

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: P233976

Luminaire Tested: **CTN-10-9-D-E1-T1**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P233976  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1707-171-24)  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: CTN-10-9-D-E1-T1  
Description: CELESTEON HIGH MAST LUMINAIRE  
(10) 70 CRI, 4000K LEDS AND TYPE I OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 99094 lumens  
Efficiency: N/A  
Efficacy: 130.4 lumens/watt  
Luminous Opening: Circular (Dia: 2.08' x H: 0')  
IES Classification: Type I - Short - Semi-Cutoff  
BUG Rating: B5 - U0 - G5

Input Watts (W): 760  
Input Voltage (V): NR  
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: 25 FT



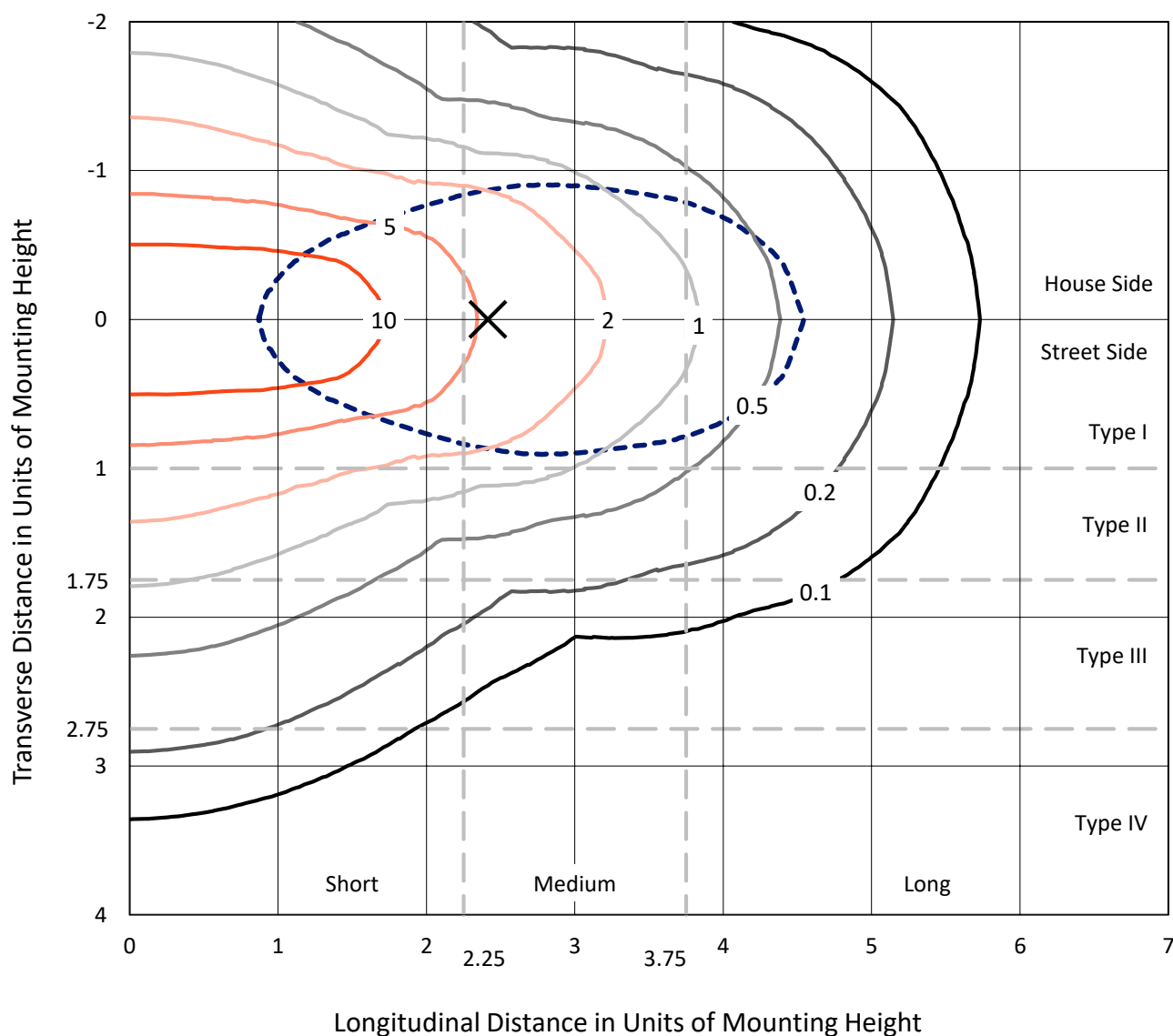
REPORT NUMBER: P233976

CATALOG NUMBER: CTN-10-9-D-E1-T1

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

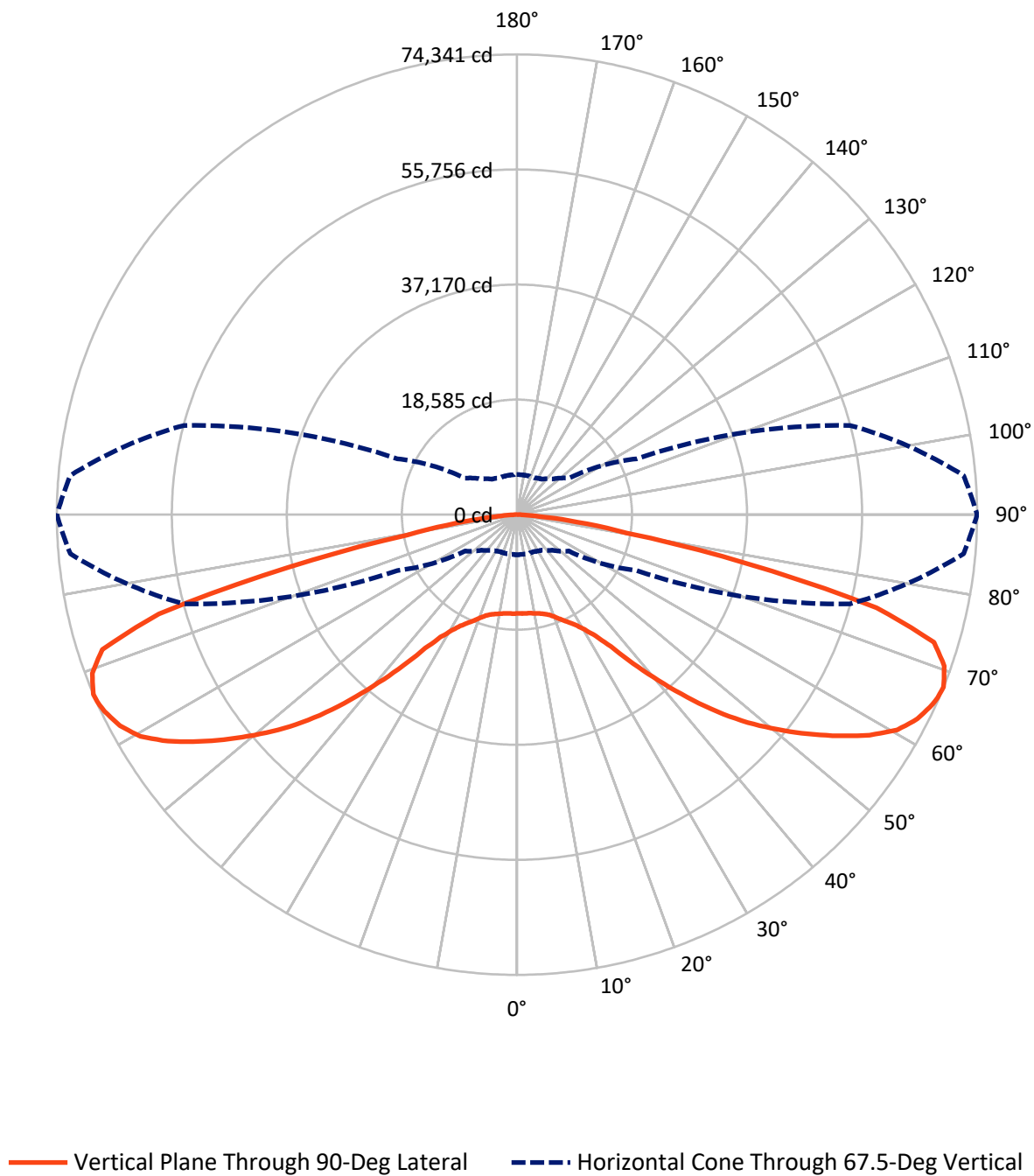


Based on 30 foot mounting height. Maximum calculated value = 17.8 fc  
 Type I - Short - Semi-Cutoff

