



# 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, KL, Hong Kong

**Test Model: 9FA19DIM/927/R**

|                          |   |
|--------------------------|---|
| <b>Report Type:</b>      | Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution, THD   |
| <b>Project Engineer:</b> | George Yang   |
| <b>Report Number:</b>    | RKSB210628038-10  |
| <b>Test Date:</b>        | 2021-07-02 to 2021-07-10  |
| <b>Report Date:</b>      | 2021-07-12  |
| <b>Reviewed By:</b>      | Seven Xia/ EE Engineer  |
| <b>Prepared By:</b>      | Bay Area Compliance Laboratories Corp. (Kunshan).<br>No. 248 Chenghu Road, Kunshan, Jiangsu Province,<br>People's Republic of China<br>Tel: +86-0512-86175000<br>Fax: +86-0512-88934268 |
| <b>Accreditation:</b>    | The A2LA Accreditation Number 4323.01.  |

## 1. Product Description #

### General Information:

One sample was received on 2021-06-28 and used for testing.

Model Tested: 9FA19DIM/927/R  
 Manufacturer: GREEN CREATIVE LTD  
 Brand Name: GREEN CREATIVE  
 Product Designation: LED Lamp  
 Burning Time Before Test: 0hour (For New Products)

### Rated Values:

Rated Voltage/Frequency: 120VAC 60Hz  
 Rated Power: 9W  
 Nominal CCT: 2700K  
 Nominal Lumen Output: 810lm

## 2. Standards Used

- 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 Equipment
- IES TM-30-18: IES Method for Evaluating Light Source Color Rendition

## 3. Description of Test Equipment

| Device                        | Manufacture | Model No  | Serial No         | Calibration date | Calibration due date |
|-------------------------------|-------------|-----------|-------------------|------------------|----------------------|
| 2.0m integrating sphere       | EVERFINE    | R98       | G121960CS1361154D | 2020-12-23       | 2021-12-22           |
| spectroradiometer             | EVERFINE    | HAAS-2000 | M12048CS1361148   | 2020-12-23       | 2021-12-22           |
| Digital CC&CV DC Power Supply | EVERFINE    | WY305     | G115986CN1361134  | 2020-11-25       | 2021-11-24           |
| Thermal Meter                 | ANYMETRE    | TH-20E    | N/A               | 2020-11-30       | 2021-11-29           |
| Standard Light Source         | EVERFINE    | D215S     | G119786CS1361115  | 2020-10-20       | 2021-10-19           |
| Digital Power Meter           | YOKOGAWA    | WT210     | 91KB35700         | 2021-03-16       | 2022-03-15           |
| Intelligence ac power supply  | EVERFINE    | DPS1005   | G119890CS1361121  | 2020-12-25       | 2021-12-24           |
| AC Power Supply               | INVENTFINE  | CHP-5KVA  | 900511765         | 2020-11-25       | 2021-11-24           |
| DC Power Supply               | INVENTFINE  | WL3010    | JWDMP030001       | 2020-11-25       | 2021-11-24           |
| Power Meter                   | INVENTFINE  | WT500     | GSDSQ200007       | 2021-03-16       | 2022-03-15           |
| Goniophotometer               | INVENTFINE  | GPM-1900  | YWGCF120001       | 2020-12-23       | 2021-12-22           |
| Wireless Weather Station      | ZHONGXING   | KG218     | N/A               | 2020-11-27       | 2021-11-26           |
| Standard Light Source         | INVENTFINE  | N/A       | JWBYR040008       | 2020-12-23       | 2022-12-22           |

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) 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% than 65%.

### 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  $U_{rel}=2.7\%$  ( $k=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=27\text{K}$  ( $k=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=2.7(k=2)$ , at the 95% confidence level.

The uncertainty of power meter AC current  $U_{rel}=0.27\%$  of rdg, AC Voltage  $U_{rel}=0.26\%$  of rdg, Power  $U_{rel}=0.41\%$  ( $k=2$ ), 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. For measurement of luminous intensity distribution, the horizontal angle (C plane) test intervals were set 22.5 degree, the vertical angle ( $\gamma$ ) test intervals were set 1 degree while data for 5 degree intervals is reported.

The uncertainty of the luminous flux is  $U_{rel}=2.6\%$  ( $k=2$ ), at the 95% confidence level.

### Additional Test

The Additional Test item may not be covered by IESNA LM-79-2008. Additional test including power factor, off-state power and THD, was measured by Digital Power Meter after stabilized at  $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$ . 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  $U_{rel}=0.27\%$  of rdg, AC Voltage  $U_{rel}=0.26\%$  of rdg, Power  $U_{rel}=0.41\%$  ( $k=2$ ), 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]

