

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: P383665

Luminaire Tested: **GLEON-SA9C-735-U-AFL-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P383665  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-30)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA9C-735-U-AFL-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 70 CRI, 3500K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND AUTOMOTIVE  
FRONTLINE OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 48221.6 lumens  
Efficiency: N/A  
Efficacy: 96.3 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G3

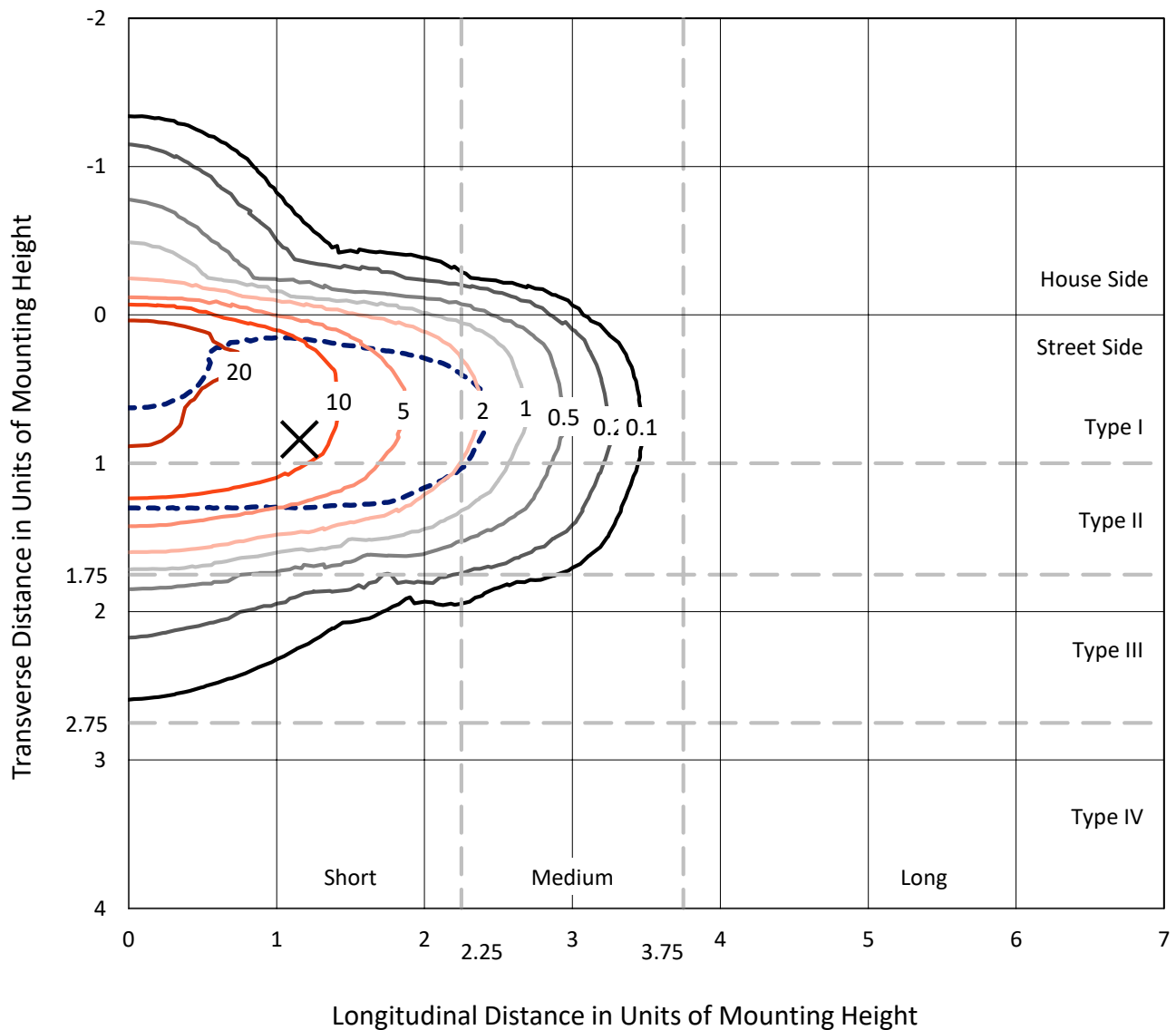
Input Watts (W): 501  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P383665  
 CATALOG NUMBER: GLEON-SA9C-735-U-AFL-HSS

## Iso-Footcandle Lines of Horizontal Illumination

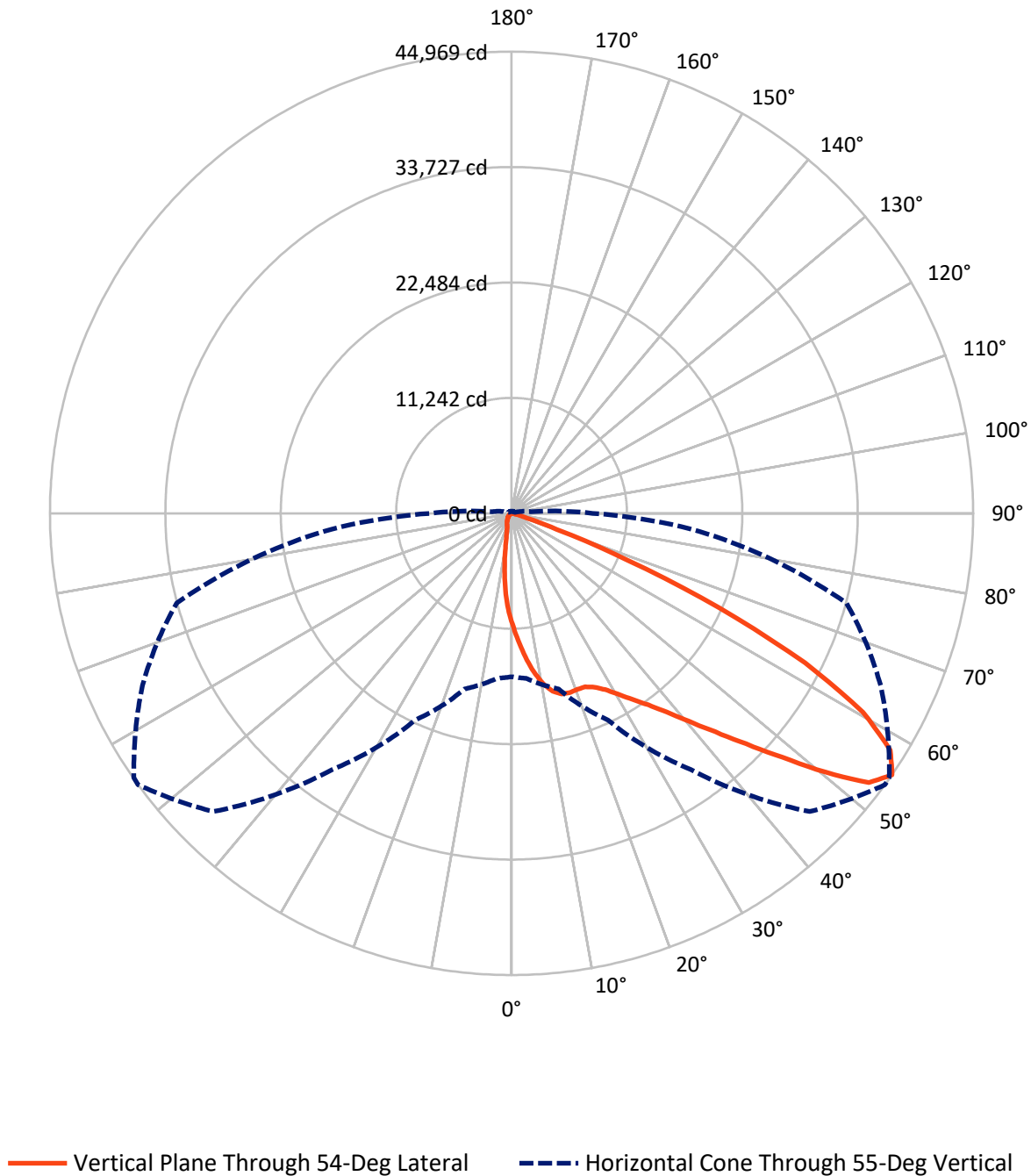
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 26.5 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA9C-735-U-AFL-HSS

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2405.9   | 0.0    | 2405.9  |
|                    | % Fixture | 5.0      | 0.0    | 5.0     |
| <b>Street Side</b> | Lumens    | 45815.7  | 0.0    | 45815.7 |
|                    | % Fixture | 95.0     | 0.0    | 95.0    |
| <b>Total</b>       | Lumens    | 48221.6  | 0.0    | 48221.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 994.5   | 2.1       |
| 10°-20°   | 2727.5  | 5.7       |
| 20°-30°   | 4656.8  | 9.7       |
| 30°-40°   | 7473.4  | 15.5      |
| 40°-50°   | 11942.5 | 24.8      |
| 50°-60°   | 12796.7 | 26.5      |
| 60°-70°   | 6570.2  | 13.6      |
| 70°-80°   | 995.2   | 2.1       |
