

## Photometric Test Report

### Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77-2017

Prepared For

**RAB Lighting Inc.**

Prepared By

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Issue Date: 2023-11-15

Revised Date: N/A

## 1.0 Test Summary

DLC Technical Requirements V5.1

| Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires                      |                                |                      |          |            |
|--|--------------------------------|----------------------|----------|------------|
| Requirement Category   | Test Method                    | Requirements         |          | Test Value |
| Luminaire Output (lm)<br>(Goniophotometer – Section 4.2) (0°-180° zones)             | IES LM-79-2008                 | N/A                  |          | 5996       |
| Minimum Luminaire Efficacy (lm/W)<br>(Goniophotometer – Section 4.2) (0°-180° zones) | IES LM-79-2008                 | N/A                  |          | 152.6      |
| Luminaire Output (lm)<br>(Goniophotometer – Section 4.2) (0°-90° zones)              | IES LM-79-2008                 | 300                  |          | 5850       |
| Minimum Luminaire Efficacy (lm/W)<br>(Goniophotometer – Section 4.2) (0°-90° zones)  | IES LM-79-2008                 | Standard             | Premium  | 148.9      |
|  |                                | 105                  | 120      |            |
| Power (Input Wattage) (W)<br>(Goniophotometer – Section 4.2)                         | IES LM-79-2008                 | Worst Case           |          | 39.3       |
| Total Harmonic Distortion (A%)<br>(THD & PF – Section 4.3)                           | ANSI C82.77:2014               | 20.00%               | 120V     | 1.97       |
|  |                                |                      | 277V     | 2.96       |
| Power Factor<br>(THD & PF – Section 4.3)   | ANSI C82.77:2014               | 0.9                  | 120V     | 0.992      |
|  |                                |                      | 277V     | 0.848      |
| Allowable CCTs* (K)<br>(Integrating Sphere – Section 4.1)                            | IES LM-79-2008                 | 7 steps              | 3985±275 | 3908       |
|  |                                | 4 steps              | 3985±154 |            |
| Minimum CRI<br>(Integrating Sphere – Section 4.1)                                    | IES LM-79-2008<br>CIE13.3-1995 | ≥70                  |          | 84.3       |
| Minimum R9<br>(Integrating Sphere – Section 4.1)                                     | IES LM-79-2008<br>CIE13.3-1995 | N/A                  |          | 17         |
| Minimum Rf<br>(Integrating Sphere – Section 4.1)                                     | ANSI/IES TM-30-18              | ≥70                  |          | 84         |
| Minimum Rg<br>(Integrating Sphere – Section 4.1)                                     | ANSI/IES TM-30-18              | ≥89                  |          | 96         |
| IES Rcs,h1<br>(Integrating Sphere – Section 4.1)                                     | ANSI/IES TM-30-18              | -18%≤IES Rcs,h1≤+23% |          | -11%       |
| Zonal Lumen Requirement (80°-90°)<br>(Goniophotometer – Section 4.2)                 | IES LM-79-2008                 | ≤10%                 |          | 2.7%       |
| Input Voltage (V)  |                                |                      |          |            |
| (Goniophotometer – Section 4.2)  | IES LM-79-2008                 | Worst Cast           |          | 120.0      |
| (Goniophotometer – Section 4.2)  |                                | Non-Worst Case       |          | 277.0      |
| Input Current (A)  |                                |                      |          |            |
| (Goniophotometer – Section 4.2)  | IES LM-79-2008                 | Worst Case           |          | 0.330      |
| (Goniophotometer – Section 4.2)  |                                | Non-Worst Case       |          | 0.165      |
| Power (Input Wattage – W)  |                                |                      |          |            |
| (Goniophotometer – Section 4.2)  | IES LM-79-2008                 | Worst Case           |          | 39.3       |
| (Goniophotometer – Section 4.2)  |                                | Non-Worst Case       |          | 38.7       |

## 2.0 Test List

| Test Item | Test                    | Test Date  | Model Number       | Sample No.   |
|-----------|-------------------------|------------|--------------------|--------------|
| 1         | Integrating Sphere Test | 2023-11-02 | WPX2 @ 40W / 4000K | 231101003-S1 |
| 2         | Goniophotometer Test    | 2023-11-02 | WPX2 @ 40W / 4000K | 231101003-S1 |
| 3         | THD and PF Test         | 2023-11-02 | WPX2 @ 40W / 4000K | 231101003-S1 |

### Remark (If any)

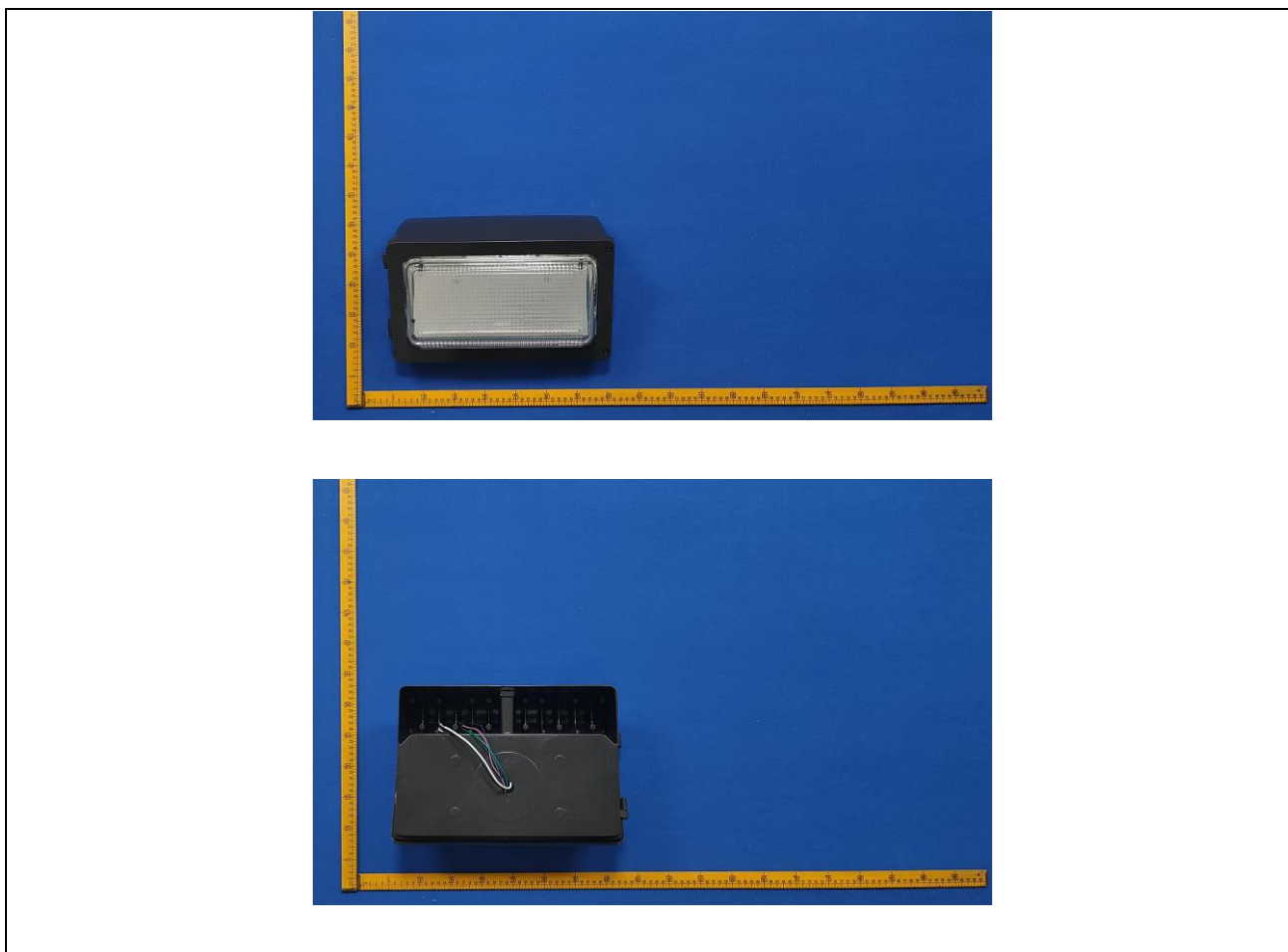
1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd.
3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

## 3.0 Product Description

Luminaire Description: Model No. WPX2 @ 40W / 4000K, color tunable from 3000K, 4000K and 5000K.

Electrical Specification: 120-277Vac, 50/60Hz

Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

|                            |                    |                                  |              |
|----------------------------|--------------------|----------------------------------|--------------|
| <b>Model No.</b>           | WPX2 @ 40W / 4000K | <b>Sample ID</b>                 | 231101003-S1 |
| <b>Operate time (Min.)</b> | 10                 | <b>Stabilization time (Min.)</b> | 60           |
| <b>Temperature (°C)</b>    | 25.4               | <b>Humidity (%RH)</b>            | 41.0         |

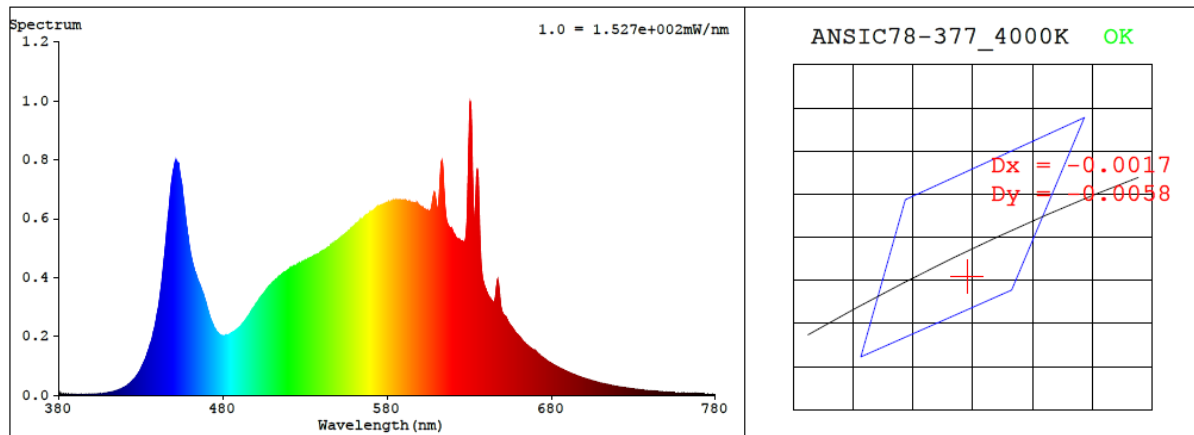
|   |
|---|
| <b>Test Method</b>  |
| <p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.</p> <p>The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.</p> <p>The sample was measured using 4<math>\pi</math> geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780nm.</p> |

#### Test Result

| Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor |
|---------------|----------------|-------------|-----------|--------------|
| 120.0         | 60             | 0.330       | 39.3      | 0.992        |
| 277.0         | 60             | 0.165       | 38.7      | 0.848        |

| CCT (K) | CRI  | R9 | Duv     | Rf | Rg | IES Rcs,h1 |
|---------|------|----|---------|----|----|------------|
| 3908    | 84.3 | 17 | -0.0022 | 84 | 96 | -11%       |

## 4.1 Integrating Sphere Test



### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.3829$   $y = 0.3735$  /  $u' = 0.2280$   $v' = 0.5005$  ( $duv = -2.24e-03$ )