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

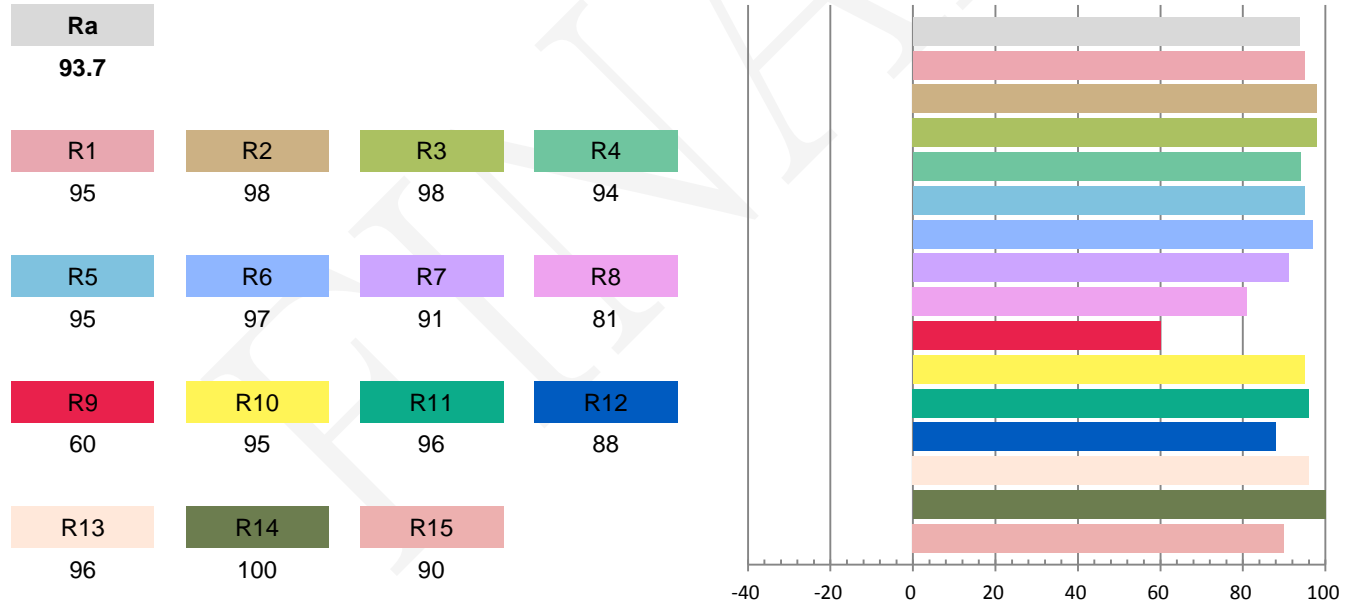
Test orientation: **Base Up**

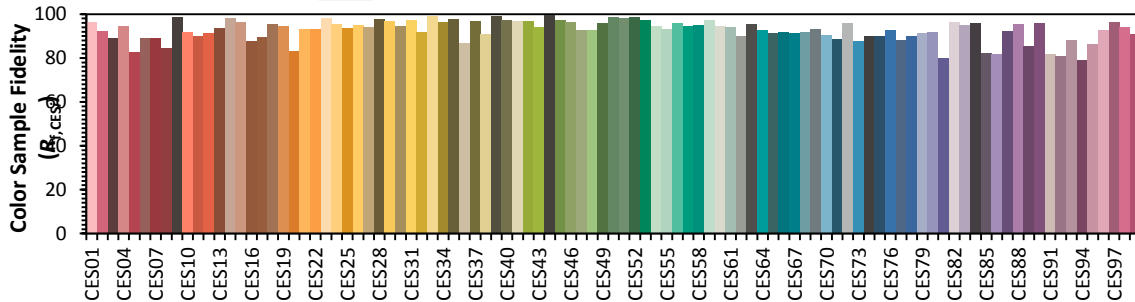
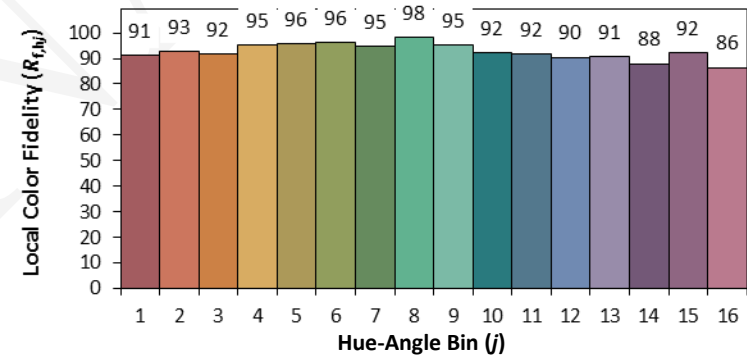
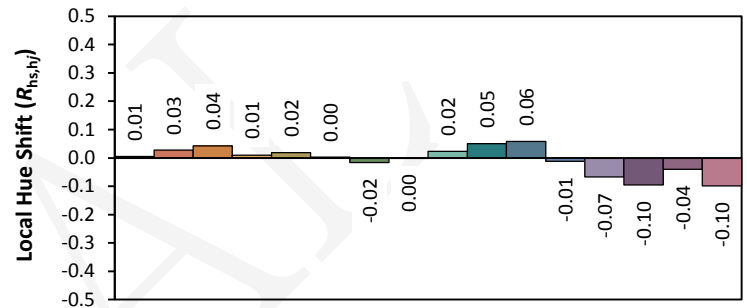
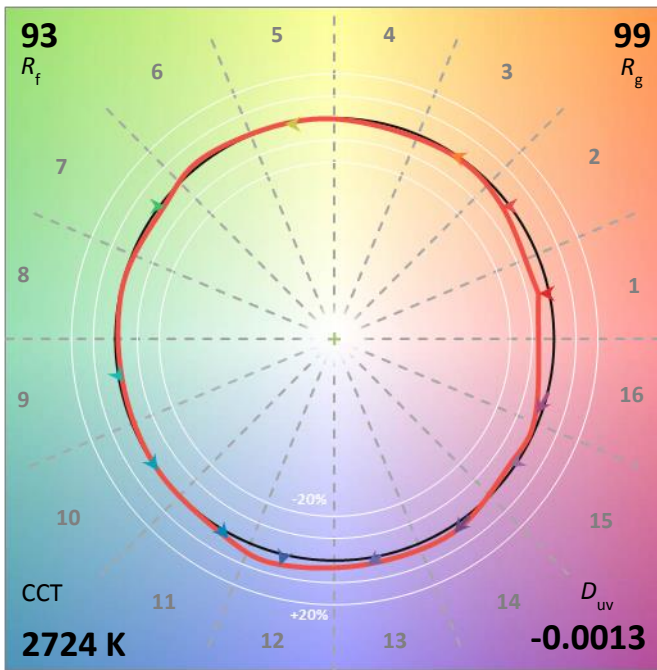
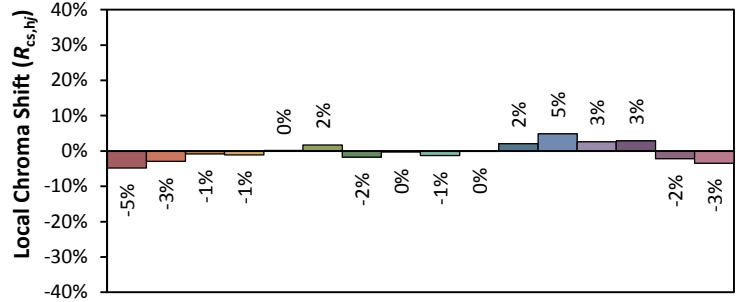
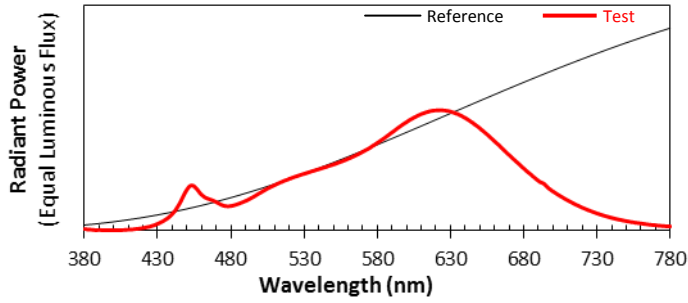
### Photometric and Electrical Measurement Result

| Voltage(V) | Frequency(Hz) | Current(A) | Power (W) | Power Factor | Luminous Flux(lm) | Efficacy(lm/W) |
|------------|---------------|------------|-----------|--------------|-------------------|----------------|
| 120.0      | 60            | 0.07778    | 7.62      | 0.8163       | 851.73            | 111.78         |

