

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: STREETWORKS

Report Number: P362917

Luminaire Tested: NVN-SA3B-760-U-T2-HSS

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-2019  
Report Number: P362917  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-13)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA3B-760-U-T2-HSS  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(3) 70 CRI, 5700K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 12340 lumens  
Efficiency: N/A  
Efficacy: 99.5 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 1.5' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B1 - U0 - G2

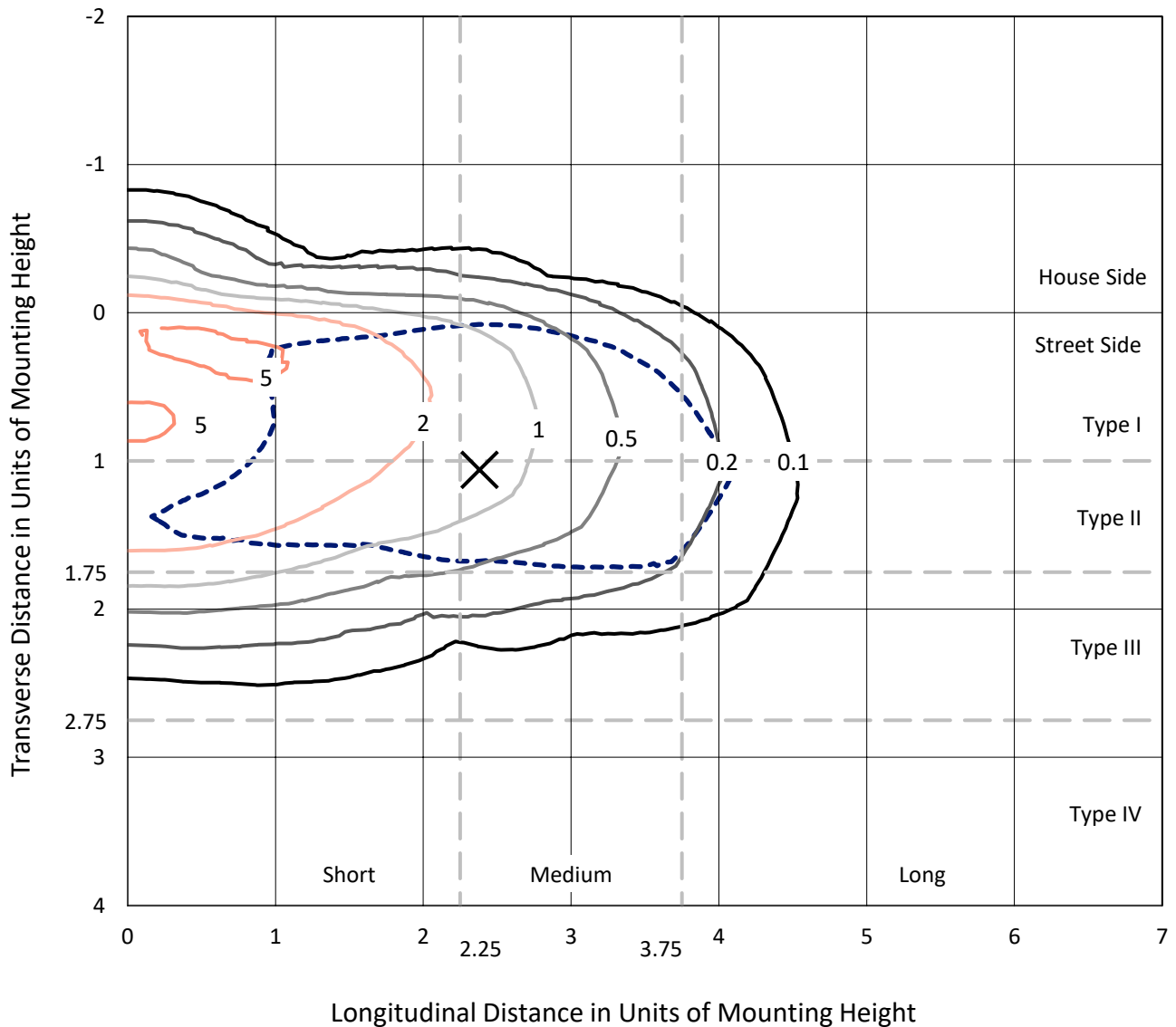
Input Watts (W): 124  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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### Iso-Footcandle Lines of Horizontal Illumination

