

## 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		10415
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		153.2
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		10140
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	149.1
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		68.0
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	480V	17.86
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	480V	0.799
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3985±275	4102
		4 steps	3985±154	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		85.8
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		21
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		85
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%		-11%
Zonal Lumen Requirement (80°-90°) (Goniophotometer – Section 4.2)	IES LM-79-2008	≤10%		2.1%
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		0.177
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		68.0
(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	2023-10-23	WPX3 @ 65W / 4000K 480	231020002-S1
2	Goniophotometer Test	2023-10-23	WPX3 @ 65W / 4000K 480	231020002-S1
3	THD and PF Test	2023-10-23	WPX3 @ 65W / 4000K 480	231020002-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. WPX3 @ 65W / 4000K 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>	WPX3 @ 65W / 4000K 480	<b>Sample ID</b>	231020002-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

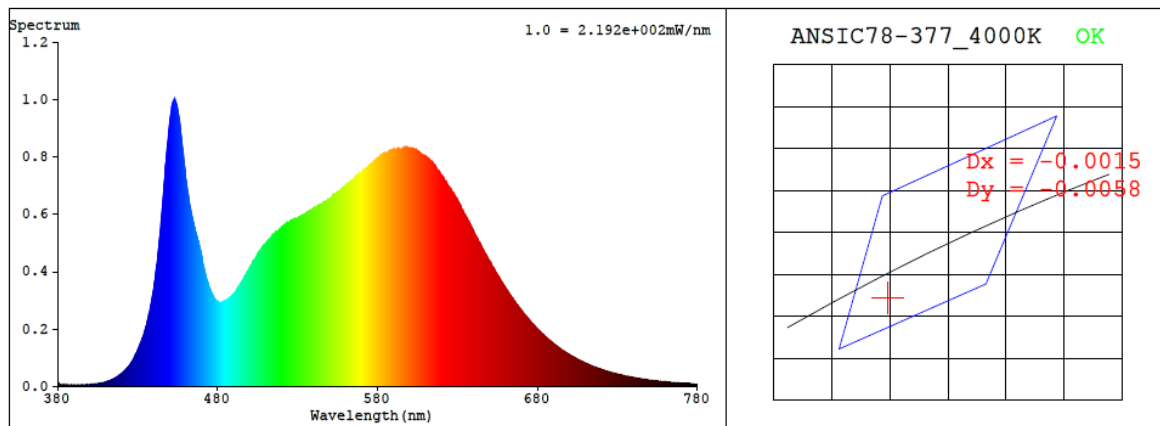
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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	0.177	68.0	0.799

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
4102	85.8	21	-0.0023	85	96	-11%

## 4.1 Integrating Sphere Test



### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.3746$   $y = 0.3682$  /  $u' = 0.2247$   $v' = 0.4969$  ( $duv = -2.32e-03$ )

CCT= 4102K Prcp WL:  $L_d = 580.2\text{nm}$  Purity=22.9%

Peak WL:  $L_p = 453\text{nm}$  FWHM:  $= 24.7\text{nm}$  Ratio:  $R = 18.6\%$   $G = 77.3\%$   $B = 4.1\%$

Render Index:  $R_a = 85.8$  AvgR = 80.3 TM30:  $R_f = 85$   $R_g = 96$

EEL: 0.09029 A++ Highest

R1 =85	R2 =93	R3 =96	R4 =84	R5 =85	R6 =89	R7 =86
R8 =68	R9 =21	R10=82	R11=83	R12=66	R13=88	R14=98
R15=80						

## 4.1 Integrating Sphere Test

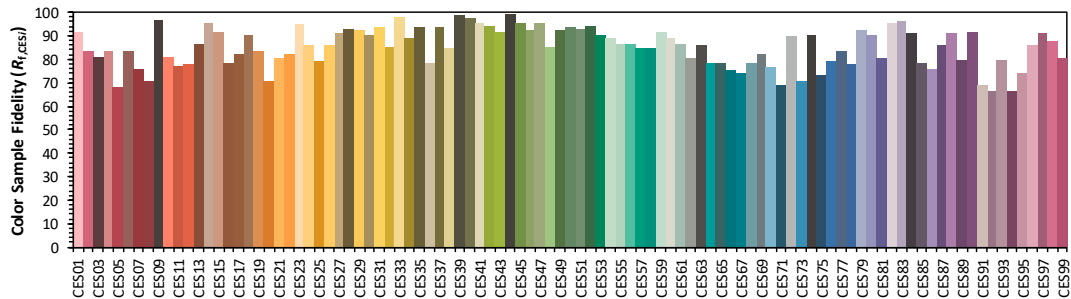
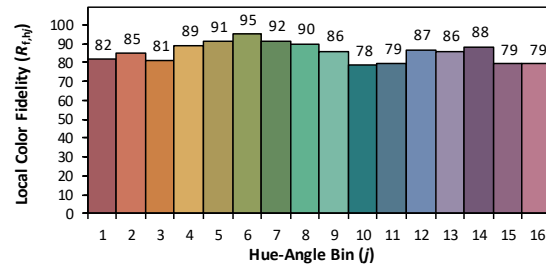
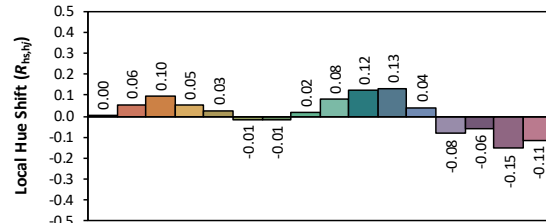
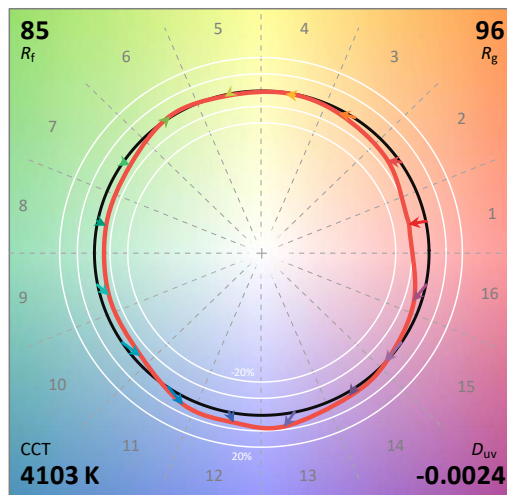
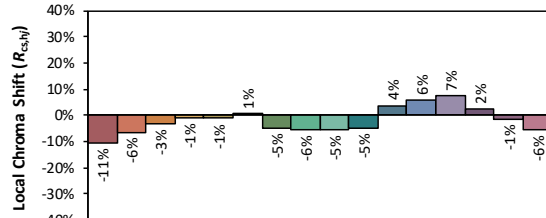
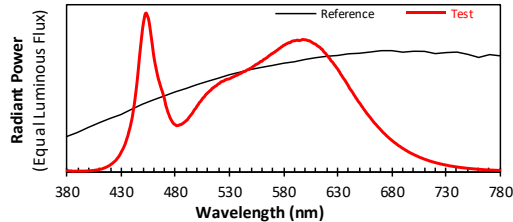
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/10/30

