

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: P317629

Luminaire Tested: **GLEON-SA5A-722-U-T2R**

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-08  
Report Number: P317629  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-8)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA5A-722-U-T2R  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(5) 70 CRI, 2200K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
ROADWAY OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 17838 lumens  
Efficiency: N/A  
Efficacy: 110.1 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G2

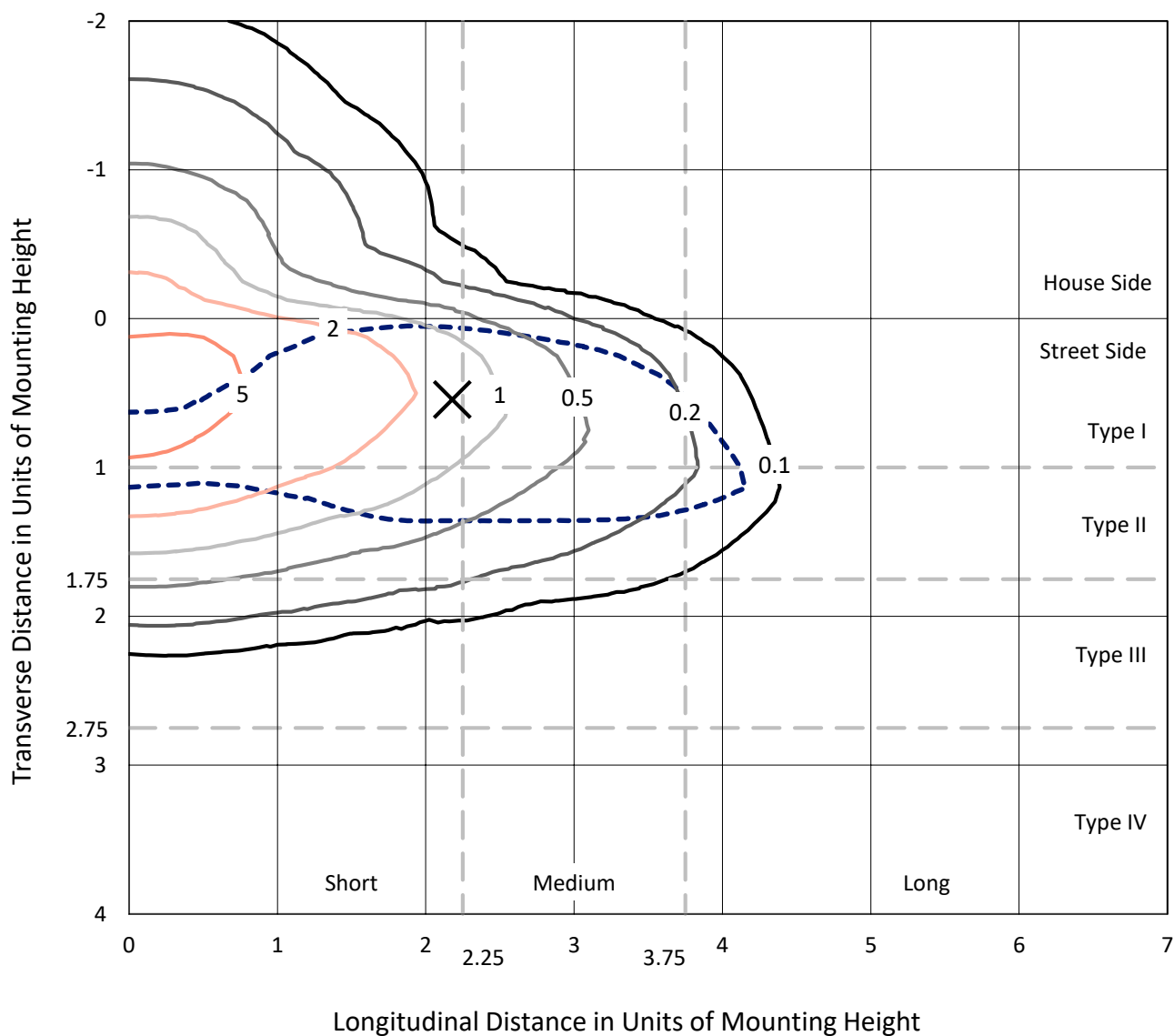
Input Watts (W): 162  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P317629  
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## Iso-Footcandle Lines of Horizontal Illumination