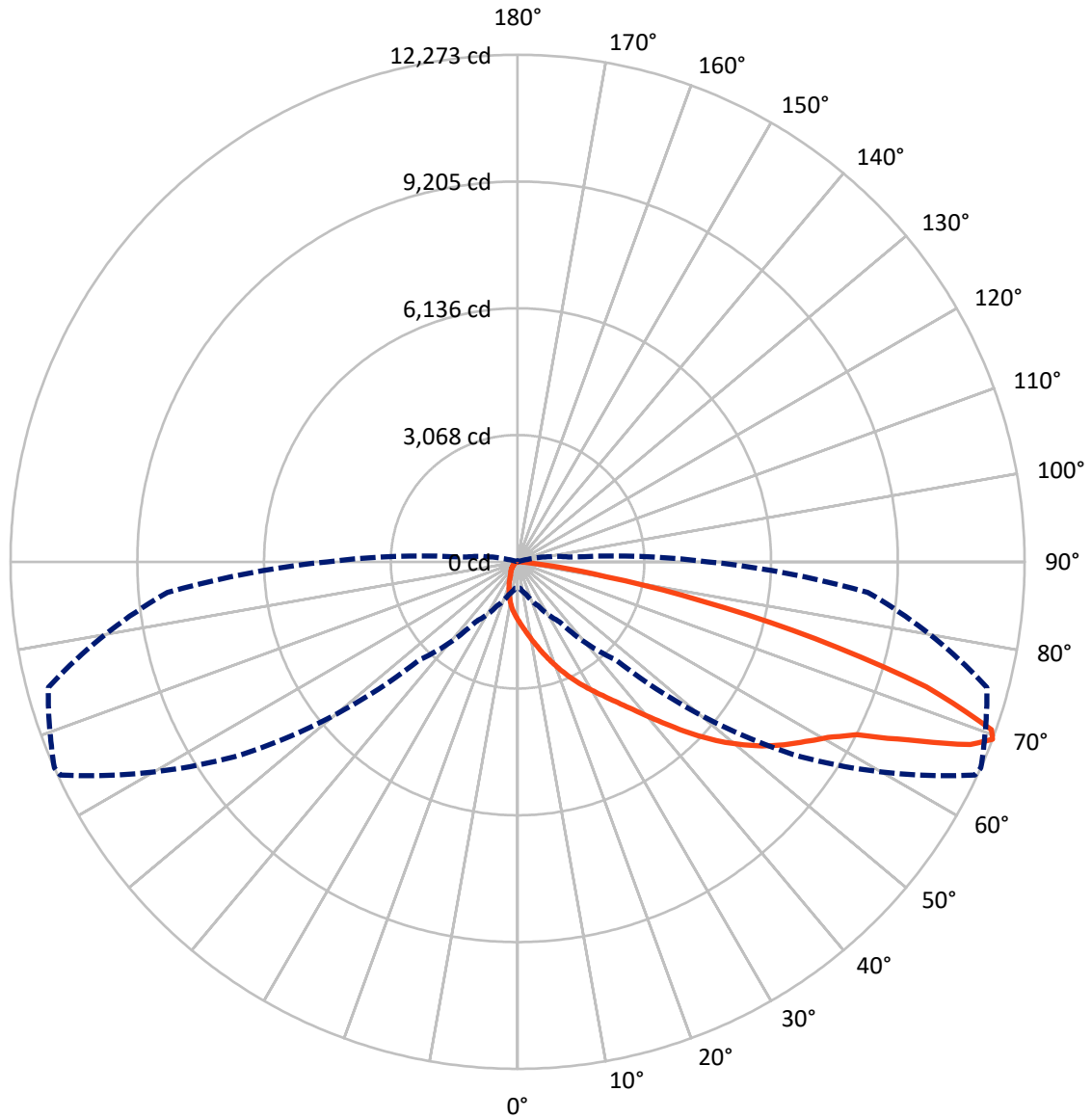
✕ Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 5.8 fc  
 Type II - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 66-Deg Lateral      - - - Horizontal Cone Through 69-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 740.2    | 0.0    | 740.2   |
|                    | % Fixture | 6.0      | 0.0    | 6.0     |
| <b>Street Side</b> | Lumens    | 11599.8  | 0.0    | 11599.8 |
|                    | % Fixture | 94.0     | 0.0    | 94.0    |
| <b>Total</b>       | Lumens    | 12340.0  | 0.0    | 12340.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 135.7   | 1.1       |
| 10°-20°   | 404.0   | 3.3       |
| 20°-30°   | 703.5   | 5.7       |
| 30°-40°   | 1234.3  | 10.0      |
| 40°-50°   | 2066.1  | 16.7      |
| 50°-60°   | 3037.0  | 24.6      |
| 60°-70°   | 3118.2  | 25.3      |
| 70°-80°   | 1539.4  | 12.5      |
| 80°-90°   | 101.8   | 0.8       |
| 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°    | 12340.0 | 100.0     |
| 0°-180°   | 12340.0 | 100.0     |