Model: WPX3 @ 65W / 4000K 480



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

$x$  0.3745  
 $y$  0.3680  
 $u'$  0.2247  
 $v'$  0.4968

CIE 13.3-1995  
(CRI)

$R_a$  86  
 $R_g$  21

## 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	6.80E-06	447	7.37E-04	514	5.25E-04	581	7.98E-04	648	4.57E-04	715	6.88E-05
381	7.60E-06	448	8.01E-04	515	5.29E-04	582	8.03E-04	649	4.45E-04	716	6.71E-05
382	5.10E-06	449	8.63E-04	516	5.35E-04	583	8.06E-04	650	4.36E-04	717	6.46E-05
383	5.70E-06	450	9.20E-04	517	5.39E-04	584	8.10E-04	651	4.28E-04	718	6.29E-05
384	6.20E-06	451	9.59E-04	518	5.42E-04	585	8.13E-04	652	4.17E-04	719	6.11E-05
385	3.40E-06	452	9.92E-04	519	5.49E-04	586	8.13E-04	653	4.08E-04	720	5.94E-05
386	4.00E-06	453	1.00E-03	520	5.54E-04	587	8.18E-04	654	3.97E-04	721	5.68E-05
387	4.80E-06	454	9.83E-04	521	5.58E-04	588	8.22E-04	655	3.88E-04	722	5.54E-05
388	4.30E-06	455	9.65E-04	522	5.65E-04	589	8.24E-04	656	3.79E-04	723	5.36E-05
389	4.90E-06	456	9.30E-04	523	5.68E-04	590	8.25E-04	657	3.69E-04	724	5.18E-05
390	5.10E-06	457	8.81E-04	524	5.70E-04	591	8.26E-04	658	3.61E-04	725	5.04E-05
391	4.30E-06	458	8.33E-04	525	5.73E-04	592	8.28E-04	659	3.52E-04	726	4.86E-05
392	4.30E-06	459	7.81E-04	526	5.79E-04	593	8.29E-04	660	3.44E-04	727	4.74E-05
393	5.30E-06	460	7.29E-04	527	5.80E-04	594	8.26E-04	661	3.35E-04	728	4.56E-05
394	4.50E-06	461	6.90E-04	528	5.83E-04	595	8.26E-04	662	3.26E-04	729	4.46E-05
395	5.00E-06	462	6.54E-04	529	5.84E-04	596	8.29E-04	663	3.18E-04	730	4.27E-05
396	4.70E-06	463	6.22E-04	530	5.86E-04	597	8.31E-04	664	3.09E-04	731	4.18E-05
397	5.30E-06	464	5.91E-04	531	5.89E-04	598	8.33E-04	665	3.02E-04	732	4.04E-05
398	5.60E-06	465	5.69E-04	532	5.93E-04	599	8.32E-04	666	2.95E-04	733	3.86E-05
399	5.90E-06	466	5.45E-04	533	5.96E-04	600	8.31E-04	667	2.86E-04	734	3.75E-05
400	6.80E-06	467	5.23E-04	534	5.99E-04	601	8.30E-04	668	2.79E-04	735	3.64E-05
401	7.10E-06	468	5.04E-04	535	6.03E-04	602	8.28E-04	669	2.72E-04	736	3.54E-05
402	6.50E-06	469	4.80E-04	536	6.06E-04	603	8.25E-04	670	2.65E-04	737	3.42E-05
403	8.20E-06	470	4.57E-04	537	6.08E-04	604	8.25E-04	671	2.57E-04	738	3.30E-05
404	8.70E-06	471	4.22E-04	538	6.11E-04	605	8.21E-04	672	2.50E-04	739	3.22E-05
405	9.80E-06	472	4.01E-04	539	6.16E-04	606	8.17E-04	673	2.43E-04	740	3.12E-05
406	1.06E-05	473	3.77E-04	540	6.19E-04	607	8.12E-04	674	2.37E-04	741	3.02E-05
407	1.18E-05	474	3.60E-04	541	6.21E-04	608	8.08E-04	675	2.30E-04	742	2.89E-05
408	1.26E-05	475	3.41E-04	542	6.27E-04	609	8.05E-04	676	2.23E-04	743	2.83E-05
409	1.37E-05	476	3.29E-04	543	6.30E-04	610	8.02E-04	677	2.17E-04	744	2.74E-05
410	1.58E-05	477	3.17E-04	544	6.32E-04	611	7.95E-04	678	2.11E-04	745	2.64E-05
411	1.74E-05	478	3.06E-04	545	6.35E-04	612	7.91E-04	679	2.05E-04	746	2.56E-05
412	1.84E-05	479	3.00E-04	546	6.40E-04	613	7.86E-04	680	2.00E-04	747	2.50E-05
413	2.09E-05	480	2.96E-04	547	6.43E-04	614	7.82E-04	681	1.94E-04	748	2.39E-05
414	2.40E-05	481	2.91E-04	548	6.45E-04	615	7.73E-04	682	1.88E-04	749	2.34E-05
415	2.64E-05	482	2.91E-04	549	6.51E-04	616	7.70E-04	683	1.83E-04	750	2.24E-05
416	2.93E-05	483	2.93E-04	550	6.53E-04	617	7.58E-04	684	1.79E-04	751	2.18E-05
417	3.28E-05	484	2.97E-04	551	6.58E-04	618	7.51E-04	685	1.73E-04	752	2.11E-05
418	3.62E-05	485	2.96E-04	552	6.64E-04	619	7.45E-04	686	1.68E-04	753	2.05E-05
419	4.00E-05	486	3.01E-04	553	6.67E-04	620	7.36E-04	687	1.63E-04	754	1.98E-05
420	4.50E-05	487	3.05E-04	554	6.73E-04	621	7.28E-04	688	1.59E-04	755	1.93E-05
421	5.03E-05	488	3.11E-04	555	6.77E-04	622	7.18E-04	689	1.54E-04	756	1.85E-05
422	5.49E-05	489	3.16E-04	556	6.80E-04	623	7.12E-04	690	1.49E-04	757	1.82E-05
423	6.11E-05	490	3.22E-04	557	6.85E-04	624	6.99E-04	691	1.45E-04	758	1.75E-05
424	6.70E-05	491	3.27E-04	558	6.89E-04	625	6.93E-04	692	1.41E-04	759	1.72E-05
425	7.33E-05	492	3.37E-04	559	6.95E-04	626	6.85E-04	693	1.36E-04	760	1.63E-05
426	8.29E-05	493	3.46E-04	560	6.96E-04	627	6.75E-04	694	1.33E-04	761	1.59E-05
427	9.10E-05	494	3.55E-04	561	7.03E-04	628	6.67E-04	695	1.28E-04	762	1.58E-05
428	1.01E-04	495	3.63E-04	562	7.08E-04	629	6.57E-04	696	1.24E-04	763	1.49E-05
429	1.12E-04	496	3.72E-04	563	7.11E-04	630	6.49E-04	697	1.21E-04	764	1.44E-05
430	1.26E-04	497	3.84E-04	564	7.16E-04	631	6.37E-04	698	1.17E-04	765	1.40E-05
431	1.38E-04	498	3.94E-04	565	7.20E-04	632	6.28E-04	699	1.14E-04	766	1.35E-05
432	1.51E-04	499	4.02E-04	566	7.27E-04	633	6.14E-04	700	1.11E-04	767	1.31E-05
433	1.67E-04	500	4.14E-04	567	7.32E-04	634	6.05E-04	701	1.07E-04	768	1.27E-05
434	1.85E-04	501	4.22E-04	568	7.37E-04	635	5.93E-04	702	1.04E-04	769	1.22E-05
435	2.07E-04	502	4.34E-04	569	7.43E-04	636	5.84E-04	703	1.01E-04	770	1.20E-05
436	2.26E-04	503	4.41E-04	570	7.45E-04	637	5.75E-04	704	9.80E-05	771	1.18E-05
437	2.55E-04	504	4.50E-04	571	7.51E-04	638	5.64E-04	705	9.47E-05	772	1.11E-05
438	2.78E-04	505	4.60E-04	572	7.54E-04	639	5.53E-04	706	9.16E-05	773	1.10E-05
439	3.09E-04	506	4.68E-04	573	7.60E-04	640	5.42E-04	707	8.88E-05	774	1.06E-05
440	3.40E-04	507	4.74E-04	574	7.65E-04	641	5.28E-04	708	8.65E-05	775	1.05E-05
441	3.83E-04	508	4.85E-04	575	7.70E-04	642	5.18E-04	709	8.36E-05	776	1.00E-05
442	4.26E-04	509	4.92E-04	576	7.76E-04	643	5.09E-04	710	8.09E-05	777	9.80E-06
443	4.79E-04	510	4.98E-04	577	7.80E-04	644	5.00E-04	711	7.86E-05	778	9.40E-06
444	5.34E-04	511	5.04E-04	578	7.86E-04	645	4.87E-04	712	7.64E-05	779	9.40E-06
445	5.96E-04	512	5.11E-04	579	7.89E-04	646	4.77E-04	713	7.38E-05	780	9.40E-06
446	6.66E-04	513	5.15E-04	580	7.96E-04	647	4.66E-04	714	7.18E-05	N/A	N/A