REPORT NUMBER: P233976

CATALOG NUMBER: CTN-10-9-D-E1-T1

## Luminous Intensity Polar Plot



REPORT NUMBER: P233976

CATALOG NUMBER: CTN-10-9-D-E1-T1

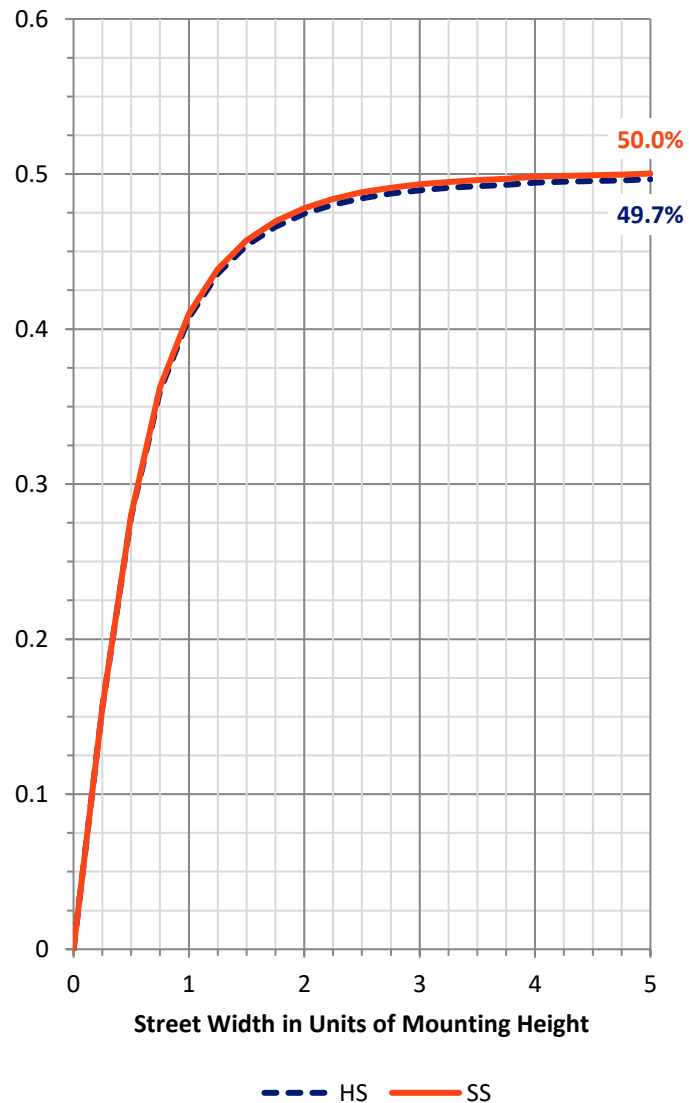
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 49547.0  | 0.0    | 49547.0 |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Street Side</b> | Lumens    | 49547.0  | 0.0    | 49547.0 |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Total</b>       | Lumens    | 99094.0  | 0.0    | 99094.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1516.8  | 1.5       |
| 10°-20°   | 4512.6  | 4.6       |
| 20°-30°   | 7466.8  | 7.5       |
| 30°-40°   | 10940.1 | 11.0      |
| 40°-50°   | 16095.1 | 16.2      |
| 50°-60°   | 20871.5 | 21.1      |
| 60°-70°   | 22182.0 | 22.4      |
| 70°-80°   | 13693.0 | 13.8      |
| 80°-90°   | 1816.3  | 1.8       |
| 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°    | 99094.0 | 100.0     |
| 0°-180°   | 99094.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P233976

