

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		6238
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		150.0
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		6083
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	146.2
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		41.6
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	480V	16.13
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	480V	0.782
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3985±275	3911
		4 steps	3985±154	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		84.4
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		17
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		84
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%		2.9%
Input Voltage (V)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Cast		480.0
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Input Current (A)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		0.111
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		41.6
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-11-08	WPX2 @ 40W / 4000K 480	231101004-S1
2	Goniophotometer Test	2023-11-08	WPX2 @ 40W / 4000K 480	231101004-S1
3	THD and PF Test	2023-11-08	WPX2 @ 40W / 4000K 480	231101004-S1

Remark (If any)

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

3.0 Product Description

Luminaire Description: Model No. WPX2 @ 40W / 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

Model No.	WPX2 @ 40W / 4000K 480	Sample ID	231101004-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

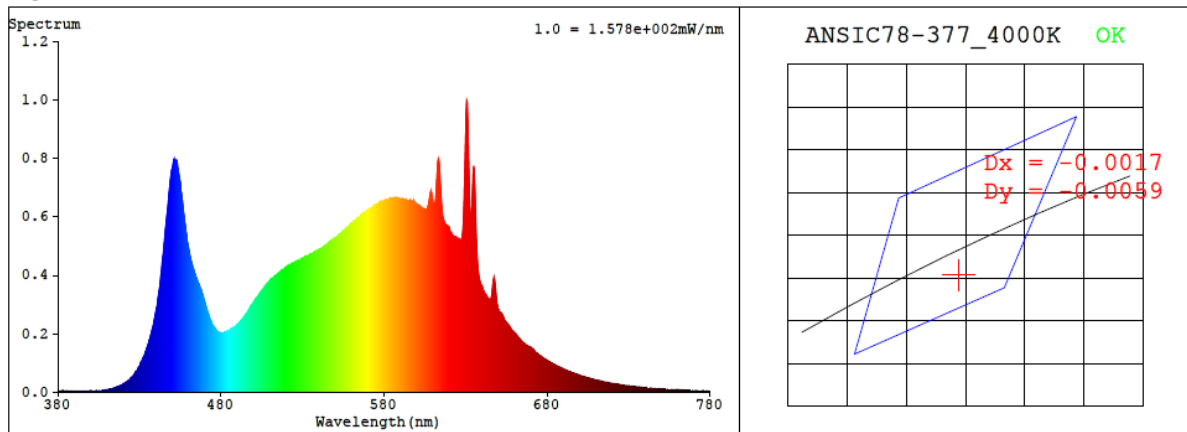
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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. 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	0.111	41.6	0.782

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
3911	84.4	17	-0.0023	84	96	-11%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3828$ $y = 0.3733$ / $u' = 0.2280$ $v' = 0.5004$ ($duv = -2.30e-03$)

CCT= 3911K Prcp WL: $L_d = 580.7\text{nm}$ Purity=26.9%

Peak WL: $L_p = 631\text{nm}$ FWHM: $=94.9\text{nm}$ Ratio: R=19.0% G=77.3% B=3.7%

Render Index: $R_a = 84.4$ AvgR = 78.4 TM30: Rf=84 Rg=96

EEL: 0.09328 A++ Highest

R1 =83	R2 =91	R3 =95	R4 =83	R5 =83	R6 =87	R7 =86
R8 =67	R9 =17	R10=78	R11=81	R12=64	R13=85	R14=98 R15=78

4.1 Integrating Sphere Test

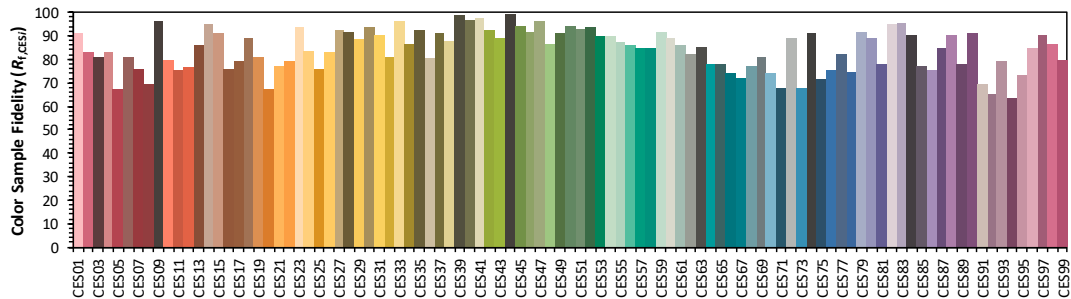
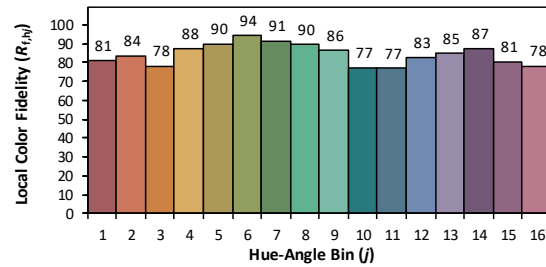
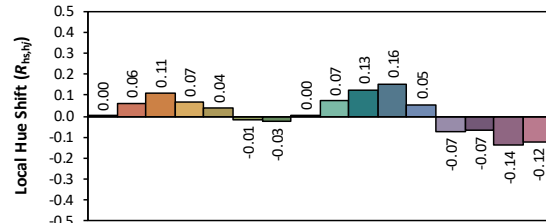
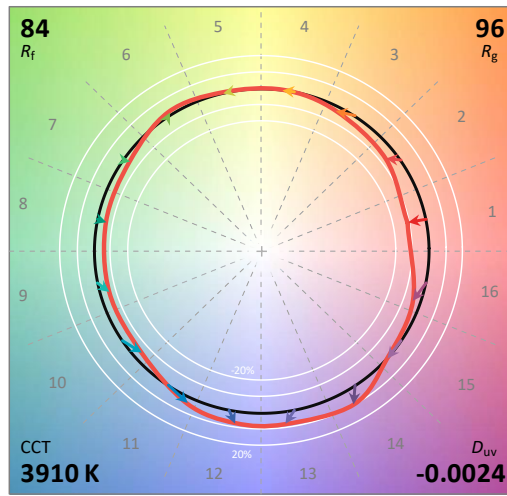
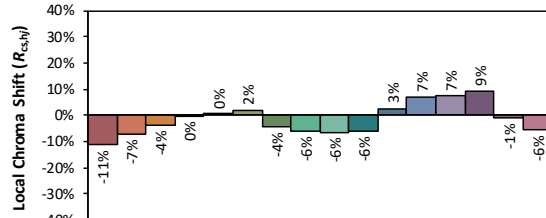
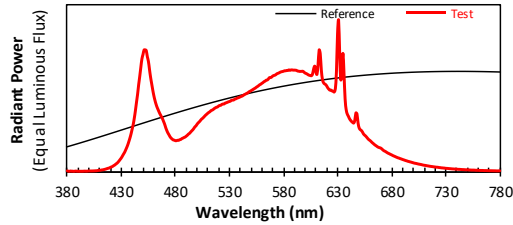
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/11/16