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

<b>Model No.</b>	WPX3 @ 65W / 4000K 480	<b>Sample ID</b>	231020002-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	0.177	68.0	0.799
<b>NON-WORST CASE</b>	N/A	N/A	N/A	N/A	N/A

#### Test Result

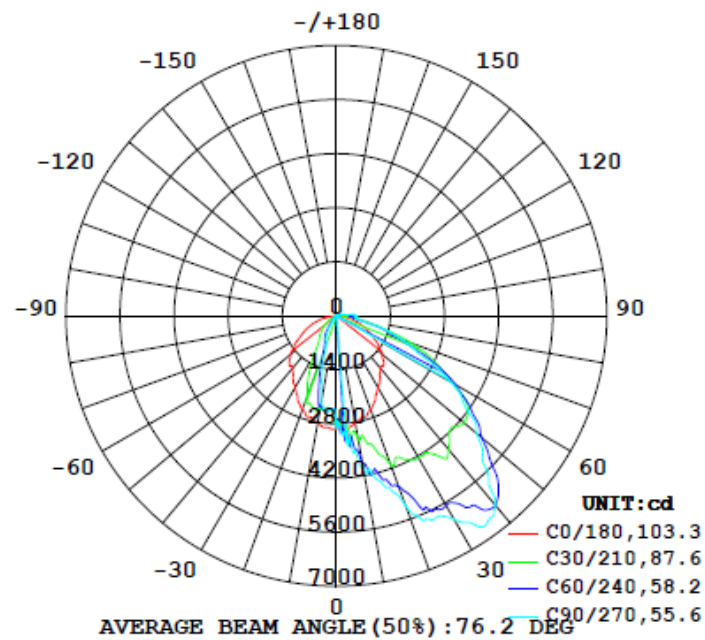
Result Type	Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement	BUG
		C0-180	C90-270	C0-180	C90-270		(80°-90°)	
<b>0°-180° zones</b>	10415	107.1	145.7	55.3	101.5	153.2	2.0%	B2-U3-G2
<b>0°-90° zones</b>	10140	107.1	145.7	55.3	101.5	149.1	2.1%	B2-U3-G2