| 80°-90°   | 64.8    | 0.1       |
| 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°    | 48221.6 | 100.0     |
| 0°-180°   | 48221.6 | 100.0     |

**Coefficient of Utilization**



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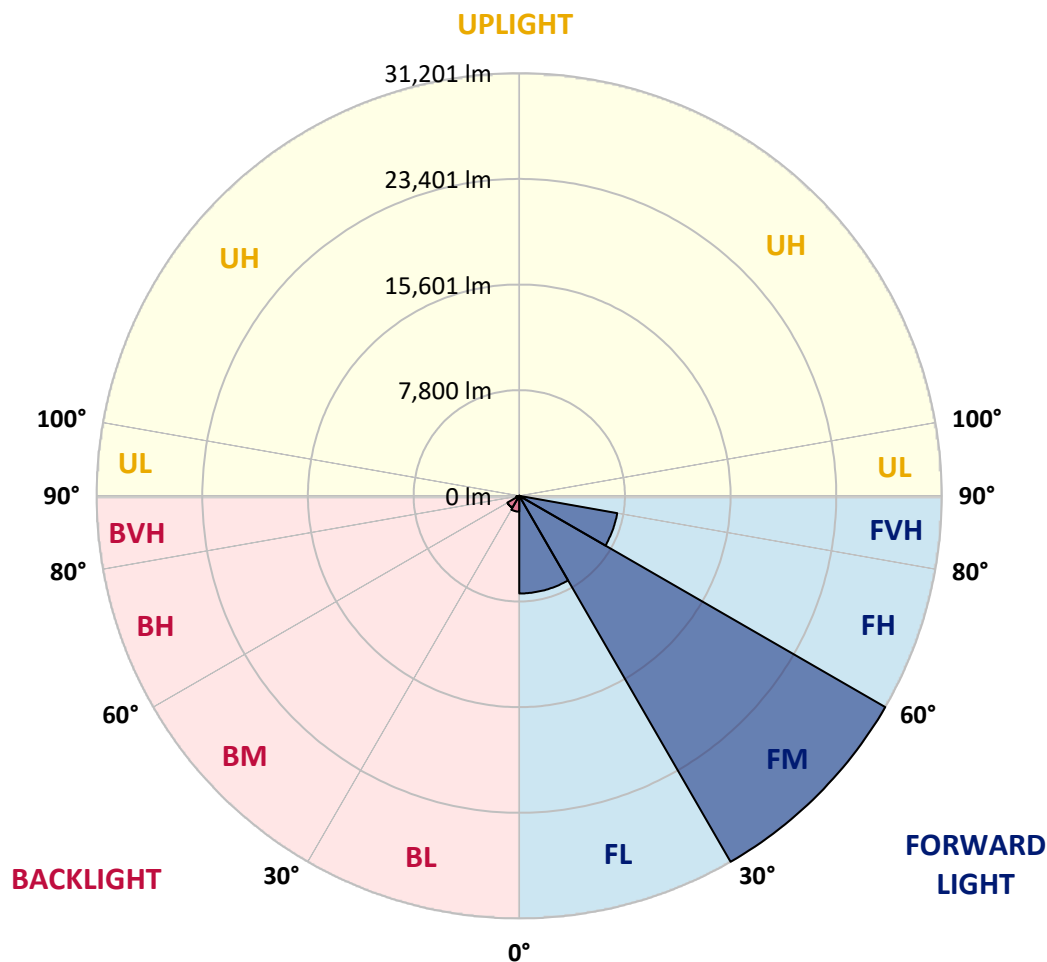
CATALOG NUMBER: GLEON-SA9C-735-U-AFL-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 7208.3  | 14.9      |                         |      |         |
| FM   | (30°-60°)   | 31201.5 | 64.7      |                         |      |         |
| FH   | (60°-80°)   | 7343.7  | 15.2      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 62.2    | 0.1       |                         |      | G1/100  |
| BL   | (0°-30°)    | 1170.6  | 2.4       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 1011.0  | 2.1       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 221.7   | 0.5       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 2.6     | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**

Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 54°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 |
| 2.5°  | 13552.7 | 13350.8 | 13357.0 | 13265.3 | 12930.1 | 12667.7 | 12394.9 | 12330.3 | 11905.5 | 11459.8 | 11030.8 |
| 5°    | 15895.5 | 15747.6 | 15712.2 | 15535.2 | 15068.7 | 14575.2 | 14046.2 | 13923.4 | 13092.5 | 12180.4 | 11282.8 |
| 7.5°  | 17099.2 | 17101.3 | 17072.1 | 17007.5 | 16716.0 | 16237.1 | 15591.5 | 15462.4 | 14331.6 | 12963.4 | 11545.2 |
| 10°   | 16749.3 | 16828.4 | 16990.9 | 17205.4 | 17428.2 | 17367.8 | 16882.6 | 16766.0 | 15537.3 | 13792.2 | 11836.8 |
