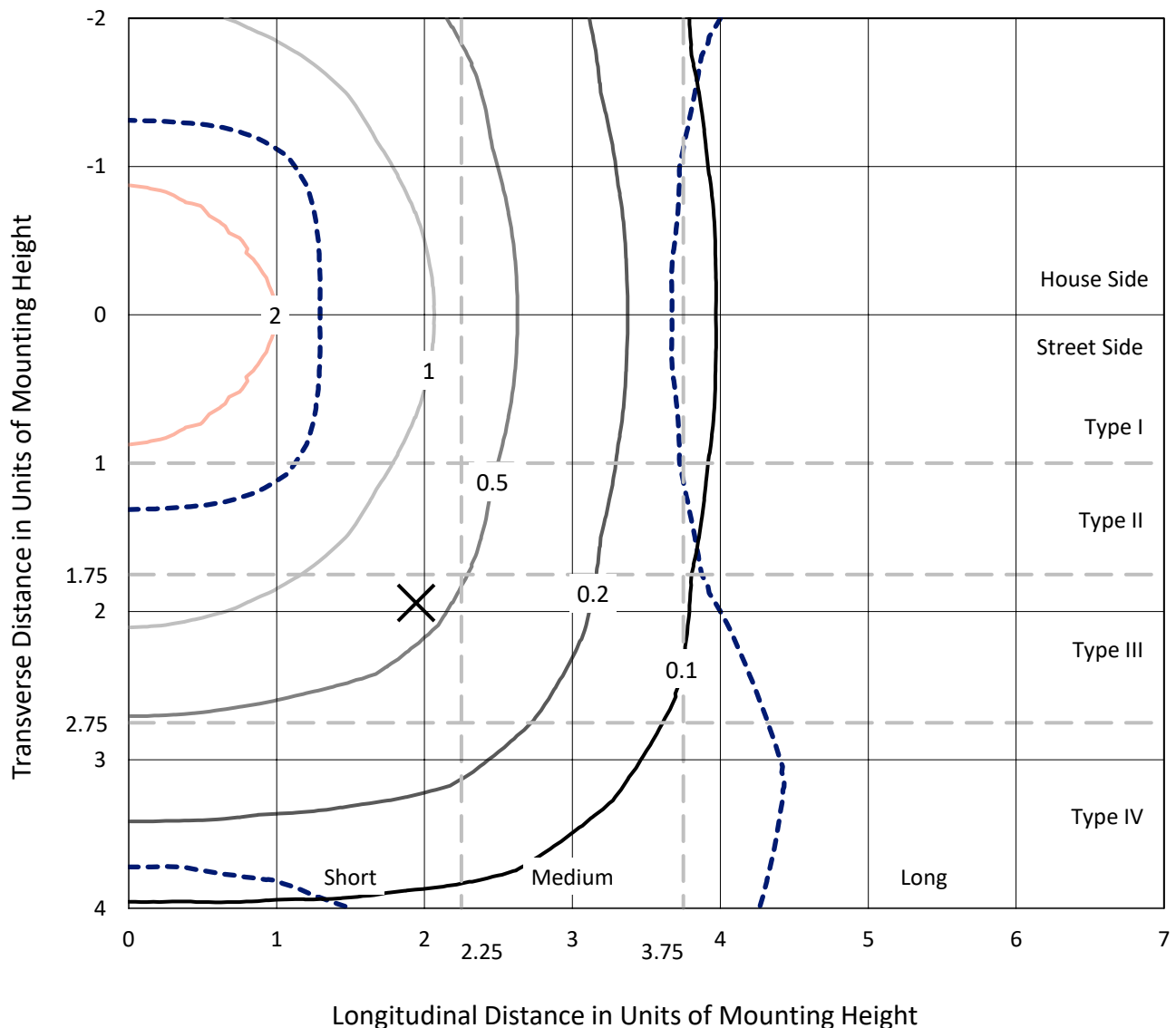


REPORT NUMBER: P510442

CATALOG NUMBER: CTN-CA10-210-750-U-T5

## Iso-Footcandle Lines of Horizontal Illumination

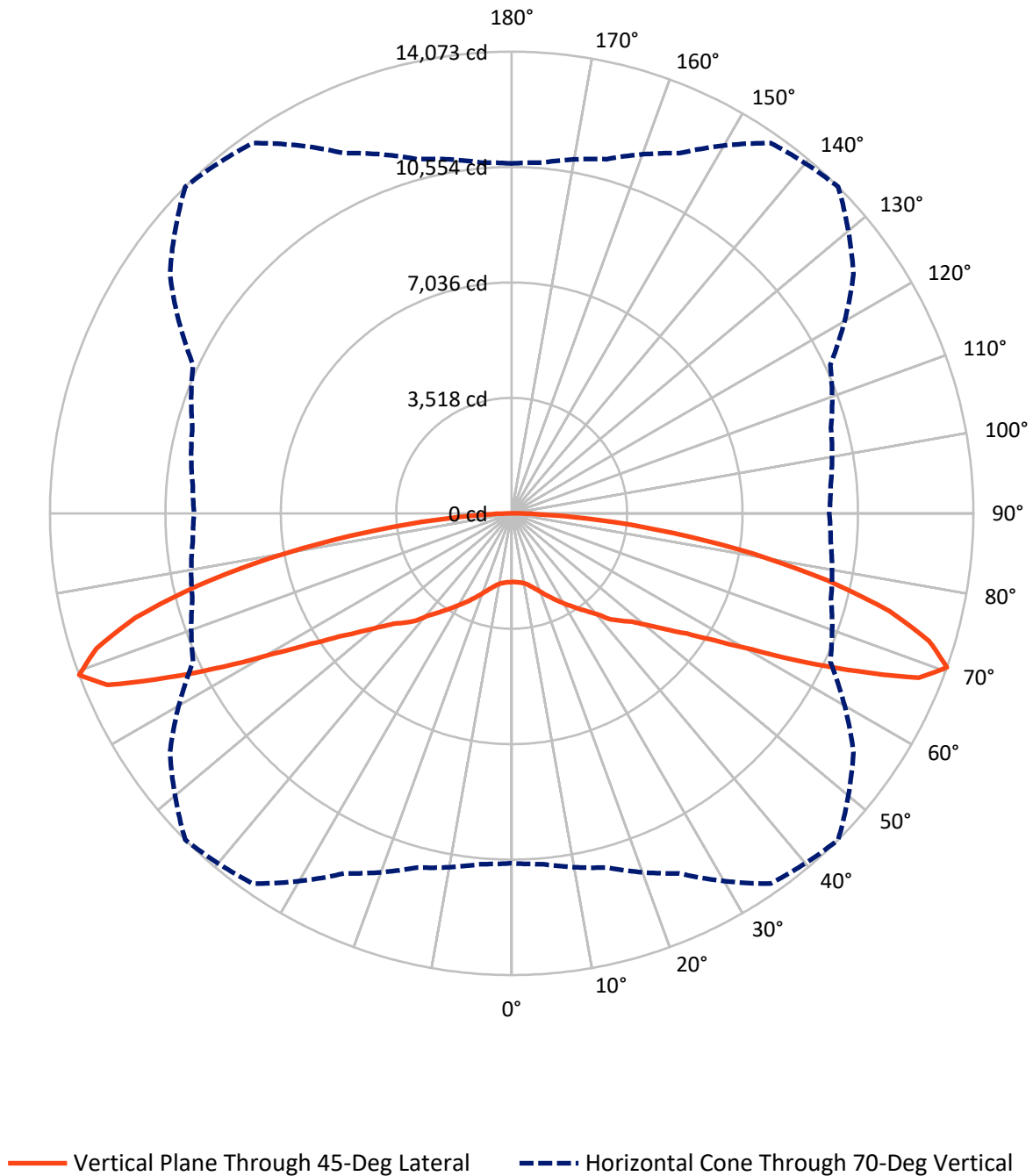
× Max cd  
 --- 1/2 Max cd



Based on 30 foot mounting height. Maximum calculated value = 2.4 fc  
 Type V - Short - N/A

REPORT NUMBER: P510442  
CATALOG NUMBER: CTN-CA10-210-750-U-T5

## Luminous Intensity Polar Plot



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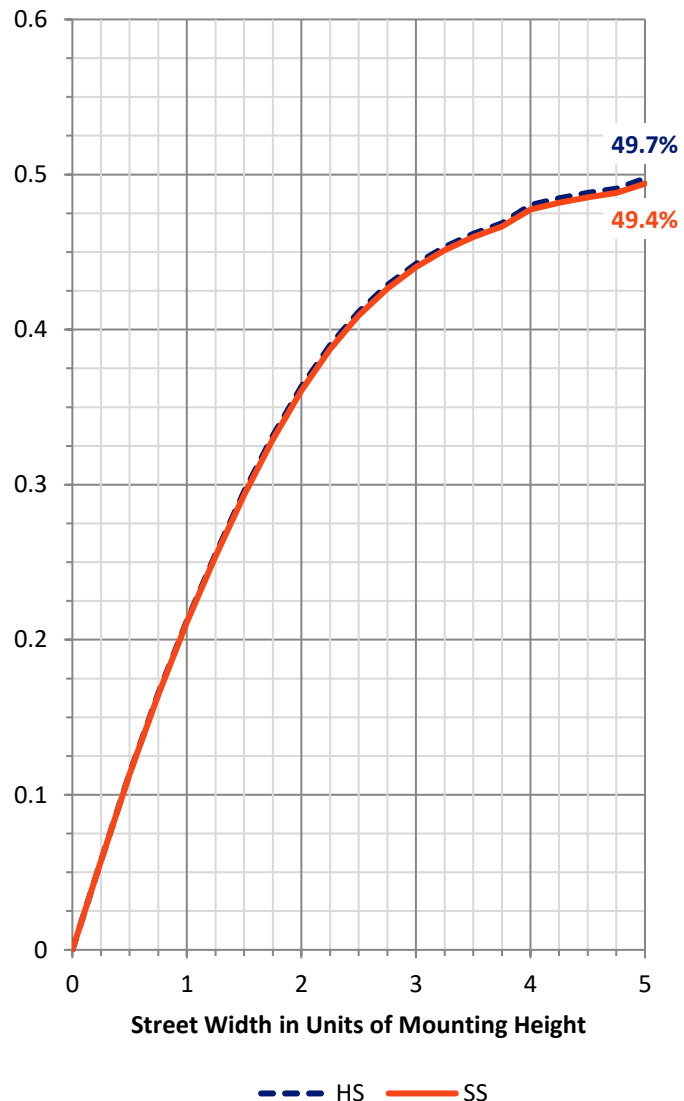
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 18332.5  | 0.0    | 18332.5 |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Street Side</b> | Lumens    | 18332.5  | 0.0    | 18332.5 |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Total</b>       | Lumens    | 36665.0  | 0.0    | 36665.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 203.7   | 0.6       |
| 10°-20°   | 663.4   | 1.8       |
| 20°-30°   | 1313.2  | 3.6       |
| 30°-40°   | 2271.7  | 6.2       |
| 40°-50°   | 3779.8  | 10.3      |
| 50°-60°   | 6592.6  | 18.0      |
| 60°-70°   | 10913.7 | 29.8      |
| 70°-80°   | 9146.5  | 24.9      |
| 80°-90°   | 1780.5  | 4.9       |
| 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°    | 36665.0 | 100.0     |
| 0°-180°   | 36665.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P510442

