

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: P318739

Luminaire Tested: **GLEON-SA5D-740-U-T4FT**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P318739  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-16)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA5D-740-U-T4FT  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(5) 70 CRI, 4000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 39014 lumens  
Efficiency: N/A  
Efficacy: 121.9 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

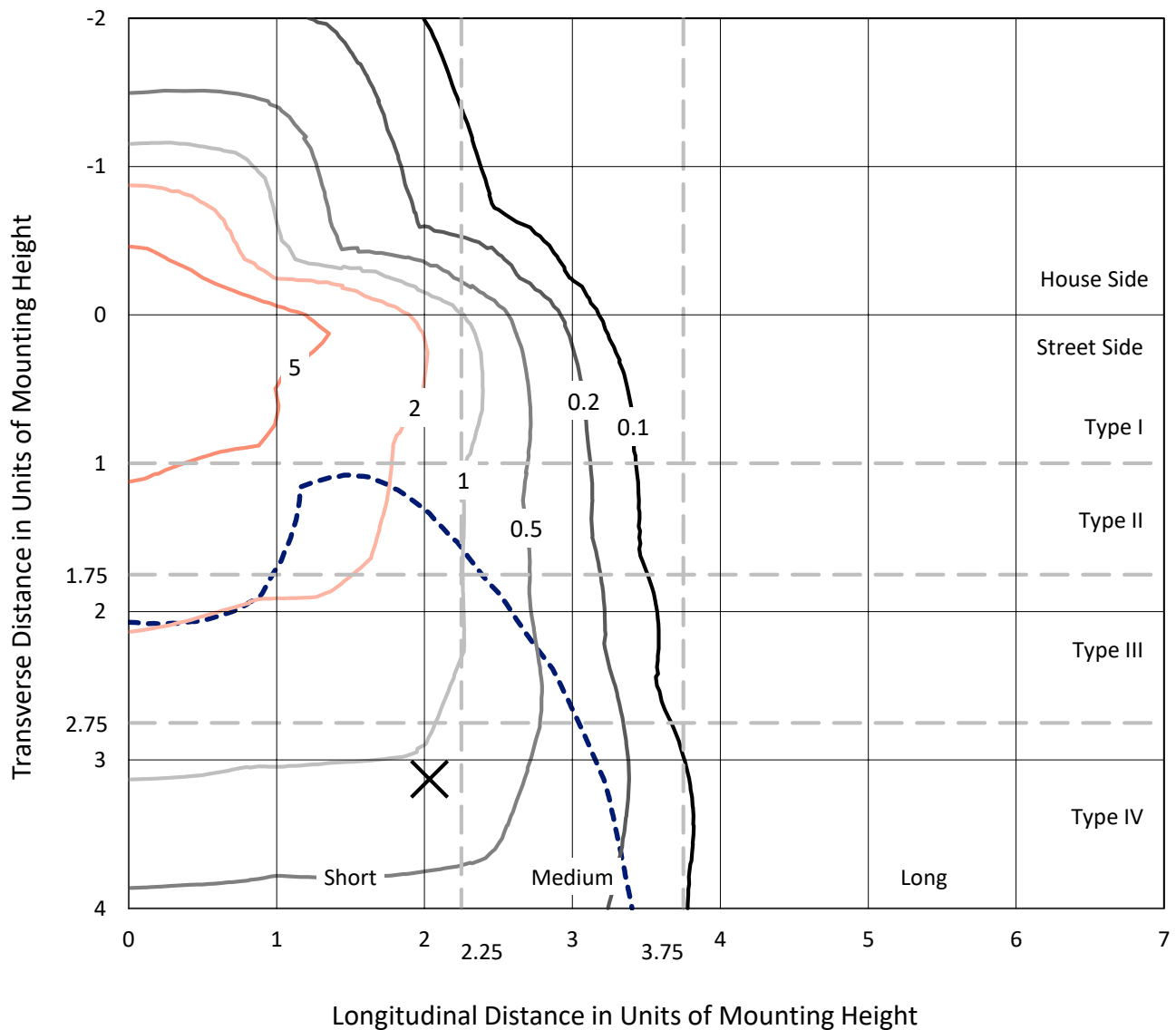
Input Watts (W): 320  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P318739  
CATALOG NUMBER: GLEON-SA5D-740-U-T4FT

## Iso-Footcandle Lines of Horizontal Illumination

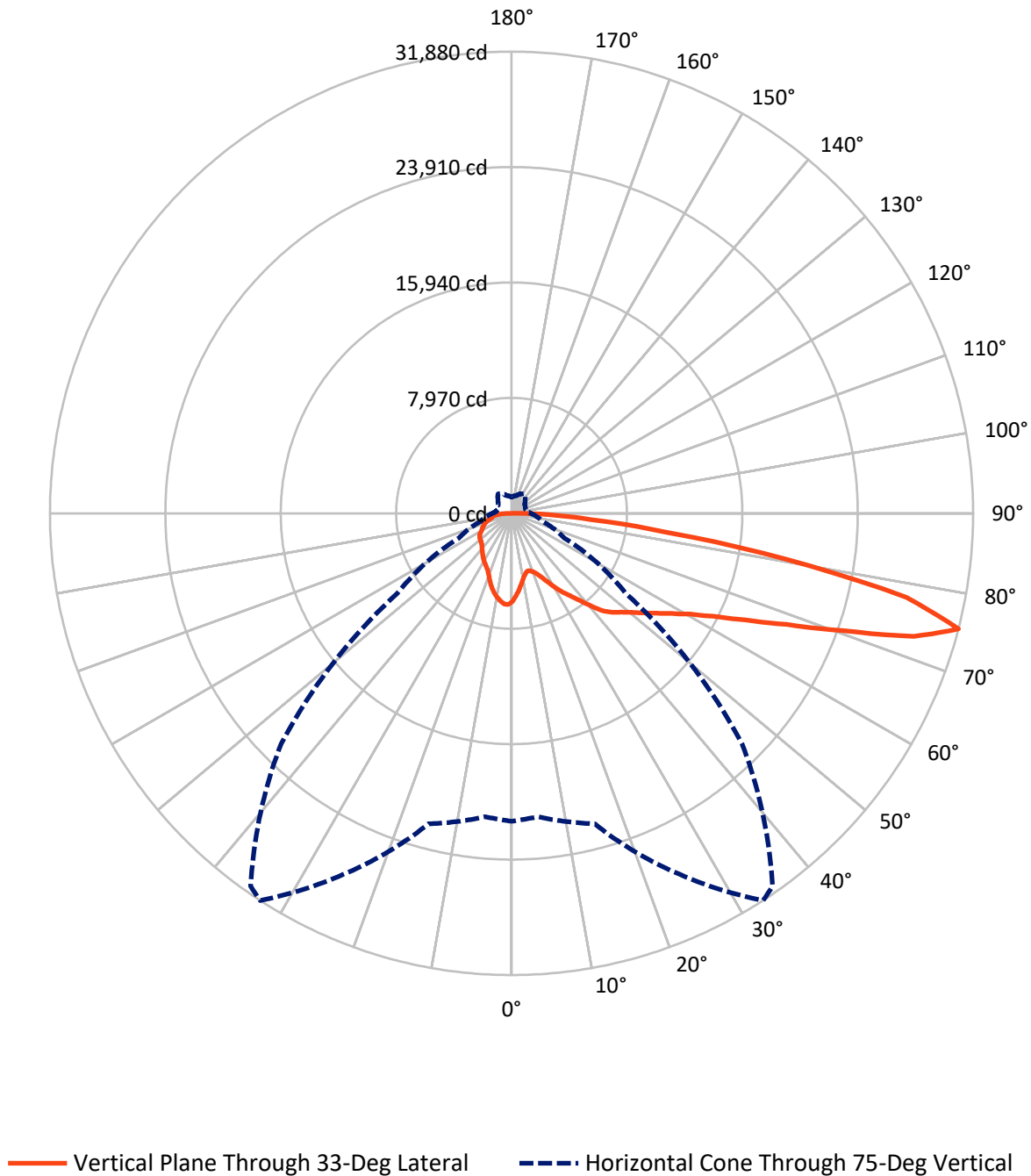
× Max cd  
- - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 9.8 fc  
Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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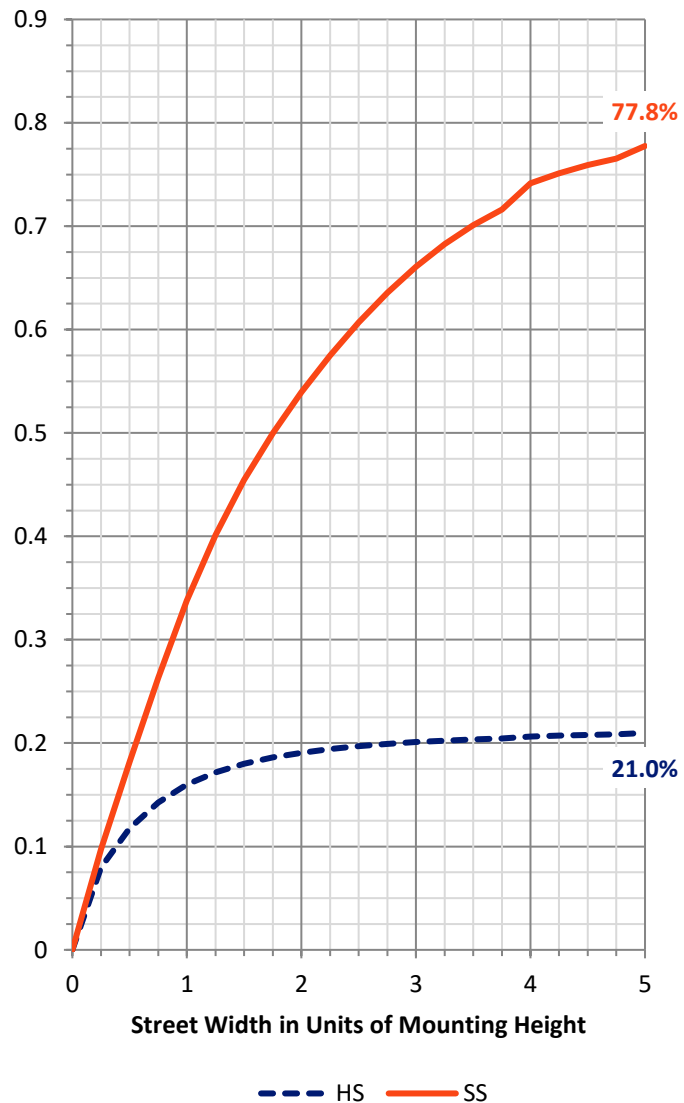
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 8377.3   | 0.0    | 8377.3  |
|                    | % Fixture | 21.5     | 0.0    | 21.5    |
| <b>Street Side</b> | Lumens    | 30636.7  | 0.0    | 30636.7 |
|                    | % Fixture | 78.5     | 0.0    | 78.5    |
| <b>Total</b>       | Lumens    | 39014.0  | 0.0    | 39014.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 551.5   | 1.4       |
| 10°-20°   | 1493.7  | 3.8       |
| 20°-30°   | 2439.4  | 6.3       |
| 30°-40°   | 3632.9  | 9.3       |
| 40°-50°   | 5210.5  | 13.4      |
| 50°-60°   | 7153.2  | 18.3      |
| 60°-70°   | 8955.5  | 23.0      |
| 70°-80°   | 8101.6  | 20.8      |
| 80°-90°   | 1475.8  | 3.8       |
| 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°    | 39014.0 | 100.0     |
| 0°-180°   | 39014.0 | 100.0     |