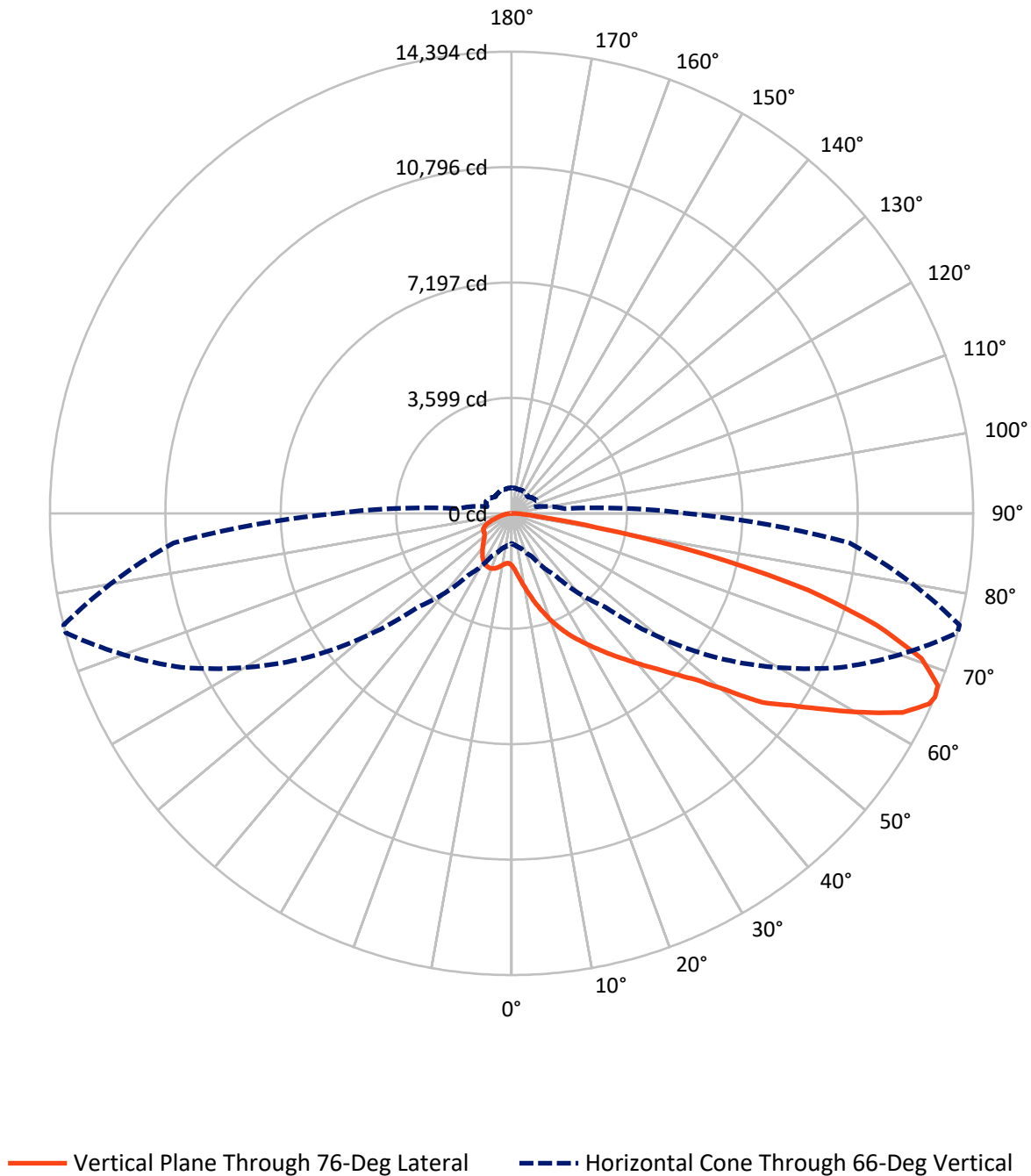
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6.9 fc  
 Type II - Short - N/A

REPORT NUMBER: P317629  
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## Luminous Intensity Polar Plot