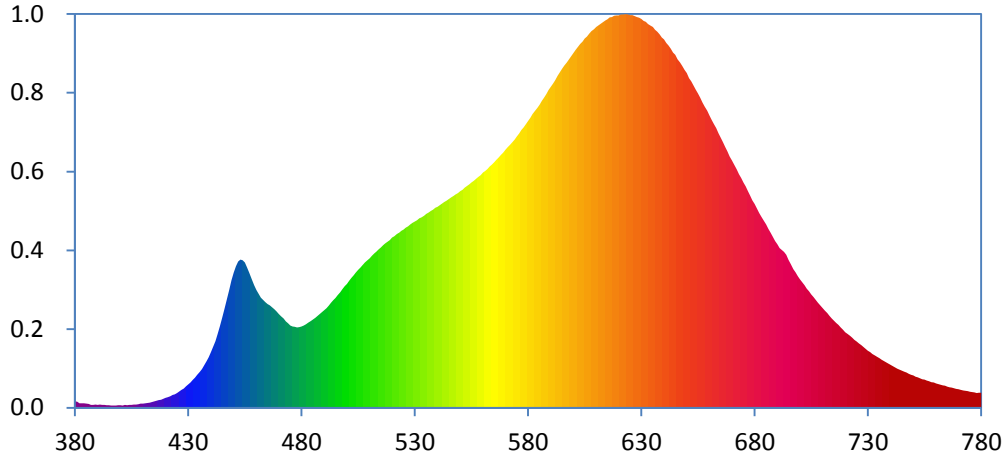
| Radiant Flux (W) | CCT (K) | Duv      | x      | y      | u'     | v'     |
|------------------|---------|----------|--------|--------|--------|--------|
| 3.031            | 2725    | -0.00129 | 0.4557 | 0.4062 | 0.2618 | 0.5250 |

