

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: P323857

Luminaire Tested: **GLEON-SA3D-740-U-SL4-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P323857  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-25)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GLEON-SA3D-740-U-SL4-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(3) 70 CRI, 4000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 19226 lumens  
Efficiency: N/A  
Efficacy: 100.7 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G4

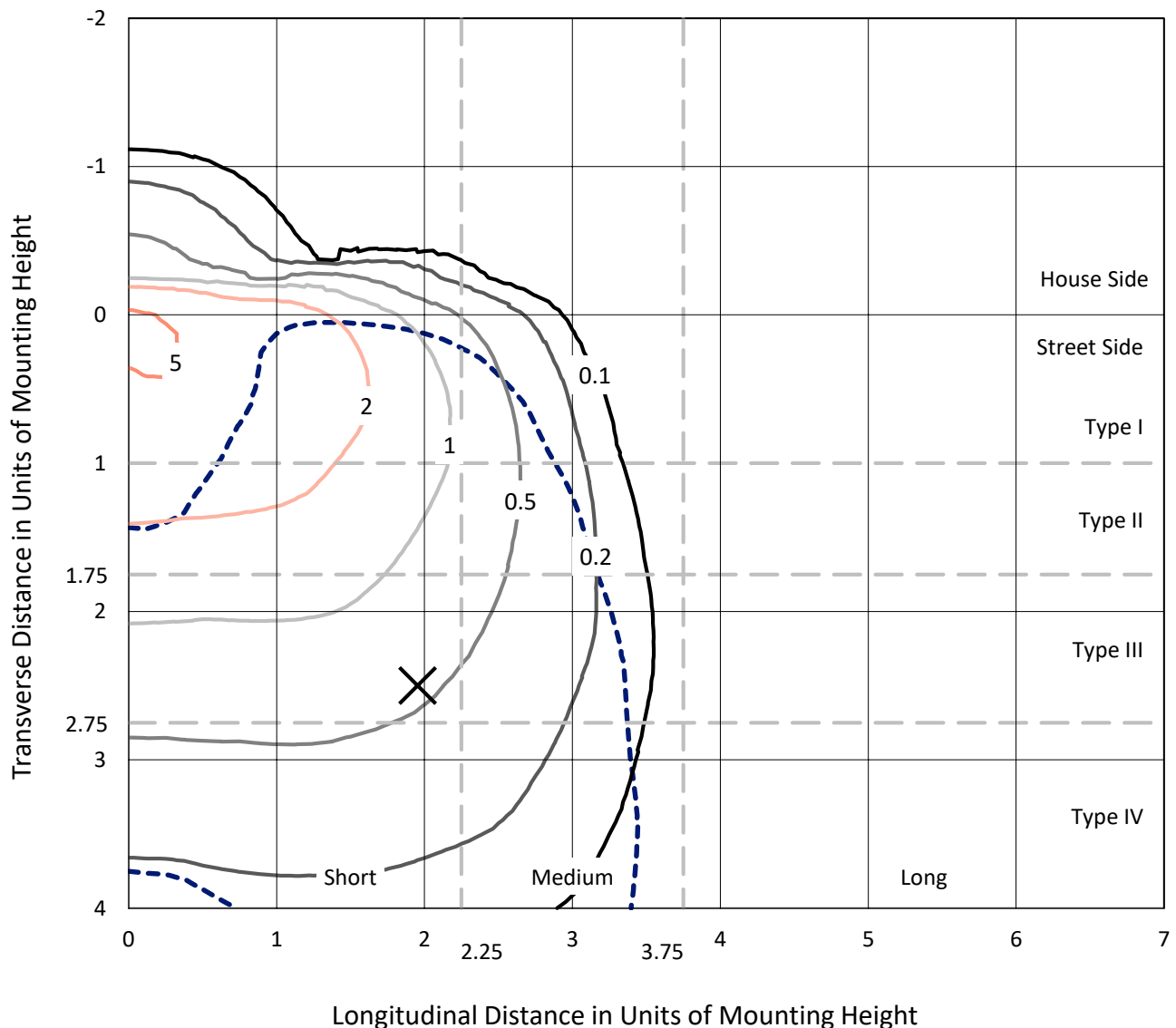
Input Watts (W): 191  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P323857  
 CATALOG NUMBER: GLEON-SA3D-740-U-SL4-HSS

