

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

Prepared By

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Issue Date: 2023-11-15

Revised Date: N/A

1.0 Test Summary

DLC Technical Requirements V5.1

Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires				
Requirement Category	Test Method	Requirements		Test Value
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		4619
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		138.7
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		4543
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	136.4
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		33.3
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	120V	2.83
			277V	9.45
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	120V	0.997
			277V	0.941
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	5029±283	5236
		4 steps	5029±220	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		82.3
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		6
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		82
Minimum Rg (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥89		97
IES Rcs,h1 (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-13%
Zonal Lumen Requirement (80°-90°) (Goniophotometer – Section 4.2)	IES LM-79-2008	≤10%		2.2%
Input Voltage (V)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Cast		277.0
(Goniophotometer – Section 4.2)		Non-Worst Case		120.0
Input Current (A)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		0.128
(Goniophotometer – Section 4.2)		Non-Worst Case		0.272
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		33.3
(Goniophotometer – Section 4.2)		Non-Worst Case		32.6

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-11-02	WPX1 @ 30W / 5000K	231101002-S1
2	Goniophotometer Test	2023-11-02	WPX1 @ 30W / 5000K	231101002-S1
3	THD and PF Test	2023-11-02	WPX1 @ 30W / 5000K	231101002-S1

Remark (If any)

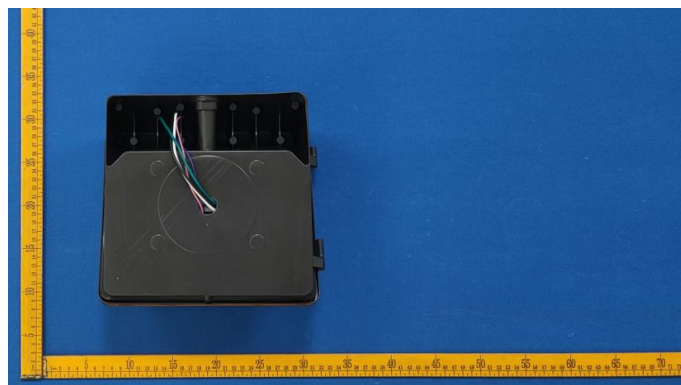
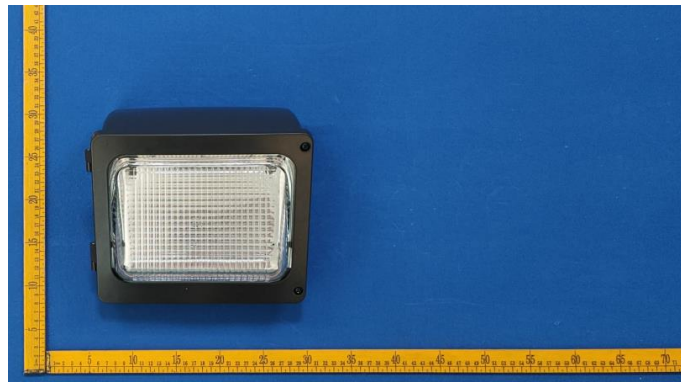
1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd.
3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

3.0 Product Description

Luminaire Description: Model No. WPX1 @ 30W / 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.	WPX1 @ 30W / 5000K	Sample ID	231101002-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

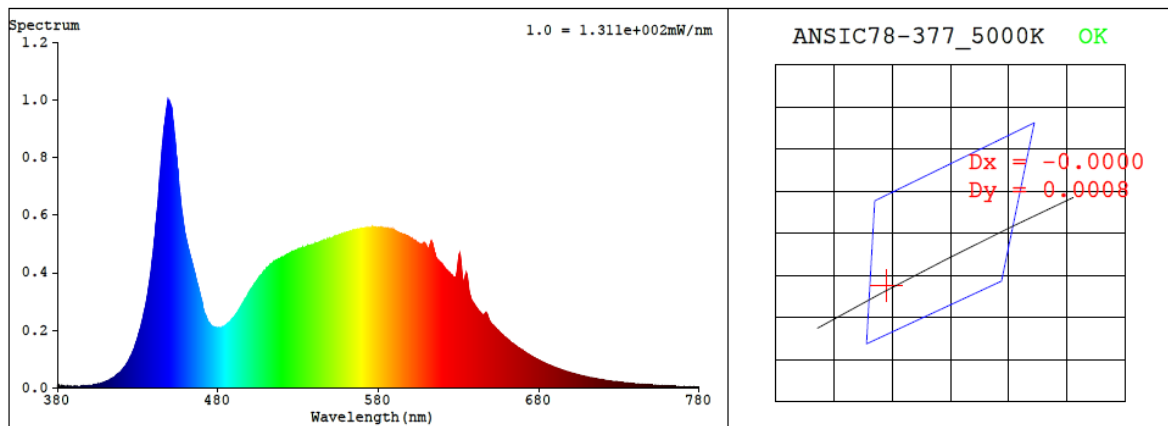
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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	0.272	32.6	0.997
277.0	60	0.128	33.3	0.941

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
5236	82.3	6	0.0004	82	97	-13%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3388$ $y = 0.3473$ / $u' = 0.2088$ $v' = 0.4816$ ($duv=4.30e-04$)

