

## Photometric Test Report

### Relevant Standards

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

Prepared For

**RAB Lighting Inc.**

Prepared By

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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		8553
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		144.0
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		8343
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	140.5
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		59.4
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	480V	10.15
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	480V	0.864
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	5029±283	5306
		4 steps	5029±220	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		82.8
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		8
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		96
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%		2.9%
Input Voltage (V)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Cast		480.0
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Input Current (A)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		0.143
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		59.4
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-11-08	WPX2 @ 60W / 5000K 480	231101004-S1
2	Goniophotometer Test	2023-11-08	WPX2 @ 60W / 5000K 480	231101004-S1
3	THD and PF Test	2023-11-08	WPX2 @ 60W / 5000K 480	231101004-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 @ 60W / 5000K 480, color tunable from 3000K, 4000K and 5000K.

Electrical Specification: 480Vac, 50/60Hz

### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

<b>Model No.</b>	WPX2 @ 60W / 5000K 480	<b>Sample ID</b>	231101004-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

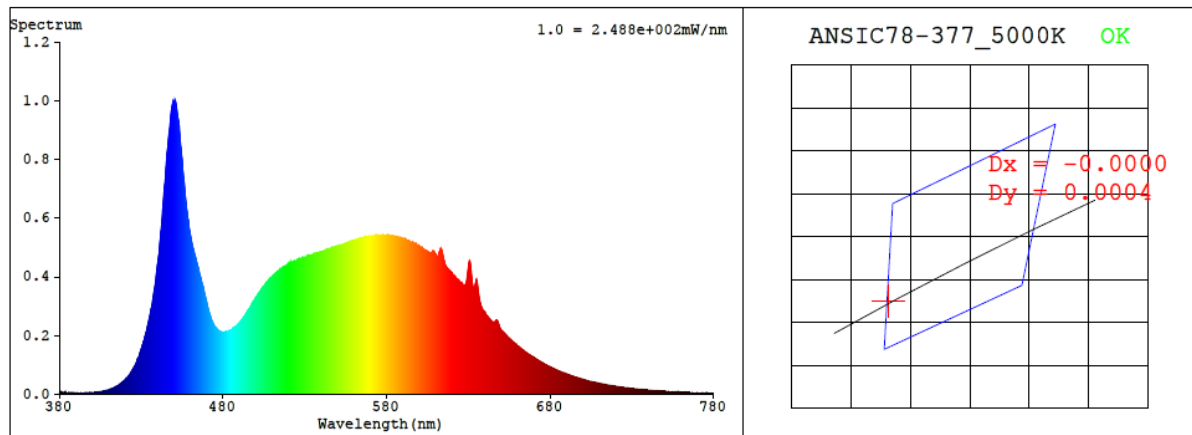
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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 4π geometry and operated at rated voltage and was stabilized before measurement.</p> <p>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
480.0	60	0.143	59.4	0.864

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
5306	82.8	8	0.0002	83	96	-13%

## 4.1 Integrating Sphere Test



### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.3371$   $y = 0.3454$  /  $u' = 0.2083$   $v' = 0.4804$  ( $duv=2.15e-04$ )

CCT= 5306K      Prcp WL:    Ld=565.4nm      Purity=4.8%

Peak WL: Lp=451nm FWHM: =20.5nm Ratio:R=15.2% G=80.1% B=4.6%

Render Index: Ra = 82.8 AvgR = 76.0 TM30:Rf=82 Rg=96

EEl: 0.09711 A++ Highest

R1 =81    R2 =87    R3 =91    R4 =83    R5 =83    R6 =82    R7 =87

R8 =68    R9 =8    R10=70    R11=83    R12=62    R13=83    R14=95    R15=77

## 4.1 Integrating Sphere Test

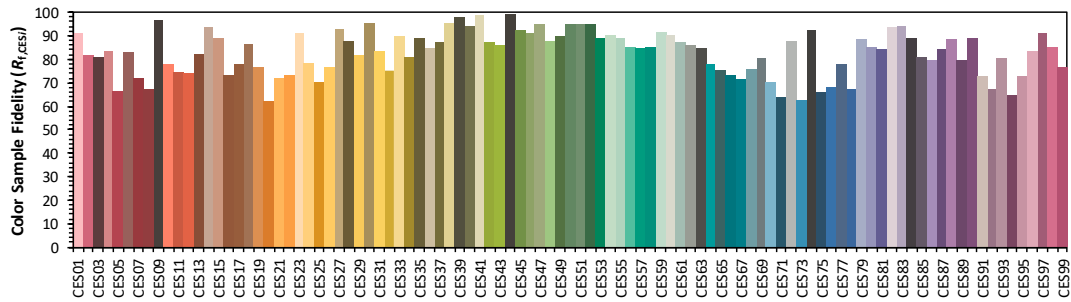
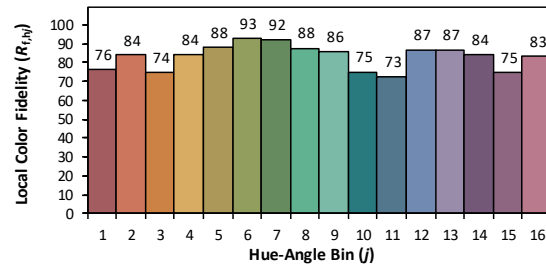
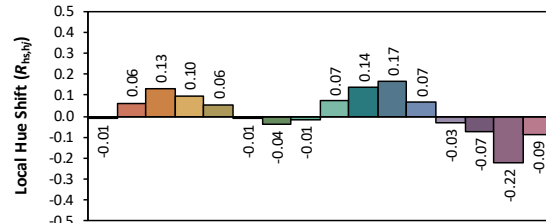
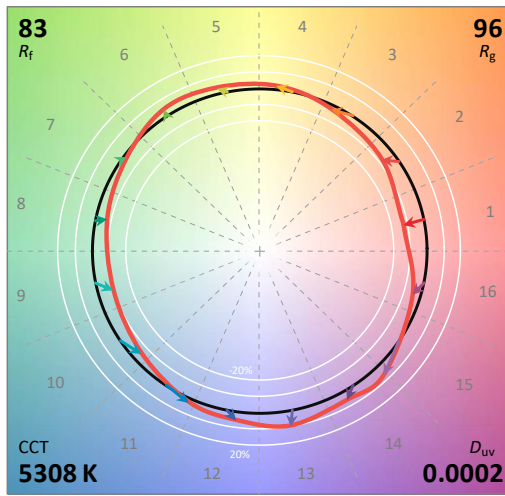
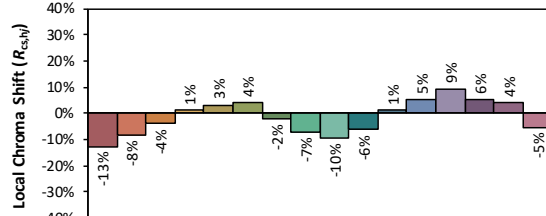
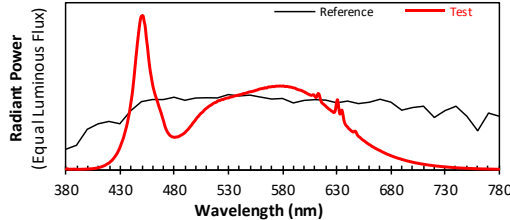
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/11/16

