

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: P436855

Luminaire Tested: **TT-D4-830-U-5MQ-PM-HSS**

Issue Date: 12/2/2020

### Test Information

Test Method: LM-79-08  
Report Number: P436855  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2010-017-1)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/2/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: TT-D4-830-U-5MQ-PM-HSS  
Description: TOPTIER LED SITE LUMINAIRE  
3000K, 80 CRI LEDS AND MEDIUM DISTRIBUTION WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 5998.1 lumens  
Efficiency: N/A  
Efficacy: 104.1 lumens/watt  
Luminous Opening: Circular (Dia: 1.12' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U2 - G2

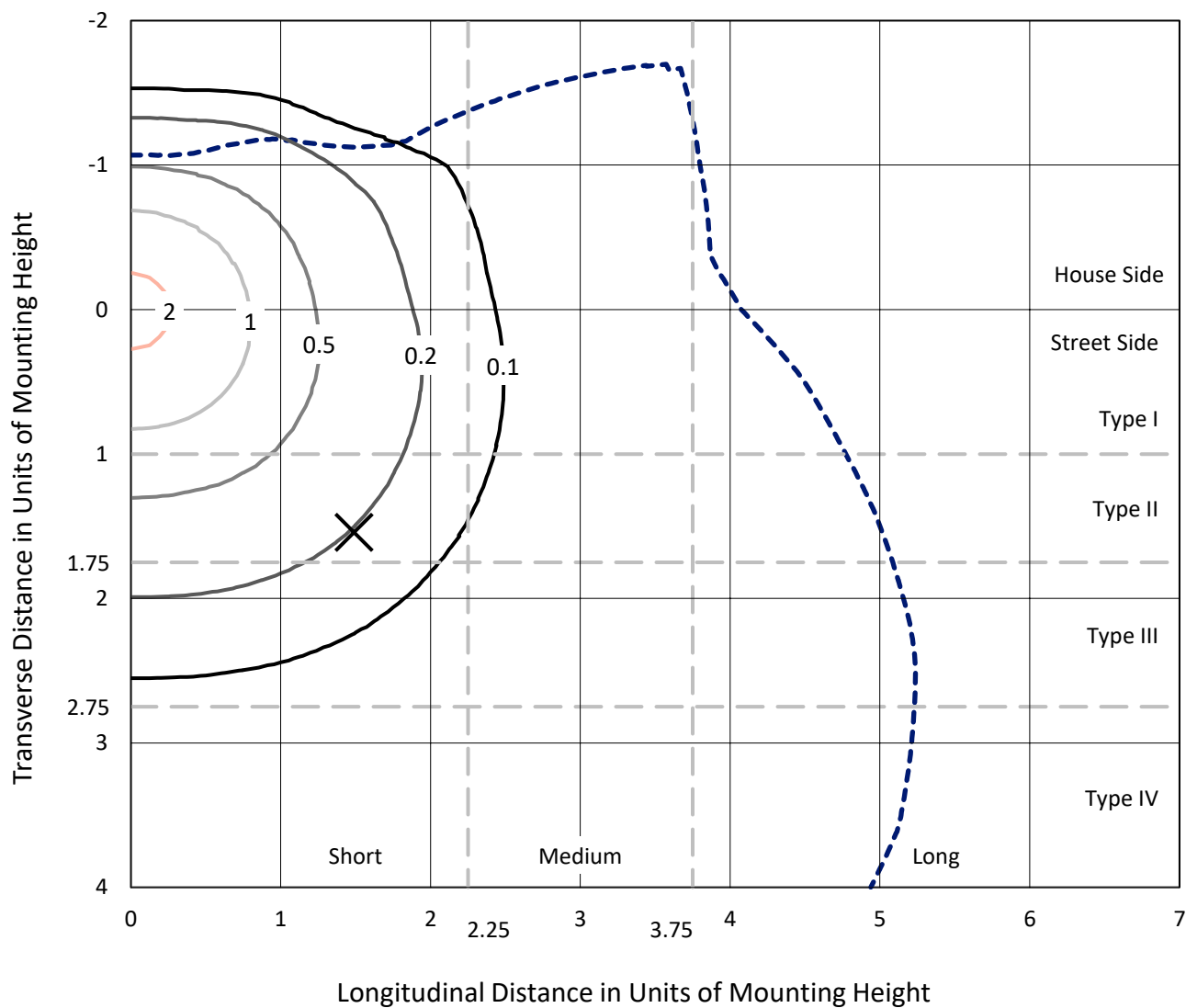
Input Watts (W): 57.6  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

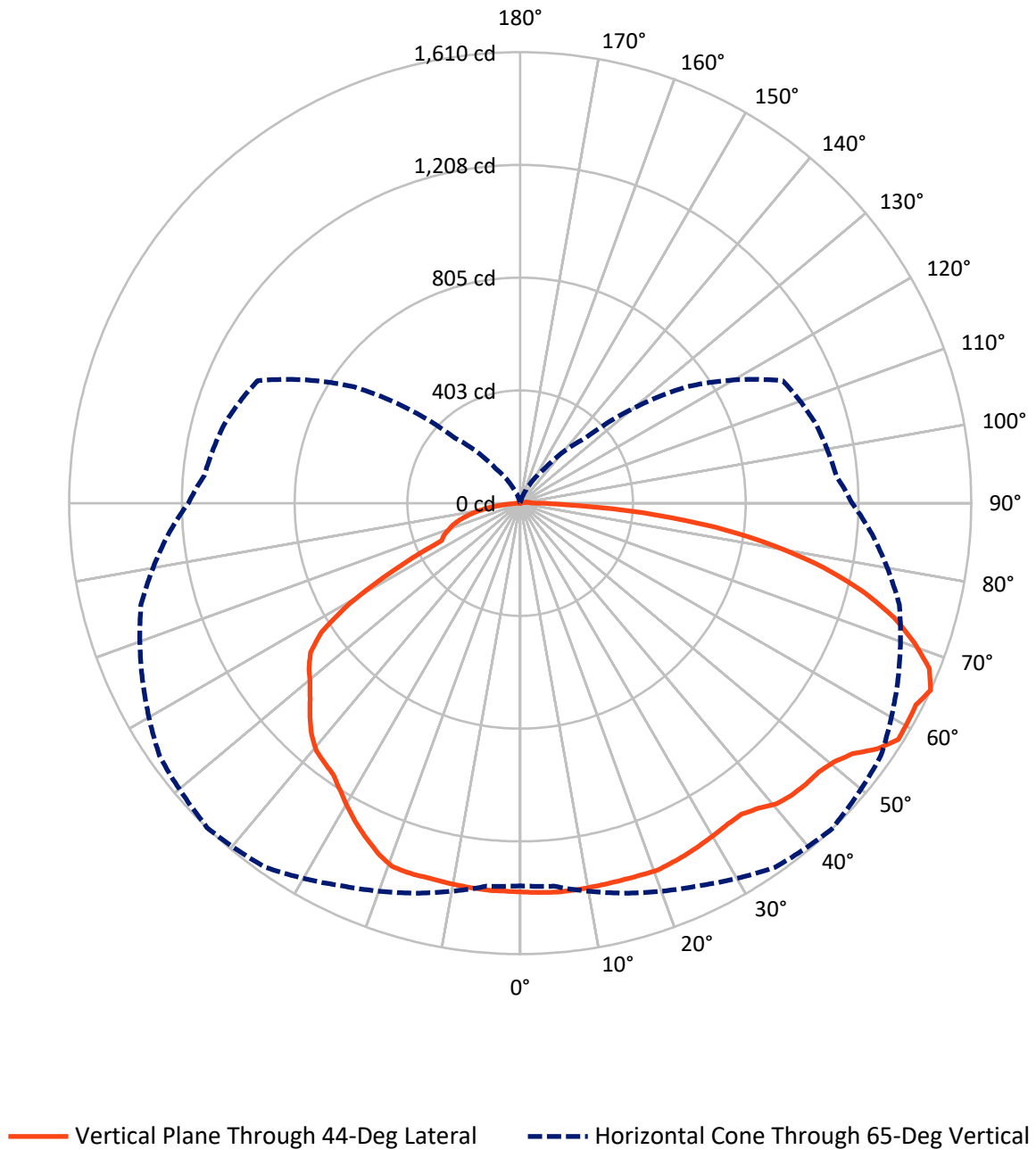
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 2.2 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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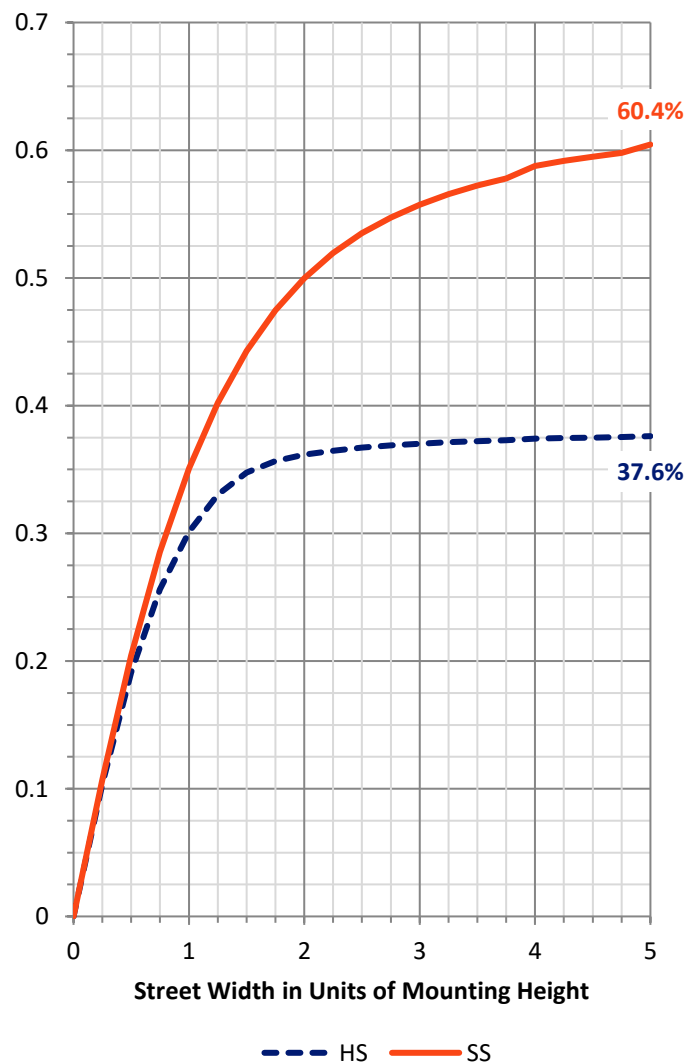
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 2271.1   | 1.6    | 2272.8 |
|                    | % Fixture | 37.9     | 0.0    | 37.9   |
| <b>Street Side</b> | Lumens    | 3705.0   | 20.4   | 3725.4 |
|                    | % Fixture | 61.8     | 0.3    | 62.1   |
| <b>Total</b>       | Lumens    | 5976.1   | 22.1   | 5998.1 |
|                    | % Fixture | 99.6     | 0.4    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 132.6  | 2.2       |
| 10°-20°   | 392.5  | 6.5       |
| 20°-30°   | 624.6  | 10.4      |
| 30°-40°   | 800.3  | 13.3      |
| 40°-50°   | 948.1  | 15.8      |
| 50°-60°   | 1038.3 | 17.3      |
| 60°-70°   | 987.0  | 16.5      |
| 70°-80°   | 785.8  | 13.1      |
| 80°-90°   | 267.0  | 4.5       |
| 90°-100°  | 14.1   | 0.2       |
| 100°-110° | 4.6    | 0.1       |
| 110°-120° | 1.0    | 0.0       |
| 120°-130° | 0.7    | 0.0       |
| 130°-140° | 0.5    | 0.0       |
| 140°-150° | 0.5    | 0.0       |
| 150°-160° | 0.4    | 0.0       |
| 160°-170° | 0.2    | 0.0       |
| 170°-180° | 0.1    | 0.0       |
| 0°-90°    | 5976.1 | 99.6      |
| 0°-180°   | 5998.1 | 100.0     |

