

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		11465
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		148.5
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		11181
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	144.8
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		77.2
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	480V	7.23
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	480V	0.913
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3985±275	3953
		4 steps	3985±154	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		84.3
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		0.176
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		77.2
(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 @ 80W / 4000K 480	231101004-S1
2	Goniophotometer Test	2023-11-08	WPX2 @ 80W / 4000K 480	231101004-S1
3	THD and PF Test	2023-11-08	WPX2 @ 80W / 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 @ 80W / 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 @ 80W / 4000K 480	Sample ID	231101004-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

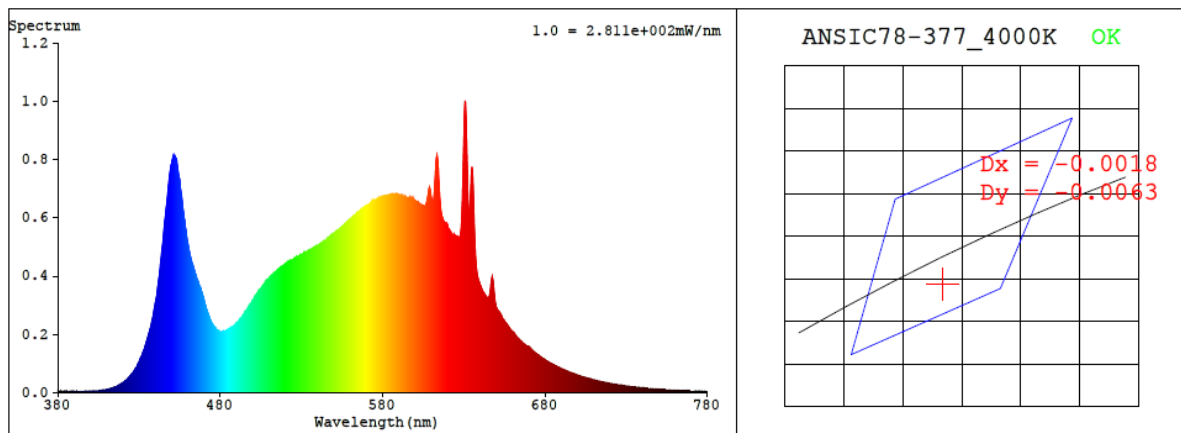
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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	0.176	77.2	0.913

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
3953	84.3	17	-0.0025	84	96	-11%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3808$ $y = 0.3717$ / $u' = 0.2274$ $v' = 0.4994$ ($duv = -2.47e-03$)