## Iso-Footcandle Lines of Horizontal Illumination

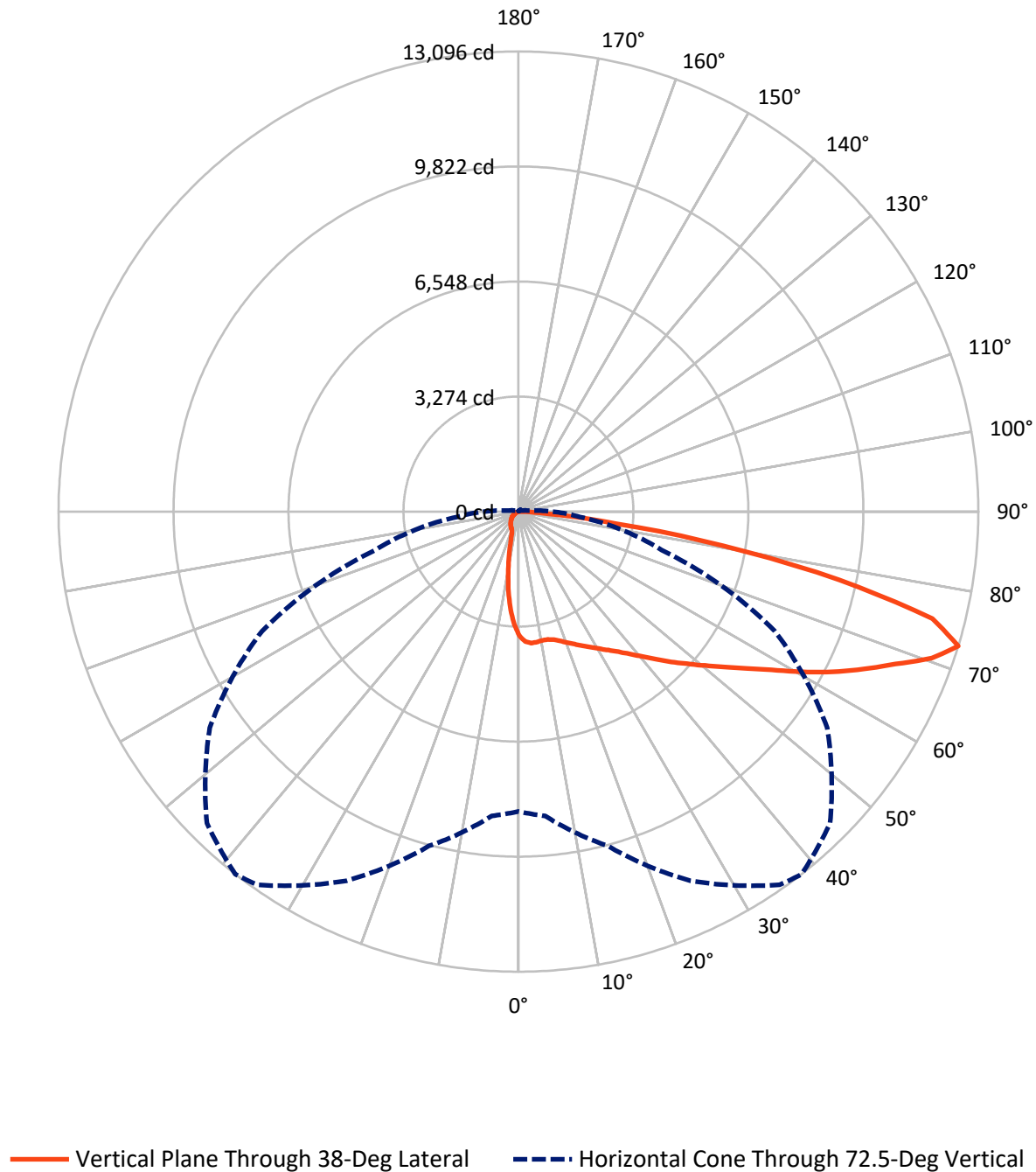
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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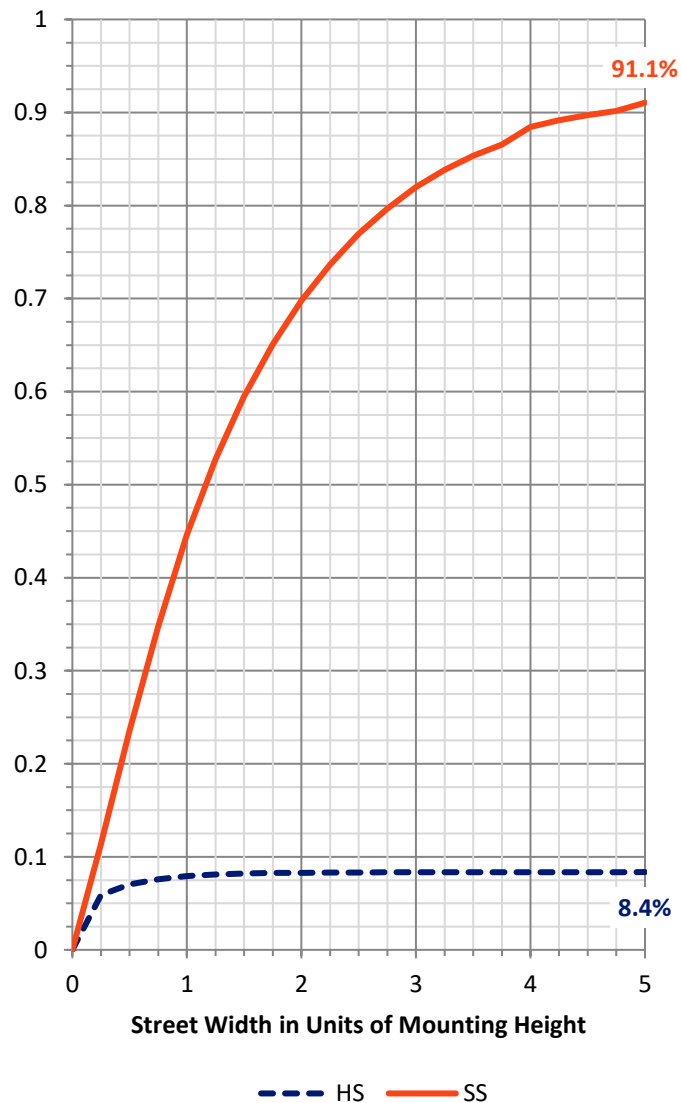
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1617.9   | 0.0    | 1617.9  |
|                    | % Fixture | 8.4      | 0.0    | 8.4     |
| <b>Street Side</b> | Lumens    | 17608.1  | 0.0    | 17608.1 |
|                    | % Fixture | 91.6     | 0.0    | 91.6    |
| <b>Total</b>       | Lumens    | 19226.0  | 0.0    | 19226.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 301.3   | 1.6       |
| 10°-20°   | 736.7   | 3.8       |
| 20°-30°   | 1171.8  | 6.1       |
| 30°-40°   | 1761.7  | 9.2       |
| 40°-50°   | 2687.5  | 14.0      |
| 50°-60°   | 3798.4  | 19.8      |
| 60°-70°   | 4764.4  | 24.8      |
| 70°-80°   | 3562.5  | 18.5      |
| 80°-90°   | 441.7   | 2.3       |
| 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°    | 19226.0 | 100.0     |
| 0°-180°   | 19226.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P323857

