

## Photometric Test Report

### Relevant Standards

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

Prepared For

**RAB Lighting Inc.**

Prepared By

**Dongguan New Testing Centre Co., Ltd.**

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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) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		2562
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		143.1
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		2520
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	140.8
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		17.9
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	120V	4.96
			277V	19.86
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	120V	0.990
			277V	0.823
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	5029±283	5216
		4 steps	5029±220	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		82.6
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		7
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		83
Minimum Rg (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥89		97
IES Rcs,h1 (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-13%
Zonal Lumen Requirement (80°-90°) (Goniophotometer – Section 4.2)	IES LM-79-2008	≤10%		2.2%
Input Voltage (V)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Cast		277.0
(Goniophotometer – Section 4.2)		Non-Worst Case		120.0
Input Current (A)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		0.079
(Goniophotometer – Section 4.2)		Non-Worst Case		0.142
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		17.9
(Goniophotometer – Section 4.2)		Non-Worst Case		16.9

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-11-02	WPX1 @ 15W / 5000K	231101002-S1
2	Goniophotometer Test	2023-11-02	WPX1 @ 15W / 5000K	231101002-S1
3	THD and PF Test	2023-11-02	WPX1 @ 15W / 5000K	231101002-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. WPX1 @ 15W / 5000K, 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>	WPX1 @ 15W / 5000K	<b>Sample ID</b>	231101002-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

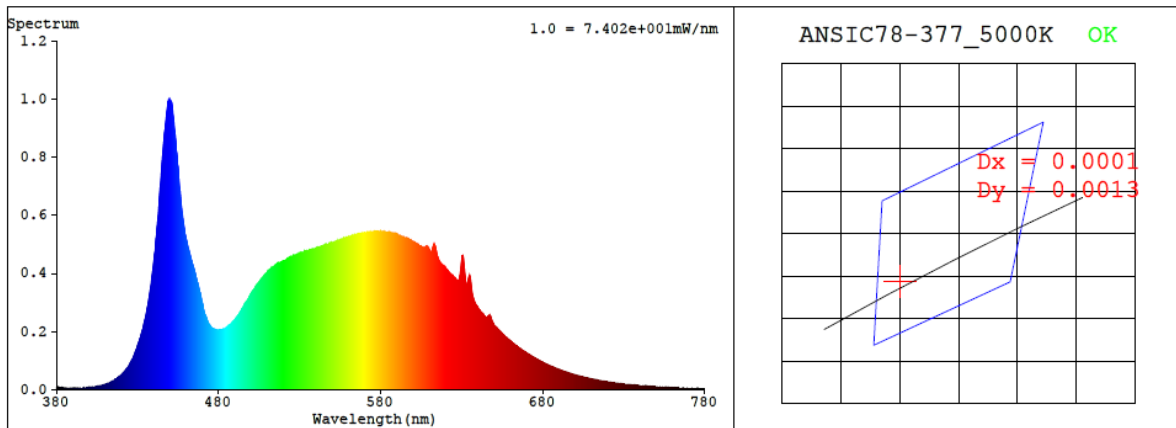
<b>Test Method</b>
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made 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	0.142	16.9	0.990
277.0	60	0.079	17.9	0.823

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
5216	82.6	7	0.0006	83	97	-13%

## 4.1 Integrating Sphere Test



### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.3394$   $y = 0.3482$  /  $u' = 0.2089$   $v' = 0.4822$  ( $duv=6.26e-04$ )

CCT= 5216K Prcp WL: Ld=568.0nm Purity=6.3%

Peak WL: Lp=450nm FWHM: =19.6nm Ratio:R=15.4% G=80.1% B=4.5%

Render Index: Ra = 82.6 AvgR = 75.6 TM30:Rf=82 Rg=96

EEL: 0.09726 A++ Highest

R1 =81	R2 =87	R3 =91	R4 =83	R5 =82	R6 =82	R7 =86
R8 =67	R9 =7	R10=69	R11=83	R12=62	R13=82	R14=95 R15=76

## 4.1 Integrating Sphere Test

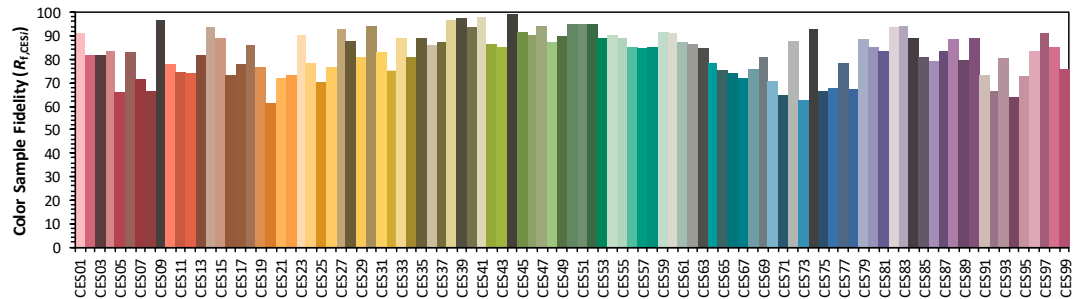
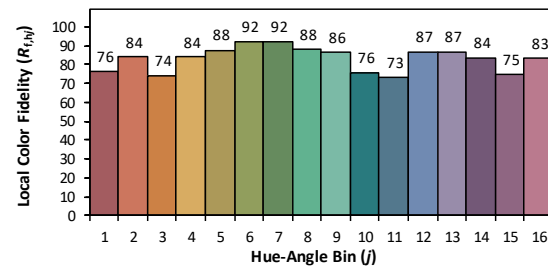
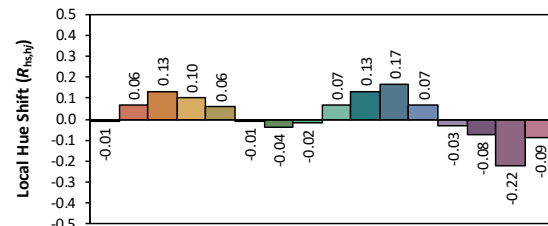
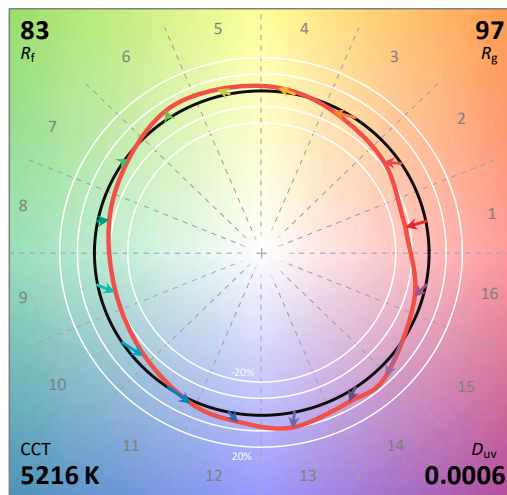
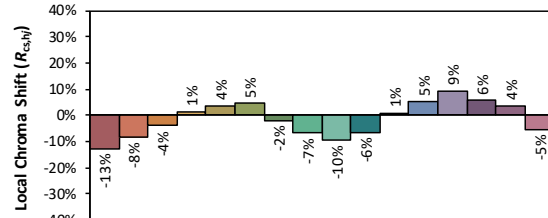
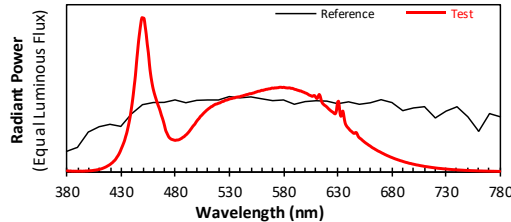
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/11/15

