

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: P382135

Luminaire Tested: **TT-D5-740-U-5MQ-PM**

Issue Date: 2/12/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P382135  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-1908-473-16)  
Test Lab: INNOVATIONS CENTER  
Issue Date: 2/12/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: TT-D5-740-U-5MQ-PM  
Description: TOPTIER LED SITE LUMINAIRE  
4000K, 70 CRI LEDS AND MEDIUM DISTRIBUTION  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 10072 lumens  
Efficiency: N/A  
Efficacy: 134.8 lumens/watt  
Luminous Opening: Circular (Dia: 1.12' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B3 - U0 - G3

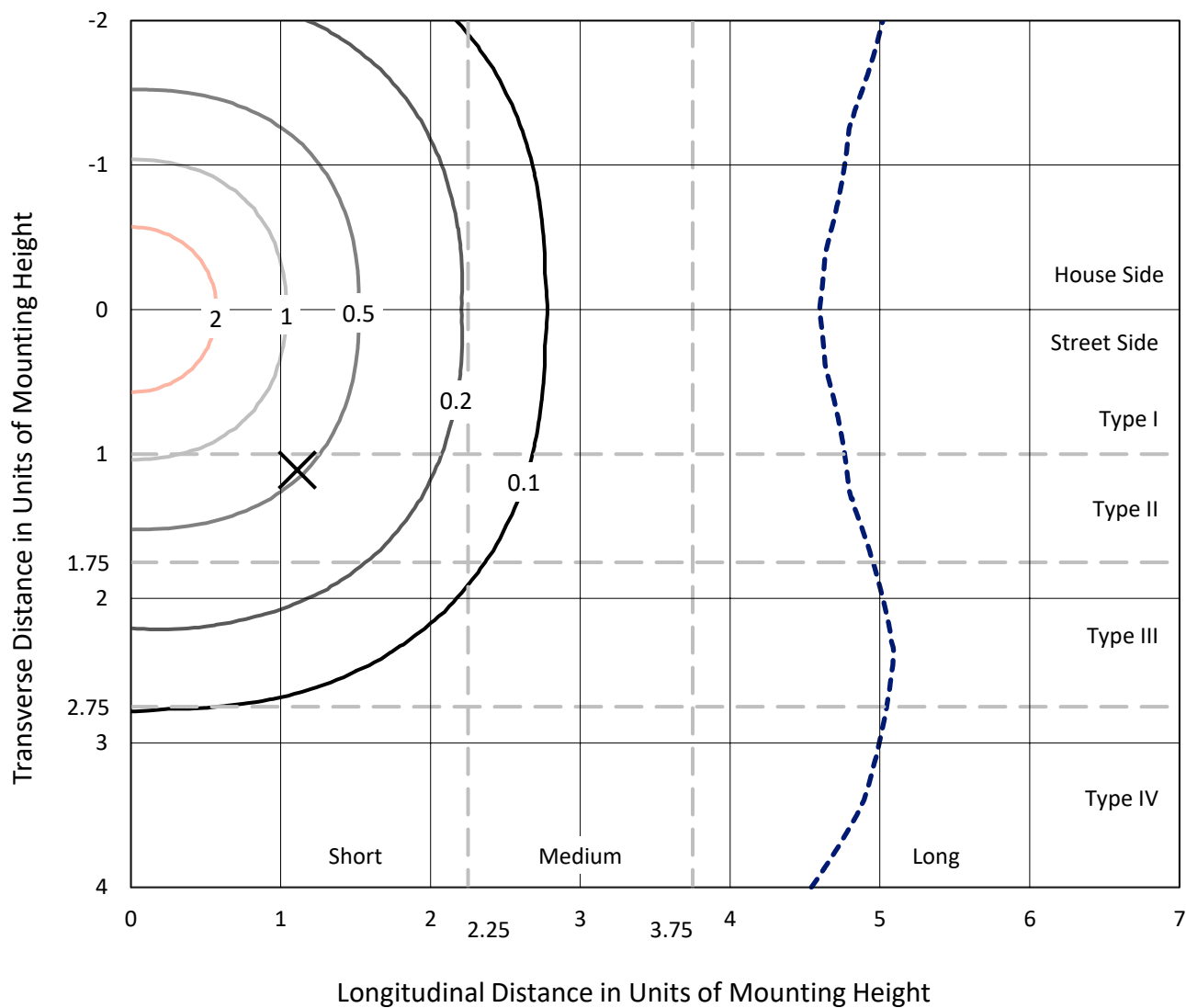
Input Watts (W): 74.7  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P382135  
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## Iso-Footcandle Lines of Horizontal Illumination

