

# ANSI/IES LM-79-19

## MEASUREMENT AND TEST REPORT

For

### GREEN CREATIVE LTD

Room 3603, Level 36, Tower 1, Enterprise Square Five, 38 Wang Chiu Road, Kowloon Bay, Kowloon,  
Hong Kong, China

**Test Model: 11PAR30SNDIM/950FL40/SL+SL25D**

|                       |   |
|-----------------------|---|
| <b>Report Type:</b>   | Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution, THD   |
| <b>Reviewed By:</b>   | Hill Liu   |
| <b>Report Number:</b> | KS2230727-43661E-EE   |
| <b>Test Date:</b>     | 2023-07-26 to 2023-07-27  |
| <b>Report Date:</b>   | 2023-08-25  |
| <b>Approved by:</b>   | Blake Zhang / EE Engineer   |
| <b>Prepared By:</b>   | Bay Area Compliance Laboratories Corp. (Shenzhen)<br>5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial<br>Building D, Shihua Road, Futian Free Trade Zone<br>Shenzhen, Guangdong, China.<br>Tel: +86-755-33320018<br>Fax: +86-755-33320008 |
| <b>Test Facility:</b> | Test facility was located at No.12, Pulong East 1 <sup>st</sup> Road, Tangxia Town, Dongguan, Guangdong, China.   |

**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.(Shenzhen). This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, or any agency of the U.S. Government.

## 1. Product Description#

### General Information:

Two test samples were in good condition and received on 2023-07-27. One was tested in integrating sphere and the other was tested in goniophotometer

Model Tested: 11PAR30SNDIM/950FL40/SL+SL25D  
Manufacturer: GREEN CREATIVE LTD  
Brand Name: GREEN CREATIVE  
Product Designation: Directional LED Lamp  
Burning Time Before Test: 0hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 120V AC 60Hz  
Rated Power: 11W  
Nominal CCT: 5000K  
Nominal Lumen Output: 1030lm

### Family Declaration

| The Model                     | Multiple Models         | Differences Items | Details   |
|-------------------------------|-------------------------|-------------------|---|
| 11PAR30SNDIM/950FL40/SL+SL25D | 11PAR30SNDIM/950NF25/SL | Model Number      | 11PAR30SNDIM/950FL40/SL+SL25D & 11PAR30SNDIM/950NF25/SL are the same product except for the model number. |

## 2. Standards Used

- ANSI/IES LM-79-19: Approved method: Optical and Electrical Measurements of Solid-State Lighting Products
- ANSI C82.77-10-2014: Harmonic Emission Limits – Related Power Quality Requirements for Lighting
- \*IES TM-30-18: IES Method for Evaluating Light Source Color Rendition (This method is not in NVLAP accreditation scope)

### 3. Description of Test Equipment

| Device  | Manufacture | Model No    | Serial No         | Calibration date | Calibration due date |
|---|-------------|-------------|-------------------|------------------|----------------------|
| 2.0m integrating sphere                       | EVERFINE    | R98         | 11010018          | 2022-11-10       | 2023-11-09           |
| spectroradiometer                             | EVERFINE    | HAAS-2000   | G112048TS81331121 | 2022-11-10       | 2023-11-09           |
| Digital Power Meter                           | EVERFINE    | PF2010A     | 1011004           | 2022-11-10       | 2023-11-09           |
| Digital CC&CV DC Power Supply                 | EVERFINE    | WY305-V1    | 1101047           | 2022-11-10       | 2023-11-09           |
| Standard Light Source                         | EVERFINE    | D204        | N/A               | 2023-05-12       | 2025-05-11           |
| Special zero-voltage synchronous switching AC | EVERFINE    | DPS1010-YF  | 1011001T          | 2022-11-10       | 2023-11-09           |
| AC POWER SUPPLY                               | EVERFINE    | VPS1030 PWM | 1012017           | 2022-11-16       | 2023-11-15           |
| Digital CC&CV DC Power Supply                 | EVERFINE    | WY12010     | 1009009           | 2022-11-10       | 2023-11-09           |
| Digital power meter                           | YOKOGAWA    | WT-210      | 91j926132         | 2022-11-10       | 2023-11-09           |
| full-field speed goniophotometer              | EVERFINE    | GO-R5000    | YG108492N10120001 | 2022-11-10       | 2023-11-09           |
| wireless remote thermohygrometer              | N/A         | AOK-5017B   | N/A               | 2022-11-10       | 2023-11-09           |
| Standard Light Source                         | EVERFINE    | D908        | 1012003           | 2023-05-12       | 2025-05-11           |

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

## 4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with ANSI/IES LM-79-19. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at  $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$  during measurement. And relative humidity is maintained between 10% and 65%. The air flow around the SSL product is less than 0.2m/s.

### Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, Spectroradiometer, and integrating sphere. The integrating sphere system is calibrated by standard spectrum light source before measurement.

$4\pi$  geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the light output (luminous flux) measurements is  $U=2.1\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=22\text{K}$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=2.1(K=2)$ , at the 95% confidence level.

The uncertainty of power meter AC current  $U=0.19\%$  of rdg, AC Voltage  $U=0.18\%$  of rdg, Power  $U=0.46\%$  ( $K=2$ ), at the 95% confidence level.

### Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report. The vertical angle ( $\gamma$ ) test intervals were set no more than 1 degree while data for 5 degree intervals is reported. The horizontal angle (C plane) test intervals were set no more than 22.5 degree.

The uncertainty of the luminous intensity is  $U=2.00\%$  ( $K=2$ ), at the 95% confidence level.

### Additional Test

The Additional Test item may not be covered by ANSI/IES LM-79-2019. Additional test including power factor, off-state power and THD, was measured by Digital Power Meter after stabilized at  $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$ . Test voltage for THD and power factor test would be equal to rated voltage or, in case of a voltage range, maximum value of that range.

The uncertainty of power meter AC current  $U=0.19\%$  of rdg, AC Voltage  $U=0.18\%$  of rdg, Power  $U=0.46\%$  ( $K=2$ ), at the 95% confidence level.

### Fidelity Index and Gamut Index Calculation

The  $R_i$ ,  $R_g$  was calculated according to IES TM-30-18 by using calculation tools. The calculation was based on the measured SPD from 380nm to 780nm with 1nm intervals. All the colors in this report is for reference only.