Model: WPX1 @ 15W / 5000K



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

$x$  0.3394  
 $y$  0.3480  
 $u'$  0.2089  
 $v'$  0.4821

CIE 13.3-1995  
(CRI)

$R_a$  83  
 $R_g$  7

## 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	8.00E-06	447	9.02E-04	514	4.22E-04	581	5.44E-04	648	2.47E-04	715	3.16E-05
381	7.20E-06	448	9.54E-04	515	4.28E-04	582	5.42E-04	649	2.31E-04	716	3.07E-05
382	6.00E-06	449	9.92E-04	516	4.32E-04	583	5.41E-04	650	2.22E-04	717	2.96E-05
383	6.90E-06	450	9.90E-04	517	4.36E-04	584	5.40E-04	651	2.16E-04	718	2.86E-05
384	5.60E-06	451	9.88E-04	518	4.37E-04	585	5.41E-04	652	2.11E-04	719	2.78E-05
385	5.20E-06	452	9.39E-04	519	4.40E-04	586	5.41E-04	653	2.04E-04	720	2.67E-05
386	5.70E-06	453	8.87E-04	520	4.43E-04	587	5.38E-04	654	1.98E-04	721	2.58E-05
387	4.90E-06	454	8.20E-04	521	4.44E-04	588	5.39E-04	655	1.92E-04	722	2.51E-05
388	5.60E-06	455	7.67E-04	522	4.48E-04	589	5.36E-04	656	1.87E-04	723	2.40E-05
389	4.70E-06	456	6.92E-04	523	4.52E-04	590	5.33E-04	657	1.82E-04	724	2.36E-05
390	5.40E-06	457	6.32E-04	524	4.54E-04	591	5.31E-04	658	1.77E-04	725	2.27E-05
391	4.80E-06	458	5.88E-04	525	4.56E-04	592	5.30E-04	659	1.72E-04	726	2.23E-05
392	5.90E-06	459	5.49E-04	526	4.61E-04	593	5.26E-04	660	1.68E-04	727	2.13E-05
393	5.70E-06	460	5.19E-04	527	4.62E-04	594	5.25E-04	661	1.63E-04	728	2.07E-05
394	5.10E-06	461	4.94E-04	528	4.64E-04	595	5.22E-04	662	1.58E-04	729	2.01E-05
395	6.00E-06	462	4.72E-04	529	4.67E-04	596	5.22E-04	663	1.54E-04	730	1.94E-05
396	5.70E-06	463	4.50E-04	530	4.69E-04	597	5.18E-04	664	1.50E-04	731	1.86E-05
397	6.90E-06	464	4.30E-04	531	4.72E-04	598	5.15E-04	665	1.45E-04	732	1.82E-05
398	6.60E-06	465	4.12E-04	532	4.72E-04	599	5.13E-04	666	1.42E-04	733	1.75E-05
399	7.00E-06	466	3.90E-04	533	4.75E-04	600	5.09E-04	667	1.37E-04	734	1.70E-05
400	8.10E-06	467	3.66E-04	534	4.77E-04	601	5.07E-04	668	1.34E-04	735	1.64E-05
401	8.30E-06	468	3.46E-04	535	4.77E-04	602	5.03E-04	669	1.30E-04	736	1.59E-05
402	8.60E-06	469	3.23E-04	536	4.81E-04	603	4.99E-04	670	1.27E-04	737	1.52E-05
403	9.20E-06	470	2.97E-04	537	4.82E-04	604	4.94E-04	671	1.23E-04	738	1.51E-05
404	1.02E-05	471	2.68E-04	538	4.83E-04	605	4.92E-04	672	1.19E-04	739	1.47E-05
405	1.15E-05	472	2.53E-04	539	4.84E-04	606	4.89E-04	673	1.16E-04	740	1.39E-05
406	1.21E-05	473	2.38E-04	540	4.85E-04	607	4.87E-04	674	1.12E-04	741	1.36E-05
407	1.36E-05	474	2.24E-04	541	4.88E-04	608	4.92E-04	675	1.09E-04	742	1.32E-05
408	1.46E-05	475	2.18E-04	542	4.88E-04	609	4.90E-04	676	1.06E-04	743	1.28E-05
409	1.64E-05	476	2.12E-04	543	4.92E-04	610	4.80E-04	677	1.03E-04	744	1.24E-05
410	1.77E-05	477	2.09E-04	544	4.93E-04	611	4.73E-04	678	9.97E-05	745	1.20E-05
411	1.96E-05	478	2.07E-04	545	4.96E-04	612	4.83E-04	679	9.66E-05	746	1.16E-05
412	2.18E-05	479	2.05E-04	546	4.98E-04	613	4.99E-04	680	9.40E-05	747	1.11E-05
413	2.45E-05	480	2.04E-04	547	4.99E-04	614	4.87E-04	681	9.11E-05	748	1.08E-05
414	2.74E-05	481	2.06E-04	548	5.02E-04	615	4.60E-04	682	8.82E-05	749	1.05E-05
415	3.05E-05	482	2.06E-04	549	5.04E-04	616	4.44E-04	683	8.56E-05	750	1.02E-05
416	3.38E-05	483	2.07E-04	550	5.04E-04	617	4.36E-04	684	8.29E-05	751	9.90E-06
417	3.79E-05	484	2.10E-04	551	5.06E-04	618	4.29E-04	685	8.07E-05	752	9.60E-06
418	4.19E-05	485	2.14E-04	552	5.08E-04	619	4.25E-04	686	7.81E-05	753	9.20E-06
419	4.59E-05	486	2.18E-04	553	5.10E-04	620	4.19E-04	687	7.60E-05	754	8.90E-06
420	5.09E-05	487	2.24E-04	554	5.13E-04	621	4.12E-04	688	7.33E-05	755	8.60E-06
421	5.68E-05	488	2.27E-04	555	5.15E-04	622	4.05E-04	689	7.15E-05	756	8.50E-06
422	6.21E-05	489	2.34E-04	556	5.18E-04	623	3.99E-04	690	6.93E-05	757	8.20E-06
423	6.97E-05	490	2.40E-04	557	5.20E-04	624	3.93E-04	691	6.69E-05	758	7.90E-06
424	7.58E-05	491	2.47E-04	558	5.20E-04	625	3.88E-04	692	6.48E-05	759	7.70E-06
425	8.51E-05	492	2.55E-04	559	5.23E-04	626	3.83E-04	693	6.26E-05	760	7.50E-06
426	9.61E-05	493	2.63E-04	560	5.26E-04	627	3.77E-04	694	6.11E-05	761	7.20E-06
427	1.06E-04	494	2.73E-04	561	5.25E-04	628	3.75E-04	695	5.92E-05	762	6.90E-06
428	1.19E-04	495	2.82E-04	562	5.28E-04	629	3.95E-04	696	5.69E-05	763	6.80E-06
429	1.33E-04	496	2.92E-04	563	5.29E-04	630	4.47E-04	697	5.54E-05	764	6.60E-06
430	1.51E-04	497	3.01E-04	564	5.32E-04	631	4.54E-04	698	5.43E-05	765	6.30E-06
431	1.67E-04	498	3.08E-04	565	5.32E-04	632	3.97E-04	699	5.21E-05	766	6.20E-06
432	1.84E-04	499	3.20E-04	566	5.35E-04	633	3.59E-04	700	5.06E-05	767	6.10E-06
433	2.03E-04	500	3.29E-04	567	5.35E-04	634	3.76E-04	701	4.91E-05	768	5.90E-06
434	2.29E-04	501	3.38E-04	568	5.36E-04	635	3.92E-04	702	4.75E-05	769	5.70E-06
435	2.52E-04	502	3.46E-04	569	5.40E-04	636	3.54E-04	703	4.57E-05	770	5.50E-06
436	2.82E-04	503	3.56E-04	570	5.40E-04	637	3.17E-04	704	4.48E-05	771	5.30E-06
437	3.14E-04	504	3.63E-04	571	5.39E-04	638	3.00E-04	705	4.35E-05	772	5.20E-06
438	3.51E-04	505	3.70E-04	572	5.42E-04	639	2.90E-04	706	4.20E-05	773	4.90E-06
439	3.95E-04	506	3.78E-04	573	5.41E-04	640	2.82E-04	707	4.06E-05	774	5.00E-06
440	4.42E-04	507	3.84E-04	574	5.42E-04	641	2.74E-04	708	3.94E-05	775	4.70E-06
441	4.97E-04	508	3.91E-04	575	5.42E-04	642	2.66E-04	709	3.83E-05	776	4.60E-06
442	5.59E-04	509	3.98E-04	576	5.45E-04	643	2.61E-04	710	3.67E-05	777	4.50E-06
443	6.20E-04	510	4.03E-04	577	5.45E-04	644	2.54E-04	711	3.55E-05	778	4.20E-06
444	7.01E-04	511	4.09E-04	578	5.45E-04	645	2.49E-04	712	3.47E-05	779	4.20E-06
445	7.74E-04	512	4.14E-04	579	5.43E-04	646	2.50E-04	713	3.38E-05	780	4.20E-06
446	8.45E-04	513	4.20E-04	580	5.45E-04	647	2.55E-04	714	3.27E-05	N/A	N/A