**Coefficient of Utilization**

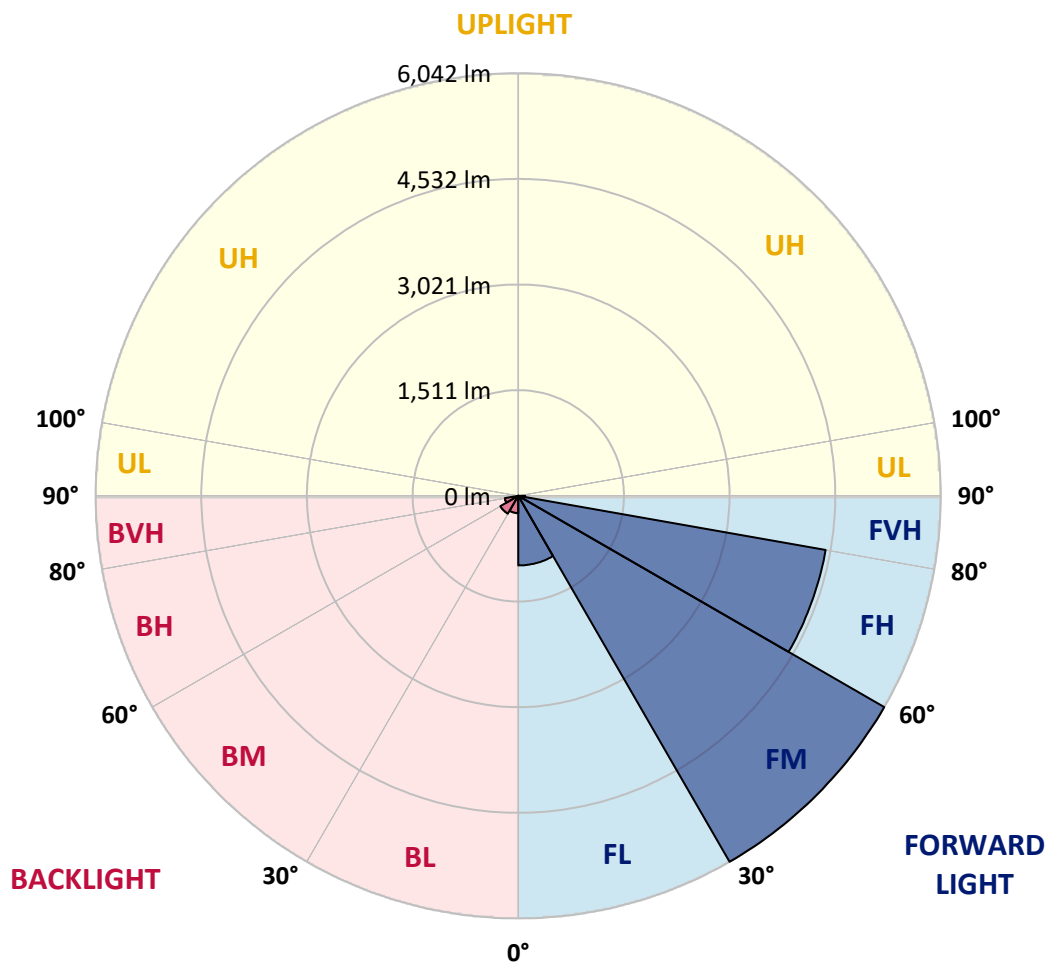


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 995.7  | 8.1       |                         |      |         |
| FM (30°-60°)   | 6042.3 | 49.0      |                         |      |         |
| FH (60°-80°)   | 4462.5 | 36.2      |                         |      | G2/5000 |
| FVH (80°-90°)  | 99.3   | 0.8       |                         |      | G1/100  |
| BL (0°-30°)    | 247.6  | 2.0       | B1/500                  |      |         |
| BM (30°-60°)   | 295.1  | 2.4       | B1/1000                 |      |         |
| BH (60°-80°)   | 195.1  | 1.6       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 2.5    | 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-G2**  
 Type II Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°     | 66°     | 75°     | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|--------|
| 0°    | 1404.3 | 1404.3 | 1404.3 | 1404.3 | 1404.3 | 1404.3 | 1404.3 | 1404.3  | 1404.3  | 1404.3  | 1404.3 |
| 2.5°  | 1652.8 | 1645.8 | 1642.9 | 1630.0 | 1607.7 | 1590.7 | 1557.9 | 1519.8  | 1512.8  | 1475.8  | 1430.7 |
| 5°    | 1867.4 | 1861.5 | 1857.4 | 1839.2 | 1816.4 | 1773.6 | 1713.8 | 1642.9  | 1629.4  | 1559.1  | 1468.8 |
| 7.5°  | 2016.8 | 2027.4 | 2027.4 | 2015.6 | 1986.9 | 1954.7 | 1881.4 | 1784.7  | 1767.7  | 1659.9  | 1519.8 |
| 10°   | 2104.2 | 2117.0 | 2127.0 | 2137.0 | 2132.9 | 2120.0 | 2050.8 | 1941.8  | 1921.3  | 1778.3  | 1579.0 |
| 12.5° | 2112.4 | 2125.3 | 2153.4 | 2195.0 | 2235.4 | 2264.7 | 2221.4 | 2115.9  | 2092.4  | 1915.4  | 1649.3 |
| 15°   | 2066.6 | 2080.1 | 2123.5 | 2204.4 | 2302.3 | 2387.8 | 2401.9 | 2308.7  | 2284.7  | 2079.0  | 1737.2 |
| 17.5° | 1986.9 | 1995.7 | 2057.8 | 2169.8 | 2323.4 | 2480.4 | 2565.4 | 2515.6  | 2493.3  | 2265.9  | 1835.1 |
| 20°   | 1927.7 | 1934.2 | 1988.7 | 2108.8 | 2310.5 | 2538.5 | 2720.2 | 2735.4  | 2712.0  | 2466.4  | 1941.2 |
| 22.5° | 2029.1 | 2040.9 | 2042.6 | 2099.5 | 2275.3 | 2567.2 | 2856.1 | 2951.7  | 2934.1  | 2679.1  | 2045.5 |
| 25°   | 2306.4 | 2319.8 | 2275.3 | 2240.1 | 2305.2 | 2580.1 | 2972.8 | 3173.2  | 3159.2  | 2908.3  | 2150.5 |
| 27.5° | 2672.7 | 2686.8 | 2629.3 | 2524.4 | 2461.7 | 2628.7 | 3076.5 | 3398.3  | 3397.7  | 3151.0  | 2263.6 |
| 30°   | 3032.6 | 3046.6 | 2988.0 | 2883.1 | 2738.9 | 2766.5 | 3166.2 | 3633.9  | 3637.4  | 3401.2  | 2383.7 |
| 32.5° | 3410.0 | 3427.6 | 3367.2 | 3232.4 | 3081.8 | 3004.4 | 3292.2 | 3870.7  | 3890.6  | 3691.4  | 2519.1 |
| 35°   | 3839.1 | 3841.4 | 3756.4 | 3615.2 | 3441.7 | 3322.7 | 3494.4 | 4136.2  | 4183.7  | 4050.6  | 2690.9 |
| 37.5° | 4259.9 | 4276.9 | 4207.1 | 3984.4 | 3825.0 | 3690.2 | 3795.1 | 4468.0  | 4535.4  | 4489.6  | 2915.3 |
| 40°   | 4571.7 | 4607.5 | 4597.5 | 4357.2 | 4206.0 | 4109.8 | 4168.5 | 4862.4  | 4948.0  | 5000.7  | 3198.4 |
| 42.5° | 4767.5 | 4794.4 | 4840.1 | 4695.4 | 4558.2 | 4574.0 | 4609.2 | 5321.9  | 5427.4  | 5583.3  | 3523.7 |
| 45°   | 4991.9 | 5004.8 | 5042.9 | 4979.0 | 4886.4 | 5045.9 | 5076.9 | 5839.5  | 5950.2  | 6209.9  | 3884.8 |