## 5. Test Result

### [Integrating Sphere System]

The Stabilization time: **30 minutes**

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Base Up**

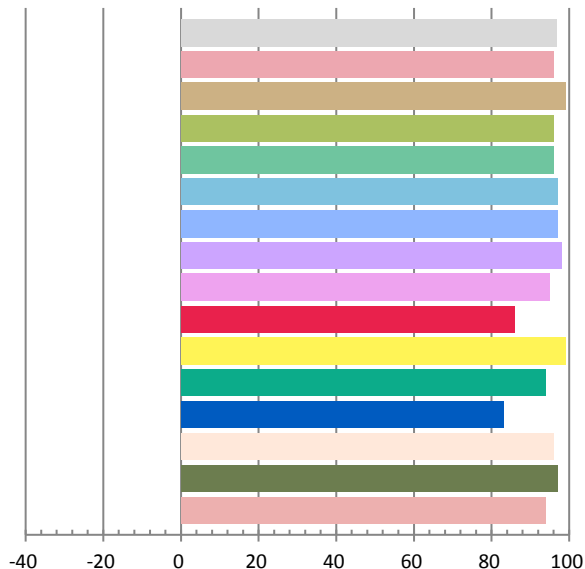
### Photometric and Electrical Measurement Result

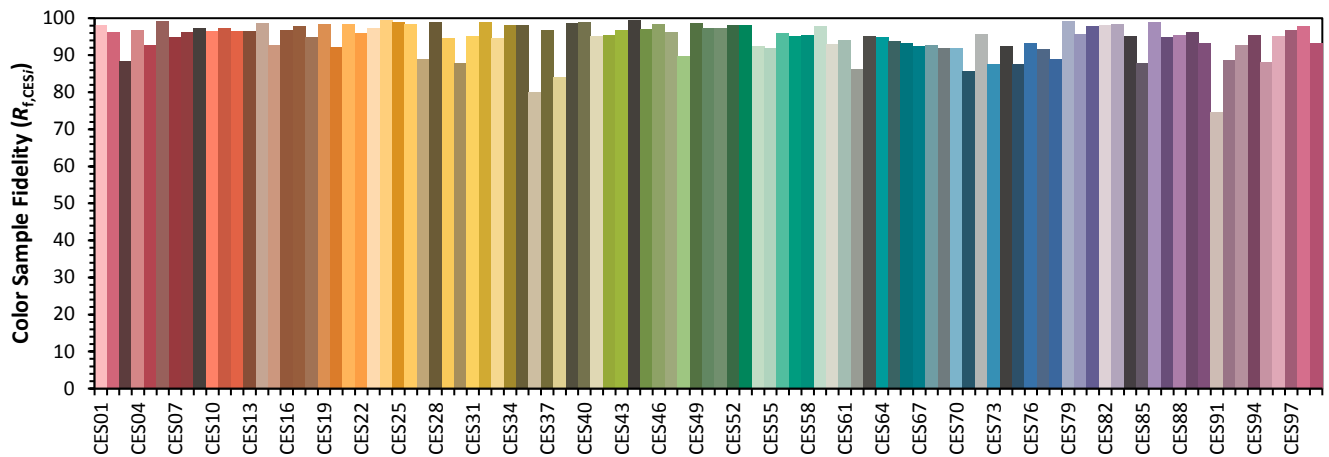
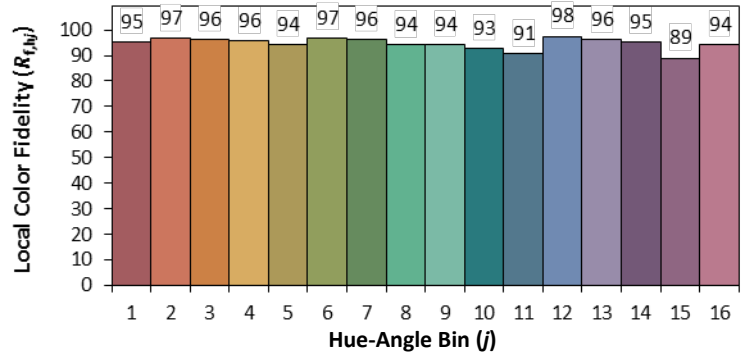
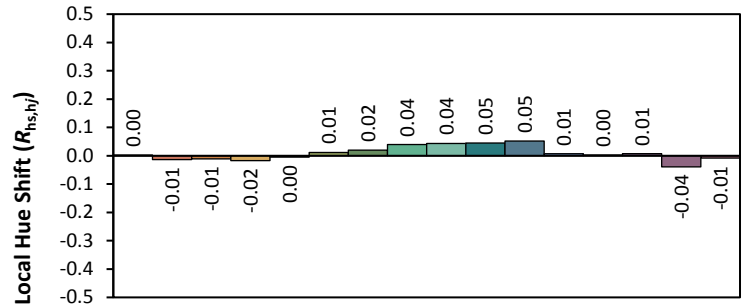
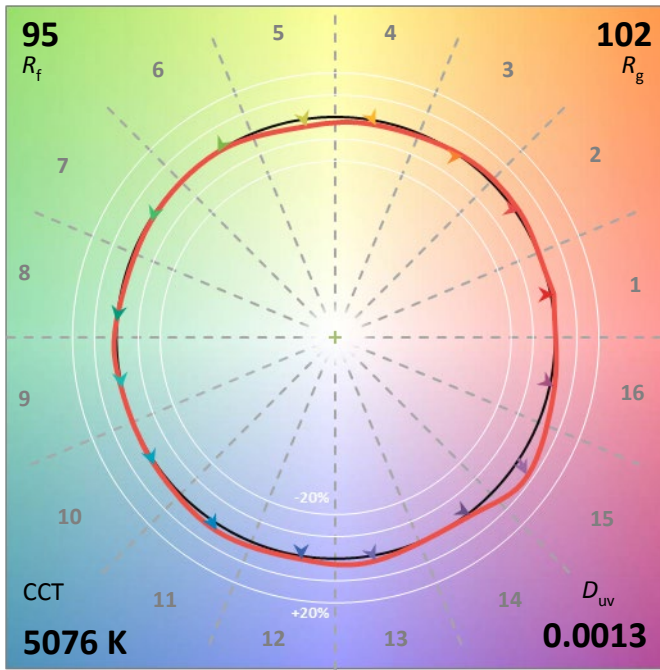
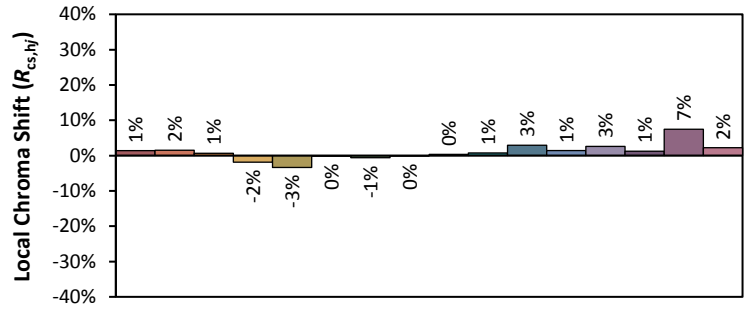
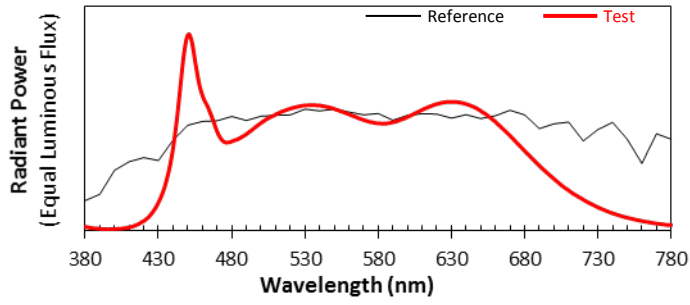
| Voltage (V) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | Luminous Flux(lm) | Efficacy (lm/W) |
|-------------|----------------|-------------|-----------|--------------|-------------------|-----------------|
| 120.0       | 60             | 0.09228     | 10.57     | 0.9543       | 1031.1            | 97.58           |

