

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: P437641

Luminaire Tested: **ISS-SA1E-727-U-T3**

Issue Date: 12/9/2020

Test Information

Test Method: LM-79-08
Report Number: P437641
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-8)
Test Lab: INNOVATION CENTER
Issue Date: 12/9/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: McGRAW-EDISON
Catalog Number: ISS-SA1E-727-U-T3
Description: IMPACT ELITE LED QUARTER SPHERE LUMINAIRE
(1) 70 CRI, 2700K, 1050mA LIGHTSQUARE WITH 16 LEDS AND TYPE III OPTICS
Light Source: -
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 5996 lumens
Efficiency: N/A
Efficacy: 103.0 lumens/watt
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')
IES Classification: Type III - Medium
BUG Rating: B1 - U0 - G2

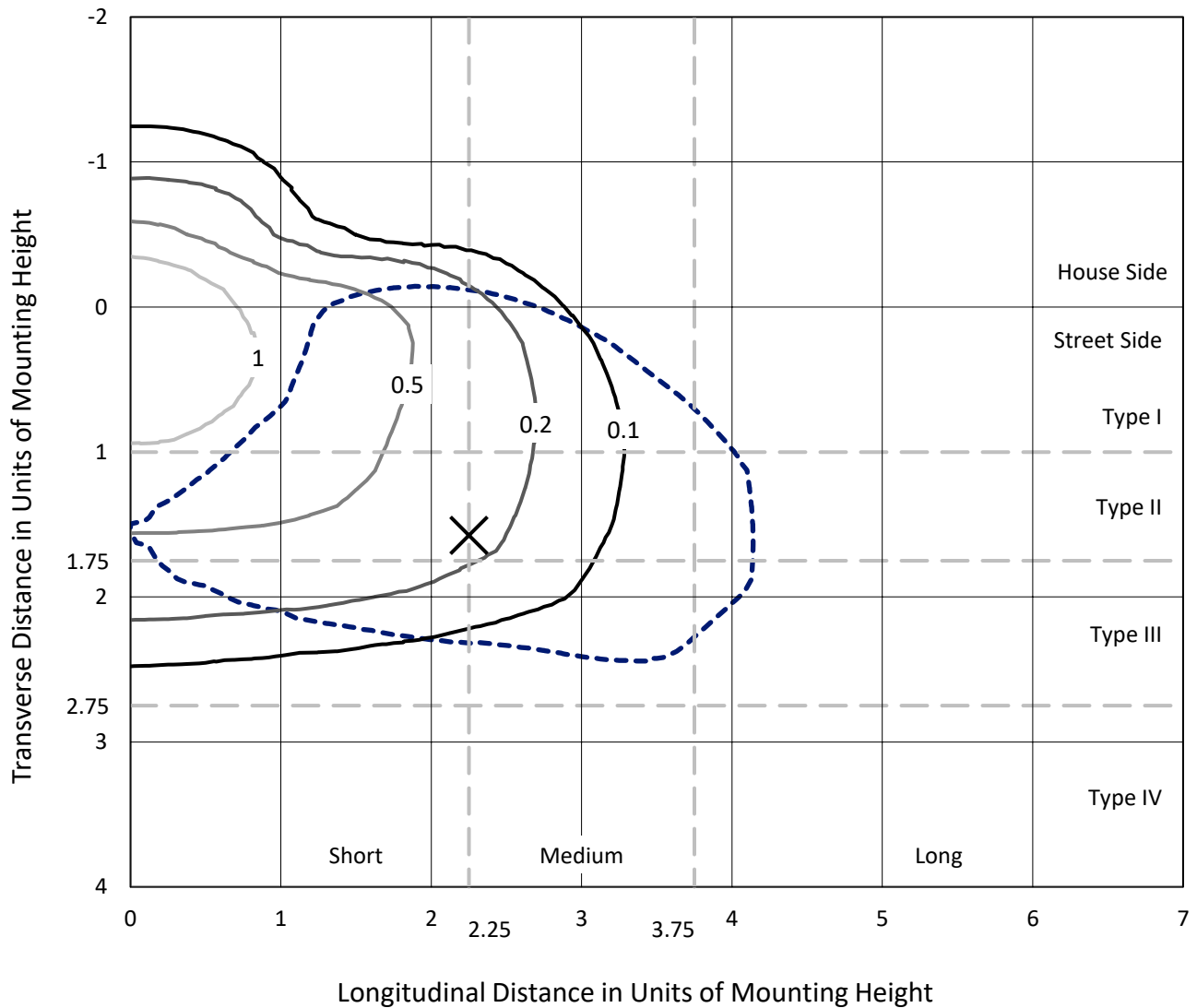
Input Watts (W): 58.2
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 28.75 FT



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Iso-Footcandle Lines of Horizontal Illumination