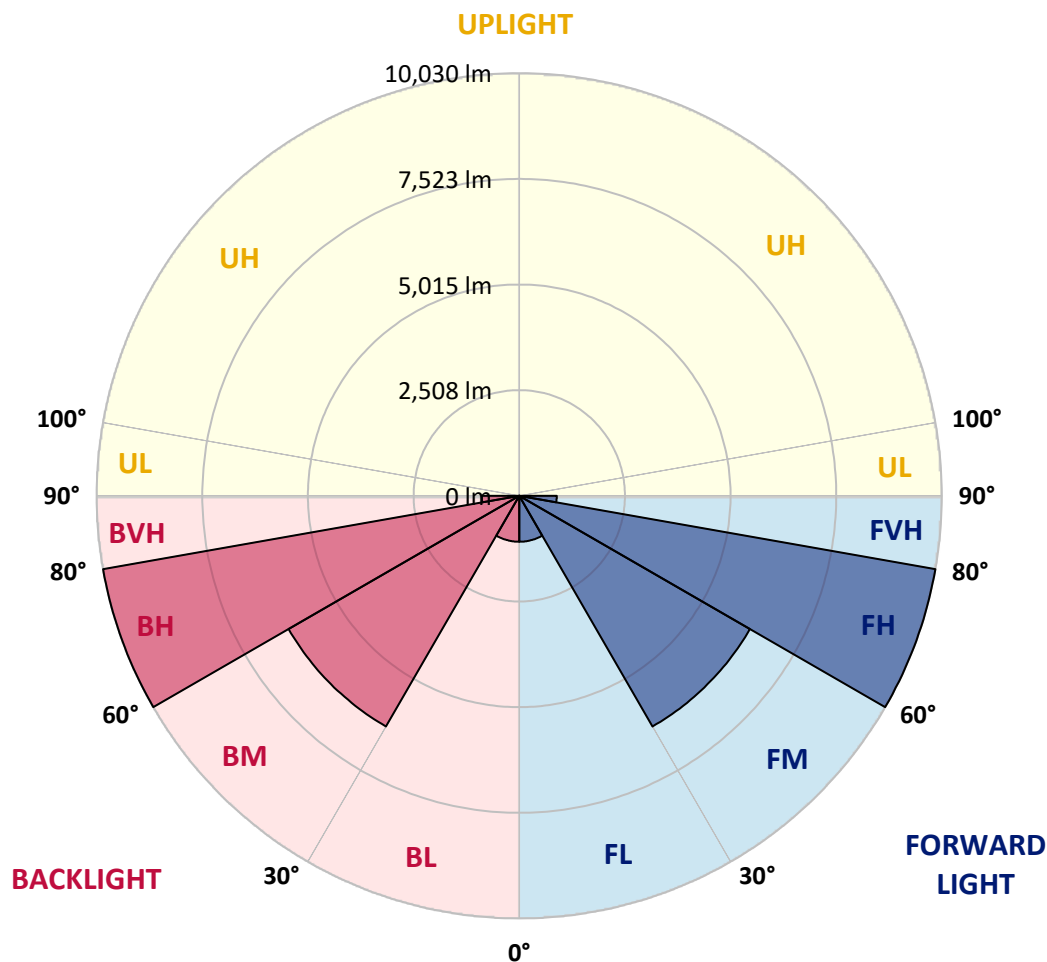
CATALOG NUMBER: CTN-CA10-210-750-U-T5

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1090.1  | 3.0       |                         |      |          |
| FM   | (30°-60°)   | 6322.0  | 17.2      |                         |      |          |
| FH   | (60°-80°)   | 10030.1 | 27.4      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 890.3   | 2.4       |                         |      | G5       |
| BL   | (0°-30°)    | 1090.1  | 3.0       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 6322.0  | 17.2      | B4/8500                 |      |          |
| BH   | (60°-80°)   | 10030.1 | 27.4      | B5                      |      | G4/12000 |
| BVH  | (80°-90°)   | 890.3   | 2.4       |                         |      | G5       |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B5-U0-G5**

Type V Short





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CATALOG NUMBER: CTN-CA10-210-750-U-T5