Model: WPX2 @ 60W / 5000K 480



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

$x$  0.3370  
 $y$  0.3452  
 $u'$  0.2084  
 $v'$  0.4803

CIE 13.3-1995  
(CRI)

$R_a$  83  
 $R_g$  8

## 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	4.30E-06	447	8.91E-04	514	4.19E-04	581	5.43E-04	648	2.45E-04	715	3.14E-05
381	7.80E-06	448	9.47E-04	515	4.24E-04	582	5.39E-04	649	2.29E-04	716	3.05E-05
382	4.60E-06	449	9.86E-04	516	4.30E-04	583	5.40E-04	650	2.19E-04	717	2.95E-05
383	3.50E-06	450	9.96E-04	517	4.33E-04	584	5.39E-04	651	2.13E-04	718	2.87E-05
384	5.30E-06	451	9.96E-04	518	4.36E-04	585	5.38E-04	652	2.08E-04	719	2.77E-05
385	4.00E-06	452	9.60E-04	519	4.39E-04	586	5.37E-04	653	2.01E-04	720	2.70E-05
386	4.70E-06	453	9.27E-04	520	4.45E-04	587	5.36E-04	654	1.95E-04	721	2.60E-05
387	5.00E-06	454	8.55E-04	521	4.48E-04	588	5.35E-04	655	1.90E-04	722	2.52E-05
388	4.60E-06	455	8.02E-04	522	4.48E-04	589	5.32E-04	656	1.86E-04	723	2.44E-05
389	4.20E-06	456	7.33E-04	523	4.52E-04	590	5.31E-04	657	1.80E-04	724	2.36E-05
390	3.70E-06	457	6.72E-04	524	4.55E-04	591	5.30E-04	658	1.75E-04	725	2.32E-05
391	4.00E-06	458	6.25E-04	525	4.54E-04	592	5.27E-04	659	1.70E-04	726	2.23E-05
392	3.40E-06	459	5.85E-04	526	4.59E-04	593	5.22E-04	660	1.65E-04	727	2.16E-05
393	4.00E-06	460	5.46E-04	527	4.61E-04	594	5.21E-04	661	1.61E-04	728	2.10E-05
394	4.00E-06	461	5.16E-04	528	4.63E-04	595	5.17E-04	662	1.56E-04	729	2.02E-05
395	4.50E-06	462	4.90E-04	529	4.65E-04	596	5.16E-04	663	1.51E-04	730	1.96E-05
396	4.30E-06	463	4.69E-04	530	4.66E-04	597	5.14E-04	664	1.48E-04	731	1.91E-05
397	4.90E-06	464	4.47E-04	531	4.67E-04	598	5.12E-04	665	1.43E-04	732	1.83E-05
398	5.40E-06	465	4.26E-04	532	4.72E-04	599	5.08E-04	666	1.39E-04	733	1.79E-05
399	5.30E-06	466	4.03E-04	533	4.71E-04	600	5.05E-04	667	1.36E-04	734	1.73E-05
400	5.90E-06	467	3.83E-04	534	4.74E-04	601	5.00E-04	668	1.32E-04	735	1.69E-05
401	6.20E-06	468	3.62E-04	535	4.76E-04	602	4.98E-04	669	1.29E-04	736	1.64E-05
402	7.20E-06	469	3.37E-04	536	4.79E-04	603	4.93E-04	670	1.26E-04	737	1.55E-05
403	7.00E-06	470	3.15E-04	537	4.80E-04	604	4.89E-04	671	1.22E-04	738	1.53E-05
404	7.60E-06	471	2.89E-04	538	4.81E-04	605	4.86E-04	672	1.18E-04	739	1.49E-05
405	8.60E-06	472	2.68E-04	539	4.83E-04	606	4.83E-04	673	1.14E-04	740	1.42E-05
406	9.20E-06	473	2.53E-04	540	4.85E-04	607	4.82E-04	674	1.11E-04	741	1.37E-05
407	1.06E-05	474	2.40E-04	541	4.86E-04	608	4.85E-04	675	1.08E-04	742	1.33E-05
408	1.17E-05	475	2.30E-04	542	4.88E-04	609	4.85E-04	676	1.05E-04	743	1.29E-05
409	1.28E-05	476	2.22E-04	543	4.91E-04	610	4.76E-04	677	1.01E-04	744	1.26E-05
410	1.46E-05	477	2.18E-04	544	4.94E-04	611	4.67E-04	678	9.87E-05	745	1.21E-05
411	1.70E-05	478	2.13E-04	545	4.94E-04	612	4.78E-04	679	9.56E-05	746	1.17E-05
412	1.91E-05	479	2.12E-04	546	4.96E-04	613	4.94E-04	680	9.26E-05	747	1.14E-05
413	2.09E-05	480	2.10E-04	547	4.98E-04	614	4.86E-04	681	9.00E-05	748	1.10E-05
414	2.41E-05	481	2.12E-04	548	5.01E-04	615	4.59E-04	682	8.74E-05	749	1.07E-05
415	2.69E-05	482	2.13E-04	549	5.04E-04	616	4.39E-04	683	8.47E-05	750	1.03E-05
416	2.97E-05	483	2.13E-04	550	5.05E-04	617	4.30E-04	684	8.19E-05	751	1.00E-05
417	3.49E-05	484	2.16E-04	551	5.05E-04	618	4.24E-04	685	7.98E-05	752	9.70E-06
418	3.89E-05	485	2.19E-04	552	5.08E-04	619	4.19E-04	686	7.72E-05	753	9.40E-06
419	4.28E-05	486	2.24E-04	553	5.09E-04	620	4.12E-04	687	7.52E-05	754	9.20E-06
420	4.78E-05	487	2.27E-04	554	5.11E-04	621	4.05E-04	688	7.29E-05	755	8.90E-06
421	5.41E-05	488	2.32E-04	555	5.14E-04	622	4.00E-04	689	7.15E-05	756	8.60E-06
422	6.01E-05	489	2.37E-04	556	5.15E-04	623	3.93E-04	690	6.87E-05	757	8.20E-06
423	6.76E-05	490	2.43E-04	557	5.18E-04	624	3.89E-04	691	6.66E-05	758	8.00E-06
424	7.64E-05	491	2.50E-04	558	5.21E-04	625	3.82E-04	692	6.48E-05	759	7.80E-06
425	8.57E-05	492	2.57E-04	559	5.23E-04	626	3.78E-04	693	6.25E-05	760	7.50E-06
426	9.57E-05	493	2.65E-04	560	5.25E-04	627	3.72E-04	694	6.11E-05	761	7.10E-06
427	1.07E-04	494	2.74E-04	561	5.25E-04	628	3.72E-04	695	5.87E-05	762	7.10E-06
428	1.21E-04	495	2.83E-04	562	5.27E-04	629	3.89E-04	696	5.69E-05	763	6.90E-06
429	1.36E-04	496	2.91E-04	563	5.28E-04	630	4.35E-04	697	5.56E-05	764	6.60E-06
430	1.52E-04	497	3.01E-04	564	5.32E-04	631	4.52E-04	698	5.34E-05	765	6.50E-06
431	1.72E-04	498	3.11E-04	565	5.29E-04	632	4.03E-04	699	5.20E-05	766	6.30E-06
432	1.90E-04	499	3.18E-04	566	5.32E-04	633	3.62E-04	700	5.03E-05	767	6.10E-06
433	2.10E-04	500	3.28E-04	567	5.36E-04	634	3.69E-04	701	4.89E-05	768	5.90E-06
434	2.36E-04	501	3.38E-04	568	5.36E-04	635	3.87E-04	702	4.73E-05	769	5.80E-06
435	2.62E-04	502	3.45E-04	569	5.37E-04	636	3.55E-04	703	4.56E-05	770	5.50E-06
436	2.88E-04	503	3.53E-04	570	5.38E-04	637	3.17E-04	704	4.41E-05	771	5.50E-06
437	3.22E-04	504	3.62E-04	571	5.39E-04	638	2.96E-04	705	4.35E-05	772	5.40E-06
438	3.56E-04	505	3.68E-04	572	5.38E-04	639	2.86E-04	706	4.18E-05	773	5.20E-06
439	3.98E-04	506	3.73E-04	573	5.39E-04	640	2.79E-04	707	4.05E-05	774	4.80E-06
440	4.47E-04	507	3.81E-04	574	5.42E-04	641	2.69E-04	708	3.93E-05	775	4.90E-06
441	4.92E-04	508	3.89E-04	575	5.41E-04	642	2.63E-04	709	3.80E-05	776	4.60E-06
442	5.55E-04	509	3.95E-04	576	5.42E-04	643	2.57E-04	710	3.69E-05	777	4.50E-06
443	6.22E-04	510	4.00E-04	577	5.42E-04	644	2.51E-04	711	3.58E-05	778	4.40E-06
444	6.97E-04	511	4.06E-04	578	5.42E-04	645	2.46E-04	712	3.47E-05	779	4.10E-06
445	7.65E-04	512	4.11E-04	579	5.41E-04	646	2.46E-04	713	3.35E-05	780	4.10E-06
446	8.33E-04	513	4.16E-04	580	5.42E-04	647	2.51E-04	714	3.23E-05	N/A	N/A



