

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

Prepared By

Dongguan New Testing Centre Co., Ltd.

Prepare by:

Alan Wang

Engineer: Alan Wang
Date: 2023-10-26

Review by:

Vincent Yuan

Technical Lead: Vincent Yuan
Issue Date: 2023-10-26
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		10026
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)		IES LM-79-2008	N/A		153.8
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)		IES LM-79-2008	300		9757
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)		IES LM-79-2008	Standard	Premium	149.6
			105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)		IES LM-79-2008	Worst Case		65.2
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)		ANSI C82.77:2014	20.00%	120V	5.04
				277V	11.97
Power Factor (THD & PF – Section 4.3)		ANSI C82.77:2014	0.9	120V	0.993
				277V	0.872
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)		IES LM-79-2008	7 steps	5029±283	5179
			4 steps	5029±220	
Minimum CRI (Integrating Sphere – Section 4.1)		IES LM-79-2008 CIE13.3-1995	≥70		85.0
Minimum R9 (Integrating Sphere – Section 4.1)		IES LM-79-2008 CIE13.3-1995	N/A		15
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		95
IES Rcs,h1 (Integrating Sphere – Section 4.1)		ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-12%
Zonal Lumen Requirement (80°-90°) (Goniophotometer – Section 4.2)		IES LM-79-2008	≤10%		2.2%
Input Voltage (V)					
(Goniophotometer – Section 4.2)		IES LM-79-2008	Worst Cast		120.0
(Goniophotometer – Section 4.2)			Non-Worst Case		277.0
Input Current (A)					
(Goniophotometer – Section 4.2)		IES LM-79-2008	Worst Case		0.547
(Goniophotometer – Section 4.2)			Non-Worst Case		0.267
Power (Input Wattage – W)					
(Goniophotometer – Section 4.2)		IES LM-79-2008	Worst Case		65.2
(Goniophotometer – Section 4.2)			Non-Worst Case		64.5

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-10-20	WPX3 @ 65W / 5000K	231020001-S1
2	Goniophotometer Test	2023-10-20	WPX3 @ 65W / 5000K	231020001-S1
3	THD and PF Test	2023-10-20	WPX3 @ 65W / 5000K	231020001-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 / 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

Model No.	WPX3 @ 65W / 5000K	Sample ID	231020001-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

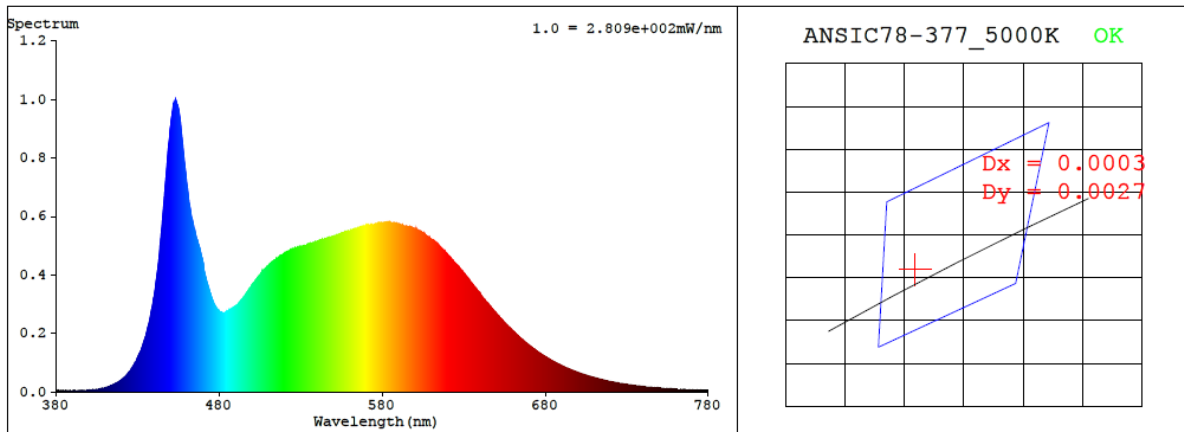
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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
120.0	60	0.547	65.2	0.993
277.0	60	0.267	64.5	0.872

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
5179	85.0	15	0.0013	85	95	-12%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3406$ $y = 0.3504$ / $u' = 0.2088$ $v' = 0.4834$ ($duv=1.27e-03$)

