

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State  
Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: FAIL-SAFE

Report Number: P735679

Luminaire Tested: **22APR-34-B2750-W2D-CP125-3000K**

Issue Date: 1/5/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P735679  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P708781)  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 1/5/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: FAIL-SAFE  
Catalog Number: 22APR-34-B2750-W2D-CP125-3000K  
Description: 2X2 3400 AMBIENT LUMEN OUTPUT APR TROFFER WITH BIO UP LEDS AT 3000K CCT, AND CP125 LENS

Light Source: -  
Ballast/Driver: -

**Summary**

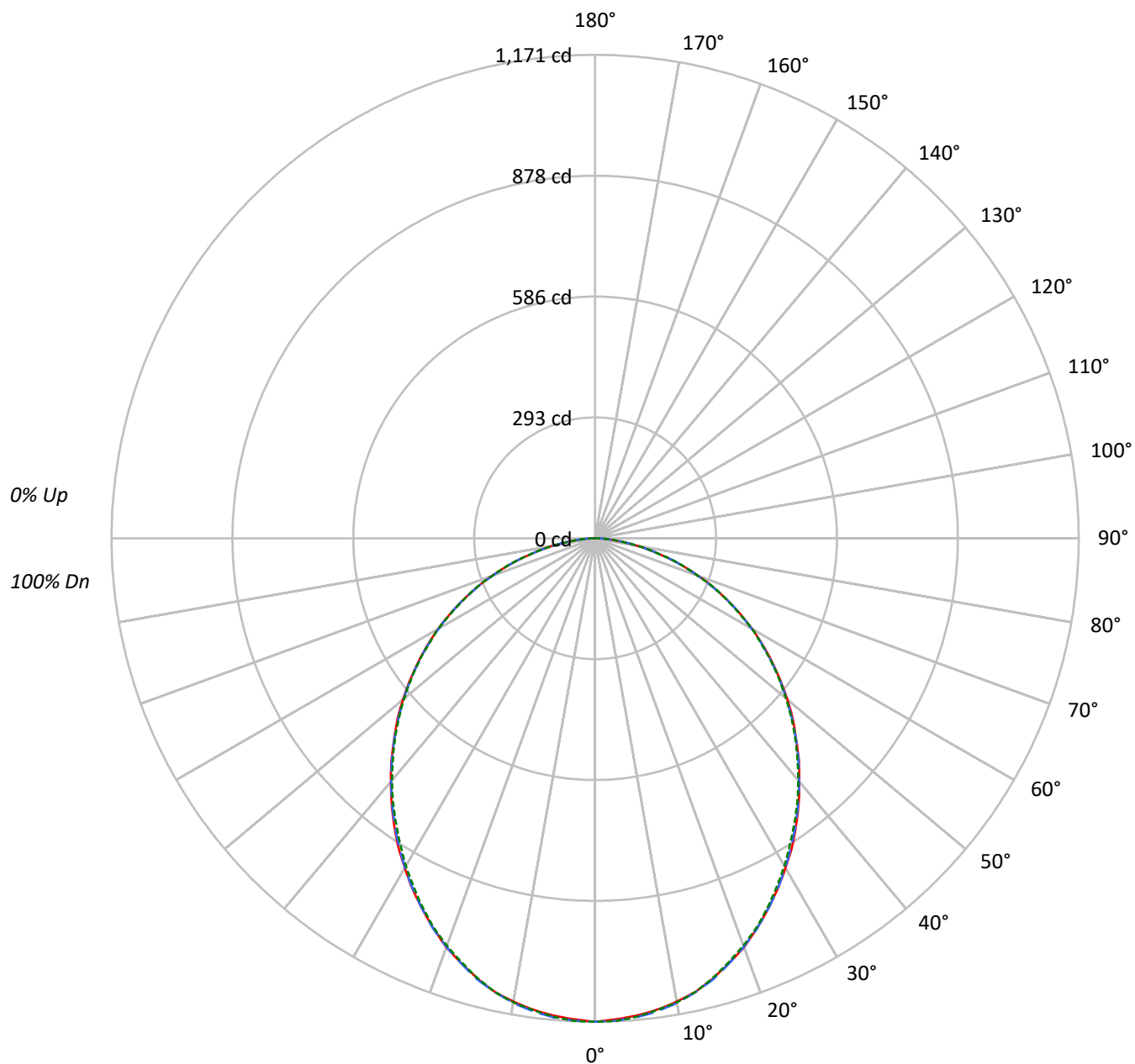
Lumens per Lamp: N/A  
Luminaire Lumens: 2992.0 lumens  
Efficiency: N/A  
Efficacy: 78.7 lumens/watt  
Spacing Criteria (0/90/45): 1.18 / 1.17 / 1.29  
Luminous Opening: Rectangular (W 2' x L: 2' x H: 0')  
CIE Type: Direct