CCT= 3908K Prcp WL:  $L_d = 580.7\text{nm}$  Purity=27.0%

Peak WL:  $L_p = 631\text{nm}$  FWHM:  $=94.9\text{nm}$  Ratio: R=19.0% G=77.3% B=3.7%

Render Index:  $R_a = 84.3$  AvgR = 78.4 TM30:  $R_f = 84$   $R_g = 96$

EEL: 0.09003 A++ Highest

|        |        |        |        |        |        |               |
|--------|--------|--------|--------|--------|--------|---------------|
| R1 =83 | R2 =91 | R3 =95 | R4 =82 | R5 =83 | R6 =87 | R7 =86        |
| R8 =67 | R9 =17 | R10=78 | R11=81 | R12=64 | R13=85 | R14=98 R15=78 |

## 4.1 Integrating Sphere Test

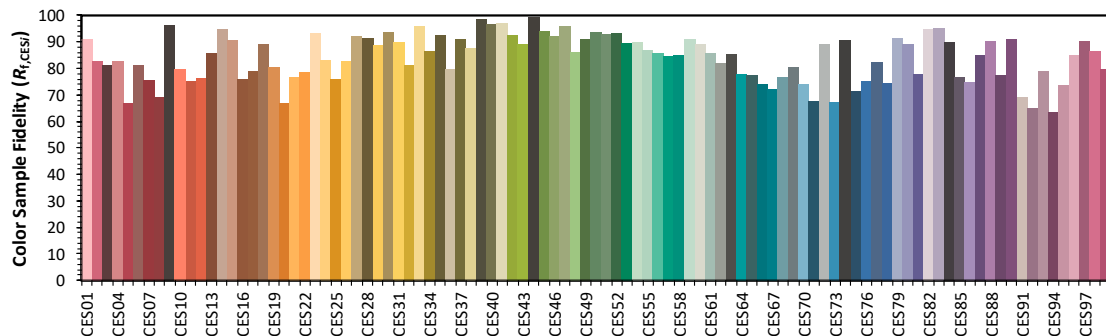
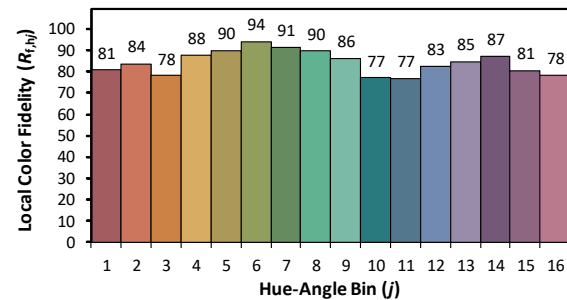
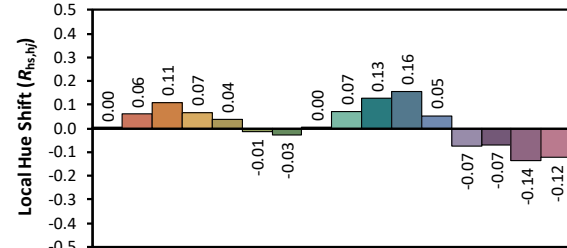
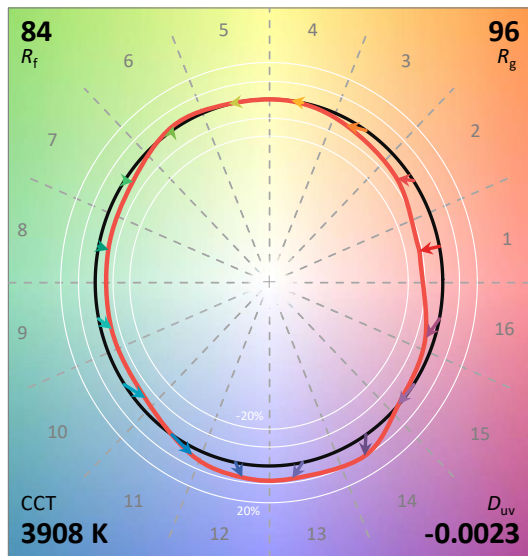
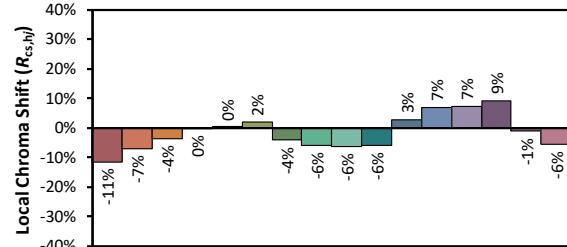
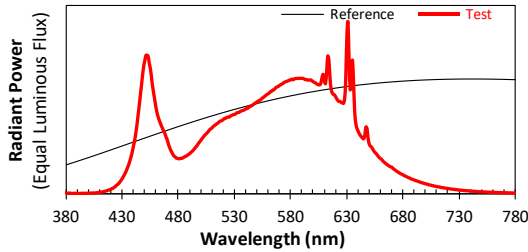
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/11/15

Model: WPX2 @ 40W / 4000K



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

$x$  0.3829

$y$  0.3733

$u'$  0.2281

$v'$  0.5004

CIE 13.3-1995  
(CRI)