| 12.5° | 15933.0 | 15943.4 | 16124.5 | 16476.5 | 17117.9 | 17776.0 | 17784.3 | 17744.8 | 16689.0 | 14658.6 | 12157.4 |
| 15°   | 15526.9 | 15566.4 | 15633.1 | 15860.1 | 16468.2 | 17521.9 | 18275.8 | 18332.0 | 17744.8 | 15578.9 | 12498.9 |
| 17.5° | 15793.5 | 15849.7 | 15793.5 | 15820.6 | 16172.5 | 17120.0 | 18361.2 | 18504.8 | 18667.3 | 16489.0 | 12821.7 |
| 20°   | 16516.1 | 16568.1 | 16468.2 | 16357.8 | 16426.5 | 17003.4 | 18300.7 | 18494.4 | 19389.9 | 17297.0 | 13092.5 |
| 22.5° | 17490.6 | 17511.5 | 17359.5 | 17178.3 | 17128.4 | 17399.1 | 18350.7 | 18550.7 | 19968.8 | 18028.0 | 13263.3 |
| 25°   | 18563.1 | 18581.9 | 18392.4 | 18184.2 | 18065.4 | 18175.8 | 18761.0 | 18910.9 | 20479.0 | 18725.6 | 13361.1 |
| 27.5° | 19731.4 | 19748.1 | 19510.7 | 19254.5 | 19117.1 | 19121.2 | 19437.8 | 19598.2 | 21022.5 | 19521.0 | 13440.3 |
| 30°   | 20966.3 | 20958.0 | 20739.3 | 20383.2 | 20208.3 | 20204.1 | 20412.4 | 20574.8 | 21809.7 | 20541.5 | 13548.5 |
| 32.5° | 22353.2 | 22336.6 | 22026.3 | 21584.8 | 21386.9 | 21416.1 | 21601.5 | 21695.2 | 22786.4 | 21628.6 | 13742.2 |
| 35°   | 24179.5 | 24131.6 | 23663.1 | 23115.4 | 22751.0 | 22740.6 | 22896.8 | 22971.8 | 24031.7 | 22944.7 | 14065.0 |
| 37.5° | 26549.4 | 26505.7 | 25870.6 | 25075.0 | 24562.8 | 24371.1 | 24556.5 | 24652.3 | 25808.1 | 24633.6 | 14583.6 |
| 40°   | 28886.0 | 28842.2 | 28465.3 | 27736.5 | 26947.2 | 26487.0 | 26632.8 | 26734.8 | 28025.9 | 26682.7 | 15237.4 |
| 42.5° | 30497.8 | 30535.3 | 30666.5 | 30726.8 | 29987.5 | 29021.3 | 29087.9 | 29194.1 | 30356.2 | 28873.5 | 15985.1 |
| 45°   | 30922.6 | 31003.9 | 31745.2 | 33200.8 | 33477.8 | 32724.0 | 32026.3 | 32084.6 | 32724.0 | 31064.2 | 16732.6 |