### Color Rendering Index





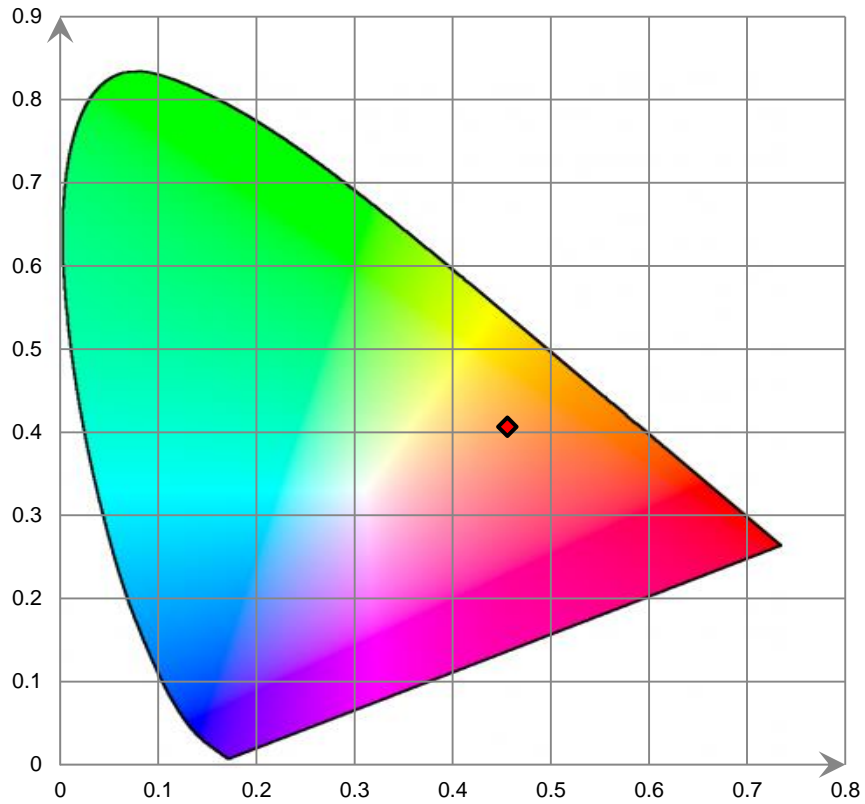
Relative Spectral Power Distribution



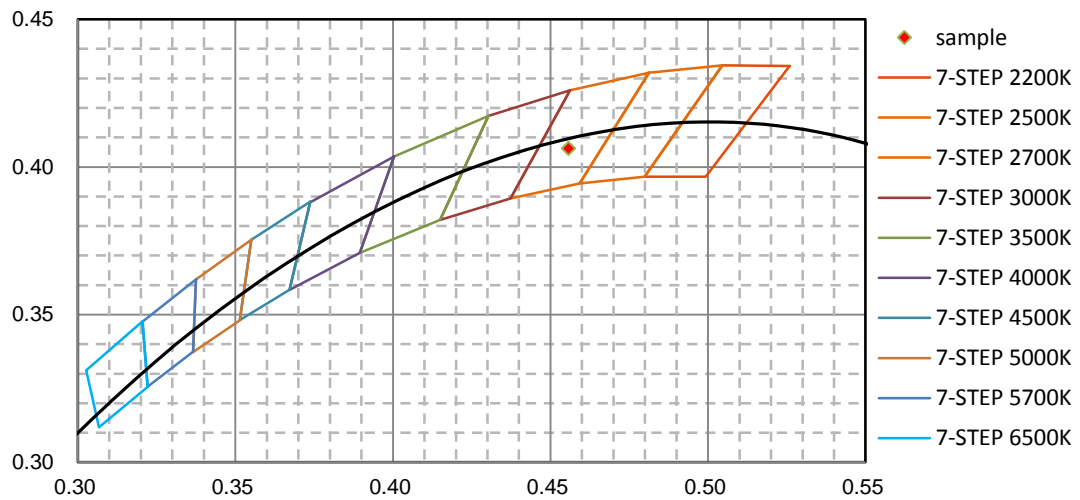
| nm  | mW        | nm  | mW        | nm  | mW        | nm  | mW        | nm  | mW        |
|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|
| 380 | 3.085E-01 | 421 | 4.942E-01 | 462 | 5.222E+00 | 503 | 6.280E+00 | 544 | 9.820E+00 |
| 381 | 2.926E-01 | 422 | 5.454E-01 | 463 | 5.108E+00 | 504 | 6.424E+00 | 545 | 9.891E+00 |
| 382 | 2.168E-01 | 423 | 6.016E-01 | 464 | 5.005E+00 | 505 | 6.542E+00 | 546 | 9.979E+00 |
| 383 | 2.085E-01 | 424 | 6.395E-01 | 465 | 4.916E+00 | 506 | 6.653E+00 | 547 | 1.005E+01 |
| 384 | 2.030E-01 | 425 | 7.031E-01 | 466 | 4.853E+00 | 507 | 6.775E+00 | 548 | 1.012E+01 |
| 385 | 1.924E-01 | 426 | 7.729E-01 | 467 | 4.769E+00 | 508 | 6.887E+00 | 549 | 1.018E+01 |
| 386 | 1.801E-01 | 427 | 8.417E-01 | 468 | 4.675E+00 | 509 | 6.992E+00 | 550 | 1.027E+01 |
| 387 | 1.386E-01 | 428 | 9.127E-01 | 469 | 4.570E+00 | 510 | 7.092E+00 | 551 | 1.034E+01 |
| 388 | 1.313E-01 | 429 | 1.019E+00 | 470 | 4.454E+00 | 511 | 7.207E+00 | 552 | 1.044E+01 |
| 389 | 1.434E-01 | 430 | 1.103E+00 | 471 | 4.340E+00 | 512 | 7.319E+00 | 553 | 1.052E+01 |
| 390 | 1.365E-01 | 431 | 1.203E+00 | 472 | 4.229E+00 | 513 | 7.411E+00 | 554 | 1.059E+01 |
| 391 | 1.459E-01 | 432 | 1.319E+00 | 473 | 4.092E+00 | 514 | 7.514E+00 | 555 | 1.068E+01 |
| 392 | 1.288E-01 | 433 | 1.417E+00 | 474 | 4.008E+00 | 515 | 7.607E+00 | 556 | 1.076E+01 |
| 393 | 1.371E-01 | 434 | 1.562E+00 | 475 | 3.907E+00 | 516 | 7.714E+00 | 557 | 1.086E+01 |
| 394 | 1.165E-01 | 435 | 1.704E+00 | 476 | 3.854E+00 | 517 | 7.800E+00 | 558 | 1.094E+01 |
| 395 | 1.163E-01 | 436 | 1.841E+00 | 477 | 3.833E+00 | 518 | 7.881E+00 | 559 | 1.104E+01 |
| 396 | 1.026E-01 | 437 | 2.010E+00 | 478 | 3.806E+00 | 519 | 7.957E+00 | 560 | 1.115E+01 |
| 397 | 1.072E-01 | 438 | 2.201E+00 | 479 | 3.828E+00 | 520 | 8.073E+00 | 561 | 1.123E+01 |
| 398 | 9.997E-02 | 439 | 2.404E+00 | 480 | 3.858E+00 | 521 | 8.128E+00 | 562 | 1.133E+01 |
| 399 | 1.160E-01 | 440 | 2.641E+00 | 481 | 3.905E+00 | 522 | 8.238E+00 | 563 | 1.144E+01 |
| 400 | 1.192E-01 | 441 | 2.894E+00 | 482 | 3.955E+00 | 523 | 8.305E+00 | 564 | 1.154E+01 |
| 401 | 1.125E-01 | 442 | 3.162E+00 | 483 | 4.030E+00 | 524 | 8.393E+00 | 565 | 1.164E+01 |
| 402 | 1.307E-01 | 443 | 3.500E+00 | 484 | 4.108E+00 | 525 | 8.459E+00 | 566 | 1.176E+01 |
| 403 | 1.230E-01 | 444 | 3.867E+00 | 485 | 4.181E+00 | 526 | 8.546E+00 | 567 | 1.186E+01 |
| 404 | 1.310E-01 | 445 | 4.262E+00 | 486 | 4.267E+00 | 527 | 8.611E+00 | 568 | 1.199E+01 |
| 405 | 1.352E-01 | 446 | 4.679E+00 | 487 | 4.362E+00 | 528 | 8.692E+00 | 569 | 1.210E+01 |
| 406 | 1.473E-01 | 447 | 5.163E+00 | 488 | 4.440E+00 | 529 | 8.767E+00 | 570 | 1.223E+01 |
| 407 | 1.545E-01 | 448 | 5.591E+00 | 489 | 4.539E+00 | 530 | 8.838E+00 | 571 | 1.235E+01 |
| 408 | 1.592E-01 | 449 | 6.036E+00 | 490 | 4.632E+00 | 531 | 8.895E+00 | 572 | 1.248E+01 |
| 409 | 1.895E-01 | 450 | 6.405E+00 | 491 | 4.727E+00 | 532 | 8.983E+00 | 573 | 1.260E+01 |
| 410 | 2.005E-01 | 451 | 6.710E+00 | 492 | 4.846E+00 | 533 | 9.038E+00 | 574 | 1.272E+01 |
| 411 | 2.084E-01 | 452 | 6.942E+00 | 493 | 4.971E+00 | 534 | 9.113E+00 | 575 | 1.286E+01 |
| 412 | 2.236E-01 | 453 | 7.030E+00 | 494 | 5.104E+00 | 535 | 9.199E+00 | 576 | 1.301E+01 |
| 413 | 2.444E-01 | 454 | 7.005E+00 | 495 | 5.210E+00 | 536 | 9.261E+00 | 577 | 1.318E+01 |
| 414 | 2.733E-01 | 455 | 6.885E+00 | 496 | 5.339E+00 | 537 | 9.331E+00 | 578 | 1.330E+01 |
| 415 | 3.001E-01 | 456 | 6.648E+00 | 497 | 5.484E+00 | 538 | 9.400E+00 | 579 | 1.345E+01 |
| 416 | 3.309E-01 | 457 | 6.393E+00 | 498 | 5.625E+00 | 539 | 9.479E+00 | 580 | 1.360E+01 |
| 417 | 3.563E-01 | 458 | 6.117E+00 | 499 | 5.768E+00 | 540 | 9.532E+00 | 581 | 1.376E+01 |
| 418 | 3.825E-01 | 459 | 5.817E+00 | 500 | 5.879E+00 | 541 | 9.604E+00 | 582 | 1.393E+01 |
| 419 | 4.215E-01 | 460 | 5.579E+00 | 501 | 6.024E+00 | 542 | 9.687E+00 | 583 | 1.407E+01 |
| 420 | 4.612E-01 | 461 | 5.403E+00 | 502 | 6.159E+00 | 543 | 9.754E+00 | 584 | 1.422E+01 |

