

LM-79-08 Test Report

For

IKIO LED LIGHTING

(Brand Name: IKIO)

8470 Allison Pointe Blvd, Suite 128 Indianapolis, IN 46250

Direct Linear Ambient Luminaires

Model name(s): IK-TPS1-25/20/15W2FTBTB1A2-GRD30/40/50 (15W)

Remark: "a" can be any two letters for lamp colors, "b" can be "M" or blank for Motion Sensor provided or not, "d" can be "D", "e" can be any digits for CCT, "f" can be "R" or blank.

Representative (Tested) Model:

IK-TPS1-25/20/15W2FTBTB1A2-GRD30/40/50 (15W)

IK-TPS1-25/20/15W2FTBTB1A2-GRD30/40/50 (15W)

IK-TPS1-25/20/15W2FTBTB1A2-GRD30/40/50 (15W)

Model Different: All construction and rating are the same, except CCT

Test & Report By:



Engineer: Winny Wu


Date: 2023-12-11

Review By:



Manager: Jason Luo

1.1 Product Information:

| | | |
|--|--|-----|
| Organization Name | IKIO LED LIGHTING | |
| Brand Name | IKIO | |
| Model Number | IK-TPS1-25/20/15W2FTBTB1A2-GRD30/40/50 (15W) | |
| SKU (if available) | N/A | |
| Type of Luminaire (for integral lamps, list base type and lamp type) | Direct Linear Ambient Luminaires | |
| Rated Voltage / Frequency | 120-277Vac, 50/60 Hz | |
| Nominal Power | 15W(Power adjustable) | |
| Rated Initial Lamp Lumen | -- | |
| Declared CCT | 3000K,4000K, 5000K (Color tunable) | |
| LED Manufacturer | Lumileds Holding B.V. | |
| LED Model | L128-3080RA35000H1 L128-5080RA35000H1 | |
| Sample Number | UTC2311030E-A1 | |
| Luminaire Aperture (for downlights) | -- | in. |
| Luminaire Length | -- | mm |
| Luminaires Width | -- | mm |
| Number of Units (modular products) | N/A | s |
| Photo | | |
|  | | |

1.2 Test Specifications:

| | |
|----------------------------|--|
| Date of Receipt | 2023-11-21 |
| Date of Test | 2023-11-23 |
| Test item | <ol style="list-style-type: none"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters |
| Reference Standard | <ol style="list-style-type: none"> 1. IES LM-79-2019 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems |
| Reference Work Instruction | BL-QP-033 |

1.3 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. Goniophotometer far field detector $f1'=1.42\%$, Test distance: 14.14m

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

Self-absorption:

IK-TPS1-25/20/15W2FTBTB1A2-GRD30/40/50 (15W):1.0595

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

| | | | |
|------------------|---|--------------------------|----------|
| Test date | 2023-11-23 | Test Ambient: | 25.2 ° C |
| Test Orientation | As intended | Stabilization Time (min) | 90 |
| Model Number | IK-TPS1-25/20/15W2FTBTB1A2GRD30/40/50 (15W) | | |

Electrical Measurement:

| Sample No. | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | THD % |
|-------------------|---------------|----------------|-------------|-----------|--------------|-----------|
| UTC231103 | 120.0 | 60 | 0.126 | 15.01 | 0.992 | 7.45 |
| 0E-A1 | 277.0 | 60 | 0.063 | 15.76 | 0.899 | 14.27 |
| DLC Pass Criteria | | | | | >= 0.9(-3%) | <= 20(+5) |

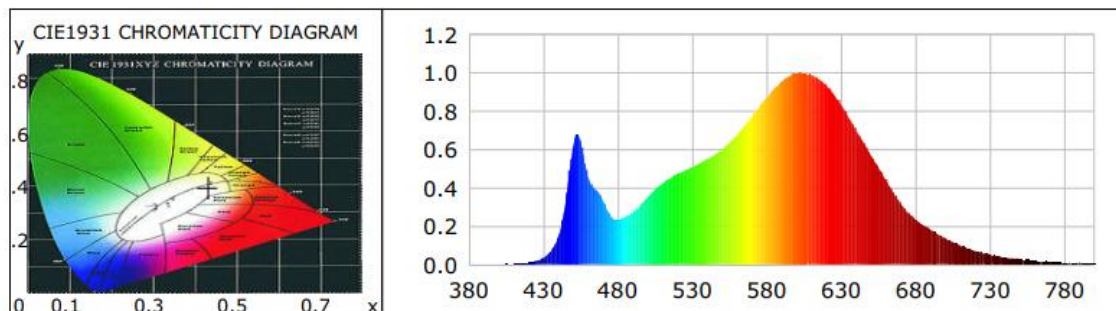
Chromaticity Measurement - Sphere-Spectroradiometer Method:

| Parameter | Result | Special Color Rendering Indices | | | |
|-----------------------------|------------------------|---------------------------------|----|-----|----|
| Test Voltage (V) | 120.0 | R1 | 83 | R9 | 11 |
| Frequency (Hz) | 60 | R2 | 94 | R10 | 86 |
| CCT (K) | 3090 | R3 | 94 | R11 | 82 |
| Duv | -0.0015 | R4 | 81 | R12 | 73 |
| Chromaticity (x, y) | x=0.4286 y=0.3973 | R5 | 84 | R13 | 86 |
| Chromaticity (u', v') | u(u')=0.2481 v'=0.5174 | R6 | 93 | R14 | 98 |
| Color Rendering Index (CRI) | 84 | R7 | 81 | R15 | 76 |
| R9 | 11 | R8 | 60 | -- | -- |
| Rf | 85 | -- | -- | -- | -- |
| Rg | 95 | -- | -- | -- | -- |
| Rcs,h1(%) | -11 | | | | |

Photometric Measurement – Goniophotometer Method:

| Parameter | Result | | DLC V5.1 Pass Criteria |
|------------------------------------|--------|--------|------------------------|
| Test Voltage (V) | 120.0 | 277.0 | -- |
| Frequency (Hz) | 60 | 60 | |
| Total Luminous (lm) | 2167.6 | 2218.1 | 375 lm/ft (-10%) |
| Luminous Efficacy (lm/W) | 144.41 | 140.74 | Standard: >= 115(-3%) |
| Most worst Luminous/Highest | 137.54 | | |
| Zonal lumens in the 0-60° zone (%) | 68.80 | -- | >=40(-3%) |
| Beam Angle (°) | 117.4 | -- | -- |
| Center Beam Candle Power (cd) | 654 | -- | -- |

Spectral Power Distribution & Chromaticity Diagram



| WL(nm) | PL | PE(mW/nm) | WL(nm) | PL | PE(mW/nm) | WL(nm) | PL | PE(mW/nm) |
|--------|--------|-----------|--------|--------|-----------|--------|--------|-----------|
| 380 | 0.0000 | 0.0007 | 535 | 0.4903 | 22.5222 | 690 | 0.3177 | 14.5939 |
| 385 | 0.0006 | 0.0281 | 540 | 0.5089 | 23.3772 | 695 | 0.2687 | 12.3424 |
| 390 | 0.0003 | 0.0156 | 545 | 0.5273 | 24.2228 | 700 | 0.2340 | 10.7488 |
| 395 | 0.0002 | 0.0078 | 550 | 0.5497 | 25.2534 | 705 | 0.2064 | 9.4796 |
| 400 | 0.0008 | 0.0376 | 555 | 0.5739 | 26.3617 | 710 | 0.1828 | 8.3959 |
| 405 | 0.0015 | 0.0710 | 560 | 0.6031 | 27.7054 | 715 | 0.1577 | 7.2433 |
| 410 | 0.0013 | 0.0609 | 565 | 0.6371 | 29.2654 | 720 | 0.1368 | 6.2825 |
| 415 | 0.0040 | 0.1836 | 570 | 0.6754 | 31.0237 | 725 | 0.1156 | 5.3098 |
| 420 | 0.0091 | 0.4158 | 575 | 0.7223 | 33.1779 | 730 | 0.0978 | 4.4939 |
| 425 | 0.0175 | 0.8050 | 580 | 0.7706 | 35.3982 | 735 | 0.0834 | 3.8309 |
| 430 | 0.0351 | 1.6102 | 585 | 0.8205 | 37.6921 | 740 | 0.0710 | 3.2601 |
| 435 | 0.0705 | 3.2374 | 590 | 0.8724 | 40.0745 | 745 | 0.0615 | 2.8263 |
| 440 | 0.1447 | 6.6491 | 595 | 0.9179 | 42.1666 | 750 | 0.0515 | 2.3671 |
| 445 | 0.3267 | 15.0055 | 600 | 0.9566 | 43.9411 | 755 | 0.0422 | 1.9366 |
| 450 | 0.6120 | 28.1122 | 605 | 0.9840 | 45.2029 | 760 | 0.0377 | 1.7340 |
| 455 | 0.6478 | 29.7556 | 610 | 0.9976 | 45.8249 | 765 | 0.0329 | 1.5092 |
| 460 | 0.4622 | 21.2332 | 615 | 0.9957 | 45.7390 | 770 | 0.0271 | 1.2449 |
| 465 | 0.3943 | 18.1112 | 620 | 0.9883 | 45.3974 | 775 | 0.0253 | 1.1617 |
| 470 | 0.3355 | 15.4134 | 625 | 0.9662 | 44.3860 | 780 | 0.0206 | 0.9451 |
| 475 | 0.2560 | 11.7603 | 630 | 0.9355 | 42.9753 | 785 | 0.0156 | 0.7150 |
| 480 | 0.2350 | 10.7961 | 635 | 0.8907 | 40.9149 | 790 | 0.0156 | 0.7174 |
| 485 | 0.2485 | 11.4174 | 640 | 0.8321 | 38.2251 | 795 | 0.0105 | 0.4834 |
| 490 | 0.2717 | 12.4794 | 645 | 0.7708 | 35.4072 | 800 | 0.0080 | 0.3686 |
| 495 | 0.3087 | 14.1786 | 650 | 0.7022 | 32.2566 | | | |
| 500 | 0.3510 | 16.1253 | 655 | 0.6359 | 29.2123 | | | |
| 505 | 0.3907 | 17.9459 | 660 | 0.5692 | 26.1460 | | | |
| 510 | 0.4237 | 19.4649 | 665 | 0.5043 | 23.1668 | | | |
| 515 | 0.4510 | 20.7151 | 670 | 0.4430 | 20.3491 | | | |
| 520 | 0.4741 | 21.7776 | 675 | 0.3755 | 17.2510 | | | |
| 525 | 0.4903 | 22.5222 | 680 | 0.3177 | 14.5939 | | | |
| 530 | 0.5089 | 23.3772 | 685 | 0.2687 | 12.3424 | | | |