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

<b>Model No.</b>	WPX1 @ 15W / 5000K	<b>Sample ID</b>	231101002-S1
<b>Operate time (Min.)</b>	30	<b>Stabilization time (Min.)</b>	60
<b>Temperature (°C)</b>	24.8	<b>Humidity (%RH)</b>	42.9

<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 <math>25 \pm 1^{\circ}\text{C}</math>, 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 <math>\pm 0.2</math> 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 <math>1.0^{\circ}</math> vertical intervals and <math>15^{\circ}</math> horizontal intervals.</p>

### Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
<b>WORST CASE</b>	277.0	60	0.079	17.9	0.823
<b>NON-WORST CASE</b>	120.0	60	0.142	16.9	0.990

### Test Result

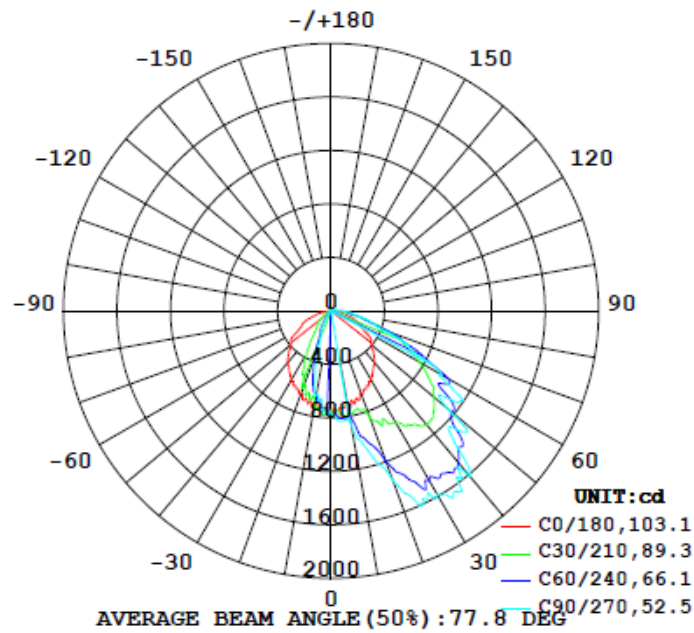
Result Type	Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement (80°-90°)	BUG
		C0-180	C90-270	C0-180	C90-270			
<b>0°-180° zones</b>	2562	109.1	146.6	52.1	95.4	143.1	2.2%	B1-U2-G1
<b>0°-90° zones</b>	2520	109.1	146.6	52.1	95.4	140.8	2.2%	B1-U2-G1



