

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: P319588

Luminaire Tested: **GLEON-SA4A-727-U-SL3**

Issue Date: 3/3/2020

Test Information

Test Method: LM-79-08
Report Number: P319588
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-22)
Test Lab: INNOVATION CENTER
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: McGRAW-EDISON
Catalog Number: GLEON-SA4A-727-U-SL3
Description: GALLEON AREA AND ROADWAY LUMINAIRE
(4) 70 CRI, 2700K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III
SPILL LIGHT ELIMINATOR OPTICS
Light Source: -
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 15722 lumens
Efficiency: N/A
Efficacy: 121.9 lumens/watt
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')
IES Classification: Type III - Medium
BUG Rating: B2 - U0 - G3

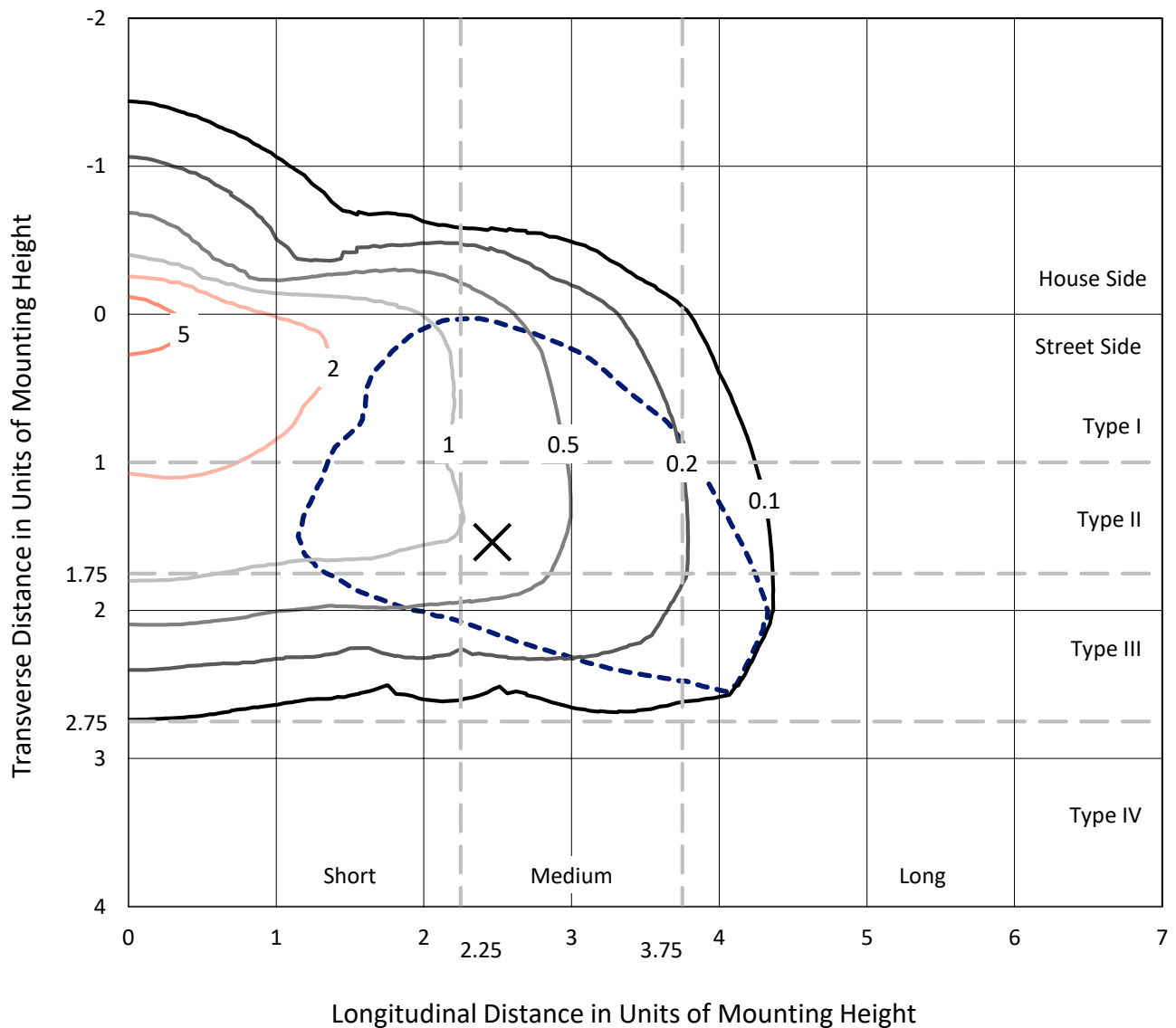
Input Watts (W): 129
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 24 FT