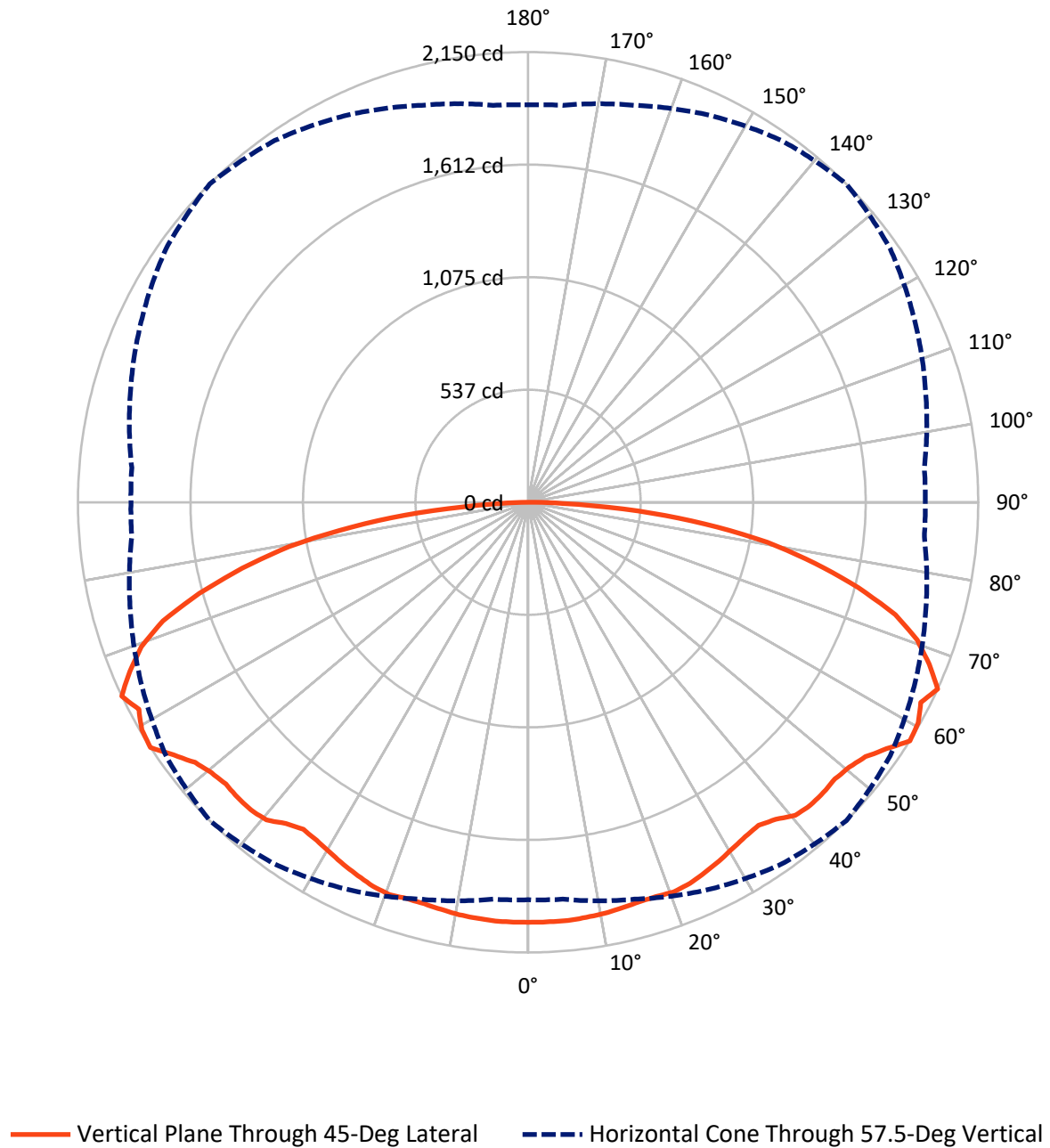
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 3.2 fc  
 Type V - Short - N/A

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## Luminous Intensity Polar Plot



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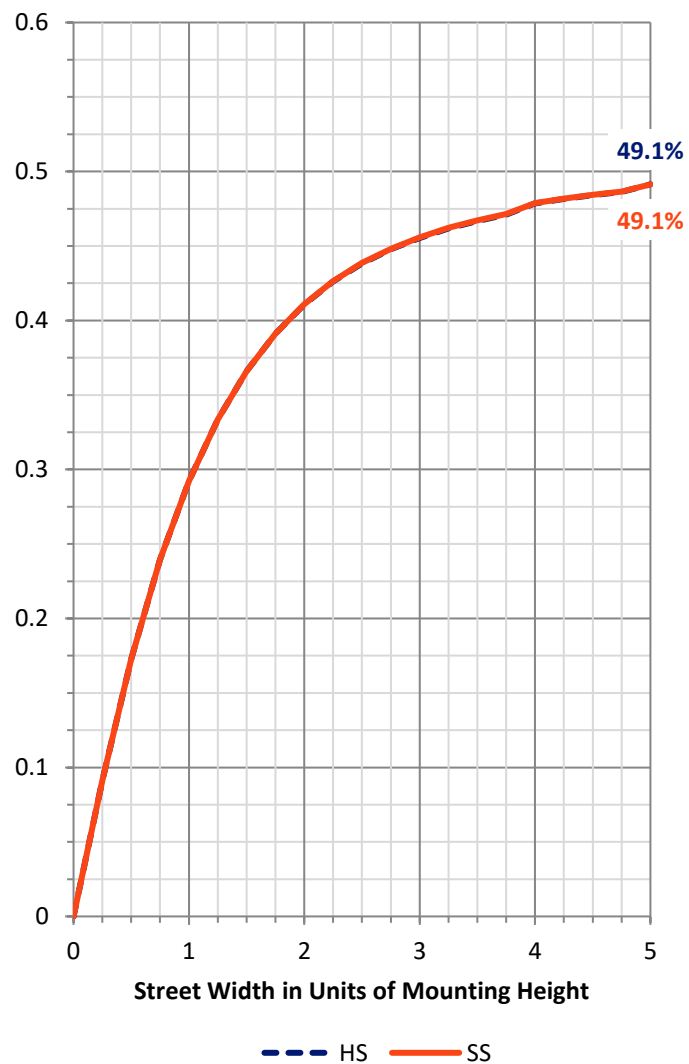
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 5036.0   | 0.0    | 5036.0  |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Street Side</b> | Lumens    | 5036.0   | 0.0    | 5036.0  |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Total</b>       | Lumens    | 10072.0  | 0.0    | 10072.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 191.2   | 1.9       |
| 10°-20°   | 562.3   | 5.6       |
| 20°-30°   | 903.4   | 9.0       |
| 30°-40°   | 1192.7  | 11.8      |
| 40°-50°   | 1492.2  | 14.8      |
| 50°-60°   | 1774.9  | 17.6      |
| 60°-70°   | 1925.0  | 19.1      |
| 70°-80°   | 1532.2  | 15.2      |
| 80°-90°   | 498.1   | 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°    | 10072.0 | 100.0     |
| 0°-180°   | 10072.0 | 100.0     |