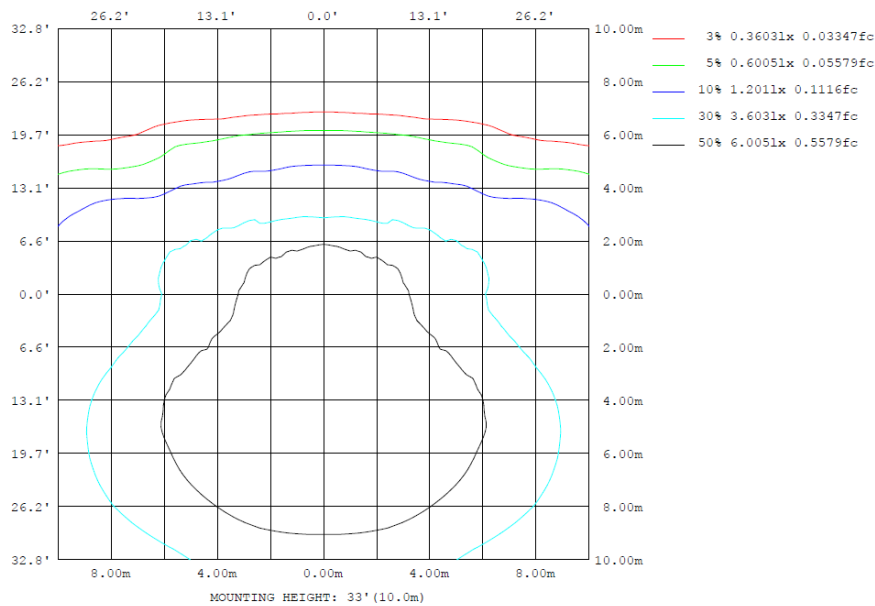
## 4.2 Goniophotometer Test

### Lighting Distribution Curve

**LUMINOUS INTENSITY DISTRIBUTION DIAGRAM**



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

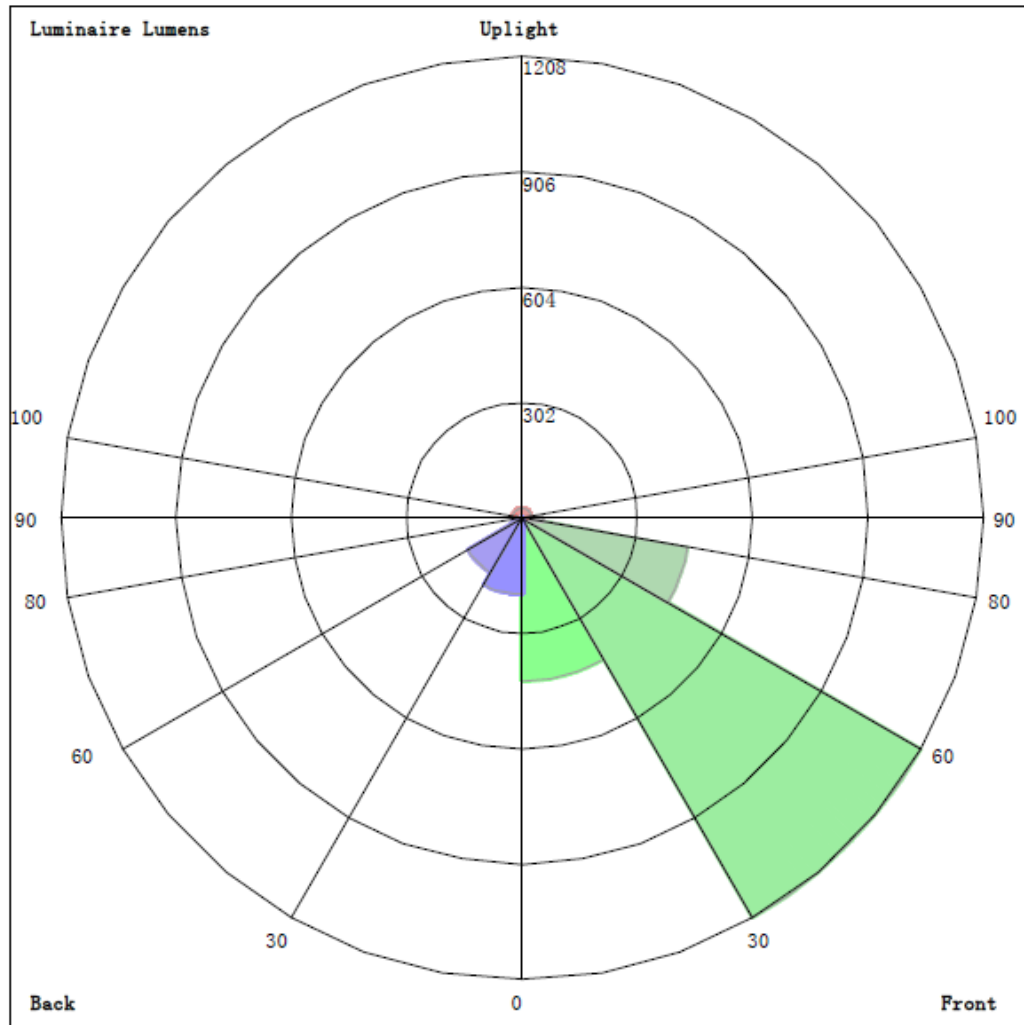
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	712.0	812.9	866.1	812.9	712.0	649.3	642.8	649.3	0~ 10	71.37	71.37	2.79, 2.79
20	655.5	1055	1345	1055	655.5	453.1	245.8	453.1	10~ 20	209.6	281.0	11, 11
30	602.6	1282	1585	1282	602.6	196.6	120.1	196.6	20~ 30	345.2	626.2	24.4, 24.4
40	507.7	1297	1615	1297	507.7	105.5	34.94	105.5	30~ 40	451.2	1077	42, 42
50	397.9	1168	1135	1168	397.9	35.80	16.05	35.80	40~ 50	483.2	1561	60.9, 60.9
60	275.3	867.7	954.8	867.7	275.3	13.58	0.3358	13.58	50~ 60	437.4	1998	78, 78
70	186.4	469.4	399.5	469.4	186.4	2.425	0.4863	2.425	60~ 70	317.8	2316	90.4, 90.4
80	66.48	161.9	175.8	161.9	66.48	1.096	0.4922	1.096	70~ 80	148.6	2464	96.2, 96.2
90	9.096	63.06	57.79	63.06	9.096	0.7366	0.5875	0.7366	80~ 90	55.75	2520	98.4, 98.4
100	6.023	19.98	31.56	19.98	6.023	0.8094	0.8043	0.8094	90~ 100	16.64	2537	99, 99
110	5.659	6.525	22.71	6.525	5.659	0.7422	0.8370	0.7422	100~ 110	7.698	2545	99.3, 99.3
120	4.515	15.14	8.512	15.14	4.515	0.7060	0.8786	0.7060	110~ 120	5.491	2550	99.5, 99.5
130	1.772	11.89	13.65	11.89	1.772	0.7546	1.044	0.7546	120~ 130	5.612	2556	99.7, 99.7
140	0.4779	7.299	10.90	7.299	0.4779	0.8336	1.078	0.8336	130~ 140	3.753	2559	99.9, 99.9
150	0.4421	3.637	5.171	3.637	0.4421	0.9218	1.048	0.9218	140~ 150	1.912	2561	100, 100
160	0.5171	0.4094	1.776	0.4094	0.5171	0.9723	0.9279	0.9723	150~ 160	0.6513	2562	100, 100
170	0.6203	0.6007	0.4892	0.6007	0.6203	0.8153	0.7116	0.8153	160~ 170	0.2149	2562	100, 100
180	0.7131	0.6320	0.5766	0.6320	0.7131	0.6590	0.6202	0.6590	170~ 180	0.0660	2562	100, 100
DEG	LUMINOUS INTENSITY: cd									UNIT: lm		

	Zonal (lm)		Total (lm)	Percent
0-10	71.37	0-10	71.37	2.79%
10-20	209.63	0-20	281.00	10.97%
20-30	345.20	0-30	626.20	24.44%
30-40	451.20	0-40	1077.40	42.05%
40-50	483.18	0-50	1560.58	60.91%
50-60	437.40	0-60	1997.98	77.98%
60-70	317.83	0-70	2315.81	90.39%
70-80	148.59	0-80	2464.40	96.19%
80-90	55.75	0-90	2520.15	98.36%
90-100	16.64	0-100	2536.79	99.01%
100-110	7.70	0-110	2544.49	99.31%
110-120	5.49	0-120	2549.98	99.53%
120-130	5.61	0-130	2555.59	99.75%
130-140	3.75	0-140	2559.34	99.89%
140-150	1.91	0-150	2561.25	99.97%
150-160	0.65	0-160	2561.90	99.99%
160-170	0.21	0-170	2562.11	100.00%
170-180	0.07	0-180	2562.18	100.00%