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

<b>Model No.</b>	WPX2 @ 60W / 5000K 480	<b>Sample ID</b>	231101004-S1
<b>Operate time (Min.)</b>	30	<b>Stabilization time (Min.)</b>	60
<b>Temperature (°C)</b>	25.0	<b>Humidity (%RH)</b>	42.1

Test Method
<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>	480.0	60	0.143	59.4	0.864
<b>NON-WORST CASE</b>	N/A	N/A	N/A	N/A	N/A

#### Test Result

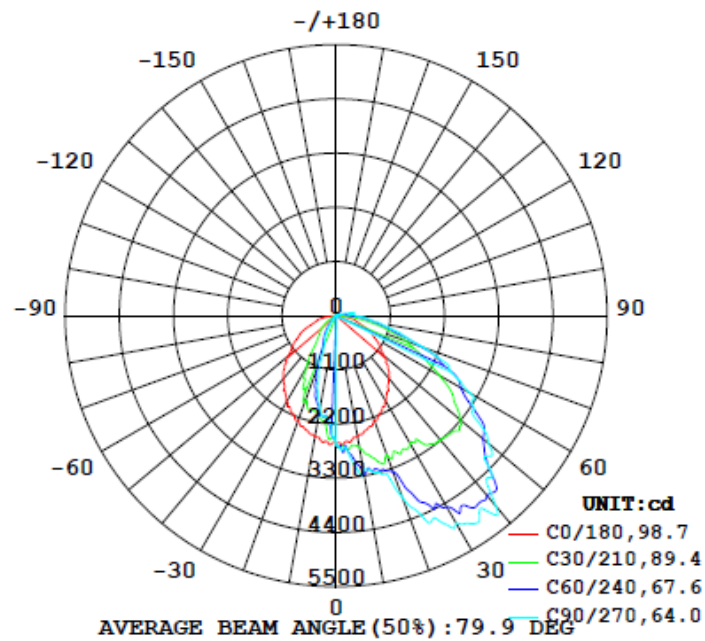
Result Type	Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	BUG
		C0-180	C90-270	C0-180	C90-270		(80°-90°)	
<b>0°-180° zones</b>	8553	114.1	147.1	65.1	97.2	144.0	2.8%	B2-U3-G3
<b>0°-90° zones</b>	8343	114.1	147.1	65.1	97.2	140.5	2.9%	B2-U3-G3