**Coefficient of Utilization**



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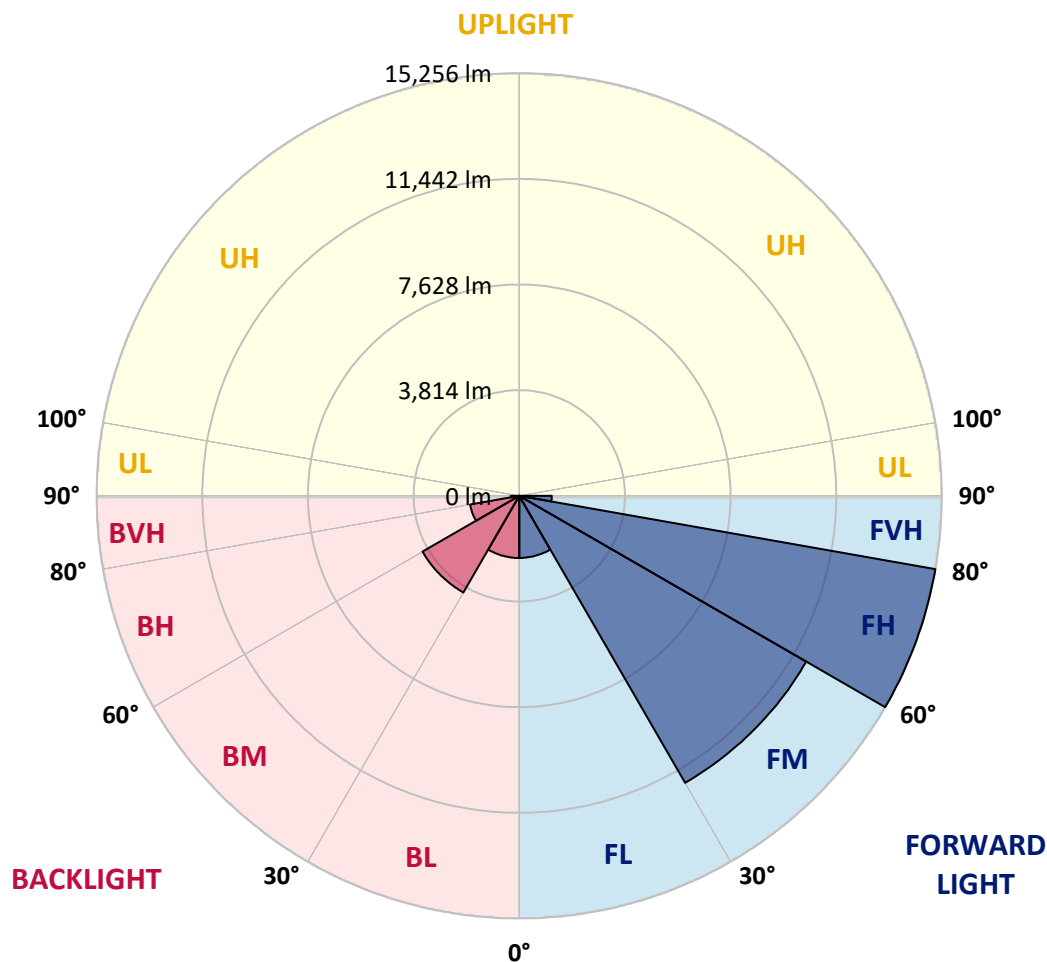
CATALOG NUMBER: GLEON-SA5D-740-U-T4FT

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 2240.8  | 5.7       |                         |      |         |
| FM   | (30°-60°)   | 11964.8 | 30.7      |                         |      |         |
| FH   | (60°-80°)   | 15255.8 | 39.1      |                         |      | G5      |
| FVH  | (80°-90°)   | 1175.3  | 3.0       |                         |      | G5      |
| BL   | (0°-30°)    | 2243.8  | 5.8       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 4031.8  | 10.3      | B3/5000                 |      |         |
| BH   | (60°-80°)   | 1801.3  | 4.6       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 300.4   | 0.8       |                         |      | G3/500  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

