

Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-State  
Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: CORELITE

Report Number: P1215866

Luminaire Tested: 24-ID2-90-CFD1-L835-U

Issue Date: 12/5/2025

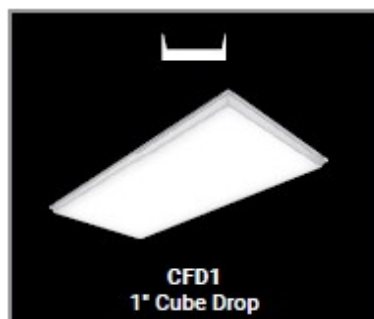
**Test Information**

Test Method: LM-79-2019  
Report Number: P1215866  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2508-510-8)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/5/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: CORELITE  
Catalog Number: 24-ID2-90-CFD1-L835-U  
Description: 2X4 IN DEPTH TROFFER WITH 1INCH CUBE DROP LENS  
Light Source: 3500K CCT, 80 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

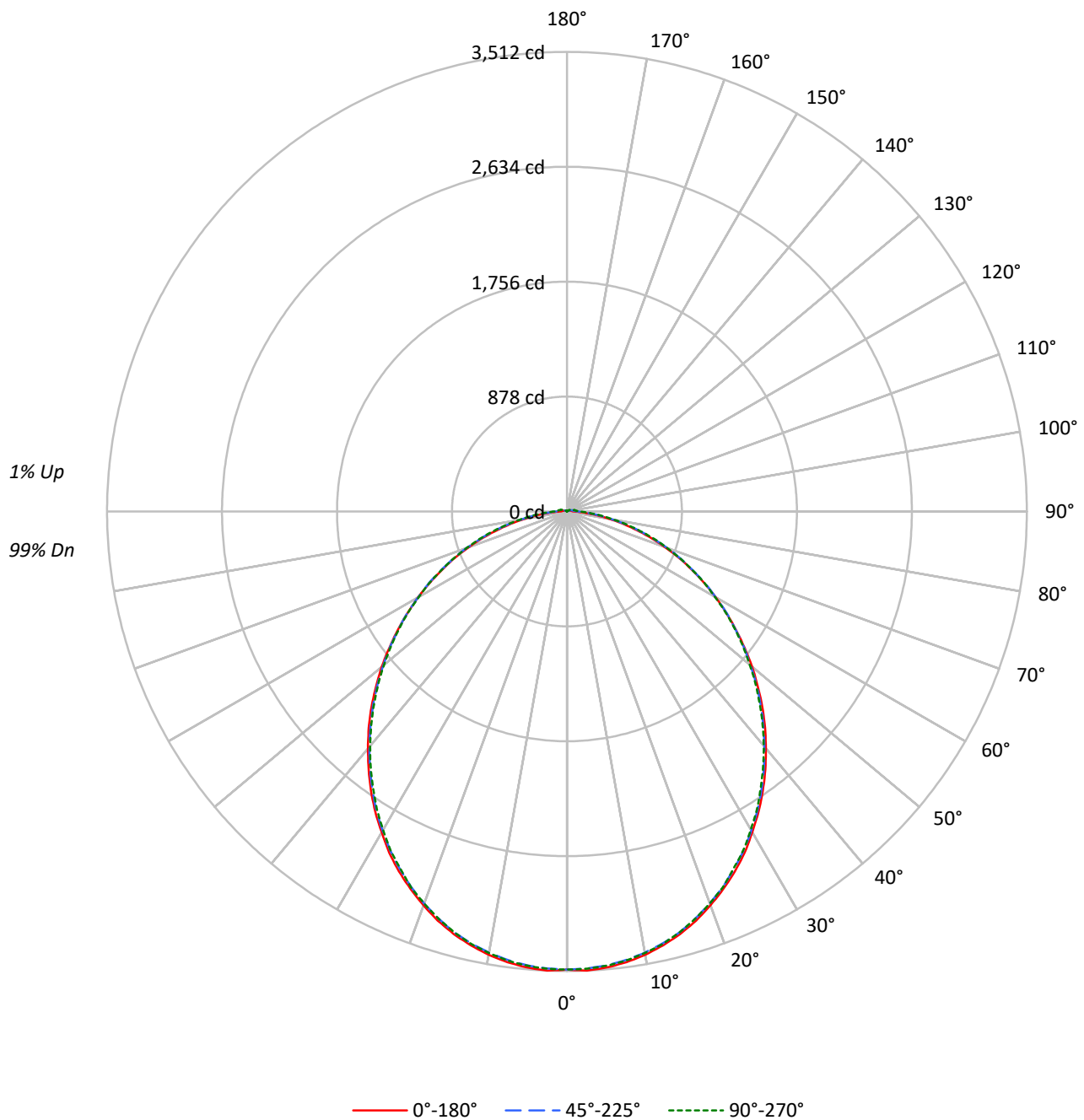
Lumens per Lamp: N/A  
Luminaire Lumens: 9305.0 lumens  
Efficiency: N/A  
Efficacy: 119.3 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.2 / 1.31  
Luminous Opening: Rectangular w/ Sides (W: 2' x L: 4' x H: 0.08')  
CIE Type: Direct

Input Watts (W): 78  
Input Voltage (V): 120  
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



TEST NUMBER: P1215866  
CATALOG NUMBER: 24-ID2-90-CFD1-L835-U

### Luminous Intensity Polar Plot



TEST NUMBER: P1215866

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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     |     | 20  |     |     |     |     | 20  |     |     |    |    | 20 |
| RC  | 80  |     |     |     | 70  |     |     |     |     | 50  |     |     |     |     | 30  |     |     |    |    | 0  |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50 | 30 | 0  |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |
| 0   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 110 | 110 | 110 | 105 | 105 | 105 | 101 | 101 | 101 |    |    | 99 |
| 1   | 108 | 104 | 99  | 96  | 106 | 101 | 97  | 94  | 97  | 94  | 91  | 93  | 90  | 88  | 89  | 87  | 85  |    |    | 83 |
| 2   | 99  | 91  | 84  | 78  | 96  | 89  | 82  | 77  | 85  | 80  | 75  | 81  | 77  | 73  | 78  | 74  | 71  |    |    | 69 |
| 3   | 90  | 80  | 72  | 65  | 88  | 78  | 71  | 65  | 75  | 68  | 63  | 72  | 66  | 62  | 69  | 65  | 61  |    |    | 58 |
| 4   | 83  | 71  | 62  | 55  | 80  | 69  | 61  | 55  | 67  | 60  | 54  | 64  | 58  | 53  | 62  | 57  | 52  |    |    | 50 |
| 5   | 76  | 63  | 54  | 48  | 74  | 62  | 54  | 48  | 60  | 53  | 47  | 58  | 51  | 46  | 56  | 50  | 46  |    |    | 44 |
| 6   | 70  | 57  | 48  | 42  | 68  | 56  | 48  | 42  | 54  | 47  | 41  | 52  | 46  | 41  | 51  | 45  | 40  |    |    | 38 |
| 7   | 65  | 52  | 43  | 37  | 64  | 51  | 43  | 37  | 49  | 42  | 37  | 48  | 41  | 36  | 46  | 40  | 36  |    |    | 34 |
| 8   | 61  | 47  | 39  | 33  | 59  | 47  | 39  | 33  | 45  | 38  | 33  | 44  | 37  | 33  | 43  | 37  | 32  |    |    | 30 |
| 9   | 57  | 44  | 35  | 30  | 55  | 43  | 35  | 30  | 42  | 35  | 30  | 41  | 34  | 29  | 39  | 34  | 29  |    |    | 27 |
| 10  | 53  | 40  | 32  | 27  | 52  | 40  | 32  | 27  | 39  | 32  | 27  | 38  | 31  | 27  | 37  | 31  | 27  |    |    | 25 |

