

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: P1217210

Luminaire Tested: 14-ID2-45-CNV-L835-U

Issue Date: 12/5/2025

**Test Information**

Test Method: LM-79-2019  
Report Number: P1217210  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2508-507-11)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/5/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: CORELITE  
Catalog Number: 14-ID2-45-CNV-L835-U  
Description: 1X4 IN DEPTH TROFFER WITH 2INCH CURVE DROP LENS  
Light Source: 3500K CCT, 80 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

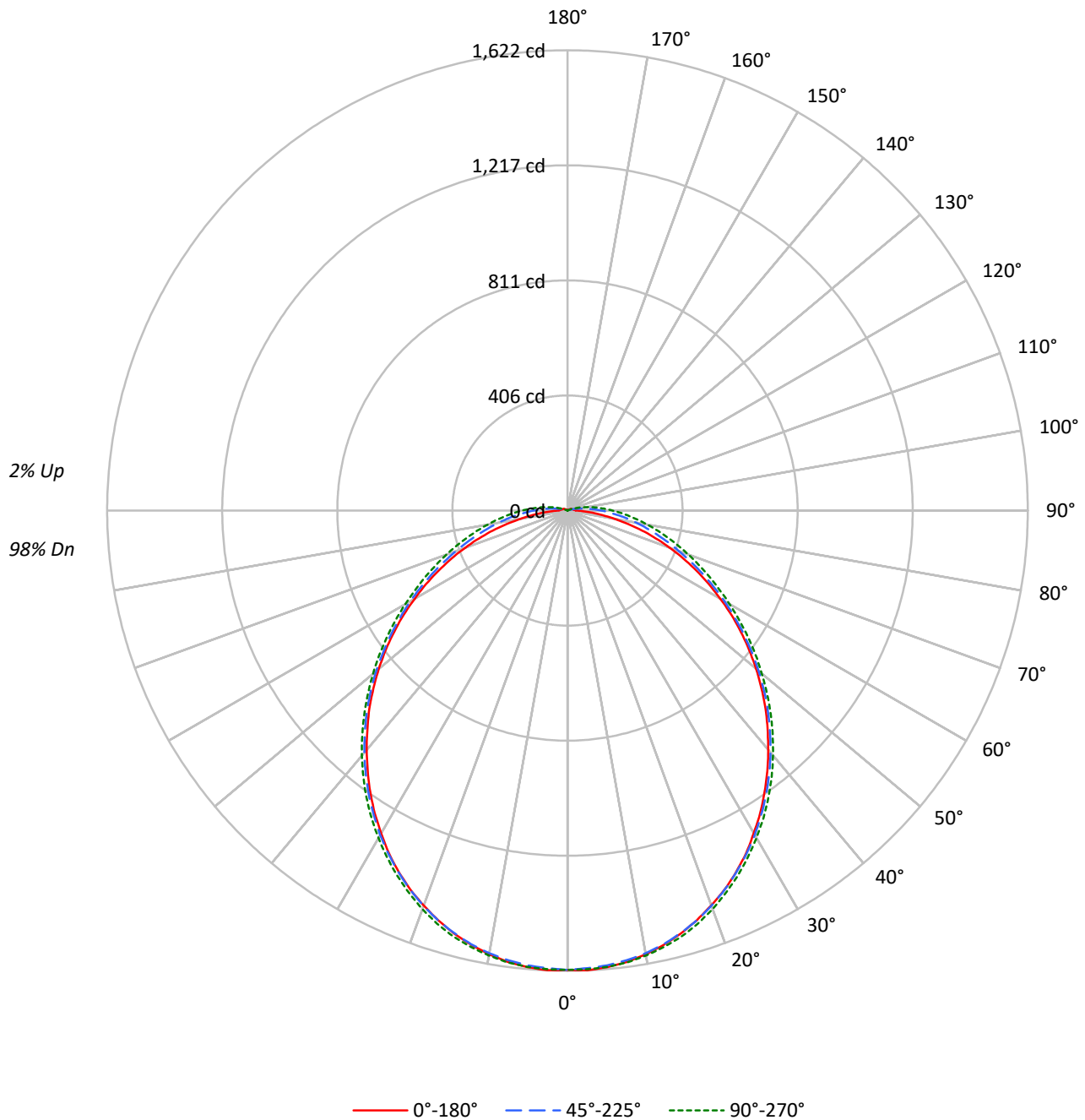
Lumens per Lamp: N/A  
Luminaire Lumens: 4607.0 lumens  
Efficiency: N/A  
Efficacy: 116.3 lumens/watt  
Spacing Criteria (0/90/45): 1.21 / 1.22 / 1.33  
Luminous Opening: Rectangular w/ Sides (W: 1' x L: 4' x H: 0.16')  
CIE Type: Direct