**Coefficient of Utilization**



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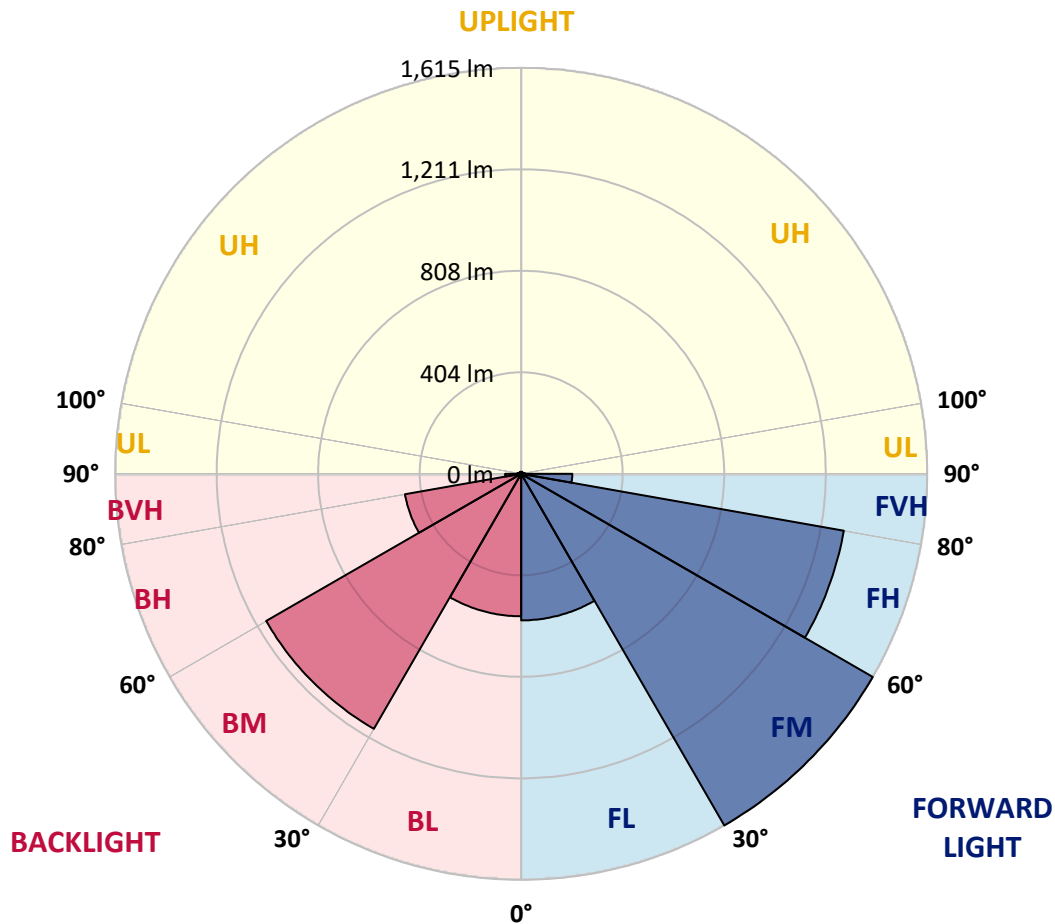
CATALOG NUMBER: TT-D4-830-U-5MQ-PM-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |       |         |
|------|-------------|--------|-----------|-------------------------|-------|---------|
|      |             |        |           | B                       | U     | G       |
| FL   | (0°-30°)    | 583.0  | 9.7       |                         |       |         |
| FM   | (30°-60°)   | 1615.2 | 26.9      |                         |       |         |
| FH   | (60°-80°)   | 1303.4 | 21.7      |                         |       | G1/1800 |
| FVH  | (80°-90°)   | 203.3  | 3.4       |                         |       | G2/225  |
| BL   | (0°-30°)    | 566.7  | 9.4       | B2/1000                 |       |         |
| BM   | (30°-60°)   | 1171.5 | 19.5      | B2/2500                 |       |         |
| BH   | (60°-80°)   | 469.3  | 7.8       | B1/500                  |       | G1/500  |
| BVH  | (80°-90°)   | 63.6   | 1.1       |                         |       | G1/100  |
| UL   | (90°-100°)  | 14.1   | 0.2       |                         | U2/50 |         |
| UH   | (100°-180°) | 8.0    | 0.1       |                         | U1/10 |         |