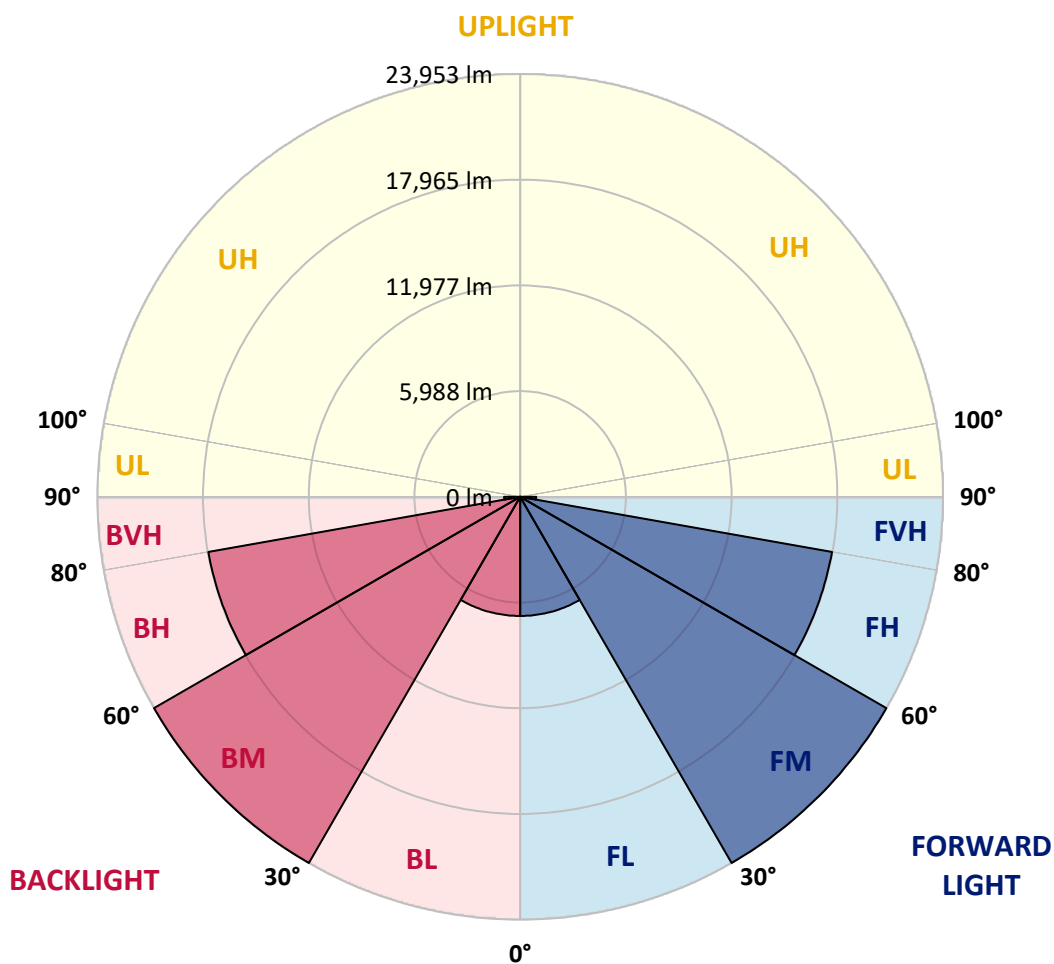
CATALOG NUMBER: CTN-10-9-D-E1-T1

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |    |
|------|-------------|---------|-----------|-------------------------|------|----|
|      |             |         |           | B                       | U    | G  |
| FL   | (0°-30°)    | 6748.1  | 6.8       |                         |      |    |
| FM   | (30°-60°)   | 23953.3 | 24.2      |                         |      |    |
| FH   | (60°-80°)   | 17937.5 | 18.1      |                         |      | G5 |
| FVH  | (80°-90°)   | 908.1   | 0.9       |                         |      | G5 |
| BL   | (0°-30°)    | 6748.1  | 6.8       | B5                      |      |    |
| BM   | (30°-60°)   | 23953.3 | 24.2      | B5                      |      |    |
| BH   | (60°-80°)   | 17937.5 | 18.1      | B5                      |      | G5 |
| BVH  | (80°-90°)   | 908.1   | 0.9       |                         |      | 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 I Short