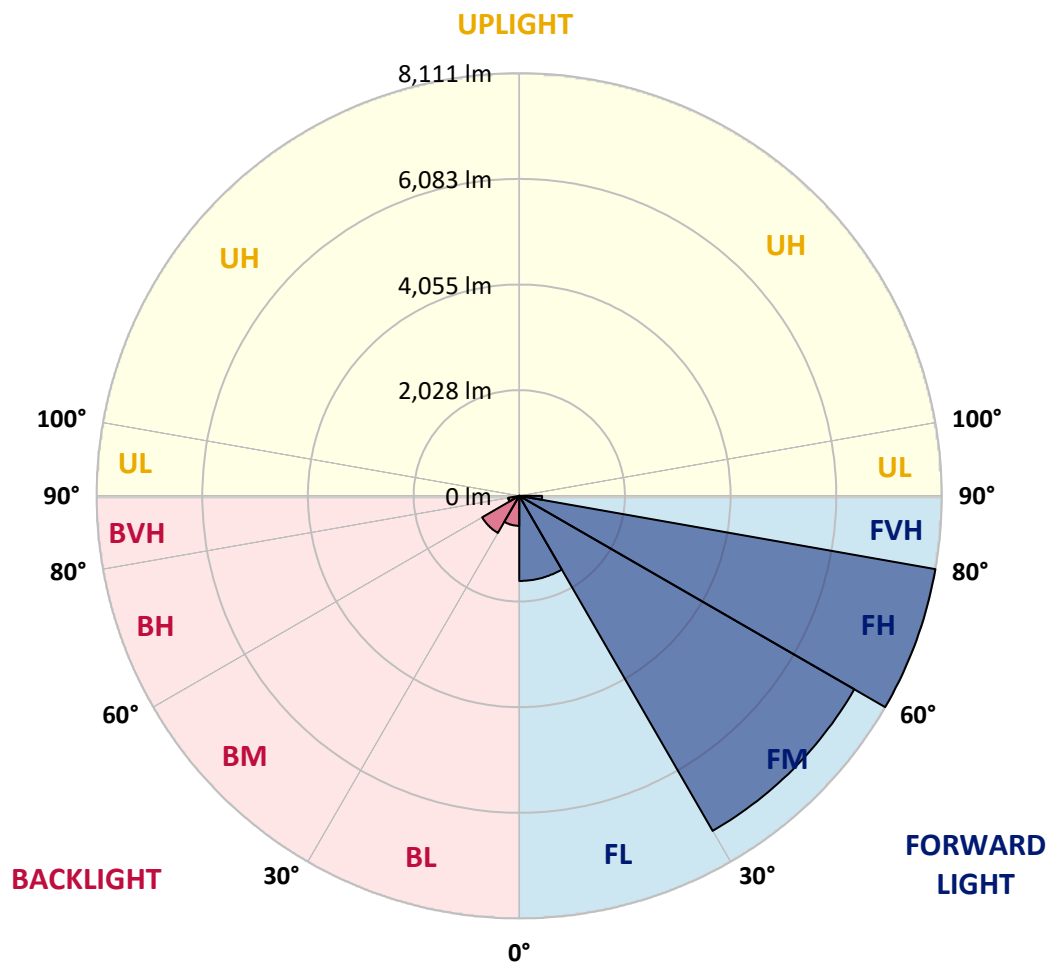
CATALOG NUMBER: GLEON-SA3D-740-U-SL4-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1633.7 | 8.5       |                         |      |          |
| FM   | (30°-60°)   | 7425.9 | 38.6      |                         |      |          |
| FH   | (60°-80°)   | 8110.8 | 42.2      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 437.6  | 2.3       |                         |      | G3/500   |
| BL   | (0°-30°)    | 576.1  | 3.0       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 821.6  | 4.3       | B1/1000                 |      |          |
| BH   | (60°-80°)   | 216.1  | 1.1       | B1/500                  |      | G1/500   |
| BVH  | (80°-90°)   | 4.1    | 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 IV Short



