

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: P383696

Luminaire Tested: **GLEON-SA9D-735-U-SL2-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P383696  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-21)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA9D-735-U-SL2-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 70 CRI, 3500K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 53522.1 lumens  
Efficiency: N/A  
Efficacy: 93.1 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G5

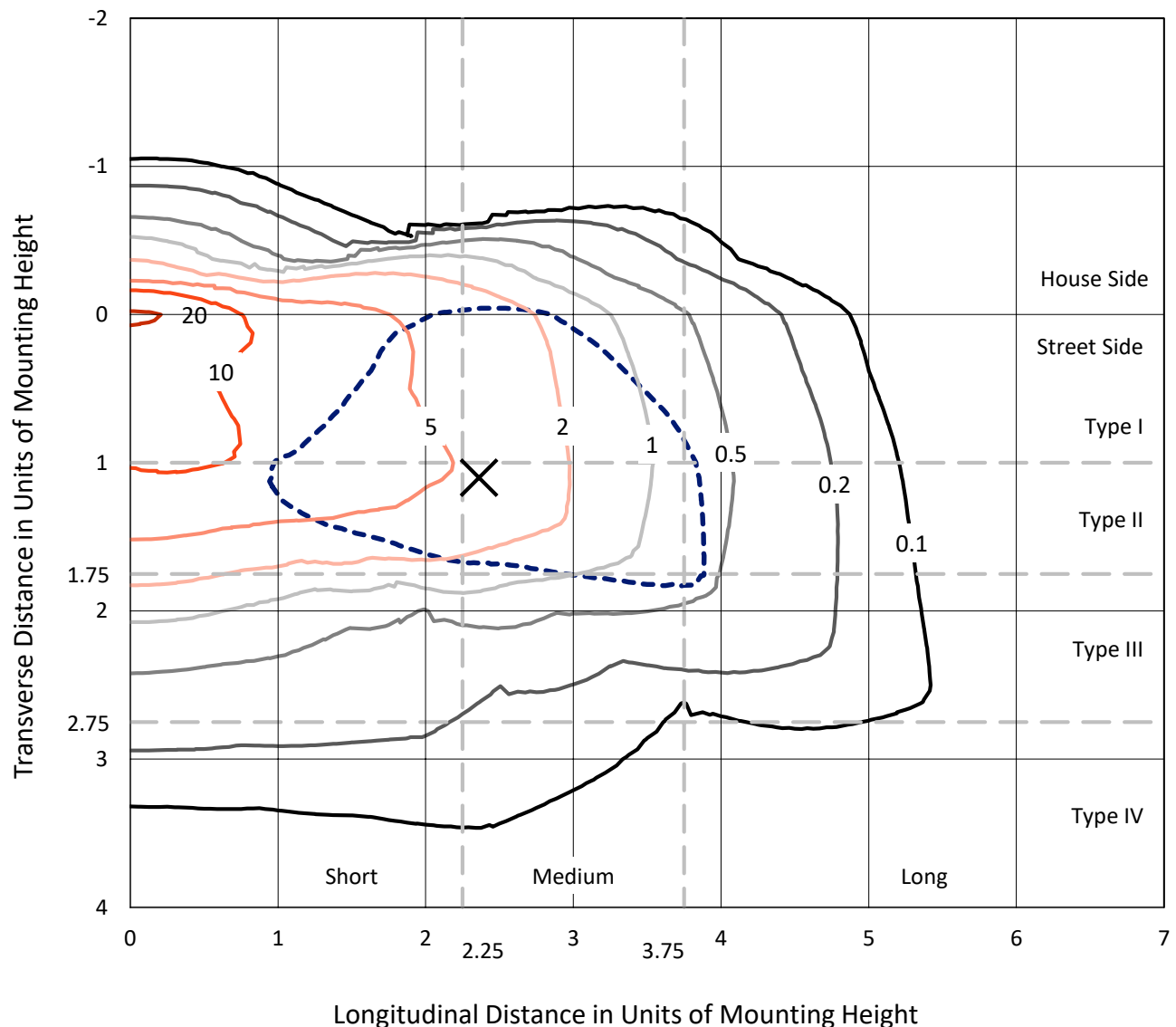
Input Watts (W): 575  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P383696  
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## Iso-Footcandle Lines of Horizontal Illumination