**BUG Rating: B2-U2-G2**

Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 5°     | 15°    | 25°    | 35°    | 44°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°     | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 |
| 2.5°   | 1393.8 | 1392.7 | 1392.7 | 1392.7 | 1392.7 | 1391.7 | 1392.7 | 1390.6 | 1391.7 | 1388.5 | 1388.5 |
| 5°     | 1397.0 | 1394.9 | 1395.9 | 1395.9 | 1395.9 | 1394.9 | 1395.9 | 1392.7 | 1393.8 | 1389.6 | 1388.5 |
| 7.5°   | 1398.0 | 1397.0 | 1397.0 | 1397.0 | 1397.0 | 1394.9 | 1395.9 | 1393.8 | 1392.7 | 1389.6 | 1387.4 |
| 10°    | 1398.0 | 1397.0 | 1397.0 | 1397.0 | 1395.9 | 1393.8 | 1394.9 | 1391.7 | 1391.7 | 1387.4 | 1385.3 |
| 12.5°  | 1398.0 | 1397.0 | 1398.0 | 1395.9 | 1395.9 | 1393.8 | 1393.8 | 1390.6 | 1390.6 | 1385.3 | 1383.2 |
| 15°    | 1397.0 | 1395.9 | 1395.9 | 1397.0 | 1395.9 | 1393.8 | 1393.8 | 1390.6 | 1389.6 | 1383.2 | 1381.1 |
| 17.5°  | 1395.9 | 1394.9 | 1395.9 | 1397.0 | 1398.0 | 1395.9 | 1397.0 | 1391.7 | 1389.6 | 1383.2 | 1380.0 |
| 20°    | 1397.0 | 1395.9 | 1397.0 | 1399.1 | 1399.1 | 1399.1 | 1399.1 | 1393.8 | 1389.6 | 1383.2 | 1377.9 |
| 22.5°  | 1393.8 | 1393.8 | 1393.8 | 1393.8 | 1395.9 | 1392.7 | 1392.7 | 1389.6 | 1384.3 | 1379.0 | 1373.7 |
| 25°    | 1386.4 | 1386.4 | 1387.4 | 1388.5 | 1388.5 | 1386.4 | 1385.3 | 1382.1 | 1377.9 | 1371.5 | 1365.2 |
| 27.5°  | 1377.9 | 1377.9 | 1379.0 | 1379.0 | 1381.1 | 1379.0 | 1377.9 | 1373.7 | 1369.4 | 1362.0 | 1354.6 |
| 30°    | 1368.4 | 1368.4 | 1368.4 | 1370.5 | 1371.5 | 1371.5 | 1370.5 | 1365.2 | 1359.9 | 1351.4 | 1341.9 |
| 32.5°  | 1357.8 | 1357.8 | 1360.9 | 1363.1 | 1364.1 | 1364.1 | 1364.1 | 1357.8 | 1351.4 | 1340.8 | 1327.0 |
| 35°    | 1349.3 | 1349.3 | 1353.5 | 1360.9 | 1365.2 | 1363.1 | 1362.0 | 1357.8 | 1348.2 | 1336.6 | 1314.3 |
| 37.5°  | 1354.6 | 1354.6 | 1364.1 | 1374.7 | 1384.3 | 1382.1 | 1382.1 | 1374.7 | 1362.0 | 1342.9 | 1315.4 |
| 40°    | 1367.3 | 1368.4 | 1383.2 | 1397.0 | 1408.6 | 1410.8 | 1410.8 | 1402.3 | 1383.2 | 1358.8 | 1320.7 |
| 42.5°  | 1370.5 | 1372.6 | 1387.4 | 1407.6 | 1418.2 | 1423.5 | 1423.5 | 1411.8 | 1391.7 | 1363.1 | 1318.5 |
| 45°    | 1370.5 | 1371.5 | 1388.5 | 1409.7 | 1426.7 | 1430.9 | 1430.9 | 1418.2 | 1392.7 | 1365.2 | 1311.1 |
| 47.5°  | 1370.5 | 1369.4 | 1384.3 | 1413.9 | 1430.9 | 1434.1 | 1434.1 | 1420.3 | 1395.9 | 1360.9 | 1300.5 |
| 50°    | 1367.3 | 1372.6 | 1394.9 | 1418.2 | 1447.9 | 1452.1 | 1451.0 | 1436.2 | 1402.3 | 1366.2 | 1292.0 |
| 52.5°  | 1374.7 | 1373.7 | 1403.3 | 1450.0 | 1476.5 | 1486.0 | 1487.1 | 1468.0 | 1433.0 | 1381.1 | 1286.7 |
| 55°    | 1405.5 | 1406.5 | 1435.1 | 1489.2 | 1529.5 | 1547.5 | 1545.4 | 1521.0 | 1471.2 | 1410.8 | 1301.6 |
| 57.5°  | 1416.1 | 1426.7 | 1468.0 | 1514.6 | 1576.1 | 1592.0 | 1592.0 | 1562.3 | 1501.9 | 1434.1 | 1312.2 |
| 60°    | 1394.9 | 1399.1 | 1450.0 | 1529.5 | 1585.6 | 1588.8 | 1589.9 | 1568.7 | 1505.1 | 1421.4 | 1291.0 |
| 62.5°  | 1389.6 | 1398.0 | 1437.3 | 1526.3 | 1562.3 | 1585.6 | 1584.6 | 1556.0 | 1501.9 | 1411.8 | 1283.6 |
| 65°    | 1366.2 | 1372.6 | 1441.5 | 1507.2 | 1586.7 | 1610.0 | 1604.7 | 1571.9 | 1488.1 | 1401.2 | 1260.2 |
| 67.5°  | 1318.5 | 1324.9 | 1388.5 | 1480.7 | 1552.8 | 1575.0 | 1580.3 | 1542.2 | 1455.3 | 1351.4 | 1210.4 |
| 70°    | 1239.0 | 1248.6 | 1313.2 | 1403.3 | 1479.6 | 1492.4 | 1490.2 | 1466.9 | 1380.0 | 1268.7 | 1137.3 |
| 72.5°  | 1127.8 | 1142.6 | 1224.2 | 1310.1 | 1375.8 | 1394.9 | 1386.4 | 1359.9 | 1288.9 | 1169.1 | 1037.7 |
| 75°    | 1010.1 | 1023.9 | 1088.5 | 1185.0 | 1253.9 | 1266.6 | 1260.2 | 1228.4 | 1156.4 | 1038.7 | 920.0  |
| 77.5°  | 881.9  | 893.5  | 948.6  | 1047.2 | 1098.1 | 1108.7 | 1111.9 | 1069.5 | 1001.6 | 895.6  | 789.6  |
| 80°    | 709.1  | 714.4  | 788.6  | 853.2  | 897.8  | 919.0  | 916.8  | 885.0  | 817.2  | 729.2  | 623.2  |
| 82.5°  | 523.6  | 527.8  | 585.1  | 640.2  | 680.5  | 699.5  | 688.9  | 657.2  | 603.1  | 527.8  | 447.3  |
| 85°    | 321.2  | 313.7  | 360.4  | 401.7  | 426.1  | 438.8  | 428.2  | 410.2  | 362.5  | 303.1  | 247.0  |
| 87.5°  | 115.5  | 109.2  | 130.4  | 136.7  | 164.3  | 160.0  | 169.6  | 136.7  | 110.2  | 78.4   | 55.1   |
| 90°    | 50.9   | 50.9   | 49.8   | 47.7   | 43.5   | 39.2   | 38.2   | 31.8   | 23.3   | 14.8   | 5.3    |
| 92.5°  | 46.6   | 46.6   | 45.6   | 43.5   | 39.2   | 35.0   | 35.0   | 28.6   | 21.2   | 13.8   | 5.3    |
| 95°    | 39.2   | 39.2   | 38.2   | 36.0   | 32.9   | 29.7   | 29.7   | 23.3   | 18.0   | 11.7   | 4.2    |
| 97.5°  | 30.7   | 30.7   | 29.7   | 28.6   | 25.4   | 23.3   | 23.3   | 19.1   | 13.8   | 8.5    | 3.2    |
| 100°   | 23.3   | 23.3   | 22.3   | 21.2   | 20.1   | 18.0   | 17.0   | 13.8   | 10.6   | 6.4    | 2.1    |
| 102.5° | 17.0   | 17.0   | 17.0   | 15.9   | 13.8   | 12.7   | 12.7   | 10.6   | 7.4    | 5.3    | 2.1    |
| 105°   | 11.7   | 11.7   | 11.7   | 10.6   | 9.5    | 8.5    | 8.5    | 7.4    | 5.3    | 3.2    | 1.1    |
| 107.5° | 7.4    | 7.4    | 7.4    | 7.4    | 6.4    | 5.3    | 5.3    | 4.2    | 3.2    | 2.1    | 1.1    |
| 110°   | 4.2    | 3.2    | 4.2    | 4.2    | 4.2    | 3.2    | 3.2    | 2.1    | 2.1    | 1.1    | 1.1    |

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CATALOG NUMBER: TT-D4-830-U-5MQ-PM-HSS

**CANDELA DISTRIBUTION (continued):**

|        | 0°  | 5°  | 15° | 25° | 35° | 44° | 45° | 55° | 65° | 75° | 85° |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 112.5° | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 115°   | 1.1 | 1.1 | 1.1 | 2.1 | 2.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 117.5° | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 120°   | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 122.5° | 0.0 | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 125°   | 0.0 | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 127.5° | 0.0 | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 130°   | 0.0 | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 132.5° | 0.0 | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 135°   | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 137.5° | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 140°   | 0.0 | 1.1 | 1.1 | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 142.5° | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 145°   | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 147.5° | 1.1 | 1.1 | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 150°   | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 152.5° | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 155°   | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 157.5° | 1.1 | 1.1 | 1.1 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 160°   | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 162.5° | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 165°   | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 167.5° | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 170°   | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 172.5° | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 175°   | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 177.5° | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 180°   | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |

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**CANDELA DISTRIBUTION (continued):**

