

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: P319577

Luminaire Tested: **GLEON-SA3D-722-U-SL2**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319577  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-20)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA3D-722-U-SL2  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(3) 70 CRI, 2200K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 17059 lumens  
Efficiency: N/A  
Efficacy: 89.3 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - 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

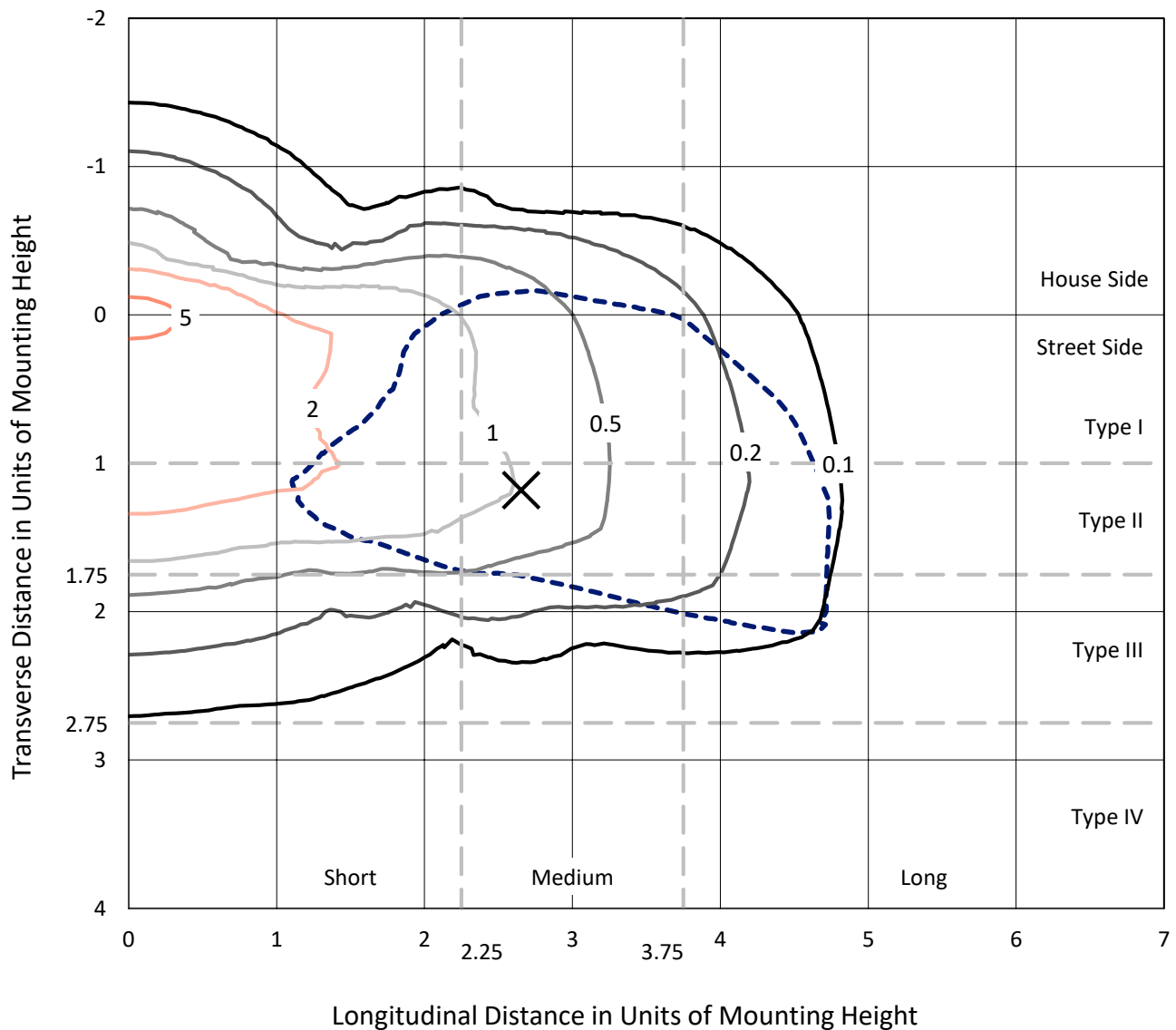


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## Iso-Footcandle Lines of Horizontal Illumination