REPORT NUMBER: P319588
 CATALOG NUMBER: GLEON-SA4A-727-U-SL3

Iso-Footcandle Lines of Horizontal Illumination

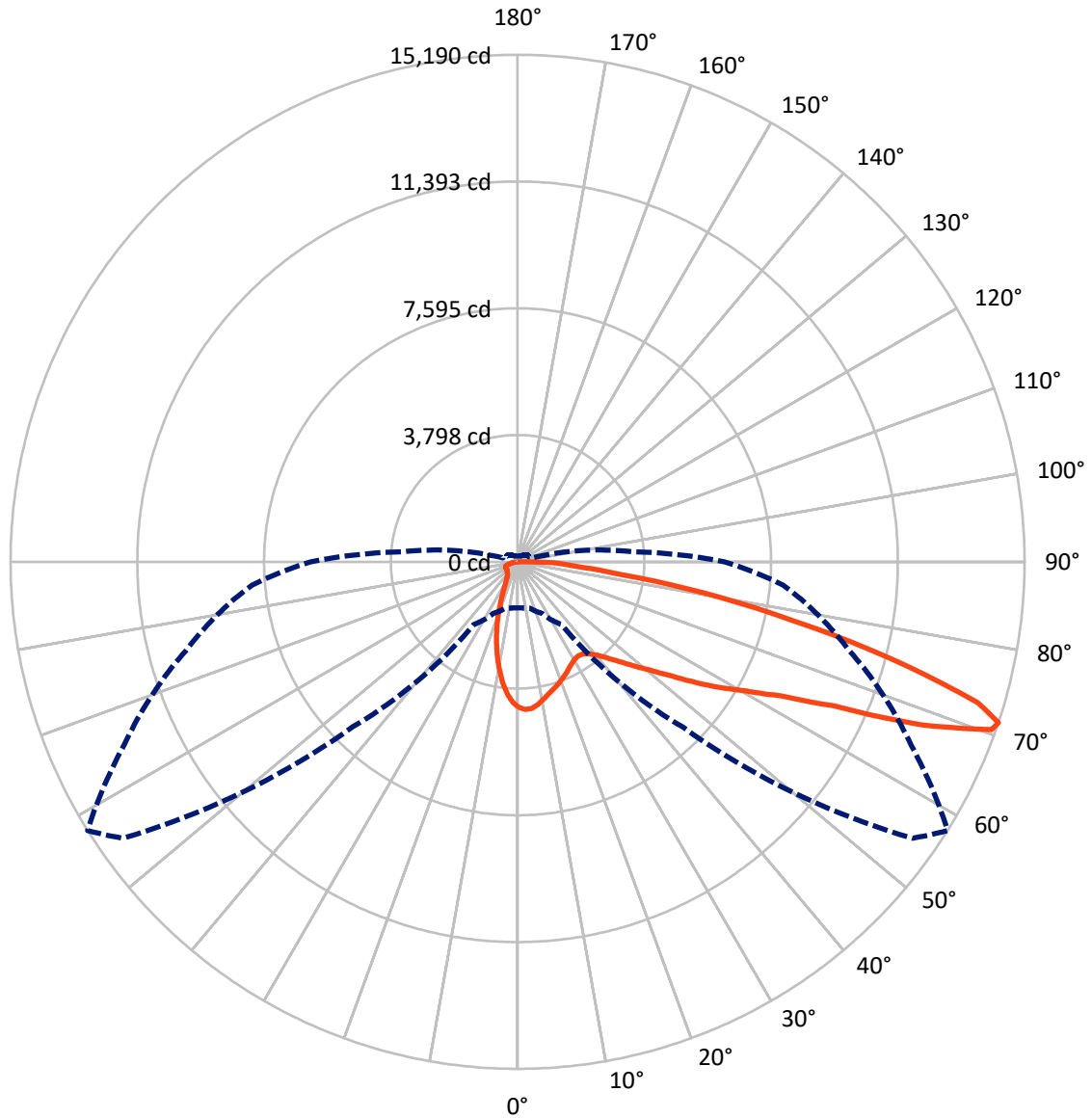
✕ Max cd
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 7 fc
 Type III - Medium - N/A

REPORT NUMBER: P319588
CATALOG NUMBER: GLEON-SA4A-727-U-SL3

Luminous Intensity Polar Plot



— Vertical Plane Through 58-Deg Lateral - - - Horizontal Cone Through 71-Deg Vertical