TM30

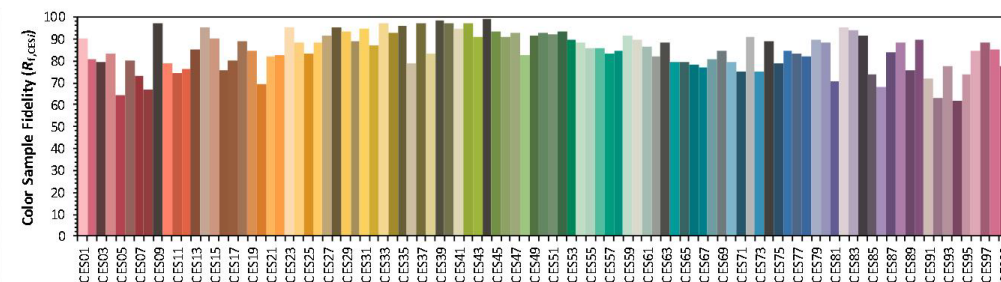
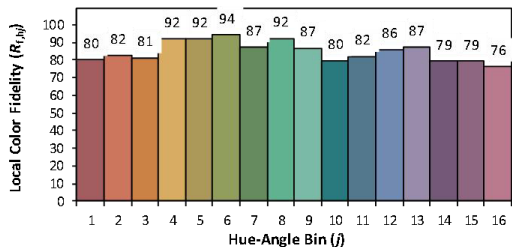
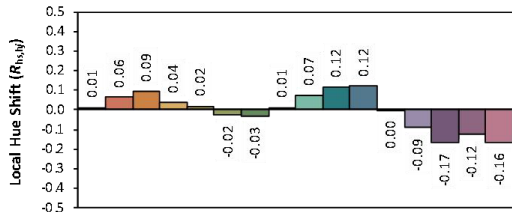
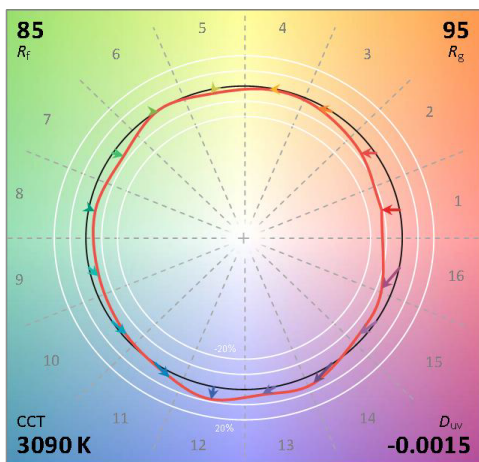
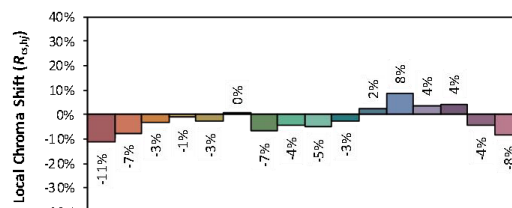
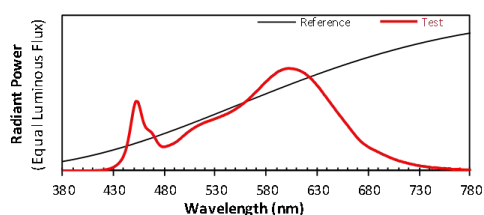
ANSI/IES TM-30-18 Color Rendition Report

Source: L128-3080RA35000H1

Manufacturer: IKIO LED LIGHTING

Date: 2023/11/23

Model: IK-TPS1-25/20/15W2FTBTB1A2-GRD30/40/50 (15W)



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4286
 y 0.3973
 u' 0.2481
 v' 0.5174

CIE 13.3-1995
(CRI)
 R_a 84
 R_g 11

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Zonal Lumen Tabulation

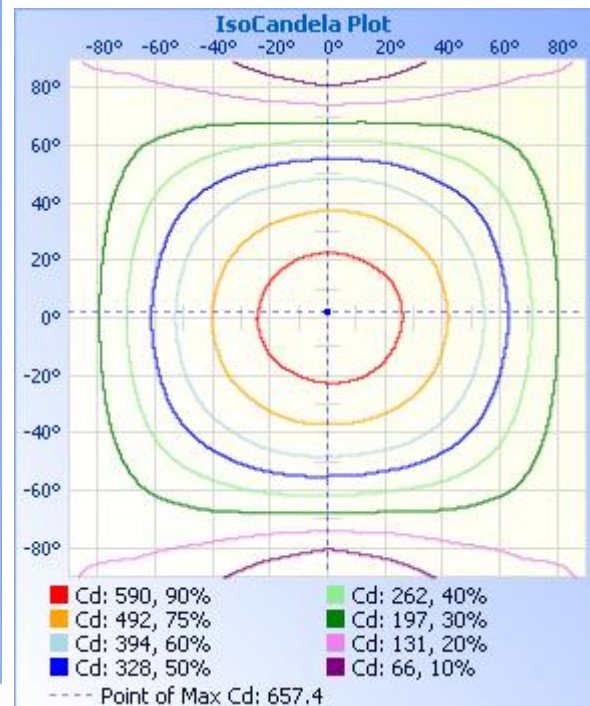
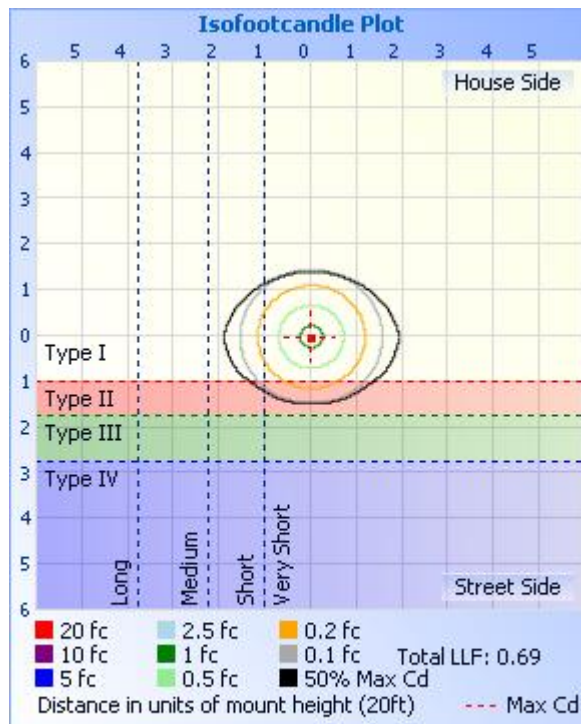
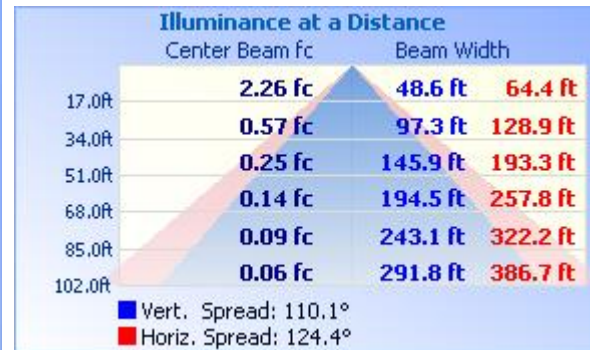
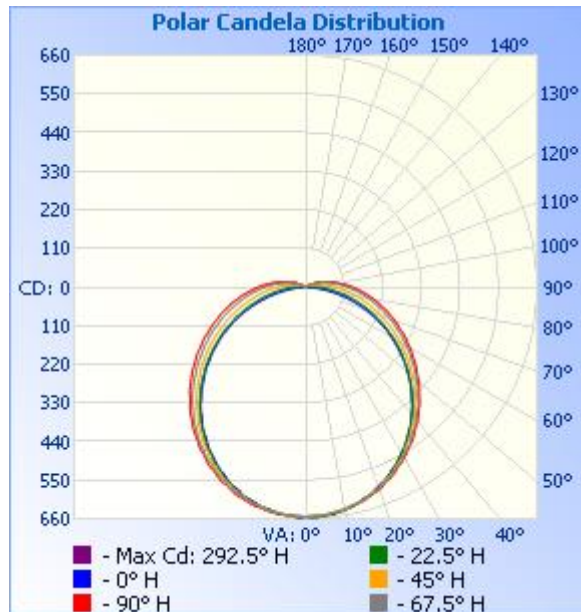
Zonal Lumen Summary