$R_a$  84

$R_g$  17

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

## 4.1 Integrating Sphere Test

| Spectral Distribution over Visible Wavelength |                |         |                |         |                |         |                |         |                |         |                |
|---|----------------|---------|----------------|---------|----------------|---------|----------------|---------|----------------|---------|----------------|
| WL (nm)                                       | Radiant (W/nm) | WL (nm) | Radiant (W/nm) | WL (nm) | Radiant (W/nm) | WL (nm) | Radiant (W/nm) | WL (nm) | Radiant (W/nm) | WL (nm) | Radiant (W/nm) |
| 380   | 5.50E-06       | 447     | 6.22E-04       | 514     | 4.01E-04       | 581     | 6.58E-04       | 648     | 3.73E-04       | 715     | 3.53E-05       |
| 381   | 2.90E-06       | 448     | 6.81E-04       | 515     | 4.05E-04       | 582     | 6.54E-04       | 649     | 3.15E-04       | 716     | 3.45E-05       |
| 382   | 4.20E-06       | 449     | 7.31E-04       | 516     | 4.11E-04       | 583     | 6.58E-04       | 650     | 2.85E-04       | 717     | 3.31E-05       |
| 383   | 3.30E-06       | 450     | 7.64E-04       | 517     | 4.16E-04       | 584     | 6.60E-04       | 651     | 2.73E-04       | 718     | 3.22E-05       |
| 384   | 3.50E-06       | 451     | 7.94E-04       | 518     | 4.18E-04       | 585     | 6.62E-04       | 652     | 2.67E-04       | 719     | 3.10E-05       |
| 385   | 0.00E+00       | 452     | 7.94E-04       | 519     | 4.22E-04       | 586     | 6.62E-04       | 653     | 2.57E-04       | 720     | 3.01E-05       |
| 386   | 3.00E-06       | 453     | 7.89E-04       | 520     | 4.26E-04       | 587     | 6.62E-04       | 654     | 2.46E-04       | 721     | 2.92E-05       |
| 387   | 1.50E-06       | 454     | 7.47E-04       | 521     | 4.32E-04       | 588     | 6.63E-04       | 655     | 2.37E-04       | 722     | 2.83E-05       |
| 388   | 3.00E-06       | 455     | 7.16E-04       | 522     | 4.33E-04       | 589     | 6.62E-04       | 656     | 2.31E-04       | 723     | 2.72E-05       |
| 389   | 2.00E-06       | 456     | 6.65E-04       | 523     | 4.38E-04       | 590     | 6.62E-04       | 657     | 2.23E-04       | 724     | 2.63E-05       |
| 390   | 2.10E-06       | 457     | 6.14E-04       | 524     | 4.40E-04       | 591     | 6.61E-04       | 658     | 2.15E-04       | 725     | 2.58E-05       |
| 391   | 2.10E-06       | 458     | 5.73E-04       | 525     | 4.39E-04       | 592     | 6.59E-04       | 659     | 2.07E-04       | 726     | 2.49E-05       |
| 392   | 1.20E-06       | 459     | 5.32E-04       | 526     | 4.45E-04       | 593     | 6.54E-04       | 660     | 2.02E-04       | 727     | 2.41E-05       |
| 393   | 1.80E-06       | 460     | 4.93E-04       | 527     | 4.48E-04       | 594     | 6.55E-04       | 661     | 1.97E-04       | 728     | 2.32E-05       |
| 394   | 3.40E-06       | 461     | 4.63E-04       | 528     | 4.51E-04       | 595     | 6.53E-04       | 662     | 1.89E-04       | 729     | 2.23E-05       |
| 395   | 2.50E-06       | 462     | 4.37E-04       | 529     | 4.54E-04       | 596     | 6.52E-04       | 663     | 1.82E-04       | 730     | 2.18E-05       |
| 396   | 2.80E-06       | 463     | 4.19E-04       | 530     | 4.55E-04       | 597     | 6.53E-04       | 664     | 1.78E-04       | 731     | 2.11E-05       |
| 397   | 3.20E-06       | 464     | 4.02E-04       | 531     | 4.59E-04       | 598     | 6.53E-04       | 665     | 1.71E-04       | 732     | 2.04E-05       |
| 398   | 2.80E-06       | 465     | 3.86E-04       | 532     | 4.64E-04       | 599     | 6.47E-04       | 666     | 1.67E-04       | 733     | 1.96E-05       |
| 399   | 3.00E-06       | 466     | 3.71E-04       | 533     | 4.66E-04       | 600     | 6.43E-04       | 667     | 1.62E-04       | 734     | 1.91E-05       |
| 400   | 3.70E-06       | 467     | 3.57E-04       | 534     | 4.68E-04       | 601     | 6.39E-04       | 668     | 1.58E-04       | 735     | 1.84E-05       |
| 401   | 3.60E-06       | 468     | 3.43E-04       | 535     | 4.72E-04       | 602     | 6.37E-04       | 669     | 1.55E-04       | 736     | 1.77E-05       |
| 402   | 4.20E-06       | 469     | 3.24E-04       | 536     | 4.75E-04       | 603     | 6.30E-04       | 670     | 1.53E-04       | 737     | 1.73E-05       |
| 403   | 4.30E-06       | 470     | 3.09E-04       | 537     | 4.77E-04       | 604     | 6.28E-04       | 671     | 1.47E-04       | 738     | 1.69E-05       |
| 404   | 4.70E-06       | 471     | 2.86E-04       | 538     | 4.79E-04       | 605     | 6.25E-04       | 672     | 1.41E-04       | 739     | 1.61E-05       |
| 405   | 4.70E-06       | 472     | 2.67E-04       | 539     | 4.83E-04       | 606     | 6.25E-04       | 673     | 1.36E-04       | 740     | 1.58E-05       |
| 406   | 5.00E-06       | 473     | 2.51E-04       | 540     | 4.87E-04       | 607     | 6.38E-04       | 674     | 1.31E-04       | 741     | 1.52E-05       |
| 407   | 5.40E-06       | 474     | 2.39E-04       | 541     | 4.89E-04       | 608     | 6.70E-04       | 675     | 1.27E-04       | 742     | 1.47E-05       |
| 408   | 6.90E-06       | 475     | 2.26E-04       | 542     | 4.92E-04       | 609     | 6.85E-04       | 676     | 1.23E-04       | 743     | 1.42E-05       |
| 409   | 7.90E-06       | 476     | 2.16E-04       | 543     | 4.98E-04       | 610     | 6.50E-04       | 677     | 1.19E-04       | 744     | 1.37E-05       |
| 410   | 8.50E-06       | 477     | 2.12E-04       | 544     | 5.02E-04       | 611     | 6.33E-04       | 678     | 1.15E-04       | 745     | 1.33E-05       |
| 411   | 9.50E-06       | 478     | 2.05E-04       | 545     | 5.04E-04       | 612     | 6.98E-04       | 679     | 1.12E-04       | 746     | 1.28E-05       |
| 412   | 1.07E-05       | 479     | 2.03E-04       | 546     | 5.08E-04       | 613     | 7.90E-04       | 680     | 1.09E-04       | 747     | 1.25E-05       |
| 413   | 1.18E-05       | 480     | 2.01E-04       | 547     | 5.14E-04       | 614     | 7.67E-04       | 681     | 1.05E-04       | 748     | 1.18E-05       |
| 414   | 1.40E-05       | 481     | 2.01E-04       | 548     | 5.17E-04       | 615     | 6.64E-04       | 682     | 1.02E-04       | 749     | 1.15E-05       |
| 415   | 1.54E-05       | 482     | 2.04E-04       | 549     | 5.23E-04       | 616     | 6.01E-04       | 683     | 9.86E-05       | 750     | 1.14E-05       |
| 416   | 1.69E-05       | 483     | 2.03E-04       | 550     | 5.27E-04       | 617     | 5.79E-04       | 684     | 9.56E-05       | 751     | 1.09E-05       |
| 417   | 1.98E-05       | 484     | 2.07E-04       | 551     | 5.31E-04       | 618     | 5.70E-04       | 685     | 9.25E-05       | 752     | 1.08E-05       |
| 418   | 2.15E-05       | 485     | 2.11E-04       | 552     | 5.35E-04       | 619     | 5.67E-04       | 686     | 8.96E-05       | 753     | 1.03E-05       |
| 419   | 2.41E-05       | 486     | 2.14E-04       | 553     | 5.38E-04       | 620     | 5.56E-04       | 687     | 8.68E-05       | 754     | 1.00E-05       |
| 420   | 2.70E-05       | 487     | 2.16E-04       | 554     | 5.45E-04       | 621     | 5.45E-04       | 688     | 8.37E-05       | 755     | 9.40E-06       |
| 421   | 3.07E-05       | 488     | 2.22E-04       | 555     | 5.50E-04       | 622     | 5.35E-04       | 689     | 8.20E-05       | 756     | 9.30E-06       |
| 422   | 3.34E-05       | 489     | 2.25E-04       | 556     | 5.55E-04       | 623     | 5.30E-04       | 690     | 7.92E-05       | 757     | 9.10E-06       |
| 423   | 3.85E-05       | 490     | 2.31E-04       | 557     | 5.60E-04       | 624     | 5.30E-04       | 691     | 7.64E-05       | 758     | 8.90E-06       |
| 424   | 4.36E-05       | 491     | 2.36E-04       | 558     | 5.65E-04       | 625     | 5.24E-04       | 692     | 7.44E-05       | 759     | 8.70E-06       |
| 425   | 4.96E-05       | 492     | 2.43E-04       | 559     | 5.70E-04       | 626     | 5.22E-04       | 693     | 7.21E-05       | 760     | 8.10E-06       |
| 426   | 5.46E-05       | 493     | 2.49E-04       | 560     | 5.74E-04       | 627     | 5.19E-04       | 694     | 6.99E-05       | 761     | 8.10E-06       |
| 427   | 6.14E-05       | 494     | 2.57E-04       | 561     | 5.79E-04       | 628     | 5.41E-04       | 695     | 6.73E-05       | 762     | 7.80E-06       |
| 428   | 6.96E-05       | 495     | 2.65E-04       | 562     | 5.86E-04       | 629     | 6.51E-04       | 696     | 6.50E-05       | 763     | 7.50E-06       |
| 429   | 7.83E-05       | 496     | 2.72E-04       | 563     | 5.88E-04       | 630     | 8.98E-04       | 697     | 6.34E-05       | 764     | 7.30E-06       |
| 430   | 8.84E-05       | 497     | 2.82E-04       | 564     | 5.95E-04       | 631     | 9.86E-04       | 698     | 6.17E-05       | 765     | 6.90E-06       |
| 431   | 1.00E-04       | 498     | 2.90E-04       | 565     | 5.97E-04       | 632     | 7.65E-04       | 699     | 5.92E-05       | 766     | 7.00E-06       |
| 432   | 1.12E-04       | 499     | 2.99E-04       | 566     | 6.03E-04       | 633     | 5.99E-04       | 700     | 5.75E-05       | 767     | 6.60E-06       |
| 433   | 1.24E-04       | 500     | 3.08E-04       | 567     | 6.10E-04       | 634     | 6.66E-04       | 701     | 5.60E-05       | 768     | 6.60E-06       |
| 434   | 1.41E-04       | 501     | 3.16E-04       | 568     | 6.13E-04       | 635     | 7.67E-04       | 702     | 5.40E-05       | 769     | 6.10E-06       |
| 435   | 1.57E-04       | 502     | 3.25E-04       | 569     | 6.16E-04       | 636     | 6.35E-04       | 703     | 5.17E-05       | 770     | 6.10E-06       |
| 436   | 1.74E-04       | 503     | 3.33E-04       | 570     | 6.21E-04       | 637     | 4.72E-04       | 704     | 5.06E-05       | 771     | 5.80E-06       |
| 437   | 1.96E-04       | 504     | 3.40E-04       | 571     | 6.25E-04       | 638     | 4.03E-04       | 705     | 4.88E-05       | 772     | 5.70E-06       |
| 438   | 2.19E-04       | 505     | 3.46E-04       | 572     | 6.29E-04       | 639     | 3.76E-04       | 706     | 4.75E-05       | 773     | 5.60E-06       |
| 439   | 2.46E-04       | 506     | 3.53E-04       | 573     | 6.33E-04       | 640     | 3.60E-04       | 707     | 4.59E-05       | 774     | 5.20E-06       |
| 440   | 2.77E-04       | 507     | 3.61E-04       | 574     | 6.39E-04       | 641     | 3.46E-04       | 708     | 4.40E-05       | 775     | 5.40E-06       |
| 441   | 3.08E-04       | 508     | 3.69E-04       | 575     | 6.41E-04       | 642     | 3.35E-04       | 709     | 4.29E-05       | 776     | 4.90E-06       |
| 442   | 3.50E-04       | 509     | 3.74E-04       | 576     | 6.44E-04       | 643     | 3.27E-04       | 710     | 4.13E-05       | 777     | 4.90E-06       |
| 443   | 3.96E-04       | 510     | 3.79E-04       | 577     | 6.46E-04       | 644     | 3.20E-04       | 711     | 4.02E-05       | 778     | 4.70E-06       |
| 444   | 4.51E-04       | 511     | 3.86E-04       | 578     | 6.49E-04       | 645     | 3.16E-04       | 712     | 3.92E-05       | 779     | 4.50E-06       |
| 445   | 5.05E-04       | 512     | 3.91E-04       | 579     | 6.51E-04       | 646     | 3.34E-04       | 713     | 3.80E-05       | 780     | 4.60E-06       |
| 446   | 5.64E-04       | 513     | 3.96E-04       | 580     | 6.54E-04       | 647     | 3.83E-04       | 714     | 3.61E-05       | N/A     | N/A            |



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

|                            |                    |                                  |              |
|----------------------------|--------------------|----------------------------------|--------------|
| <b>Model No.</b>           | WPX2 @ 40W / 4000K | <b>Sample ID</b>                 | 231101003-S1 |
| <b>Operate time (Min.)</b> | 30                 | <b>Stabilization time (Min.)</b> | 60           |
| <b>Temperature (°C)</b>    | 25.0               | <b>Humidity (%RH)</b>            | 42.3         |

|  |
|--|
| <b>Test Method</b>   |
| <p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using a type C goniophotometer and software.</p> <p>The ambient temperature shall be maintained at 25±1°C, measured at a point not more than 1 m from the sample and at the same height as the sample.</p> <p>The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.</p> <p>The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1.0° vertical intervals and 15° horizontal intervals.</p> |

### Test Conditions

| Condition             | Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor |
|-----------------------|---------------|----------------|-------------|-----------|--------------|
| <b>WORST CASE</b>     | 120.0         | 60             | 0.330       | 39.3      | 0.992        |
| <b>NON-WORST CASE</b> | 277.0         | 60             | 0.165       | 38.7      | 0.848        |

### Test Result

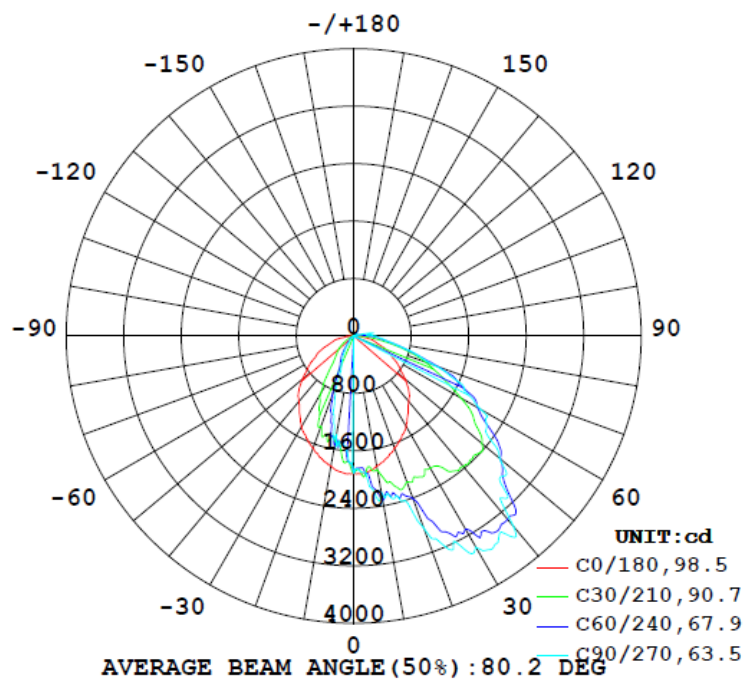
| Result Type          | Flux (lm) | Field Angle (10%) |         | Beam Angle (50%) |         | Luminous Efficacy (lm/W) | Zonal Lumen Requirement (80°-90°) | BUG      |
|----------------------|-----------|-------------------|---------|------------------|---------|--------------------------|-----------------------------------|----------|
|                      |           | C0-180            | C90-270 | C0-180           | C90-270 |                          |                                   |          |
| <b>0°-180° zones</b> | 5996      | 113.2             | 147.7   | 65.0             | 98.1    | 152.6                    | 2.7%                              | B1-U3-G2 |
| <b>0°-90° zones</b>  | 5850      | 113.2             | 147.7   | 65.0             | 98.1    | 148.9                    | 2.7%                              | B1-U3-G2 |