REPORT NUMBER: P319588
 CATALOG NUMBER: GLEON-SA4A-727-U-SL3

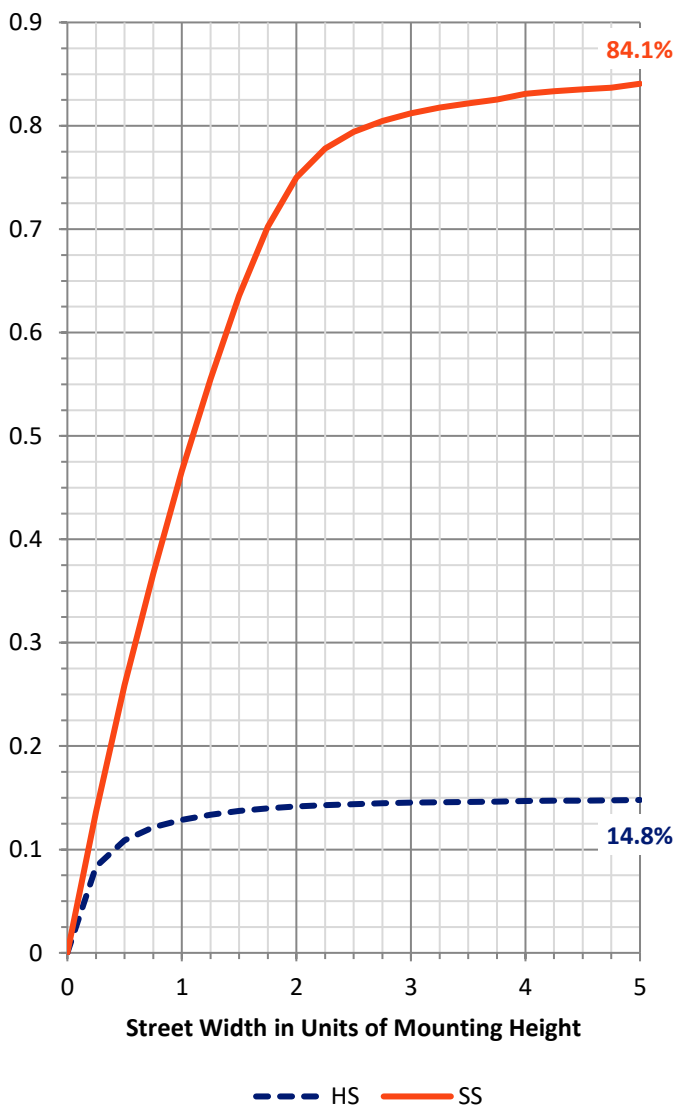
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|---------|
| House Side | Lumens | 2350.5 | 0.0 | 2350.5 |
| | % Fixture | 15.0 | 0.0 | 15.0 |
| Street Side | Lumens | 13371.4 | 0.0 | 13371.4 |
| | % Fixture | 85.0 | 0.0 | 85.0 |
| Total | Lumens | 15722.0 | 0.0 | 15722.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|---------|-----------|
| 0°-10° | 375.8 | 2.4 |
| 10°-20° | 835.6 | 5.3 |
| 20°-30° | 1062.0 | 6.8 |
| 30°-40° | 1352.8 | 8.6 |
| 40°-50° | 1918.3 | 12.2 |
| 50°-60° | 2968.6 | 18.9 |
| 60°-70° | 4041.4 | 25.7 |
| 70°-80° | 2696.1 | 17.1 |
| 80°-90° | 471.4 | 3.0 |
| 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° | 15722.0 | 100.0 |
| 0°-180° | 15722.0 | 100.0 |

