

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

Prepared By

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Technical Lead: Vincent Yuan
Issue Date: 2023-11-16
Revised Date: N/A

1.0 Test Summary

DLC Technical Requirements V5.1

Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires				
Requirement Category	Test Method	Requirements		Test Value
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		8639
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		8424
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	146.3
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		57.6
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	480V	10.56
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	480V	0.858
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3985±275	3932
		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		0.140
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		57.6
(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 @ 60W / 4000K 480	231101004-S1
2	Goniophotometer Test	2023-11-08	WPX2 @ 60W / 4000K 480	231101004-S1
3	THD and PF Test	2023-11-08	WPX2 @ 60W / 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 @ 60W / 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 @ 60W / 4000K 480	Sample ID	231101004-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

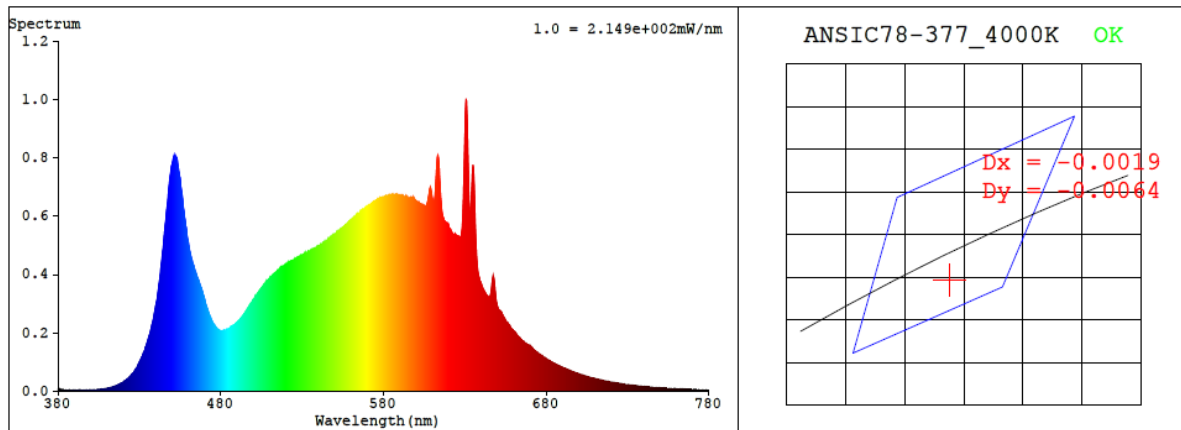
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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.</p> <p>Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780nm.</p>

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
480.0	60	0.140	57.6	0.858

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
3932	84.4	17	-0.0025	84	96	-11%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3816$ $y = 0.3723$ / $u' = 0.2277$ $v' = 0.4998$ ($duv = -2.46e-03$)

CCT= 3932K Prcp WL: Ld=580.7nm Purity=26.2%

Peak WL: Lp=631nm FWHM: =97.3nm Ratio: R=19.0% G=77.3% B=3.7%

Render Index: Ra = 84.4 AvgR = 78.5 TM30: Rf=84 Rg=96

EEI: 0.09265 A++ Highest

R1 =83 R2 =91 R3 =95 R4 =82 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

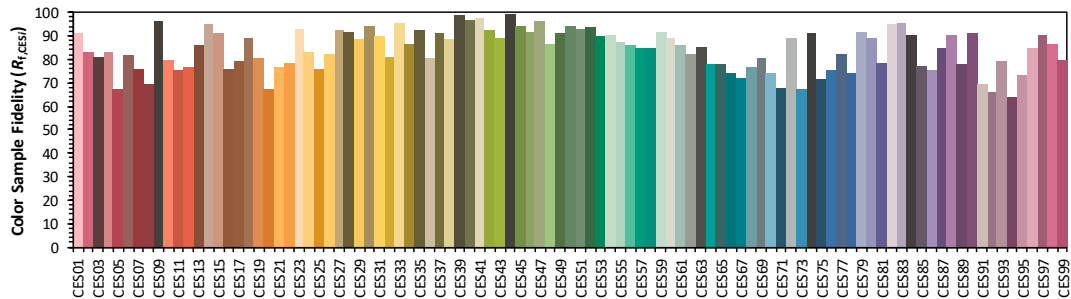
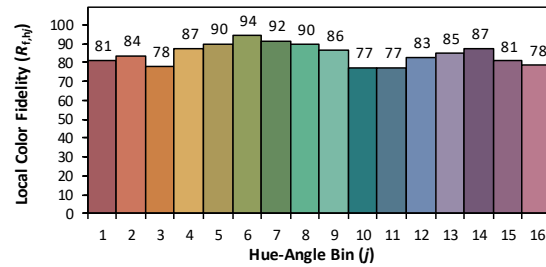
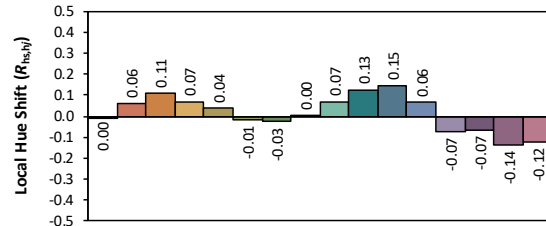
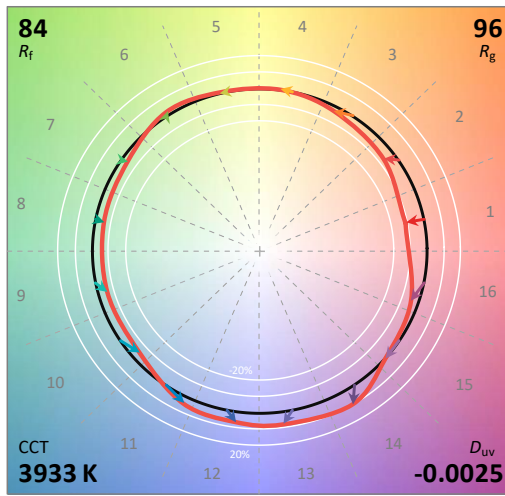
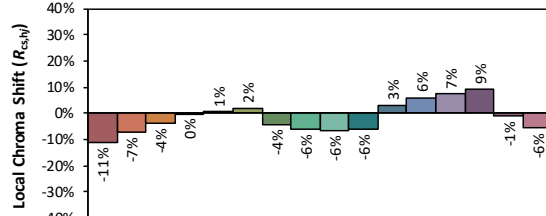
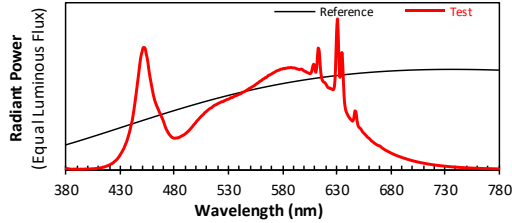
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/11/16

