

## Photometric Test Report

### Relevant Standards

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

Prepared For

**RAB Lighting Inc.**

Prepared By

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Date: 2023-11-16

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Issue Date: 2023-11-16

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		11042
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		139.2
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		10777
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	135.9
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		79.3
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	120V	2.45
			277V	3.41
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	120V	0.998
			277V	0.953
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		82.6
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%		2.8%
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		0.662
(Goniophotometer – Section 4.2)		Non-Worst Case		0.297
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		79.3
(Goniophotometer – Section 4.2)		Non-Worst Case		78.4

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-11-02	WPX2 @ 80W / 5000K	231101003-S1
2	Goniophotometer Test	2023-11-02	WPX2 @ 80W / 5000K	231101003-S1
3	THD and PF Test	2023-11-02	WPX2 @ 80W / 5000K	231101003-S1

### Remark (If any)

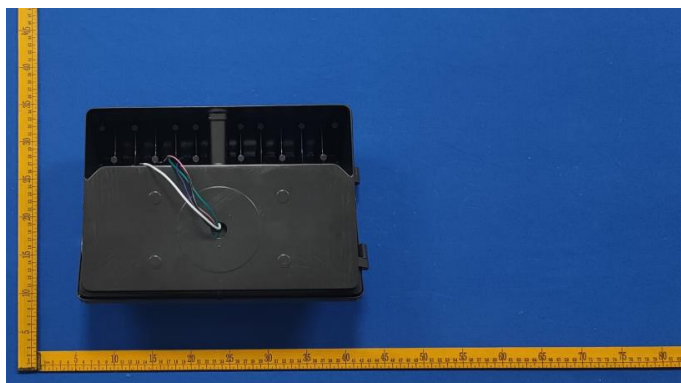
1. The results contained in this report pertain only to the tested samples.
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3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

## 3.0 Product Description

Luminaire Description: Model No. WPX2 @ 80W / 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>	WPX2 @ 80W / 5000K	<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

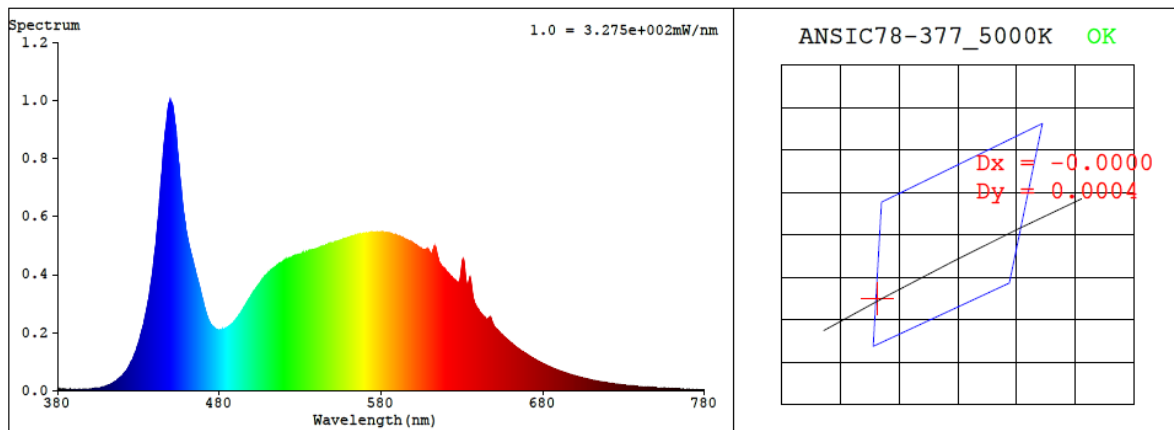
<b>Test Method</b>
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made 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.</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
120.0	60	0.662	79.3	0.998
277.0	60	0.297	78.4	0.953

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
5306	82.6	7	0.0002	83	97	-13%

## 4.1 Integrating Sphere Test



### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.3371$   $y = 0.3455$  /  $u' = 0.2083$   $v' = 0.4804$  ( $duv=2.28e-04$ )

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

Peak WL: Lp=450nm FWHM: =20.8nm Ratio:R=15.2% G=80.2% B=4.6%

Render Index: Ra = 82.6 AvgR = 75.7 TM30:Rf=82 Rg=96

EEL: 0.09855 A++ Highest

R1 =81 R2 =87 R3 =91 R4 =83 R5 =82 R6 =82 R7 =86

R8 =68 R9 =7 R10=69 R11=83 R12=62 R13=82 R14=95 R15=76

## 4.1 Integrating Sphere Test

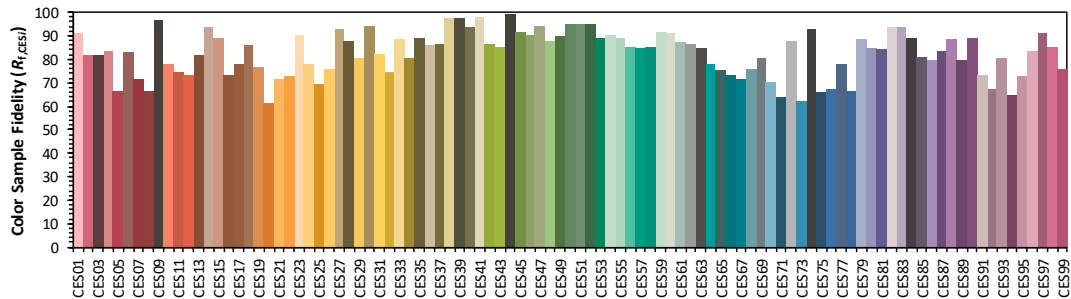
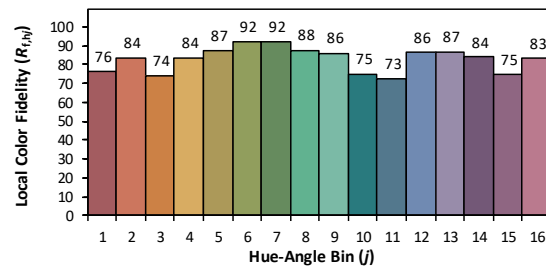
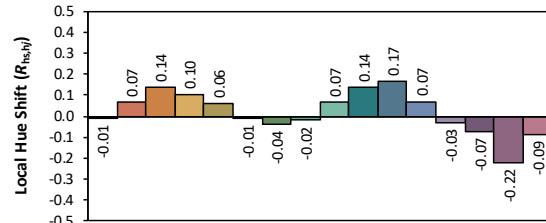
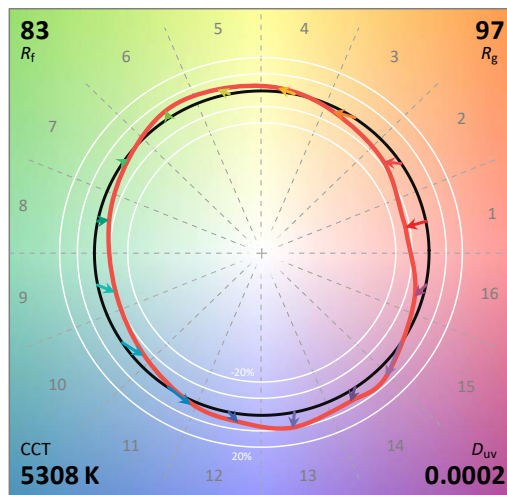
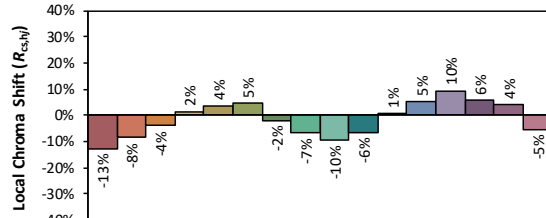
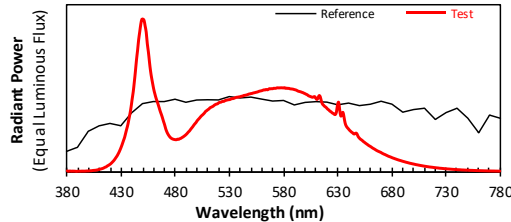
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/11/16