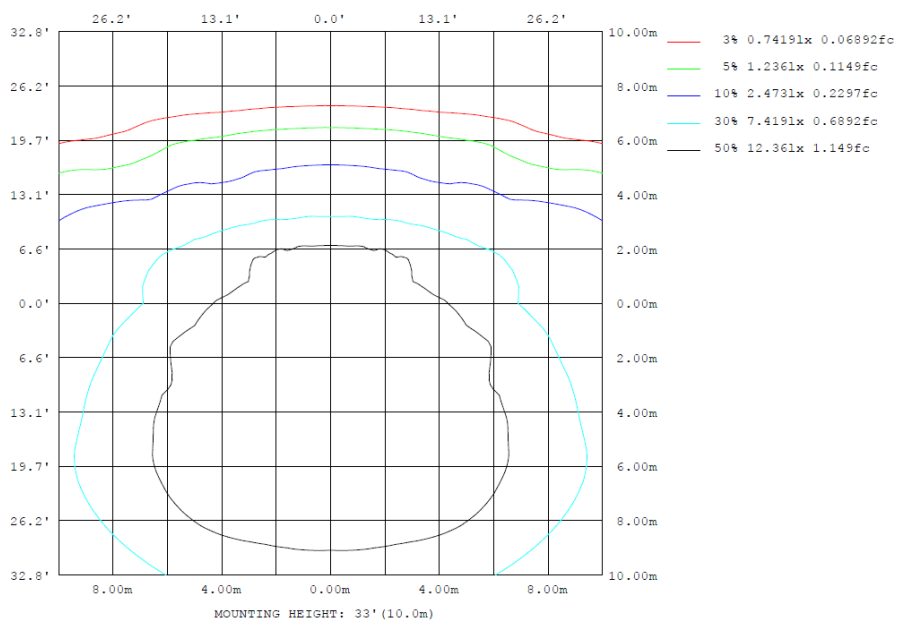
## 4.2 Goniophotometer Test

### Lighting Distribution Curve

#### LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

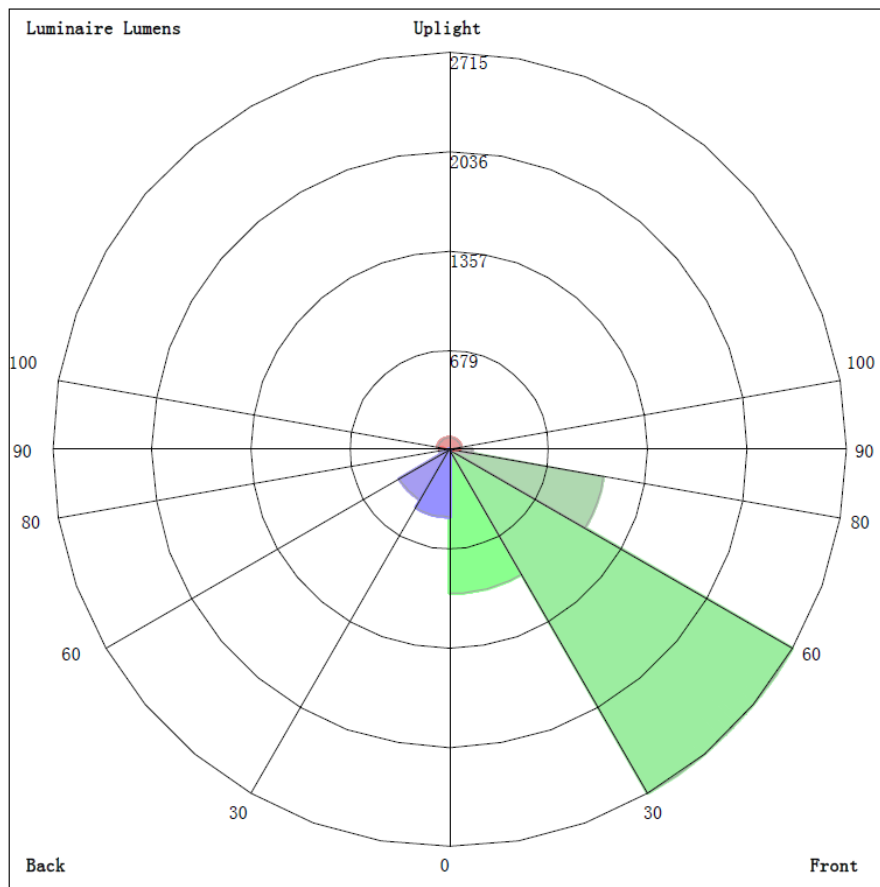
ZONAL FLUX DIAGRAM:

| γ   | C0                    | C45    | C90   | C135   | C180  | C225  | C270   | C315  | γ       | ± zone  | ± total | ±lum, lamp |
|-----|-----------------------|--------|-------|--------|-------|-------|--------|-------|---------|---------|---------|------------|
| 10  | 1839                  | 2143   | 2212  | 2143   | 1839  | 1566  | 1394   | 1566  | 0- 10   | 172.2   | 172.2   | 2.87,2.87  |
| 20  | 1661                  | 2291   | 2835  | 2291   | 1661  | 1071  | 578.8  | 1071  | 10- 20  | 491.7   | 664.0   | 11.1,11.1  |
| 30  | 1456                  | 2805   | 3397  | 2805   | 1456  | 440.5 | 281.2  | 440.5 | 20- 30  | 778.8   | 1443    | 24.1,24.1  |
| 40  | 1190                  | 2990   | 3454  | 2990   | 1190  | 260.5 | 84.87  | 260.5 | 30- 40  | 1028    | 2471    | 41.2,41.2  |
| 50  | 930.6                 | 2615   | 2648  | 2615   | 930.6 | 106.1 | 48.68  | 106.1 | 40- 50  | 1103    | 3574    | 59.6,59.6  |
| 60  | 652.4                 | 1938   | 2034  | 1938   | 652.4 | 48.33 | 17.62  | 48.33 | 50- 60  | 978.4   | 4552    | 75.9,75.9  |
| 70  | 401.2                 | 1250   | 1189  | 1250   | 401.2 | 5.983 | 0.9296 | 5.983 | 60- 70  | 740.4   | 5293    | 88.3,88.3  |
| 80  | 214.6                 | 521.5  | 541.3 | 521.5  | 214.6 | 2.425 | 1.277  | 2.425 | 70- 80  | 398.5   | 5691    | 94.9,94.9  |
| 90  | 20.16                 | 161.6  | 272.6 | 161.6  | 20.16 | 1.566 | 1.454  | 1.566 | 80- 90  | 159.2   | 5850    | 97.6,97.6  |
| 100 | 16.93                 | 67.93  | 270.3 | 67.93  | 16.93 | 2.008 | 1.840  | 2.008 | 90-100  | 66.06   | 5917    | 98.7,98.7  |
| 110 | 13.63                 | 15.41  | 46.60 | 15.41  | 13.63 | 1.582 | 2.022  | 1.582 | 100-110 | 29.73   | 5946    | 99.2,99.2  |
| 120 | 8.215                 | 46.82  | 20.98 | 46.82  | 8.215 | 1.535 | 1.966  | 1.535 | 110-120 | 14.06   | 5960    | 99.4,99.4  |
| 130 | 4.526                 | 39.44  | 47.06 | 39.44  | 4.526 | 1.643 | 2.290  | 1.643 | 120-130 | 15.98   | 5976    | 99.7,99.7  |
| 140 | 1.423                 | 24.56  | 38.51 | 24.56  | 1.423 | 1.812 | 2.389  | 1.812 | 130-140 | 11.39   | 5988    | 99.9,99.9  |
| 150 | 1.105                 | 12.11  | 20.24 | 12.11  | 1.105 | 2.035 | 2.387  | 2.035 | 140-150 | 5.812   | 5994    | 100,100    |
| 160 | 1.135                 | 0.9546 | 7.909 | 0.9546 | 1.135 | 2.158 | 2.113  | 2.158 | 150-160 | 2.033   | 5996    | 100,100    |
| 170 | 1.327                 | 1.257  | 1.365 | 1.257  | 1.327 | 1.760 | 1.642  | 1.760 | 160-170 | 0.5381  | 5996    | 100,100    |
| 180 | 1.615                 | 1.562  | 1.319 | 1.562  | 1.615 | 1.484 | 1.403  | 1.484 | 170-180 | 0.1444  | 5996    | 100,100    |
| DEG | LUMINOUS INTENSITY:cd |        |       |        |       |       |        |       |         | UNIT:lm |         |            |

| Zonal (lm) |         | Total (lm) |         | Percent |
|------------|---------|------------|---------|---------|
| 0-10       | 172.23  | 0-10       | 172.23  | 2.87%   |
| 10-20      | 491.72  | 0-20       | 663.95  | 11.07%  |
| 20-30      | 778.77  | 0-30       | 1442.72 | 24.06%  |
| 30-40      | 1028.22 | 0-40       | 2470.94 | 41.21%  |
| 40-50      | 1103.02 | 0-50       | 3573.96 | 59.61%  |
| 50-60      | 978.40  | 0-60       | 4552.36 | 75.92%  |
| 60-70      | 740.43  | 0-70       | 5292.79 | 88.27%  |
| 70-80      | 398.48  | 0-80       | 5691.27 | 94.92%  |
| 80-90      | 159.20  | 0-90       | 5850.47 | 97.57%  |
| 90-100     | 66.06   | 0-100      | 5916.53 | 98.67%  |
| 100-110    | 29.73   | 0-110      | 5946.26 | 99.17%  |
| 110-120    | 14.06   | 0-120      | 5960.32 | 99.40%  |
| 120-130    | 15.98   | 0-130      | 5976.30 | 99.67%  |
| 130-140    | 11.39   | 0-140      | 5987.69 | 99.86%  |
| 140-150    | 5.81    | 0-150      | 5993.50 | 99.96%  |
| 150-160    | 2.03    | 0-160      | 5995.53 | 99.99%  |
| 160-170    | 0.54    | 0-170      | 5996.07 | 100.00% |
| 170-180    | 0.14    | 0-180      | 5996.21 | 100.00% |