CCT= 5236K Prcp WL: Ld=567.5nm Purity=5.9%

Peak WL: Lp=450nm FWHM: =20.8nm Ratio:R=15.3% G=80.2% B=4.5%

Render Index: Ra = 82.3 AvgR = 75.3 TM30:Rf=82 Rg=96

EEL: 0.09980 A++ Highest

R1 =81	R2 =87	R3 =90	R4 =83	R5 =82	R6 =82	R7 =86
R8 =67	R9 =6	R10=68	R11=82	R12=62	R13=82	R14=95 R15=76

4.1 Integrating Sphere Test

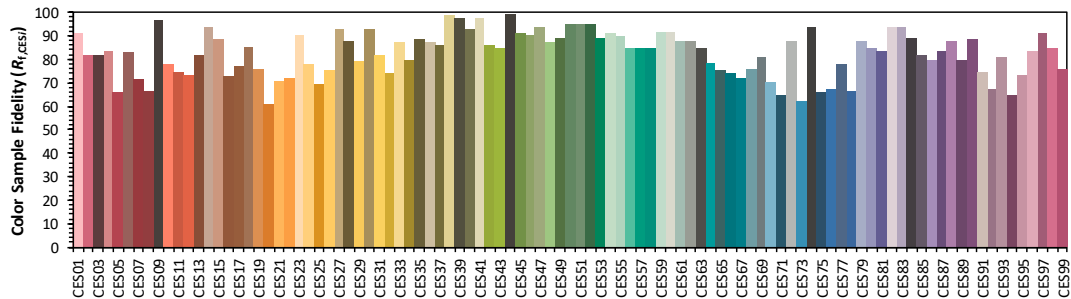
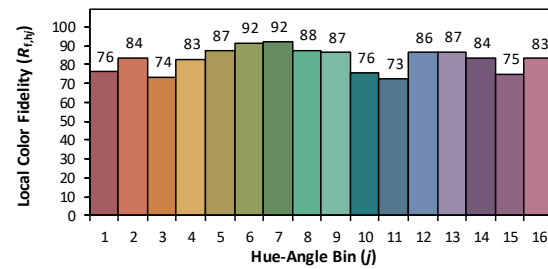
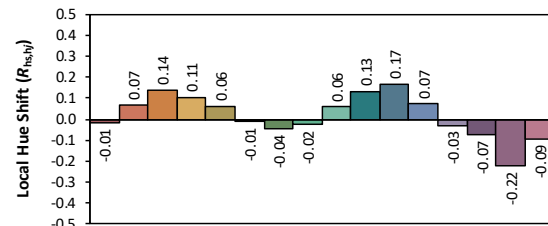
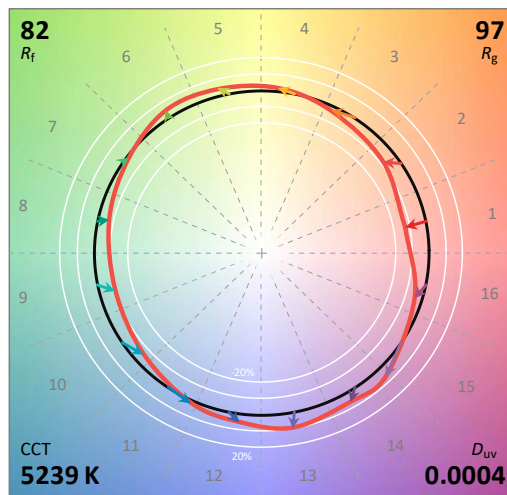
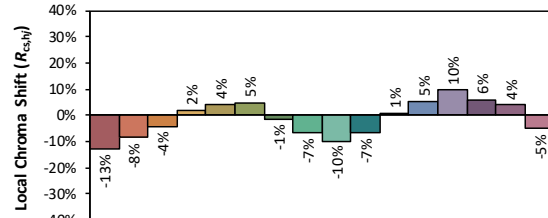
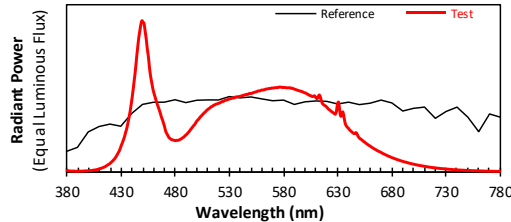
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/11/15

Model: WPX1 @ 30W / 5000K



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

x 0.3388
 y 0.3471
 u' 0.2088
 v' 0.4815

CIE 13.3-1995
(CRI)

R_a 82
 R_g 6

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	9.80E-06	447	9.25E-04	514	4.31E-04	581	5.56E-04	648	2.51E-04	715	3.23E-05
381	8.90E-06	448	9.68E-04	515	4.37E-04	582	5.55E-04	649	2.35E-04	716	3.14E-05
382	6.30E-06	449	9.95E-04	516	4.41E-04	583	5.55E-04	650	2.26E-04	717	3.05E-05
383	7.20E-06	450	9.85E-04	517	4.45E-04	584	5.54E-04	651	2.19E-04	718	2.93E-05
384	6.20E-06	451	9.78E-04	518	4.48E-04	585	5.54E-04	652	2.14E-04	719	2.88E-05
385	5.80E-06	452	9.26E-04	519	4.49E-04	586	5.54E-04	653	2.08E-04	720	2.77E-05
386	7.00E-06	453	8.76E-04	520	4.53E-04	587	5.50E-04	654	2.02E-04	721	2.69E-05
387	5.50E-06	454	8.09E-04	521	4.54E-04	588	5.52E-04	655	1.97E-04	722	2.57E-05
388	5.50E-06	455	7.59E-04	522	4.59E-04	589	5.48E-04	656	1.91E-04	723	2.52E-05
389	4.90E-06	456	6.87E-04	523	4.63E-04	590	5.46E-04	657	1.86E-04	724	2.43E-05
390	5.60E-06	457	6.33E-04	524	4.64E-04	591	5.43E-04	658	1.81E-04	725	2.35E-05
391	6.20E-06	458	5.93E-04	525	4.67E-04	592	5.41E-04	659	1.76E-04	726	2.27E-05
392	6.00E-06	459	5.53E-04	526	4.72E-04	593	5.38E-04	660	1.72E-04	727	2.23E-05
393	5.80E-06	460	5.23E-04	527	4.73E-04	594	5.36E-04	661	1.66E-04	728	2.16E-05
394	5.90E-06	461	4.99E-04	528	4.75E-04	595	5.33E-04	662	1.61E-04	729	2.10E-05
395	6.50E-06	462	4.74E-04	529	4.78E-04	596	5.32E-04	663	1.57E-04	730	1.99E-05
396	7.30E-06	463	4.51E-04	530	4.82E-04	597	5.29E-04	664	1.53E-04	731	1.94E-05
397	7.50E-06	464	4.31E-04	531	4.82E-04	598	5.27E-04	665	1.49E-04	732	1.90E-05
398	7.80E-06	465	4.10E-04	532	4.85E-04	599	5.23E-04	666	1.45E-04	733	1.84E-05
399	8.20E-06	466	3.88E-04	533	4.87E-04	600	5.20E-04	667	1.40E-04	734	1.77E-05
400	8.80E-06	467	3.63E-04	534	4.87E-04	601	5.18E-04	668	1.37E-04	735	1.72E-05
401	9.20E-06	468	3.44E-04	535	4.90E-04	602	5.13E-04	669	1.33E-04	736	1.67E-05
402	9.50E-06	469	3.22E-04	536	4.94E-04	603	5.10E-04	670	1.30E-04	737	1.61E-05
403	1.09E-05	470	2.98E-04	537	4.94E-04	604	5.04E-04	671	1.26E-04	738	1.54E-05
404	1.18E-05	471	2.69E-04	538	4.96E-04	605	5.03E-04	672	1.22E-04	739	1.49E-05
405	1.35E-05	472	2.54E-04	539	4.97E-04	606	4.98E-04	673	1.18E-04	740	1.47E-05
406	1.37E-05	473	2.41E-04	540	4.97E-04	607	4.97E-04	674	1.15E-04	741	1.40E-05
407	1.57E-05	474	2.27E-04	541	5.01E-04	608	5.00E-04	675	1.12E-04	742	1.38E-05
408	1.71E-05	475	2.22E-04	542	5.02E-04	609	5.00E-04	676	1.08E-04	743	1.31E-05
409	1.87E-05	476	2.15E-04	543	5.05E-04	610	4.89E-04	677	1.05E-04	744	1.28E-05
410	2.13E-05	477	2.12E-04	544	5.07E-04	611	4.82E-04	678	1.02E-04	745	1.25E-05
411	2.38E-05	478	2.10E-04	545	5.09E-04	612	4.91E-04	679	9.93E-05	746	1.21E-05
412	2.64E-05	479	2.09E-04	546	5.11E-04	613	5.07E-04	680	9.58E-05	747	1.17E-05
413	2.94E-05	480	2.07E-04	547	5.11E-04	614	4.96E-04	681	9.34E-05	748	1.13E-05
414	3.21E-05	481	2.09E-04	548	5.15E-04	615	4.71E-04	682	9.02E-05	749	1.10E-05
415	3.59E-05	482	2.08E-04	549	5.17E-04	616	4.52E-04	683	8.79E-05	750	1.06E-05
416	3.99E-05	483	2.10E-04	550	5.16E-04	617	4.43E-04	684	8.52E-05	751	1.03E-05
417	4.55E-05	484	2.13E-04	551	5.19E-04	618	4.38E-04	685	8.26E-05	752	1.02E-05
418	4.94E-05	485	2.17E-04	552	5.22E-04	619	4.34E-04	686	7.99E-05	753	9.70E-06
419	5.38E-05	486	2.21E-04	553	5.24E-04	620	4.27E-04	687	7.82E-05	754	9.20E-06
420	5.99E-05	487	2.27E-04	554	5.26E-04	621	4.19E-04	688	7.54E-05	755	8.80E-06
421	6.69E-05	488	2.31E-04	555	5.28E-04	622	4.12E-04	689	7.30E-05	756	8.80E-06
422	7.32E-05	489	2.40E-04	556	5.32E-04	623	4.07E-04	690	7.10E-05	757	8.50E-06
423	8.14E-05	490	2.45E-04	557	5.34E-04	624	4.01E-04	691	6.88E-05	758	8.30E-06
424	8.89E-05	491	2.53E-04	558	5.33E-04	625	3.95E-04	692	6.68E-05	759	8.00E-06
425	1.00E-04	492	2.60E-04	559	5.37E-04	626	3.90E-04	693	6.51E-05	760	7.70E-06
426	1.12E-04	493	2.69E-04	560	5.40E-04	627	3.84E-04	694	6.33E-05	761	7.40E-06
427	1.25E-04	494	2.79E-04	561	5.39E-04	628	3.81E-04	695	6.09E-05	762	7.50E-06
428	1.38E-04	495	2.88E-04	562	5.41E-04	629	4.01E-04	696	5.90E-05	763	7.10E-06
429	1.56E-04	496	2.97E-04	563	5.43E-04	630	4.50E-04	697	5.71E-05	764	6.90E-06
430	1.76E-04	497	3.06E-04	564	5.46E-04	631	4.59E-04	698	5.55E-05	765	6.60E-06
431	1.93E-04	498	3.14E-04	565	5.46E-04	632	4.05E-04	699	5.36E-05	766	6.40E-06
432	2.14E-04	499	3.26E-04	566	5.48E-04	633	3.67E-04	700	5.22E-05	767	6.20E-06
433	2.34E-04	500	3.37E-04	567	5.50E-04	634	3.81E-04	701	5.09E-05	768	6.00E-06
434	2.62E-04	501	3.44E-04	568	5.49E-04	635	3.95E-04	702	4.88E-05	769	5.90E-06
435	2.87E-04	502	3.52E-04	569	5.53E-04	636	3.60E-04	703	4.74E-05	770	5.90E-06
436	3.20E-04	503	3.62E-04	570	5.53E-04	637	3.23E-04	704	4.61E-05	771	5.50E-06
437	3.56E-04	504	3.69E-04	571	5.53E-04	638	3.05E-04	705	4.46E-05	772	5.40E-06
438	3.94E-04	505	3.77E-04	572	5.55E-04	639	2.95E-04	706	4.32E-05	773	5.20E-06
439	4.41E-04	506	3.85E-04	573	5.55E-04	640	2.88E-04	707	4.18E-05	774	5.20E-06
440	4.91E-04	507	3.91E-04	574	5.56E-04	641	2.79E-04	708	4.09E-05	775	4.80E-06
441	5.48E-04	508	3.98E-04	575	5.56E-04	642	2.72E-04	709	3.95E-05	776	4.80E-06
442	6.08E-04	509	4.06E-04	576	5.59E-04	643	2.65E-04	710	3.82E-05	777	4.50E-06
443	6.70E-04	510	4.12E-04	577	5.59E-04	644	2.59E-04	711	3.67E-05	778	4.50E-06
444	7.45E-04	511	4.17E-04	578	5.58E-04	645	2.53E-04	712	3.57E-05	779	4.60E-06
445	8.13E-04	512	4.23E-04	579	5.56E-04	646	2.53E-04	713	3.47E-05	780	4.60E-06
446	8.77E-04	513	4.29E-04	580	5.57E-04	647	2.60E-04	714	3.34E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	WPX1 @ 30W / 5000K	Sample ID	231101002-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	277.0	60	0.128	33.3	0.941
NON-WORST CASE	120.0	60	0.272	32.6	0.997