Model: WPX2 @ 80W / 5000K



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

$x$  0.3370  
 $y$  0.3453  
 $u'$  0.2084  
 $v'$  0.4803

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	6.10E-06	447	9.10E-04	514	4.23E-04	581	5.47E-04	648	2.46E-04	715	3.13E-05
381	3.00E-06	448	9.60E-04	515	4.27E-04	582	5.42E-04	649	2.30E-04	716	3.06E-05
382	4.70E-06	449	9.91E-04	516	4.33E-04	583	5.44E-04	650	2.21E-04	717	2.97E-05
383	4.50E-06	450	9.92E-04	517	4.37E-04	584	5.42E-04	651	2.13E-04	718	2.89E-05
384	3.80E-06	451	9.85E-04	518	4.40E-04	585	5.42E-04	652	2.08E-04	719	2.78E-05
385	4.40E-06	452	9.47E-04	519	4.42E-04	586	5.40E-04	653	2.03E-04	720	2.70E-05
386	3.90E-06	453	9.07E-04	520	4.48E-04	587	5.39E-04	654	1.96E-04	721	2.61E-05
387	3.90E-06	454	8.32E-04	521	4.52E-04	588	5.38E-04	655	1.91E-04	722	2.53E-05
388	2.80E-06	455	7.80E-04	522	4.52E-04	589	5.37E-04	656	1.86E-04	723	2.47E-05
389	2.90E-06	456	7.14E-04	523	4.56E-04	590	5.34E-04	657	1.80E-04	724	2.36E-05
390	3.80E-06	457	6.55E-04	524	4.58E-04	591	5.33E-04	658	1.75E-04	725	2.28E-05
391	4.00E-06	458	6.11E-04	525	4.58E-04	592	5.30E-04	659	1.70E-04	726	2.24E-05
392	3.50E-06	459	5.72E-04	526	4.63E-04	593	5.26E-04	660	1.66E-04	727	2.16E-05
393	4.20E-06	460	5.35E-04	527	4.65E-04	594	5.23E-04	661	1.62E-04	728	2.10E-05
394	4.30E-06	461	5.07E-04	528	4.67E-04	595	5.21E-04	662	1.57E-04	729	2.01E-05
395	4.20E-06	462	4.81E-04	529	4.68E-04	596	5.19E-04	663	1.52E-04	730	1.97E-05
396	4.10E-06	463	4.60E-04	530	4.69E-04	597	5.17E-04	664	1.48E-04	731	1.90E-05
397	4.60E-06	464	4.39E-04	531	4.71E-04	598	5.14E-04	665	1.44E-04	732	1.82E-05
398	5.20E-06	465	4.16E-04	532	4.76E-04	599	5.11E-04	666	1.39E-04	733	1.80E-05
399	5.30E-06	466	3.92E-04	533	4.75E-04	600	5.08E-04	667	1.36E-04	734	1.73E-05
400	5.50E-06	467	3.73E-04	534	4.77E-04	601	5.04E-04	668	1.32E-04	735	1.68E-05
401	6.50E-06	468	3.51E-04	535	4.80E-04	602	5.01E-04	669	1.29E-04	736	1.62E-05
402	6.50E-06	469	3.28E-04	536	4.83E-04	603	4.95E-04	670	1.26E-04	737	1.57E-05
403	7.70E-06	470	3.06E-04	537	4.85E-04	604	4.92E-04	671	1.22E-04	738	1.53E-05
404	8.70E-06	471	2.81E-04	538	4.85E-04	605	4.89E-04	672	1.18E-04	739	1.47E-05
405	9.30E-06	472	2.61E-04	539	4.87E-04	606	4.86E-04	673	1.15E-04	740	1.43E-05
406	9.80E-06	473	2.46E-04	540	4.88E-04	607	4.84E-04	674	1.12E-04	741	1.37E-05
407	1.10E-05	474	2.35E-04	541	4.91E-04	608	4.87E-04	675	1.08E-04	742	1.34E-05
408	1.25E-05	475	2.26E-04	542	4.92E-04	609	4.88E-04	676	1.05E-04	743	1.30E-05
409	1.43E-05	476	2.19E-04	543	4.95E-04	610	4.77E-04	677	1.01E-04	744	1.26E-05
410	1.63E-05	477	2.14E-04	544	4.97E-04	611	4.70E-04	678	9.87E-05	745	1.19E-05
411	1.81E-05	478	2.12E-04	545	4.98E-04	612	4.80E-04	679	9.62E-05	746	1.18E-05
412	2.02E-05	479	2.10E-04	546	5.00E-04	613	4.96E-04	680	9.31E-05	747	1.14E-05
413	2.24E-05	480	2.09E-04	547	5.02E-04	614	4.88E-04	681	9.01E-05	748	1.10E-05
414	2.58E-05	481	2.09E-04	548	5.05E-04	615	4.61E-04	682	8.77E-05	749	1.07E-05
415	2.96E-05	482	2.12E-04	549	5.07E-04	616	4.41E-04	683	8.51E-05	750	1.04E-05
416	3.22E-05	483	2.11E-04	550	5.09E-04	617	4.33E-04	684	8.26E-05	751	9.90E-06
417	3.78E-05	484	2.15E-04	551	5.10E-04	618	4.26E-04	685	8.01E-05	752	9.70E-06
418	4.17E-05	485	2.17E-04	552	5.12E-04	619	4.21E-04	686	7.76E-05	753	9.40E-06
419	4.62E-05	486	2.22E-04	553	5.14E-04	620	4.14E-04	687	7.54E-05	754	9.20E-06
420	5.12E-05	487	2.26E-04	554	5.15E-04	621	4.06E-04	688	7.34E-05	755	9.00E-06
421	5.78E-05	488	2.31E-04	555	5.17E-04	622	4.02E-04	689	7.12E-05	756	8.50E-06
422	6.51E-05	489	2.37E-04	556	5.19E-04	623	3.94E-04	690	6.89E-05	757	8.40E-06
423	7.27E-05	490	2.43E-04	557	5.22E-04	624	3.90E-04	691	6.69E-05	758	8.00E-06
424	8.21E-05	491	2.50E-04	558	5.24E-04	625	3.83E-04	692	6.50E-05	759	7.80E-06
425	9.25E-05	492	2.59E-04	559	5.26E-04	626	3.79E-04	693	6.28E-05	760	7.60E-06
426	1.03E-04	493	2.65E-04	560	5.27E-04	627	3.74E-04	694	6.11E-05	761	7.30E-06
427	1.16E-04	494	2.75E-04	561	5.30E-04	628	3.73E-04	695	5.92E-05	762	7.10E-06
428	1.29E-04	495	2.84E-04	562	5.33E-04	629	3.89E-04	696	5.73E-05	763	6.90E-06
429	1.46E-04	496	2.92E-04	563	5.32E-04	630	4.35E-04	697	5.54E-05	764	6.70E-06
430	1.63E-04	497	3.03E-04	564	5.35E-04	631	4.52E-04	698	5.40E-05	765	6.50E-06
431	1.83E-04	498	3.12E-04	565	5.33E-04	632	4.03E-04	699	5.22E-05	766	6.20E-06
432	2.04E-04	499	3.20E-04	566	5.36E-04	633	3.63E-04	700	5.08E-05	767	6.10E-06
433	2.24E-04	500	3.30E-04	567	5.40E-04	634	3.69E-04	701	4.92E-05	768	6.00E-06
434	2.52E-04	501	3.39E-04	568	5.39E-04	635	3.87E-04	702	4.75E-05	769	5.60E-06
435	2.79E-04	502	3.46E-04	569	5.40E-04	636	3.55E-04	703	4.60E-05	770	5.50E-06
436	3.06E-04	503	3.55E-04	570	5.40E-04	637	3.18E-04	704	4.48E-05	771	5.30E-06
437	3.43E-04	504	3.63E-04	571	5.43E-04	638	2.98E-04	705	4.33E-05	772	5.10E-06
438	3.79E-04	505	3.69E-04	572	5.42E-04	639	2.87E-04	706	4.20E-05	773	5.00E-06
439	4.21E-04	506	3.76E-04	573	5.43E-04	640	2.80E-04	707	4.06E-05	774	4.90E-06
440	4.73E-04	507	3.83E-04	574	5.46E-04	641	2.71E-04	708	3.95E-05	775	4.90E-06
441	5.21E-04	508	3.93E-04	575	5.45E-04	642	2.64E-04	709	3.81E-05	776	4.50E-06
442	5.84E-04	509	3.98E-04	576	5.45E-04	643	2.58E-04	710	3.69E-05	777	4.60E-06
443	6.53E-04	510	4.04E-04	577	5.46E-04	644	2.53E-04	711	3.56E-05	778	4.40E-06
444	7.27E-04	511	4.08E-04	578	5.46E-04	645	2.46E-04	712	3.47E-05	779	4.20E-06
445	7.89E-04	512	4.16E-04	579	5.46E-04	646	2.47E-04	713	3.34E-05	780	4.20E-06
446	8.58E-04	513	4.19E-04	580	5.45E-04	647	2.52E-04	714	3.25E-05	N/A	N/A