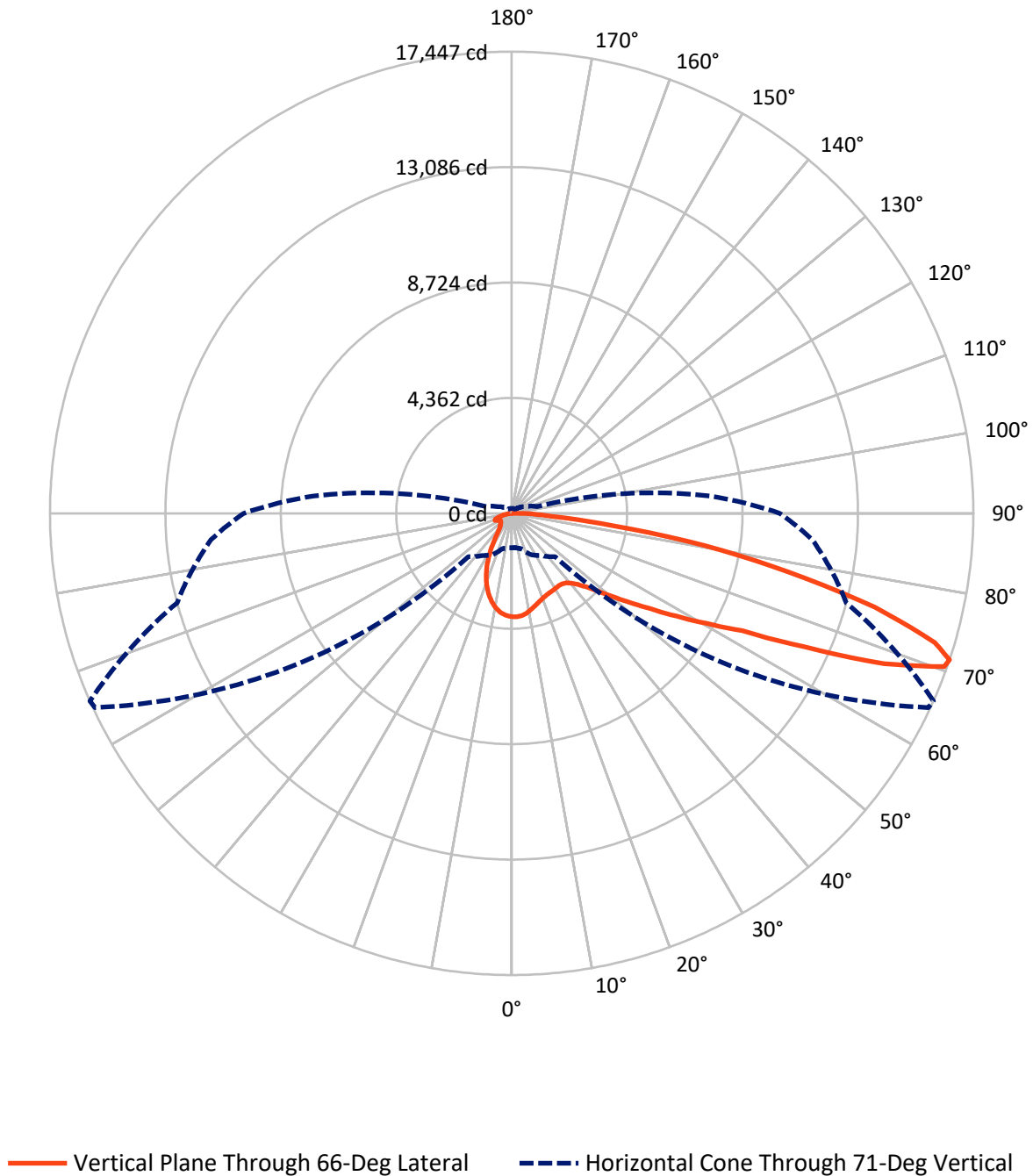
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6.3 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA3D-722-U-SL2

