

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 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: P321993

Luminaire Tested: **GLEON-SA9A-760-U-T2-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P321993  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-13)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA9A-760-U-T2-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 70 CRI, 5700K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 29637 lumens  
Efficiency: N/A  
Efficacy: 102.2 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B2 - U0 - G4

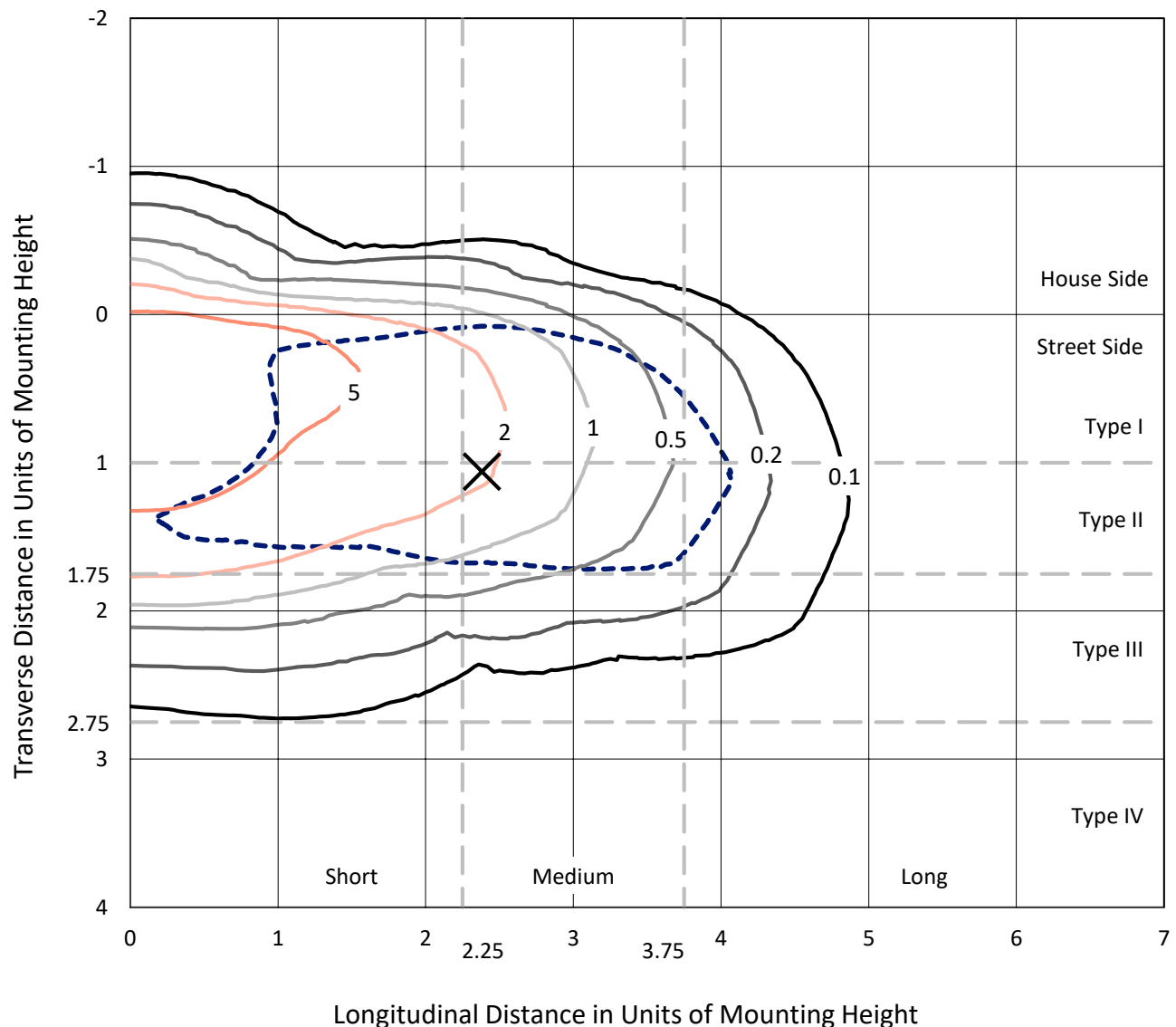
Input Watts (W): 290  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