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

<b>Model No.</b>	WPX2 @ 80W / 5000K	<b>Sample ID</b>	231101003-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>	120.0	60	0.662	79.3	0.998
<b>NON-WORST CASE</b>	277.0	60	0.297	78.4	0.953

### Test Result

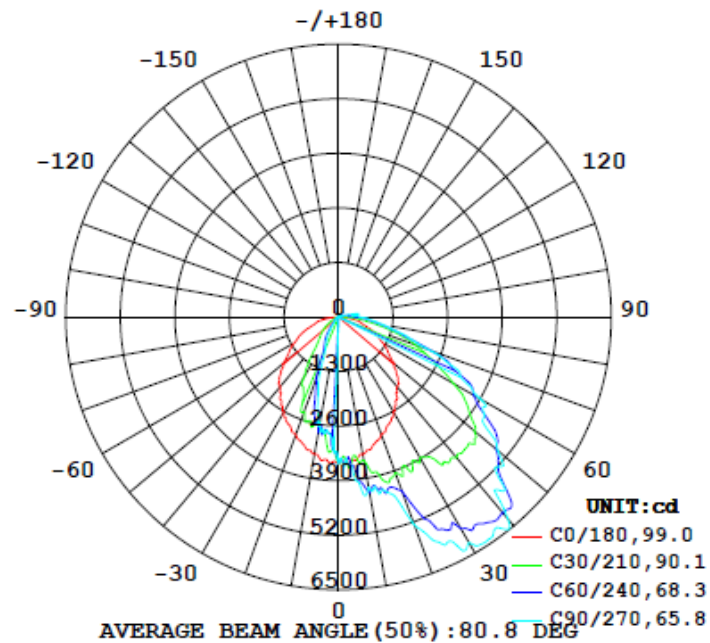
Result Type	Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement (80°-90°)	BUG
		C0-180	C90-270	C0-180	C90-270			
<b>0°-180° zones</b>	11042	114.3	148.0	65.9	98.9	139.2	2.8%	B2-U3-G3
<b>0°-90° zones</b>	10777	114.3	148.0	65.9	98.9	135.9	2.8%	B2-U3-G3