| Radiant Flux (W) | CCT (K) | Duv     | x      | y      | u'     | v'     |
|------------------|---------|---------|--------|--------|--------|--------|
| 3.866            | 5073    | 0.00136 | 0.3433 | 0.3529 | 0.2097 | 0.4850 |

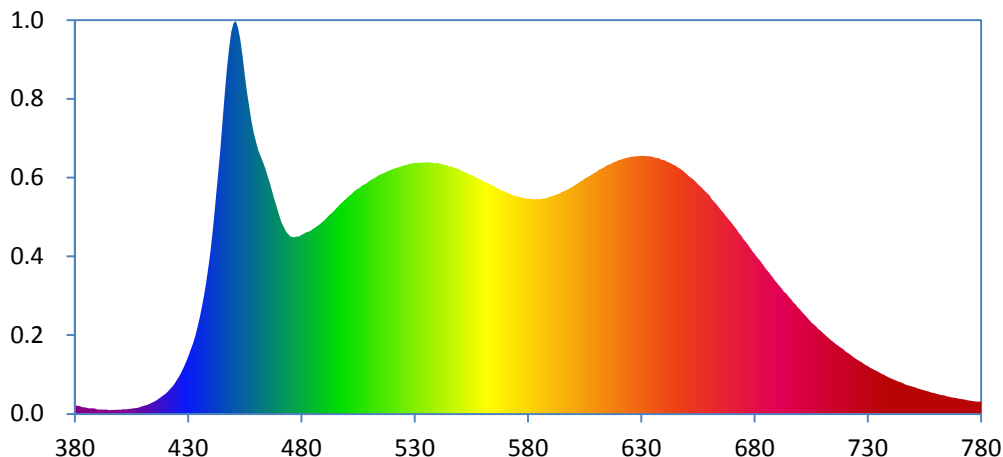
### Color Rendering Index

|             |            |            |            |
|-------------|------------|------------|------------|
| <b>Ra</b>   |            |            |            |
| <b>96.7</b> |            |            |            |
| <b>R1</b>   | <b>R2</b>  | <b>R3</b>  | <b>R4</b>  |
| 96          | 99         | 96         | 96         |
| <b>R5</b>   | <b>R6</b>  | <b>R7</b>  | <b>R8</b>  |
| 97          | 97         | 98         | 95         |
| <b>R9</b>   | <b>R10</b> | <b>R11</b> | <b>R12</b> |
| 86          | 99         | 94         | 83         |
| <b>R13</b>  | <b>R14</b> | <b>R15</b> |            |
| 96          | 97         | 94         |            |