Model: WPX2 @ 60W / 4000K 480



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

x 0.3816
 y 0.3721
 u' 0.2277
 v' 0.4997

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	4.90E-06	447	6.37E-04	514	4.07E-04	581	6.69E-04	648	3.79E-04	715	3.64E-05
381	6.90E-06	448	6.96E-04	515	4.13E-04	582	6.67E-04	649	3.22E-04	716	3.54E-05
382	5.10E-06	449	7.46E-04	516	4.20E-04	583	6.70E-04	650	2.90E-04	717	3.41E-05
383	4.30E-06	450	7.76E-04	517	4.24E-04	584	6.70E-04	651	2.78E-04	718	3.34E-05
384	2.90E-06	451	8.04E-04	518	4.28E-04	585	6.73E-04	652	2.73E-04	719	3.18E-05
385	2.80E-06	452	8.07E-04	519	4.30E-04	586	6.73E-04	653	2.63E-04	720	3.11E-05
386	2.60E-06	453	8.00E-04	520	4.35E-04	587	6.74E-04	654	2.51E-04	721	3.00E-05
387	4.00E-06	454	7.62E-04	521	4.39E-04	588	6.75E-04	655	2.42E-04	722	2.91E-05
388	1.80E-06	455	7.31E-04	522	4.42E-04	589	6.73E-04	656	2.36E-04	723	2.80E-05
389	3.30E-06	456	6.80E-04	523	4.46E-04	590	6.72E-04	657	2.28E-04	724	2.73E-05
390	3.20E-06	457	6.29E-04	524	4.49E-04	591	6.72E-04	658	2.20E-04	725	2.67E-05
391	3.10E-06	458	5.89E-04	525	4.49E-04	592	6.70E-04	659	2.12E-04	726	2.55E-05
392	1.40E-06	459	5.51E-04	526	4.54E-04	593	6.66E-04	660	2.07E-04	727	2.47E-05
393	3.10E-06	460	5.13E-04	527	4.57E-04	594	6.65E-04	661	2.01E-04	728	2.42E-05
394	3.10E-06	461	4.79E-04	528	4.61E-04	595	6.62E-04	662	1.92E-04	729	2.33E-05
395	2.50E-06	462	4.53E-04	529	4.64E-04	596	6.62E-04	663	1.86E-04	730	2.28E-05
396	2.70E-06	463	4.33E-04	530	4.66E-04	597	6.64E-04	664	1.81E-04	731	2.17E-05
397	4.00E-06	464	4.15E-04	531	4.69E-04	598	6.63E-04	665	1.75E-04	732	2.12E-05
398	3.50E-06	465	3.99E-04	532	4.75E-04	599	6.58E-04	666	1.70E-04	733	2.04E-05
399	3.90E-06	466	3.83E-04	533	4.75E-04	600	6.52E-04	667	1.65E-04	734	1.98E-05
400	3.90E-06	467	3.67E-04	534	4.78E-04	601	6.49E-04	668	1.61E-04	735	1.89E-05
401	4.10E-06	468	3.51E-04	535	4.82E-04	602	6.45E-04	669	1.58E-04	736	1.87E-05
402	4.10E-06	469	3.34E-04	536	4.86E-04	603	6.40E-04	670	1.56E-04	737	1.79E-05
403	4.80E-06	470	3.17E-04	537	4.89E-04	604	6.39E-04	671	1.51E-04	738	1.72E-05
404	5.50E-06	471	2.95E-04	538	4.91E-04	605	6.35E-04	672	1.44E-04	739	1.67E-05
405	5.60E-06	472	2.75E-04	539	4.95E-04	606	6.35E-04	673	1.39E-04	740	1.63E-05
406	5.80E-06	473	2.59E-04	540	4.98E-04	607	6.49E-04	674	1.35E-04	741	1.61E-05
407	7.00E-06	474	2.47E-04	541	5.01E-04	608	6.82E-04	675	1.30E-04	742	1.53E-05
408	7.30E-06	475	2.36E-04	542	5.04E-04	609	6.95E-04	676	1.26E-04	743	1.48E-05
409	8.60E-06	476	2.26E-04	543	5.10E-04	610	6.61E-04	677	1.22E-04	744	1.43E-05
410	9.50E-06	477	2.18E-04	544	5.13E-04	611	6.45E-04	678	1.18E-04	745	1.38E-05
411	1.01E-05	478	2.12E-04	545	5.16E-04	612	7.07E-04	679	1.15E-04	746	1.33E-05
412	1.21E-05	479	2.10E-04	546	5.20E-04	613	8.02E-04	680	1.11E-04	747	1.32E-05
413	1.34E-05	480	2.07E-04	547	5.25E-04	614	7.81E-04	681	1.07E-04	748	1.26E-05
414	1.60E-05	481	2.08E-04	548	5.29E-04	615	6.79E-04	682	1.04E-04	749	1.21E-05
415	1.72E-05	482	2.09E-04	549	5.35E-04	616	6.14E-04	683	1.01E-04	750	1.17E-05
416	1.90E-05	483	2.09E-04	550	5.39E-04	617	5.89E-04	684	9.78E-05	751	1.13E-05
417	2.23E-05	484	2.12E-04	551	5.42E-04	618	5.80E-04	685	9.47E-05	752	1.10E-05
418	2.49E-05	485	2.14E-04	552	5.47E-04	619	5.75E-04	686	9.18E-05	753	1.08E-05
419	2.76E-05	486	2.20E-04	553	5.52E-04	620	5.67E-04	687	8.87E-05	754	1.02E-05
420	3.06E-05	487	2.23E-04	554	5.55E-04	621	5.54E-04	688	8.68E-05	755	1.03E-05
421	3.49E-05	488	2.27E-04	555	5.61E-04	622	5.44E-04	689	8.43E-05	756	9.80E-06
422	3.89E-05	489	2.30E-04	556	5.66E-04	623	5.39E-04	690	8.11E-05	757	9.30E-06
423	4.31E-05	490	2.36E-04	557	5.71E-04	624	5.39E-04	691	7.86E-05	758	9.20E-06
424	4.89E-05	491	2.41E-04	558	5.77E-04	625	5.33E-04	692	7.63E-05	759	9.00E-06
425	5.56E-05	492	2.48E-04	559	5.83E-04	626	5.31E-04	693	7.42E-05	760	8.80E-06
426	6.12E-05	493	2.55E-04	560	5.87E-04	627	5.28E-04	694	7.21E-05	761	8.50E-06
427	6.89E-05	494	2.62E-04	561	5.92E-04	628	5.47E-04	695	6.96E-05	762	8.10E-06
428	7.78E-05	495	2.70E-04	562	5.98E-04	629	6.55E-04	696	6.70E-05	763	7.70E-06
429	8.80E-05	496	2.78E-04	563	6.01E-04	630	8.96E-04	697	6.52E-05	764	7.80E-06
430	9.92E-05	497	2.87E-04	564	6.08E-04	631	9.93E-04	698	6.30E-05	765	7.40E-06
431	1.11E-04	498	2.97E-04	565	6.08E-04	632	7.83E-04	699	6.12E-05	766	7.00E-06
432	1.24E-04	499	3.04E-04	566	6.15E-04	633	6.14E-04	700	5.90E-05	767	6.80E-06
433	1.36E-04	500	3.13E-04	567	6.23E-04	634	6.71E-04	701	5.72E-05	768	6.70E-06
434	1.53E-04	501	3.23E-04	568	6.24E-04	635	7.74E-04	702	5.55E-05	769	6.40E-06
435	1.71E-04	502	3.29E-04	569	6.29E-04	636	6.49E-04	703	5.37E-05	770	6.40E-06
436	1.88E-04	503	3.38E-04	570	6.32E-04	637	4.84E-04	704	5.21E-05	771	6.10E-06
437	2.12E-04	504	3.46E-04	571	6.38E-04	638	4.11E-04	705	5.04E-05	772	6.10E-06
438	2.36E-04	505	3.53E-04	572	6.41E-04	639	3.83E-04	706	4.86E-05	773	5.90E-06
439	2.64E-04	506	3.60E-04	573	6.45E-04	640	3.66E-04	707	4.72E-05	774	5.50E-06
440	2.95E-04	507	3.66E-04	574	6.50E-04	641	3.52E-04	708	4.55E-05	775	5.50E-06
441	3.25E-04	508	3.75E-04	575	6.53E-04	642	3.42E-04	709	4.43E-05	776	5.20E-06
442	3.69E-04	509	3.81E-04	576	6.56E-04	643	3.32E-04	710	4.31E-05	777	5.00E-06
443	4.17E-04	510	3.87E-04	577	6.57E-04	644	3.26E-04	711	4.16E-05	778	4.90E-06
444	4.69E-04	511	3.93E-04	578	6.62E-04	645	3.21E-04	712	4.03E-05	779	4.60E-06
445	5.24E-04	512	3.98E-04	579	6.64E-04	646	3.40E-04	713	3.91E-05	780	4.60E-06
446	5.80E-04	513	4.04E-04	580	6.65E-04	647	3.87E-04	714	3.77E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	WPX2 @ 60W / 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	0.140	57.6	0.858
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