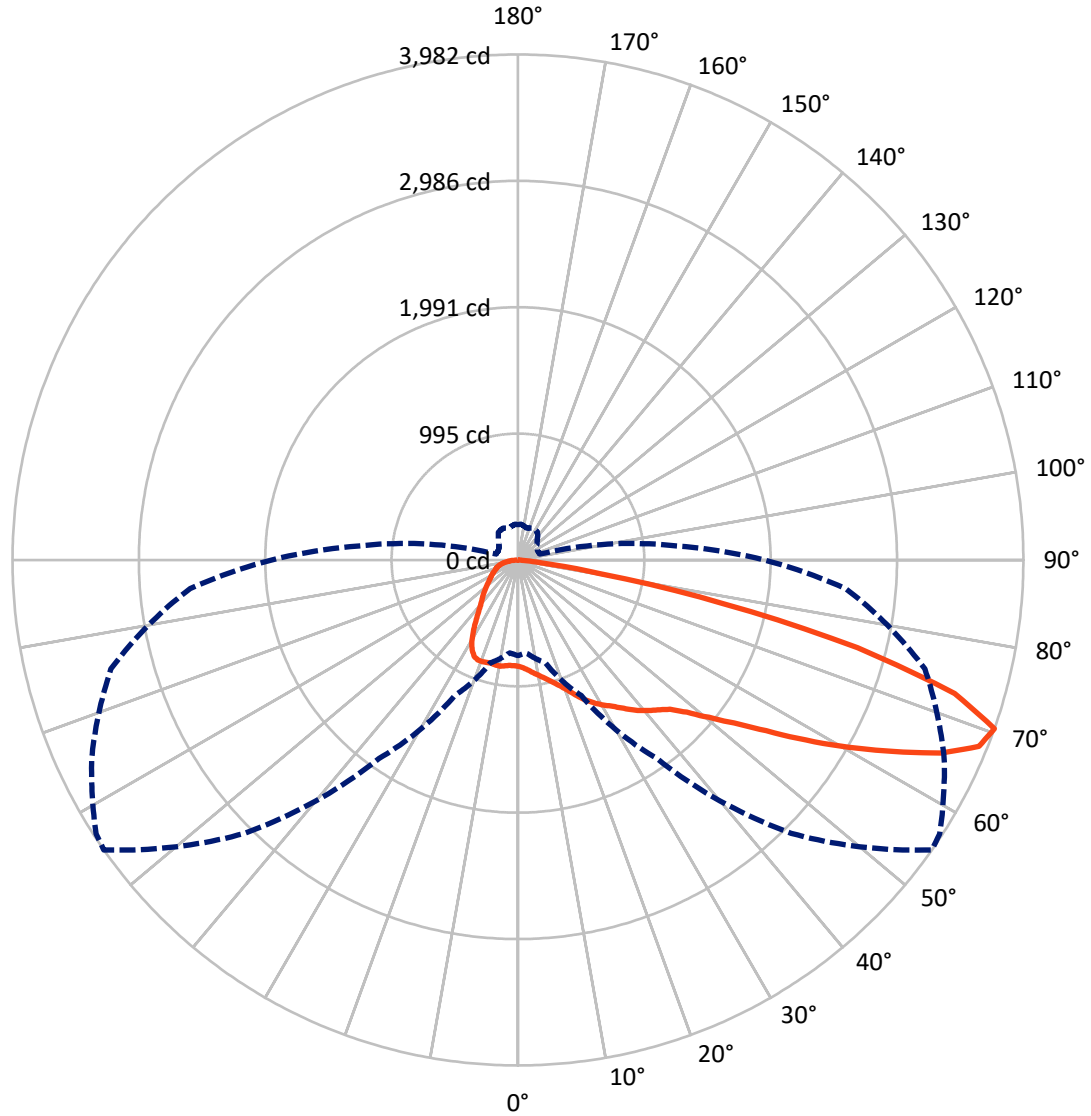
✕ Max cd
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.5 fc
 Type III - Medium - N/A

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Luminous Intensity Polar Plot



— Vertical Plane Through 55-Deg Lateral - - - Horizontal Cone Through 70-Deg Vertical

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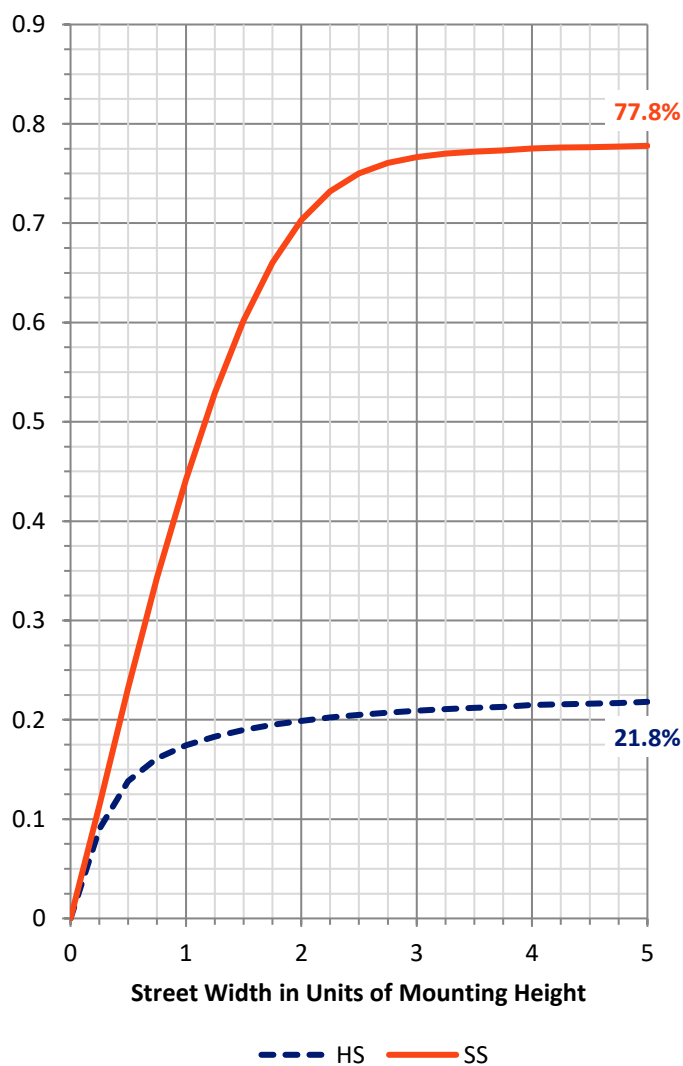
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|--------|
| House Side | Lumens | 1326.2 | 0.0 | 1326.2 |
| | % Fixture | 22.1 | 0.0 | 22.1 |
| Street Side | Lumens | 4669.8 | 0.0 | 4669.8 |
| | % Fixture | 77.9 | 0.0 | 77.9 |
| Total | Lumens | 5996.0 | 0.0 | 5996.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 82.5 | 1.4 |
| 10°-20° | 262.5 | 4.4 |
| 20°-30° | 456.5 | 7.6 |
| 30°-40° | 643.5 | 10.7 |
| 40°-50° | 852.8 | 14.2 |
| 50°-60° | 1242.4 | 20.7 |
| 60°-70° | 1550.5 | 25.9 |
| 70°-80° | 825.7 | 13.8 |
| 80°-90° | 79.6 | 1.3 |
| 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° | 5996.0 | 100.0 |
| 0°-180° | 5996.0 | 100.0 |