## 4.2 Goniophotometer Test

LCS/BUG

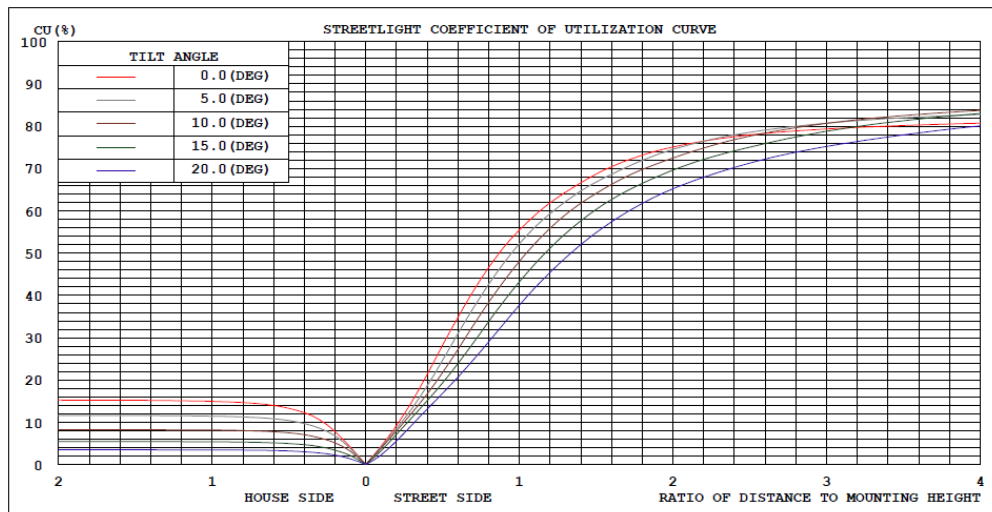


### LUMINAIRE CLASSIFICATION SYSTEM (LCS)

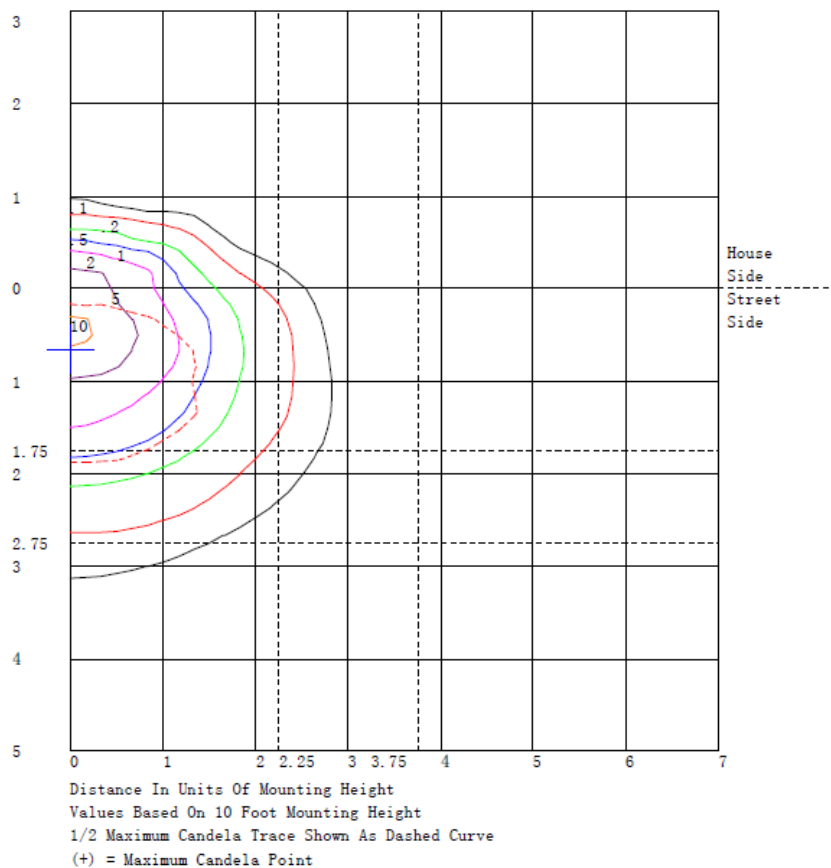
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	426.3	N.A.	16.6
FM - Front-Medium (30-60)	1208.0	N.A.	47.1
FH - Front-High (60-80)	440.2	N.A.	17.2
FVH - Front-Very High (80-90)	53.2	N.A.	2.1
BL - Back-Low (0-30)	199.9	N.A.	7.8
BM - Back-Medium (30-60)	163.8	N.A.	6.4
BH - Back-High (60-80)	26.2	N.A.	1.0
BVH - Back-Very High (80-90)	2.6	N.A.	0.1
UL - Uplight-Low (90-100)	16.6	N.A.	0.6
UH - Uplight-High (100-180)	25.4	N.A.	1.0
Total	2562.2	N.A.	100.0
BUG Rating	B1-U2-G1		