### Relative Spectral Power Distribution

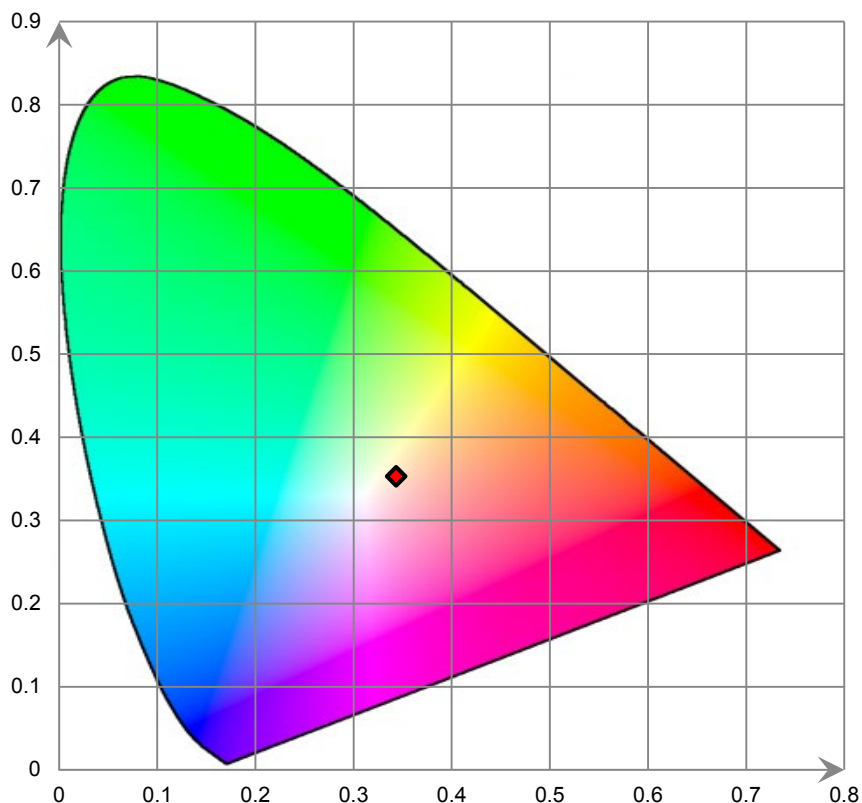


| nm  | mW        | nm  | mW        | nm  | mW        | nm  | mW        | nm  | mW        |
|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|
| 380 | 5.351E-01 | 421 | 1.354E+00 | 462 | 1.556E+01 | 503 | 1.343E+01 | 544 | 1.504E+01 |
| 381 | 5.000E-01 | 422 | 1.514E+00 | 463 | 1.522E+01 | 504 | 1.353E+01 | 545 | 1.497E+01 |
| 382 | 4.692E-01 | 423 | 1.646E+00 | 464 | 1.485E+01 | 505 | 1.363E+01 | 546 | 1.497E+01 |
| 383 | 4.161E-01 | 424 | 1.856E+00 | 465 | 1.440E+01 | 506 | 1.371E+01 | 547 | 1.490E+01 |
| 384 | 3.981E-01 | 425 | 2.059E+00 | 466 | 1.398E+01 | 507 | 1.384E+01 | 548 | 1.486E+01 |
| 385 | 3.826E-01 | 426 | 2.281E+00 | 467 | 1.349E+01 | 508 | 1.389E+01 | 549 | 1.482E+01 |
| 386 | 3.390E-01 | 427 | 2.534E+00 | 468 | 1.300E+01 | 509 | 1.397E+01 | 550 | 1.476E+01 |
| 387 | 3.364E-01 | 428 | 2.810E+00 | 469 | 1.250E+01 | 510 | 1.410E+01 | 551 | 1.466E+01 |
| 388 | 3.343E-01 | 429 | 3.116E+00 | 470 | 1.204E+01 | 511 | 1.417E+01 | 552 | 1.462E+01 |
| 389 | 3.144E-01 | 430 | 3.458E+00 | 471 | 1.162E+01 | 512 | 1.424E+01 | 553 | 1.457E+01 |
| 390 | 2.695E-01 | 431 | 3.852E+00 | 472 | 1.133E+01 | 513 | 1.433E+01 | 554 | 1.448E+01 |
| 391 | 2.554E-01 | 432 | 4.251E+00 | 473 | 1.106E+01 | 514 | 1.442E+01 | 555 | 1.443E+01 |
| 392 | 2.617E-01 | 433 | 4.691E+00 | 474 | 1.088E+01 | 515 | 1.448E+01 | 556 | 1.438E+01 |
| 393 | 2.593E-01 | 434 | 5.232E+00 | 475 | 1.075E+01 | 516 | 1.454E+01 | 557 | 1.430E+01 |
| 394 | 2.580E-01 | 435 | 5.810E+00 | 476 | 1.069E+01 | 517 | 1.460E+01 | 558 | 1.423E+01 |
| 395 | 2.307E-01 | 436 | 6.473E+00 | 477 | 1.070E+01 | 518 | 1.467E+01 | 559 | 1.417E+01 |
| 396 | 2.376E-01 | 437 | 7.204E+00 | 478 | 1.072E+01 | 519 | 1.473E+01 | 560 | 1.410E+01 |
| 397 | 2.406E-01 | 438 | 8.046E+00 | 479 | 1.074E+01 | 520 | 1.479E+01 | 561 | 1.402E+01 |
| 398 | 2.423E-01 | 439 | 8.997E+00 | 480 | 1.083E+01 | 521 | 1.484E+01 | 562 | 1.396E+01 |
| 399 | 2.513E-01 | 440 | 1.003E+01 | 481 | 1.089E+01 | 522 | 1.487E+01 | 563 | 1.389E+01 |
| 400 | 2.509E-01 | 441 | 1.131E+01 | 482 | 1.097E+01 | 523 | 1.494E+01 | 564 | 1.382E+01 |
| 401 | 2.703E-01 | 442 | 1.272E+01 | 483 | 1.103E+01 | 524 | 1.497E+01 | 565 | 1.377E+01 |
| 402 | 2.749E-01 | 443 | 1.419E+01 | 484 | 1.107E+01 | 525 | 1.502E+01 | 566 | 1.367E+01 |
| 403 | 2.794E-01 | 444 | 1.585E+01 | 485 | 1.119E+01 | 526 | 1.505E+01 | 567 | 1.361E+01 |
| 404 | 2.983E-01 | 445 | 1.760E+01 | 486 | 1.126E+01 | 527 | 1.509E+01 | 568 | 1.354E+01 |
| 405 | 3.143E-01 | 446 | 1.928E+01 | 487 | 1.138E+01 | 528 | 1.514E+01 | 569 | 1.347E+01 |
| 406 | 3.460E-01 | 447 | 2.087E+01 | 488 | 1.147E+01 | 529 | 1.515E+01 | 570 | 1.342E+01 |
| 407 | 3.624E-01 | 448 | 2.213E+01 | 489 | 1.158E+01 | 530 | 1.517E+01 | 571 | 1.336E+01 |
| 408 | 3.866E-01 | 449 | 2.314E+01 | 490 | 1.171E+01 | 531 | 1.518E+01 | 572 | 1.331E+01 |
| 409 | 4.367E-01 | 450 | 2.363E+01 | 491 | 1.183E+01 | 532 | 1.519E+01 | 573 | 1.325E+01 |
| 410 | 4.661E-01 | 451 | 2.376E+01 | 492 | 1.198E+01 | 533 | 1.520E+01 | 574 | 1.319E+01 |
| 411 | 5.094E-01 | 452 | 2.334E+01 | 493 | 1.210E+01 | 534 | 1.520E+01 | 575 | 1.315E+01 |
| 412 | 5.497E-01 | 453 | 2.264E+01 | 494 | 1.224E+01 | 535 | 1.521E+01 | 576 | 1.314E+01 |
| 413 | 6.094E-01 | 454 | 2.164E+01 | 495 | 1.239E+01 | 536 | 1.521E+01 | 577 | 1.308E+01 |
| 414 | 6.802E-01 | 455 | 2.048E+01 | 496 | 1.252E+01 | 537 | 1.520E+01 | 578 | 1.305E+01 |
| 415 | 7.435E-01 | 456 | 1.943E+01 | 497 | 1.268E+01 | 538 | 1.517E+01 | 579 | 1.303E+01 |
| 416 | 8.297E-01 | 457 | 1.843E+01 | 498 | 1.279E+01 | 539 | 1.516E+01 | 580 | 1.301E+01 |
| 417 | 9.241E-01 | 458 | 1.758E+01 | 499 | 1.294E+01 | 540 | 1.517E+01 | 581 | 1.301E+01 |
| 418 | 1.017E+00 | 459 | 1.692E+01 | 500 | 1.305E+01 | 541 | 1.513E+01 | 582 | 1.299E+01 |
| 419 | 1.133E+00 | 460 | 1.637E+01 | 501 | 1.320E+01 | 542 | 1.510E+01 | 583 | 1.296E+01 |
| 420 | 1.231E+00 | 461 | 1.589E+01 | 502 | 1.329E+01 | 543 | 1.507E+01 | 584 | 1.300E+01 |