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

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 33°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 6098.1  | 6098.1  | 6098.1  | 6098.1  | 6098.1  | 6098.1  | 6098.1  | 6098.1  | 6098.1  | 6098.1  | 6098.1  |
| 2.5°  | 5662.8  | 5641.3  | 5681.7  | 5687.1  | 5722.1  | 5735.6  | 5784.1  | 5859.6  | 5921.6  | 5993.0  | 6057.7  |
| 5°    | 5149.4  | 5134.5  | 5191.1  | 5231.6  | 5308.4  | 5340.7  | 5455.3  | 5615.6  | 5758.5  | 5920.2  | 6067.1  |
| 7.5°  | 4661.5  | 4653.4  | 4716.8  | 4808.4  | 4897.4  | 4941.8  | 5139.9  | 5373.1  | 5611.6  | 5873.0  | 6098.1  |
| 10°   | 4250.5  | 4247.8  | 4308.4  | 4398.7  | 4529.4  | 4579.3  | 4835.4  | 5142.6  | 5476.8  | 5836.7  | 6150.7  |
| 12.5° | 4020.0  | 4029.5  | 4057.8  | 4133.2  | 4254.5  | 4304.4  | 4588.7  | 4949.9  | 5363.6  | 5824.5  | 6227.5  |
| 15°   | 4076.6  | 4091.5  | 4042.9  | 4040.2  | 4126.5  | 4165.6  | 4432.4  | 4812.5  | 5282.8  | 5844.7  | 6339.3  |
| 17.5° | 4317.9  | 4320.6  | 4192.5  | 4111.7  | 4164.2  | 4184.4  | 4383.9  | 4734.3  | 5235.6  | 5890.6  | 6479.5  |
| 20°   | 4657.5  | 4650.7  | 4424.3  | 4289.6  | 4317.9  | 4323.3  | 4452.6  | 4735.6  | 5231.6  | 5970.1  | 6661.4  |
| 22.5° | 5107.6  | 5057.7  | 4753.2  | 4569.9  | 4563.1  | 4555.1  | 4629.2  | 4835.4  | 5290.9  | 6099.5  | 6878.4  |
| 25°   | 5695.2  | 5648.0  | 5228.9  | 4978.2  | 4924.3  | 4904.1  | 4914.9  | 5048.3  | 5408.1  | 6238.3  | 7121.0  |
| 27.5° | 6348.8  | 6266.6  | 5862.3  | 5507.8  | 5396.0  | 5367.7  | 5303.0  | 5348.8  | 5536.1  | 6371.7  | 7409.4  |
| 30°   | 6895.9  | 6851.4  | 6498.4  | 6077.9  | 5945.8  | 5905.4  | 5735.6  | 5685.7  | 5720.8  | 6553.6  | 7773.2  |
| 32.5° | 7201.8  | 7172.2  | 6957.9  | 6618.3  | 6495.7  | 6439.1  | 6199.2  | 6099.5  | 6017.2  | 6840.7  | 8266.5  |
| 35°   | 7572.4  | 7553.6  | 7424.2  | 7177.6  | 6995.6  | 6936.3  | 6750.4  | 6646.6  | 6435.0  | 7235.5  | 8903.9  |
| 37.5° | 8044.1  | 8023.9  | 8026.6  | 7827.1  | 7610.2  | 7554.9  | 7432.3  | 7323.1  | 6976.8  | 7754.4  | 9596.6  |
| 40°   | 8577.8  | 8538.7  | 8523.9  | 8514.4  | 8377.0  | 8346.0  | 8281.3  | 8133.1  | 7656.0  | 8374.3  | 10279.9 |
| 42.5° | 9381.0  | 9242.2  | 8945.7  | 9057.5  | 9193.7  | 9177.5  | 9230.0  | 9017.1  | 8410.7  | 9107.4  | 10946.9 |
| 45°   | 10155.9 | 9928.1  | 9416.0  | 9440.3  | 9738.1  | 9828.4  | 10221.9 | 10071.0 | 9228.7  | 9910.6  | 11636.9 |
| 47.5° | 10509.0 | 10336.5 | 9901.2  | 9902.5  | 10197.7 | 10385.0 | 11247.5 | 11139.7 | 10088.5 | 10823.0 | 12479.2 |
| 50°   | 10903.8 | 10731.3 | 10340.5 | 10487.4 | 10744.8 | 10944.2 | 12238.0 | 12182.7 | 10906.5 | 11821.6 | 13488.6 |
| 52.5° | 11335.1 | 11042.6 | 10794.7 | 11057.5 | 11418.6 | 11650.4 | 13229.9 | 13078.9 | 11657.2 | 12826.9 | 14648.9 |
| 55°   | 11340.5 | 11260.9 | 11449.6 | 11642.3 | 12182.7 | 12467.1 | 14268.9 | 13870.0 | 12269.0 | 13814.7 | 15593.6 |
| 57.5° | 11986.0 | 11856.6 | 12256.9 | 12345.8 | 13052.0 | 13372.7 | 15302.5 | 14558.6 | 12891.6 | 14572.1 | 16103.0 |
| 60°   | 12840.4 | 12729.9 | 13057.4 | 13291.9 | 14127.4 | 14555.9 | 16406.3 | 15266.2 | 13380.8 | 15143.5 | 16078.8 |
| 62.5° | 14316.1 | 14190.7 | 14186.7 | 14515.5 | 15640.8 | 16139.4 | 17644.8 | 15960.2 | 13574.9 | 15256.7 | 15392.8 |
| 65°   | 16476.3 | 16276.9 | 15900.9 | 16057.2 | 17731.0 | 18228.3 | 19028.8 | 16462.9 | 13318.8 | 14650.3 | 13626.1 |
| 67.5° | 18578.7 | 18571.9 | 18109.7 | 18430.4 | 20491.0 | 20889.9 | 20605.5 | 16512.7 | 12519.6 | 12538.5 | 10491.4 |
| 70°   | 20674.3 | 20701.2 | 20623.1 | 21738.9 | 24219.9 | 24635.0 | 22284.7 | 15842.9 | 10723.2 | 9054.8  | 6285.4  |
| 72.5° | 22334.6 | 22327.8 | 22721.3 | 25598.6 | 29059.3 | 28966.3 | 23699.7 | 13813.4 | 7699.1  | 4887.9  | 3003.9  |
| 75°   | 21259.1 | 21024.7 | 22197.1 | 27509.5 | 31880.0 | 31425.8 | 22496.3 | 9635.7  | 3995.8  | 2225.0  | 1617.2  |
| 77.5° | 13865.9 | 14088.3 | 15809.3 | 22725.4 | 27885.5 | 27333.0 | 16504.6 | 4495.8  | 1882.7  | 1459.5  | 1172.5  |
| 80°   | 5021.3  | 5255.8  | 7402.6  | 12872.7 | 19212.1 | 19121.8 | 8127.7  | 1847.6  | 1273.5  | 1102.4  | 854.4   |
| 82.5° | 1727.7  | 1813.9  | 2920.4  | 5716.7  | 10847.2 | 11251.5 | 3057.8  | 1049.8  | 925.8   | 781.6   | 584.9   |
| 85°   | 677.9   | 776.2   | 1335.5  | 2750.5  | 5471.5  | 5511.9  | 1238.5  | 628.0   | 644.2   | 512.1   | 320.7   |
| 87.5° | 257.4   | 312.7   | 638.8   | 1277.6  | 2498.5  | 2295.0  | 443.4   | 299.2   | 366.6   | 304.6   | 152.3   |
| 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: P318739