CCT= 5179K Prcp WL: $L_d=568.3nm$ Purity=7.3%

Peak WL: $L_p=453nm$ FWHM: $=23.7nm$ Ratio:R=15.7% G=79.2% B=5.1%

Render Index: $R_a = 85.0$ AvgR = 78.8 TM30:Rf=84 Rg=95

EEL: 0.08731 A++ Highest

R1 =84	R2 =91	R3 =95	R4 =84	R5 =84	R6 =87	R7 =87
R8 =69	R9 =15	R10=78	R11=83	R12=64	R13=86	R14=97 R15=79

4.1 Integrating Sphere Test

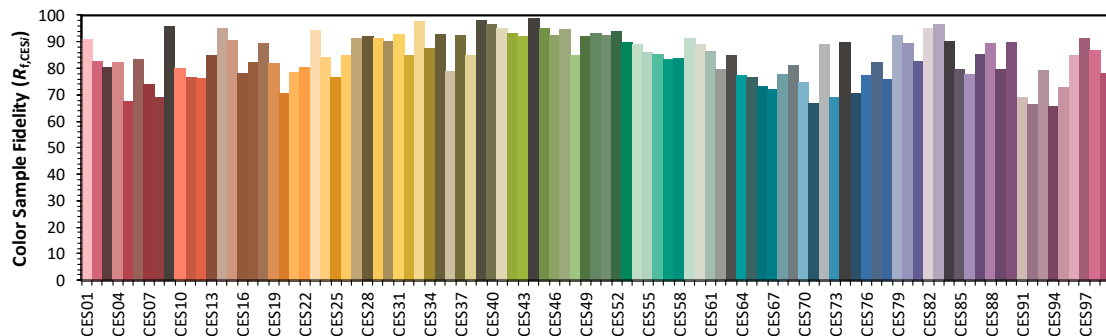
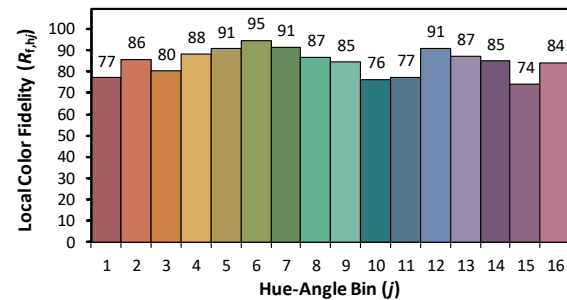
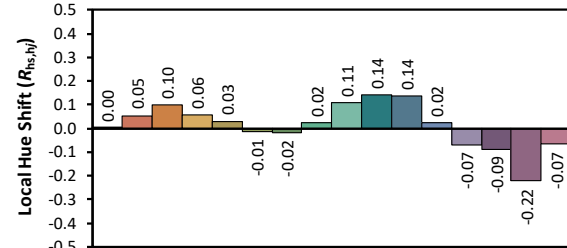
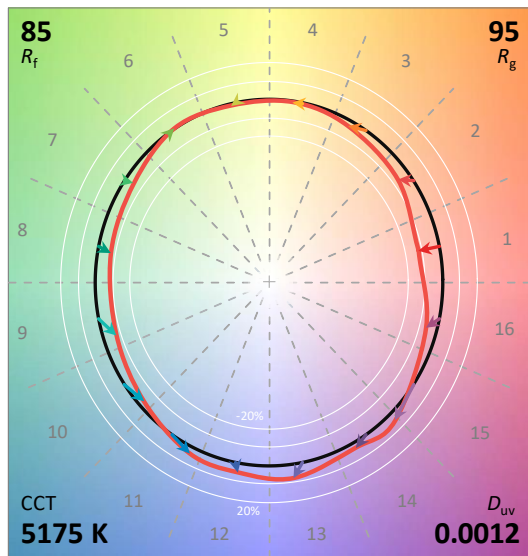
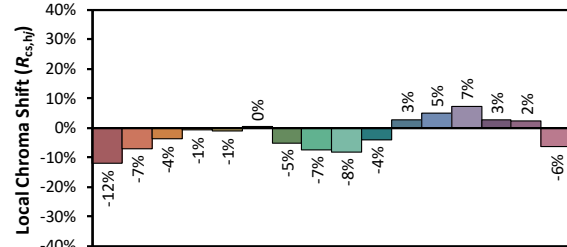
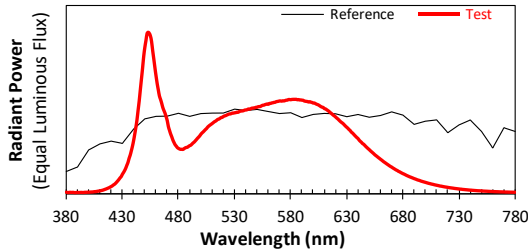
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/10/26

Model: WPX3 @ 65W / 5000K



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

x 0.3405
 y 0.3503
 u' 0.2088
 v' 0.4833

CIE 13.3-1995
(CRI)