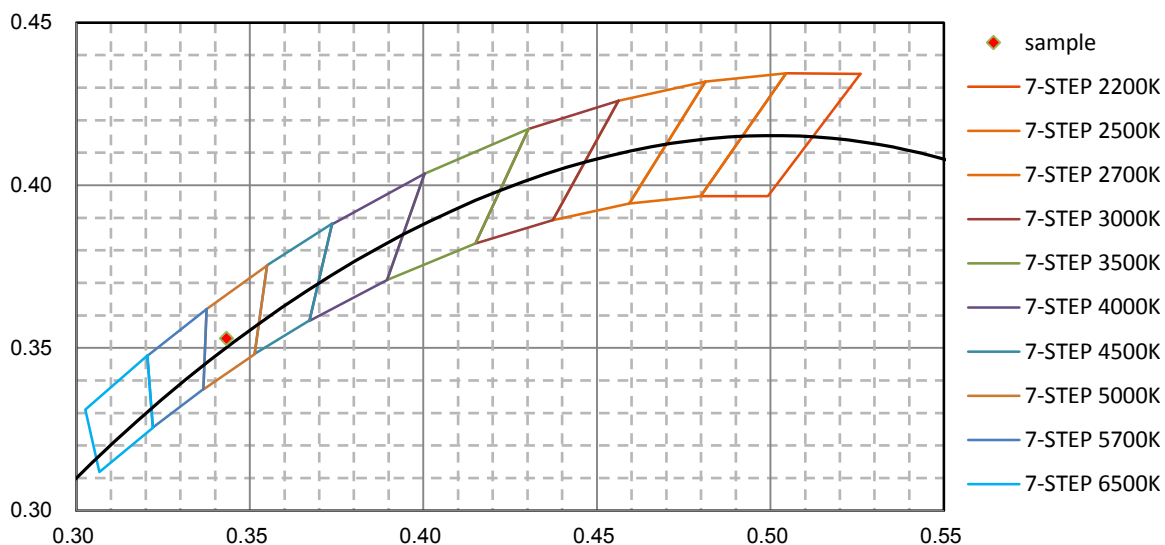
| nm  | mW        | nm  | mW        | nm  | mW        | nm  | mW        | nm  | mW        |
|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|
| 585 | 1.297E+01 | 626 | 1.557E+01 | 667 | 1.203E+01 | 708 | 5.144E+00 | 749 | 1.664E+00 |
| 586 | 1.301E+01 | 627 | 1.557E+01 | 668 | 1.185E+01 | 709 | 5.043E+00 | 750 | 1.626E+00 |
| 587 | 1.303E+01 | 628 | 1.558E+01 | 669 | 1.169E+01 | 710 | 4.914E+00 | 751 | 1.588E+00 |
| 588 | 1.304E+01 | 629 | 1.559E+01 | 670 | 1.151E+01 | 711 | 4.784E+00 | 752 | 1.535E+00 |
| 589 | 1.311E+01 | 630 | 1.560E+01 | 671 | 1.133E+01 | 712 | 4.654E+00 | 753 | 1.497E+00 |
| 590 | 1.315E+01 | 631 | 1.561E+01 | 672 | 1.116E+01 | 713 | 4.546E+00 | 754 | 1.454E+00 |
| 591 | 1.319E+01 | 632 | 1.559E+01 | 673 | 1.095E+01 | 714 | 4.415E+00 | 755 | 1.416E+00 |
| 592 | 1.322E+01 | 633 | 1.559E+01 | 674 | 1.078E+01 | 715 | 4.332E+00 | 756 | 1.379E+00 |
| 593 | 1.329E+01 | 634 | 1.557E+01 | 675 | 1.058E+01 | 716 | 4.218E+00 | 757 | 1.343E+00 |
| 594 | 1.335E+01 | 635 | 1.555E+01 | 676 | 1.042E+01 | 717 | 4.112E+00 | 758 | 1.296E+00 |
| 595 | 1.343E+01 | 636 | 1.550E+01 | 677 | 1.024E+01 | 718 | 4.012E+00 | 759 | 1.260E+00 |
| 596 | 1.348E+01 | 637 | 1.547E+01 | 678 | 1.005E+01 | 719 | 3.916E+00 | 760 | 1.231E+00 |
| 597 | 1.355E+01 | 638 | 1.545E+01 | 679 | 9.846E+00 | 720 | 3.788E+00 | 761 | 1.194E+00 |
| 598 | 1.360E+01 | 639 | 1.536E+01 | 680 | 9.682E+00 | 721 | 3.684E+00 | 762 | 1.160E+00 |
| 599 | 1.370E+01 | 640 | 1.535E+01 | 681 | 9.482E+00 | 722 | 3.600E+00 | 763 | 1.128E+00 |
| 600 | 1.377E+01 | 641 | 1.527E+01 | 682 | 9.322E+00 | 723 | 3.493E+00 | 764 | 1.111E+00 |
| 601 | 1.387E+01 | 642 | 1.521E+01 | 683 | 9.151E+00 | 724 | 3.406E+00 | 765 | 1.065E+00 |
| 602 | 1.393E+01 | 643 | 1.517E+01 | 684 | 8.947E+00 | 725 | 3.306E+00 | 766 | 1.033E+00 |
| 603 | 1.403E+01 | 644 | 1.507E+01 | 685 | 8.766E+00 | 726 | 3.221E+00 | 767 | 1.005E+00 |
| 604 | 1.411E+01 | 645 | 1.501E+01 | 686 | 8.608E+00 | 727 | 3.140E+00 | 768 | 9.728E-01 |
| 605 | 1.422E+01 | 646 | 1.491E+01 | 687 | 8.418E+00 | 728 | 3.054E+00 | 769 | 9.521E-01 |
| 606 | 1.429E+01 | 647 | 1.484E+01 | 688 | 8.246E+00 | 729 | 2.951E+00 | 770 | 9.256E-01 |
| 607 | 1.438E+01 | 648 | 1.473E+01 | 689 | 8.069E+00 | 730 | 2.884E+00 | 771 | 8.986E-01 |
| 608 | 1.446E+01 | 649 | 1.462E+01 | 690 | 7.899E+00 | 731 | 2.799E+00 | 772 | 8.736E-01 |
| 609 | 1.456E+01 | 650 | 1.451E+01 | 691 | 7.722E+00 | 732 | 2.716E+00 | 773 | 8.531E-01 |
| 610 | 1.463E+01 | 651 | 1.436E+01 | 692 | 7.568E+00 | 733 | 2.640E+00 | 774 | 8.278E-01 |
| 611 | 1.473E+01 | 652 | 1.427E+01 | 693 | 7.386E+00 | 734 | 2.582E+00 | 775 | 8.118E-01 |
| 612 | 1.481E+01 | 653 | 1.417E+01 | 694 | 7.259E+00 | 735 | 2.501E+00 | 776 | 7.779E-01 |
| 613 | 1.487E+01 | 654 | 1.404E+01 | 695 | 7.071E+00 | 736 | 2.422E+00 | 777 | 7.561E-01 |
| 614 | 1.495E+01 | 655 | 1.389E+01 | 696 | 6.928E+00 | 737 | 2.364E+00 | 778 | 7.379E-01 |
| 615 | 1.504E+01 | 656 | 1.377E+01 | 697 | 6.744E+00 | 738 | 2.287E+00 | 779 | 7.393E-01 |
| 616 | 1.508E+01 | 657 | 1.362E+01 | 698 | 6.619E+00 | 739 | 2.219E+00 | 780 | 7.407E-01 |
| 617 | 1.516E+01 | 658 | 1.347E+01 | 699 | 6.440E+00 | 740 | 2.160E+00 |     |           |
| 618 | 1.523E+01 | 659 | 1.334E+01 | 700 | 6.325E+00 | 741 | 2.107E+00 |     |           |
| 619 | 1.528E+01 | 660 | 1.322E+01 | 701 | 6.142E+00 | 742 | 2.045E+00 |     |           |
| 620 | 1.535E+01 | 661 | 1.300E+01 | 702 | 6.004E+00 | 743 | 1.984E+00 |     |           |
| 621 | 1.537E+01 | 662 | 1.284E+01 | 703 | 5.859E+00 | 744 | 1.932E+00 |     |           |
| 622 | 1.543E+01 | 663 | 1.270E+01 | 704 | 5.694E+00 | 745 | 1.878E+00 |     |           |
| 623 | 1.547E+01 | 664 | 1.253E+01 | 705 | 5.552E+00 | 746 | 1.816E+00 |     |           |
| 624 | 1.552E+01 | 665 | 1.236E+01 | 706 | 5.424E+00 | 747 | 1.761E+00 |     |           |
| 625 | 1.553E+01 | 666 | 1.220E+01 | 707 | 5.283E+00 | 748 | 1.720E+00 |     |           |



CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



**[Goniophotometer System]**

The Stabilization time: **30 minutes**

Total operating time for luminous intensity distribution: **1.0 hour**

Test orientation: **Base up**

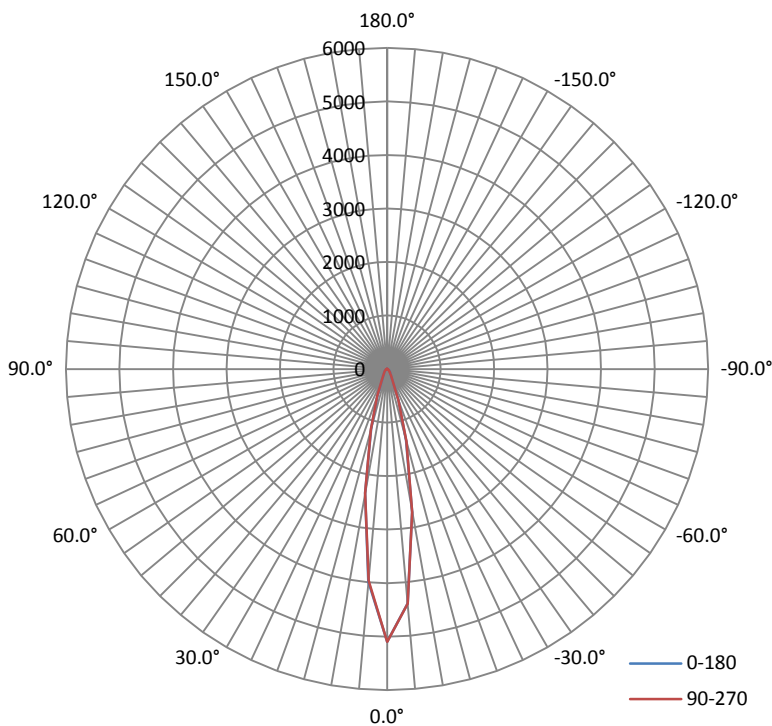
**Electrical Measurement**

| Input Voltage (V) | Frequency (Hz) | Input Current (A) | Power (W) | Power Factor |
|-------------------|----------------|-------------------|-----------|--------------|
| 120.05            | 60             | 0.0924            | 10.580    | 0.9538       |

**Photometric Measurement**

| Luminous Flux (lm) | Efficacy (lm/W) | I <sub>max</sub> (cd) | S/MH (C0/180) | S/MH (C90/270) |
|--------------------|-----------------|-----------------------|---------------|----------------|
| 1032.99            | 97.64           | 5132                  | 0.36          | 0.36           |

**Luminous Intensity Distribution**



|                                      | C0/180 | C45/225 | C90/270 | C135/315 | AVG. |
|--------------------------------------|--------|---------|---------|----------|------|
| Beam Angle (50% I <sub>max</sub> ):  | 19.8   | 19.9    | 19.8    | 19.7     | 19.8 |
| Field Angle (10% I <sub>max</sub> ): | 41.1   | 41.6    | 41.3    | 41.2     | 41.3 |