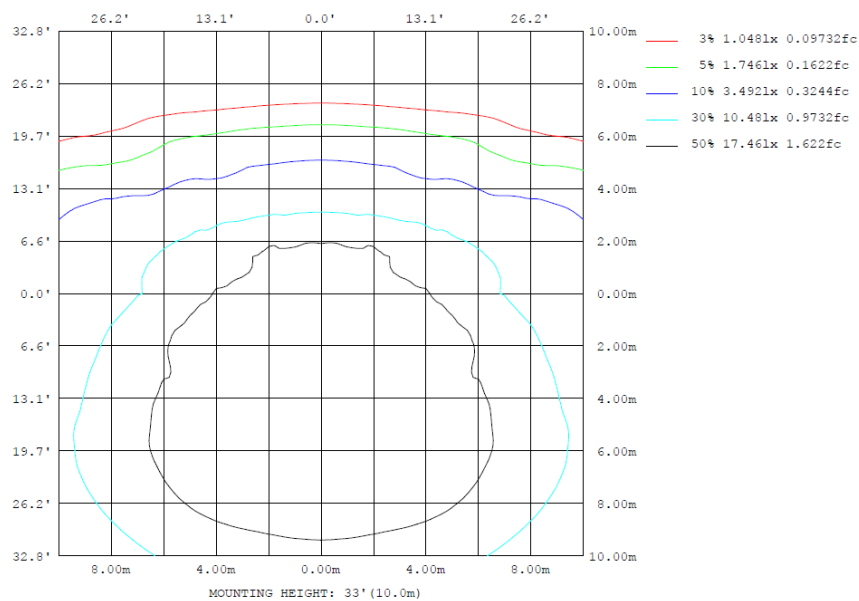
## 4.2 Goniophotometer Test

### Lighting Distribution Curve

**LUMINOUS INTENSITY DISTRIBUTION DIAGRAM**



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

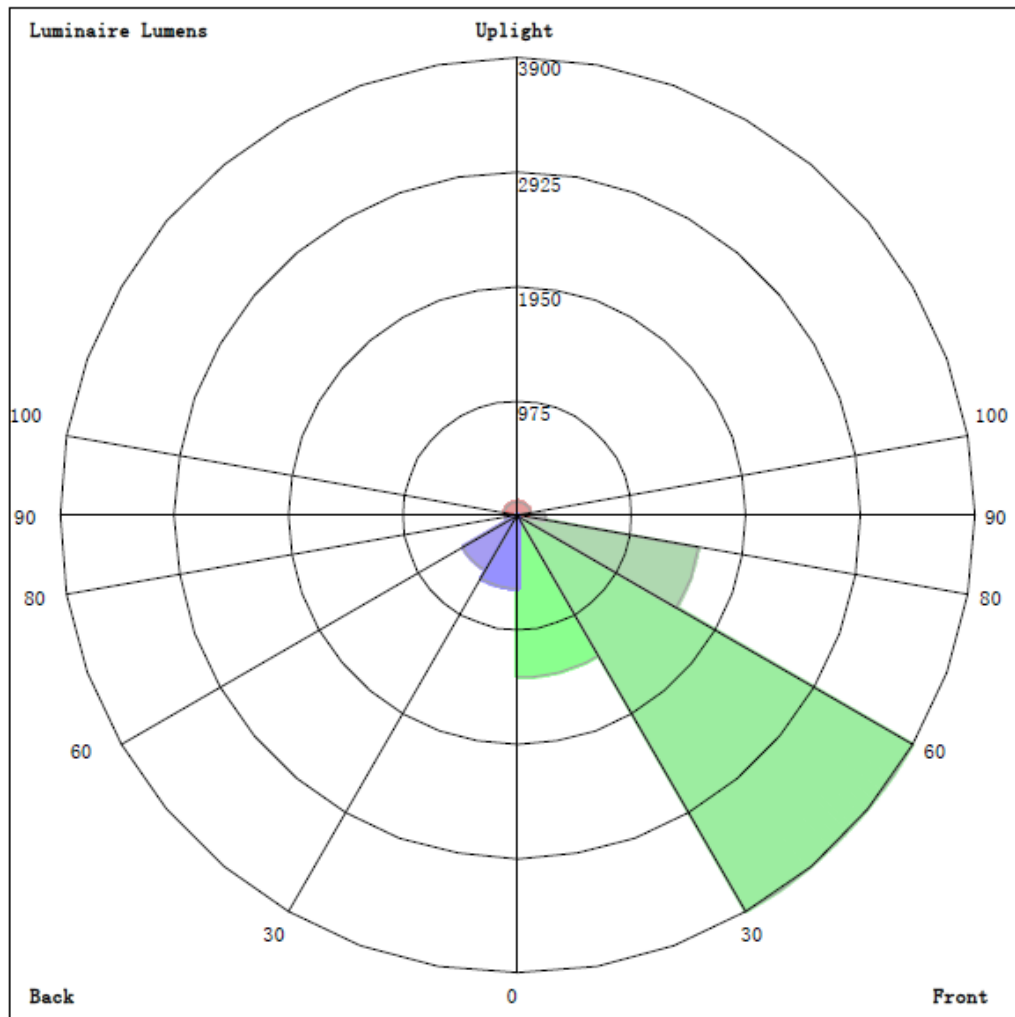
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	zone	total	lum, lamp
10	2499	3027	3164	3027	2499	2009	1903	2009	0- 10	239.6	239.6	2.8,2.8
20	2260	3225	3904	3225	2260	1491	758.0	1491	10- 20	680.1	919.7	10.8,10.8
30	2017	3922	4859	3922	2017	600.5	394.2	600.5	20- 30	1084	2004	23.4,23.4
40	1667	4254	5047	4254	1667	354.9	124.8	354.9	30- 40	1450	3454	40.4,40.4
50	1258	3810	4033	3810	1258	148.4	70.18	148.4	40- 50	1578	5033	58.8,58.8
60	898.8	2815	3136	2815	898.8	64.53	24.46	64.53	50- 60	1408	6440	75.3,75.3
70	545.8	1809	1893	1809	545.8	8.249	1.378	8.249	60- 70	1073	7513	87.8,87.8
80	296.4	791.7	910.8	791.7	296.4	3.519	1.936	3.519	70- 80	587.5	8101	94.7,94.7
90	28.05	235.2	419.0	235.2	28.05	2.384	2.091	2.384	80- 90	242.5	8343	97.6,97.6
100	23.62	97.17	380.3	97.17	23.62	3.007	2.685	3.007	90-100	96.10	8439	98.7,98.7
110	16.30	23.41	65.01	23.41	16.30	2.465	3.010	2.465	100-110	42.31	8482	99.2,99.2
120	11.33	66.44	28.66	66.44	11.33	2.363	2.938	2.363	110-120	20.48	8502	99.4,99.4
130	6.549	55.15	65.65	55.15	6.549	2.464	3.393	2.464	120-130	22.48	8525	99.7,99.7
140	2.075	34.36	53.88	34.36	2.075	2.673	3.456	2.673	130-140	15.90	8541	99.9,99.9
150	1.363	17.09	29.02	17.09	1.363	2.980	3.447	2.980	140-150	8.128	8549	100,100
160	1.639	1.361	11.63	1.361	1.639	3.078	3.044	3.078	150-160	2.908	8552	100,100
170	1.885	1.724	2.076	1.724	1.885	2.388	2.320	2.388	160-170	0.7614	8552	100,100
180	2.286	2.210	1.890	2.210	2.286	2.093	1.999	2.093	170-180	0.2024	8553	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

	Zonal (lm)		Total (lm)	Percent
0-10	239.56	0-10	239.56	2.80%
10-20	680.14	0-20	919.70	10.75%
20-30	1083.93	0-30	2003.63	23.43%
30-40	1450.46	0-40	3454.09	40.39%
40-50	1578.42	0-50	5032.51	58.84%
50-60	1407.59	0-60	6440.10	75.30%
60-70	1073.23	0-70	7513.33	87.85%
70-80	587.46	0-80	8100.79	94.72%
80-90	242.52	0-90	8343.31	97.56%
90-100	96.10	0-100	8439.41	98.68%
100-110	42.31	0-110	8481.72	99.17%
110-120	20.48	0-120	8502.20	99.41%
120-130	22.48	0-130	8524.68	99.68%
130-140	15.90	0-140	8540.58	99.86%
140-150	8.13	0-150	8548.71	99.96%
150-160	2.91	0-160	8551.62	99.99%
160-170	0.76	0-170	8552.38	100.00%
170-180	0.20	0-180	8552.58	100.00%