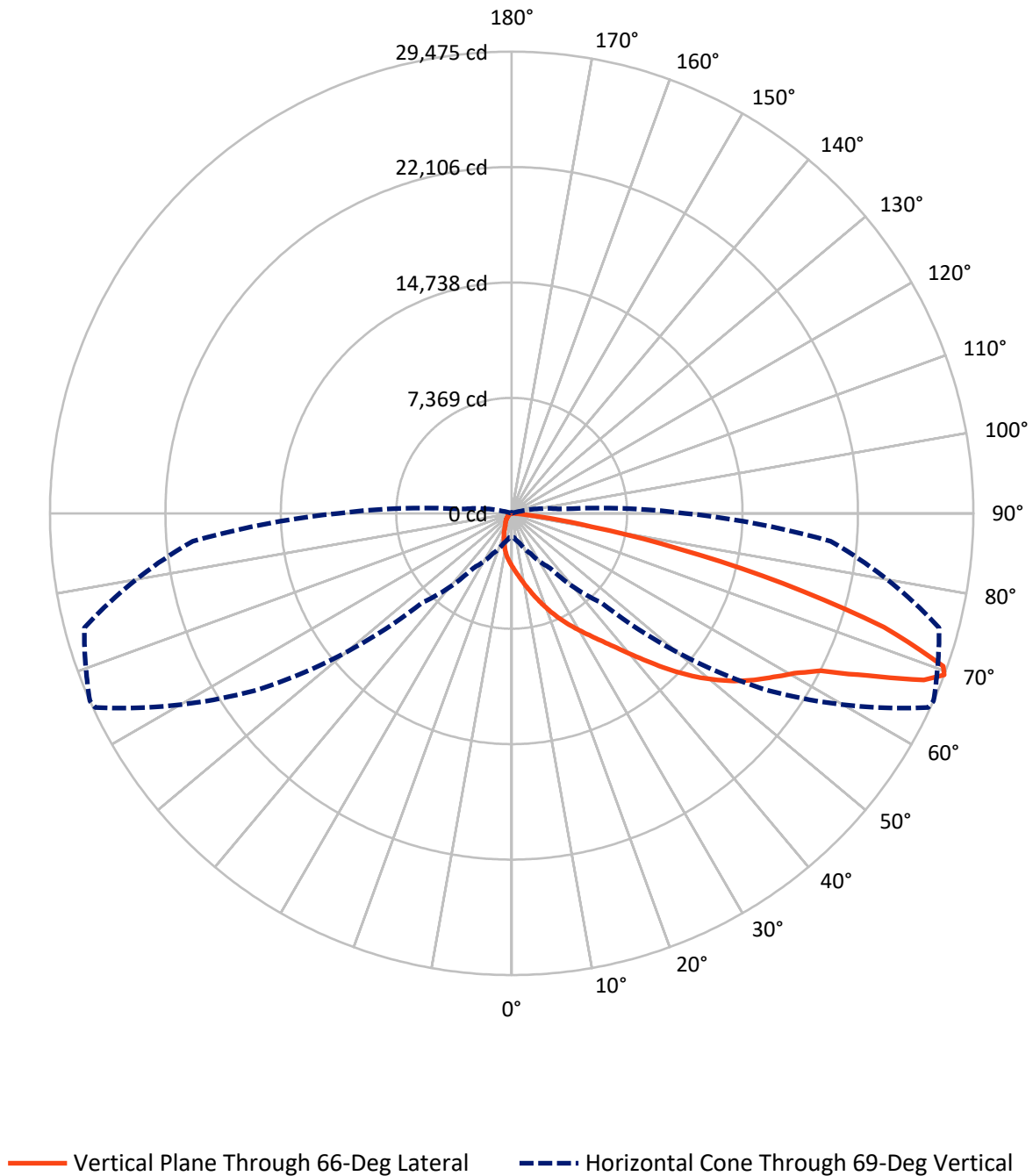
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 8.9 fc  
 Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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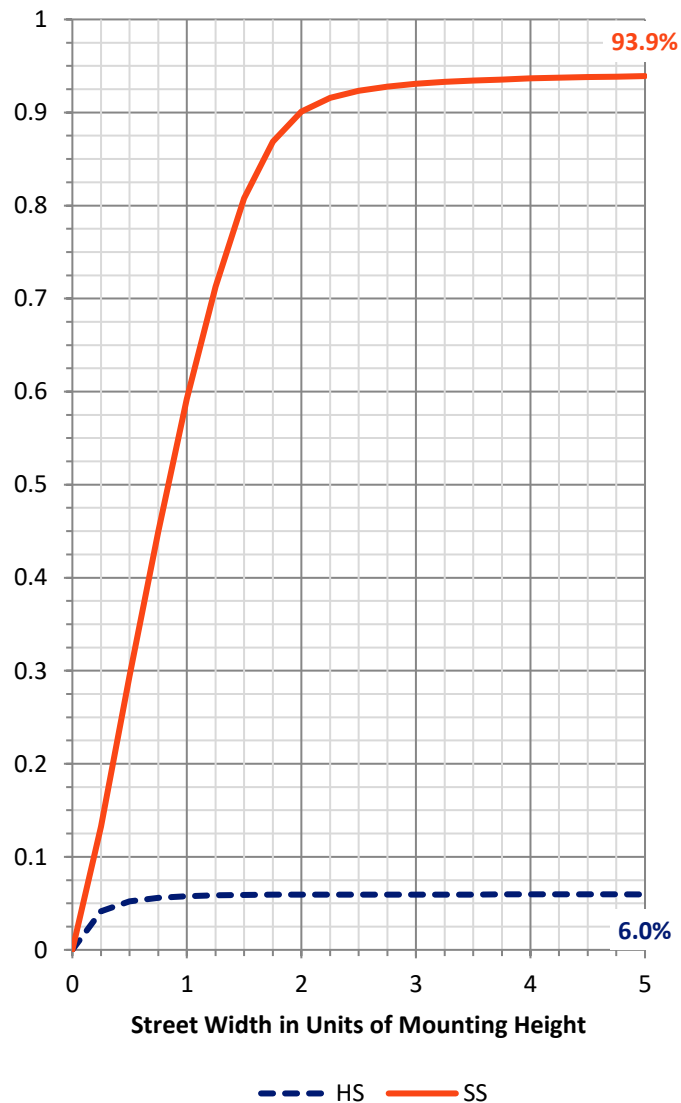
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1777.8   | 0.0    | 1777.8  |
|                    | % Fixture | 6.0      | 0.0    | 6.0     |
| <b>Street Side</b> | Lumens    | 27859.2  | 0.0    | 27859.2 |
|                    | % Fixture | 94.0     | 0.0    | 94.0    |
| <b>Total</b>       | Lumens    | 29637.0  | 0.0    | 29637.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 326.0   | 1.1       |
| 10°-20°   | 970.3   | 3.3       |
| 20°-30°   | 1689.7  | 5.7       |
| 30°-40°   | 2964.5  | 10.0      |
| 40°-50°   | 4962.1  | 16.7      |
| 50°-60°   | 7293.9  | 24.6      |
| 60°-70°   | 7489.0  | 25.3      |
| 70°-80°   | 3697.1  | 12.5      |
| 80°-90°   | 244.5   | 0.8       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 29637.0 | 100.0     |
| 0°-180°   | 29637.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P321993

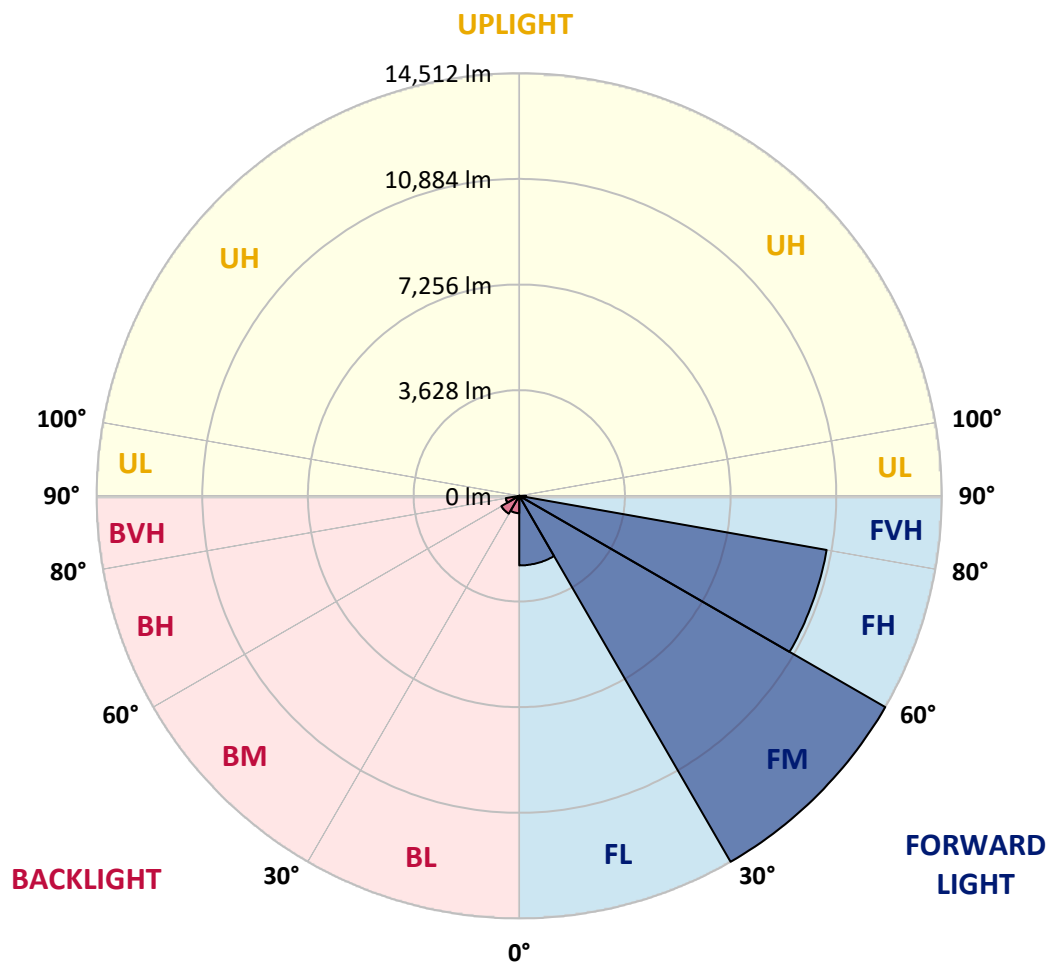
CATALOG NUMBER: GLEON-SA9A-760-U-T2-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2391.4  | 8.1       |                         |      |          |
| FM   | (30°-60°)   | 14511.7 | 49.0      |                         |      |          |
| FH   | (60°-80°)   | 10717.5 | 36.2      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 238.5   | 0.8       |                         |      | G3/500   |
| BL   | (0°-30°)    | 594.6   | 2.0       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 708.8   | 2.4       | B1/1000                 |      |          |
| BH   | (60°-80°)   | 468.5   | 1.6       | B1/500                  |      | G1/500   |
| BVH  | (80°-90°)   | 5.9     | 0.0       |                         |      | G0/10    |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B2-U0-G4**