| 47.5° | 29646.0 | 29796.0 | 31226.7 | 33933.9 | 36278.7 | 36811.9 | 35491.6 | 35414.5 | 34995.9 | 32836.4 | 17263.7 |
| 50°   | 26745.2 | 26882.6 | 28736.0 | 32740.6 | 37128.4 | 40714.4 | 39644.0 | 39417.0 | 36988.9 | 33896.4 | 17451.1 |
| 52.5° | 22546.9 | 22713.6 | 24219.1 | 28983.8 | 35527.0 | 42455.4 | 43575.7 | 43386.2 | 38450.7 | 33979.7 | 17482.4 |
| 55°   | 15922.6 | 16124.5 | 17717.7 | 22213.7 | 30452.0 | 41070.5 | 44968.9 | 44912.6 | 39664.8 | 33758.9 | 17549.0 |
| 57.5° | 8948.4  | 9094.1  | 10812.2 | 14239.9 | 22303.3 | 35772.7 | 43513.2 | 43886.0 | 40397.9 | 33375.8 | 17648.9 |
| 60°   | 3973.3  | 4012.9  | 4902.2  | 7088.7  | 13057.1 | 27338.7 | 39346.2 | 39975.1 | 39769.0 | 32863.5 | 17817.6 |
| 62.5° | 2203.3  | 2169.9  | 2169.9  | 2946.7  | 5674.7  | 16924.3 | 32084.6 | 33123.8 | 37084.6 | 32257.4 | 17825.9 |
| 65°   | 1726.3  | 1695.1  | 1605.6  | 1618.1  | 2161.6  | 7511.4  | 22217.9 | 24065.0 | 31986.7 | 30481.2 | 17226.2 |
| 67.5° | 1464.0  | 1436.9  | 1347.4  | 1312.0  | 1343.2  | 2478.1  | 12207.5 | 14125.4 | 24271.2 | 25864.3 | 14920.9 |
| 70°   | 1237.0  | 1218.3  | 1172.4  | 1128.7  | 1049.6  | 1224.5  | 4671.0  | 5974.6  | 14956.3 | 17205.4 | 10185.4 |
| 72.5° | 995.5   | 987.1   | 1003.7  | 966.3   | 870.4   | 816.3   | 1597.2  | 1934.6  | 6718.0  | 7678.1  | 4196.2  |
| 75°   | 858.0   | 853.9   | 862.1   | 824.7   | 716.4   | 568.5   | 812.1   | 887.1   | 1895.0  | 1878.4  | 849.7   |
| 77.5° | 558.1   | 564.3   | 714.3   | 697.6   | 616.4   | 379.0   | 420.7   | 453.9   | 574.8   | 431.0   | 258.2   |
| 80°   | 356.1   | 351.9   | 362.4   | 579.0   | 553.9   | 289.4   | 210.3   | 220.8   | 276.9   | 212.4   | 124.9   |