## 4.2 Goniophotometer Test

LCS/BUG

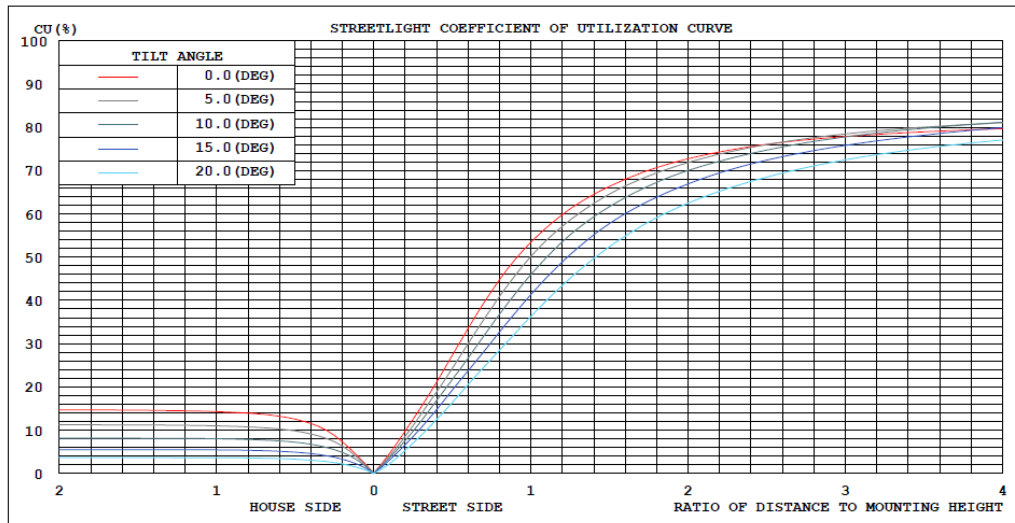


### LUMINAIRE CLASSIFICATION SYSTEM (LCS)

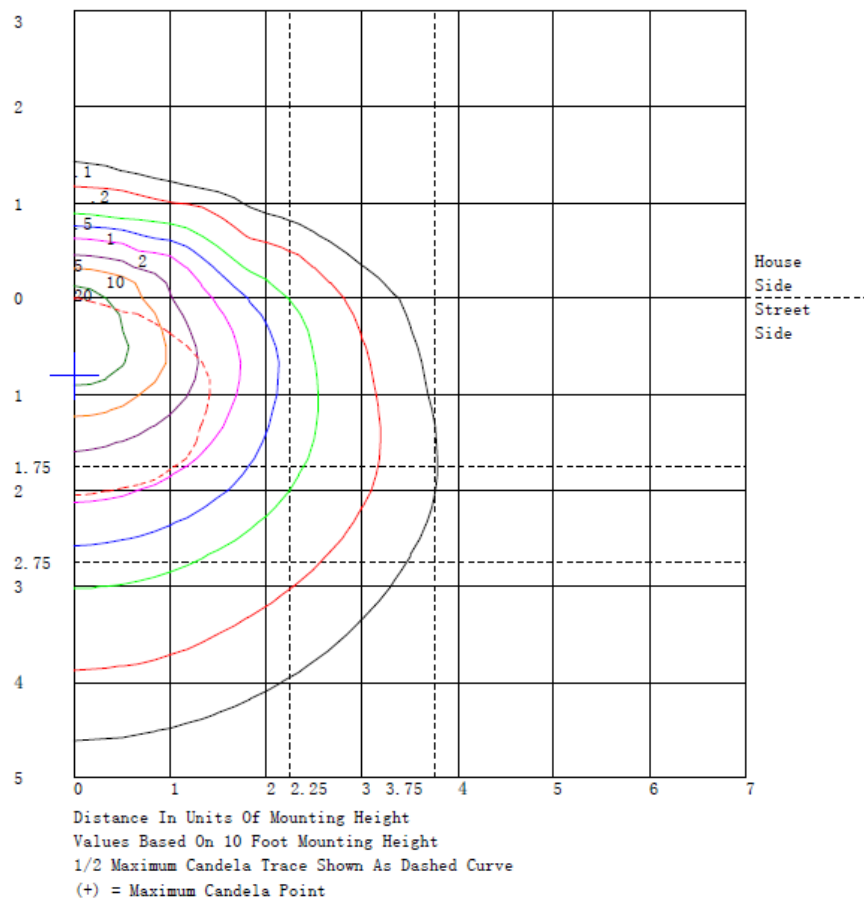
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1382.3	N.A.	16.2
FM - Front-Medium (30-60)	3899.9	N.A.	45.6
FH - Front-High (60-80)	1569.8	N.A.	18.4
FVH - Front-Very High (80-90)	232.3	N.A.	2.7
BL - Back-Low (0-30)	621.4	N.A.	7.3
BM - Back-Medium (30-60)	536.6	N.A.	6.3
BH - Back-High (60-80)	90.9	N.A.	1.1
BVH - Back-Very High (80-90)	10.3	N.A.	0.1
UL - Uplight-Low (90-100)	96.1	N.A.	1.1
UH - Uplight-High (100-180)	113.2	N.A.	1.3
Total	8552.8	N.A.	100.0
BUG Rating	B2-U3-G3		