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3161.5   | 0.0    | 3161.5  |
|                    | % Fixture | 18.5     | 0.0    | 18.5    |
| <b>Street Side</b> | Lumens    | 13897.5  | 0.0    | 13897.5 |
|                    | % Fixture | 81.5     | 0.0    | 81.5    |
| <b>Total</b>       | Lumens    | 17059.0  | 0.0    | 17059.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 344.0   | 2.0       |
| 10°-20°   | 825.0   | 4.8       |
| 20°-30°   | 1108.2  | 6.5       |
| 30°-40°   | 1457.9  | 8.5       |
| 40°-50°   | 2120.8  | 12.4      |
| 50°-60°   | 3312.9  | 19.4      |
| 60°-70°   | 4149.9  | 24.3      |
| 70°-80°   | 3165.5  | 18.6      |
| 80°-90°   | 574.8   | 3.4       |
| 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°    | 17059.0 | 100.0     |
| 0°-180°   | 17059.0 | 100.0     |

**Coefficient of Utilization**



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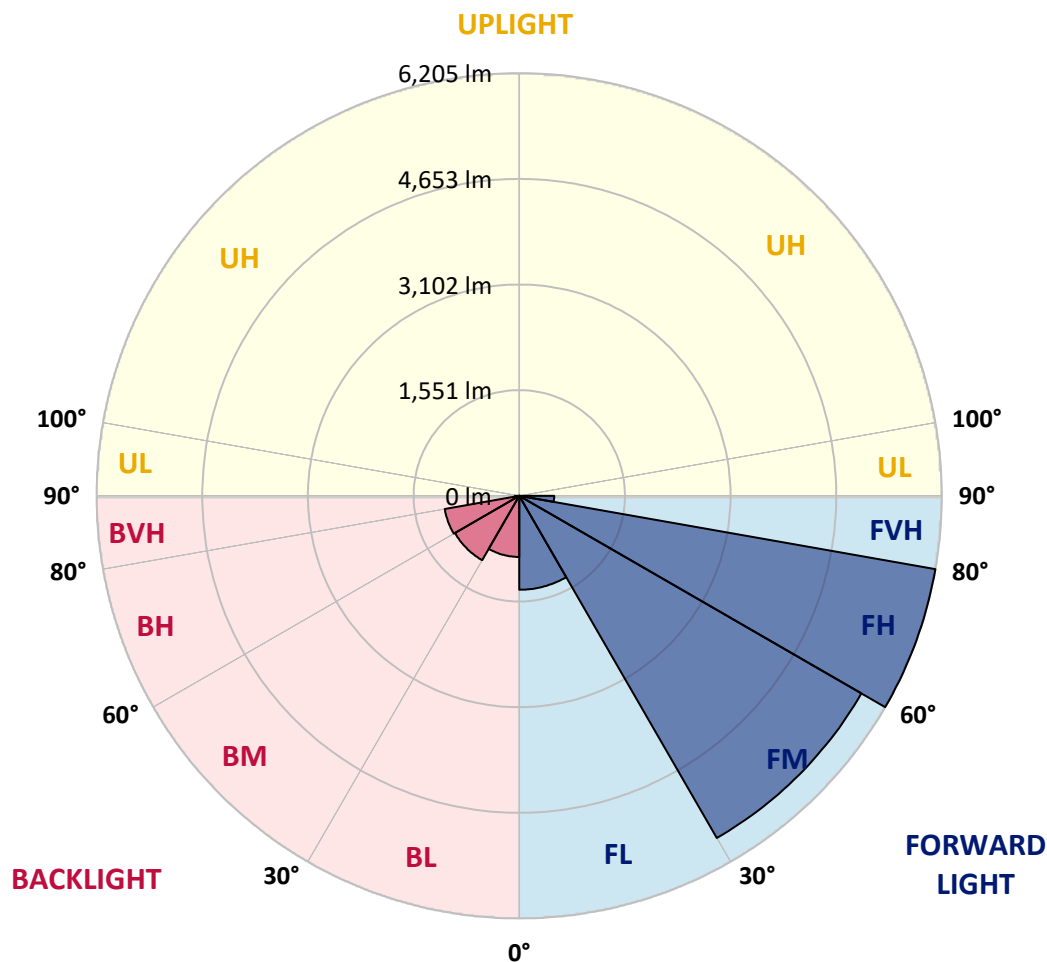
CATALOG NUMBER: GLEON-SA3D-722-U-SL2