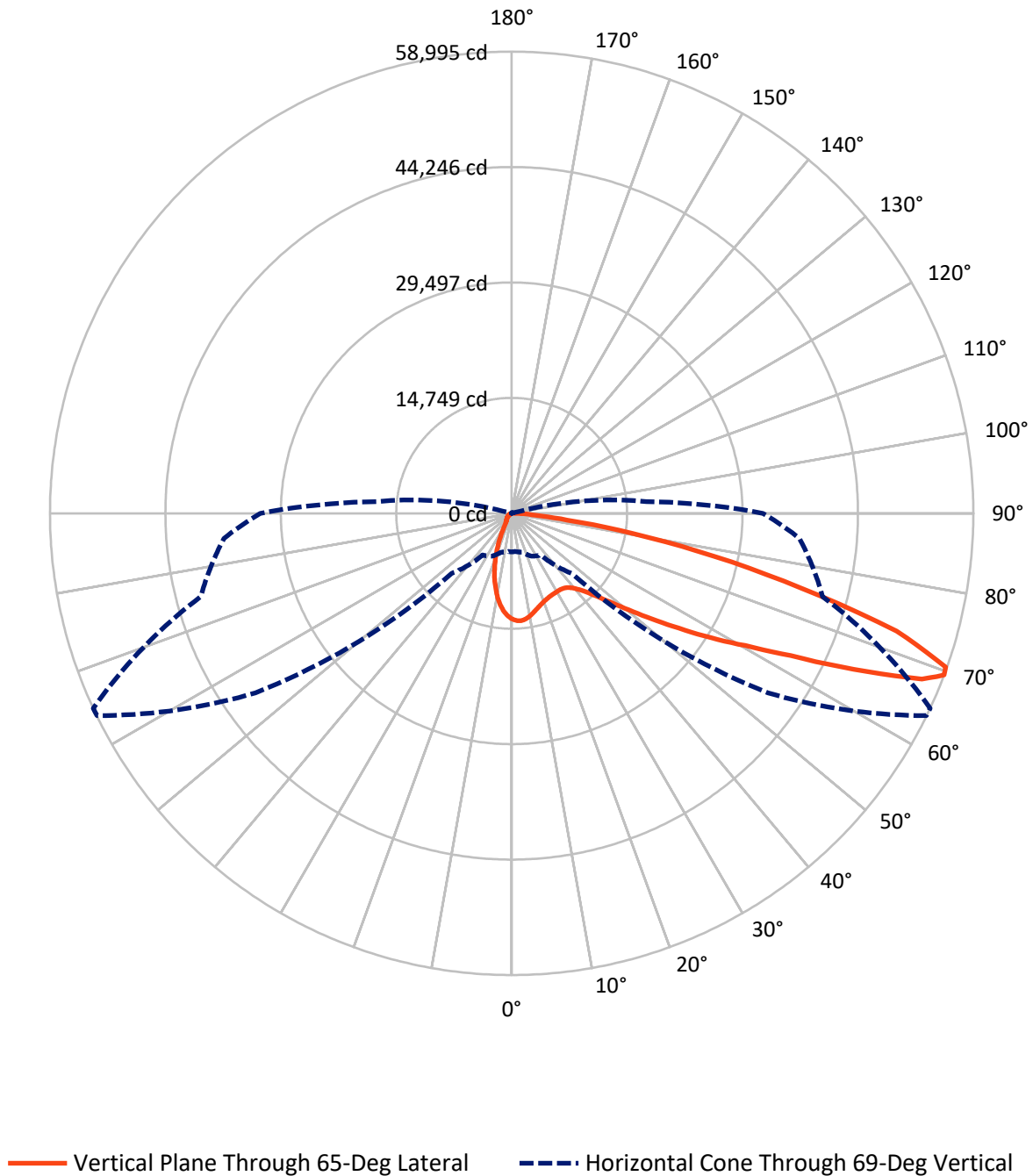
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 21.6 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 6309.0   | 0.0    | 6309.0  |
|                    | % Fixture | 11.8     | 0.0    | 11.8    |
| <b>Street Side</b> | Lumens    | 47213.1  | 0.0    | 47213.1 |
|                    | % Fixture | 88.2     | 0.0    | 88.2    |
| <b>Total</b>       | Lumens    | 53522.1  | 0.0    | 53522.1 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1131.0  | 2.1       |
| 10°-20°   | 2475.8  | 4.6       |
| 20°-30°   | 3429.0  | 6.4       |
| 30°-40°   | 4781.2  | 8.9       |
| 40°-50°   | 7431.5  | 13.9      |
| 50°-60°   | 11930.5 | 22.3      |
| 60°-70°   | 13495.3 | 25.2      |
| 70°-80°   | 7925.9  | 14.8      |
| 80°-90°   | 922.0   | 1.7       |
| 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°    | 53522.1 | 100.0     |
| 0°-180°   | 53522.1 | 100.0     |