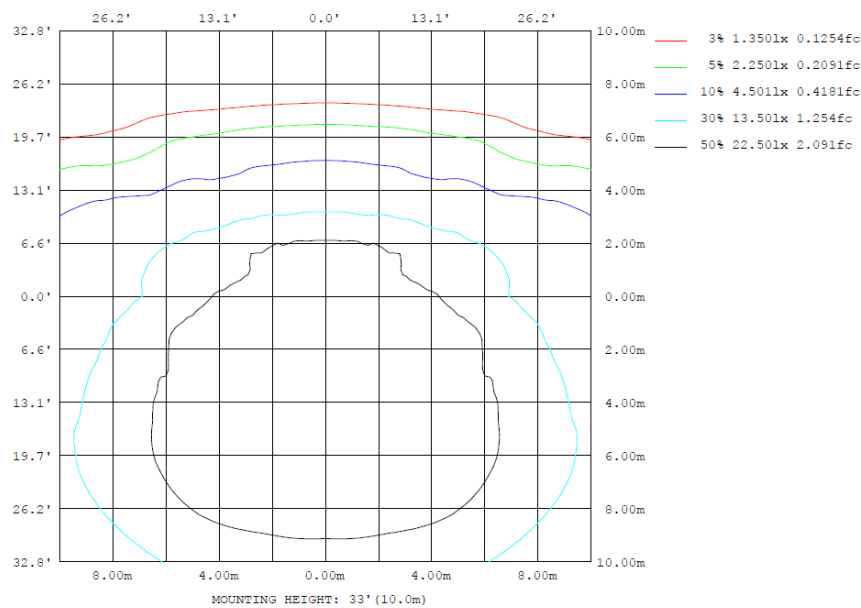
## 4.2 Goniophotometer Test

### Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

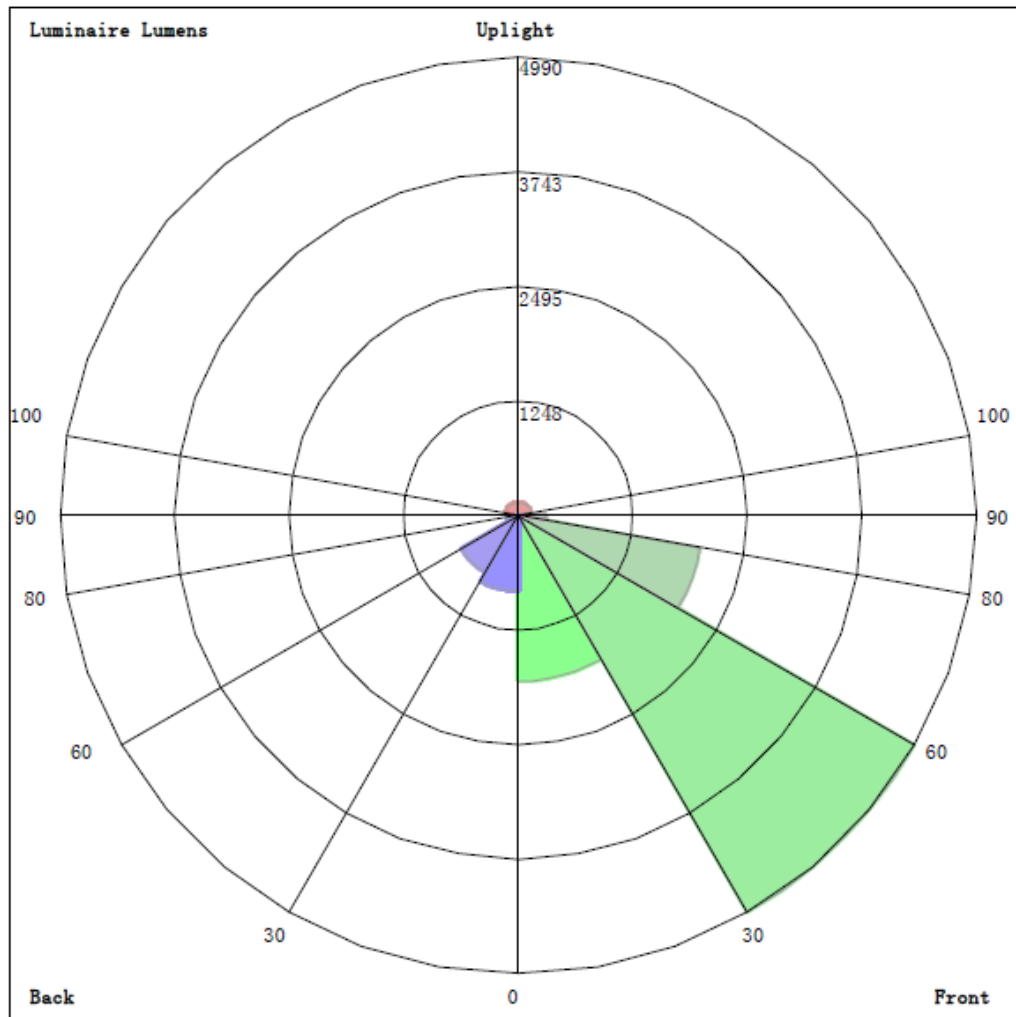
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	zone	total	lum, lamp
10	3322	3976	4116	3976	3322	2838	2545	2838	0- 10	313.2	313.2	2.84, 2.84
20	2989	4170	5262	4170	2989	2048	1040	2048	10- 20	897.0	1210	11, 11
30	2606	5158	6206	5158	2606	802.7	515.9	802.7	20- 30	1421	2631	23.8, 23.8
40	2181	5434	6277	5434	2181	473.4	156.5	473.4	30- 40	1876	4507	40.8, 40.8
50	1725	4797	4953	4797	1725	192.7	89.46	192.7	40- 50	2022	6529	59.1, 59.1
60	1201	3599	3874	3599	1201	87.25	33.71	87.25	50- 60	1809	8338	75.5, 75.5
70	742.4	2353	2282	2353	742.4	11.03	1.744	11.03	60- 70	1380	9718	88, 88
80	403.8	998.9	1095	998.9	403.8	4.496	2.414	4.496	70- 80	752.2	10470	94.8, 94.8
90	37.85	300.6	510.3	300.6	37.85	2.945	2.793	2.945	80- 90	306.3	10777	97.6, 97.6
100	31.20	121.6	475.3	121.6	31.20	3.765	3.487	3.765	90-100	121.5	10898	98.7, 98.7
110	26.09	28.74	85.24	28.74	26.09	2.989	3.802	2.989	100-110	52.25	10950	99.2, 99.2
120	14.99	85.54	40.12	85.54	14.99	2.883	3.667	2.883	110-120	26.00	10976	99.4, 99.4
130	8.358	71.19	87.34	71.19	8.358	3.070	4.245	3.070	120-130	29.42	11006	99.7, 99.7
140	2.630	44.20	70.54	44.20	2.630	3.373	4.411	3.373	130-140	20.76	11026	99.9, 99.9
150	2.046	21.57	36.90	21.57	2.046	3.769	4.388	3.769	140-150	10.57	11037	100, 100
160	2.093	1.761	14.36	1.761	2.093	3.969	3.878	3.969	150-160	3.709	11041	100, 100
170	2.441	2.313	2.525	2.313	2.441	3.215	3.002	3.215	160-170	1.012	11042	100, 100
180	2.963	2.834	2.358	2.834	2.963	2.723	2.575	2.723	170-180	0.2647	11042	100, 100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Zonal (lm)	Total (lm)	Percent
0-10	313.22	2.84%
10-20	897.03	10.96%
20-30	1420.90	23.83%
30-40	1875.84	40.82%
40-50	2021.54	59.13%
50-60	1809.21	75.51%
60-70	1380.28	88.01%
70-80	752.18	94.82%
80-90	306.31	97.60%
90-100	121.47	98.70%
100-110	52.25	99.17%
110-120	26.00	99.41%
120-130	29.42	99.67%
130-140	20.76	99.86%
140-150	10.57	99.96%
150-160	3.71	99.99%
160-170	1.01	100.00%
170-180	0.26	100.00%