Type II Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 66°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3372.8  | 3372.8  | 3372.8  | 3372.8  | 3372.8  | 3372.8  | 3372.8  | 3372.8  | 3372.8  | 3372.8  | 3372.8  |
| 2.5°  | 3969.6  | 3952.7  | 3945.7  | 3914.7  | 3861.2  | 3820.4  | 3741.6  | 3650.1  | 3633.2  | 3544.5  | 3436.1  |
| 5°    | 4484.8  | 4470.8  | 4460.9  | 4417.3  | 4362.4  | 4259.6  | 4116.0  | 3945.7  | 3913.3  | 3744.4  | 3527.6  |
| 7.5°  | 4843.8  | 4869.1  | 4869.1  | 4841.0  | 4772.0  | 4694.6  | 4518.6  | 4286.4  | 4245.5  | 3986.5  | 3650.1  |
| 10°   | 5053.5  | 5084.5  | 5108.4  | 5132.4  | 5122.5  | 5091.6  | 4925.4  | 4663.6  | 4614.4  | 4270.9  | 3792.3  |
| 12.5° | 5073.3  | 5104.2  | 5171.8  | 5271.7  | 5368.9  | 5439.3  | 5335.1  | 5081.7  | 5025.4  | 4600.3  | 3961.2  |
| 15°   | 4963.5  | 4995.8  | 5100.0  | 5294.3  | 5529.3  | 5734.9  | 5768.6  | 5544.8  | 5487.1  | 4993.0  | 4172.3  |
| 17.5° | 4772.0  | 4793.1  | 4942.3  | 5211.2  | 5580.0  | 5957.3  | 6161.4  | 6041.7  | 5988.2  | 5442.1  | 4407.4  |
| 20°   | 4629.8  | 4645.3  | 4776.2  | 5064.8  | 5549.0  | 6096.6  | 6533.0  | 6569.6  | 6513.3  | 5923.5  | 4662.2  |
| 22.5° | 4873.4  | 4901.5  | 4905.7  | 5042.3  | 5464.6  | 6165.6  | 6859.6  | 7089.0  | 7046.8  | 6434.5  | 4912.8  |
| 25°   | 5539.2  | 5571.6  | 5464.6  | 5380.1  | 5536.4  | 6196.6  | 7139.7  | 7621.1  | 7587.4  | 6984.9  | 5164.8  |
| 27.5° | 6419.0  | 6452.8  | 6314.8  | 6062.8  | 5912.2  | 6313.4  | 7388.9  | 8161.7  | 8160.3  | 7567.7  | 5436.4  |
| 30°   | 7283.3  | 7317.1  | 7176.3  | 6924.3  | 6578.1  | 6644.2  | 7604.3  | 8727.6  | 8736.0  | 8168.7  | 5725.0  |
| 32.5° | 8189.8  | 8232.1  | 8087.1  | 7763.3  | 7401.5  | 7215.7  | 7906.9  | 9296.3  | 9344.1  | 8865.5  | 6050.2  |
| 35°   | 9220.3  | 9225.9  | 9021.8  | 8682.5  | 8265.9  | 7980.1  | 8392.5  | 9934.0  | 10048.0 | 9728.4  | 6462.6  |
| 37.5° | 10231.0 | 10271.8 | 10104.3 | 9569.4  | 9186.5  | 8862.7  | 9114.7  | 10730.7 | 10892.6 | 10782.8 | 7001.8  |
| 40°   | 10979.9 | 11065.7 | 11041.8 | 10464.6 | 10101.5 | 9870.6  | 10011.4 | 11678.1 | 11883.6 | 12010.3 | 7681.7  |
| 42.5° | 11450.0 | 11514.8 | 11624.6 | 11276.9 | 10947.5 | 10985.5 | 11069.9 | 12781.7 | 13035.1 | 13409.5 | 8462.9  |
| 45°   | 11989.2 | 12020.1 | 12111.6 | 11958.2 | 11735.8 | 12118.7 | 12193.3 | 14024.7 | 14290.7 | 14914.3 | 9330.1  |
| 47.5° | 12647.9 | 12721.1 | 12746.5 | 12605.7 | 12504.4 | 13120.9 | 13275.8 | 15155.0 | 15528.0 | 16526.1 | 10247.9 |
| 50°   | 13486.9 | 13506.6 | 13550.3 | 13458.8 | 13357.4 | 13982.4 | 14247.1 | 16341.7 | 16680.9 | 18143.5 | 11153.0 |
| 52.5° | 14307.6 | 14378.0 | 14530.0 | 14472.3 | 14431.5 | 14715.8 | 15112.8 | 17411.5 | 17790.2 | 19492.1 | 12056.7 |
| 55°   | 14544.1 | 14604.6 | 15129.7 | 15488.6 | 15820.8 | 15619.5 | 15940.5 | 18370.1 | 18779.8 | 20697.0 | 12926.7 |
| 57.5° | 13599.5 | 13722.0 | 14631.4 | 15566.1 | 16944.2 | 17024.4 | 17077.9 | 19354.1 | 19721.5 | 21620.5 | 13831.8 |
| 60°   | 11212.1 | 11236.1 | 12728.2 | 14331.5 | 16758.4 | 18250.5 | 18738.9 | 20411.3 | 20719.5 | 22480.5 | 14915.7 |
| 62.5° | 7131.3  | 7374.8  | 9011.9  | 11275.5 | 14793.2 | 18073.1 | 20747.7 | 22010.4 | 22123.0 | 23512.4 | 16469.8 |
| 65°   | 3396.7  | 3554.4  | 4734.0  | 6966.6  | 10715.2 | 15802.5 | 22134.3 | 24903.2 | 24953.8 | 25557.7 | 18546.1 |
| 67.5° | 1880.7  | 1956.7  | 2518.3  | 3750.0  | 6264.1  | 11175.5 | 21574.0 | 28329.4 | 28377.3 | 27646.7 | 20367.6 |
| 69°   | 1471.0  | 1535.8  | 1977.8  | 2826.6  | 4247.0  | 8032.2  | 19523.0 | 29333.1 | 29475.3 | 28245.0 | 20432.4 |
| 70°   | 1248.6  | 1312.0  | 1703.3  | 2387.4  | 3415.0  | 6206.4  | 17377.7 | 29083.9 | 29234.6 | 28188.7 | 19949.5 |
| 72.5° | 764.4   | 801.0   | 1134.6  | 1680.8  | 2288.9  | 3122.2  | 10716.6 | 24596.3 | 24851.1 | 25857.6 | 17145.5 |
| 75°   | 515.2   | 534.9   | 709.5   | 1159.9  | 1637.1  | 1607.6  | 5567.3  | 17336.9 | 17888.7 | 20114.2 | 12663.4 |
| 77.5° | 368.8   | 387.1   | 475.8   | 750.3   | 1147.3  | 1061.4  | 2521.1  | 10774.3 | 10892.6 | 12063.8 | 6906.0  |
| 80°   | 209.7   | 226.6   | 336.4   | 446.2   | 778.4   | 708.1   | 1002.3  | 5146.5  | 5205.6  | 5173.2  | 2305.8  |
| 82.5° | 109.8   | 123.9   | 184.4   | 294.2   | 499.7   | 463.1   | 416.7   | 1723.0  | 1731.4  | 1440.1  | 505.4   |
| 85°   | 21.1    | 25.3    | 91.5    | 201.3   | 257.6   | 201.3   | 170.3   | 404.0   | 412.4   | 364.6   | 125.3   |
| 87.5° | 0.0     | 1.4     | 36.6    | 45.0    | 50.7    | 52.1    | 54.9    | 78.8    | 84.5    | 114.0   | 33.8    |
| 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: P321993