| 82.5° | 216.6   | 212.4   | 237.4   | 270.7   | 279.1   | 202.0   | 129.1   | 131.2   | 172.8   | 137.4   | 66.6    |
| 85°   | 18.7    | 25.0    | 143.6   | 133.3   | 95.8    | 62.5    | 62.5    | 66.6    | 91.7    | 81.2    | 37.4    |
| 87.5° | 0.0     | 0.0     | 25.0    | 37.4    | 20.9    | 22.9    | 22.9    | 25.0    | 35.4    | 35.4    | 18.7    |
| 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: P383665

CATALOG NUMBER: GLEON-SA9C-735-U-AFL-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°    | 115°    | 125°    | 135°    | 145°    | 155°    | 165°    | 175°    | 180°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 | 10799.7 |
| 2.5°  | 10808.0 | 10591.4 | 10154.1 | 9733.5  | 9377.3  | 9033.8  | 8642.2  | 8254.9  | 8073.7  | 8000.9  | 7925.9  |
| 5°    | 10826.7 | 10381.1 | 9479.4  | 8571.4  | 7630.2  | 6782.6  | 6060.0  | 5318.7  | 4947.9  | 4785.5  | 4710.6  |
| 7.5°  | 10851.8 | 10172.9 | 8715.2  | 7190.8  | 5674.7  | 4525.2  | 3521.4  | 2875.9  | 2596.9  | 2553.1  | 2444.8  |
| 10°   | 10855.9 | 9920.9  | 7828.0  | 5666.4  | 3804.7  | 2728.0  | 2099.1  | 1765.9  | 1643.1  | 1622.3  | 1586.8  |
| 12.5° | 10864.3 | 9623.1  | 6843.0  | 4196.2  | 2536.4  | 1824.2  | 1518.1  | 1407.8  | 1374.4  | 1372.4  | 1372.4  |
| 15°   | 10889.2 | 9310.7  | 5820.5  | 3023.7  | 1822.2  | 1445.2  | 1332.8  | 1289.1  | 1276.6  | 1282.8  | 1280.7  |
| 17.5° | 10889.2 | 8942.1  | 4816.8  | 2253.2  | 1472.3  | 1299.4  | 1237.0  | 1207.8  | 1203.7  | 1209.9  | 1212.0  |
| 20°   | 10810.1 | 8494.4  | 3896.3  | 1753.5  | 1305.8  | 1205.8  | 1149.5  | 1122.4  | 1112.1  | 1116.2  | 1118.3  |