|        | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°     | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 | 1388.5 |
| 2.5°   | 1388.5 | 1387.4 | 1386.4 | 1387.4 | 1386.4 | 1386.4 | 1385.3 | 1385.3 | 1384.3 | 1384.3 | 1383.2 |
| 5°     | 1388.5 | 1387.4 | 1386.4 | 1387.4 | 1385.3 | 1386.4 | 1386.4 | 1385.3 | 1384.3 | 1383.2 | 1382.1 |
| 7.5°   | 1387.4 | 1387.4 | 1385.3 | 1386.4 | 1384.3 | 1384.3 | 1383.2 | 1383.2 | 1382.1 | 1382.1 | 1381.1 |
| 10°    | 1385.3 | 1384.3 | 1384.3 | 1384.3 | 1382.1 | 1382.1 | 1381.1 | 1380.0 | 1380.0 | 1379.0 | 1377.9 |
| 12.5°  | 1383.2 | 1382.1 | 1381.1 | 1381.1 | 1380.0 | 1379.0 | 1377.9 | 1377.9 | 1376.8 | 1375.8 | 1374.7 |
| 15°    | 1380.0 | 1379.0 | 1379.0 | 1379.0 | 1377.9 | 1377.9 | 1376.8 | 1375.8 | 1373.7 | 1372.6 | 1371.5 |
| 17.5°  | 1379.0 | 1377.9 | 1379.0 | 1379.0 | 1377.9 | 1379.0 | 1376.8 | 1374.7 | 1372.6 | 1371.5 | 1370.5 |
| 20°    | 1377.9 | 1377.9 | 1377.9 | 1376.8 | 1375.8 | 1374.7 | 1373.7 | 1372.6 | 1371.5 | 1370.5 | 1369.4 |
| 22.5°  | 1372.6 | 1371.5 | 1369.4 | 1363.1 | 1355.6 | 1350.3 | 1349.3 | 1351.4 | 1351.4 | 1351.4 | 1348.2 |
| 25°    | 1363.1 | 1359.9 | 1351.4 | 1339.7 | 1327.0 | 1318.5 | 1313.2 | 1313.2 | 1312.2 | 1310.1 | 1309.0 |
| 27.5°  | 1351.4 | 1345.0 | 1330.2 | 1315.4 | 1297.3 | 1286.7 | 1274.0 | 1266.6 | 1263.4 | 1262.4 | 1260.2 |
| 30°    | 1335.5 | 1326.0 | 1306.9 | 1287.8 | 1265.5 | 1250.7 | 1230.6 | 1217.8 | 1210.4 | 1207.2 | 1205.1 |
| 32.5°  | 1316.4 | 1306.9 | 1284.6 | 1261.3 | 1234.8 | 1213.6 | 1188.2 | 1168.0 | 1154.3 | 1147.9 | 1144.7 |
| 35°    | 1303.7 | 1289.9 | 1264.5 | 1236.9 | 1210.4 | 1179.7 | 1149.0 | 1121.4 | 1100.2 | 1092.8 | 1088.5 |
| 37.5°  | 1298.4 | 1285.7 | 1258.1 | 1230.6 | 1200.9 | 1163.8 | 1127.8 | 1088.5 | 1059.9 | 1047.2 | 1043.0 |
| 40°    | 1301.6 | 1285.7 | 1254.9 | 1225.3 | 1190.3 | 1149.0 | 1101.3 | 1052.5 | 1015.4 | 997.4  | 993.1  |
| 42.5°  | 1294.2 | 1276.1 | 1240.1 | 1208.3 | 1164.9 | 1118.2 | 1059.9 | 1003.7 | 953.9  | 939.1  | 932.7  |
| 45°    | 1281.4 | 1259.2 | 1220.0 | 1179.7 | 1134.1 | 1076.9 | 1016.5 | 944.4  | 885.0  | 867.0  | 861.7  |
| 47.5°  | 1268.7 | 1238.0 | 1191.4 | 1154.3 | 1099.1 | 1032.4 | 961.3  | 880.8  | 806.6  | 788.6  | 785.4  |
| 50°    | 1249.6 | 1221.0 | 1171.2 | 1127.8 | 1071.6 | 994.2  | 913.7  | 813.0  | 729.2  | 698.5  | 690.0  |
| 52.5°  | 1241.2 | 1204.1 | 1156.4 | 1122.5 | 1054.6 | 966.6  | 864.9  | 756.8  | 636.0  | 597.8  | 589.3  |
| 55°    | 1249.6 | 1203.0 | 1152.1 | 1119.3 | 1040.8 | 931.7  | 806.6  | 668.8  | 528.9  | 488.6  | 477.0  |
| 57.5°  | 1234.8 | 1194.5 | 1143.7 | 1106.6 | 1004.8 | 859.6  | 721.8  | 544.8  | 399.6  | 347.7  | 343.4  |
| 60°    | 1215.7 | 1158.5 | 1110.8 | 1076.9 | 929.6  | 723.9  | 561.8  | 387.9  | 240.6  | 196.1  | 187.6  |
| 62.5°  | 1208.3 | 1149.0 | 1093.8 | 1052.5 | 828.9  | 532.1  | 342.4  | 196.1  | 99.6   | 70.0   | 63.6   |
| 65°    | 1185.0 | 1132.0 | 1092.8 | 1034.5 | 723.9  | 328.6  | 147.3  | 58.3   | 4.2    | 3.2    | 3.2    |
| 67.5°  | 1140.5 | 1086.4 | 1059.9 | 1026.0 | 713.3  | 313.7  | 133.5  | 53.0   | 2.1    | 0.0    | 0.0    |
| 70°    | 1064.2 | 1021.8 | 1003.7 | 985.7  | 682.6  | 290.4  | 121.9  | 47.7   | 1.1    | 0.0    | 0.0    |
| 72.5°  | 963.5  | 934.8  | 931.7  | 929.6  | 638.1  | 268.2  | 109.2  | 42.4   | 1.1    | 0.0    | 0.0    |
| 75°    | 862.8  | 827.8  | 833.1  | 845.8  | 583.0  | 237.4  | 94.3   | 37.1   | 1.1    | 0.0    | 0.0    |
| 77.5°  | 735.6  | 710.1  | 722.9  | 744.1  | 510.9  | 201.4  | 77.4   | 29.7   | 1.1    | 0.0    | 0.0    |
| 80°    | 578.7  | 561.8  | 590.4  | 609.5  | 417.6  | 160.0  | 58.3   | 21.2   | 0.0    | 0.0    | 0.0    |
| 82.5°  | 411.2  | 401.7  | 428.2  | 452.6  | 310.6  | 113.4  | 40.3   | 13.8   | 0.0    | 0.0    | 0.0    |
| 85°    | 221.5  | 216.2  | 241.7  | 268.2  | 186.5  | 64.7   | 20.1   | 6.4    | 0.0    | 0.0    | 0.0    |
| 87.5°  | 55.1   | 50.9   | 51.9   | 62.5   | 45.6   | 13.8   | 3.2    | 1.1    | 0.0    | 0.0    | 0.0    |
| 90°    | 1.1    | 1.1    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 92.5°  | 1.1    | 1.1    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 95°    | 1.1    | 1.1    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 97.5°  | 1.1    | 1.1    | 1.1    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 100°   | 1.1    | 1.1    | 1.1    | 1.1    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 102.5° | 1.1    | 1.1    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 105°   | 1.1    | 1.1    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 107.5° | 1.1    | 1.1    | 1.1    | 1.1    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 110°   | 1.1    | 1.1    | 1.1    | 1.1    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

REPORT NUMBER: P436855

CATALOG NUMBER: TT-D4-830-U-5MQ-PM-HSS

**CANDELA DISTRIBUTION (continued):**

|        | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|--------|-----|-----|------|------|------|------|------|------|------|------|------|
| 112.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 115°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 117.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 120°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 122.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 125°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 127.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 130°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 132.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 135°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 137.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 140°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 142.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 145°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 147.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 150°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 152.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 155°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 157.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 160°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 162.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 165°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 167.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 170°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 172.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 175°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 177.5° | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 180°   | 1.1 | 1.1 | 1.1  | 1.1  | 1.1  | 1.1  | 1.1  | 1.1  | 1.1  | 1.1  | 1.1  |

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: SP1-2006-844-5

Luminaire Tested: TT-D5-830-U-MQ

Data valid for TT-D\* family of products

Test Date: 09/30/2020

### Test Information

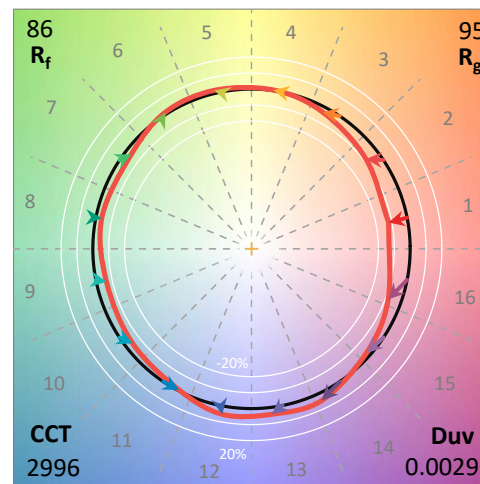
Test Method: LM-79-08  
 Report Number: SP1-2006-844-5  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 09/30/2020  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **TT-D5-830-U-MQ**  
 Description: MCGRAW EDISON

### DISTRIBUTION

### Spectral Parameters

CCT (K): 2996  
 CIE  $u'$ : 0.2496  
 CIE  $v'$ : 0.5255  
 Duv: 0.0029  
 CIE x: 0.4414  
 CIE y: 0.4130  
 CIE z: 0.1455  
 Peak Wavelength (nm): 601  
 Dominant Wavelength (nm): 581  
 Purity: 56.8  
 Rf: 85.7  
 Rg: 94.5

CRI (Ra): 81.6  
 R1: 79.1  
 R2: 89.7  
 R3: 96.7  
 R4: 80.2  
 R5: 79.8  
 R6: 88.4  
 R7: 82.6  
 R8: 56.3  
 R9: -0.6  
 R10: 77.8  
 R11: 80.1  
 R12: 72.7  
 R13: 81.5  
 R14: 98.5



### Test Conditions

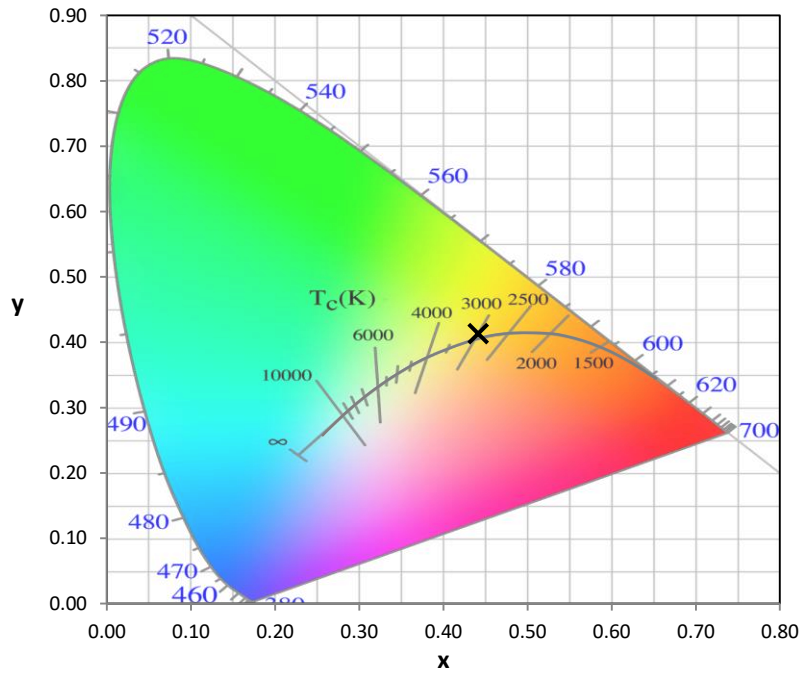
Stabilization Time: 55M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.5/43%  
 Sphere Temperature (°C): 25.9

REPORT NUMBER: SP1-2006-844-5

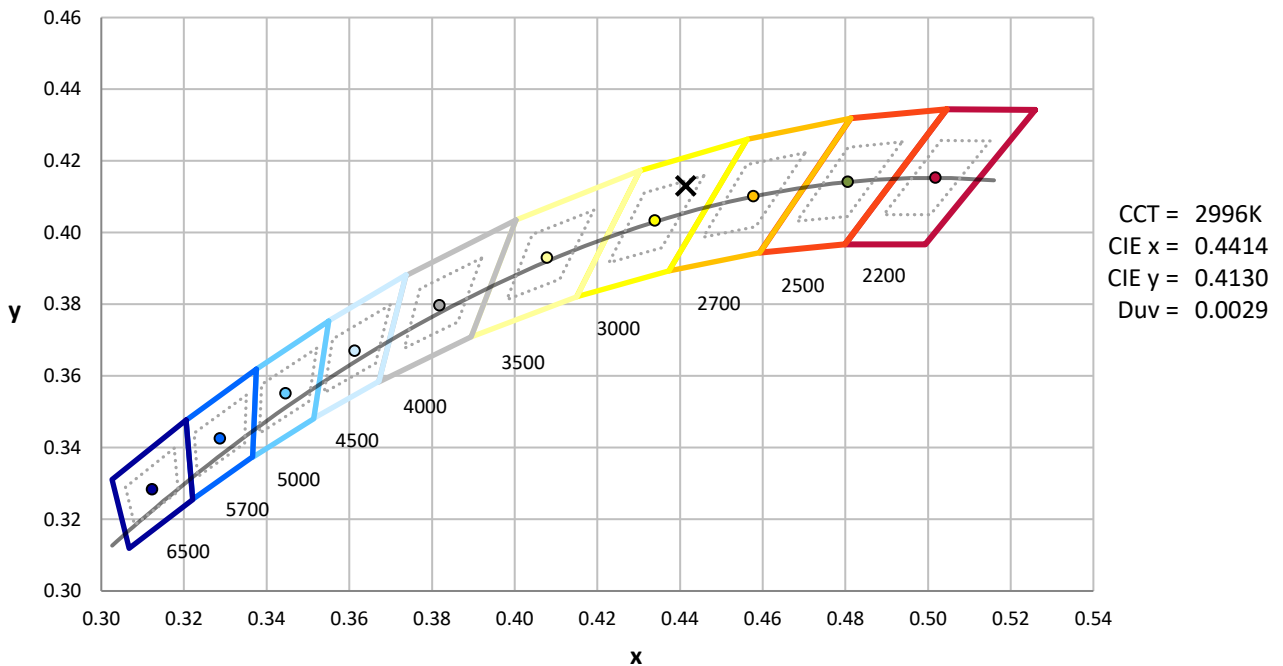
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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            |