R_a 85
 R_g 15

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

4.1 Integrating Sphere Test

Spectral Distribution over Visible Wavelength											
WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)
380	5.90E-06	447	7.05E-04	514	4.50E-04	581	5.79E-04	648	2.81E-04	715	4.17E-05
381	4.30E-06	448	7.72E-04	515	4.56E-04	582	5.79E-04	649	2.75E-04	716	4.04E-05
382	3.90E-06	449	8.45E-04	516	4.57E-04	583	5.79E-04	650	2.69E-04	717	3.90E-05
383	5.00E-06	450	8.99E-04	517	4.62E-04	584	5.79E-04	651	2.62E-04	718	3.78E-05
384	4.80E-06	451	9.42E-04	518	4.67E-04	585	5.79E-04	652	2.56E-04	719	3.67E-05
385	4.30E-06	452	9.85E-04	519	4.68E-04	586	5.77E-04	653	2.50E-04	720	3.55E-05
386	5.00E-06	453	9.94E-04	520	4.73E-04	587	5.78E-04	654	2.43E-04	721	3.43E-05
387	3.70E-06	454	9.87E-04	521	4.77E-04	588	5.75E-04	655	2.37E-04	722	3.33E-05
388	2.90E-06	455	9.70E-04	522	4.79E-04	589	5.76E-04	656	2.31E-04	723	3.23E-05
389	4.10E-06	456	9.37E-04	523	4.82E-04	590	5.74E-04	657	2.26E-04	724	3.14E-05
390	4.10E-06	457	8.80E-04	524	4.85E-04	591	5.74E-04	658	2.20E-04	725	3.04E-05
391	4.00E-06	458	8.29E-04	525	4.89E-04	592	5.70E-04	659	2.15E-04	726	2.92E-05
392	4.00E-06	459	7.74E-04	526	4.89E-04	593	5.68E-04	660	2.09E-04	727	2.84E-05
393	4.50E-06	460	7.24E-04	527	4.91E-04	594	5.67E-04	661	2.04E-04	728	2.75E-05
394	4.40E-06	461	6.77E-04	528	4.94E-04	595	5.66E-04	662	1.99E-04	729	2.66E-05
395	3.70E-06	462	6.38E-04	529	4.94E-04	596	5.63E-04	663	1.93E-04	730	2.58E-05
396	4.80E-06	463	6.00E-04	530	4.96E-04	597	5.65E-04	664	1.89E-04	731	2.48E-05
397	5.30E-06	464	5.79E-04	531	4.97E-04	598	5.62E-04	665	1.84E-04	732	2.44E-05
398	5.30E-06	465	5.56E-04	532	5.00E-04	599	5.60E-04	666	1.79E-04	733	2.32E-05
399	5.90E-06	466	5.30E-04	533	4.99E-04	600	5.56E-04	667	1.74E-04	734	2.26E-05
400	5.70E-06	467	5.11E-04	534	5.03E-04	601	5.57E-04	668	1.69E-04	735	2.19E-05
401	6.30E-06	468	4.94E-04	535	5.06E-04	602	5.53E-04	669	1.64E-04	736	2.12E-05
402	6.90E-06	469	4.71E-04	536	5.07E-04	603	5.49E-04	670	1.61E-04	737	2.06E-05
403	7.20E-06	470	4.47E-04	537	5.08E-04	604	5.47E-04	671	1.56E-04	738	1.99E-05
404	7.70E-06	471	4.11E-04	538	5.09E-04	605	5.43E-04	672	1.52E-04	739	1.92E-05
405	9.10E-06	472	3.88E-04	539	5.13E-04	606	5.39E-04	673	1.47E-04	740	1.86E-05
406	9.40E-06	473	3.66E-04	540	5.14E-04	607	5.34E-04	674	1.43E-04	741	1.82E-05
407	1.05E-05	474	3.48E-04	541	5.15E-04	608	5.31E-04	675	1.40E-04	742	1.74E-05
408	1.19E-05	475	3.28E-04	542	5.19E-04	609	5.29E-04	676	1.35E-04	743	1.69E-05
409	1.29E-05	476	3.13E-04	543	5.20E-04	610	5.22E-04	677	1.32E-04	744	1.63E-05
410	1.43E-05	477	2.99E-04	544	5.20E-04	611	5.20E-04	678	1.28E-04	745	1.58E-05
411	1.57E-05	478	2.91E-04	545	5.24E-04	612	5.15E-04	679	1.24E-04	746	1.52E-05
412	1.74E-05	479	2.81E-04	546	5.25E-04	613	5.10E-04	680	1.20E-04	747	1.48E-05
413	1.94E-05	480	2.76E-04	547	5.26E-04	614	5.05E-04	681	1.18E-04	748	1.44E-05
414	2.21E-05	481	2.73E-04	548	5.27E-04	615	4.99E-04	682	1.14E-04	749	1.42E-05
415	2.46E-05	482	2.71E-04	549	5.30E-04	616	4.94E-04	683	1.10E-04	750	1.37E-05
416	2.72E-05	483	2.71E-04	550	5.31E-04	617	4.87E-04	684	1.07E-04	751	1.30E-05
417	3.04E-05	484	2.70E-04	551	5.34E-04	618	4.81E-04	685	1.04E-04	752	1.27E-05
418	3.32E-05	485	2.75E-04	552	5.34E-04	619	4.76E-04	686	1.01E-04	753	1.23E-05
419	3.70E-05	486	2.79E-04	553	5.35E-04	620	4.70E-04	687	9.84E-05	754	1.20E-05
420	4.07E-05	487	2.82E-04	554	5.39E-04	621	4.64E-04	688	9.55E-05	755	1.17E-05
421	4.49E-05	488	2.84E-04	555	5.43E-04	622	4.58E-04	689	9.28E-05	756	1.12E-05
422	5.05E-05	489	2.89E-04	556	5.43E-04	623	4.51E-04	690	8.97E-05	757	1.09E-05
423	5.49E-05	490	2.93E-04	557	5.46E-04	624	4.44E-04	691	8.74E-05	758	1.04E-05
424	6.13E-05	491	2.97E-04	558	5.49E-04	625	4.38E-04	692	8.47E-05	759	1.02E-05
425	6.88E-05	492	3.03E-04	559	5.50E-04	626	4.33E-04	693	8.17E-05	760	9.70E-06
426	7.68E-05	493	3.10E-04	560	5.48E-04	627	4.27E-04	694	7.98E-05	761	9.40E-06
427	8.54E-05	494	3.15E-04	561	5.54E-04	628	4.20E-04	695	7.76E-05	762	9.20E-06
428	9.48E-05	495	3.23E-04	562	5.54E-04	629	4.13E-04	696	7.48E-05	763	9.00E-06
429	1.03E-04	496	3.31E-04	563	5.57E-04	630	4.06E-04	697	7.27E-05	764	8.80E-06
430	1.16E-04	497	3.39E-04	564	5.58E-04	631	4.00E-04	698	7.06E-05	765	8.50E-06
431	1.27E-04	498	3.46E-04	565	5.60E-04	632	3.93E-04	699	6.86E-05	766	8.10E-06
432	1.40E-04	499	3.54E-04	566	5.61E-04	633	3.87E-04	700	6.66E-05	767	7.90E-06
433	1.54E-04	500	3.64E-04	567	5.64E-04	634	3.77E-04	701	6.45E-05	768	7.70E-06
434	1.72E-04	501	3.72E-04	568	5.66E-04	635	3.72E-04	702	6.25E-05	769	7.40E-06
435	1.90E-04	502	3.78E-04	569	5.67E-04	636	3.64E-04	703	6.04E-05	770	7.20E-06
436	2.15E-04	503	3.85E-04	570	5.69E-04	637	3.57E-04	704	5.89E-05	771	6.90E-06
437	2.35E-04	504	3.93E-04	571	5.69E-04	638	3.50E-04	705	5.69E-05	772	6.70E-06
438	2.62E-04	505	3.99E-04	572	5.68E-04	639	3.43E-04	706	5.53E-05	773	6.70E-06
439	2.90E-04	506	4.08E-04	573	5.70E-04	640	3.37E-04	707	5.38E-05	774	6.40E-06
440	3.24E-04	507	4.14E-04	574	5.70E-04	641	3.27E-04	708	5.19E-05	775	6.20E-06
441	3.64E-04	508	4.20E-04	575	5.72E-04	642	3.20E-04	709	5.03E-05	776	6.00E-06
442	4.05E-04	509	4.25E-04	576	5.74E-04	643	3.14E-04	710	4.89E-05	777	5.90E-06
443	4.52E-04	510	4.30E-04	577	5.75E-04	644	3.06E-04	711	4.73E-05	778	5.70E-06
444	5.11E-04	511	4.35E-04	578	5.78E-04	645	3.02E-04	712	4.58E-05	779	5.70E-06
445	5.70E-04	512	4.41E-04	579	5.78E-04	646	2.95E-04	713	4.39E-05	780	5.70E-06
446	6.38E-04	513	4.45E-04	580	5.77E-04	647	2.88E-04	714	4.32E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	WPX3 @ 65W / 5000K	Sample ID	231020001-S1
Operate time (Min.)	30	Stabilization time (Min.)	60
Temperature (°C)	24.8	Humidity (%RH)	42.9

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 25±1°C, measured at a point not more than 1 m from the sample and at the same height as the sample.</p> <p>The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.</p> <p>The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1.0° vertical intervals and 15° horizontal intervals.</p>

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.0	60	0.547	65.2	0.993
NON-WORST CASE	277.0	60	0.267	64.5	0.872

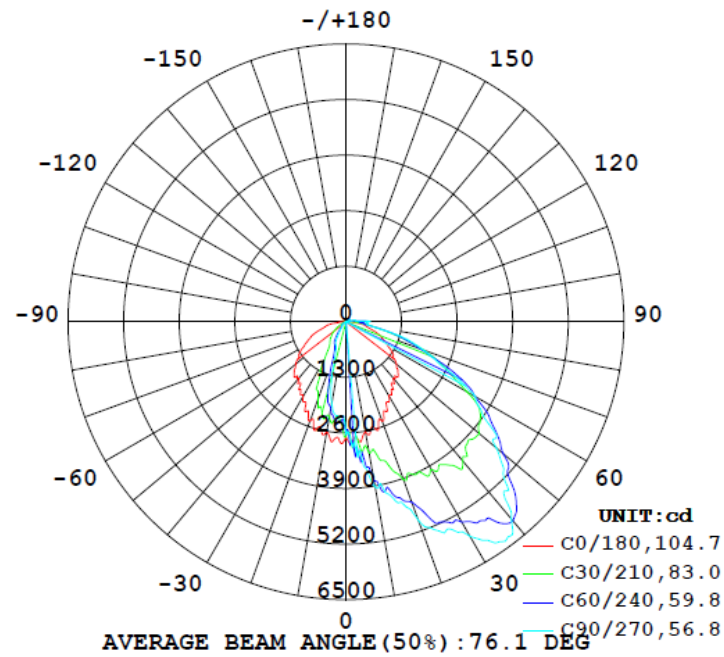
Test Result

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			
0°-180° zones	10026	105.7	147.5	55.9	100.5	153.8	2.2%	B2-U3-G2
0°-90° zones	9757	105.7	147.5	55.9	100.5	149.6	2.2%	B2-U3-G2