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1379.5 | 8.1       |                         |      |         |
| FM   | (30°-60°)   | 5800.9 | 34.0      |                         |      |         |
| FH   | (60°-80°)   | 6204.5 | 36.4      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 512.6  | 3.0       |                         |      | G4/750  |
| BL   | (0°-30°)    | 897.8  | 5.3       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1090.6 | 6.4       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1110.9 | 6.5       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 62.2   | 0.4       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G4**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°     | 65°     | 66°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
| 0°    | 3907.9 | 3907.9 | 3907.9 | 3907.9 | 3907.9 | 3907.9 | 3907.9  | 3907.9  | 3907.9  | 3907.9  | 3907.9  |
| 2.5°  | 3835.4 | 3829.6 | 3847.2 | 3865.5 | 3872.5 | 3884.3 | 3902.0  | 3912.0  | 3911.4  | 3913.2  | 3907.3  |
| 5°    | 3581.0 | 3573.3 | 3608.7 | 3637.5 | 3692.9 | 3755.3 | 3831.3  | 3885.5  | 3886.7  | 3917.3  | 3925.6  |
| 7.5°  | 3340.1 | 3334.8 | 3375.4 | 3422.0 | 3486.2 | 3581.6 | 3704.7  | 3821.3  | 3828.4  | 3911.4  | 3940.3  |
| 10°   | 3146.9 | 3145.7 | 3185.2 | 3235.9 | 3310.7 | 3417.3 | 3558.6  | 3729.4  | 3740.0  | 3883.1  | 3942.6  |
| 12.5° | 2996.1 | 2998.5 | 3032.7 | 3090.4 | 3169.3 | 3280.6 | 3433.8  | 3626.4  | 3643.4  | 3838.4  | 3929.1  |
| 15°   | 2884.8 | 2894.3 | 2921.9 | 2980.2 | 3058.0 | 3171.1 | 3328.3  | 3530.9  | 3556.9  | 3788.3  | 3921.4  |
| 17.5° | 2821.2 | 2831.8 | 2851.3 | 2899.6 | 2972.6 | 3081.5 | 3230.6  | 3452.6  | 3476.2  | 3750.0  | 3922.0  |
| 20°   | 2802.4 | 2811.2 | 2822.4 | 2851.8 | 2913.7 | 3012.6 | 3153.4  | 3381.9  | 3407.3  | 3719.4  | 3927.9  |
| 22.5° | 2839.5 | 2846.0 | 2847.1 | 2844.8 | 2882.5 | 2963.2 | 3097.4  | 3330.1  | 3357.2  | 3699.4  | 3932.0  |
| 25°   | 2919.0 | 2927.8 | 2921.3 | 2899.6 | 2887.2 | 2936.7 | 3068.6  | 3295.9  | 3323.0  | 3684.7  | 3923.8  |
| 27.5° | 3038.6 | 3039.7 | 3034.4 | 3006.2 | 2947.8 | 2939.6 | 3059.8  | 3275.9  | 3301.8  | 3667.6  | 3906.7  |
| 30°   | 3201.1 | 3208.8 | 3199.3 | 3161.1 | 3065.6 | 2986.7 | 3070.4  | 3256.5  | 3280.0  | 3645.8  | 3879.0  |
| 32.5° | 3391.4 | 3410.2 | 3409.6 | 3369.6 | 3232.9 | 3092.1 | 3113.9  | 3244.7  | 3263.0  | 3622.8  | 3845.5  |
| 35°   | 3588.7 | 3614.6 | 3662.9 | 3645.8 | 3476.8 | 3258.8 | 3197.6  | 3263.5  | 3275.9  | 3619.9  | 3821.9  |