| 47.5° | 5266.2 | 5296.7 | 5307.3 | 5248.7 | 5206.5 | 5463.2 | 5527.7 | 6310.1  | 6465.4  | 6881.0  | 4266.9 |
| 50°   | 5615.6 | 5623.8 | 5641.9 | 5603.8 | 5561.6 | 5821.9 | 5932.1 | 6804.2  | 6945.5  | 7554.4  | 4643.8 |
| 52.5° | 5957.3 | 5986.6 | 6049.9 | 6025.8 | 6008.9 | 6127.2 | 6292.5 | 7249.7  | 7407.3  | 8115.9  | 5020.1 |
| 55°   | 6055.7 | 6080.9 | 6299.6 | 6449.0 | 6587.3 | 6503.5 | 6637.2 | 7648.8  | 7819.4  | 8617.6  | 5382.3 |
| 57.5° | 5662.5 | 5713.4 | 6092.1 | 6481.3 | 7055.1 | 7088.5 | 7110.7 | 8058.5  | 8211.5  | 9002.1  | 5759.2 |
| 60°   | 4668.4 | 4678.4 | 5299.7 | 5967.2 | 6977.7 | 7599.0 | 7802.4 | 8498.7  | 8627.0  | 9360.3  | 6210.5 |
| 62.5° | 2969.3 | 3070.7 | 3752.3 | 4694.8 | 6159.5 | 7525.1 | 8638.7 | 9164.5  | 9211.4  | 9789.9  | 6857.5 |
| 65°   | 1414.3 | 1479.9 | 1971.1 | 2900.7 | 4461.5 | 6579.7 | 9216.1 | 10369.0 | 10390.1 | 10641.5 | 7722.1 |
| 67.5° | 783.0  | 814.7  | 1048.6 | 1561.4 | 2608.2 | 4653.2 | 8982.8 | 11795.6 | 11815.5 | 11511.3 | 8480.5 |
| 69°   | 612.5  | 639.5  | 823.5  | 1176.9 | 1768.3 | 3344.4 | 8128.8 | 12213.5 | 12272.7 | 11760.4 | 8507.5 |
| 70°   | 519.9  | 546.3  | 709.2  | 994.1  | 1421.9 | 2584.2 | 7235.6 | 12109.7 | 12172.4 | 11737.0 | 8306.4 |
| 72.5° | 318.3  | 333.5  | 472.4  | 699.8  | 953.0  | 1300.0 | 4462.1 | 10241.2 | 10347.3 | 10766.3 | 7138.9 |
| 75°   | 214.5  | 222.7  | 295.4  | 483.0  | 681.7  | 669.3  | 2318.1 | 7218.6  | 7448.3  | 8375.0  | 5272.7 |
| 77.5° | 153.6  | 161.2  | 198.1  | 312.4  | 477.7  | 441.9  | 1049.7 | 4486.1  | 4535.4  | 5023.0  | 2875.5 |
| 80°   | 87.3   | 94.4   | 140.1  | 185.8  | 324.1  | 294.8  | 417.3  | 2142.8  | 2167.5  | 2154.0  | 960.1  |
| 82.5° | 45.7   | 51.6   | 76.8   | 122.5  | 208.1  | 192.8  | 173.5  | 717.4   | 720.9   | 599.6   | 210.4  |
| 85°   | 8.8    | 10.6   | 38.1   | 83.8   | 107.3  | 83.8   | 70.9   | 168.2   | 171.7   | 151.8   | 52.2   |
| 87.5° | 0.0    | 0.6    | 15.2   | 18.8   | 21.1   | 21.7   | 22.9   | 32.8    | 35.2    | 47.5    | 14.1   |
| 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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 CATALOG NUMBER: NVN-SA3B-760-U-T2-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1404.3 | 1404.3 | 1404.3 | 1404.3 | 1404.3 | 1404.3 | 1404.3 | 1404.3 | 1404.3 | 1404.3 | 1404.3 |
| 2.5°  | 1410.8 | 1389.7 | 1349.2 | 1302.3 | 1266.0 | 1230.3 | 1202.1 | 1172.8 | 1162.3 | 1157.0 | 1156.4 |
| 5°    | 1424.8 | 1380.3 | 1294.7 | 1206.8 | 1134.7 | 1066.7 | 1018.1 | 971.8  | 950.1  | 940.1  | 936.0  |
| 7.5°  | 1448.3 | 1376.8 | 1239.0 | 1104.8 | 1001.1 | 916.1  | 848.7  | 798.3  | 773.1  | 762.5  | 758.4  |
| 10°   | 1475.8 | 1372.1 | 1174.0 | 997.0  | 864.5  | 776.6  | 709.8  | 660.0  | 632.4  | 620.7  | 614.8  |
| 12.5° | 1508.1 | 1363.9 | 1099.0 | 888.0  | 747.9  | 660.0  | 579.1  | 517.5  | 485.9  | 472.4  | 466.0  |
| 15°   | 1547.9 | 1355.7 | 1020.4 | 785.4  | 645.3  | 538.1  | 449.6  | 407.9  | 401.5  | 399.1  | 399.7  |
| 17.5° | 1587.2 | 1342.8 | 934.9  | 684.0  | 537.5  | 420.2  | 375.1  | 372.8  | 373.9  | 373.9  | 373.9  |
| 20°   | 1622.4 | 1313.5 | 841.7  | 597.3  | 434.9  | 354.6  | 345.2  | 341.1  | 338.2  | 335.8  | 332.9  |