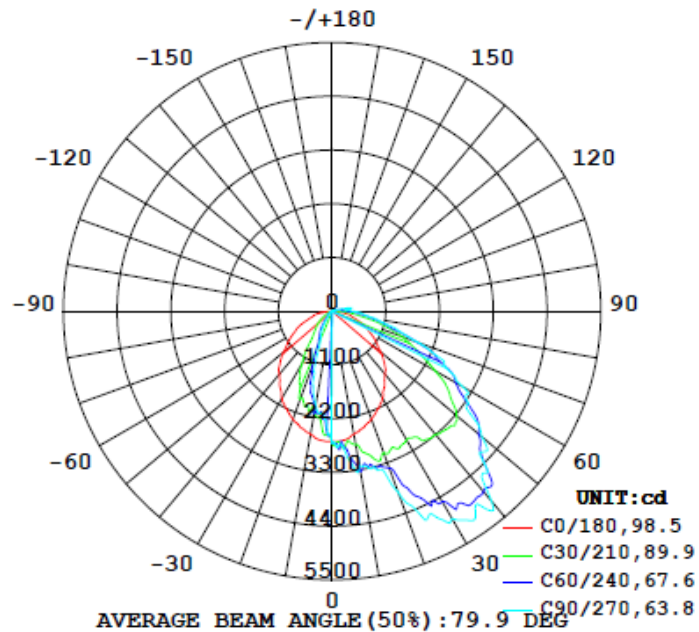
Test Result

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	8639	114.0	147.0	65.3	97.0	150.0	2.8%	B2-U3-G3
0°-90° zones	8424	114.0	147.0	65.3	97.0	146.3	2.9%	B2-U3-G3

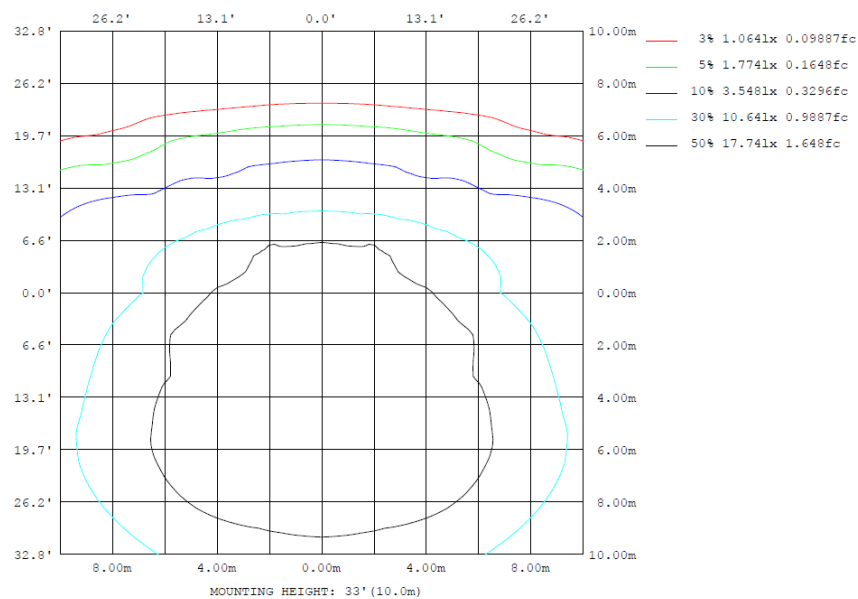
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