| 37.5° | 3793.6 | 3819.5 | 3919.1 | 3965.0 | 3767.1 | 3497.4 | 3329.5  | 3330.1  | 3336.0  | 3655.8  | 3820.1  |
| 40°   | 4008.0 | 4035.7 | 4185.3 | 4304.9 | 4143.5 | 3799.5 | 3542.1  | 3469.1  | 3462.6  | 3744.2  | 3854.9  |
| 42.5° | 4308.4 | 4333.1 | 4512.8 | 4665.3 | 4561.1 | 4186.5 | 3836.0  | 3683.5  | 3669.9  | 3917.3  | 3966.2  |
| 45°   | 4688.3 | 4709.5 | 4900.3 | 5063.5 | 5009.9 | 4628.2 | 4205.3  | 3978.6  | 3976.2  | 4205.9  | 4191.8  |
| 47.5° | 5140.0 | 5156.5 | 5327.9 | 5485.8 | 5505.2 | 5136.5 | 4669.4  | 4433.8  | 4395.6  | 4601.7  | 4541.0  |
| 50°   | 5610.6 | 5628.9 | 5745.5 | 5915.1 | 6059.4 | 5816.8 | 5266.7  | 4991.6  | 4940.4  | 5124.1  | 5035.8  |
| 52.5° | 5922.2 | 5946.3 | 6047.7 | 6262.6 | 6682.6 | 6562.4 | 5972.9  | 5667.8  | 5590.0  | 5757.3  | 5689.6  |
| 55°   | 5783.2 | 5837.4 | 5992.3 | 6336.8 | 7180.9 | 7701.5 | 6844.0  | 6456.4  | 6368.6  | 6507.6  | 6467.6  |
| 57.5° | 5151.2 | 5225.4 | 5436.9 | 5968.7 | 7250.9 | 8705.1 | 8160.9  | 7385.2  | 7323.4  | 7283.3  | 7301.6  |
| 60°   | 3996.2 | 4067.5 | 4329.6 | 5022.8 | 6762.7 | 9437.8 | 10142.8 | 8530.2  | 8440.7  | 8062.0  | 8078.5  |
| 62.5° | 2828.3 | 2792.4 | 2972.0 | 3479.1 | 5495.2 | 9523.8 | 12398.0 | 10061.6 | 9767.1  | 8884.2  | 8811.7  |
| 65°   | 2156.8 | 2148.6 | 2229.3 | 2390.7 | 3328.3 | 8494.9 | 13741.5 | 12635.4 | 12175.4 | 9851.3  | 9680.5  |
| 67.5° | 1772.2 | 1757.5 | 1837.0 | 2072.0 | 2143.3 | 5480.5 | 13771.0 | 15621.5 | 15169.8 | 11055.2 | 10685.3 |
| 70°   | 1457.1 | 1440.6 | 1514.9 | 1818.2 | 1980.7 | 2779.4 | 11590.0 | 17370.2 | 17346.1 | 12579.4 | 11443.9 |
| 71°   | 1306.4 | 1294.6 | 1383.5 | 1720.4 | 1946.0 | 2316.5 | 10006.8 | 17374.9 | 17447.4 | 13095.4 | 11399.1 |
| 72.5° | 1063.7 | 1067.8 | 1162.1 | 1531.3 | 1920.1 | 2045.5 | 7354.6  | 16565.1 | 16718.2 | 13587.2 | 10992.1 |
| 75°   | 706.8  | 710.3  | 834.0  | 1178.0 | 1861.8 | 2001.4 | 4042.2  | 13899.9 | 14181.5 | 13292.7 | 10030.3 |
| 77.5° | 474.7  | 473.5  | 557.8  | 808.1  | 1622.1 | 2001.4 | 2370.1  | 10396.1 | 10705.3 | 10576.9 | 7732.7  |
| 80°   | 326.9  | 324.5  | 384.0  | 557.8  | 1228.0 | 2025.5 | 1832.3  | 7285.7  | 7379.3  | 5711.9  | 3142.8  |
| 82.5° | 200.3  | 202.0  | 250.9  | 394.0  | 835.8  | 1822.9 | 1729.8  | 3972.7  | 3870.8  | 1602.0  | 785.1   |
| 85°   | 114.9  | 114.3  | 160.2  | 266.8  | 536.6  | 1538.4 | 1686.8  | 1709.8  | 1568.5  | 482.4   | 283.9   |
| 87.5° | 41.2   | 44.2   | 86.0   | 147.8  | 307.4  | 1071.4 | 1431.2  | 889.4   | 801.6   | 217.9   | 128.4   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