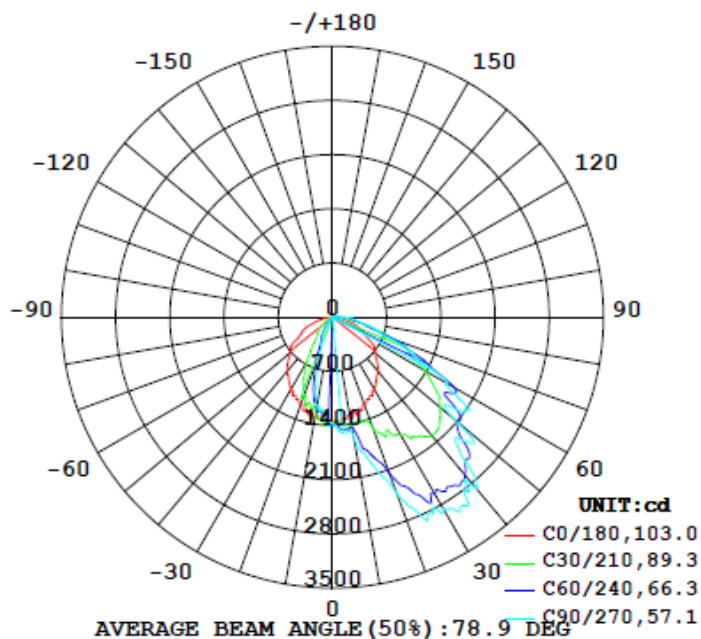
Test Result

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	4619	109.3	146.7	56.4	95.5	138.7	2.2%	B1-U2-G1
0°-90° zones	4543	109.3	146.7	56.4	95.5	136.4	2.2%	B1-U2-G1

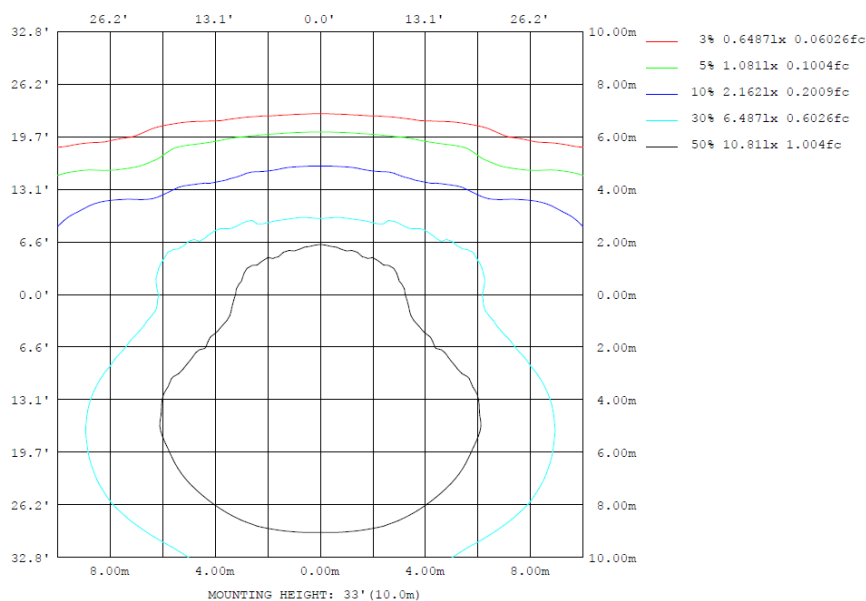
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