| nm  | mW        | nm  | mW        | nm  | mW        | nm  | mW        | nm  | mW        |
|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|
| 585 | 1.438E+01 | 626 | 1.862E+01 | 667 | 1.236E+01 | 708 | 4.975E+00 | 749 | 1.570E+00 |
| 586 | 1.455E+01 | 627 | 1.858E+01 | 668 | 1.216E+01 | 709 | 4.846E+00 | 750 | 1.526E+00 |
| 587 | 1.472E+01 | 628 | 1.854E+01 | 669 | 1.192E+01 | 710 | 4.726E+00 | 751 | 1.478E+00 |
| 588 | 1.488E+01 | 629 | 1.850E+01 | 670 | 1.174E+01 | 711 | 4.593E+00 | 752 | 1.439E+00 |
| 589 | 1.507E+01 | 630 | 1.844E+01 | 671 | 1.153E+01 | 712 | 4.487E+00 | 753 | 1.393E+00 |
| 590 | 1.523E+01 | 631 | 1.835E+01 | 672 | 1.130E+01 | 713 | 4.357E+00 | 754 | 1.353E+00 |
| 591 | 1.538E+01 | 632 | 1.831E+01 | 673 | 1.109E+01 | 714 | 4.241E+00 | 755 | 1.339E+00 |
| 592 | 1.555E+01 | 633 | 1.821E+01 | 674 | 1.090E+01 | 715 | 4.129E+00 | 756 | 1.289E+00 |
| 593 | 1.574E+01 | 634 | 1.812E+01 | 675 | 1.068E+01 | 716 | 4.017E+00 | 757 | 1.261E+00 |
| 594 | 1.591E+01 | 635 | 1.807E+01 | 676 | 1.050E+01 | 717 | 3.932E+00 | 758 | 1.219E+00 |
| 595 | 1.607E+01 | 636 | 1.792E+01 | 677 | 1.028E+01 | 718 | 3.809E+00 | 759 | 1.201E+00 |
| 596 | 1.623E+01 | 637 | 1.783E+01 | 678 | 1.006E+01 | 719 | 3.703E+00 | 760 | 1.155E+00 |
| 597 | 1.638E+01 | 638 | 1.771E+01 | 679 | 9.833E+00 | 720 | 3.586E+00 | 761 | 1.129E+00 |
| 598 | 1.653E+01 | 639 | 1.756E+01 | 680 | 9.664E+00 | 721 | 3.511E+00 | 762 | 1.098E+00 |
| 599 | 1.668E+01 | 640 | 1.747E+01 | 681 | 9.456E+00 | 722 | 3.413E+00 | 763 | 1.066E+00 |
| 600 | 1.683E+01 | 641 | 1.731E+01 | 682 | 9.239E+00 | 723 | 3.325E+00 | 764 | 1.039E+00 |
| 601 | 1.698E+01 | 642 | 1.718E+01 | 683 | 9.057E+00 | 724 | 3.213E+00 | 765 | 1.002E+00 |
| 602 | 1.712E+01 | 643 | 1.703E+01 | 684 | 8.865E+00 | 725 | 3.145E+00 | 766 | 9.779E-01 |
| 603 | 1.726E+01 | 644 | 1.685E+01 | 685 | 8.695E+00 | 726 | 3.047E+00 | 767 | 9.545E-01 |
| 604 | 1.737E+01 | 645 | 1.674E+01 | 686 | 8.478E+00 | 727 | 2.966E+00 | 768 | 9.283E-01 |
| 605 | 1.752E+01 | 646 | 1.653E+01 | 687 | 8.296E+00 | 728 | 2.883E+00 | 769 | 8.893E-01 |
| 606 | 1.761E+01 | 647 | 1.638E+01 | 688 | 8.105E+00 | 729 | 2.796E+00 | 770 | 8.814E-01 |
| 607 | 1.775E+01 | 648 | 1.622E+01 | 689 | 7.915E+00 | 730 | 2.705E+00 | 771 | 8.470E-01 |
| 608 | 1.786E+01 | 649 | 1.604E+01 | 690 | 7.751E+00 | 731 | 2.647E+00 | 772 | 8.235E-01 |
| 609 | 1.796E+01 | 650 | 1.588E+01 | 691 | 7.581E+00 | 732 | 2.555E+00 | 773 | 8.064E-01 |
| 610 | 1.806E+01 | 651 | 1.564E+01 | 692 | 7.477E+00 | 733 | 2.482E+00 | 774 | 7.814E-01 |
| 611 | 1.814E+01 | 652 | 1.549E+01 | 693 | 7.398E+00 | 734 | 2.419E+00 | 775 | 7.519E-01 |
| 612 | 1.822E+01 | 653 | 1.529E+01 | 694 | 7.259E+00 | 735 | 2.346E+00 | 776 | 7.446E-01 |
| 613 | 1.830E+01 | 654 | 1.509E+01 | 695 | 7.017E+00 | 736 | 2.280E+00 | 777 | 7.217E-01 |
| 614 | 1.837E+01 | 655 | 1.490E+01 | 696 | 6.812E+00 | 737 | 2.216E+00 | 778 | 7.026E-01 |
| 615 | 1.843E+01 | 656 | 1.471E+01 | 697 | 6.576E+00 | 738 | 2.151E+00 | 779 | 7.035E-01 |
| 616 | 1.852E+01 | 657 | 1.448E+01 | 698 | 6.422E+00 | 739 | 2.089E+00 | 780 | 7.044E-01 |
| 617 | 1.854E+01 | 658 | 1.428E+01 | 699 | 6.243E+00 | 740 | 2.029E+00 |     |           |
| 618 | 1.859E+01 | 659 | 1.408E+01 | 700 | 6.088E+00 | 741 | 1.969E+00 |     |           |
| 619 | 1.862E+01 | 660 | 1.386E+01 | 701 | 5.950E+00 | 742 | 1.914E+00 |     |           |
| 620 | 1.862E+01 | 661 | 1.365E+01 | 702 | 5.806E+00 | 743 | 1.857E+00 |     |           |
| 621 | 1.866E+01 | 662 | 1.345E+01 | 703 | 5.647E+00 | 744 | 1.803E+00 |     |           |
| 622 | 1.865E+01 | 663 | 1.327E+01 | 704 | 5.529E+00 | 745 | 1.757E+00 |     |           |
| 623 | 1.867E+01 | 664 | 1.303E+01 | 705 | 5.368E+00 | 746 | 1.714E+00 |     |           |
| 624 | 1.866E+01 | 665 | 1.280E+01 | 706 | 5.252E+00 | 747 | 1.662E+00 |     |           |
| 625 | 1.863E+01 | 666 | 1.260E+01 | 707 | 5.110E+00 | 748 | 1.612E+00 |     |           |