CATALOG NUMBER: GLEON-SA5D-740-U-T4FT

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 6098.1  | 6098.1 | 6098.1 | 6098.1 | 6098.1 | 6098.1 | 6098.1 | 6098.1 | 6098.1 | 6098.1 | 6098.1 |
| 2.5°  | 6107.5  | 6135.8 | 6195.1 | 6235.6 | 6278.7 | 6290.8 | 6296.2 | 6307.0 | 6317.8 | 6313.7 | 6315.1 |
| 5°    | 6145.3  | 6200.5 | 6296.2 | 6336.6 | 6355.5 | 6333.9 | 6292.2 | 6258.5 | 6234.2 | 6220.7 | 6216.7 |
| 7.5°  | 6207.3  | 6285.4 | 6387.9 | 6381.1 | 6338.0 | 6242.3 | 6134.5 | 6053.6 | 5986.3 | 5962.0 | 5948.5 |
| 10°   | 6289.5  | 6381.1 | 6452.5 | 6375.7 | 6250.4 | 6084.6 | 5922.9 | 5797.6 | 5696.5 | 5657.4 | 5650.7 |
| 12.5° | 6394.6  | 6487.6 | 6501.1 | 6338.0 | 6130.5 | 5904.0 | 5684.4 | 5518.6 | 5367.7 | 5319.2 | 5308.4 |
| 15°   | 6530.7  | 6618.3 | 6534.7 | 6272.0 | 5982.2 | 5677.6 | 5393.3 | 5168.2 | 5009.2 | 4949.9 | 4928.3 |
| 17.5° | 6673.6  | 6757.1 | 6541.5 | 6162.8 | 5788.1 | 5409.5 | 5052.3 | 4821.9 | 4640.0 | 4571.2 | 4563.1 |
| 20°   | 6844.7  | 6882.4 | 6513.2 | 6006.5 | 5521.3 | 5061.8 | 4685.8 | 4468.8 | 4371.8 | 4323.3 | 4317.9 |
| 22.5° | 7056.3  | 7015.9 | 6448.5 | 5794.9 | 5183.1 | 4660.2 | 4354.3 | 4253.2 | 4228.9 | 4218.1 | 4222.2 |
| 25°   | 7280.0  | 7156.0 | 6352.8 | 5518.6 | 4755.8 | 4258.6 | 4111.7 | 4140.0 | 4172.3 | 4168.3 | 4168.3 |
| 27.5° | 7526.6  | 7298.9 | 6205.9 | 5152.1 | 4282.8 | 3929.7 | 3947.3 | 4051.0 | 4099.5 | 4098.2 | 4096.8 |
| 30°   | 7843.3  | 7460.6 | 6018.6 | 4711.4 | 3840.8 | 3697.9 | 3804.4 | 3931.1 | 3997.1 | 3994.4 | 3995.8 |
| 32.5° | 8232.8  | 7638.5 | 5763.9 | 4219.5 | 3521.4 | 3526.8 | 3649.4 | 3774.8 | 3851.6 | 3844.8 | 3846.2 |
| 35°   | 8688.3  | 7837.9 | 5418.9 | 3734.3 | 3309.8 | 3390.7 | 3487.7 | 3575.3 | 3648.1 | 3638.6 | 3629.2 |
| 37.5° | 9184.2  | 8033.3 | 4960.7 | 3300.4 | 3137.3 | 3264.0 | 3344.9 | 3359.7 | 3393.4 | 3369.1 | 3351.6 |
| 40°   | 9655.9  | 8182.9 | 4370.4 | 2944.6 | 2963.5 | 3156.2 | 3208.7 | 3149.5 | 3088.8 | 3080.7 | 3056.5 |
| 42.5° | 10066.9 | 8232.8 | 3773.4 | 2660.3 | 2780.2 | 3043.0 | 3075.3 | 2951.3 | 2842.2 | 2791.0 | 2769.4 |
| 45°   | 10500.9 | 8250.3 | 3216.8 | 2421.7 | 2603.7 | 2941.9 | 2977.0 | 2811.2 | 2657.6 | 2547.1 | 2510.7 |
| 47.5° | 11068.2 | 8377.0 | 2784.2 | 2245.2 | 2468.9 | 2874.5 | 2924.4 | 2699.3 | 2499.9 | 2342.2 | 2308.5 |
| 50°   | 11810.8 | 8627.6 | 2432.5 | 2110.4 | 2381.3 | 2830.1 | 2886.7 | 2590.2 | 2370.5 | 2180.5 | 2146.8 |
| 52.5° | 12635.5 | 8858.1 | 2148.2 | 2001.3 | 2296.4 | 2751.9 | 2838.1 | 2512.0 | 2249.2 | 2030.9 | 1994.5 |
| 55°   | 13212.3 | 8681.5 | 1919.1 | 1888.1 | 2185.9 | 2640.0 | 2770.8 | 2446.0 | 2075.4 | 1885.4 | 1853.0 |
| 57.5° | 13322.8 | 8077.8 | 1745.2 | 1770.8 | 2052.5 | 2499.9 | 2667.0 | 2299.1 | 1981.0 | 1822.0 | 1788.3 |
| 60°   | 13021.0 | 7236.9 | 1615.8 | 1663.0 | 1909.6 | 2323.3 | 2472.9 | 2195.3 | 1890.8 | 1754.6 | 1726.3 |
| 62.5° | 12262.2 | 6375.7 | 1520.1 | 1566.0 | 1776.2 | 2144.1 | 2351.6 | 2086.2 | 1799.1 | 1677.8 | 1649.5 |
| 65°   | 10730.0 | 5352.9 | 1428.5 | 1479.7 | 1652.2 | 1989.1 | 2242.5 | 1985.1 | 1708.8 | 1615.8 | 1588.9 |
| 67.5° | 8099.4  | 4009.3 | 1342.3 | 1388.1 | 1541.7 | 1854.4 | 2123.9 | 1885.4 | 1621.2 | 1561.9 | 1529.6 |
| 70°   | 4769.3  | 2510.7 | 1243.9 | 1292.4 | 1425.8 | 1714.2 | 1997.2 | 1776.2 | 1512.1 | 1485.1 | 1443.3 |
| 72.5° | 2219.6  | 1510.7 | 1132.0 | 1179.2 | 1280.3 | 1526.9 | 1834.1 | 1633.3 | 1382.7 | 1323.4 | 1266.8 |
| 75°   | 1324.7  | 1105.1 | 1000.0 | 1041.7 | 1113.2 | 1327.4 | 1629.3 | 1487.8 | 1260.1 | 1181.9 | 1122.6 |
| 77.5° | 990.5   | 845.0  | 854.4  | 898.9  | 956.8  | 1161.7 | 1443.3 | 1373.3 | 1165.7 | 1105.1 | 1064.6 |
| 80°   | 712.9   | 641.5  | 696.7  | 745.2  | 805.9  | 1056.6 | 1382.7 | 1269.5 | 1053.9 | 973.0  | 935.3  |
| 82.5° | 475.7   | 460.9  | 524.2  | 574.1  | 633.4  | 924.5  | 1299.1 | 1111.8 | 900.2  | 797.8  | 714.3  |
| 85°   | 262.8   | 277.6  | 353.1  | 374.6  | 425.9  | 650.9  | 1064.6 | 893.5  | 677.9  | 545.8  | 521.5  |
| 87.5° | 109.2   | 128.0  | 190.0  | 183.3  | 226.4  | 388.1  | 700.8  | 539.1  | 431.2  | 322.1  | 250.7  |
| 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

MCGRAW, INVUE, LUMARK AND STREETWORKS

DATA VALID FOR LUMINAIRES UTILIZING SA LIGHT ENGINES

Report Number: SP1-2101-121-2

Luminaire Tested: IFLD-S-SA2A-740-U-T3R-HSS

Test Date: 03/05/2021

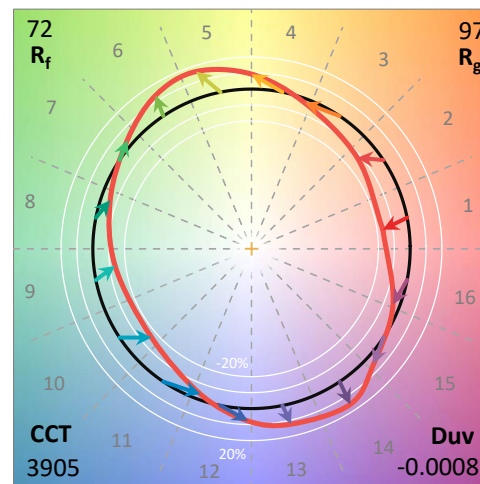
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/05/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-740-U-T3R-HSS**  
 Description: STREETWORKS INF FLOOD

SHIELD, DRIVER PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 3905    | CRI (Ra): | 71.2 |      |       |
| CIE u':                   | 0.2273  | R1:       | 68.9 | R9:  | -29.7 |
| CIE v':                   | 0.5024  | R2:       | 77.0 | R10: | 46.2  |
| Duv:                      | -0.0008 | R3:       | 84.0 | R11: | 68.8  |
| CIE x:                    | 0.3841  | R4:       | 71.6 | R12: | 45.6  |
| CIE y:                    | 0.3774  | R5:       | 68.9 | R13: | 69.5  |
| CIE z:                    | 0.2385  | R6:       | 68.3 | R14: | 90.7  |
| Peak Wavelength (nm):     | 443     | R7:       | 78.7 |      |       |
| Dominant Wavelength (nm): | 579     | R8:       | 52.2 |      |       |
| Purity:                   | 28.7    |           |      |      |       |
| Rf:                       | 71.7    |           |      |      |       |
| Rg:                       | 96.9    |           |      |      |       |



### Test Conditions

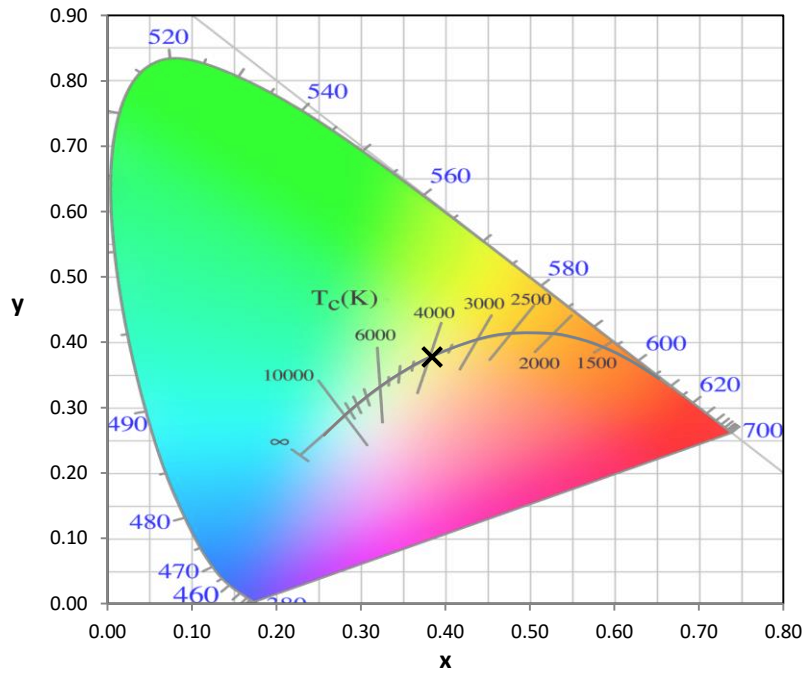
Stabilization Time: 211M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/312%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2101-121-2