## 4.2 Goniophotometer Test

### Coefficients of Utilization



## Isolines



## 4.2 Goniophotometer Test

### Luminous Distribution Intensity Data

Table--1

UNIT: cd

C (DEG) y	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	2608	2609	2611	2612	2614	2615	2617	2618	2620	2623	2625	2627	2630	2632	2634	2636	2637	2639	2640
5	2553	2546	2553	2576	2635	2694	2738	2705	2661	2626	2667	2721	2773	2777	2772	2764	2771	2781	2792
10	2499	2593	2663	2711	2711	2707	2717	2805	2913	3027	3124	3206	3266	3277	3266	3241	3214	3186	3164
15	2399	2412	2460	2543	2690	2849	2997	3066	3109	3138	3173	3203	3228	3249	3265	3275	3279	3278	3271
20	2260	2329	2420	2534	2692	2856	3008	3099	3169	3225	3262	3307	3375	3539	3711	3863	3910	3920	3904
25	2151	2336	2510	2673	2828	2970	3098	3178	3267	3388	3641	3916	4180	4351	4479	4565	4599	4604	4591
30	2017	2297	2530	2716	2802	2881	2993	3280	3603	3922	4142	4328	4483	4628	4745	4830	4861	4867	4859
35	1866	2144	2401	2636	2827	3014	3212	3479	3760	4041	4307	4549	4756	4899	5000	5064	5090	5091	5074
40	1667	1977	2271	2550	2797	3041	3296	3624	3952	4254	4457	4624	4765	4932	5072	5169	5152	5102	5047
45	1480	1752	2038	2339	2671	3006	3335	3657	3944	4178	4297	4364	4396	4431	4452	4459	4450	4436	4425
50	1258	1486	1758	2074	2487	2905	3285	3525	3697	3810	3858	3877	3887	3952	4017	4069	4067	4052	4033
55	1078	1274	1514	1797	2176	2560	2908	3109	3251	3346	3430	3482	3501	3461	3406	3351	3347	3355	3369
60	899	1139	1385	1635	1912	2178	2417	2588	2719	2815	2861	2890	2918	3003	3087	3157	3163	3152	3136
65	755	997	1220	1423	1601	1763	1915	2082	2232	2352	2402	2423	2430	2449	2466	2482	2498	2513	2525
70	546	681	827	983	1164	1343	1509	1637	1737	1809	1835	1840	1836	1848	1860	1871	1879	1885	1893
75	406	459	534	629	769	913	1044	1112	1156	1180	1192	1197	1203	1229	1259	1289	1311	1329	1339
80	296	297	317	359	434	520	608	681	743	792	809	817	821	843	866	887	898	906	911
85	113	114	129	157	206	264	324	374	421	463	496	524	548	570	590	605	614	620	623
90	28.0	44.1	62.4	82.8	106	131	157	182	208	235	266	298	328	353	375	393	406	415	419
95	23.0	31.5	40.9	51.2	62.6	74.6	87.2	98.5	111	126	148	172	198	224	249	270	284	293	297
100	23.6	25.0	27.0	29.6	30.9	34.3	41.1	54.2	72.8	97.2	131	169	210	256	299	336	360	375	380
105	15.5	17.0	18.5	19.9	20.3	21.3	23.6	29.0	36.2	45.0	57.0	69.0	79.6	82.6	84.8	88.4	105	120	129
110	16.3	12.9	12.9	16.6	28.1	39.9	48.7	40.8	31.0	23.4	32.9	45.7	58.3	61.0	61.4	60.7	62.4	64.0	65.0
115	16.1	10.8	9.69	12.7	23.1	35.2	46.5	51.8	53.6	51.6	40.1	28.2	19.4	26.2	36.9	48.6	55.4	59.8	61.2
120	11.3	6.93	6.51	10.1	20.1	32.3	44.8	53.8	61.1	66.4	69.9	70.6	67.8	56.9	44.5	33.0	29.1	27.8	28.7
125	8.79	4.84	4.57	7.97	17.0	28.3	40.2	49.9	58.4	65.6	70.8	74.2	75.8	74.7	72.4	69.5	66.8	64.7	63.5
130	6.55	3.35	3.18	6.04	13.5	22.8	32.8	40.9	48.4	55.2	61.3	66.4	70.0	70.7	70.2	68.9	67.6	66.4	65.6
135	2.16	0.00	0.00	1.36	8.52	17.3	26.6	33.2	39.2	44.7	50.8	56.2	60.5	61.9	62.2	61.8	62.0	62.0	62.1
140	2.07	3.17	5.01	7.59	11.1	15.2	19.8	24.6	29.5	34.4	38.9	42.9	46.4	48.7	50.4	51.7	52.8	53.5	53.9
145	1.90	2.22	3.19	4.81	7.24	10.2	13.6	17.4	21.3	25.0	28.0	30.7	33.1	35.1	36.9	38.4	40.0	41.3	42.1
150	1.36	1.33	1.29	1.25	0.41	0.17	1.12	5.94	11.6	17.1	19.8	21.7	23.0	24.3	25.5	26.5	27.6	28.4	29.0
155	1.49	1.30	1.35	1.64	2.19	2.97	3.98	5.19	6.64	8.34	10.7	13.0	15.2	16.3	17.0	17.6	18.3	18.9	19.3
160	1.64	1.54	1.52	1.57	1.78	2.00	2.14	1.75	1.42	1.36	2.16	3.36	4.89	6.95	8.99	10.7	11.4	11.7	11.6
165	1.75	1.76	1.75	1.74	1.68	1.64	1.66	1.79	2.01	2.32	3.00	3.60	3.93	3.25	2.35	1.48	1.31	1.33	1.45
170	1.89	1.89	1.90	1.89	1.87	1.85	1.81	1.77	1.72	1.68	1.66	1.68	1.81	1.96	2.10	2.11	2.10	2.08	2.07
175	1.99	2.00	2.01	2.02	2.01	2.00	1.99	1.99	1.98	1.97	1.96	1.94	1.92	1.90	1.87	1.84	1.80	1.77	1.75
180	2.29	2.29	2.30	2.29	2.28	2.27	2.25	2.24	2.23	2.21	2.18	2.14	2.11	2.07	2.03	2.00	1.95	1.91	1.89

C (DEG)																	UNIT: cd		
y	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	2639	2637	2636	2634	2632	2630	2627	2625	2623	2620	2618	2617	2615	2614	2612	2611	2609	2608	2624
5	2781	2771	2764	2772	2777	2773	2721	2667	2626	2661	2705	2738	2694	2635	2576	2553	2546	2553	2525
10	3186	3214	3241	3266	3277	3266	3206	3124	3027	2913	2805	2717	2707	2711	2711	2663	2593	2499	2415
15	3278	3279	3275	3265	3249	3228	3203	3173	3138	3109	3066	2997	2849	2690	2543	2460	2412	2399	2222
20	3920	3910	3863	3711	3539	3375	3307	3262	3225	3169	3099	3008	2856	2692	2534	2420	2329	2260	2066
25	4604	4599	4565	4479	4351	4180	3916	3641	3388	3267	3178	3098	2970	2828	2673	2510	2336	2151	2073
30	4867	4861	4830	4745	4628	4483	4328	4142	3922	3603	3280	2993	2881	2802	2716	2530	2297	2017	1998
35	5091	5090	5064	5000	4899	4756	4549	4307	4041	3760	3479	3212	3014	2827	2636	2401	2144	1866	1863
40	5102	5152	5169	5072	4932	4765	4624	4457	4254	3952	3624	3296	3041	2797	2550	2271	1977	1667	1652
45	4436	4450	4459	4452	4431	4396	4364	4297	4178	3944	3657	3335	3006	2671	2339	2038	1752	1480	1419
50	4052	4067	4069	4017	3952	3887	3877	3858	3810	3697	3525	3285	2905	2487	2074	1758	1486	1258	1113
55	3355	3347	3351	3406	3461	3501	3482	3430	3346	3251	3109	2908	2560	2176	1797	1514	1274	1078	876
60	3152	3163	3157	3087	3003	2918	2890	2861	2815	2719	2588	2417	2178	1912	1635	1385	1139	899	663
65	2513	2498	2482	2466	2449	2430	2423	2402	2352	2232	2082	1915	1763	1601	1423	1220	997	755	553
70	1885	1879	1871	1860	1848	1836	1840	1835	1809	1737	1637	1509	1343	1164	983	827	681	546	409
75	1329	1311	1289	1259	1229	1203	1197	1192	1180	1156	1112	1044	913	769	629	534	459	406	291
80	906	898	887	866	843	821	817	809	792	743	681	608	520	434	359	317	297	296	202
85	620	614	605	590	570	548	524	496	463	421	374	324	264	206	157	129	114	113	82.1
90	415	406	393	375	353	328	298	266	235	208	182	157	131	106	82.8	62.4	44.1	28.0	26.0
95	293	284	270	249	224	198	172	148	126	111	98.5	87.2	74.6	62.6	51.2	40.9	31.5	23.0	19.8
100	375	360	336	299	256	210	169	131	97.2	72.8	54.2	41.1	34.3	30.9	29.6	27.0	25.0	23.6	18.8
105	120	105	88.4	84.8	82.6	79.6	69.0	57.0	45.0	36.2	29.0	23.6	21.3	20.3	19.9	18.5	17.0	15.5	12.1
110	64.0	62.4	60.7	61.4	61.0	58.3	45.7	32.9	23.4	31.0	40.8	48.7	39.9	28.1	16.6	12.9	12.9	16.3	12.5
115	59.8	55.4	48.6	36.9	26.2	19.4	28.2	40.1	51.6	53.6	51.8	46.5	35.2	23.1	12.7	9.69	10.8	16.1	11.8
120	27.8	29.1	33.0	44.5	56.9	67.8	70.6	69.9	66.4	61.1	53.8	44.8	32.3	20.1	10.1	6.51	6.93	11.3	8.80
125	64.7	66.8	69.5	72.4	74.7	75.8	74.2	70.8	65.6	58.4	49.9	40.2	28.3	17.0	7.97	4.57	4.84	8.79	6.97
130	66.4	67.6	68.9	70.2	70.7	70.0	66.4	61.3	55.2	48.4	40.9	32.8	22.8	13.5	6.04	3.18	3.35	6.55	5.37
135	62.0	62.0	61.8	62.2	61.9	60.5	56.2	50.8	44.7	39.2	33.2	26.6	17.3	8.52	1.36	0.00	0.00	2.16	2.71
140	53.5	52.8	51.7	50.4	48.7	46.4	42.9	38.9	34.4	29.5	24.6	19.8	15.2	11.1	7.89	5.01	3.17	2.07	2.43
145	41.3	40.8	40.4	36.9	35.1	33.1	30.7	28.0	25.0	23.3	17.4	13.8	10.2	7.24	4.81	3.19	2.22	1.90	2.24
150	28.4	27.6	26.5	25.5	24.3	23.0	21.7	19.8	17.7	11.6	6.94	1.12	0.17	0.41	1.25	1.29	1.33	1.36	1.92
155	18.9	18.3	17.6	17.0	16.3	15.2	13.0	10.7	8.34	6.64	5.19	1.28	2.97	1.21	1.64	1.35	1.30	1.49	1.24
160	11.7	11.4	10.7	8.99	6.95	4.89	3.36	2.16	1.36	1.42	1.75	2.14	2.00	1.78	1.57	1.52	1.54	1.64	2.35
165	1.33	1.31	1.48	2.35	3.25	3.93	3.60	3.00	2.32	2.01	1.79	1.66	1.64	1.68	1.74	1.75	1.76	1.75	2.44
170	2.10	2.11	2.10	1.96	1.81	1.68	1.66	1.68	1.72	1.77	1.81	1.85	1.87	1.89	1.89	1.90	1.89	1.89	2.43
175	1.77	1.80	1.84	1.87	1.90	1.92	1.94	1.96	1.97	1.98	1.99	1.99	2.00	2.01	2.02	2.01	2.00	1.99	2.33
180	1.91	1.95	2.00	2.03	2.07	2.11	2.14	2.18	2.21	2.23	2.24	2.25	2.27	2.28	2.29	2.30	2.29	2.29	2.28