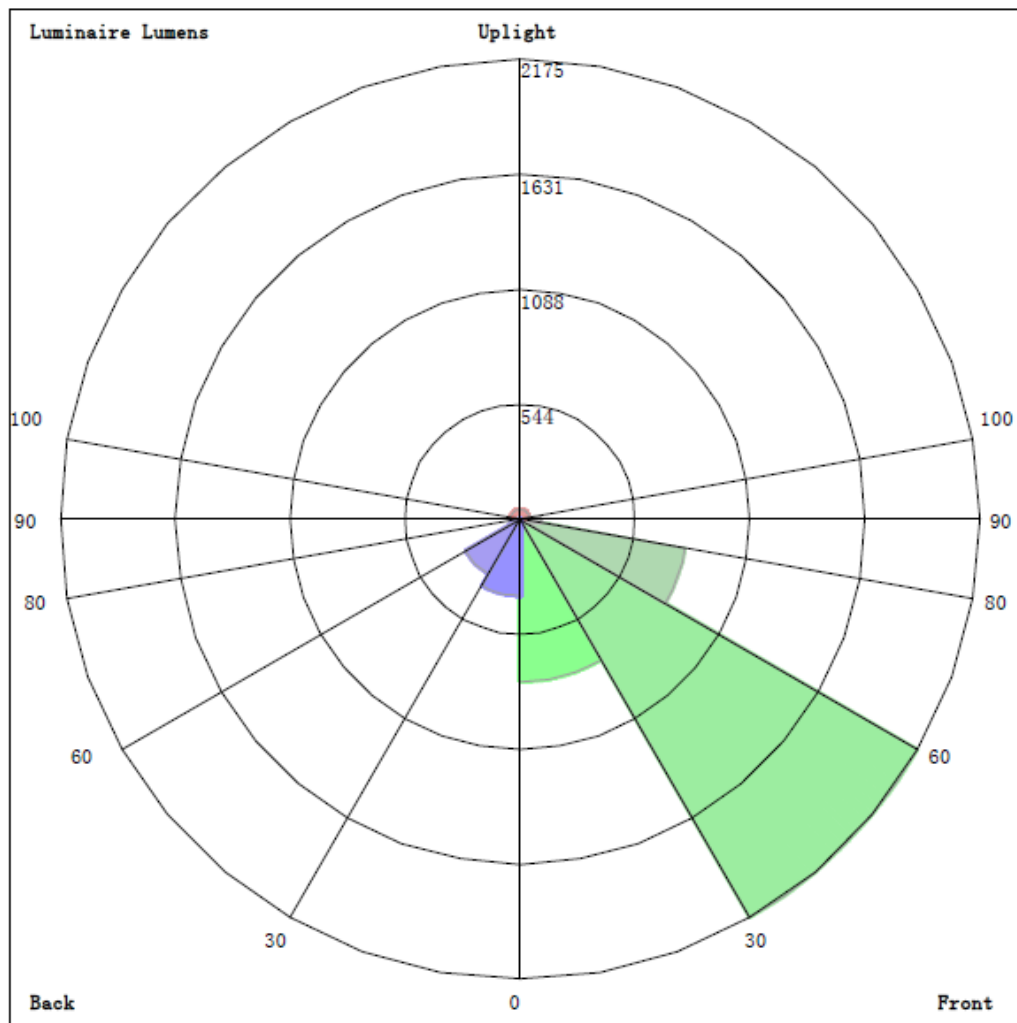
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	± zone	± total	%lum, lamp
10	1294	1464	1563	1464	1294	1173	1163	1173	0- 10	129.1	129.1	2.8,2.8
20	1186	1811	2424	1811	1186	820.6	447.0	820.6	10- 20	379.0	508.1	11,11
30	1087	2305	2857	2305	1087	357.5	216.6	357.5	20- 30	622.2	1130	24.5,24.5
40	917.5	2333	2904	2333	917.5	191.1	63.32	191.1	30- 40	813.9	1944	42.1,42.1
50	719.1	2101	2039	2101	719.1	64.94	29.26	64.94	40- 50	870.6	2815	60.9,60.9
60	498.0	1561	1710	1561	498.0	24.77	0.6069	24.77	50- 60	787.7	3602	78,78
70	336.5	867.6	749.3	867.6	336.5	4.420	0.8777	4.420	60- 70	572.5	4175	90.4,90.4
80	119.9	291.5	317.9	291.5	119.9	1.995	0.8893	1.995	70- 80	268.0	4443	96.2,96.2
90	15.99	112.8	103.4	112.8	15.99	1.338	1.061	1.338	80- 90	99.88	4543	98.4,98.4
100	10.93	36.03	56.85	36.03	10.93	1.467	1.453	1.467	90-100	30.32	4573	99,99
110	10.25	11.68	41.04	11.68	10.25	1.344	1.514	1.344	100-110	13.87	4587	99.3,99.3
120	8.167	27.45	15.05	27.45	8.167	1.279	1.587	1.279	110-120	9.864	4597	99.5,99.5
130	3.211	21.55	24.82	21.55	3.211	1.367	1.889	1.367	120-130	10.19	4607	99.7,99.7
140	0.8723	13.22	19.76	13.22	0.8723	1.507	1.954	1.507	130-140	6.791	4614	99.9,99.9
150	0.8020	6.577	9.407	6.577	0.8020	1.666	1.895	1.666	140-150	3.456	4617	100,100
160	0.9351	0.7410	3.210	0.7410	0.9351	1.757	1.680	1.757	150-160	1.177	4618	100,100
170	1.125	1.089	0.8845	1.089	1.125	1.476	1.286	1.476	160-170	0.3883	4619	100,100
180	1.295	1.247	1.054	1.247	1.295	1.193	1.123	1.193	170-180	0.1195	4619	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

	Zonal (lm)		Total (lm)	Percent
0-10	129.10	0-10	129.10	2.80%
10-20	379.02	0-20	508.12	11.00%
20-30	622.17	0-30	1130.29	24.47%
30-40	813.86	0-40	1944.15	42.09%
40-50	870.57	0-50	2814.72	60.94%
50-60	787.74	0-60	3602.46	77.99%
60-70	572.48	0-70	4174.94	90.39%
70-80	267.97	0-80	4442.91	96.19%
80-90	99.88	0-90	4542.79	98.35%
90-100	30.32	0-100	4573.11	99.01%
100-110	13.87	0-110	4586.98	99.31%
110-120	9.86	0-120	4596.84	99.52%
120-130	10.19	0-130	4607.03	99.74%
130-140	6.79	0-140	4613.82	99.89%
140-150	3.46	0-150	4617.28	99.97%
150-160	1.18	0-160	4618.46	99.99%
160-170	0.39	0-170	4618.85	100.00%
170-180	0.12	0-180	4618.97	100.00%