**Luminous Intensity (cd) Distribution Data**

| C<br>y | 0°   | 22.5° | 45°  | 67.5° | 90°  | 112.5° | 135° | 157.5° |
|--------|------|-------|------|-------|------|--------|------|--------|
| 0.0°   | 5096 | 5096  | 5096 | 5096  | 5096 | 5096   | 5096 | 5096   |
| 5.0°   | 3991 | 3976  | 3976 | 3950  | 3973 | 4019   | 4072 | 4155   |
| 10.0°  | 2345 | 2357  | 2365 | 2346  | 2359 | 2386   | 2430 | 2490   |
| 15.0°  | 1145 | 1148  | 1160 | 1156  | 1165 | 1173   | 1192 | 1227   |
| 20.0°  | 515  | 519   | 539  | 532   | 528  | 536    | 544  | 558    |
| 25.0°  | 227  | 233   | 239  | 240   | 237  | 236    | 236  | 239    |
| 30.0°  | 135  | 137   | 138  | 139   | 138  | 137    | 137  | 137    |
| 35.0°  | 100  | 102   | 102  | 100   | 100  | 101    | 102  | 103    |
| 40.0°  | 80   | 80    | 81   | 80    | 80   | 81     | 81   | 81     |
| 45.0°  | 66   | 66    | 66   | 66    | 65   | 65     | 66   | 67     |
| 50.0°  | 52   | 52    | 52   | 52    | 52   | 52     | 53   | 53     |
| 55.0°  | 43   | 43    | 43   | 43    | 43   | 43     | 43   | 44     |
| 60.0°  | 34   | 34    | 34   | 34    | 34   | 34     | 35   | 35     |
| 65.0°  | 26   | 26    | 26   | 26    | 26   | 26     | 27   | 27     |
| 70.0°  | 20   | 20    | 20   | 20    | 20   | 20     | 20   | 20     |
| 75.0°  | 14   | 14    | 14   | 14    | 14   | 14     | 14   | 14     |
| 80.0°  | 9    | 9     | 9    | 9     | 9    | 9      | 9    | 9      |
| 85.0°  | 4    | 4     | 4    | 4     | 4    | 4      | 5    | 5      |
| 90.0°  | 1    | 1     | 1    | 1     | 1    | 1      | 1    | 1      |
| 95.0°  | 0    | 0     | 0    | 0     | 0    | 0      | 0    | 0      |
| 100.0° | 0    | 0     | 0    | 0     | 0    | 0      | 0    | 0      |
| 105.0° | 0    | 0     | 0    | 0     | 0    | 0      | 0    | 0      |
| 110.0° | 0    | 0     | 0    | 0     | 0    | 0      | 0    | 0      |
| 115.0° | 0    | 0     | 0    | 0     | 0    | 0      | 0    | 0      |
| 120.0° | 0    | 0     | 0    | 0     | 0    | 0      | 0    | 0      |
| 125.0° | 0    | 0     | 0    | 0     | 0    | 0      | 0    | 0      |
| 130.0° | 0    | 0     | 0    | 0     | 0    | 0      | 0    | 0      |
| 135.0° | 0    | 0     | 0    | 0     | 0    | 0      | 0    | 0      |
| 140.0° | 1    | 1     | 1    | 1     | 1    | 1      | 1    | 1      |
| 145.0° | 2    | 2     | 2    | 2     | 2    | 2      | 2    | 2      |
| 150.0° | 2    | 2     | 2    | 2     | 2    | 2      | 2    | 2      |
| 155.0° | 3    | 3     | 3    | 3     | 3    | 3      | 3    | 3      |
| 160.0° | 3    | 3     | 3    | 3     | 3    | 3      | 3    | 3      |
| 165.0° | 3    | 3     | 3    | 3     | 3    | 3      | 3    | 3      |
| 170.0° | 3    | 3     | 3    | 3     | 3    | 3      | 3    | 3      |
| 175.0° | 2    | 2     | 2    | 2     | 2    | 2      | 2    | 2      |
| 180.0° | 1    | 1     | 1    | 1     | 1    | 1      | 1    | 1      |