| 22.5° | 10620.6 | 7944.6  | 3146.6  | 1451.4  | 1195.4  | 1120.4  | 1060.0  | 1018.4  | 1001.7  | 1003.7  | 1003.7  |
| 25°   | 10324.9 | 7292.8  | 2461.5  | 1255.7  | 1105.7  | 1028.7  | 957.9   | 910.0   | 899.6   | 897.5   | 901.7   |
| 27.5° | 9945.9  | 6572.3  | 1959.6  | 1105.7  | 999.6   | 926.7   | 855.9   | 816.3   | 808.0   | 810.1   | 812.1   |
| 30°   | 9573.1  | 5824.7  | 1545.2  | 978.8   | 880.9   | 812.1   | 758.0   | 739.3   | 739.3   | 745.5   | 747.6   |
| 32.5° | 9231.6  | 5106.2  | 1222.4  | 868.4   | 774.7   | 712.2   | 681.0   | 678.9   | 689.3   | 693.4   | 695.6   |
| 35°   | 8937.9  | 4441.9  | 1012.1  | 783.0   | 691.4   | 637.3   | 626.8   | 635.1   | 647.6   | 656.0   | 658.0   |
| 37.5° | 8729.7  | 3848.4  | 885.1   | 712.2   | 626.8   | 583.1   | 581.0   | 597.7   | 614.4   | 633.1   | 637.3   |
| 40°   | 8642.2  | 3346.5  | 797.6   | 649.8   | 574.8   | 541.4   | 535.2   | 558.1   | 589.3   | 616.4   | 620.6   |
| 42.5° | 8569.4  | 2936.2  | 722.6   | 589.3   | 533.1   | 485.2   | 483.1   | 512.3   | 549.8   | 576.8   | 583.1   |
| 45°   | 8506.9  | 2607.2  | 653.9   | 524.7   | 479.0   | 416.5   | 422.7   | 460.2   | 489.3   | 518.5   | 524.7   |
| 47.5° | 8377.8  | 2336.5  | 579.0   | 456.1   | 395.6   | 356.1   | 368.6   | 402.0   | 424.8   | 468.6   | 474.8   |
| 50°   | 8146.7  | 2115.8  | 501.9   | 372.8   | 322.8   | 308.2   | 327.0   | 349.9   | 379.0   | 416.5   | 420.7   |
| 52.5° | 7990.4  | 1949.2  | 435.2   | 312.3   | 266.5   | 270.7   | 289.4   | 297.8   | 314.5   | 329.0   | 324.8   |
| 55°   | 7900.9  | 1857.6  | 381.1   | 270.7   | 227.0   | 239.5   | 243.7   | 233.3   | 224.9   | 210.3   | 204.1   |