**Coefficient of Utilization**



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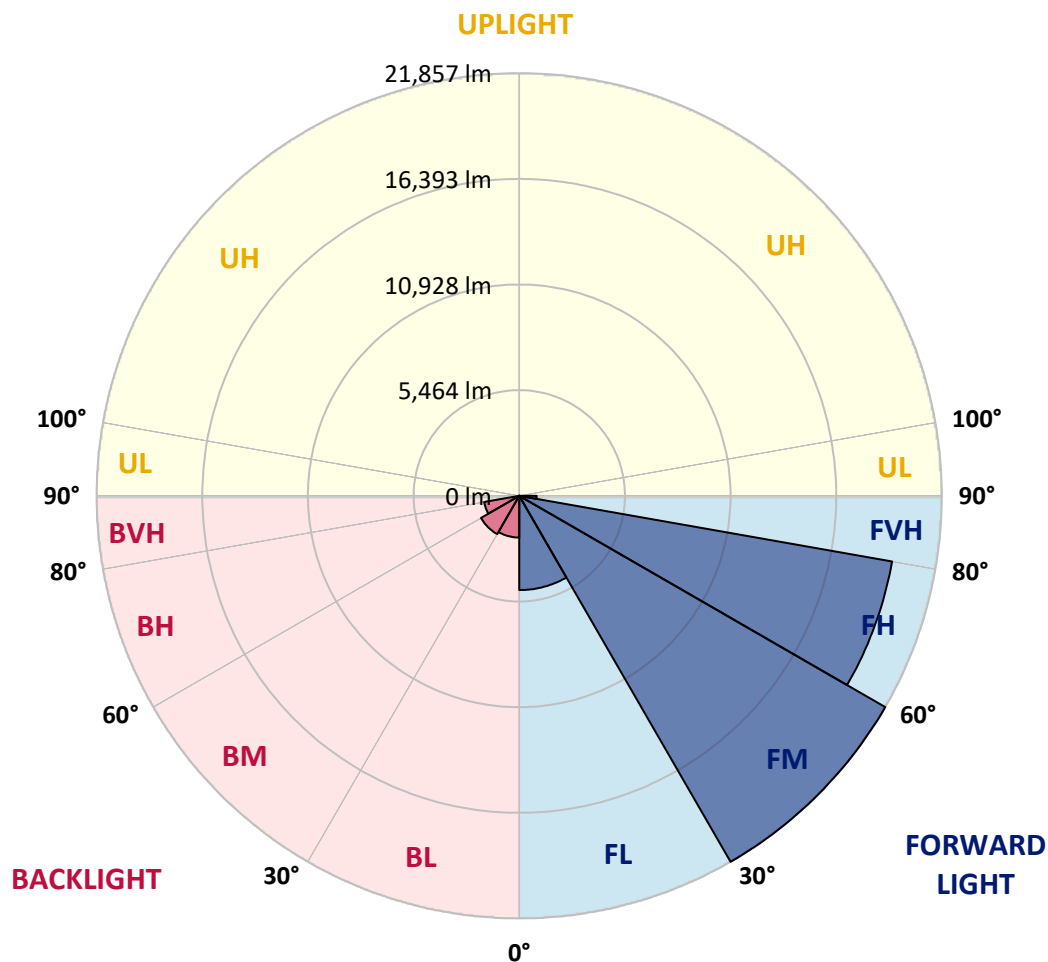
CATALOG NUMBER: GLEON-SA9D-735-U-SL2-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 4877.1  | 9.1       |                         |      |         |
| FM   | (30°-60°)   | 21856.9 | 40.8      |                         |      |         |
| FH   | (60°-80°)   | 19577.8 | 36.6      |                         |      | G5      |
| FVH  | (80°-90°)   | 901.3   | 1.7       |                         |      | G5      |
| BL   | (0°-30°)    | 2158.7  | 4.0       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 2286.2  | 4.3       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1843.4  | 3.4       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 20.7    | 0.0       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G5**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 64°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 |
| 2.5°  | 13645.1 | 13611.2 | 13638.3 | 13697.2 | 13726.7 | 13726.7 | 13749.4 | 13722.2 | 13731.2 | 13665.5 | 13570.4 |
| 5°    | 12791.4 | 12739.3 | 12814.0 | 12979.3 | 13183.2 | 13357.6 | 13615.7 | 13751.6 | 13765.2 | 13767.4 | 13656.5 |
| 7.5°  | 11871.8 | 11824.3 | 11935.3 | 12130.1 | 12392.8 | 12716.6 | 13167.3 | 13561.4 | 13584.0 | 13796.9 | 13715.4 |
| 10°   | 11124.4 | 11090.5 | 11219.6 | 11427.9 | 11736.0 | 12098.3 | 12650.9 | 13199.0 | 13264.7 | 13735.8 | 13706.3 |
| 12.5° | 10531.1 | 10503.9 | 10626.3 | 10866.3 | 11181.1 | 11581.9 | 12159.5 | 12795.8 | 12884.2 | 13597.6 | 13661.0 |
| 15°   | 10098.5 | 10094.0 | 10196.0 | 10426.9 | 10775.7 | 11149.4 | 11740.5 | 12422.2 | 12524.1 | 13448.1 | 13654.3 |
| 17.5° | 9872.1  | 9878.9  | 9953.6  | 10150.6 | 10449.5 | 10821.0 | 11387.1 | 12107.4 | 12218.4 | 13314.5 | 13688.2 |