## 4.2 Goniophotometer Test

LCS/BUG

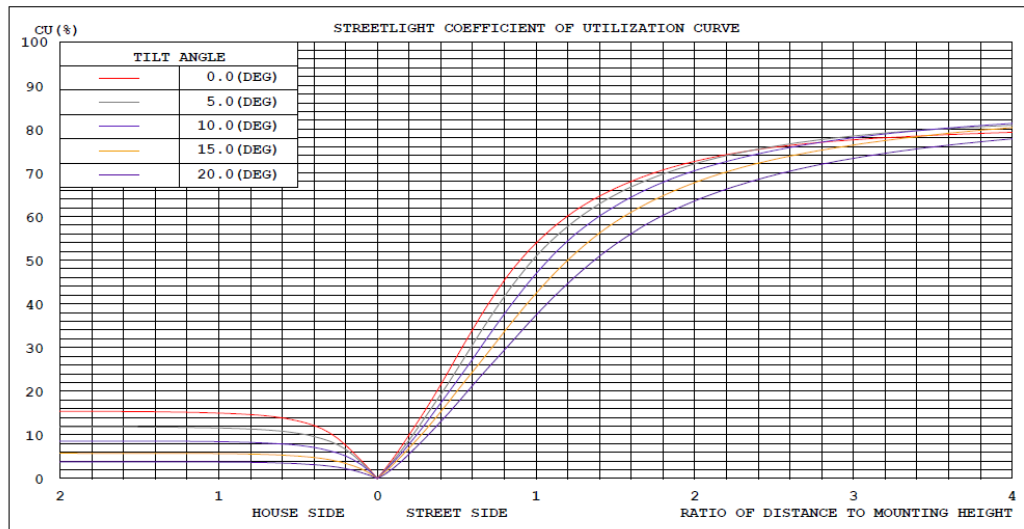


### LUMINAIRE CLASSIFICATION SYSTEM (LCS)

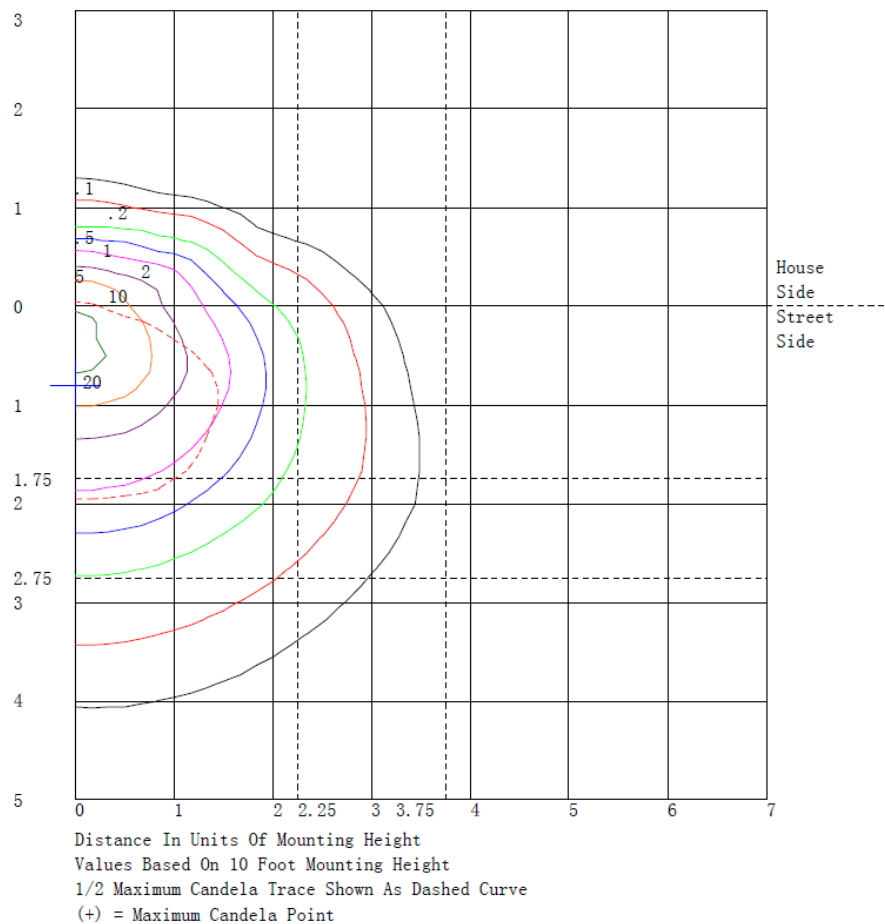
|                               | Lumens   | % Lamp | % Luminaire |
|-------------------------------|----------|--------|-------------|
| FL - Front-Low (0-30)         | 984.2    | N.A.   | 16.4        |
| FM - Front-Medium (30-60)     | 2714.8   | N.A.   | 45.3        |
| FH - Front-High (60-80)       | 1071.8   | N.A.   | 17.9        |
| FVH - Front-Very High (80-90) | 151.8    | N.A.   | 2.5         |
| BL - Back-Low (0-30)          | 458.6    | N.A.   | 7.6         |
| BM - Back-Medium (30-60)      | 394.8    | N.A.   | 6.6         |
| BH - Back-High (60-80)        | 67.1     | N.A.   | 1.1         |
| BVH - Back-Very High (80-90)  | 7.4      | N.A.   | 0.1         |
| UL - Uplight-Low (90-100)     | 66.1     | N.A.   | 1.1         |
| UH - Uplight-High (100-180)   | 79.7     | N.A.   | 1.3         |
| Total                         | 5996.3   | N.A.   | 100.0       |
| BUG Rating                    | B1-U3-G2 |        |             |

## 4.2 Goniophotometer Test

### Coefficients of Utilization



### Isolines



## 4.2 Goniophotometer Test

### Luminous Distribution Intensity Data

Table--1

UNIT: cd

| C (DEG)<br>γ (DEG) | 0    | 5    | 10   | 15   | 20   | 25   | 30   | 35   | 40   | 45   | 50   | 55   | 60   | 65   | 70   | 75   | 80   | 85   | 90   |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0                  | 1907 | 1908 | 1908 | 1908 | 1909 | 1909 | 1910 | 1910 | 1910 | 1910 | 1910 | 1910 | 1910 | 1911 | 1911 | 1911 | 1910 | 1908 | 1907 |
| 5                  | 1905 | 1877 | 1860 | 1856 | 1875 | 1897 | 1914 | 1888 | 1859 | 1837 | 1860 | 1892 | 1923 | 1923 | 1916 | 1908 | 1909 | 1912 | 1915 |
| 10                 | 1839 | 1837 | 1839 | 1846 | 1849 | 1862 | 1892 | 1967 | 2054 | 2143 | 2220 | 2282 | 2324 | 2316 | 2291 | 2258 | 2238 | 2222 | 2212 |
| 15                 | 1760 | 1749 | 1768 | 1819 | 1927 | 2045 | 2154 | 2193 | 2213 | 2223 | 2253 | 2281 | 2304 | 2310 | 2309 | 2306 | 2304 | 2302 | 2298 |
| 20                 | 1661 | 1684 | 1732 | 1803 | 1920 | 2045 | 2161 | 2219 | 2260 | 2291 | 2319 | 2354 | 2408 | 2529 | 2657 | 2773 | 2820 | 2839 | 2835 |
| 25                 | 1567 | 1685 | 1795 | 1898 | 1993 | 2082 | 2164 | 2221 | 2290 | 2386 | 2591 | 2808 | 3007 | 3097 | 3151 | 3183 | 3229 | 3261 | 3277 |
| 30                 | 1456 | 1664 | 1833 | 1963 | 2013 | 2056 | 2125 | 2338 | 2576 | 2805 | 2930 | 3026 | 3105 | 3208 | 3300 | 3373 | 3398 | 3404 | 3397 |
| 35                 | 1318 | 1520 | 1707 | 1879 | 2024 | 2162 | 2303 | 2474 | 2652 | 2832 | 3023 | 3199 | 3347 | 3428 | 3477 | 3500 | 3513 | 3512 | 3501 |
| 40                 | 1190 | 1396 | 1598 | 1796 | 1988 | 2179 | 2372 | 2589 | 2799 | 2990 | 3126 | 3238 | 3329 | 3423 | 3496 | 3543 | 3527 | 3493 | 3454 |
| 45                 | 1082 | 1268 | 1464 | 1672 | 1901 | 2132 | 2358 | 2573 | 2762 | 2912 | 2977 | 3006 | 3012 | 3030 | 3036 | 3027 | 2979 | 2927 | 2886 |
| 50                 | 931  | 1095 | 1286 | 1505 | 1789 | 2071 | 2324 | 2466 | 2559 | 2615 | 2646 | 2659 | 2663 | 2684 | 2701 | 2710 | 2693 | 2670 | 2648 |
| 55                 | 783  | 948  | 1131 | 1332 | 1581 | 1826 | 2046 | 2181 | 2275 | 2334 | 2367 | 2375 | 2364 | 2331 | 2292 | 2255 | 2250 | 2250 | 2252 |
| 60                 | 652  | 846  | 1033 | 1214 | 1399 | 1569 | 1717 | 1816 | 1889 | 1938 | 1961 | 1976 | 1990 | 2043 | 2093 | 2129 | 2105 | 2068 | 2034 |
| 65                 | 542  | 715  | 873  | 1016 | 1144 | 1258 | 1360 | 1458 | 1541 | 1606 | 1634 | 1647 | 1650 | 1659 | 1666 | 1673 | 1683 | 1691 | 1694 |
| 70                 | 401  | 500  | 604  | 712  | 834  | 954  | 1063 | 1145 | 1208 | 1250 | 1258 | 1253 | 1241 | 1243 | 1244 | 1241 | 1223 | 1204 | 1189 |
| 75                 | 304  | 340  | 391  | 456  | 553  | 651  | 737  | 775  | 794  | 800  | 803  | 804  | 804  | 817  | 831  | 843  | 842  | 837  | 830  |
| 80                 | 215  | 217  | 232  | 260  | 310  | 367  | 423  | 464  | 498  | 521  | 527  | 526  | 522  | 527  | 532  | 537  | 540  | 542  | 541  |
| 85                 | 89.2 | 84.2 | 90.2 | 107  | 141  | 181  | 223  | 254  | 282  | 307  | 328  | 346  | 360  | 371  | 379  | 384  | 386  | 386  | 385  |
| 90                 | 20.2 | 29.5 | 40.6 | 53.7 | 69.0 | 85.9 | 104  | 123  | 142  | 162  | 183  | 204  | 224  | 239  | 252  | 262  | 268  | 272  | 273  |
| 95                 | 15.8 | 21.2 | 27.1 | 33.4 | 39.7 | 46.8 | 54.7 | 63.9 | 74.4 | 86.5 | 102  | 118  | 135  | 151  | 167  | 180  | 188  | 193  | 194  |
| 100                | 16.9 | 17.5 | 18.6 | 20.3 | 21.3 | 23.9 | 28.9 | 37.8 | 50.6 | 67.9 | 93.2 | 122  | 152  | 184  | 213  | 239  | 256  | 267  | 270  |
| 105                | 12.7 | 13.0 | 13.4 | 13.8 | 13.6 | 13.9 | 15.3 | 20.2 | 26.0 | 31.7 | 33.4 | 35.9 | 40.7 | 54.9 | 70.6 | 85.0 | 91.7 | 95.0 | 95.1 |
| 110                | 13.6 | 9.54 | 8.44 | 10.3 | 18.7 | 27.5 | 34.1 | 28.3 | 21.0 | 15.4 | 22.5 | 31.9 | 41.2 | 43.1 | 43.3 | 42.8 | 44.3 | 45.7 | 46.6 |
| 115                | 12.0 | 7.58 | 6.31 | 8.21 | 15.7 | 24.6 | 32.9 | 36.8 | 38.1 | 36.5 | 28.1 | 19.2 | 12.3 | 15.7 | 21.9 | 29.1 | 34.0 | 37.3 | 38.5 |
| 120                | 8.21 | 4.69 | 4.17 | 6.64 | 14.0 | 22.9 | 32.0 | 38.3 | 43.2 | 46.8 | 49.3 | 50.0 | 48.3 | 41.4 | 33.4 | 25.8 | 22.2 | 20.6 | 21.0 |
| 125                | 6.13 | 3.21 | 2.95 | 5.38 | 11.9 | 20.1 | 28.7 | 35.6 | 41.7 | 46.8 | 50.3 | 52.6 | 53.7 | 52.9 | 51.4 | 49.4 | 47.4 | 45.8 | 44.8 |
| 130                | 4.53 | 2.48 | 2.53 | 4.68 | 10.0 | 16.6 | 23.7 | 29.4 | 34.7 | 39.4 | 43.8 | 47.3 | 49.8 | 50.4 | 50.1 | 49.2 | 48.3 | 47.5 | 47.1 |
| 135                | 1.49 | 0.00 | 0.00 | 0.68 | 5.89 | 12.3 | 19.1 | 23.8 | 28.2 | 32.2 | 36.7 | 40.7 | 43.8 | 44.8 | 45.0 | 44.7 | 44.7 | 44.6 | 44.5 |
| 140                | 1.42 | 2.60 | 4.14 | 6.05 | 8.36 | 11.0 | 14.0 | 17.4 | 21.0 | 24.6 | 27.9 | 31.0 | 33.6 | 35.2 | 36.3 | 37.1 | 37.8 | 38.3 | 38.5 |
| 145                | 1.39 | 1.64 | 2.32 | 3.45 | 5.11 | 7.15 | 9.50 | 12.3 | 15.1 | 17.8 | 20.0 | 21.9 | 23.6 | 25.1 | 26.4 | 27.5 | 28.7 | 29.5 | 30.0 |
| 150                | 1.10 | 1.12 | 1.14 | 1.14 | 0.60 | 0.47 | 1.14 | 4.47 | 8.35 | 12.1 | 14.0 | 15.2 | 16.1 | 17.1 | 18.0 | 18.7 | 19.4 | 19.9 | 20.2 |
| 155                | 1.03 | 1.01 | 1.05 | 1.15 | 1.11 | 1.26 | 1.76 | 3.23 | 4.98 | 6.81 | 8.26 | 9.55 | 10.6 | 11.3 | 11.9 | 12.3 | 12.8 | 13.1 | 13.3 |
| 160                | 1.13 | 1.08 | 1.06 | 1.09 | 1.23 | 1.36 | 1.44 | 1.11 | 0.89 | 0.95 | 2.04 | 3.40 | 4.83 | 5.86 | 6.73 | 7.39 | 7.73 | 7.89 | 7.91 |
| 165                | 1.23 | 1.23 | 1.23 | 1.23 | 1.18 | 1.16 | 1.17 | 1.29 | 1.45 | 1.64 | 1.91 | 2.13 | 2.22 | 1.88 | 1.45 | 1.04 | 0.96 | 0.96 | 1.02 |
| 170                | 1.33 | 1.34 | 1.34 | 1.34 | 1.33 | 1.32 | 1.31 | 1.29 | 1.27 | 1.26 | 1.24 | 1.23 | 1.23 | 1.25 | 1.27 | 1.30 | 1.32 | 1.34 | 1.36 |
| 175                | 1.43 | 1.44 | 1.45 | 1.45 | 1.45 | 1.45 | 1.44 | 1.43 | 1.42 | 1.40 | 1.39 | 1.38 | 1.36 | 1.34 | 1.32 | 1.30 | 1.27 | 1.25 | 1.24 |
| 180                | 1.62 | 1.63 | 1.63 | 1.63 | 1.62 | 1.61 | 1.60 | 1.59 | 1.58 | 1.56 | 1.53 | 1.50 | 1.47 | 1.44 | 1.42 | 1.40 | 1.37 | 1.34 | 1.32 |