REPORT NUMBER: P317629

CATALOG NUMBER: GLEON-SA5A-722-U-T2R

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3001.5   | 0.0    | 3001.5  |
|                    | % Fixture | 16.8     | 0.0    | 16.8    |
| <b>Street Side</b> | Lumens    | 14836.5  | 0.0    | 14836.5 |
|                    | % Fixture | 83.2     | 0.0    | 83.2    |
| <b>Total</b>       | Lumens    | 17838.0  | 0.0    | 17838.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 197.0   | 1.1       |
| 10°-20°   | 777.9   | 4.4       |
| 20°-30°   | 1511.7  | 8.5       |
| 30°-40°   | 2467.4  | 13.8      |
| 40°-50°   | 3371.0  | 18.9      |
| 50°-60°   | 3926.6  | 22.0      |
| 60°-70°   | 3520.2  | 19.7      |
| 70°-80°   | 1779.0  | 10.0      |
| 80°-90°   | 287.3   | 1.6       |
| 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°    | 17838.0 | 100.0     |
| 0°-180°   | 17838.0 | 100.0     |

**Coefficient of Utilization**







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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°     | 75°     | 76°     | 85°     |
|-------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| 0°    | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0  | 1629.0  | 1629.0  | 1629.0  |
| 2.5°  | 2162.5 | 2129.8 | 2126.8 | 2079.0 | 2068.1 | 1976.6 | 1909.4 | 1839.1  | 1759.2  | 1743.5  | 1680.5  |
| 5°    | 2777.8 | 2774.8 | 2733.0 | 2654.9 | 2593.7 | 2437.5 | 2283.0 | 2119.5  | 1940.3  | 1911.2  | 1769.5  |
| 7.5°  | 3331.3 | 3326.5 | 3294.4 | 3210.2 | 3121.8 | 2929.8 | 2709.4 | 2458.7  | 2168.0  | 2125.0  | 1890.0  |
| 10°   | 3751.6 | 3749.8 | 3738.9 | 3677.1 | 3602.0 | 3417.9 | 3174.5 | 2832.3  | 2432.6  | 2373.9  | 2040.8  |
| 12.5° | 4076.2 | 4079.8 | 4087.1 | 4065.3 | 4029.5 | 3872.7 | 3623.2 | 3228.3  | 2714.8  | 2656.7  | 2208.6  |
| 15°   | 4296.0 | 4306.9 | 4344.4 | 4375.3 | 4394.1 | 4297.8 | 4056.2 | 3633.5  | 3030.9  | 2961.3  | 2394.5  |
| 17.5° | 4406.8 | 4418.9 | 4483.7 | 4577.0 | 4663.0 | 4653.3 | 4461.3 | 4019.8  | 3334.3  | 3267.1  | 2594.3  |
| 20°   | 4502.5 | 4511.6 | 4584.2 | 4696.3 | 4848.3 | 4915.5 | 4807.7 | 4391.7  | 3666.8  | 3586.9  | 2806.3  |
| 22.5° | 4779.8 | 4791.4 | 4813.2 | 4876.7 | 5011.2 | 5134.7 | 5082.6 | 4743.5  | 3971.4  | 3896.9  | 3007.3  |
| 25°   | 5315.2 | 5329.1 | 5281.9 | 5228.0 | 5253.4 | 5339.4 | 5349.1 | 5064.5  | 4280.2  | 4196.1  | 3223.5  |
| 27.5° | 5960.1 | 5980.1 | 5899.6 | 5760.9 | 5639.8 | 5606.5 | 5595.0 | 5327.3  | 4575.2  | 4477.7  | 3437.3  |
| 30°   | 6591.7 | 6626.3 | 6521.5 | 6341.6 | 6119.4 | 5963.2 | 5847.5 | 5584.7  | 4865.8  | 4772.6  | 3638.9  |
| 32.5° | 7208.8 | 7194.9 | 7042.9 | 6867.3 | 6606.9 | 6411.3 | 6131.5 | 5860.8  | 5192.9  | 5085.7  | 3839.4  |
