

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: P322714

Luminaire Tested: **GLEON-SA0A-830-U-T4FT-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P322714  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-17)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA0A-830-U-T4FT-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(10) 80 CRI, 3000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 26031 lumens  
Efficiency: N/A  
Efficacy: 80.6 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G5

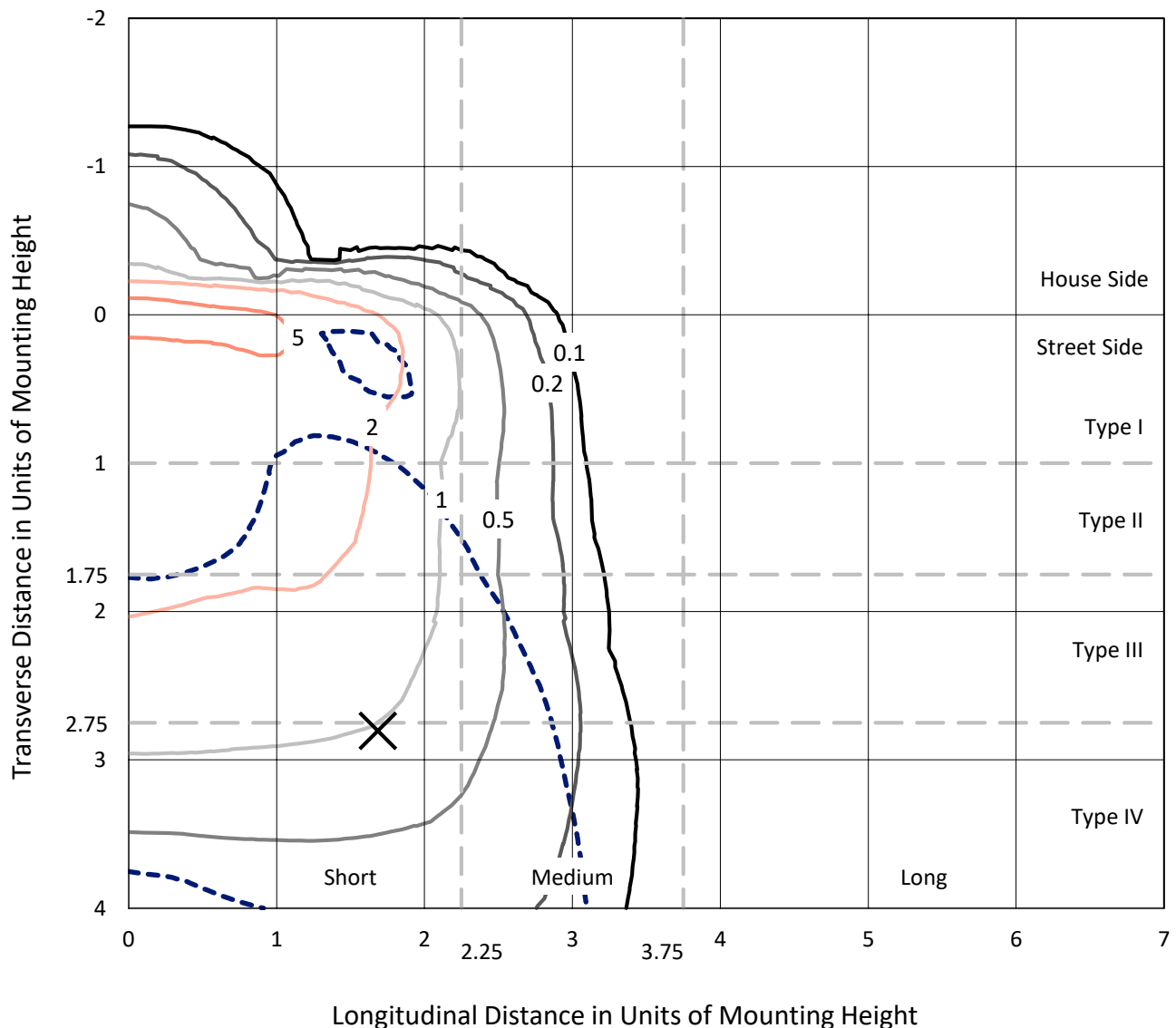
Input Watts (W): 323  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