| UNIT: cd           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| C (DEG)<br>γ (DEG) | 95   | 100  | 105  | 110  | 115  | 120  | 125  | 130  | 135  | 140  | 145  | 150  | 155  | 160  | 165  | 170  | 175  | 180  | 185  |
| 0                  | 1908 | 1910 | 1911 | 1911 | 1911 | 1910 | 1910 | 1910 | 1910 | 1910 | 1910 | 1910 | 1909 | 1909 | 1908 | 1908 | 1908 | 1907 | 1911 |
| 5                  | 1912 | 1909 | 1908 | 1916 | 1923 | 1923 | 1892 | 1860 | 1837 | 1859 | 1888 | 1914 | 1897 | 1875 | 1856 | 1860 | 1877 | 1905 | 1828 |
| 10                 | 2222 | 2238 | 2258 | 2291 | 2316 | 2324 | 2282 | 2220 | 2143 | 2054 | 1967 | 1892 | 1862 | 1849 | 1846 | 1839 | 1837 | 1839 | 1781 |
| 15                 | 2302 | 2304 | 2306 | 2309 | 2310 | 2304 | 2281 | 2253 | 2223 | 2213 | 2193 | 2154 | 2045 | 1927 | 1819 | 1768 | 1749 | 1760 | 1618 |
| 20                 | 2839 | 2820 | 2773 | 2657 | 2529 | 2408 | 2354 | 2319 | 2291 | 2260 | 2219 | 2161 | 2045 | 1920 | 1803 | 1732 | 1684 | 1661 | 1528 |
| 25                 | 3261 | 3229 | 3183 | 3151 | 3097 | 3007 | 2808 | 2591 | 2386 | 2290 | 2221 | 2164 | 2082 | 1993 | 1898 | 1795 | 1685 | 1567 | 1514 |
| 30                 | 3404 | 3398 | 3373 | 3300 | 3208 | 3105 | 3026 | 2930 | 2805 | 2576 | 2338 | 2125 | 2056 | 2013 | 1963 | 1833 | 1664 | 1456 | 1430 |
| 35                 | 3512 | 3513 | 3500 | 3477 | 3428 | 3347 | 3199 | 3023 | 2832 | 2652 | 2474 | 2303 | 2162 | 2024 | 1879 | 1707 | 1520 | 1318 | 1336 |
| 40                 | 3493 | 3527 | 3543 | 3496 | 3423 | 3329 | 3238 | 3126 | 2990 | 2799 | 2589 | 2372 | 2179 | 1988 | 1796 | 1598 | 1396 | 1190 | 1198 |
| 45                 | 2927 | 2979 | 3027 | 3036 | 3030 | 3012 | 3006 | 2977 | 2912 | 2762 | 2573 | 2358 | 2132 | 1901 | 1672 | 1464 | 1268 | 1082 | 1042 |
| 50                 | 2670 | 2693 | 2710 | 2701 | 2684 | 2663 | 2659 | 2646 | 2615 | 2559 | 2466 | 2324 | 2071 | 1789 | 1505 | 1286 | 1095 | 931  | 838  |
| 55                 | 2250 | 2250 | 2255 | 2292 | 2331 | 2364 | 2375 | 2367 | 2334 | 2275 | 2181 | 2046 | 1826 | 1581 | 1332 | 1131 | 948  | 783  | 647  |
| 60                 | 2068 | 2105 | 2129 | 2093 | 2043 | 1990 | 1976 | 1961 | 1938 | 1889 | 1816 | 1717 | 1569 | 1399 | 1214 | 1033 | 846  | 652  | 492  |
| 65                 | 1691 | 1683 | 1673 | 1666 | 1659 | 1650 | 1647 | 1634 | 1606 | 1541 | 1458 | 1360 | 1258 | 1144 | 1016 | 873  | 715  | 542  | 395  |
| 70                 | 1204 | 1223 | 1241 | 1244 | 1243 | 1241 | 1253 | 1258 | 1250 | 1208 | 1145 | 1063 | 954  | 834  | 712  | 604  | 500  | 401  | 302  |
| 75                 | 837  | 842  | 843  | 831  | 817  | 804  | 804  | 803  | 800  | 794  | 775  | 737  | 651  | 553  | 456  | 391  | 340  | 304  | 218  |
| 80                 | 542  | 540  | 537  | 532  | 527  | 522  | 526  | 527  | 521  | 498  | 464  | 423  | 367  | 310  | 260  | 232  | 217  | 215  | 146  |
| 85                 | 386  | 386  | 384  | 379  | 371  | 360  | 346  | 328  | 307  | 282  | 254  | 223  | 181  | 141  | 107  | 90.2 | 84.2 | 89.2 | 63.4 |
| 90                 | 272  | 268  | 262  | 252  | 239  | 224  | 204  | 183  | 162  | 142  | 123  | 104  | 85.9 | 69.0 | 53.7 | 40.6 | 29.5 | 20.2 | 18.4 |
| 95                 | 193  | 188  | 180  | 167  | 151  | 135  | 118  | 102  | 86.5 | 74.4 | 63.9 | 54.7 | 46.8 | 39.7 | 33.4 | 27.1 | 21.2 | 15.8 | 13.8 |
| 100                | 267  | 256  | 239  | 213  | 184  | 152  | 122  | 93.2 | 67.9 | 50.6 | 37.8 | 28.9 | 23.9 | 21.3 | 20.3 | 18.6 | 17.5 | 16.9 | 13.4 |
| 105                | 95.0 | 91.7 | 85.0 | 70.6 | 54.9 | 40.7 | 35.9 | 33.4 | 31.7 | 26.0 | 20.2 | 15.3 | 13.9 | 13.6 | 13.8 | 13.4 | 13.0 | 12.7 | 9.75 |
| 110                | 45.7 | 44.3 | 42.8 | 43.3 | 43.1 | 41.2 | 31.9 | 22.5 | 15.4 | 21.0 | 28.3 | 34.1 | 27.5 | 18.7 | 10.3 | 8.44 | 9.54 | 13.6 | 9.61 |
| 115                | 37.3 | 34.0 | 29.1 | 21.9 | 15.7 | 12.3 | 19.2 | 28.1 | 36.5 | 38.1 | 36.8 | 32.9 | 24.6 | 15.7 | 8.21 | 6.31 | 7.58 | 12.0 | 8.53 |
| 120                | 20.6 | 22.2 | 25.8 | 33.4 | 41.4 | 48.3 | 50.0 | 49.3 | 46.8 | 43.2 | 38.3 | 32.0 | 22.9 | 14.0 | 6.64 | 4.17 | 4.69 | 8.21 | 6.26 |
| 125                | 45.8 | 47.4 | 49.4 | 51.4 | 52.9 | 53.7 | 52.6 | 50.3 | 46.8 | 41.7 | 35.6 | 28.7 | 20.1 | 11.9 | 5.38 | 2.95 | 3.21 | 6.13 | 4.85 |
| 130                | 47.5 | 48.3 | 49.2 | 50.1 | 50.4 | 49.8 | 47.3 | 43.8 | 39.4 | 34.7 | 29.4 | 23.7 | 16.6 | 10.0 | 4.68 | 2.53 | 2.48 | 4.53 | 3.69 |
| 135                | 44.6 | 44.7 | 44.7 | 45.0 | 44.8 | 43.8 | 40.7 | 36.7 | 32.2 | 28.2 | 23.8 | 19.1 | 12.3 | 5.89 | 0.68 | 0.00 | 0.00 | 1.49 | 1.86 |
| 140                | 38.3 | 37.8 | 37.1 | 36.3 | 35.2 | 33.6 | 31.0 | 27.9 | 24.6 | 21.0 | 17.4 | 14.0 | 11.0 | 8.36 | 6.05 | 4.14 | 2.60 | 1.42 | 1.67 |
| 145                | 29.5 | 28.7 | 27.5 | 26.4 | 25.1 | 23.6 | 21.9 | 20.0 | 17.8 | 15.1 | 12.3 | 9.50 | 7.15 | 5.11 | 3.45 | 2.32 | 1.64 | 1.39 | 1.58 |
| 150                | 19.3 | 19.4 | 18.7 | 18.0 | 17.1 | 16.1 | 15.2 | 14.0 | 12.1 | 8.35 | 4.47 | 1.14 | 0.47 | 0.60 | 1.14 | 1.14 | 1.12 | 1.10 | 1.41 |
| 155                | 13.1 | 12.8 | 12.3 | 11.9 | 11.3 | 10.6 | 9.55 | 8.26 | 6.81 | 4.98 | 3.23 | 1.76 | 1.26 | 1.11 | 1.15 | 1.05 | 1.01 | 1.03 | 1.47 |
| 160                | 7.89 | 7.73 | 7.39 | 6.73 | 5.86 | 4.83 | 3.40 | 2.04 | 0.95 | 0.89 | 1.11 | 1.44 | 1.36 | 1.23 | 1.09 | 1.06 | 1.08 | 1.13 | 1.63 |
| 165                | 0.96 | 0.96 | 1.04 | 1.45 | 1.88 | 2.22 | 2.13 | 1.91 | 1.64 | 1.45 | 1.29 | 1.17 | 1.16 | 1.18 | 1.23 | 1.23 | 1.23 | 1.23 | 1.70 |
| 170                | 1.34 | 1.32 | 1.30 | 1.27 | 1.25 | 1.23 | 1.23 | 1.24 | 1.26 | 1.27 | 1.29 | 1.31 | 1.32 | 1.33 | 1.34 | 1.34 | 1.34 | 1.33 | 1.71 |
| 175                | 1.25 | 1.27 | 1.30 | 1.32 | 1.34 | 1.36 | 1.38 | 1.39 | 1.40 | 1.42 | 1.43 | 1.44 | 1.45 | 1.45 | 1.45 | 1.45 | 1.44 | 1.43 | 1.68 |
| 180                | 1.34 | 1.37 | 1.40 | 1.42 | 1.44 | 1.47 | 1.50 | 1.53 | 1.56 | 1.58 | 1.59 | 1.60 | 1.61 | 1.62 | 1.63 | 1.63 | 1.63 | 1.62 | 1.61 |