**Coefficient of Utilization**



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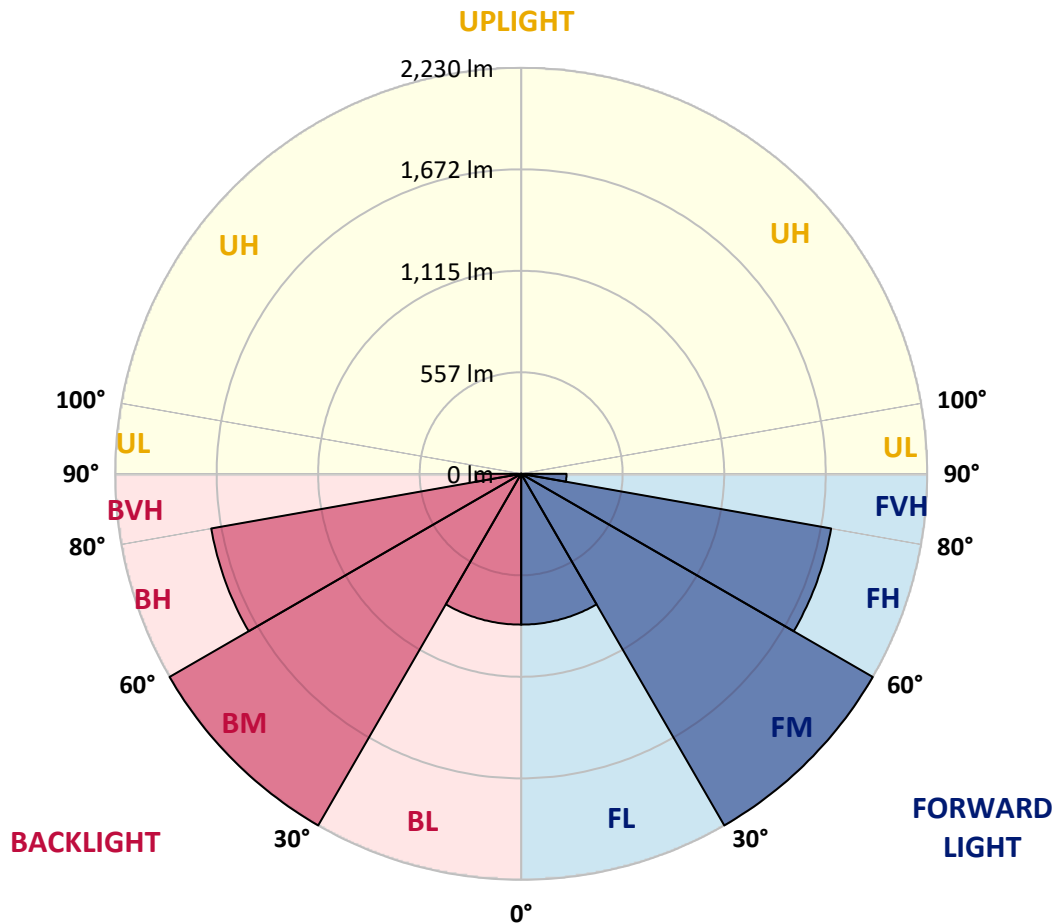
CATALOG NUMBER: TT-D5-740-U-5MQ-PM