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     | 90°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 2095.5  | 2095.5  | 2095.5  | 2095.5  | 2095.5  | 2095.5  | 2095.5  | 2095.5  | 2095.5  | 2095.5  | 2095.5  |
| 2.5°  | 2108.6  | 2102.1  | 2099.9  | 2097.7  | 2099.2  | 2098.4  | 2102.1  | 2103.5  | 2105.0  | 2111.5  | 2107.9  |
| 5°    | 2121.7  | 2116.6  | 2115.9  | 2112.9  | 2112.2  | 2112.2  | 2117.3  | 2118.0  | 2118.8  | 2123.1  | 2118.8  |
| 7.5°  | 2145.6  | 2140.5  | 2139.1  | 2137.6  | 2136.9  | 2134.0  | 2137.6  | 2136.2  | 2137.6  | 2139.8  | 2134.7  |
| 10°   | 2183.4  | 2177.6  | 2176.1  | 2172.5  | 2174.7  | 2170.3  | 2173.2  | 2169.6  | 2163.0  | 2164.5  | 2157.2  |
| 12.5° | 2234.9  | 2229.8  | 2232.0  | 2231.3  | 2240.0  | 2237.8  | 2232.0  | 2224.8  | 2213.9  | 2206.6  | 2198.6  |
| 15°   | 2311.2  | 2303.2  | 2309.0  | 2314.8  | 2323.5  | 2327.1  | 2322.8  | 2303.2  | 2287.2  | 2275.6  | 2269.1  |
| 17.5° | 2404.1  | 2391.0  | 2402.7  | 2414.3  | 2433.2  | 2436.8  | 2420.8  | 2396.9  | 2379.4  | 2374.3  | 2363.5  |
| 20°   | 2512.3  | 2510.1  | 2510.8  | 2529.7  | 2558.8  | 2563.9  | 2542.8  | 2514.5  | 2497.1  | 2497.8  | 2485.4  |
| 22.5° | 2643.0  | 2631.4  | 2635.0  | 2653.9  | 2695.3  | 2709.1  | 2674.2  | 2643.0  | 2632.1  | 2635.0  | 2633.6  |
| 25°   | 2792.6  | 2781.7  | 2776.6  | 2785.3  | 2839.0  | 2863.0  | 2829.6  | 2793.3  | 2788.2  | 2794.8  | 2784.6  |
| 27.5° | 2956.7  | 2946.5  | 2940.7  | 2945.1  | 2987.2  | 3032.2  | 2995.2  | 2964.7  | 2963.9  | 2973.4  | 2967.6  |
| 30°   | 3143.3  | 3128.0  | 3121.5  | 3126.6  | 3155.6  | 3199.2  | 3169.4  | 3151.3  | 3166.5  | 3173.1  | 3170.9  |
| 32.5° | 3332.1  | 3324.8  | 3322.6  | 3321.2  | 3356.8  | 3381.4  | 3366.9  | 3370.6  | 3382.9  | 3412.7  | 3403.2  |
| 35°   | 3547.0  | 3525.9  | 3531.7  | 3536.1  | 3582.6  | 3584.7  | 3586.2  | 3592.7  | 3625.4  | 3667.5  | 3642.8  |
| 37.5° | 3770.6  | 3765.5  | 3769.2  | 3756.8  | 3791.0  | 3804.8  | 3825.1  | 3846.9  | 3898.4  | 3947.1  | 3936.9  |
| 40°   | 4047.3  | 4037.8  | 4041.5  | 4026.9  | 4043.6  | 4054.5  | 4095.9  | 4143.1  | 4209.2  | 4261.5  | 4237.5  |
| 42.5° | 4414.0  | 4390.0  | 4390.0  | 4394.4  | 4429.2  | 4417.6  | 4506.2  | 4519.2  | 4601.3  | 4645.6  | 4631.8  |
| 45°   | 4845.3  | 4836.5  | 4790.8  | 4713.8  | 4670.3  | 4669.5  | 4740.7  | 4846.7  | 4982.5  | 5074.7  | 5074.0  |
| 47.5° | 5393.5  | 5366.6  | 5257.0  | 5071.8  | 4961.4  | 4934.6  | 5009.4  | 5215.6  | 5465.3  | 5609.1  | 5606.9  |
| 50°   | 6112.3  | 6078.2  | 5911.9  | 5624.4  | 5409.4  | 5343.4  | 5463.2  | 5730.4  | 6066.6  | 6258.2  | 6274.2  |
| 52.5° | 6916.8  | 6919.7  | 6731.7  | 6296.7  | 5978.7  | 5859.6  | 5986.7  | 6368.6  | 6787.6  | 7050.4  | 7081.6  |
| 55°   | 7851.3  | 7828.8  | 7650.9  | 7157.9  | 6720.0  | 6464.5  | 6656.9  | 7163.0  | 7644.4  | 7844.8  | 7900.0  |
| 57.5° | 8824.3  | 8736.4  | 8599.9  | 8138.8  | 7626.9  | 7300.2  | 7531.1  | 8026.3  | 8487.4  | 8743.0  | 8734.2  |
| 60°   | 9686.9  | 9628.8  | 9550.4  | 9183.0  | 8790.2  | 8416.9  | 8594.8  | 9013.8  | 9408.8  | 9563.4  | 9570.0  |
| 62.5° | 10629.4 | 10580.7 | 10510.3 | 10309.2 | 10092.8 | 9954.1  | 9792.9  | 9986.8  | 10295.4 | 10464.5 | 10519.7 |
| 65°   | 11554.4 | 11537.0 | 11577.6 | 11547.1 | 11638.6 | 11618.3 | 11232.0 | 11110.0 | 11115.1 | 11067.2 | 11042.5 |
| 67.5° | 11500.0 | 11493.4 | 11733.0 | 12210.8 | 13122.8 | 13381.3 | 12390.2 | 11286.5 | 10789.1 | 10662.8 | 10644.6 |
| 70°   | 10661.3 | 10731.7 | 11175.4 | 12110.6 | 13774.8 | 14072.5 | 12715.4 | 10712.1 | 10076.1 | 9759.5  | 9681.1  |
| 72.5° | 9047.9  | 9185.9  | 9866.2  | 11243.6 | 13233.2 | 13301.4 | 11897.9 | 9848.1  | 8911.4  | 8533.8  | 8477.9  |
| 75°   | 6981.4  | 6998.9  | 7695.2  | 9445.8  | 11810.0 | 11895.7 | 10613.4 | 8260.1  | 7338.7  | 6868.9  | 6854.4  |
| 77.5° | 4252.0  | 4499.6  | 5515.4  | 7082.4  | 9388.5  | 9834.3  | 8876.6  | 6579.2  | 5483.5  | 5067.4  | 4835.1  |
| 80°   | 2086.1  | 2199.4  | 2931.3  | 4477.9  | 6710.6  | 7457.8  | 6587.2  | 4550.5  | 3382.2  | 2854.3  | 2796.2  |
| 82.5° | 949.7   | 1010.0  | 1386.8  | 2340.9  | 4049.5  | 4975.2  | 4065.4  | 2606.0  | 1805.8  | 1412.3  | 1399.2  |
| 85°   | 368.9   | 366.7   | 561.3   | 982.4   | 1938.7  | 2754.8  | 2058.5  | 1243.1  | 826.3   | 614.3   | 579.4   |
| 87.5° | 107.5   | 114.7   | 164.8   | 322.4   | 574.3   | 774.0   | 634.6   | 429.9   | 254.1   | 163.4   | 150.3   |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

STREETWORKS

Report Number: SP1-2104-215-7

Luminaire Tested: CST-CA6-230-750-U-T4

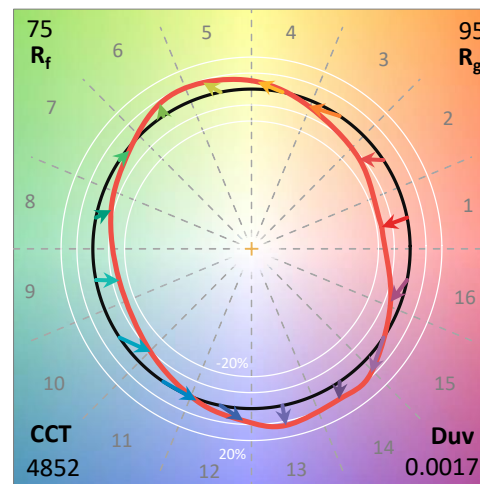
Test Date: 04/22/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-215-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/22/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **CST-CA6-230-750-U-T4**  
 Description: STREETWORKS HIGH MAST LUMINAIRE

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 4852   | CRI (Ra): | 74.1 |      |       |
| CIE u':                   | 0.2118 | R1:       | 71.0 | R9:  | -25.4 |
| CIE v':                   | 0.4888 | R2:       | 79.6 | R10: | 51.4  |
| Duv:                      | 0.0017 | R3:       | 85.8 | R11: | 70.1  |
| CIE x:                    | 0.3498 | R4:       | 73.5 | R12: | 42.9  |
| CIE y:                    | 0.3588 | R5:       | 71.4 | R13: | 72.5  |
| CIE z:                    | 0.2914 | R6:       | 71.2 | R14: | 92.1  |
| Peak Wavelength (nm):     | 449    | R7:       | 82.9 |      |       |
| Dominant Wavelength (nm): | 572    | R8:       | 57.2 |      |       |
| Purity:                   | 12.7   |           |      |      |       |
| Rf:                       | 75.2   |           |      |      |       |
| Rg:                       | 94.7   |           |      |      |       |