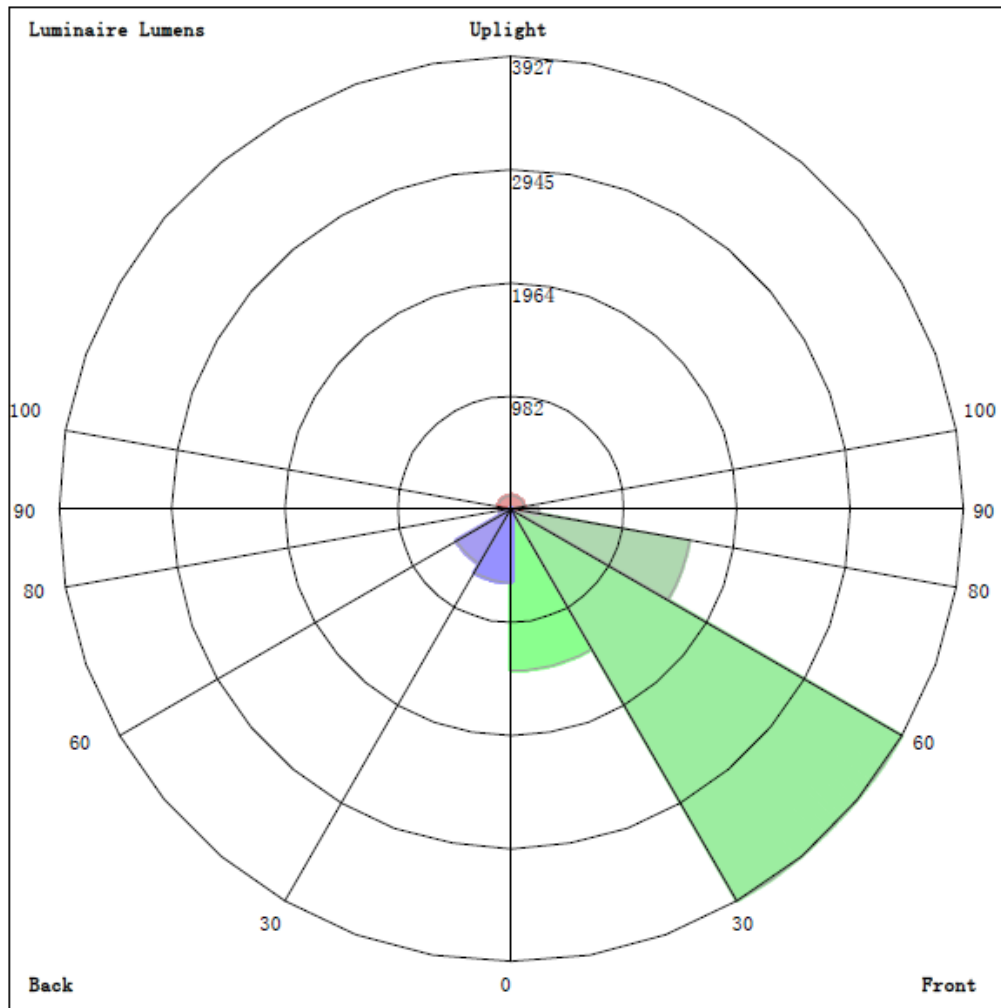
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	2562	3075	3212	3075	2562	2079	1946	2079	0- 10	245.1	245.1	2.84,2.84
20	2350	3286	3941	3286	2350	1545	777.3	1545	10- 20	693.1	938.2	10.9,10.9
30	2062	3992	4901	3992	2062	614.8	397.8	614.8	20- 30	1101	2040	23.6,23.6
40	1685	4334	5072	4334	1685	362.8	125.5	362.8	30- 40	1470	3510	40.6,40.6
50	1294	3812	3999	3812	1294	151.0	70.74	151.0	40- 50	1593	5102	59.1,59.1
60	914.0	2824	3077	2824	914.0	65.90	24.65	65.90	50- 60	1413	6515	75.4,75.4
70	552.8	1812	1872	1812	552.8	8.290	1.373	8.290	60- 70	1075	7590	87.9,87.9
80	294.4	794.8	898.1	794.8	294.4	3.534	1.924	3.534	70- 80	590.1	8180	94.7,94.7
90	27.95	243.6	424.5	243.6	27.95	2.371	2.083	2.371	80- 90	243.6	8424	97.5,97.5
100	23.88	102.8	404.1	102.8	23.88	2.988	2.667	2.988	90-100	98.76	8523	98.7,98.7
110	16.52	23.69	65.61	23.69	16.52	2.423	2.995	2.423	100-110	44.94	8568	99.2,99.2
120	11.60	67.83	28.32	67.83	11.60	2.334	2.928	2.334	110-120	20.71	8588	99.4,99.4
130	6.610	56.40	66.15	56.40	6.610	2.447	3.399	2.447	120-130	22.75	8611	99.7,99.7
140	2.085	34.96	54.27	34.96	2.085	2.671	3.473	2.671	130-140	16.07	8627	99.9,99.9
150	1.366	17.27	29.22	17.27	1.366	2.995	3.477	2.995	140-150	8.192	8635	100,100
160	1.651	1.374	11.68	1.374	1.651	3.107	3.085	3.107	150-160	2.927	8638	100,100
170	1.902	1.742	2.088	1.742	1.902	2.423	2.354	2.423	160-170	0.7684	8639	100,100
180	2.311	2.234	1.911	2.234	2.311	2.118	2.023	2.118	170-180	0.2047	8639	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

	Zonal (lm)		Total (lm)	Percent
0-10	245.05	0-10	245.05	2.84%
10-20	693.10	0-20	938.15	10.86%
20-30	1101.36	0-30	2039.51	23.61%
30-40	1470.09	0-40	3509.60	40.63%
40-50	1592.61	0-50	5102.21	59.06%
50-60	1412.64	0-60	6514.85	75.41%
60-70	1075.27	0-70	7590.12	87.86%
70-80	590.08	0-80	8180.20	94.69%
80-90	243.62	0-90	8423.82	97.51%
90-100	98.76	0-100	8522.58	98.65%
100-110	44.94	0-110	8567.52	99.17%
110-120	20.71	0-120	8588.23	99.41%
120-130	22.75	0-130	8610.98	99.68%
130-140	16.07	0-140	8627.05	99.86%
140-150	8.19	0-150	8635.24	99.96%
150-160	2.93	0-160	8638.17	99.99%
160-170	0.77	0-170	8638.94	100.00%
170-180	0.20	0-180	8639.14	100.00%