| 20°   | 9849.4  | 9856.2  | 9896.9  | 10008.0 | 10250.3 | 10578.7 | 11099.6 | 11842.4 | 11957.9 | 13214.8 | 13742.6 |
| 22.5° | 10048.7 | 10044.2 | 10055.5 | 10044.2 | 10180.0 | 10429.2 | 10909.4 | 11638.6 | 11772.2 | 13149.2 | 13785.6 |
| 25°   | 10431.5 | 10424.7 | 10420.1 | 10336.4 | 10245.7 | 10379.4 | 10830.1 | 11523.1 | 11649.9 | 13101.6 | 13810.5 |
| 27.5° | 10963.7 | 10959.2 | 10952.4 | 10814.2 | 10542.4 | 10458.7 | 10839.1 | 11480.0 | 11586.5 | 13063.1 | 13805.9 |
| 30°   | 11663.5 | 11695.2 | 11686.2 | 11493.6 | 11070.1 | 10701.0 | 10934.2 | 11457.4 | 11550.3 | 12988.4 | 13758.4 |
| 32.5° | 12485.6 | 12549.0 | 12598.8 | 12392.8 | 11862.8 | 11181.1 | 11153.9 | 11482.3 | 11550.3 | 12931.7 | 13672.3 |
| 35°   | 13339.4 | 13420.9 | 13604.4 | 13531.9 | 12834.4 | 11903.6 | 11532.1 | 11631.8 | 11688.4 | 12963.4 | 13631.5 |
| 37.5° | 14179.6 | 14277.0 | 14675.6 | 14886.2 | 14107.2 | 12859.3 | 12121.0 | 12000.9 | 12030.4 | 13156.0 | 13676.9 |
| 40°   | 15155.7 | 15303.0 | 15907.7 | 16247.4 | 15626.8 | 14138.8 | 13002.0 | 12635.0 | 12646.4 | 13579.4 | 13887.5 |
| 42.5° | 16437.6 | 16589.4 | 17243.9 | 17776.1 | 17339.0 | 15755.9 | 14197.7 | 13604.4 | 13593.0 | 14372.1 | 14383.5 |
| 45°   | 18000.3 | 18158.8 | 18836.0 | 19427.1 | 19230.0 | 17671.9 | 15728.7 | 15019.9 | 15006.3 | 15622.2 | 15323.3 |
| 47.5° | 19771.4 | 19927.6 | 20532.2 | 21141.5 | 21354.4 | 19909.5 | 17678.7 | 16951.7 | 16920.0 | 17359.4 | 16775.0 |
| 50°   | 21291.0 | 21392.9 | 21950.1 | 22769.8 | 23730.2 | 22658.9 | 20104.2 | 19404.4 | 19370.4 | 19667.1 | 18906.2 |
| 52.5° | 21843.6 | 21902.5 | 22468.6 | 23616.9 | 26013.0 | 26382.2 | 23290.7 | 22389.4 | 22364.5 | 22493.5 | 21743.9 |
| 55°   | 20724.8 | 20831.3 | 21526.5 | 23229.6 | 27249.5 | 30590.1 | 27313.0 | 26085.5 | 25897.5 | 25619.0 | 24710.8 |