Model: WPX2 @ 40W / 4000K 480



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

x 0.3827
 y 0.3731
 u' 0.2281
 v' 0.5003

CIE 13.3-1995
(CRI)

R_a 84
 R_g 17

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	5.00E-06	447	6.20E-04	514	4.01E-04	581	6.57E-04	648	3.75E-04	715	3.53E-05
381	2.60E-06	448	6.79E-04	515	4.05E-04	582	6.57E-04	649	3.17E-04	716	3.42E-05
382	2.10E-06	449	7.34E-04	516	4.11E-04	583	6.59E-04	650	2.85E-04	717	3.31E-05
383	3.80E-06	450	7.63E-04	517	4.16E-04	584	6.59E-04	651	2.74E-04	718	3.23E-05
384	2.60E-06	451	7.93E-04	518	4.19E-04	585	6.63E-04	652	2.68E-04	719	3.10E-05
385	2.80E-06	452	7.93E-04	519	4.22E-04	586	6.60E-04	653	2.59E-04	720	3.03E-05
386	1.50E-06	453	7.90E-04	520	4.28E-04	587	6.63E-04	654	2.46E-04	721	2.91E-05
387	2.80E-06	454	7.50E-04	521	4.31E-04	588	6.63E-04	655	2.38E-04	722	2.87E-05
388	3.40E-06	455	7.20E-04	522	4.33E-04	589	6.62E-04	656	2.32E-04	723	2.79E-05
389	2.30E-06	456	6.68E-04	523	4.38E-04	590	6.62E-04	657	2.24E-04	724	2.65E-05
390	2.60E-06	457	6.17E-04	524	4.41E-04	591	6.61E-04	658	2.15E-04	725	2.59E-05
391	1.90E-06	458	5.75E-04	525	4.41E-04	592	6.60E-04	659	2.08E-04	726	2.45E-05
392	2.10E-06	459	5.34E-04	526	4.47E-04	593	6.56E-04	660	2.03E-04	727	2.42E-05
393	2.30E-06	460	4.97E-04	527	4.49E-04	594	6.55E-04	661	1.97E-04	728	2.33E-05
394	2.20E-06	461	4.67E-04	528	4.52E-04	595	6.53E-04	662	1.89E-04	729	2.28E-05
395	2.60E-06	462	4.41E-04	529	4.55E-04	596	6.53E-04	663	1.84E-04	730	2.15E-05
396	3.10E-06	463	4.21E-04	530	4.57E-04	597	6.54E-04	664	1.77E-04	731	2.11E-05
397	2.80E-06	464	4.04E-04	531	4.60E-04	598	6.54E-04	665	1.72E-04	732	2.06E-05
398	2.80E-06	465	3.87E-04	532	4.65E-04	599	6.48E-04	666	1.67E-04	733	1.97E-05
399	3.40E-06	466	3.72E-04	533	4.66E-04	600	6.43E-04	667	1.62E-04	734	1.91E-05
400	4.30E-06	467	3.59E-04	534	4.67E-04	601	6.39E-04	668	1.58E-04	735	1.85E-05
401	3.80E-06	468	3.46E-04	535	4.73E-04	602	6.36E-04	669	1.56E-04	736	1.77E-05
402	4.00E-06	469	3.28E-04	536	4.75E-04	603	6.31E-04	670	1.53E-04	737	1.73E-05
403	4.10E-06	470	3.10E-04	537	4.79E-04	604	6.28E-04	671	1.48E-04	738	1.68E-05
404	4.50E-06	471	2.88E-04	538	4.81E-04	605	6.26E-04	672	1.41E-04	739	1.60E-05
405	4.70E-06	472	2.69E-04	539	4.84E-04	606	6.26E-04	673	1.36E-04	740	1.59E-05
406	5.30E-06	473	2.53E-04	540	4.87E-04	607	6.39E-04	674	1.32E-04	741	1.54E-05
407	5.50E-06	474	2.41E-04	541	4.91E-04	608	6.72E-04	675	1.28E-04	742	1.46E-05
408	6.90E-06	475	2.28E-04	542	4.93E-04	609	6.87E-04	676	1.23E-04	743	1.46E-05
409	7.80E-06	476	2.19E-04	543	4.98E-04	610	6.50E-04	677	1.19E-04	744	1.39E-05
410	8.30E-06	477	2.12E-04	544	5.02E-04	611	6.35E-04	678	1.16E-04	745	1.35E-05
411	9.40E-06	478	2.07E-04	545	5.06E-04	612	6.99E-04	679	1.12E-04	746	1.30E-05
412	1.09E-05	479	2.05E-04	546	5.10E-04	613	7.93E-04	680	1.09E-04	747	1.28E-05
413	1.17E-05	480	2.02E-04	547	5.13E-04	614	7.68E-04	681	1.05E-04	748	1.20E-05
414	1.36E-05	481	2.02E-04	548	5.20E-04	615	6.64E-04	682	1.02E-04	749	1.19E-05
415	1.53E-05	482	2.04E-04	549	5.23E-04	616	6.03E-04	683	9.89E-05	750	1.16E-05
416	1.76E-05	483	2.04E-04	550	5.27E-04	617	5.80E-04	684	9.56E-05	751	1.09E-05
417	2.00E-05	484	2.08E-04	551	5.32E-04	618	5.72E-04	685	9.25E-05	752	1.07E-05
418	2.21E-05	485	2.10E-04	552	5.36E-04	619	5.67E-04	686	8.97E-05	753	1.04E-05
419	2.42E-05	486	2.15E-04	553	5.41E-04	620	5.58E-04	687	8.76E-05	754	9.90E-06
420	2.81E-05	487	2.18E-04	554	5.45E-04	621	5.46E-04	688	8.46E-05	755	9.80E-06
421	3.08E-05	488	2.22E-04	555	5.51E-04	622	5.37E-04	689	8.23E-05	756	9.80E-06
422	3.44E-05	489	2.25E-04	556	5.55E-04	623	5.31E-04	690	7.95E-05	757	9.40E-06
423	3.94E-05	490	2.31E-04	557	5.60E-04	624	5.32E-04	691	7.71E-05	758	8.70E-06
424	4.35E-05	491	2.37E-04	558	5.66E-04	625	5.25E-04	692	7.47E-05	759	8.60E-06
425	4.97E-05	492	2.44E-04	559	5.70E-04	626	5.23E-04	693	7.20E-05	760	8.10E-06
426	5.48E-05	493	2.49E-04	560	5.76E-04	627	5.19E-04	694	7.01E-05	761	8.10E-06
427	6.21E-05	494	2.57E-04	561	5.80E-04	628	5.41E-04	695	6.74E-05	762	7.70E-06
428	7.07E-05	495	2.65E-04	562	5.87E-04	629	6.52E-04	696	6.57E-05	763	7.40E-06
429	8.02E-05	496	2.72E-04	563	5.90E-04	630	8.97E-04	697	6.36E-05	764	7.50E-06
430	8.95E-05	497	2.81E-04	564	5.96E-04	631	9.88E-04	698	6.18E-05	765	7.00E-06
431	1.02E-04	498	2.91E-04	565	5.97E-04	632	7.66E-04	699	5.96E-05	766	6.70E-06
432	1.14E-04	499	2.98E-04	566	6.04E-04	633	6.00E-04	700	5.76E-05	767	6.80E-06
433	1.26E-04	500	3.08E-04	567	6.13E-04	634	6.66E-04	701	5.53E-05	768	6.50E-06
434	1.41E-04	501	3.17E-04	568	6.13E-04	635	7.71E-04	702	5.40E-05	769	6.20E-06
435	1.58E-04	502	3.24E-04	569	6.16E-04	636	6.37E-04	703	5.26E-05	770	6.00E-06
436	1.76E-04	503	3.32E-04	570	6.23E-04	637	4.74E-04	704	5.08E-05	771	5.70E-06
437	1.97E-04	504	3.41E-04	571	6.26E-04	638	4.04E-04	705	4.91E-05	772	5.60E-06
438	2.21E-04	505	3.47E-04	572	6.28E-04	639	3.76E-04	706	4.78E-05	773	5.50E-06
439	2.47E-04	506	3.53E-04	573	6.33E-04	640	3.62E-04	707	4.65E-05	774	5.30E-06
440	2.77E-04	507	3.61E-04	574	6.38E-04	641	3.46E-04	708	4.48E-05	775	5.20E-06
441	3.08E-04	508	3.68E-04	575	6.41E-04	642	3.35E-04	709	4.30E-05	776	5.10E-06
442	3.49E-04	509	3.74E-04	576	6.44E-04	643	3.27E-04	710	4.15E-05	777	4.70E-06
443	3.97E-04	510	3.81E-04	577	6.48E-04	644	3.21E-04	711	4.05E-05	778	4.60E-06
444	4.52E-04	511	3.86E-04	578	6.51E-04	645	3.17E-04	712	3.93E-05	779	4.90E-06
445	5.03E-04	512	3.91E-04	579	6.52E-04	646	3.34E-04	713	3.78E-05	780	4.90E-06
446	5.66E-04	513	3.98E-04	580	6.54E-04	647	3.82E-04	714	3.67E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	WPX2 @ 40W / 4000K 480	Sample ID	231101004-S1
Operate time (Min.)	30	Stabilization time (Min.)	60
Temperature (°C)	25.0	Humidity (%RH)	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 $25 \pm 1^{\circ}\text{C}$, 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	480.0	60	0.111	41.6	0.782
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