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CATALOG NUMBER: GLEON-SA3D-722-U-SL2

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3907.9  | 3907.9 | 3907.9 | 3907.9 | 3907.9 | 3907.9 | 3907.9 | 3907.9 | 3907.9 | 3907.9 | 3907.9 |
| 2.5°  | 3903.2  | 3906.7 | 3902.6 | 3879.0 | 3859.0 | 3826.6 | 3808.3 | 3783.0 | 3775.4 | 3771.8 | 3781.3 |
| 5°    | 3917.9  | 3919.1 | 3884.3 | 3822.5 | 3753.0 | 3671.1 | 3612.2 | 3539.8 | 3505.6 | 3490.9 | 3500.3 |
| 7.5°  | 3931.4  | 3926.1 | 3850.2 | 3731.8 | 3603.4 | 3460.9 | 3334.2 | 3218.2 | 3150.5 | 3122.8 | 3125.1 |
| 10°   | 3933.2  | 3910.8 | 3788.9 | 3605.7 | 3406.7 | 3197.6 | 3003.2 | 2824.2 | 2711.1 | 2637.5 | 2659.8 |
| 12.5° | 3915.0  | 3877.3 | 3698.8 | 3442.6 | 3166.4 | 2881.3 | 2618.6 | 2350.0 | 2188.7 | 2113.9 | 2116.2 |
| 15°   | 3900.8  | 3832.5 | 3588.1 | 3250.6 | 2879.5 | 2502.0 | 2143.3 | 1827.6 | 1655.6 | 1579.1 | 1543.1 |
| 17.5° | 3889.0  | 3784.2 | 3459.7 | 3034.4 | 2540.9 | 2062.0 | 1630.9 | 1349.4 | 1255.1 | 1232.7 | 1223.3 |
| 20°   | 3872.5  | 3733.0 | 3316.6 | 2784.1 | 2155.1 | 1569.6 | 1190.9 | 1051.9 | 1052.5 | 1078.4 | 1082.0 |
| 22.5° | 3849.6  | 3674.7 | 3164.0 | 2503.2 | 1741.0 | 1143.2 | 933.5  | 893.5  | 934.1  | 983.6  | 992.4  |
| 25°   | 3815.4  | 3605.7 | 2994.4 | 2192.8 | 1327.6 | 878.8  | 797.5  | 795.7  | 845.2  | 897.0  | 904.7  |
| 27.5° | 3767.1  | 3515.6 | 2805.9 | 1859.4 | 978.3  | 746.8  | 714.4  | 726.8  | 763.3  | 801.0  | 804.0  |
| 30°   | 3702.3  | 3410.8 | 2598.0 | 1507.8 | 766.9  | 665.0  | 661.4  | 672.6  | 695.0  | 721.5  | 723.9  |
| 32.5° | 3631.1  | 3304.2 | 2375.9 | 1167.4 | 656.7  | 620.8  | 624.3  | 629.6  | 640.2  | 650.8  | 653.2  |
| 35°   | 3566.3  | 3195.2 | 2148.6 | 887.0  | 604.3  | 591.9  | 589.6  | 588.4  | 589.6  | 586.0  | 586.6  |
| 37.5° | 3524.5  | 3105.1 | 1911.8 | 706.2  | 574.3  | 566.6  | 559.5  | 550.7  | 540.7  | 534.8  | 536.0  |
| 40°   | 3509.1  | 3038.0 | 1672.1 | 610.2  | 549.5  | 544.2  | 530.7  | 511.8  | 500.0  | 496.5  | 496.5  |
| 42.5° | 3550.4  | 3003.2 | 1440.6 | 561.9  | 528.9  | 520.1  | 497.7  | 475.9  | 467.1  | 466.5  | 465.9  |
| 45°   | 3676.4  | 3017.3 | 1220.4 | 535.4  | 510.1  | 493.0  | 463.5  | 445.3  | 439.4  | 440.6  | 440.0  |
| 47.5° | 3902.6  | 3106.3 | 1031.9 | 517.7  | 491.2  | 468.8  | 435.8  | 421.1  | 414.1  | 414.1  | 414.6  |
| 50°   | 4287.2  | 3314.2 | 881.7  | 503.0  | 475.3  | 446.4  | 415.8  | 397.6  | 388.1  | 387.5  | 387.5  |
| 52.5° | 4847.3  | 3686.4 | 788.1  | 490.6  | 457.6  | 426.4  | 395.8  | 372.8  | 361.6  | 359.3  | 358.1  |
| 55°   | 5549.4  | 4220.0 | 762.1  | 482.4  | 434.1  | 404.6  | 371.6  | 348.7  | 336.3  | 331.0  | 330.4  |
| 57.5° | 6334.5  | 4869.1 | 813.4  | 472.4  | 409.9  | 378.7  | 345.1  | 323.4  | 310.4  | 303.9  | 303.3  |
| 60°   | 7129.0  | 5577.6 | 1022.5 | 458.2  | 389.9  | 350.4  | 318.0  | 298.0  | 285.1  | 278.0  | 276.8  |
| 62.5° | 7924.7  | 6324.5 | 1449.5 | 457.0  | 375.8  | 323.4  | 290.4  | 273.3  | 260.9  | 253.3  | 251.5  |
| 65°   | 8822.3  | 7142.0 | 1934.8 | 488.3  | 371.1  | 298.6  | 262.1  | 248.5  | 237.9  | 230.9  | 230.3  |
| 67.5° | 9853.1  | 8064.9 | 1888.3 | 552.5  | 387.0  | 276.2  | 235.6  | 225.0  | 217.3  | 211.4  | 210.9  |
| 70°   | 10336.6 | 7920.6 | 1173.8 | 597.8  | 409.3  | 254.4  | 210.3  | 202.6  | 196.7  | 192.6  | 190.8  |
| 71°   | 10134.0 | 7520.7 | 984.2  | 592.5  | 407.0  | 245.0  | 200.3  | 194.4  | 188.5  | 184.9  | 183.2  |
| 72.5° | 9581.5  | 6858.7 | 821.0  | 551.3  | 380.5  | 227.9  | 187.3  | 181.4  | 176.1  | 172.0  | 170.8  |
| 75°   | 8597.9  | 6125.4 | 657.3  | 440.6  | 303.3  | 192.6  | 164.3  | 157.8  | 153.7  | 151.4  | 149.0  |
| 77.5° | 6320.4  | 4371.4 | 508.3  | 348.1  | 223.2  | 157.3  | 140.2  | 135.5  | 131.3  | 127.8  | 126.0  |
| 80°   | 2421.3  | 1693.3 | 342.2  | 259.7  | 163.7  | 124.3  | 113.1  | 110.7  | 106.6  | 104.2  | 104.2  |
| 82.5° | 652.0   | 505.9  | 182.6  | 157.3  | 109.6  | 90.7   | 86.6   | 85.4   | 81.9   | 77.2   | 77.7   |
| 85°   | 263.9   | 223.2  | 102.5  | 86.6   | 67.1   | 53.6   | 58.3   | 58.9   | 54.8   | 48.9   | 49.5   |
| 87.5° | 116.0   | 94.8   | 57.1   | 38.3   | 29.4   | 20.6   | 26.5   | 26.5   | 24.1   | 20.0   | 18.3   |
| 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: SP1-1908-441-10-R4