Table--3

UNIT: °C

C (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
γ (DEG)	0	2636	2644	2647	2648	2647	2647	2647	2647	2647	2646	2646	2646	2645	2643	2642	2640	2642	2643
5	2492	2454	2409	2361	2310	2254	2203	2164	2165	2173	2178	2145	2105	2068	2054	2048	2049	2048	2054
10	2330	2242	2138	2044	1972	1964	1980	2009	2032	2051	2061	2042	2014	1981	1949	1921	1903	1921	1949
15	2087	1993	1959	1952	1961	1966	1962	1939	1853	1754	1658	1610	1578	1555	1530	1512	1504	1512	1530
20	1922	1828	1826	1844	1851	1754	1629	1491	1373	1256	1143	1027	923	837	789	763	758	763	789
25	1989	1900	1817	1720	1600	1410	1207	1008	854	728	632	589	570	565	554	547	545	547	554
30	1933	1822	1644	1434	1210	982	772	601	535	508	501	470	443	420	406	397	394	397	406
35	1791	1648	1378	1082	802	658	560	494	429	377	337	300	270	248	234	227	226	227	234
40	1569	1418	1139	839	565	453	390	355	293	238	193	164	145	133	127	124	125	124	127
45	1314	1166	930	683	457	346	276	232	185	149	125	113	109	108	104	103	102	103	104
50	966	817	653	497	359	266	197	148	119	103	95.1	84.9	77.6	73.0	70.5	69.7	70.2	69.7	70.5
55	700	550	429	330	251	188	140	105	82.1	67.8	59.9	54.2	51.4	50.5	49.3	48.9	49.1	48.9	49.3
60	472	326	242	192	161	121	89.2	64.5	49.7	40.5	35.2	30.1	26.8	24.9	24.0	24.0	24.5	24.0	24.0
65	388	260	181	129	97.4	68.1	47.3	32.7	18.8	8.65	1.91	0.00	0.00	0.80	0.80	0.91	1.06	0.91	0.80
70	295	202	137	90.7	58.4	33.8	17.7	8.25	2.75	0.70	0.79	0.36	0.50	0.94	1.08	1.22	1.38	1.22	1.08
75	197	123	76.7	46.5	28.6	15.4	8.17	5.04	2.29	1.13	1.00	0.74	0.81	1.07	1.25	1.47	1.68	1.47	1.25
80	126	69.6	39.2	23.1	16.4	9.11	5.17	3.52	1.99	1.33	1.24	1.07	1.09	1.25	1.46	1.71	1.94	1.71	1.46
85	56.4	36.3	23.7	15.4	10.4	6.39	3.93	2.64	1.79	1.47	1.49	1.38	1.39	1.47	1.63	1.82	2.01	1.82	1.63
90	23.4	20.2	15.8	11.4	7.28	4.94	3.36	2.38	1.88	1.71	1.75	1.70	1.71	1.77	1.85	1.96	2.09	1.96	1.85
95	16.8	13.9	11.0	8.29	5.99	4.40	3.24	2.48	2.12	2.00	2.03	2.00	2.02	2.06	2.10	2.17	2.27	2.17	2.10
100	14.7	11.2	8.48	6.34	4.76	3.82	3.27	3.01	2.81	2.73	2.70	2.63	2.57	2.54	2.54	2.58	2.69	2.58	2.54
105	9.25	6.81	4.77	3.22	2.19	2.07	2.31	2.71	2.82	2.89	2.92	2.90	2.87	2.85	2.87	2.93	3.03	2.93	2.87
110	9.29	6.79	5.15	4.05	3.36	2.85	2.57	2.46	2.47	2.57	2.71	2.83	2.93	3.01	3.02	3.01	3.01	3.01	3.02
115	8.35	5.74	4.21	3.32	2.89	2.56	2.43	2.44	2.48	2.57	2.67	2.70	2.73	2.75	2.78	2.82	2.86	2.82	2.78
120	6.70	5.01	3.82	3.00	2.49	2.28	2.26	2.36	2.45	2.56	2.67	2.73	2.78	2.82	2.87	2.91	2.94	2.91	2.87
125	5.46	4.25	3.37	2.77	2.40	2.26	2.28	2.40	2.52	2.66	2.80	2.87	2.92	2.96	3.03	3.09	3.13	3.09	3.03
130	4.38	3.58	2.97	2.54	2.28	2.24	2.32	2.46	2.58	2.70	2.83	2.95	3.06	3.16	3.26	3.34	3.39	3.34	3.26
135	3.05	3.18	2.94	2.60	2.28	2.29	2.40	2.55	2.68	2.82	2.95	3.05	3.15	3.23	3.30	3.36	3.40	3.36	3.30
140	2.69	2.81	2.72	2.57	2.42	2.47	2.56	2.67	2.77	2.86	2.96	3.05	3.15	3.24	3.33	3.40	3.46	3.40	3.33
145	2.47	2.63	2.67	2.67	2.64	2.69	2.76	2.83	2.93	3.03	3.12	3.17	3.21	3.26	3.34	3.43	3.49	3.43	3.34
150	2.36	2.66	2.79	2.83	2.82	2.88	2.93	2.98	3.04	3.09	3.14	3.18	3.21	3.25	3.32	3.39	3.45	3.39	3.32
155	2.64	2.98	3.12	3.15	3.11	3.08	3.04	3.00	3.01	3.04	3.08	3.13	3.18	3.22	3.23	3.23	3.23	3.23	3.23
160	2.88	3.24	3.37	3.36	3.29	3.22	3.15	3.08	3.08	3.09	3.10	3.07	3.03	3.00	3.01	3.03	3.04	3.03	3.01
165	2.96	3.29	3.37	3.33	3.21	3.15	3.07	2.99	2.93	2.87	2.81	2.73	2.68	2.64	2.66	2.69	2.72	2.69	2.66
170	2.81	3.05	3.07	2.99	2.83	2.68	2.52	2.39	2.36	2.37	2.39	2.37	2.34	2.32	2.32	2.31	2.32	2.31	2.32
175	2.58	2.73	2.78	2.74	2.66	2.52	2.38	2.25	2.22	2.22	2.22	2.22	2.16	2.09	2.04	2.07	2.12	2.12	2.07
180	2.27	2.26	2.25	2.24	2.22	2.19	2.14	2.09	2.04	2.00	1.96	1.93	1.91	1.91	1.93	1.96	2.00	1.96	1.93