REPORT NUMBER: P233976

CATALOG NUMBER: CTN-10-9-D-E1-T1

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     | 90°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 15958.4 | 15958.4 | 15958.4 | 15958.4 | 15958.4 | 15958.4 | 15958.4 | 15958.4 | 15958.4 | 15958.4 | 15958.4 |
| 2.5°  | 16002.9 | 15952.4 | 15973.2 | 16047.4 | 15777.2 | 15910.8 | 15863.3 | 15982.1 | 15919.8 | 15973.2 | 15999.9 |
| 5°    | 15890.1 | 15827.7 | 15857.4 | 15997.0 | 15750.5 | 15887.1 | 15851.5 | 15985.1 | 15904.9 | 15979.1 | 16008.8 |
| 7.5°  | 15792.1 | 15726.8 | 15780.2 | 15896.0 | 15709.0 | 15860.4 | 15830.7 | 16011.8 | 15946.5 | 16041.5 | 16071.2 |
| 10°   | 15729.7 | 15658.5 | 15709.0 | 15836.6 | 15637.7 | 15875.2 | 15848.5 | 16089.0 | 16056.3 | 16187.0 | 16222.6 |
| 12.5° | 15575.4 | 15501.1 | 15536.8 | 15706.0 | 15616.9 | 15863.3 | 15928.7 | 16204.8 | 16195.9 | 16353.2 | 16391.8 |
| 15°   | 15299.2 | 15225.0 | 15272.5 | 15498.2 | 15530.8 | 15872.3 | 16074.1 | 16400.7 | 16454.2 | 16611.5 | 16644.2 |
| 17.5° | 14951.9 | 14898.4 | 14969.7 | 15269.5 | 15474.4 | 15994.0 | 16284.9 | 16700.6 | 16831.2 | 16991.6 | 17036.1 |
| 20°   | 14476.8 | 14447.1 | 14574.8 | 14984.5 | 15376.4 | 16083.1 | 16537.3 | 17122.2 | 17359.7 | 17621.0 | 17653.6 |
| 22.5° | 13829.6 | 13794.0 | 14061.2 | 14637.1 | 15201.3 | 16103.8 | 16783.7 | 17558.6 | 17998.1 | 18333.5 | 18419.7 |
| 25°   | 13102.2 | 13090.3 | 13455.5 | 14212.6 | 14963.7 | 16089.0 | 17024.2 | 18024.8 | 18695.8 | 19138.1 | 19233.2 |
| 27.5° | 12386.7 | 12422.3 | 12864.7 | 13758.3 | 14767.8 | 16121.6 | 17300.3 | 18621.5 | 19568.7 | 20120.9 | 20162.5 |
| 30°   | 11778.0 | 11807.7 | 12285.7 | 13310.0 | 14580.7 | 16160.2 | 17641.8 | 19334.1 | 20655.3 | 21400.5 | 21522.3 |
| 32.5° | 11205.0 | 11273.3 | 11760.2 | 12823.1 | 14372.9 | 16234.5 | 18084.2 | 20263.4 | 21988.4 | 23164.1 | 23315.5 |
| 35°   | 10732.9 | 10792.3 | 11267.3 | 12327.3 | 14043.4 | 16293.8 | 18669.0 | 21439.1 | 23974.6 | 25931.2 | 26165.8 |
| 37.5° | 10314.3 | 10385.5 | 10795.3 | 11870.0 | 13651.4 | 16314.6 | 19251.0 | 22888.0 | 26664.6 | 29779.0 | 30509.4 |
| 40°   | 10011.5 | 10067.9 | 10421.2 | 11412.8 | 13229.8 | 16219.6 | 19916.0 | 24509.1 | 29687.0 | 34372.1 | 35173.7 |
| 42.5° | 9762.1  | 9809.6  | 10100.5 | 10964.5 | 12754.8 | 16032.6 | 20536.5 | 26124.2 | 32881.6 | 39238.3 | 40283.3 |
| 45°   | 9509.7  | 9521.6  | 9800.7  | 10578.5 | 12273.8 | 15735.7 | 21002.7 | 27671.0 | 36245.5 | 44202.4 | 45425.6 |
| 47.5° | 9284.1  | 9269.2  | 9488.9  | 10198.5 | 11757.2 | 15236.9 | 21183.8 | 28953.6 | 39514.4 | 48854.8 | 50190.9 |
| 50°   | 9073.3  | 9010.9  | 9200.9  | 9836.3  | 11255.5 | 14521.4 | 20955.2 | 29841.4 | 42952.5 | 53349.9 | 54534.5 |
| 52.5° | 8758.5  | 8728.8  | 8910.0  | 9480.0  | 10753.7 | 13666.3 | 20201.0 | 30310.5 | 46619.2 | 57607.4 | 58845.5 |
| 55°   | 8476.5  | 8455.7  | 8642.7  | 9117.8  | 10260.8 | 12796.4 | 18900.6 | 30182.8 | 50232.4 | 61713.5 | 63085.2 |
| 57.5° | 8164.7  | 8149.9  | 8325.1  | 8722.9  | 9717.5  | 11988.8 | 17291.4 | 29357.4 | 53459.7 | 65258.5 | 67197.3 |
| 60°   | 7858.9  | 7867.8  | 7980.7  | 8322.1  | 9165.3  | 11098.1 | 15456.6 | 27920.4 | 56033.9 | 68468.0 | 70584.9 |
| 62.5° | 7502.7  | 7493.7  | 7576.9  | 7861.9  | 8532.9  | 10136.2 | 13648.5 | 25928.2 | 57542.1 | 71270.7 | 72624.6 |
| 65°   | 7021.7  | 6989.0  | 7084.0  | 7265.1  | 7766.9  | 9150.4  | 11867.1 | 23517.4 | 57580.7 | 72663.2 | 73815.2 |
| 66°   | 6816.8  | 6781.2  | 6867.3  | 6995.0  | 7467.0  | 8752.6  | 11210.9 | 22496.1 | 56989.9 | 72704.8 | 74135.8 |
| 67.5° | 6499.1  | 6457.6  | 6514.0  | 6573.4  | 6997.9  | 8117.2  | 10249.0 | 21338.2 | 55695.4 | 72443.5 | 74340.7 |
| 70°   | 5709.4  | 5715.3  | 5774.7  | 5753.9  | 5970.7  | 6704.0  | 8464.6  | 19188.6 | 49451.6 | 71386.5 | 73242.2 |
| 72.5° | 4444.6  | 4394.1  | 4308.0  | 4224.9  | 4328.8  | 4973.1  | 6410.1  | 16103.8 | 40494.1 | 66829.1 | 70436.5 |
| 75°   | 2868.1  | 2859.1  | 2856.2  | 2957.1  | 2972.0  | 3408.4  | 4952.3  | 12992.3 | 31566.4 | 54843.3 | 60036.1 |
| 77.5° | 1793.3  | 1778.4  | 1906.1  | 2152.5  | 2191.1  | 2203.0  | 3248.1  | 9874.9  | 22819.7 | 35093.5 | 37816.1 |
| 80°   | 1285.6  | 1285.6  | 1294.5  | 1327.1  | 1535.0  | 1567.6  | 2244.6  | 6199.3  | 12977.5 | 17107.4 | 17974.3 |
| 82.5° | 973.8   | 959.0   | 962.0   | 976.8   | 994.6   | 1068.8  | 1350.9  | 2752.3  | 5183.9  | 8669.5  | 9809.6  |
| 85°   | 703.7   | 724.4   | 760.1   | 733.3   | 662.1   | 671.0   | 766.0   | 947.1   | 1992.2  | 3357.9  | 3631.1  |
| 87.5° | 255.3   | 293.9   | 302.8   | 314.7   | 302.8   | 305.8   | 314.7   | 296.9   | 403.8   | 828.3   | 956.0   |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |

LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

STREETWORKS

Report Number: SP1-2104-215-1

Luminaire Tested: CST-CA6-230-740-U-T4

Test Date: 04/20/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-215-1  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/20/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **CST-CA6-230-740-U-T4**  
 Description: STREETWORKS HIGH MAST LUMINAIRE

230W

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 3783    | CRI (Ra): | 75.1 |      |       |
| CIE u':                   | 0.2297  | R1:       | 72.8 | R9:  | -19.0 |
| CIE v':                   | 0.5046  | R2:       | 81.9 | R10: | 57.0  |
| Duv:                      | -0.0008 | R3:       | 89.0 | R11: | 70.7  |
| CIE x:                    | 0.3897  | R4:       | 74.1 | R12: | 48.2  |
| CIE y:                    | 0.3804  | R5:       | 72.3 | R13: | 74.4  |
| CIE z:                    | 0.2299  | R6:       | 74.5 | R14: | 93.7  |
| Peak Wavelength (nm):     | 450     | R7:       | 81.7 |      |       |
| Dominant Wavelength (nm): | 580     | R8:       | 54.6 |      |       |
| Purity:                   | 31.3    |           |      |      |       |
| Rf:                       | 76.5    |           |      |      |       |
| Rg:                       | 95.6    |           |      |      |       |



### Test Conditions

Stabilization Time: 47M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.5/39%  
 Sphere Temperature (°C): 24.0

REPORT NUMBER: SP1-2104-215-1

| 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            |

REPORT NUMBER: SP1-2104-215-1

**CIE 1931 Chromaticity Diagram**



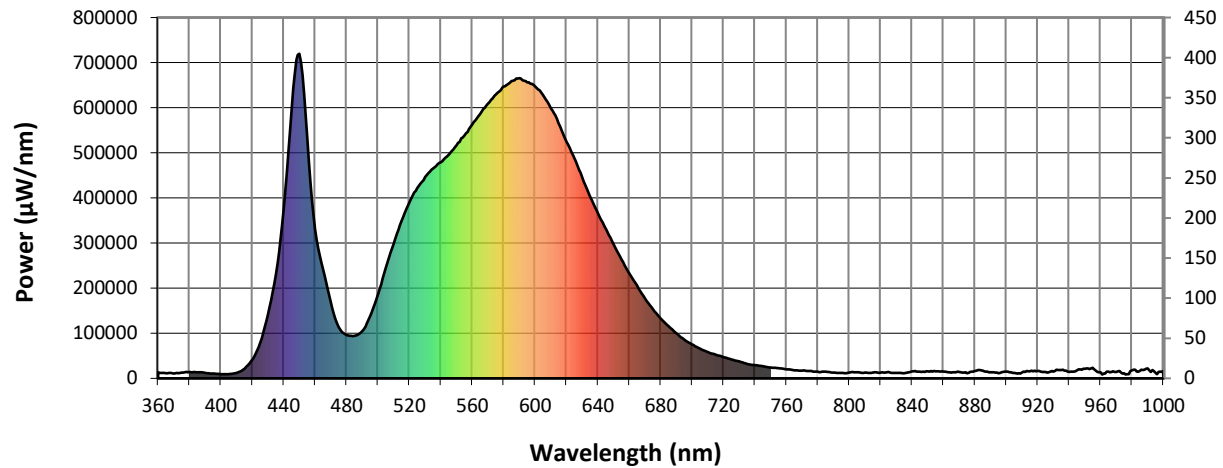
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 4000K 7-step quadrangle