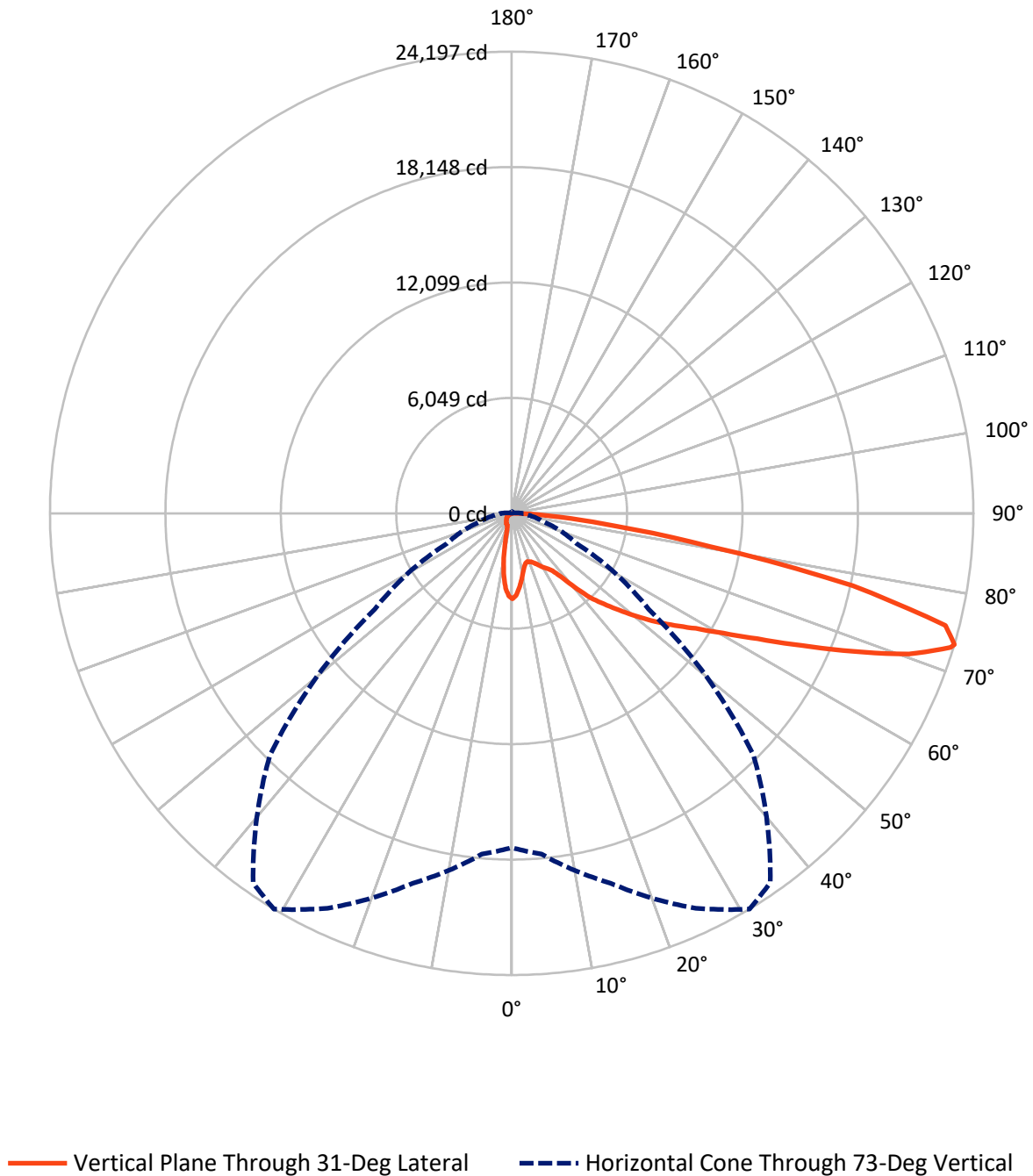
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 7.2 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    | 2372.8   | 0.0    | 2372.8  |
|                    | % Fixture | 9.1      | 0.0    | 9.1     |
| <b>Street Side</b> | Lumens    | 23658.2  | 0.0    | 23658.2 |
|                    | % Fixture | 90.9     | 0.0    | 90.9    |
| <b>Total</b>       | Lumens    | 26031.0  | 0.0    | 26031.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 371.3   | 1.4       |
| 10°-20°   | 806.3   | 3.1       |
| 20°-30°   | 1208.1  | 4.6       |
| 30°-40°   | 1922.0  | 7.4       |
| 40°-50°   | 3432.2  | 13.2      |
| 50°-60°   | 5325.8  | 20.5      |
| 60°-70°   | 7080.0  | 27.2      |
| 70°-80°   | 5325.6  | 20.5      |
| 80°-90°   | 559.6   | 2.1       |
| 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°    | 26031.0 | 100.0     |
| 0°-180°   | 26031.0 | 100.0     |