4.2 Goniophotometer Test

LCS/BUG

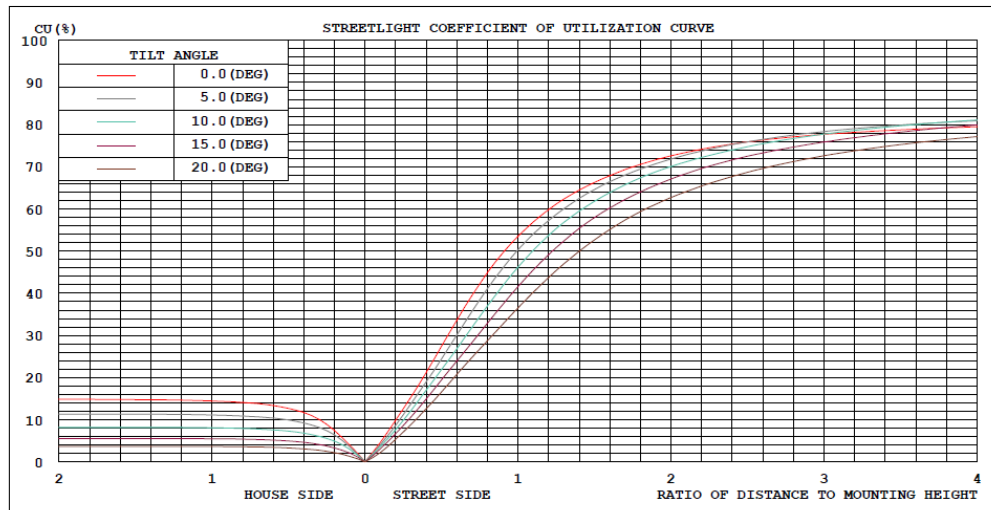


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

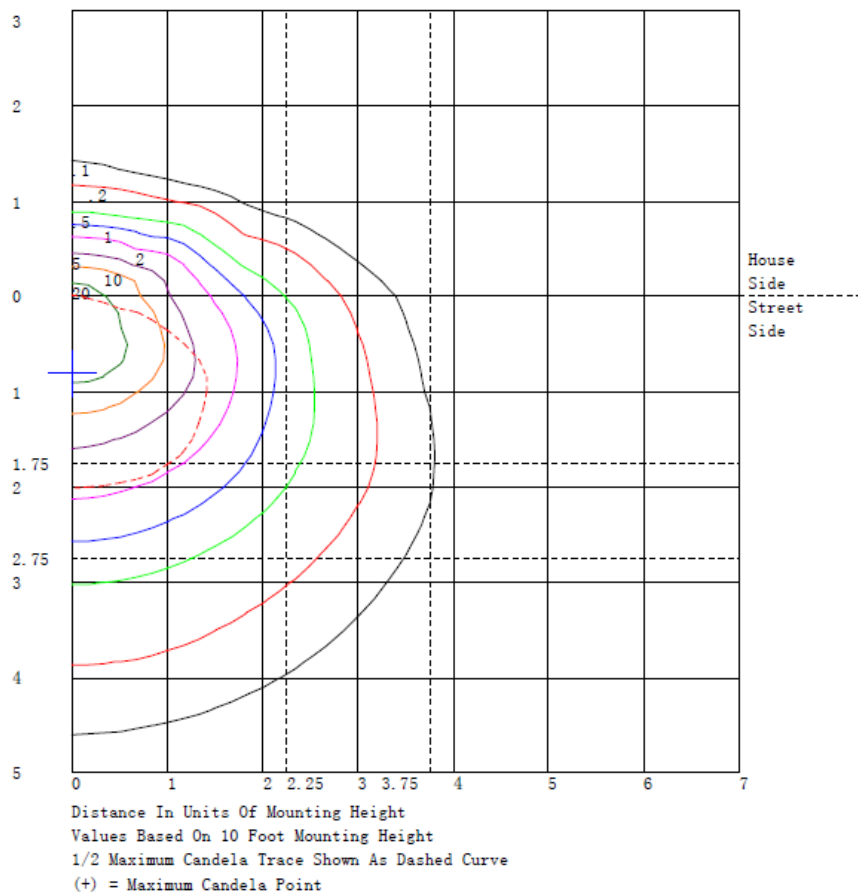
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1403.0	N.A.	16.2
FM - Front-Medium (30-60)	3927.2	N.A.	45.5
FH - Front-High (60-80)	1573.1	N.A.	18.2
FVH - Front-Very High (80-90)	233.4	N.A.	2.7
BL - Back-Low (0-30)	636.5	N.A.	7.4
BM - Back-Medium (30-60)	548.1	N.A.	6.3
BH - Back-High (60-80)	92.3	N.A.	1.1
BVH - Back-Very High (80-90)	10.2	N.A.	0.1
UL - Uplight-Low (90-100)	98.8	N.A.	1.1
UH - Uplight-High (100-180)	116.6	N.A.	1.3
Total	8639.2	N.A.	100.0
BUG Rating	B2-U3-G3		

4.2 Goniophotometer Test

Coefficients of Utilization



Isolines



4.2 Goniophotometer Test

Luminous Distribution Intensity Data

Table--1																			UNIT: cd	
C (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	
γ (DEG)	0	2673	2675	2677	2679	2682	2684	2687	2689	2691	2694	2696	2698	2701	2703	2705	2707	2710	2712	2713
5	2652	2634	2635	2656	2723	2790	2837	2787	2722	2666	2695	2742	2794	2816	2829	2836	2837	2834	2833	2833
10	2562	2635	2694	2737	2745	2753	2774	2860	2964	3075	3183	3274	3340	3334	3304	3304	3264	3240	3222	3212
15	2474	2475	2515	2594	2746	2911	3063	3122	3155	3176	3222	3264	3297	3306	3305	3300	3302	3301	3299	3299
20	2350	2416	2505	2616	2774	2937	3087	3173	3237	3286	3318	3359	3423	3583	3752	3901	3946	3955	3954	3941
25	2206	2379	2543	2697	2842	2978	3104	3191	3288	3417	3665	3934	4194	4375	4515	4614	4652	4660	4650	4637
30	2062	2345	2580	2768	2852	2929	3041	3338	3669	3992	4195	4360	4500	4654	4785	4884	4915	4917	4901	4887
35	1873	2178	2451	2694	2877	3050	3237	3508	3799	4094	4380	4640	4858	4983	5060	5102	5129	5135	5127	5113
40	1685	2014	2318	2599	2827	3053	3295	3648	4005	4334	4535	4690	4814	4961	5081	5164	5154	5116	5072	5047
45	1515	1784	2070	2373	2708	3047	3379	3698	3981	4211	4323	4384	4411	4448	4469	4475	4452	4424	4401	4377
50	1294	1508	1772	2084	2504	2929	3316	3546	3707	3812	3869	3899	3916	3972	4023	4060	4047	4023	3999	3975
55	1106	1305	1547	1831	2207	2587	2934	3144	3293	3390	3450	3474	3469	3430	3381	3335	3333	3341	3352	3363
60	914	1163	1414	1666	1939	2198	2431	2600	2730	2824	2869	2896	2921	3002	3082	3144	3133	3106	3077	3053
65	758	1005	1231	1437	1618	1782	1934	2095	2237	2351	2394	2412	2416	2439	2461	2481	2500	2516	2526	2537
70	553	678	818	973	1160	1348	1521	1647	1744	1812	1835	1839	1835	1852	1868	1881	1879	1874	1872	1869
75	409	464	541	638	781	927	1057	1120	1157	1177	1192	1202	1212	1239	1267	1293	1313	1326	1332	1339
80	294	296	318	362	439	527	617	688	748	795	813	822	827	846	865	882	891	896	898	898
85	111	113	128	158	209	268	330	383	431	474	503	527	548	571	590	606	614	617	618	619
90	28.0	44.1	62.5	83.2	107	132	159	186	215	244	275	306	336	361	383	401	413	421	424	426
95	23.1	31.7	41.2	51.6	62.9	75.0	87.9	100	114	131	153	178	204	231	256	277	291	300	303	306
100	23.9	25.3	27.4	30.1	31.3	34.7	41.9	56.2	76.3	103	139	181	225	272	317	356	382	398	404	408
105	15.6	17.2	18.7	20.1	20.5	21.5	23.8	29.3	36.8	46.1	59.4	72.7	84.3	86.6	88.2	91.6	110	128	139	151
110	16.5	13.0	13.1	16.8	28.7	40.7	49.7	41.6	31.4	23.7	33.5	46.6	59.6	62.3	62.6	61.8	63.4	64.8	65.6	66.5
115	16.4	11.0	9.85	12.9	23.6	35.9	47.6	53.0	54.8	52.7	40.9	28.5	19.3	26.0	36.7	48.4	55.2	59.7	61.1	61.9
120	11.6	7.05	6.60	10.2	20.5	32.9	45.7	55.0	62.4	67.8	71.2	71.7	68.6	57.2	44.2	32.3	28.4	27.3	28.3	28.8
125	8.93	4.91	4.64	8.12	17.4	28.9	41.1	50.9	59.7	67.0	72.2	75.5	77.1	75.7	73.1	70.0	67.2	65.0	63.8	63.1
130	6.61	3.38	3.24	6.17	13.8	23.3	33.5	41.8	49.5	56.4	62.6	67.6	71.1	71.4	70.6	69.0	67.7	66.7	66.2	66.0
135	2.16	0.00	0.00	1.37	8.67	17.7	27.1	33.9	40.0	45.6	51.7	57.1	61.3	62.5	62.6	62.1	62.2	62.4	62.6	62.8
140	2.08	3.18	5.04	7.66	11.3	15.5	20.1	25.1	30.1	35.0	39.5	43.5	46.9	49.1	50.7	51.8	52.9	53.8	54.3	54.6
145	1.92	2.23	3.21	4.86	7.34	10.4	13.8	17.6	21.6	25.3	28.4	31.1	33.4	35.4	37.0	38.5	40.2	41.5	42.4	42.9
150	1.37	1.33	1.29	1.26	0.42	0.19	1.15	6.03	11.7	17.3	20.0	21.8	23.1	24.4	25.6	26.5	27.7	28.6	29.2	29.6
155	1.50	1.30	1.36	1.65	2.21	3.00	4.03	5.25	6.70	8.41	10.7	13.1	15.2	16.4	17.1	17.7	18.5	19.1	19.4	19.7
160	1.65	1.55	1.53	1.58	1.80	2.01	2.15	1.77	1.44	1.37	2.17	3.36	4.90	6.96	9.02	10.8	11.5	11.7	11.7	11.7
165	1.76	1.77	1.77	1.76	1.70	1.66	1.67	1.80	2.03	2.35	3.03	3.64	3.97	3.28	2.38	1.50	1.33	1.34	1.47	1.60
170	1.90	1.91	1.91	1.91	1.91	1.89	1.87	1.83	1.78	1.74	1.70	1.68	1.70	1.83	1.98	2.11	2.12	2.11	2.09	2.07
175	2.00	2.02	2.03	2.04	2.03	2.03	2.02	2.01	2.00	1.99	1.98	1.96	1.94	1.92	1.89	1.86	1.82	1.79	1.79	1.79
180	2.31	2.32	2.32	2.32	2.31	2.30	2.28	2.27	2.25	2.23	2.20	2.17	2.13	2.10	2.06	2.02	1.98	1.94	1.91	1.89