| 22.5° | 1649.9 | 1274.2 | 752.0  | 511.1  | 355.2  | 324.7  | 310.1  | 297.2  | 286.6  | 279.6  | 276.1  |
| 25°   | 1668.7 | 1222.0 | 669.9  | 428.5  | 319.4  | 295.4  | 269.0  | 247.3  | 230.9  | 221.0  | 216.9  |
| 27.5° | 1682.7 | 1165.8 | 596.7  | 358.7  | 294.8  | 261.4  | 226.8  | 201.0  | 184.0  | 175.2  | 171.7  |
| 30°   | 1692.7 | 1101.9 | 532.2  | 315.3  | 267.3  | 225.7  | 188.7  | 163.5  | 151.2  | 146.5  | 144.2  |
| 32.5° | 1702.1 | 1031.0 | 471.2  | 294.8  | 241.5  | 192.8  | 158.3  | 138.9  | 131.3  | 125.4  | 123.7  |
| 35°   | 1725.5 | 965.3  | 413.2  | 273.1  | 215.1  | 164.7  | 136.0  | 121.9  | 114.3  | 110.8  | 109.6  |
| 37.5° | 1781.2 | 916.7  | 357.5  | 250.9  | 188.7  | 142.4  | 119.0  | 109.0  | 102.0  | 98.5   | 97.3   |
| 40°   | 1870.9 | 892.1  | 310.6  | 226.8  | 162.9  | 125.4  | 107.8  | 98.5   | 90.8   | 85.6   | 84.4   |
| 42.5° | 2002.8 | 895.6  | 277.8  | 202.8  | 142.4  | 111.9  | 97.3   | 86.2   | 78.0   | 73.3   | 72.1   |
| 45°   | 2162.8 | 921.4  | 255.0  | 179.4  | 125.4  | 101.4  | 85.6   | 73.9   | 66.2   | 62.1   | 61.0   |
| 47.5° | 2336.3 | 963.0  | 236.2  | 158.3  | 111.9  | 91.4   | 73.9   | 61.5   | 55.1   | 51.6   | 51.0   |
| 50°   | 2519.1 | 1003.4 | 216.9  | 137.7  | 100.2  | 81.5   | 62.1   | 51.0   | 45.7   | 42.8   | 41.6   |
| 52.5° | 2704.3 | 1050.3 | 199.3  | 119.0  | 90.3   | 69.7   | 51.6   | 41.6   | 37.5   | 35.2   | 34.0   |
| 55°   | 2903.6 | 1085.5 | 182.3  | 104.3  | 80.3   | 59.2   | 42.8   | 34.6   | 31.1   | 28.1   | 27.5   |
| 57.5° | 3138.1 | 1140.0 | 164.7  | 90.3   | 68.6   | 49.2   | 35.2   | 27.5   | 24.6   | 21.7   | 21.1   |
| 60°   | 3454.6 | 1203.9 | 145.9  | 79.7   | 56.3   | 40.4   | 28.7   | 22.3   | 18.8   | 16.4   | 15.8   |
| 62.5° | 3871.9 | 1274.8 | 122.5  | 69.7   | 45.7   | 32.8   | 22.9   | 17.6   | 13.5   | 10.6   | 10.6   |
| 65°   | 4401.1 | 1390.3 | 100.2  | 58.6   | 37.5   | 27.0   | 17.6   | 12.9   | 7.6    | 4.7    | 4.7    |
| 67.5° | 4710.0 | 1410.2 | 80.9   | 48.1   | 30.5   | 22.9   | 14.7   | 8.8    | 2.3    | 0.6    | 0.0    |
| 69°   | 4611.0 | 1294.7 | 68.6   | 41.0   | 26.4   | 21.7   | 13.5   | 6.4    | 1.2    | 0.0    | 0.0    |
| 70°   | 4424.6 | 1184.0 | 60.4   | 36.3   | 24.0   | 20.5   | 12.9   | 4.7    | 1.2    | 0.0    | 0.0    |
| 72.5° | 3656.2 | 842.8  | 45.7   | 27.0   | 17.6   | 18.2   | 11.7   | 2.9    | 1.2    | 0.0    | 0.0    |
| 75°   | 2663.3 | 512.3  | 32.8   | 18.8   | 11.1   | 13.5   | 8.2    | 1.2    | 0.6    | 0.0    | 0.0    |
| 77.5° | 1481.7 | 241.5  | 20.5   | 10.6   | 7.0    | 8.2    | 4.1    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 481.2  | 65.6   | 9.4    | 5.9    | 4.1    | 4.7    | 1.8    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 89.1   | 18.8   | 5.3    | 2.9    | 1.2    | 1.2    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 19.3   | 7.6    | 2.9    | 1.2    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 6.4    | 2.3    | 0.6    | 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: SP1-1908-441-9-R4