C (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
γ (DEG)	0	2645	2646	2646	2646	2647	2647	2647	2647	2647	2648	2647	2644	2636	2624				
5	2068	2105	2145	2178	2173	2165	2164	2203	2254	2310	2361	2409	2454	2492	2525				
10	1981	2014	2042	2061	2051	2032	2009	1980	1964	1972	2044	2138	2242	2330	2415				
15	1555	1578	1610	1658	1754	1853	1939	1962	1966	1961	1952	1959	1993	2087	2222				
20	837	923	1027	1143	1256	1373	1491	1629	1754	1851	1844	1826	1828	1922	2066				
25	565	570	589	632	728	854	1008	1207	1410	1600	1720	1817	1900	1989	2073				
30	420	443	470	501	508	535	601	772	982	1210	1434	1644	1822	1933	1998				
35	248	270	300	337	377	429	494	560	658	802	1082	1378	1648	1791	1863				
40	133	145	164	193	238	293	355	390	453	565	839	1139	1418	1569	1652				
45	108	109	113	125	149	185	232	276	346	457	683	930	1166	1314	1419				
50	73.0	77.6	84.9	95.1	103	119	148	197	266	359	497	653	817	966	1113				
55	50.5	51.4	54.2	59.9	67.8	82.1	105	140	188	251	330	429	550	700	876				
60	24.9	26.8	30.1	35.2	40.5	49.7	64.5	89.2	121	161	192	242	326	472	663				
65	0.80	0.00	0.00	1.91	8.65	18.8	32.7	47.3	68.1	97.4	129	181	260	388	553				
70	0.94	0.50	0.36	0.79	0.70	2.75	8.25	17.7	33.8	58.4	90.7	137	202	295	409				
75	1.07	0.81	0.74	1.00	1.13	2.29	5.04	8.17	15.4	28.6	46.5	76.7	123	197	291				
80	1.25	1.09	1.07	1.24	1.33	1.99	3.52	5.17	9.11	16.4	23.1	39.2	69.6	126	202				
85	1.47	1.39	1.38	1.49	1.47	1.79	2.64	3.93	6.39	10.4	15.4	23.7	36.3	56.4	82.1				
90	1.77	1.71	1.70	1.75	1.71	1.88	2.38	3.36	4.94	7.28	11.4	15.8	20.2	23.4	26.0				
95	2.06	2.02	2.00	2.03	2.00	2.12	2.48	3.24	4.40	5.99	8.29	11.0	13.9	16.8	19.8				
100	2.54	2.57	2.63	2.70	2.73	2.81	3.01	3.27	3.82	4.76	6.34	8.48	11.2	14.7	18.8				
105	2.85	2.87	2.90	2.92	2.89	2.82	2.71	2.31	2.07	2.19	3.22	4.77	6.81	9.25	12.1				
110	3.01	2.93	2.83	2.71	2.57	2.47	2.46	2.57	2.85	3.36	4.05	5.15	6.79	9.29	12.5				
115	2.75	2.73	2.70	2.67	2.57	2.48	2.44	2.43	2.56	2.89	3.32	4.21	5.74	8.35	11.8				
120	2.82	2.78	2.73	2.67	2.56	2.45	2.36	2.26	2.28	2.49	3.00	3.82	5.01	6.70	8.80				
125	2.96	2.92	2.87	2.80	2.66	2.52	2.40	2.28	2.26	2.40	2.77	3.37	4.25	5.46	6.97				
130	3.16	3.06	2.95	2.83	2.70	2.58	2.46	2.32	2.24	2.28	2.54	2.97	3.58	4.38	5.37				
135	3.23	3.15	3.05	2.95	2.82	2.68	2.55	2.40	2.29	2.28	2.60	2.94	3.18	3.05	2.71				
140	3.24	3.15	3.05	2.96	2.86	2.77	2.67	2.56	2.47	2.42	2.57	2.72	2.81	2.69	2.44				
145	3.26	3.21	3.17	3.12	3.03	2.93	2.83	2.76	2.69	2.64	2.67	2.67	2.63	2.47	2.23				
150	3.25	3.21	3.18	3.14	3.09	3.04	2.98	2.93	2.88	2.82	2.83	2.79	2.66	2.36	1.92				
155	3.22	3.18	3.13	3.08	3.04	3.01	3.00	3.04	3.08	3.11	3.15	3.12	2.98	2.64	2.14				
160	3.00	3.03	3.07	3.10	3.09	3.08	3.08	3.15	3.22	3.29	3.36	3.37	3.24	2.88	2.35				
165	2.64	2.68	2.73	2.81	2.87	2.93	2.99	3.07	3.15	3.21	3.33	3.37	3.29	2.96	2.44				
170	2.32	2.34	2.37	2.39	2.37	2.36	2.39	2.52	2.68	2.83	2.99	3.07	3.05	2.81	2.43				
175	2.04	2.09	2.16	2.22	2.22	2.22	2.25	2.38	2.52	2.66	2.74	2.78	2.73	2.58	2.33				
180	1.91	1.91	1.93	1.96	2.00	2.04	2.09	2.14	2.19	2.22	2.24	2.25	2.26	2.27	2.28				

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

<b>Model No.</b>	WPX2 @ 60W / 5000K 480	<b>Sample ID</b>	231101004-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

<b>Voltage (Vac)</b>	<b>Frequency (Hz)</b>	<b>Current (A)</b>	<b>Power (W)</b>	<b>Power Factor</b>	<b>iTHD(%)</b>
480.0	60	0.143	59.4	0.864	10.15



## 5.0 Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2023-11-08	2024-11-07
NTC-F01-006	2.0 meter Integrating Sphere	2023-11-08	2024-11-07
NTC-F01-012	Standard Lamp	2023-11-02	2024-11-01
NTC-F01-013	Standard Lamp	2023-11-02	2024-11-01
NTC-F01-031	Digital Power Meter	2023-08-25	2024-08-24
NTC-F01-019	Temperature & Humidity Meter	2023-11-06	2024-11-05

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