| 35°   | 7631.5 | 7636.4 | 7495.3 | 7287.0 | 7038.7 | 6888.5 | 6511.8 | 6158.8  | 5526.5  | 5427.8  | 4067.1  |
| 37.5° | 7991.2 | 7968.8 | 7809.0 | 7614.6 | 7400.8 | 7336.6 | 6956.9 | 6487.0  | 5888.1  | 5780.3  | 4309.3  |
| 40°   | 8111.1 | 8085.1 | 7980.3 | 7840.5 | 7669.1 | 7663.6 | 7448.0 | 6858.8  | 6296.8  | 6190.2  | 4582.4  |
| 42.5° | 8038.5 | 8005.2 | 7962.2 | 7924.0 | 7871.3 | 7895.6 | 7909.5 | 7294.8  | 6746.2  | 6626.9  | 4898.5  |
| 45°   | 7770.2 | 7719.9 | 7750.2 | 7833.2 | 7947.6 | 8084.5 | 8326.1 | 7777.5  | 7249.4  | 7149.5  | 5269.8  |
| 47.5° | 7357.8 | 7312.4 | 7406.9 | 7584.3 | 7895.6 | 8242.0 | 8720.4 | 8310.4  | 7850.1  | 7750.8  | 5798.4  |
| 50°   | 6777.7 | 6791.0 | 6926.0 | 7248.8 | 7719.3 | 8314.6 | 9206.0 | 9015.9  | 8723.4  | 8630.7  | 6519.7  |
| 52.5° | 5825.7 | 5828.1 | 6208.4 | 6738.3 | 7406.9 | 8277.1 | 9475.5 | 9917.6  | 9915.8  | 9803.7  | 7206.4  |
| 55°   | 4941.5 | 4995.4 | 5296.4 | 6000.7 | 6900.6 | 8126.9 | 9663.9 | 10356.0 | 10698.8 | 10567.4 | 7846.5  |
| 57.5° | 4078.0 | 4109.5 | 4394.7 | 5102.0 | 6178.1 | 7726.6 | 9857.0 | 10882.3 | 11601.1 | 11518.1 | 8642.2  |
| 60°   | 3095.7 | 3144.2 | 3439.1 | 4092.5 | 5254.0 | 7016.3 | 9875.2 | 11431.5 | 12679.6 | 12596.1 | 9530.6  |
| 62.5° | 2009.3 | 2092.9 | 2369.0 | 2981.3 | 4136.1 | 5994.6 | 9453.7 | 11790.7 | 13701.9 | 13672.2 | 10319.1 |
| 65°   | 1154.8 | 1217.8 | 1409.8 | 1882.1 | 2853.5 | 4712.0 | 8451.5 | 11652.6 | 14331.1 | 14314.1 | 10614.0 |
| 66°   | 943.5  | 982.9  | 1130.0 | 1471.0 | 2354.5 | 4137.9 | 7868.9 | 11361.3 | 14393.4 | 14394.0 | 10580.1 |
| 67.5° | 754.6  | 772.1  | 838.1  | 1053.1 | 1737.4 | 3279.8 | 6827.9 | 10718.8 | 14315.9 | 14337.1 | 10361.5 |
| 70°   | 624.4  | 633.4  | 654.0  | 706.1  | 948.3  | 1977.8 | 4846.5 | 9049.2  | 13537.8 | 13554.1 | 9508.2  |
| 72.5° | 560.2  | 565.6  | 573.5  | 580.8  | 669.2  | 1105.2 | 2960.1 | 7239.1  | 11869.4 | 11890.6 | 8208.0  |
| 75°   | 507.5  | 510.5  | 509.3  | 509.9  | 561.4  | 704.3  | 1529.7 | 5404.8  | 9597.2  | 9554.9  | 6287.7  |
| 77.5° | 445.7  | 448.7  | 442.7  | 443.9  | 496.6  | 541.4  | 761.2  | 3783.7  | 6476.7  | 6177.5  | 3542.6  |
| 80°   | 376.7  | 379.1  | 376.7  | 380.9  | 432.4  | 408.8  | 442.7  | 2128.6  | 2863.8  | 2708.8  | 1259.6  |
| 82.5° | 284.6  | 294.9  | 302.2  | 319.1  | 356.1  | 290.7  | 296.1  | 829.0   | 872.0   | 830.3   | 386.4   |
| 85°   | 124.7  | 152.0  | 227.7  | 244.0  | 267.7  | 174.4  | 194.4  | 337.9   | 354.9   | 344.0   | 140.5   |
| 87.5° | 32.7   | 35.7   | 112.6  | 141.7  | 148.4  | 78.7   | 101.1  | 153.8   | 162.3   | 153.8   | 46.6    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0     | 0.0     |