Input Watts (W): 38  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

TEST NUMBER: P735679

CATALOG NUMBER: 22APR-34-B2750-W2D-CP125-3000K

### Luminous Intensity Polar Plot





TEST NUMBER: P735679

CATALOG NUMBER: 22APR-34-B2750-W2D-CP125-3000K

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

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     |     | 20  |     |     |     |     | 20  |     |     |     |    | 20 |
| RC  | 80  |     |     |     | 70  |     |     |     |     | 50  |     |     |     |     | 30  |     |     |     |    | 10 |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30 | 10 |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
| 0   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 100 |    |    |
| 1   | 109 | 104 | 100 | 96  | 106 | 102 | 98  | 95  | 98  | 95  | 92  | 94  | 91  | 89  | 90  | 88  | 86  | 84  |    |    |
| 2   | 99  | 91  | 85  | 79  | 97  | 89  | 83  | 78  | 86  | 81  | 76  | 83  | 78  | 74  | 80  | 76  | 73  | 71  |    |    |
| 3   | 91  | 80  | 72  | 66  | 88  | 79  | 71  | 65  | 76  | 69  | 64  | 73  | 68  | 63  | 71  | 66  | 62  | 60  |    |    |
| 4   | 83  | 71  | 63  | 56  | 81  | 70  | 62  | 56  | 68  | 61  | 55  | 65  | 59  | 54  | 63  | 58  | 53  | 51  |    |    |
| 5   | 77  | 64  | 55  | 49  | 75  | 63  | 54  | 48  | 61  | 53  | 48  | 59  | 52  | 47  | 57  | 51  | 47  | 45  |    |    |
| 6   | 71  | 58  | 49  | 43  | 69  | 57  | 48  | 42  | 55  | 47  | 42  | 53  | 47  | 42  | 52  | 46  | 41  | 39  |    |    |
| 7   | 66  | 52  | 44  | 38  | 64  | 52  | 43  | 38  | 50  | 43  | 37  | 49  | 42  | 37  | 47  | 41  | 37  | 35  |    |    |
| 8   | 61  | 48  | 39  | 34  | 60  | 47  | 39  | 34  | 46  | 39  | 33  | 45  | 38  | 33  | 43  | 37  | 33  | 31  |    |    |
| 9   | 57  | 44  | 36  | 30  | 56  | 43  | 36  | 30  | 42  | 35  | 30  | 41  | 35  | 30  | 40  | 34  | 30  | 28  |    |    |
| 10  | 54  | 41  | 33  | 28  | 53  | 40  | 33  | 28  | 39  | 32  | 27  | 38  | 32  | 27  | 37  | 31  | 27  | 25  |    |    |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3151 | 3151 | 3151 |
| 5°  | 3135 | 3146 | 3142 |
| 10° | 3114 | 3123 | 3118 |
| 15° | 3074 | 3080 | 3071 |
| 20° | 3018 | 3015 | 3006 |
| 25° | 2942 | 2942 | 2932 |
| 30° | 2865 | 2862 | 2847 |
| 35° | 2787 | 2780 | 2763 |
| 40° | 2702 | 2699 | 2688 |
| 45° | 2619 | 2616 | 2607 |
| 50° | 2543 | 2532 | 2526 |
| 55° | 2455 | 2443 | 2443 |
| 60° | 2363 | 2355 | 2359 |
| 65° | 2240 | 2245 | 2230 |
| 70° | 2094 | 2081 | 2081 |
| 75° | 1866 | 1876 | 1876 |
| 80° | 1579 | 1579 | 1592 |
| 85° | 1198 | 1198 | 1223 |



TEST NUMBER: P735679

CATALOG NUMBER: 22APR-34-B2750-W2D-CP125-3000K

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 110.4  | 3.7       |
| 10°-20°   | 311.2  | 10.4      |
| 20°-30°   | 456.3  | 15.2      |
| 30°-40°   | 529.3  | 17.7      |
| 40°-50°   | 530.7  | 17.7      |
| 50°-60°   | 466.7  | 15.6      |
| 60°-70°   | 348.3  | 11.6      |
| 70°-80°   | 191.7  | 6.4       |
| 80°-90°   | 47.4   | 1.6       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-30°    | 877.9  | 29.3      |
| 0°-40°    | 1407.2 | 47.0      |
| 0°-60°    | 2404.6 | 80.4      |
| 0°-90°    | 2992.0 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 2992.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|-----|------|-------|------|-------|------|------|
| 0°  | 1171 | 1171  | 1171 | 1171  | 1171 |      |
| 5°  | 1161 | 1165  | 1165 | 1165  | 1163 | 110  |
| 15° | 1103 | 1108  | 1106 | 1104  | 1102 | 311  |
| 25° | 991  | 995   | 991  | 990   | 988  | 456  |
| 35° | 848  | 849   | 846  | 844   | 841  | 531  |
| 45° | 688  | 691   | 688  | 687   | 685  | 532  |
| 55° | 523  | 524   | 521  | 522   | 521  | 468  |
| 65° | 352  | 352   | 353  | 351   | 350  | 349  |
| 75° | 180  | 180   | 180  | 179   | 180  | 192  |
| 85° | 39   | 40    | 39   | 39    | 40   | 47   |
| 90° | 0    | 0     | 0    | 0     | 0    |      |