REPORT NUMBER: SP1-2006-844-5

**CIE 1931 Chromaticity Diagram**



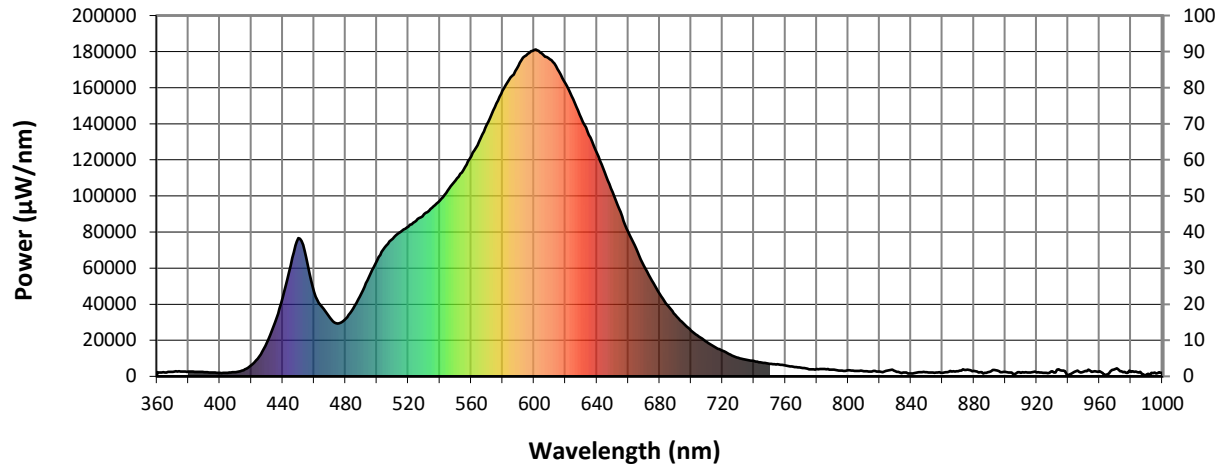
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2006-844-5

### Photopic Flux vs. Wavelength

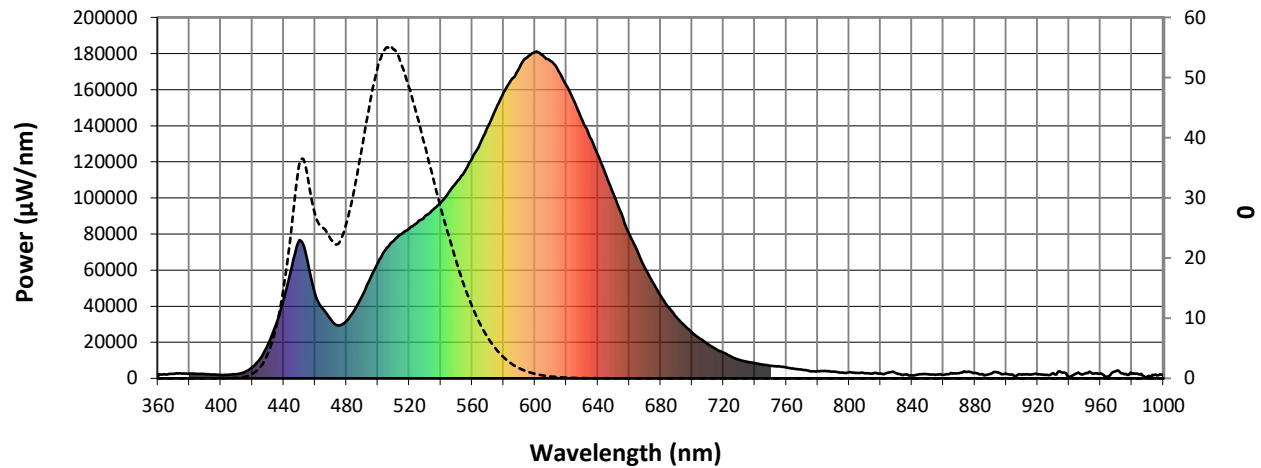


#####

| 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       | 2265             | 0.0              | 490       | 45874            | 6.5              | 620       | 162337           | 42.2             | 750       | 6976             | 0.0              | 880       | 2976             | 0.0              |
| 365       | 2167             | 0.0              | 495       | 55189            | 10.0             | 625       | 153641           | 33.9             | 755       | 6666             | 0.0              | 885       | 2283             | 0.0              |
| 370       | 2505             | 0.0              | 500       | 64204            | 14.2             | 630       | 143151           | 25.9             | 760       | 5969             | 0.0              | 890       | 2506             | 0.0              |
| 375       | 2720             | 0.0              | 505       | 71441            | 20.0             | 635       | 133763           | 20.1             | 765       | 5281             | 0.0              | 895       | 3132             | 0.0              |
| 380       | 2601             | 0.0              | 510       | 76219            | 26.2             | 640       | 123759           | 14.8             | 770       | 4732             | 0.0              | 900       | 2539             | 0.0              |
| 385       | 2461             | 0.0              | 515       | 79949            | 33.1             | 645       | 112859           | 10.9             | 775       | 3998             | 0.0              | 905       | 1252             | 0.0              |
| 390       | 2308             | 0.0              | 520       | 83077            | 40.3             | 650       | 102080           | 7.5              | 780       | 4027             | 0.0              | 910       | 1938             | 0.0              |
| 395       | 2104             | 0.0              | 525       | 86267            | 46.3             | 655       | 91102            | 5.2              | 785       | 4088             | 0.0              | 915       | 2171             | 0.0              |
| 400       | 1900             | 0.0              | 530       | 89871            | 52.9             | 660       | 79928            | 3.3              | 790       | 3700             | 0.0              | 920       | 2123             | 0.0              |
| 405       | 1945             | 0.0              | 535       | 93544            | 58.0             | 665       | 70694            | 2.2              | 795       | 3213             | 0.0              | 925       | 1954             | 0.0              |
| 410       | 2378             | 0.0              | 540       | 97371            | 63.4             | 670       | 61201            | 1.3              | 800       | 3403             | 0.0              | 930       | 2800             | 0.0              |
| 415       | 3437             | 0.0              | 545       | 103011           | 68.6             | 675       | 53092            | 0.9              | 805       | 3079             | 0.0              | 935       | 3314             | 0.0              |
| 420       | 6173             | 0.0              | 550       | 108560           | 73.8             | 680       | 45718            | 0.5              | 810       | 2921             | 0.0              | 940       | 553              | 0.0              |
| 425       | 11052            | 0.1              | 555       | 114473           | 78.2             | 685       | 39372            | 0.3              | 815       | 2705             | 0.0              | 945       | 2793             | 0.0              |
| 430       | 18756            | 0.1              | 560       | 121896           | 82.8             | 690       | 34120            | 0.2              | 820       | 2685             | 0.0              | 950       | 2629             | 0.0              |
| 435       | 29750            | 0.4              | 565       | 130192           | 86.6             | 695       | 29427            | 0.1              | 825       | 3246             | 0.0              | 955       | 2418             | 0.0              |
| 440       | 43697            | 0.7              | 570       | 139595           | 90.8             | 700       | 25380            | 0.1              | 830       | 2813             | 0.0              | 960       | 2857             | 0.0              |
| 445       | 61462            | 1.3              | 575       | 149225           | 92.8             | 705       | 22079            | 0.0              | 835       | 2097             | 0.0              | 965       | 1052             | 0.0              |
| 450       | 76648            | 2.0              | 580       | 158344           | 94.1             | 710       | 18938            | 0.0              | 840       | 1606             | 0.0              | 970       | 4009             | 0.0              |
| 455       | 65529            | 2.2              | 585       | 165704           | 92.1             | 715       | 16322            | 0.0              | 845       | 2347             | 0.0              | 975       | 2341             | 0.0              |
| 460       | 46753            | 1.9              | 590       | 172269           | 89.1             | 720       | 14132            | 0.0              | 850       | 2273             | 0.0              | 980       | 2439             | 0.0              |
| 465       | 38422            | 2.0              | 595       | 177895           | 84.3             | 725       | 12072            | 0.0              | 855       | 1971             | 0.0              | 985       | 2098             | 0.0              |
| 470       | 32450            | 2.0              | 600       | 180887           | 78.0             | 730       | 10271            | 0.0              | 860       | 1962             | 0.0              | 990       | 1159             | 0.0              |
| 475       | 29284            | 2.3              | 605       | 178880           | 69.3             | 735       | 9202             | 0.0              | 865       | 2989             | 0.0              | 995       | 2146             | 0.0              |
| 480       | 31922            | 3.0              | 610       | 175843           | 60.4             | 740       | 8451             | 0.0              | 870       | 2921             | 0.0              | 1000      | 1904             | 0.0              |
| 485       | 37800            | 4.5              | 615       | 170321           | 51.4             | 745       | 7632             | 0.0              | 875       | 3581             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2006-844-5