## 4.2 Goniophotometer Test

LCS/BUG

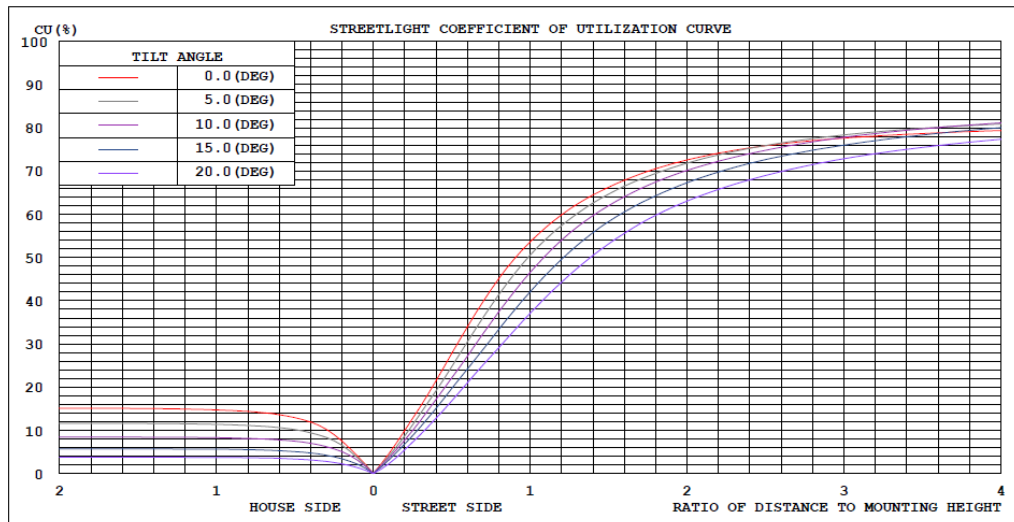


### LUMINAIRE CLASSIFICATION SYSTEM (LCS)

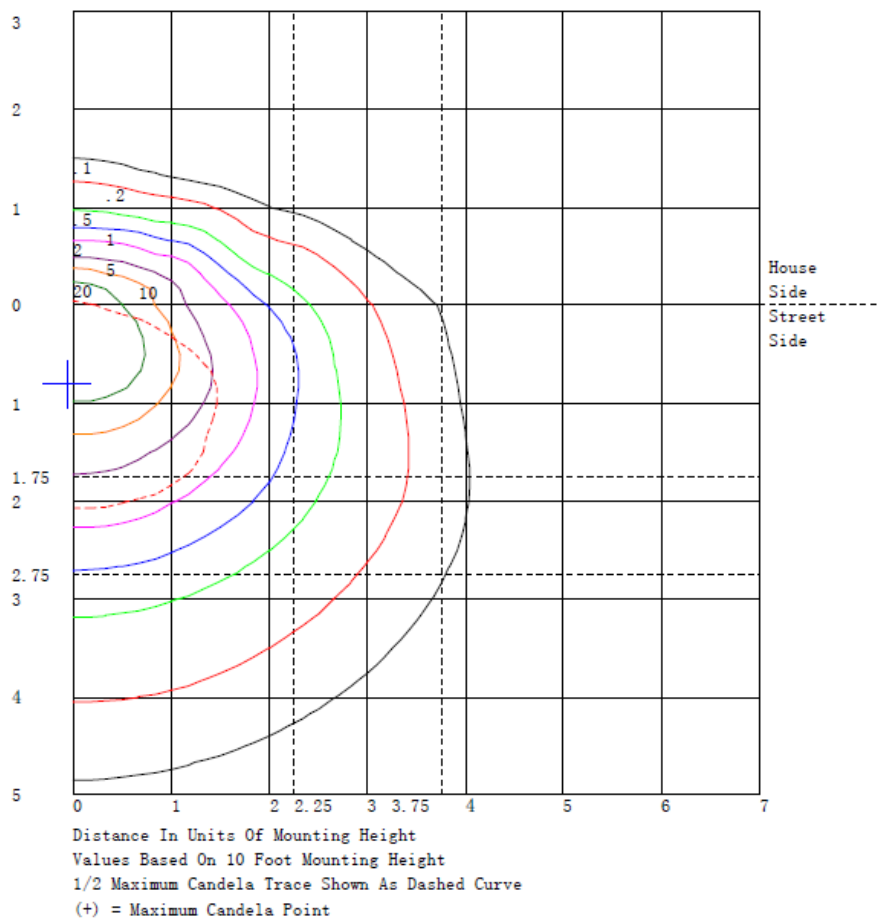
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1806.0	N.A.	16.4
FM - Front-Medium (30-60)	4990.0	N.A.	45.2
FH - Front-High (60-80)	2009.7	N.A.	18.2
FVH - Front-Very High (80-90)	292.5	N.A.	2.6
BL - Back-Low (0-30)	825.1	N.A.	7.5
BM - Back-Medium (30-60)	716.6	N.A.	6.5
BH - Back-High (60-80)	122.8	N.A.	1.1
BVH - Back-Very High (80-90)	13.8	N.A.	0.1
UL - Uplight-Low (90-100)	121.5	N.A.	1.1
UH - Uplight-High (100-180)	144.0	N.A.	1.3
Total	11042.0	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) γ (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	3490	3490	3490	3490	3491	3492	3493	3492	3492	3491	3491	3491	3491	3494	3497	3499	3500	3500	3500
5	3402	3350	3326	3329	3387	3452	3505	3474	3431	3398	3443	3502	3557	3557	3546	3532	3545	3560	3571
10	3322	3340	3361	3384	3387	3408	3462	3618	3798	3976	4103	4198	4257	4247	4210	4164	4143	4128	4116
15	3163	3144	3188	3296	3522	3771	4001	4091	4142	4173	4245	4307	4351	4338	4310	4278	4279	4284	4286
20	2989	3086	3208	3356	3559	3765	3952	4046	4114	4170	4233	4311	4417	4613	4823	5019	5147	5230	5262
25	2829	3033	3239	3446	3668	3881	4075	4172	4279	4434	4817	5223	5584	5697	5739	5751	5850	5939	5999
30	2606	3040	3386	3643	3721	3777	3881	4273	4719	5158	5433	5650	5817	5952	6052	6123	6170	6197	6206
35	2411	2787	3140	3470	3759	4037	4317	4648	4979	5295	5567	5807	6012	6175	6299	6383	6414	6415	6393
40	2181	2551	2920	3287	3652	4014	4374	4749	5107	5434	5691	5907	6086	6251	6374	6448	6414	6348	6277
45	1982	2325	2688	3073	3503	3936	4353	4735	5066	5326	5442	5496	5513	5565	5598	5604	5530	5446	5378
50	1725	2023	2368	2760	3262	3764	4216	4687	4977	4858	4885	4898	4957	5012	5050	5028	4991	4953	
55	1437	1758	2107	2482	2935	3378	3771	4006	4170	4278	4366	4414	4421	4357	4275	4197	4193	4203	4214
60	1201	1541	1876	2205	2551	2875	3159	3354	3498	3599	3649	3680	3712	3815	3916	3993	3969	3922	3874
65	1002	1314	1601	1864	2102	2317	2512	2698	2858	2985	3052	3089	3108	3127	3141	3152	3172	3189	3198
70	742	925	1116	1314	1534	1751	1952	2121	2257	2353	2372	2363	2340	2349	2358	2360	2333	2304	2282
75	564	632	726	845	1020	1200	1361	1445	1496	1522	1527	1518	1545	1576	1605	1616	1616	1620	1619
80	404	407	436	489	586	694	803	884	950	999	1017	1023	1024	1035	1046	1058	1073	1086	1095
85	166	158	170	203	267	342	420	481	535	583	626	661	691	712	728	739	747	752	753
90	37.8	55.2	76.1	101	130	162	196	230	265	301	340	379	415	444	468	487	500	508	510
95	29.2	39.4	50.4	62.3	74.5	87.9	103	120	139	161	189	219	250	280	308	331	347	357	360
100	31.2	32.0	34.0	37.1	39.3	44.1	53.2	68.9	91.4	122	165	215	268	324	377	423	452	470	475
105	23.6	24.1	24.7	25.5	25.2	26.0	28.7	37.3	47.4	57.6	63.7	69.2	74.7	81.0	88.6	98.1	115	131	144
110	26.1	18.3	16.0	19.2	34.2	50.0	62.0	51.6	38.6	28.7	41.6	58.7	75.5	78.9	79.2	78.2	80.9	83.4	85.2
115	22.1	14.1	11.7	15.1	28.7	44.7	59.8	66.8	69.1	66.3	51.2	35.2	23.0	30.2	42.5	56.4	65.3	71.4	73.3
120	15.0	8.64	7.71	12.2	25.5	41.6	58.2	69.6	78.8	85.5	90.5	92.2	89.7	77.5	63.1	49.4	42.8	39.7	40.1
125	11.3	5.93	5.44	9.80	21.6	36.3	52.0	64.6	75.8	85.3	92.2	96.8	99.2	98.1	95.4	91.9	88.5	87.7	84.1
130	8.36	4.64	4.69	8.51	18.0	29.9	42.6	52.9	62.5	71.2	79.2	85.9	90.8	92.3	92.2	91.1	89.6	88.1	87.3
135	2.76	0.00	0.00	1.24	10.5	21.9	33.9	42.6	50.6	58.1	66.3	73.7	79.6	81.8	82.5	82.3	82.3	82.2	81.9
140	2.63	4.59	7.25	10.6	14.8	19.6	25.0	31.2	37.7	44.2	50.3	55.9	60.7	63.9	66.2	67.9	69.4	70.3	70.5
145	2.58	3.04	4.28	6.30	9.22	12.8	17.0	21.9	27.0	31.9	35.9	39.6	42.8	45.6	48.0	50.1	52.2	53.8	54.7
150	2.05	1.80	1.83	2.15	2.17	2.90	4.77	9.95	15.8	21.6	24.8	27.3	29.2	31.1	32.6	34.0	35.3	36.3	36.9
155	1.90	1.90	1.97	2.13	1.99	2.21	3.07	5.75	8.96	12.3	14.9	17.2	19.1	20.5	21.5	22.3	23.2	23.9	24.3
160	2.09	1.99	1.96	2.02	2.27	2.51	2.67	2.06	1.64	1.76	3.82	6.38	9.03	10.8	12.3	13.4	14.0	14.3	14.4
165	2.26	2.27	2.27	2.26	2.18	2.13	2.15	2.38	2.68	3.03	3.49	3.84	3.97	3.37	2.63	1.92	1.78	1.79	1.90
170	2.44	2.46	2.47	2.46	2.45	2.43	2.41	2.38	2.34	2.31	2.28	2.26	2.26	2.29	2.34	2.40	2.43	2.47	2.53
175	2.63	2.65	2.66	2.66	2.66	2.65	2.64	2.62	2.60	2.58	2.55	2.52	2.49	2.46	2.42	2.38	2.33	2.29	2.28
180	2.96	2.99	3.01	3.01	2.99	2.96	2.92	2.90	2.87	2.83	2.77	2.71	2.65	2.64	2.63	2.61	2.51	2.42	2.36