**AVERAGE LUMINANCE (cd/sqm):**

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 4710 | 4710 | 4710 |
| 5°  | 4716 | 4685 | 4689 |
| 10° | 4683 | 4642 | 4650 |
| 15° | 4631 | 4584 | 4587 |
| 20° | 4553 | 4495 | 4499 |
| 25° | 4464 | 4390 | 4388 |
| 30° | 4346 | 4270 | 4264 |
| 35° | 4225 | 4134 | 4123 |
| 40° | 4083 | 3979 | 3974 |
| 45° | 3937 | 3822 | 3811 |
| 50° | 3774 | 3648 | 3640 |
| 55° | 3592 | 3472 | 3472 |
| 60° | 3415 | 3285 | 3282 |
| 65° | 3200 | 3089 | 3096 |
| 70° | 2965 | 2873 | 2886 |
| 75° | 2670 | 2568 | 2629 |
| 80° | 2299 | 2238 | 2327 |
| 85° | 1877 | 1921 | 2133 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3937 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 330.8  | 3.6       |
| 10°-20°   | 938.1  | 10.1      |
| 20°-30°   | 1390.0 | 14.9      |
| 30°-40°   | 1620.7 | 17.4      |
| 40°-50°   | 1615.6 | 17.4      |
| 50°-60°   | 1406.3 | 15.1      |
| 60°-70°   | 1048.2 | 11.3      |
| 70°-80°   | 608.3  | 6.5       |
| 80°-90°   | 212.2  | 2.3       |
| 90°-100°  | 63.6   | 0.7       |
| 100°-110° | 38.2   | 0.4       |
| 110°-120° | 20.2   | 0.2       |
| 120°-130° | 8.6    | 0.1       |
| 130°-140° | 2.6    | 0.0       |
| 140°-150° | 0.8    | 0.0       |
| 150°-160° | 0.6    | 0.0       |
| 160°-170° | 0.1    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-30°    | 2658.9 | 28.6      |
| 0°-40°    | 4279.6 | 46.0      |
| 0°-60°    | 7301.6 | 78.5      |
| 0°-90°    | 9170.3 | 98.6      |
| 90°-120°  | 122.0  | 1.3       |
| 90°-150°  | 134.0  | 1.4       |
| 90°-180°  | 135.0  | 1.5       |
| 0°-180°   | 9305.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3501 | 3501  | 3501 | 3501  | 3501 |      |
| 5°   | 3498 | 3487  | 3482 | 3478  | 3484 | 332  |
| 15°  | 3342 | 3331  | 3328 | 3321  | 3328 | 942  |
| 25°  | 3035 | 3026  | 3016 | 3012  | 3011 | 1397 |
| 35°  | 2608 | 2600  | 2592 | 2583  | 2580 | 1630 |
| 45°  | 2110 | 2102  | 2094 | 2086  | 2083 | 1627 |
| 55°  | 1575 | 1579  | 1570 | 1571  | 1565 | 1410 |
| 65°  | 1048 | 1055  | 1058 | 1061  | 1056 | 1041 |
| 75°  | 552  | 563   | 572  | 586   | 581  | 587  |
| 85°  | 149  | 167   | 185  | 196   | 201  | 161  |
| 90°  | 51   | 65    | 82   | 95    | 98   | 32   |
| 95°  | 38   | 46    | 60   | 67    | 70   | 30   |
| 105° | 25   | 25    | 37   | 44    | 48   | 27   |
| 115° | 15   | 13    | 19   | 25    | 30   | 15   |
| 125° | 9    | 6     | 6    | 13    | 16   | 8    |
| 135° | 4    | 2     | 1    | 4     | 5    | 3    |
| 145° | 1    | 1     | 1    | 1     | 1    | 1    |
| 155° | 1    | 1     | 1    | 1     | 1    | 1    |
| 165° | 0    | 0     | 0    | 0     | 0    | 0    |
| 175° | 0    | 0     | 0    | 0     | 0    | 0    |
| 180° | 0    | 0     | 0    | 0     | 0    | 0    |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3500.6 | 3500.6 | 3500.6 | 3500.6 | 3500.6 |
| 2.5°   | 3512.0 | 3501.9 | 3494.3 | 3491.8 | 3498.1 |
| 5°     | 3498.1 | 3486.7 | 3481.7 | 3477.9 | 3484.2 |
| 7.5°   | 3474.1 | 3465.2 | 3457.6 | 3453.8 | 3461.4 |
| 10°    | 3439.9 | 3428.5 | 3423.4 | 3419.6 | 3427.2 |
| 12.5°  | 3395.6 | 3385.4 | 3380.4 | 3376.6 | 3384.2 |
| 15°    | 3342.4 | 3331.0 | 3328.5 | 3320.9 | 3328.5 |
| 17.5°  | 3279.1 | 3269.0 | 3261.4 | 3258.8 | 3262.6 |
| 20°    | 3203.1 | 3196.8 | 3187.9 | 3185.4 | 3187.9 |
| 22.5°  | 3122.1 | 3114.5 | 3106.9 | 3101.8 | 3109.4 |
| 25°    | 3034.7 | 3025.9 | 3015.7 | 3011.9 | 3010.7 |
| 27.5°  | 2939.8 | 2928.4 | 2920.8 | 2913.2 | 2918.3 |
| 30°    | 2829.6 | 2824.6 | 2815.7 | 2810.6 | 2808.1 |
| 32.5°  | 2723.3 | 2719.5 | 2708.1 | 2698.0 | 2700.5 |
| 35°    | 2608.1 | 2600.5 | 2591.6 | 2582.8 | 2580.2 |
| 37.5°  | 2487.8 | 2480.2 | 2470.1 | 2462.5 | 2461.2 |
| 40°    | 2363.7 | 2358.7 | 2346.0 | 2338.4 | 2338.4 |
| 42.5°  | 2239.7 | 2233.3 | 2219.4 | 2215.6 | 2211.8 |
| 45°    | 2110.5 | 2101.7 | 2094.1 | 2086.5 | 2082.7 |
| 47.5°  | 1976.3 | 1971.2 | 1962.4 | 1957.3 | 1954.8 |
| 50°    | 1845.9 | 1839.6 | 1830.7 | 1826.9 | 1821.9 |
| 52.5°  | 1709.2 | 1709.2 | 1702.8 | 1699.0 | 1694.0 |
| 55°    | 1575.0 | 1578.8 | 1569.9 | 1571.2 | 1564.8 |
| 57.5°  | 1442.0 | 1445.8 | 1447.1 | 1438.2 | 1437.0 |
| 60°    | 1312.9 | 1314.2 | 1310.4 | 1310.4 | 1304.0 |
| 62.5°  | 1180.0 | 1183.8 | 1190.1 | 1186.3 | 1185.0 |
| 65°    | 1048.3 | 1054.6 | 1058.4 | 1061.0 | 1055.9 |
| 67.5°  | 925.5  | 931.8  | 938.1  | 935.6  | 934.3  |
| 70°    | 795.1  | 802.7  | 815.3  | 820.4  | 814.1  |
| 72.5°  | 673.5  | 683.7  | 690.0  | 697.6  | 700.1  |
| 75°    | 552.0  | 563.4  | 572.3  | 586.2  | 581.1  |
| 77.5°  | 438.1  | 452.0  | 463.4  | 474.8  | 474.8  |
| 80°    | 330.4  | 344.4  | 358.3  | 371.0  | 368.4  |
| 82.5°  | 233.0  | 249.4  | 263.3  | 277.3  | 279.8  |
| 85°    | 149.4  | 167.1  | 184.8  | 196.2  | 201.3  |
| 87.5°  | 89.9   | 103.8  | 122.8  | 135.5  | 140.5  |
| 90°    | 50.6   | 64.6   | 82.3   | 95.0   | 97.5   |
| 92.5°  | 41.8   | 50.6   | 65.8   | 77.2   | 78.5   |
| 95°    | 38.0   | 45.6   | 59.5   | 67.1   | 69.6   |
| 97.5°  | 34.2   | 39.2   | 53.2   | 62.0   | 64.6   |
| 100°   | 31.7   | 34.2   | 46.8   | 55.7   | 58.2   |
| 102.5° | 27.9   | 30.4   | 41.8   | 49.4   | 53.2   |
| 105°   | 25.3   | 25.3   | 36.7   | 44.3   | 48.1   |
| 107.5° | 22.8   | 21.5   | 31.7   | 39.2   | 43.0   |
| 110°   | 20.3   | 17.7   | 27.9   | 34.2   | 39.2   |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°   | 22.5° | 45°  | 67.5° | 90°  |
|--------|------|-------|------|-------|------|
| 112.5° | 17.7 | 15.2  | 22.8 | 29.1  | 34.2 |
| 115°   | 15.2 | 12.7  | 19.0 | 25.3  | 30.4 |
| 117.5° | 12.7 | 11.4  | 15.2 | 21.5  | 26.6 |
| 120°   | 11.4 | 8.9   | 12.7 | 19.0  | 22.8 |
| 122.5° | 10.1 | 7.6   | 8.9  | 15.2  | 19.0 |
| 125°   | 8.9  | 6.3   | 6.3  | 12.7  | 16.5 |
| 127.5° | 6.3  | 5.1   | 3.8  | 10.1  | 12.7 |
| 130°   | 6.3  | 3.8   | 2.5  | 7.6   | 10.1 |
| 132.5° | 5.1  | 3.8   | 1.3  | 5.1   | 7.6  |
| 135°   | 3.8  | 2.5   | 1.3  | 3.8   | 5.1  |
| 137.5° | 2.5  | 2.5   | 1.3  | 2.5   | 3.8  |
| 140°   | 2.5  | 1.3   | 1.3  | 1.3   | 2.5  |
| 142.5° | 1.3  | 1.3   | 1.3  | 1.3   | 1.3  |
| 145°   | 1.3  | 1.3   | 1.3  | 1.3   | 1.3  |
| 147.5° | 1.3  | 1.3   | 1.3  | 1.3   | 1.3  |
| 150°   | 1.3  | 1.3   | 1.3  | 1.3   | 1.3  |
| 152.5° | 1.3  | 1.3   | 1.3  | 1.3   | 1.3  |
| 155°   | 1.3  | 1.3   | 1.3  | 1.3   | 1.3  |
| 157.5° | 1.3  | 1.3   | 1.3  | 1.3   | 1.3  |
| 160°   | 2.5  | 1.3   | 1.3  | 1.3   | 1.3  |
| 162.5° | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  |
| 165°   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  |
| 167.5° | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  |
| 170°   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  |
| 172.5° | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  |
| 175°   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  |
| 177.5° | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  |
| 180°   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  |