CATALOG NUMBER: GLEON-SA9A-760-U-T2-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3372.8  | 3372.8 | 3372.8 | 3372.8 | 3372.8 | 3372.8 | 3372.8 | 3372.8 | 3372.8 | 3372.8 | 3372.8 |
| 2.5°  | 3388.3  | 3337.6 | 3240.5 | 3127.9 | 3040.6 | 2954.7 | 2887.1 | 2816.8 | 2791.4 | 2778.7 | 2777.3 |
| 5°    | 3422.1  | 3315.1 | 3109.6 | 2898.4 | 2725.3 | 2562.0 | 2445.1 | 2333.9 | 2281.8 | 2257.9 | 2248.1 |
| 7.5°  | 3478.4  | 3306.6 | 2975.8 | 2653.5 | 2404.3 | 2200.2 | 2038.3 | 1917.3 | 1856.7 | 1831.4 | 1821.5 |
| 10°   | 3544.5  | 3295.4 | 2819.6 | 2394.5 | 2076.3 | 1865.2 | 1704.7 | 1585.0 | 1518.9 | 1490.7 | 1476.6 |
| 12.5° | 3621.9  | 3275.7 | 2639.4 | 2132.6 | 1796.2 | 1585.0 | 1390.8 | 1243.0 | 1167.0 | 1134.6 | 1119.1 |
| 15°   | 3717.7  | 3255.9 | 2450.8 | 1886.3 | 1549.8 | 1292.2 | 1079.7 | 979.7  | 964.3  | 958.6  | 960.0  |
| 17.5° | 3812.0  | 3225.0 | 2245.2 | 1642.8 | 1290.8 | 1009.3 | 900.9  | 895.3  | 898.1  | 898.1  | 898.1  |
| 20°   | 3896.4  | 3154.6 | 2021.4 | 1434.4 | 1044.5 | 851.6  | 829.1  | 819.3  | 812.2  | 806.6  | 799.6  |
| 22.5° | 3962.6  | 3060.3 | 1806.0 | 1227.5 | 853.1  | 779.9  | 744.7  | 713.7  | 688.4  | 671.5  | 663.0  |
| 25°   | 4007.6  | 2935.0 | 1609.0 | 1029.0 | 767.2  | 709.5  | 646.1  | 594.0  | 554.6  | 530.7  | 520.8  |
| 27.5° | 4041.4  | 2799.9 | 1433.0 | 861.5  | 708.1  | 627.8  | 544.8  | 482.8  | 442.0  | 420.9  | 412.4  |
| 30°   | 4065.4  | 2646.4 | 1278.2 | 757.3  | 641.9  | 542.0  | 453.3  | 392.7  | 363.2  | 351.9  | 346.3  |
| 32.5° | 4087.9  | 2476.1 | 1131.8 | 708.1  | 580.0  | 463.1  | 380.1  | 333.6  | 315.3  | 301.2  | 297.0  |
| 35°   | 4144.2  | 2318.4 | 992.4  | 656.0  | 516.6  | 395.6  | 326.6  | 292.8  | 274.5  | 266.1  | 263.2  |
| 37.5° | 4277.9  | 2201.6 | 858.7  | 602.5  | 453.3  | 342.1  | 285.8  | 261.8  | 244.9  | 236.5  | 233.7  |
| 40°   | 4493.3  | 2142.5 | 746.1  | 544.8  | 391.3  | 301.2  | 259.0  | 236.5  | 218.2  | 205.5  | 202.7  |
| 42.5° | 4810.0  | 2150.9 | 667.2  | 487.1  | 342.1  | 268.9  | 233.7  | 206.9  | 187.2  | 176.0  | 173.1  |
| 45°   | 5194.3  | 2212.9 | 612.3  | 430.7  | 301.2  | 243.5  | 205.5  | 177.4  | 159.1  | 149.2  | 146.4  |
| 47.5° | 5611.0  | 2312.8 | 567.3  | 380.1  | 268.9  | 219.6  | 177.4  | 147.8  | 132.3  | 123.9  | 122.5  |
| 50°   | 6050.2  | 2409.9 | 520.8  | 330.8  | 240.7  | 195.7  | 149.2  | 122.5  | 109.8  | 102.8  | 99.9   |
| 52.5° | 6495.0  | 2522.6 | 478.6  | 285.8  | 216.8  | 167.5  | 123.9  | 99.9   | 90.1   | 84.5   | 81.6   |
| 55°   | 6973.6  | 2607.0 | 437.8  | 250.6  | 192.9  | 142.2  | 102.8  | 83.1   | 74.6   | 67.6   | 66.2   |
| 57.5° | 7536.7  | 2737.9 | 395.6  | 216.8  | 164.7  | 118.2  | 84.5   | 66.2   | 59.1   | 52.1   | 50.7   |
| 60°   | 8296.8  | 2891.4 | 350.5  | 191.4  | 135.1  | 97.1   | 69.0   | 53.5   | 45.0   | 39.4   | 38.0   |
| 62.5° | 9299.1  | 3061.7 | 294.2  | 167.5  | 109.8  | 78.8   | 54.9   | 42.2   | 32.4   | 25.3   | 25.3   |
| 65°   | 10570.2 | 3339.0 | 240.7  | 140.8  | 90.1   | 64.8   | 42.2   | 31.0   | 18.3   | 11.3   | 11.3   |
| 67.5° | 11312.1 | 3386.9 | 194.3  | 115.4  | 73.2   | 54.9   | 35.2   | 21.1   | 5.6    | 1.4    | 0.0    |
| 69°   | 11074.2 | 3109.6 | 164.7  | 98.5   | 63.3   | 52.1   | 32.4   | 15.5   | 2.8    | 0.0    | 0.0    |
| 70°   | 10626.5 | 2843.5 | 145.0  | 87.3   | 57.7   | 49.3   | 31.0   | 11.3   | 2.8    | 0.0    | 0.0    |
| 72.5° | 8781.1  | 2024.2 | 109.8  | 64.8   | 42.2   | 43.6   | 28.2   | 7.0    | 2.8    | 0.0    | 0.0    |
| 75°   | 6396.5  | 1230.3 | 78.8   | 45.0   | 26.7   | 32.4   | 19.7   | 2.8    | 1.4    | 0.0    | 0.0    |
| 77.5° | 3558.6  | 580.0  | 49.3   | 25.3   | 16.9   | 19.7   | 9.9    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 1155.7  | 157.7  | 22.5   | 14.1   | 9.9    | 11.3   | 4.2    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 214.0   | 45.0   | 12.7   | 7.0    | 2.8    | 2.8    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 46.5    | 18.3   | 7.0    | 2.8    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 15.5    | 5.6    | 1.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-9-R4