Input Watts (W): 39.6  
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



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### Luminous Intensity Polar Plot



TEST NUMBER: P1217210

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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   | 118 | 118 | 118 | 118 | 115 | 115 | 115 | 115 | 110 | 110 | 110 | 105 | 105 | 105 | 100 | 100 | 100 | 100 | 100 | 98 |
| 1   | 107 | 102 | 98  | 94  | 104 | 100 | 96  | 92  | 95  | 92  | 88  | 91  | 88  | 85  | 87  | 84  | 82  | 80  | 80  | 80 |
| 2   | 98  | 89  | 82  | 76  | 95  | 87  | 80  | 75  | 83  | 77  | 73  | 79  | 75  | 71  | 76  | 72  | 69  | 66  | 66  | 66 |
| 3   | 89  | 78  | 70  | 63  | 86  | 76  | 69  | 62  | 73  | 66  | 61  | 70  | 64  | 60  | 67  | 62  | 58  | 56  | 56  | 56 |
| 4   | 81  | 69  | 60  | 54  | 79  | 68  | 59  | 53  | 65  | 58  | 52  | 62  | 56  | 51  | 60  | 54  | 50  | 48  | 48  | 48 |
| 5   | 75  | 62  | 53  | 46  | 73  | 61  | 52  | 46  | 58  | 51  | 45  | 56  | 49  | 44  | 54  | 48  | 44  | 41  | 41  | 41 |
| 6   | 69  | 56  | 47  | 40  | 67  | 55  | 46  | 40  | 53  | 45  | 39  | 51  | 44  | 39  | 49  | 43  | 38  | 36  | 36  | 36 |
| 7   | 64  | 51  | 42  | 36  | 62  | 50  | 41  | 35  | 48  | 40  | 35  | 46  | 40  | 35  | 45  | 39  | 34  | 32  | 32  | 32 |
| 8   | 60  | 46  | 38  | 32  | 58  | 45  | 37  | 32  | 44  | 37  | 31  | 42  | 36  | 31  | 41  | 35  | 31  | 29  | 29  | 29 |
| 9   | 56  | 42  | 34  | 29  | 54  | 42  | 34  | 29  | 40  | 33  | 28  | 39  | 33  | 28  | 38  | 32  | 28  | 26  | 26  | 26 |
| 10  | 52  | 39  | 31  | 26  | 51  | 39  | 31  | 26  | 37  | 30  | 26  | 36  | 30  | 25  | 35  | 29  | 25  | 23  | 23  | 23 |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 4356 | 4356 | 4356 |
| 5°  | 4347 | 4292 | 4300 |
| 10° | 4308 | 4223 | 4232 |
| 15° | 4253 | 4137 | 4151 |
| 20° | 4180 | 4037 | 4045 |
| 25° | 4097 | 3920 | 3923 |
| 30° | 3987 | 3791 | 3789 |
| 35° | 3871 | 3648 | 3647 |
| 40° | 3741 | 3495 | 3490 |
| 45° | 3614 | 3331 | 3321 |
| 50° | 3466 | 3152 | 3143 |
| 55° | 3310 | 2957 | 2964 |
| 60° | 3130 | 2762 | 2781 |
| 65° | 2939 | 2558 | 2614 |
| 70° | 2718 | 2366 | 2476 |
| 75° | 2460 | 2219 | 2370 |
| 80° | 2123 | 2111 | 2322 |
| 85° | 1854 | 2075 | 2375 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3614 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 153.0  | 3.3       |
| 10°-20°   | 435.5  | 9.5       |
| 20°-30°   | 649.0  | 14.1      |
| 30°-40°   | 763.7  | 16.6      |
| 40°-50°   | 770.6  | 16.7      |
| 50°-60°   | 679.3  | 14.7      |