Coefficient of Utilization

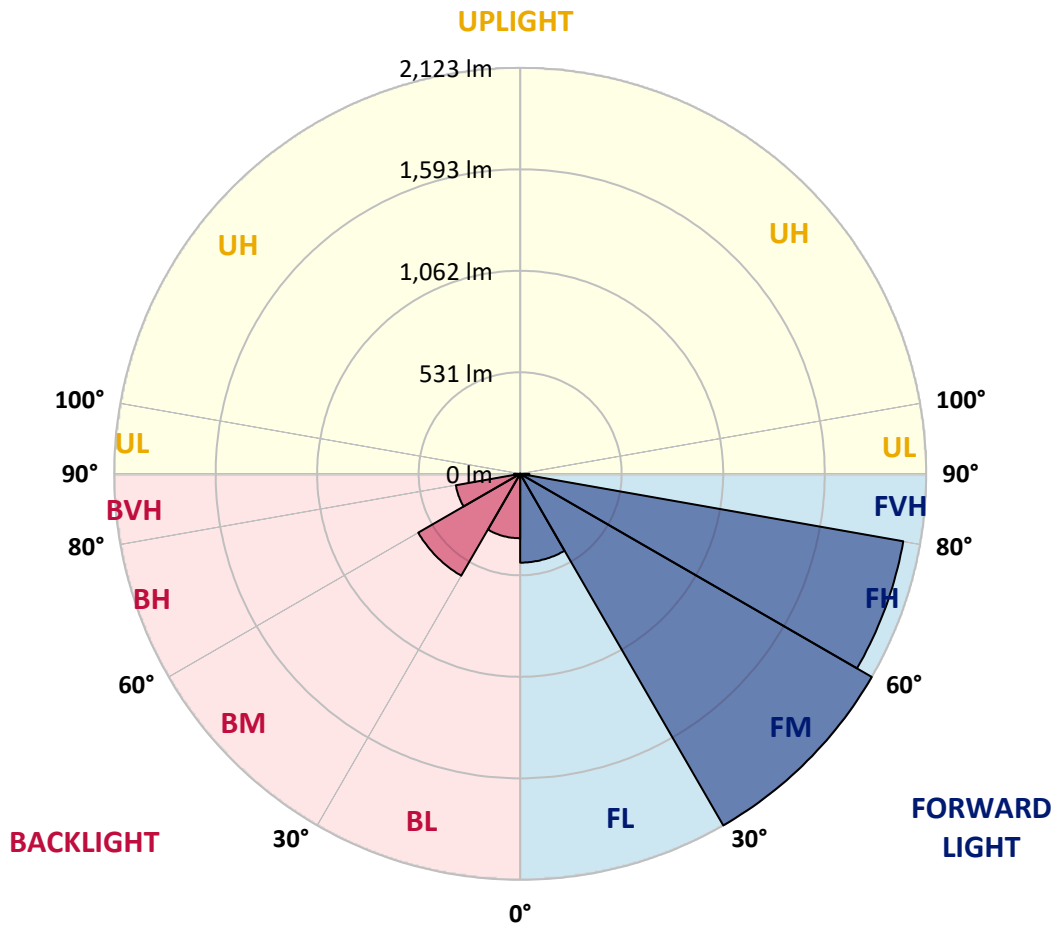


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LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|------|---------|
| | | | B | U | G |
| FL (0°-30°) | 464.4 | 7.7 | | | |
| FM (30°-60°) | 2123.4 | 35.4 | | | |
| FH (60°-80°) | 2034.4 | 33.9 | | | G2/5000 |
| FVH (80°-90°) | 47.5 | 0.8 | | | G1/100 |
| BL (0°-30°) | 337.0 | 5.6 | B1/500 | | |
| BM (30°-60°) | 615.4 | 10.3 | B1/1000 | | |
| BH (60°-80°) | 341.8 | 5.7 | B1/500 | | G1/500 |
| BVH (80°-90°) | 32.1 | 0.5 | | | G1/100 |
| UL (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH (100°-180°) | 0.0 | 0.0 | | U0/0 | |