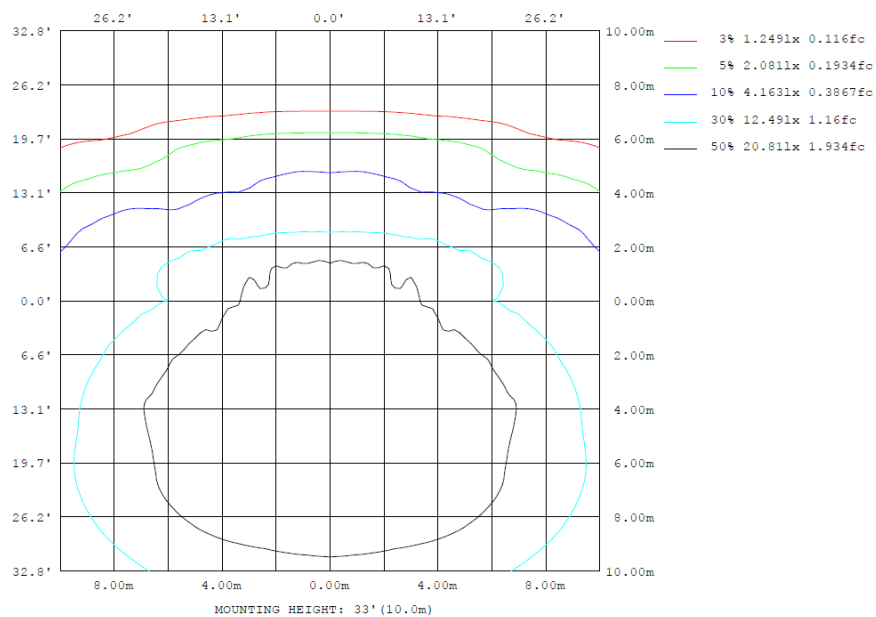
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

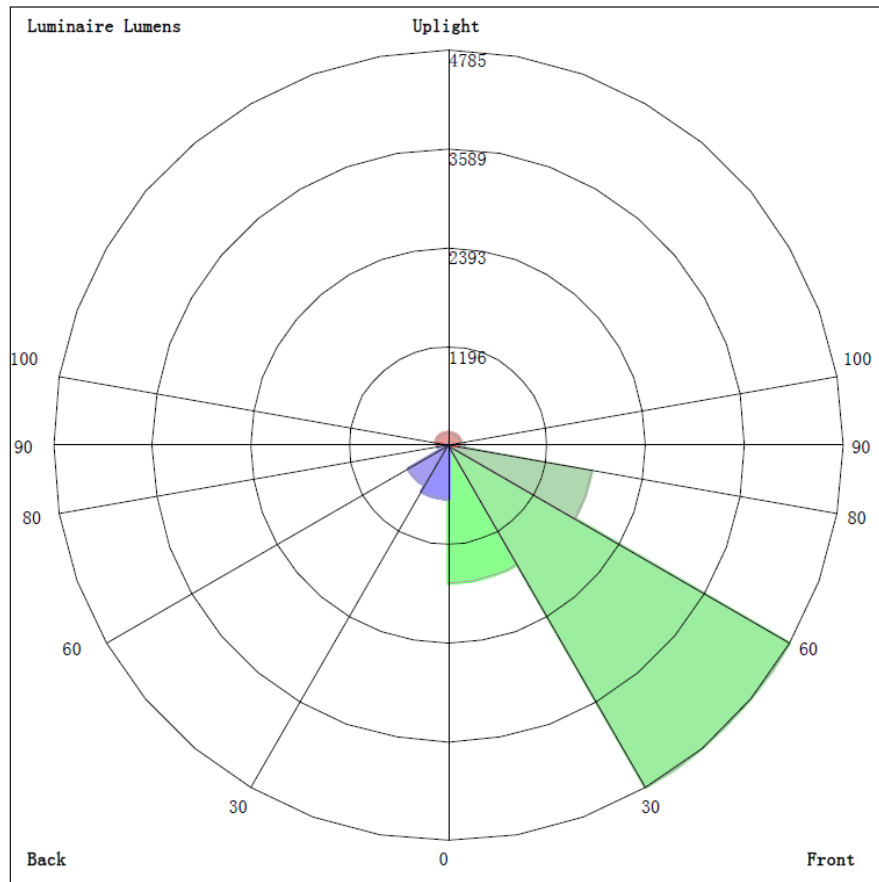
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	2620	3501	3913	3501	2620	2297	1939	2297	0- 10	256.4	256.4	2.56,2.56
20	2468	4227	4933	4227	2468	1323	695.3	1323	10- 20	781.9	1038	10.4,10.4
30	2012	5029	5795	5029	2012	620.4	423.1	620.4	20- 30	1271	2309	23,23
40	1721	5057	6008	5057	1721	389.2	139.3	389.2	30- 40	1722	4032	40.2,40.2
50	1533	4827	4591	4827	1533	172.8	67.56	172.8	40- 50	1907	5939	59.2,59.2
60	1129	3574	3484	3574	1129	88.83	26.03	88.83	50- 60	1716	7655	76.4,76.4
70	775.2	1927	1925	1927	775.2	12.37	1.268	12.37	60- 70	1253	8908	88.8,88.8
80	437.6	653.6	613.9	653.6	437.6	5.643	1.932	5.643	70- 80	632.6	9541	95.2,95.2
90	39.60	209.5	526.9	209.5	39.60	3.837	2.627	3.837	80- 90	216.4	9757	97.3,97.3
100	35.34	163.6	227.0	163.6	35.34	3.974	3.657	3.974	90-100	117.5	9875	98.5,98.5
110	16.70	58.22	76.79	58.22	16.70	3.159	4.241	3.159	100-110	46.48	9921	99,99
120	16.14	100.3	61.26	100.3	16.14	2.934	3.470	2.934	110-120	31.01	9952	99.3,99.3
130	8.497	81.32	102.3	81.32	8.497	2.955	3.947	2.955	120-130	33.02	9985	99.6,99.6
140	1.543	47.85	96.43	47.85	1.543	3.191	4.176	3.191	130-140	24.50	10010	99.8,99.8
150	1.609	20.08	44.17	20.08	1.609	3.464	3.993	3.464	140-150	11.82	10022	100,100
160	1.912	1.602	13.06	1.602	1.912	3.527	3.440	3.527	150-160	3.555	10025	100,100
170	2.238	2.151	2.172	2.151	2.238	2.846	2.478	2.846	160-170	0.8903	10026	100,100
180	2.610	2.500	2.170	2.500	2.610	2.428	2.263	2.428	170-180	0.2364	10026	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Zonal (lm)		Total (lm)		Percent
0-10	256.38	0-10	256.38	2.56%
10-20	781.89	0-20	1038.27	10.36%
20-30	1270.95	0-30	2309.22	23.03%
30-40	1722.45	0-40	4031.67	40.21%
40-50	1907.31	0-50	5938.98	59.23%
50-60	1716.32	0-60	7655.30	76.35%
60-70	1253.08	0-70	8908.38	88.85%
70-80	632.62	0-80	9541.00	95.16%
80-90	216.37	0-90	9757.37	97.32%
90-100	117.51	0-100	9874.88	98.49%
100-110	46.48	0-110	9921.36	98.95%
110-120	31.01	0-120	9952.37	99.26%
120-130	33.02	0-130	9985.39	99.59%
130-140	24.50	0-140	10009.89	99.84%
140-150	11.82	0-150	10021.71	99.96%
150-160	3.56	0-160	10025.27	99.99%
160-170	0.89	0-170	10026.16	100.00%
170-180	0.24	0-180	10026.40	100.00%