**Coefficient of Utilization**



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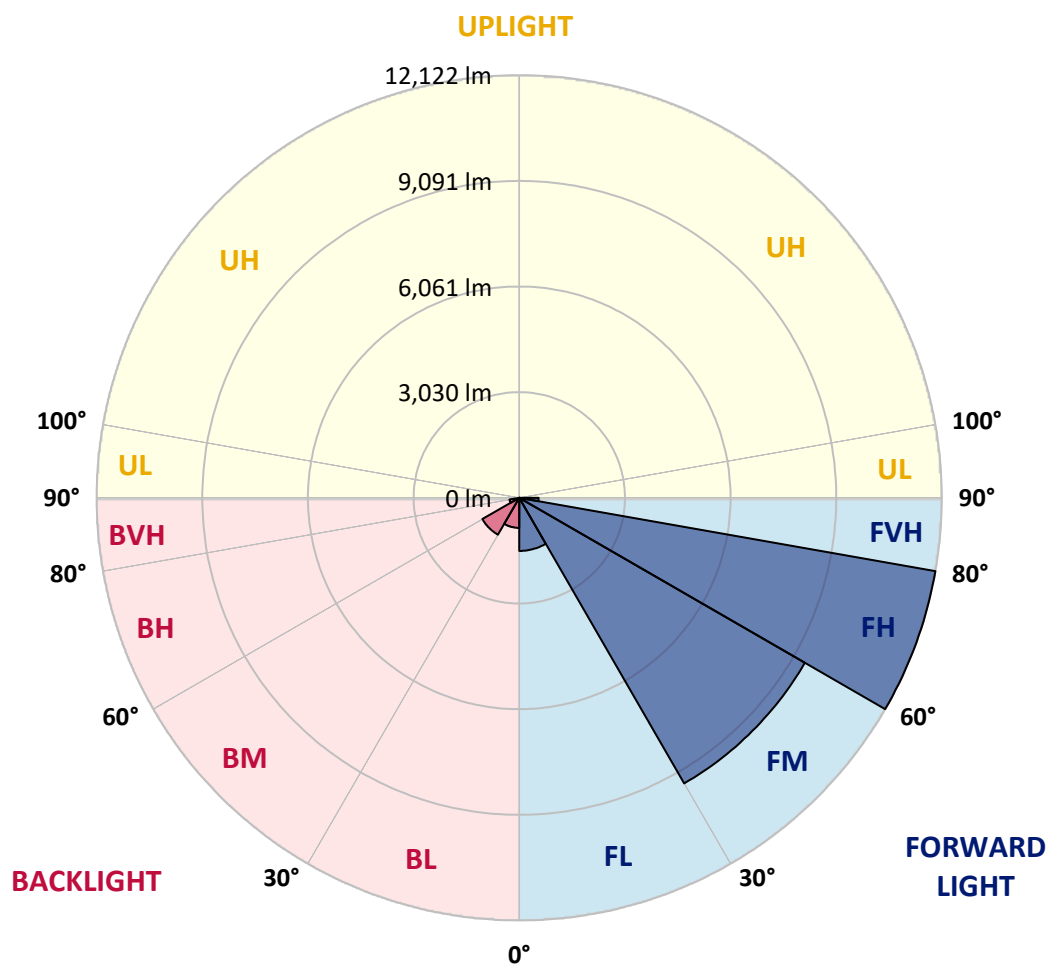
CATALOG NUMBER: GLEON-SA0A-830-U-T4FT-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|---------|-----------|-------------------------|------|--------|
|      |             |         |           | B                       | U    | G      |
| FL   | (0°-30°)    | 1522.8  | 5.9       |                         |      |        |
| FM   | (30°-60°)   | 9458.8  | 36.3      |                         |      |        |
| FH   | (60°-80°)   | 12121.7 | 46.6      |                         |      | G5     |
| FVH  | (80°-90°)   | 554.9   | 2.1       |                         |      | G4/750 |
| BL   | (0°-30°)    | 862.9   | 3.3       | B2/1000                 |      |        |
| BM   | (30°-60°)   | 1221.4  | 4.7       | B2/2500                 |      |        |
| BH   | (60°-80°)   | 283.9   | 1.1       | B1/500                  |      | G1/500 |
| BVH  | (80°-90°)   | 4.7     | 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-G5**

Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 31°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 4478.7  | 4478.7  | 4478.7  | 4478.7  | 4478.7  | 4478.7  | 4478.7  | 4478.7  | 4478.7  | 4478.7  | 4478.7  |
| 2.5°  | 4244.3  | 4262.1  | 4281.2  | 4285.1  | 4316.9  | 4318.2  | 4364.0  | 4398.4  | 4432.8  | 4465.9  | 4477.4  |
| 5°    | 3808.7  | 3838.0  | 3872.4  | 3906.7  | 3974.3  | 4001.0  | 4113.1  | 4227.7  | 4337.3  | 4441.7  | 4492.7  |
| 7.5°  | 3343.7  | 3376.8  | 3425.3  | 3510.6  | 3585.8  | 3638.0  | 3815.0  | 4018.8  | 4222.7  | 4415.0  | 4525.8  |
| 10°   | 2919.6  | 2950.1  | 3001.1  | 3091.5  | 3207.4  | 3278.8  | 3517.0  | 3799.8  | 4099.1  | 4390.8  | 4575.5  |
| 12.5° | 2649.5  | 2666.1  | 2694.1  | 2790.9  | 2895.4  | 2975.6  | 3255.8  | 3606.1  | 3997.2  | 4389.5  | 4655.7  |
| 15°   | 2599.8  | 2604.9  | 2582.0  | 2625.3  | 2706.8  | 2784.5  | 3068.6  | 3449.5  | 3919.5  | 4409.9  | 4760.2  |
| 17.5° | 2678.8  | 2676.3  | 2599.8  | 2594.7  | 2659.7  | 2723.4  | 2976.9  | 3341.2  | 3864.7  | 4457.0  | 4895.2  |
| 20°   | 2798.5  | 2789.6  | 2657.2  | 2632.9  | 2701.7  | 2761.6  | 2970.5  | 3300.4  | 3844.3  | 4536.0  | 5059.5  |
| 22.5° | 2957.8  | 2942.5  | 2734.9  | 2709.4  | 2783.3  | 2845.7  | 3049.5  | 3339.9  | 3862.2  | 4641.7  | 5250.6  |
| 25°   | 3155.2  | 3132.3  | 2868.6  | 2840.6  | 2915.7  | 2978.1  | 3190.9  | 3453.3  | 3915.7  | 4770.4  | 5492.6  |
| 27.5° | 3378.1  | 3345.0  | 3082.6  | 3010.0  | 3095.3  | 3160.3  | 3379.4  | 3626.5  | 3999.7  | 4906.7  | 5789.4  |
| 30°   | 3588.3  | 3545.0  | 3308.1  | 3188.3  | 3292.8  | 3365.4  | 3583.2  | 3832.9  | 4134.8  | 5116.9  | 6195.8  |
| 32.5° | 3799.8  | 3751.3  | 3509.3  | 3366.7  | 3460.9  | 3539.9  | 3793.4  | 4116.9  | 4388.2  | 5437.9  | 6735.9  |
| 35°   | 4286.3  | 4235.4  | 3938.6  | 3702.9  | 3701.7  | 3746.3  | 4087.6  | 4505.4  | 4723.3  | 5885.0  | 7380.4  |
| 37.5° | 5105.4  | 5076.1  | 4793.3  | 4346.2  | 4226.5  | 4176.8  | 4488.9  | 4969.1  | 5204.8  | 6500.2  | 8107.7  |
| 40°   | 6002.2  | 5976.7  | 5659.5  | 5254.4  | 5072.3  | 4950.0  | 5064.6  | 5614.9  | 5885.0  | 7251.8  | 8850.4  |
| 42.5° | 7014.8  | 6893.8  | 6328.2  | 6207.2  | 6044.2  | 5951.2  | 5848.0  | 6411.0  | 6720.6  | 8069.5  | 9586.6  |