REPORT NUMBER: SP1-2104-215-1

### 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       | 13329            | 0.0              | 490       | 105235           | 15.0             | 620       | 524343           | 136.4            | 750       | 24224            | 0.0              | 880       | 16135            | 0.0              |
| 365       | 11697            | 0.0              | 495       | 137678           | 25.0             | 625       | 488932           | 107.9            | 755       | 22376            | 0.0              | 885       | 16876            | 0.0              |
| 370       | 10917            | 0.0              | 500       | 186689           | 41.2             | 630       | 445400           | 80.6             | 760       | 20109            | 0.0              | 890       | 13554            | 0.0              |
| 375       | 12548            | 0.0              | 505       | 244611           | 68.4             | 635       | 403534           | 60.6             | 765       | 18097            | 0.0              | 895       | 11525            | 0.0              |
| 380       | 13932            | 0.0              | 510       | 298987           | 102.7            | 640       | 366414           | 43.8             | 770       | 17366            | 0.0              | 900       | 14656            | 0.0              |
| 385       | 13265            | 0.0              | 515       | 348170           | 144.2            | 645       | 331272           | 31.9             | 775       | 16226            | 0.0              | 905       | 11999            | 0.0              |
| 390       | 11808            | 0.0              | 520       | 390427           | 189.3            | 650       | 297360           | 21.7             | 780       | 14803            | 0.0              | 910       | 12965            | 0.0              |
| 395       | 10395            | 0.0              | 525       | 421211           | 226.1            | 655       | 263291           | 15.1             | 785       | 15199            | 0.0              | 915       | 15939            | 0.0              |
| 400       | 9348             | 0.0              | 530       | 446063           | 262.6            | 660       | 232931           | 9.7              | 790       | 12989            | 0.0              | 920       | 16238            | 0.0              |
| 405       | 9479             | 0.0              | 535       | 465110           | 288.4            | 665       | 204719           | 6.5              | 795       | 12106            | 0.0              | 925       | 14419            | 0.0              |
| 410       | 12414            | 0.0              | 540       | 479189           | 312.2            | 670       | 177096           | 3.9              | 800       | 12942            | 0.0              | 930       | 14788            | 0.0              |
| 415       | 21574            | 0.0              | 545       | 495864           | 330.0            | 675       | 153254           | 2.6              | 805       | 13253            | 0.0              | 935       | 18619            | 0.0              |
| 420       | 41448            | 0.1              | 550       | 516625           | 351.1            | 680       | 132874           | 1.5              | 810       | 12808            | 0.0              | 940       | 13995            | 0.0              |
| 425       | 79385            | 0.4              | 555       | 538555           | 367.8            | 685       | 115378           | 1.0              | 815       | 12903            | 0.0              | 945       | 18047            | 0.0              |
| 430       | 141845           | 1.1              | 560       | 562412           | 382.2            | 690       | 100157           | 0.6              | 820       | 12621            | 0.0              | 950       | 21418            | 0.0              |
| 435       | 231290           | 2.7              | 565       | 585835           | 389.5            | 695       | 85561            | 0.4              | 825       | 13903            | 0.0              | 955       | 23138            | 0.0              |
| 440       | 374482           | 5.9              | 570       | 608681           | 395.8            | 700       | 75396            | 0.2              | 830       | 11870            | 0.0              | 960       | 13665            | 0.0              |
| 445       | 596715           | 12.4             | 575       | 629563           | 391.7            | 705       | 65658            | 0.1              | 835       | 11069            | 0.0              | 965       | 14793            | 0.0              |
| 450       | 719656           | 18.7             | 580       | 646820           | 384.3            | 710       | 58172            | 0.1              | 840       | 15291            | 0.0              | 970       | 14396            | 0.0              |
| 455       | 530438           | 17.8             | 585       | 659231           | 366.3            | 715       | 52563            | 0.1              | 845       | 15125            | 0.0              | 975       | 11155            | 0.0              |
| 460       | 330446           | 13.5             | 590       | 665630           | 344.2            | 720       | 47085            | 0.0              | 850       | 15336            | 0.0              | 980       | 17987            | 0.0              |
| 465       | 241999           | 12.5             | 595       | 656228           | 311.1            | 725       | 41741            | 0.0              | 855       | 15791            | 0.0              | 985       | 16185            | 0.0              |
| 470       | 167096           | 10.4             | 600       | 646946           | 278.8            | 730       | 37415            | 0.0              | 860       | 14660            | 0.0              | 990       | 22120            | 0.0              |
| 475       | 113791           | 8.9              | 605       | 628643           | 243.4            | 735       | 32125            | 0.0              | 865       | 12528            | 0.0              | 995       | 11943            | 0.0              |
| 480       | 96126            | 9.1              | 610       | 599057           | 205.8            | 740       | 29322            | 0.0              | 870       | 14089            | 0.0              | 1000      | 16020            | 0.0              |
| 485       | 94467            | 11.2             | 615       | 565669           | 170.8            | 745       | 26862            | 0.0              | 875       | 11732            | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-215-1