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	3500	3500	3499	3497	3494	3491	3491	3491	3492	3492	3492	3493	3492	3491	3490	3490	3490	3490	3497
5	3560	3545	3532	3546	3557	3557	3502	3443	3398	3431	3474	3505	3452	3387	3329	3326	3350	3402	3277
10	4128	4143	4164	4210	4247	4257	4198	4103	3976	3798	3618	3462	3408	3387	3384	3361	3340	3322	3197
15	4284	4279	4278	4310	4338	4351	4307	4245	4173	4142	4091	4001	3771	3522	3296	3188	3144	3163	2898
20	5230	5147	5019	4823	4613	4417	4311	4233	4170	4114	4046	3952	3765	3559	3356	3208	3086	2989	2761
25	5939	5850	5751	5739	5697	5584	5223	4817	4434	4279	4172	4075	3881	3668	3446	3239	3033	2829	2717
30	6197	6170	6123	6052	5952	5817	5650	5433	5158	4719	4273	3881	3777	3721	3643	3386	3040	2606	2590
35	6415	6414	6383	6299	6175	6012	5807	5567	5295	4979	4648	4317	4037	3759	3470	3140	2787	2411	2431
40	6348	6414	6448	6374	6251	6086	5907	5691	5434	5107	4749	4374	4014	3652	3287	2920	2551	2181	2161
45	5446	5530	5604	5598	5565	5513	5496	5442	5326	5066	4735	4353	3936	3503	3073	2688	2325	1982	1894
50	4991	5028	5050	5012	4957	4898	4885	4858	4797	4676	4487	4216	3764	3262	2760	2368	2023	1725	1545
55	4203	4193	4197	4275	4357	4421	4414	4366	4278	4170	4006	3771	3378	2935	2482	2107	1758	1437	1178
60	3922	3969	3993	3916	3815	3712	3680	3649	3599	3498	3354	3159	2875	2551	2205	1876	1541	1201	897
65	3189	3172	3152	3141	3127	3108	3089	3052	2985	2858	2698	2512	2317	2102	1864	1601	1314	1002	729
70	2304	2333	2360	2358	2349	2340	2363	2372	2353	2257	2121	1952	1751	1534	1314	1116	925	742	559
75	1620	1616	1605	1576	1545	1518	1522	1527	1522	1496	1445	1361	1200	1020	845	726	632	564	403
80	1086	1073	1058	1046	1035	1024	1023	1017	999	950	884	803	694	586	489	436	407	404	274
85	752	747	739	728	712	691	661	626	583	535	481	420	342	267	203	170	158	166	118
90	508	500	487	468	444	415	379	340	301	265	230	196	162	130	101	76.1	55.2	37.8	34.3
95	357	347	331	308	280	250	219	189	161	139	120	103	87.9	74.5	62.3	50.4	39.4	29.2	25.5
100	470	452	423	377	324	268	215	165	122	91.4	68.9	53.2	44.1	39.3	37.1	34.0	32.0	31.2	24.7
105	131	115	98.1	88.6	81.0	74.7	69.2	63.7	57.6	47.4	37.3	28.7	26.0	25.2	25.5	24.7	24.1	23.6	18.1
110	83.4	80.9	78.2	79.2	78.9	75.5	58.7	41.6	28.7	38.6	51.6	62.0	50.0	34.2	19.2	16.0	18.3	26.1	18.3
115	71.4	65.3	56.4	42.5	30.2	23.0	35.2	51.2	66.3	69.1	66.8	59.8	44.7	28.7	15.1	11.7	14.1	22.1	15.7
120	39.7	42.8	49.4	63.1	77.5	89.7	92.2	90.5	85.5	78.8	69.6	58.2	41.6	25.5	12.2	7.71	8.64	15.0	11.5
125	85.7	88.5	91.9	95.4	98.1	99.2	96.8	92.2	85.3	75.8	64.6	52.0	36.3	21.6	9.80	5.44	5.93	11.3	8.90
130	88.1	89.6	91.1	92.2	92.3	90.8	85.9	79.2	71.2	62.5	52.9	42.6	29.9	18.0	8.51	4.69	4.64	8.36	6.81
135	82.2	82.3	82.3	82.5	81.8	79.6	73.7	66.3	58.1	50.6	42.6	33.9	21.9	10.5	1.24	0.00	0.00	2.76	3.05
140	70.3	69.4	67.9	66.2	63.9	60.7	55.9	50.3	44.2	37.7	31.2	25.0	19.6	14.8	10.6	7.25	4.59	6.23	4.03
145	53.8	52.2	50.1	48.0	45.6	42.8	39.6	35.9	31.9	27.0	21.9	17.0	12.8	9.2	6.30	4.28	3.04	2.58	2.22
150	36.3	35.3	34.0	32.6	31.1	29.2	27.3	24.8	21.6	15.8	9.9	4.77	2.90	2.21	1.25	1.83	1.80	2.05	2.61
155	23.9	23.2	22.3	21.5	20.5	19.1	17.2	14.9	12.3	8.96	5.75	3.07	2.21	1.99	2.13	1.97	1.90	1.90	2.72
160	14.3	14.0	13.4	12.3	10.8	9.3	6.38	3.82	1.76	1.64	2.06	2.67	2.51	2.27	2.02	1.96	1.99	2.09	2.95
165	1.79	1.78	1.92	2.63	3.37	3.97	3.84	3.49	3.03	2.68	2.38	2.15	2.13	2.18	2.26	2.27	2.27	2.26	3.14
170	2.47	2.43	2.40	2.34	2.29	2.26	2.26	2.28	2.31	2.34	2.38	2.43	2.43	2.45	2.46	2.47	2.46	2.44	3.12
175	2.29	2.33	2.38	2.42	2.46	2.49	2.52	2.55	2.58	2.60	2.62	2.64	2.65	2.66	2.66	2.66	2.65	2.63	3.08
180	2.42	2.51	2.61	2.63	2.64	2.65	2.71	2.77	2.83	2.87	2.90	2.92	2.96	2.99	3.01	3.01	2.99	2.96	3.00