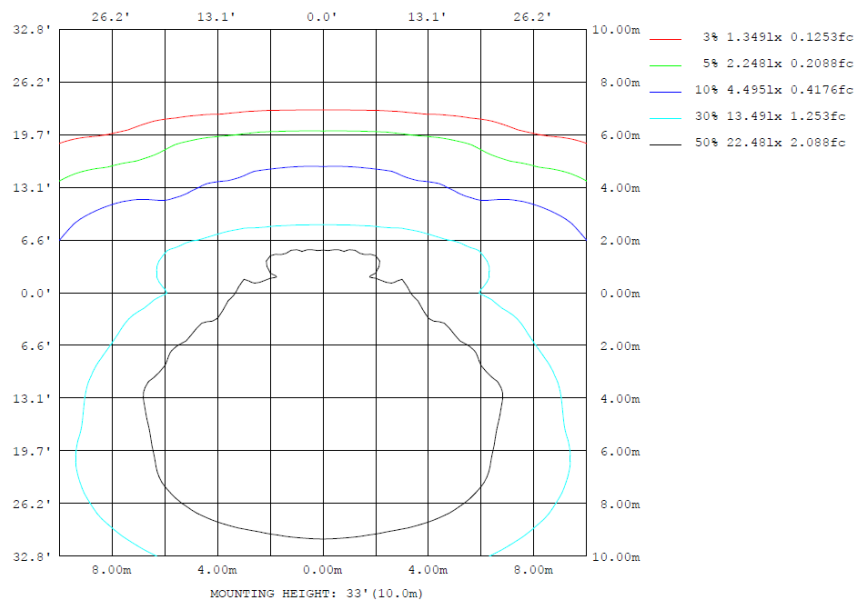
## 4.2 Goniophotometer Test

### Lighting Distribution Curve

**LUMINOUS INTENSITY DISTRIBUTION DIAGRAM**



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

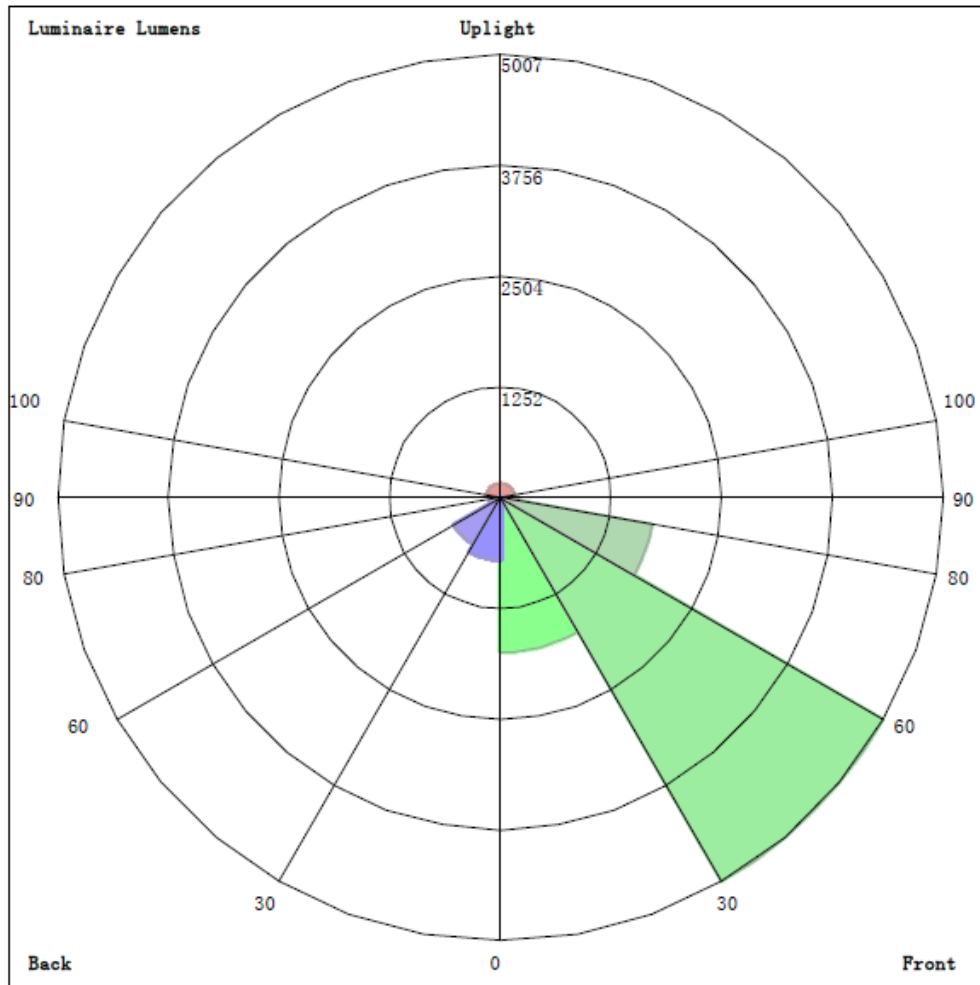
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	φ zone	φ total	θlum, lamp
10	2801	3580	4010	3580	2801	2454	2292	2454	0- 10	269.2	269.2	2.58,2.58
20	2599	4419	5219	4419	2599	1482	786.6	1482	10- 20	828.0	1097	10.5,10.5
30	2153	5356	6084	5356	2153	716.7	437.7	716.7	20- 30	1356	2454	23.6,23.6
40	1767	5353	6402	5353	1767	414.8	147.0	414.8	30- 40	1824	4278	41.1,41.1
50	1542	5188	4746	5188	1542	182.9	68.97	182.9	40- 50	2000	6278	60.3,60.3
60	1078	3705	3389	3705	1078	92.01	26.27	92.01	50- 60	1791	8068	77.5,77.5
70	697.6	1872	1797	1872	697.6	12.85	2.153	12.85	60- 70	1260	9329	89.6,89.6
80	292.7	582.1	564.4	582.1	292.7	6.249	2.800	6.249	70- 80	598.8	9927	95.3,95.3
90	26.38	222.5	520.3	222.5	26.38	4.626	3.687	4.626	80- 90	212.4	10140	97.4,97.4
100	27.06	167.8	224.3	167.8	27.06	4.884	4.373	4.884	90-100	120.8	10261	98.5,98.5
110	16.12	57.36	74.04	57.36	16.12	3.216	5.246	3.216	100-110	46.79	10307	99,99
120	16.49	105.0	62.57	105.0	16.49	2.992	3.562	2.992	110-120	31.75	10339	99.3,99.3
130	8.649	84.76	102.5	84.76	8.649	3.001	4.127	3.001	120-130	33.50	10373	99.6,99.6
140	1.908	49.67	98.51	49.67	1.908	3.229	4.365	3.229	130-140	24.97	10398	99.8,99.8
150	1.692	22.15	45.74	22.15	1.692	3.558	4.088	3.558	140-150	12.35	10410	100,100
160	1.981	1.605	14.33	1.605	1.981	3.668	3.559	3.668	150-160	3.820	10414	100,100
170	2.324	2.191	2.327	2.191	2.324	2.974	2.586	2.974	160-170	0.9517	10415	100,100
180	2.709	2.608	2.234	2.608	2.709	2.561	2.364	2.561	170-180	0.2453	10415	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

	Zonal (lm)		Total (lm)	Percent
0-10	269.21	0-10	269.21	2.58%
10-20	828.01	0-20	1097.22	10.54%
20-30	1356.41	0-30	2453.63	23.56%
30-40	1824.04	0-40	4277.67	41.07%
40-50	2000.15	0-50	6277.82	60.28%
50-60	1790.65	0-60	8068.47	77.47%
60-70	1260.06	0-70	9328.53	89.57%
70-80	598.83	0-80	9927.36	95.32%
80-90	212.42	0-90	10139.78	97.36%
90-100	120.77	0-100	10260.55	98.52%
100-110	46.79	0-110	10307.34	98.97%
110-120	31.75	0-120	10339.09	99.27%
120-130	33.50	0-130	10372.59	99.60%
130-140	24.97	0-140	10397.56	99.84%
140-150	12.35	0-150	10409.91	99.95%
150-160	3.82	0-160	10413.73	99.99%
160-170	0.95	0-170	10414.68	100.00%
170-180	0.25	0-180	10414.93	100.00%