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 828.4  | 8.2       |                         |      |         |
| FM   | (30°-60°)   | 2229.9 | 22.1      |                         |      |         |
| FH   | (60°-80°)   | 1728.6 | 17.2      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 249.0  | 2.5       |                         |      | G3/500  |
| BL   | (0°-30°)    | 828.4  | 8.2       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 2229.9 | 22.1      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1728.6 | 17.2      | B3/2500                 |      | G1/1800 |
| BVH  | (80°-90°)   | 249.0  | 2.5       |                         |      | G3/500  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type V Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2006.0 | 2006.0 | 2006.0 | 2006.0 | 2006.0 | 2006.0 | 2006.0 | 2006.0 | 2006.0 | 2006.0 | 2006.0 |
| 2.5°  | 2009.0 | 2007.5 | 2009.0 | 2007.5 | 2007.5 | 2006.0 | 2007.5 | 2007.5 | 2007.5 | 2007.5 | 2007.5 |
| 5°    | 2007.5 | 2006.0 | 2006.0 | 2007.5 | 2006.0 | 2006.0 | 2006.0 | 2006.0 | 2006.0 | 2006.0 | 2006.0 |
| 7.5°  | 2001.5 | 2001.5 | 2003.0 | 2001.5 | 2001.5 | 2001.5 | 2001.5 | 2001.5 | 2001.5 | 2003.0 | 2003.0 |
| 10°   | 1997.0 | 1995.5 | 1997.0 | 1997.0 | 1995.5 | 1997.0 | 1995.5 | 1997.0 | 1997.0 | 1997.0 | 1997.0 |
| 12.5° | 1991.0 | 1989.6 | 1991.0 | 1991.0 | 1989.6 | 1988.1 | 1989.6 | 1989.6 | 1991.0 | 1991.0 | 1991.0 |
| 15°   | 1980.6 | 1980.6 | 1983.6 | 1982.1 | 1982.1 | 1980.6 | 1983.6 | 1982.1 | 1980.6 | 1982.1 | 1982.1 |
| 17.5° | 1973.1 | 1973.1 | 1976.1 | 1979.1 | 1979.1 | 1979.1 | 1979.1 | 1977.6 | 1974.6 | 1976.1 | 1973.1 |
| 20°   | 1974.6 | 1976.1 | 1977.6 | 1982.1 | 1985.1 | 1986.6 | 1986.6 | 1982.1 | 1977.6 | 1979.1 | 1977.6 |
| 22.5° | 1970.1 | 1968.6 | 1970.1 | 1973.1 | 1977.6 | 1977.6 | 1977.6 | 1971.6 | 1970.1 | 1968.6 | 1968.6 |
| 25°   | 1952.1 | 1952.1 | 1955.1 | 1958.1 | 1961.1 | 1959.6 | 1961.1 | 1958.1 | 1955.1 | 1952.1 | 1952.1 |
| 27.5° | 1931.1 | 1931.1 | 1935.6 | 1938.6 | 1941.6 | 1941.6 | 1940.1 | 1937.1 | 1935.6 | 1932.6 | 1931.1 |
| 30°   | 1910.1 | 1910.1 | 1914.6 | 1917.6 | 1922.1 | 1920.6 | 1920.6 | 1916.1 | 1911.6 | 1908.7 | 1908.7 |
| 32.5° | 1887.7 | 1886.2 | 1890.7 | 1898.2 | 1904.2 | 1904.2 | 1904.2 | 1895.2 | 1889.2 | 1886.2 | 1884.7 |
| 35°   | 1868.2 | 1868.2 | 1874.2 | 1887.7 | 1895.2 | 1895.2 | 1892.2 | 1886.2 | 1872.7 | 1868.2 | 1868.2 |
| 37.5° | 1862.2 | 1866.7 | 1883.2 | 1902.7 | 1917.6 | 1920.6 | 1916.1 | 1899.7 | 1881.7 | 1868.2 | 1863.7 |
| 40°   | 1881.7 | 1886.2 | 1907.2 | 1938.6 | 1961.1 | 1965.6 | 1961.1 | 1937.1 | 1905.7 | 1884.7 | 1883.2 |
| 42.5° | 1884.7 | 1887.7 | 1913.1 | 1949.1 | 1970.1 | 1977.6 | 1970.1 | 1946.1 | 1911.6 | 1886.2 | 1884.7 |
| 45°   | 1874.2 | 1875.7 | 1905.7 | 1943.1 | 1968.6 | 1977.6 | 1968.6 | 1940.1 | 1904.2 | 1875.7 | 1874.2 |
| 47.5° | 1860.7 | 1863.7 | 1896.7 | 1935.6 | 1967.1 | 1973.1 | 1965.6 | 1934.1 | 1893.7 | 1865.2 | 1860.7 |
| 50°   | 1850.2 | 1859.2 | 1889.2 | 1932.6 | 1970.1 | 1988.1 | 1970.1 | 1928.1 | 1887.7 | 1856.2 | 1850.2 |
| 52.5° | 1856.2 | 1859.2 | 1898.2 | 1959.6 | 2010.5 | 2018.0 | 2009.0 | 1959.6 | 1895.2 | 1859.2 | 1854.7 |
| 55°   | 1874.2 | 1887.7 | 1929.6 | 2018.0 | 2064.5 | 2077.9 | 2058.5 | 2015.0 | 1931.1 | 1887.7 | 1874.2 |
| 57.5° | 1898.2 | 1902.7 | 1962.6 | 2040.5 | 2109.4 | 2149.9 | 2110.9 | 2039.0 | 1967.1 | 1899.7 | 1896.7 |
| 60°   | 1878.7 | 1865.2 | 1940.1 | 2031.5 | 2124.4 | 2140.9 | 2118.4 | 2033.0 | 1937.1 | 1863.7 | 1877.2 |
| 62.5° | 1826.3 | 1835.2 | 1896.7 | 2022.5 | 2086.9 | 2104.9 | 2080.9 | 2022.5 | 1893.7 | 1842.7 | 1821.8 |
| 65°   | 1784.3 | 1838.2 | 1905.7 | 1995.5 | 2098.9 | 2149.9 | 2100.4 | 1992.5 | 1908.7 | 1829.2 | 1779.8 |
| 67.5° | 1725.9 | 1736.4 | 1836.7 | 1947.6 | 2040.5 | 2066.0 | 2039.0 | 1949.1 | 1827.8 | 1728.9 | 1736.4 |
| 70°   | 1627.0 | 1612.0 | 1713.9 | 1842.7 | 1931.1 | 1971.6 | 1934.1 | 1836.7 | 1709.4 | 1609.0 | 1622.5 |
| 72.5° | 1463.7 | 1472.7 | 1567.1 | 1703.4 | 1794.8 | 1833.7 | 1796.3 | 1692.9 | 1564.1 | 1481.7 | 1472.7 |
| 75°   | 1292.9 | 1303.4 | 1394.8 | 1519.1 | 1612.0 | 1628.5 | 1618.0 | 1511.6 | 1397.8 | 1301.9 | 1292.9 |
| 77.5° | 1098.1 | 1108.6 | 1183.5 | 1319.9 | 1375.3 | 1400.8 | 1378.3 | 1327.4 | 1180.5 | 1107.1 | 1095.2 |
| 80°   | 882.4  | 879.4  | 945.3  | 1062.2 | 1131.1 | 1159.6 | 1131.1 | 1065.2 | 942.3  | 885.4  | 865.9  |
| 82.5° | 630.7  | 633.7  | 695.1  | 776.0  | 842.0  | 851.0  | 837.5  | 783.5  | 689.2  | 641.2  | 614.2  |
| 85°   | 350.6  | 364.1  | 409.0  | 468.9  | 512.4  | 527.4  | 504.9  | 453.9  | 407.5  | 370.0  | 358.1  |
| 87.5° | 83.9   | 91.4   | 106.4  | 134.8  | 151.3  | 166.3  | 151.3  | 140.8  | 100.4  | 91.4   | 83.9   |
| 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)

McGRAW-EDISON

Report Number: SP1-2006-844-6

Luminaire Tested: TT-D2-740-U-RW

Test Date: 06/30/2020

Data applicable to product families TT-x-740 and TTN-x-740



### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2006-844-6  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 06/30/2020  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **TT-D2-740-U-RW**  
 Description: MCGRAW EDISON