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

Data in this report applies to families of products SA1C-722-U-5WQ.

### Test Information

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-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-722-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):                  | 2237    | CRI (Ra): | 72.0 |      |       |
| CIE u':                   | 0.2876  | R1:       | 68.9 | R9:  | -17.4 |
| CIE v':                   | 0.5346  | R2:       | 83.0 | R10: | 61.3  |
| Duv:                      | -0.0006 | R3:       | 95.2 | R11: | 59.8  |
| CIE x:                    | 0.5005  | R4:       | 66.2 | R12: | 50.5  |
| CIE y:                    | 0.4134  | R5:       | 65.9 | R13: | 71.1  |
| CIE z:                    | 0.0860  | R6:       | 76.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 603     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.8 |      |       |
| Purity:                   | 74.5    |           |      |      |       |
| Rf:                       | 69.8    |           |      |      |       |
| Rg:                       | 99.2    |           |      |      |       |



### Test Conditions

Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

REPORT NUMBER: SP1-1908-441-10-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            |

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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 2200K 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 4696.9

S/P: 0.85

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8 M/P: 0.27**

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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### Summary

$R_f = 69.8$   
 $R_g = 99.2$   
 CIE  $R_a = 72.0$   
 $R_g = -17.4$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 84 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 51 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 42 | CES33 = 53 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 70 | CES59 = 84 | CES84 = 92 |
| CES10 = 78 | CES35 = 85 | CES60 = 90 | CES85 = 81 |
| CES11 = 61 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 70 | CES87 = 78 |
| CES13 = 45 | CES38 = 53 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 84 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 69 | CES93 = 79 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 63 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 63 | CES96 = 78 |
| CES22 = 81 | CES47 = 60 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 56 | CES98 = 71 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)