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	2712	2710	2707	2705	2703	2701	2698	2696	2694	2691	2689	2687	2684	2682	2679	2677	2675	2673	2668	
5	2834	2837	2836	2829	2816	2794	2742	2695	2666	2722	2787	2837	2790	2723	2656	2635	2634	2652	2603	
10	3222	3240	3264	3304	3334	3340	3274	3183	3075	2964	2860	2774	2753	2745	2737	2694	2635	2562	2472	
15	3301	3302	3300	3305	3306	3297	3264	3222	3176	3155	3122	3063	2911	2746	2594	2515	2475	2474	2295	
20	3955	3946	3901	3752	3583	3423	3359	3318	3286	3237	3173	3087	2937	2774	2616	2505	2416	2350	2140	
25	4660	4652	4614	4515	4375	4194	3934	3665	3417	3288	3191	3104	2978	2842	2697	2543	2379	2206	2114	
30	4917	4915	4884	4785	4654	4500	4360	4195	3992	3669	3338	3041	2929	2852	2768	2580	2345	2062	2039	
35	5135	5129	5102	5060	4983	4858	4640	4380	4094	3799	3508	3237	3050	2877	2694	2451	2178	1873	1898	
40	5116	5154	5164	5081	4961	4814	4690	4535	4334	4005	3648	3295	3053	2827	2599	2318	2014	1685	1668	
45	4424	4452	4475	4469	4448	4411	4384	4323	4211	3981	3698	3379	3047	2708	2373	2070	1784	1515	1450	
50	4023	4047	4060	4023	3972	3916	3899	3869	3812	3707	3546	3316	2929	2504	2084	1772	1508	1294	1151	
55	3341	3333	3335	3381	3430	3469	3474	3450	3390	3293	3144	2934	2587	2207	1831	1547	1305	1106	899	
60	3106	3133	3144	3082	3002	2921	2896	2869	2824	2730	2600	2431	2198	1939	1666	1414	1163	914	677	
65	2516	2500	2481	2461	2439	2416	2412	2394	2351	2237	2095	1934	1782	1618	1437	1231	1005	758	557	
70	1874	1879	1881	1868	1852	1835	1839	1835	1812	1744	1647	1521	1348	1160	973	818	678	553	415	
75	1326	1313	1293	1267	1239	1212	1202	1192	1177	1157	1120	1057	927	781	638	541	464	409	294	
80	896	891	882	865	846	827	822	813	795	748	688	617	527	439	362	318	296	294	201	
85	617	614	606	590	571	548	527	503	474	431	383	330	268	209	158	128	113	111	81	
90	421	413	401	383	361	336	306	275	244	215	186	159	132	107	83.2	62.5	44.1	28.0	26.0	
95	300	291	277	256	231	204	178	153	131	114	100	87.9	75.0	62.9	51.6	41.2	31.7	23.1	19.9	
100	398	382	356	317	272	225	181	139	103	76.3	56.2	41.9	34.7	31.3	30.1	27.4	25.3	23.9	19.0	
105	128	110	91.6	88.2	86.6	84.3	72.7	59.4	46.1	36.8	29.3	23.8	21.5	20.5	20.1	18.7	17.2	15.6	12.2	
110	64.8	63.4	61.8	62.6	62.3	59.6	46.6	33.5	23.7	31.4	41.6	49.7	40.7	28.7	16.8	13.1	13.0	16.5	12.6	
115	59.7	55.2	48.4	36.7	26.0	19.3	28.5	40.9	52.7	54.8	53.0	47.6	35.9	23.6	12.9	9.85	11.0	16.4	12.0	
120	27.3	28.4	32.3	44.2	57.2	68.6	71.7	71.2	67.8	62.4	55.0	45.7	32.9	20.5	10.2	6.60	7.05	11.6	8.97	
125	65.0	67.2	70.0	73.1	75.7	77.1	75.5	72.2	67.0	59.7	50.9	41.1	28.9	17.4	8.12	4.64	4.91	8.93	7.07	
130	66.7	67.7	69.0	70.6	71.4	71.1	67.6	62.6	56.4	49.5	41.8	33.5	23.3	13.8	6.17	3.24	3.38	6.61	5.14	
135	62.4	62.2	62.1	62.6	62.5	61.3	57.1	51.7	45.6	40.0	33.9	27.1	17.7	8.67	1.37	0.00	0.00	2.16	2.72	
140	53.8	52.9	51.8	50.7	49.1	46.9	43.5	39.5	35.0	30.1	25.1	20.1	15.5	11.3	7.66	5.04	3.18	2.08	2.45	
145	41.5	40.2	38.5	37.0	35.4	33.4	31.1	28.4	25.3	21.6	17.6	13.8	10.4	7.34	4.86	3.21	2.23	1.92	2.44	
150	28.6	27.7	26.5	25.6	24.4	23.1	21.8	20.0	17.3	11.7	6.03	1.15	0.19	0.42	1.26	1.29	1.33	1.37	1.93	
155	19.1	18.5	17.7	17.1	16.4	15.2	13.1	10.7	8.4	7.0	5.25	4.03	3.00	2.21	1.65	1.36	1.30	1.50	2.15	
160	11.7	11.5	10.8	9.02	6.96	4.90	3.36	2.17	1.37	1.44	1.77	2.15	2.01	1.80	1.58	1.53	1.55	1.65	2.36	
165	1.34	1.33	1.50	2.38	3.28	3.97	3.64	3.03	2.35	2.03	1.80	1.67	1.66	1.70	1.76	1.77	1.77	1.76	2.46	
170	2.11	2.12	2.11	1.98	1.83	1.70	1.68	1.70	1.74	1.78	1.83	1.87	1.89	1.91	1.91	1.91	1.91	1.91	2.46	
175	1.79	1.82	1.86	1.89	1.92	1.94	1.96	1.98	1.99	2.00	2.01	2.02	2.03	2.03	2.04	2.03	2.02	2.00	2.35	
180	1.94	1.98	2.02	2.06	2.10	2.13	2.17	2.20	2.23	2.25	2.27	2.28	2.30	2.31	2.32	2.32	2.32	2.31	2.46	