Coefficient of Utilization

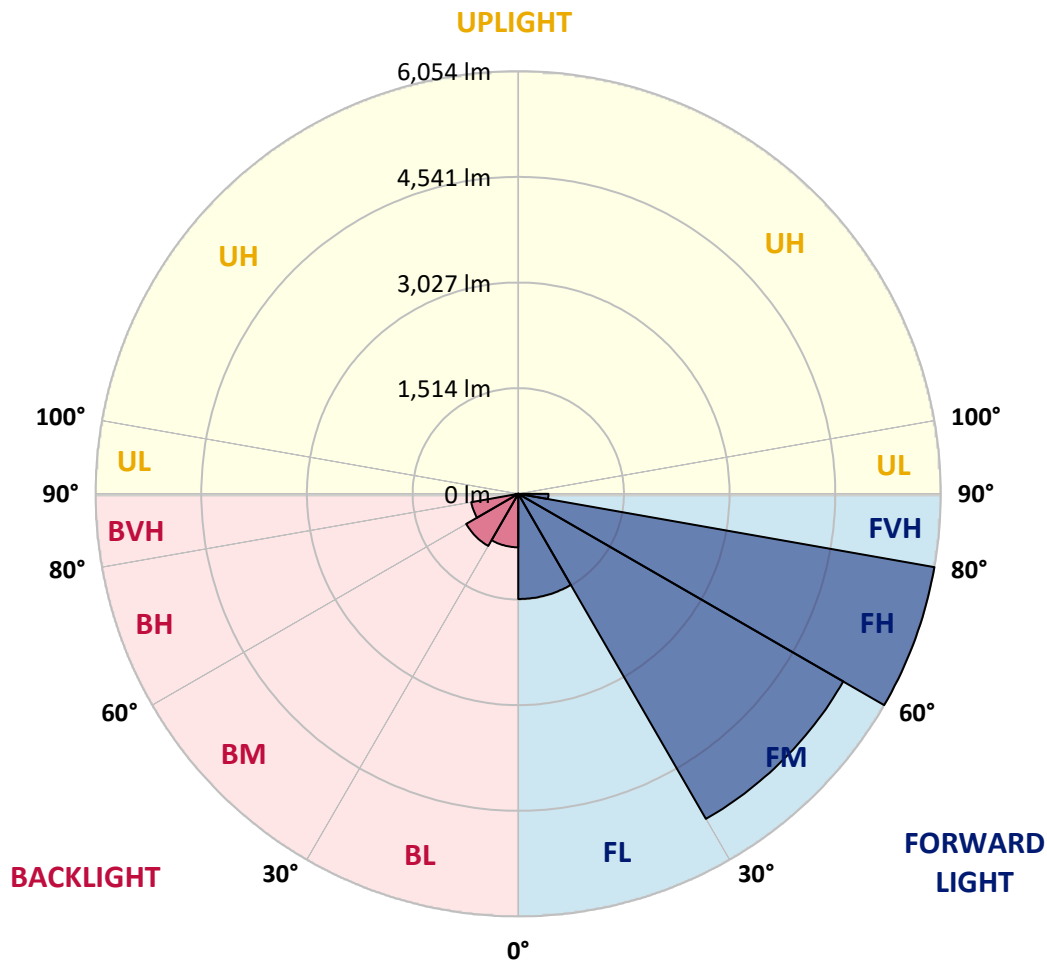


REPORT NUMBER: P319588
 CATALOG NUMBER: GLEON-SA4A-727-U-SL3

LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|------|---------|
| | | | B | U | G |
| FL (0°-30°) | 1507.2 | 9.6 | | | |
| FM (30°-60°) | 5377.7 | 34.2 | | | |
| FH (60°-80°) | 6054.4 | 38.5 | | | G3/7500 |
| FVH (80°-90°) | 432.2 | 2.7 | | | G3/500 |
| BL (0°-30°) | 766.2 | 4.9 | B2/1000 | | |
| BM (30°-60°) | 862.0 | 5.5 | B1/1000 | | |
| BH (60°-80°) | 683.2 | 4.3 | B2/1000 | | G2/1000 |
| BVH (80°-90°) | 39.2 | 0.2 | | | G1/100 |
| UL (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH (100°-180°) | 0.0 | 0.0 | | U0/0 | |