### RECTANGULAR DISTRIBUTION

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3623   | CRI (Ra): | 72.6 |      |       |
| CIE u':                   | 0.2297 | R1:       | 69.4 | R9:  | -22.4 |
| CIE v':                   | 0.5166 | R2:       | 78.4 | R10: | 49.0  |
| Duv:                      | 0.0060 | R3:       | 86.1 | R11: | 67.4  |
| CIE x:                    | 0.4044 | R4:       | 72.3 | R12: | 39.3  |
| CIE y:                    | 0.4042 | R5:       | 68.2 | R13: | 70.5  |
| CIE z:                    | 0.1914 | R6:       | 69.2 | R14: | 91.9  |
| Peak Wavelength (nm):     | 588    | R7:       | 83.0 |      |       |
| Dominant Wavelength (nm): | 578    | R8:       | 54.2 |      |       |
| Purity:                   | 42.8   |           |      |      |       |
| Rf:                       | 76.2   |           |      |      |       |
| Rg:                       | 94.3   |           |      |      |       |



### Test Conditions

Stabilization Time: 207M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.9/42%  
 Sphere Temperature (°C): 25.8

REPORT NUMBER: SP1-2006-844-6

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 7/29/2020        | 1/29/2021            |
| Power Meter                    | IN0071                | 12/3/2019        | 12/3/2020            |
| AC Power Source                | IN0063                | 12/3/2019        | 12/3/2020            |
| DC Power Source                | IN0208                | 12/3/2019        | 12/3/2020            |
| Sphere Thermometer             | IN0085                | 12/3/2019        | 12/3/2020            |
| Room Thermometer               | IN0046                | 12/3/2019        | 12/3/2020            |

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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 3500K 7-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       | 1254             | 0.0              | 490       | 9219             | 1.3              | 620       | 54761            | 14.3             | 750       | 2901             | 0.0              | 880       | 1835             | 0.0              |
| 365       | 1158             | 0.0              | 495       | 12322            | 2.2              | 625       | 51064            | 11.3             | 755       | 2733             | 0.0              | 885       | 1690             | 0.0              |
| 370       | 1131             | 0.0              | 500       | 17160            | 3.8              | 630       | 47879            | 8.7              | 760       | 2503             | 0.0              | 890       | 1819             | 0.0              |
| 375       | 1414             | 0.0              | 505       | 23071            | 6.5              | 635       | 44248            | 6.6              | 765       | 2289             | 0.0              | 895       | 1314             | 0.0              |
| 380       | 1275             | 0.0              | 510       | 29162            | 10.0             | 640       | 41034            | 4.9              | 770       | 2078             | 0.0              | 900       | 1547             | 0.0              |
| 385       | 1122             | 0.0              | 515       | 34992            | 14.5             | 645       | 37515            | 3.6              | 775       | 1927             | 0.0              | 905       | 1281             | 0.0              |
| 390       | 1074             | 0.0              | 520       | 40102            | 19.4             | 650       | 33900            | 2.5              | 780       | 1724             | 0.0              | 910       | 1345             | 0.0              |
| 395       | 1058             | 0.0              | 525       | 44194            | 23.7             | 655       | 30384            | 1.7              | 785       | 1617             | 0.0              | 915       | 1561             | 0.0              |
| 400       | 885              | 0.0              | 530       | 48014            | 28.3             | 660       | 26883            | 1.1              | 790       | 1709             | 0.0              | 920       | 1368             | 0.0              |
| 405       | 912              | 0.0              | 535       | 51019            | 31.6             | 665       | 23703            | 0.8              | 795       | 1561             | 0.0              | 925       | 1730             | 0.0              |
| 410       | 1108             | 0.0              | 540       | 53190            | 34.7             | 670       | 20603            | 0.5              | 800       | 1525             | 0.0              | 930       | 1629             | 0.0              |
| 415       | 1763             | 0.0              | 545       | 55452            | 36.9             | 675       | 18039            | 0.3              | 805       | 1332             | 0.0              | 935       | 1796             | 0.0              |
| 420       | 3421             | 0.0              | 550       | 57280            | 38.9             | 680       | 15849            | 0.2              | 810       | 1269             | 0.0              | 940       | 1595             | 0.0              |
| 425       | 6610             | 0.0              | 555       | 59041            | 40.3             | 685       | 13806            | 0.1              | 815       | 1261             | 0.0              | 945       | 1410             | 0.0              |
| 430       | 12444            | 0.1              | 560       | 60976            | 41.4             | 690       | 12093            | 0.1              | 820       | 1551             | 0.0              | 950       | 1937             | 0.0              |
| 435       | 21116            | 0.2              | 565       | 62904            | 41.8             | 695       | 10566            | 0.0              | 825       | 1708             | 0.0              | 955       | 2186             | 0.0              |
| 440       | 33463            | 0.5              | 570       | 64555            | 42.0             | 700       | 9300             | 0.0              | 830       | 1592             | 0.0              | 960       | 1583             | 0.0              |
| 445       | 49089            | 1.0              | 575       | 65785            | 40.9             | 705       | 8110             | 0.0              | 835       | 1642             | 0.0              | 965       | 1953             | 0.0              |
| 450       | 57374            | 1.5              | 580       | 66948            | 39.8             | 710       | 7052             | 0.0              | 840       | 1514             | 0.0              | 970       | 1519             | 0.0              |
| 455       | 42663            | 1.4              | 585       | 67963            | 37.8             | 715       | 6233             | 0.0              | 845       | 1376             | 0.0              | 975       | 1168             | 0.0              |
| 460       | 25334            | 1.0              | 590       | 68001            | 35.2             | 720       | 5362             | 0.0              | 850       | 1592             | 0.0              | 980       | 1593             | 0.0              |
| 465       | 17751            | 0.9              | 595       | 67308            | 31.9             | 725       | 4563             | 0.0              | 855       | 1667             | 0.0              | 985       | 1722             | 0.0              |
| 470       | 12447            | 0.8              | 600       | 66343            | 28.6             | 730       | 3976             | 0.0              | 860       | 1662             | 0.0              | 990       | 1648             | 0.0              |
| 475       | 8641             | 0.7              | 605       | 64393            | 24.9             | 735       | 3424             | 0.0              | 865       | 1916             | 0.0              | 995       | 2495             | 0.0              |
| 480       | 7423             | 0.7              | 610       | 61634            | 21.2             | 740       | 3222             | 0.0              | 870       | 1655             | 0.0              | 1000      | 2643             | 0.0              |
| 485       | 7759             | 0.9              | 615       | 58349            | 17.6             | 745       | 3060             | 0.0              | 875       | 2036             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2006-844-6

### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 1941.7**
**S/P: 0.51**

| 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       | 1254             | 0.0              | 490       | 9219             | 14.2             | 620       | 54761            | 0.7              | 750       | 2901             | 0.0              | 880       | 1835             | 0.0              |
| 365       | 1158             | 0.0              | 495       | 12322            | 19.9             | 625       | 51064            | 0.4              | 755       | 2733             | 0.0              | 885       | 1690             | 0.0              |
| 370       | 1131             | 0.0              | 500       | 17160            | 28.7             | 630       | 47879            | 0.3              | 760       | 2503             | 0.0              | 890       | 1819             | 0.0              |
| 375       | 1414             | 0.0              | 505       | 23071            | 39.2             | 635       | 44248            | 0.2              | 765       | 2289             | 0.0              | 895       | 1314             | 0.0              |
| 380       | 1275             | 0.0              | 510       | 29162            | 49.4             | 640       | 41034            | 0.1              | 770       | 2078             | 0.0              | 900       | 1547             | 0.0              |
| 385       | 1122             | 0.0              | 515       | 34992            | 58.0             | 645       | 37515            | 0.1              | 775       | 1927             | 0.0              | 905       | 1281             | 0.0              |
| 390       | 1074             | 0.0              | 520       | 40102            | 63.7             | 650       | 33900            | 0.0              | 780       | 1724             | 0.0              | 910       | 1345             | 0.0              |
| 395       | 1058             | 0.0              | 525       | 44194            | 66.1             | 655       | 30384            | 0.0              | 785       | 1617             | 0.0              | 915       | 1561             | 0.0              |
| 400       | 885              | 0.0              | 530       | 48014            | 66.2             | 660       | 26883            | 0.0              | 790       | 1709             | 0.0              | 920       | 1368             | 0.0              |
| 405       | 912              | 0.0              | 535       | 51019            | 63.6             | 665       | 23703            | 0.0              | 795       | 1561             | 0.0              | 925       | 1730             | 0.0              |
| 410       | 1108             | 0.1              | 540       | 53190            | 58.8             | 670       | 20603            | 0.0              | 800       | 1525             | 0.0              | 930       | 1629             | 0.0              |
| 415       | 1763             | 0.2              | 545       | 55452            | 53.2             | 675       | 18039            | 0.0              | 805       | 1332             | 0.0              | 935       | 1796             | 0.0              |
| 420       | 3421             | 0.6              | 550       | 57280            | 46.8             | 680       | 15849            | 0.0              | 810       | 1269             | 0.0              | 940       | 1595             | 0.0              |
| 425       | 6610             | 1.6              | 555       | 59041            | 40.3             | 685       | 13806            | 0.0              | 815       | 1261             | 0.0              | 945       | 1410             | 0.0              |
| 430       | 12444            | 4.2              | 560       | 60976            | 34.1             | 690       | 12093            | 0.0              | 820       | 1551             | 0.0              | 950       | 1937             | 0.0              |
| 435       | 21116            | 9.4              | 565       | 62904            | 28.2             | 695       | 10566            | 0.0              | 825       | 1708             | 0.0              | 955       | 2186             | 0.0              |
| 440       | 33463            | 18.7             | 570       | 64555            | 22.8             | 700       | 9300             | 0.0              | 830       | 1592             | 0.0              | 960       | 1583             | 0.0              |
| 445       | 49089            | 32.9             | 575       | 65785            | 17.9             | 705       | 8110             | 0.0              | 835       | 1642             | 0.0              | 965       | 1953             | 0.0              |
| 450       | 57374            | 44.5             | 580       | 66948            | 13.8             | 710       | 7052             | 0.0              | 840       | 1514             | 0.0              | 970       | 1519             | 0.0              |
| 455       | 42663            | 37.3             | 585       | 67963            | 10.4             | 715       | 6233             | 0.0              | 845       | 1376             | 0.0              | 975       | 1168             | 0.0              |
| 460       | 25334            | 24.5             | 590       | 68001            | 7.6              | 720       | 5362             | 0.0              | 850       | 1592             | 0.0              | 980       | 1593             | 0.0              |
| 465       | 17751            | 18.7             | 595       | 67308            | 5.4              | 725       | 4563             | 0.0              | 855       | 1667             | 0.0              | 985       | 1722             | 0.0              |
| 470       | 12447            | 14.3             | 600       | 66343            | 3.7              | 730       | 3976             | 0.0              | 860       | 1662             | 0.0              | 990       | 1648             | 0.0              |
| 475       | 8641             | 10.8             | 605       | 64393            | 2.5              | 735       | 3424             | 0.0              | 865       | 1916             | 0.0              | 995       | 2495             | 0.0              |
| 480       | 7423             | 10.0             | 610       | 61634            | 1.7              | 740       | 3222             | 0.0              | 870       | 1655             | 0.0              | 1000      | 2643             | 0.0              |
| 485       | 7759             | 11.2             | 615       | 58349            | 1.1              | 745       | 3060             | 0.0              | 875       | 2036             | 0.0              |           |                  |                  |