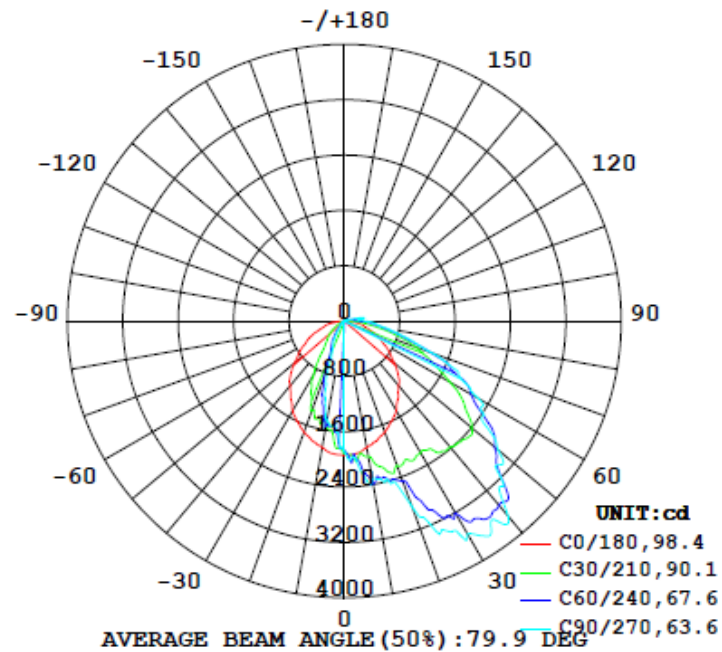
Test Result

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°)	
0°-180° zones	6238	113.7	147.0	65.1	96.8	150.0	2.8%	B1-U3-G2
0°-90° zones	6083	113.7	147.0	65.1	96.8	146.2	2.9%	B1-U3-G2

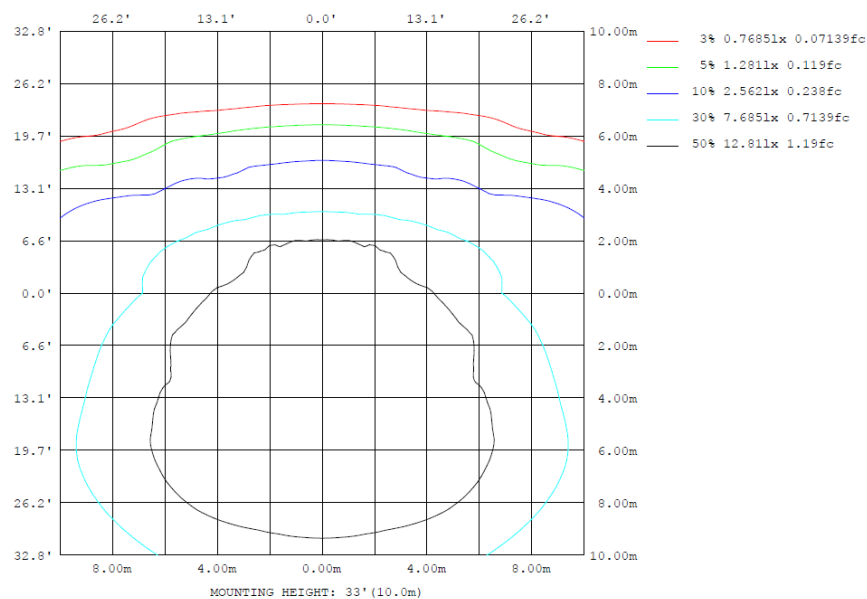
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