### Test Conditions

Stabilization Time: 72M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.4/13%  
 Sphere Temperature (°C): 24.0

REPORT NUMBER: SP1-2104-215-7

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

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**CIE 1931 Chromaticity Diagram**



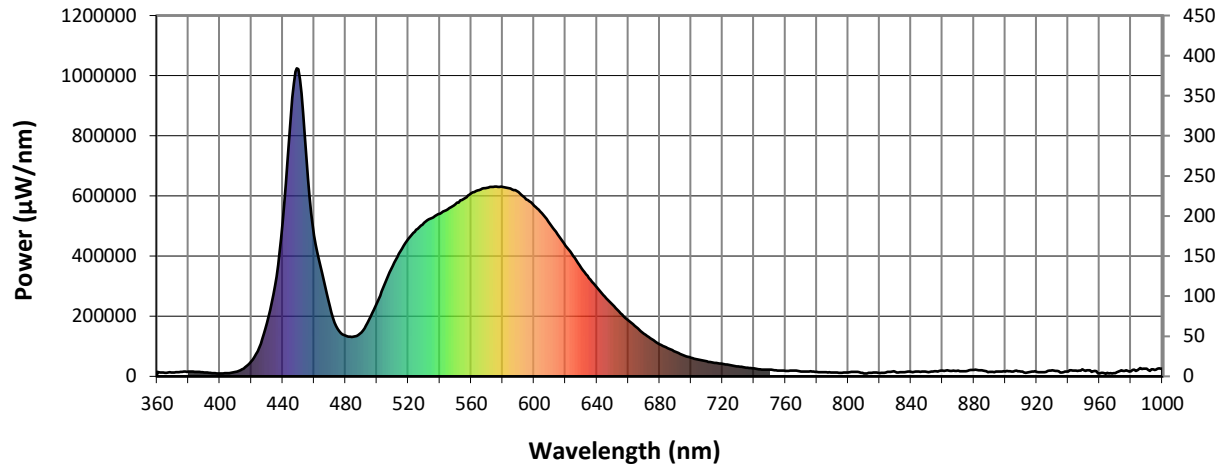
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 5000K 4-step quadrangle

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### Photopic Flux vs. Wavelength



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 15077            | 0.0              | 490       | 146327           | 20.8             | 620       | 434415           | 113.0            | 750       | 22886            | 0.0              | 880       | 20960            | 0.0              |
| 365       | 12138            | 0.0              | 495       | 188585           | 34.2             | 625       | 400670           | 88.4             | 755       | 19692            | 0.0              | 885       | 20315            | 0.0              |
| 370       | 12993            | 0.0              | 500       | 245069           | 54.1             | 630       | 360611           | 65.3             | 760       | 18199            | 0.0              | 890       | 15211            | 0.0              |
| 375       | 14513            | 0.0              | 505       | 307682           | 86.1             | 635       | 326986           | 49.1             | 765       | 19191            | 0.0              | 895       | 15502            | 0.0              |
| 380       | 15679            | 0.0              | 510       | 367102           | 126.1            | 640       | 295583           | 35.3             | 770       | 16229            | 0.0              | 900       | 15935            | 0.0              |
| 385       | 14569            | 0.0              | 515       | 416068           | 172.4            | 645       | 264664           | 25.5             | 775       | 16351            | 0.0              | 905       | 15965            | 0.0              |
| 390       | 13091            | 0.0              | 520       | 457470           | 221.8            | 650       | 238441           | 17.4             | 780       | 14567            | 0.0              | 910       | 16119            | 0.0              |
| 395       | 10927            | 0.0              | 525       | 486980           | 261.4            | 655       | 210047           | 12.1             | 785       | 13349            | 0.0              | 915       | 13972            | 0.0              |
| 400       | 9655             | 0.0              | 530       | 511184           | 301.0            | 660       | 186019           | 7.8              | 790       | 12552            | 0.0              | 920       | 14830            | 0.0              |
| 405       | 10895            | 0.0              | 535       | 527191           | 326.9            | 665       | 164001           | 5.2              | 795       | 11517            | 0.0              | 925       | 13744            | 0.0              |
| 410       | 14929            | 0.0              | 540       | 540658           | 352.3            | 670       | 142007           | 3.1              | 800       | 13250            | 0.0              | 930       | 20340            | 0.0              |
| 415       | 25993            | 0.0              | 545       | 555639           | 369.8            | 675       | 123441           | 2.1              | 805       | 15135            | 0.0              | 935       | 13272            | 0.0              |
| 420       | 49620            | 0.1              | 550       | 572229           | 388.9            | 680       | 106894           | 1.2              | 810       | 9873             | 0.0              | 940       | 16357            | 0.0              |
| 425       | 95836            | 0.5              | 555       | 589788           | 402.8            | 685       | 94026            | 0.8              | 815       | 11566            | 0.0              | 945       | 19257            | 0.0              |
| 430       | 178101           | 1.4              | 560       | 608278           | 413.4            | 690       | 82099            | 0.5              | 820       | 11216            | 0.0              | 950       | 19804            | 0.0              |
| 435       | 300144           | 3.5              | 565       | 619317           | 411.8            | 695       | 70275            | 0.3              | 825       | 15165            | 0.0              | 955       | 14877            | 0.0              |
| 440       | 512674           | 8.1              | 570       | 627176           | 407.8            | 700       | 61784            | 0.2              | 830       | 14983            | 0.0              | 960       | 9882             | 0.0              |
| 445       | 857336           | 17.9             | 575       | 631114           | 392.7            | 705       | 55550            | 0.1              | 835       | 13993            | 0.0              | 965       | 11741            | 0.0              |
| 450       | 1021494          | 26.5             | 580       | 630436           | 374.6            | 710       | 50234            | 0.1              | 840       | 15281            | 0.0              | 970       | 11068            | 0.0              |
| 455       | 730207           | 24.4             | 585       | 625204           | 347.4            | 715       | 44909            | 0.0              | 845       | 15737            | 0.0              | 975       | 18108            | 0.0              |
| 460       | 467897           | 19.2             | 590       | 612752           | 316.8            | 720       | 41441            | 0.0              | 850       | 15148            | 0.0              | 980       | 17506            | 0.0              |
| 465       | 344659           | 17.8             | 595       | 589048           | 279.2            | 725       | 36834            | 0.0              | 855       | 17198            | 0.0              | 985       | 23821            | 0.0              |
| 470       | 230541           | 14.3             | 600       | 567479           | 244.6            | 730       | 32988            | 0.0              | 860       | 19169            | 0.0              | 990       | 25862            | 0.0              |
| 475       | 157156           | 12.3             | 605       | 542722           | 210.2            | 735       | 28984            | 0.0              | 865       | 18632            | 0.0              | 995       | 21133            | 0.0              |
| 480       | 134805           | 12.8             | 610       | 507118           | 174.2            | 740       | 26177            | 0.0              | 870       | 18831            | 0.0              | 1000      | 25640            | 0.0              |
| 485       | 132031           | 15.6             | 615       | 472188           | 142.5            | 745       | 22680            | 0.0              | 875       | 16978            | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-215-7