TEST NUMBER: P735679

CATALOG NUMBER: 22APR-34-B2750-W2D-CP125-3000K

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|-------|--------|--------|--------|--------|--------|
| 0°    | 1171.1 | 1171.1 | 1171.1 | 1171.1 | 1171.1 |
| 2.5°  | 1166.2 | 1170.3 | 1169.4 | 1172.0 | 1170.3 |
| 5°    | 1160.6 | 1164.7 | 1164.7 | 1164.7 | 1163.0 |
| 7.5°  | 1151.7 | 1155.7 | 1155.7 | 1155.7 | 1152.5 |
| 10°   | 1139.6 | 1143.7 | 1142.9 | 1142.9 | 1141.2 |
| 12.5° | 1125.1 | 1127.5 | 1125.8 | 1125.8 | 1125.1 |
| 15°   | 1103.3 | 1108.0 | 1105.6 | 1104.0 | 1102.4 |
| 17.5° | 1078.9 | 1083.8 | 1079.7 | 1078.9 | 1076.5 |
| 20°   | 1053.9 | 1057.1 | 1053.0 | 1053.0 | 1049.8 |
| 22.5° | 1023.1 | 1026.3 | 1023.9 | 1022.4 | 1020.7 |
| 25°   | 990.8  | 994.8  | 990.8  | 989.9  | 987.5  |
| 27.5° | 957.6  | 960.8  | 956.7  | 953.5  | 952.0  |
| 30°   | 922.0  | 924.4  | 921.2  | 918.8  | 916.3  |
| 32.5° | 887.2  | 887.2  | 884.0  | 881.6  | 878.4  |
| 35°   | 848.4  | 849.3  | 846.1  | 843.5  | 841.2  |
| 37.5° | 809.7  | 811.2  | 808.0  | 805.6  | 803.9  |
| 40°   | 769.2  | 770.8  | 768.4  | 765.9  | 765.2  |
| 42.5° | 730.3  | 730.3  | 728.8  | 726.3  | 724.7  |
| 45°   | 688.3  | 690.7  | 687.5  | 686.7  | 685.0  |
| 47.5° | 649.4  | 649.4  | 646.2  | 644.5  | 644.5  |
| 50°   | 607.5  | 609.0  | 604.9  | 604.1  | 603.4  |
| 52.5° | 565.3  | 564.5  | 563.7  | 563.0  | 562.1  |
| 55°   | 523.2  | 524.1  | 520.8  | 521.7  | 520.8  |
| 57.5° | 481.2  | 480.4  | 479.6  | 478.9  | 478.0  |
| 60°   | 439.1  | 438.4  | 437.6  | 436.7  | 438.4  |
| 62.5° | 395.5  | 396.3  | 393.9  | 396.3  | 393.1  |
| 65°   | 351.8  | 351.8  | 352.6  | 351.0  | 350.3  |
| 67.5° | 309.8  | 309.8  | 308.1  | 308.1  | 311.4  |
| 70°   | 266.2  | 266.9  | 264.5  | 267.7  | 264.5  |
| 72.5° | 223.2  | 224.0  | 223.2  | 222.4  | 224.0  |
| 75°   | 179.5  | 180.4  | 180.4  | 178.7  | 180.4  |
| 77.5° | 139.9  | 140.8  | 139.9  | 139.1  | 139.9  |
| 80°   | 101.9  | 102.7  | 101.9  | 101.0  | 102.7  |
| 82.5° | 67.9   | 68.7   | 67.9   | 67.9   | 68.7   |
| 85°   | 38.8   | 39.6   | 38.8   | 38.8   | 39.6   |
| 87.5° | 15.4   | 16.2   | 16.2   | 16.2   | 16.2   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



Report Generated By 670246072 / DESKTOP-50001EG





— 0°-180°    - - 45°-225°    - - - 90°-270°







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

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

METALUX

Report Number: SP1-2210-795-2

Test Date: 10/06/2022

Luminaire Tested: 9WP217084MDER4AM-3000K-315MA

Data in this report applies to families of products including 9WP217084MDER4AM-3000K.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2210-795-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/06/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: METALUX  
 Catalog Number: **9WP217084MDER4AM-3000K-315MA**  
 Description: METALUX

TUNABLE BOARD, 3000K-315MA, PROGRAMMED @ 2.6Vdc.

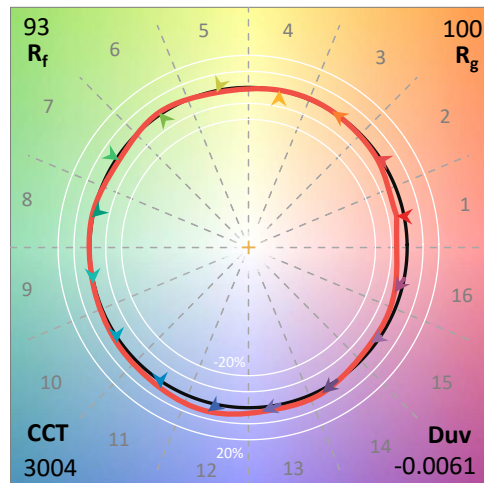
### Spectral Parameters

CCT (K): 3004  
 CIE  $u'$ : 0.2526  
 CIE  $v'$ : 0.5127  
 Duv: -0.0061  
 CIE x: 0.4279  
 CIE y: 0.3860  
 CIE z: 0.1861  
 Peak Wavelength (nm): 632  
 Dominant Wavelength (nm): 585  
 Purity: 44.5

CRI (Ra): 93.2

|     |      |      |      |
|-----|------|------|------|
| R1: | 98.5 | R9:  | 67.1 |
| R2: | 96.3 | R10: | 94.0 |
| R3: | 94.1 | R11: | 97.7 |
| R4: | 96.5 | R12: | 86.0 |
| R5: | 98.5 | R13: | 98.4 |
| R6: | 90.3 | R14: | 98.1 |
| R7: | 88.3 |      |      |
| R8: | 83.1 |      |      |

Rf: 92.5  
 Rg: 99.9



### Test Conditions

Stabilization Time: 53M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.0/38%  
 Sphere Temperature (°C): 24.4