Test Date: 10/23/2019

Luminaire Tested: SA1C-760-U-5WQ

Data in this report applies to families of products SA1C-760-U-5WQ .

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-9-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-760-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): 5474  
 CIE u': 0.2052  
 CIE v': 0.4804  
 Duv: 0.0025  
 CIE x: 0.3330  
 CIE y: 0.3466  
 CIE z: 0.3204  
 Peak Wavelength (nm): 442  
 Dominant Wavelength (nm): 554  
 Purity: 4.1

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.7 |      |       |
| R1:       | 70.6 | R9:  | -27.1 |
| R2:       | 74.6 | R10: | 40.8  |
| R3:       | 78.3 | R11: | 74.6  |
| R4:       | 73.8 | R12: | 50.4  |
| R5:       | 72.4 | R13: | 70.0  |
| R6:       | 67.5 | R14: | 87.8  |
| R7:       | 77.5 |      |       |
| R8:       | 58.9 |      |       |

Rf: 72.1  
 Rg: 97.2



**Test Conditions**

Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.6/31%  
 Sphere Temperature (°C): 25.9

REPORT NUMBER: SP1-1908-441-9-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 5700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 3540                                 | NR                             | 490               | 33363                                | NR                             | 620               | 80193                                | NR                             | 750               | 4663                                 | NR                             | 880               | 4678                                 | NR                             |
| 365               | 2862                                 | NR                             | 495               | 44177                                | NR                             | 625               | 73091                                | NR                             | 755               | 4147                                 | NR                             | 885               | 4128                                 | NR                             |
| 370               | 2865                                 | NR                             | 500               | 57019                                | NR                             | 630               | 66269                                | NR                             | 760               | 4040                                 | NR                             | 890               | 4504                                 | NR                             |
| 375               | 3254                                 | NR                             | 505               | 70030                                | NR                             | 635               | 60012                                | NR                             | 765               | 3474                                 | NR                             | 895               | 4371                                 | NR                             |
| 380               | 3076                                 | NR                             | 510               | 81972                                | NR                             | 640               | 53914                                | NR                             | 770               | 3469                                 | NR                             | 900               | 4082                                 | NR                             |
| 385               | 2904                                 | NR                             | 515               | 92590                                | NR                             | 645               | 48385                                | NR                             | 775               | 3181                                 | NR                             | 905               | 2982                                 | NR                             |
| 390               | 2689                                 | NR                             | 520               | 100305                               | NR                             | 650               | 43219                                | NR                             | 780               | 2969                                 | NR                             | 910               | 4351                                 | NR                             |
| 395               | 2619                                 | NR                             | 525               | 107452                               | NR                             | 655               | 38562                                | NR                             | 785               | 3132                                 | NR                             | 915               | 3365                                 | NR                             |
| 400               | 2679                                 | NR                             | 530               | 111373                               | NR                             | 660               | 34110                                | NR                             | 790               | 2507                                 | NR                             | 920               | 3430                                 | NR                             |
| 405               | 3515                                 | NR                             | 535               | 114505                               | NR                             | 665               | 30085                                | NR                             | 795               | 2968                                 | NR                             | 925               | 4264                                 | NR                             |
| 410               | 6934                                 | NR                             | 540               | 116408                               | NR                             | 670               | 26205                                | NR                             | 800               | 2758                                 | NR                             | 930               | 4095                                 | NR                             |
| 415               | 14943                                | NR                             | 545               | 118700                               | NR                             | 675               | 22906                                | NR                             | 805               | 2872                                 | NR                             | 935               | 5048                                 | NR                             |
| 420               | 31939                                | NR                             | 550               | 119209                               | NR                             | 680               | 20058                                | NR                             | 810               | 3094                                 | NR                             | 940               | 4074                                 | NR                             |
| 425               | 64701                                | NR                             | 555               | 120742                               | NR                             | 685               | 17413                                | NR                             | 815               | 3222                                 | NR                             | 945               | 4949                                 | NR                             |
| 430               | 110939                               | NR                             | 560               | 121594                               | NR                             | 690               | 15447                                | NR                             | 820               | 3238                                 | NR                             | 950               | 4387                                 | NR                             |
| 435               | 164597                               | NR                             | 565               | 121913                               | NR                             | 695               | 13398                                | NR                             | 825               | 3524                                 | NR                             | 955               | 4978                                 | NR                             |
| 440               | 207696                               | NR                             | 570               | 122147                               | NR                             | 700               | 11777                                | NR                             | 830               | 2921                                 | NR                             | 960               | 4706                                 | NR                             |
| 445               | 201830                               | NR                             | 575               | 121605                               | NR                             | 705               | 10412                                | NR                             | 835               | 3595                                 | NR                             | 965               | 5083                                 | NR                             |
| 450               | 145410                               | NR                             | 580               | 120248                               | NR                             | 710               | 9544                                 | NR                             | 840               | 3016                                 | NR                             | 970               | 4522                                 | NR                             |
| 455               | 89594                                | NR                             | 585               | 117717                               | NR                             | 715               | 8940                                 | NR                             | 845               | 4032                                 | NR                             | 975               | 4740                                 | NR                             |
| 460               | 58321                                | NR                             | 590               | 114359                               | NR                             | 720               | 7897                                 | NR                             | 850               | 3579                                 | NR                             | 980               | 6122                                 | NR                             |
| 465               | 39318                                | NR                             | 595               | 109974                               | NR                             | 725               | 7045                                 | NR                             | 855               | 4571                                 | NR                             | 985               | 6450                                 | NR                             |
| 470               | 27693                                | NR                             | 600               | 105269                               | NR                             | 730               | 6483                                 | NR                             | 860               | 4485                                 | NR                             | 990               | 4875                                 | NR                             |
| 475               | 23081                                | NR                             | 605               | 99453                                | NR                             | 735               | 5838                                 | NR                             | 865               | 3978                                 | NR                             | 995               | 4764                                 | NR                             |
| 480               | 23002                                | NR                             | 610               | 92921                                | NR                             | 740               | 5261                                 | NR                             | 870               | 4298                                 | NR                             | 1000              | 3640                                 | NR                             |
| 485               | 26201                                | NR                             | 615               | 86989                                | NR                             | 745               | 4760                                 | NR                             | 875               | 4356                                 | NR                             |                   |                                      |                                |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 13759.3 S/P: 1.85