| Zone | Lumens | % Lamp | % Luminaire |
|--------|---------|--------|-------------|
| 0-30 | 507.9 | 23.4% | 23.4% |
| 0-40 | 832.8 | 38.4% | 38.4% |
| 0-60 | 1,490.6 | 68.8% | 68.8% |
| 60-90 | 567.3 | 26.2% | 26.2% |
| 70-100 | 367.6 | 17% | 17% |
| 90-120 | 101.6 | 4.7% | 4.7% |
| 0-90 | 2,057.9 | 94.9% | 94.9% |
| 90-180 | 109.6 | 5.1% | 5.1% |
| 0-180 | 2,167.5 | 100% | 100% |

Lumens Per Zone

| Zone | Lumens | % Total | Zone | Lumens | % Total |
|-------|--------|---------|---------|--------|---------|
| 0-10 | 61.9 | 2.9% | 90-100 | 62.5 | 2.9% |
| 10-20 | 177.3 | 8.2% | 100-110 | 28.7 | 1.3% |
| 20-30 | 268.8 | 12.4% | 110-120 | 10.4 | 0.5% |
| 30-40 | 324.9 | 15.0% | 120-130 | 2.9 | 0.1% |
| 40-50 | 340.6 | 15.7% | 130-140 | 1.8 | 0.1% |
| 50-60 | 317.1 | 14.6% | 140-150 | 1.4 | 0.1% |
| 60-70 | 262.2 | 12.1% | 150-160 | 1.0 | 0% |
| 70-80 | 188.9 | 8.7% | 160-170 | 0.6 | 0% |
| 80-90 | 116.2 | 5.4% | 170-180 | 0.2 | 0% |

Photometric Data



Candela Table - Type C

| | 0 | 22.5 | 45 | 67.5 | 90 | 112.5 | 135 | 157.5 | 180 | 202.5 | 225 | 247.5 | 270 | 292.5 | 315 | 337.5 | 360 |
|----|-----|------|-----|------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|
| 0 | 654 | 654 | 654 | 654 | 654 | 654 | 654 | 654 | 654 | 654 | 654 | 654 | 654 | 654 | 654 | 654 | 654 |
| 1 | 654 | 657 | 654 | 651 | 654 | 656 | 651 | 653 | 656 | 654 | 651 | 654 | 653 | 654 | 654 | 652 | 654 |
| 2 | 656 | 656 | 652 | 651 | 654 | 656 | 651 | 651 | 656 | 655 | 651 | 653 | 652 | 657 | 654 | 651 | 656 |
| 3 | 656 | 656 | 650 | 653 | 651 | 656 | 652 | 650 | 655 | 655 | 652 | 651 | 654 | 657 | 650 | 650 | 656 |
| 4 | 654 | 652 | 651 | 653 | 650 | 653 | 652 | 651 | 651 | 653 | 653 | 650 | 653 | 654 | 650 | 652 | 654 |
| 5 | 652 | 651 | 651 | 651 | 652 | 652 | 650 | 650 | 650 | 650 | 652 | 652 | 652 | 652 | 652 | 651 | 652 |
| 6 | 651 | 652 | 650 | 647 | 651 | 653 | 648 | 648 | 651 | 649 | 648 | 651 | 649 | 651 | 651 | 648 | 651 |
| 7 | 651 | 651 | 646 | 646 | 648 | 651 | 646 | 643 | 649 | 650 | 646 | 647 | 648 | 652 | 649 | 646 | 651 |
| 8 | 649 | 648 | 644 | 647 | 645 | 649 | 645 | 641 | 645 | 648 | 646 | 646 | 649 | 651 | 645 | 644 | 649 |
| 9 | 647 | 645 | 644 | 645 | 643 | 646 | 643 | 642 | 642 | 644 | 645 | 643 | 648 | 647 | 643 | 644 | 647 |
| 10 | 642 | 643 | 643 | 643 | 645 | 644 | 639 | 639 | 640 | 641 | 643 | 644 | 646 | 645 | 643 | 642 | 642 |
| 11 | 639 | 642 | 641 | 638 | 642 | 643 | 635 | 637 | 639 | 638 | 638 | 642 | 642 | 645 | 641 | 637 | 639 |
| 12 | 639 | 639 | 635 | 635 | 637 | 641 | 633 | 631 | 636 | 638 | 636 | 638 | 640 | 644 | 638 | 634 | 639 |
| 13 | 635 | 634 | 632 | 635 | 635 | 637 | 632 | 628 | 631 | 635 | 635 | 635 | 640 | 641 | 634 | 633 | 635 |
| 14 | 632 | 630 | 632 | 633 | 632 | 631 | 628 | 627 | 627 | 631 | 632 | 633 | 637 | 636 | 631 | 631 | 632 |
| 15 | 626 | 627 | 629 | 629 | 631 | 629 | 623 | 623 | 625 | 625 | 629 | 631 | 635 | 633 | 630 | 627 | 626 |
| 16 | 622 | 626 | 625 | 623 | 628 | 627 | 619 | 619 | 622 | 621 | 623 | 628 | 630 | 632 | 626 | 621 | 622 |
| 17 | 621 | 621 | 620 | 620 | 622 | 624 | 617 | 612 | 617 | 620 | 620 | 622 | 626 | 629 | 623 | 617 | 621 |
| 18 | 616 | 614 | 615 | 619 | 619 | 621 | 613 | 608 | 610 | 615 | 617 | 618 | 625 | 625 | 617 | 615 | 616 |
| 19 | 612 | 609 | 614 | 615 | 616 | 613 | 609 | 607 | 606 | 610 | 613 | 617 | 622 | 620 | 612 | 610 | 612 |
| 20 | 604 | 606 | 609 | 610 | 614 | 609 | 602 | 602 | 603 | 604 | 609 | 613 | 616 | 616 | 611 | 606 | 604 |
| 21 | 599 | 603 | 604 | 605 | 609 | 607 | 597 | 595 | 599 | 599 | 601 | 609 | 611 | 614 | 606 | 599 | 599 |
| 22 | 596 | 597 | 597 | 600 | 602 | 602 | 595 | 589 | 593 | 596 | 598 | 602 | 606 | 609 | 602 | 595 | 596 |
| 23 | 591 | 590 | 592 | 598 | 597 | 598 | 590 | 584 | 585 | 590 | 594 | 598 | 605 | 605 | 594 | 591 | 591 |
| 24 | 585 | 584 | 589 | 593 | 595 | 591 | 585 | 581 | 579 | 583 | 589 | 594 | 600 | 598 | 589 | 587 | 585 |
| 25 | 578 | 580 | 584 | 586 | 590 | 585 | 576 | 575 | 575 | 577 | 583 | 589 | 594 | 593 | 587 | 581 | 578 |
| 26 | 572 | 574 | 578 | 580 | 584 | 581 | 571 | 567 | 569 | 570 | 576 | 584 | 588 | 589 | 581 | 573 | 572 |
| 27 | 568 | 567 | 570 | 575 | 577 | 576 | 568 | 561 | 562 | 566 | 570 | 577 | 583 | 584 | 574 | 567 | 568 |