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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 |
| 2.5°  | 1647.2 | 1617.5 | 1564.2 | 1517.0 | 1481.3 | 1457.0 | 1432.8 | 1420.7 | 1413.4 | 1406.2 | 1407.4 |
| 5°    | 1699.9 | 1639.9 | 1548.5 | 1483.7 | 1447.3 | 1424.3 | 1412.2 | 1407.4 | 1404.3 | 1397.1 | 1397.1 |
| 7.5°  | 1779.2 | 1694.4 | 1568.5 | 1501.8 | 1473.4 | 1455.8 | 1448.5 | 1446.1 | 1442.5 | 1434.0 | 1435.2 |
| 10°   | 1879.1 | 1760.4 | 1610.2 | 1545.4 | 1519.4 | 1500.0 | 1489.7 | 1486.1 | 1479.4 | 1469.7 | 1471.0 |
| 12.5° | 1996.6 | 1842.2 | 1665.3 | 1597.5 | 1566.0 | 1540.0 | 1523.0 | 1512.7 | 1501.2 | 1488.5 | 1489.1 |
| 15°   | 2125.0 | 1931.2 | 1724.7 | 1644.2 | 1601.2 | 1564.8 | 1537.6 | 1520.0 | 1501.8 | 1486.1 | 1485.5 |
| 17.5° | 2255.2 | 2017.2 | 1770.1 | 1669.6 | 1611.4 | 1563.6 | 1526.7 | 1499.4 | 1477.0 | 1457.6 | 1455.8 |
| 20°   | 2395.7 | 2094.7 | 1795.5 | 1667.2 | 1592.1 | 1535.1 | 1486.1 | 1452.2 | 1427.4 | 1408.0 | 1404.9 |
| 22.5° | 2538.6 | 2167.4 | 1799.8 | 1642.3 | 1549.1 | 1479.4 | 1428.0 | 1390.4 | 1365.0 | 1345.0 | 1337.7 |
| 25°   | 2669.4 | 2223.7 | 1782.2 | 1594.5 | 1489.1 | 1414.0 | 1363.8 | 1325.6 | 1305.0 | 1281.4 | 1274.1 |
| 27.5° | 2788.7 | 2263.1 | 1747.1 | 1533.3 | 1421.9 | 1348.0 | 1300.8 | 1268.1 | 1245.7 | 1227.5 | 1221.5 |
| 30°   | 2895.9 | 2284.2 | 1689.6 | 1460.7 | 1352.9 | 1285.6 | 1245.7 | 1223.3 | 1203.9 | 1180.9 | 1176.6 |
| 32.5° | 2997.6 | 2284.2 | 1615.7 | 1381.3 | 1284.4 | 1230.5 | 1206.9 | 1193.0 | 1171.2 | 1148.8 | 1142.7 |
| 35°   | 3099.4 | 2270.3 | 1528.5 | 1298.4 | 1221.5 | 1191.2 | 1190.0 | 1173.6 | 1140.3 | 1110.0 | 1102.2 |
| 37.5° | 3206.5 | 2241.9 | 1430.4 | 1220.9 | 1170.0 | 1173.6 | 1183.9 | 1147.6 | 1100.3 | 1057.3 | 1045.8 |
| 40°   | 3327.7 | 2202.5 | 1328.6 | 1153.6 | 1127.0 | 1165.7 | 1167.6 | 1110.0 | 1018.0 | 978.6  | 968.3  |
| 42.5° | 3470.0 | 2163.1 | 1234.2 | 1094.3 | 1093.1 | 1142.1 | 1136.7 | 1028.9 | 973.8  | 953.8  | 948.3  |
| 45°   | 3657.1 | 2140.7 | 1144.5 | 1038.0 | 1066.4 | 1104.0 | 1084.0 | 984.1  | 961.1  | 949.6  | 944.7  |
| 47.5° | 3952.0 | 2152.2 | 1062.2 | 993.2  | 1039.8 | 1065.8 | 985.9  | 965.9  | 949.6  | 935.6  | 930.8  |
| 50°   | 4321.4 | 2145.6 | 995.6  | 962.3  | 1009.5 | 1025.9 | 941.7  | 942.3  | 933.8  | 918.1  | 910.8  |
| 52.5° | 4599.4 | 2093.5 | 952.6  | 944.7  | 982.9  | 955.0  | 913.8  | 919.3  | 915.0  | 892.0  | 884.1  |
| 55°   | 4867.7 | 2048.7 | 930.8  | 938.0  | 963.5  | 866.6  | 881.1  | 894.4  | 890.2  | 867.8  | 864.2  |
| 57.5° | 5201.3 | 2040.2 | 917.5  | 939.9  | 947.1  | 822.4  | 849.6  | 867.2  | 864.2  | 854.5  | 852.7  |
| 60°   | 5610.1 | 2042.6 | 905.3  | 942.9  | 929.0  | 789.7  | 820.0  | 842.4  | 844.2  | 842.4  | 841.2  |
| 62.5° | 5834.8 | 1976.6 | 875.1  | 934.4  | 896.9  | 761.2  | 789.1  | 821.8  | 822.4  | 826.0  | 825.4  |
| 65°   | 5644.0 | 1779.2 | 818.7  | 904.7  | 843.0  | 737.6  | 762.4  | 798.2  | 789.1  | 805.4  | 805.4  |
| 66°   | 5458.7 | 1665.3 | 790.9  | 885.4  | 820.0  | 728.5  | 753.9  | 786.0  | 774.5  | 796.9  | 796.9  |
| 67.5° | 5080.2 | 1473.4 | 740.6  | 844.2  | 787.3  | 715.8  | 744.3  | 766.1  | 750.3  | 783.6  | 781.2  |
| 70°   | 4388.6 | 1139.7 | 639.5  | 750.9  | 733.4  | 697.0  | 730.9  | 726.1  | 703.1  | 753.9  | 744.3  |
| 72.5° | 3700.1 | 866.0  | 513.5  | 628.6  | 651.6  | 673.4  | 712.2  | 675.2  | 646.2  | 681.9  | 660.7  |
| 75°   | 2871.1 | 651.0  | 405.7  | 488.7  | 550.5  | 636.5  | 689.8  | 616.5  | 574.7  | 571.1  | 559.6  |
| 77.5° | 1552.1 | 446.9  | 321.6  | 373.0  | 437.2  | 590.4  | 674.6  | 553.5  | 490.5  | 476.0  | 466.9  |
| 80°   | 614.7  | 290.7  | 233.8  | 282.8  | 305.8  | 523.8  | 638.3  | 480.2  | 404.5  | 390.0  | 376.1  |
| 82.5° | 253.7  | 172.0  | 150.8  | 189.5  | 199.2  | 448.1  | 572.9  | 393.6  | 312.5  | 432.4  | 459.0  |
| 85°   | 109.0  | 94.5   | 89.6   | 98.1   | 112.6  | 314.3  | 456.0  | 300.4  | 337.3  | 301.0  | 239.2  |
| 87.5° | 32.7   | 40.0   | 38.2   | 37.5   | 41.2   | 75.1   | 242.8  | 167.1  | 247.7  | 93.9   | 70.2   |
| 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: SP1-1908-441-10-R4