Test Date: 10/23/2019

Luminaire Tested: SA1C-760-U-5WQ

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

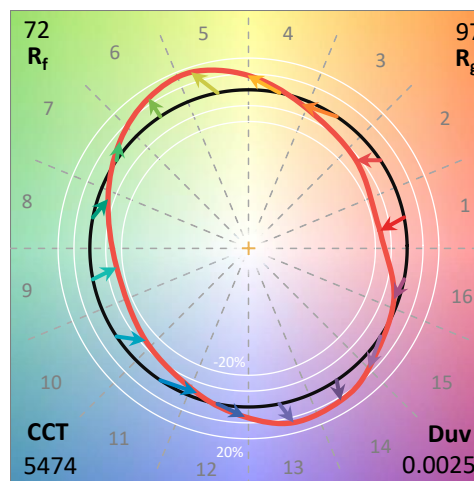
### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-9-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-760-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

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

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 5474   | CRI (Ra): | 71.7 |      |       |
| CIE u':                   | 0.2052 | R1:       | 70.6 | R9:  | -27.1 |
| CIE v':                   | 0.4804 | R2:       | 74.6 | R10: | 40.8  |
| Duv:                      | 0.0025 | R3:       | 78.3 | R11: | 74.6  |
| CIE x:                    | 0.3330 | R4:       | 73.8 | R12: | 50.4  |
| CIE y:                    | 0.3466 | R5:       | 72.4 | R13: | 70.0  |
| CIE z:                    | 0.3204 | R6:       | 67.5 | R14: | 87.8  |
| Peak Wavelength (nm):     | 442    | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 554    | R8:       | 58.9 |      |       |
| Purity:                   | 4.1    |           |      |      |       |
| Rf:                       | 72.1   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



### Test Conditions

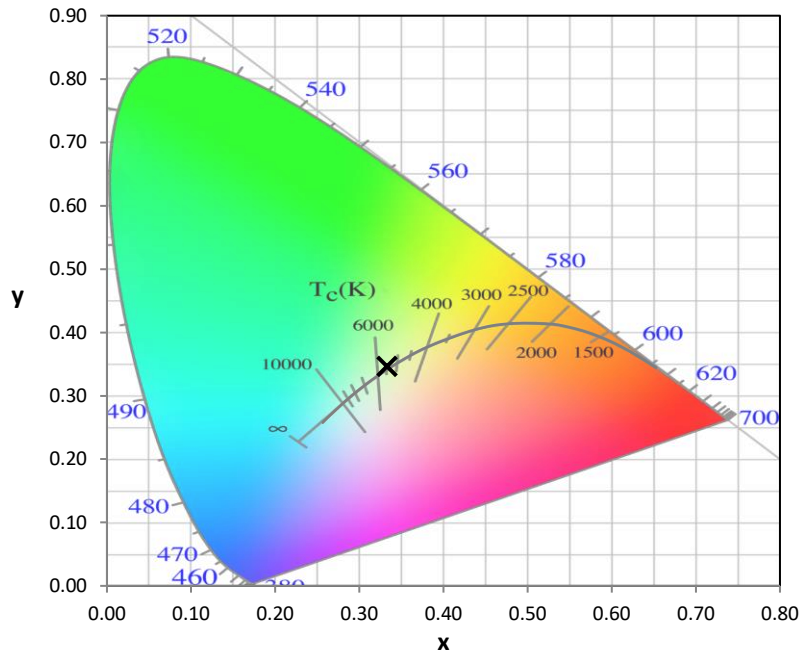
Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.6/31%  
 Sphere Temperature (°C): 25.9

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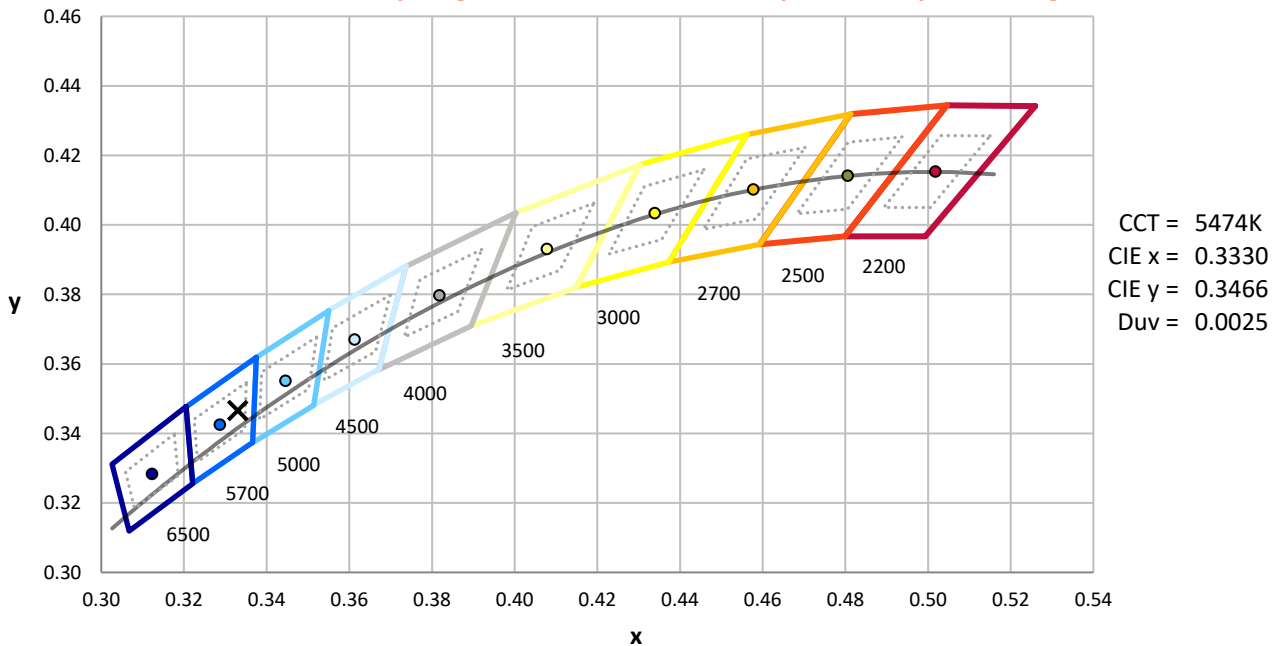
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

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CIE 1931 Chromaticity Diagram