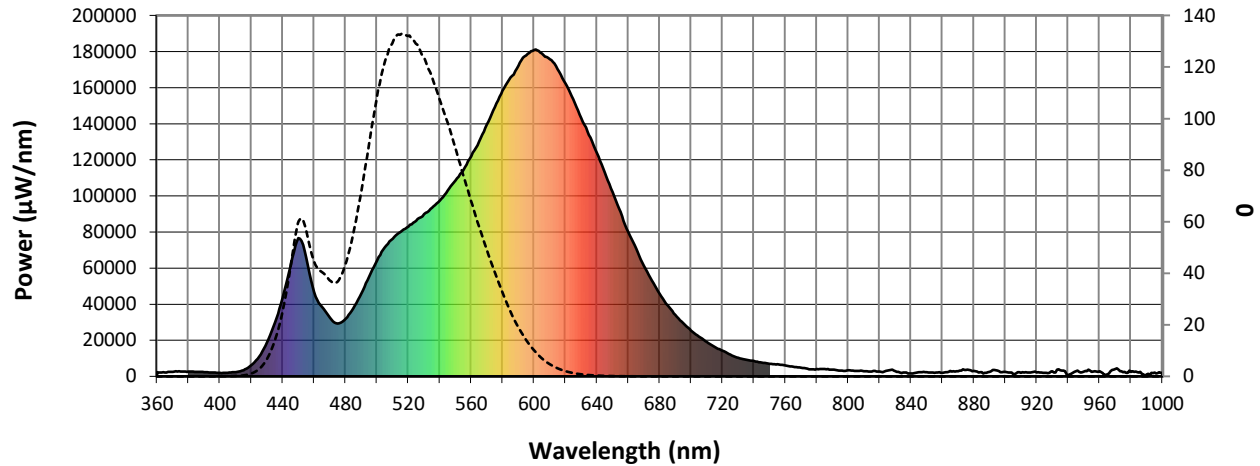
### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 4357.3**
**S/P: 0.5**

| 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       | 2265             | 0.0              | 490       | 45874            | 70.6             | 620       | 162337           | 2.0              | 750       | 6976             | 0.0              | 880       | 2976             | 0.0              |
| 365       | 2167             | 0.0              | 495       | 55189            | 89.2             | 625       | 153641           | 1.3              | 755       | 6666             | 0.0              | 885       | 2283             | 0.0              |
| 370       | 2505             | 0.0              | 500       | 64204            | 107.4            | 630       | 143151           | 0.8              | 760       | 5969             | 0.0              | 890       | 2506             | 0.0              |
| 375       | 2720             | 0.0              | 505       | 71441            | 121.4            | 635       | 133763           | 0.5              | 765       | 5281             | 0.0              | 895       | 3132             | 0.0              |
| 380       | 2601             | 0.0              | 510       | 76219            | 129.2            | 640       | 123759           | 0.3              | 770       | 4732             | 0.0              | 900       | 2539             | 0.0              |
| 385       | 2461             | 0.0              | 515       | 79949            | 132.5            | 645       | 112859           | 0.2              | 775       | 3998             | 0.0              | 905       | 1252             | 0.0              |
| 390       | 2308             | 0.0              | 520       | 83077            | 132.1            | 650       | 102080           | 0.1              | 780       | 4027             | 0.0              | 910       | 1938             | 0.0              |
| 395       | 2104             | 0.0              | 525       | 86267            | 129.1            | 655       | 91102            | 0.1              | 785       | 4088             | 0.0              | 915       | 2171             | 0.0              |
| 400       | 1900             | 0.0              | 530       | 89871            | 123.9            | 660       | 79928            | 0.0              | 790       | 3700             | 0.0              | 920       | 2123             | 0.0              |
| 405       | 1945             | 0.1              | 535       | 93544            | 116.6            | 665       | 70694            | 0.0              | 795       | 3213             | 0.0              | 925       | 1954             | 0.0              |
| 410       | 2378             | 0.1              | 540       | 97371            | 107.6            | 670       | 61201            | 0.0              | 800       | 3403             | 0.0              | 930       | 2800             | 0.0              |
| 415       | 3437             | 0.4              | 545       | 103011           | 98.8             | 675       | 53092            | 0.0              | 805       | 3079             | 0.0              | 935       | 3314             | 0.0              |
| 420       | 6173             | 1.0              | 550       | 108560           | 88.8             | 680       | 45718            | 0.0              | 810       | 2921             | 0.0              | 940       | 553              | 0.0              |
| 425       | 11052            | 2.7              | 555       | 114473           | 78.2             | 685       | 39372            | 0.0              | 815       | 2705             | 0.0              | 945       | 2793             | 0.0              |
| 430       | 18756            | 6.4              | 560       | 121896           | 68.1             | 690       | 34120            | 0.0              | 820       | 2685             | 0.0              | 950       | 2629             | 0.0              |
| 435       | 29750            | 13.3             | 565       | 130192           | 58.4             | 695       | 29427            | 0.0              | 825       | 3246             | 0.0              | 955       | 2418             | 0.0              |
| 440       | 43697            | 24.4             | 570       | 139595           | 49.3             | 700       | 25380            | 0.0              | 830       | 2813             | 0.0              | 960       | 2857             | 0.0              |
| 445       | 61462            | 41.2             | 575       | 149225           | 40.6             | 705       | 22079            | 0.0              | 835       | 2097             | 0.0              | 965       | 1052             | 0.0              |
| 450       | 76648            | 59.4             | 580       | 158344           | 32.6             | 710       | 18938            | 0.0              | 840       | 1606             | 0.0              | 970       | 4009             | 0.0              |
| 455       | 65529            | 57.3             | 585       | 165704           | 25.3             | 715       | 16322            | 0.0              | 845       | 2347             | 0.0              | 975       | 2341             | 0.0              |
| 460       | 46753            | 45.2             | 590       | 172269           | 19.2             | 720       | 14132            | 0.0              | 850       | 2273             | 0.0              | 980       | 2439             | 0.0              |
| 465       | 38422            | 40.6             | 595       | 177895           | 14.2             | 725       | 12072            | 0.0              | 855       | 1971             | 0.0              | 985       | 2098             | 0.0              |
| 470       | 32450            | 37.4             | 600       | 180887           | 10.2             | 730       | 10271            | 0.0              | 860       | 1962             | 0.0              | 990       | 1159             | 0.0              |
| 475       | 29284            | 36.6             | 605       | 178880           | 7.0              | 735       | 9202             | 0.0              | 865       | 2989             | 0.0              | 995       | 2146             | 0.0              |
| 480       | 31922            | 43.1             | 610       | 175843           | 4.8              | 740       | 8451             | 0.0              | 870       | 2921             | 0.0              | 1000      | 1904             | 0.0              |
| 485       | 37800            | 54.8             | 615       | 170321           | 3.2              | 745       | 7632             | 0.0              | 875       | 3581             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 11640.4      S/P: 1.33**

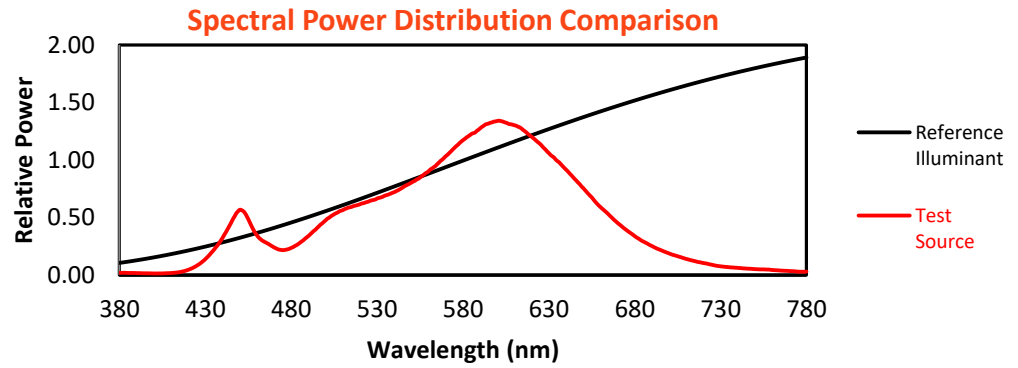
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2265             | 0.0              | 490       | 45874            | 38.2             | 620       | 162337           | 0.1              | 750       | 6976             | 0.0              | 880       | 2976             | 0.0              |
| 365       | 2167             | 0.0              | 495       | 55189            | 45.6             | 625       | 153641           | 0.1              | 755       | 6666             | 0.0              | 885       | 2283             | 0.0              |
| 370       | 2505             | 0.0              | 500       | 64204            | 51.6             | 630       | 143151           | 0.0              | 760       | 5969             | 0.0              | 890       | 2506             | 0.0              |
| 375       | 2720             | 0.0              | 505       | 71441            | 54.8             | 635       | 133763           | 0.0              | 765       | 5281             | 0.0              | 895       | 3132             | 0.0              |
| 380       | 2601             | 0.0              | 510       | 76219            | 54.7             | 640       | 123759           | 0.0              | 770       | 4732             | 0.0              | 900       | 2539             | 0.0              |
| 385       | 2461             | 0.0              | 515       | 79949            | 52.2             | 645       | 112859           | 0.0              | 775       | 3998             | 0.0              | 905       | 1252             | 0.0              |
| 390       | 2308             | 0.0              | 520       | 83077            | 48.4             | 650       | 102080           | 0.0              | 780       | 4027             | 0.0              | 910       | 1938             | 0.0              |
| 395       | 2104             | 0.0              | 525       | 86267            | 43.7             | 655       | 91102            | 0.0              | 785       | 4088             | 0.0              | 915       | 2171             | 0.0              |
| 400       | 1900             | 0.0              | 530       | 89871            | 38.8             | 660       | 79928            | 0.0              | 790       | 3700             | 0.0              | 920       | 2123             | 0.0              |
| 405       | 1945             | 0.0              | 535       | 93544            | 33.7             | 665       | 70694            | 0.0              | 795       | 3213             | 0.0              | 925       | 1954             | 0.0              |
| 410       | 2378             | 0.1              | 540       | 97371            | 28.5             | 670       | 61201            | 0.0              | 800       | 3403             | 0.0              | 930       | 2800             | 0.0              |
| 415       | 3437             | 0.2              | 545       | 103011           | 23.9             | 675       | 53092            | 0.0              | 805       | 3079             | 0.0              | 935       | 3314             | 0.0              |
| 420       | 6173             | 0.7              | 550       | 108560           | 19.5             | 680       | 45718            | 0.0              | 810       | 2921             | 0.0              | 940       | 553              | 0.0              |
| 425       | 11052            | 1.7              | 555       | 114473           | 15.4             | 685       | 39372            | 0.0              | 815       | 2705             | 0.0              | 945       | 2793             | 0.0              |
| 430       | 18756            | 4.0              | 560       | 121896           | 12.0             | 690       | 34120            | 0.0              | 820       | 2685             | 0.0              | 950       | 2629             | 0.0              |
| 435       | 29750            | 7.9              | 565       | 130192           | 9.1              | 695       | 29427            | 0.0              | 825       | 3246             | 0.0              | 955       | 2418             | 0.0              |
| 440       | 43697            | 14.6             | 570       | 139595           | 6.8              | 700       | 25380            | 0.0              | 830       | 2813             | 0.0              | 960       | 2857             | 0.0              |
| 445       | 61462            | 24.2             | 575       | 149225           | 5.0              | 705       | 22079            | 0.0              | 835       | 2097             | 0.0              | 965       | 1052             | 0.0              |
| 450       | 76648            | 35.3             | 580       | 158344           | 3.5              | 710       | 18938            | 0.0              | 840       | 1606             | 0.0              | 970       | 4009             | 0.0              |
| 455       | 65529            | 34.3             | 585       | 165704           | 2.5              | 715       | 16322            | 0.0              | 845       | 2347             | 0.0              | 975       | 2341             | 0.0              |
| 460       | 46753            | 27.5             | 590       | 172269           | 1.7              | 720       | 14132            | 0.0              | 850       | 2273             | 0.0              | 980       | 2439             | 0.0              |
| 465       | 38422            | 25.1             | 595       | 177895           | 1.1              | 725       | 12072            | 0.0              | 855       | 1971             | 0.0              | 985       | 2098             | 0.0              |
| 470       | 32450            | 23.2             | 600       | 180887           | 0.8              | 730       | 10271            | 0.0              | 860       | 1962             | 0.0              | 990       | 1159             | 0.0              |
| 475       | 29284            | 22.4             | 605       | 178880           | 0.5              | 735       | 9202             | 0.0              | 865       | 2989             | 0.0              | 995       | 2146             | 0.0              |
| 480       | 31922            | 25.6             | 610       | 175843           | 0.3              | 740       | 8451             | 0.0              | 870       | 2921             | 0.0              | 1000      | 1904             | 0.0              |
| 485       | 37800            | 31.2             | 615       | 170321           | 0.2              | 745       | 7632             | 0.0              | 875       | 3581             | 0.0              |           |                  |                  |