REPORT NUMBER: SP1-2210-795-2

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 8/8/2022         | 2/8/2023             |
| Power Meter                    | XITRON 2801 IN0071    | 11/29/2021       | 11/29/2022           |
| AC Power Source                | CHROMA 61603 IN0063   | 11/29/2021       | 11/29/2022           |
| DC Power Source                | AGILENT E3634A IN0208 | 11/29/2021       | 11/29/2022           |
| Sphere Thermometer             | ONSET IN0085          | 11/29/2021       | 11/29/2022           |
| Room Thermometer               | ONSET IN0046          | 11/29/2021       | 11/29/2022           |

REPORT NUMBER: SP1-2210-795-2

**CIE 1931 Chromaticity Diagram**



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



Point lies outside the range

REPORT NUMBER: SP1-2210-795-2

**Photopic Flux vs. Wavelength**

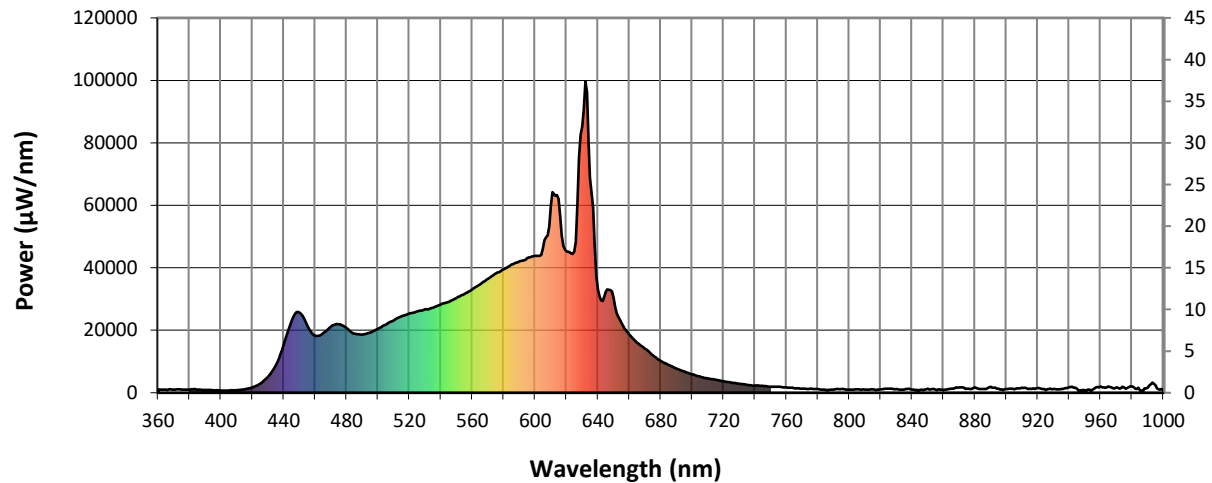


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1141             | NR               | 490       | 18648            | NR               | 620       | 45240            | NR               | 750       | 1949             | NR               | 880       | 1696             | NR               |
| 365       | 981              | NR               | 495       | 19266            | NR               | 625       | 45103            | NR               | 755       | 1928             | NR               | 885       | 1176             | NR               |
| 370       | 993              | NR               | 500       | 20501            | NR               | 630       | 85243            | NR               | 760       | 1686             | NR               | 890       | 1892             | NR               |
| 375       | 1026             | NR               | 505       | 21835            | NR               | 635       | 68928            | NR               | 765       | 1435             | NR               | 895       | 1303             | NR               |
| 380       | 1011             | NR               | 510       | 23128            | NR               | 640       | 33096            | NR               | 770       | 1270             | NR               | 900       | 1197             | NR               |
| 385       | 1002             | NR               | 515       | 24473            | NR               | 645       | 32437            | NR               | 775       | 1334             | NR               | 905       | 1148             | NR               |
| 390       | 868              | NR               | 520       | 25336            | NR               | 650       | 30398            | NR               | 780       | 1218             | NR               | 910       | 1595             | NR               |
| 395       | 834              | NR               | 525       | 26013            | NR               | 655       | 22347            | NR               | 785       | 928              | NR               | 915       | 1266             | NR               |
| 400       | 731              | NR               | 530       | 26667            | NR               | 660       | 18602            | NR               | 790       | 989              | NR               | 920       | 1495             | NR               |
| 405       | 725              | NR               | 535       | 27195            | NR               | 665       | 15938            | NR               | 795       | 1224             | NR               | 925       | 855              | NR               |
| 410       | 825              | NR               | 540       | 28268            | NR               | 670       | 14142            | NR               | 800       | 1005             | NR               | 930       | 1185             | NR               |
| 415       | 1102             | NR               | 545       | 29091            | NR               | 675       | 11970            | NR               | 805       | 1076             | NR               | 935       | 1186             | NR               |
| 420       | 1695             | NR               | 550       | 30262            | NR               | 680       | 10212            | NR               | 810       | 1018             | NR               | 940       | 1843             | NR               |
| 425       | 2899             | NR               | 555       | 31582            | NR               | 685       | 8911             | NR               | 815       | 1059             | NR               | 945       | 1344             | NR               |
| 430       | 5092             | NR               | 560       | 33069            | NR               | 690       | 7775             | NR               | 820       | 1047             | NR               | 950       | 827              | NR               |
| 435       | 8866             | NR               | 565       | 34747            | NR               | 695       | 6796             | NR               | 825       | 1259             | NR               | 955       | 984              | NR               |
| 440       | 15398            | NR               | 570       | 36451            | NR               | 700       | 5894             | NR               | 830       | 1151             | NR               | 960       | 1985             | NR               |
| 445       | 23004            | NR               | 575       | 38145            | NR               | 705       | 5150             | NR               | 835       | 1045             | NR               | 965       | 2009             | NR               |
| 450       | 25734            | NR               | 580       | 39543            | NR               | 710       | 4545             | NR               | 840       | 1037             | NR               | 970       | 1686             | NR               |
| 455       | 21534            | NR               | 585       | 41063            | NR               | 715       | 4197             | NR               | 845       | 888              | NR               | 975       | 1733             | NR               |
| 460       | 18246            | NR               | 590       | 42070            | NR               | 720       | 3650             | NR               | 850       | 1271             | NR               | 980       | 2039             | NR               |
| 465       | 18978            | NR               | 595       | 43067            | NR               | 725       | 3265             | NR               | 855       | 1028             | NR               | 985       | 919              | NR               |
| 470       | 21128            | NR               | 600       | 43863            | NR               | 730       | 2885             | NR               | 860       | 867              | NR               | 990       | 1621             | NR               |
| 475       | 21866            | NR               | 605       | 46127            | NR               | 735       | 2521             | NR               | 865       | 1316             | NR               | 995       | 2360             | NR               |
| 480       | 20628            | NR               | 610       | 59905            | NR               | 740       | 2317             | NR               | 870       | 1674             | NR               | 1000      | 905              | NR               |
| 485       | 18888            | NR               | 615       | 62018            | NR               | 745       | 2212             | NR               | 875       | 1299             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2210-795-2