CCT= 3953K Prp WL: Ld=580.7nm Purity=25.8%

Peak WL: Lp=631nm FWHM: =99.3nm Ratio: R=18.9% G=77.4% B=3.7%

Render Index: Ra = 84.3 AvgR = 78.3 TM30: Rf=84 Rg=96

EEI: 0.09366 A++ Highest

R1 =83 R2 =91 R3 =95 R4 =82 R5 =83 R6 =87 R7 =86

R8 =67 R9 =17 R10=77 R11=81 R12=64 R13=85 R14=97 R15=78

4.1 Integrating Sphere Test

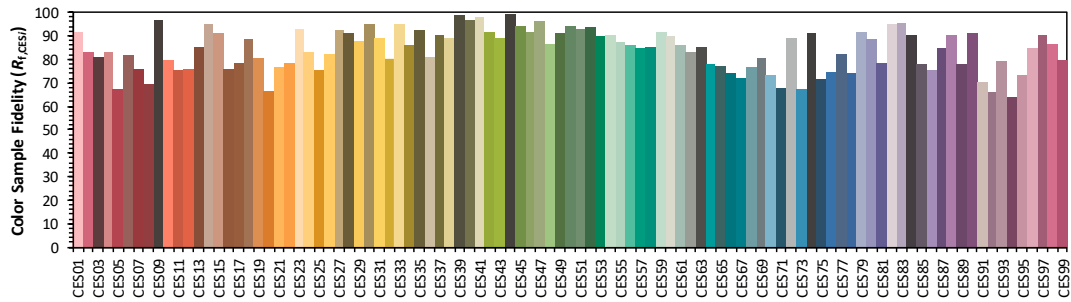
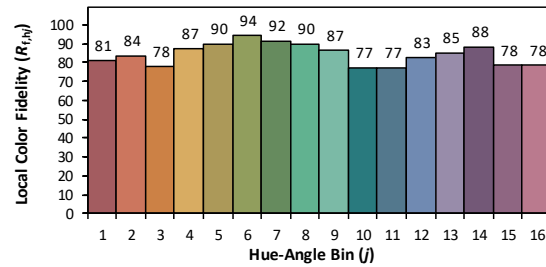
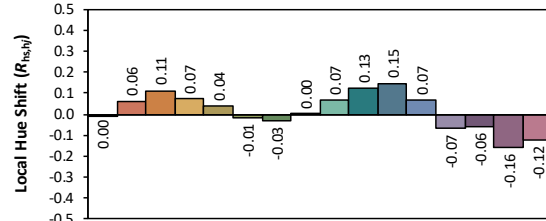
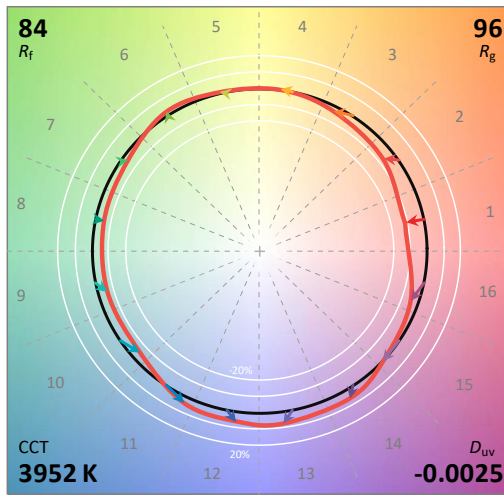
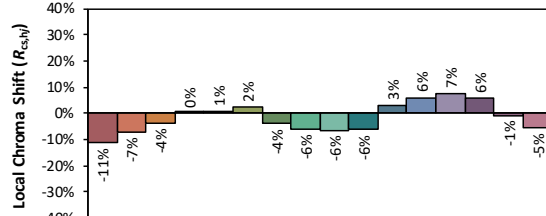
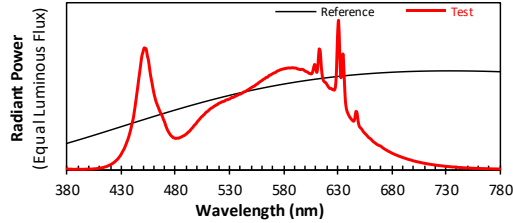
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/11/16