Table--3

UNIT: cd

C (DEG) y (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	3502	3505	3506	3505	3503	3502	3502	3501	3501	3501	3502	3502	3502	3501	3501	3501	3500	3501	3501
5	3183	3121	3120	3129	3126	3031	2923	2824	2796	2789	2795	2793	2794	2794	2789	2783	2777	2783	2789
10	3079	2970	2849	2750	2686	2719	2778	2838	2848	2834	2796	2706	2609	2525	2515	2526	2545	2526	2515
15	2700	2569	2535	2546	2578	2592	2593	2573	2491	2388	2275	2165	2064	1979	1931	1905	1899	1905	1931
20	2584	2460	2424	2412	2396	2303	2185	2048	1899	1744	1590	1443	1309	1195	1114	1061	1040	1061	1114
25	2593	2459	2315	2159	1987	1786	1577	1368	1162	978	831	769	743	739	724	717	715	717	724
30	2515	2381	2163	1904	1621	1319	1037	803	709	666	652	612	577	550	531	520	516	520	531
35	2357	2188	1853	1477	1115	908	756	646	561	498	450	399	357	325	305	295	293	295	305
40	2054	1860	1500	1112	756	608	523	473	391	318	258	217	188	170	160	156	156	156	160
45	1749	1547	1230	900	599	454	363	306	242	193	159	144	138	137	133	130	129	130	133
50	1353	1151	912	681	475	346	254	193	155	134	124	110	101	94.6	90.9	89.3	89.5	89.3	90.9
55	949	751	587	451	340	253	187	138	107	88.8	79.0	71.9	68.5	67.6	65.6	64.5	64.2	64.5	65.6
60	649	457	341	267	219	164	120	87.3	67.2	55.2	48.8	44.0	41.4	40.1	37.2	34.9	33.7	34.9	37.2
65	506	335	232	169	131	93.0	65.9	46.6	29.2	16.3	7.51	3.00	1.15	1.01	0.70	0.90	1.34	0.90	0.70
70	404	279	190	125	79.2	45.5	23.7	11.0	3.58	0.83	0.99	0.40	0.59	1.18	1.36	1.55	1.74	1.55	1.36
75	270	168	103	62.3	38.4	20.4	10.7	6.48	2.82	1.33	1.23	0.90	0.99	1.33	1.57	1.84	2.11	1.84	1.57
80	170	93.4	52.3	30.9	22.2	12.3	6.86	4.50	2.44	1.60	1.52	1.30	1.34	1.55	1.82	2.13	2.41	2.13	1.82
85	78.8	48.8	30.8	19.9	13.8	8.32	5.02	3.29	2.18	1.78	1.83	1.69	1.70	1.82	2.06	2.33	2.60	2.33	2.06
90	30.3	25.8	20.1	14.5	9.46	6.40	4.28	2.94	2.29	2.08	2.15	2.08	2.10	2.18	2.36	2.57	2.79	2.57	2.36
95	21.8	18.1	14.3	10.7	7.54	5.44	3.95	2.98	2.54	2.42	2.49	2.45	2.47	2.54	2.66	2.82	3.01	2.82	2.66
100	19.1	14.5	11.0	8.37	6.42	5.09	4.25	3.77	3.46	3.32	3.29	3.18	3.13	3.12	3.19	3.31	3.49	3.31	3.19
105	13.3	9.44	6.34	4.07	2.65	2.55	2.99	3.65	3.71	3.69	3.62	3.57	3.54	3.53	3.59	3.71	3.87	3.71	3.59
110	12.1	7.67	5.47	4.47	4.19	3.56	3.17	2.99	3.08	3.28	3.51	3.60	3.66	3.70	3.73	3.76	3.80	3.76	3.73
115	10.7	6.89	4.92	3.93	3.58	3.17	2.99	2.97	3.01	3.12	3.25	3.29	3.33	3.37	3.42	3.47	3.53	3.47	3.42
120	8.53	6.24	4.71	3.70	3.12	2.83	2.78	2.88	2.99	3.13	3.28	3.36	3.42	3.47	3.55	3.62	3.67	3.62	3.55
125	6.93	5.35	4.23	3.46	2.98	2.80	2.80	2.94	3.09	3.26	3.44	3.53	3.59	3.65	3.75	3.83	3.90	3.83	3.75
130	5.51	4.47	3.70	3.17	2.86	2.81	2.90	3.07	3.19	3.32	3.47	3.62	3.77	3.92	4.06	4.17	4.24	4.17	4.06
135	3.84	4.00	3.70	3.29	2.90	2.91	3.03	3.22	3.37	3.53	3.68	3.81	3.92	4.03	4.14	4.23	4.28	4.23	4.14
140	3.39	3.55	3.44	3.27	3.09	3.14	3.24	3.37	3.48	3.59	3.71	3.84	3.97	4.09	4.22	4.33	4.41	4.33	4.22
145	3.18	3.35	3.39	3.38	3.36	3.41	3.48	3.57	3.69	3.82	3.94	4.01	4.08	4.15	4.27	4.39	4.47	4.39	4.27
150	3.05	3.36	3.49	3.54	3.54	3.62	3.69	3.77	3.84	3.90	3.96	4.01	4.05	4.11	4.21	4.31	4.39	4.31	4.21
155	3.34	3.77	3.94	3.96	3.91	3.88	3.84	3.81	3.82	3.86	3.92	4.00	4.07	4.13	4.12	4.08	4.05	4.08	4.12
160	3.67	4.13	4.28	4.27	4.17	4.11	4.03	3.97	3.96	3.97	3.96	3.91	3.85	3.81	3.82	3.85	3.88	3.85	3.82
165	3.79	4.21	4.31	4.25	4.10	4.02	3.94	3.86	3.82	3.78	3.73	3.61	3.48	3.38	3.41	3.46	3.51	3.46	3.41
170	3.61	3.90	3.94	3.83	3.66	3.50	3.35	3.21	3.16	3.13	3.12	3.08	3.04	3.00	3.00	3.00	3.00	3.00	3.00
175	3.40	3.60	3.63	3.57	3.43	3.25	3.06	2.90	2.88	2.89	2.90	2.82	2.74	2.67	2.69	2.74	2.79	2.74	2.69
180	2.94	2.93	2.92	2.90	2.88	2.83	2.78	2.72	2.66	2.60	2.54	2.50	2.47	2.46	2.49	2.53	2.58	2.53	2.49