4.2 Goniophotometer Test

LCS/BUG

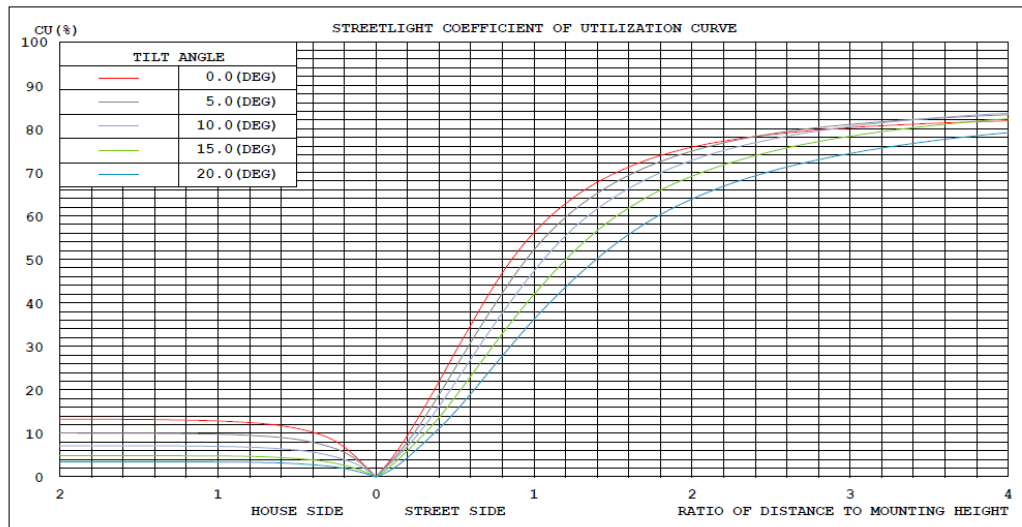


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

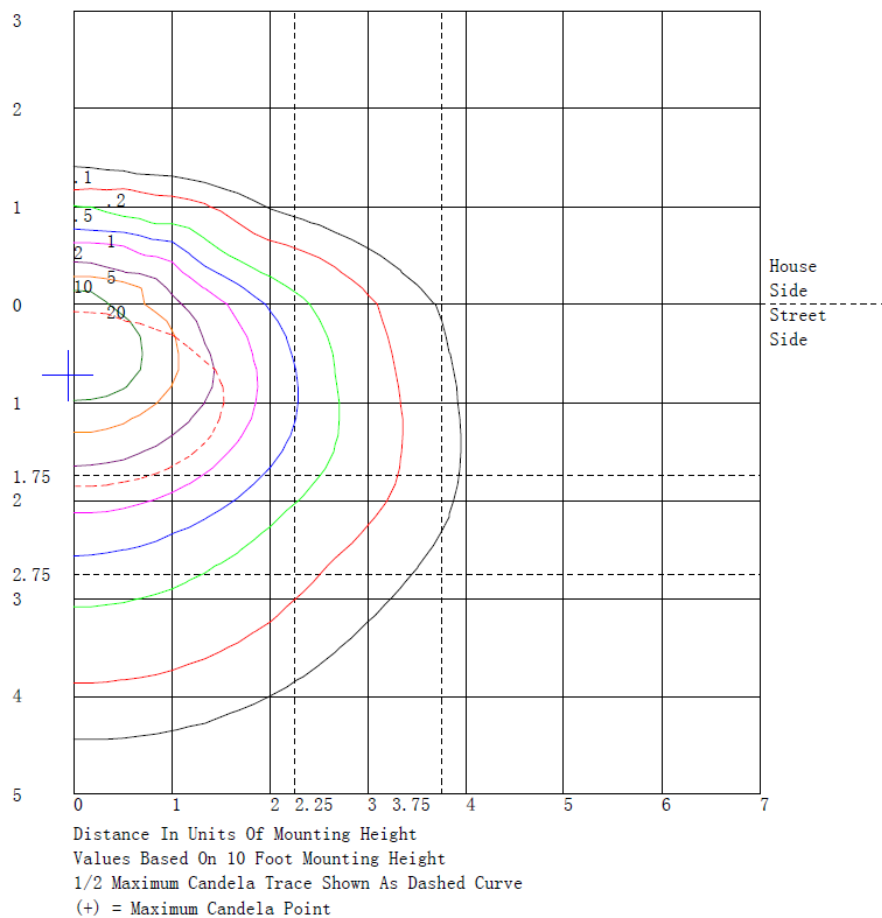
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1665.6	N.A.	16.6
FM - Front-Medium (30-60)	4785.2	N.A.	47.7
FH - Front-High (60-80)	1766.5	N.A.	17.6
FVH - Front-Very High (80-90)	201.5	N.A.	2.0
BL - Back-Low (0-30)	643.6	N.A.	6.4
BM - Back-Medium (30-60)	560.8	N.A.	5.6
BH - Back-High (60-80)	119.2	N.A.	1.2
BVH - Back-Very High (80-90)	14.8	N.A.	0.1
UL - Uplight-Low (90-100)	117.5	N.A.	1.2
UH - Uplight-High (100-180)	151.5	N.A.	1.5
Total	10026.2	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
C (DEG)
UNIT: cd