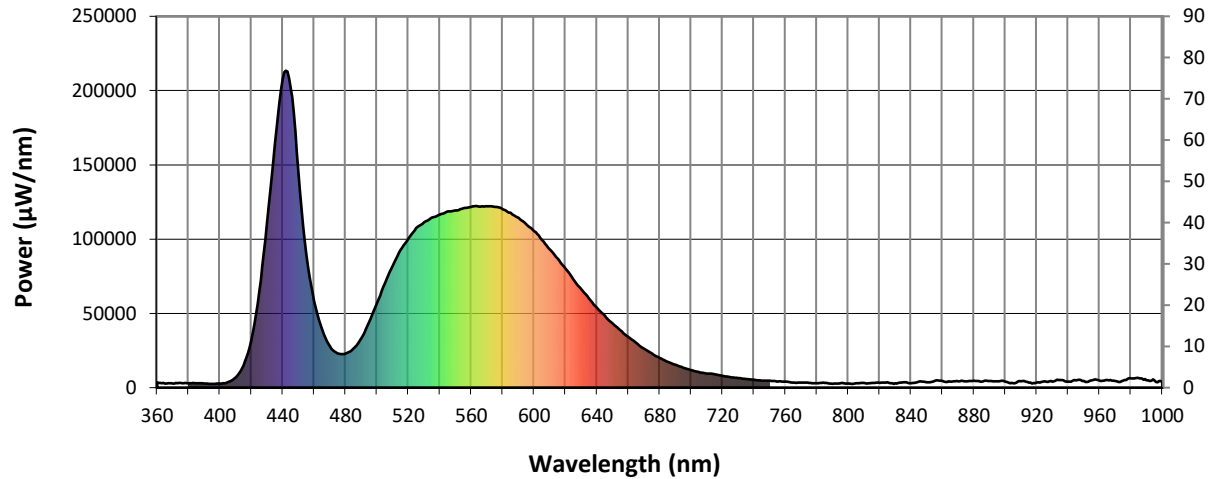
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 5700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**

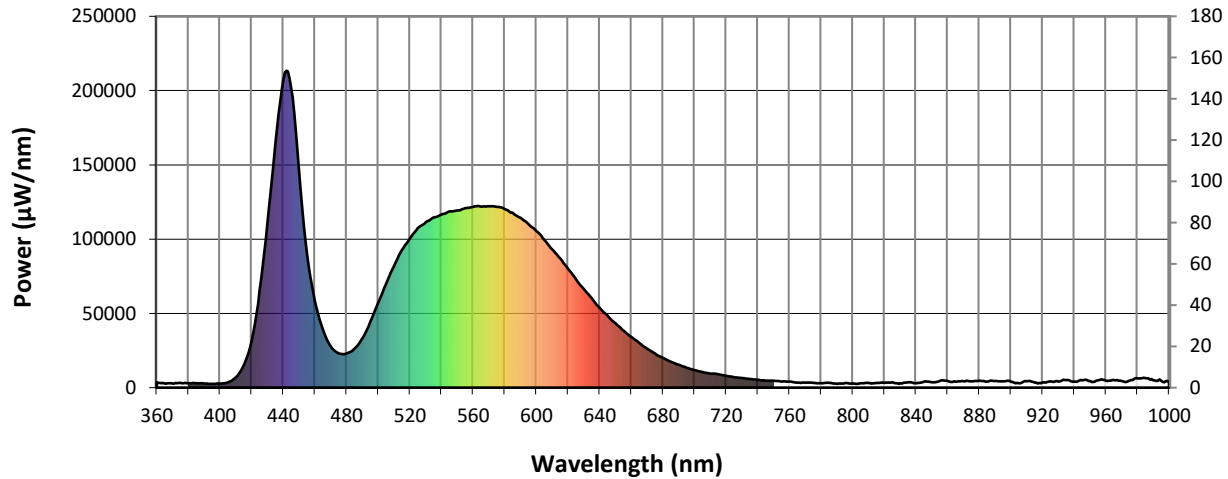


#####

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

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Scotopic Flux vs. Wavelength



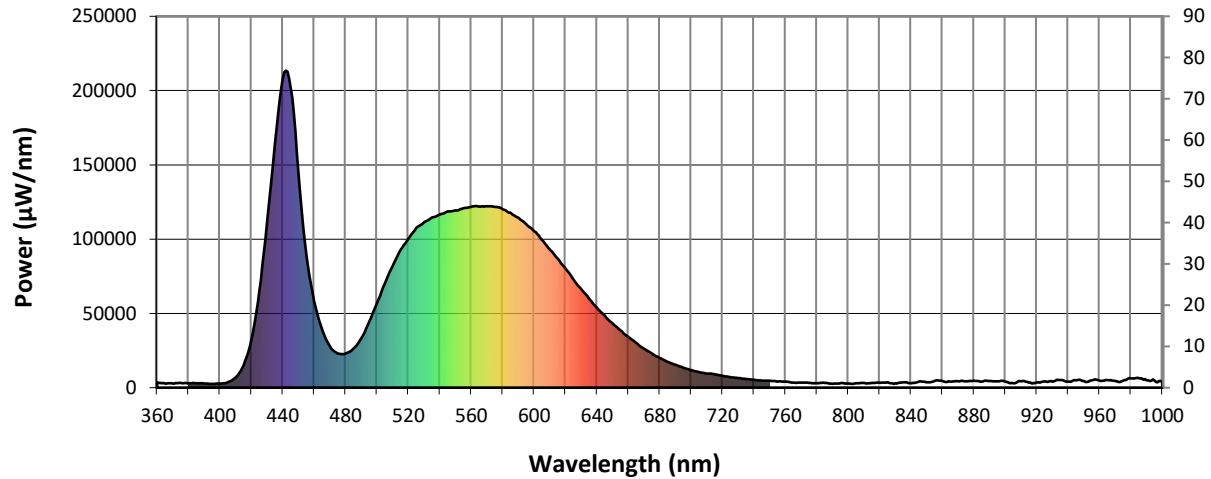
Scotopic Lumens: 13759.3

S/P: 1.85

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

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**Melanopic Flux vs. Wavelength**



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

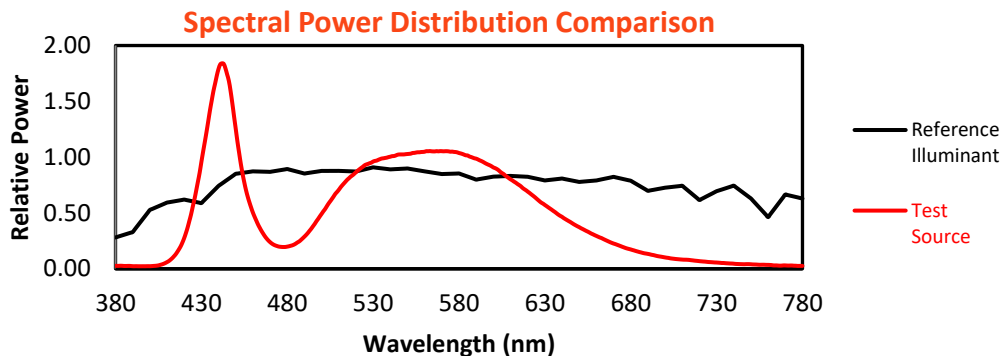
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------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