BUG Rating: B1-U0-G2
 Type III Medium





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CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 57° | 65° | 75° | 85° |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 |
| 2.5° | 865.4 | 863.3 | 863.3 | 861.1 | 858.9 | 856.8 | 852.5 | 848.2 | 848.2 | 843.8 | 843.8 |
| 5° | 887.0 | 882.7 | 884.8 | 882.7 | 882.7 | 878.4 | 871.9 | 871.9 | 869.7 | 858.9 | 850.3 |
| 7.5° | 908.6 | 906.4 | 906.4 | 908.6 | 906.4 | 902.1 | 900.0 | 897.8 | 889.2 | 876.2 | 863.3 |
| 10° | 938.8 | 938.8 | 938.8 | 936.6 | 936.6 | 932.3 | 925.8 | 925.8 | 915.1 | 900.0 | 884.8 |
| 12.5° | 984.1 | 982.0 | 979.8 | 979.8 | 973.3 | 964.7 | 958.2 | 958.2 | 951.7 | 928.0 | 908.6 |
| 15° | 1035.9 | 1029.4 | 1025.1 | 1025.1 | 1016.5 | 1001.4 | 994.9 | 997.1 | 990.6 | 962.5 | 934.5 |
| 17.5° | 1087.7 | 1087.7 | 1083.4 | 1072.6 | 1061.8 | 1051.0 | 1035.9 | 1040.2 | 1033.8 | 1005.7 | 969.0 |
| 20° | 1135.2 | 1130.9 | 1130.9 | 1124.4 | 1109.3 | 1096.3 | 1087.7 | 1085.6 | 1081.2 | 1051.0 | 1007.9 |
| 22.5° | 1187.0 | 1184.8 | 1178.4 | 1174.0 | 1163.2 | 1156.8 | 1152.5 | 1152.5 | 1135.2 | 1094.2 | 1038.1 |
| 25° | 1249.6 | 1247.4 | 1247.4 | 1230.1 | 1221.5 | 1210.7 | 1217.2 | 1210.7 | 1202.1 | 1141.7 | 1070.4 |
| 27.5° | 1312.2 | 1312.2 | 1310.0 | 1301.4 | 1277.6 | 1271.2 | 1275.5 | 1271.2 | 1269.0 | 1187.0 | 1100.7 |
| 30° | 1379.1 | 1376.9 | 1370.4 | 1368.3 | 1344.5 | 1327.3 | 1325.1 | 1316.5 | 1316.5 | 1228.0 | 1122.2 |
| 32.5° | 1435.2 | 1433.0 | 1437.3 | 1428.7 | 1413.6 | 1389.9 | 1374.7 | 1374.7 | 1359.6 | 1269.0 | 1148.1 |
| 35° | 1487.0 | 1491.3 | 1491.3 | 1487.0 | 1474.0 | 1450.3 | 1435.2 | 1439.5 | 1417.9 | 1305.7 | 1180.5 |
| 37.5° | 1545.2 | 1540.9 | 1534.4 | 1530.1 | 1512.9 | 1502.1 | 1502.1 | 1506.4 | 1474.0 | 1344.5 | 1223.7 |
| 40° | 1558.2 | 1569.0 | 1584.1 | 1566.8 | 1558.2 | 1556.0 | 1560.3 | 1549.6 | 1517.2 | 1405.0 | 1297.1 |
| 42.5° | 1584.1 | 1592.7 | 1620.8 | 1614.3 | 1607.8 | 1614.3 | 1614.3 | 1599.2 | 1584.1 | 1487.0 | 1396.3 |
| 45° | 1648.8 | 1663.9 | 1685.5 | 1687.7 | 1685.5 | 1696.3 | 1676.9 | 1674.7 | 1672.6 | 1605.7 | 1530.1 |
| 47.5° | 1720.1 | 1737.3 | 1787.0 | 1780.5 | 1804.2 | 1825.8 | 1791.3 | 1789.1 | 1795.6 | 1763.2 | 1700.6 |
| 50° | 1804.2 | 1821.5 | 1884.1 | 1907.8 | 1972.6 | 2011.4 | 1948.8 | 1920.8 | 1966.1 | 1963.9 | 1916.4 |
| 52.5° | 1901.3 | 1922.9 | 1966.1 | 2048.1 | 2158.2 | 2199.2 | 2132.3 | 2108.5 | 2162.5 | 2188.4 | 2145.2 |
| 55° | 1968.2 | 1985.5 | 2052.4 | 2179.7 | 2358.9 | 2412.8 | 2374.0 | 2352.4 | 2410.7 | 2432.2 | 2386.9 |
| 57.5° | 1992.0 | 1996.3 | 2095.6 | 2296.3 | 2544.5 | 2682.6 | 2676.1 | 2661.0 | 2637.3 | 2691.2 | 2678.3 |
| 60° | 1951.0 | 1974.7 | 2102.0 | 2348.1 | 2710.6 | 2971.8 | 2995.5 | 2961.0 | 2930.8 | 2943.7 | 2900.6 |
| 62.5° | 1897.0 | 1916.4 | 2050.2 | 2354.5 | 2822.9 | 3232.9 | 3321.4 | 3282.6 | 3207.0 | 3172.5 | 3071.1 |
| 65° | 1707.1 | 1707.1 | 1838.8 | 2222.9 | 2803.4 | 3446.6 | 3664.6 | 3597.6 | 3459.5 | 3336.5 | 3064.6 |
| 67.5° | 1305.7 | 1299.2 | 1426.5 | 1825.8 | 2529.4 | 3468.2 | 3917.1 | 3882.5 | 3660.2 | 3399.1 | 2943.7 |
| 70° | 753.2 | 733.8 | 839.5 | 1178.4 | 1910.0 | 3045.2 | 3981.8 | 3962.4 | 3705.6 | 3319.2 | 2591.9 |
| 72.5° | 261.1 | 278.4 | 347.5 | 500.7 | 1051.0 | 2192.7 | 3597.6 | 3638.7 | 3489.7 | 3014.9 | 2082.6 |
| 75° | 136.0 | 136.0 | 159.7 | 218.0 | 444.6 | 1130.9 | 2764.6 | 2891.9 | 2924.3 | 2522.9 | 1487.0 |
| 77.5° | 99.3 | 101.4 | 114.4 | 140.3 | 211.5 | 433.8 | 1659.6 | 1780.5 | 2024.4 | 1737.3 | 858.9 |
| 80° | 66.9 | 69.1 | 82.0 | 92.8 | 129.5 | 168.3 | 662.6 | 727.3 | 1003.5 | 776.9 | 332.4 |
| 82.5° | 49.6 | 51.8 | 51.8 | 54.0 | 71.2 | 77.7 | 174.8 | 215.8 | 345.3 | 230.9 | 118.7 |
| 85° | 10.8 | 10.8 | 21.6 | 21.6 | 21.6 | 21.6 | 38.8 | 43.2 | 64.7 | 69.1 | 38.8 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 | 2.2 | 4.3 | 4.3 | 4.3 | 6.5 | 6.5 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |



REPORT NUMBER: P437641
 CATALOG NUMBER: ISS-SA1E-727-U-T3

CANDELA DISTRIBUTION (continued):

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0° | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 | 837.4 |
| 2.5° | 841.7 | 839.5 | 837.4 | 835.2 | 833.0 | 830.9 | 828.7 | 830.9 | 830.9 | 835.2 | 837.4 |
| 5° | 848.2 | 841.7 | 839.5 | 835.2 | 833.0 | 833.0 | 833.0 | 835.2 | 837.4 | 839.5 | 841.7 |
| 7.5° | 858.9 | 856.8 | 850.3 | 841.7 | 839.5 | 839.5 | 835.2 | 835.2 | 835.2 | 839.5 | 839.5 |
| 10° | 878.4 | 871.9 | 863.3 | 854.6 | 848.2 | 835.2 | 824.4 | 815.8 | 820.1 | 826.6 | 826.6 |
| 12.5° | 900.0 | 889.2 | 878.4 | 863.3 | 846.0 | 824.4 | 813.6 | 815.8 | 815.8 | 822.3 | 824.4 |
| 15° | 928.0 | 919.4 | 895.6 | 869.7 | 839.5 | 822.3 | 817.9 | 813.6 | 813.6 | 817.9 | 822.3 |
| 17.5° | 958.2 | 943.1 | 912.9 | 874.1 | 843.8 | 824.4 | 815.8 | 798.5 | 789.9 | 787.7 | 792.0 |
| 20° | 986.3 | 969.0 | 928.0 | 878.4 | 848.2 | 822.3 | 792.0 | 764.0 | 742.4 | 738.1 | 733.8 |
| 22.5° | 1010.0 | 988.4 | 938.8 | 887.0 | 848.2 | 800.7 | 748.9 | 707.9 | 677.7 | 669.0 | 673.3 |
| 25° | 1035.9 | 1003.5 | 951.7 | 895.6 | 833.0 | 757.5 | 686.3 | 636.7 | 606.4 | 593.5 | 593.5 |
| 27.5° | 1057.5 | 1025.1 | 964.7 | 889.2 | 794.2 | 699.2 | 617.2 | 567.6 | 543.9 | 530.9 | 528.7 |
| 30° | 1076.9 | 1042.4 | 990.6 | 869.7 | 738.1 | 619.4 | 548.2 | 513.6 | 498.5 | 483.4 | 485.6 |
| 32.5° | 1102.8 | 1072.6 | 1010.0 | 828.7 | 662.6 | 546.0 | 492.1 | 474.8 | 459.7 | 448.9 | 453.2 |
| 35° | 1139.5 | 1122.2 | 1016.5 | 776.9 | 584.9 | 494.2 | 457.5 | 438.1 | 425.2 | 410.0 | 410.0 |
| 37.5° | 1191.3 | 1176.2 | 994.9 | 699.2 | 515.8 | 455.4 | 429.5 | 403.6 | 382.0 | 364.7 | 360.4 |
| 40° | 1253.9 | 1232.3 | 958.2 | 612.9 | 461.8 | 429.5 | 405.7 | 373.4 | 343.1 | 319.4 | 315.1 |
| 42.5° | 1353.2 | 1290.6 | 904.3 | 524.4 | 423.0 | 407.9 | 375.5 | 334.5 | 304.3 | 287.0 | 282.7 |
| 45° | 1458.9 | 1357.5 | 826.6 | 448.9 | 392.8 | 382.0 | 345.3 | 304.3 | 282.7 | 269.8 | 267.6 |
| 47.5° | 1592.7 | 1430.9 | 753.2 | 392.8 | 358.3 | 356.1 | 312.9 | 287.0 | 269.8 | 261.1 | 259.0 |
| 50° | 1769.7 | 1523.7 | 679.8 | 349.6 | 328.0 | 321.6 | 297.8 | 276.2 | 263.3 | 256.8 | 254.7 |
| 52.5° | 1974.7 | 1631.6 | 621.5 | 317.2 | 300.0 | 295.7 | 289.2 | 271.9 | 263.3 | 256.8 | 254.7 |
| 55° | 2168.9 | 1743.8 | 559.0 | 287.0 | 276.2 | 280.6 | 284.9 | 271.9 | 265.5 | 261.1 | 256.8 |
| 57.5° | 2382.6 | 1838.8 | 487.7 | 263.3 | 256.8 | 267.6 | 280.6 | 274.1 | 269.8 | 263.3 | 261.1 |
| 60° | 2514.3 | 1905.7 | 392.8 | 241.7 | 241.7 | 256.8 | 274.1 | 269.8 | 261.1 | 261.1 | 261.1 |
| 62.5° | 2572.5 | 1894.9 | 310.8 | 220.1 | 224.4 | 243.9 | 263.3 | 259.0 | 252.5 | 263.3 | 263.3 |
| 65° | 2497.0 | 1771.8 | 252.5 | 200.7 | 207.2 | 226.6 | 252.5 | 252.5 | 252.5 | 269.8 | 269.8 |
| 67.5° | 2300.6 | 1586.2 | 207.2 | 183.4 | 189.9 | 213.7 | 252.5 | 267.6 | 265.5 | 284.9 | 284.9 |
| 70° | 1942.3 | 1258.2 | 179.1 | 170.5 | 179.1 | 213.7 | 267.6 | 276.2 | 261.1 | 282.7 | 278.4 |
| 72.5° | 1480.5 | 878.4 | 159.7 | 157.5 | 168.3 | 207.2 | 269.8 | 265.5 | 246.0 | 252.5 | 246.0 |
| 75° | 973.3 | 533.1 | 140.3 | 144.6 | 148.9 | 183.4 | 256.8 | 248.2 | 224.4 | 220.1 | 215.8 |
| 77.5° | 535.2 | 267.6 | 123.0 | 129.5 | 129.5 | 155.4 | 233.1 | 213.7 | 194.2 | 183.4 | 179.1 |
| 80° | 213.7 | 136.0 | 107.9 | 114.4 | 105.7 | 125.2 | 174.8 | 166.2 | 148.9 | 140.3 | 136.0 |
| 82.5° | 97.1 | 75.5 | 90.6 | 95.0 | 79.9 | 92.8 | 129.5 | 125.2 | 112.2 | 97.1 | 92.8 |
| 85° | 36.7 | 43.2 | 69.1 | 64.7 | 56.1 | 54.0 | 73.4 | 66.9 | 54.0 | 43.2 | 43.2 |
| 87.5° | 4.3 | 8.6 | 17.3 | 23.7 | 12.9 | 8.6 | 4.3 | 2.2 | 2.2 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-1-R4