| 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    | 3540          | NR            | 490    | 33363         | NR            | 620    | 80193         | NR            | 750    | 4663          | NR            | 880    | 4678          | NR            |
| 365    | 2862          | NR            | 495    | 44177         | NR            | 625    | 73091         | NR            | 755    | 4147          | NR            | 885    | 4128          | NR            |
| 370    | 2865          | NR            | 500    | 57019         | NR            | 630    | 66269         | NR            | 760    | 4040          | NR            | 890    | 4504          | NR            |
| 375    | 3254          | NR            | 505    | 70030         | NR            | 635    | 60012         | NR            | 765    | 3474          | NR            | 895    | 4371          | NR            |
| 380    | 3076          | NR            | 510    | 81972         | NR            | 640    | 53914         | NR            | 770    | 3469          | NR            | 900    | 4082          | NR            |
| 385    | 2904          | NR            | 515    | 92590         | NR            | 645    | 48385         | NR            | 775    | 3181          | NR            | 905    | 2982          | NR            |
| 390    | 2689          | NR            | 520    | 100305        | NR            | 650    | 43219         | NR            | 780    | 2969          | NR            | 910    | 4351          | NR            |
| 395    | 2619          | NR            | 525    | 107452        | NR            | 655    | 38562         | NR            | 785    | 3132          | NR            | 915    | 3365          | NR            |
| 400    | 2679          | NR            | 530    | 111373        | NR            | 660    | 34110         | NR            | 790    | 2507          | NR            | 920    | 3430          | NR            |
| 405    | 3515          | NR            | 535    | 114505        | NR            | 665    | 30085         | NR            | 795    | 2968          | NR            | 925    | 4264          | NR            |
| 410    | 6934          | NR            | 540    | 116408        | NR            | 670    | 26205         | NR            | 800    | 2758          | NR            | 930    | 4095          | NR            |
| 415    | 14943         | NR            | 545    | 118700        | NR            | 675    | 22906         | NR            | 805    | 2872          | NR            | 935    | 5048          | NR            |
| 420    | 31939         | NR            | 550    | 119209        | NR            | 680    | 20058         | NR            | 810    | 3094          | NR            | 940    | 4074          | NR            |
| 425    | 64701         | NR            | 555    | 120742        | NR            | 685    | 17413         | NR            | 815    | 3222          | NR            | 945    | 4949          | NR            |
| 430    | 110939        | NR            | 560    | 121594        | NR            | 690    | 15447         | NR            | 820    | 3238          | NR            | 950    | 4387          | NR            |
| 435    | 164597        | NR            | 565    | 121913        | NR            | 695    | 13398         | NR            | 825    | 3524          | NR            | 955    | 4978          | NR            |
| 440    | 207696        | NR            | 570    | 122147        | NR            | 700    | 11777         | NR            | 830    | 2921          | NR            | 960    | 4706          | NR            |
| 445    | 201830        | NR            | 575    | 121605        | NR            | 705    | 10412         | NR            | 835    | 3595          | NR            | 965    | 5083          | NR            |
| 450    | 145410        | NR            | 580    | 120248        | NR            | 710    | 9544          | NR            | 840    | 3016          | NR            | 970    | 4522          | NR            |
| 455    | 89594         | NR            | 585    | 117717        | NR            | 715    | 8940          | NR            | 845    | 4032          | NR            | 975    | 4740          | NR            |
| 460    | 58321         | NR            | 590    | 114359        | NR            | 720    | 7897          | NR            | 850    | 3579          | NR            | 980    | 6122          | NR            |
| 465    | 39318         | NR            | 595    | 109974        | NR            | 725    | 7045          | NR            | 855    | 4571          | NR            | 985    | 6450          | NR            |
| 470    | 27693         | NR            | 600    | 105269        | NR            | 730    | 6483          | NR            | 860    | 4485          | NR            | 990    | 4875          | NR            |
| 475    | 23081         | NR            | 605    | 99453         | NR            | 735    | 5838          | NR            | 865    | 3978          | NR            | 995    | 4764          | NR            |
| 480    | 23002         | NR            | 610    | 92921         | NR            | 740    | 5261          | NR            | 870    | 4298          | NR            | 1000   | 3640          | NR            |
| 485    | 26201         | NR            | 615    | 86989         | NR            | 745    | 4760          | NR            | 875    | 4356          | NR            |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5527.6 M/P: 0.74**