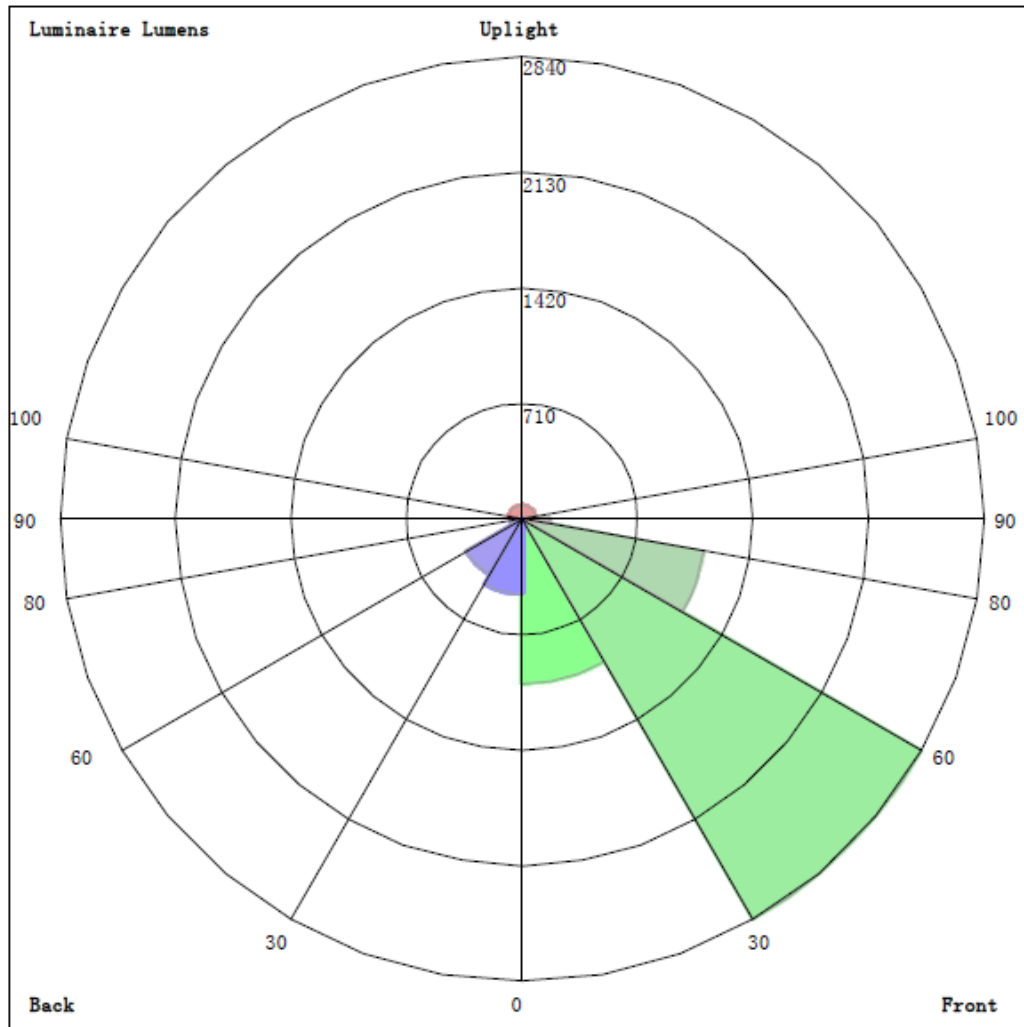
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	Φlum, lamp
10	1857	2217	2320	2217	1857	1507	1456	1507	0- 10	177.0	177.0	2.84,2.84
20	1705	2375	2845	2375	1705	1116	558.4	1116	10- 20	500.6	677.6	10.9,10.9
30	1496	2862	3557	2862	1496	442.8	285.3	442.8	20- 30	793.4	1471	23.6,23.6
40	1221	3134	3679	3134	1221	261.4	90.38	261.4	30- 40	1061	2532	40.6,40.6
50	938.3	2767	2901	2767	938.3	108.6	50.95	108.6	40- 50	1152	3684	59.1,59.1
60	651.1	2046	2232	2046	651.1	47.46	15.60	47.46	50- 60	1022	4706	75.4,75.4
70	399.2	1311	1351	1311	399.2	5.967	0.9945	5.967	60- 70	777.0	5483	87.9,87.9
80	213.4	569.8	641.8	569.8	213.4	2.539	1.388	2.539	70- 80	425.1	5908	94.7,94.7
90	20.27	175.6	305.7	175.6	20.27	1.706	1.493	1.706	80- 90	174.6	6083	97.5,97.5
100	17.26	73.79	292.0	73.79	17.26	2.154	1.923	2.154	90-100	71.15	6154	98.6,98.6
110	15.03	17.26	47.39	17.26	15.03	1.749	2.159	1.749	100-110	32.80	6187	99.2,99.2
120	8.357	48.84	20.24	48.84	8.357	1.685	2.116	1.685	110-120	14.93	6202	99.4,99.4
130	4.759	40.85	47.67	40.85	4.759	1.765	2.457	1.765	120-130	16.38	6218	99.7,99.7
140	1.502	25.38	39.33	25.38	1.502	1.927	2.507	1.927	130-140	11.64	6230	99.9,99.9
150	0.9839	12.62	21.20	12.62	0.9839	2.160	2.508	2.160	140-150	5.950	6236	100,100
160	1.189	0.9866	8.506	0.9866	1.189	2.243	2.224	2.243	150-160	2.136	6238	100,100
170	1.370	1.255	1.514	1.255	1.370	1.744	1.695	1.744	160-170	0.5637	6238	100,100
180	1.668	1.610	1.376	1.610	1.668	1.529	1.458	1.529	170-180	0.1476	6238	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

	Zonal (lm)		Total (lm)	Percent
0-10	176.97	0-10	176.97	2.84%
10-20	500.61	0-20	677.58	10.86%
20-30	793.40	0-30	1470.98	23.58%
30-40	1061.17	0-40	2532.15	40.59%
40-50	1152.25	0-50	3684.40	59.06%
50-60	1021.60	0-60	4706.00	75.44%
60-70	776.95	0-70	5482.95	87.89%
70-80	425.11	0-80	5908.06	94.71%
80-90	174.64	0-90	6082.70	97.51%
90-100	71.15	0-100	6153.85	98.65%
100-110	32.80	0-110	6186.65	99.17%
110-120	14.93	0-120	6201.58	99.41%
120-130	16.38	0-130	6217.96	99.67%
130-140	11.64	0-140	6229.60	99.86%
140-150	5.95	0-150	6235.55	99.96%
150-160	2.14	0-160	6237.69	99.99%
160-170	0.56	0-170	6238.25	100.00%
170-180	0.15	0-180	6238.40	100.00%