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

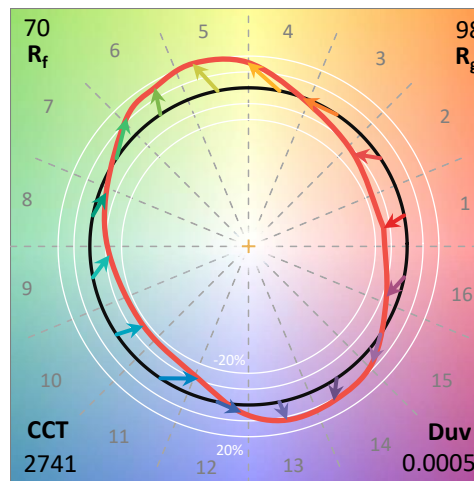
Test Information

Test Method: LM-79-2008
 Report Number: SP1-1908-441-1-R4
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 10/28/2024
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: McGRAW-EDISON
 Catalog Number: **SA1C-727-U-5WQ**
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

THIS IS A REVISION OF SP1-1908-441-1-R3. TO UPDATE THE CATALOG NUMBER.TESTED IN
 SITU. (1) 70 CRI, 2700K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

Spectral Parameters

| | | | | | |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K): | 2741 | CRI (Ra): | 71.5 | R9: | -16.1 |
| CIE u': | 0.2605 | R1: | 69.2 | R10: | 51.4 |
| CIE v': | 0.5272 | R2: | 79.4 | R11: | 63.1 |
| Duv: | 0.0005 | R3: | 87.8 | R12: | 42.0 |
| CIE x: | 0.4573 | R4: | 69.4 | R13: | 70.2 |
| CIE y: | 0.4113 | R5: | 66.4 | R14: | 92.4 |
| CIE z: | 0.1313 | R6: | 69.8 | | |
| Peak Wavelength (nm): | 602 | R7: | 79.8 | | |
| Dominant Wavelength (nm): | 583 | R8: | 50.1 | | |
| Purity: | 61.2 | | | | |
| Rf: | 69.9 | | | | |
| Rg: | 98.3 | | | | |



Test Conditions

Stabilization Time: 56M
 Operation Time: 12H
 Room Temperature (°C) / RH%: 25.3./42%
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-1-R4

| Measurement and Test Equipment | | | |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/28/2019 | 12/28/2019 |
| Power Meter | IN0071 | 12/5/2018 | 12/5/2019 |
| AC Power Source | IN0063 | 12/5/2018 | 12/5/2019 |
| DC Power Source | IN0208 | 12/5/2018 | 12/5/2019 |
| Sphere Thermometer | IN0085 | 12/5/2018 | 12/5/2019 |
| Room Thermometer | IN0046 | 12/5/2018 | 12/5/2019 |