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 3849.1**

**S/P: 1.53**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1141             | NR               | 490       | 18648            | NR               | 620       | 45240            | NR               | 750       | 1949             | NR               | 880       | 1696             | NR               |
| 365       | 981              | NR               | 495       | 19266            | NR               | 625       | 45103            | NR               | 755       | 1928             | NR               | 885       | 1176             | NR               |
| 370       | 993              | NR               | 500       | 20501            | NR               | 630       | 85243            | NR               | 760       | 1686             | NR               | 890       | 1892             | NR               |
| 375       | 1026             | NR               | 505       | 21835            | NR               | 635       | 68928            | NR               | 765       | 1435             | NR               | 895       | 1303             | NR               |
| 380       | 1011             | NR               | 510       | 23128            | NR               | 640       | 33096            | NR               | 770       | 1270             | NR               | 900       | 1197             | NR               |
| 385       | 1002             | NR               | 515       | 24473            | NR               | 645       | 32437            | NR               | 775       | 1334             | NR               | 905       | 1148             | NR               |
| 390       | 868              | NR               | 520       | 25336            | NR               | 650       | 30398            | NR               | 780       | 1218             | NR               | 910       | 1595             | NR               |
| 395       | 834              | NR               | 525       | 26013            | NR               | 655       | 22347            | NR               | 785       | 928              | NR               | 915       | 1266             | NR               |
| 400       | 731              | NR               | 530       | 26667            | NR               | 660       | 18602            | NR               | 790       | 989              | NR               | 920       | 1495             | NR               |
| 405       | 725              | NR               | 535       | 27195            | NR               | 665       | 15938            | NR               | 795       | 1224             | NR               | 925       | 855              | NR               |
| 410       | 825              | NR               | 540       | 28268            | NR               | 670       | 14142            | NR               | 800       | 1005             | NR               | 930       | 1185             | NR               |
| 415       | 1102             | NR               | 545       | 29091            | NR               | 675       | 11970            | NR               | 805       | 1076             | NR               | 935       | 1186             | NR               |
| 420       | 1695             | NR               | 550       | 30262            | NR               | 680       | 10212            | NR               | 810       | 1018             | NR               | 940       | 1843             | NR               |
| 425       | 2899             | NR               | 555       | 31582            | NR               | 685       | 8911             | NR               | 815       | 1059             | NR               | 945       | 1344             | NR               |
| 430       | 5092             | NR               | 560       | 33069            | NR               | 690       | 7775             | NR               | 820       | 1047             | NR               | 950       | 827              | NR               |
| 435       | 8866             | NR               | 565       | 34747            | NR               | 695       | 6796             | NR               | 825       | 1259             | NR               | 955       | 984              | NR               |
| 440       | 15398            | NR               | 570       | 36451            | NR               | 700       | 5894             | NR               | 830       | 1151             | NR               | 960       | 1985             | NR               |
| 445       | 23004            | NR               | 575       | 38145            | NR               | 705       | 5150             | NR               | 835       | 1045             | NR               | 965       | 2009             | NR               |
| 450       | 25734            | NR               | 580       | 39543            | NR               | 710       | 4545             | NR               | 840       | 1037             | NR               | 970       | 1686             | NR               |
| 455       | 21534            | NR               | 585       | 41063            | NR               | 715       | 4197             | NR               | 845       | 888              | NR               | 975       | 1733             | NR               |
| 460       | 18246            | NR               | 590       | 42070            | NR               | 720       | 3650             | NR               | 850       | 1271             | NR               | 980       | 2039             | NR               |
| 465       | 18978            | NR               | 595       | 43067            | NR               | 725       | 3265             | NR               | 855       | 1028             | NR               | 985       | 919              | NR               |
| 470       | 21128            | NR               | 600       | 43863            | NR               | 730       | 2885             | NR               | 860       | 867              | NR               | 990       | 1621             | NR               |
| 475       | 21866            | NR               | 605       | 46127            | NR               | 735       | 2521             | NR               | 865       | 1316             | NR               | 995       | 2360             | NR               |
| 480       | 20628            | NR               | 610       | 59905            | NR               | 740       | 2317             | NR               | 870       | 1674             | NR               | 1000      | 905              | NR               |
| 485       | 18888            | NR               | 615       | 62018            | NR               | 745       | 2212             | NR               | 875       | 1299             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2210-795-2