C (DEG) y (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	3501	3502	3502	3502	3501	3501	3501	3502	3502	3503	3505	3506	3505	3502	3497				
5	2794	2794	2793	2795	2789	2796	2824	2923	3031	3126	3129	3120	3121	3183	3277				
10	2525	2609	2706	2796	2834	2848	2838	2778	2719	2686	2750	2849	2970	3079	3197				
15	1979	2064	2165	2275	2388	2491	2573	2593	2592	2578	2546	2535	2569	2700	2898				
20	1195	1309	1443	1590	1744	1899	2048	2185	2303	2396	2412	2424	2460	2584	2761				
25	739	743	769	831	978	1162	1368	1577	1786	1987	2159	2315	2459	2593	2717				
30	550	577	612	652	666	709	803	1037	1319	1621	1904	2163	2381	2515	2590				
35	325	357	399	450	498	561	646	756	908	1115	1477	1853	2188	2357	2431				
40	170	188	217	258	318	391	473	523	608	756	1112	1500	1860	2054	2161				
45	137	138	144	159	193	242	306	363	454	599	900	1230	1547	1749	1894				
50	94.6	101	110	124	134	155	193	254	346	475	681	912	1151	1353	1545				
55	67.6	68.5	71.9	79.0	88.8	107	138	187	253	340	451	587	751	949	1178				
60	40.1	41.4	44.0	48.8	55.2	67.2	87.3	120	164	219	267	341	457	649	897				
65	1.01	1.15	1.30	1.52	1.60	2.44	4.50	6.86	12.3	22.2	30.9	52.3	93.4	170	274				
70	1.18	0.59	0.40	0.99	0.83	3.58	11.0	23.7	45.5	79.2	125	190	279	404	559				
75	1.33	0.99	0.90	1.23	1.33	2.82	6.48	10.7	20.4	38.4	62.3	103	168	270	403				
80	1.55	1.34	1.30	1.52	1.60	2.44	4.50	6.86	12.3	22.2	30.9	52.3	93.4	170	274				
85	1.82	1.70	1.69	1.83	1.78	2.18	3.29	5.02	8.32	13.8	19.9	30.8	48.8	78.8	118				
90	2.18	2.10	2.08	2.15	2.08	2.29	2.94	4.28	6.40	9.46	14.5	20.1	25.8	30.3	34.3				
95	2.54	2.47	2.45	2.49	2.42	2.54	2.98	3.95	5.44	7.54	10.7	14.3	18.1	21.8	25.5				
100	3.12	3.13	3.18	3.29	3.32	3.46	3.77	4.25	5.09	6.42	8.37	11.0	14.5	19.1	24.7				
105	3.53	3.54	3.57	3.62	3.69	3.71	3.65	2.99	2.55	2.65	4.07	6.34	9.44	13.3	18.1				
110	3.70	3.66	3.60	3.51	3.28	3.08	2.99	3.17	3.56	4.19	4.47	5.47	7.67	12.1	18.3				
115	3.37	3.33	3.29	3.25	3.12	3.01	2.97	2.99	3.17	3.58	3.93	4.92	6.89	10.7	15.7				
120	3.47	3.42	3.36	3.28	3.13	2.99	2.88	2.78	2.83	3.12	3.70	4.71	6.24	8.53	11.5				
125	3.65	3.59	3.53	3.44	3.26	3.09	2.94	2.80	2.80	2.98	3.46	4.23	5.35	6.93	8.90				
130	3.92	3.77	3.62	3.47	3.32	3.19	3.07	2.90	2.81	2.86	3.17	3.70	4.47	5.51	6.81				
135	4.03	3.92	3.81	3.68	3.53	3.37	3.22	3.03	2.91	2.90	3.29	3.70	4.00	3.84	3.43				
140	4.09	3.97	3.84	3.71	3.59	3.48	3.37	3.24	3.14	3.09	3.27	3.44	3.55	3.39	3.09				
145	4.15	4.08	4.01	3.94	3.82	3.69	3.57	3.48	3.41	3.36	3.38	3.39	3.35	3.18	2.92				
150	4.11	4.05	4.01	3.96	3.90	3.84	3.77	3.69	3.62	3.54	3.54	3.49	3.36	3.05	2.61				
155	4.13	4.07	4.00	3.92	3.86	3.82	3.81	3.84	3.88	3.91	3.96	3.94	3.77	3.34	2.72				
160	3.81	3.85	3.91	3.96	3.97	3.96	3.97	4.03	4.11	4.17	4.27	4.28	4.13	3.67	2.99				
165	3.38	3.48	3.61	3.73	3.78	3.82	3.86	3.94	4.02	4.10	4.25	4.31	4.21	3.79	3.14				
170	3.00	3.04	3.08	3.12	3.13	3.16	3.21	3.35	3.50	3.66	3.83	3.94	3.90	3.61	3.12				
175	2.67	2.74	2.82	2.90	2.89	2.88	2.90	3.06	3.25	3.43	3.57	3.63	3.60	3.40	3.08				
180	2.46	2.47	2.50	2.54	2.60	2.66	2.72	2.78	2.83	2.88	2.90	2.92	2.93	2.94	2.95				

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

<b>Model No.</b>	WPX2 @ 80W / 5000K	<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 <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	0.662	79.3	0.998	2.45
277.0	60	0.297	78.4	0.953	3.41



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