| 60°-70°   | 520.4  | 11.3      |
| 70°-80°   | 340.8  | 7.4       |
| 80°-90°   | 182.2  | 4.0       |
| 90°-100°  | 77.5   | 1.7       |
| 100°-110° | 24.7   | 0.5       |
| 110°-120° | 5.8    | 0.1       |
| 120°-130° | 2.6    | 0.1       |
| 130°-140° | 1.3    | 0.0       |
| 140°-150° | 0.5    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-30°    | 1237.5 | 26.9      |
| 0°-40°    | 2001.2 | 43.4      |
| 0°-60°    | 3451.1 | 74.9      |
| 0°-90°    | 4494.6 | 97.6      |
| 90°-120°  | 108.0  | 2.3       |
| 90°-150°  | 112.4  | 2.4       |
| 90°-180°  | 112.0  | 2.4       |
| 0°-180°   | 4607.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 1619 | 1619  | 1619 | 1619  | 1619 |      |
| 5°   | 1615 | 1612  | 1609 | 1609  | 1614 | 153  |
| 15°  | 1543 | 1541  | 1541 | 1548  | 1554 | 435  |
| 25°  | 1406 | 1403  | 1407 | 1414  | 1420 | 647  |
| 35°  | 1211 | 1211  | 1221 | 1231  | 1235 | 757  |
| 45°  | 988  | 988   | 999  | 1011  | 1012 | 761  |
| 55°  | 746  | 746   | 758  | 773   | 776  | 667  |
| 65°  | 501  | 503   | 524  | 543   | 551  | 497  |
| 75°  | 272  | 283   | 326  | 356   | 364  | 288  |
| 85°  | 88   | 120   | 176  | 209   | 218  | 88   |
| 90°  | 31   | 68    | 118  | 150   | 159  | 20   |
| 95°  | 26   | 35    | 73   | 101   | 110  | 20   |
| 105° | 18   | 14    | 16   | 31    | 37   | 19   |
| 115° | 12   | 9     | 5    | 0     | 0    | 12   |
| 125° | 7    | 5     | 2    | 0     | 0    | 7    |
| 135° | 4    | 3     | 2    | 0     | 0    | 3    |
| 145° | 2    | 2     | 0    | 0     | 0    | 1    |
| 155° | 0    | 0     | 0    | 0     | 0    | 0    |
| 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°     | 1618.7 | 1618.7 | 1618.7 | 1618.7 | 1618.7 |
| 2.5°   | 1621.8 | 1619.5 | 1614.1 | 1615.6 | 1617.9 |
| 5°     | 1614.8 | 1612.5 | 1608.6 | 1609.4 | 1614.1 |
| 7.5°   | 1604.8 | 1601.7 | 1598.6 | 1600.9 | 1606.3 |
| 10°    | 1587.7 | 1586.2 | 1583.9 | 1587.0 | 1592.4 |
| 12.5°  | 1567.6 | 1566.0 | 1565.3 | 1569.1 | 1575.3 |
| 15°    | 1542.8 | 1541.3 | 1541.3 | 1547.5 | 1553.7 |
| 17.5°  | 1514.2 | 1513.4 | 1514.9 | 1521.9 | 1526.5 |
| 20°    | 1480.9 | 1480.1 | 1482.4 | 1489.4 | 1494.8 |
| 22.5°  | 1446.0 | 1444.4 | 1446.8 | 1453.0 | 1458.4 |
| 25°    | 1405.7 | 1403.4 | 1407.3 | 1414.2 | 1419.7 |
| 27.5°  | 1362.4 | 1358.5 | 1364.7 | 1372.4 | 1377.1 |
| 30°    | 1312.8 | 1313.6 | 1319.8 | 1327.5 | 1332.1 |
| 32.5°  | 1264.0 | 1263.2 | 1271.0 | 1280.3 | 1284.9 |
| 35°    | 1211.3 | 1211.3 | 1220.6 | 1230.7 | 1234.6 |
| 37.5°  | 1156.3 | 1158.7 | 1168.0 | 1177.2 | 1181.9 |