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1558.5**

**S/P: 0.62**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1141             | NR               | 490       | 18648            | NR               | 620       | 45240            | NR               | 750       | 1949             | NR               | 880       | 1696             | NR               |
| 365       | 981              | NR               | 495       | 19266            | NR               | 625       | 45103            | NR               | 755       | 1928             | NR               | 885       | 1176             | NR               |
| 370       | 993              | NR               | 500       | 20501            | NR               | 630       | 85243            | NR               | 760       | 1686             | NR               | 890       | 1892             | NR               |
| 375       | 1026             | NR               | 505       | 21835            | NR               | 635       | 68928            | NR               | 765       | 1435             | NR               | 895       | 1303             | NR               |
| 380       | 1011             | NR               | 510       | 23128            | NR               | 640       | 33096            | NR               | 770       | 1270             | NR               | 900       | 1197             | NR               |
| 385       | 1002             | NR               | 515       | 24473            | NR               | 645       | 32437            | NR               | 775       | 1334             | NR               | 905       | 1148             | NR               |
| 390       | 868              | NR               | 520       | 25336            | NR               | 650       | 30398            | NR               | 780       | 1218             | NR               | 910       | 1595             | NR               |
| 395       | 834              | NR               | 525       | 26013            | NR               | 655       | 22347            | NR               | 785       | 928              | NR               | 915       | 1266             | NR               |
| 400       | 731              | NR               | 530       | 26667            | NR               | 660       | 18602            | NR               | 790       | 989              | NR               | 920       | 1495             | NR               |
| 405       | 725              | NR               | 535       | 27195            | NR               | 665       | 15938            | NR               | 795       | 1224             | NR               | 925       | 855              | NR               |
| 410       | 825              | NR               | 540       | 28268            | NR               | 670       | 14142            | NR               | 800       | 1005             | NR               | 930       | 1185             | NR               |
| 415       | 1102             | NR               | 545       | 29091            | NR               | 675       | 11970            | NR               | 805       | 1076             | NR               | 935       | 1186             | NR               |
| 420       | 1695             | NR               | 550       | 30262            | NR               | 680       | 10212            | NR               | 810       | 1018             | NR               | 940       | 1843             | NR               |
| 425       | 2899             | NR               | 555       | 31582            | NR               | 685       | 8911             | NR               | 815       | 1059             | NR               | 945       | 1344             | NR               |
| 430       | 5092             | NR               | 560       | 33069            | NR               | 690       | 7775             | NR               | 820       | 1047             | NR               | 950       | 827              | NR               |
| 435       | 8866             | NR               | 565       | 34747            | NR               | 695       | 6796             | NR               | 825       | 1259             | NR               | 955       | 984              | NR               |
| 440       | 15398            | NR               | 570       | 36451            | NR               | 700       | 5894             | NR               | 830       | 1151             | NR               | 960       | 1985             | NR               |
| 445       | 23004            | NR               | 575       | 38145            | NR               | 705       | 5150             | NR               | 835       | 1045             | NR               | 965       | 2009             | NR               |
| 450       | 25734            | NR               | 580       | 39543            | NR               | 710       | 4545             | NR               | 840       | 1037             | NR               | 970       | 1686             | NR               |
| 455       | 21534            | NR               | 585       | 41063            | NR               | 715       | 4197             | NR               | 845       | 888              | NR               | 975       | 1733             | NR               |
| 460       | 18246            | NR               | 590       | 42070            | NR               | 720       | 3650             | NR               | 850       | 1271             | NR               | 980       | 2039             | NR               |
| 465       | 18978            | NR               | 595       | 43067            | NR               | 725       | 3265             | NR               | 855       | 1028             | NR               | 985       | 919              | NR               |
| 470       | 21128            | NR               | 600       | 43863            | NR               | 730       | 2885             | NR               | 860       | 867              | NR               | 990       | 1621             | NR               |
| 475       | 21866            | NR               | 605       | 46127            | NR               | 735       | 2521             | NR               | 865       | 1316             | NR               | 995       | 2360             | NR               |
| 480       | 20628            | NR               | 610       | 59905            | NR               | 740       | 2317             | NR               | 870       | 1674             | NR               | 1000      | 905              | NR               |
| 485       | 18888            | NR               | 615       | 62018            | NR               | 745       | 2212             | NR               | 875       | 1299             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2210-795-2

