

Signify Classified - Internal
Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269



Scaled data based on original data using
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P632658

Luminaire Tested: GWS-SA2D-727-U-T2-W-GRSBK

Issue Date: 1/10/2023

Test Information

Test Method: LM-79-2019
Report Number: P632658
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-20)
Test Lab: COOPER LIGHTING SOLUTIONS
Issue Date: 1/10/2023
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: McGRAW-EDISON
Catalog Number: GWS-SA2D-727-U-T2-W-GRSBK
Description: GALLEON WALL SLIM LUMINAIRE. (2) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS W/ FACTORY INSTALLED GLARE SHIELD, BK
Light Source: (32) 2700K CCT, 70 CRI LEDS
Ballast/Driver: -

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 5800.2 lumens
Efficiency: N/A
Efficacy: 70.6 lumens/watt
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')
IES Classification: Type II - Short
BUG Rating: B1 - U0 - G0

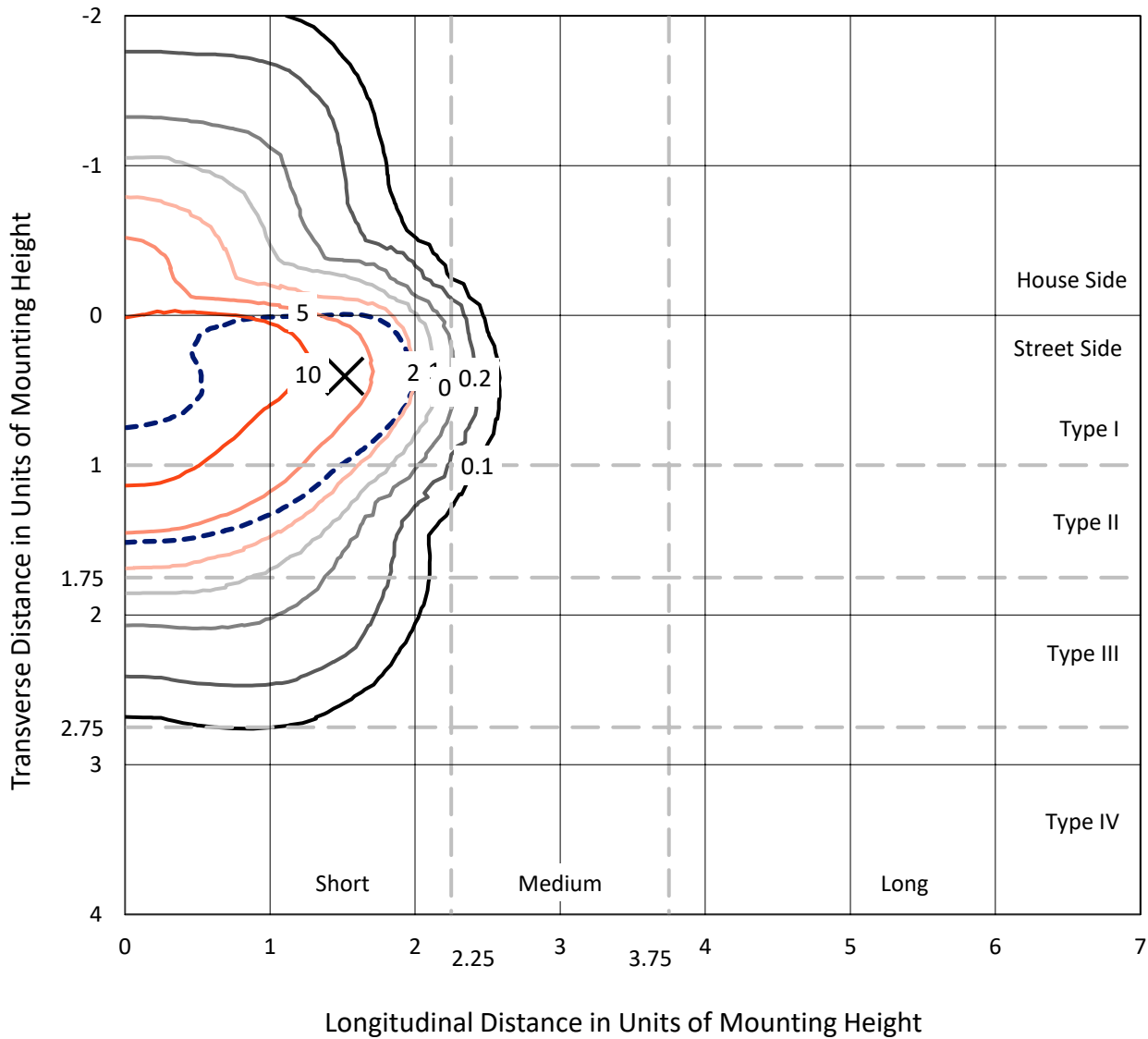
Input Watts (W): 82.1
Input Voltage (V): 120
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 0
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 28.75 FT