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	2700	2709	2712	2713	2713	2714	2715	2715	2715	2715	2715	2716	2716	2715	2715	2714	2713	2714	2715
5	2557	2513	2478	2441	2399	2329	2260	2203	2199	2206	2217	2202	2182	2159	2132	2109	2094	2109	2132
10	2385	2300	2206	2124	2062	2050	2058	2079	2108	2131	2135	2072	1997	1929	1922	1931	1946	1931	1922
15	2155	2054	2004	1984	1982	1995	2004	1994	1914	1818	1721	1658	1608	1572	1556	1549	1550	1549	1556
20	1985	1886	1887	1909	1920	1819	1689	1545	1422	1302	1186	1066	957	867	815	785	777	785	815
25	2018	1919	1827	1724	1601	1417	1221	1030	875	745	645	598	577	570	558	551	549	551	558
30	1970	1854	1671	1458	1230	999	788	615	547	518	510	477	449	425	410	401	398	401	410
35	1845	1713	1440	1135	842	686	577	500	433	381	342	305	275	253	238	229	227	229	238
40	1584	1434	1155	855	580	466	401	363	299	243	197	167	147	135	128	125	126	125	128
45	1340	1187	947	695	465	353	281	236	188	152	128	116	111	110	106	104	103	104	106
50	1003	850	677	510	363	268	198	151	122	105	97.2	86.6	79.0	74.0	71.4	70.4	70.7	70.4	71.4
55	718	564	439	337	256	192	143	107	83.8	69.3	61.2	55.3	52.4	51.4	50.1	49.4	49.4	49.4	50.1
60	485	337	250	197	163	123	90.5	65.9	50.8	41.4	35.9	30.7	27.3	25.3	24.4	24.2	24.6	24.2	24.4
65	393	265	185	132	98.9	69.1	48.0	33.2	19.2	8.80	1.95	0.00	0.00	0.80	0.80	0.90	1.06	0.90	0.80
70	299	205	140	92.2	59.3	34.3	17.9	8.29	2.73	0.67	0.80	0.36	0.50	0.95	1.07	1.22	1.37	1.22	1.07
75	199	126	78.3	47.6	29.1	15.6	8.27	5.07	2.28	1.12	1.00	0.74	0.81	1.07	1.25	1.46	1.67	1.46	1.25
80	126	70.3	39.9	23.6	16.7	9.28	5.26	3.53	1.98	1.32	1.23	1.06	1.09	1.25	1.45	1.69	1.92	1.69	1.45
85	56.0	36.4	23.9	15.7	10.6	6.48	3.98	2.64	1.78	1.46	1.47	1.37	1.37	1.46	1.62	1.81	2.00	1.81	1.62
90	23.5	20.3	16.0	11.5	7.38	5.00	3.38	2.37	1.85	1.69	1.73	1.68	1.69	1.75	1.84	1.95	2.08	1.95	1.84
95	16.9	14.0	11.0	8.35	6.03	4.41	3.24	2.46	2.09	1.97	2.00	1.98	1.99	2.04	2.08	2.15	2.25	2.15	2.08
100	14.9	11.4	8.56	6.38	4.78	3.81	3.26	2.99	2.79	2.70	2.68	2.60	2.54	2.51	2.52	2.56	2.67	2.56	2.52
105	9.37	6.92	4.83	3.23	2.15	2.02	2.26	2.68	2.79	2.85	2.89	2.87	2.84	2.82	2.85	2.90	3.01	2.90	2.85
110	9.43	6.89	5.21	4.07	3.35	2.82	2.53	2.42	2.43	2.53	2.68	2.80	2.90	2.99	3.00	2.99	2.99	2.99	3.00
115	8.48	5.79	4.22	3.31	2.87	2.53	2.39	2.40	2.44	2.53	2.64	2.67	2.70	2.72	2.76	2.80	2.84	2.80	2.76
120	6.79	5.05	3.83	2.99	2.48	2.26	2.23	2.33	2.42	2.53	2.65	2.71	2.76	2.80	2.85	2.89	2.93	2.89	2.85
125	5.51	4.26	3.37	2.75	2.38	2.24	2.26	2.37	2.49	2.64	2.78	2.85	2.90	2.95	3.02	3.08	3.13	3.08	3.02
130	4.40	3.59	2.97	2.53	2.27	2.23	2.30	2.45	2.56	2.69	2.82	2.94	3.05	3.15	3.26	3.34	3.40	3.34	3.26
135	3.06	3.19	2.94	2.60	2.27	2.28	2.38	2.54	2.67	2.81	2.94	3.05	3.14	3.23	3.31	3.37	3.41	3.37	3.31
140	2.69	2.81	2.72	2.56	2.42	2.46	2.55	2.67	2.76	2.86	2.95	3.06	3.16	3.25	3.34	3.41	3.47	3.41	3.34
145	2.47	2.64	2.67	2.67	2.65	2.70	2.76	2.84	2.94	3.04	3.13	3.18	3.23	3.27	3.36	3.45	3.52	3.45	3.36
150	2.36	2.67	2.79	2.83	2.83	2.89	2.94	3.00	3.05	3.11	3.16	3.20	3.24	3.28	3.35	3.42	3.48	3.42	3.35
155	2.65	3.00	3.14	3.16	3.13	3.10	3.06	3.02	3.03	3.06	3.11	3.16	3.21	3.26	3.27	3.27	3.26	3.27	3.27
160	2.90	3.26	3.39	3.38	3.31	3.25	3.17	3.11	3.11	3.12	3.13	3.10	3.07	3.04	3.05	3.07	3.08	3.07	3.05
165	2.98	3.32	3.40	3.36	3.24	3.18	3.10	3.03	2.96	2.90	2.84	2.77	2.71	2.67	2.69	2.73	2.76	2.73	2.69
170	2.84	3.08	3.10	3.01	2.86	2.71	2.55	2.42	2.40	2.40	2.42	2.40	2.38	2.36	2.35	2.35	2.35	2.35	2.35
175	2.60	2.76	2.80	2.77	2.69	2.55	2.40	2.27	2.25	2.25	2.25	2.19	2.12	2.07	2.10	2.15	2.21	2.15	2.10
180	2.29	2.28	2.27	2.26	2.25	2.21	2.17	2.12	2.07	2.02	1.98	1.96	1.94	1.93	1.96	1.99	2.02	1.99	1.96