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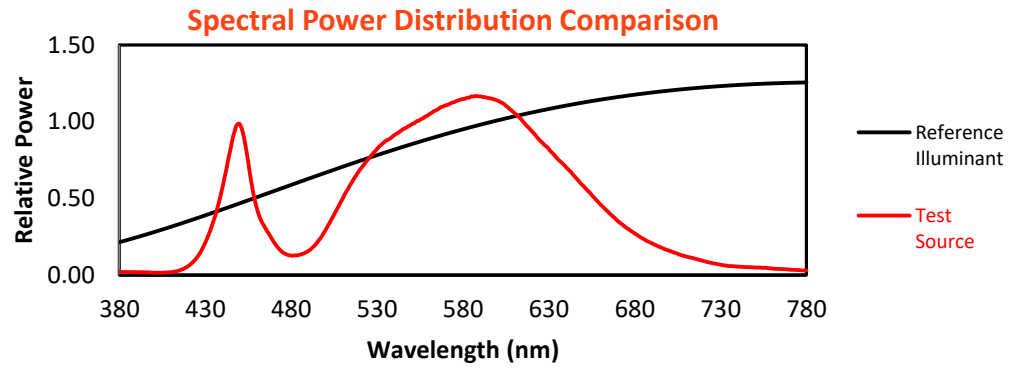
### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 5289.9**
**S/P: 1.39**

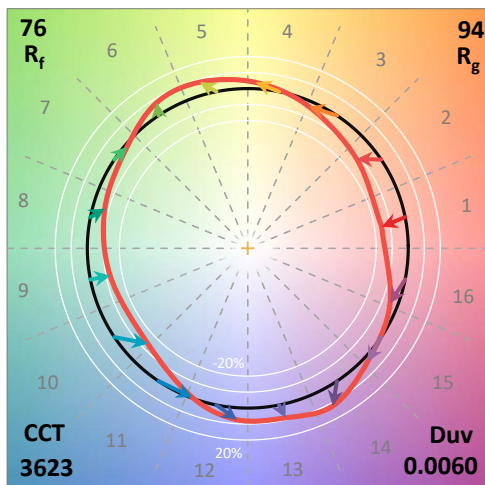
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1254             | 0.0              | 490       | 9219             | 7.7              | 620       | 54761            | 0.0              | 750       | 2901             | 0.0              | 880       | 1835             | 0.0              |
| 365       | 1158             | 0.0              | 495       | 12322            | 10.2             | 625       | 51064            | 0.0              | 755       | 2733             | 0.0              | 885       | 1690             | 0.0              |
| 370       | 1131             | 0.0              | 500       | 17160            | 13.8             | 630       | 47879            | 0.0              | 760       | 2503             | 0.0              | 890       | 1819             | 0.0              |
| 375       | 1414             | 0.0              | 505       | 23071            | 17.7             | 635       | 44248            | 0.0              | 765       | 2289             | 0.0              | 895       | 1314             | 0.0              |
| 380       | 1275             | 0.0              | 510       | 29162            | 20.9             | 640       | 41034            | 0.0              | 770       | 2078             | 0.0              | 900       | 1547             | 0.0              |
| 385       | 1122             | 0.0              | 515       | 34992            | 22.9             | 645       | 37515            | 0.0              | 775       | 1927             | 0.0              | 905       | 1281             | 0.0              |
| 390       | 1074             | 0.0              | 520       | 40102            | 23.3             | 650       | 33900            | 0.0              | 780       | 1724             | 0.0              | 910       | 1345             | 0.0              |
| 395       | 1058             | 0.0              | 525       | 44194            | 22.4             | 655       | 30384            | 0.0              | 785       | 1617             | 0.0              | 915       | 1561             | 0.0              |
| 400       | 885              | 0.0              | 530       | 48014            | 20.7             | 660       | 26883            | 0.0              | 790       | 1709             | 0.0              | 920       | 1368             | 0.0              |
| 405       | 912              | 0.0              | 535       | 51019            | 18.4             | 665       | 23703            | 0.0              | 795       | 1561             | 0.0              | 925       | 1730             | 0.0              |
| 410       | 1108             | 0.0              | 540       | 53190            | 15.6             | 670       | 20603            | 0.0              | 800       | 1525             | 0.0              | 930       | 1629             | 0.0              |
| 415       | 1763             | 0.1              | 545       | 55452            | 12.9             | 675       | 18039            | 0.0              | 805       | 1332             | 0.0              | 935       | 1796             | 0.0              |
| 420       | 3421             | 0.4              | 550       | 57280            | 10.3             | 680       | 15849            | 0.0              | 810       | 1269             | 0.0              | 940       | 1595             | 0.0              |
| 425       | 6610             | 1.0              | 555       | 59041            | 8.0              | 685       | 13806            | 0.0              | 815       | 1261             | 0.0              | 945       | 1410             | 0.0              |
| 430       | 12444            | 2.6              | 560       | 60976            | 6.0              | 690       | 12093            | 0.0              | 820       | 1551             | 0.0              | 950       | 1937             | 0.0              |
| 435       | 21116            | 5.6              | 565       | 62904            | 4.4              | 695       | 10566            | 0.0              | 825       | 1708             | 0.0              | 955       | 2186             | 0.0              |
| 440       | 33463            | 11.2             | 570       | 64555            | 3.2              | 700       | 9300             | 0.0              | 830       | 1592             | 0.0              | 960       | 1583             | 0.0              |
| 445       | 49089            | 19.4             | 575       | 65785            | 2.2              | 705       | 8110             | 0.0              | 835       | 1642             | 0.0              | 965       | 1953             | 0.0              |
| 450       | 57374            | 26.4             | 580       | 66948            | 1.5              | 710       | 7052             | 0.0              | 840       | 1514             | 0.0              | 970       | 1519             | 0.0              |
| 455       | 42663            | 22.4             | 585       | 67963            | 1.0              | 715       | 6233             | 0.0              | 845       | 1376             | 0.0              | 975       | 1168             | 0.0              |
| 460       | 25334            | 14.9             | 590       | 68001            | 0.7              | 720       | 5362             | 0.0              | 850       | 1592             | 0.0              | 980       | 1593             | 0.0              |
| 465       | 17751            | 11.6             | 595       | 67308            | 0.4              | 725       | 4563             | 0.0              | 855       | 1667             | 0.0              | 985       | 1722             | 0.0              |
| 470       | 12447            | 8.9              | 600       | 66343            | 0.3              | 730       | 3976             | 0.0              | 860       | 1662             | 0.0              | 990       | 1648             | 0.0              |
| 475       | 8641             | 6.6              | 605       | 64393            | 0.2              | 735       | 3424             | 0.0              | 865       | 1916             | 0.0              | 995       | 2495             | 0.0              |
| 480       | 7423             | 6.0              | 610       | 61634            | 0.1              | 740       | 3222             | 0.0              | 870       | 1655             | 0.0              | 1000      | 2643             | 0.0              |
| 485       | 7759             | 6.4              | 615       | 58349            | 0.1              | 745       | 3060             | 0.0              | 875       | 2036             | 0.0              |           |                  |                  |