REPORT NUMBER: P632658
 CATALOG NUMBER: GWS-SA2D-727-U-T2-W-GRSBK

Iso-Footcandle Lines of Horizontal Illumination

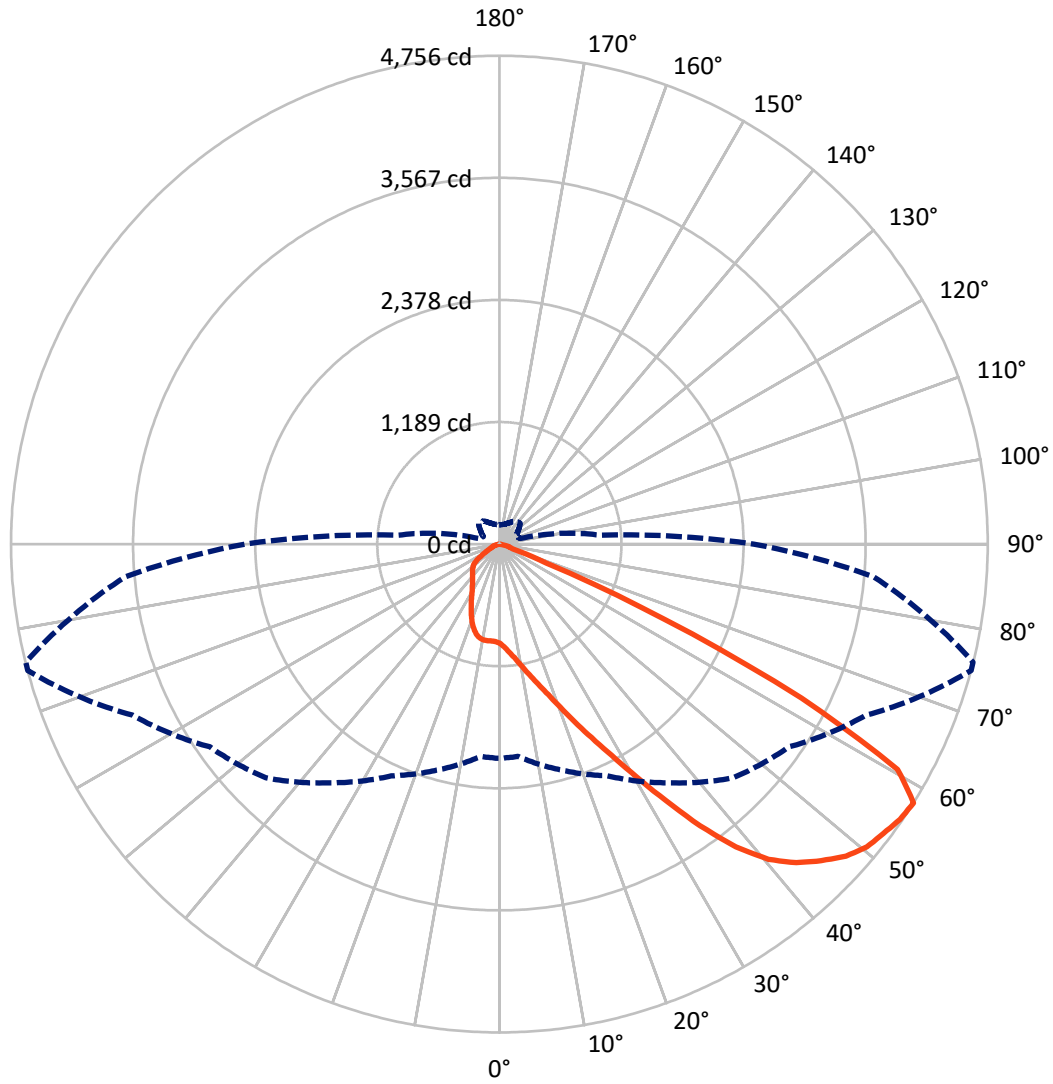
✕ Max cd
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 18.1 fc
 Type II - Short - N/A