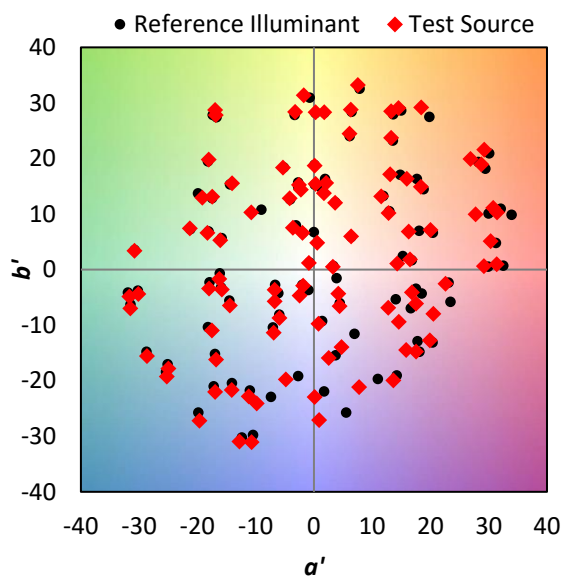
**TM-30-18**

**Summary**

$R_f = 92.5$   
 $R_g = 99.9$   
 CIE  $R_a = 93.2$   
 $R_g = 67.1$



**Color Vector Graphics**

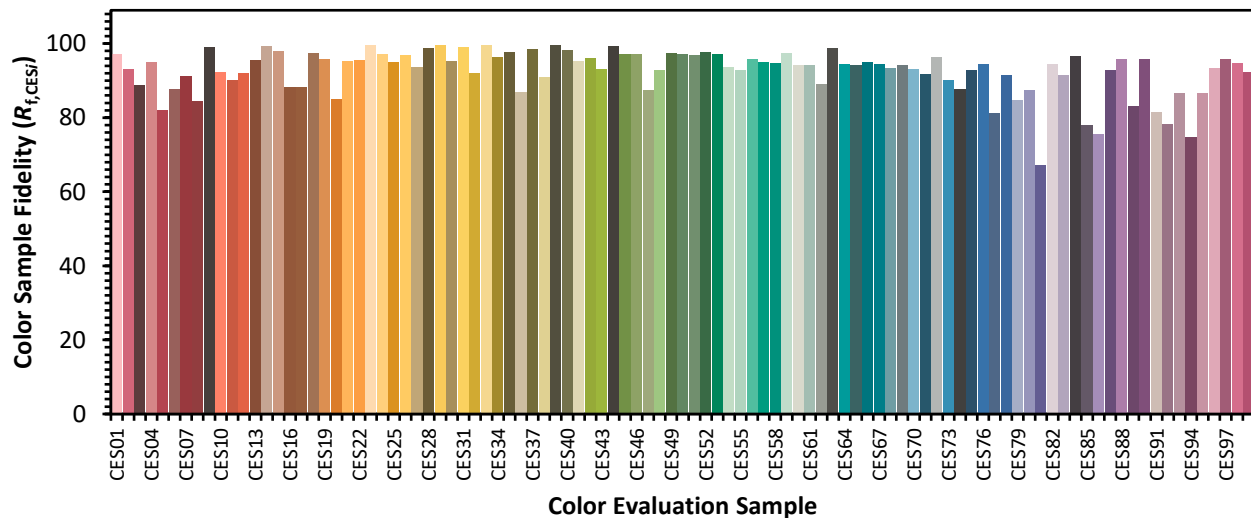


REPORT NUMBER: SP1-2210-795-2

TM-30-18

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

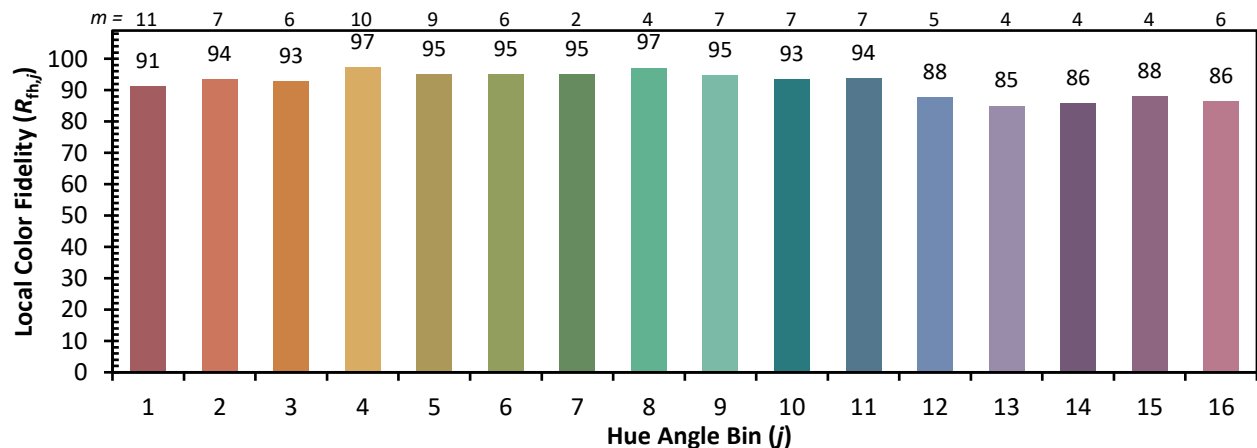
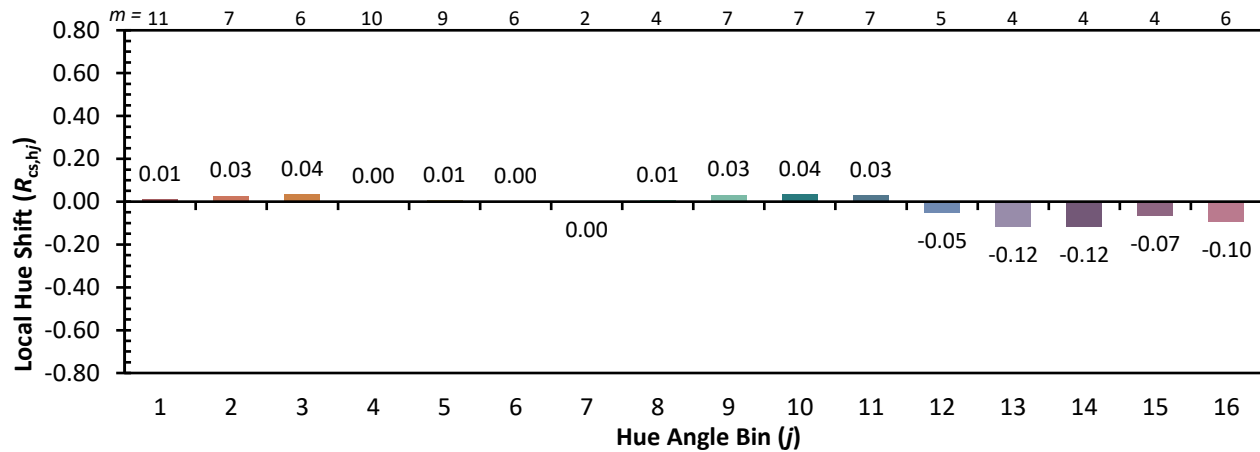
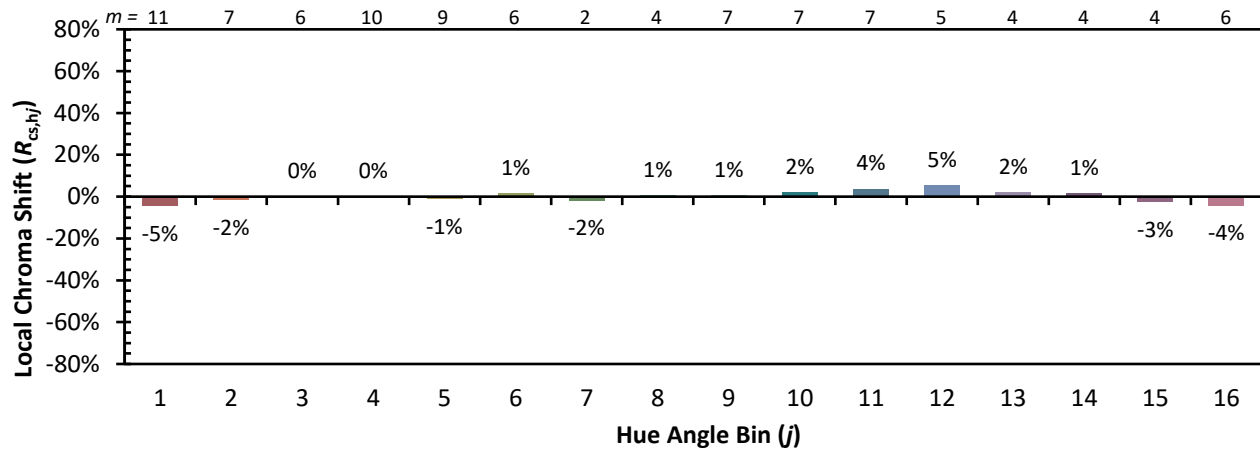
|            |             |            |            |
|------------|-------------|------------|------------|
| CES01 = 86 | CES26 = 97  | CES51 = 97 | CES76 = 94 |
| CES02 = 63 | CES27 = 93  | CES52 = 98 | CES77 = 81 |
| CES03 = 32 | CES28 = 99  | CES53 = 97 | CES78 = 91 |
| CES04 = 70 | CES29 = 99  | CES54 = 93 | CES79 = 85 |
| CES05 = 51 | CES30 = 95  | CES55 = 93 | CES80 = 87 |
| CES06 = 51 | CES31 = 99  | CES56 = 96 | CES81 = 67 |
| CES07 = 44 | CES32 = 92  | CES57 = 95 | CES82 = 94 |
| CES08 = 42 | CES33 = 99  | CES58 = 95 | CES83 = 91 |
| CES09 = 29 | CES34 = 96  | CES59 = 97 | CES84 = 97 |