**Luminous Intensity (cd) Distribution Data (cont.)**

| $\begin{matrix} C \\ \backslash \\ \gamma \end{matrix}$ | 180° | 202.5° | 225° | 247.5° | 270° | 292.5° | 315° | 337.5° |
|---|------|--------|------|--------|------|--------|------|--------|
| 0.0°  | 5096 | 5096   | 5096 | 5096   | 5096 | 5096   | 5096 | 5096   |
| 5.0°  | 4396 | 4453   | 4465 | 4445   | 4402 | 4338   | 4256 | 4191   |
| 10.0°   | 2716 | 2744   | 2750 | 2756   | 2718 | 2650   | 2571 | 2518   |
| 15.0°   | 1385 | 1402   | 1414 | 1417   | 1394 | 1340   | 1314 | 1286   |
| 20.0°   | 615  | 623    | 626  | 627    | 618  | 595    | 576  | 566    |
| 25.0°   | 268  | 271    | 272  | 271    | 266  | 254    | 245  | 243    |
| 30.0°   | 148  | 147    | 144  | 143    | 144  | 140    | 137  | 139    |
| 35.0°   | 104  | 102    | 101  | 101    | 102  | 100    | 100  | 102    |
| 40.0°   | 84   | 84     | 84   | 83     | 84   | 83     | 83   | 82     |
| 45.0°   | 69   | 68     | 67   | 67     | 67   | 66     | 65   | 66     |
| 50.0°   | 55   | 56     | 55   | 54     | 54   | 53     | 53   | 53     |
| 55.0°   | 45   | 45     | 45   | 45     | 45   | 44     | 44   | 44     |
| 60.0°   | 37   | 37     | 37   | 36     | 36   | 36     | 36   | 35     |
| 65.0°   | 28   | 28     | 28   | 28     | 28   | 28     | 28   | 27     |
| 70.0°   | 21   | 22     | 21   | 21     | 21   | 21     | 21   | 21     |
| 75.0°   | 15   | 16     | 15   | 15     | 15   | 15     | 15   | 15     |
| 80.0°   | 10   | 10     | 10   | 10     | 10   | 10     | 10   | 9      |
| 85.0°   | 5    | 6      | 5    | 5      | 5    | 5      | 5    | 5      |
| 90.0°   | 2    | 2      | 2    | 2      | 2    | 2      | 2    | 2      |
| 95.0°   | 0    | 0      | 0    | 0      | 0    | 0      | 0    | 0      |
| 100.0°  | 0    | 0      | 0    | 0      | 0    | 0      | 0    | 0      |
| 105.0°  | 0    | 0      | 0    | 0      | 0    | 0      | 0    | 0      |
| 110.0°  | 0    | 0      | 0    | 0      | 0    | 0      | 0    | 0      |
| 115.0°  | 0    | 0      | 0    | 0      | 0    | 0      | 0    | 0      |
| 120.0°  | 0    | 0      | 0    | 0      | 0    | 0      | 0    | 0      |
| 125.0°  | 0    | 0      | 0    | 0      | 0    | 0      | 0    | 0      |
| 130.0°  | 0    | 0      | 0    | 0      | 0    | 0      | 0    | 0      |
| 135.0°  | 0    | 0      | 0    | 0      | 0    | 0      | 0    | 0      |
| 140.0°  | 0    | 0      | 0    | 0      | 0    | 0      | 0    | 0      |
| 145.0°  | 0    | 0      | 0    | 0      | 0    | 0      | 0    | 0      |
| 150.0°  | 1    | 1      | 1    | 1      | 1    | 1      | 1    | 1      |
| 155.0°  | 1    | 1      | 1    | 1      | 1    | 1      | 1    | 1      |
| 160.0°  | 1    | 1      | 1    | 1      | 1    | 1      | 1    | 1      |
| 165.0°  | 1    | 1      | 1    | 1      | 1    | 1      | 1    | 1      |
| 170.0°  | 1    | 1      | 1    | 1      | 1    | 1      | 1    | 1      |
| 175.0°  | 1    | 1      | 1    | 1      | 1    | 1      | 1    | 1      |
| 180.0°  | 1    | 1      | 1    | 1      | 1    | 1      | 1    | 1      |

**Zonal Lumen Density Measurement**

| Deg     | Flux (lm) | %     |
|---------|-----------|-------|
| 0-5     | 110.5     | 10.69 |
| 5-10    | 234.1     | 22.66 |
| 10-15   | 214.3     | 20.75 |
| 15-20   | 141.7     | 13.72 |
| 20-25   | 79.8      | 7.73  |
| 25-30   | 45.9      | 4.44  |
| 30-35   | 34.7      | 3.36  |
| 35-40   | 30.3      | 2.93  |
| 40-45   | 27.3      | 2.64  |
| 45-50   | 24.1      | 2.33  |
| 50-55   | 21.1      | 2.03  |
| 55-60   | 18.3      | 1.78  |
| 60-65   | 15.1      | 1.46  |
| 65-70   | 12.0      | 1.17  |
| 70-75   | 9.1       | 0.88  |
| 75-80   | 6.4       | 0.62  |
| 80-85   | 3.9       | 0.38  |
| 85-90   | 1.7       | 0.16  |
| 90-95   | 0.4       | 0.03  |
| 95-100  | 0.0       | 0.01  |
| 100-105 | 0.0       | 0.00  |
| 105-110 | 0.0       | 0.00  |
| 110-115 | 0.0       | 0.00  |
| 115-120 | 0.0       | 0.00  |
| 120-125 | 0.0       | 0.00  |
| 125-130 | 0.0       | 0.00  |
| 130-135 | 0.1       | 0.01  |
| 135-140 | 0.1       | 0.01  |
| 140-145 | 0.3       | 0.03  |
| 145-150 | 0.4       | 0.03  |
| 150-155 | 0.4       | 0.04  |
| 155-160 | 0.4       | 0.04  |
| 160-165 | 0.3       | 0.04  |
| 165-170 | 0.2       | 0.02  |
| 170-175 | 0.1       | 0.01  |
| 175-180 | 0.0       | 0.00  |

| Deg   | Flux (lm) | %      |
|-------|-----------|--------|
| 0-5   | 110.5     | 10.69  |
| 0-10  | 344.5     | 33.35  |
| 0-15  | 558.9     | 54.10  |
| 0-20  | 700.6     | 67.82  |
| 0-25  | 780.4     | 75.55  |
| 0-30  | 826.3     | 79.99  |
| 0-35  | 861.0     | 83.35  |
| 0-40  | 891.2     | 86.28  |
| 0-45  | 918.5     | 88.92  |
| 0-50  | 942.6     | 91.25  |
| 0-55  | 963.6     | 93.28  |
| 0-60  | 982.0     | 95.06  |
| 0-65  | 997.1     | 96.52  |
| 0-70  | 1009.1    | 97.69  |
| 0-75  | 1018.3    | 98.57  |
| 0-80  | 1024.7    | 99.19  |
| 0-85  | 1028.5    | 99.57  |
| 0-90  | 1030.2    | 99.73  |
| 0-95  | 1030.6    | 99.76  |
| 0-100 | 1030.6    | 99.77  |
| 0-105 | 1030.6    | 99.77  |
| 0-110 | 1030.6    | 99.77  |
| 0-115 | 1030.6    | 99.77  |
| 0-120 | 1030.6    | 99.77  |
| 0-125 | 1030.6    | 99.77  |
| 0-130 | 1030.7    | 99.77  |
| 0-135 | 1030.7    | 99.78  |
| 0-140 | 1030.8    | 99.79  |
| 0-145 | 1031.1    | 99.82  |
| 0-150 | 1031.5    | 99.85  |
| 0-155 | 1031.9    | 99.89  |
| 0-160 | 1032.3    | 99.93  |
| 0-165 | 1032.6    | 99.97  |
| 0-170 | 1032.9    | 99.99  |
| 0-175 | 1033.0    | 100.00 |
| 0-180 | 1033.0    | 100.00 |

| Test Item                  | Test Voltage (V) | Frequency (Hz) | Test Result |
|----------------------------|------------------|----------------|-------------|
| Total Harmonic Distortion: | 120.0            | 60             | 16.94%      |

## 6. Product Photo



## Directions

1. The information marked "superscript #" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. This report includes some test methods are not in NVLAP accreditation scope marked \*.
3. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor  $K=2$  with the 95% confidence interval.
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