| | | | | | | | | | | | | | | | | | |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 28 | 561 | 560 | 565 | 571 | 572 | 570 | 561 | 555 | 555 | 560 | 566 | 572 | 580 | 578 | 568 | 564 | 561 |
| 29 | 555 | 553 | 560 | 566 | 568 | 563 | 555 | 549 | 548 | 550 | 559 | 568 | 575 | 571 | 562 | 557 | 555 |
| 30 | 546 | 548 | 554 | 557 | 562 | 557 | 546 | 543 | 543 | 544 | 553 | 562 | 568 | 565 | 557 | 550 | 546 |
| 31 | 540 | 540 | 548 | 551 | 556 | 553 | 539 | 535 | 536 | 538 | 545 | 557 | 560 | 561 | 550 | 542 | 540 |
| 32 | 535 | 533 | 539 | 545 | 547 | 547 | 535 | 528 | 528 | 531 | 538 | 548 | 555 | 555 | 541 | 536 | 535 |
| 33 | 528 | 525 | 531 | 541 | 542 | 538 | 528 | 521 | 519 | 524 | 533 | 542 | 550 | 549 | 535 | 530 | 528 |
| 34 | 518 | 517 | 526 | 534 | 538 | 531 | 521 | 516 | 511 | 515 | 526 | 538 | 544 | 539 | 528 | 523 | 518 |
| 35 | 510 | 512 | 520 | 526 | 531 | 525 | 511 | 508 | 506 | 507 | 517 | 531 | 536 | 533 | 522 | 515 | 510 |
| 36 | 502 | 504 | 513 | 518 | 524 | 520 | 504 | 500 | 498 | 500 | 509 | 524 | 529 | 528 | 515 | 507 | 502 |
| 37 | 497 | 496 | 503 | 512 | 516 | 512 | 498 | 492 | 490 | 493 | 502 | 515 | 524 | 521 | 505 | 500 | 497 |
| 38 | 489 | 487 | 495 | 506 | 509 | 503 | 491 | 484 | 480 | 485 | 497 | 508 | 518 | 514 | 498 | 494 | 489 |
| 39 | 479 | 479 | 490 | 498 | 504 | 496 | 483 | 478 | 471 | 474 | 489 | 503 | 511 | 505 | 492 | 486 | 479 |
| 40 | 471 | 472 | 483 | 490 | 497 | 490 | 473 | 470 | 465 | 467 | 478 | 495 | 502 | 498 | 485 | 478 | 471 |
| 41 | 462 | 464 | 474 | 482 | 489 | 483 | 465 | 459 | 456 | 461 | 471 | 487 | 496 | 492 | 477 | 468 | 462 |
| 42 | 455 | 455 | 465 | 475 | 481 | 475 | 459 | 451 | 448 | 452 | 463 | 479 | 490 | 484 | 467 | 460 | 455 |
| 43 | 446 | 445 | 457 | 469 | 473 | 466 | 451 | 445 | 437 | 443 | 457 | 471 | 483 | 476 | 459 | 452 | 446 |
| 44 | 436 | 437 | 450 | 462 | 468 | 458 | 441 | 436 | 428 | 433 | 448 | 465 | 475 | 467 | 452 | 444 | 436 |
| 45 | 427 | 429 | 442 | 452 | 460 | 451 | 432 | 427 | 421 | 423 | 438 | 457 | 466 | 459 | 443 | 437 | 427 |
| 46 | 418 | 421 | 433 | 443 | 451 | 444 | 424 | 417 | 412 | 416 | 430 | 448 | 458 | 453 | 435 | 425 | 418 |
| 47 | 409 | 411 | 424 | 438 | 443 | 435 | 417 | 409 | 400 | 407 | 422 | 440 | 452 | 445 | 425 | 416 | 409 |
| 48 | 401 | 401 | 415 | 430 | 435 | 426 | 408 | 401 | 391 | 398 | 414 | 432 | 445 | 437 | 416 | 410 | 401 |
| 49 | 390 | 392 | 408 | 422 | 429 | 418 | 398 | 391 | 382 | 387 | 405 | 424 | 437 | 427 | 409 | 401 | 390 |
| 50 | 380 | 384 | 399 | 412 | 422 | 410 | 389 | 382 | 374 | 377 | 395 | 416 | 429 | 419 | 400 | 392 | 380 |
| 51 | 372 | 375 | 389 | 404 | 412 | 403 | 381 | 372 | 364 | 369 | 387 | 406 | 421 | 412 | 391 | 381 | 372 |
| 52 | 362 | 365 | 380 | 397 | 404 | 395 | 374 | 363 | 352 | 360 | 379 | 398 | 413 | 404 | 382 | 372 | 362 |
| 53 | 353 | 354 | 372 | 390 | 397 | 385 | 365 | 355 | 343 | 350 | 371 | 390 | 405 | 394 | 372 | 364 | 353 |
| 54 | 341 | 345 | 363 | 381 | 390 | 376 | 355 | 346 | 334 | 339 | 360 | 382 | 397 | 385 | 365 | 354 | 341 |
| 55 | 332 | 337 | 355 | 371 | 382 | 369 | 346 | 335 | 325 | 329 | 350 | 374 | 388 | 377 | 357 | 344 | 332 |
| 56 | 323 | 328 | 345 | 364 | 373 | 361 | 339 | 325 | 314 | 320 | 341 | 364 | 380 | 370 | 347 | 334 | 323 |
| 57 | 312 | 319 | 336 | 356 | 365 | 353 | 330 | 315 | 303 | 311 | 334 | 355 | 373 | 362 | 337 | 324 | 312 |
| 58 | 302 | 308 | 328 | 348 | 359 | 344 | 322 | 306 | 293 | 300 | 325 | 348 | 366 | 352 | 327 | 315 | 302 |

| | | | | | | | | | | | | | | | | | |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 59 | 292 | 298 | 320 | 339 | 351 | 335 | 311 | 297 | 284 | 289 | 315 | 340 | 358 | 344 | 320 | 306 | 292 |
| 60 | 282 | 289 | 311 | 331 | 343 | 328 | 302 | 287 | 274 | 280 | 305 | 331 | 348 | 336 | 312 | 295 | 282 |
| 61 | 272 | 279 | 301 | 322 | 334 | 320 | 295 | 277 | 263 | 271 | 297 | 322 | 340 | 329 | 303 | 285 | 272 |
| 62 | 261 | 269 | 292 | 315 | 327 | 312 | 286 | 266 | 252 | 262 | 288 | 314 | 334 | 320 | 293 | 276 | 261 |
| 63 | 251 | 259 | 285 | 308 | 320 | 302 | 277 | 257 | 242 | 250 | 279 | 307 | 326 | 310 | 284 | 265 | 251 |
| 64 | 240 | 249 | 276 | 300 | 312 | 295 | 268 | 247 | 232 | 240 | 270 | 299 | 317 | 302 | 276 | 255 | 240 |
| 65 | 229 | 240 | 267 | 290 | 305 | 288 | 260 | 237 | 221 | 232 | 261 | 291 | 308 | 295 | 267 | 245 | 229 |
| 66 | 219 | 231 | 258 | 282 | 295 | 280 | 252 | 226 | 210 | 222 | 252 | 282 | 300 | 287 | 258 | 234 | 219 |
| 67 | 209 | 221 | 250 | 276 | 288 | 271 | 244 | 216 | 199 | 212 | 245 | 273 | 294 | 278 | 249 | 225 | 209 |
| 68 | 198 | 211 | 242 | 268 | 282 | 262 | 235 | 207 | 188 | 201 | 235 | 266 | 286 | 269 | 240 | 215 | 198 |
| 69 | 188 | 203 | 232 | 260 | 274 | 256 | 226 | 197 | 178 | 191 | 227 | 258 | 278 | 262 | 232 | 204 | 188 |
| 70 | 177 | 194 | 224 | 252 | 267 | 249 | 218 | 187 | 167 | 183 | 218 | 251 | 270 | 254 | 224 | 194 | 177 |
| 71 | 167 | 184 | 216 | 244 | 259 | 241 | 211 | 176 | 157 | 174 | 209 | 241 | 263 | 247 | 215 | 183 | 167 |
| 72 | 156 | 174 | 208 | 238 | 251 | 233 | 203 | 167 | 146 | 163 | 202 | 234 | 256 | 239 | 207 | 174 | 156 |
| 73 | 145 | 165 | 201 | 231 | 246 | 225 | 195 | 158 | 136 | 154 | 194 | 227 | 248 | 231 | 200 | 165 | 145 |
| 74 | 134 | 156 | 192 | 223 | 238 | 219 | 187 | 149 | 125 | 145 | 185 | 219 | 241 | 223 | 192 | 156 | 134 |
| 75 | 125 | 148 | 185 | 215 | 230 | 212 | 179 | 139 | 115 | 137 | 177 | 212 | 232 | 216 | 184 | 145 | 125 |
| 76 | 114 | 139 | 176 | 208 | 223 | 205 | 172 | 131 | 105 | 129 | 170 | 205 | 226 | 209 | 175 | 136 | 114 |
| 77 | 104 | 130 | 168 | 201 | 216 | 197 | 165 | 123 | 94 | 120 | 163 | 198 | 220 | 202 | 168 | 128 | 104 |
| 78 | 94 | 122 | 163 | 195 | 210 | 190 | 157 | 115 | 84 | 111 | 156 | 191 | 212 | 193 | 161 | 119 | 94 |
| 79 | 84 | 114 | 155 | 187 | 203 | 185 | 149 | 106 | 76 | 103 | 148 | 184 | 205 | 187 | 154 | 111 | 84 |
| 80 | 75 | 106 | 148 | 180 | 196 | 178 | 143 | 98 | 66 | 96 | 141 | 176 | 198 | 181 | 146 | 102 | 75 |
| 81 | 66 | 98 | 141 | 174 | 189 | 171 | 136 | 91 | 57 | 88 | 134 | 170 | 191 | 174 | 139 | 94 | 66 |
| 82 | 57 | 90 | 134 | 168 | 183 | 164 | 129 | 83 | 48 | 81 | 128 | 163 | 184 | 167 | 132 | 87 | 57 |
| 83 | 48 | 83 | 128 | 161 | 177 | 158 | 123 | 77 | 41 | 74 | 121 | 158 | 178 | 160 | 125 | 80 | 48 |
| 84 | 40 | 77 | 122 | 155 | 170 | 153 | 116 | 70 | 34 | 68 | 114 | 151 | 171 | 154 | 119 | 73 | 40 |
| 85 | 33 | 70 | 115 | 149 | 163 | 146 | 110 | 63 | 27 | 62 | 108 | 145 | 166 | 149 | 113 | 67 | 33 |
| 86 | 27 | 63 | 110 | 144 | 158 | 140 | 105 | 58 | 22 | 56 | 103 | 139 | 159 | 142 | 107 | 61 | 27 |
| 87 | 21 | 57 | 103 | 137 | 151 | 134 | 99 | 52 | 16 | 51 | 97 | 133 | 153 | 136 | 100 | 55 | 21 |
| 88 | 17 | 51 | 97 | 132 | 145 | 128 | 93 | 47 | 13 | 45 | 91 | 128 | 147 | 130 | 95 | 50 | 17 |
| 89 | 12 | 47 | 92 | 126 | 140 | 122 | 88 | 43 | 11 | 41 | 86 | 122 | 140 | 124 | 90 | 45 | 12 |