Model: WPX2 @ 80W / 4000K 480



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

x 0.3808
 y 0.3716
 u' 0.2274
 v' 0.4993

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	6.70E-06	447	6.53E-04	514	4.14E-04	581	6.75E-04	648	3.81E-04	715	3.69E-05
381	4.80E-06	448	7.08E-04	515	4.19E-04	582	6.75E-04	649	3.26E-04	716	3.62E-05
382	2.70E-06	449	7.59E-04	516	4.25E-04	583	6.78E-04	650	2.93E-04	717	3.46E-05
383	3.50E-06	450	7.86E-04	517	4.28E-04	584	6.78E-04	651	2.81E-04	718	3.38E-05
384	4.30E-06	451	8.11E-04	518	4.34E-04	585	6.80E-04	652	2.74E-04	719	3.29E-05
385	2.70E-06	452	8.11E-04	519	4.36E-04	586	6.78E-04	653	2.64E-04	720	3.16E-05
386	2.90E-06	453	8.04E-04	520	4.43E-04	587	6.79E-04	654	2.53E-04	721	3.08E-05
387	2.90E-06	454	7.62E-04	521	4.46E-04	588	6.81E-04	655	2.45E-04	722	2.94E-05
388	3.20E-06	455	7.33E-04	522	4.49E-04	589	6.80E-04	656	2.38E-04	723	2.91E-05
389	3.90E-06	456	6.81E-04	523	4.53E-04	590	6.80E-04	657	2.30E-04	724	2.77E-05
390	3.90E-06	457	6.31E-04	524	4.55E-04	591	6.78E-04	658	2.22E-04	725	2.70E-05
391	3.10E-06	458	5.93E-04	525	4.56E-04	592	6.77E-04	659	2.14E-04	726	2.64E-05
392	2.90E-06	459	5.52E-04	526	4.61E-04	593	6.72E-04	660	2.09E-04	727	2.55E-05
393	2.80E-06	460	5.15E-04	527	4.66E-04	594	6.72E-04	661	2.03E-04	728	2.44E-05
394	3.30E-06	461	4.84E-04	528	4.67E-04	595	6.69E-04	662	1.95E-04	729	2.38E-05
395	2.70E-06	462	4.57E-04	529	4.70E-04	596	6.69E-04	663	1.88E-04	730	2.29E-05
396	3.20E-06	463	4.38E-04	530	4.72E-04	597	6.70E-04	664	1.83E-04	731	2.19E-05
397	4.10E-06	464	4.19E-04	531	4.76E-04	598	6.69E-04	665	1.77E-04	732	2.17E-05
398	4.20E-06	465	4.01E-04	532	4.83E-04	599	6.64E-04	666	1.72E-04	733	2.07E-05
399	4.40E-06	466	3.83E-04	533	4.83E-04	600	6.58E-04	667	1.67E-04	734	2.02E-05
400	4.30E-06	467	3.70E-04	534	4.84E-04	601	6.55E-04	668	1.63E-04	735	1.94E-05
401	4.90E-06	468	3.55E-04	535	4.90E-04	602	6.53E-04	669	1.60E-04	736	1.87E-05
402	4.50E-06	469	3.35E-04	536	4.92E-04	603	6.46E-04	670	1.58E-04	737	1.85E-05
403	4.70E-06	470	3.19E-04	537	4.95E-04	604	6.43E-04	671	1.52E-04	738	1.78E-05
404	5.60E-06	471	2.96E-04	538	5.00E-04	605	6.40E-04	672	1.45E-04	739	1.71E-05
405	6.40E-06	472	2.77E-04	539	5.03E-04	606	6.40E-04	673	1.41E-04	740	1.64E-05
406	6.60E-06	473	2.61E-04	540	5.04E-04	607	6.54E-04	674	1.36E-04	741	1.62E-05
407	7.50E-06	474	2.48E-04	541	5.09E-04	608	6.85E-04	675	1.32E-04	742	1.54E-05
408	8.60E-06	475	2.36E-04	542	5.11E-04	609	7.02E-04	676	1.28E-04	743	1.48E-05
409	9.40E-06	476	2.27E-04	543	5.17E-04	610	6.68E-04	677	1.23E-04	744	1.46E-05
410	1.05E-05	477	2.21E-04	544	5.21E-04	611	6.51E-04	678	1.20E-04	745	1.43E-05
411	1.21E-05	478	2.14E-04	545	5.23E-04	612	7.11E-04	679	1.16E-04	746	1.34E-05
412	1.36E-05	479	2.13E-04	546	5.28E-04	613	8.05E-04	680	1.12E-04	747	1.31E-05