| 40°    | 1100.6 | 1103.7 | 1113.0 | 1123.0 | 1126.9 |
| 42.5°  | 1043.3 | 1046.4 | 1056.4 | 1067.3 | 1070.4 |
| 45°    | 987.5  | 988.3  | 999.1  | 1010.7 | 1012.3 |
| 47.5°  | 927.1  | 927.9  | 939.5  | 951.1  | 953.4  |
| 50°    | 867.4  | 868.2  | 879.8  | 892.2  | 893.8  |
| 52.5°  | 807.0  | 807.8  | 817.9  | 832.6  | 835.7  |
| 55°    | 745.8  | 745.8  | 757.5  | 773.0  | 776.1  |
| 57.5°  | 684.7  | 684.7  | 697.1  | 713.3  | 717.2  |
| 60°    | 621.9  | 623.5  | 639.0  | 654.5  | 659.9  |
| 62.5°  | 561.5  | 563.1  | 580.1  | 596.4  | 603.3  |
| 65°    | 501.1  | 503.4  | 523.6  | 542.9  | 551.4  |
| 67.5°  | 442.2  | 445.3  | 468.6  | 493.4  | 501.1  |
| 70°    | 383.4  | 389.6  | 417.5  | 444.6  | 453.1  |
| 72.5°  | 326.8  | 333.8  | 371.0  | 399.6  | 407.4  |
| 75°    | 271.9  | 282.7  | 326.1  | 355.5  | 364.0  |
| 77.5°  | 218.4  | 234.7  | 284.2  | 316.0  | 323.7  |
| 80°    | 168.1  | 192.1  | 245.5  | 277.3  | 285.8  |
| 82.5°  | 125.5  | 152.6  | 209.9  | 242.4  | 250.2  |
| 85°    | 87.5   | 120.0  | 175.8  | 209.1  | 217.6  |
| 87.5°  | 56.5   | 92.2   | 145.6  | 178.1  | 187.4  |
| 90°    | 31.0   | 68.2   | 118.5  | 149.5  | 158.8  |
| 92.5°  | 27.9   | 49.6   | 94.5   | 123.9  | 133.2  |
| 95°    | 25.6   | 34.9   | 72.8   | 100.7  | 110.0  |
| 97.5°  | 23.2   | 23.2   | 54.2   | 79.8   | 88.3   |
| 100°   | 21.7   | 17.0   | 38.7   | 61.2   | 69.7   |
| 102.5° | 19.4   | 15.5   | 25.6   | 44.9   | 52.7   |
| 105°   | 17.8   | 13.9   | 15.5   | 31.0   | 37.2   |
| 107.5° | 16.3   | 12.4   | 7.7    | 19.4   | 24.8   |
| 110°   | 14.7   | 11.6   | 6.2    | 9.3    | 14.7   |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°   | 22.5° | 45° | 67.5° | 90° |
|--------|------|-------|-----|-------|-----|
| 112.5° | 13.2 | 10.1  | 5.4 | 2.3   | 5.4 |
| 115°   | 11.6 | 9.3   | 4.6 | 0.0   | 0.0 |
| 117.5° | 10.1 | 8.5   | 3.9 | 0.0   | 0.0 |
| 120°   | 9.3  | 7.0   | 3.9 | 0.0   | 0.0 |
| 122.5° | 8.5  | 6.2   | 3.1 | 0.0   | 0.0 |
| 125°   | 7.0  | 5.4   | 2.3 | 0.0   | 0.0 |
| 127.5° | 6.2  | 4.6   | 2.3 | 0.0   | 0.0 |
| 130°   | 5.4  | 4.6   | 1.5 | 0.0   | 0.0 |
| 132.5° | 4.6  | 3.9   | 1.5 | 0.0   | 0.0 |
| 135°   | 3.9  | 3.1   | 1.5 | 0.0   | 0.0 |
| 137.5° | 3.9  | 3.1   | 0.8 | 0.0   | 0.0 |
| 140°   | 3.1  | 2.3   | 0.8 | 0.0   | 0.0 |
| 142.5° | 2.3  | 1.5   | 0.8 | 0.0   | 0.0 |
| 145°   | 2.3  | 1.5   | 0.0 | 0.0   | 0.0 |
| 147.5° | 1.5  | 1.5   | 0.0 | 0.0   | 0.0 |
| 150°   | 1.5  | 0.8   | 0.0 | 0.0   | 0.0 |
| 152.5° | 0.0  | 0.0   | 0.0 | 0.0   | 0.0 |