| | | | | | | | | | | | | | | | | | |
|-----|----|----|----|-----|-----|-----|----|----|---|----|----|-----|-----|-----|----|----|----|
| 90 | 11 | 43 | 87 | 120 | 134 | 116 | 82 | 38 | 9 | 37 | 81 | 116 | 134 | 119 | 85 | 40 | 11 |
| 91 | 10 | 38 | 81 | 115 | 127 | 111 | 77 | 33 | 9 | 32 | 76 | 110 | 129 | 114 | 79 | 36 | 10 |
| 92 | 9 | 34 | 76 | 109 | 122 | 105 | 72 | 30 | 9 | 28 | 71 | 105 | 124 | 108 | 73 | 32 | 9 |
| 93 | 9 | 29 | 71 | 104 | 116 | 100 | 66 | 26 | 8 | 24 | 66 | 100 | 118 | 102 | 69 | 28 | 9 |
| 94 | 8 | 25 | 66 | 98 | 111 | 95 | 61 | 23 | 8 | 21 | 61 | 95 | 111 | 97 | 64 | 24 | 8 |
| 95 | 7 | 22 | 61 | 93 | 105 | 90 | 57 | 19 | 7 | 18 | 56 | 90 | 107 | 92 | 59 | 20 | 7 |
| 96 | 7 | 18 | 56 | 88 | 100 | 85 | 53 | 16 | 6 | 16 | 52 | 85 | 102 | 86 | 54 | 18 | 7 |
| 97 | 6 | 16 | 52 | 84 | 95 | 80 | 47 | 14 | 6 | 14 | 47 | 80 | 96 | 81 | 49 | 16 | 6 |
| 98 | 6 | 14 | 47 | 79 | 90 | 75 | 43 | 12 | 6 | 12 | 43 | 76 | 91 | 77 | 45 | 14 | 6 |
| 99 | 5 | 12 | 43 | 74 | 85 | 71 | 40 | 10 | 5 | 11 | 39 | 71 | 86 | 73 | 41 | 12 | 5 |
| 100 | 4 | 9 | 40 | 70 | 80 | 67 | 36 | 9 | 4 | 9 | 36 | 67 | 81 | 68 | 38 | 10 | 4 |
| 101 | 4 | 8 | 36 | 66 | 76 | 63 | 33 | 7 | 3 | 7 | 33 | 63 | 77 | 63 | 34 | 9 | 4 |
| 102 | 4 | 6 | 33 | 62 | 72 | 58 | 30 | 6 | 3 | 6 | 30 | 60 | 72 | 60 | 32 | 7 | 4 |
| 103 | 3 | 5 | 30 | 58 | 67 | 55 | 27 | 5 | 3 | 5 | 27 | 56 | 68 | 56 | 29 | 6 | 3 |
| 104 | 3 | 4 | 27 | 54 | 62 | 51 | 25 | 3 | 2 | 4 | 24 | 51 | 63 | 53 | 26 | 4 | 3 |
| 105 | 2 | 3 | 25 | 50 | 58 | 48 | 22 | 2 | 2 | 3 | 23 | 48 | 59 | 49 | 24 | 4 | 2 |
| 106 | 2 | 1 | 22 | 47 | 54 | 44 | 20 | 2 | 2 | 3 | 21 | 45 | 56 | 45 | 21 | 3 | 2 |
| 107 | 2 | 3 | 20 | 43 | 50 | 41 | 18 | 3 | 2 | 3 | 18 | 42 | 51 | 42 | 19 | 3 | 2 |
| 108 | 1 | 3 | 18 | 40 | 46 | 37 | 16 | 2 | 1 | 2 | 16 | 38 | 48 | 40 | 18 | 2 | 1 |
| 109 | 1 | 3 | 16 | 37 | 42 | 34 | 14 | 2 | 1 | 2 | 14 | 35 | 44 | 36 | 15 | 3 | 1 |
| 110 | 1 | 2 | 14 | 34 | 39 | 31 | 12 | 2 | 1 | 2 | 13 | 32 | 41 | 33 | 14 | 2 | 1 |
| 111 | 2 | 2 | 13 | 31 | 36 | 28 | 11 | 2 | 1 | 2 | 11 | 30 | 38 | 30 | 12 | 2 | 2 |
| 112 | 2 | 3 | 10 | 28 | 32 | 26 | 9 | 2 | 1 | 2 | 10 | 27 | 34 | 27 | 10 | 2 | 2 |
| 113 | 2 | 3 | 9 | 25 | 29 | 23 | 8 | 2 | 1 | 2 | 8 | 24 | 31 | 24 | 9 | 2 | 2 |
| 114 | 1 | 3 | 8 | 22 | 27 | 19 | 6 | 2 | 1 | 2 | 7 | 21 | 28 | 22 | 8 | 2 | 1 |
| 115 | 1 | 3 | 6 | 20 | 24 | 17 | 5 | 2 | 1 | 2 | 6 | 20 | 26 | 19 | 6 | 2 | 1 |
| 116 | 1 | 2 | 5 | 18 | 21 | 15 | 4 | 2 | 1 | 2 | 4 | 17 | 23 | 17 | 4 | 2 | 1 |
| 117 | 1 | 3 | 5 | 15 | 18 | 12 | 4 | 2 | 1 | 2 | 4 | 15 | 20 | 15 | 4 | 2 | 1 |
| 118 | 2 | 2 | 4 | 13 | 15 | 11 | 3 | 2 | 1 | 2 | 4 | 13 | 17 | 13 | 4 | 2 | 2 |
| 119 | 2 | 2 | 4 | 10 | 13 | 9 | 3 | 2 | 0 | 2 | 2 | 10 | 15 | 10 | 4 | 2 | 2 |
| 120 | 1 | 2 | 4 | 9 | 11 | 7 | 3 | 2 | 1 | 2 | 2 | 8 | 13 | 8 | 3 | 2 | 1 |

| | | | | | | | | | | | | | | | | | |
|-----|---|---|---|---|---|---|---|---|---|---|---|---|----|---|---|---|---|
| 121 | 2 | 2 | 4 | 8 | 9 | 5 | 3 | 2 | 1 | 1 | 3 | 7 | 11 | 8 | 3 | 2 | 2 |
| 122 | 1 | 2 | 4 | 6 | 8 | 3 | 3 | 2 | 1 | 2 | 4 | 6 | 8 | 6 | 3 | 1 | 1 |
| 123 | 2 | 2 | 3 | 5 | 5 | 3 | 3 | 1 | 1 | 2 | 3 | 4 | 8 | 5 | 3 | 2 | 2 |
| 124 | 1 | 3 | 3 | 5 | 4 | 2 | 3 | 2 | 2 | 2 | 3 | 4 | 6 | 4 | 3 | 2 | 1 |
| 125 | 2 | 2 | 3 | 4 | 3 | 2 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 3 | 3 | 2 | 2 |
| 126 | 1 | 2 | 3 | 4 | 3 | 3 | 3 | 2 | 1 | 2 | 3 | 4 | 4 | 3 | 3 | 2 | 1 |
| 127 | 2 | 2 | 2 | 4 | 3 | 2 | 2 | 2 | 1 | 2 | 3 | 4 | 3 | 3 | 3 | 2 | 2 |
| 128 | 2 | 2 | 3 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 2 | 2 | 2 |
| 129 | 2 | 3 | 3 | 4 | 3 | 2 | 2 | 2 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| 130 | 1 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 3 | 4 | 2 | 3 | 2 | 2 | 1 |
| 131 | 2 | 2 | 3 | 4 | 2 | 2 | 3 | 2 | 1 | 2 | 3 | 4 | 2 | 3 | 2 | 2 | 2 |
| 132 | 2 | 2 | 3 | 4 | 2 | 3 | 3 | 2 | 1 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 |
| 133 | 1 | 2 | 3 | 4 | 2 | 2 | 3 | 2 | 1 | 1 | 3 | 4 | 2 | 3 | 3 | 2 | 1 |
| 134 | 2 | 2 | 3 | 4 | 2 | 2 | 1 | 2 | 1 | 2 | 3 | 4 | 3 | 3 | 3 | 2 | 2 |
| 135 | 1 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 1 |
| 136 | 2 | 2 | 3 | 4 | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| 137 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 4 | 3 | 3 | 3 | 2 | 2 |
| 138 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 2 | 3 | 2 | 2 | 2 |
| 139 | 2 | 2 | 2 | 4 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 1 | 2 |
| 140 | 2 | 2 | 3 | 4 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 3 | 1 | 2 |
| 141 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 2 | 3 | 2 | 2 | 2 |
| 142 | 2 | 2 | 3 | 4 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| 143 | 2 | 2 | 3 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 1 | 2 | 2 | 2 | 2 |
| 144 | 2 | 1 | 3 | 4 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 |
| 145 | 2 | 2 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 |
| 146 | 2 | 2 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 4 | 2 | 2 | 3 | 2 | 2 |
| 147 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| 148 | 2 | 3 | 3 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 |
| 149 | 2 | 2 | 2 | 3 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 4 | 2 | 3 | 2 | 2 | 2 |
| 150 | 2 | 2 | 3 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| 151 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 2 | 3 | 2 | 2 | 3 |