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**CIE UGR TABLE:**

| Reflectances:   |      |                  |       |       |       |       |                |       |       |       |       |
|-----------------|------|------------------|-------|-------|-------|-------|----------------|-------|-------|-------|-------|
| Ceiling         |      | 0.7              | 0.7   | 0.5   | 0.5   | 0.3   | 0.7            | 0.7   | 0.5   | 0.5   | 0.3   |
| Wall            |      | 0.5              | 0.3   | 0.5   | 0.3   | 0.3   | 0.5            | 0.3   | 0.5   | 0.3   | 0.3   |
| Reference plane |      | 0.2              | 0.2   | 0.2   | 0.2   | 0.2   | 0.2            | 0.2   | 0.2   | 0.2   | 0.2   |
| Room dimensions |      | Viewed crosswise |       |       |       |       | Viewed endwise |       |       |       |       |
| X=2H            | Y=2H | 16.16            | 17.74 | 16.55 | 18.09 | 18.44 | 16.19          | 17.77 | 16.58 | 18.12 | 18.47 |
|                 | 3H   | 17.84            | 19.27 | 18.24 | 19.63 | 20.03 | 17.95          | 19.38 | 18.35 | 19.74 | 20.13 |
|                 | 4H   | 18.44            | 19.79 | 18.87 | 20.17 | 20.58 | 18.62          | 19.97 | 19.04 | 20.35 | 20.76 |
|                 | 6H   | 18.87            | 20.12 | 19.30 | 20.51 | 20.94 | 19.14          | 20.39 | 19.57 | 20.78 | 21.21 |
|                 | 8H   | 19.00            | 20.19 | 19.44 | 20.61 | 21.04 | 19.32          | 20.52 | 19.77 | 20.94 | 21.37 |
|                 | 12H  | 19.08            | 20.22 | 19.53 | 20.63 | 21.10 | 19.48          | 20.62 | 19.93 | 21.03 | 21.49 |
| 4H              | 2H   | 16.76            | 18.10 | 17.18 | 18.48 | 18.89 | 16.78          | 18.13 | 17.20 | 18.51 | 18.92 |
|                 | 3H   | 18.66            | 19.79 | 19.09 | 20.21 | 20.65 | 18.76          | 19.89 | 19.19 | 20.32 | 20.75 |
|                 | 4H   | 19.39            | 20.41 | 19.84 | 20.85 | 21.32 | 19.56          | 20.59 | 20.02 | 21.03 | 21.50 |
|                 | 6H   | 19.93            | 20.83 | 20.41 | 21.30 | 21.79 | 20.21          | 21.11 | 20.69 | 21.57 | 22.06 |
|                 | 8H   | 20.10            | 20.94 | 20.59 | 21.41 | 21.91 | 20.45          | 21.29 | 20.93 | 21.76 | 22.26 |
|                 | 12H  | 20.23            | 20.98 | 20.73 | 21.48 | 21.99 | 20.66          | 21.41 | 21.16 | 21.91 | 22.42 |
| 8H              | 4H   | 19.69            | 20.53 | 20.17 | 20.99 | 21.49 | 19.84          | 20.68 | 20.33 | 21.15 | 21.65 |
|                 | 6H   | 20.35            | 21.05 | 20.87 | 21.57 | 22.07 | 20.62          | 21.31 | 21.13 | 21.83 | 22.34 |
|                 | 8H   | 20.59            | 21.22 | 21.13 | 21.75 | 22.27 | 20.94          | 21.56 | 21.47 | 22.10 | 22.62 |
|                 | 12H  | 20.79            | 21.34 | 21.32 | 21.86 | 22.45 | 21.24          | 21.79 | 21.77 | 22.31 | 22.90 |
| 12H             | 4H   | 19.72            | 20.48 | 20.22 | 20.98 | 21.48 | 19.87          | 20.62 | 20.37 | 21.13 | 21.63 |
|                 | 6H   | 20.41            | 21.04 | 20.94 | 21.57 | 22.09 | 20.66          | 21.29 | 21.19 | 21.82 | 22.34 |
|                 | 8H   | 20.71            | 21.27 | 21.24 | 21.78 | 22.38 | 21.04          | 21.60 | 21.57 | 22.12 | 22.71 |

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

Report Prepared for

Cooper Lighting Solutions

Corelite

Report Number: SP1-2506-458-1

Test Date: 07/23/2025

Luminaire Tested: 22ID2-55-CFR1-L835-U

Data in this report applies to families of products including 22ID2-55-CFR1-L835-U

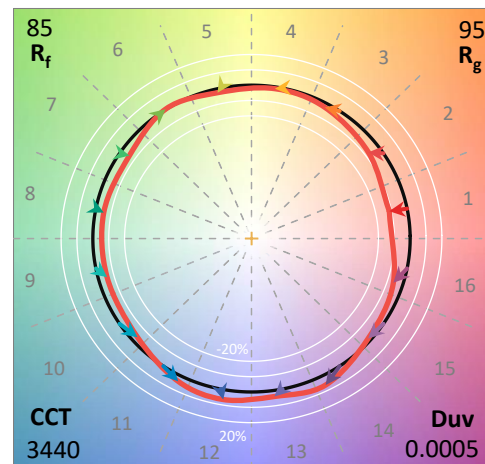
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2506-458-1  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 08/27/2025  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Corelite  
 Catalog Number: **22ID2-55-CFR1-L835-U**  
 Description: 2X2 CGTX WITH INDEPTH FRAME AND CFR1 LENS - 5500 LUMEN 3500K 80CRI

### Spectral Parameters

CCT (K): 3440  
 CIE  $u'$ : 0.2370  
 CIE  $v'$ : 0.5132  
 Duv: 0.0005  
 CIE x: 0.4093  
 CIE y: 0.3940  
 CIE z: 0.1967  
 Peak Wavelength (nm): 599  
 Dominant Wavelength (nm): 580  
 Purity: 41.09375  
 R<sub>f</sub>: 84.9  
 R<sub>g</sub>: 94.6