REPORT NUMBER: P632658
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Luminous Intensity Polar Plot



— Vertical Plane Through 75-Deg Lateral - - - Horizontal Cone Through 57.5-Deg Vertical

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FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|--------|
| House Side | Lumens | 947.5 | 0.0 | 947.5 |
| | % Fixture | 16.3 | 0.0 | 16.3 |
| Street Side | Lumens | 4852.8 | 0.0 | 4852.8 |
| | % Fixture | 83.7 | 0.0 | 83.7 |
| Total | Lumens | 5800.2 | 0.0 | 5800.2 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 98.4 | 1.7 |
| 10°-20° | 319.8 | 5.5 |
| 20°-30° | 585.6 | 10.1 |
| 30°-40° | 971.5 | 16.8 |
| 40°-50° | 1483.8 | 25.6 |
| 50°-60° | 1667.3 | 28.7 |
| 60°-70° | 615.0 | 10.6 |
| 70°-80° | 58.8 | 1.0 |
| 80°-90° | 0.0 | 0.0 |
| 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° | 5800.2 | 100.0 |
| 0°-180° | 5800.2 | 100.0 |

Coefficient of Utilization



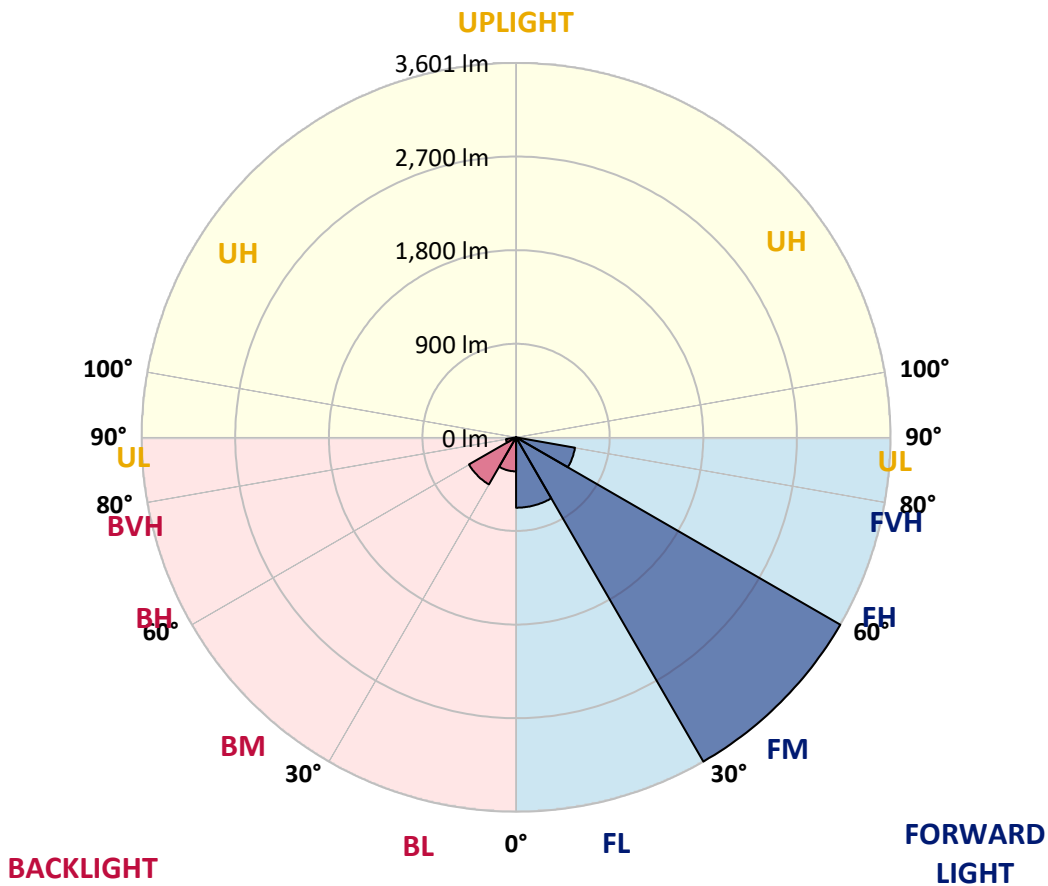
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LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|------|--------|
| | | | B | U | G |
| FL (0°-30°) | 676.9 | 11.7 | | | |
| FM (30°-60°) | 3600.5 | 62.1 | | | |
| FH (60°-80°) | 575.4 | 9.9 | | | G0/660 |
| FVH (80°-90°) | 0.0 | 0.0 | | | G0/10 |
| BL (0°-30°) | 326.9 | 5.6 | B1/500 | | |
| BM (30°-60°) | 522.1 | 9.0 | B1/1000 | | |
| BH (60°-80°) | 98.4 | 1.7 | B0/110 | | G0/110 |
| BVH (80°-90°) | 0.0 | 0.0 | | | G0/10 |
| UL (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH (100°-180°) | 0.0 | 0.0 | | U0/0 | |