| 57.5° | 7890.5  | 1774.2  | 339.5   | 235.3   | 199.9   | 206.2   | 191.6   | 156.2   | 127.1   | 110.4   | 106.2   |
| 60°   | 7873.8  | 1672.2  | 306.1   | 197.9   | 177.0   | 168.7   | 137.4   | 85.4    | 60.4    | 56.3    | 56.3    |
| 62.5° | 7692.6  | 1514.0  | 281.1   | 166.6   | 150.0   | 127.1   | 79.1    | 39.6    | 33.3    | 35.4    | 35.4    |
| 65°   | 7115.8  | 1293.2  | 256.2   | 135.4   | 118.7   | 91.7    | 39.6    | 22.9    | 12.5    | 14.5    | 14.5    |
| 67.5° | 6049.6  | 1030.9  | 229.1   | 104.1   | 89.5    | 58.3    | 22.9    | 10.4    | 0.0     | 0.0     | 0.0     |
| 70°   | 4050.4  | 639.3   | 193.7   | 72.8    | 58.3    | 35.4    | 16.7    | 2.0     | 0.0     | 0.0     | 0.0     |
| 72.5° | 1553.5  | 345.7   | 156.2   | 43.7    | 37.4    | 25.0    | 10.4    | 0.0     | 0.0     | 0.0     | 0.0     |
| 75°   | 349.9   | 227.0   | 108.2   | 31.2    | 27.1    | 16.7    | 4.2     | 0.0     | 0.0     | 0.0     | 0.0     |
| 77.5° | 133.3   | 164.5   | 62.5    | 20.9    | 18.7    | 10.4    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |
| 80°   | 64.6    | 97.9    | 29.2    | 12.5    | 10.4    | 4.2     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |
| 82.5° | 33.3    | 37.4    | 12.5    | 6.2     | 4.2     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |
| 85°   | 18.7    | 18.7    | 6.2     | 4.2     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |
| 87.5° | 10.4    | 6.2     | 2.0     | 2.0     | 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     |

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)