CIE 1931xy Chromaticity Diagram



7-Step Chromaticity Quadrangles





**[Goniophotometer System]**

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

Test orientation: **Base Up**

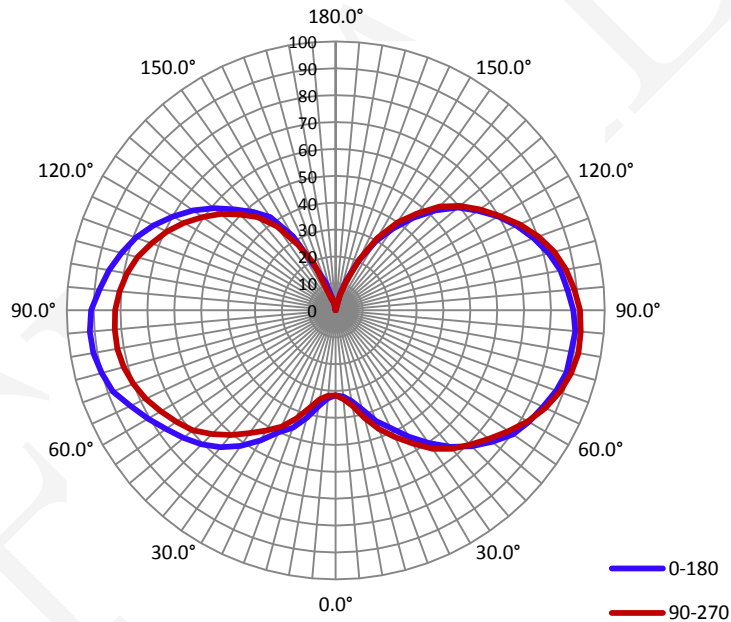
**Electrical Measurement**

| Input Voltage(V) | Frequency(Hz) | Input Current(A) | Power (W) | Power Factor |
|------------------|---------------|------------------|-----------|--------------|
| 120.0            | 60            | 0.079            | 7.65      | 0.807        |

**Photometric Measurement**

| Luminous Flux(lm) | Efficacy(lm/W) | I <sub>max</sub> (cd) | S/MH(C0/180) | S/MH(C90/270) |
|-------------------|----------------|-----------------------|--------------|---------------|
| 855.4             | 111.87         | 93.8                  | 2.75         | 2.69          |

**Luminous Intensity Distribution**



|                                    | C0/180 | C45/225 | C90/270 | C135/315 | AVG.  |
|------------------------------------|--------|---------|---------|----------|-------|
| Beam Angle(50%I <sub>max</sub> ):  | 281.6  | 278.3   | 280.6   | 276.3    | 279.2 |
| Field Angle(10%I <sub>max</sub> ): | 323.1  | 322.8   | 320.1   | 321.6    | 321.9 |

Luminous Intensity (cd) Distribution Data

| C \ γ  | 0°   | 22.5° | 45°  | 67.5° | 90°  | 112.5° | 135° | 157.5° |
|--------|------|-------|------|-------|------|--------|------|--------|
| 0.0°   | 31.6 | 31.6  | 31.6 | 31.6  | 31.6 | 31.6   | 31.6 | 31.6   |
| 5.0°   | 32.2 | 32.6  | 32.9 | 32.9  | 33.2 | 33.3   | 33.2 | 33.0   |
| 10.0°  | 34.3 | 34.4  | 34.9 | 34.6  | 36.1 | 36.4   | 35.8 | 33.3   |
| 15.0°  | 38.2 | 39.3  | 38.2 | 38.1  | 41.3 | 40.9   | 38.0 | 37.5   |
| 20.0°  | 43.8 | 49.8  | 43.2 | 43.4  | 47.0 | 49.1   | 44.2 | 43.7   |
| 25.0°  | 48.3 | 60.4  | 49.8 | 50.6  | 52.0 | 57.9   | 51.1 | 50.0   |
| 30.0°  | 54.2 | 65.7  | 56.8 | 57.9  | 57.1 | 65.2   | 59.2 | 57.1   |
| 35.0°  | 60.3 | 70.1  | 62.5 | 63.9  | 62.8 | 69.8   | 65.9 | 63.7   |
| 40.0°  | 66.3 | 73.8  | 68.0 | 68.8  | 67.2 | 74.0   | 71.6 | 69.2   |
| 45.0°  | 71.4 | 77.8  | 72.6 | 72.8  | 70.7 | 77.3   | 76.6 | 73.9   |
| 50.0°  | 76.1 | 81.2  | 76.4 | 76.0  | 74.4 | 80.7   | 80.6 | 77.8   |
| 55.0°  | 80.4 | 83.9  | 79.6 | 78.6  | 78.4 | 83.8   | 83.2 | 81.1   |
| 60.0°  | 82.9 | 86.3  | 81.8 | 81.5  | 82.5 | 86.5   | 85.6 | 84.0   |
| 65.0°  | 85.0 | 88.3  | 83.8 | 84.0  | 86.0 | 88.8   | 88.6 | 87.0   |
| 70.0°  | 87.3 | 90.0  | 86.0 | 86.2  | 88.7 | 91.2   | 90.8 | 89.0   |
| 75.0°  | 88.9 | 90.5  | 87.3 | 88.0  | 90.6 | 92.8   | 92.6 | 90.4   |
| 80.0°  | 88.9 | 90.4  | 87.9 | 88.7  | 91.6 | 93.6   | 93.4 | 90.7   |
| 85.0°  | 89.4 | 89.8  | 87.5 | 88.5  | 91.4 | 93.6   | 93.6 | 89.9   |
| 90.0°  | 88.4 | 88.5  | 87.2 | 87.3  | 90.8 | 93.2   | 92.4 | 89.4   |
| 95.0°  | 86.6 | 86.6  | 84.7 | 85.7  | 89.0 | 91.8   | 90.9 | 87.8   |
| 100.0° | 84.9 | 84.4  | 82.7 | 84.1  | 86.9 | 89.9   | 88.5 | 85.2   |
| 105.0° | 82.0 | 81.7  | 79.7 | 81.4  | 84.1 | 86.9   | 85.6 | 82.8   |
| 110.0° | 78.3 | 78.3  | 76.5 | 78.5  | 80.2 | 83.5   | 81.8 | 79.9   |
| 115.0° | 74.3 | 74.2  | 72.2 | 74.1  | 75.6 | 79.0   | 77.9 | 76.1   |
| 120.0° | 69.7 | 69.7  | 67.6 | 69.3  | 70.3 | 73.7   | 72.9 | 71.6   |
| 125.0° | 64.5 | 64.5  | 62.2 | 64.2  | 65.4 | 68.1   | 67.2 | 66.7   |
| 130.0° | 59.4 | 58.7  | 56.5 | 58.6  | 60.3 | 62.4   | 60.9 | 61.2   |
| 135.0° | 52.5 | 52.4  | 50.1 | 52.8  | 54.6 | 55.8   | 53.9 | 55.1   |
| 140.0° | 44.9 | 45.9  | 42.9 | 45.5  | 47.0 | 48.5   | 45.8 | 47.4   |
| 145.0° | 37.0 | 38.4  | 34.4 | 40.3  | 39.9 | 39.6   | 37.2 | 39.0   |
| 150.0° | 29.6 | 29.1  | 23.8 | 32.0  | 30.9 | 29.1   | 26.0 | 30.7   |
| 155.0° | 20.5 | 18.0  | 15.3 | 18.3  | 20.8 | 17.4   | 13.5 | 14.0   |
| 160.0° | 12.2 | 9.6   | 10.5 | 8.8   | 11.4 | 7.2    | 10.1 | 11.6   |
| 165.0° | 6.3  | 6.3   | 3.2  | 2.7   | 5.6  | 6.0    | 5.6  | 5.2    |
| 170.0° | 0.5  | 0.5   | 0.4  | 0.3   | 0.4  | 0.7    | 0.8  | 1.0    |
| 175.0° | 0.2  | 0.2   | 0.2  | 0.2   | 0.2  | 0.2    | 0.2  | 0.2    |
| 180.0° | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0    | 0.0  | 0.0    |