| 57.5° | 17676.4 | 17846.3 | 18593.6 | 20858.4 | 26672.1 | 33928.3 | 33223.9 | 30266.2 | 29989.9 | 28286.8 | 27122.8 |
| 60°   | 13244.3 | 13452.7 | 14073.2 | 16516.9 | 23589.7 | 35117.3 | 39683.1 | 34924.8 | 34302.0 | 30411.1 | 29339.9 |
| 62.5° | 9088.5  | 9192.6  | 9613.9  | 11206.1 | 17372.9 | 33169.6 | 45086.7 | 41164.2 | 40027.3 | 32721.2 | 31738.3 |
| 65°   | 6941.5  | 6977.8  | 7149.8  | 7697.9  | 10345.4 | 26943.8 | 47236.0 | 49396.6 | 48021.8 | 35484.2 | 34227.3 |
| 67.5° | 5593.9  | 5564.5  | 5802.3  | 6585.9  | 6927.9  | 16437.6 | 44728.9 | 57185.1 | 56541.9 | 39178.0 | 36732.0 |
| 69°   | 4932.6  | 4891.8  | 5134.2  | 6044.6  | 6506.7  | 10866.3 | 39986.5 | 58953.8 | 58994.6 | 41127.9 | 36904.2 |
| 70°   | 4438.9  | 4466.1  | 4706.2  | 5723.1  | 6364.0  | 8529.1  | 35457.0 | 58503.1 | 58824.7 | 41857.2 | 35871.5 |
| 72.5° | 2964.6  | 3037.0  | 3519.4  | 4751.5  | 6119.3  | 6454.5  | 21408.7 | 50202.9 | 51439.4 | 40215.3 | 30775.7 |
| 75°   | 1671.4  | 1725.8  | 2298.7  | 3582.8  | 5766.1  | 6146.5  | 11308.0 | 36985.7 | 38181.5 | 33629.3 | 23732.4 |
| 77.5° | 819.9   | 849.3   | 1300.0  | 2312.3  | 4821.7  | 5856.6  | 6413.8  | 25122.9 | 26488.6 | 21950.1 | 13423.2 |
| 80°   | 346.5   | 362.4   | 649.9   | 1426.8  | 3446.9  | 5589.4  | 4762.8  | 15461.5 | 15631.4 | 8599.3  | 3576.0  |
| 82.5° | 133.6   | 138.1   | 274.1   | 890.1   | 2190.0  | 4357.4  | 3983.7  | 7331.0  | 7154.4  | 1619.3  | 815.3   |
| 85°   | 15.8    | 18.1    | 99.7    | 534.5   | 1218.5  | 2242.1  | 3236.3  | 3159.3  | 2923.8  | 321.6   | 419.0   |
| 87.5° | 0.0     | 0.0     | 6.8     | 163.0   | 362.4   | 1050.9  | 1682.7  | 1311.3  | 1182.2  | 104.1   | 217.4   |
| 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: P383696