4.2 Goniophotometer Test

LCS/BUG

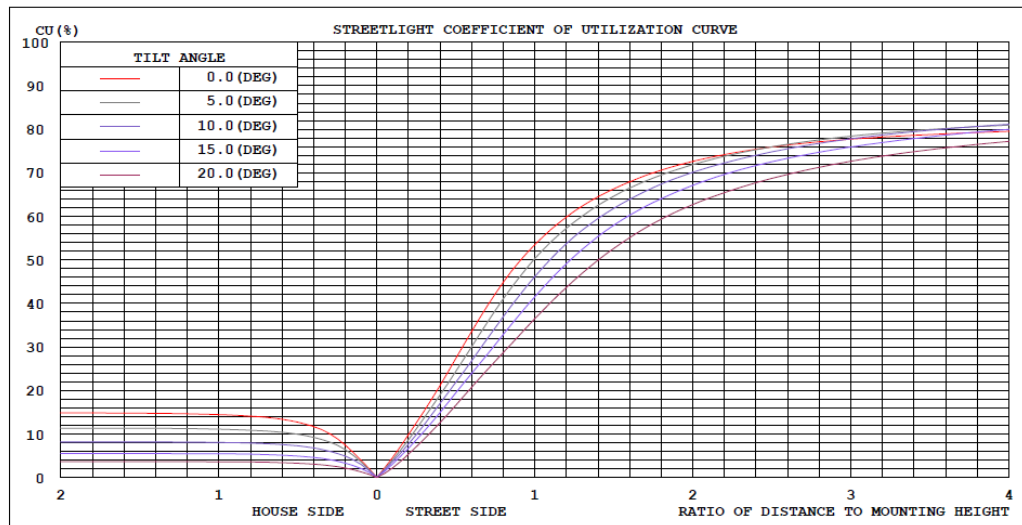


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

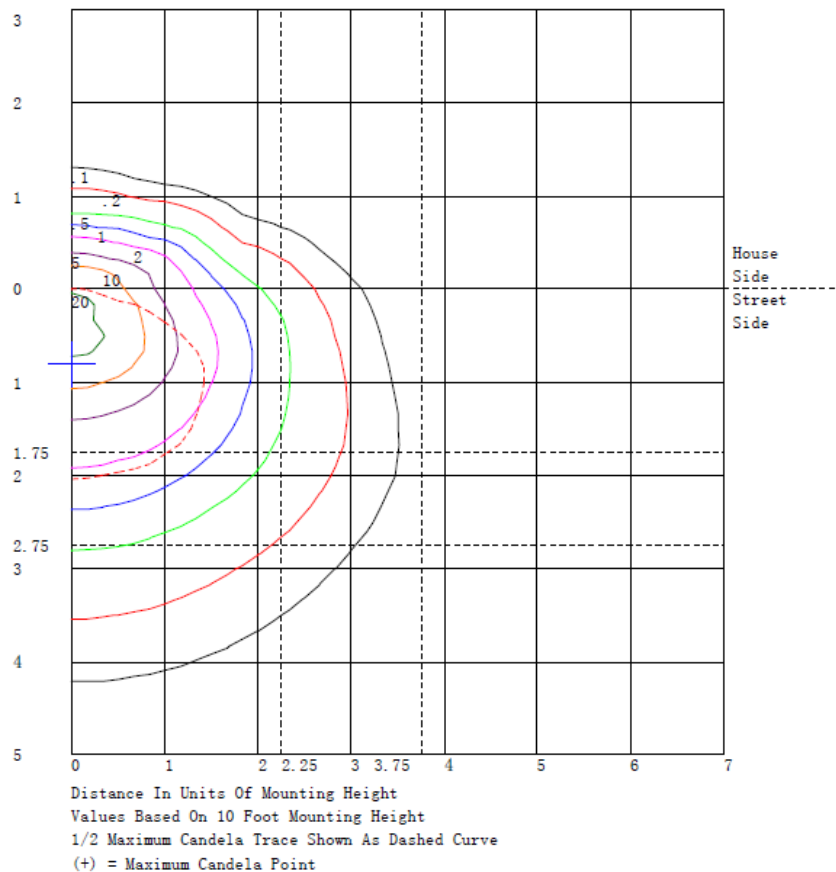
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1010.1	N.A.	16.2
FM - Front-Medium (30-60)	2840.0	N.A.	45.5
FH - Front-High (60-80)	1135.6	N.A.	18.2
FVH - Front-Very High (80-90)	167.3	N.A.	2.7
BL - Back-Low (0-30)	460.9	N.A.	7.4
BM - Back-Medium (30-60)	395.0	N.A.	6.3
BH - Back-High (60-80)	66.5	N.A.	1.1
BVH - Back-Very High (80-90)	7.4	N.A.	0.1
UL - Uplight-Low (90-100)	71.2	N.A.	1.1
UH - Uplight-High (100-180)	84.5	N.A.	1.4
Total	6238.5	N.A.	100.0
BUG Rating	B1-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	1938	1948	1950	1944	1925	1903	1881	1871	1866	1863	1863	1865	1867	1870	1873	1876	1880	1883	1886
5	1925	1907	1904	1916	1963	2010	2044	2007	1959	1918	1938	1972	2009	2023	2031	2034	2033	2031	2029
10	1857	1906	1945	1972	1974	1977	1991	2056	2135	2217	2287	2346	2388	2391	2379	2359	2343	2329	2320
15	1795	1793	1819	1872	1977	2092	2198	2239	2262	2276	2305	2333	2356	2373	2383	2387	2380	2370	2359
20	1705	1745	1804	1881	1995	2114	2225	2290	2338	2375	2396	2423	2465	2576	2695	2801	2839	2852	2845
25	1601	1720	1834	1940	2040	2134	2222	2290	2365	2462	2635	2823	3009	3158	3279	3363	3372	3355	3328
30	1496	1689	1852	1985	2052	2115	2201	2410	2639	2862	2994	3104	3203	3339	3463	3561	3582	3576	3557
35	1358	1574	1767	1938	2062	2182	2314	2519	2740	2964	3167	3349	3500	3591	3650	3684	3704	3710	3704
40	1221	1452	1667	1868	2034	2200	2379	2636	2895	3134	3277	3387	3475	3580	3667	3728	3727	3706	3679
45	1099	1292	1496	1711	1947	2187	2423	2658	2868	3042	3133	3184	3209	3230	3238	3236	3222	3206	3193
50	938	1091	1280	1505	1807	2114	2395	2566	2687	2767	2807	2825	2835	2876	2914	2942	2934	2918	2901
55	801	940	1112	1316	1589	1867	2121	2275	2384	2456	2500	2519	2515	2486	2449	2414	2411	2415	2422
60	651	835	1020	1204	1402	1591	1759	1882	1977	2046	2077	2095	2112	2169	2225	2269	2265	2250	2232
65	547	725	889	1038	1169	1288	1398	1515	1619	1701	1732	1743	1745	1761	1776	1790	1803	1813	1819
70	399	495	598	711	844	976	1099	1190	1261	1311	1327	1328	1324	1335	1347	1356	1355	1353	1351
75	295	336	391	462	565	670	765	814	845	863	874	879	884	898	913	926	930	931	930
80	213	214	230	260	316	379	444	495	537	570	582	587	588	596	605	614	626	636	642
85	84.5	83.9	93.7	114	150	193	237	275	309	339	360	378	392	409	424	435	441	443	444
90	20.3	31.2	44.0	58.8	76.2	95.0	115	135	155	176	198	221	242	261	276	289	298	303	306
95	16.6	23.1	29.9	37.2	44.7	52.8	61.7	71.4	82.5	95.3	111	129	147	167	185	200	210	216	219
100	17.3	18.3	19.8	21.7	22.6	25.1	30.3	40.5	54.8	73.8	100	130	162	196	229	257	276	288	292
105	11.4	12.5	13.6	14.6	14.9	15.6	17.3	21.2	26.5	33.2	41.5	50.9	61.2	73.8	85.8	95.9	100	102	101
110	15.0	11.1	10.1	12.1	20.4	29.2	35.8	30.1	22.8	17.3	24.2	33.5	42.7	44.7	45.1	44.6	45.8	46.8	47.4
115	11.8	7.91	7.06	9.27	17.0	25.9	34.3	38.1	39.4	37.8	29.3	20.5	14.0	18.9	26.7	35.3	40.2	43.4	44.4
120	8.36	5.06	4.73	7.36	14.8	23.8	33.0	39.7	45.0	48.8	51.3	51.5	49.2	40.9	31.5	22.8	20.1	19.4	20.2
125	6.43	3.53	3.34	5.86	12.6	20.9	29.7	36.8	43.1	48.3	52.0	54.4	55.4	54.4	52.5	50.2	48.2	46.7	45.8
130	4.76	2.42	2.33	4.47	10.0	16.9	24.3	30.3	35.9	40.9	45.3	48.9	51.4	51.6	50.9	49.7	48.8	47.0	47.7
135	1.56	0.00	0.00	0.98	6.31	12.9	19.8	24.6	29.0	33.1	37.5	41.4	44.4	45.2	45.3	44.9	45.0	45.1	45.2
140	1.50	2.32	3.68	5.60	8.23	11.3	14.7	18.2	21.8	25.4	28.7	31.6	34.1	35.6	36.8	37.5	38.4	39.0	39.3
145	1.39	1.63	2.34	3.53	5.30	7.46	9.93	12.8	15.7	18.5	20.7	22.6	24.3	25.7	26.9	28.0	29.2	30.1	30.8
150	0.98	0.96	0.93	0.90	0.29	0.11	0.82	4.40	8.57	12.6	14.6	15.9	16.8	17.8	18.6	19.3	20.1	20.8	21.2
155	1.08	0.94	0.98	1.19	1.52	2.07	2.89	4.25	5.79	7.37	8.75	10.0	11.1	11.8	12.4	12.9	13.4	13.9	14.1
160	1.19	1.12	1.10	1.14	1.30	1.46	1.56	1.26	1.01	0.99	1.68	2.67	3.87	5.29	6.68	7.86	8.33	8.52	8.51
165	1.27	1.28	1.27	1.27	1.22	1.19	1.20	1.30	1.47	1.70	2.19	2.62	2.86	2.36	1.71	1.08	0.95	0.97	1.06
170	1.37	1.38	1.38	1.38	1.37	1.36	1.35	1.32	1.29	1.26	1.22	1.21	1.22	1.32	1.43	1.53	1.54	1.53	1.51
175	1.44	1.46	1.46	1.47	1.46	1.46	1.45	1.44	1.44	1.43	1.43	1.41	1.40	1.38	1.36	1.34	1.31	1.29	1.28
180	1.67	1.67	1.68	1.68	1.67	1.66	1.65	1.64	1.62	1.61	1.59	1.56	1.54	1.51	1.48	1.46	1.42	1.39	1.38