## 4.2 Goniophotometer Test

LCS/BUG

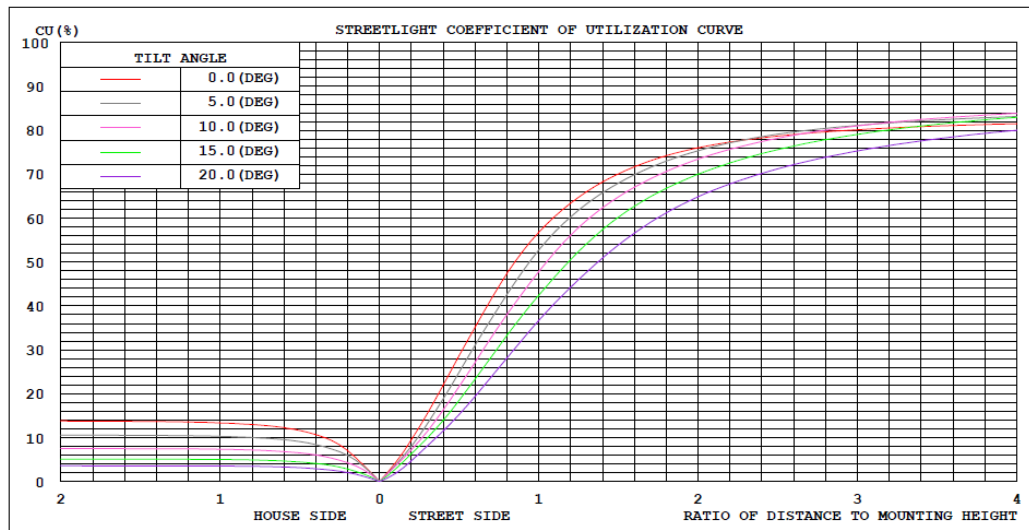


### LUMINAIRE CLASSIFICATION SYSTEM (LCS)

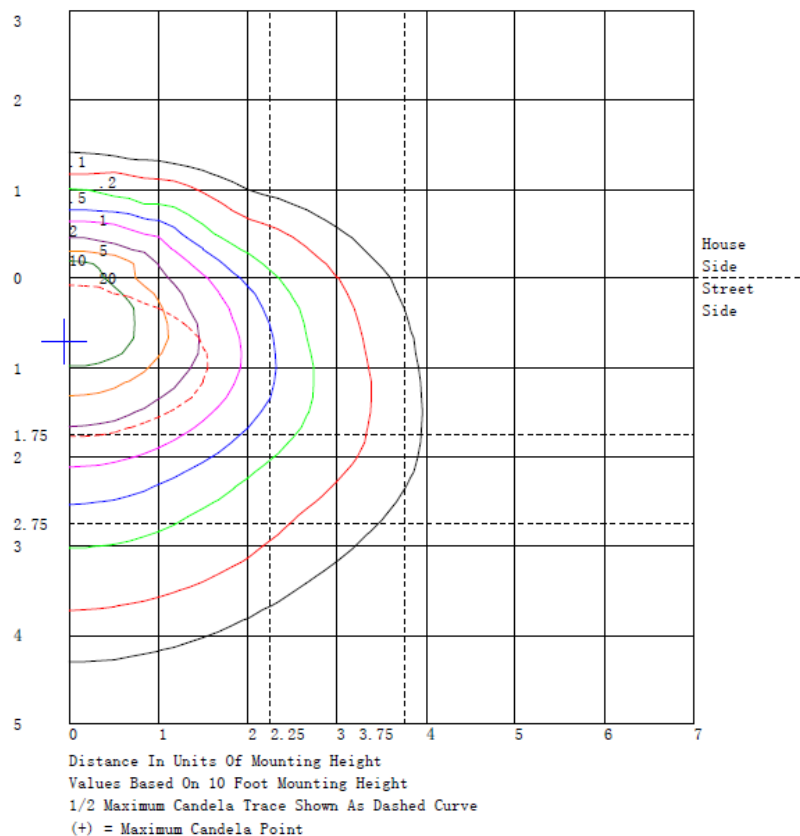
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1748.7	N.A.	16.8
FM - Front-Medium (30-60)	5007.5	N.A.	48.1
FH - Front-High (60-80)	1741.8	N.A.	16.7
FVH - Front-Very High (80-90)	200.3	N.A.	1.9
BL - Back-Low (0-30)	704.9	N.A.	6.8
BM - Back-Medium (30-60)	607.4	N.A.	5.8
BH - Back-High (60-80)	117.1	N.A.	1.1
BVH - Back-Very High (80-90)	12.2	N.A.	0.1
UL - Uplight-Low (90-100)	120.8	N.A.	1.2
UH - Uplight-High (100-180)	154.4	N.A.	1.5
Total	10415.1	N.A.	100.0
BUG Rating	B2-U3-G2		