| 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    | 3540          | NR            | 490    | 33363         | NR            | 620    | 80193         | NR            | 750    | 4663          | NR            | 880    | 4678          | NR            |
| 365    | 2862          | NR            | 495    | 44177         | NR            | 625    | 73091         | NR            | 755    | 4147          | NR            | 885    | 4128          | NR            |
| 370    | 2865          | NR            | 500    | 57019         | NR            | 630    | 66269         | NR            | 760    | 4040          | NR            | 890    | 4504          | NR            |
| 375    | 3254          | NR            | 505    | 70030         | NR            | 635    | 60012         | NR            | 765    | 3474          | NR            | 895    | 4371          | NR            |
| 380    | 3076          | NR            | 510    | 81972         | NR            | 640    | 53914         | NR            | 770    | 3469          | NR            | 900    | 4082          | NR            |
| 385    | 2904          | NR            | 515    | 92590         | NR            | 645    | 48385         | NR            | 775    | 3181          | NR            | 905    | 2982          | NR            |
| 390    | 2689          | NR            | 520    | 100305        | NR            | 650    | 43219         | NR            | 780    | 2969          | NR            | 910    | 4351          | NR            |
| 395    | 2619          | NR            | 525    | 107452        | NR            | 655    | 38562         | NR            | 785    | 3132          | NR            | 915    | 3365          | NR            |
| 400    | 2679          | NR            | 530    | 111373        | NR            | 660    | 34110         | NR            | 790    | 2507          | NR            | 920    | 3430          | NR            |
| 405    | 3515          | NR            | 535    | 114505        | NR            | 665    | 30085         | NR            | 795    | 2968          | NR            | 925    | 4264          | NR            |
| 410    | 6934          | NR            | 540    | 116408        | NR            | 670    | 26205         | NR            | 800    | 2758          | NR            | 930    | 4095          | NR            |
| 415    | 14943         | NR            | 545    | 118700        | NR            | 675    | 22906         | NR            | 805    | 2872          | NR            | 935    | 5048          | NR            |
| 420    | 31939         | NR            | 550    | 119209        | NR            | 680    | 20058         | NR            | 810    | 3094          | NR            | 940    | 4074          | NR            |
| 425    | 64701         | NR            | 555    | 120742        | NR            | 685    | 17413         | NR            | 815    | 3222          | NR            | 945    | 4949          | NR            |
| 430    | 110939        | NR            | 560    | 121594        | NR            | 690    | 15447         | NR            | 820    | 3238          | NR            | 950    | 4387          | NR            |
| 435    | 164597        | NR            | 565    | 121913        | NR            | 695    | 13398         | NR            | 825    | 3524          | NR            | 955    | 4978          | NR            |
| 440    | 207696        | NR            | 570    | 122147        | NR            | 700    | 11777         | NR            | 830    | 2921          | NR            | 960    | 4706          | NR            |
| 445    | 201830        | NR            | 575    | 121605        | NR            | 705    | 10412         | NR            | 835    | 3595          | NR            | 965    | 5083          | NR            |
| 450    | 145410        | NR            | 580    | 120248        | NR            | 710    | 9544          | NR            | 840    | 3016          | NR            | 970    | 4522          | NR            |
| 455    | 89594         | NR            | 585    | 117717        | NR            | 715    | 8940          | NR            | 845    | 4032          | NR            | 975    | 4740          | NR            |
| 460    | 58321         | NR            | 590    | 114359        | NR            | 720    | 7897          | NR            | 850    | 3579          | NR            | 980    | 6122          | NR            |
| 465    | 39318         | NR            | 595    | 109974        | NR            | 725    | 7045          | NR            | 855    | 4571          | NR            | 985    | 6450          | NR            |
| 470    | 27693         | NR            | 600    | 105269        | NR            | 730    | 6483          | NR            | 860    | 4485          | NR            | 990    | 4875          | NR            |
| 475    | 23081         | NR            | 605    | 99453         | NR            | 735    | 5838          | NR            | 865    | 3978          | NR            | 995    | 4764          | NR            |
| 480    | 23002         | NR            | 610    | 92921         | NR            | 740    | 5261          | NR            | 870    | 4298          | NR            | 1000   | 3640          | NR            |
| 485    | 26201         | NR            | 615    | 86989         | NR            | 745    | 4760          | NR            | 875    | 4356          | NR            |        |               |               |





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

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| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 81 | CES79 = 74 |
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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)