| | | | | | | | | | | | | | | | | | |
|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 152 | 2 | 2 | 3 | 4 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 1 | 2 | 2 | 2 | 2 |
| 153 | 2 | 2 | 3 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 2 | 2 | 2 | 3 | 2 |
| 154 | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 |
| 155 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 |
| 156 | 2 | 2 | 2 | 3 | 1 | 1 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 |
| 157 | 2 | 2 | 3 | 3 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 2 |
| 158 | 3 | 2 | 3 | 3 | 1 | 1 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 |
| 159 | 2 | 2 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| 160 | 3 | 2 | 3 | 3 | 1 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 |
| 161 | 3 | 2 | 2 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 3 | 3 |
| 162 | 2 | 2 | 3 | 3 | 1 | 1 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 |
| 163 | 2 | 3 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 2 |
| 164 | 2 | 3 | 3 | 3 | 0 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 |
| 165 | 2 | 3 | 3 | 3 | 1 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 1 | 2 | 2 | 2 | 2 |
| 166 | 2 | 3 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 1 | 2 | 3 | 2 | 2 |
| 167 | 2 | 3 | 2 | 2 | 0 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 |
| 168 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 | 3 | 2 | 3 | 2 | 1 | 2 | 3 | 2 | 3 |
| 169 | 2 | 2 | 3 | 3 | 1 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 2 |
| 170 | 2 | 2 | 3 | 3 | 1 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 1 | 3 | 2 | 2 | 2 |
| 171 | 2 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 1 | 3 | 2 | 2 | 2 |
| 172 | 2 | 3 | 3 | 3 | 1 | 1 | 2 | 3 | 2 | 3 | 2 | 3 | 1 | 2 | 3 | 3 | 2 |
| 173 | 3 | 2 | 3 | 3 | 1 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 1 | 3 | 2 | 3 |
| 174 | 3 | 3 | 3 | 3 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 1 | 2 | 2 | 3 | 3 |
| 175 | 3 | 2 | 3 | 3 | 1 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 |
| 176 | 2 | 3 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 |
| 177 | 3 | 2 | 3 | 3 | 0 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 1 | 2 | 3 | 2 | 3 |
| 178 | 2 | 3 | 3 | 3 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 3 | 3 | 2 |
| 179 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 |
| 180 | 2 | 3 | 2 | 3 | 1 | 1 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 2 |

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

| | | | |
|------------------|---|--------------------------|----------|
| Test date | 2023-11-23 | Test Ambient: | 25.2 ° C |
| Test Orientation | As intended | Stabilization Time (min) | 90 |
| Model Number | IK-TPS1-25/20/15W2FTBTB1A2-GRD30/40/50 (15W) | | |

Electrical Measurement:

| Sample No. | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | THD % |
|--------------------|---------------|----------------|-------------|-----------|--------------|-----------|
| UTC231103 0E-A1 | 120.0 | 60 | 0.124 | 14.82 | 0.992 | 6.44 |
| | 277.0 | 60 | 0.061 | 15.19 | 0.899 | 14.12 |
| DLC Pass Criteria | | | | | >= 0.9(-3%) | <= 20(+5) |

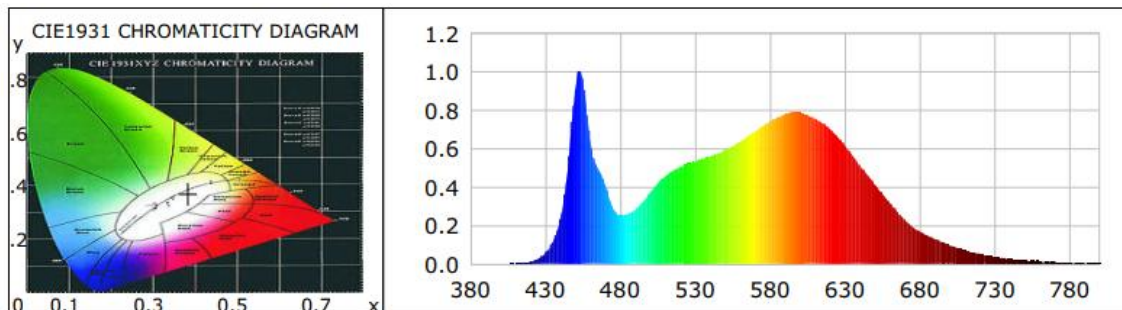
Chromaticity Measurement - Sphere-Spectroradiometer Method:

| Parameter | Result | Special Color Rendering Indices | | | |
|-----------------------------|------------------------|---------------------------------|----|-----|----|
| Test Voltage (V) | 120.0 | R1 | 85 | R9 | 19 |
| Frequency (Hz) | 60 | R2 | 93 | R10 | 83 |
| CCT (K) | 3947 | R3 | 96 | R11 | 83 |
| Duv | -0.0023 | R4 | 81 | R12 | 65 |
| Chromaticity (x, y) | x=0.3811 y=0.3723 | R5 | 85 | R13 | 88 |
| Chromaticity (u', v') | u(u')=0.2274 v'=0.4997 | R6 | 90 | R14 | 99 |
| Color Rendering Index (CRI) | 86 | R7 | 85 | R15 | 79 |
| R9 | 19 | R8 | 67 | -- | -- |
| Rf | 85 | -- | -- | -- | -- |
| Rg | 95 | -- | -- | -- | -- |
| Rcs,h1(%) | -11 | | | | |

Photometric Measurement – Sphere-Spectroradiometer Method:

| Parameter | Result | | DLC V5.1 Pass Criteria |
|-----------------------------------|--------|--------|------------------------|
| Test Voltage (V) | 120.0 | 277.0 | -- |
| Frequency (Hz) | 60 | 60 | |
| Total Luminous (lm) | 2302.8 | 2375.9 | 375 lm/ft (-10%) |
| Luminous Efficacy (lm/W) | 155.38 | 156.41 | Standard: >= 115(-3%) |
| Most worst Luminous/Highest Watts | 151.60 | | |

Spectral Power Distribution & Chromaticity Diagram



| WL(nm) | PL | PE(mW/nm) | WL(nm) | PL | PE(mW/nm) | WL(nm) | PL | PE(mW/nm) |
|--------|--------|-----------|--------|--------|-----------|--------|--------|-----------|
| 380 | 0.0005 | 0.0274 | 535 | 0.5222 | 28.0590 | 690 | 0.2271 | 12.2016 |
| 385 | 0.0004 | 0.0231 | 540 | 0.5334 | 28.6598 | 695 | 0.1927 | 10.3541 |
| 390 | 0.0008 | 0.0414 | 545 | 0.5467 | 29.3749 | 700 | 0.1689 | 9.0733 |
| 395 | 0.0006 | 0.0325 | 550 | 0.5601 | 30.0930 | 705 | 0.1479 | 7.9482 |
| 400 | 0.0008 | 0.0404 | 555 | 0.5754 | 30.9172 | 710 | 0.1308 | 7.0288 |
| 405 | 0.0014 | 0.0774 | 560 | 0.5944 | 31.9371 | 715 | 0.1134 | 6.0935 |
| 410 | 0.0012 | 0.0638 | 565 | 0.6144 | 33.0155 | 720 | 0.0971 | 5.2179 |
| 415 | 0.0046 | 0.2486 | 570 | 0.6371 | 34.2317 | 725 | 0.0823 | 4.4236 |
| 420 | 0.0117 | 0.6273 | 575 | 0.6635 | 35.6536 | 730 | 0.0709 | 3.8107 |
| 425 | 0.0263 | 1.4138 | 580 | 0.6901 | 37.0796 | 735 | 0.0598 | 3.2108 |
| 430 | 0.0560 | 3.0074 | 585 | 0.7177 | 38.5632 | 740 | 0.0515 | 2.7656 |
| 435 | 0.1159 | 6.2280 | 590 | 0.7434 | 39.9455 | 745 | 0.0435 | 2.3395 |
| 440 | 0.2327 | 12.5030 | 595 | 0.7628 | 40.9848 | 750 | 0.0371 | 1.9922 |
| 445 | 0.4933 | 26.5056 | 600 | 0.7810 | 41.9663 | 755 | 0.0295 | 1.5875 |
| 450 | 0.9036 | 48.5523 | 605 | 0.7895 | 42.4246 | 760 | 0.0270 | 1.4527 |
| 455 | 0.9655 | 51.8793 | 610 | 0.7880 | 42.3431 | 765 | 0.0243 | 1.3068 |
| 460 | 0.6467 | 34.7497 | 615 | 0.7746 | 41.6220 | 770 | 0.0185 | 0.9924 |
| 465 | 0.4999 | 26.8607 | 620 | 0.7575 | 40.6998 | 775 | 0.0173 | 0.9310 |
| 470 | 0.4108 | 22.0749 | 625 | 0.7322 | 39.3427 | 780 | 0.0148 | 0.7969 |
| 475 | 0.2941 | 15.8002 | 630 | 0.7034 | 37.7964 | 785 | 0.0109 | 0.5856 |
| 480 | 0.2516 | 13.5207 | 635 | 0.6626 | 35.6039 | 790 | 0.0117 | 0.6295 |
| 485 | 0.2613 | 14.0379 | 640 | 0.6168 | 33.1434 | 795 | 0.0091 | 0.4888 |
| 490 | 0.2840 | 15.2605 | 645 | 0.5663 | 30.4286 | 800 | 0.0047 | 0.2550 |
| 495 | 0.3225 | 17.3279 | 650 | 0.5126 | 27.5439 | | | |
| 500 | 0.3728 | 20.0291 | 655 | 0.4614 | 24.7914 | | | |
| 505 | 0.4188 | 22.5051 | 660 | 0.4129 | 22.1883 | | | |
| 510 | 0.4562 | 24.5108 | 665 | 0.3640 | 19.5569 | | | |
| 515 | 0.4840 | 26.0053 | 670 | 0.3171 | 17.0406 | | | |
| 520 | 0.5044 | 27.1030 | 675 | 0.2705 | 14.5362 | | | |
| 525 | 0.5222 | 28.0590 | 680 | 0.2271 | 12.2016 | | | |
| 530 | 0.5334 | 28.6598 | 685 | 0.1927 | 10.3541 | | | |