Table--3

UNIT: cd

| C (DEG)<br>γ (DEG) | 190  | 195  | 200  | 205  | 210  | 215  | 220  | 225  | 230  | 235  | 240  | 245  | 250  | 255  | 260  | 265  | 270  | 275  | 280  |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0                  | 1913 | 1915 | 1915 | 1914 | 1913 | 1912 | 1911 | 1911 | 1911 | 1912 | 1912 | 1911 | 1910 | 1909 | 1908 | 1907 | 1907 | 1907 | 1908 |
| 5                  | 1771 | 1733 | 1735 | 1743 | 1743 | 1684 | 1617 | 1556 | 1544 | 1545 | 1553 | 1554 | 1555 | 1555 | 1551 | 1548 | 1545 | 1548 | 1551 |
| 10                 | 1724 | 1669 | 1605 | 1549 | 1510 | 1519 | 1542 | 1566 | 1569 | 1563 | 1548 | 1512 | 1473 | 1435 | 1413 | 1400 | 1394 | 1400 | 1413 |
| 15                 | 1511 | 1440 | 1423 | 1428 | 1443 | 1443 | 1436 | 1417 | 1367 | 1308 | 1245 | 1188 | 1138 | 1101 | 1096 | 1102 | 1112 | 1102 | 1096 |
| 20                 | 1427 | 1357 | 1344 | 1343 | 1334 | 1258 | 1166 | 1071 | 1006 | 946  | 887  | 812  | 739  | 674  | 627  | 594  | 579  | 594  | 627  |
| 25                 | 1454 | 1386 | 1315 | 1235 | 1142 | 1024 | 898  | 772  | 650  | 541  | 455  | 420  | 406  | 405  | 396  | 390  | 388  | 390  | 396  |
| 30                 | 1379 | 1301 | 1190 | 1058 | 912  | 741  | 578  | 440  | 388  | 365  | 359  | 336  | 317  | 301  | 290  | 284  | 281  | 284  | 290  |
| 35                 | 1301 | 1212 | 1031 | 826  | 627  | 508  | 419  | 354  | 306  | 272  | 246  | 219  | 196  | 178  | 167  | 161  | 159  | 161  | 167  |
| 40                 | 1151 | 1049 | 845  | 622  | 416  | 333  | 287  | 260  | 215  | 175  | 142  | 119  | 103  | 93.2 | 87.2 | 84.7 | 84.9 | 84.7 | 87.2 |
| 45                 | 968  | 860  | 684  | 500  | 330  | 249  | 198  | 167  | 132  | 106  | 87.6 | 79.1 | 75.8 | 75.5 | 72.7 | 70.8 | 69.9 | 70.8 | 72.7 |
| 50                 | 739  | 631  | 501  | 374  | 261  | 190  | 140  | 106  | 85.2 | 73.7 | 68.2 | 60.8 | 55.5 | 51.9 | 49.7 | 48.7 | 48.7 | 48.7 | 49.7 |
| 55                 | 525  | 418  | 326  | 249  | 186  | 138  | 102  | 76.5 | 59.6 | 49.3 | 43.8 | 39.7 | 37.7 | 37.1 | 35.9 | 35.3 | 35.0 | 35.3 | 35.9 |
| 60                 | 359  | 256  | 191  | 148  | 119  | 88.9 | 65.6 | 48.3 | 37.5 | 30.8 | 26.9 | 23.4 | 21.0 | 19.6 | 18.5 | 17.8 | 17.6 | 17.8 | 18.5 |
| 65                 | 275  | 183  | 128  | 92.8 | 72.0 | 51.3 | 36.5 | 25.8 | 16.3 | 9.28 | 4.45 | 1.87 | 0.73 | 0.54 | 0.35 | 0.46 | 0.72 | 0.46 | 0.35 |
| 70                 | 219  | 152  | 103  | 68.4 | 43.7 | 25.2 | 13.1 | 5.98 | 1.90 | 0.41 | 0.53 | 0.21 | 0.31 | 0.63 | 0.72 | 0.82 | 0.93 | 0.82 | 0.72 |
| 75                 | 147  | 92.1 | 57.4 | 35.2 | 22.0 | 11.9 | 6.18 | 3.53 | 1.46 | 0.66 | 0.65 | 0.47 | 0.52 | 0.70 | 0.83 | 0.97 | 1.11 | 0.97 | 0.83 |
| 80                 | 91.3 | 50.5 | 28.5 | 16.8 | 11.9 | 6.53 | 3.65 | 2.43 | 1.32 | 0.85 | 0.80 | 0.68 | 0.70 | 0.81 | 0.95 | 1.12 | 1.28 | 1.12 | 0.95 |
| 85                 | 42.4 | 26.4 | 16.7 | 10.8 | 7.50 | 4.54 | 2.72 | 1.76 | 1.15 | 0.93 | 0.95 | 0.88 | 0.88 | 0.95 | 1.07 | 1.21 | 1.35 | 1.21 | 1.07 |
| 90                 | 16.3 | 13.9 | 10.9 | 7.90 | 5.16 | 3.49 | 2.31 | 1.57 | 1.20 | 1.09 | 1.12 | 1.09 | 1.10 | 1.14 | 1.23 | 1.34 | 1.45 | 1.34 | 1.23 |
| 95                 | 11.8 | 9.78 | 7.71 | 5.77 | 4.08 | 2.94 | 2.12 | 1.58 | 1.34 | 1.27 | 1.30 | 1.28 | 1.29 | 1.33 | 1.39 | 1.47 | 1.57 | 1.47 | 1.39 |
| 100                | 10.4 | 7.87 | 5.98 | 4.54 | 3.49 | 2.76 | 2.29 | 2.01 | 1.83 | 1.76 | 1.74 | 1.68 | 1.65 | 1.64 | 1.68 | 1.74 | 1.84 | 1.74 | 1.68 |
| 105                | 7.22 | 5.13 | 3.44 | 2.19 | 1.40 | 1.34 | 1.59 | 1.95 | 1.97 | 1.96 | 1.92 | 1.89 | 1.87 | 1.87 | 1.90 | 1.97 | 2.05 | 1.97 | 1.90 |
| 110                | 6.44 | 4.12 | 2.97 | 2.43 | 2.26 | 1.91 | 1.69 | 1.58 | 1.63 | 1.74 | 1.87 | 1.92 | 1.94 | 1.96 | 1.98 | 2.00 | 2.02 | 2.00 | 1.98 |
| 115                | 5.77 | 3.73 | 2.66 | 2.12 | 1.92 | 1.69 | 1.59 | 1.58 | 1.60 | 1.66 | 1.72 | 1.75 | 1.77 | 1.79 | 1.82 | 1.85 | 1.88 | 1.85 | 1.82 |
| 120                | 4.65 | 3.39 | 2.55 | 1.99 | 1.67 | 1.51 | 1.48 | 1.53 | 1.59 | 1.67 | 1.75 | 1.79 | 1.83 | 1.86 | 1.90 | 1.94 | 1.97 | 1.94 | 1.90 |
| 125                | 3.78 | 2.92 | 2.29 | 1.86 | 1.60 | 1.49 | 1.49 | 1.57 | 1.65 | 1.75 | 1.84 | 1.89 | 1.93 | 1.96 | 2.01 | 2.06 | 2.10 | 2.06 | 2.01 |
| 130                | 2.99 | 2.43 | 2.00 | 1.71 | 1.53 | 1.50 | 1.55 | 1.64 | 1.71 | 1.78 | 1.86 | 1.95 | 2.03 | 2.11 | 2.19 | 2.25 | 2.29 | 2.25 | 2.19 |
| 135                | 2.08 | 2.16 | 2.00 | 1.77 | 1.55 | 1.56 | 1.62 | 1.72 | 1.81 | 1.89 | 1.98 | 2.05 | 2.11 | 2.17 | 2.23 | 2.28 | 2.32 | 2.28 | 2.23 |
| 140                | 1.84 | 1.92 | 1.86 | 1.76 | 1.66 | 1.68 | 1.74 | 1.81 | 1.87 | 1.93 | 2.00 | 2.07 | 2.14 | 2.21 | 2.28 | 2.34 | 2.39 | 2.34 | 2.28 |
| 145                | 1.72 | 1.81 | 1.83 | 1.82 | 1.81 | 1.83 | 1.87 | 1.92 | 1.99 | 2.06 | 2.12 | 2.17 | 2.21 | 2.25 | 2.31 | 2.38 | 2.43 | 2.38 | 2.31 |
| 150                | 1.64 | 1.81 | 1.88 | 1.91 | 1.91 | 1.95 | 1.99 | 2.03 | 2.07 | 2.11 | 2.14 | 2.17 | 2.20 | 2.23 | 2.29 | 2.34 | 2.39 | 2.34 | 2.29 |
| 155                | 1.81 | 2.04 | 2.13 | 2.14 | 2.12 | 2.10 | 2.08 | 2.06 | 2.07 | 2.09 | 2.12 | 2.17 | 2.21 | 2.25 | 2.25 | 2.24 | 2.23 | 2.24 | 2.25 |
| 160                | 1.99 | 2.24 | 2.32 | 2.32 | 2.26 | 2.23 | 2.19 | 2.16 | 2.16 | 2.16 | 2.16 | 2.13 | 2.10 | 2.07 | 2.08 | 2.10 | 2.11 | 2.10 | 2.08 |
| 165                | 2.06 | 2.29 | 2.35 | 2.32 | 2.24 | 2.19 | 2.15 | 2.10 | 2.08 | 2.06 | 2.04 | 1.97 | 1.90 | 1.85 | 1.86 | 1.89 | 1.92 | 1.89 | 1.86 |
| 170                | 1.96 | 2.13 | 2.15 | 2.09 | 2.00 | 1.92 | 1.83 | 1.76 | 1.73 | 1.71 | 1.70 | 1.68 | 1.66 | 1.64 | 1.64 | 1.64 | 1.64 | 1.64 | 1.64 |
| 175                | 1.85 | 1.96 | 1.98 | 1.95 | 1.87 | 1.78 | 1.67 | 1.58 | 1.57 | 1.58 | 1.58 | 1.54 | 1.50 | 1.46 | 1.47 | 1.50 | 1.52 | 1.50 | 1.47 |
| 180                | 1.60 | 1.60 | 1.59 | 1.58 | 1.57 | 1.55 | 1.52 | 1.48 | 1.45 | 1.41 | 1.38 | 1.36 | 1.35 | 1.34 | 1.36 | 1.38 | 1.40 | 1.38 | 1.36 |