### Scotopic Flux vs. Wavelength



Scotopic Lumens: 66024.8

S/P: 1.78

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 15077            | 0.0              | 490       | 146327           | 225.3            | 620       | 434415           | 5.4              | 750       | 22886            | 0.0              | 880       | 20960            | 0.0              |
| 365       | 12138            | 0.0              | 495       | 188585           | 304.9            | 625       | 400670           | 3.4              | 755       | 19692            | 0.0              | 885       | 20315            | 0.0              |
| 370       | 12993            | 0.0              | 500       | 245069           | 409.9            | 630       | 360611           | 2.0              | 760       | 18199            | 0.0              | 890       | 15211            | 0.0              |
| 375       | 14513            | 0.0              | 505       | 307682           | 523.1            | 635       | 326986           | 1.2              | 765       | 19191            | 0.0              | 895       | 15502            | 0.0              |
| 380       | 15679            | 0.0              | 510       | 367102           | 622.2            | 640       | 295583           | 0.8              | 770       | 16229            | 0.0              | 900       | 15935            | 0.0              |
| 385       | 14569            | 0.0              | 515       | 416068           | 689.6            | 645       | 264664           | 0.5              | 775       | 16351            | 0.0              | 905       | 15965            | 0.0              |
| 390       | 13091            | 0.0              | 520       | 457470           | 727.1            | 650       | 238441           | 0.3              | 780       | 14567            | 0.0              | 910       | 16119            | 0.0              |
| 395       | 10927            | 0.1              | 525       | 486980           | 728.5            | 655       | 210047           | 0.2              | 785       | 13349            | 0.0              | 915       | 13972            | 0.0              |
| 400       | 9655             | 0.2              | 530       | 511184           | 704.8            | 660       | 186019           | 0.1              | 790       | 12552            | 0.0              | 920       | 14830            | 0.0              |
| 405       | 10895            | 0.3              | 535       | 527191           | 656.9            | 665       | 164001           | 0.1              | 795       | 11517            | 0.0              | 925       | 13744            | 0.0              |
| 410       | 14929            | 0.9              | 540       | 540658           | 597.4            | 670       | 142007           | 0.0              | 800       | 13250            | 0.0              | 930       | 20340            | 0.0              |
| 415       | 25993            | 2.7              | 545       | 555639           | 532.7            | 675       | 123441           | 0.0              | 805       | 15135            | 0.0              | 935       | 13272            | 0.0              |
| 420       | 49620            | 8.2              | 550       | 572229           | 467.9            | 680       | 106894           | 0.0              | 810       | 9873             | 0.0              | 940       | 16357            | 0.0              |
| 425       | 95836            | 23.4             | 555       | 589788           | 403.1            | 685       | 94026            | 0.0              | 815       | 11566            | 0.0              | 945       | 19257            | 0.0              |
| 430       | 178101           | 60.6             | 560       | 608278           | 340.0            | 690       | 82099            | 0.0              | 820       | 11216            | 0.0              | 950       | 19804            | 0.0              |
| 435       | 300144           | 134.2            | 565       | 619317           | 277.8            | 695       | 70275            | 0.0              | 825       | 15165            | 0.0              | 955       | 14877            | 0.0              |
| 440       | 512674           | 286.5            | 570       | 627176           | 221.3            | 700       | 61784            | 0.0              | 830       | 14983            | 0.0              | 960       | 9882             | 0.0              |
| 445       | 857336           | 574.1            | 575       | 631114           | 171.9            | 705       | 55550            | 0.0              | 835       | 13993            | 0.0              | 965       | 11741            | 0.0              |
| 450       | 1021494          | 791.7            | 580       | 630436           | 129.9            | 710       | 50234            | 0.0              | 840       | 15281            | 0.0              | 970       | 11068            | 0.0              |
| 455       | 730207           | 638.1            | 585       | 625204           | 95.5             | 715       | 44909            | 0.0              | 845       | 15737            | 0.0              | 975       | 18108            | 0.0              |
| 460       | 467897           | 451.9            | 590       | 612752           | 68.2             | 720       | 41441            | 0.0              | 850       | 15148            | 0.0              | 980       | 17506            | 0.0              |
| 465       | 344659           | 364.0            | 595       | 589048           | 47.0             | 725       | 36834            | 0.0              | 855       | 17198            | 0.0              | 985       | 23821            | 0.0              |
| 470       | 230541           | 265.5            | 600       | 567479           | 32.0             | 730       | 32988            | 0.0              | 860       | 19169            | 0.0              | 990       | 25862            | 0.0              |
| 475       | 157156           | 196.5            | 605       | 542722           | 21.3             | 735       | 28984            | 0.0              | 865       | 18632            | 0.0              | 995       | 21133            | 0.0              |
| 480       | 134805           | 182.1            | 610       | 507118           | 13.7             | 740       | 26177            | 0.0              | 870       | 18831            | 0.0              | 1000      | 25640            | 0.0              |
| 485       | 132031           | 191.4            | 615       | 472188           | 8.7              | 745       | 22680            | 0.0              | 875       | 16978            | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 26696.3**      **M/P: 0.72**