4.2 Goniophotometer Test

LCS/BUG

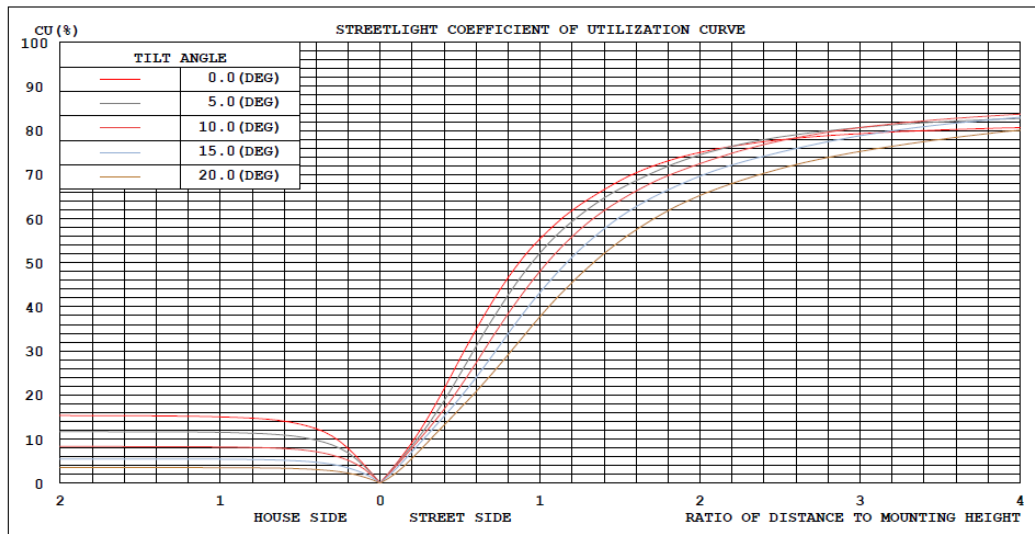


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

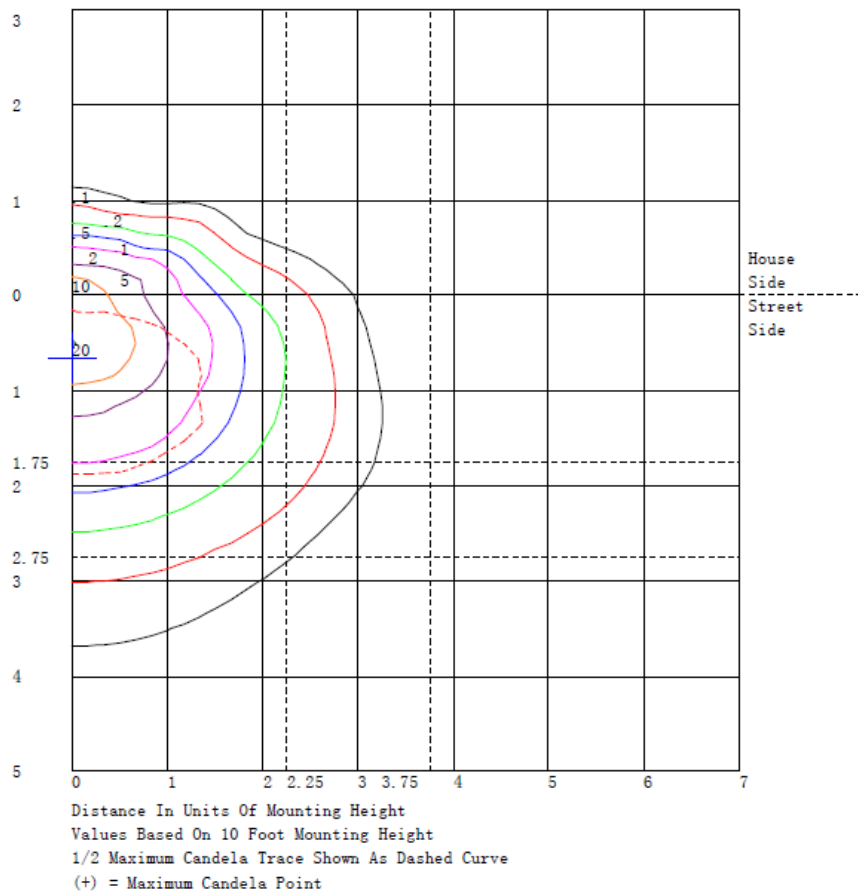
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	768.9	N.A.	16.6
FM - Front-Medium (30-60)	2175.3	N.A.	47.1
FH - Front-High (60-80)	793.0	N.A.	17.2
FVH - Front-Very High (80-90)	95.2	N.A.	2.1
BL - Back-Low (0-30)	361.4	N.A.	7.8
BM - Back-Medium (30-60)	296.9	N.A.	6.4
BH - Back-High (60-80)	47.4	N.A.	1.0
BVH - Back-Very High (80-90)	4.6	N.A.	0.1
UL - Uplight-Low (90-100)	30.3	N.A.	0.7
UH - Uplight-High (100-180)	45.9	N.A.	1.0
Total	4618.9	N.A.	100.0
BUG Rating	B1-U2-G1		