REPORT NUMBER: P323857

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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°     | 35°     | 38°     | 45°     | 55°     | 65°     | 75°    | 85°    |
|-------|--------|--------|--------|---------|---------|---------|---------|---------|---------|--------|--------|
| 0°    | 3535.6 | 3535.6 | 3535.6 | 3535.6  | 3535.6  | 3535.6  | 3535.6  | 3535.6  | 3535.6  | 3535.6 | 3535.6 |
| 2.5°  | 3752.8 | 3753.6 | 3744.8 | 3730.4  | 3712.1  | 3702.5  | 3686.5  | 3661.0  | 3633.8  | 3585.1 | 3532.4 |
| 5°    | 3829.4 | 3829.4 | 3818.3 | 3799.1  | 3769.5  | 3760.8  | 3730.4  | 3689.7  | 3633.8  | 3554.8 | 3466.1 |
| 7.5°  | 3821.4 | 3823.0 | 3807.9 | 3787.9  | 3758.4  | 3750.4  | 3713.7  | 3668.1  | 3598.7  | 3502.9 | 3389.5 |
| 10°   | 3779.9 | 3783.9 | 3771.9 | 3762.4  | 3735.2  | 3726.4  | 3692.1  | 3646.6  | 3577.1  | 3474.9 | 3344.8 |
| 12.5° | 3737.6 | 3741.6 | 3745.6 | 3754.4  | 3737.6  | 3734.4  | 3707.3  | 3668.9  | 3602.7  | 3496.5 | 3349.6 |
| 15°   | 3710.5 | 3718.4 | 3747.2 | 3781.5  | 3785.5  | 3782.3  | 3764.8  | 3728.8  | 3661.8  | 3551.6 | 3383.9 |
| 17.5° | 3710.5 | 3723.2 | 3783.1 | 3848.6  | 3871.8  | 3874.1  | 3859.0  | 3808.7  | 3728.8  | 3610.7 | 3415.8 |
| 20°   | 3741.6 | 3759.2 | 3852.6 | 3945.2  | 3983.5  | 3983.5  | 3954.0  | 3883.7  | 3790.3  | 3664.2 | 3437.4 |
| 22.5° | 3821.4 | 3844.6 | 3962.0 | 4069.0  | 4109.7  | 4100.9  | 4061.0  | 3958.8  | 3854.2  | 3724.8 | 3464.5 |
| 25°   | 3978.7 | 3996.3 | 4118.5 | 4226.3  | 4251.0  | 4231.1  | 4180.8  | 4049.8  | 3935.6  | 3807.1 | 3514.0 |
| 27.5° | 4181.6 | 4184.0 | 4310.1 | 4401.1  | 4386.0  | 4372.4  | 4309.3  | 4164.0  | 4053.0  | 3924.4 | 3599.5 |
| 30°   | 4404.3 | 4404.3 | 4515.3 | 4584.8  | 4538.5  | 4527.3  | 4464.2  | 4302.1  | 4203.1  | 4084.1 | 3720.8 |
| 32.5° | 4619.9 | 4629.5 | 4719.7 | 4763.6  | 4711.7  | 4700.6  | 4639.1  | 4477.0  | 4402.7  | 4327.7 | 3910.1 |
| 35°   | 4828.3 | 4835.5 | 4920.9 | 4944.9  | 4895.4  | 4898.6  | 4854.7  | 4717.3  | 4689.4  | 4679.8 | 4195.1 |
| 37.5° | 5030.3 | 5031.9 | 5119.0 | 5134.1  | 5109.4  | 5136.5  | 5140.5  | 5019.1  | 5071.0  | 5148.5 | 4596.8 |
| 40°   | 5214.8 | 5216.4 | 5302.6 | 5341.7  | 5384.0  | 5419.2  | 5450.3  | 5385.6  | 5557.3  | 5737.0 | 5075.0 |
| 42.5° | 5362.5 | 5379.3 | 5488.6 | 5562.9  | 5674.7  | 5741.8  | 5826.4  | 5823.2  | 6136.2  | 6406.1 | 5653.1 |
| 45°   | 5492.6 | 5521.4 | 5673.9 | 5804.0  | 5995.7  | 6102.7  | 6235.2  | 6339.0  | 6787.7  | 7151.0 | 6238.4 |
| 47.5° | 5664.3 | 5691.5 | 5865.5 | 6078.7  | 6334.2  | 6474.7  | 6694.3  | 6918.7  | 7504.0  | 7882.4 | 6810.1 |
| 50°   | 5906.2 | 5894.3 | 6065.9 | 6371.7  | 6699.9  | 6884.4  | 7197.4  | 7533.5  | 8214.6  | 8519.6 | 7146.3 |
| 52.5° | 6164.1 | 6159.4 | 6286.3 | 6690.3  | 7131.1  | 7346.7  | 7760.3  | 8169.1  | 8894.1  | 8958.8 | 7300.4 |
| 55°   | 6483.5 | 6449.2 | 6556.2 | 7053.6  | 7642.9  | 7874.5  | 8361.5  | 8798.3  | 9435.4  | 9206.3 | 7377.8 |
| 57.5° | 6818.1 | 6761.4 | 6863.6 | 7458.5  | 8220.2  | 8494.1  | 9027.4  | 9411.5  | 9795.6  | 9375.6 | 7377.0 |
| 60°   | 7163.8 | 7096.7 | 7218.1 | 7964.7  | 8937.2  | 9254.2  | 9749.2  | 9825.9  | 10131.7 | 9461.0 | 7322.7 |
| 62.5° | 7452.9 | 7412.9 | 7593.4 | 8506.0  | 9738.1  | 10049.5 | 10294.6 | 10202.8 | 10415.2 | 9527.3 | 7195.8 |
| 65°   | 7758.7 | 7761.1 | 8052.5 | 9137.6  | 10589.2 | 10799.2 | 10820.0 | 10691.4 | 10652.3 | 9513.7 | 6766.2 |
| 67.5° | 8172.3 | 8210.6 | 8696.9 | 9995.2  | 11417.2 | 11579.3 | 11577.7 | 11220.8 | 10825.6 | 8973.9 | 5813.6 |
| 70°   | 8609.8 | 8700.1 | 9439.4 | 10976.5 | 12321.1 | 12485.6 | 12400.9 | 11557.8 | 10193.2 | 7256.4 | 4114.5 |
| 72.5° | 8536.4 | 8692.9 | 9852.2 | 11595.3 | 12970.2 | 13095.6 | 12545.5 | 10729.8 | 8056.5  | 4217.5 | 1751.8 |
| 75°   | 6585.7 | 6767.0 | 9033.8 | 10982.1 | 12289.2 | 12176.6 | 10779.3 | 8349.5  | 4402.7  | 1176.9 | 394.4  |
| 77.5° | 3478.9 | 3575.5 | 5967.7 | 8366.3  | 9582.4  | 9346.8  | 7593.4  | 4631.9  | 1342.2  | 291.4  | 177.3  |
| 80°   | 1822.1 | 1844.5 | 2600.6 | 4746.9  | 5914.2  | 5915.8  | 4500.1  | 2034.5  | 553.3   | 149.3  | 119.0  |
| 82.5° | 975.7  | 994.9  | 1374.2 | 2193.4  | 3098.8  | 2809.0  | 1723.1  | 1119.4  | 321.8   | 84.6   | 114.2  |
| 85°   | 234.7  | 238.7  | 779.3  | 1002.1  | 1218.5  | 870.3   | 511.8   | 939.8   | 87.0    | 49.5   | 92.6   |
| 87.5° | 90.2   | 91.8   | 289.0  | 433.6   | 310.6   | 201.2   | 239.5   | 350.5   | 11.2    | 19.2   | 14.4   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0    | 0.0    |