γ (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	2684	2682	2680	2677	2675	2672	2669	2666	2662	2658	2654	2651	2647	2645	2642	2641	2638	2637	2636
5	2719	2702	2688	2677	2649	2638	2660	2797	2945	3068	3035	2975	2923	2989	3074	3159	3182	3189	3188
10	2620	2574	2579	2636	2773	2940	3118	3257	3385	3501	3607	3700	3776	3826	3862	3885	3899	3907	3913
15	2561	2588	2656	2767	2933	3132	3352	3605	3843	4042	4112	4139	4146	4193	4238	4275	4285	4284	4276
20	2468	2524	2655	2860	3209	3581	3921	4072	4165	4227	4318	4405	4489	4573	4653	4730	4820	4892	4933
25	2299	2446	2643	2889	3231	3589	3928	4141	4323	4496	4737	4969	5173	5286	5359	5402	5431	5444	5448
30	2012	2307	2616	2938	3278	3627	3981	4363	4721	5029	5202	5321	5404	5494	5571	5637	5707	5762	5795
35	1939	2366	2766	3137	3470	3782	4080	4387	4682	4963	5216	5452	5671	5895	6089	6239	6287	6294	6275
40	1721	2198	2653	3085	3501	3889	4244	4527	4791	5057	5344	5788	6076	6149	6144	6095	6057	6023	6008
45	1724	2200	2639	3040	3378	3698	4021	4445	4854	5209	5401	5515	5562	5552	5505	5436	5360	5296	5260
50	1533	1935	2345	2763	3220	3663	4068	4393	4649	4827	4867	4848	4798	4785	4767	4741	4682	4627	4591
55	1356	1622	1947	2331	2862	3386	3839	4019	4099	4117	4153	4171	4175	4183	4178	4159	4090	4023	3978
60	1129	1393	1692	2028	2460	2884	3252	3435	3537	3574	3564	3527	3480	3471	3469	3471	3474	3478	3484
65	952	1221	1491	1762	2062	2342	2580	2711	2788	2821	2823	2798	2753	2693	2630	2573	2543	2527	2524
70	775	926	1093	1276	1513	1737	1919	1966	1962	1927	1896	1863	1838	1853	1879	1906	1916	1922	1925
75	549	619	703	803	948	1086	1195	1189	1157	1123	1156	1202	1252	1285	1311	1330	1339	1344	1348
80	438	442	459	488	543	600	650	663	664	654	637	619	602	601	604	608	610	612	614
85	184	195	211	231	261	293	323	344	362	377	392	405	419	437	456	474	494	510	520
90	39.6	62.2	83.7	104	124	142	160	171	186	210	260	319	378	429	473	507	521	527	527
95	27.6	39.4	52.0	65.1	76.9	91.0	109	137	168	201	232	260	281	287	286	281	278	275	272
100	35.3	34.3	34.7	36.4	35.3	38.8	50.2	86.3	126	164	176	183	186	196	207	216	221	225	227
105	25.7	21.6	21.9	26.7	40.1	54.8	67.5	68.7	66.6	63.2	62.5	62.4	63.0	64.2	66.8	71.4	81.1	91.7	101
110	16.7	13.8	17.7	28.4	54.5	81.0	101	90.1	73.4	58.2	67.3	80.6	93.4	92.8	89.0	83.8	80.2	77.6	76.8
115	21.9	14.2	13.4	19.8	38.6	60.3	80.9	92.0	96.9	94.4	75.1	52.6	32.3	29.3	31.5	36.6	40.5	44.2	46.8
120	16.1	8.02	6.72	12.3	29.0	49.3	69.8	83.2	93.4	100	103	103	99.3	91.2	81.8	72.6	65.9	61.8	61.3
125	11.7	4.95	3.96	8.68	22.3	39.2	57.2	71.1	83.3	93.4	100.0	104	107	107	107	105	104	102	101
130	8.50	2.10	0.74	4.44	15.7	30.1	45.8	58.6	70.5	81.3	91.0	98.9	105	106	106	105	104	103	102
135	1.82	0.68	2.18	6.31	14.0	23.6	34.5	45.9	57.5	68.6	78.5	87.2	94.5	99.4	103	105	108	109	110
140	1.54	4.32	7.54	11.2	15.0	19.5	24.8	31.9	39.7	47.9	56.0	63.7	70.7	75.6	79.7	83.5	89.0	93.6	96.4
145	1.57	2.94	4.72	6.92	9.33	12.3	15.9	20.8	26.3	32.3	38.9	45.5	51.5	55.6	58.8	61.4	64.2	66.3	67.4
150	1.61	2.97	3.77	3.99	2.33	1.09	1.25	6.70	13.4	20.1	23.5	26.2	28.6	32.3	35.8	39.1	41.6	43.4	44.2
155	1.73	1.43	1.48	1.88	2.71	3.82	5.15	6.42	7.91	9.70	12.3	15.0	17.6	19.5	21.1	22.2	23.0	23.4	23.4
160	1.91	1.87	1.86	1.91	2.07	2.22	2.30	1.87	1.56	1.60	2.74	4.33	6.23	8.45	10.6	12.4	13.0	13.2	13.1
165	2.06	2.12	2.14	2.15	2.08	2.02	2.00	2.11	2.31	2.60	3.24	3.80	4.11	3.42	2.53	1.67	1.50	1.51	1.63
170	2.24	2.28	2.30	2.32	2.32	2.31	2.29	2.25	2.20	2.15	2.10	2.05	2.02	2.04	2.06	2.10	2.12	2.14	2.17
175	2.36	2.39	2.42	2.43	2.43	2.41	2.40	2.39	2.37	2.35	2.32	2.27	2.23	2.19	2.15	2.11	2.09	2.07	2.07
180	2.61	2.62	2.62	2.61	2.60	2.58	2.55	2.54	2.52	2.50	2.46	2.42	2.38	2.34	2.31	2.28	2.23	2.20	2.17