TM30

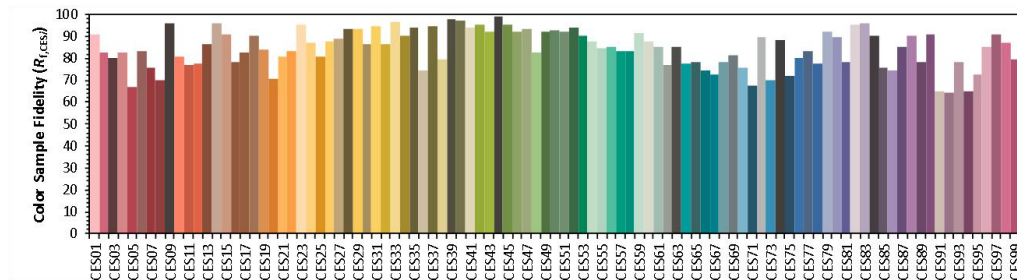
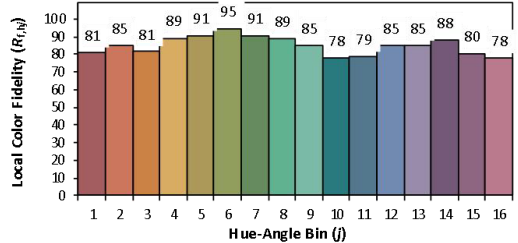
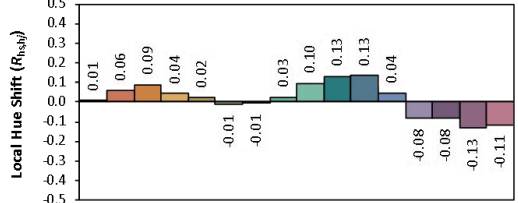
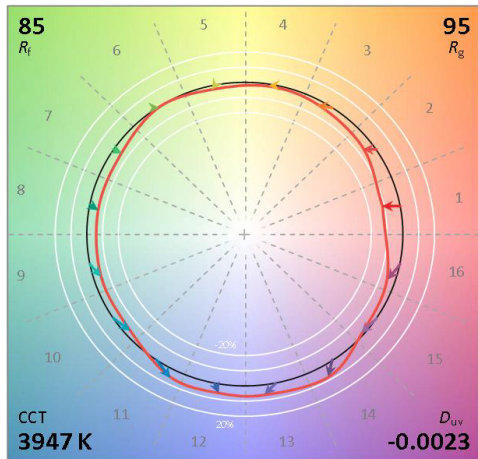
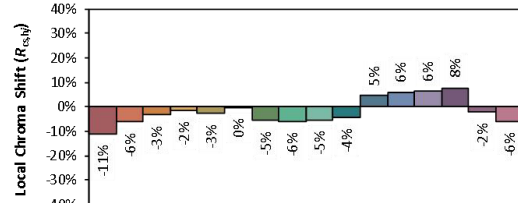
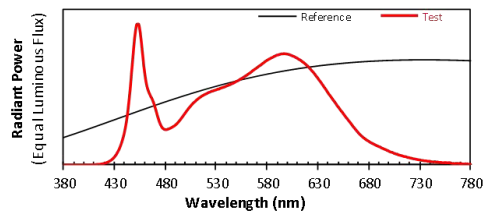
ANSI/IES TM-30-18 Color Rendition Report

Source: L128-3080RA35000H1
L128-5080RA35000H1

Manufacturer: IKIO LED LIGHTING

Date: 2023/11/23

Model: IK-TPS1-25/20/15W2FTBTB1A2-GRD30/40/50 (15W)



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3811
 y 0.3722
 u' 0.2274
 v' 0.4997

CIE 13.3-1995
(CRI)
 R_a 86
 R_g 19

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

2.3 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction BL-QP-033)

| | | | |
|------------------|--|--------------------------|----------|
| Test date | 2023-11-23 | Test Ambient: | 25.2 ° C |
| Test Orientation | As intended | Stabilization Time (min) | 90 |
| Model Number | IK-TPS1-25/20/15W2FTBTB1A2-GRD30/40/50 (15W) | | |

Electrical Measurement:

| Sample No. | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | THD % |
|--------------------|---------------|----------------|-------------|-----------|--------------|-----------|
| UTC231103 0E-A1 | 120.0 | 60 | 0.127 | 15.07 | 0.992 | 6.24 |
| | 277.0 | 60 | 0.064 | 15.87 | 0.9 | 14.27 |
| DLC Pass Criteria | | | | | >= 0.9(-3%) | <= 20(+5) |

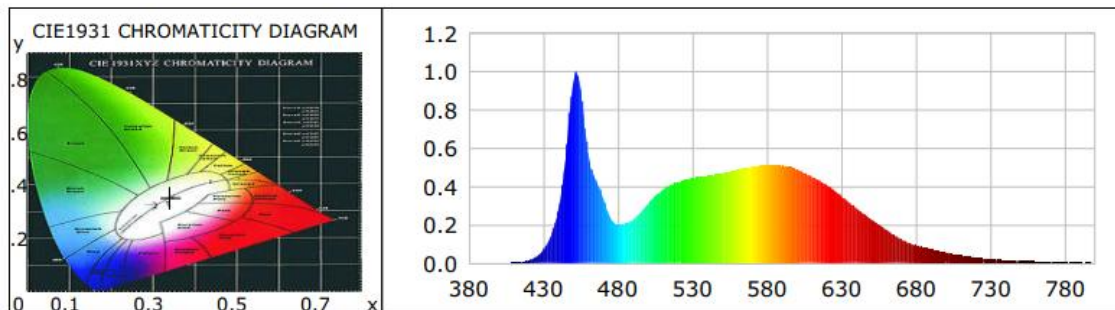
Chromaticity Measurement - Sphere-Spectroradiometer Method:

| Parameter | Result | Special Color Rendering Indices | | | |
|-----------------------------|------------------------|---------------------------------|----|-----|----|
| Test Voltage (V) | 120.0 | R1 | 82 | R9 | 8 |
| Frequency (Hz) | 60 | R2 | 89 | R10 | 74 |
| CCT (K) | 5174 | R3 | 93 | R11 | 82 |
| Duv | 0.0017 | R4 | 83 | R12 | 59 |
| Chromaticity (x, y) | x=0.3406 y=0.3512 | R5 | 83 | R13 | 84 |
| Chromaticity (u', v') | u(u')=0.2085 v'=0.4838 | R6 | 84 | R14 | 97 |
| Color Rendering Index (CRI) | 83 | R7 | 86 | R15 | 77 |
| R9 | 8 | R8 | 67 | -- | -- |
| Rf | 83 | -- | -- | -- | -- |
| Rg | 95 | -- | -- | -- | -- |
| Rcs,h1(%) | -13 | | | | |

Photometric Measurement – Sphere-Spectroradiometer Method:

| Parameter | Result | | DLC V5.1 Pass Criteria |
|-----------------------------------|--------|--------|------------------------|
| Test Voltage (V) | 120.0 | 277.0 | -- |
| Frequency (Hz) | 60 | 60 | |
| Total Luminous (lm) | 2355.8 | 2353.2 | 375 lm/ft (-10%) |
| Luminous Efficacy (lm/W) | 156.32 | 148.28 | Standard: >= 115(-3%) |
| Most worst Luminous/Highest Watts | 148.28 | | |