## 4.2 Goniophotometer Test

### Coefficients of Utilization



### Isolines



## 4.2 Goniophotometer Test

### Luminous Distribution Intensity Data

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	763	763	763	764	764	764	764	765	765	766	766	766	766	766	766	766	766	766	767
5	728	733	739	745	751	757	765	778	791	802	805	806	806	805	805	807	815	824	830
10	712	721	731	741	753	766	778	793	805	813	807	800	795	805	819	835	849	859	866
15	698	727	747	760	756	751	753	790	835	885	924	961	995	1028	1055	1077	1086	1089	1086
20	656	670	691	719	752	794	843	912	985	1055	1108	1154	1193	1224	1251	1275	1307	1332	1345
25	622	638	666	707	762	828	904	994	1087	1180	1259	1332	1398	1460	1514	1558	1589	1607	1613
30	603	606	632	681	763	861	969	1078	1184	1282	1356	1418	1468	1508	1539	1561	1574	1582	1585
35	544	579	633	707	812	929	1047	1152	1248	1332	1392	1441	1485	1537	1585	1623	1642	1651	1650
40	508	549	614	703	836	977	1110	1186	1246	1297	1366	1429	1478	1487	1486	1488	1535	1581	1615
45	446	517	602	701	829	960	1082	1163	1227	1278	1334	1374	1393	1360	1314	1265	1247	1238	1237
50	398	465	545	640	764	891	1007	1081	1134	1168	1175	1173	1173	1214	1254	1279	1233	1179	1135
55	363	471	572	665	755	835	901	942	968	984	985	985	992	1030	1074	1118	1145	1164	1174
60	275	380	475	562	640	709	767	805	837	868	923	974	1009	988	955	923	929	942	955
65	240	330	409	476	527	570	609	656	697	728	733	727	713	693	671	652	645	642	643
70	186	223	264	309	369	425	471	480	478	469	472	474	471	457	439	422	412	404	400
75	119	149	178	206	238	265	285	284	278	269	268	270	273	281	290	298	302	304	304
80	66.5	86.7	104	120	132	143	150	156	159	162	165	167	168	169	170	170	173	175	176
85	24.5	32.9	41.8	51.4	62.6	73.7	84.1	91.3	97.8	104	112	120	128	133	136	139	140	141	141
90	9.10	13.7	19.0	25.1	32.5	40.2	47.6	53.9	59.1	63.1	65.0	65.6	64.8	62.0	58.7	55.8	56.0	56.9	57.8
95	6.51	9.90	13.5	17.2	21.8	26.1	29.4	29.7	29.1	28.3	28.5	29.0	29.8	31.0	32.3	33.8	35.3	36.7	37.6
100	6.02	6.42	6.87	7.36	7.49	7.98	9.16	12.6	16.4	20.0	21.6	22.7	23.6	24.9	26.4	27.8	29.4	30.7	31.6
105	1.04	2.66	4.03	5.13	5.62	6.11	6.86	8.93	11.1	13.1	13.7	14.0	14.2	15.4	16.7	18.1	19.5	20.7	21.4
110	5.66	4.88	4.90	5.72	8.37	11.0	13.0	10.9	8.34	6.52	9.07	12.6	16.4	18.4	19.9	21.0	21.9	22.4	22.7
115	5.07	4.02	3.83	4.50	6.65	9.19	11.7	13.3	14.1	14.0	11.0	7.65	4.84	5.29	6.69	8.57	10.3	11.6	12.3
120	4.52	3.44	3.14	3.64	5.33	7.50	9.87	11.8	13.6	15.1	16.6	17.6	18.0	17.2	15.8	14.1	11.7	9.62	8.51
125	3.27	2.49	2.34	2.82	4.18	5.99	8.04	10.0	11.9	13.8	15.4	16.8	17.9	18.9	19.4	19.4	17.5	15.5	14.2
130	1.77	1.33	1.39	1.93	3.14	4.70	6.49	8.26	10.1	11.9	13.8	15.5	16.8	17.6	17.8	17.5	16.1	14.6	13.7
135	0.61	0.00	0.00	0.33	1.68	3.41	5.30	6.80	8.30	9.83	11.8	13.6	15.1	15.6	15.6	15.3	14.3	13.4	12.8
140	0.48	1.18	1.86	2.50	3.03	3.59	4.24	5.10	6.11	7.30	8.97	10.6	12.0	12.5	12.6	12.4	11.8	11.2	10.9
145	0.45	0.81	1.21	1.63	2.05	2.52	3.05	3.68	4.40	5.21	6.33	7.41	8.30	8.58	8.62	8.48	8.20	7.94	7.78
150	0.44	0.68	0.82	0.85	0.55	0.32	0.33	1.29	2.46	3.64	4.28	4.74	5.05	5.25	5.34	5.36	5.30	5.22	5.17
155	0.47	0.46	0.47	0.49	0.46	0.48	0.61	1.04	1.55	2.05	2.37	2.62	2.80	2.93	3.00	3.05	3.09	3.11	3.13
160	0.52	0.51	0.51	0.50	0.49	0.47	0.46	0.40	0.37	0.41	0.66	0.96	1.26	1.44	1.59	1.69	1.74	1.77	1.78
165	0.56	0.57	0.57	0.57	0.56	0.55	0.53	0.51	0.50	0.50	0.53	0.57	0.60	0.56	0.52	0.47	0.45	0.43	0.44
170	0.62	0.63	0.64	0.64	0.64	0.64	0.63	0.62	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55	0.53	0.50	0.49
175	0.67	0.67	0.67	0.67	0.68	0.68	0.68	0.67	0.67	0.67	0.66	0.66	0.64	0.62	0.59	0.56	0.54	0.53	0.53
180	0.71	0.72	0.72	0.72	0.70	0.68	0.66	0.65	0.64	0.63	0.64	0.64	0.65	0.65	0.64	0.63	0.61	0.59	0.58

UNIT: cd																			
C (DEG) γ (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	766	766	766	766	766	766	766	766	766	765	765	764	764	764	764	763	763	763	763
5	824	815	807	805	805	806	806	805	802	791	778	765	757	751	745	739	733	728	737
10	859	849	835	819	805	795	800	807	813	805	793	778	766	753	741	731	721	712	717
15	1089	1086	1077	1055	1028	995	961	924	885	835	790	753	751	756	760	747	727	698	716
20	1332	1307	1275	1251	1224	1193	1154	1108	1055	985	912	843	794	752	719	691	670	656	644
25	1607	1589	1558	1514	1460	1398	1332	1259	1180	1087	994	904	828	762	707	666	638	622	637
30	1582	1574	1561	1539	1508	1468	1418	1356	1282	1184	1078	969	861	763	681	632	606	603	618
35	1651	1642	1623	1585	1537	1485	1441	1392	1332	1248	1152	1047	929	812	707	633	579	544	568
40	1581	1535	1488	1486	1487	1478	1429	1366	1297	1246	1186	1110	977	836	703	614	549	508	530
45	1238	1247	1265	1314	1360	1393	1374	1334	1278	1227	1163	1082	960	829	701	602	517	446	439
50	1179	1233	1279	1254	1214	1173	1173	1175	1168	1134	1081	1007	891	764	640	545	465	398	355
55	1164	1145	1118	1074	1030	992	985	985	984	968	942	901	835	755	665	572	471	363	289
60	942	929	923	955	988	1009	974	923	868	837	805	767	709	640	562	475	380	275	204
65	642	645	652	671	693	713	727	733	728	697	656	609	570	527	476	409	330	240	169
70	404	412	422	439	457	471	474	472	469	478	480	471	425	369	309	264	223	186	131
75	304	302	298	290	281	273	270	268	269	278	284	285	265	238	206	178	149	119	83.7
80	175	173	170	170	169	168	167	165	162	159	156	150	143	132	120	104	86.7	66.5	46.1
85	141	140	139	136	133	128	120	112	104	97.8	91.3	84.1	73.7	62.6	51.4	41.8	32.9	24.5	18.3
90	56.9	56.0	55.8	58.7	62.0	64.8	65.6	65.0	63.1	59.1	53.9	47.6	40.2	32.5	25.1	19.0	13.7	9.10	7.46
95	36.7	35.3	33.8	32.3	31.0	29.8	29.0	28.5	28.3	29.1	29.7	29.4	26.1	21.8	17.2	13.5	9.90	6.51	5.29
100	30.7	29.4	27.8	26.4	24.9	23.6	22.7	21.6	20.0	16.4	12.6	9.16	7.98	7.49	7.36	6.87	6.42	6.02	4.72
105	20.7	19.5	18.1	16.7	15.4	14.2	14.0	13.7	13.1	11.1	8.93	6.86	6.11	5.62	5.13	4.03	2.66	1.04	0.86
110	22.4	21.9	21.0	19.9	18.4	16.4	12.6	9.07	6.52	8.34	10.9	13.0	11.0	8.37	5.72	4.90	4.88	5.66	3.58
115	11.6	10.3	8.57	6.69	5.29	4.84	7.65	11.0	14.0	14.1	13.3	11.7	9.19	6.65	4.50	3.83	4.02	5.07	3.23
120	9.62	11.7	14.1	15.8	17.2	18.0	17.6	16.6	15.1	13.6	11.8	9.87	7.50	5.33	3.64	3.14	3.44	4.52	2.93
125	15.5	17.5	19.4	19.4	18.9	17.9	16.8	15.4	13.8	11.9	10.0	8.04	5.99	4.18	2.82	2.34	2.49	3.27	2.27
130	14.6	16.1	17.5	17.8	17.6	16.8	15.5	13.8	11.9	10.1	8.26	6.49	4.70	3.14	1.93	1.39	1.33	1.77	1.38
135	13.4	14.3	15.3	15.6	15.6	15.1	13.6	11.8	9.83	8.30	6.80	5.30	3.41	1.68	0.33	0.00	0.00	0.61	0.72
140	11.2	11.8	12.4	12.6	12.5	12.0	10.6	8.97	7.30	6.11	5.10	4.24	3.59	3.03	2.50	1.86	1.18	0.48	0.61
145	7.94	8.20	8.48	8.62	8.58	8.30	7.41	6.33	5.21	4.40	3.68	3.05	2.52	2.05	1.63	1.21	0.81	0.45	0.59
150	5.22	5.30	5.36	5.34	5.25	5.05	4.74	4.28	3.64	2.46	1.29	0.33	0.32	0.55	0.85	0.82	0.68	0.44	0.60
155	3.11	3.09	3.05	3.00	2.93	2.80	2.62	2.37	2.05	1.55	1.04	0.61	0.48	0.46	0.49	0.47	0.46	0.47	0.67
160	1.77	1.74	1.69	1.59	1.44	1.26	0.96	0.66	0.41	0.37	0.40	0.46	0.47	0.49	0.50	0.51	0.51	0.52	0.74
165	0.43	0.45	0.47	0.52	0.56	0.60	0.57	0.53	0.50	0.50	0.51	0.53	0.55	0.56	0.57	0.57	0.57	0.56	0.75
170	0.50	0.53	0.55	0.56	0.57	0.58	0.59	0.59	0.60	0.61	0.62	0.63	0.64	0.64	0.64	0.64	0.63	0.62	0.76
175	0.53	0.54	0.56	0.59	0.62	0.64	0.66	0.66	0.67	0.67	0.67	0.68	0.68	0.68	0.67	0.67	0.67	0.67	0.77
180	0.59	0.61	0.63	0.64	0.65	0.65	0.64	0.63	0.64	0.65	0.66	0.68	0.70	0.72	0.72	0.72	0.72	0.71	0.80