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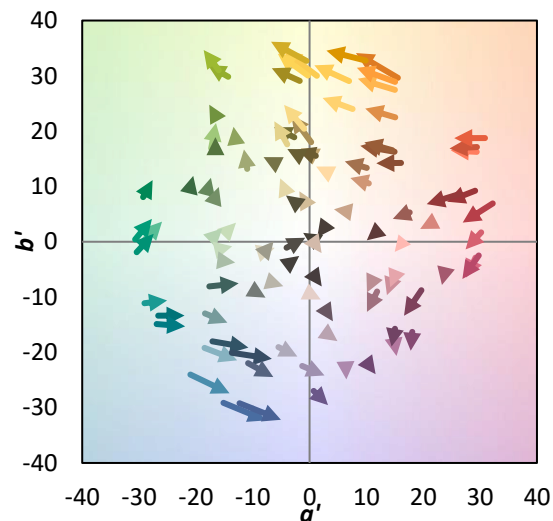
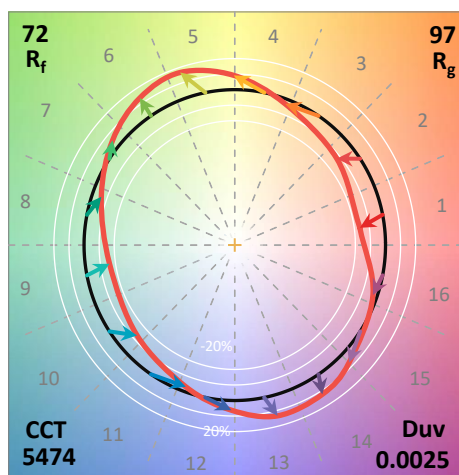
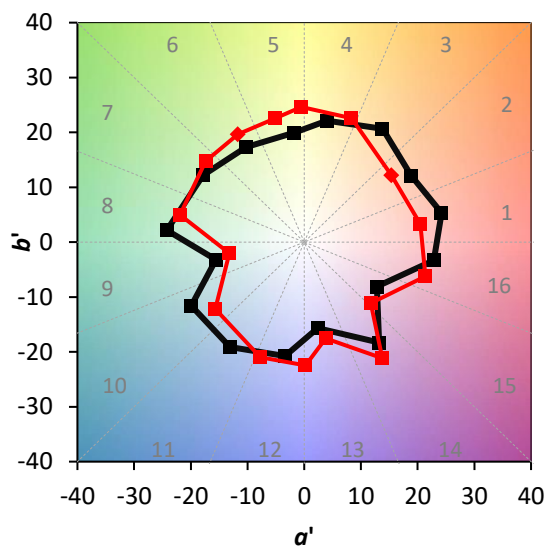
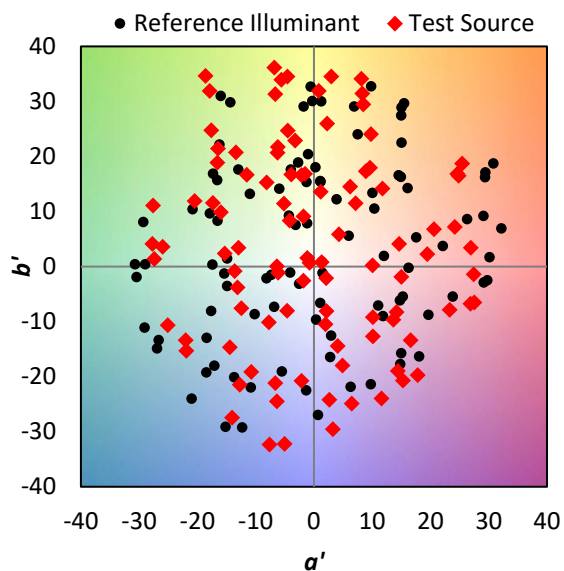
**TM-30-18**