| 45°   | 7934.5  | 7730.7  | 6997.0  | 6813.6  | 6776.6  | 6799.6  | 6856.9  | 7481.0  | 7660.6  | 9041.4  | 10320.3 |
| 47.5° | 8482.2  | 8321.7  | 7758.7  | 7582.9  | 7572.8  | 7724.3  | 8157.4  | 8689.9  | 8596.9  | 9888.5  | 10966.2 |
| 50°   | 9003.2  | 8858.0  | 8390.5  | 8433.8  | 8481.0  | 8687.3  | 9633.8  | 9933.1  | 9451.6  | 10656.6 | 11558.5 |
| 52.5° | 9424.9  | 9203.2  | 8958.6  | 9201.9  | 9433.8  | 9766.2  | 11157.2 | 11049.0 | 10057.9 | 11268.1 | 12065.4 |
| 55°   | 9668.2  | 9567.5  | 9686.0  | 9930.6  | 10366.2 | 10906.3 | 12595.4 | 11977.6 | 10501.2 | 11826.0 | 12403.0 |
| 57.5° | 10559.8 | 10362.4 | 10598.0 | 10809.5 | 11377.6 | 12133.0 | 13827.1 | 12669.2 | 10820.9 | 12171.2 | 12480.7 |
| 60°   | 11638.7 | 11479.5 | 11618.3 | 11969.9 | 12736.7 | 13624.6 | 14978.6 | 13233.5 | 10987.8 | 12392.8 | 12279.4 |
| 62.5° | 13355.8 | 13145.6 | 13059.0 | 13452.6 | 14469.1 | 15438.5 | 15852.5 | 13624.6 | 10950.9 | 12294.7 | 11589.0 |
| 65°   | 15656.3 | 15438.5 | 15051.2 | 15407.9 | 16700.8 | 17384.8 | 16829.5 | 13707.4 | 10696.1 | 11501.2 | 9843.9  |
| 67.5° | 18012.8 | 17854.9 | 17523.7 | 18124.9 | 19291.7 | 19512.1 | 17862.5 | 13506.1 | 9875.8  | 9325.5  | 6955.0  |
| 70°   | 19569.4 | 19501.9 | 19717.2 | 21047.0 | 22087.7 | 22024.0 | 18810.2 | 12424.7 | 7697.6  | 5734.7  | 3440.5  |
| 72.5° | 18447.2 | 18770.7 | 20360.4 | 22771.8 | 24043.0 | 23523.3 | 18323.6 | 9540.8  | 4399.7  | 2206.2  | 994.8   |
| 73°   | 17517.3 | 17931.3 | 20071.3 | 22836.7 | 24197.1 | 23627.7 | 17914.7 | 8757.4  | 3750.1  | 1741.3  | 754.1   |
| 75°   | 12186.5 | 12694.7 | 16616.7 | 21268.7 | 23476.2 | 22511.9 | 14932.8 | 5360.2  | 1737.5  | 771.9   | 304.4   |
| 77.5° | 5916.8  | 6292.6  | 9149.7  | 15367.1 | 18257.4 | 17588.7 | 9296.2  | 1997.3  | 784.7   | 482.8   | 140.1   |
| 80°   | 2208.8  | 2455.9  | 3971.7  | 7821.1  | 10550.9 | 10827.3 | 4088.9  | 755.4   | 522.3   | 388.5   | 71.3    |
| 82.5° | 578.3   | 644.5   | 1464.9  | 3487.7  | 5407.3  | 5659.5  | 1289.1  | 380.9   | 382.1   | 319.7   | 43.3    |
| 85°   | 184.7   | 211.5   | 457.3   | 1565.5  | 2547.6  | 2236.8  | 336.3   | 184.7   | 277.7   | 238.2   | 24.2    |
| 87.5° | 22.9    | 29.3    | 145.2   | 368.1   | 561.7   | 312.1   | 52.2    | 54.8    | 118.5   | 132.5   | 14.0    |
| 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: P322714