REPORT NUMBER: P323857

CATALOG NUMBER: GLEON-SA3D-740-U-SL4-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3535.6 | 3535.6 | 3535.6 | 3535.6 | 3535.6 | 3535.6 | 3535.6 | 3535.6 | 3535.6 | 3535.6 | 3535.6 |
| 2.5°  | 3500.5 | 3479.7 | 3428.6 | 3363.9 | 3306.4 | 3264.9 | 3202.6 | 3161.9 | 3134.8 | 3134.0 | 3123.6 |
| 5°    | 3411.8 | 3369.5 | 3259.3 | 3128.4 | 3009.4 | 2902.4 | 2776.3 | 2676.5 | 2602.2 | 2590.2 | 2564.7 |
| 7.5°  | 3316.8 | 3247.4 | 3078.1 | 2873.7 | 2674.1 | 2471.2 | 2235.7 | 2089.6 | 1964.2 | 1904.3 | 1897.9 |
| 10°   | 3258.5 | 3161.1 | 2920.8 | 2625.3 | 2312.4 | 1982.6 | 1674.4 | 1461.2 | 1307.1 | 1263.2 | 1230.4 |
| 12.5° | 3246.6 | 3118.0 | 2799.4 | 2392.2 | 1945.1 | 1509.1 | 1168.2 | 941.4  | 818.4  | 779.3  | 768.9  |
| 15°   | 3258.5 | 3098.0 | 2697.2 | 2161.4 | 1573.0 | 1070.7 | 784.1  | 652.3  | 606.0  | 594.9  | 594.1  |
| 17.5° | 3265.7 | 3074.1 | 2581.4 | 1905.1 | 1212.1 | 764.9  | 600.4  | 562.1  | 554.9  | 554.1  | 555.7  |
| 20°   | 3264.9 | 3037.4 | 2443.3 | 1619.3 | 901.5  | 601.2  | 543.0  | 535.0  | 533.4  | 534.2  | 533.4  |
| 22.5° | 3259.3 | 2994.2 | 2291.6 | 1324.7 | 681.1  | 537.4  | 518.2  | 513.4  | 512.6  | 512.6  | 512.6  |
| 25°   | 3269.7 | 2959.9 | 2124.7 | 1042.8 | 561.3  | 507.8  | 495.8  | 491.9  | 491.1  | 491.1  | 489.5  |
| 27.5° | 3307.2 | 2940.7 | 1941.9 | 802.5  | 507.0  | 481.5  | 471.9  | 471.1  | 468.7  | 467.9  | 469.5  |
| 30°   | 3367.9 | 2940.7 | 1741.4 | 624.4  | 474.3  | 454.3  | 447.1  | 445.5  | 444.7  | 443.9  | 444.7  |
| 32.5° | 3474.9 | 2963.1 | 1522.7 | 519.0  | 443.1  | 424.0  | 419.2  | 421.6  | 419.2  | 419.2  | 419.2  |
| 35°   | 3668.1 | 3030.2 | 1293.5 | 452.7  | 410.4  | 394.4  | 389.7  | 392.8  | 391.2  | 391.2  | 390.4  |
| 37.5° | 3950.0 | 3154.7 | 1062.8 | 412.8  | 381.7  | 364.9  | 358.5  | 363.3  | 361.7  | 361.7  | 360.9  |
| 40°   | 4293.3 | 3336.0 | 843.2  | 382.5  | 353.7  | 336.2  | 330.6  | 333.0  | 329.0  | 329.0  | 330.6  |
| 42.5° | 4717.3 | 3565.9 | 651.5  | 352.9  | 325.8  | 309.0  | 305.8  | 303.4  | 296.2  | 292.2  | 293.0  |
| 45°   | 5188.4 | 3805.5 | 507.8  | 324.2  | 299.4  | 285.9  | 281.1  | 274.7  | 262.7  | 254.7  | 255.5  |
| 47.5° | 5609.2 | 3989.9 | 412.8  | 296.2  | 275.5  | 265.1  | 257.9  | 245.9  | 228.4  | 218.8  | 219.6  |
| 50°   | 5830.4 | 4017.9 | 351.3  | 268.3  | 253.1  | 242.7  | 232.4  | 214.0  | 193.2  | 182.8  | 182.0  |
| 52.5° | 5887.1 | 3886.9 | 305.8  | 242.7  | 230.8  | 218.8  | 205.2  | 180.5  | 157.3  | 146.1  | 144.5  |
| 55°   | 5907.8 | 3687.3 | 265.1  | 218.8  | 206.8  | 193.2  | 175.7  | 147.7  | 126.2  | 115.0  | 114.2  |
| 57.5° | 5839.2 | 3389.5 | 233.2  | 197.2  | 182.8  | 166.1  | 144.5  | 118.2  | 97.4   | 88.6   | 88.6   |
| 60°   | 5686.7 | 2986.3 | 208.4  | 174.1  | 158.1  | 138.9  | 116.6  | 91.8   | 72.7   | 65.5   | 65.5   |
| 62.5° | 5382.4 | 2464.1 | 185.2  | 150.1  | 134.9  | 115.0  | 94.2   | 69.5   | 51.1   | 47.1   | 47.9   |
| 65°   | 4808.3 | 1869.2 | 162.1  | 128.6  | 115.0  | 95.0   | 73.5   | 49.5   | 34.3   | 34.3   | 35.9   |
| 67.5° | 3921.3 | 1298.3 | 138.1  | 109.4  | 99.0   | 77.5   | 55.9   | 34.3   | 24.0   | 27.1   | 30.3   |
| 70°   | 2595.8 | 728.2  | 118.2  | 90.2   | 84.6   | 61.5   | 41.5   | 23.2   | 19.2   | 25.6   | 31.1   |
| 72.5° | 979.7  | 283.5  | 99.0   | 72.7   | 73.5   | 47.1   | 29.5   | 17.6   | 17.6   | 27.9   | 36.7   |
| 75°   | 273.1  | 138.9  | 71.1   | 53.5   | 57.5   | 34.3   | 21.6   | 15.2   | 16.8   | 31.9   | 43.1   |
| 77.5° | 160.5  | 102.2  | 46.3   | 31.1   | 39.1   | 24.0   | 14.4   | 12.0   | 14.4   | 27.1   | 41.5   |
| 80°   | 129.4  | 54.3   | 27.1   | 16.0   | 21.6   | 13.6   | 9.6    | 7.2    | 4.0    | 10.4   | 21.6   |
| 82.5° | 129.4  | 32.7   | 12.8   | 11.2   | 11.2   | 7.2    | 4.8    | 3.2    | 0.8    | 0.0    | 5.6    |
| 85°   | 87.0   | 13.6   | 8.0    | 7.2    | 5.6    | 2.4    | 1.6    | 0.8    | 0.0    | 0.0    | 0.0    |
| 87.5° | 14.4   | 5.6    | 3.2    | 1.6    | 0.8    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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