413	1.46E-05	480	2.09E-04	547	5.33E-04	614	7.89E-04	681	1.08E-04	748	1.27E-05
414	1.67E-05	481	2.10E-04	548	5.37E-04	615	6.87E-04	682	1.06E-04	749	1.24E-05
415	1.92E-05	482	2.11E-04	549	5.42E-04	616	6.21E-04	683	1.02E-04	750	1.21E-05
416	2.04E-05	483	2.10E-04	550	5.46E-04	617	5.95E-04	684	9.94E-05	751	1.18E-05
417	2.39E-05	484	2.14E-04	551	5.51E-04	618	5.86E-04	685	9.59E-05	752	1.14E-05
418	2.70E-05	485	2.17E-04	552	5.55E-04	619	5.81E-04	686	9.33E-05	753	1.10E-05
419	3.10E-05	486	2.21E-04	553	5.58E-04	620	5.71E-04	687	9.05E-05	754	1.06E-05
420	3.36E-05	487	2.25E-04	554	5.64E-04	621	5.59E-04	688	8.75E-05	755	1.00E-05
421	3.80E-05	488	2.28E-04	555	5.70E-04	622	5.49E-04	689	8.51E-05	756	1.00E-05
422	4.22E-05	489	2.33E-04	556	5.74E-04	623	5.42E-04	690	8.24E-05	757	9.70E-06
423	4.78E-05	490	2.38E-04	557	5.80E-04	624	5.43E-04	691	7.96E-05	758	9.00E-06
424	5.33E-05	491	2.44E-04	558	5.85E-04	625	5.36E-04	692	7.76E-05	759	9.20E-06
425	6.06E-05	492	2.52E-04	559	5.91E-04	626	5.35E-04	693	7.52E-05	760	8.80E-06
426	6.69E-05	493	2.57E-04	560	5.95E-04	627	5.31E-04	694	7.30E-05	761	8.70E-06
427	7.47E-05	494	2.66E-04	561	6.01E-04	628	5.50E-04	695	7.00E-05	762	8.30E-06
428	8.41E-05	495	2.75E-04	562	6.06E-04	629	6.55E-04	696	6.82E-05	763	8.00E-06
429	9.42E-05	496	2.81E-04	563	6.09E-04	630	8.93E-04	697	6.64E-05	764	7.80E-06
430	1.05E-04	497	2.92E-04	564	6.16E-04	631	9.95E-04	698	6.45E-05	765	7.60E-06
431	1.19E-04	498	3.00E-04	565	6.16E-04	632	7.91E-04	699	6.17E-05	766	7.40E-06
432	1.32E-04	499	3.06E-04	566	6.23E-04	633	6.19E-04	700	5.98E-05	767	7.20E-06
433	1.46E-04	500	3.17E-04	567	6.30E-04	634	6.71E-04	701	5.80E-05	768	7.10E-06
434	1.64E-04	501	3.26E-04	568	6.32E-04	635	7.73E-04	702	5.61E-05	769	6.70E-06
435	1.83E-04	502	3.34E-04	569	6.37E-04	636	6.53E-04	703	5.42E-05	770	6.40E-06
436	2.02E-04	503	3.43E-04	570	6.41E-04	637	4.90E-04	704	5.32E-05	771	6.30E-06
437	2.24E-04	504	3.52E-04	571	6.45E-04	638	4.15E-04	705	5.11E-05	772	6.00E-06
438	2.50E-04	505	3.57E-04	572	6.48E-04	639	3.87E-04	706	4.95E-05	773	6.00E-06
439	2.78E-04	506	3.65E-04	573	6.51E-04	640	3.70E-04	707	4.79E-05	774	5.80E-06
440	3.11E-04	507	3.71E-04	574	6.58E-04	641	3.55E-04	708	4.67E-05	775	5.60E-06
441	3.42E-04	508	3.80E-04	575	6.60E-04	642	3.44E-04	709	4.48E-05	776	5.40E-06
442	3.88E-04	509	3.87E-04	576	6.63E-04	643	3.35E-04	710	4.35E-05	777	5.30E-06
443	4.37E-04	510	3.90E-04	577	6.67E-04	644	3.28E-04	711	4.22E-05	778	5.10E-06
444	4.90E-04	511	3.98E-04	578	6.69E-04	645	3.24E-04	712	4.12E-05	779	5.10E-06
445	5.43E-04	512	4.04E-04	579	6.72E-04	646	3.41E-04	713	3.94E-05	780	5.10E-06
446	6.00E-04	513	4.10E-04	580	6.72E-04	647	3.89E-04	714	3.82E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	WPX2 @ 80W / 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	0.176	77.2	0.913
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