Table--3 UNIT: cd

C (DEG) γ	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	764	764	765	765	765	766	766	766	766	766	766	766	766	766	766	767	767	767	766
5	746	754	762	769	772	766	757	748	744	742	739	731	723	718	724	732	738	732	724
10	719	718	713	706	695	679	663	649	647	646	646	639	631	626	631	638	643	638	631
15	722	717	691	660	631	629	629	626	599	567	534	510	489	472	459	452	448	452	459
20	633	623	620	613	598	556	506	453	408	367	332	313	299	288	269	254	246	254	269
25	638	625	596	554	504	441	377	315	268	230	201	187	181	179	176	174	174	174	176
30	611	582	518	441	361	297	241	197	175	163	157	147	138	131	126	122	120	122	126
35	562	528	441	342	247	202	172	152	131	113	99.2	85.6	74.5	66.2	61.7	59.6	59.6	59.6	61.7
40	520	480	384	275	174	136	116	105	84.0	65.1	49.7	41.5	36.9	34.9	34.0	34.2	34.9	34.2	34.0
45	414	372	298	218	142	104	78.2	61.6	46.3	35.8	29.2	26.2	25.5	26.1	25.5	25.2	25.1	25.2	25.5
50	310	263	210	158	111	78.1	53.4	35.8	25.8	20.7	18.7	16.8	16.0	16.0	15.8	15.9	16.1	15.9	15.8
55	225	171	132	101	76.7	54.0	35.9	22.4	15.3	11.8	10.6	9.36	8.96	9.05	8.96	8.98	9.04	8.98	8.96
60	146	102	76.3	60.5	50.3	35.8	23.4	13.6	8.37	5.41	3.94	2.39	1.42	0.88	0.51	0.35	0.34	0.35	0.51
65	113	70.1	47.2	34.6	28.1	18.7	11.4	6.03	2.85	1.11	0.40	0.10	0.21	0.52	0.49	0.45	0.40	0.45	0.49
70	87.0	53.5	34.4	23.3	17.4	10.4	5.56	2.42	0.86	0.32	0.43	0.35	0.41	0.55	0.54	0.52	0.49	0.52	0.54
75	55.2	33.7	21.4	14.3	10.5	6.25	3.35	1.56	0.65	0.36	0.46	0.43	0.48	0.56	0.55	0.52	0.49	0.52	0.55
80	29.8	17.6	11.1	7.51	5.85	3.62	2.08	1.10	0.61	0.45	0.49	0.47	0.49	0.53	0.53	0.51	0.49	0.51	0.53
85	13.2	9.10	6.45	4.63	3.40	2.24	1.38	0.82	0.55	0.46	0.49	0.48	0.49	0.52	0.52	0.52	0.52	0.52	0.52
90	6.03	4.80	3.83	3.01	2.34	1.68	1.14	0.74	0.58	0.54	0.56	0.55	0.55	0.56	0.57	0.58	0.59	0.58	0.57
95	4.24	3.38	2.76	2.26	1.87	1.43	1.05	0.77	0.66	0.63	0.64	0.62	0.62	0.62	0.63	0.65	0.67	0.65	0.63
100	3.64	2.78	2.22	1.83	1.55	1.24	0.99	0.81	0.74	0.72	0.74	0.73	0.73	0.74	0.75	0.77	0.80	0.77	0.75
105	0.72	0.64	0.63	0.65	0.69	0.72	0.76	0.79	0.79	0.79	0.78	0.79	0.80	0.81	0.83	0.85	0.86	0.85	0.83
110	2.02	0.99	0.72	0.80	1.02	0.93	0.83	0.74	0.74	0.76	0.80	0.81	0.82	0.83	0.83	0.84	0.84	0.84	0.83
115	1.85	0.91	0.63	0.64	0.81	0.77	0.73	0.71	0.73	0.76	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.84	0.83
120	1.72	0.90	0.60	0.57	0.68	0.67	0.68	0.71	0.73	0.77	0.80	0.82	0.83	0.85	0.86	0.87	0.88	0.87	0.86
125	1.49	0.94	0.70	0.62	0.65	0.65	0.67	0.72	0.77	0.81	0.86	0.88	0.90	0.91	0.93	0.95	0.95	0.95	0.93
130	1.07	0.84	0.72	0.67	0.66	0.68	0.71	0.75	0.79	0.84	0.88	0.92	0.96	1.00	1.02	1.04	1.04	1.04	1.02
135	0.80	0.83	0.80	0.75	0.70	0.71	0.75	0.79	0.83	0.88	0.92	0.96	1.00	1.03	1.05	1.06	1.07	1.06	1.05
140	0.71	0.77	0.78	0.77	0.75	0.77	0.80	0.83	0.86	0.89	0.92	0.96	1.00	1.04	1.06	1.07	1.08	1.07	1.06
145	0.70	0.78	0.80	0.81	0.80	0.82	0.85	0.87	0.91	0.94	0.98	1.01	1.03	1.05	1.06	1.07	1.08	1.07	1.06
150	0.73	0.82	0.85	0.86	0.86	0.88	0.90	0.92	0.94	0.96	0.98	0.99	1.01	1.02	1.03	1.04	1.05	1.04	1.03
155	0.82	0.92	0.96	0.96	0.95	0.94	0.92	0.91	0.93	0.95	0.97	0.98	0.99	1.00	1.00	0.99	0.98	0.99	1.00
160	0.91	1.02	1.06	1.06	1.03	1.02	0.99	0.97	0.97	0.96	0.95	0.93	0.91	0.89	0.90	0.91	0.93	0.91	0.90
165	0.95	1.06	1.08	1.06	1.03	1.01	1.00	0.98	0.97	0.95	0.93	0.88	0.83	0.79	0.80	0.81	0.83	0.81	0.80
170	0.90	0.98	1.00	0.98	0.94	0.90	0.86	0.82	0.80	0.79	0.78	0.75	0.72	0.69	0.69	0.70	0.71	0.70	0.69
175	0.85	0.89	0.90	0.89	0.86	0.82	0.77	0.72	0.70	0.68	0.67	0.65	0.63	0.62	0.63	0.65	0.67	0.65	0.63
180	0.70	0.70	0.70	0.70	0.69	0.68	0.67	0.66	0.64	0.63	0.62	0.60	0.60	0.59	0.60	0.61	0.62	0.61	0.60