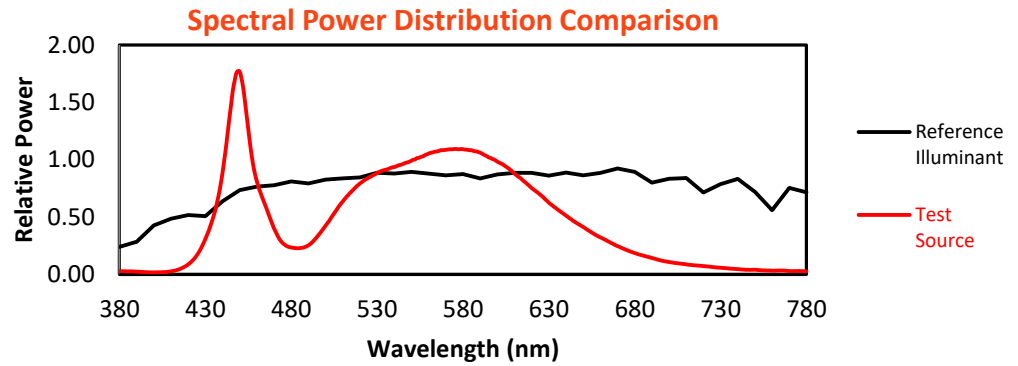
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 15077            | 0.0              | 490       | 146327           | 121.8            | 620       | 434415           | 0.3              | 750       | 22886            | 0.0              | 880       | 20960            | 0.0              |
| 365       | 12138            | 0.0              | 495       | 188585           | 155.7            | 625       | 400670           | 0.2              | 755       | 19692            | 0.0              | 885       | 20315            | 0.0              |
| 370       | 12993            | 0.0              | 500       | 245069           | 197.0            | 630       | 360611           | 0.1              | 760       | 18199            | 0.0              | 890       | 15211            | 0.0              |
| 375       | 14513            | 0.0              | 505       | 307682           | 236.1            | 635       | 326986           | 0.1              | 765       | 19191            | 0.0              | 895       | 15502            | 0.0              |
| 380       | 15679            | 0.0              | 510       | 367102           | 263.6            | 640       | 295583           | 0.0              | 770       | 16229            | 0.0              | 900       | 15935            | 0.0              |
| 385       | 14569            | 0.0              | 515       | 416068           | 271.9            | 645       | 264664           | 0.0              | 775       | 16351            | 0.0              | 905       | 15965            | 0.0              |
| 390       | 13091            | 0.0              | 520       | 457470           | 266.3            | 650       | 238441           | 0.0              | 780       | 14567            | 0.0              | 910       | 16119            | 0.0              |
| 395       | 10927            | 0.1              | 525       | 486980           | 247.0            | 655       | 210047           | 0.0              | 785       | 13349            | 0.0              | 915       | 13972            | 0.0              |
| 400       | 9655             | 0.1              | 530       | 511184           | 220.9            | 660       | 186019           | 0.0              | 790       | 12552            | 0.0              | 920       | 14830            | 0.0              |
| 405       | 10895            | 0.2              | 535       | 527191           | 189.7            | 665       | 164001           | 0.0              | 795       | 11517            | 0.0              | 925       | 13744            | 0.0              |
| 410       | 14929            | 0.6              | 540       | 540658           | 158.2            | 670       | 142007           | 0.0              | 800       | 13250            | 0.0              | 930       | 20340            | 0.0              |
| 415       | 25993            | 1.7              | 545       | 555639           | 129.1            | 675       | 123441           | 0.0              | 805       | 15135            | 0.0              | 935       | 13272            | 0.0              |
| 420       | 49620            | 5.7              | 550       | 572229           | 102.7            | 680       | 106894           | 0.0              | 810       | 9873             | 0.0              | 940       | 16357            | 0.0              |
| 425       | 95836            | 14.9             | 555       | 589788           | 79.5             | 685       | 94026            | 0.0              | 815       | 11566            | 0.0              | 945       | 19257            | 0.0              |
| 430       | 178101           | 37.6             | 560       | 608278           | 60.0             | 690       | 82099            | 0.0              | 820       | 11216            | 0.0              | 950       | 19804            | 0.0              |
| 435       | 300144           | 80.1             | 565       | 619317           | 43.5             | 695       | 70275            | 0.0              | 825       | 15165            | 0.0              | 955       | 14877            | 0.0              |
| 440       | 512674           | 171.3            | 570       | 627176           | 30.6             | 700       | 61784            | 0.0              | 830       | 14983            | 0.0              | 960       | 9882             | 0.0              |
| 445       | 857336           | 338.2            | 575       | 631114           | 21.0             | 705       | 55550            | 0.0              | 835       | 13993            | 0.0              | 965       | 11741            | 0.0              |
| 450       | 1021494          | 470.7            | 580       | 630436           | 14.1             | 710       | 50234            | 0.0              | 840       | 15281            | 0.0              | 970       | 11068            | 0.0              |
| 455       | 730207           | 382.6            | 585       | 625204           | 9.3              | 715       | 44909            | 0.0              | 845       | 15737            | 0.0              | 975       | 18108            | 0.0              |
| 460       | 467897           | 275.7            | 590       | 612752           | 6.0              | 720       | 41441            | 0.0              | 850       | 15148            | 0.0              | 980       | 17506            | 0.0              |
| 465       | 344659           | 225.2            | 595       | 589048           | 3.8              | 725       | 36834            | 0.0              | 855       | 17198            | 0.0              | 985       | 23821            | 0.0              |
| 470       | 230541           | 165.0            | 600       | 567479           | 2.4              | 730       | 32988            | 0.0              | 860       | 19169            | 0.0              | 990       | 25862            | 0.0              |
| 475       | 157156           | 120.0            | 605       | 542722           | 1.5              | 735       | 28984            | 0.0              | 865       | 18632            | 0.0              | 995       | 21133            | 0.0              |
| 480       | 134805           | 108.3            | 610       | 507118           | 0.9              | 740       | 26177            | 0.0              | 870       | 18831            | 0.0              | 1000      | 25640            | 0.0              |
| 485       | 132031           | 108.8            | 615       | 472188           | 0.6              | 745       | 22680            | 0.0              | 875       | 16978            | 0.0              |           |                  |                  |