CATALOG NUMBER: GLEON-SA0A-830-U-T4FT-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4478.7 | 4478.7 | 4478.7 | 4478.7 | 4478.7 | 4478.7 | 4478.7 | 4478.7 | 4478.7 | 4478.7 | 4478.7 |
| 2.5°  | 4488.9 | 4482.5 | 4483.8 | 4450.7 | 4429.0 | 4385.7 | 4341.1 | 4320.7 | 4299.1 | 4290.2 | 4299.1 |
| 5°    | 4511.8 | 4500.3 | 4467.2 | 4365.3 | 4257.0 | 4116.9 | 3985.7 | 3886.4 | 3761.5 | 3727.1 | 3762.8 |
| 7.5°  | 4547.5 | 4524.5 | 4427.7 | 4220.1 | 3979.4 | 3711.9 | 3411.2 | 3192.1 | 3012.5 | 2896.6 | 2938.7 |
| 10°   | 4599.7 | 4556.4 | 4361.5 | 4008.7 | 3578.1 | 3104.3 | 2677.5 | 2345.1 | 2109.4 | 2012.6 | 2008.8 |
| 12.5° | 4687.6 | 4606.1 | 4280.0 | 3733.5 | 3087.7 | 2455.9 | 1896.7 | 1536.2 | 1345.1 | 1221.6 | 1219.0 |
| 15°   | 4784.4 | 4664.7 | 4176.8 | 3403.6 | 2517.0 | 1759.1 | 1221.6 | 947.7  | 824.1  | 784.7  | 779.6  |
| 17.5° | 4902.9 | 4732.2 | 4043.0 | 2997.3 | 1919.6 | 1165.5 | 797.4  | 718.4  | 713.3  | 709.5  | 709.5  |
| 20°   | 5051.9 | 4812.4 | 3871.1 | 2532.3 | 1361.7 | 778.3  | 677.7  | 682.8  | 685.3  | 680.2  | 681.5  |
| 22.5° | 5225.1 | 4893.9 | 3666.0 | 2033.0 | 921.0  | 650.9  | 648.4  | 654.7  | 657.3  | 654.7  | 656.0  |
| 25°   | 5426.4 | 4988.2 | 3416.3 | 1509.5 | 664.9  | 617.8  | 624.2  | 633.1  | 639.4  | 639.4  | 639.4  |
| 27.5° | 5676.1 | 5102.8 | 3115.7 | 1053.4 | 574.5  | 583.4  | 601.2  | 617.8  | 626.7  | 629.3  | 629.3  |
| 30°   | 6000.9 | 5245.5 | 2755.2 | 722.2  | 522.3  | 537.5  | 570.7  | 602.5  | 619.1  | 621.6  | 622.9  |
| 32.5° | 6411.0 | 5406.0 | 2337.4 | 533.7  | 477.7  | 489.1  | 524.8  | 578.3  | 610.2  | 615.2  | 615.2  |
| 35°   | 6881.1 | 5592.0 | 1887.8 | 464.9  | 445.8  | 449.7  | 477.7  | 538.8  | 594.9  | 608.9  | 610.2  |
| 37.5° | 7395.7 | 5775.4 | 1435.6 | 434.4  | 419.1  | 419.1  | 439.5  | 491.7  | 557.9  | 601.2  | 606.3  |
| 40°   | 7875.9 | 5886.2 | 1006.3 | 410.2  | 394.9  | 394.9  | 412.7  | 450.9  | 513.3  | 578.3  | 592.3  |
| 42.5° | 8319.2 | 5924.5 | 700.6  | 387.2  | 372.0  | 375.8  | 391.1  | 421.6  | 468.8  | 533.7  | 546.5  |
| 45°   | 8775.2 | 5918.1 | 510.8  | 360.5  | 349.0  | 360.5  | 372.0  | 394.9  | 429.3  | 466.2  | 468.8  |
| 47.5° | 9119.1 | 5864.6 | 405.1  | 335.0  | 327.4  | 342.7  | 352.8  | 368.1  | 387.2  | 384.7  | 384.7  |
| 50°   | 9441.4 | 5734.7 | 326.1  | 300.6  | 305.7  | 323.5  | 328.6  | 333.7  | 335.0  | 310.8  | 308.3  |
| 52.5° | 9686.0 | 5532.1 | 261.1  | 263.7  | 284.1  | 301.9  | 296.8  | 289.2  | 276.4  | 247.1  | 242.0  |
| 55°   | 9767.5 | 5142.3 | 205.1  | 217.8  | 252.2  | 275.1  | 256.0  | 239.5  | 215.3  | 191.1  | 186.0  |
| 57.5° | 9619.8 | 4639.2 | 166.9  | 169.4  | 212.7  | 231.8  | 210.2  | 191.1  | 164.3  | 143.9  | 140.1  |
| 60°   | 9306.4 | 4080.0 | 137.6  | 127.4  | 164.3  | 180.9  | 166.9  | 147.8  | 123.6  | 108.3  | 107.0  |
| 62.5° | 8684.8 | 3483.8 | 113.4  | 99.4   | 124.8  | 138.8  | 129.9  | 115.9  | 95.5   | 85.3   | 84.1   |
| 65°   | 7377.9 | 2787.1 | 91.7   | 80.2   | 96.8   | 108.3  | 100.6  | 90.4   | 75.2   | 67.5   | 66.2   |
| 67.5° | 5150.0 | 1884.0 | 75.2   | 66.2   | 76.4   | 85.3   | 79.0   | 73.9   | 59.9   | 58.6   | 59.9   |
| 70°   | 2483.9 | 908.2  | 62.4   | 53.5   | 59.9   | 66.2   | 63.7   | 59.9   | 57.3   | 66.2   | 76.4   |
| 72.5° | 712.1  | 304.4  | 49.7   | 44.6   | 48.4   | 52.2   | 54.8   | 53.5   | 62.4   | 80.2   | 93.0   |
| 73°   | 547.7  | 245.8  | 47.1   | 42.0   | 45.9   | 51.0   | 53.5   | 52.2   | 63.7   | 81.5   | 93.0   |
| 75°   | 234.4  | 118.5  | 35.7   | 34.4   | 38.2   | 44.6   | 47.1   | 47.1   | 63.7   | 82.8   | 89.2   |
| 77.5° | 105.7  | 63.7   | 22.9   | 26.7   | 33.1   | 35.7   | 39.5   | 39.5   | 51.0   | 63.7   | 63.7   |
| 80°   | 59.9   | 34.4   | 17.8   | 20.4   | 24.2   | 24.2   | 24.2   | 21.7   | 22.9   | 25.5   | 28.0   |
| 82.5° | 38.2   | 22.9   | 14.0   | 16.6   | 15.3   | 12.7   | 10.2   | 10.2   | 8.9    | 10.2   | 12.7   |
| 85°   | 21.7   | 12.7   | 12.7   | 10.2   | 6.4    | 5.1    | 6.4    | 5.1    | 1.3    | 0.0    | 1.3    |
| 87.5° | 12.7   | 7.6    | 3.8    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2408-195-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 08/07/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW EDISON  
 Catalog Number: **GALN-SB1A-830-U-5WQ**  
 Description: GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS

### Spectral Parameters

CCT (K): 3050  
 CIE  $u'$ : 0.2476  
 CIE  $v'$ : 0.5251  
 Duv: 0.0034  
 CIE x: 0.4383  
 CIE y: 0.4131  
 CIE z: 0.1487  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 581  
 Purity: 55.55201  
 R<sub>f</sub>: 81.5  
 R<sub>g</sub>: 99.2

CRI (Ra): 81.0  
 R1: 79.6  
 R2: 85.6  
 R3: 92.0  
 R4: 82.6  
 R5: 78.9  
 R6: 81.7  
 R7: 85.2  
 R8: 62.0  
 R9: 7.1  
 R10: 67.0  
 R11: 82.7  
 R12: 63.2  
 R13: 80.3  
 R14: 95.0  
 R15: 71.7



### Test Conditions

Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2408-195-9

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

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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 3000K 4-step quadrangle

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### Photopic Flux vs. Wavelength



### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 168                                  | NR                             | 620               | 940                                  | NR                             | 750               | 35                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 233                                  | NR                             | 625               | 897                                  | NR                             | 755               | 30                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 300                                  | NR                             | 630               | 847                                  | NR                             | 760               | 26                                   | NR                             | 890               | 1                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 372                                  | NR                             | 635               | 790                                  | NR                             | 765               | 22                                   | NR                             | 895               | 1                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 430                                  | NR                             | 640               | 730                                  | NR                             | 770               | 19                                   | NR                             | 900               | 1                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 483                                  | NR                             | 645               | 668                                  | NR                             | 775               | 16                                   | NR                             | 905               | 1                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 524                                  | NR                             | 650               | 605                                  | NR                             | 780               | 14                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 2                                    | NR                             | 525               | 555                                  | NR                             | 655               | 545                                  | NR                             | 785               | 12                                   | NR                             | 915               | 0                                    | NR                             |
| 400               | 4                                    | NR                             | 530               | 581                                  | NR                             | 660               | 485                                  | NR                             | 790               | 10                                   | NR                             | 920               | 0                                    | NR                             |
| 405               | 7                                    | NR                             | 535               | 604                                  | NR                             | 665               | 430                                  | NR                             | 795               | 9                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 17                                   | NR                             | 540               | 623                                  | NR                             | 670               | 378                                  | NR                             | 800               | 8                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 34                                   | NR                             | 545               | 645                                  | NR                             | 675               | 331                                  | NR                             | 805               | 7                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 68                                   | NR                             | 550               | 667                                  | NR                             | 680               | 290                                  | NR                             | 810               | 6                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 128                                  | NR                             | 555               | 693                                  | NR                             | 685               | 251                                  | NR                             | 815               | 5                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 214                                  | NR                             | 560               | 719                                  | NR                             | 690               | 218                                  | NR                             | 820               | 4                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 339                                  | NR                             | 565               | 754                                  | NR                             | 695               | 188                                  | NR                             | 825               | 4                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 507                                  | NR                             | 570               | 791                                  | NR                             | 700               | 162                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 573                                  | NR                             | 575               | 830                                  | NR                             | 705               | 139                                  | NR                             | 835               | 3                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 356                                  | NR                             | 580               | 873                                  | NR                             | 710               | 119                                  | NR                             | 840               | 3                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 217                                  | NR                             | 585               | 913                                  | NR                             | 715               | 102                                  | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 168                                  | NR                             | 590               | 948                                  | NR                             | 720               | 88                                   | NR                             | 850               | 2                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 113                                  | NR                             | 595               | 974                                  | NR                             | 725               | 76                                   | NR                             | 855               | 2                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 85                                   | NR                             | 600               | 994                                  | NR                             | 730               | 65                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 85                                   | NR                             | 605               | 998                                  | NR                             | 735               | 55                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 94                                   | NR                             | 610               | 994                                  | NR                             | 740               | 47                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 120                                  | NR                             | 615               | 973                                  | NR                             | 745               | 41                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.27

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 168                      | NR            | 620    | 940                      | NR            | 750    | 35                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 233                      | NR            | 625    | 897                      | NR            | 755    | 30                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 300                      | NR            | 630    | 847                      | NR            | 760    | 26                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 372                      | NR            | 635    | 790                      | NR            | 765    | 22                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 430                      | NR            | 640    | 730                      | NR            | 770    | 19                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 483                      | NR            | 645    | 668                      | NR            | 775    | 16                       | NR            | 905    | 1                        | NR            |
| 390    | 0                        | NR            | 520    | 524                      | NR            | 650    | 605                      | NR            | 780    | 14                       | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 555                      | NR            | 655    | 545                      | NR            | 785    | 12                       | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 581                      | NR            | 660    | 485                      | NR            | 790    | 10                       | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 604                      | NR            | 665    | 430                      | NR            | 795    | 9                        | NR            | 925    | 0                        | NR            |
| 410    | 17                       | NR            | 540    | 623                      | NR            | 670    | 378                      | NR            | 800    | 8                        | NR            | 930    | 0                        | NR            |
| 415    | 34                       | NR            | 545    | 645                      | NR            | 675    | 331                      | NR            | 805    | 7                        | NR            | 935    | 0                        | NR            |
| 420    | 68                       | NR            | 550    | 667                      | NR            | 680    | 290                      | NR            | 810    | 6                        | NR            | 940    | 0                        | NR            |
| 425    | 128                      | NR            | 555    | 693                      | NR            | 685    | 251                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 214                      | NR            | 560    | 719                      | NR            | 690    | 218                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 339                      | NR            | 565    | 754                      | NR            | 695    | 188                      | NR            | 825    | 4                        | NR            | 955    | 0                        | NR            |
| 440    | 507                      | NR            | 570    | 791                      | NR            | 700    | 162                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 573                      | NR            | 575    | 830                      | NR            | 705    | 139                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 356                      | NR            | 580    | 873                      | NR            | 710    | 119                      | NR            | 840    | 3                        | NR            | 970    | 0                        | NR            |
| 455    | 217                      | NR            | 585    | 913                      | NR            | 715    | 102                      | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 168                      | NR            | 590    | 948                      | NR            | 720    | 88                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 113                      | NR            | 595    | 974                      | NR            | 725    | 76                       | NR            | 855    | 2                        | NR            | 985    | 0                        | NR            |
| 470    | 85                       | NR            | 600    | 994                      | NR            | 730    | 65                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 85                       | NR            | 605    | 998                      | NR            | 735    | 55                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 94                       | NR            | 610    | 994                      | NR            | 740    | 47                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 120                      | NR            | 615    | 973                      | NR            | 745    | 41                       | NR            | 875    | 1                        | NR            |        |                          |               |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.32

| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|
| 360               | 0                                      | NR                             | 490               | 168                                    | NR                             | 620               | 940                                    | NR                             | 750               | 35                                     | NR                             | 880               | 1                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 233                                    | NR                             | 625               | 897                                    | NR                             | 755               | 30                                     | NR                             | 885               | 1                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 300                                    | NR                             | 630               | 847                                    | NR                             | 760               | 26                                     | NR                             | 890               | 1                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 372                                    | NR                             | 635               | 790                                    | NR                             | 765               | 22                                     | NR                             | 895               | 1                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 430                                    | NR                             | 640               | 730                                    | NR                             | 770               | 19                                     | NR                             | 900               | 1                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 483                                    | NR                             | 645               | 668                                    | NR                             | 775               | 16                                     | NR                             | 905               | 1                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 524                                    | NR                             | 650               | 605                                    | NR                             | 780               | 14                                     | NR                             | 910               | 0                                      | NR                             |
| 395               | 2                                      | NR                             | 525               | 555                                    | NR                             | 655               | 545                                    | NR                             | 785               | 12                                     | NR                             | 915               | 0                                      | NR                             |
| 400               | 4                                      | NR                             | 530               | 581                                    | NR                             | 660               | 485                                    | NR                             | 790               | 10                                     | NR                             | 920               | 0                                      | NR                             |
| 405               | 7                                      | NR                             | 535               | 604                                    | NR                             | 665               | 430                                    | NR                             | 795               | 9                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 17                                     | NR                             | 540               | 623                                    | NR                             | 670               | 378                                    | NR                             | 800               | 8                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 34                                     | NR                             | 545               | 645                                    | NR                             | 675               | 331                                    | NR                             | 805               | 7                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 68                                     | NR                             | 550               | 667                                    | NR                             | 680               | 290                                    | NR                             | 810               | 6                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 128                                    | NR                             | 555               | 693                                    | NR                             | 685               | 251                                    | NR                             | 815               | 5                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 214                                    | NR                             | 560               | 719                                    | NR                             | 690               | 218                                    | NR                             | 820               | 4                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 339                                    | NR                             | 565               | 754                                    | NR                             | 695               | 188                                    | NR                             | 825               | 4                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 507                                    | NR                             | 570               | 791                                    | NR                             | 700               | 162                                    | NR                             | 830               | 3                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 573                                    | NR                             | 575               | 830                                    | NR                             | 705               | 139                                    | NR                             | 835               | 3                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 356                                    | NR                             | 580               | 873                                    | NR                             | 710               | 119                                    | NR                             | 840               | 3                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 217                                    | NR                             | 585               | 913                                    | NR                             | 715               | 102                                    | NR                             | 845               | 2                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 168                                    | NR                             | 590               | 948                                    | NR                             | 720               | 88                                     | NR                             | 850               | 2                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 113                                    | NR                             | 595               | 974                                    | NR                             | 725               | 76                                     | NR                             | 855               | 2                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 85                                     | NR                             | 600               | 994                                    | NR                             | 730               | 65                                     | NR                             | 860               | 1                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 85                                     | NR                             | 605               | 998                                    | NR                             | 735               | 55                                     | NR                             | 865               | 1                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 94                                     | NR                             | 610               | 994                                    | NR                             | 740               | 47                                     | NR                             | 870               | 1                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 120                                    | NR                             | 615               | 973                                    | NR                             | 745               | 41                                     | NR                             | 875               | 1                                      | NR                             |                   |                                        |                                |

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TM-30-18

### Summary

$R_f = 81.5$   
 $R_g = 99.2$   
 $CIE R_a = 81.0$   
 $R_g = 7.1$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 51 | CES31 = 71 | CES56 = 78 | CES81 = 78 |
| CES07 = 42 | CES32 = 70 | CES57 = 76 | CES82 = 95 |
| CES08 = 41 | CES33 = 71 | CES58 = 78 | CES83 = 90 |
| CES09 = 29 | CES34 = 82 | CES59 = 92 | CES84 = 94 |
| CES10 = 76 | CES35 = 90 | CES60 = 95 | CES85 = 86 |
| CES11 = 59 | CES36 = 93 | CES61 = 93 | CES86 = 72 |
| CES12 = 65 | CES37 = 87 | CES62 = 83 | CES87 = 85 |
| CES13 = 43 | CES38 = 75 | CES63 = 77 | CES88 = 83 |
| CES14 = 74 | CES39 = 94 | CES64 = 83 | CES89 = 75 |
| CES15 = 71 | CES40 = 89 | CES65 = 77 | CES90 = 81 |
| CES16 = 47 | CES41 = 85 | CES66 = 80 | CES91 = 96 |
| CES17 = 50 | CES42 = 86 | CES67 = 79 | CES92 = 73 |
| CES18 = 56 | CES43 = 81 | CES68 = 84 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 91 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 78 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 76 | CES96 = 84 |
| CES22 = 79 | CES47 = 77 | CES72 = 92 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 71 | CES98 = 81 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 74 |
| CES25 = 72 | CES50 = 89 | CES75 = 74 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**


(END OF REPORT)