UNIT: cd																			
C (DEG) y	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	1883	1880	1876	1873	1870	1867	1865	1863	1863	1866	1871	1881	1903	1925	1944	1950	1948	1938	1950
5	2031	2033	2034	2031	2023	2009	1972	1938	1918	1959	2007	2044	2010	1963	1916	1904	1907	1925	1888
10	2329	2343	2359	2379	2391	2388	2346	2287	2217	2135	2056	1991	1977	1974	1972	1945	1906	1857	1793
15	2370	2380	2387	2383	2373	2356	2333	2305	2276	2262	2239	2198	2092	1977	1872	1819	1793	1795	1665
20	2852	2839	2801	2695	2576	2465	2423	2396	2375	2338	2290	2225	2114	1995	1881	1804	1745	1705	1548
25	3355	3372	3363	3279	3158	3009	2823	2635	2462	2365	2290	2222	2134	2040	1940	1834	1720	1601	1531
30	3576	3582	3561	3463	3339	3203	3104	2994	2862	2639	2410	2201	2115	2052	1985	1852	1689	1496	1476
35	3710	3704	3684	3650	3591	3500	3349	3167	2964	2740	2519	2314	2182	2062	1938	1767	1574	1358	1372
40	3706	3727	3728	3667	3580	3475	3387	3277	3134	2895	2636	2379	2200	2034	1868	1667	1452	1221	1206
45	3206	3222	3236	3238	3230	3209	3184	3133	3042	2868	2658	2423	2187	1947	1711	1496	1292	1099	1048
50	2918	2934	2942	2914	2876	2835	2825	2807	2767	2687	2566	2395	2114	1807	1505	1280	1091	938	833
55	2415	2411	2414	2449	2486	2515	2519	2500	2456	2384	2275	2121	1867	1589	1316	1112	940	801	650
60	2250	2265	2269	2225	2169	2112	2095	2077	2046	1977	1882	1759	1591	1402	1204	1020	835	651	487
65	1813	1803	1790	1776	1761	1745	1743	1732	1701	1619	1515	1398	1288	1169	1038	889	725	547	402
70	1353	1355	1356	1347	1335	1324	1328	1327	1311	1261	1190	1099	976	844	711	598	495	399	299
75	931	930	926	913	898	884	879	874	863	845	814	765	670	565	462	391	336	295	212
80	636	626	614	605	596	588	587	582	570	537	495	444	379	316	260	230	214	213	145
85	443	441	435	424	409	392	378	360	339	309	275	237	193	150	114	93.7	83.9	84.5	60.6
90	303	298	289	276	261	242	221	198	176	155	135	115	95.0	76.2	58.8	44.0	31.2	20.3	18.5
95	216	210	200	185	167	147	129	111	95.3	82.5	71.4	61.7	52.8	44.7	37.2	29.9	23.1	16.6	14.3
100	288	276	257	229	196	162	130	100	73.8	54.8	40.5	30.3	25.1	22.6	21.7	19.8	18.3	17.3	13.7
105	102	100	95.9	85.8	73.8	61.2	50.9	41.5	33.2	26.5	21.2	17.3	15.6	14.9	14.6	13.6	12.5	11.4	8.86
110	46.8	45.8	44.6	45.1	44.7	42.7	33.5	24.2	17.3	22.8	30.1	35.8	29.2	20.4	12.1	10.1	11.1	15.0	10.8
115	43.4	40.2	35.3	26.7	18.9	14.0	20.5	29.3	37.8	39.4	38.1	34.3	25.9	17.0	9.27	7.06	7.91	11.8	8.65
120	19.4	20.1	22.8	31.5	40.9	49.2	51.5	51.3	48.8	45.0	39.7	33.0	23.8	14.8	7.36	4.73	5.06	8.36	6.46
125	46.7	48.2	50.2	52.5	54.4	55.4	54.4	52.0	48.3	43.1	36.8	29.7	20.9	12.6	5.86	3.34	3.53	6.43	5.09
130	48.0	48.8	49.7	50.9	51.6	51.4	48.9	45.3	40.9	35.9	30.3	24.3	16.9	10.0	4.47	2.33	2.42	4.76	3.90
135	45.1	45.0	44.9	45.3	45.2	44.4	41.4	37.5	33.1	29.0	24.6	19.8	12.9	6.31	0.98	0.00	0.00	1.56	1.99
140	39.0	38.4	37.5	36.8	35.6	34.1	31.6	28.7	25.4	21.8	18.2	14.7	11.3	8.33	0.60	3.68	2.32	5.50	1.77
145	30.1	29.2	28.0	26.9	25.7	24.3	22.6	20.7	18.5	15.7	12.8	9.93	7.46	5.30	3.53	2.34	1.63	1.39	1.63
150	20.8	20.1	19.3	18.6	17.8	16.8	15.9	14.6	12.6	8.57	4.40	0.82	0.11	0.29	0.90	0.93	0.96	0.98	1.33
155	13.9	13.4	12.9	12.4	11.8	11.1	10.1	8.75	7.37	4.25	2.89	0.82	0.07	1.52	1.19	0.98	0.94	1.08	1.55
160	8.52	8.33	7.86	6.68	5.29	3.87	2.67	1.68	0.99	1.01	1.26	1.56	1.46	1.30	1.14	1.10	1.12	1.19	1.77
165	0.97	0.95	1.08	1.71	2.36	2.86	2.62	2.19	1.70	1.47	1.30	1.20	1.19	1.22	1.27	1.27	1.28	1.27	1.77
170	1.53	1.54	1.53	1.43	1.32	1.22	1.21	1.22	1.26	1.29	1.32	1.35	1.36	1.37	1.38	1.38	1.38	1.37	1.77
175	1.29	1.31	1.34	1.36	1.38	1.40	1.41	1.43	1.43	1.44	1.44	1.45	1.46	1.46	1.47	1.46	1.46	1.44	1.66
180	1.39	1.42	1.46	1.48	1.51	1.54	1.56	1.59	1.61	1.62	1.64	1.65	1.66	1.67	1.68	1.68	1.67	1.67	1.77