Luminous Intensity (cd) Distribution Data (cont.)

| C<br>y | 180° | 202.5° | 225° | 247.5° | 270° | 292.5° | 315° | 337.5° |
|--------|------|--------|------|--------|------|--------|------|--------|
| 0.0°   | 31.6 | 31.6   | 31.6 | 31.6   | 31.6 | 31.6   | 31.6 | 31.6   |
| 5.0°   | 32.8 | 32.5   | 32.5 | 32.0   | 31.9 | 31.7   | 31.8 | 31.9   |
| 10.0°  | 36.1 | 35.0   | 31.3 | 33.1   | 33.5 | 33.4   | 31.5 | 33.8   |
| 15.0°  | 41.3 | 37.6   | 33.7 | 36.1   | 37.5 | 35.9   | 33.9 | 38.1   |
| 20.0°  | 46.4 | 43.7   | 40.9 | 40.4   | 42.7 | 42.1   | 39.8 | 42.6   |
| 25.0°  | 50.0 | 51.0   | 50.0 | 45.6   | 47.8 | 52.1   | 46.4 | 47.9   |
| 30.0°  | 55.9 | 57.6   | 56.5 | 51.8   | 51.6 | 60.4   | 53.8 | 53.8   |
| 35.0°  | 61.6 | 62.4   | 61.6 | 57.5   | 55.8 | 66.9   | 60.5 | 60.1   |
| 40.0°  | 66.5 | 65.8   | 67.1 | 61.8   | 60.5 | 70.3   | 65.8 | 65.6   |
| 45.0°  | 70.5 | 68.5   | 70.6 | 66.3   | 65.0 | 72.0   | 70.3 | 70.1   |
| 50.0°  | 73.8 | 71.8   | 74.2 | 69.6   | 69.4 | 73.8   | 74.0 | 73.3   |
| 55.0°  | 77.0 | 75.1   | 77.2 | 72.4   | 72.3 | 75.4   | 77.8 | 75.8   |
| 60.0°  | 80.6 | 77.6   | 79.0 | 75.0   | 75.1 | 76.9   | 80.8 | 78.2   |
| 65.0°  | 84.2 | 80.3   | 81.0 | 76.8   | 77.9 | 78.9   | 83.3 | 80.0   |
| 70.0°  | 88.1 | 82.6   | 83.0 | 78.6   | 80.0 | 80.8   | 85.3 | 81.5   |
| 75.0°  | 90.1 | 84.1   | 85.0 | 80.0   | 81.6 | 82.1   | 86.8 | 82.3   |
| 80.0°  | 91.5 | 85.7   | 85.6 | 80.8   | 82.4 | 82.2   | 87.8 | 82.6   |
| 85.0°  | 91.7 | 85.7   | 85.7 | 81.1   | 82.5 | 82.4   | 87.8 | 82.0   |
| 90.0°  | 90.9 | 86.0   | 84.6 | 80.3   | 82.0 | 82.1   | 86.8 | 81.4   |
| 95.0°  | 88.2 | 84.8   | 83.6 | 79.8   | 80.7 | 81.3   | 84.8 | 80.0   |
| 100.0° | 85.6 | 83.5   | 80.9 | 77.6   | 78.8 | 79.7   | 82.6 | 77.9   |
| 105.0° | 82.5 | 81.3   | 78.7 | 75.2   | 76.3 | 77.3   | 79.3 | 75.7   |
| 110.0° | 79.1 | 78.8   | 75.0 | 72.1   | 72.8 | 74.4   | 75.7 | 72.4   |
| 115.0° | 74.8 | 75.4   | 70.7 | 68.3   | 69.2 | 70.8   | 71.9 | 69.0   |
| 120.0° | 69.8 | 70.5   | 66.2 | 64.3   | 65.1 | 66.6   | 67.2 | 64.6   |
| 125.0° | 64.7 | 64.9   | 61.4 | 59.2   | 60.5 | 61.9   | 62.1 | 59.6   |
| 130.0° | 59.1 | 58.7   | 55.6 | 54.1   | 55.8 | 56.1   | 56.4 | 54.6   |
| 135.0° | 53.0 | 52.6   | 49.6 | 48.5   | 50.3 | 50.3   | 49.4 | 48.8   |
| 140.0° | 47.7 | 46.0   | 42.7 | 42.8   | 45.2 | 43.9   | 42.6 | 47.4   |
| 145.0° | 42.3 | 39.0   | 34.7 | 36.7   | 38.1 | 35.7   | 33.6 | 41.9   |
| 150.0° | 31.8 | 15.8   | 24.4 | 26.5   | 28.2 | 26.4   | 23.9 | 28.4   |
| 155.0° | 17.2 | 14.4   | 16.2 | 16.5   | 19.2 | 17.6   | 15.6 | 17.2   |
| 160.0° | 11.0 | 9.2    | 10.4 | 9.7    | 4.0  | 8.9    | 9.5  | 10.6   |
| 165.0° | 4.0  | 3.0    | 2.0  | 4.0    | 5.0  | 3.9    | 6.0  | 4.2    |
| 170.0° | 0.8  | 0.7    | 1.1  | 1.6    | 1.5  | 0.5    | 0.7  | 0.5    |
| 175.0° | 0.2  | 0.2    | 0.2  | 0.2    | 0.2  | 0.2    | 0.2  | 0.2    |
| 180.0° | 0.0  | 0.0    | 0.0  | 0.0    | 0.0  | 0.0    | 0.0  | 0.0    |