Report Prepared for

Cooper Lighting Solutions

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

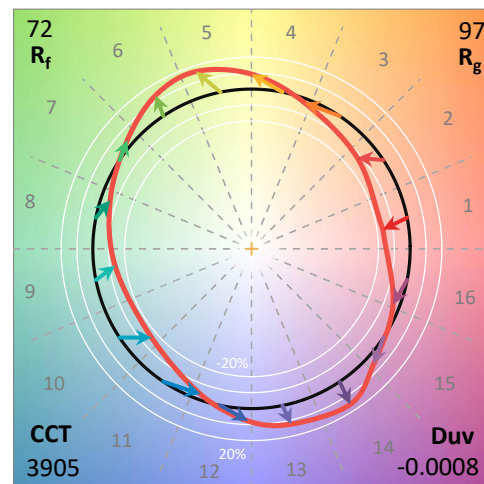
### Test Information

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

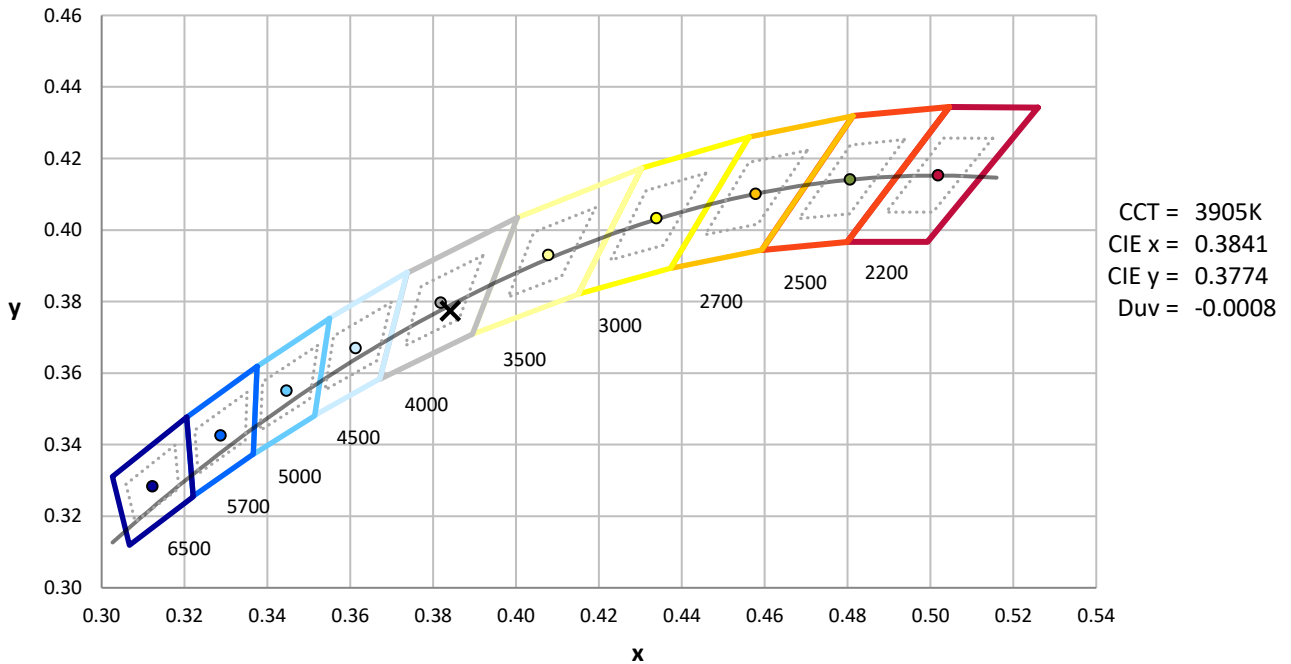
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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

REPORT NUMBER: SP1-2101-121-2

**CIE 1931 Chromaticity Diagram**



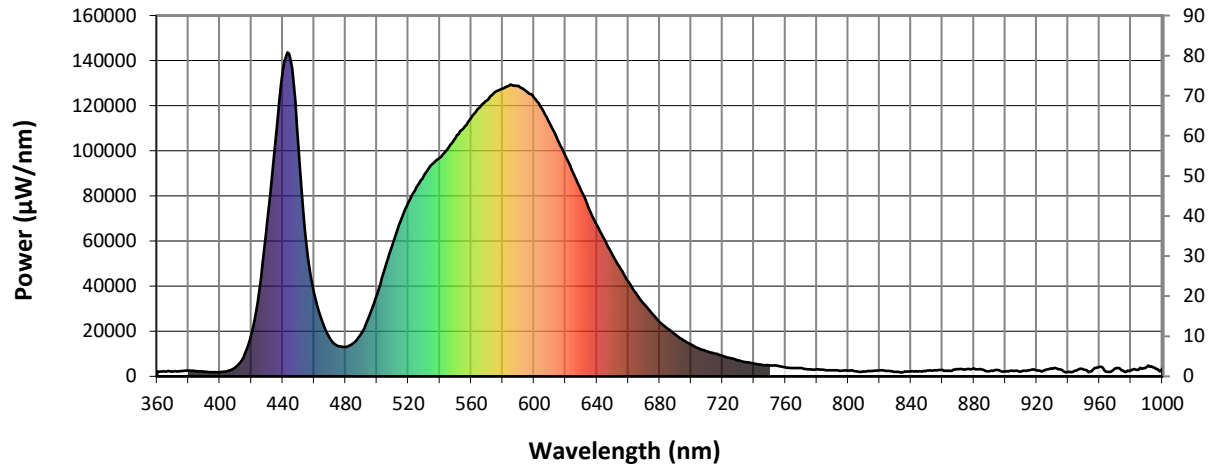
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 4000K 4-step quadrangle

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### Photopic Flux vs. Wavelength