REPORT NUMBER: SP1-1908-441-1-R4

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-1-R4

Photopic Flux vs. Wavelength



Photopic Lumens: 6211.7

| λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360 | 2044 | 0.0 | 490 | 7179 | 1.0 | 620 | 118034 | 30.7 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 1.9 | 625 | 111884 | 24.7 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 3.4 | 630 | 106119 | 19.2 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 6.3 | 635 | 99706 | 15.0 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 10.4 | 640 | 92142 | 11.0 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 16.3 | 645 | 84987 | 8.2 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 22.9 | 650 | 78016 | 5.7 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 29.7 | 655 | 71541 | 4.1 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 36.7 | 660 | 64863 | 2.7 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.0 | 535 | 68520 | 42.5 | 665 | 58485 | 1.9 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.0 | 540 | 73435 | 47.8 | 670 | 51641 | 1.1 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.0 | 545 | 78677 | 52.4 | 675 | 46030 | 0.8 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 0.0 | 550 | 83331 | 56.6 | 680 | 40590 | 0.5 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 0.1 | 555 | 89120 | 60.9 | 685 | 35691 | 0.3 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 0.3 | 560 | 94613 | 64.3 | 690 | 31631 | 0.2 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 0.6 | 565 | 99818 | 66.4 | 695 | 27437 | 0.1 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 0.9 | 570 | 106526 | 69.3 | 700 | 24589 | 0.1 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 1.1 | 575 | 111610 | 69.4 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 1.0 | 580 | 117163 | 69.6 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 0.8 | 585 | 122201 | 67.9 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 0.6 | 590 | 125662 | 65.0 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 0.5 | 595 | 127415 | 60.4 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 0.4 | 600 | 129155 | 55.7 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 0.4 | 605 | 128057 | 49.6 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 0.5 | 610 | 126031 | 43.3 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 0.7 | 615 | 123059 | 37.1 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

REPORT NUMBER: SP1-1908-441-1-R4

Scotopic Flux vs. Wavelength



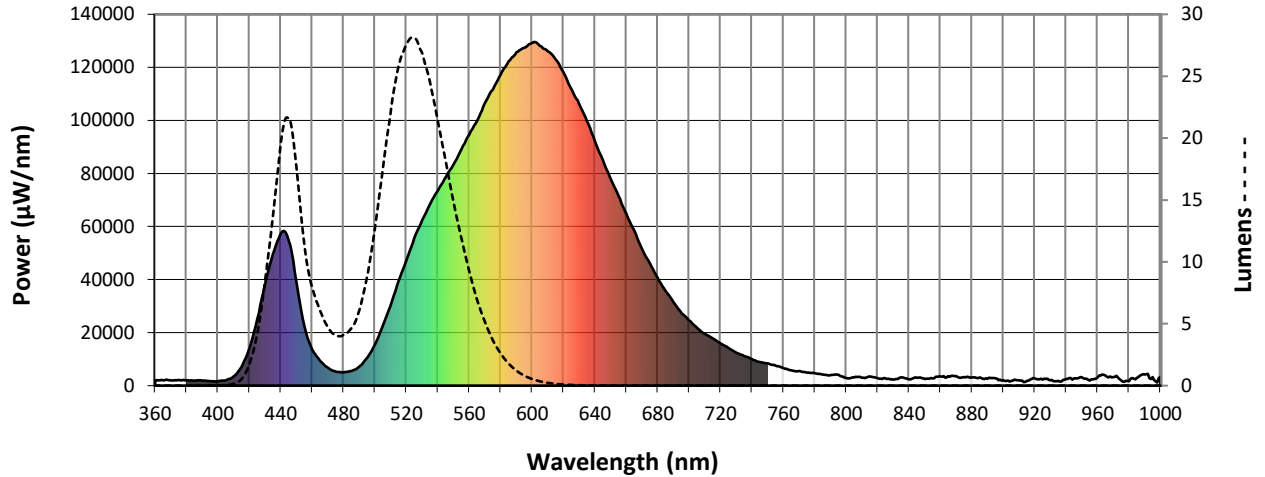
Scotopic Lumens: 6474.3

S/P: 1.04

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360 | 2044 | 0.0 | 490 | 7179 | 6.0 | 620 | 118034 | 0.1 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 8.6 | 625 | 111884 | 0.1 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 12.5 | 630 | 106119 | 0.0 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 17.3 | 635 | 99706 | 0.0 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 21.8 | 640 | 92142 | 0.0 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 25.7 | 645 | 84987 | 0.0 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 27.5 | 650 | 78016 | 0.0 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 28.1 | 655 | 71541 | 0.0 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 27.0 | 660 | 64863 | 0.0 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.0 | 535 | 68520 | 24.7 | 665 | 58485 | 0.0 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.1 | 540 | 73435 | 21.5 | 670 | 51641 | 0.0 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.5 | 545 | 78677 | 18.3 | 675 | 46030 | 0.0 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 1.6 | 550 | 83331 | 15.0 | 680 | 40590 | 0.0 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 3.9 | 555 | 89120 | 12.0 | 685 | 35691 | 0.0 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 8.1 | 560 | 94613 | 9.3 | 690 | 31631 | 0.0 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 13.3 | 565 | 99818 | 7.0 | 695 | 27437 | 0.0 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 19.1 | 570 | 106526 | 5.2 | 700 | 24589 | 0.0 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 21.6 | 575 | 111610 | 3.7 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 18.1 | 580 | 117163 | 2.6 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 11.8 | 585 | 122201 | 1.8 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 8.1 | 590 | 125662 | 1.2 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 6.2 | 595 | 127415 | 0.8 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 4.8 | 600 | 129155 | 0.5 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 4.1 | 605 | 128057 | 0.4 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 4.1 | 610 | 126031 | 0.2 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 4.6 | 615 | 123059 | 0.1 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