| CES10 = 76 | CES35 = 98  | CES60 = 94 | CES85 = 78 |
| CES11 = 59 | CES36 = 87  | CES61 = 94 | CES86 = 76 |
| CES12 = 65 | CES37 = 98  | CES62 = 89 | CES87 = 93 |
| CES13 = 44 | CES38 = 91  | CES63 = 99 | CES88 = 96 |
| CES14 = 74 | CES39 = 100 | CES64 = 94 | CES89 = 83 |
| CES15 = 72 | CES40 = 98  | CES65 = 94 | CES90 = 96 |
| CES16 = 48 | CES41 = 95  | CES66 = 95 | CES91 = 81 |
| CES17 = 50 | CES42 = 96  | CES67 = 94 | CES92 = 78 |
| CES18 = 57 | CES43 = 93  | CES68 = 93 | CES93 = 86 |
| CES19 = 72 | CES44 = 99  | CES69 = 94 | CES94 = 75 |
| CES20 = 67 | CES45 = 97  | CES70 = 93 | CES95 = 86 |
| CES21 = 86 | CES46 = 97  | CES71 = 92 | CES96 = 93 |
| CES22 = 79 | CES47 = 87  | CES72 = 96 | CES97 = 96 |
| CES23 = 92 | CES48 = 93  | CES73 = 90 | CES98 = 95 |
| CES24 = 90 | CES49 = 97  | CES74 = 88 | CES99 = 92 |
| CES25 = 72 | CES50 = 97  | CES75 = 93 |            |



REPORT NUMBER: SP1-2210-795-2

**TM-30-18**

**Color Rendition by Hue-Angle Bin**



REPORT NUMBER: SP1-2210-795-2

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)