## 4.2 Goniophotometer Test

### Coefficients of Utilization



### Isolines



## 4.2 Goniophotometer Test

### Luminous Distribution Intensity Data

Table--1

UNIT: cd

C (DEG) y (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	2925	2926	2926	2925	2924	2921	2919	2917	2915	2913	2912	2911	2910	2907	2904	2901	2901	2901	2901
5	2903	2869	2844	2827	2802	2798	2824	2959	3100	3210	3153	3068	2998	3068	3168	3273	3329	3365	3380
10	2801	2748	2747	2801	2941	3110	3283	3393	3490	3580	3692	3794	3877	3903	3912	3916	3953	3987	4010
15	2708	2740	2806	2909	3051	3225	3427	3694	3954	4173	4242	4264	4266	4317	4367	4411	4434	4445	4446
20	2599	2697	2856	3076	3416	3771	4095	4248	4348	4419	4516	4611	4706	4813	4918	5016	5112	5184	5219
25	2392	2585	2813	3078	3412	3757	4088	4326	4539	4744	4996	5239	5458	5618	5739	5821	5850	5851	5833
30	2153	2457	2778	3117	3480	3855	4236	4649	5032	5356	5514	5611	5675	5772	5861	5939	6009	6060	6084
35	1980	2400	2812	3214	3616	4003	4368	4686	4981	5257	5535	5796	6036	6259	6447	6591	6648	6665	6654
40	1767	2179	2611	3060	3567	4063	4519	4825	5093	5353	5740	6104	6401	6746	7043	7291	7484	7602	7642
45	1735	2235	2697	3122	3475	3817	4173	4679	5170	5592	5787	5877	5880	5811	5701	5575	5474	5398	5361
50	1542	1978	2424	2881	3381	3867	4315	4698	4996	5188	5156	5045	4909	4877	4859	4847	4803	4766	4746
55	1336	1683	2079	2524	3111	3677	4155	4327	4384	4364	4352	4316	4265	4218	4172	4128	4090	4065	4058
60	1078	1413	1773	2159	2635	3089	3471	3634	3704	3705	3675	3620	3556	3525	3500	3476	3436	3404	3389
65	888	1204	1521	1841	2207	2542	2810	2899	2912	2872	2819	2748	2669	2605	2547	2497	2456	2430	2423
70	698	880	1078	1294	1578	1841	2040	2039	1972	1872	1817	1769	1736	1739	1753	1773	1781	1788	1797
75	495	595	704	823	983	1130	1239	1219	1165	1102	1101	1112	1126	1123	1118	1114	1115	1119	1128
80	293	334	387	450	547	638	705	682	636	582	566	559	558	561	565	570	568	565	564
85	104	135	171	211	264	316	359	370	372	374	392	414	438	463	488	512	534	551	560
90	26.4	51.7	76.2	99.8	123	145	166	179	197	223	277	338	398	440	474	499	512	519	520
95	21.8	35.3	49.6	64.7	78.5	94.7	115	146	180	214	248	278	301	309	310	309	312	315	318
100	27.1	29.4	32.5	36.2	35.9	39.8	51.4	88.9	130	168	179	183	184	194	203	212	218	222	224
105	20.4	20.3	23.6	30.2	44.0	58.3	70.3	70.8	68.2	64.5	64.3	64.9	66.3	68.6	71.7	75.4	80.2	85.3	90.6
110	16.1	14.4	19.1	30.3	56.5	82.8	103	90.9	73.5	57.4	65.1	77.2	89.2	89.3	86.4	82.1	78.1	75.1	74.0
115	21.7	14.1	13.7	20.4	39.8	62.2	83.5	95.6	101	99.0	78.2	54.1	32.3	29.5	32.2	37.6	40.4	42.9	44.7
120	16.5	7.99	6.69	12.6	30.3	51.8	73.5	87.7	98.4	105	106	103	97.1	89.8	81.8	74.0	67.7	63.6	62.6
125	12.0	4.85	3.82	8.92	23.5	41.7	61.0	76.3	89.4	99.7	105	107	107	105	103	100	99.0	98.5	98.8
130	8.65	1.77	0.28	4.19	16.3	31.7	48.3	61.6	73.9	84.8	94.2	102	107	107	105	103	103	102	102
135	2.15	0.19	1.22	5.25	13.4	23.7	35.3	47.0	58.8	70.1	80.4	89.6	97.1	102	105	107	109	110	110
140	1.91	4.72	8.05	11.9	16.0	20.8	26.4	33.6	41.5	49.7	57.8	65.6	72.6	77.8	82.3	86.3	91.7	96.0	98.5
145	1.76	3.17	5.06	7.42	10.2	13.5	17.4	22.1	27.4	33.4	40.6	47.7	54.3	58.8	62.2	64.9	67.4	69.1	69.8
150	1.69	3.05	3.83	4.05	2.27	0.99	1.27	7.39	14.8	22.1	25.6	28.2	30.5	34.2	37.9	41.2	43.6	45.2	45.7
155	1.79	1.39	1.41	1.85	2.81	4.12	5.73	7.51	9.51	11.7	14.3	16.9	19.3	21.2	22.8	24.0	24.7	25.0	25.0
160	1.98	1.88	1.86	1.92	2.20	2.47	2.63	1.99	1.53	1.61	3.59	6.10	8.74	10.7	12.3	13.6	14.2	14.4	14.3
165	2.14	2.17	2.17	2.16	2.08	2.02	2.04	2.24	2.55	2.94	3.67	4.28	4.58	3.77	2.74	1.74	1.54	1.51	1.69
170	2.32	2.34	2.36	2.36	2.36	2.34	2.32	2.28	2.24	2.19	2.14	2.10	2.08	2.13	2.19	2.26	2.29	2.31	2.33
175	2.46	2.49	2.51	2.52	2.51	2.49	2.47	2.45	2.42	2.39	2.36	2.32	2.29	2.25	2.21	2.17	2.13	2.09	2.08
180	2.71	2.72	2.72	2.72	2.70	2.68	2.65	2.64	2.63	2.61	2.57	2.53	2.49	2.46	2.43	2.39	2.33	2.27	2.23

Table--2

UNIT: cd

C (DEG) y (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	2901	2901	2901	2904	2907	2910	2911	2912	2913	2915	2917	2919	2921	2924	2925	2926	2926	2925	2917
5	3365	3329	3273	3168	3068	2998	3068	3153	3210	3100	2959	2824	2798	2802	2827	2844	2869	2903	2692
10	3987	3953	3916	3912	3903	3877	3794	3692	3580	3490	3393	3283	3110	2941	2801	2747	2748	2801	2590
15	4445	4434	4411	4367	4317	4266	4264	4242	4173	3954	3694	3427	3225	3051	2909	2806	2740	2708	2553
20	5184	5112	5016	4918	4813	4706	4611	4516	4419	4348	4248	4095	3771	3416	3076	2856	2697	2599	2444
25	5851	5850	5821	5739	5618	5458	5239	4996	4744	4539	4326	4088	3757	3412	3078	2813	2585	2392	2476
30	6060	6009	5939	5861	5772	5675	5611	5514	5356	5032	4649	4236	3855	3480	3117	2778	2457	2153	2309
35	6665	6648	6591	6447	6259	6036	5796	5535	5257	4981	4686	4368	4003	3616	3214	2812	2400	1980	2103
40	6402	6414	6429	6473	6476	6401	6104	5740	5353	5093	4825	4519	4063	3567	3060	2611	2179	1767	1764
45	5398	5474	5575	5701	5811	5880	5877	5787	5592	5170	4679	4173	3817	3475	3122	2697	2235	1735	1574
50	4766	4803	4847	4859	4877	4909	5045	5156	5188	4996	4698	4315	3867	3381	2881	2424	1978	1542	1249
55	4065	4090	4128	4172	4218	4265	4316	4352	4364	4384	4327	4155	3677	3111	2524	2079	1683	1336	1026
60	3404	3436	3476	3500	3525	3556	3620	3675	3705	3704	3634	3471	3089	2635	2159	1773	1413	1078	802
65	2430	2456	2497	2547	2605	2669	2748	2819	2872	2912	2899	2810	2542	2207	1841	1521	1204	888	655
70	1788	1781	1773	1753	1739	1736	1769	1817	1872	1972	2039	2040	1841	1578	1294	1078	880	698	530
75	1119	1115	1114	1118	1123	1126	1112	1101	1102	1165	1219	1239	1130	983	823	704	595	495	372
80	565	568	570	565	561	558	559	566	582	636	682	705	638	547	450	387	334	293	215
85	551	534	512	488	463	438	414	392	374	372	370	359	316	264	211	171	135	104	83.3
90	519	512	499	474	440	398	338	277	223	197	179	166	145	123	99.8	76.2	51.7	26.4	27.1
95	315	312	309	310	309	301	278	248	214	180	146	115	94.7	78.5	64.7	49.6	35.3	21.8	20.3
100	222	218	212	203	194	184	183	179	168	130	88.9	51.4	39.8	35.9	36.2	32.5	29.4	27.1	22.3
105	85.3	80.2	75.4	71.7	68.6	66.3	64.9	64.3	64.5	68.2	70.8	70.3	58.3	44.0	30.2	23.6	20.3	20.4	16.9
110	75.1	78.1	82.1	86.4	89.3	89.2	77.2	65.1	57.4	73.5	90.9	103	82.8	56.5	30.3	19.1	14.4	16.1	12.3
115	42.9	40.4	37.6	32.2	29.5	32.3	54.1	78.2	99.0	101	95.6	83.5	62.2	39.8	20.4	13.7	14.1	21.7	15.9
120	63.6	67.7	74.0	81.8	89.8	97.1	103	106	105	98.4	87.7	73.5	51.8	30.3	12.6	6.69	7.99	16.5	12.7
125	98.5	99.0	100	103	105	107	107	105	99.7	89.4	76.3	61.0	41.7	23.5	8.92	3.82	4.85	12.0	9.84
130	102	103	103	105	107	107	102	94.2	84.8	73.9	61.6	48.3	31.7	16.3	4.19	0.28	1.77	8.65	7.54
135	110	109	107	105	102	97.1	89.6	80.4	70.1	58.8	47.0	35.3	23.7	13.4	5.25	1.22	0.19	2.15	2