REPORT NUMBER: SP1-1908-441-1-R4

Melanopic Flux vs. Wavelength



Melanopic Lumens: 2145.7 M/P: 0.35

| λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360 | 2044 | 0.0 | 490 | 7179 | 11.1 | 620 | 118034 | 1.5 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 16.9 | 625 | 111884 | 0.9 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 26.0 | 630 | 106119 | 0.6 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 38.2 | 635 | 99706 | 0.4 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 51.6 | 640 | 92142 | 0.2 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 65.1 | 645 | 84987 | 0.1 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 75.2 | 650 | 78016 | 0.1 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 82.9 | 655 | 71541 | 0.1 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 86.0 | 660 | 64863 | 0.0 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.1 | 535 | 68520 | 85.4 | 665 | 58485 | 0.0 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.2 | 540 | 73435 | 81.1 | 670 | 51641 | 0.0 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.7 | 545 | 78677 | 75.4 | 675 | 46030 | 0.0 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 2.3 | 550 | 83331 | 68.1 | 680 | 40590 | 0.0 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 6.2 | 555 | 89120 | 60.9 | 685 | 35691 | 0.0 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 13.0 | 560 | 94613 | 52.9 | 690 | 31631 | 0.0 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 22.2 | 565 | 99818 | 44.8 | 695 | 27437 | 0.0 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 32.0 | 570 | 106526 | 37.6 | 700 | 24589 | 0.0 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 36.7 | 575 | 111610 | 30.4 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 30.4 | 580 | 117163 | 24.1 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 19.7 | 585 | 122201 | 18.7 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 13.2 | 590 | 125662 | 14.0 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 10.0 | 595 | 127415 | 10.2 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 7.7 | 600 | 129155 | 7.3 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 6.7 | 605 | 128057 | 5.0 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 6.9 | 610 | 126031 | 3.4 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 8.1 | 615 | 123059 | 2.3 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

REPORT NUMBER: SP1-1908-441-1-R4

TM-30-18

Summary

$R_f = 69.9$
 $R_g = 98.3$
 CIE $R_a = 71.5$
 $R_9 = -16.1$



Color Vector Graphics



REPORT NUMBER: SP1-1908-441-1-R4

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

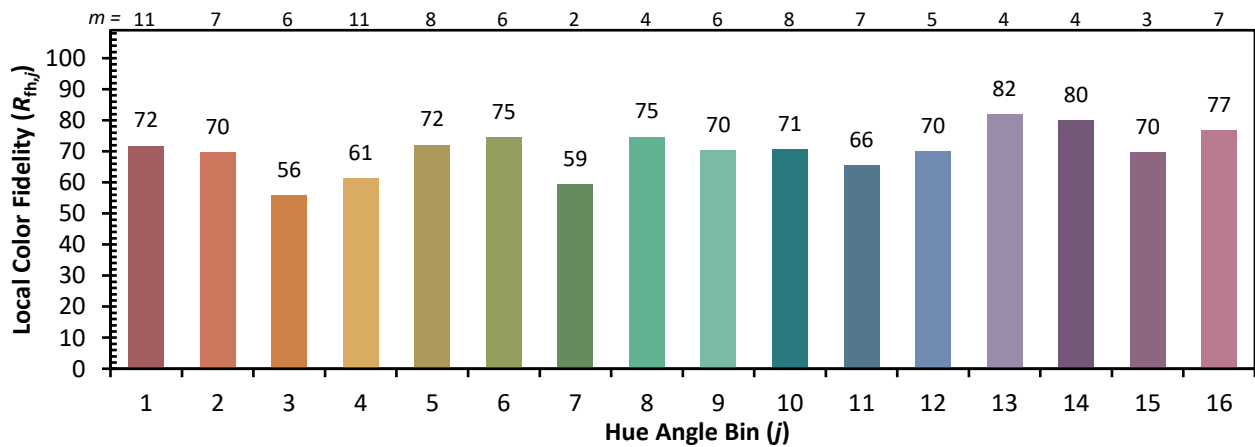
| | | | |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 77 | CES79 = 81 |
| CES05 = 50 | CES30 = 46 | CES55 = 74 | CES80 = 80 |
| CES06 = 52 | CES31 = 50 | CES56 = 63 | CES81 = 73 |
| CES07 = 42 | CES32 = 49 | CES57 = 60 | CES82 = 91 |
| CES08 = 41 | CES33 = 53 | CES58 = 63 | CES83 = 84 |
| CES09 = 29 | CES34 = 66 | CES59 = 85 | CES84 = 90 |
| CES10 = 77 | CES35 = 82 | CES60 = 89 | CES85 = 87 |
| CES11 = 60 | CES36 = 78 | CES61 = 85 | CES86 = 65 |
| CES12 = 66 | CES37 = 75 | CES62 = 69 | CES87 = 78 |
| CES13 = 43 | CES38 = 53 | CES63 = 68 | CES88 = 73 |
| CES14 = 74 | CES39 = 91 | CES64 = 68 | CES89 = 68 |
| CES15 = 71 | CES40 = 85 | CES65 = 65 | CES90 = 68 |
| CES16 = 48 | CES41 = 76 | CES66 = 62 | CES91 = 91 |
| CES17 = 50 | CES42 = 76 | CES67 = 60 | CES92 = 71 |
| CES18 = 57 | CES43 = 65 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 57 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 78 |
| CES21 = 88 | CES46 = 70 | CES71 = 57 | CES96 = 80 |
| CES22 = 80 | CES47 = 63 | CES72 = 86 | CES97 = 79 |
| CES23 = 92 | CES48 = 51 | CES73 = 52 | CES98 = 71 |
| CES24 = 91 | CES49 = 68 | CES74 = 90 | CES99 = 64 |
| CES25 = 73 | CES50 = 77 | CES75 = 58 | |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)