4.2 Goniophotometer Test

Coefficients of Utilization



Isolines



4.2 Goniophotometer Test

Luminous Distribution Intensity Data

Table--1

UNIT: cd

C (DEG) y (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	1384	1383	1384	1384	1385	1386	1386	1386	1386	1385	1385	1386	1386	1386	1386	1386	1386	1387	1387
5	1317	1325	1335	1345	1356	1368	1384	1408	1432	1453	1458	1459	1457	1456	1456	1459	1475	1491	1504
10	1294	1308	1324	1342	1363	1386	1408	1432	1451	1464	1457	1446	1439	1456	1479	1505	1529	1549	1563
15	1263	1313	1350	1374	1365	1356	1363	1432	1518	1609	1679	1742	1800	1855	1903	1940	1960	1968	1966
20	1186	1212	1251	1301	1367	1443	1528	1616	1710	1811	1931	2048	2152	2213	2260	2297	2355	2400	2424
25	1124	1153	1203	1277	1375	1494	1630	1789	1954	2118	2263	2397	2519	2629	2725	2803	2859	2893	2905
30	1087	1095	1144	1235	1383	1560	1753	1945	2132	2305	2438	2550	2642	2714	2770	2810	2836	2851	2857
35	984	1047	1145	1279	1472	1684	1899	2084	2252	2399	2505	2593	2672	2768	2855	2926	2960	2974	2971
40	917	995	1114	1274	1512	1763	1999	2135	2241	2333	2458	2571	2661	2677	2677	2681	2764	2846	2904
45	807	937	1090	1268	1497	1731	1948	2092	2208	2300	2398	2469	2503	2446	2364	2278	2244	2227	2225
50	719	842	988	1158	1380	1604	1810	1943	2040	2101	2112	2108	2107	2180	2251	2296	2214	2117	2039
55	658	857	1040	1208	1367	1507	1622	1694	1741	1769	1771	1772	1783	1852	1932	2009	2056	2088	2104
60	498	688	861	1016	1154	1275	1376	1445	1504	1561	1661	1752	1815	1778	1718	1658	1667	1688	1710
65	436	597	738	858	951	1028	1097	1181	1253	1308	1319	1309	1285	1249	1209	1173	1159	1153	1152
70	337	404	477	558	662	760	842	868	874	868	869	865	855	829	800	773	760	753	749
75	215	270	322	373	430	479	515	514	501	485	483	485	491	506	522	538	546	549	549
80	120	156	188	215	237	256	270	280	287	292	296	300	303	305	306	307	311	315	318
85	44.0	59.6	76.0	93.2	112	132	150	163	175	187	202	217	230	239	246	250	253	254	254
90	16.0	24.1	33.8	45.2	60.1	75.4	89.6	100	108	113	113	111	108	105	102	100	101	102	103
95	11.8	18.0	24.4	31.1	39.4	46.9	52.7	53.3	52.4	50.9	51.3	52.2	53.7	55.8	58.3	60.9	63.7	66.1	67.7
100	10.9	11.7	12.5	13.3	13.4	14.2	16.2	22.4	29.4	36.0	39.0	40.9	42.5	45.0	47.6	50.1	53.0	55.3	56.9
105	1.88	5.80	8.85	11.0	11.7	12.0	12.3	14.0	16.1	18.4	20.8	23.2	25.7	28.1	30.4	32.6	35.1	37.2	38.6
110	10.2	8.90	8.98	10.5	15.2	20.0	23.5	19.6	15.0	11.7	16.3	22.8	29.6	33.3	36.0	38.0	39.6	40.6	41.0
115	9.18	7.32	7.01	8.23	12.1	16.7	21.1	24.0	25.5	25.4	21.2	16.2	11.5	10.3	10.2	10.9	12.1	13.4	14.3
120	8.17	6.26	5.76	6.68	9.71	13.6	17.9	21.4	24.6	27.5	30.1	32.0	32.8	31.2	28.6	25.3	20.5	16.7	15.0
125	5.91	4.55	4.31	5.20	7.65	10.9	14.6	18.1	21.6	25.0	27.9	30.5	32.5	34.2	35.2	35.0	31.6	28.1	25.8
130	3.21	2.45	2.57	3.56	5.74	8.56	11.8	15.0	18.3	21.5	25.0	28.0	30.5	31.8	32.1	31.7	29.0	26.5	24.8
135	1.12	0.00	0.00	0.59	3.04	6.16	9.57	12.3	15.0	17.8	21.3	24.6	27.3	28.2	28.2	27.6	25.9	24.2	23.2
140	0.87	2.15	3.37	4.53	5.49	6.50	7.67	9.23	11.1	13.2	16.2	19.2	21.7	22.5	22.7	22.3	21.3	20.3	19.8
145	0.81	1.47	2.18	2.94	3.70	4.55	5.52	6.67	7.98	9.46	11.5	13.4	15.0	15.5	15.5	15.3	14.8	14.4	14.1
150	0.80	1.24	1.49	1.55	0.99	0.56	0.59	2.33	4.45	6.58	7.73	8.57	9.13	9.50	9.70	9.76	9.64	9.50	9.41
155	0.85	0.84	0.85	0.88	0.83	0.88	1.12	1.89	2.80	3.70	4.27	4.72	5.06	5.28	5.42	5.50	5.58	5.62	5.65
160	0.94	0.93	0.92	0.91	0.88	0.86	0.83	0.72	0.67	0.74	1.17	1.69	2.21	2.57	2.85	3.05	3.15	3.19	3.21
165	1.02	1.03	1.03	1.03	1.01	0.99	0.96	0.93	0.90	0.90	0.96	1.03	1.08	1.02	0.93	0.84	0.81	0.79	0.79
170	1.13	1.14	1.15	1.16	1.16	1.16	1.15	1.13	1.11	1.09	1.07	1.06	1.04	1.03	1.02	1.00	0.95	0.91	0.88
175	1.21	1.21	1.22	1.22	1.22	1.23	1.23	1.22	1.22	1.21	1.20	1.19	1.17	1.12	1.06	1.01	0.98	0.97	0.96
180	1.29	1.30	1.31	1.31	1.30	1.29	1.28	1.27	1.26	1.25	1.23	1.20	1.18	1.16	1.15	1.13	1.10	1.07	1.05

C (DEG)																			UNIT: cd									
y (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185									
0	1387	1386	1386	1386	1386	1386	1386	1385	1385	1386	1386	1386	1386	1385	1384	1384	1383	1384	1383									
5	1491	1475	1459	1456	1456	1457	1459	1458	1453	1432	1408	1384	1368	1356	1345	1335	1325	1317	1334									
10	1549	1529	1505	1479	1456	1439	1446	1457	1464	1451	1432	1408	1386	1363	1342	1324	1308	1294	1299									
15	1968	1960	1940	1903	1855	1800	1742	1679	1609	1518	1432	1363	1356	1365	1374	1350	1313	1263	1294									
20	2400	2355	2297	2260	2213	2152	2048	1931	1811	1710	1616	1528	1443	1367	1301	1251	1212	1186	1166									
25	2893	2859	2803	2725	2629	2519	2397	2263	2118	1954	1789	1630	1494	1375	1277	1203	1153	1124	1151									
30	2851	2836	2810	2770	2714	2642	2550	2438	2305	2132	1945	1753	1560	1383	1235	1144	1095	1087	1116									
35	2974	2960	2926	2855	2768	2672	2593	2505	2399	2252	2084	1899	1684	1472	1279	1145	1047	984	1028									
40	2846	2764	2681	2677	2677	2661	2571	2458	2333	2241	2135	1999	1763	1512	1274	1114	995	917	958									
45	2227	2244	2278	2364	2446	2503	2469	2398	2300	2208	2092	1948	1731	1497	1268	1090	937	807	795									
50	2117	2214	2296	2251	2180	2107	2108	2112	2101	2040	1943	1810	1604	1380	1158	988	842	719	642									
55	2088	2056	2009	1932	1852	1783	1772	1771	1769	1741	1694	1622	1507	1367	1208	1040	857	658	524									
60	1688	1667	1658	1718	1778	1815	1752	1661	1561	1504	1445	1376	1275	1154	1016	861	688	498	369									
65	1153	1159	1173	1209	1249	1285	1309	1319	1308	1253	1181	1097	1028	951	858	738	597	436	307									
70	753	760	773	800	829	855	865	869	868	874	868	842	760	662	558	477	404	337	237									
75	549	546	538	522	506	491	485	483	485	501	514	515	479	430	373	322	270	215	152									
80	315	311	307	306	305	303	300	296	292	287	280	270	256	237	215	188	156	120	83.3									
85	254	253	250	246	239	230	217	202	187	175	163	150	132	112	93.2	76.0	59.6	44.0	32.9									
90	102	101	100	102	105	108	111	113	113	108	100	89.6	75.4	60.1	45.2	33.8	24.1	16.0	13.3									
95	66.1	63.7	60.9	58.3	55.8	53.7	52.2	51.3	50.9	52.4	53.3	52.7	46.9	39.4	31.1	24.4	18.0	11.8	9.58									
100	55.3	53.0	50.1	47.6	45.0	42.5	40.9	39.0	36.0	29.4	22.4	16.2	14.2	13.4	13.3	12.5	11.7	10.9	8.57									
105	37.2	35.1	32.6	30.4	28.1	25.7	23.2	20.8	18.4	16.1	14.0	12.3	12.0	11.7	11.0	8.85	5.80	1.88	1.55									
110	40.6	39.6	38.0	36.0	33.3	29.6	22.8	16.3	11.7	15.0	19.6	23.5	20.0	15.2	10.5	8.98	8.90	10.2	6.51									
115	13.4	12.1	10.9	10.2	10.3	11.5	16.2	21.2	25.4	25.5	24.0	21.1	16.7	12.1	8.23	7.01	7.32	9.18	5.89									
120	16.7	20.5	25.3	28.6	31.2	32.8	32.0	30.1	27.5	24.6	21.4	17.9	13.6	9.71	6.68	5.76	6.26	8.17	5.34									
125	28.1	31.6	35.0	35.2	34.2	32.9	30.5	27.9	25.0	21.6	18.1	14.6	10.9	7.65	5.20	4.31	4.55	5.91	4.12									
130	26.5	29.0	31.7	32.1	31.8	30.5	28.0	25.0	21.5	18.3	15.0	11.8	8.56	5.74	3.56	2.57	2.45	3.21	2.51									
135	24.2	25.9	27.6	28.2	28.2	27.3	24.6	21.3	17.8	15.0	12.3	9.57	6.16	3.04	0.59	0.00	0.00	1.12	1.34									
140	20.3	21.3	22.3	22.7	22.5	21.7	19.2	16.2	13.2	11.1	9.23	7.67	5.60	5.49	4.53	3.37	2.15	0.87	1.14									
145	14.4	14.8	15.3	15.5	15.5	15.0	13.4	11.5	9.46	7.98	6.67	5.52	4.55	3.70	2.94	2.18	1.47	0.81	1.04									
150	9.50	9.64	9.76	9.70	9.50	9.13	8.57	7.73	6.58	4.45	2.33	0.59	0.56	0.99	1.55	1.49	1.24	0.80	1.14									
155	5.62	5.58	5.50	5.42	5.28	5.06	4.72	4.23	3.70	2.80	1.89	1.12	0.88	0.83	0.88	0.85	0.84	0.85	1.21									
160	3.19	3.15	3.05	2.85	2.57	2.21	1.69	1.17	0.74	0.67	0.72	0.83	0.86	0.88	0.91	0.92	0.93	0.94	1.33									
165	0.79	0.81	0.84	0.93	1.02	1.08	1.03	0.96	0.90	0.90	0.93	0.96	0.99	1.01	1.03	1.03	1.03	1.02	1.41									
170	0.91	0.95	1.00	1.02	1.03	1.04	1.06	1.07	1.09	1.11	1.13	1.15	1.16	1.16	1.16	1.15	1.14	1.13	1.44									
175	0.97	0.98	1.01	1.06	1.12	1.17	1.19	1.20	1.21	1.22	1.22	1.23	1.23	1.22	1.22	1.22	1.21	1.21	1.44									
180	1.07	1.10	1.13	1.15	1.16	1.18	1.20	1.23	1.25	1.26	1.27	1.28	1.29	1.30	1.31	1.31	1.30	1.29	1.44									