| 155°   | 0.0  | 0.0   | 0.0 | 0.0   | 0.0 |
| 157.5° | 0.0  | 0.0   | 0.0 | 0.0   | 0.0 |
| 160°   | 0.0  | 0.0   | 0.0 | 0.0   | 0.0 |
| 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 | 15.18            | 16.77 | 15.58 | 17.14 | 17.51 | 15.82          | 17.41 | 16.22 | 17.78 | 18.15 |
|                 | 3H   | 16.78            | 18.22 | 17.19 | 18.60 | 19.02 | 17.80          | 19.24 | 18.21 | 19.62 | 20.04 |
|                 | 4H   | 17.35            | 18.71 | 17.78 | 19.11 | 19.54 | 18.69          | 20.06 | 19.13 | 20.45 | 20.89 |
|                 | 6H   | 17.74            | 19.01 | 18.19 | 19.42 | 19.87 | 19.56          | 20.83 | 20.01 | 21.25 | 21.70 |
|                 | 8H   | 17.86            | 19.08 | 18.33 | 19.51 | 19.97 | 19.99          | 21.20 | 20.45 | 21.64 | 22.10 |
|                 | 12H  | 17.94            | 19.11 | 18.41 | 19.54 | 20.03 | 20.43          | 21.59 | 20.90 | 22.02 | 22.51 |
| 4H              | 2H   | 15.82            | 17.18 | 16.26 | 17.58 | 18.02 | 16.33          | 17.70 | 16.77 | 18.10 | 18.53 |
|                 | 3H   | 17.64            | 18.79 | 18.09 | 19.24 | 19.70 | 18.54          | 19.69 | 18.99 | 20.14 | 20.60 |
|                 | 4H   | 18.33            | 19.38 | 18.80 | 19.84 | 20.33 | 19.59          | 20.64 | 20.06 | 21.10 | 21.60 |
|                 | 6H   | 18.85            | 19.78 | 19.34 | 20.26 | 20.77 | 20.65          | 21.57 | 21.14 | 22.06 | 22.57 |
|                 | 8H   | 19.02            | 19.89 | 19.52 | 20.38 | 20.90 | 21.16          | 22.03 | 21.66 | 22.52 | 23.04 |
|                 | 12H  | 19.15            | 19.94 | 19.67 | 20.45 | 20.98 | 21.71          | 22.49 | 22.22 | 23.01 | 23.54 |
| 8H              | 4H   | 18.76            | 19.62 | 19.25 | 20.11 | 20.63 | 19.87          | 20.73 | 20.36 | 21.22 | 21.74 |
|                 | 6H   | 19.43            | 20.16 | 19.96 | 20.69 | 21.22 | 21.09          | 21.82 | 21.62 | 22.35 | 22.88 |
|                 | 8H   | 19.68            | 20.34 | 20.23 | 20.89 | 21.43 | 21.73          | 22.39 | 22.28 | 22.94 | 23.48 |
|                 | 12H  | 19.89            | 20.48 | 20.43 | 21.01 | 21.62 | 22.45          | 23.03 | 22.99 | 23.56 | 24.18 |
| 12H             | 4H   | 18.85            | 19.63 | 19.37 | 20.15 | 20.68 | 19.89          | 20.67 | 20.41 | 21.19 | 21.72 |
|                 | 6H   | 19.58            | 20.24 | 20.13 | 20.79 | 21.33 | 21.14          | 21.81 | 21.69 | 22.35 | 22.89 |
|                 | 8H   | 19.92            | 20.50 | 20.46 | 21.04 | 21.65 | 21.87          | 22.45 | 22.41 | 22.98 | 23.60 |