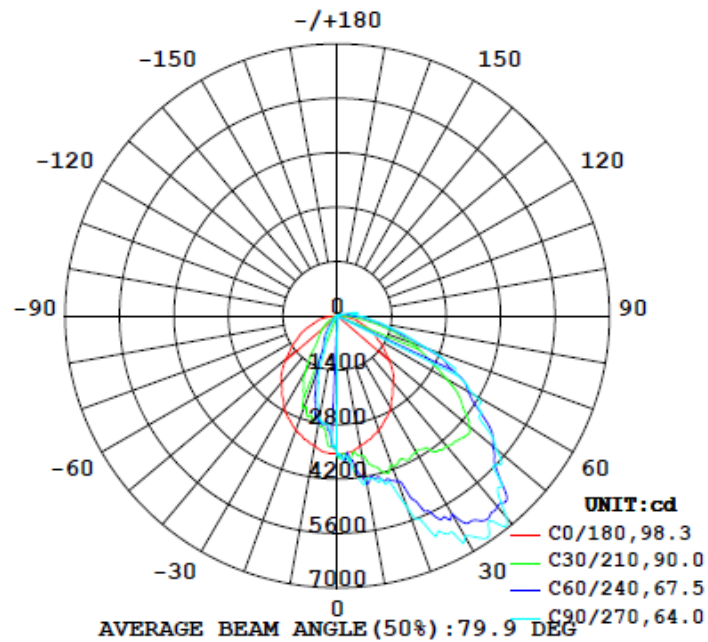
Test Result

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	11465	113.7	146.9	64.9	96.8	148.5	2.8%	B2-U3-G3
0°-90° zones	11181	113.7	146.9	64.9	96.8	144.8	2.9%	B2-U3-G3

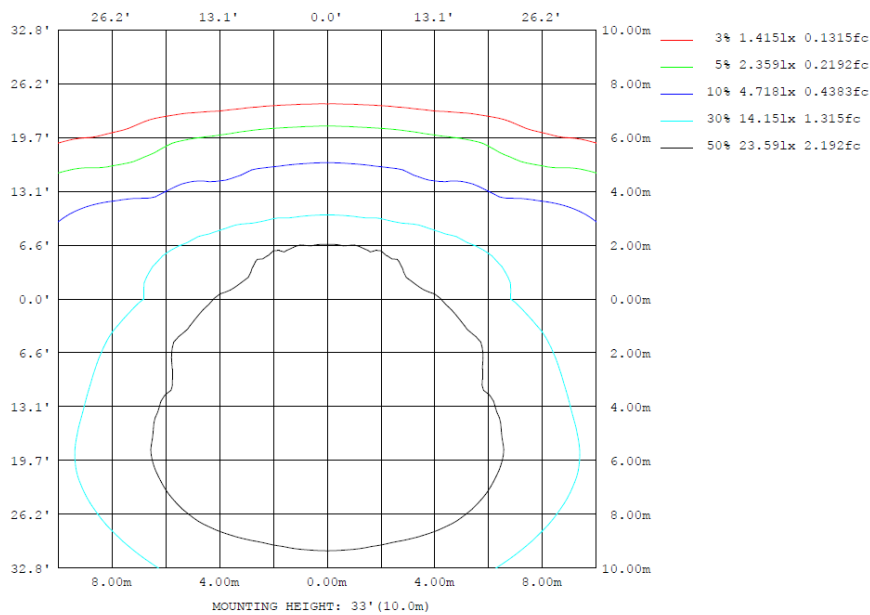
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