BUG Rating: B1-U0-G0
 Type II Short





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CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 76° | 85° |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 |
| 2.5° | 1080.8 | 1092.0 | 1088.5 | 1081.5 | 1077.3 | 1062.6 | 1053.5 | 1026.9 | 1008.0 | 1005.9 | 988.4 |
| 5° | 1217.3 | 1215.2 | 1212.4 | 1204.0 | 1197.0 | 1173.9 | 1146.6 | 1101.8 | 1061.9 | 1057.0 | 1019.9 |
| 7.5° | 1292.2 | 1293.6 | 1295.0 | 1293.6 | 1288.7 | 1271.2 | 1241.1 | 1188.6 | 1127.7 | 1123.5 | 1064.7 |
| 10° | 1323.0 | 1325.8 | 1332.8 | 1346.1 | 1358.0 | 1356.6 | 1339.1 | 1285.2 | 1210.3 | 1203.3 | 1124.2 |
| 12.5° | 1337.7 | 1341.2 | 1352.4 | 1377.6 | 1409.8 | 1435.0 | 1437.8 | 1389.5 | 1306.9 | 1295.7 | 1194.9 |
| 15° | 1358.0 | 1361.5 | 1375.5 | 1408.4 | 1455.3 | 1505.0 | 1537.2 | 1506.4 | 1414.0 | 1402.1 | 1272.6 |
| 17.5° | 1367.1 | 1372.0 | 1392.3 | 1435.7 | 1496.6 | 1572.9 | 1645.7 | 1642.9 | 1540.7 | 1531.6 | 1362.9 |
| 20° | 1384.6 | 1388.1 | 1406.3 | 1453.2 | 1526.7 | 1636.6 | 1759.1 | 1803.2 | 1695.4 | 1682.1 | 1472.1 |
| 22.5° | 1439.9 | 1441.3 | 1449.7 | 1479.1 | 1547.7 | 1682.8 | 1874.6 | 1990.1 | 1878.1 | 1860.6 | 1594.6 |
| 25° | 1530.2 | 1529.5 | 1533.0 | 1537.9 | 1588.3 | 1729.7 | 1985.9 | 2200.8 | 2087.4 | 2068.5 | 1733.2 |
| 27.5° | 1645.0 | 1645.0 | 1653.4 | 1639.4 | 1659.7 | 1787.8 | 2095.8 | 2443.0 | 2331.0 | 2304.4 | 1885.1 |
| 30° | 1780.1 | 1779.4 | 1799.0 | 1776.6 | 1782.9 | 1879.5 | 2214.1 | 2706.9 | 2625.0 | 2592.1 | 2060.1 |
| 32.5° | 1963.5 | 1959.3 | 1981.7 | 1950.9 | 1929.9 | 2018.1 | 2358.3 | 2982.7 | 2977.1 | 2926.7 | 2279.9 |
| 35° | 2195.2 | 2188.2 | 2195.2 | 2165.1 | 2127.3 | 2212.0 | 2547.3 | 3257.8 | 3367.7 | 3314.5 | 2541.7 |
| 37.5° | 2425.5 | 2447.9 | 2455.6 | 2403.8 | 2373.0 | 2457.7 | 2774.8 | 3504.2 | 3740.8 | 3685.5 | 2814.0 |