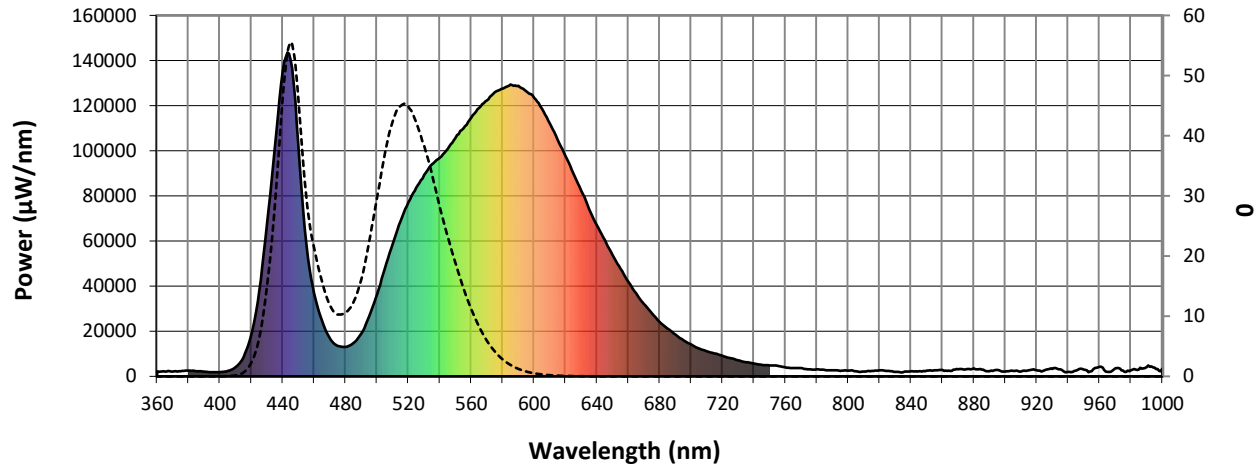


#####

| 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



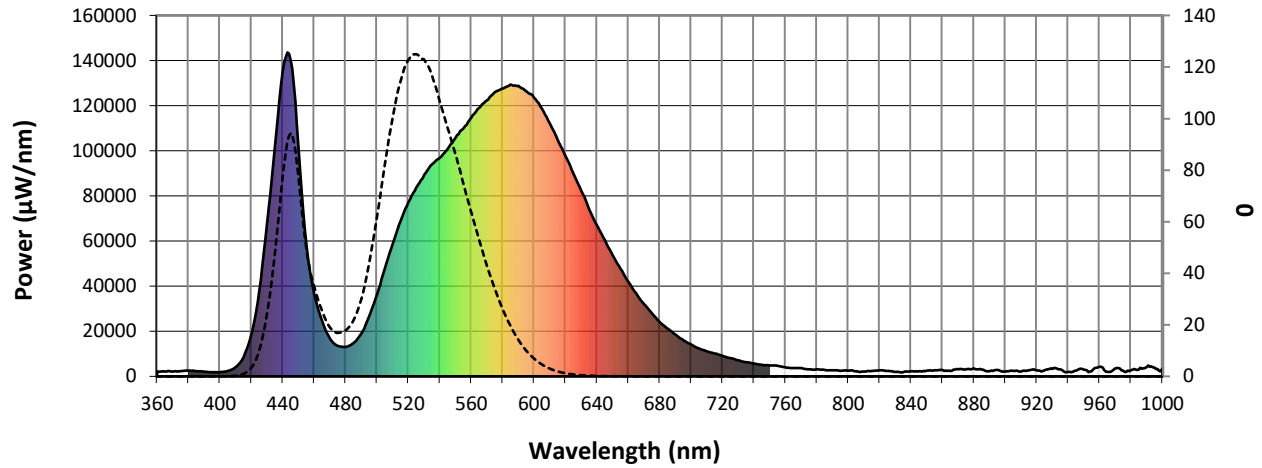
Scotopic Lumens: 10425.8

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**

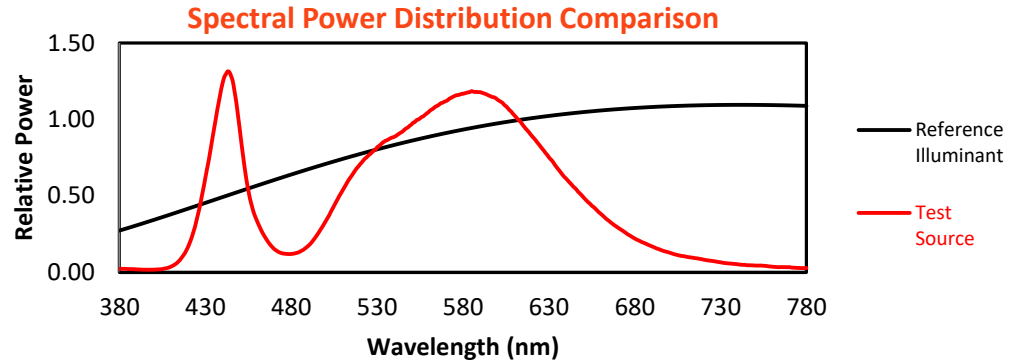
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 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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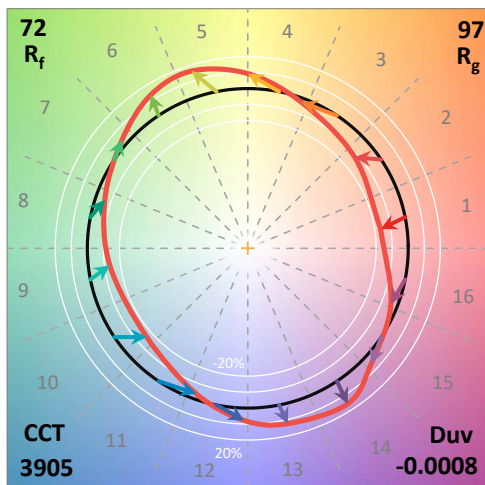
TM-30-18