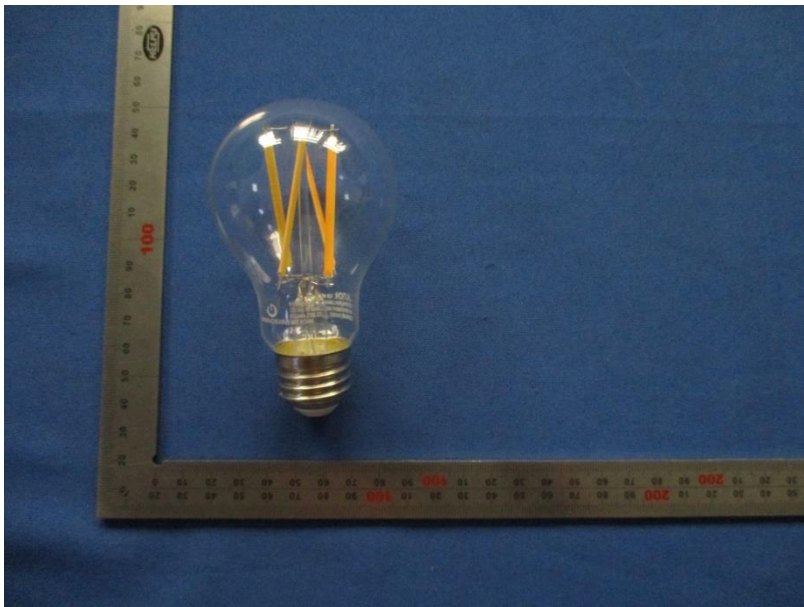
Zonal Lumen Density Measurement

| Deg     | Flux (lm) | %    | Deg   | Flux (lm) | %      |
|---------|-----------|------|-------|-----------|--------|
| 0-5     | 0.8       | 0.09 | 0-5   | 0.8       | 0.09   |
| 5-10    | 2.3       | 0.28 | 0-10  | 3.2       | 0.37   |
| 10-15   | 4.2       | 0.50 | 0-15  | 7.4       | 0.87   |
| 15-20   | 6.7       | 0.79 | 0-20  | 14.2      | 1.65   |
| 20-25   | 9.9       | 1.17 | 0-25  | 24.1      | 2.82   |
| 25-30   | 13.7      | 1.60 | 0-30  | 37.8      | 4.42   |
| 30-35   | 17.7      | 2.07 | 0-35  | 55.5      | 6.49   |
| 35-40   | 21.8      | 2.55 | 0-40  | 77.3      | 9.04   |
| 40-45   | 25.9      | 3.02 | 0-45  | 103.1     | 12.06  |
| 45-50   | 29.6      | 3.47 | 0-50  | 132.8     | 15.53  |
| 50-55   | 33.4      | 3.90 | 0-55  | 166.2     | 19.43  |
| 55-60   | 36.8      | 4.31 | 0-60  | 203.0     | 23.73  |
| 60-65   | 39.9      | 4.68 | 0-65  | 243.0     | 28.40  |
| 65-70   | 42.9      | 5.01 | 0-70  | 285.8     | 33.41  |
| 70-75   | 45.2      | 5.29 | 0-75  | 331.0     | 38.69  |
| 75-80   | 46.9      | 5.48 | 0-80  | 377.8     | 44.16  |
| 80-85   | 47.7      | 5.58 | 0-85  | 425.5     | 49.74  |
| 85-90   | 47.9      | 5.60 | 0-90  | 473.3     | 55.33  |
| 90-95   | 47.2      | 5.51 | 0-95  | 520.5     | 60.85  |
| 95-100  | 45.9      | 5.37 | 0-100 | 566.4     | 66.22  |
| 100-105 | 44.0      | 5.14 | 0-105 | 610.3     | 71.35  |
| 105-110 | 41.4      | 4.83 | 0-110 | 651.6     | 76.18  |
| 110-115 | 38.2      | 4.46 | 0-115 | 689.8     | 80.65  |
| 115-120 | 34.6      | 4.04 | 0-120 | 724.4     | 84.68  |
| 120-125 | 30.6      | 3.58 | 0-125 | 755.0     | 88.26  |
| 125-130 | 26.5      | 3.10 | 0-130 | 781.5     | 91.36  |
| 130-135 | 22.3      | 2.60 | 0-135 | 803.7     | 93.96  |
| 135-140 | 18.0      | 2.10 | 0-140 | 821.8     | 96.07  |
| 140-145 | 14.0      | 1.64 | 0-145 | 835.8     | 97.71  |
| 145-150 | 9.7       | 1.15 | 0-150 | 845.5     | 98.84  |
| 150-155 | 5.5       | 0.65 | 0-155 | 851.1     | 99.49  |
| 155-160 | 2.8       | 0.33 | 0-160 | 853.9     | 99.82  |
| 160-165 | 1.1       | 0.14 | 0-165 | 855.0     | 99.96  |
| 165-170 | 0.3       | 0.03 | 0-170 | 855.4     | 100.00 |
| 170-175 | 0.0       | 0.00 | 0-175 | 855.4     | 100.00 |
| 175-180 | 0.0       | 0.00 | 0-180 | 855.4     | 100.00 |

**[Additional Test]**

| Test Item                  | Test Voltage (V) | Frequency (Hz) | Test Result |
|----------------------------|------------------|----------------|-------------|
| Power Factor:              | 120.0            | 60             | 0.8163      |
| Total Harmonic Distortion: | 120.0            | 60             | 71.66%      |

**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. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
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\*\*\*\*\*END OF REPORT\*\*\*\*\*