Table--3

UNIT: cd

C (DBG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
γ (DBG)	0	1959	1966	1973	1975	1968	1936	1900	1869	1863	1865	1872	1875	1878	1882	1884	1886	1886	1884
5	1854	1823	1798	1773	1744	1692	1641	1599	1596	1601	1609	1599	1585	1568	1549	1532	1521	1532	1549
10	1730	1669	1601	1541	1495	1486	1492	1507	1530	1547	1552	1503	1447	1399	1411	1433	1456	1433	1411
15	1564	1491	1455	1440	1439	1445	1447	1437	1377	1307	1236	1192	1159	1135	1120	1113	1112	1113	1120
20	1433	1359	1360	1378	1387	1314	1220	1116	1025	937	851	763	685	620	583	563	558	563	583
25	1459	1385	1317	1241	1152	1019	878	740	628	535	464	430	415	410	402	397	395	397	402
30	1423	1338	1204	1049	884	718	567	443	394	373	367	344	323	306	294	288	285	288	294
35	1331	1234	1037	817	606	494	415	360	312	275	247	219	197	179	169	163	161	163	169
40	1143	1033	831	615	417	335	288	261	215	175	141	120	106	97.2	92.0	90.0	90.4	90.0	92.0
45	967	855	681	500	335	253	201	168	134	109	92.1	83.5	79.8	79.1	76.4	74.6	73.9	74.6	76.4
50	724	613	488	368	262	193	143	109	87.6	75.8	69.9	62.3	56.9	53.4	51.4	50.7	51.0	50.7	51.4
55	518	405	315	241	183	137	102	77.4	60.5	50.0	44.1	39.8	37.6	36.9	35.9	35.5	35.6	35.5	35.9
60	354	250	186	144	117	87.9	64.7	47.5	36.6	29.8	25.8	21.9	19.1	17.4	16.1	15.6	15.6	15.6	16.1
65	283	190	132	94.7	71.1	49.7	34.7	24.1	13.9	6.37	1.34	0.00	0.00	0.58	0.58	0.66	0.77	0.66	0.58
70	215	148	100	66.3	42.7	24.7	12.9	5.97	1.96	0.48	0.57	0.26	0.36	0.68	0.77	0.88	0.99	0.88	0.77
75	143	90.1	56.2	34.3	21.2	11.5	6.08	3.65	1.62	0.79	0.72	0.53	0.58	0.77	0.90	1.05	1.21	1.05	0.90
80	90.7	50.2	28.3	16.8	12.0	6.68	3.79	2.54	1.42	0.95	0.88	0.76	0.78	0.89	1.05	1.22	1.39	1.22	1.05
85	41.2	26.2	16.9	11.0	7.59	4.66	2.86	1.90	1.28	1.05	1.06	0.98	0.99	1.05	1.16	1.30	1.43	1.30	1.16
90	16.5	14.1	11.1	8.05	5.30	3.62	2.45	1.71	1.34	1.21	1.24	1.21	1.22	1.26	1.32	1.40	1.49	1.40	1.32
95	12.1	10.0	7.92	6.00	4.34	3.18	2.34	1.78	1.51	1.42	1.45	1.43	1.44	1.47	1.50	1.55	1.62	1.55	1.50
100	10.7	8.15	6.14	4.58	3.44	2.75	2.35	2.15	2.01	1.95	1.93	1.88	1.83	1.81	1.81	1.85	1.92	1.85	1.81
105	6.70	4.89	3.40	2.29	1.56	1.46	1.63	1.93	2.00	2.05	2.08	2.07	2.05	2.04	2.05	2.09	2.17	2.09	2.05
110	7.47	4.95	3.55	2.77	2.41	2.03	1.83	1.75	1.76	1.83	1.93	2.02	2.10	2.16	2.16	2.16	2.16	2.16	2.16
115	6.10	4.16	3.03	2.38	2.07	1.82	1.73	1.73	1.76	1.83	1.90	1.93	1.95	1.97	1.99	2.02	2.05	2.02	1.99
120	4.89	3.63	2.75	2.15	1.79	1.63	1.61	1.68	1.75	1.83	1.92	1.96	1.99	2.02	2.06	2.09	2.12	2.09	2.06
125	3.97	3.07	2.43	1.98	1.71	1.61	1.63	1.71	1.80	1.91	2.01	2.06	2.10	2.13	2.18	2.23	2.26	2.23	2.18
130	3.18	2.59	2.14	1.83	1.63	1.60	1.66	1.77	1.85	1.94	2.04	2.12	2.20	2.28	2.35	2.41	2.46	2.41	2.35
135	2.21	2.30	2.12	1.87	1.64	1.64	1.72	1.83	1.93	2.03	2.12	2.20	2.27	2.33	2.39	2.43	2.46	2.43	2.39
140	1.94	2.03	1.96	1.85	1.74	1.78	1.84	1.93	1.99	2.06	2.13	2.21	2.28	2.35	2.41	2.46	2.51	2.46	2.41
145	1.78	1.90	1.93	1.92	1.91	1.94	1.99	2.05	2.12	2.19	2.26	2.30	2.33	2.36	2.42	2.49	2.54	2.49	2.42
150	1.71	1.93	2.02	2.05	2.05	2.08	2.12	2.16	2.20	2.24	2.28	2.30	2.33	2.36	2.41	2.47	2.51	2.47	2.41
155	1.91	2.17	2.27	2.29	2.26	2.23	2.20	2.18	2.19	2.21	2.24	2.28	2.31	2.34	2.35	2.35	2.35	2.35	2.35
160	2.09	2.35	2.44	2.44	2.39	2.34	2.29	2.24	2.24	2.25	2.26	2.24	2.21	2.19	2.20	2.21	2.22	2.21	2.20
165	2.15	2.40	2.46	2.42	2.34	2.29	2.24	2.18	2.14	2.09	2.05	2.00	1.95	1.93	1.94	1.97	1.99	1.97	1.94
170	2.05	2.22	2.24	2.17	2.06	1.95	1.84	1.74	1.73	1.73	1.75	1.73	1.71	1.70	1.69	1.69	1.70	1.69	1.69
175	1.88	1.99	2.02	2.00	1.94	1.84	1.74	1.64	1.62	1.62	1.63	1.58	1.53	1.49	1.51	1.55	1.59	1.55	1.51
180	1.65	1.65	1.64	1.63	1.62	1.59	1.56	1.53	1.49	1.46	1.43	1.41	1.40	1.39	1.41	1.43	1.46	1.43	1.41