### Summary

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



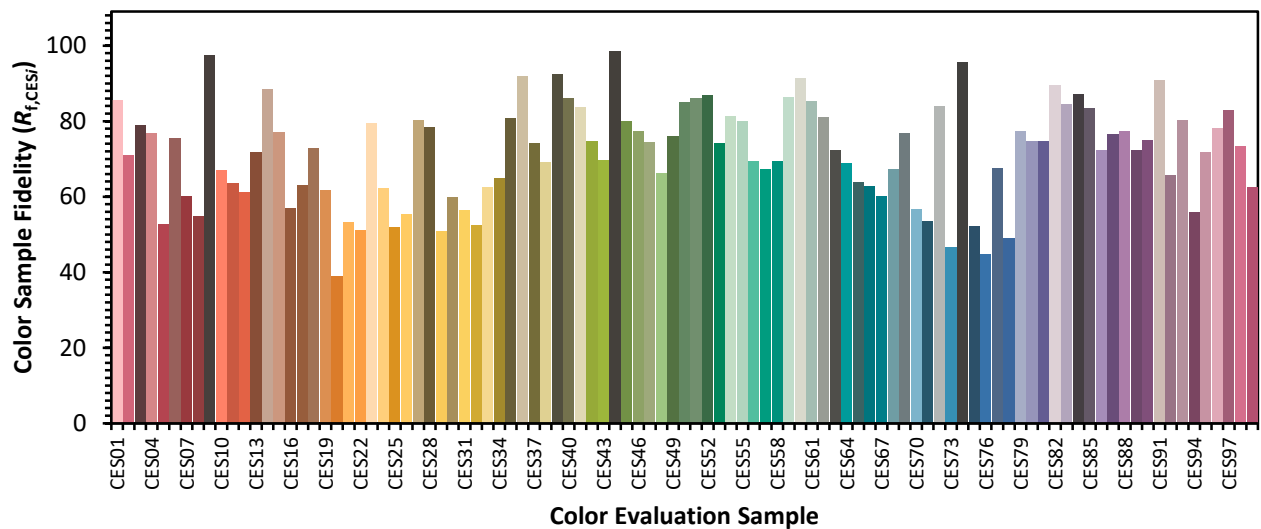
### Color Vector Graphics

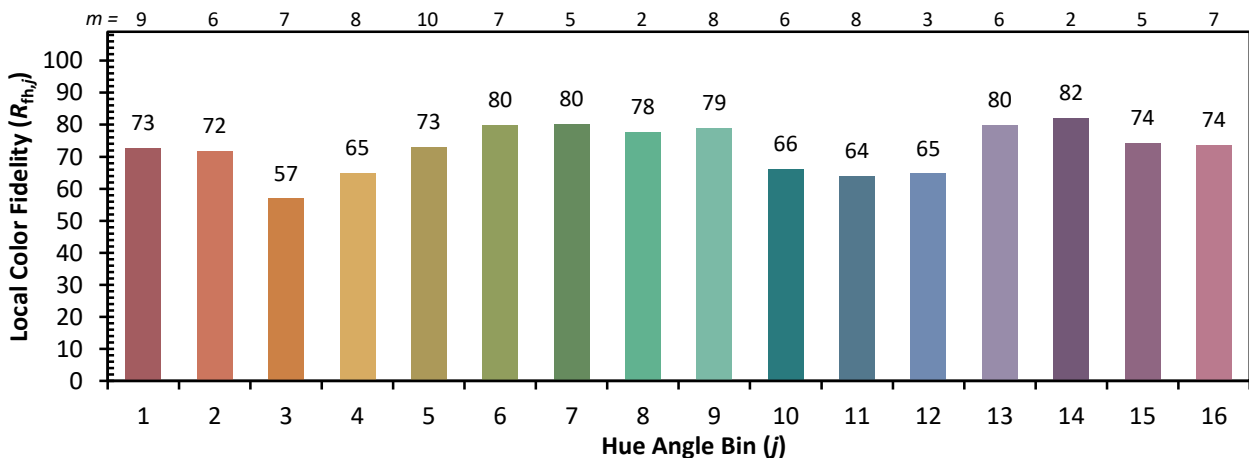
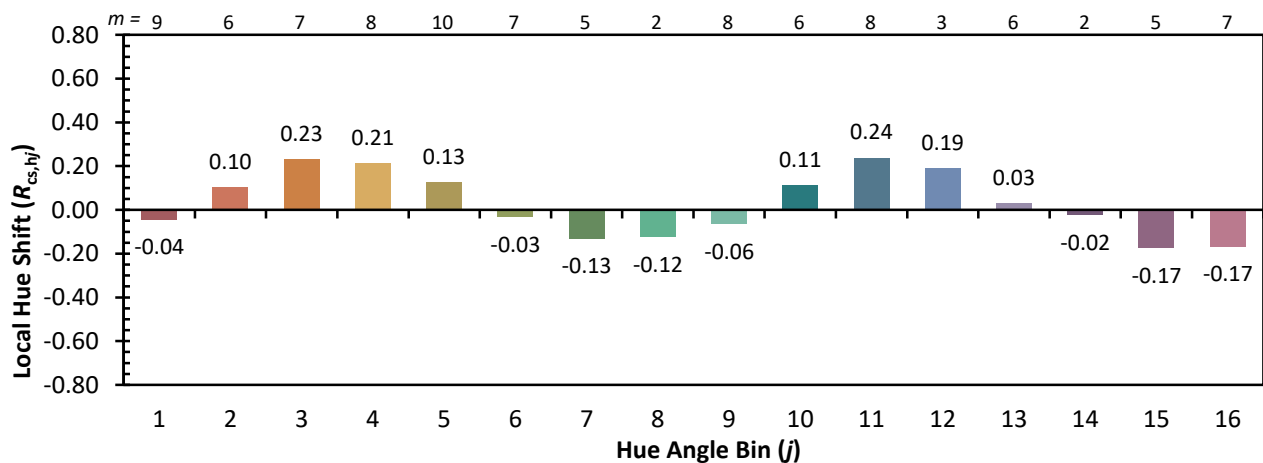
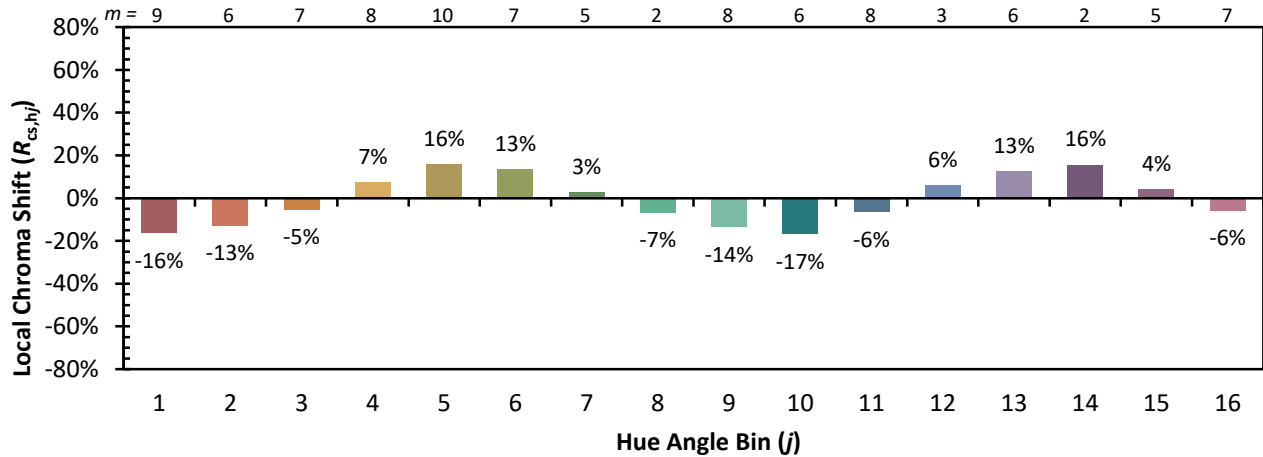




Individual Sample Fidelity Index ( $R_{f,i}$ )

|            |            |            |            |
|------------|------------|------------|------------|
| 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**


**Measure Comparisons**



(END OF REPORT)