### Summary

$R_f = 76.2$   
 $R_g = 94.3$   
 CIE  $R_a = 72.6$   
 $R_g = -22.4$



### Color Vector Graphics

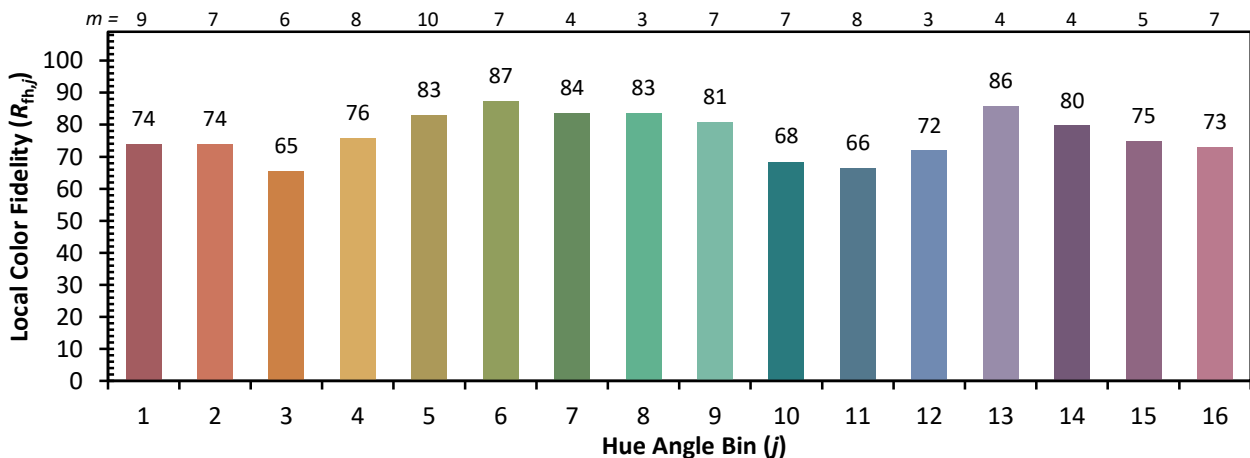


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 66 | CES51 = 88 | CES76 = 55 |
| CES02 = 61 | CES27 = 89 | CES52 = 88 | CES77 = 73 |
| CES03 = 31 | CES28 = 83 | CES53 = 78 | CES78 = 59 |
| CES04 = 70 | CES29 = 69 | CES54 = 85 | CES79 = 84 |
| CES05 = 48 | CES30 = 83 | CES55 = 84 | CES80 = 81 |
| CES06 = 51 | CES31 = 73 | CES56 = 74 | CES81 = 79 |
| CES07 = 40 | CES32 = 65 | CES57 = 73 | CES82 = 92 |
| CES08 = 39 | CES33 = 79 | CES58 = 74 | CES83 = 90 |
| CES09 = 29 | CES34 = 74 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 85 | CES60 = 90 | CES85 = 79 |
| CES11 = 57 | CES36 = 92 | CES61 = 84 | CES86 = 73 |
| CES12 = 63 | CES37 = 80 | CES62 = 87 | CES87 = 78 |
| CES13 = 42 | CES38 = 92 | CES63 = 73 | CES88 = 81 |
| CES14 = 74 | CES39 = 97 | CES64 = 68 | CES89 = 72 |
| CES15 = 71 | CES40 = 92 | CES65 = 65 | CES90 = 80 |
| CES16 = 47 | CES41 = 93 | CES66 = 61 | CES91 = 78 |
| CES17 = 49 | CES42 = 82 | CES67 = 58 | CES92 = 63 |
| CES18 = 56 | CES43 = 80 | CES68 = 68 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 76 | CES94 = 57 |
| CES20 = 65 | CES45 = 86 | CES70 = 60 | CES95 = 69 |
| CES21 = 86 | CES46 = 83 | CES71 = 54 | CES96 = 78 |
| CES22 = 78 | CES47 = 86 | CES72 = 85 | CES97 = 85 |
| CES23 = 92 | CES48 = 77 | CES73 = 52 | CES98 = 77 |
| CES24 = 91 | CES49 = 81 | CES74 = 95 | CES99 = 67 |
| CES25 = 72 | CES50 = 88 | CES75 = 56 |            |





**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)