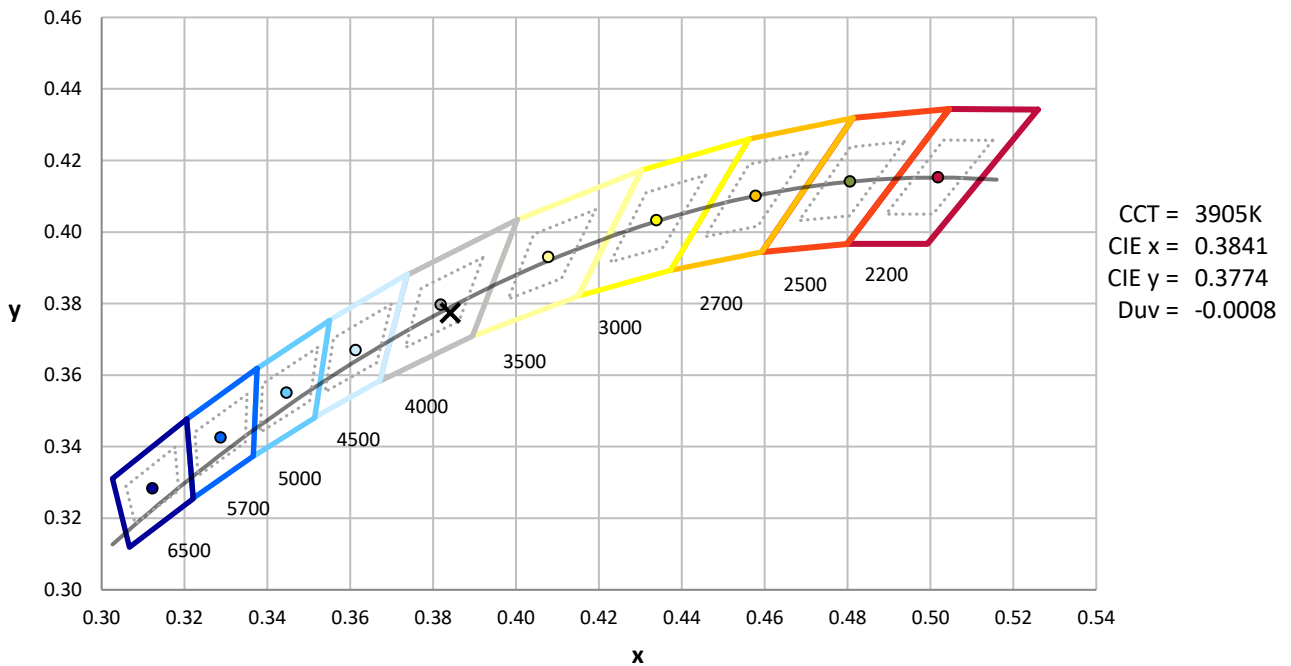
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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**



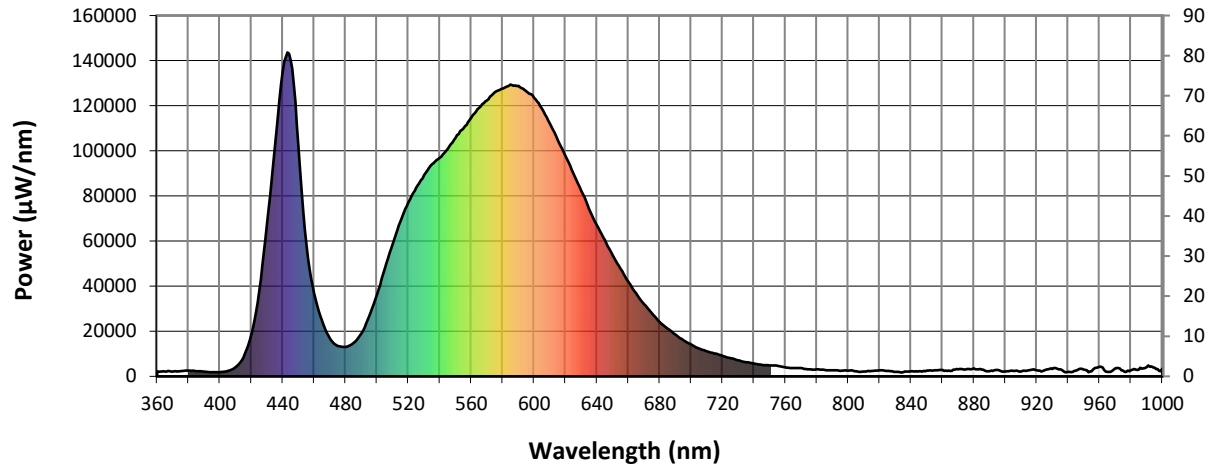
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 4000K 4-step quadrangle

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### Photopic Flux vs. Wavelength

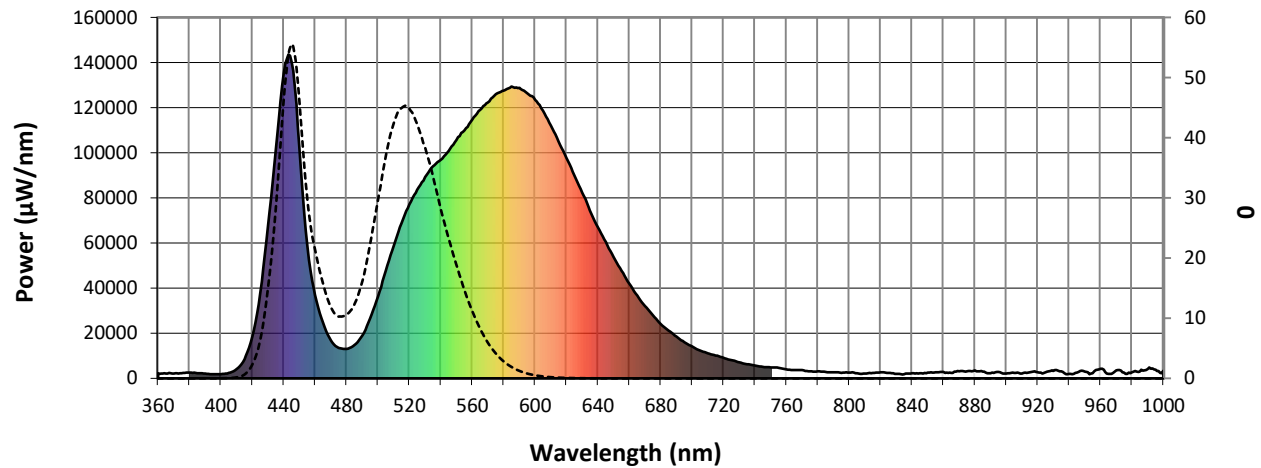


#####

| 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       | 2304             | 0.0              | 490       | 19043            | 2.7              | 620       | 97577            | 25.4             | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 4.8              | 625       | 90158            | 19.9             | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 8.0              | 630       | 82240            | 14.9             | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 13.3             | 635       | 74361            | 11.2             | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 20.2             | 640       | 66994            | 8.0              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 28.5             | 645       | 60405            | 5.8              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 37.4             | 650       | 53806            | 3.9              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 44.9             | 655       | 47610            | 2.7              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 52.6             | 660       | 42018            | 1.8              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.0              | 535       | 94097            | 58.4             | 665       | 36742            | 1.2              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.0              | 540       | 96845            | 63.1             | 670       | 32105            | 0.7              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.0              | 545       | 100829           | 67.1             | 675       | 27946            | 0.5              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 0.1              | 550       | 105648           | 71.8             | 680       | 24146            | 0.3              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 0.2              | 555       | 110017           | 75.1             | 685       | 21191            | 0.2              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 0.5              | 560       | 114586           | 77.9             | 690       | 18544            | 0.1              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 1.2              | 565       | 118987           | 79.1             | 695       | 16058            | 0.1              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 2.1              | 570       | 122326           | 79.5             | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 2.9              | 575       | 125968           | 78.4             | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 2.7              | 580       | 127613           | 75.8             | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 2.0              | 585       | 129466           | 71.9             | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 1.5              | 590       | 128813           | 66.6             | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 1.3              | 595       | 126387           | 59.9             | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 1.0              | 600       | 123477           | 53.2             | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 1.1              | 605       | 118718           | 46.0             | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 1.2              | 610       | 112091           | 38.5             | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 1.7              | 615       | 105039           | 31.7             | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