CRI (Ra): 84.2  
 R1: 82.8  
 R2: 91.7  
 R3: 96.7  
 R4: 81.9  
 R5: 82.6  
 R6: 88.8  
 R7: 85.0  
 R8: 63.7  
 R9: 13.6  
 R10: 80.1  
 R11: 81.1  
 R12: 65.8  
 R13: 85.2  
 R14: 98.7  
 R15: 76.2



### Test Conditions

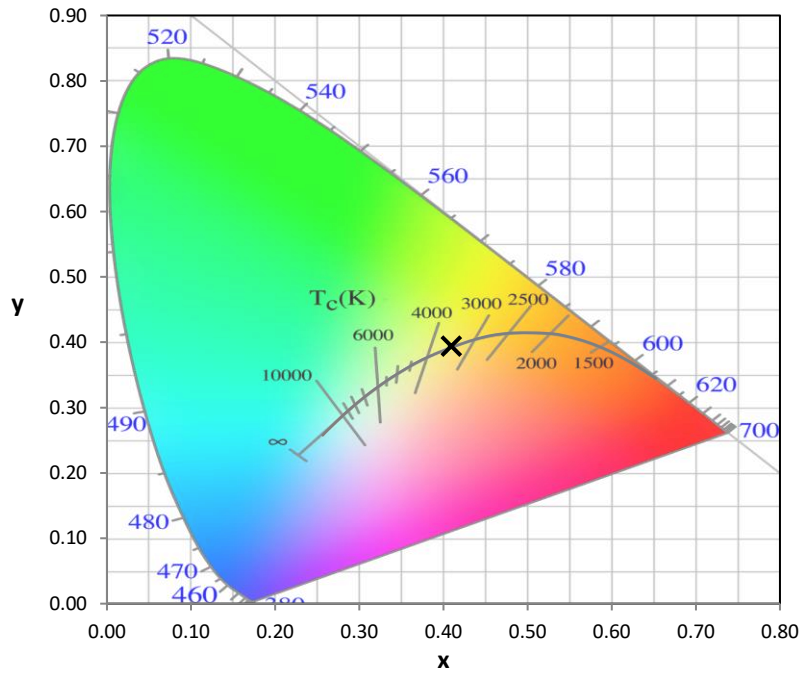
Stabilization Time: 36M  
 Operation Time: 1H 36M  
 Sphere Temperature (°C): 24.0

REPORT NUMBER: SP1-2506-458-1

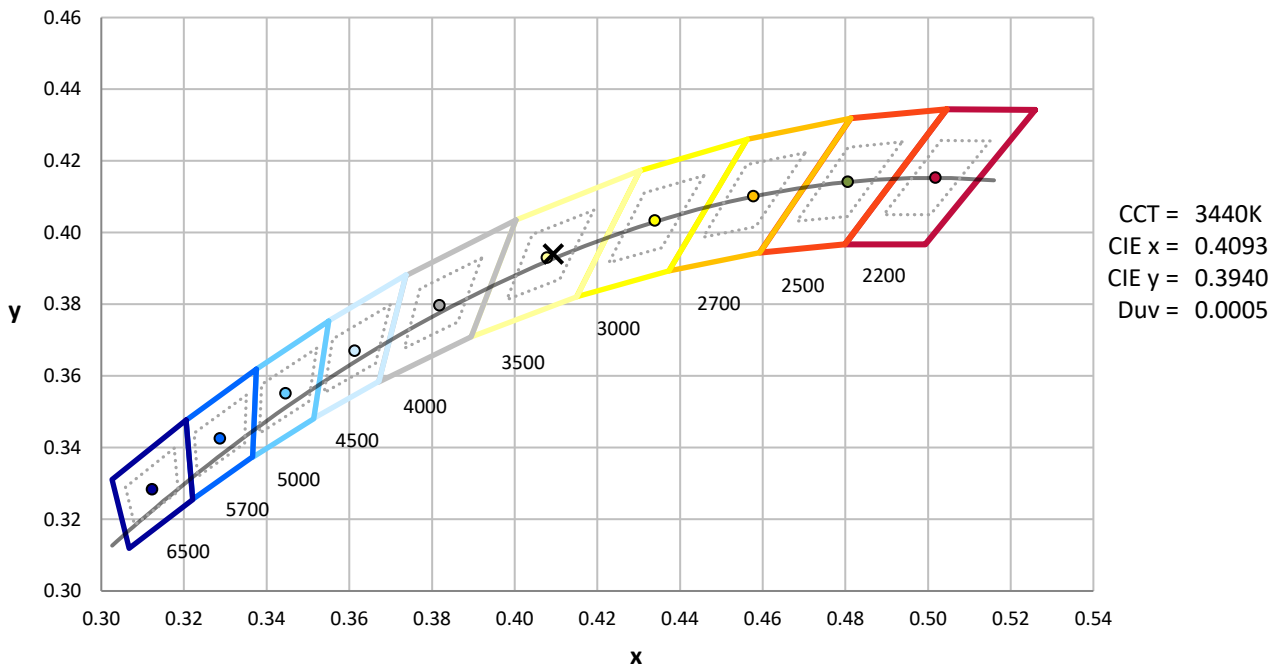
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 6/16/2025        | 12/16/2025           |
| Power Meter                    | XITRON INXT2011004    | 1/21/2025        | 1/21/2026            |
| AC Power Source                | CHROMA 61603 IN0063   | 10/22/2024       | 10/22/2025           |
| DC Power Source                | AGILENT E3634A IN0208 | 10/22/2024       | 10/22/2025           |
| Sphere Thermometer             | ONSET IN0085          | 10/22/2024       | 10/22/2025           |
| Room Thermometer               | ONSET IN0046          | 10/22/2024       | 10/22/2025           |

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**CIE 1931 Chromaticity Diagram**



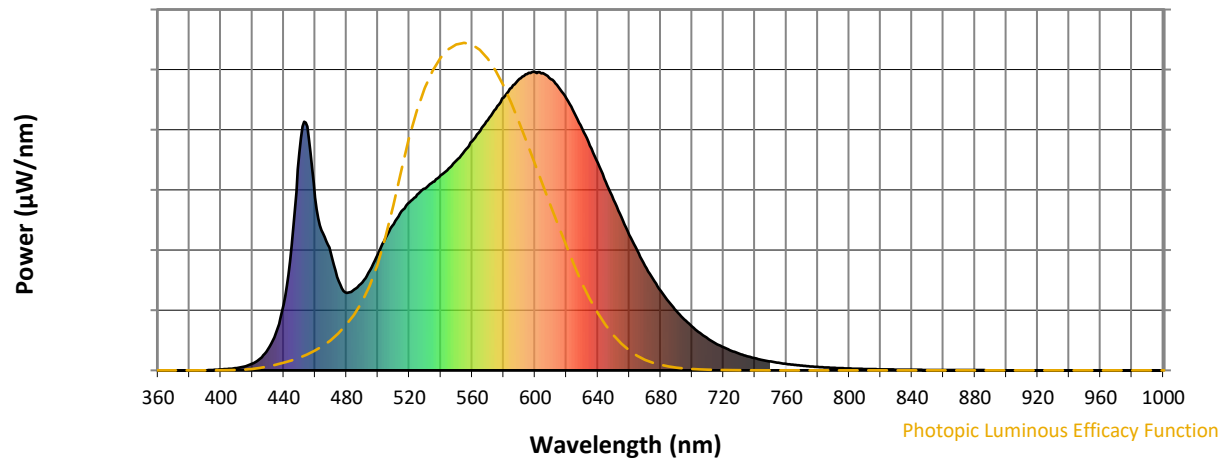
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3500K 4-step quadrangle

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### Photopic Flux vs. Wavelength