Table--3

UNIT: °C

C (DEG) y (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	1381	1381	1381	1382	1383	1384	1384	1385	1386	1386	1387	1387	1387	1387	1387	1387	1387	1387	1387
5	1349	1363	1379	1391	1396	1385	1369	1352	1345	1341	1336	1323	1311	1303	1313	1326	1338	1326	1313
10	1300	1296	1289	1277	1259	1229	1199	1173	1171	1173	1175	1159	1143	1131	1140	1153	1163	1153	1140
15	1304	1294	1247	1191	1140	1137	1139	1134	1086	1028	969	925	887	857	834	819	812	819	834
20	1147	1129	1122	1108	1080	1004	915	821	738	664	602	567	543	524	490	462	447	462	490
25	1152	1129	1077	1003	913	800	683	572	487	418	366	341	329	326	320	317	316	317	320
30	1104	1052	937	798	654	538	438	358	319	297	285	265	248	234	224	219	217	219	224
35	1018	955	799	620	449	367	313	277	238	206	180	155	136	120	112	108	108	108	112
40	942	869	695	499	316	247	210	191	152	118	90.4	75.5	67.1	63.4	61.7	61.9	63.3	61.9	61.7
45	751	676	541	395	259	189	142	112	84.2	65.0	53.0	47.7	46.4	47.4	46.4	45.7	45.5	45.7	46.4
50	562	477	380	286	200	141	96.7	64.9	46.8	37.4	33.8	30.3	29.0	29.0	28.8	29.0	29.3	29.0	28.8
55	409	313	241	184	139	97.7	64.9	40.7	28.0	21.6	19.5	17.2	16.4	16.4	16.2	16.3	16.4	16.3	16.2
60	264	184	139	110	91.5	65.2	42.7	24.8	15.3	9.96	7.29	4.45	2.66	1.65	0.95	0.65	0.61	0.65	0.95
65	204	127	85.6	62.8	51.2	34.2	20.9	11.1	5.26	2.05	0.72	0.16	0.37	0.93	0.89	0.81	0.71	0.81	0.89
70	158	97.1	62.7	42.6	31.7	19.1	10.2	4.42	1.56	0.59	0.77	0.62	0.75	0.99	0.98	0.95	0.88	0.95	0.98
75	100	61.3	39.1	26.2	19.3	11.5	6.18	2.84	1.17	0.65	0.82	0.77	0.86	1.01	0.99	0.95	0.88	0.95	0.99
80	54.0	32.1	20.2	13.7	10.6	6.60	3.78	1.99	1.10	0.81	0.88	0.84	0.89	0.97	0.96	0.93	0.89	0.93	0.96
85	23.8	16.5	11.7	8.43	6.20	4.08	2.53	1.48	1.00	0.84	0.89	0.87	0.89	0.94	0.95	0.95	0.93	0.95	0.95
90	10.8	8.73	6.99	5.52	4.26	3.06	2.08	1.34	1.05	0.97	1.01	0.99	0.99	1.01	1.02	1.04	1.06	1.04	1.02
95	7.70	6.14	5.01	4.12	3.39	2.60	1.92	1.40	1.20	1.14	1.16	1.13	1.12	1.12	1.14	1.17	1.22	1.17	1.14
100	6.61	5.06	4.04	3.33	2.82	2.25	1.80	1.47	1.34	1.31	1.34	1.32	1.32	1.33	1.36	1.40	1.45	1.40	1.36
105	1.31	1.16	1.14	1.18	1.25	1.31	1.37	1.42	1.43	1.42	1.41	1.42	1.44	1.46	1.50	1.53	1.56	1.53	1.50
110	3.71	1.84	1.36	1.47	1.86	1.69	1.51	1.34	1.34	1.38	1.44	1.47	1.49	1.50	1.51	1.51	1.51	1.51	1.51
115	3.40	1.71	1.18	1.19	1.48	1.39	1.33	1.29	1.32	1.37	1.42	1.45	1.47	1.48	1.50	1.52	1.53	1.52	1.50
120	3.19	1.70	1.15	1.06	1.24	1.22	1.23	1.28	1.33	1.39	1.44	1.48	1.50	1.53	1.56	1.58	1.59	1.58	1.56
125	2.73	1.74	1.30	1.14	1.18	1.17	1.22	1.31	1.39	1.47	1.55	1.59	1.62	1.64	1.68	1.71	1.73	1.71	1.68
130	1.95	1.55	1.32	1.22	1.20	1.22	1.28	1.37	1.44	1.51	1.59	1.67	1.74	1.80	1.85	1.88	1.89	1.88	1.85
135	1.45	1.51	1.45	1.36	1.27	1.29	1.35	1.43	1.51	1.59	1.67	1.74	1.81	1.86	1.90	1.92	1.93	1.92	1.90
140	1.28	1.40	1.41	1.39	1.36	1.40	1.45	1.51	1.56	1.61	1.67	1.74	1.81	1.87	1.91	1.94	1.95	1.94	1.91
145	1.27	1.41	1.45	1.46	1.45	1.49	1.53	1.58	1.64	1.71	1.77	1.82	1.86	1.89	1.92	1.94	1.95	1.94	1.92
150	1.32	1.48	1.54	1.55	1.55	1.58	1.62	1.67	1.70	1.74	1.77	1.80	1.82	1.84	1.86	1.88	1.90	1.88	1.86
155	1.48	1.66	1.73	1.74	1.71	1.69	1.67	1.65	1.67	1.71	1.74	1.77	1.80	1.81	1.80	1.79	1.77	1.79	1.80
160	1.64	1.84	1.91	1.91	1.87	1.84	1.80	1.76	1.74	1.73	1.72	1.68	1.64	1.62	1.63	1.66	1.68	1.66	1.63
165	1.72	1.92	1.96	1.93	1.86	1.83	1.80	1.77	1.75	1.71	1.67	1.59	1.50	1.44	1.44	1.47	1.50	1.47	1.44
170	1.64	1.77	1.80	1.77	1.70	1.63	1.55	1.48	1.45	1.43	1.41	1.35	1.30	1.25	1.25	1.27	1.29	1.27	1.25
175	1.53	1.61	1.63	1.61	1.55	1.48	1.39	1.31	1.27	1.24	1.21	1.18	1.15	1.13	1.15	1.18	1.21	1.18	1.15
180	1.27	1.26	1.26	1.26	1.25	1.24	1.22	1.19	1.17	1.14	1.11	1.09	1.08	1.07	1.08	1.10	1.12	1.10	1.08