| 40° | 2697.1 | 2690.1 | 2716.7 | 2658.6 | 2639.0 | 2732.8 | 2997.4 | 3687.6 | 4036.2 | 3983.7 | 3056.2 |
| 42.5° | 2897.3 | 2909.9 | 2942.8 | 2910.6 | 2895.2 | 2983.4 | 3184.3 | 3794.7 | 4241.3 | 4189.5 | 3229.1 |
| 45° | 3137.4 | 3146.5 | 3159.1 | 3132.5 | 3116.4 | 3203.2 | 3319.4 | 3841.6 | 4397.4 | 4341.4 | 3345.3 |
| 47.5° | 3397.1 | 3404.1 | 3404.1 | 3349.5 | 3297.7 | 3333.4 | 3409.7 | 3868.2 | 4540.9 | 4487.0 | 3431.4 |
| 50° | 3583.3 | 3586.8 | 3617.6 | 3579.1 | 3466.4 | 3411.1 | 3451.0 | 3894.1 | 4636.1 | 4585.7 | 3459.4 |
| 52.5° | 3418.1 | 3413.9 | 3515.4 | 3595.2 | 3625.3 | 3515.4 | 3522.4 | 3931.9 | 4682.3 | 4638.9 | 3481.8 |
| 55° | 2878.4 | 2871.4 | 3014.2 | 3208.1 | 3473.4 | 3614.1 | 3608.5 | 3954.3 | 4733.4 | 4706.8 | 3563.0 |
| 57.5° | 2086.7 | 2074.8 | 2273.6 | 2489.2 | 2837.1 | 3218.6 | 3442.6 | 3941.7 | 4755.8 | 4753.7 | 3657.5 |
| 60° | 1254.4 | 1244.6 | 1432.2 | 1659.0 | 1927.8 | 2311.4 | 2683.1 | 3530.8 | 4456.2 | 4460.4 | 3411.8 |
| 62.5° | 772.1 | 781.2 | 950.6 | 1066.1 | 1166.2 | 1281.7 | 1496.6 | 2375.1 | 3301.2 | 3328.5 | 2397.5 |
| 65° | 519.4 | 526.4 | 683.2 | 828.8 | 828.8 | 677.6 | 581.7 | 1135.4 | 1761.2 | 1715.0 | 1134.0 |
| 67.5° | 348.6 | 356.3 | 480.2 | 650.3 | 674.8 | 472.5 | 235.9 | 338.8 | 490.7 | 476.0 | 280.7 |
| 70° | 205.1 | 213.5 | 319.9 | 445.9 | 491.4 | 329.0 | 157.5 | 143.5 | 139.3 | 135.1 | 109.2 |
| 72.5° | 91.7 | 95.2 | 163.1 | 226.8 | 207.2 | 138.6 | 111.3 | 114.8 | 108.5 | 106.4 | 88.9 |
| 75° | 28.0 | 29.4 | 42.0 | 49.0 | 49.7 | 49.7 | 67.2 | 90.3 | 85.4 | 86.1 | 68.6 |
| 77.5° | 7.0 | 7.0 | 11.2 | 10.5 | 5.6 | 4.9 | 12.6 | 20.3 | 21.0 | 18.9 | 14.0 |
| 80° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| 82.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 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 |