BUG Rating: B2-U0-G3
 Type III Medium





REPORT NUMBER: P319588

CATALOG NUMBER: GLEON-SA4A-727-U-SL3

CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 58° | 65° | 75° | 85° |
|-------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|--------|
| 0° | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 |
| 2.5° | 4471.6 | 4465.6 | 4467.8 | 4463.4 | 4453.0 | 4442.6 | 4427.2 | 4430.0 | 4408.6 | 4376.9 | 4337.4 |
| 5° | 4387.3 | 4385.1 | 4401.5 | 4410.8 | 4418.5 | 4412.5 | 4408.1 | 4413.5 | 4382.3 | 4338.5 | 4270.1 |
| 7.5° | 4210.4 | 4186.3 | 4207.1 | 4238.3 | 4267.9 | 4290.3 | 4319.9 | 4323.7 | 4304.0 | 4258.0 | 4168.2 |
| 10° | 3959.0 | 3936.0 | 3966.7 | 4015.4 | 4074.6 | 4128.2 | 4187.9 | 4198.9 | 4202.7 | 4161.1 | 4052.1 |
| 12.5° | 3698.3 | 3680.8 | 3711.5 | 3779.9 | 3877.9 | 3960.6 | 4055.9 | 4072.4 | 4106.3 | 4078.4 | 3944.8 |
| 15° | 3465.0 | 3458.4 | 3495.7 | 3563.0 | 3675.9 | 3802.4 | 3939.8 | 3969.9 | 4027.5 | 4018.1 | 3861.0 |
| 17.5° | 3263.5 | 3261.8 | 3290.3 | 3361.0 | 3485.8 | 3645.7 | 3824.3 | 3875.2 | 3960.6 | 3971.6 | 3792.0 |
| 20° | 3113.4 | 3110.1 | 3129.8 | 3181.9 | 3310.6 | 3491.8 | 3699.4 | 3769.5 | 3892.7 | 3931.1 | 3720.8 |
| 22.5° | 3032.9 | 3032.4 | 3032.9 | 3057.6 | 3162.7 | 3331.4 | 3577.8 | 3663.3 | 3826.5 | 3898.8 | 3641.9 |
| 25° | 3019.2 | 3017.6 | 3005.5 | 3002.8 | 3062.5 | 3197.2 | 3457.3 | 3551.5 | 3763.5 | 3876.3 | 3566.9 |
| 27.5° | 3054.8 | 3057.0 | 3041.1 | 3015.4 | 3027.4 | 3109.0 | 3352.7 | 3453.5 | 3713.1 | 3871.9 | 3514.8 |
| 30° | 3128.8 | 3127.7 | 3114.0 | 3087.1 | 3063.6 | 3076.2 | 3278.3 | 3379.0 | 3679.1 | 3891.1 | 3479.2 |
| 32.5° | 3210.4 | 3216.4 | 3213.6 | 3198.9 | 3163.8 | 3113.4 | 3255.8 | 3354.4 | 3669.3 | 3937.1 | 3463.9 |
| 35° | 3308.4 | 3315.0 | 3334.7 | 3346.2 | 3305.1 | 3224.0 | 3304.0 | 3389.4 | 3697.8 | 4023.6 | 3488.6 |
| 37.5° | 3401.5 | 3418.5 | 3473.8 | 3522.5 | 3487.5 | 3397.1 | 3432.2 | 3492.9 | 3785.9 | 4160.0 | 3554.8 |
| 40° | 3508.8 | 3523.6 | 3614.0 | 3717.5 | 3712.0 | 3618.4 | 3638.6 | 3679.1 | 3941.5 | 4355.5 | 3674.8 |
| 42.5° | 3614.5 | 3644.1 | 3775.0 | 3921.8 | 3963.9 | 3881.2 | 3913.5 | 3934.9 | 4160.5 | 4614.5 | 3884.0 |
| 45° | 3755.3 | 3787.0 | 3968.9 | 4145.7 | 4244.3 | 4197.8 | 4249.3 | 4257.5 | 4436.0 | 4967.2 | 4187.9 |
| 47.5° | 3968.3 | 4004.5 | 4216.4 | 4402.0 | 4552.7 | 4557.6 | 4642.5 | 4639.2 | 4779.9 | 5370.8 | 4570.7 |
| 50° | 4300.2 | 4352.2 | 4525.8 | 4699.4 | 4882.3 | 4984.2 | 5097.6 | 5081.7 | 5192.3 | 5800.8 | 5011.6 |
| 52.5° | 4735.0 | 4759.1 | 4887.8 | 5016.0 | 5243.2 | 5471.6 | 5634.3 | 5620.0 | 5660.0 | 6242.7 | 5512.1 |
| 55° | 5185.7 | 5203.8 | 5256.9 | 5327.0 | 5632.6 | 6005.0 | 6349.0 | 6326.5 | 6225.2 | 6701.6 | 6006.7 |
| 57.5° | 5591.0 | 5627.7 | 5664.4 | 5693.4 | 6024.7 | 6562.5 | 7080.1 | 7081.7 | 6838.6 | 7196.7 | 6517.6 |
| 60° | 5654.0 | 5686.3 | 5928.9 | 6157.8 | 6695.6 | 7306.3 | 7862.7 | 7846.2 | 7473.3 | 7734.0 | 7087.2 |
| 62.5° | 4997.9 | 5070.7 | 5476.0 | 6085.0 | 7341.9 | 8666.6 | 8861.1 | 8840.8 | 8232.3 | 8396.1 | 7750.4 |
| 65° | 3581.7 | 3664.4 | 4153.4 | 5068.5 | 7028.6 | 10165.6 | 10662.8 | 10390.1 | 9267.4 | 9210.5 | 8527.0 |
| 67.5° | 2066.3 | 2086.0 | 2298.0 | 3032.9 | 5351.7 | 10243.9 | 13411.5 | 13029.8 | 10874.8 | 10134.3 | 8907.1 |
| 70° | 1528.0 | 1527.4 | 1577.8 | 1866.4 | 2896.0 | 8360.5 | 14718.8 | 15061.1 | 12567.0 | 10438.3 | 8369.8 |
| 71° | 1381.7 | 1383.4 | 1439.8 | 1698.8 | 2293.6 | 6997.9 | 14441.1 | 15190.3 | 13012.8 | 10288.2 | 7981.0 |
| 72.5° | 1181.8 | 1187.3 | 1265.6 | 1523.6 | 1929.4 | 4825.9 | 13245.0 | 14414.8 | 13224.2 | 9918.0 | 7372.5 |
| 75° | 896.5 | 909.1 | 1017.5 | 1284.3 | 1763.4 | 2447.5 | 9720.9 | 11510.6 | 11747.7 | 8751.5 | 5478.2 |
| 77.5° | 639.7 | 653.9 | 776.6 | 1080.0 | 1676.4 | 1844.5 | 6510.0 | 8396.1 | 8645.3 | 5608.5 | 2471.0 |
| 80° | 404.2 | 421.1 | 513.7 | 859.3 | 1575.1 | 1751.4 | 4091.0 | 5643.6 | 4714.2 | 1794.7 | 628.7 |
| 82.5° | 237.1 | 250.3 | 318.7 | 561.3 | 1286.4 | 1686.8 | 2406.9 | 3128.2 | 1834.6 | 542.2 | 285.9 |
| 85° | 137.5 | 143.5 | 198.8 | 357.6 | 934.3 | 1592.0 | 1768.4 | 1748.7 | 796.3 | 265.1 | 135.3 |
| 87.5° | 64.1 | 71.2 | 117.7 | 186.8 | 518.6 | 1153.9 | 1397.6 | 1207.6 | 495.1 | 124.3 | 63.5 |
| 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: P319588
 CATALOG NUMBER: GLEON-SA4A-727-U-SL3

CANDELA DISTRIBUTION (continued):