### Scotopic Flux vs. Wavelength



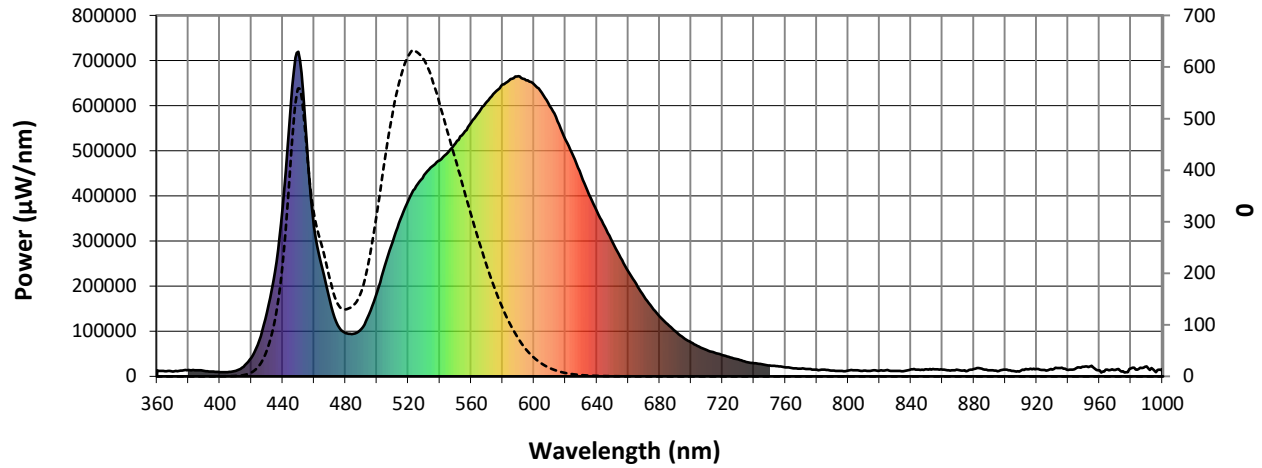
Scotopic Lumens: 54268.8

S/P: 1.5

| 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       | 13329            | 0.0              | 490       | 105235           | 162.0            | 620       | 524343           | 6.6              | 750       | 24224            | 0.0              | 880       | 16135            | 0.0              |
| 365       | 11697            | 0.0              | 495       | 137678           | 222.6            | 625       | 488932           | 4.1              | 755       | 22376            | 0.0              | 885       | 16876            | 0.0              |
| 370       | 10917            | 0.0              | 500       | 186689           | 312.3            | 630       | 445400           | 2.5              | 760       | 20109            | 0.0              | 890       | 13554            | 0.0              |
| 375       | 12548            | 0.0              | 505       | 244611           | 415.8            | 635       | 403534           | 1.5              | 765       | 18097            | 0.0              | 895       | 11525            | 0.0              |
| 380       | 13932            | 0.0              | 510       | 298987           | 506.8            | 640       | 366414           | 0.9              | 770       | 17366            | 0.0              | 900       | 14656            | 0.0              |
| 385       | 13265            | 0.0              | 515       | 348170           | 577.1            | 645       | 331272           | 0.6              | 775       | 16226            | 0.0              | 905       | 11999            | 0.0              |
| 390       | 11808            | 0.0              | 520       | 390427           | 620.6            | 650       | 297360           | 0.3              | 780       | 14803            | 0.0              | 910       | 12965            | 0.0              |
| 395       | 10395            | 0.1              | 525       | 421211           | 630.1            | 655       | 263291           | 0.2              | 785       | 15199            | 0.0              | 915       | 15939            | 0.0              |
| 400       | 9348             | 0.1              | 530       | 446063           | 615.0            | 660       | 232931           | 0.1              | 790       | 12989            | 0.0              | 920       | 16238            | 0.0              |
| 405       | 9479             | 0.3              | 535       | 465110           | 579.6            | 665       | 204719           | 0.1              | 795       | 12106            | 0.0              | 925       | 14419            | 0.0              |
| 410       | 12414            | 0.7              | 540       | 479189           | 529.5            | 670       | 177096           | 0.0              | 800       | 12942            | 0.0              | 930       | 14788            | 0.0              |
| 415       | 21574            | 2.2              | 545       | 495864           | 475.4            | 675       | 153254           | 0.0              | 805       | 13253            | 0.0              | 935       | 18619            | 0.0              |
| 420       | 41448            | 6.8              | 550       | 516625           | 422.4            | 680       | 132874           | 0.0              | 810       | 12808            | 0.0              | 940       | 13995            | 0.0              |
| 425       | 79385            | 19.4             | 555       | 538555           | 368.0            | 685       | 115378           | 0.0              | 815       | 12903            | 0.0              | 945       | 18047            | 0.0              |
| 430       | 141845           | 48.3             | 560       | 562412           | 314.4            | 690       | 100157           | 0.0              | 820       | 12621            | 0.0              | 950       | 21418            | 0.0              |
| 435       | 231290           | 103.4            | 565       | 585835           | 262.8            | 695       | 85561            | 0.0              | 825       | 13903            | 0.0              | 955       | 23138            | 0.0              |
| 440       | 374482           | 209.3            | 570       | 608681           | 214.8            | 700       | 75396            | 0.0              | 830       | 11870            | 0.0              | 960       | 13665            | 0.0              |
| 445       | 596715           | 399.6            | 575       | 629563           | 171.5            | 705       | 65658            | 0.0              | 835       | 11069            | 0.0              | 965       | 14793            | 0.0              |
| 450       | 719656           | 557.8            | 580       | 646820           | 133.3            | 710       | 58172            | 0.0              | 840       | 15291            | 0.0              | 970       | 14396            | 0.0              |
| 455       | 530438           | 463.5            | 585       | 659231           | 100.8            | 715       | 52563            | 0.0              | 845       | 15125            | 0.0              | 975       | 11155            | 0.0              |
| 460       | 330446           | 319.2            | 590       | 665630           | 74.1             | 720       | 47085            | 0.0              | 850       | 15336            | 0.0              | 980       | 17987            | 0.0              |
| 465       | 241999           | 255.6            | 595       | 656228           | 52.3             | 725       | 41741            | 0.0              | 855       | 15791            | 0.0              | 985       | 16185            | 0.0              |
| 470       | 167096           | 192.4            | 600       | 646946           | 36.5             | 730       | 37415            | 0.0              | 860       | 14660            | 0.0              | 990       | 22120            | 0.0              |
| 475       | 113791           | 142.3            | 605       | 628643           | 24.7             | 735       | 32125            | 0.0              | 865       | 12528            | 0.0              | 995       | 11943            | 0.0              |
| 480       | 96126            | 129.8            | 610       | 599057           | 16.2             | 740       | 29322            | 0.0              | 870       | 14089            | 0.0              | 1000      | 16020            | 0.0              |
| 485       | 94467            | 136.9            | 615       | 565669           | 10.5             | 745       | 26862            | 0.0              | 875       | 11732            | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2104-215-1

### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 20938.3      M/P: 0.58**