Table--2
C (DEG)
UNIT: cd

γ (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	2637	2638	2641	2642	2645	2647	2651	2654	2658	2662	2666	2669	2672	2675	2677	2680	2682	2684	2667
5	3189	3182	3159	3074	2989	2923	2975	3035	3068	2945	2797	2660	2638	2649	2677	2688	2702	2719	2513
10	3907	3899	3885	3862	3826	3776	3700	3607	3501	3385	3257	3118	2940	2773	2636	2579	2574	2620	2424
15	4284	4285	4275	4238	4193	4146	4139	4112	4042	3843	3605	3352	3132	2933	2767	2656	2588	2561	2419
20	4892	4820	4730	4653	4573	4489	4405	4318	4227	4165	4072	3921	3581	3209	2860	2655	2524	2468	2361
25	5444	5431	5402	5359	5286	5173	4969	4737	4496	4323	4141	3928	3589	3231	2889	2643	2446	2299	2365
30	5762	5707	5637	5571	5494	5404	5321	5202	5029	4721	4363	3981	3627	3278	2938	2616	2307	2012	2110
35	6294	6287	6239	6089	5895	5671	5452	5216	4963	4682	4387	4080	3782	3470	3137	2766	2366	1939	2029
40	6023	6057	6095	6144	6149	6076	5788	5434	5057	4791	4527	4244	3889	3501	3085	2653	2198	1721	1660
45	5296	5360	5436	5505	5552	5562	5515	5401	5209	4854	4445	4021	3698	3378	3040	2639	2200	1724	1471
50	4627	4682	4741	4767	4785	4798	4848	4867	4827	4649	4393	4068	3663	3220	2763	2345	1935	1533	1183
55	4023	4090	4159	4178	4183	4175	4171	4153	4117	4099	4019	3839	3386	2862	2331	1947	1622	1356	1000
60	3478	3474	3471	3469	3471	3480	3527	3564	3574	3537	3435	3252	2884	2460	2028	1692	1393	1129	815
65	2527	2543	2573	2630	2693	2753	2798	2823	2821	2788	2711	2580	2342	2062	1762	1491	1221	952	686
70	1922	1916	1906	1879	1853	1838	1863	1896	1927	1962	1966	1919	1737	1513	1276	1093	926	775	567
75	1344	1339	1330	1311	1285	1252	1202	1156	1123	1157	1189	1195	1086	948	803	703	619	549	401
80	612	610	608	604	601	602	619	637	654	664	663	650	600	543	488	459	442	438	295
85	510	494	474	456	437	419	405	392	377	362	344	323	293	261	231	211	195	184	128
90	527	521	507	473	429	378	319	260	210	186	171	160	142	124	104	89.7	62.2	39.6	34.6
95	275	278	281	286	287	281	260	232	201	168	137	109	91.0	76.9	65.1	52.0	39.4	27.6	24.1
100	225	221	216	207	196	186	183	176	164	126	86.3	50.2	38.8	35.3	36.4	34.7	34.3	35.3	27.3
105	91.7	81.1	71.4	66.8	64.2	63.0	62.4	62.5	63.2	66.6	68.7	67.5	54.8	40.1	26.7	21.9	21.6	25.7	19.9
110	77.6	80.2	83.8	89.0	92.8	93.4	80.6	67.3	58.2	73.4	90.1	101	81.0	54.5	28.4	17.7	13.8	16.7	11.8
115	44.2	40.5	36.6	31.5	29.3	32.3	52.6	75.1	94.4	96.9	92.0	80.9	60.3	38.6	19.8	13.4	14.2	21.9	14.9
120	61.8	65.9	72.6	81.8	91.2	99.3	103	103	100	93.4	83.2	69.8	49.3	29.0	12.3	6.72	8.02	16.1	11.6
125	102	104	105	107	107	107	104	100.0	93.4	83.3	71.1	57.2	39.2	22.3	8.68	3.96	4.95	11.7	9.10
130	103	104	105	106	106	105	98.9	91.0	81.3	70.5	58.6	45.8	30.1	15.7	4.44	0.74	2.10	8.50	7.19
135	109	108	105	103	99.4	94.5	87.2	78.5	68.6	57.5	45.9	34.5	23.6	14.0	6.31	2.18	0.68	1.82	2.53

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	2653	2643	2638	2636	2636	2638	2639	2641	2640	2638	2637	2639	2642	2644	2642	2639	2636	2639	2642
5	2358	2254	2222	2224	2246	2248	2256	2272	2316	2359	2392	2381	2353	2316	2270	2229	2200	2229	2270
10	2282	2196	2190	2219	2263	2291	2305	2297	2219	2130	2049	2038	2042	2047	2006	1966	1939	1966	2006
15	2308	2230	2207	2198	2185	2120	2036	1938	1830	1718	1606	1497	1401	1324	1290	1277	1280	1277	1290
20	2260	2167	2102	2028	1929	1742	1533	1323	1151	1003	881	807	758	729	708	697	695	697	708
25	2354	2265	2066	1814	1535	1254	993	777	684	641	629	611	602	598	588	580	575	580	588
30	2101	1986	1684	1335	995	817	696	620	580	562	554	523	492	464	444	430	423	430	444
35	1998	1848	1474	1058	678	573	542	547	486	425	367	324	289	263	244	234	230	234	244
40	1549	1386	1119	840	589	484	425	389	323	263	212	182	162	150	142	139	139	139	142
45	1236	1022	821	645	495	391	312	253	203	167	144	138	140	146	145	144	143	144	145
50	898	678	552	470	412	321	239	173	148	138	134	116	98.3	82.6	73.9	69.0	67.6	69.0	73.9
55	715	502	389	325	290	232	181	139	109	86.6	71.3	61.2	55.2	52.3	50.0	49.2	49.4	49.2	50.0
60	565	378	280	226	199	155	118	88.8	67.6	52.4	42.3	36.6	33.7	32.5	29.5	27.2	26.0	27.2	29.5
65	471	308	214	158	127	91.7	65.4	46.2	30.2	18.5	10.5	5.23	2.29	1.01	0.41	0.51	0.95	0.51	0.41
70	395	261	175	118	80.9	48.4	26.2	12.4	4.42	1.13	0.85	0.27	0.56	1.26	1.30	1.30	1.27	1.30	1.30
75	278	181	114	68.6	39.5	21.0	11.5	7.87	3.71	1.66	1.06	0.76	0.99	1.47	1.56	1.61	1.61	1.61	1.56
80	182	98.4	53.8	30.9	22.1	12.4	7.44	5.64	3.20	1.83	1.26	1.11	1.31	1.68	1.81	1.90	1.93	1.90	1.81
85	82.7	48.7	29.2	18.1	12.6	7.87	5.39	4.35	2.93	2.03	1.57	1.51	1.67	1.95	2.11	2.24	2.31	2.24	2.11
90	29.6	24.5	19.0	13.9	9.46	6.81	5.01	3.84	2.89	2.31	2.01	1.96	2.06	2.25	2.40	2.54	2.63	2.54	2.40
95	20.7	17.4	13.9	10.8	8.04	6.17	4.78	3.80	3.15	2.76	2.58	2.50	2.53	2.64	2.82	2.99	3.13	2.99	2.82
100	20.6	15.2	11.5	8.89	7.10	5.64	4.64	3.97	3.47	3.16	3.02	2.96	2.99	3.10	3.30	3.50	3.66	3.50	3.30
105	14.9	10.7	7.30	4.70	2.97	2.63	2.91	3.48	3.65	3.79	3.89	3.86	3.81	3.80	3.98	4.18	4.34	4.18	3.98
110	8.14	5.68	5.09	5.22	5.59	4.80	3.93	3.16	3.02	3.08	3.26	3.39	3.55	3.73	3.95	4.13	4.24	4.13	3.95
115	9.60	5.91	4.60	4.37	4.67	4.10	3.57	3.16	3.11	3.18	3.31	3.35	3.39	3.42	3.45	3.47	3.48	3.47	3.45
120	8.10	5.56	4.40	3.92	3.84	3.43	3.12	2.93	2.98	3.11	3.28	3.34	3.39	3.42	3.45	3.47	3.47	3.47	3.45
125	7.01	5.40	4.40	3.76	3.40	3.08	2.91	2.87	2.98	3.16	3.36	3.46	3.53	3.58	3.63	3.66	3.66	3.66	3.63
130	6.04	5.06	4.23	3.57	3.10	2.91	2.88	2.96	3.05	3.19	3.35	3.53	3.69	3.83	3.90	3.94	3.95	3.94	3.90
135	3.04	3.34	3.32	3.18	3.00	2.99	3.03	3.10	3.25	3.42	3.59	3.72	3.83	3.92	3.98	4.01	4.02	4.01	3.98
140	3.61	4.05	3.85	3.45	3.00	2.98	3.05	3.19	3.30	3.42	3.56	3.75	3.94	4.09	4.15	4.18	4.18	4.18	4.15
145	3.14	3.53	3.50	3.31	3.09	3.12	3.21	3.33	3.44	3.56	3.69	3.87	4.04	4.18	4.22	4.21	4.18	4.21	4.22
150	2.84	3.19	3.26	3.23	3.16	3.24	3.35	3.46	3.55	3.63	3.72	3.86	3.99	4.09	4.09	4.05	3.99	4.05	4.09
155	3.02	3.40	3.52	3.53	3.47	3.45	3.43	3.43	3.48	3.56	3.64	3.75	3.84	3.90	3.85	3.78	3.70	3.78	3.85
160	3.33	3.73	3.85	3.82	3.71	3.65	3.58	3.53	3.56	3.60	3.64	3.61	3.57	3.52	3.49	3.46	3.44	3.46	3.49
165	3.43	3.80	3.88	3.82	3.68	3.63	3.58	3.52	3.46	3.39	3.31	3.20	3.09	3.00	2.99	3.01	3.02	3.01	2.99
170	3.30	3.57	3.60	3.50	3.33	3.17	3.00	2.85	2.78	2.74	2.71	2.64	2.58	2.53	2.50	2.48	2.48	2.48	2.50
175	3.11	3.29	3.30	3.21	3.05	2.86	2.66	2.50	2.47	2.47	2.48	2.40	2.32	2.25	2.26	2.29	2.33	2.29	2.26
180	2.61	2.61	2.61	2.60	2.59	2.54	2.49	2.43	2.36	2.30	2.24	2.22	2.20	2.20	2.21	2.24	2.26	2.24	2.21