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

Data in this report applies to families of products SA1C-722-U-5WQ.

### Test Information

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-722-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2237    | CRI (Ra): | 72.0 |      |       |
| CIE u':                   | 0.2876  | R1:       | 68.9 | R9:  | -17.4 |
| CIE v':                   | 0.5346  | R2:       | 83.0 | R10: | 61.3  |
| Duv:                      | -0.0006 | R3:       | 95.2 | R11: | 59.8  |
| CIE x:                    | 0.5005  | R4:       | 66.2 | R12: | 50.5  |
| CIE y:                    | 0.4134  | R5:       | 65.9 | R13: | 71.1  |
| CIE z:                    | 0.0860  | R6:       | 76.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 603     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.8 |      |       |
| Purity:                   | 74.5    |           |      |      |       |
| Rf:                       | 69.8    |           |      |      |       |
| Rg:                       | 99.2    |           |      |      |       |



### Test Conditions

Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

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| 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 2200K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 4696.9

S/P: 0.85

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8 M/P: 0.27**

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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### Summary

$R_f = 69.8$   
 $R_g = 99.2$   
 CIE  $R_a = 72.0$   
 $R_g = -17.4$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 84 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 51 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 42 | CES33 = 53 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 70 | CES59 = 84 | CES84 = 92 |
| CES10 = 78 | CES35 = 85 | CES60 = 90 | CES85 = 81 |
| CES11 = 61 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 70 | CES87 = 78 |
| CES13 = 45 | CES38 = 53 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 84 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 69 | CES93 = 79 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 63 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 63 | CES96 = 78 |
| CES22 = 81 | CES47 = 60 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 56 | CES98 = 71 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)