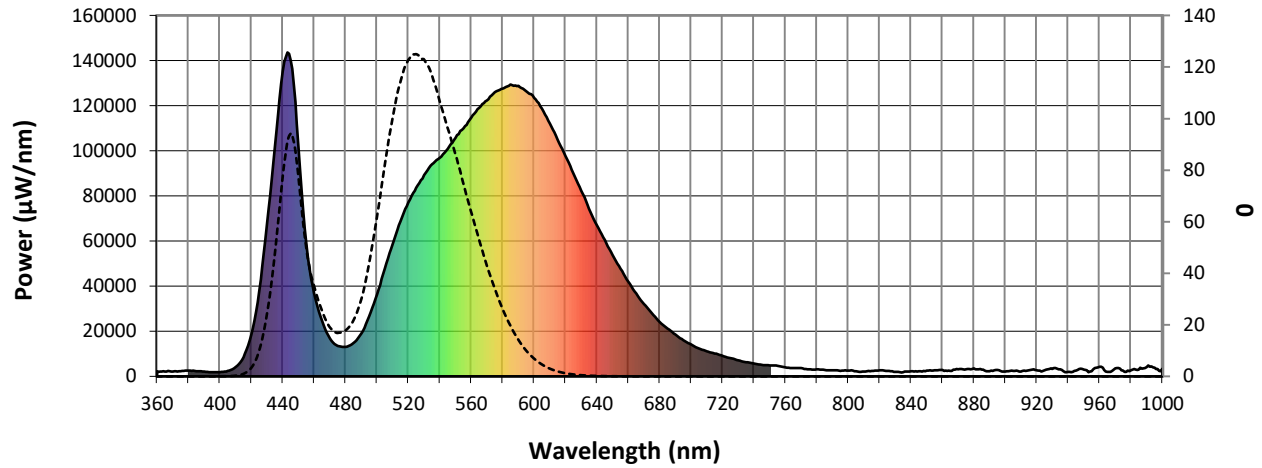
Scotopic Lumens: 10425.8

S/P: 1.47

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 360               | 2304                          | 0.0                            | 490               | 19043                         | 29.3                           | 620               | 97577                         | 1.2                            | 750               | 4830                          | 0.0                            | 880               | 3505                          | 0.0                            |
| 365               | 2150                          | 0.0                            | 495               | 26606                         | 43.0                           | 625               | 90158                         | 0.8                            | 755               | 4664                          | 0.0                            | 885               | 2991                          | 0.0                            |
| 370               | 2146                          | 0.0                            | 500               | 36376                         | 60.8                           | 630               | 82240                         | 0.5                            | 760               | 4006                          | 0.0                            | 890               | 2327                          | 0.0                            |
| 375               | 2332                          | 0.0                            | 505               | 47714                         | 81.1                           | 635               | 74361                         | 0.3                            | 765               | 3715                          | 0.0                            | 895               | 2775                          | 0.0                            |
| 380               | 2527                          | 0.0                            | 510               | 58741                         | 99.6                           | 640               | 66994                         | 0.2                            | 770               | 3696                          | 0.0                            | 900               | 2141                          | 0.0                            |
| 385               | 2304                          | 0.0                            | 515               | 68716                         | 113.9                          | 645               | 60405                         | 0.1                            | 775               | 3117                          | 0.0                            | 905               | 2421                          | 0.0                            |
| 390               | 2064                          | 0.0                            | 520               | 77136                         | 122.6                          | 650               | 53806                         | 0.1                            | 780               | 3062                          | 0.0                            | 910               | 2200                          | 0.0                            |
| 395               | 1856                          | 0.0                            | 525               | 83567                         | 125.0                          | 655               | 47610                         | 0.0                            | 785               | 2907                          | 0.0                            | 915               | 2716                          | 0.0                            |
| 400               | 1856                          | 0.0                            | 530               | 89283                         | 123.1                          | 660               | 42018                         | 0.0                            | 790               | 2655                          | 0.0                            | 920               | 2656                          | 0.0                            |
| 405               | 2374                          | 0.1                            | 535               | 94097                         | 117.3                          | 665               | 36742                         | 0.0                            | 795               | 2467                          | 0.0                            | 925               | 2671                          | 0.0                            |
| 410               | 4084                          | 0.2                            | 540               | 96845                         | 107.0                          | 670               | 32105                         | 0.0                            | 800               | 2609                          | 0.0                            | 930               | 3292                          | 0.0                            |
| 415               | 8543                          | 0.9                            | 545               | 100829                        | 96.7                           | 675               | 27946                         | 0.0                            | 805               | 2293                          | 0.0                            | 935               | 3188                          | 0.0                            |
| 420               | 18394                         | 3.0                            | 550               | 105648                        | 86.4                           | 680               | 24146                         | 0.0                            | 810               | 2188                          | 0.0                            | 940               | 1997                          | 0.0                            |
| 425               | 37987                         | 9.3                            | 555               | 110017                        | 75.2                           | 685               | 21191                         | 0.0                            | 815               | 2386                          | 0.0                            | 945               | 2623                          | 0.0                            |
| 430               | 67605                         | 23.0                           | 560               | 114586                        | 64.0                           | 690               | 18544                         | 0.0                            | 820               | 2712                          | 0.0                            | 950               | 2969                          | 0.0                            |
| 435               | 102160                        | 45.7                           | 565               | 118987                        | 53.4                           | 695               | 16058                         | 0.0                            | 825               | 2473                          | 0.0                            | 955               | 2277                          | 0.0                            |
| 440               | 135103                        | 75.5                           | 570               | 122326                        | 43.2                           | 700               | 14133                         | 0.0                            | 830               | 1969                          | 0.0                            | 960               | 4267                          | 0.0                            |
| 445               | 140126                        | 93.8                           | 575               | 125968                        | 34.3                           | 705               | 12309                         | 0.0                            | 835               | 1917                          | 0.0                            | 965               | 2034                          | 0.0                            |
| 450               | 102339                        | 79.3                           | 580               | 127613                        | 26.3                           | 710               | 11142                         | 0.0                            | 840               | 2248                          | 0.0                            | 970               | 3586                          | 0.0                            |
| 455               | 58751                         | 51.3                           | 585               | 129466                        | 19.8                           | 715               | 10143                         | 0.0                            | 845               | 2266                          | 0.0                            | 975               | 2505                          | 0.0                            |
| 460               | 36892                         | 35.6                           | 590               | 128813                        | 14.3                           | 720               | 9072                          | 0.0                            | 850               | 2558                          | 0.0                            | 980               | 2666                          | 0.0                            |
| 465               | 24637                         | 26.0                           | 595               | 126387                        | 10.1                           | 725               | 8130                          | 0.0                            | 855               | 2767                          | 0.0                            | 985               | 2934                          | 0.0                            |
| 470               | 16738                         | 19.3                           | 600               | 123477                        | 7.0                            | 730               | 7149                          | 0.0                            | 860               | 2826                          | 0.0                            | 990               | 4120                          | 0.0                            |
| 475               | 13456                         | 16.8                           | 605               | 118718                        | 4.7                            | 735               | 6311                          | 0.0                            | 865               | 2385                          | 0.0                            | 995               | 3858                          | 0.0                            |
| 480               | 13081                         | 17.7                           | 610               | 112091                        | 3.0                            | 740               | 5711                          | 0.0                            | 870               | 3194                          | 0.0                            | 1000              | 3405                          | 0.0                            |
| 485               | 14734                         | 21.4                           | 615               | 105039                        | 1.9                            | 745               | 5111                          | 0.0                            | 875               | 3189                          | 0.0                            |                   |                               |                                |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 3927.2**
**M/P: 0.55**

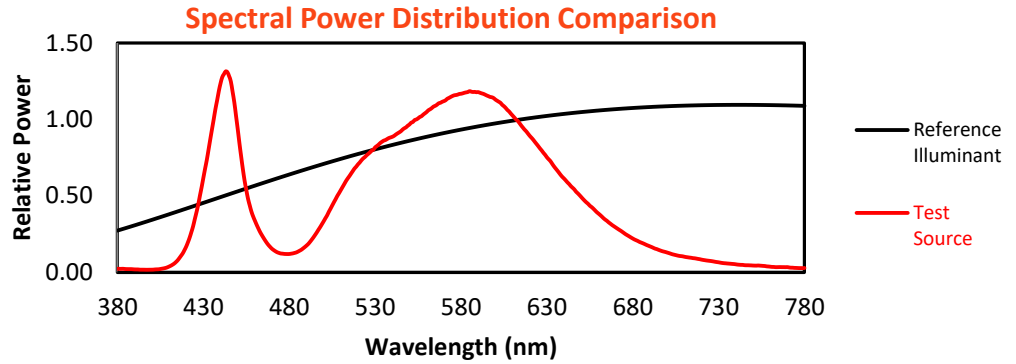
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2304             | 0.0              | 490       | 19043            | 15.8             | 620       | 97577            | 0.1              | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 22.0             | 625       | 90158            | 0.0              | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 29.2             | 630       | 82240            | 0.0              | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 36.6             | 635       | 74361            | 0.0              | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 42.2             | 640       | 66994            | 0.0              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 44.9             | 645       | 60405            | 0.0              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 44.9             | 650       | 53806            | 0.0              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 42.4             | 655       | 47610            | 0.0              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 38.6             | 660       | 42018            | 0.0              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.0              | 535       | 94097            | 33.9             | 665       | 36742            | 0.0              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.2              | 540       | 96845            | 28.3             | 670       | 32105            | 0.0              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.6              | 545       | 100829           | 23.4             | 675       | 27946            | 0.0              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 2.1              | 550       | 105648           | 19.0             | 680       | 24146            | 0.0              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 5.9              | 555       | 110017           | 14.8             | 685       | 21191            | 0.0              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 14.3             | 560       | 114586           | 11.3             | 690       | 18544            | 0.0              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 27.3             | 565       | 118987           | 8.4              | 695       | 16058            | 0.0              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 45.1             | 570       | 122326           | 6.0              | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 55.3             | 575       | 125968           | 4.2              | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 47.2             | 580       | 127613           | 2.9              | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 30.8             | 585       | 129466           | 1.9              | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 21.7             | 590       | 128813           | 1.3              | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 16.1             | 595       | 126387           | 0.8              | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 12.0             | 600       | 123477           | 0.5              | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 10.3             | 605       | 118718           | 0.3              | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 10.5             | 610       | 112091           | 0.2              | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 12.1             | 615       | 105039           | 0.1              | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