C (DEG)																UNIT: cd			
γ (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	1882	1878	1875	1872	1865	1863	1869	1900	1936	1968	1975	1973	1966	1959	1950				
5	1568	1585	1599	1609	1601	1596	1599	1641	1692	1744	1773	1798	1823	1854	1888				
10	1399	1447	1503	1552	1547	1530	1507	1492	1486	1495	1541	1601	1669	1730	1793				
15	1135	1159	1192	1236	1307	1377	1437	1447	1445	1439	1440	1455	1491	1564	1665				
20	620	685	763	851	937	1025	1116	1220	1314	1387	1378	1360	1359	1433	1548				
25	410	415	430	464	535	628	740	878	1019	1152	1241	1317	1385	1459	1531				
30	306	323	344	367	373	394	443	567	718	884	1049	1204	1338	1423	1476				
35	179	197	219	247	275	312	360	415	494	606	817	1037	1234	1331	1372				
40	97.2	106	120	141	175	215	261	288	335	417	615	831	1033	1143	1206				
45	79.1	79.8	83.5	92.1	109	134	168	201	253	335	500	681	855	967	1048				
50	53.4	56.9	62.3	69.9	75.8	87.6	109	143	193	262	368	488	613	724	833				
55	36.9	37.6	39.8	44.1	50.0	60.5	77.4	102	137	183	241	315	405	518	650				
60	17.4	19.1	21.9	25.8	29.8	36.6	47.5	64.7	87.9	117	144	186	250	354	487				
65	0.58	0.00	0.00	1.34	6.37	13.9	24.1	34.7	49.7	71.1	94.7	132	190	283	402				
70	0.68	0.36	0.26	0.57	0.48	1.96	5.97	12.9	24.7	42.7	66.3	100	148	215	299				
75	0.77	0.58	0.53	0.72	0.79	1.62	3.65	6.08	11.5	21.2	34.3	56.2	90.1	143	212				
80	0.89	0.78	0.76	0.88	0.95	1.42	2.54	3.79	6.68	12.0	16.8	28.3	50.2	90.7	145				
85	1.05	0.99	0.98	1.06	1.05	1.28	1.90	2.86	4.66	7.59	11.0	16.9	26.2	41.2	60.6				
90	1.26	1.22	1.21	1.24	1.21	1.34	1.71	2.45	3.62	5.30	8.05	11.1	14.1	16.5	18.5				
95	1.47	1.44	1.43	1.45	1.42	1.51	1.78	2.34	3.18	4.34	6.00	7.92	10.0	12.1	14.3				
100	1.81	1.83	1.88	1.93	1.95	2.01	2.15	2.35	2.75	3.44	4.58	6.14	8.15	10.7	13.7				
105	2.04	2.05	2.07	2.08	2.05	2.00	1.93	1.63	1.46	1.56	2.29	3.40	4.89	6.70	8.86				
110	2.16	2.10	2.02	1.93	1.83	1.76	1.75	1.83	2.03	2.41	2.77	3.55	4.95	7.47	10.8				
115	1.97	1.95	1.93	1.90	1.83	1.76	1.73	1.73	1.82	2.07	2.38	3.03	4.16	6.10	8.65				
120	2.02	1.99	1.96	1.92	1.83	1.75	1.68	1.61	1.63	1.79	2.15	2.75	3.63	4.89	6.46				
125	2.13	2.10	2.06	2.01	1.91	1.80	1.71	1.63	1.61	1.71	1.98	2.43	3.07	3.97	5.09				
130	2.28	2.20	2.12	2.04	1.94	1.85	1.77	1.66	1.60	1.63	1.83	2.14	2.59	3.18	3.90				
135	2.33	2.27	2.20	2.12	2.03	1.93	1.83	1.72	1.64	1.64	1.87	2.12	2.30	2.21	1.96				
140	2.35	2.28	2.21	2.13	2.06	1.99	1.93	1.84	1.78	1.74	1.85	1.96	2.03	1.94	1.77				
145	2.36	2.33	2.30	2.26	2.19	2.12	2.05	1.99	1.94	1.91	1.92	1.93	1.90	1.78	1.61				
150	2.36	2.33	2.30	2.28	2.24	2.20	2.16	2.12	2.08	2.05	2.05	2.02	1.93	1.71	1.39				
155	2.34	2.31	2.28	2.24	2.21	2.19	2.18	2.20	2.23	2.26	2.29	2.27	2.17	1.91	1.55				
160	2.19	2.21	2.24	2.26	2.25	2.24	2.24	2.29	2.34	2.39	2.44	2.44	2.35	2.09	1.70				
165	1.93	1.95	2.00	2.05	2.09	2.14	2.18	2.24	2.29	2.34	2.42	2.46	2.40	2.15	1.78				
170	1.70	1.71	1.73	1.75	1.73	1.73	1.74	1.84	1.95	2.06	2.17	2.24	2.22	2.05	1.77				
175	1.49	1.53	1.58	1.63	1.62	1.62	1.64	1.74	1.84	1.94	2.00	2.02	1.99	1.88	1.69				
180	1.38	1.40	1.43	1.42	1.46	1.45	1.53	1.56	1.59	1.62	1.63	1.64	1.65	1.66	1.66				

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	WPX2 @ 40W / 4000K 480	Sample ID	231101004-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(%)
480.0	60	0.111	41.6	0.782	16.13

5.0 Equipment List:

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

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