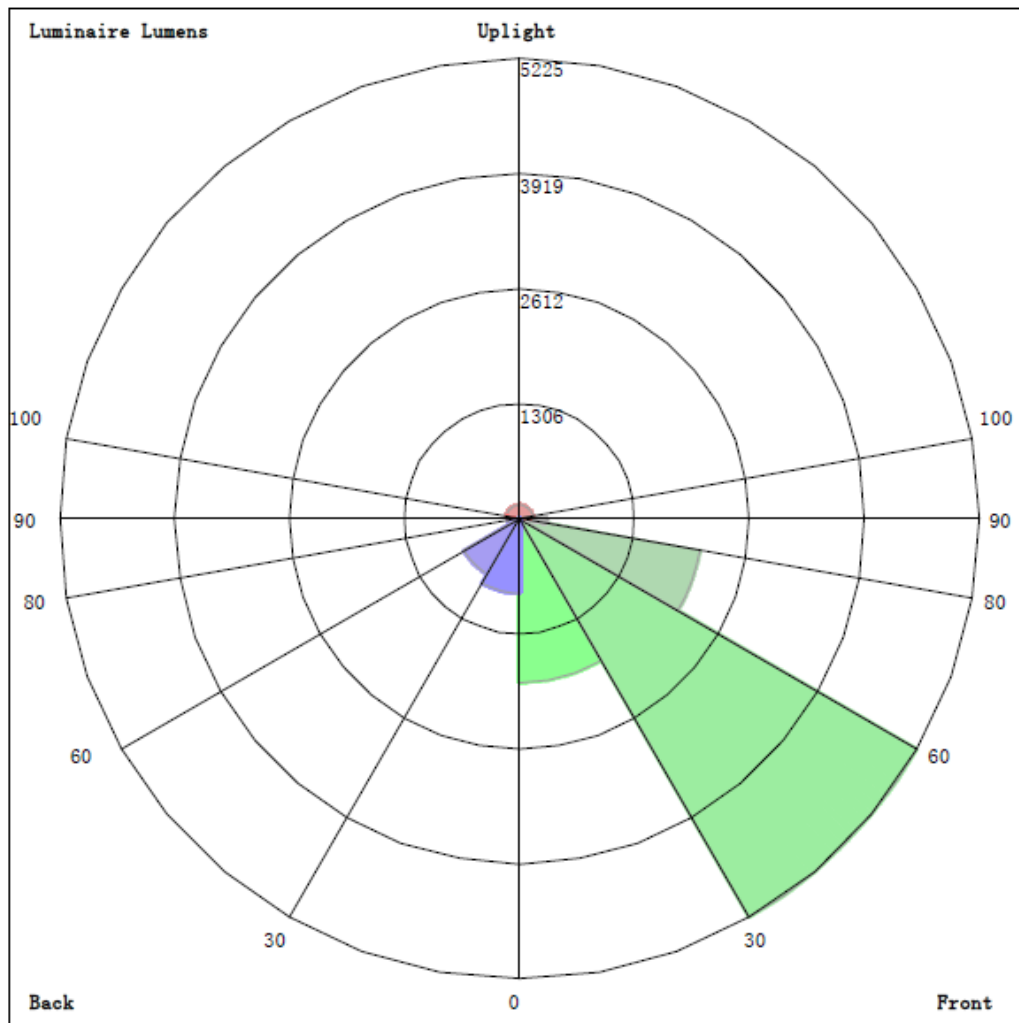
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	3400	4075	4255	4075	3400	2761	2654	2761	0- 10	324.8	324.8	2.83,2.83
20	3119	4367	5236	4367	3119	1953	1032	1953	10- 20	918.3	1243	10.8,10.8
30	2738	5261	6554	5261	2738	814.8	527.1	814.8	20- 30	1458	2701	23.6,23.6
40	2237	5775	6767	5775	2237	481.7	166.3	481.7	30- 40	1952	4654	40.6,40.6
50	1716	5094	5331	5094	1716	200.2	93.69	200.2	40- 50	2120	6773	59.1,59.1
60	1192	3765	4092	3765	1192	87.54	32.88	87.54	50- 60	1879	8653	75.5,75.5
70	732.9	2407	2476	2407	732.9	11.01	1.810	11.01	60- 70	1429	10081	87.9,87.9
80	390.5	1043	1178	1043	390.5	4.688	2.545	4.688	70- 80	778.9	10860	94.7,94.7
90	36.95	320.5	561.0	320.5	36.95	3.149	2.772	3.149	80- 90	320.4	11181	97.5,97.5
100	31.73	136.0	533.9	136.0	31.73	3.976	3.542	3.976	90-100	130.4	11311	98.7,98.7
110	21.79	31.34	86.97	31.34	21.79	3.223	3.985	3.223	100-110	58.98	11370	99.2,99.2
120	15.34	89.87	37.49	89.87	15.34	3.102	3.897	3.102	110-120	27.43	11398	99.4,99.4
130	8.718	74.95	87.72	74.95	8.718	3.250	4.523	3.250	120-130	30.13	11428	99.7,99.7
140	2.769	46.59	72.02	46.59	2.769	3.545	4.616	3.545	130-140	21.37	11449	99.9,99.9
150	1.812	23.13	38.89	23.13	1.812	3.977	4.617	3.977	140-150	10.94	11460	100,100
160	2.188	1.822	15.58	1.822	2.188	4.123	4.088	4.123	150-160	3.941	11464	100,100
170	2.523	2.308	2.763	2.308	2.523	3.214	3.124	3.214	160-170	1.071	11465	100,100
180	3.063	2.958	2.538	2.958	3.063	2.812	2.684	2.812	170-180	0.2716	11465	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Zonal (lm)		Total (lm)		Percent
0-10	324.81	0-10	324.81	2.83%
10-20	918.26	0-20	1243.07	10.84%
20-30	1458.23	0-30	2701.30	23.56%
30-40	1952.30	0-40	4653.60	40.59%
40-50	2119.81	0-50	6773.41	59.08%
50-60	1879.44	0-60	8652.85	75.47%
60-70	1428.51	0-70	10081.36	87.93%
70-80	778.94	0-80	10860.30	94.73%
80-90	320.42	0-90	11180.72	97.52%
90-100	130.43	0-100	11311.15	98.66%
100-110	58.98	0-110	11370.13	99.17%
110-120	27.43	0-120	11397.56	99.41%
120-130	30.13	0-130	11427.69	99.67%
130-140	21.37	0-140	11449.06	99.86%
140-150	10.94	0-150	11460.00	99.96%
150-160	3.94	0-160	11463.94	99.99%
160-170	1.07	0-170	11465.01	100.00%
170-180	0.27	0-180	11465.28	100.00%