| 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       | 13329            | 0.0              | 490       | 105235           | 87.6             | 620       | 524343           | 0.4              | 750       | 24224            | 0.0              | 880       | 16135            | 0.0              |
| 365       | 11697            | 0.0              | 495       | 137678           | 113.7            | 625       | 488932           | 0.3              | 755       | 22376            | 0.0              | 885       | 16876            | 0.0              |
| 370       | 10917            | 0.0              | 500       | 186689           | 150.1            | 630       | 445400           | 0.2              | 760       | 20109            | 0.0              | 890       | 13554            | 0.0              |
| 375       | 12548            | 0.0              | 505       | 244611           | 187.7            | 635       | 403534           | 0.1              | 765       | 18097            | 0.0              | 895       | 11525            | 0.0              |
| 380       | 13932            | 0.0              | 510       | 298987           | 214.7            | 640       | 366414           | 0.1              | 770       | 17366            | 0.0              | 900       | 14656            | 0.0              |
| 385       | 13265            | 0.0              | 515       | 348170           | 227.5            | 645       | 331272           | 0.0              | 775       | 16226            | 0.0              | 905       | 11999            | 0.0              |
| 390       | 11808            | 0.0              | 520       | 390427           | 227.3            | 650       | 297360           | 0.0              | 780       | 14803            | 0.0              | 910       | 12965            | 0.0              |
| 395       | 10395            | 0.1              | 525       | 421211           | 213.6            | 655       | 263291           | 0.0              | 785       | 15199            | 0.0              | 915       | 15939            | 0.0              |
| 400       | 9348             | 0.1              | 530       | 446063           | 192.8            | 660       | 232931           | 0.0              | 790       | 12989            | 0.0              | 920       | 16238            | 0.0              |
| 405       | 9479             | 0.2              | 535       | 465110           | 167.4            | 665       | 204719           | 0.0              | 795       | 12106            | 0.0              | 925       | 14419            | 0.0              |
| 410       | 12414            | 0.5              | 540       | 479189           | 140.2            | 670       | 177096           | 0.0              | 800       | 12942            | 0.0              | 930       | 14788            | 0.0              |
| 415       | 21574            | 1.4              | 545       | 495864           | 115.2            | 675       | 153254           | 0.0              | 805       | 13253            | 0.0              | 935       | 18619            | 0.0              |
| 420       | 41448            | 4.7              | 550       | 516625           | 92.7             | 680       | 132874           | 0.0              | 810       | 12808            | 0.0              | 940       | 13995            | 0.0              |
| 425       | 79385            | 12.4             | 555       | 538555           | 72.6             | 685       | 115378           | 0.0              | 815       | 12903            | 0.0              | 945       | 18047            | 0.0              |
| 430       | 141845           | 30.0             | 560       | 562412           | 55.5             | 690       | 100157           | 0.0              | 820       | 12621            | 0.0              | 950       | 21418            | 0.0              |
| 435       | 231290           | 61.7             | 565       | 585835           | 41.1             | 695       | 85561            | 0.0              | 825       | 13903            | 0.0              | 955       | 23138            | 0.0              |
| 440       | 374482           | 125.1            | 570       | 608681           | 29.7             | 700       | 75396            | 0.0              | 830       | 11870            | 0.0              | 960       | 13665            | 0.0              |
| 445       | 596715           | 235.4            | 575       | 629563           | 21.0             | 705       | 65658            | 0.0              | 835       | 11069            | 0.0              | 965       | 14793            | 0.0              |
| 450       | 719656           | 331.6            | 580       | 646820           | 14.5             | 710       | 58172            | 0.0              | 840       | 15291            | 0.0              | 970       | 14396            | 0.0              |
| 455       | 530438           | 277.9            | 585       | 659231           | 9.8              | 715       | 52563            | 0.0              | 845       | 15125            | 0.0              | 975       | 11155            | 0.0              |
| 460       | 330446           | 194.7            | 590       | 665630           | 6.5              | 720       | 47085            | 0.0              | 850       | 15336            | 0.0              | 980       | 17987            | 0.0              |
| 465       | 241999           | 158.1            | 595       | 656228           | 4.2              | 725       | 41741            | 0.0              | 855       | 15791            | 0.0              | 985       | 16185            | 0.0              |
| 470       | 167096           | 119.6            | 600       | 646946           | 2.7              | 730       | 37415            | 0.0              | 860       | 14660            | 0.0              | 990       | 22120            | 0.0              |
| 475       | 113791           | 86.9             | 605       | 628643           | 1.7              | 735       | 32125            | 0.0              | 865       | 12528            | 0.0              | 995       | 11943            | 0.0              |
| 480       | 96126            | 77.2             | 610       | 599057           | 1.1              | 740       | 29322            | 0.0              | 870       | 14089            | 0.0              | 1000      | 16020            | 0.0              |
| 485       | 94467            | 77.9             | 615       | 565669           | 0.7              | 745       | 26862            | 0.0              | 875       | 11732            | 0.0              |           |                  |                  |

### Summary

$R_f = 76.5$   
 $R_g = 95.6$   
 CIE  $R_a = 75.1$   
 $R_g = -19.0$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 66 | CES51 = 90 | CES76 = 56 |
| CES02 = 61 | CES27 = 89 | CES52 = 89 | CES77 = 73 |
| CES03 = 31 | CES28 = 83 | CES53 = 81 | CES78 = 58 |
| CES04 = 70 | CES29 = 69 | CES54 = 87 | CES79 = 84 |
| CES05 = 48 | CES30 = 84 | CES55 = 86 | CES80 = 81 |
| CES06 = 51 | CES31 = 72 | CES56 = 77 | CES81 = 79 |
| CES07 = 40 | CES32 = 64 | CES57 = 77 | CES82 = 92 |
| CES08 = 39 | CES33 = 79 | CES58 = 77 | CES83 = 90 |
| CES09 = 29 | CES34 = 73 | CES59 = 87 | CES84 = 87 |
| CES10 = 74 | CES35 = 85 | CES60 = 90 | CES85 = 78 |
| CES11 = 57 | CES36 = 91 | CES61 = 84 | CES86 = 73 |
| CES12 = 63 | CES37 = 81 | CES62 = 87 | CES87 = 79 |
| CES13 = 42 | CES38 = 94 | CES63 = 75 | CES88 = 83 |
| CES14 = 74 | CES39 = 96 | CES64 = 69 | CES89 = 73 |
| CES15 = 71 | CES40 = 91 | CES65 = 66 | CES90 = 83 |
| CES16 = 47 | CES41 = 94 | CES66 = 63 | CES91 = 76 |
| CES17 = 49 | CES42 = 82 | CES67 = 60 | CES92 = 62 |
| CES18 = 56 | CES43 = 78 | CES68 = 68 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 76 | CES94 = 57 |
| CES20 = 65 | CES45 = 86 | CES70 = 60 | CES95 = 69 |
| CES21 = 86 | CES46 = 84 | CES71 = 54 | CES96 = 79 |
| CES22 = 78 | CES47 = 87 | CES72 = 85 | CES97 = 86 |
| CES23 = 92 | CES48 = 80 | CES73 = 52 | CES98 = 79 |
| CES24 = 91 | CES49 = 82 | CES74 = 94 | CES99 = 69 |
| CES25 = 72 | CES50 = 90 | CES75 = 56 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)