																UNIT: cd			
C (DEG) y (DEG)		285	290	295	300	305	310	315	320	325	330	335	340	345	350	355			
0		2715	2716	2716	2715	2715	2715	2715	2715	2714	2713	2713	2712	2709	2700	2688			
5		2159	2182	2202	2217	2206	2199	2203	2260	2329	2399	2441	2478	2513	2557	2603			
10		1929	1997	2072	2135	2131	2108	2079	2058	2050	2062	2124	2206	2300	2385	2472			
15		1572	1608	1658	1721	1818	1914	1994	2004	1995	1982	1984	2004	2054	2155	2295			
20		867	957	1066	1186	1302	1422	1545	1689	1819	1920	1909	1887	1886	1985	2140			
25		570	577	598	645	745	875	1030	1221	1417	1601	1724	1827	1919	2018	2114			
30		425	449	477	510	518	547	615	788	999	1230	1458	1671	1854	1970	2039			
35		253	275	305	342	381	433	500	577	686	842	1135	1440	1713	1845	1898			
40		135	147	167	197	243	299	363	401	466	580	855	1155	1434	1584	1668			
45		110	111	116	128	152	188	236	281	353	465	695	947	1187	1340	1450			
50		74.0	79.0	86.6	97.2	105	122	151	198	268	363	510	677	850	1003	1151			
55		51.4	52.4	55.3	61.2	69.3	83.8	107	143	192	256	337	439	564	718	899			
60		25.3	27.3	30.7	35.9	41.4	50.8	65.9	90.5	123	163	197	250	337	485	677			
65		0.80	0.00	0.00	1.95	8.80	19.2	33.2	48.0	69.1	98.9	132	185	265	393	557			
70		0.95	0.50	0.36	0.80	0.67	2.73	8.29	17.9	34.3	59.3	92.2	140	205	299	415			
75		1.07	0.81	0.74	1.00	1.12	2.28	5.07	8.27	15.6	29.1	47.6	78.3	126	199	294			
80		1.25	1.09	1.06	1.23	1.32	1.98	3.53	5.26	9.28	16.7	23.6	39.9	70.3	126	201			
85		1.46	1.37	1.37	1.47	1.46	1.78	2.64	3.98	6.48	10.6	15.7	23.9	36.4	56.0	81.0			
90		1.75	1.69	1.68	1.73	1.69	1.85	2.37	3.38	5.00	7.38	11.5	16.0	20.3	23.5	26.0			
95		2.04	1.99	1.98	2.00	1.97	2.09	2.46	3.24	4.41	6.03	8.35	11.0	14.0	16.9	19.9			
100		2.51	2.54	2.60	2.68	2.70	2.79	2.99	3.26	3.81	4.78	6.38	8.56	11.4	14.9	19.0			
105		2.82	2.84	2.87	2.89	2.85	2.79	2.68	2.26	2.02	2.15	3.23	4.83	6.92	9.37	12.2			
110		2.99	2.90	2.80	2.68	2.53	2.43	2.42	2.53	2.82	3.35	4.07	5.21	6.89	9.43	12.6			
115		2.72	2.70	2.67	2.64	2.53	2.44	2.40	2.39	2.53	2.87	3.31	4.22	5.79	8.48	12.0			
120		2.80	2.76	2.71	2.65	2.53	2.42	2.33	2.23	2.26	2.48	2.99	3.83	5.05	6.79	8.97			
125		2.95	2.90	2.85	2.78	2.64	2.49	2.37	2.26	2.24	2.38	2.75	3.37	4.26	5.51	7.07			
130		3.15	3.05	2.94	2.82	2.69	2.56	2.45	2.30	2.23	2.27	2.53	2.97	3.59	4.40	5.41			
135		3.23	3.14	3.05	2.94	2.81	2.67	2.54	2.38	2.28	2.27	2.60	2.94	3.19	3.06	2.72			
140		3.25	3.16	3.06	2.95	2.86	2.76	2.67	2.55	2.46	2.42	2.56	2.72	2.81	2.69	2.45			
145		3.27	3.23	3.18	3.13	3.04	2.94	2.84	2.76	2.70	2.65	2.67	2.67	2.64	2.47	2.24			
150		3.28	3.24	3.20	3.16	3.11	3.05	3.00	2.94	2.89	2.83	2.83	2.79	2.67	2.36	1.93			
155		3.26	3.21	3.16	3.11	3.06	3.03	3.02	3.06	3.10	3.13	3.16	3.14	3.00	2.65	2.15			
160		3.04	3.07	3.10	3.13	3.12	3.11	3.11	3.17	3.25	3.31	3.38	3.39	3.26	2.90	2.36			
165		2.67	2.71	2.77	2.84	2.90	2.96	3.03	3.10	3.18	3.24	3.36	3.40	3.32	2.98	2.46			
170		2.36	2.38	2.40	2.42	2.40	2.40	2.42	2.55	2.71	2.86	3.01	3.10	3.08	2.84	2.45			
175		2.07	2.12	2.19	2.25	2.25	2.25	2.27	2.40	2.55	2.69	2.77	2.80	2.76	2.60	2.35			
180		1.93	1.94	1.96	1.98	2.02	2.07	2.12	2.17	2.21	2.25	2.26	2.27	2.28	2.29	2.30			

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	WPX2 @ 60W / 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	0.140	57.6	0.858	10.56

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*****