C (DEG) γ	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	766	766	766	766	766	766	766	766	766	765	765	765	764	764	763				
5	718	723	731	739	742	744	748	757	766	772	769	762	754	746	737				
10	626	631	639	646	646	647	649	663	679	695	706	713	718	719	717				
15	472	489	510	534	567	599	626	629	629	631	660	691	717	722	716				
20	288	299	313	332	367	408	453	506	556	598	613	620	623	633	644				
25	179	181	187	201	230	268	315	377	441	504	554	596	625	638	637				
30	131	138	147	157	163	175	197	241	297	361	441	518	582	611	618				
35	66.2	74.5	85.6	99.2	113	131	152	172	202	247	342	441	528	562	568				
40	34.9	36.9	41.5	49.7	65.1	84.0	105	116	136	174	275	384	480	520	530				
45	26.1	25.5	26.2	29.2	35.8	46.3	61.6	78.2	104	142	218	298	372	414	439				
50	16.0	16.0	16.8	18.7	20.7	25.8	35.8	53.4	78.1	111	158	210	263	310	355				
55	9.05	8.96	9.36	10.6	11.8	15.3	22.4	35.9	54.0	76.7	101	132	171	225	289				
60	0.88	1.42	2.39	3.94	5.41	8.37	13.6	23.4	35.8	50.3	60.5	76.3	102	146	204				
65	0.52	0.21	0.10	0.40	1.11	2.85	6.03	11.4	18.7	28.1	34.6	47.2	70.1	113	169				
70	0.55	0.41	0.35	0.43	0.32	0.86	2.42	5.56	10.4	17.4	23.3	34.4	53.5	87.0	131				
75	0.56	0.48	0.43	0.46	0.36	0.65	1.56	3.35	6.25	10.5	14.3	21.4	33.7	55.2	83.7				
80	0.53	0.49	0.47	0.49	0.45	0.61	1.10	2.08	3.62	5.85	7.51	11.1	17.6	29.8	46.1				
85	0.52	0.49	0.48	0.49	0.46	0.55	0.82	1.38	2.24	3.40	4.63	6.45	9.10	13.2	18.3				
90	0.56	0.55	0.55	0.56	0.54	0.58	0.74	1.14	1.68	2.34	3.01	3.83	4.80	6.03	7.46				
95	0.62	0.62	0.62	0.64	0.63	0.66	0.77	1.05	1.43	1.87	2.26	2.76	3.38	4.24	5.29				
100	0.74	0.73	0.73	0.74	0.72	0.74	0.81	0.99	1.24	1.55	1.83	2.22	2.78	3.64	4.72				
105	0.81	0.80	0.79	0.78	0.79	0.79	0.79	0.76	0.72	0.69	0.65	0.63	0.64	0.72	0.86				
110	0.83	0.82	0.81	0.80	0.76	0.74	0.74	0.83	0.93	1.02	0.80	0.72	0.99	2.02	3.58				
115	0.82	0.81	0.80	0.79	0.76	0.73	0.71	0.73	0.77	0.81	0.64	0.63	0.91	1.85	3.23				
120	0.85	0.83	0.82	0.80	0.77	0.73	0.71	0.68	0.67	0.68	0.57	0.60	0.90	1.72	2.93				
125	0.91	0.90	0.88	0.86	0.81	0.77	0.72	0.67	0.65	0.65	0.62	0.70	0.94	1.49	2.27				
130	1.00	0.96	0.92	0.88	0.84	0.79	0.75	0.71	0.68	0.66	0.67	0.72	0.84	1.07	1.38				
135	1.03	1.00	0.96	0.92	0.88	0.83	0.79	0.75	0.71	0.70	0.75	0.80	0.83	0.80	0.72				
140	1.04	1.00	0.96	0.92	0.89	0.86	0.83	0.80	0.77	0.75	0.77	0.78	0.77	0.71	0.61				
145	1.05	1.03	1.01	0.98	0.94	0.91	0.87	0.85	0.82	0.80	0.81	0.80	0.78	0.70	0.59				
150	1.02	1.01	0.99	0.98	0.96	0.94	0.92	0.90	0.88	0.86	0.86	0.85	0.82	0.73	0.60				
155	1.00	0.99	0.98	0.97	0.95	0.93	0.91	0.92	0.94	0.95	0.96	0.96	0.92	0.82	0.67				
160	0.89	0.91	0.93	0.95	0.96	0.97	0.97	0.99	1.02	1.03	1.06	1.06	1.02	0.91	0.74				
165	0.79	0.83	0.88	0.93	0.95	0.97	0.98	1.00	1.01	1.03	1.06	1.08	1.06	0.95	0.79				
170	0.69	0.72	0.75	0.78	0.79	0.80	0.82	0.86	0.90	0.94	0.98	1.00	0.98	0.90	0.78				
175	0.62	0.63	0.65	0.67	0.68	0.70	0.72	0.77	0.82	0.86	0.89	0.90	0.89	0.85	0.77				
180	0.58	0.60	0.60	0.62	0.63	0.64	0.66	0.67	0.68	0.69	0.70	0.70	0.70	0.70	0.71				

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

<b>Model No.</b>	WPX1 @ 15W / 5000K	<b>Sample ID</b>	231101002-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 <math>25 \pm 1^{\circ}\text{C}</math>. 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	0.142	16.9	0.990	4.96
277.0	60	0.079	17.9	0.823	19.86



## 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\*\*\*\*\*