REPORT NUMBER: P632658
 CATALOG NUMBER: GWS-SA2D-727-U-T2-W-GRSBK

CANDELA DISTRIBUTION (continued):

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0° | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 | 967.4 |
| 2.5° | 980.7 | 962.5 | 950.6 | 933.8 | 921.9 | 909.3 | 898.1 | 889.0 | 884.1 | 882.7 | 883.4 |
| 5° | 1003.1 | 974.4 | 946.4 | 914.2 | 891.8 | 870.8 | 854.0 | 840.7 | 834.4 | 832.3 | 832.3 |
| 7.5° | 1037.4 | 997.5 | 947.8 | 897.4 | 859.6 | 826.7 | 807.1 | 792.4 | 786.8 | 785.4 | 781.2 |
| 10° | 1082.2 | 1027.6 | 945.7 | 867.3 | 814.1 | 779.8 | 765.8 | 761.6 | 763.7 | 764.4 | 763.7 |
| 12.5° | 1136.1 | 1059.1 | 932.4 | 823.2 | 765.8 | 744.8 | 746.2 | 757.4 | 770.0 | 776.3 | 777.7 |
| 15° | 1193.5 | 1087.8 | 902.3 | 770.7 | 724.5 | 723.8 | 744.1 | 770.0 | 794.5 | 805.0 | 807.8 |
| 17.5° | 1257.9 | 1110.9 | 856.1 | 714.7 | 688.8 | 709.1 | 745.5 | 785.4 | 818.3 | 835.8 | 839.3 |
| 20° | 1328.6 | 1129.8 | 797.3 | 662.2 | 657.3 | 693.7 | 744.1 | 793.1 | 833.7 | 853.3 | 856.8 |
| 22.5° | 1402.1 | 1143.1 | 729.4 | 613.9 | 628.6 | 676.2 | 730.8 | 778.4 | 816.9 | 839.3 | 842.1 |
| 25° | 1486.1 | 1144.5 | 660.1 | 573.3 | 602.0 | 652.4 | 698.6 | 737.8 | 770.0 | 789.6 | 791.7 |
| 27.5° | 1559.6 | 1127.7 | 598.5 | 540.4 | 577.5 | 623.0 | 653.8 | 675.5 | 697.9 | 709.1 | 709.8 |
| 30° | 1644.3 | 1098.3 | 540.4 | 513.8 | 552.3 | 586.6 | 602.0 | 606.9 | 609.0 | 611.1 | 608.3 |
| 32.5° | 1745.1 | 1062.6 | 497.0 | 487.9 | 523.6 | 546.7 | 550.9 | 541.1 | 529.2 | 512.4 | 508.2 |
| 35° | 1869.0 | 1030.4 | 461.3 | 462.7 | 492.1 | 506.1 | 502.6 | 481.6 | 458.5 | 438.2 | 434.7 |
| 37.5° | 2003.4 | 1003.1 | 434.0 | 438.2 | 457.8 | 467.6 | 457.1 | 434.0 | 423.5 | 406.0 | 406.7 |
| 40° | 2122.4 | 980.7 | 409.5 | 413.7 | 422.8 | 431.9 | 415.1 | 399.7 | 419.3 | 417.9 | 419.3 |
| 42.5° | 2207.1 | 961.8 | 388.5 | 386.4 | 392.7 | 399.0 | 386.4 | 378.7 | 411.6 | 402.5 | 407.4 |
| 45° | 2256.8 | 944.3 | 371.0 | 358.4 | 368.2 | 379.4 | 371.0 | 361.2 | 372.4 | 330.4 | 326.9 |
| 47.5° | 2290.4 | 934.5 | 355.6 | 331.1 | 348.6 | 368.2 | 350.7 | 326.9 | 310.8 | 274.4 | 271.6 |
| 50° | 2293.9 | 929.6 | 337.4 | 303.1 | 325.5 | 346.5 | 326.2 | 293.3 | 270.2 | 254.1 | 252.0 |