Spectral Power Distribution & Chromaticity Diagram



| WL(nm) | PL | PE(mW/nm) | WL(nm) | PL | PE(mW/nm) | WL(nm) | PL | PE(mW/nm) |
|--------|--------|-----------|--------|--------|-----------|--------|--------|-----------|
| 380 | 0.0003 | 0.0261 | 535 | 0.4344 | 33.0674 | 690 | 0.1253 | 9.5381 |
| 385 | 0.0003 | 0.0201 | 540 | 0.4414 | 33.5983 | 695 | 0.1056 | 8.0415 |
| 390 | 0.0006 | 0.0488 | 545 | 0.4487 | 34.1601 | 700 | 0.0932 | 7.0954 |
| 395 | 0.0005 | 0.0355 | 550 | 0.4552 | 34.6503 | 705 | 0.0824 | 6.2721 |
| 400 | 0.0013 | 0.0959 | 555 | 0.4616 | 35.1409 | 710 | 0.0726 | 5.5296 |
| 405 | 0.0010 | 0.0744 | 560 | 0.4694 | 35.7322 | 715 | 0.0621 | 4.7274 |
| 410 | 0.0022 | 0.1666 | 565 | 0.4773 | 36.3346 | 720 | 0.0529 | 4.0253 |
| 415 | 0.0056 | 0.4227 | 570 | 0.4847 | 36.8993 | 725 | 0.0466 | 3.5500 |
| 420 | 0.0145 | 1.1052 | 575 | 0.4947 | 37.6561 | 730 | 0.0385 | 2.9314 |
| 425 | 0.0325 | 2.4767 | 580 | 0.5025 | 38.2535 | 735 | 0.0335 | 2.5495 |
| 430 | 0.0704 | 5.3602 | 585 | 0.5081 | 38.6770 | 740 | 0.0281 | 2.1411 |
| 435 | 0.1424 | 10.8413 | 590 | 0.5103 | 38.8461 | 745 | 0.0243 | 1.8532 |
| 440 | 0.2770 | 21.0848 | 595 | 0.5110 | 38.9005 | 750 | 0.0214 | 1.6273 |
| 445 | 0.5538 | 42.1590 | 600 | 0.5089 | 38.7380 | 755 | 0.0165 | 1.2586 |
| 450 | 0.9371 | 71.3384 | 605 | 0.5010 | 38.1361 | 760 | 0.0160 | 1.2174 |
| 455 | 0.9144 | 69.6075 | 610 | 0.4891 | 37.2314 | 765 | 0.0138 | 1.0498 |
| 460 | 0.5830 | 44.3825 | 615 | 0.4717 | 35.9086 | 770 | 0.0122 | 0.9282 |
| 465 | 0.4374 | 33.3007 | 620 | 0.4521 | 34.4154 | 775 | 0.0103 | 0.7818 |
| 470 | 0.3403 | 25.9030 | 625 | 0.4316 | 32.8558 | 780 | 0.0073 | 0.5533 |
| 475 | 0.2372 | 18.0535 | 630 | 0.4081 | 31.0679 | 785 | 0.0067 | 0.5108 |
| 480 | 0.2005 | 15.2669 | 635 | 0.3787 | 28.8307 | 790 | 0.0068 | 0.5194 |
| 485 | 0.2072 | 15.7743 | 640 | 0.3483 | 26.5154 | 795 | 0.0036 | 0.2778 |
| 490 | 0.2266 | 17.2474 | 645 | 0.3184 | 24.2414 | 800 | 0.0024 | 0.1815 |
| 495 | 0.2630 | 20.0248 | 650 | 0.2860 | 21.7730 | | | |
| 500 | 0.3086 | 23.4956 | 655 | 0.2569 | 19.5531 | | | |
| 505 | 0.3498 | 26.6304 | 660 | 0.2279 | 17.3487 | | | |
| 510 | 0.3831 | 29.1630 | 665 | 0.2012 | 15.3151 | | | |
| 515 | 0.4065 | 30.9432 | 670 | 0.1746 | 13.2930 | | | |
| 520 | 0.4227 | 32.1819 | 675 | 0.1485 | 11.3059 | | | |
| 525 | 0.4344 | 33.0674 | 680 | 0.1253 | 9.5381 | | | |
| 530 | 0.4414 | 33.5983 | 685 | 0.1056 | 8.0415 | | | |

TM30

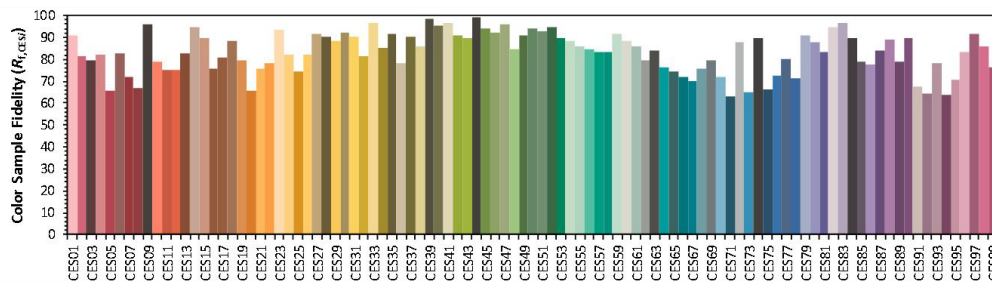
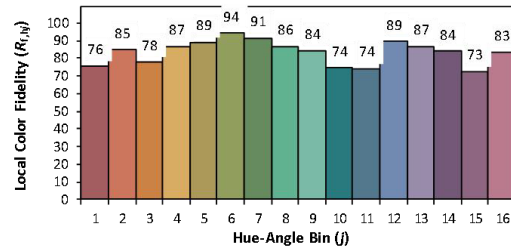
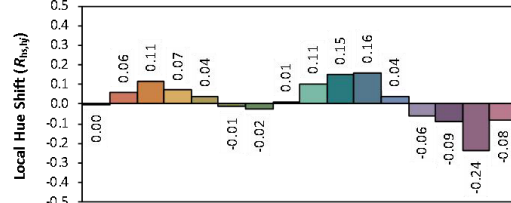
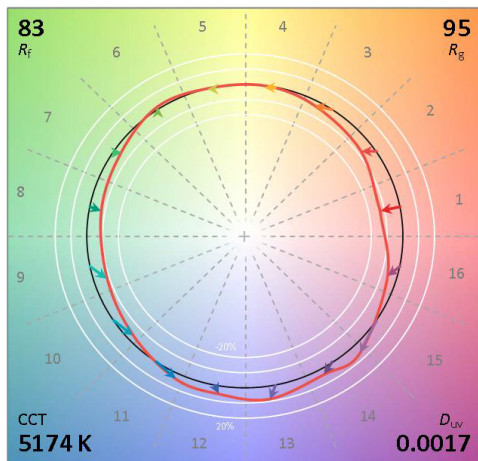
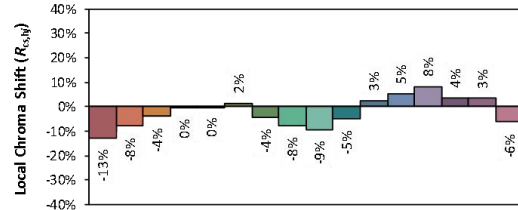
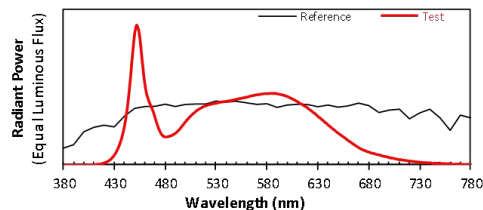
ANSI/IES TM-30-18 Color Rendition Report

Source: L128-5080RA35000H1

Manufacturer: IKIO LED LIGHTING

Date: 2023/11/23

Model: IK-TPS1-25/20/15W2FTBTB1A2-GRD30/40/50 (15W)



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3406
 y 0.3512
 u' 0.2085
 v' 0.4838

CIE 13.3-1995
(CRI)

R_a 83
 R_g 8

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

3. Test Equipment

| Equipment Name | Model No. | Serial No. | Calibration Date |
|--|-----------|-------------|------------------|
| Goniophotometric System | GPM-3000 | DYHXF120001 | 2023-01-17 |
| AC Power Source | CHP-500C | DYBWD010159 | 2023-01-18 |
| Total Luminous Flux Standard Lamp | 24V/150W | DYJYR040040 | 2023-02-01 |
| Digital Power Meter | WT500 | DYDWQ20010 | 2023-01-18 |
| Integral Sphere (2M) | 2M | DYJCE120067 | 2023-01-17 |
| Digital Power Meter | WT500 | DYDWQ200006 | 2023-01-18 |
| Optical Color and Electrical Measurement System | CMS-3000S | DYJCE120067 | 2023-01-17 |
| Expand Uncertainty: Photometric Measurement (Sphere): 2.08%, k=2 Chromaticity Measurement(Sphere):25.6K, k=2 Photometric Measurement(Goniophotometer):2.645%, k=2 | | | |

***** END OF REPORT *****