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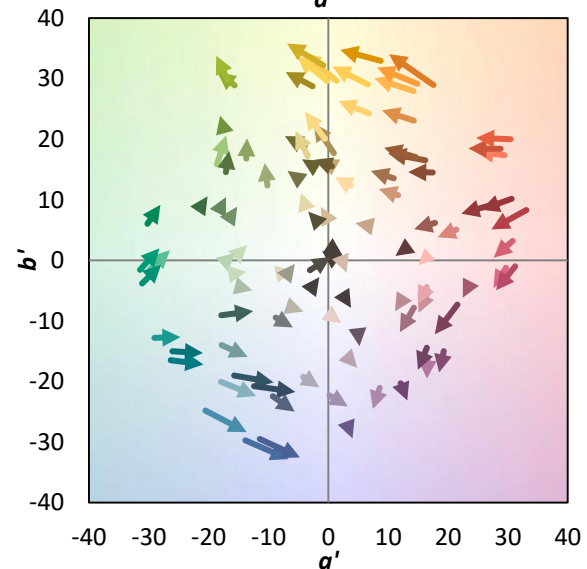
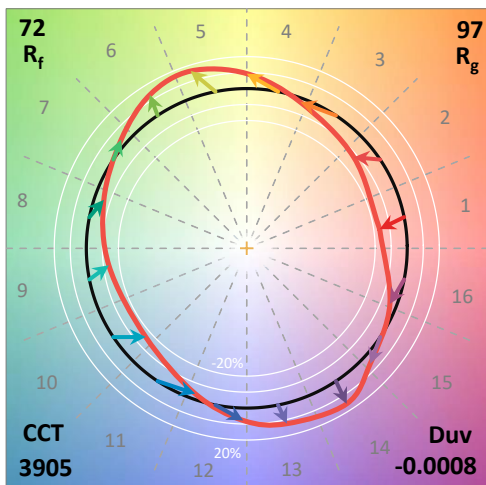
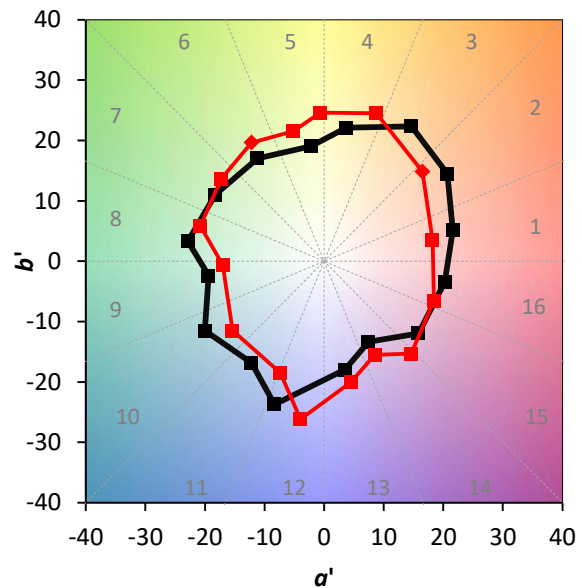
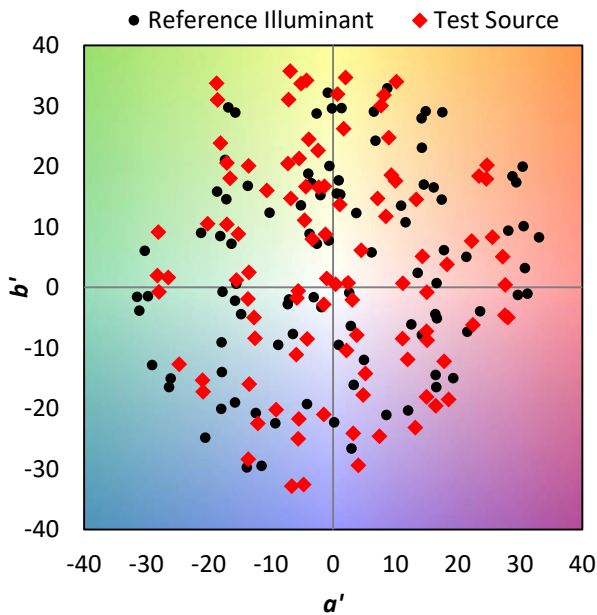
TM-30-18