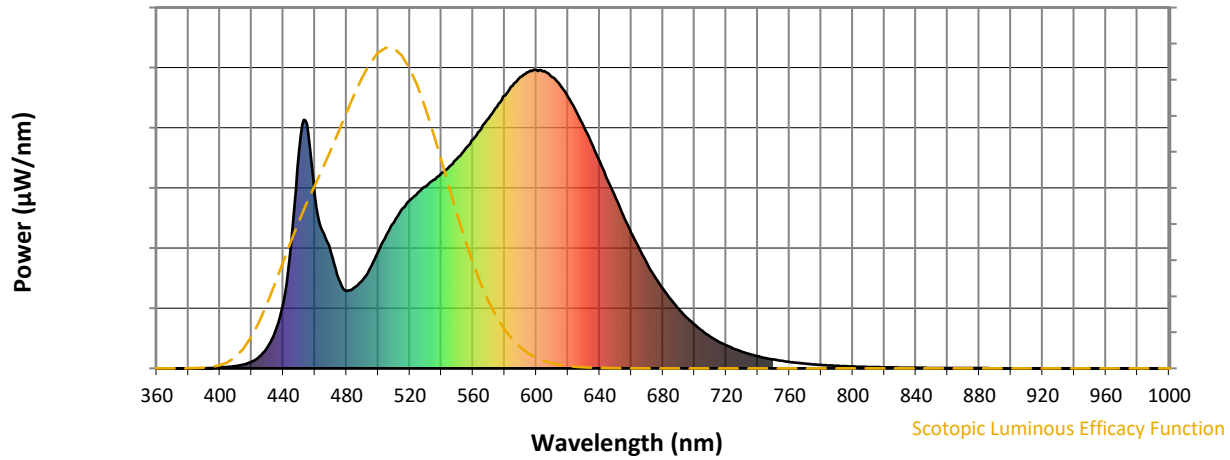


### Photopic Lumens: NR

| $\lambda$<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               | 295                                    | NR                             | 620               | 910                                    | NR                             | 750               | 30                                     | NR                             | 880               | 1                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 335                                    | NR                             | 625               | 862                                    | NR                             | 755               | 25                                     | NR                             | 885               | 1                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 390                                    | NR                             | 630               | 809                                    | NR                             | 760               | 21                                     | NR                             | 890               | 1                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 445                                    | NR                             | 635               | 752                                    | NR                             | 765               | 18                                     | NR                             | 895               | 0                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 490                                    | NR                             | 640               | 694                                    | NR                             | 770               | 16                                     | NR                             | 900               | 0                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 532                                    | NR                             | 645               | 630                                    | NR                             | 775               | 13                                     | NR                             | 905               | 0                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 563                                    | NR                             | 650               | 571                                    | NR                             | 780               | 12                                     | NR                             | 910               | 0                                      | NR                             |
| 395               | 2                                      | NR                             | 525               | 588                                    | NR                             | 655               | 512                                    | NR                             | 785               | 10                                     | NR                             | 915               | 0                                      | NR                             |
| 400               | 3                                      | NR                             | 530               | 609                                    | NR                             | 660               | 453                                    | NR                             | 790               | 8                                      | NR                             | 920               | 0                                      | NR                             |
| 405               | 5                                      | NR                             | 535               | 631                                    | NR                             | 665               | 401                                    | NR                             | 795               | 7                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 8                                      | NR                             | 540               | 654                                    | NR                             | 670               | 351                                    | NR                             | 800               | 6                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 13                                     | NR                             | 545               | 677                                    | NR                             | 675               | 306                                    | NR                             | 805               | 5                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 23                                     | NR                             | 550               | 702                                    | NR                             | 680               | 267                                    | NR                             | 810               | 5                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 40                                     | NR                             | 555               | 734                                    | NR                             | 685               | 230                                    | NR                             | 815               | 4                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 70                                     | NR                             | 560               | 767                                    | NR                             | 690               | 199                                    | NR                             | 820               | 4                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 126                                    | NR                             | 565               | 802                                    | NR                             | 695               | 171                                    | NR                             | 825               | 3                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 221                                    | NR                             | 570               | 838                                    | NR                             | 700               | 146                                    | NR                             | 830               | 3                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 418                                    | NR                             | 575               | 875                                    | NR                             | 705               | 125                                    | NR                             | 835               | 2                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 729                                    | NR                             | 580               | 913                                    | NR                             | 710               | 107                                    | NR                             | 840               | 2                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 816                                    | NR                             | 585               | 946                                    | NR                             | 715               | 90                                     | NR                             | 845               | 2                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 578                                    | NR                             | 590               | 976                                    | NR                             | 720               | 77                                     | NR                             | 850               | 1                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 458                                    | NR                             | 595               | 992                                    | NR                             | 725               | 66                                     | NR                             | 855               | 1                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 390                                    | NR                             | 600               | 999                                    | NR                             | 730               | 56                                     | NR                             | 860               | 1                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 299                                    | NR                             | 605               | 995                                    | NR                             | 735               | 47                                     | NR                             | 865               | 1                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 260                                    | NR                             | 610               | 975                                    | NR                             | 740               | 40                                     | NR                             | 870               | 1                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 271                                    | NR                             | 615               | 948                                    | NR                             | 745               | 34                                     | NR                             | 875               | 1                                      | NR                             |                   |                                        |                                |

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### Scotopic Flux vs. Wavelength