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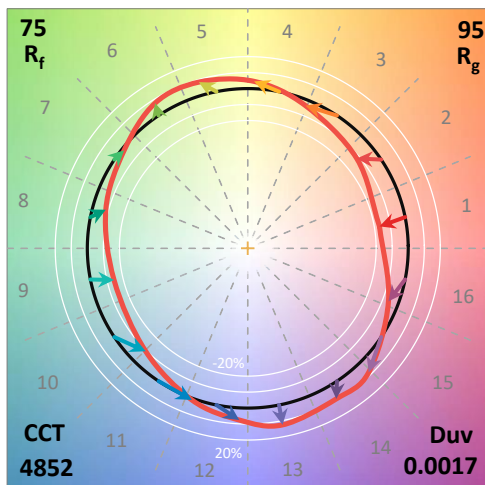
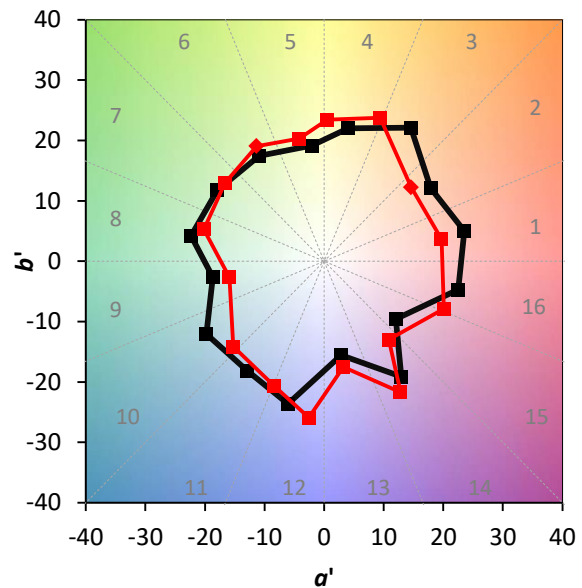
TM-30-18

### Summary

$R_f = 75.2$   
 $R_g = 94.7$   
 CIE  $R_a = 74.1$   
 $R_g = -25.4$

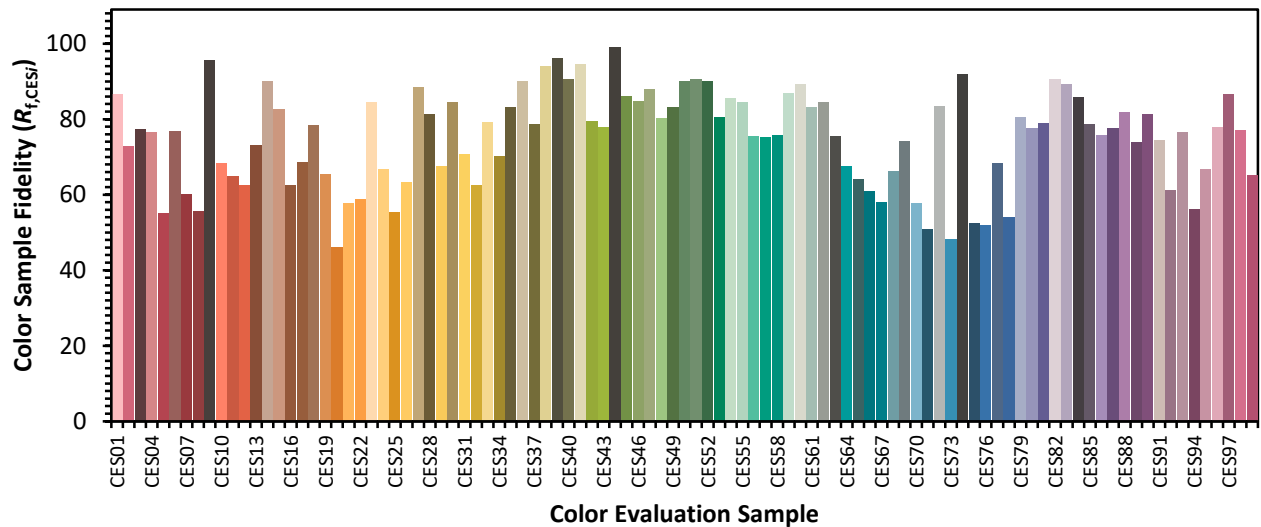


### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 63 | CES51 = 90 | CES76 = 52 |
| CES02 = 60 | CES27 = 88 | CES52 = 90 | CES77 = 68 |
| CES03 = 30 | CES28 = 81 | CES53 = 81 | CES78 = 54 |
| CES04 = 69 | CES29 = 67 | CES54 = 86 | CES79 = 81 |
| CES05 = 46 | CES30 = 85 | CES55 = 84 | CES80 = 77 |
| CES06 = 50 | CES31 = 71 | CES56 = 76 | CES81 = 79 |
| CES07 = 39 | CES32 = 63 | CES57 = 75 | CES82 = 91 |
| CES08 = 38 | CES33 = 79 | CES58 = 76 | CES83 = 89 |
| CES09 = 29 | CES34 = 70 | CES59 = 87 | CES84 = 86 |
| CES10 = 73 | CES35 = 83 | CES60 = 89 | CES85 = 79 |
| CES11 = 56 | CES36 = 90 | CES61 = 83 | CES86 = 76 |
| CES12 = 62 | CES37 = 79 | CES62 = 85 | CES87 = 78 |
| CES13 = 42 | CES38 = 94 | CES63 = 76 | CES88 = 82 |
| CES14 = 74 | CES39 = 96 | CES64 = 67 | CES89 = 74 |
| CES15 = 70 | CES40 = 91 | CES65 = 64 | CES90 = 81 |
| CES16 = 46 | CES41 = 95 | CES66 = 61 | CES91 = 74 |
| CES17 = 49 | CES42 = 80 | CES67 = 58 | CES92 = 61 |
| CES18 = 55 | CES43 = 78 | CES68 = 66 | CES93 = 77 |
| CES19 = 71 | CES44 = 99 | CES69 = 74 | CES94 = 56 |
| CES20 = 64 | CES45 = 86 | CES70 = 58 | CES95 = 67 |
| CES21 = 85 | CES46 = 85 | CES71 = 51 | CES96 = 78 |
| CES22 = 77 | CES47 = 88 | CES72 = 83 | CES97 = 86 |
| CES23 = 91 | CES48 = 80 | CES73 = 48 | CES98 = 77 |
| CES24 = 90 | CES49 = 83 | CES74 = 92 | CES99 = 65 |
| CES25 = 71 | CES50 = 90 | CES75 = 52 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)