|                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | UNIT: cd |  |  |  |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----------|--|--|--|
| C (DEG)<br>γ (DEG) | 285  | 290  | 295  | 300  | 305  | 310  | 315  | 320  | 325  | 330  | 335  | 340  | 345  | 350  | 355  |          |  |  |  |
| 0                  | 1909 | 1910 | 1911 | 1912 | 1912 | 1911 | 1911 | 1911 | 1912 | 1913 | 1914 | 1915 | 1915 | 1913 | 1911 |          |  |  |  |
| 5                  | 1555 | 1555 | 1554 | 1553 | 1545 | 1544 | 1556 | 1617 | 1684 | 1743 | 1743 | 1735 | 1733 | 1771 | 1828 |          |  |  |  |
| 10                 | 1435 | 1473 | 1512 | 1548 | 1563 | 1569 | 1566 | 1542 | 1519 | 1510 | 1549 | 1605 | 1669 | 1724 | 1781 |          |  |  |  |
| 15                 | 1101 | 1138 | 1188 | 1245 | 1308 | 1367 | 1417 | 1436 | 1443 | 1443 | 1428 | 1423 | 1440 | 1511 | 1618 |          |  |  |  |
| 20                 | 674  | 739  | 812  | 887  | 946  | 1006 | 1071 | 1166 | 1258 | 1334 | 1343 | 1344 | 1357 | 1427 | 1528 |          |  |  |  |
| 25                 | 405  | 406  | 420  | 455  | 541  | 650  | 772  | 898  | 1024 | 1142 | 1235 | 1315 | 1386 | 1454 | 1514 |          |  |  |  |
| 30                 | 301  | 317  | 336  | 359  | 365  | 388  | 440  | 578  | 741  | 912  | 1058 | 1190 | 1301 | 1379 | 1430 |          |  |  |  |
| 35                 | 178  | 196  | 219  | 246  | 272  | 306  | 354  | 419  | 508  | 627  | 826  | 1031 | 1212 | 1301 | 1336 |          |  |  |  |
| 40                 | 93.2 | 103  | 119  | 142  | 175  | 215  | 260  | 287  | 333  | 416  | 622  | 845  | 1049 | 1151 | 1198 |          |  |  |  |
| 45                 | 75.5 | 75.8 | 79.1 | 87.6 | 106  | 132  | 167  | 198  | 249  | 330  | 500  | 684  | 860  | 968  | 1042 |          |  |  |  |
| 50                 | 51.9 | 55.5 | 60.8 | 68.2 | 73.7 | 85.2 | 106  | 140  | 190  | 261  | 374  | 501  | 631  | 739  | 838  |          |  |  |  |
| 55                 | 37.1 | 37.7 | 39.7 | 43.8 | 49.3 | 59.6 | 76.5 | 102  | 138  | 186  | 249  | 326  | 418  | 525  | 647  |          |  |  |  |
| 60                 | 19.6 | 21.0 | 23.4 | 26.9 | 30.8 | 37.5 | 48.3 | 65.6 | 88.9 | 119  | 148  | 191  | 256  | 359  | 492  |          |  |  |  |
| 65                 | 0.54 | 0.73 | 1.87 | 4.45 | 9.28 | 16.3 | 25.8 | 36.5 | 51.3 | 72.0 | 92.8 | 128  | 183  | 275  | 395  |          |  |  |  |
| 70                 | 0.63 | 0.31 | 0.21 | 0.53 | 0.41 | 1.90 | 5.98 | 13.1 | 25.2 | 43.7 | 68.4 | 103  | 152  | 219  | 302  |          |  |  |  |
| 75                 | 0.70 | 0.52 | 0.47 | 0.65 | 0.66 | 1.46 | 3.53 | 6.18 | 11.9 | 22.0 | 35.2 | 57.4 | 92.1 | 147  | 218  |          |  |  |  |
| 80                 | 0.81 | 0.70 | 0.68 | 0.80 | 0.85 | 1.32 | 2.43 | 3.65 | 6.53 | 11.9 | 16.8 | 28.5 | 50.5 | 91.3 | 146  |          |  |  |  |
| 85                 | 0.95 | 0.88 | 0.88 | 0.95 | 0.93 | 1.15 | 1.76 | 2.72 | 4.54 | 7.50 | 10.8 | 16.7 | 26.4 | 42.4 | 63.4 |          |  |  |  |
| 90                 | 1.14 | 1.10 | 1.09 | 1.12 | 1.09 | 1.20 | 1.57 | 2.31 | 3.49 | 5.16 | 7.90 | 10.9 | 13.9 | 16.3 | 18.4 |          |  |  |  |
| 95                 | 1.33 | 1.29 | 1.28 | 1.30 | 1.27 | 1.34 | 1.58 | 2.12 | 2.94 | 4.08 | 5.77 | 7.71 | 9.78 | 11.8 | 13.8 |          |  |  |  |
| 100                | 1.64 | 1.65 | 1.68 | 1.74 | 1.76 | 1.83 | 2.01 | 2.29 | 2.76 | 3.49 | 4.54 | 5.98 | 7.87 | 10.4 | 13.4 |          |  |  |  |
| 105                | 1.87 | 1.87 | 1.89 | 1.92 | 1.96 | 1.97 | 1.95 | 1.59 | 1.34 | 1.40 | 2.19 | 3.44 | 5.13 | 7.22 | 9.75 |          |  |  |  |
| 110                | 1.96 | 1.94 | 1.92 | 1.87 | 1.74 | 1.63 | 1.58 | 1.69 | 1.91 | 2.26 | 2.43 | 2.97 | 4.12 | 6.44 | 9.61 |          |  |  |  |
| 115                | 1.79 | 1.77 | 1.75 | 1.72 | 1.66 | 1.60 | 1.58 | 1.59 | 1.69 | 1.92 | 2.12 | 2.66 | 3.73 | 5.77 | 8.53 |          |  |  |  |
| 120                | 1.86 | 1.83 | 1.79 | 1.75 | 1.67 | 1.59 | 1.53 | 1.48 | 1.51 | 1.67 | 1.99 | 2.55 | 3.39 | 4.65 | 6.26 |          |  |  |  |
| 125                | 1.96 | 1.93 | 1.89 | 1.84 | 1.75 | 1.65 | 1.57 | 1.49 | 1.49 | 1.60 | 1.86 | 2.29 | 2.92 | 3.78 | 4.85 |          |  |  |  |
| 130                | 2.11 | 2.03 | 1.95 | 1.86 | 1.78 | 1.71 | 1.64 | 1.55 | 1.50 | 1.53 | 1.71 | 2.00 | 2.43 | 2.99 | 3.69 |          |  |  |  |
| 135                | 2.17 | 2.11 | 2.05 | 1.98 | 1.89 | 1.81 | 1.72 | 1.62 | 1.56 | 1.55 | 1.77 | 2.00 | 2.16 | 2.08 | 1.86 |          |  |  |  |
| 140                | 2.21 | 2.14 | 2.07 | 2.00 | 1.93 | 1.87 | 1.81 | 1.74 | 1.68 | 1.66 | 1.76 | 1.86 | 1.92 | 1.84 | 1.67 |          |  |  |  |
| 145                | 2.25 | 2.21 | 2.17 | 2.12 | 2.06 | 1.99 | 1.92 | 1.87 | 1.83 | 1.81 | 1.82 | 1.83 | 1.81 | 1.72 | 1.58 |          |  |  |  |
| 150                | 2.23 | 2.20 | 2.17 | 2.14 | 2.11 | 2.07 | 2.03 | 1.99 | 1.95 | 1.91 | 1.91 | 1.88 | 1.81 | 1.64 | 1.41 |          |  |  |  |
| 155                | 2.25 | 2.21 | 2.17 | 2.12 | 2.09 | 2.07 | 2.06 | 2.08 | 2.10 | 2.12 | 2.14 | 2.13 | 2.04 | 1.81 | 1.47 |          |  |  |  |
| 160                | 2.07 | 2.10 | 2.13 | 2.16 | 2.16 | 2.16 | 2.16 | 2.19 | 2.23 | 2.26 | 2.32 | 2.32 | 2.24 | 1.99 | 1.63 |          |  |  |  |
| 165                | 1.85 | 1.90 | 1.97 | 2.04 | 2.06 | 2.08 | 2.10 | 2.15 | 2.19 | 2.24 | 2.32 | 2.35 | 2.29 | 2.06 | 1.71 |          |  |  |  |
| 170                | 1.64 | 1.66 | 1.68 | 1.70 | 1.71 | 1.73 | 1.76 | 1.83 | 1.92 | 2.00 | 2.09 | 2.15 | 2.13 | 1.96 | 1.70 |          |  |  |  |
| 175                | 1.46 | 1.50 | 1.54 | 1.58 | 1.58 | 1.57 | 1.58 | 1.67 | 1.78 | 1.87 | 1.95 | 1.98 | 1.96 | 1.85 | 1.68 |          |  |  |  |
| 180                | 1.34 | 1.35 | 1.36 | 1.38 | 1.41 | 1.45 | 1.48 | 1.52 | 1.55 | 1.57 | 1.58 | 1.59 | 1.60 | 1.60 | 1.61 |          |  |  |  |

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

|                         |                    |                       |              |
|-------------------------|--------------------|-----------------------|--------------|
| <b>Model No.</b>        | WPX2 @ 40W / 4000K | <b>Sample ID</b>      | 231101003-S1 |
| <b>Temperature (°C)</b> | 25.4               | <b>Humidity (%RH)</b> | 41.0         |

|  |
|--|
| <b>Test Method</b>   |
| <p>The samples were tested according to the ANSI C82.77:2014</p> <p>The total harmonic distortion shall be measured to the 40th order.</p> <p>The ambient temperature shall be maintained at 25±1°C. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion was calculated.</p> |

### Test Results

| Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | iTHD(%) |
|---------------|----------------|-------------|-----------|--------------|---------|
| 120.0         | 60             | 0.330       | 39.3      | 0.992        | 1.97    |
| 277.0         | 60             | 0.165       | 38.7      | 0.848        | 2.96    |



## 5.0 Equipment List:

| Equipment ID | Equipment Name               | Last Cal.  | Due Cal.   |
|--------------|------------------------------|------------|------------|
| NTC-F01-001  | Goniophotometer System       | 2022-11-09 | 2023-11-08 |
| NTC-F01-006  | 2.0 meter Integrating Sphere | 2022-11-09 | 2023-11-08 |
| NTC-F01-012  | Standard Lamp                | 2022-11-09 | 2023-11-08 |
| NTC-F01-013  | Standard Lamp                | 2022-11-09 | 2023-11-08 |
| NTC-F01-031  | Digital Power Meter          | 2023-08-25 | 2024-08-24 |
| NTC-F01-019  | Temperature & Humidity Meter | 2022-11-12 | 2023-11-11 |

\*\*\*\*\*End of Report\*\*\*\*\*