### Summary

$R_f = 71.7$   
 $R_g = 96.9$   
 CIE  $R_a = 71.2$   
 $R_g = -29.7$



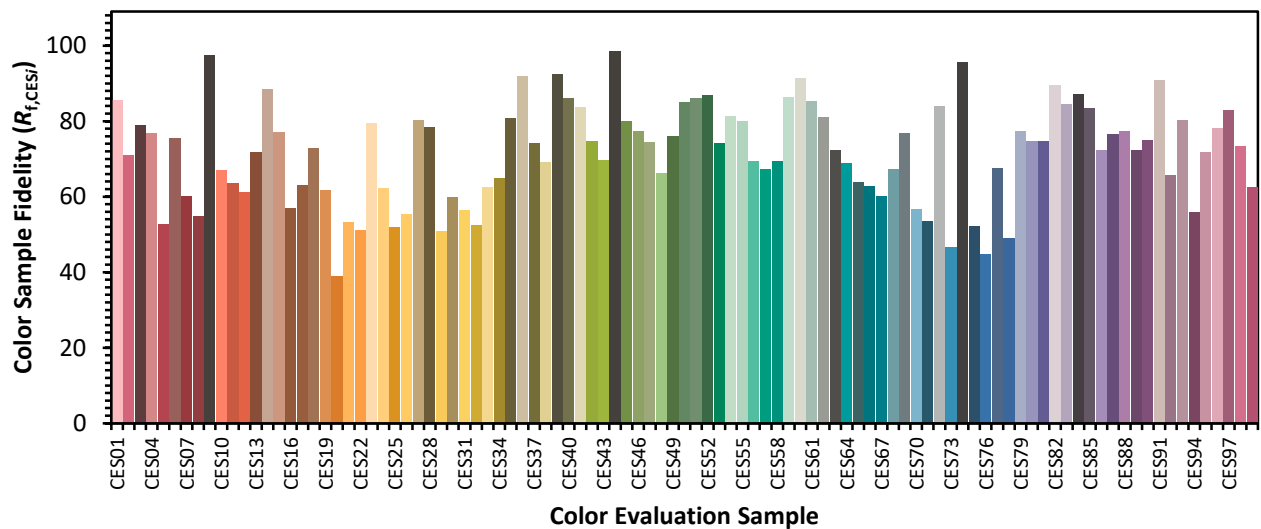
### Color Vector Graphics



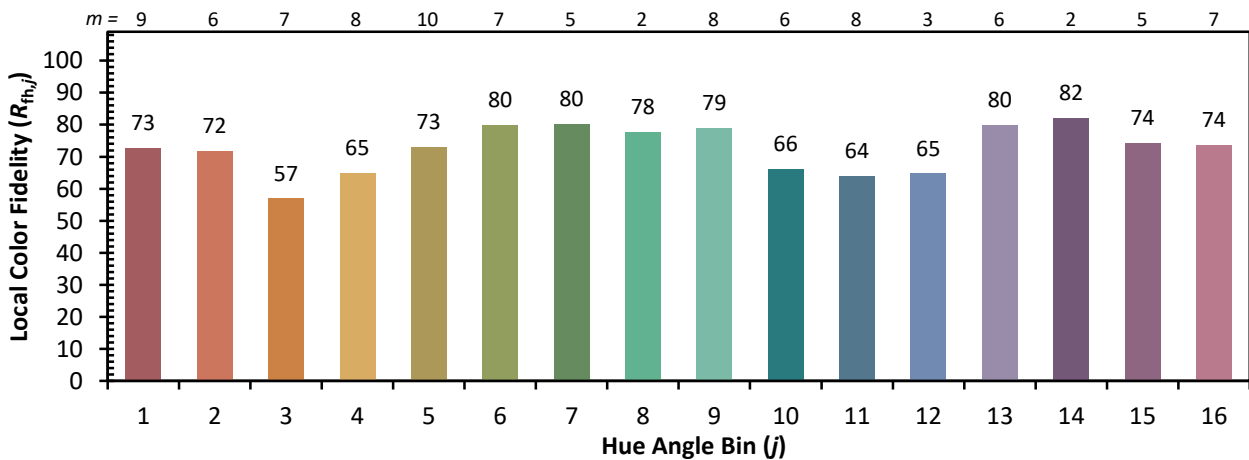
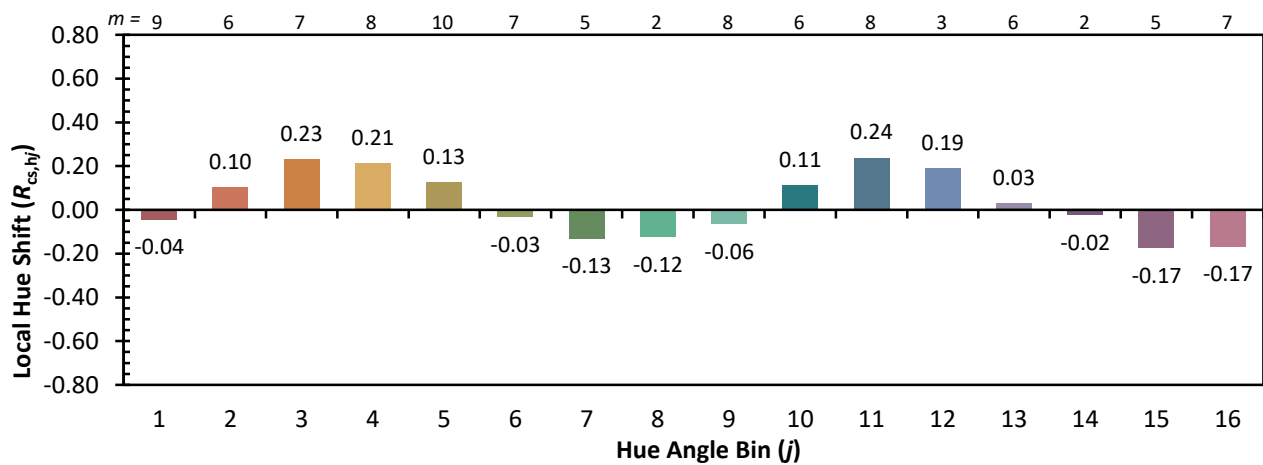
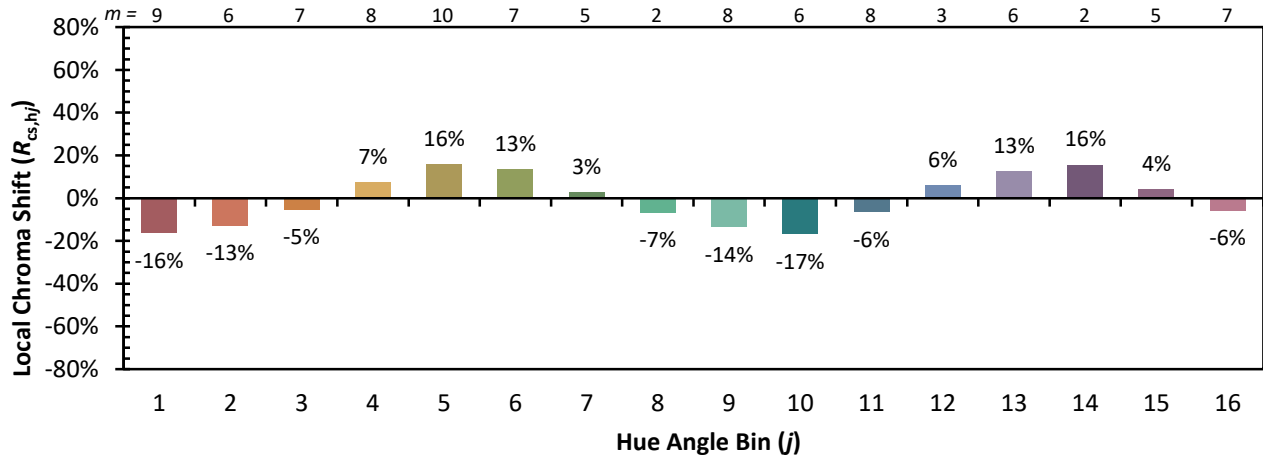


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 55 | CES51 = 86 | CES76 = 45 |
| CES02 = 61 | CES27 = 80 | CES52 = 87 | CES77 = 68 |
| CES03 = 30 | CES28 = 79 | CES53 = 74 | CES78 = 49 |
| CES04 = 70 | CES29 = 51 | CES54 = 81 | CES79 = 77 |
| CES05 = 47 | CES30 = 60 | CES55 = 80 | CES80 = 75 |
| CES06 = 50 | CES31 = 56 | CES56 = 69 | CES81 = 75 |
| CES07 = 40 | CES32 = 52 | CES57 = 67 | CES82 = 90 |
| CES08 = 39 | CES33 = 62 | CES58 = 69 | CES83 = 85 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 81 | CES60 = 91 | CES85 = 83 |
| CES11 = 57 | CES36 = 92 | CES61 = 85 | CES86 = 72 |
| CES12 = 63 | CES37 = 74 | CES62 = 81 | CES87 = 77 |
| CES13 = 42 | CES38 = 69 | CES63 = 72 | CES88 = 77 |
| CES14 = 74 | CES39 = 92 | CES64 = 69 | CES89 = 72 |
| CES15 = 71 | CES40 = 86 | CES65 = 64 | CES90 = 75 |
| CES16 = 46 | CES41 = 84 | CES66 = 63 | CES91 = 91 |
| CES17 = 49 | CES42 = 75 | CES67 = 60 | CES92 = 66 |
| CES18 = 56 | CES43 = 70 | CES68 = 67 | CES93 = 80 |
| CES19 = 72 | CES44 = 98 | CES69 = 77 | CES94 = 56 |
| CES20 = 65 | CES45 = 80 | CES70 = 57 | CES95 = 72 |
| CES21 = 86 | CES46 = 77 | CES71 = 53 | CES96 = 78 |
| CES22 = 78 | CES47 = 74 | CES72 = 84 | CES97 = 83 |
| CES23 = 92 | CES48 = 66 | CES73 = 47 | CES98 = 73 |
| CES24 = 91 | CES49 = 76 | CES74 = 96 | CES99 = 63 |
| CES25 = 72 | CES50 = 85 | CES75 = 52 |            |



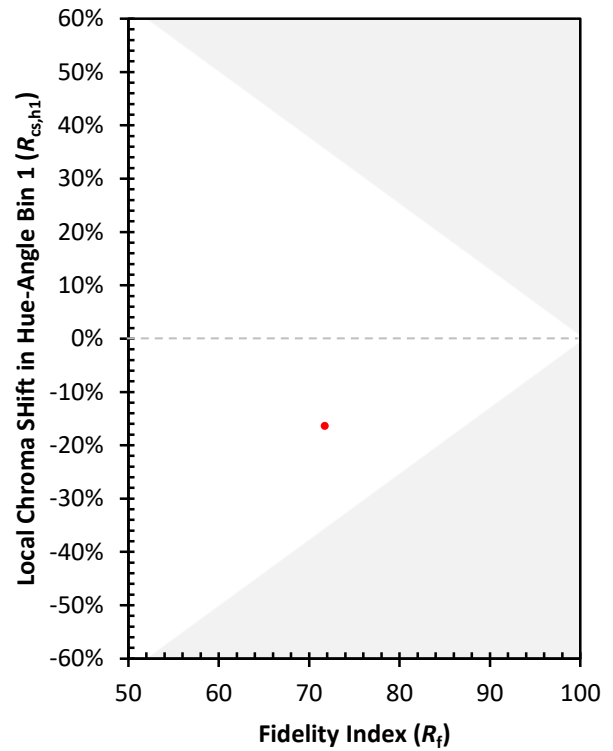
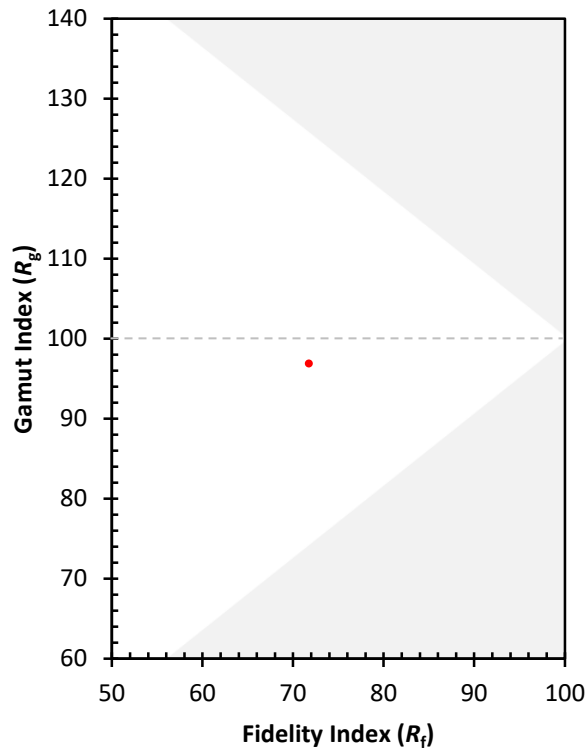
Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)