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 | 4356.0 |
| 2.5° | 4318.3 | 4308.9 | 4270.1 | 4235.6 | 4199.4 | 4152.3 | 4100.3 | 4093.7 | 4062.0 | 4068.0 | 4057.0 |
| 5° | 4232.8 | 4209.3 | 4115.6 | 4030.7 | 3930.5 | 3840.7 | 3743.2 | 3698.3 | 3633.7 | 3629.3 | 3612.9 |
| 7.5° | 4110.7 | 4066.9 | 3921.8 | 3760.7 | 3599.7 | 3446.4 | 3294.7 | 3195.0 | 3093.2 | 3049.9 | 3046.1 |
| 10° | 3973.2 | 3898.8 | 3685.2 | 3446.9 | 3214.7 | 2990.7 | 2773.9 | 2613.4 | 2468.8 | 2400.4 | 2397.6 |
| 12.5° | 3842.9 | 3732.8 | 3439.8 | 3115.6 | 2798.0 | 2507.7 | 2210.3 | 1999.5 | 1818.2 | 1757.4 | 1731.7 |
| 15° | 3732.3 | 3577.3 | 3201.0 | 2786.5 | 2400.9 | 1997.8 | 1659.4 | 1437.6 | 1270.0 | 1212.0 | 1201.0 |
| 17.5° | 3624.9 | 3425.6 | 2956.2 | 2454.0 | 1988.0 | 1544.9 | 1205.9 | 1041.1 | 951.8 | 928.3 | 927.7 |
| 20° | 3518.1 | 3269.5 | 2700.5 | 2113.9 | 1588.7 | 1155.6 | 927.2 | 853.2 | 823.1 | 820.4 | 816.0 |
| 22.5° | 3397.1 | 3104.1 | 2431.6 | 1772.8 | 1239.9 | 908.6 | 788.1 | 758.5 | 754.7 | 764.5 | 764.5 |
| 25° | 3283.7 | 2939.8 | 2158.9 | 1438.7 | 964.4 | 758.0 | 703.7 | 697.7 | 708.1 | 725.6 | 727.3 |
| 27.5° | 3178.0 | 2781.5 | 1892.7 | 1141.9 | 772.7 | 667.6 | 645.1 | 652.3 | 670.9 | 691.1 | 691.7 |
| 30° | 3091.0 | 2632.0 | 1634.2 | 899.8 | 652.8 | 600.2 | 596.4 | 610.6 | 630.9 | 646.8 | 650.6 |
| 32.5° | 3023.6 | 2504.4 | 1384.5 | 723.5 | 574.5 | 549.8 | 553.1 | 565.2 | 577.8 | 586.5 | 592.6 |
| 35° | 2992.4 | 2394.9 | 1153.9 | 610.1 | 524.7 | 511.0 | 515.3 | 521.9 | 527.4 | 534.0 | 538.9 |
| 37.5° | 2997.9 | 2310.0 | 948.0 | 539.4 | 491.2 | 484.1 | 484.1 | 484.1 | 484.1 | 487.4 | 488.0 |
| 40° | 3048.8 | 2261.3 | 780.4 | 494.5 | 468.8 | 461.1 | 455.1 | 449.6 | 445.2 | 447.4 | 446.3 |
| 42.5° | 3179.1 | 2256.9 | 657.7 | 466.1 | 450.7 | 438.1 | 426.1 | 418.4 | 412.9 | 415.1 | 416.2 |
| 45° | 3400.4 | 2311.7 | 575.0 | 445.8 | 433.7 | 414.6 | 399.2 | 391.0 | 387.2 | 394.3 | 395.4 |
| 47.5° | 3686.8 | 2431.0 | 524.7 | 431.0 | 417.9 | 392.7 | 376.2 | 368.6 | 369.7 | 380.1 | 382.8 |
| 50° | 4055.9 | 2624.9 | 500.6 | 421.7 | 406.9 | 374.0 | 357.1 | 350.5 | 353.8 | 368.6 | 371.9 |
| 52.5° | 4461.2 | 2904.2 | 503.3 | 419.0 | 399.8 | 360.4 | 342.3 | 334.6 | 340.1 | 353.8 | 356.5 |
| 55° | 4928.9 | 3239.9 | 548.7 | 422.8 | 389.4 | 351.6 | 330.2 | 317.1 | 321.5 | 334.1 | 336.3 |
| 57.5° | 5448.6 | 3624.4 | 640.2 | 421.7 | 376.2 | 343.4 | 317.6 | 297.9 | 301.2 | 308.9 | 311.1 |
| 60° | 5989.7 | 4088.8 | 782.1 | 425.0 | 370.2 | 333.5 | 300.7 | 276.0 | 274.9 | 281.5 | 282.6 |
| 62.5° | 6639.2 | 4626.0 | 944.2 | 427.2 | 374.0 | 320.9 | 278.2 | 254.1 | 250.8 | 252.5 | 253.6 |
| 65° | 7308.5 | 5014.9 | 883.4 | 418.4 | 386.1 | 310.5 | 258.5 | 232.8 | 226.7 | 225.6 | 226.2 |
| 67.5° | 7329.3 | 4598.1 | 619.4 | 400.9 | 391.0 | 305.0 | 243.7 | 214.7 | 204.8 | 201.0 | 200.4 |
| 70° | 6573.0 | 3735.6 | 482.5 | 382.3 | 371.3 | 296.3 | 230.0 | 199.9 | 185.1 | 179.1 | 178.5 |
| 71° | 6203.8 | 3438.7 | 457.3 | 373.0 | 356.5 | 287.5 | 224.0 | 193.3 | 178.0 | 171.4 | 170.3 |
| 72.5° | 5625.0 | 3082.7 | 426.6 | 358.2 | 328.0 | 265.1 | 212.5 | 184.0 | 168.1 | 160.5 | 158.8 |
| 75° | 4036.8 | 2015.9 | 366.4 | 319.3 | 271.6 | 211.4 | 186.2 | 165.4 | 151.7 | 142.4 | 141.3 |
| 77.5° | 1555.3 | 802.3 | 277.1 | 265.6 | 208.1 | 165.4 | 153.3 | 142.9 | 133.1 | 123.8 | 123.2 |
| 80° | 480.8 | 358.7 | 202.1 | 199.9 | 150.6 | 123.2 | 119.4 | 116.7 | 112.8 | 103.0 | 100.8 |
| 82.5° | 256.9 | 205.9 | 139.1 | 129.2 | 98.6 | 82.1 | 86.5 | 87.6 | 88.2 | 77.8 | 76.7 |
| 85° | 122.7 | 109.0 | 78.3 | 73.4 | 57.5 | 46.0 | 53.1 | 57.5 | 58.1 | 47.6 | 44.4 |
| 87.5° | 58.6 | 57.0 | 36.7 | 27.9 | 21.4 | 15.3 | 18.6 | 23.0 | 25.2 | 18.1 | 15.9 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-1-R4