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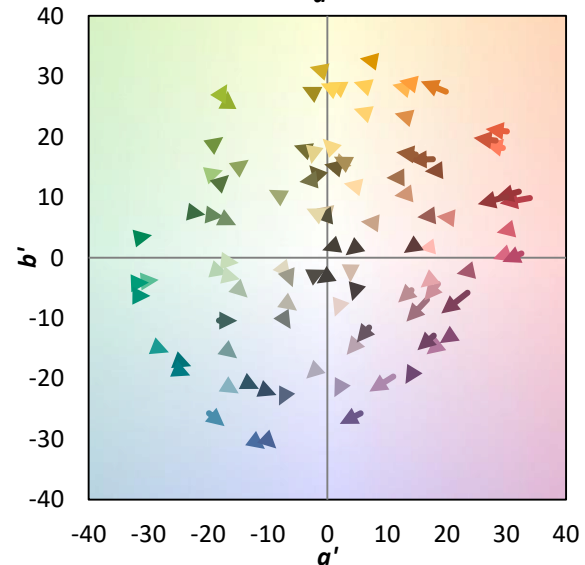
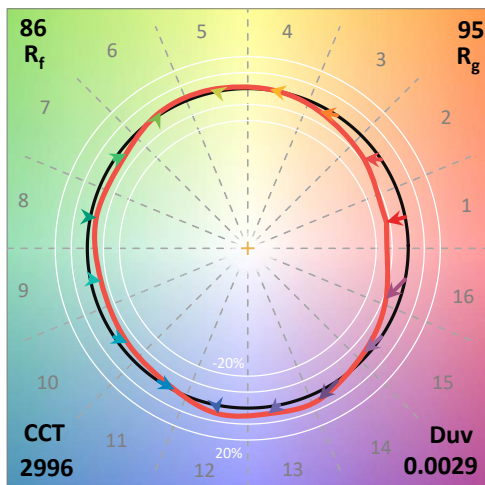
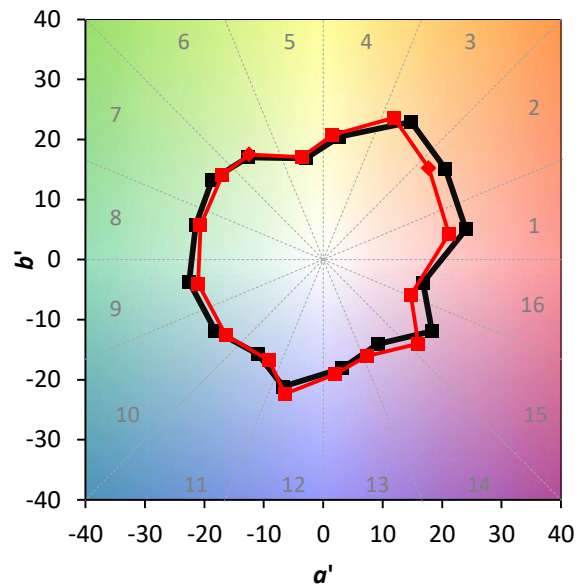
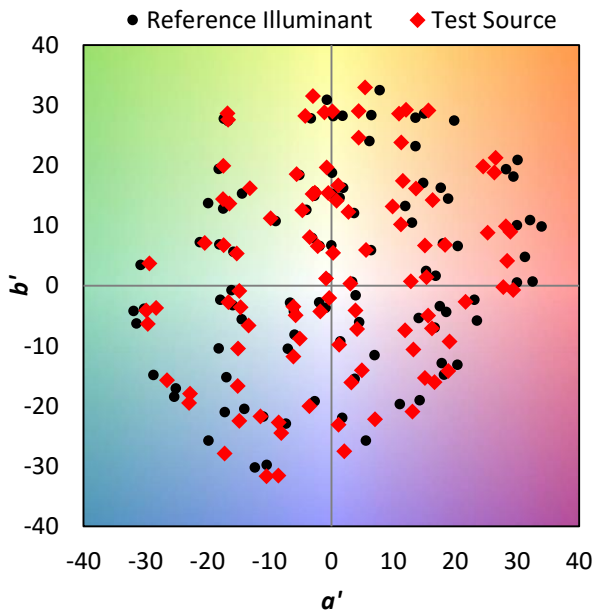
TM-30-18