UNIT: °C																			
C (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	2911	2906	2905	2905	2905	2901	2897	2895	2898	2902	2905	2902	2898	2894	2895	2898	2901	2898	2895
5	2532	2424	2389	2390	2408	2402	2400	2404	2430	2457	2479	2468	2451	2433	2435	2441	2446	2441	2435
10	2441	2353	2358	2400	2455	2468	2467	2454	2410	2364	2326	2342	2365	2384	2354	2319	2292	2319	2354
15	2441	2373	2384	2413	2431	2370	2279	2164	2026	1882	1742	1627	1532	1461	1430	1420	1424	1420	1430
20	2488	2431	2402	2350	2254	2020	1752	1482	1285	1121	992	914	864	834	807	792	787	792	807
25	2481	2405	2219	1976	1699	1408	1134	901	796	742	720	692	675	663	647	633	625	633	647
30	2336	2235	1916	1535	1158	956	813	717	657	622	598	556	517	484	460	445	438	445	460
35	2098	1965	1599	1184	798	673	619	599	524	451	385	336	297	268	249	239	236	239	249
40	1689	1542	1261	955	670	544	466	415	340	275	221	188	166	153	147	145	147	145	147
45	1399	1208	977	750	547	422	331	268	214	177	154	146	147	152	149	147	146	147	149
50	1000	794	648	534	441	339	251	183	156	144	139	118	98.7	81.7	73.6	69.6	69.0	69.6	73.6
55	772	573	450	367	310	244	189	145	113	90.2	74.5	63.9	57.7	54.5	51.6	50.3	50.3	50.3	51.6
60	579	408	309	249	211	163	124	92.0	69.5	53.7	43.3	37.4	34.6	33.4	30.1	27.6	26.3	27.6	30.1
65	464	317	227	169	132	95.3	67.5	46.7	28.8	15.6	6.62	2.32	0.81	1.04	0.96	1.29	1.73	1.29	0.96
70	389	273	190	128	83.4	49.6	26.8	12.8	4.72	1.39	1.11	0.38	0.55	1.22	1.58	1.93	2.15	1.93	1.58
75	268	183	120	73.0	40.7	22.1	12.5	8.79	4.36	2.02	1.15	0.66	0.78	1.26	1.71	2.14	2.42	2.14	1.71
80	150	98.8	63.4	38.9	23.2	13.3	8.25	6.25	3.63	2.10	1.39	1.08	1.19	1.56	2.04	2.50	2.80	2.50	2.04
85	65.0	48.9	34.6	22.7	13.4	8.71	6.18	5.03	3.46	2.41	1.80	1.58	1.66	1.96	2.50	3.01	3.34	3.01	2.50
90	26.4	24.4	20.0	15.0	10.2	7.67	5.86	4.63	3.57	2.85	2.42	2.20	2.19	2.36	2.87	3.36	3.69	3.36	2.87
95	18.5	16.6	14.1	11.5	9.05	7.09	5.45	4.16	3.37	2.89	2.65	2.48	2.47	2.61	3.11	3.60	3.91	3.60	3.11
100	18.1	14.6	11.7	9.44	7.66	6.41	5.52	4.88	4.27	3.79	3.45	3.20	3.10	3.15	3.60	4.06	4.37	4.06	3.60
105	13.6	10.6	7.54	4.97	3.09	2.84	3.19	3.86	4.18	4.46	4.68	4.63	4.55	4.51	4.86	5.20	5.42	5.20	4.86
110	9.28	7.14	6.30	5.98	5.84	4.91	3.99	3.22	3.04	3.11	3.36	3.70	4.10	4.50	4.85	5.11	5.25	5.11	4.85
115	11.3	7.93	6.17	5.24	4.83	4.13	3.61	3.27	3.21	3.27	3.38	3.39	3.39	3.40	3.46	3.51	3.54	3.51	3.46
120	9.53	7.09	5.54	4.54	3.93	3.41	3.11	2.99	3.05	3.19	3.35	3.39	3.42	3.43	3.49	3.54	3.56	3.54	3.49
125	7.97	6.40	5.13	4.16	3.46	3.07	2.89	2.89	3.03	3.23	3.45	3.53	3.58	3.62	3.69	3.75	3.78	3.75	3.69
130	6.51	5.56	4.61	3.80	3.17	2.95	2.91	3.00	3.12	3.28	3.47	3.62	3.77	3.89	4.01	4.09	4.13	4.09	4.01
135	3.08	3.31	3.31	3.21	3.08	3.05	3.06	3.12	3.28	3.47	3.66	3.77	3.86	3.94	4.03	4.11	4.15	4.11	4.03
140	3.72	4.09	3.89	3.49	3.07	3.04	3.10	3.23	3.34	3.47	3.62	3.78	3.93	4.07	4.20	4.30	4.37	4.30	4.20
145	3.24	3.60	3.57	3.39	3.17	3.20	3.28	3.40	3.51	3.63	3.77	3.92	4.06	4.19	4.29	4.35	4.38	4.35	4.29
150	2.93	3.29	3.37	3.34	3.27	3.35	3.45	3.56	3.63	3.70	3.78	3.92	4.06	4.17	4.17	4.13	4.09	4.13	4.17
155	3.13	3.53	3.67	3.68	3.62	3.59	3.56	3.55	3.59	3.66	3.74	3.86	3.98	4.05	3.98	3.88	3.78	3.88	3.98
160	3.46	3.88	4.01	3.98	3.87	3.80	3.73	3.67	3.69	3.73	3.77	3.74	3.71	3.67	3.63	3.59	3.56	3.59	3.63
165	3.57	3.96	4.04	3.97	3.83	3.77	3.70	3.63	3.59	3.53	3.47	3.34	3.21	3.10	3.10	3.13	3.16	3.13	3.10
170	3.43	3.71	3.74	3.64	3.47	3.30	3.13	2.97	2.91	2.86	2.83	2.76	2.70	2.64	2.61	2.59	2.59	2.59	2.61
175	3.24	3.44	3.47	3.40	3.25	3.05	2.84	2.65	2.62	2.61	2.61	2.52	2.43	2.36	2.37	2.40	2.44	2.40	2.37
180	2.72	2.73	2.73	2.73	2.71	2.67	2.62	2.56	2.49	2.42	2.36	2.32	2.30	2.29	2.31	2.33	2.36	2.33	2.31