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

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| 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



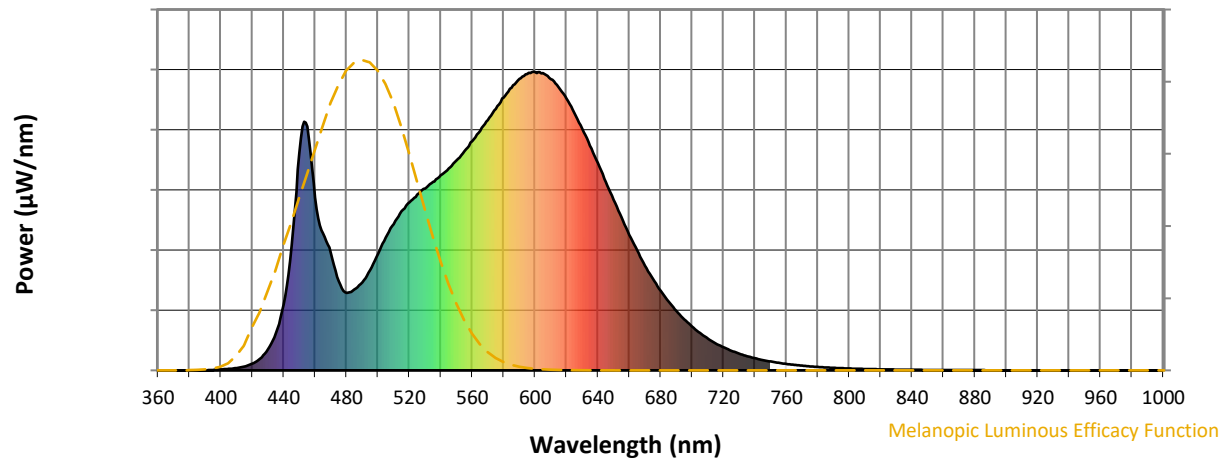
Scotopic Lumens: NR

S/P: 1.53

| λ (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    | 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

| $\lambda$<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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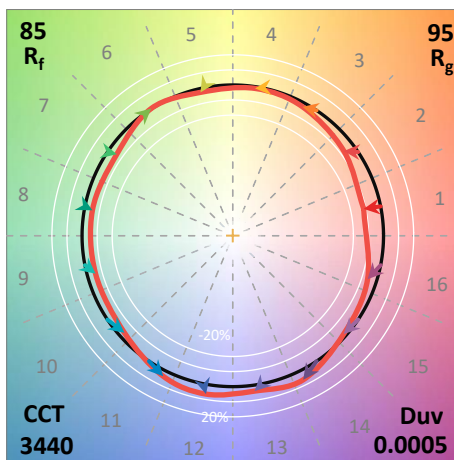
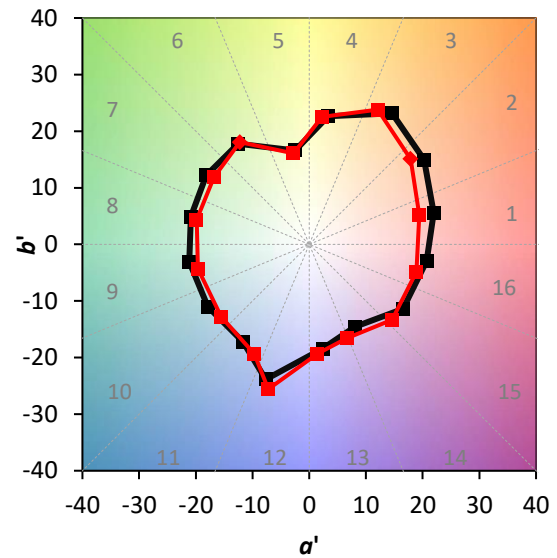
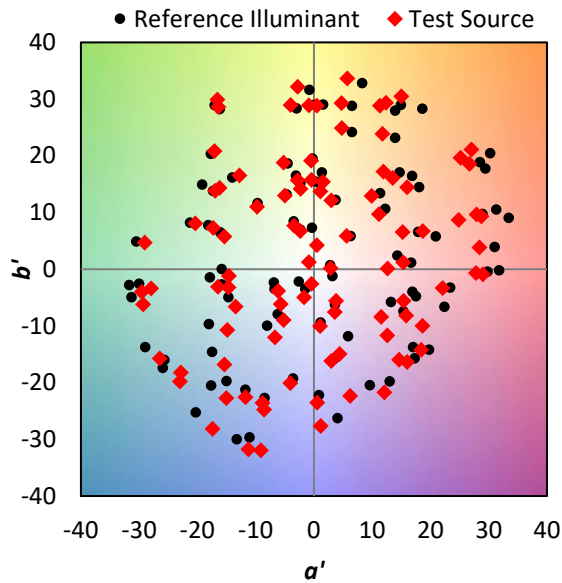
TM-30-18

### Summary

$R_f = 84.9$   
 $R_g = 94.6$   
 $CIE R_a = 84.2$   
 $R_9 = 13.6$



### 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)