**Summary**

$R_f = 72.1$   
 $R_g = 97.2$   
 CIE  $R_a = 71.7$   
 $R_g = -27.1$



**Color Vector Graphics**



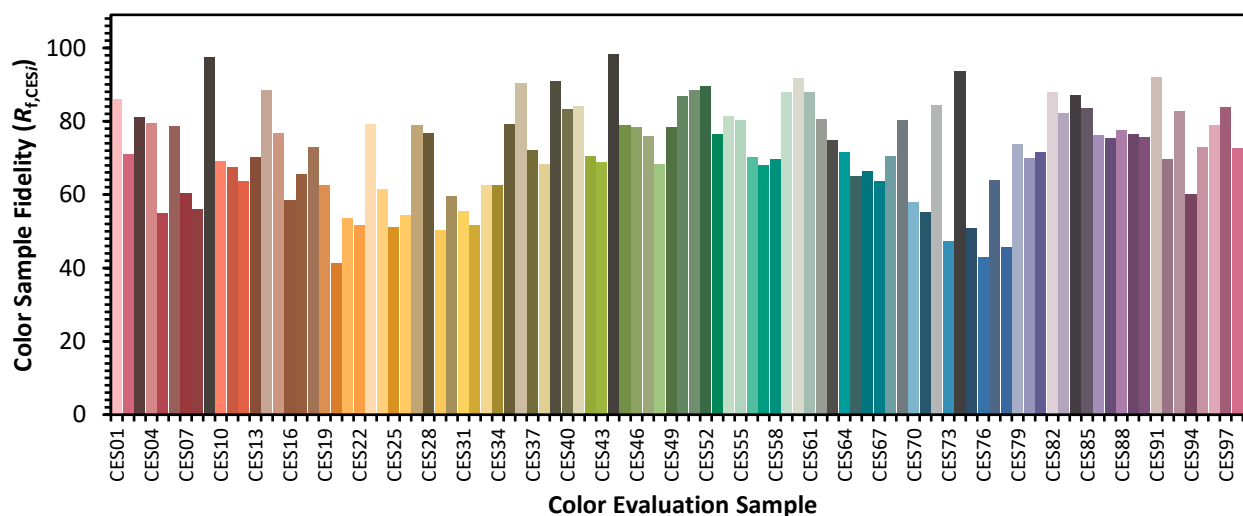


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

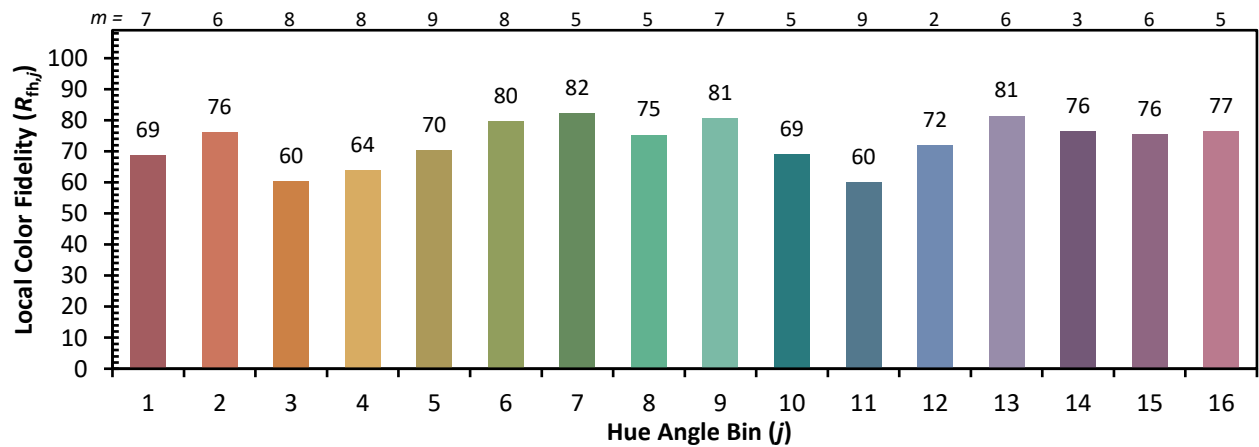
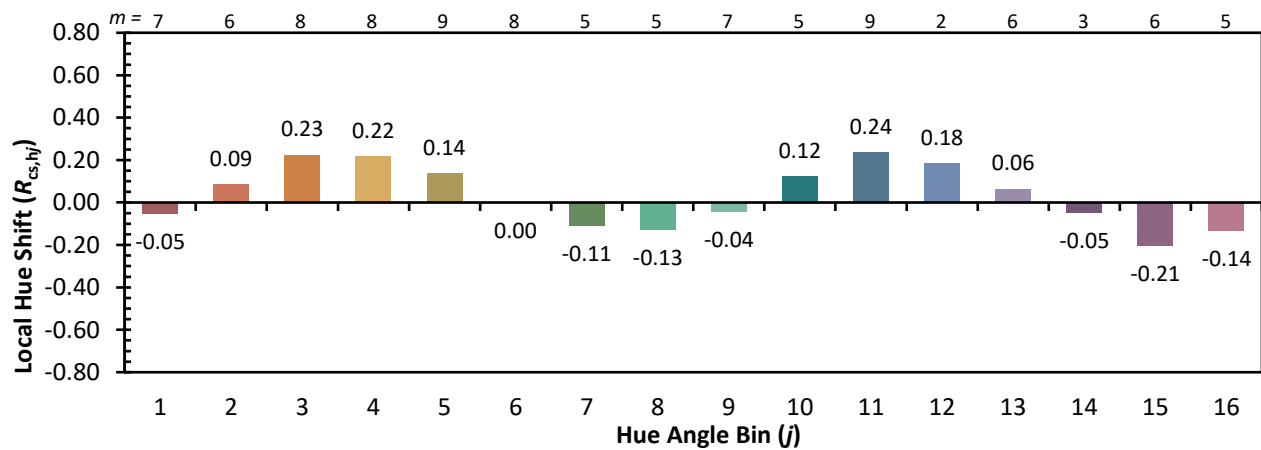
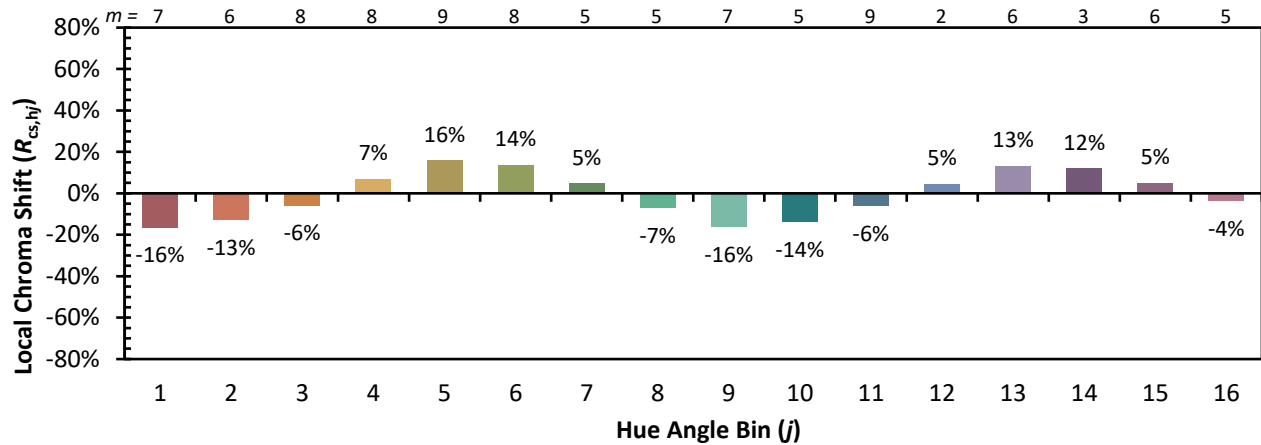
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 88 | CES76 = 43 |
| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 81 | CES79 = 74 |
| CES05 = 46 | CES30 = 59 | CES55 = 80 | CES80 = 70 |
| CES06 = 50 | CES31 = 55 | CES56 = 70 | CES81 = 71 |
| CES07 = 38 | CES32 = 52 | CES57 = 68 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 82 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 84 |
| CES11 = 55 | CES36 = 90 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 72 | CES62 = 81 | CES87 = 75 |
| CES13 = 41 | CES38 = 68 | CES63 = 75 | CES88 = 77 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 84 | CES66 = 66 | CES91 = 92 |
| CES17 = 48 | CES42 = 70 | CES67 = 64 | CES92 = 70 |
| CES18 = 55 | CES43 = 69 | CES68 = 71 | CES93 = 83 |
| CES19 = 70 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 73 |
| CES21 = 85 | CES46 = 78 | CES71 = 55 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 68 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 78 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



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**TM-30-18**

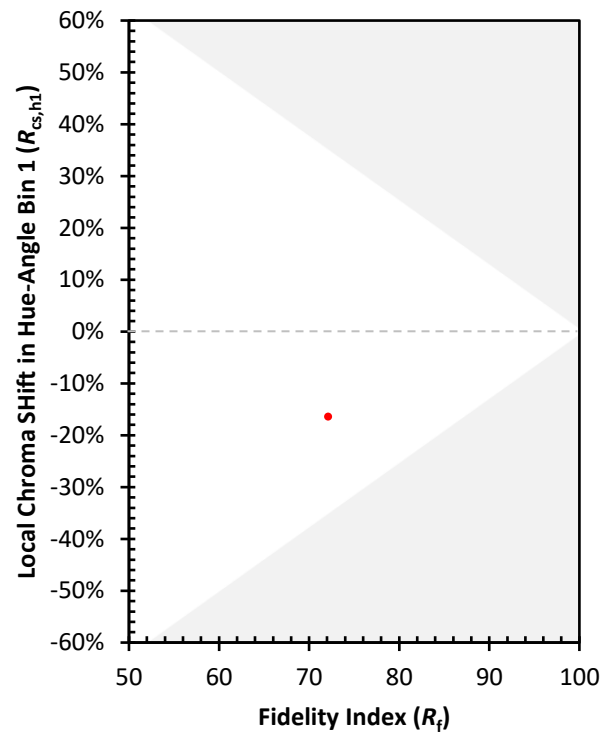
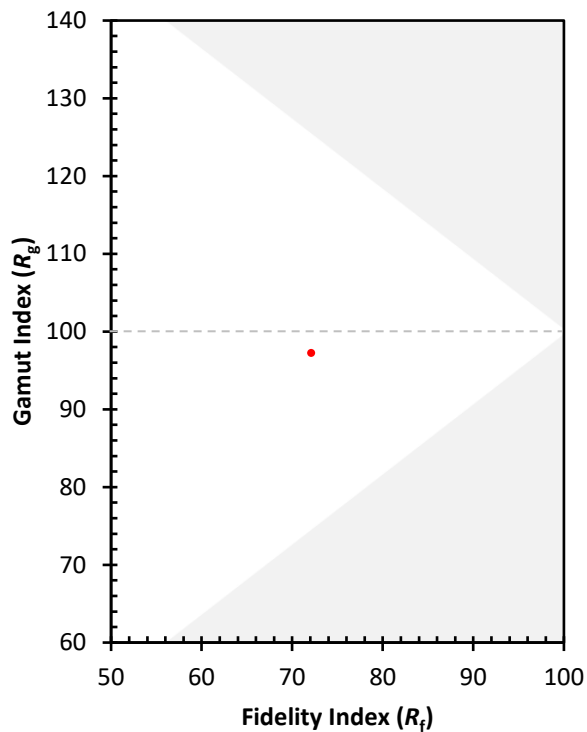
Color Rendition by Hue-Angle Bin



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**TM-30-18**

**Measure Comparisons**



(END OF REPORT)