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

Test Information

Test Method: LM-79-2008
 Report Number: SP1-1908-441-1-R4
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 10/28/2024
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: McGRAW-EDISON
 Catalog Number: **SA1C-727-U-5WQ**
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

THIS IS A REVISION OF SP1-1908-441-1-R3. TO UPDATE THE CATALOG NUMBER.TESTED IN
 SITU. (1) 70 CRI, 2700K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

Spectral Parameters

CCT (K): 2741
 CIE u': 0.2605
 CIE v': 0.5272
 Duv: 0.0005
 CIE x: 0.4573
 CIE y: 0.4113
 CIE z: 0.1313
 Peak Wavelength (nm): 602
 Dominant Wavelength (nm): 583
 Purity: 61.2
 R_f: 69.9
 R_g: 98.3

| | | | |
|-----------|------|------|-------|
| CRI (Ra): | 71.5 | | |
| R1: | 69.2 | R9: | -16.1 |
| R2: | 79.4 | R10: | 51.4 |
| R3: | 87.8 | R11: | 63.1 |
| R4: | 69.4 | R12: | 42.0 |
| R5: | 66.4 | R13: | 70.2 |
| R6: | 69.8 | R14: | 92.4 |
| R7: | 79.8 | | |
| R8: | 50.1 | | |



Test Conditions

Stabilization Time: 56M
 Operation Time: 12H
 Room Temperature (°C) / RH%: 25.3./42%
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-1-R4

| 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 |

REPORT NUMBER: SP1-1908-441-1-R4

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-1-R4

Photopic Flux vs. Wavelength



Photopic Lumens: 6211.7

| λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360 | 2044 | 0.0 | 490 | 7179 | 1.0 | 620 | 118034 | 30.7 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 1.9 | 625 | 111884 | 24.7 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 3.4 | 630 | 106119 | 19.2 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 6.3 | 635 | 99706 | 15.0 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 10.4 | 640 | 92142 | 11.0 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 16.3 | 645 | 84987 | 8.2 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 22.9 | 650 | 78016 | 5.7 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 29.7 | 655 | 71541 | 4.1 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 36.7 | 660 | 64863 | 2.7 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.0 | 535 | 68520 | 42.5 | 665 | 58485 | 1.9 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.0 | 540 | 73435 | 47.8 | 670 | 51641 | 1.1 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.0 | 545 | 78677 | 52.4 | 675 | 46030 | 0.8 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 0.0 | 550 | 83331 | 56.6 | 680 | 40590 | 0.5 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 0.1 | 555 | 89120 | 60.9 | 685 | 35691 | 0.3 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 0.3 | 560 | 94613 | 64.3 | 690 | 31631 | 0.2 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 0.6 | 565 | 99818 | 66.4 | 695 | 27437 | 0.1 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 0.9 | 570 | 106526 | 69.3 | 700 | 24589 | 0.1 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 1.1 | 575 | 111610 | 69.4 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 1.0 | 580 | 117163 | 69.6 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 0.8 | 585 | 122201 | 67.9 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 0.6 | 590 | 125662 | 65.0 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 0.5 | 595 | 127415 | 60.4 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 0.4 | 600 | 129155 | 55.7 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 0.4 | 605 | 128057 | 49.6 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 0.5 | 610 | 126031 | 43.3 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 0.7 | 615 | 123059 | 37.1 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