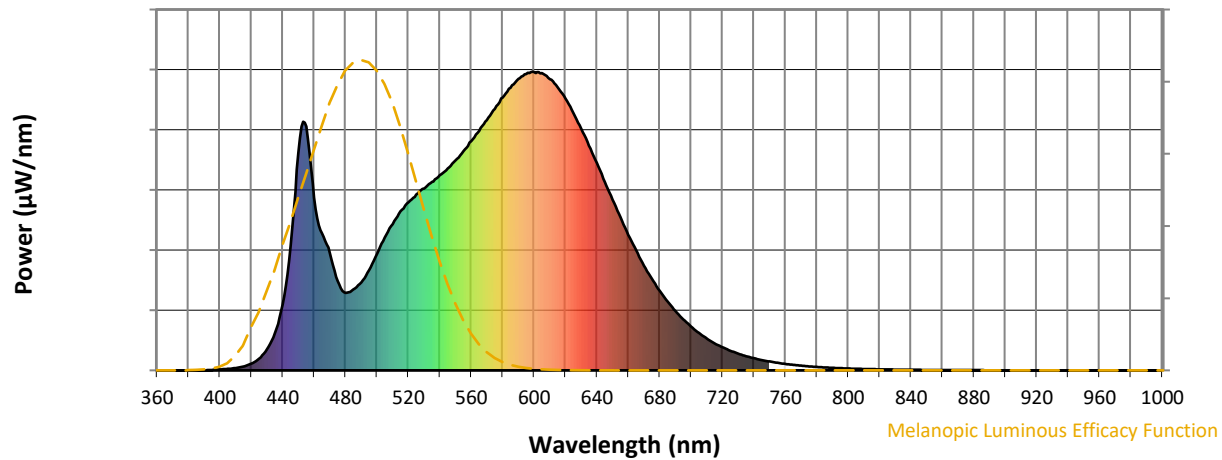
Scotopic Lumens: NR

S/P: 1.53

| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 295                         | NR               | 620       | 910                         | NR               | 750       | 30                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 335                         | NR               | 625       | 862                         | NR               | 755       | 25                          | NR               | 885       | 1                           | NR               |
| 370       | 0                           | NR               | 500       | 390                         | NR               | 630       | 809                         | NR               | 760       | 21                          | NR               | 890       | 1                           | NR               |
| 375       | 0                           | NR               | 505       | 445                         | NR               | 635       | 752                         | NR               | 765       | 18                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 490                         | NR               | 640       | 694                         | NR               | 770       | 16                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 532                         | NR               | 645       | 630                         | NR               | 775       | 13                          | NR               | 905       | 0                           | NR               |
| 390       | 0                           | NR               | 520       | 563                         | NR               | 650       | 571                         | NR               | 780       | 12                          | NR               | 910       | 0                           | NR               |
| 395       | 2                           | NR               | 525       | 588                         | NR               | 655       | 512                         | NR               | 785       | 10                          | NR               | 915       | 0                           | NR               |
| 400       | 3                           | NR               | 530       | 609                         | NR               | 660       | 453                         | NR               | 790       | 8                           | NR               | 920       | 0                           | NR               |
| 405       | 5                           | NR               | 535       | 631                         | NR               | 665       | 401                         | NR               | 795       | 7                           | NR               | 925       | 0                           | NR               |
| 410       | 8                           | NR               | 540       | 654                         | NR               | 670       | 351                         | NR               | 800       | 6                           | NR               | 930       | 0                           | NR               |
| 415       | 13                          | NR               | 545       | 677                         | NR               | 675       | 306                         | NR               | 805       | 5                           | NR               | 935       | 0                           | NR               |
| 420       | 23                          | NR               | 550       | 702                         | NR               | 680       | 267                         | NR               | 810       | 5                           | NR               | 940       | 0                           | NR               |
| 425       | 40                          | NR               | 555       | 734                         | NR               | 685       | 230                         | NR               | 815       | 4                           | NR               | 945       | 0                           | NR               |
| 430       | 70                          | NR               | 560       | 767                         | NR               | 690       | 199                         | NR               | 820       | 4                           | NR               | 950       | 0                           | NR               |
| 435       | 126                         | NR               | 565       | 802                         | NR               | 695       | 171                         | NR               | 825       | 3                           | NR               | 955       | 0                           | NR               |
| 440       | 221                         | NR               | 570       | 838                         | NR               | 700       | 146                         | NR               | 830       | 3                           | NR               | 960       | 0                           | NR               |
| 445       | 418                         | NR               | 575       | 875                         | NR               | 705       | 125                         | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 729                         | NR               | 580       | 913                         | NR               | 710       | 107                         | NR               | 840       | 2                           | NR               | 970       | 0                           | NR               |
| 455       | 816                         | NR               | 585       | 946                         | NR               | 715       | 90                          | NR               | 845       | 2                           | NR               | 975       | 0                           | NR               |
| 460       | 578                         | NR               | 590       | 976                         | NR               | 720       | 77                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 458                         | NR               | 595       | 992                         | NR               | 725       | 66                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 390                         | NR               | 600       | 999                         | NR               | 730       | 56                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 299                         | NR               | 605       | 995                         | NR               | 735       | 47                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 260                         | NR               | 610       | 975                         | NR               | 740       | 40                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 271                         | NR               | 615       | 948                         | NR               | 745       | 34                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 3.07

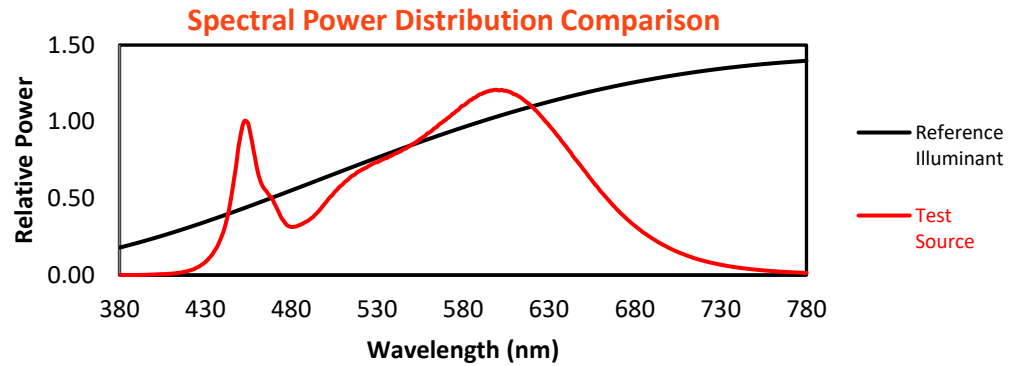
| λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 295                         | NR               | 620       | 910                         | NR               | 750       | 30                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 335                         | NR               | 625       | 862                         | NR               | 755       | 25                          | NR               | 885       | 1                           | NR               |
| 370       | 0                           | NR               | 500       | 390                         | NR               | 630       | 809                         | NR               | 760       | 21                          | NR               | 890       | 1                           | NR               |
| 375       | 0                           | NR               | 505       | 445                         | NR               | 635       | 752                         | NR               | 765       | 18                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 490                         | NR               | 640       | 694                         | NR               | 770       | 16                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 532                         | NR               | 645       | 630                         | NR               | 775       | 13                          | NR               | 905       | 0                           | NR               |
| 390       | 0                           | NR               | 520       | 563                         | NR               | 650       | 571                         | NR               | 780       | 12                          | NR               | 910       | 0                           | NR               |
| 395       | 2                           | NR               | 525       | 588                         | NR               | 655       | 512                         | NR               | 785       | 10                          | NR               | 915       | 0                           | NR               |
| 400       | 3                           | NR               | 530       | 609                         | NR               | 660       | 453                         | NR               | 790       | 8                           | NR               | 920       | 0                           | NR               |
| 405       | 5                           | NR               | 535       | 631                         | NR               | 665       | 401                         | NR               | 795       | 7                           | NR               | 925       | 0                           | NR               |
| 410       | 8                           | NR               | 540       | 654                         | NR               | 670       | 351                         | NR               | 800       | 6                           | NR               | 930       | 0                           | NR               |
| 415       | 13                          | NR               | 545       | 677                         | NR               | 675       | 306                         | NR               | 805       | 5                           | NR               | 935       | 0                           | NR               |
| 420       | 23                          | NR               | 550       | 702                         | NR               | 680       | 267                         | NR               | 810       | 5                           | NR               | 940       | 0                           | NR               |
| 425       | 40                          | NR               | 555       | 734                         | NR               | 685       | 230                         | NR               | 815       | 4                           | NR               | 945       | 0                           | NR               |
| 430       | 70                          | NR               | 560       | 767                         | NR               | 690       | 199                         | NR               | 820       | 4                           | NR               | 950       | 0                           | NR               |
| 435       | 126                         | NR               | 565       | 802                         | NR               | 695       | 171                         | NR               | 825       | 3                           | NR               | 955       | 0                           | NR               |
| 440       | 221                         | NR               | 570       | 838                         | NR               | 700       | 146                         | NR               | 830       | 3                           | NR               | 960       | 0                           | NR               |
| 445       | 418                         | NR               | 575       | 875                         | NR               | 705       | 125                         | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 729                         | NR               | 580       | 913                         | NR               | 710       | 107                         | NR               | 840       | 2                           | NR               | 970       | 0                           | NR               |
| 455       | 816                         | NR               | 585       | 946                         | NR               | 715       | 90                          | NR               | 845       | 2                           | NR               | 975       | 0                           | NR               |
| 460       | 578                         | NR               | 590       | 976                         | NR               | 720       | 77                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 458                         | NR               | 595       | 992                         | NR               | 725       | 66                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 390                         | NR               | 600       | 999                         | NR               | 730       | 56                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 299                         | NR               | 605       | 995                         | NR               | 735       | 47                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 260                         | NR               | 610       | 975                         | NR               | 740       | 40                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 271                         | NR               | 615       | 948                         | NR               | 745       | 34                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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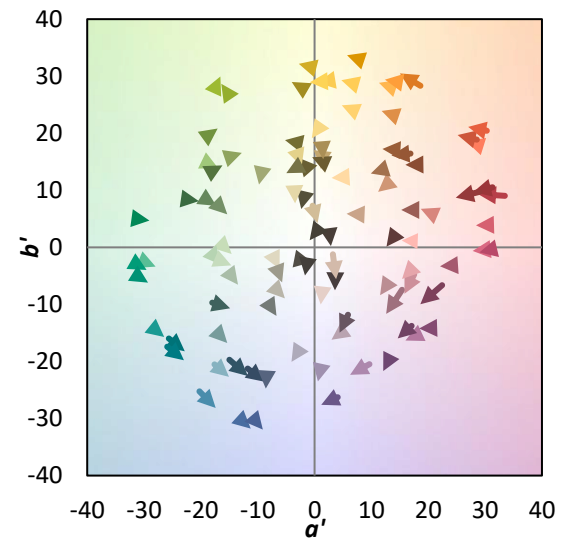
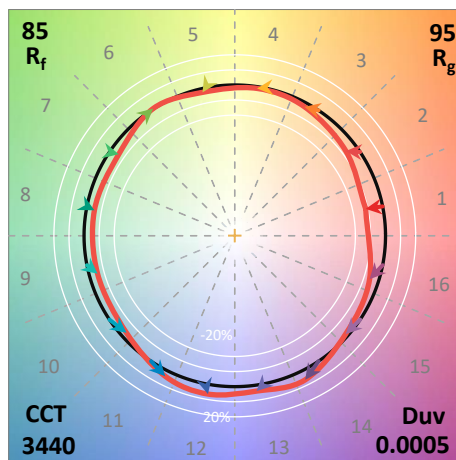
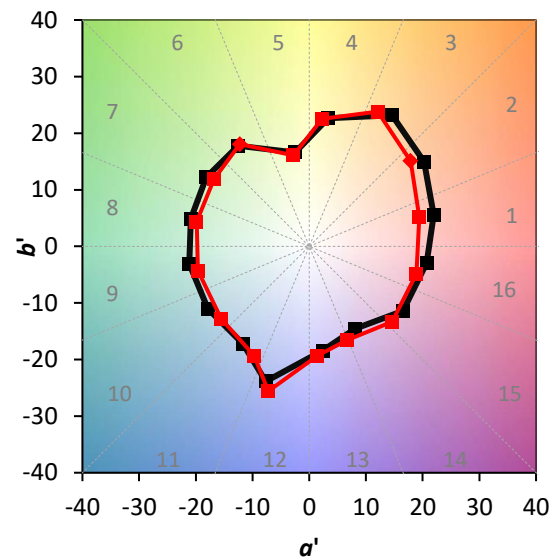
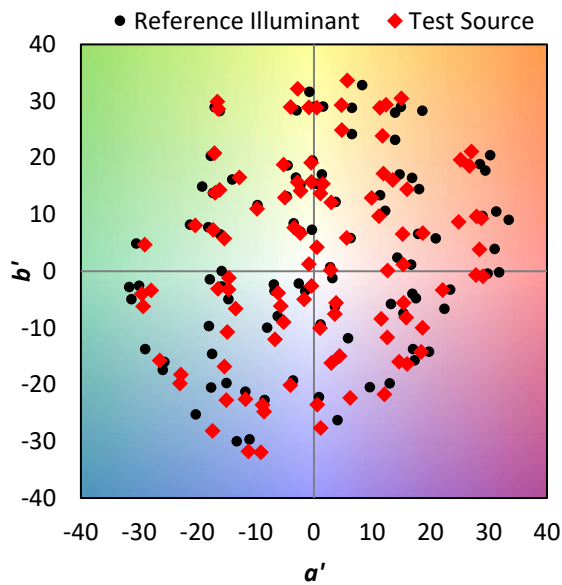
TM-30-18