Table--4

UNIT: °C

C (DEG) γ (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	1387	1387	1387	1387	1386	1386	1385	1384	1384	1383	1382	1381	1381	1381	1382				
5	1303	1311	1323	1336	1341	1345	1352	1369	1385	1396	1391	1379	1363	1349	1334				
10	1131	1143	1159	1175	1173	1171	1173	1199	1229	1259	1277	1289	1296	1300	1299				
15	857	887	925	969	1028	1086	1134	1139	1137	1140	1191	1247	1294	1304	1294				
20	524	543	567	602	664	738	821	915	1004	1080	1108	1122	1129	1147	1166				
25	326	329	341	366	418	487	572	683	800	913	1003	1077	1129	1152	1151				
30	234	248	265	285	297	319	358	438	538	654	798	937	1052	1104	1116				
35	120	136	155	180	206	238	277	313	367	449	620	799	955	1018	1028				
40	63.4	67.1	75.5	90.4	118	152	191	210	247	316	499	695	869	942	958				
45	47.4	46.4	47.7	53.0	65.0	84.2	112	142	189	259	395	541	676	751	795				
50	29.0	29.0	30.3	33.8	37.4	46.8	64.9	96.7	141	200	286	380	477	562	642				
55	16.4	16.4	17.2	19.5	21.6	28.0	40.7	64.9	97.7	139	184	241	313	409	524				
60	1.65	2.66	4.45	7.29	9.96	15.3	24.8	42.7	65.2	91.5	110	139	184	264	369				
65	0.93	0.37	0.16	0.72	2.05	5.26	11.1	20.9	34.2	51.2	62.8	85.6	127	204	307				
70	0.99	0.75	0.62	0.77	0.59	1.56	4.42	10.2	19.1	31.7	42.6	62.7	97.1	158	237				
75	1.01	0.86	0.77	0.82	0.65	1.17	2.84	6.18	11.5	19.3	26.2	39.1	61.3	100	152				
80	0.97	0.89	0.84	0.88	0.81	1.10	1.99	3.78	6.60	10.6	13.7	20.2	32.1	54.0	83.3				
85	0.94	0.89	0.87	0.89	0.84	1.00	1.48	2.53	4.08	6.20	8.43	11.7	16.5	23.8	32.9				
90	1.01	0.99	0.99	1.01	0.97	1.05	1.34	2.08	3.06	4.26	5.52	6.99	8.73	10.8	13.3				
95	1.12	1.12	1.13	1.16	1.14	1.20	1.40	1.92	2.60	3.39	4.12	5.01	6.14	7.70	9.58				
100	1.33	1.32	1.32	1.34	1.31	1.34	1.47	1.80	2.25	2.82	3.33	4.04	5.06	6.61	8.57				
105	1.46	1.44	1.42	1.41	1.42	1.43	1.42	1.37	1.31	1.25	1.18	1.14	1.16	1.31	1.55				
110	1.50	1.49	1.47	1.44	1.38	1.34	1.34	1.51	1.69	1.86	1.47	1.36	1.84	3.71	6.51				
115	1.48	1.47	1.45	1.42	1.37	1.32	1.29	1.33	1.39	1.48	1.19	1.18	1.71	3.40	5.89				
120	1.53	1.50	1.48	1.44	1.39	1.33	1.28	1.23	1.22	1.24	1.06	1.15	1.70	3.19	5.34				
125	1.64	1.62	1.59	1.55	1.47	1.39	1.31	1.22	1.17	1.18	1.14	1.30	1.74	2.73	4.12				
130	1.80	1.74	1.67	1.59	1.51	1.44	1.37	1.28	1.22	1.20	1.22	1.32	1.55	1.95	2.51				
135	1.86	1.81	1.74	1.67	1.59	1.51	1.43	1.35	1.29	1.27	1.36	1.45	1.51	1.45	1.32				
140	1.87	1.81	1.74	1.67	1.61	1.56	1.51	1.45	1.40	1.36	1.39	1.41	1.40	1.28	1.11				
145	1.89	1.86	1.82	1.77	1.71	1.64	1.58	1.53	1.49	1.45	1.46	1.45	1.41	1.27	1.07				
150	1.84	1.82	1.80	1.77	1.74	1.70	1.67	1.62	1.58	1.55	1.55	1.54	1.48	1.32	1.10				
155	1.81	1.80	1.77	1.74	1.71	1.67	1.65	1.67	1.69	1.71	1.74	1.73	1.66	1.48	1.20				
160	1.62	1.64	1.68	1.72	1.73	1.74	1.76	1.80	1.84	1.87	1.91	1.91	1.84	1.64	1.34				
165	1.44	1.50	1.59	1.67	1.71	1.75	1.77	1.80	1.83	1.86	1.93	1.96	1.92	1.72	1.42				
170	1.25	1.30	1.35	1.41	1.43	1.45	1.48	1.55	1.63	1.70	1.77	1.80	1.77	1.64	1.42				
175	1.13	1.15	1.18	1.21	1.24	1.27	1.31	1.39	1.48	1.55	1.61	1.63	1.61	1.53	1.40				
180	1.02	1.08	1.09	1.11	1.14	1.17	1.19	1.22	1.24	1.25	1.26	1.26	1.26	1.27	1.28				

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	WPX1 @ 30W / 5000K	Sample ID	231101002-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 $25 \pm 1^{\circ}\text{C}$. 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	0.272	32.6	0.997	2.83
277.0	60	0.128	33.3	0.941	9.45

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*****