C (DEG) y (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	2644	2642	2639	2637	2638	2640	2641	2639	2638	2636	2636	2638	2643	2653	2667				
5	2316	2353	2381	2392	2359	2316	2272	2256	2248	2246	2224	2222	2254	2358	2513				
10	2047	2042	2038	2049	2130	2219	2297	2305	2291	2263	2219	2190	2196	2282	2424				
15	1324	1401	1497	1606	1718	1830	1938	2036	2120	2185	2198	2207	2230	2308	2419				
20	729	758	807	881	1003	1151	1323	1533	1742	1929	2028	2102	2167	2260	2361				
25	598	602	611	629	641	684	777	993	1254	1535	1814	2066	2265	2354	2365				
30	464	492	523	554	562	580	620	696	817	995	1335	1684	1986	2101	2110				
35	263	289	324	367	425	486	547	542	573	678	1058	1474	1848	1998	2029				
40	150	162	182	212	263	323	389	425	484	589	840	1119	1386	1549	1660				
45	146	140	138	144	167	203	253	312	391	495	645	821	1022	1236	1471				
50	82.6	98.3	116	134	138	148	173	239	321	412	470	552	678	898	1183				
55	52.3	55.2	61.2	71.3	86.6	109	139	181	232	290	325	389	502	715	1000				
60	32.5	33.7	36.6	42.3	52.4	67.6	88.8	118	155	199	226	280	378	565	815				
65	1.01	2.29	5.23	10.5	18.5	30.2	46.2	65.4	91.7	127	158	214	308	471	686				
70	1.26	0.56	0.27	0.85	1.13	4.42	12.4	26.2	48.4	80.9	118	175	261	395	567				
75	1.47	0.99	0.76	1.06	1.66	3.71	7.87	11.5	21.0	39.5	68.6	114	181	278	401				
80	1.68	1.31	1.11	1.26	1.83	3.20	5.64	7.44	12.4	22.1	30.9	53.8	98.4	182	295				
85	1.95	1.67	1.51	1.57	2.03	2.93	4.35	5.39	7.87	12.6	18.1	29.2	48.7	82.7	128				
90	2.25	2.06	1.96	2.01	2.31	2.89	3.84	5.01	6.81	9.46	13.9	19.0	24.5	29.6	34.6				
95	2.64	2.53	2.50	2.58	2.76	3.15	3.80	4.78	6.17	8.04	10.8	13.9	17.4	20.7	24.1				
100	3.10	2.99	2.96	3.02	3.16	3.47	3.97	4.64	5.64	7.10	8.89	11.5	15.2	20.6	27.3				
105	3.80	3.81	3.86	3.89	3.79	3.65	3.48	2.91	2.63	2.97	4.70	7.30	10.7	14.9	19.9				
110	3.73	3.55	3.39	3.26	3.08	3.02	3.16	3.93	4.80	5.59	5.22	5.09	5.68	8.14	11.8				
115	3.42	3.39	3.35	3.31	3.18	3.11	3.16	3.57	4.10	4.67	4.37	4.60	5.91	9.60	14.9				
120	3.42	3.39	3.34	3.28	3.11	2.98	2.93	3.12	3.43	3.84	3.92	4.40	5.56	8.10	11.6				
125	3.58	3.53	3.46	3.36	3.16	2.98	2.87	2.91	3.08	3.40	3.76	4.40	5.40	7.01	9.10				
130	3.83	3.69	3.53	3.35	3.19	3.05	2.96	2.88	2.91	3.10	3.57	4.23	5.06	6.04	7.19				
135	3.92	3.83	3.72	3.59	3.42	3.25	3.10	3.03	2.99	3.00	3.18	3.32	3.34	3.04	2.53				
140	4.09	3.94	3.75	3.56	3.42	3.30	3.19	3.05	2.98	3.00	3.45	3.85	4.05	3.61	2.77				
145	4.18	4.04	3.87	3.69	3.56	3.44	3.33	3.21	3.12	3.09	3.31	3.50	3.53	3.14	2.49				
150	4.09	3.99	3.86	3.72	3.63	3.55	3.46	3.35	3.24	3.16	3.23	3.26	3.19	2.84	2.31				
155	3.90	3.84	3.75	3.64	3.56	3.48	3.43	3.43	3.45	3.47	3.53	3.52	3.40	3.02	2.46				
160	3.52	3.57	3.61	3.64	3.60	3.56	3.53	3.58	3.65	3.71	3.82	3.85	3.73	3.33	2.72				
165	3.00	3.09	3.20	3.31	3.39	3.46	3.52	3.58	3.63	3.68	3.82	3.88	3.80	3.43	2.85				
170	2.53	2.58	2.64	2.71	2.74	2.78	2.85	3.00	3.17	3.33	3.50	3.60	3.57	3.30	2.85				
175	2.25	2.32	2.40	2.48	2.47	2.47	2.50	2.66	2.86	3.05	3.21	3.30	3.29	3.11	2.80				
180	2.20	2.20	2.22	2.24	2.30	2.36	2.43	2.49	2.54	2.59	2.60	2.61	2.61	2.61	2.61				

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	WPX3 @ 65W / 5000K	Sample ID	231020001-S1
Temperature (°C)	25.4	Humidity (%RH)	41.0

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

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	iTHD(%)
120.0	60	0.547	65.2	0.993	5.04
277.0	60	0.267	64.5	0.872	11.97

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*****