REPORT NUMBER: SP1-1908-441-1-R4

Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3

S/P: 1.04

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360 | 2044 | 0.0 | 490 | 7179 | 6.0 | 620 | 118034 | 0.1 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 8.6 | 625 | 111884 | 0.1 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 12.5 | 630 | 106119 | 0.0 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 17.3 | 635 | 99706 | 0.0 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 21.8 | 640 | 92142 | 0.0 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 25.7 | 645 | 84987 | 0.0 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 27.5 | 650 | 78016 | 0.0 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 28.1 | 655 | 71541 | 0.0 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 27.0 | 660 | 64863 | 0.0 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.0 | 535 | 68520 | 24.7 | 665 | 58485 | 0.0 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.1 | 540 | 73435 | 21.5 | 670 | 51641 | 0.0 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.5 | 545 | 78677 | 18.3 | 675 | 46030 | 0.0 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 1.6 | 550 | 83331 | 15.0 | 680 | 40590 | 0.0 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 3.9 | 555 | 89120 | 12.0 | 685 | 35691 | 0.0 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 8.1 | 560 | 94613 | 9.3 | 690 | 31631 | 0.0 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 13.3 | 565 | 99818 | 7.0 | 695 | 27437 | 0.0 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 19.1 | 570 | 106526 | 5.2 | 700 | 24589 | 0.0 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 21.6 | 575 | 111610 | 3.7 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 18.1 | 580 | 117163 | 2.6 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 11.8 | 585 | 122201 | 1.8 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 8.1 | 590 | 125662 | 1.2 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 6.2 | 595 | 127415 | 0.8 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 4.8 | 600 | 129155 | 0.5 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 4.1 | 605 | 128057 | 0.4 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 4.1 | 610 | 126031 | 0.2 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 4.6 | 615 | 123059 | 0.1 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

REPORT NUMBER: SP1-1908-441-1-R4

Melanopic Flux vs. Wavelength



Melanopic Lumens: 2145.7 M/P: 0.35

| λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360 | 2044 | 0.0 | 490 | 7179 | 11.1 | 620 | 118034 | 1.5 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 16.9 | 625 | 111884 | 0.9 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 26.0 | 630 | 106119 | 0.6 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 38.2 | 635 | 99706 | 0.4 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 51.6 | 640 | 92142 | 0.2 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 65.1 | 645 | 84987 | 0.1 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 75.2 | 650 | 78016 | 0.1 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 82.9 | 655 | 71541 | 0.1 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 86.0 | 660 | 64863 | 0.0 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.1 | 535 | 68520 | 85.4 | 665 | 58485 | 0.0 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.2 | 540 | 73435 | 81.1 | 670 | 51641 | 0.0 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.7 | 545 | 78677 | 75.4 | 675 | 46030 | 0.0 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 2.3 | 550 | 83331 | 68.1 | 680 | 40590 | 0.0 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 6.2 | 555 | 89120 | 60.9 | 685 | 35691 | 0.0 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 13.0 | 560 | 94613 | 52.9 | 690 | 31631 | 0.0 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 22.2 | 565 | 99818 | 44.8 | 695 | 27437 | 0.0 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 32.0 | 570 | 106526 | 37.6 | 700 | 24589 | 0.0 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 36.7 | 575 | 111610 | 30.4 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 30.4 | 580 | 117163 | 24.1 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 19.7 | 585 | 122201 | 18.7 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 13.2 | 590 | 125662 | 14.0 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 10.0 | 595 | 127415 | 10.2 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 7.7 | 600 | 129155 | 7.3 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 6.7 | 605 | 128057 | 5.0 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 6.9 | 610 | 126031 | 3.4 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 8.1 | 615 | 123059 | 2.3 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

REPORT NUMBER: SP1-1908-441-1-R4

TM-30-18

Summary

$R_f = 69.9$
 $R_g = 98.3$
 CIE $R_a = 71.5$
 $R_9 = -16.1$



Color Vector Graphics



REPORT NUMBER: SP1-1908-441-1-R4

TM-30-18

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

| | | | |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 77 | CES79 = 81 |
| CES05 = 50 | CES30 = 46 | CES55 = 74 | CES80 = 80 |
| CES06 = 52 | CES31 = 50 | CES56 = 63 | CES81 = 73 |
| CES07 = 42 | CES32 = 49 | CES57 = 60 | CES82 = 91 |
| CES08 = 41 | CES33 = 53 | CES58 = 63 | CES83 = 84 |
| CES09 = 29 | CES34 = 66 | CES59 = 85 | CES84 = 90 |
| CES10 = 77 | CES35 = 82 | CES60 = 89 | CES85 = 87 |
| CES11 = 60 | CES36 = 78 | CES61 = 85 | CES86 = 65 |
| CES12 = 66 | CES37 = 75 | CES62 = 69 | CES87 = 78 |
| CES13 = 43 | CES38 = 53 | CES63 = 68 | CES88 = 73 |
| CES14 = 74 | CES39 = 91 | CES64 = 68 | CES89 = 68 |
| CES15 = 71 | CES40 = 85 | CES65 = 65 | CES90 = 68 |
| CES16 = 48 | CES41 = 76 | CES66 = 62 | CES91 = 91 |
| CES17 = 50 | CES42 = 76 | CES67 = 60 | CES92 = 71 |
| CES18 = 57 | CES43 = 65 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 57 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 78 |
| CES21 = 88 | CES46 = 70 | CES71 = 57 | CES96 = 80 |
| CES22 = 80 | CES47 = 63 | CES72 = 86 | CES97 = 79 |
| CES23 = 92 | CES48 = 51 | CES73 = 52 | CES98 = 71 |
| CES24 = 91 | CES49 = 68 | CES74 = 90 | CES99 = 64 |
| CES25 = 73 | CES50 = 77 | CES75 = 58 | |



REPORT NUMBER: SP1-1908-441-1-R4

TM-30-18

Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-1908-441-1-R4

TM-30-18

Measure Comparisons



(END OF REPORT)