CATALOG NUMBER: GLEON-SA9D-735-U-SL2-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°    | 115°    | 125°    | 135°    | 145°    | 155°    | 165°    | 175°    | 180°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 | 13525.1 |
| 2.5°  | 13491.1 | 13468.5 | 13346.2 | 13169.6 | 13002.0 | 12793.6 | 12594.3 | 12474.3 | 12379.1 | 12315.7 | 12390.5 |
| 5°    | 13527.4 | 13427.7 | 13056.3 | 12580.7 | 12114.2 | 11588.7 | 11099.6 | 10685.1 | 10522.0 | 10340.8 | 10422.4 |
| 7.5°  | 13516.1 | 13328.1 | 12660.0 | 11813.0 | 10956.9 | 10071.3 | 9233.4  | 8587.9  | 8252.8  | 7924.4  | 8008.1  |
| 10°   | 13459.5 | 13142.4 | 12130.1 | 10875.4 | 9593.5  | 8320.7  | 7131.7  | 6228.0  | 5723.1  | 5265.6  | 5331.2  |
| 12.5° | 13334.9 | 12893.3 | 11505.0 | 9801.8  | 8087.4  | 6409.2  | 5016.5  | 3859.1  | 3238.6  | 2964.6  | 2998.6  |
| 15°   | 13260.1 | 12650.9 | 10843.7 | 8714.8  | 6479.5  | 4463.8  | 3066.5  | 2280.6  | 1997.5  | 1906.9  | 1918.2  |
| 17.5° | 13223.9 | 12417.6 | 10159.7 | 7471.4  | 4835.3  | 2842.2  | 1981.7  | 1748.4  | 1687.2  | 1671.4  | 1675.9  |
| 20°   | 13187.6 | 12182.1 | 9455.4  | 6241.6  | 3331.5  | 1911.4  | 1628.3  | 1560.4  | 1537.8  | 1517.4  | 1521.9  |
| 22.5° | 13126.5 | 11955.7 | 8698.9  | 4996.1  | 2246.6  | 1551.4  | 1467.6  | 1401.9  | 1354.3  | 1329.4  | 1334.0  |
| 25°   | 13051.8 | 11717.8 | 7926.6  | 3721.0  | 1639.7  | 1383.7  | 1304.5  | 1211.7  | 1155.0  | 1109.8  | 1112.0  |
| 27.5° | 12931.7 | 11425.7 | 7129.4  | 2708.7  | 1377.0  | 1238.9  | 1132.4  | 1030.5  | 935.4   | 883.3   | 883.3   |
| 30°   | 12764.2 | 11095.0 | 6244.0  | 1938.6  | 1234.3  | 1096.2  | 967.0   | 840.3   | 738.3   | 690.7   | 686.2   |
| 32.5° | 12578.4 | 10750.8 | 5349.3  | 1469.8  | 1121.0  | 962.5   | 815.3   | 681.7   | 591.1   | 552.6   | 550.4   |
| 35°   | 12420.0 | 10379.4 | 4457.1  | 1232.1  | 1007.8  | 833.5   | 672.7   | 559.4   | 486.9   | 455.2   | 452.9   |
| 37.5° | 12318.0 | 10008.0 | 3587.4  | 1100.7  | 905.9   | 713.4   | 564.0   | 462.0   | 409.9   | 385.0   | 382.8   |
| 40°   | 12302.1 | 9731.7  | 2792.4  | 1001.0  | 810.8   | 607.0   | 471.1   | 391.8   | 344.2   | 317.1   | 314.8   |
| 42.5° | 12508.3 | 9573.1  | 2142.5  | 917.2   | 713.4   | 514.1   | 400.8   | 335.2   | 285.3   | 258.2   | 255.9   |
| 45°   | 13049.5 | 9623.0  | 1648.7  | 842.5   | 616.0   | 434.8   | 339.7   | 278.5   | 233.3   | 212.9   | 208.4   |
| 47.5° | 14036.9 | 9967.2  | 1311.3  | 767.8   | 523.2   | 369.2   | 289.9   | 231.0   | 192.5   | 172.1   | 169.8   |
| 50°   | 15794.4 | 10775.7 | 1096.2  | 686.2   | 437.1   | 314.8   | 240.1   | 188.0   | 156.3   | 138.1   | 135.9   |
| 52.5° | 18127.1 | 12216.1 | 978.4   | 607.0   | 362.4   | 267.3   | 197.0   | 149.5   | 122.3   | 108.7   | 106.5   |
| 55°   | 20699.8 | 13960.0 | 901.4   | 520.9   | 296.7   | 222.0   | 156.3   | 117.7   | 95.1    | 83.8    | 79.3    |
| 57.5° | 23211.5 | 15470.6 | 828.9   | 437.1   | 246.9   | 181.2   | 124.5   | 92.9    | 74.7    | 63.4    | 61.1    |
| 60°   | 25519.3 | 16858.9 | 745.1   | 351.0   | 201.6   | 142.7   | 97.3    | 72.5    | 58.9    | 47.6    | 47.6    |
| 62.5° | 27990.1 | 17932.3 | 629.6   | 274.1   | 165.3   | 108.7   | 79.3    | 65.7    | 47.6    | 40.8    | 38.5    |
| 65°   | 30608.1 | 18729.5 | 493.7   | 212.9   | 129.1   | 81.5    | 65.7    | 67.9    | 38.5    | 29.4    | 27.2    |
| 67.5° | 32542.3 | 18571.0 | 364.6   | 167.6   | 99.7    | 63.4    | 63.4    | 72.5    | 34.0    | 22.6    | 20.4    |
| 69°   | 32116.5 | 17282.4 | 305.7   | 144.9   | 86.1    | 54.3    | 58.9    | 72.5    | 31.7    | 20.4    | 18.1    |
| 70°   | 30882.2 | 15855.6 | 269.5   | 129.1   | 77.0    | 49.8    | 56.6    | 70.2    | 29.4    | 20.4    | 18.1    |
| 72.5° | 25718.5 | 11942.1 | 210.6   | 97.3    | 61.1    | 40.8    | 47.6    | 61.1    | 29.4    | 20.4    | 15.8    |
| 75°   | 19345.5 | 7643.5  | 160.8   | 70.2    | 45.3    | 31.7    | 36.2    | 45.3    | 29.4    | 18.1    | 15.8    |
| 77.5° | 10526.6 | 2756.2  | 115.5   | 47.6    | 31.7    | 24.9    | 24.9    | 34.0    | 27.2    | 13.6    | 9.0     |
| 80°   | 2706.4  | 693.0   | 72.5    | 31.7    | 24.9    | 18.1    | 15.8    | 22.6    | 15.8    | 2.2     | 0.0     |
| 82.5° | 668.1   | 156.3   | 38.5    | 22.6    | 18.1    | 6.8     | 6.8     | 11.4    | 6.8     | 0.0     | 0.0     |
| 85°   | 366.9   | 77.0    | 24.9    | 15.8    | 9.0     | 0.0     | 0.0     | 2.2     | 0.0     | 0.0     | 0.0     |
| 87.5° | 188.0   | 22.6    | 6.8     | 4.6     | 2.2     | 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     |

LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

All Brands

Data applicable to all product families using SA light engines

Report Number: SP1-2101-121-7

Luminaire Tested: IFLD-S-SA2A-735-U-T2

Test Date: 03/04/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/04/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-735-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3388   | CRI (Ra): | 73.1 |      |       |
| CIE u':                   | 0.2371 | R1:       | 68.9 | R9:  | -34.6 |
| CIE v':                   | 0.5177 | R2:       | 81.1 | R10: | 57.8  |
| Duv:                      | 0.0032 | R3:       | 93.1 | R11: | 68.6  |
| CIE x:                    | 0.4153 | R4:       | 71.6 | R12: | 53.9  |
| CIE y:                    | 0.4030 | R5:       | 69.4 | R13: | 70.9  |
| CIE z:                    | 0.1817 | R6:       | 75.0 | R14: | 96.2  |
| Peak Wavelength (nm):     | 590    | R7:       | 79.5 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 46.4 |      |       |
| Purity:                   | 45.7   |           |      |      |       |
| Rf:                       | 76.9   |           |      |      |       |
| Rg:                       | 94.4   |           |      |      |       |



### Test Conditions

Stabilization Time: 81M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0/30%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2101-121-7

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

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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 3500K 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       | 2672             | 0.0              | 490       | 34553            | 4.9              | 620       | 136720           | 35.6             | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 8.0              | 625       | 126308           | 27.9             | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 12.1             | 630       | 114625           | 20.7             | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 18.1             | 635       | 103216           | 15.5             | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 25.4             | 640       | 92605            | 11.1             | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 33.9             | 645       | 83234            | 8.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 43.0             | 650       | 73263            | 5.4              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 50.1             | 655       | 64627            | 3.7              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 57.9             | 660       | 56614            | 2.4              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 64.0             | 665       | 49537            | 1.6              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.0              | 540       | 107316           | 69.9             | 670       | 42866            | 0.9              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.0              | 545       | 113101           | 75.3             | 675       | 36708            | 0.6              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 0.0              | 550       | 120690           | 82.0             | 680       | 31814            | 0.4              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 0.1              | 555       | 128583           | 87.8             | 685       | 27485            | 0.2              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 0.3              | 560       | 137796           | 93.6             | 690       | 23698            | 0.1              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 0.8              | 565       | 146577           | 97.5             | 695       | 20309            | 0.1              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 1.6              | 570       | 154581           | 100.5            | 700       | 17890            | 0.1              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 2.4              | 575       | 162633           | 101.2            | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 2.5              | 580       | 168101           | 99.9             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 2.1              | 585       | 173145           | 96.2             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 1.8              | 590       | 174675           | 90.3             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 1.7              | 595       | 173724           | 82.3             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 1.5              | 600       | 171241           | 73.8             | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 1.7              | 605       | 165134           | 64.0             | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 2.2              | 610       | 156652           | 53.8             | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 3.3              | 615       | 147879           | 44.6             | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 12126