C (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	2894	2898	2902	2905	2902	2898	2895	2897	2901	2905	2905	2905	2906	2911	2917				
5	2433	2451	2468	2479	2457	2430	2404	2400	2402	2408	2390	2389	2424	2532	2692				
10	2384	2365	2342	2326	2364	2410	2454	2467	2468	2455	2400	2358	2353	2441	2590				
15	1461	1532	1627	1742	1882	2026	2164	2279	2370	2431	2413	2384	2373	2441	2553				
20	834	864	914	992	1121	1285	1482	1752	2020	2254	2350	2402	2431	2488	2544				
25	663	675	692	720	742	796	901	1134	1408	1699	1976	2219	2405	2481	2476				
30	484	517	556	598	622	657	717	813	956	1158	1535	1916	2235	2336	2309				
35	268	297	336	385	451	524	599	619	673	798	1184	1599	1965	2098	2103				
40	153	166	188	221	275	340	415	466	544	670	955	1261	1542	1689	1764				
45	152	147	146	154	177	214	268	331	422	547	750	977	1208	1399	1574				
50	81.7	98.7	118	139	144	156	183	251	339	441	534	648	794	1000	1249				
55	54.5	57.7	63.9	74.5	90.2	113	145	189	244	310	367	450	573	772	1026				
60	33.4	34.6	37.4	43.3	53.7	69.5	92.0	124	163	211	249	309	408	579	802				
65	1.04	0.81	2.32	6.62	15.6	28.8	46.7	67.5	95.3	132	169	227	317	464	655				
70	1.22	0.55	0.38	1.11	1.39	4.72	12.8	26.8	49.6	83.4	128	190	273	389	530				
75	1.26	0.78	0.66	1.15	2.02	4.36	8.79	12.5	22.1	40.7	73.0	120	183	268	372				
80	1.56	1.19	1.08	1.39	2.10	3.63	6.25	8.25	13.3	23.2	38.9	63.4	98.8	150	215				
85	1.96	1.66	1.58	1.80	2.41	3.46	5.03	6.18	8.71	13.4	22.7	34.6	48.9	65.0	83.3				
90	2.36	2.19	2.20	2.42	2.85	3.57	4.63	5.86	7.67	10.2	15.0	20.0	24.4	26.4	27.1				
95	2.61	2.47	2.48	2.65	2.89	3.37	4.16	5.45	7.09	9.05	11.5	14.1	16.6	18.5	20.3				
100	3.15	3.10	3.20	3.45	3.79	4.27	4.88	5.52	6.41	7.66	9.44	11.7	14.6	18.1	22.3				
105	4.51	4.55	4.63	4.68	4.46	4.18	3.86	3.19	2.84	3.09	4.97	7.54	10.6	13.6	16.9				
110	4.50	4.10	3.70	3.36	3.11	3.04	3.22	3.99	4.91	5.84	5.98	6.30	7.14	9.28	12.3				
115	3.40	3.39	3.39	3.38	3.27	3.21	3.27	3.61	4.13	4.83	5.24	6.17	7.93	11.3	15.9				
120	3.43	3.42	3.39	3.35	3.19	3.05	2.99	3.11	3.41	3.93	4.54	5.54	7.09	9.53	12.7				
125	3.62	3.58	3.53	3.45	3.23	3.03	2.89	2.89	3.07	3.46	4.16	5.13	6.40	7.97	9.84				
130	3.89	3.77	3.62	3.47	3.28	3.12	3.00	2.91	2.95	3.17	3.80	4.61	5.56	6.51	7.54				
135	3.94	3.86	3.77	3.66	3.47	3.28	3.12	3.06	3.05	3.08	3.21	3.31	3.31	3.08	2.69				
140	4.07	3.93	3.78	3.62	3.47	3.34	3.23	3.10	3.04	3.07	3.49	3.89	4.09	3.72	2.99				
145	4.19	4.06	3.92	3.77	3.63	3.51	3.40	3.28	3.20	3.17	3.39	3.57	3.60	3.24	2.63				
150	4.17	4.06	3.92	3.78	3.70	3.63	3.56	3.45	3.35	3.27	3.34	3.37	3.29	2.93	2.40				
155	4.05	3.98	3.86	3.74	3.66	3.59	3.55	3.56	3.59	3.62	3.68	3.67	3.53	3.13	2.55				
160	3.67	3.71	3.74	3.77	3.73	3.69	3.67	3.73	3.80	3.87	3.98	4.01	3.88	3.46	2.83				
165	3.10	3.21	3.34	3.47	3.53	3.59	3.63	3.70	3.77	3.83	3.97	4.04	3.96	3.57	2.96				
170	2.64	2.70	2.76	2.83	2.86	2.91	2.97	3.13	3.30	3.47	3.64	3.74	3.71	3.43	2.96				
175	2.36	2.43	2.52	2.61	2.61	2.62	2.65	2.84	3.05	3.25	3.40	3.47	3.44	3.24	2.91				
180	2.29	2.30	2.32	2.36	2.42	2.43	2.56	2.62	2.67	2.71	2.73	2.73	2.73	2.72	2.72				

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

<b>Model No.</b>	WPX3 @ 65W / 4000K 480	<b>Sample ID</b>	231020002-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	0.177	68.0	0.799	17.86



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