| 52.5° | 2312.1 | 939.4 | 312.2 | 267.4 | 291.9 | 325.5 | 311.5 | 278.6 | 247.1 | 233.1 | 230.3 |
| 55° | 2393.3 | 980.7 | 270.2 | 218.4 | 254.1 | 309.4 | 299.6 | 248.5 | 218.4 | 210.0 | 207.9 |
| 57.5° | 2477.3 | 989.1 | 212.8 | 172.9 | 221.2 | 286.3 | 273.7 | 228.9 | 199.5 | 189.7 | 187.6 |
| 60° | 2265.2 | 814.8 | 159.6 | 142.8 | 195.3 | 264.6 | 253.4 | 217.0 | 182.7 | 170.8 | 168.7 |
| 62.5° | 1488.2 | 440.3 | 126.7 | 121.1 | 164.5 | 224.0 | 231.0 | 196.0 | 163.1 | 150.5 | 149.8 |
| 65° | 686.0 | 204.4 | 97.3 | 95.9 | 128.8 | 178.5 | 198.8 | 171.5 | 137.9 | 126.7 | 126.7 |
| 67.5° | 186.9 | 101.5 | 76.3 | 70.7 | 87.5 | 119.7 | 144.9 | 128.1 | 98.0 | 84.7 | 84.0 |
| 70° | 93.1 | 81.9 | 68.6 | 60.9 | 63.0 | 74.2 | 85.4 | 71.4 | 49.7 | 40.6 | 39.9 |
| 72.5° | 76.3 | 67.2 | 58.1 | 51.8 | 47.6 | 45.5 | 44.1 | 35.7 | 23.1 | 17.5 | 16.8 |
| 75° | 56.7 | 48.3 | 41.3 | 33.6 | 28.7 | 26.6 | 23.8 | 17.5 | 9.8 | 5.6 | 4.9 |
| 77.5° | 12.6 | 11.9 | 11.2 | 8.4 | 7.7 | 6.3 | 4.9 | 3.5 | 1.4 | 0.0 | 0.0 |
| 80° | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 82.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 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 |

Signify Classified - Internal
Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269



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
 CIE u': 0.2605
 CIE v': 0.5272
 Duv: 0.0005
 CIE x: 0.4573
 CIE y: 0.4113
 CIE z: 0.1313
 Peak Wavelength (nm): 602
 Dominant Wavelength (nm): 583
 Purity: 61.2

| | | | |
|-----------|------|------|-------|
| CRI (Ra): | 71.5 | | |
| R1: | 69.2 | R9: | -16.1 |
| R2: | 79.4 | R10: | 51.4 |
| R3: | 87.8 | R11: | 63.1 |
| R4: | 69.4 | R12: | 42.0 |
| R5: | 66.4 | R13: | 70.2 |
| R6: | 69.8 | R14: | 92.4 |
| R7: | 79.8 | | |
| R8: | 50.1 | | |

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 |

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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 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 (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 | 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

TM-30-18

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)