S/P: 1.36

| 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       | 2672             | 0.0              | 490       | 34553            | 53.2             | 620       | 136720           | 1.7              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 71.7             | 625       | 126308           | 1.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 91.4             | 630       | 114625           | 0.6              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 110.0            | 635       | 103216           | 0.4              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 125.1            | 640       | 92605            | 0.2              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 135.7            | 645       | 83234            | 0.1              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 140.8            | 650       | 73263            | 0.1              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 139.6            | 655       | 64627            | 0.1              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 135.7            | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.1              | 535       | 103269           | 128.7            | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.2              | 540       | 107316           | 118.6            | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.6              | 545       | 113101           | 108.4            | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 2.0              | 550       | 120690           | 98.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 5.9              | 555       | 128583           | 87.9             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 14.3             | 560       | 137796           | 77.0             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 30.5             | 565       | 146577           | 65.8             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 55.5             | 570       | 154581           | 54.6             | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 77.4             | 575       | 162633           | 44.3             | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 73.6             | 580       | 168101           | 34.6             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 53.7             | 585       | 173145           | 26.5             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 41.9             | 590       | 174675           | 19.5             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 34.3             | 595       | 173724           | 13.9             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 27.9             | 600       | 171241           | 9.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 27.1             | 605       | 165134           | 6.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 31.3             | 610       | 156652           | 4.2              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 40.0             | 615       | 147879           | 2.7              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: 4490.7

M/P: 0.5

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2672             | 0.0              | 490       | 34553            | 28.8             | 620       | 136720           | 0.1              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 36.6             | 625       | 126308           | 0.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 43.9             | 630       | 114625           | 0.0              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 49.6             | 635       | 103216           | 0.0              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 53.0             | 640       | 92605            | 0.0              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 53.5             | 645       | 83234            | 0.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 51.6             | 650       | 73263            | 0.0              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 47.3             | 655       | 64627            | 0.0              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 42.5             | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 37.2             | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.1              | 540       | 107316           | 31.4             | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.4              | 545       | 113101           | 26.3             | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 1.4              | 550       | 120690           | 21.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 3.7              | 555       | 128583           | 17.3             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 8.9              | 560       | 137796           | 13.6             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 18.2             | 565       | 146577           | 10.3             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 33.2             | 570       | 154581           | 7.6              | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 45.6             | 575       | 162633           | 5.4              | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 43.8             | 580       | 168101           | 3.8              | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 32.2             | 585       | 173145           | 2.6              | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 25.6             | 590       | 174675           | 1.7              | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 21.2             | 595       | 173724           | 1.1              | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 17.4             | 600       | 171241           | 0.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 16.6             | 605       | 165134           | 0.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 18.6             | 610       | 156652           | 0.3              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 22.7             | 615       | 147879           | 0.2              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 76.9$   
 $R_g = 94.4$   
 CIE  $R_a = 73.1$   
 $R_g = -34.6$

### Spectral Power Distribution Comparison



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 88 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 84 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 75 | CES81 = 75 |
| CES07 = 40 | CES32 = 67 | CES57 = 74 | CES82 = 94 |
| CES08 = 39 | CES33 = 74 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 78 | CES59 = 87 | CES84 = 89 |
| CES10 = 75 | CES35 = 89 | CES60 = 93 | CES85 = 80 |
| CES11 = 58 | CES36 = 98 | CES61 = 86 | CES86 = 66 |
| CES12 = 64 | CES37 = 86 | CES62 = 89 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 68 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 88 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 82 | CES94 = 52 |
| CES20 = 65 | CES45 = 87 | CES70 = 67 | CES95 = 69 |
| CES21 = 86 | CES46 = 82 | CES71 = 66 | CES96 = 78 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 59 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 88 | CES75 = 66 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)