### Summary

$R_f = 85.7$   
 $R_g = 94.5$   
 CIE  $R_a = 81.6$   
 $R_g = -0.6$

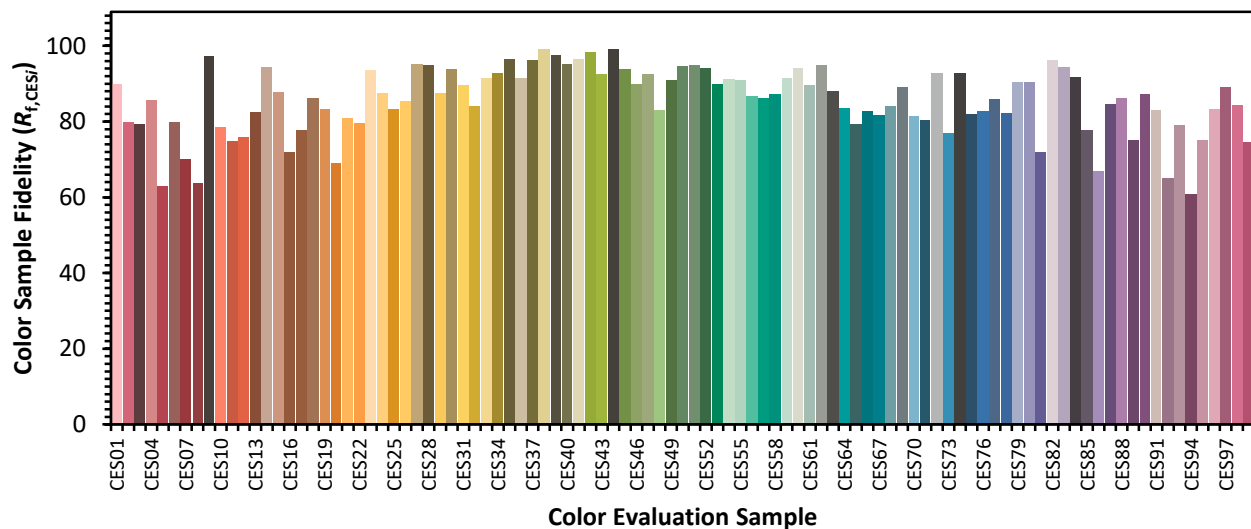


### Color Vector Graphics

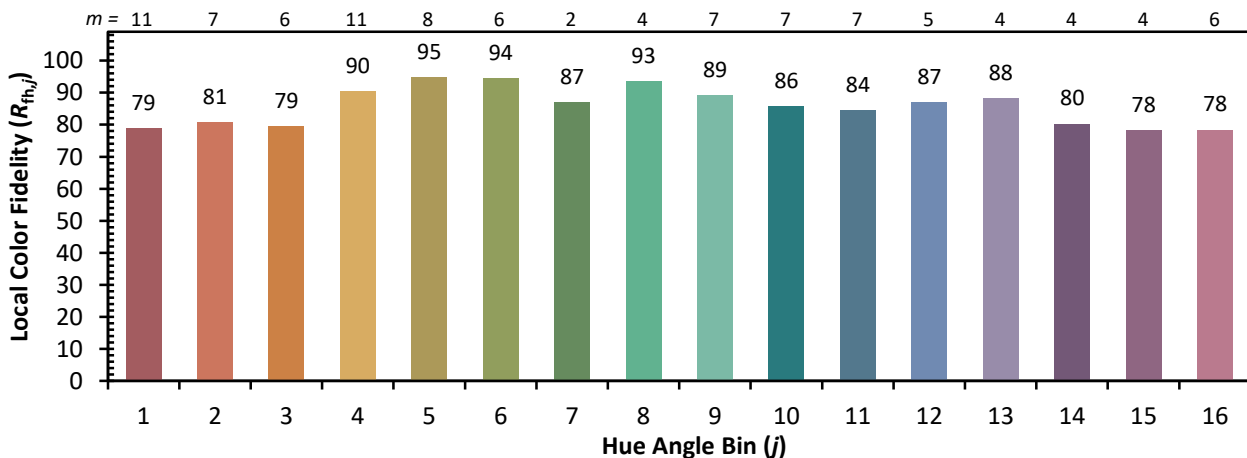
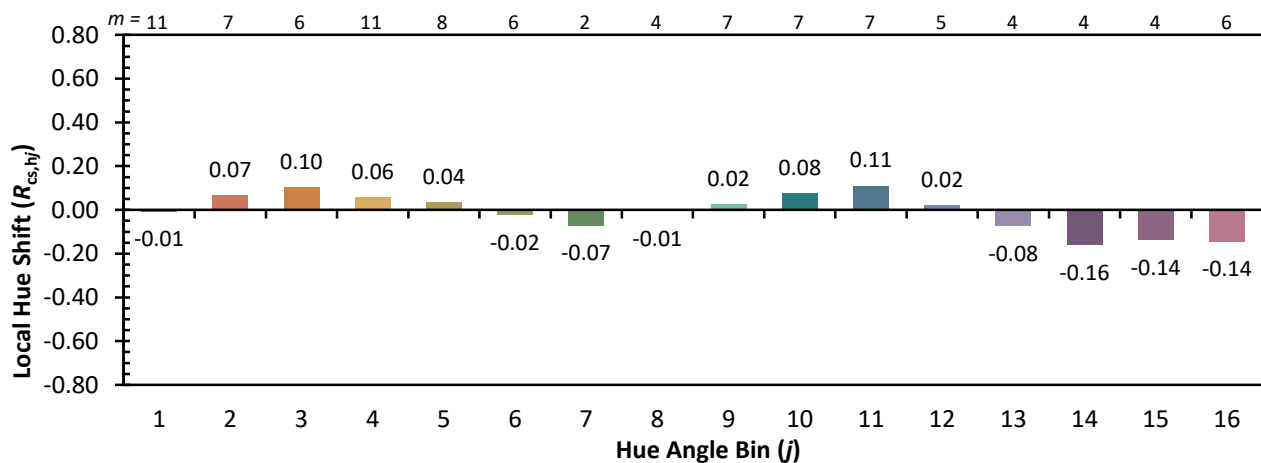
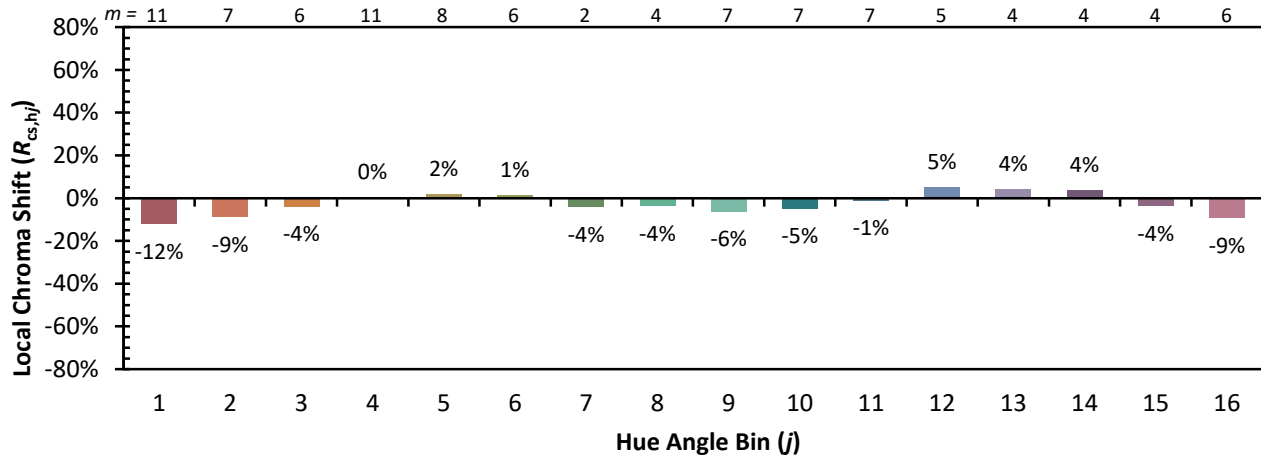


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

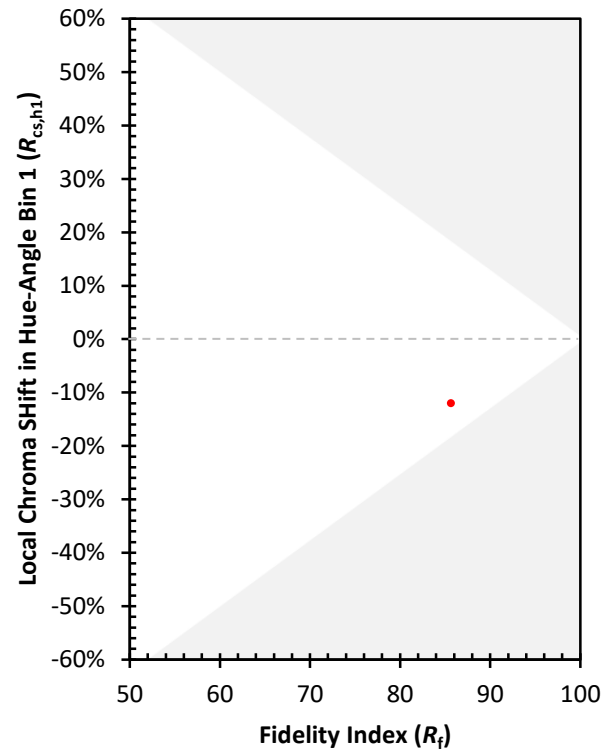
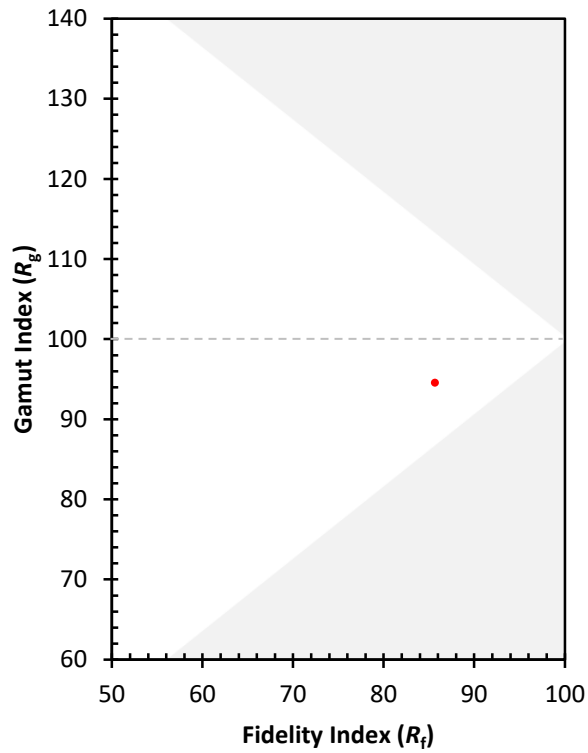
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 85 | CES51 = 95 | CES76 = 83 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 86 |
| CES03 = 31 | CES28 = 95 | CES53 = 90 | CES78 = 82 |
| CES04 = 70 | CES29 = 88 | CES54 = 91 | CES79 = 91 |
| CES05 = 50 | CES30 = 94 | CES55 = 91 | CES80 = 90 |
| CES06 = 51 | CES31 = 90 | CES56 = 87 | CES81 = 72 |
| CES07 = 42 | CES32 = 84 | CES57 = 86 | CES82 = 96 |
| CES08 = 41 | CES33 = 92 | CES58 = 87 | CES83 = 94 |
| CES09 = 29 | CES34 = 93 | CES59 = 91 | CES84 = 92 |
| CES10 = 76 | CES35 = 96 | CES60 = 94 | CES85 = 78 |
| CES11 = 59 | CES36 = 91 | CES61 = 90 | CES86 = 67 |
| CES12 = 65 | CES37 = 96 | CES62 = 95 | CES87 = 85 |
| CES13 = 43 | CES38 = 99 | CES63 = 88 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 84 | CES89 = 75 |
| CES15 = 72 | CES40 = 95 | CES65 = 79 | CES90 = 87 |
| CES16 = 47 | CES41 = 97 | CES66 = 83 | CES91 = 83 |
| CES17 = 50 | CES42 = 98 | CES67 = 82 | CES92 = 65 |
| CES18 = 56 | CES43 = 93 | CES68 = 84 | CES93 = 79 |
| CES19 = 72 | CES44 = 99 | CES69 = 89 | CES94 = 61 |
| CES20 = 67 | CES45 = 94 | CES70 = 81 | CES95 = 75 |
| CES21 = 87 | CES46 = 90 | CES71 = 80 | CES96 = 83 |
| CES22 = 79 | CES47 = 93 | CES72 = 93 | CES97 = 89 |
| CES23 = 92 | CES48 = 83 | CES73 = 77 | CES98 = 84 |
| CES24 = 91 | CES49 = 91 | CES74 = 93 | CES99 = 75 |
| CES25 = 72 | CES50 = 95 | CES75 = 82 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)