### Summary

$R_f = 84.9$   
 $R_g = 94.6$   
 $\text{CIE } R_a = 84.2$   
 $R_9 = 13.6$

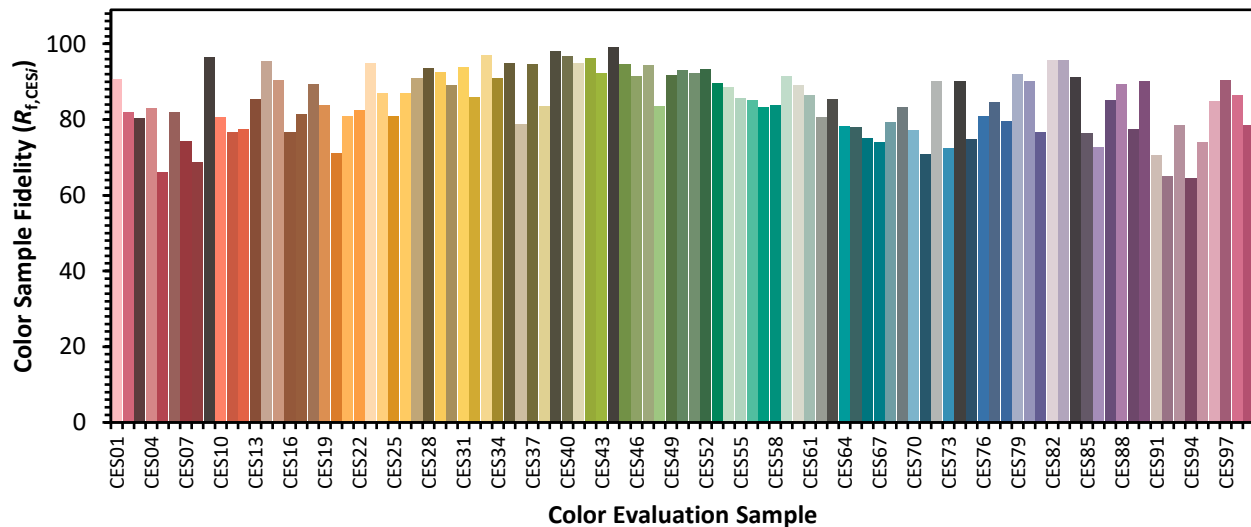


### Color Vector Graphics

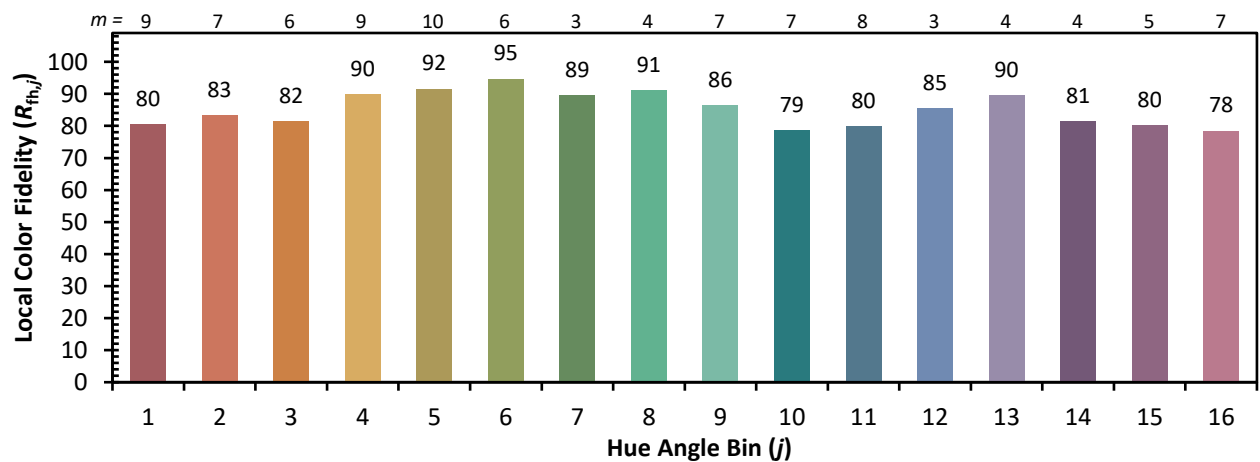
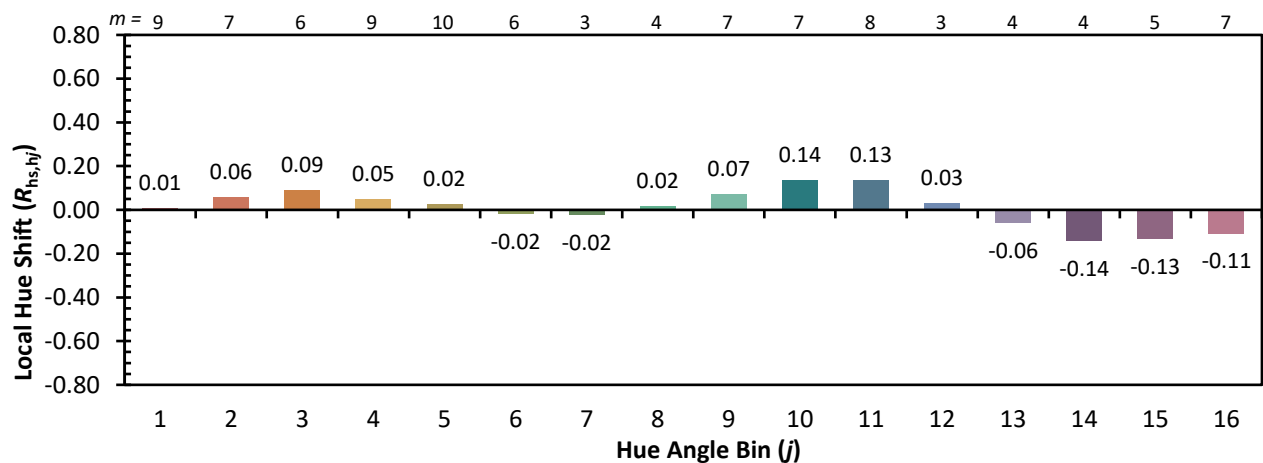
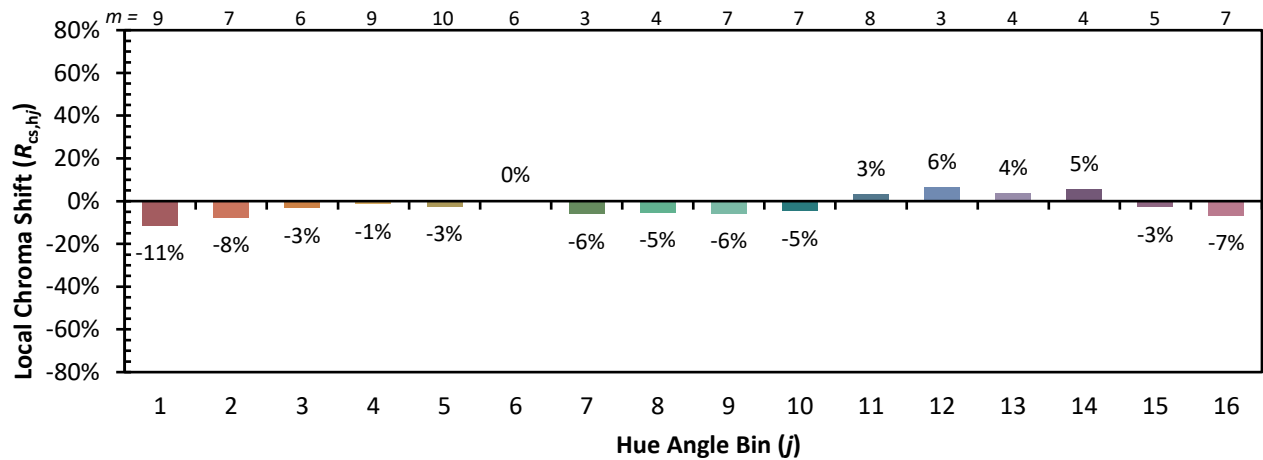


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

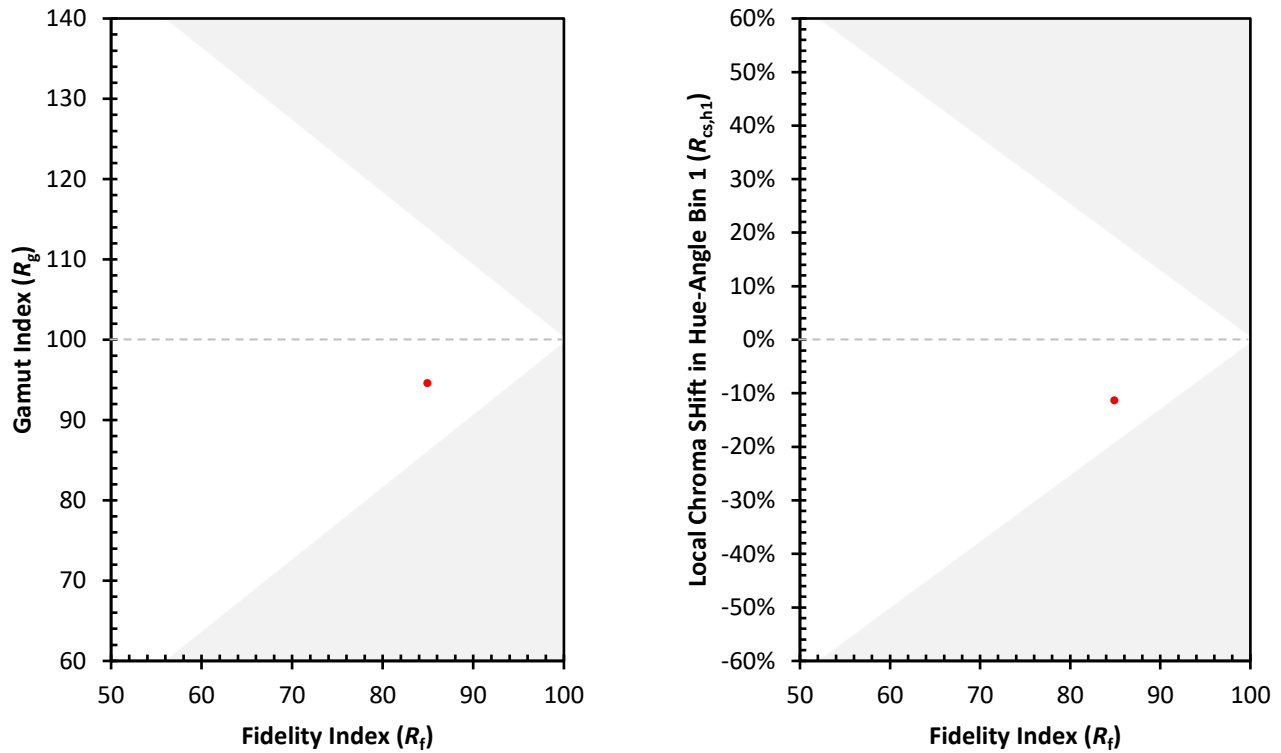
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 87 | CES51 = 92 | CES76 = 81 |
| CES02 = 62 | CES27 = 91 | CES52 = 93 | CES77 = 85 |
| CES03 = 31 | CES28 = 94 | CES53 = 90 | CES78 = 80 |
| CES04 = 70 | CES29 = 92 | CES54 = 89 | CES79 = 92 |
| CES05 = 49 | CES30 = 89 | CES55 = 86 | CES80 = 90 |
| CES06 = 51 | CES31 = 94 | CES56 = 85 | CES81 = 77 |
| CES07 = 41 | CES32 = 86 | CES57 = 83 | CES82 = 96 |
| CES08 = 40 | CES33 = 97 | CES58 = 84 | CES83 = 96 |
| CES09 = 29 | CES34 = 91 | CES59 = 91 | CES84 = 91 |
| CES10 = 75 | CES35 = 95 | CES60 = 89 | CES85 = 76 |
| CES11 = 58 | CES36 = 79 | CES61 = 87 | CES86 = 73 |
| CES12 = 64 | CES37 = 95 | CES62 = 81 | CES87 = 85 |
| CES13 = 43 | CES38 = 84 | CES63 = 85 | CES88 = 89 |
| CES14 = 74 | CES39 = 98 | CES64 = 78 | CES89 = 78 |
| CES15 = 71 | CES40 = 97 | CES65 = 78 | CES90 = 90 |
| CES16 = 47 | CES41 = 95 | CES66 = 75 | CES91 = 71 |
| CES17 = 50 | CES42 = 96 | CES67 = 74 | CES92 = 65 |
| CES18 = 56 | CES43 = 92 | CES68 = 79 | CES93 = 79 |
| CES19 = 72 | CES44 = 99 | CES69 = 83 | CES94 = 64 |
| CES20 = 66 | CES45 = 95 | CES70 = 77 | CES95 = 74 |
| CES21 = 86 | CES46 = 91 | CES71 = 71 | CES96 = 85 |
| CES22 = 78 | CES47 = 94 | CES72 = 90 | CES97 = 90 |
| CES23 = 92 | CES48 = 83 | CES73 = 72 | CES98 = 86 |
| CES24 = 90 | CES49 = 92 | CES74 = 90 | CES99 = 79 |
| CES25 = 72 | CES50 = 93 | CES75 = 75 |            |



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)