4.2 Goniophotometer Test

LCS/BUG

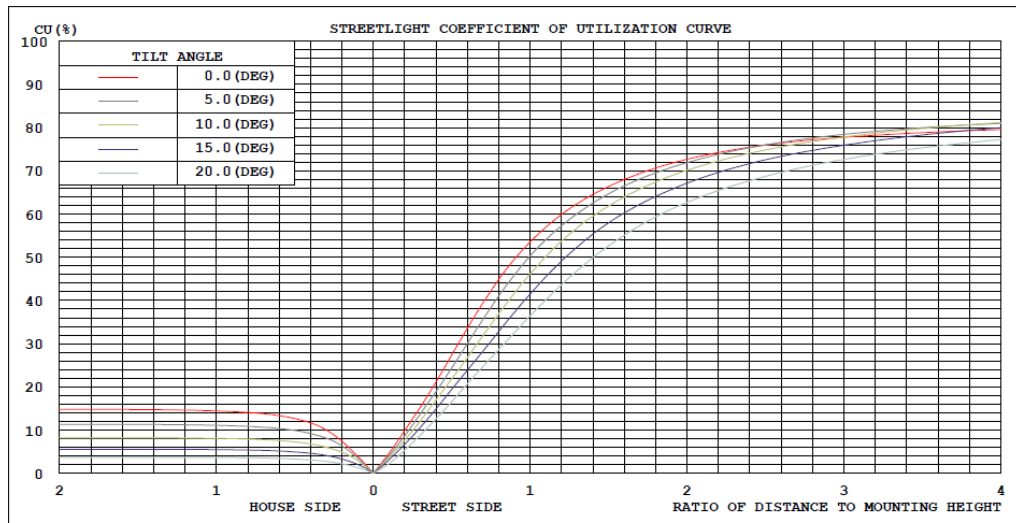


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

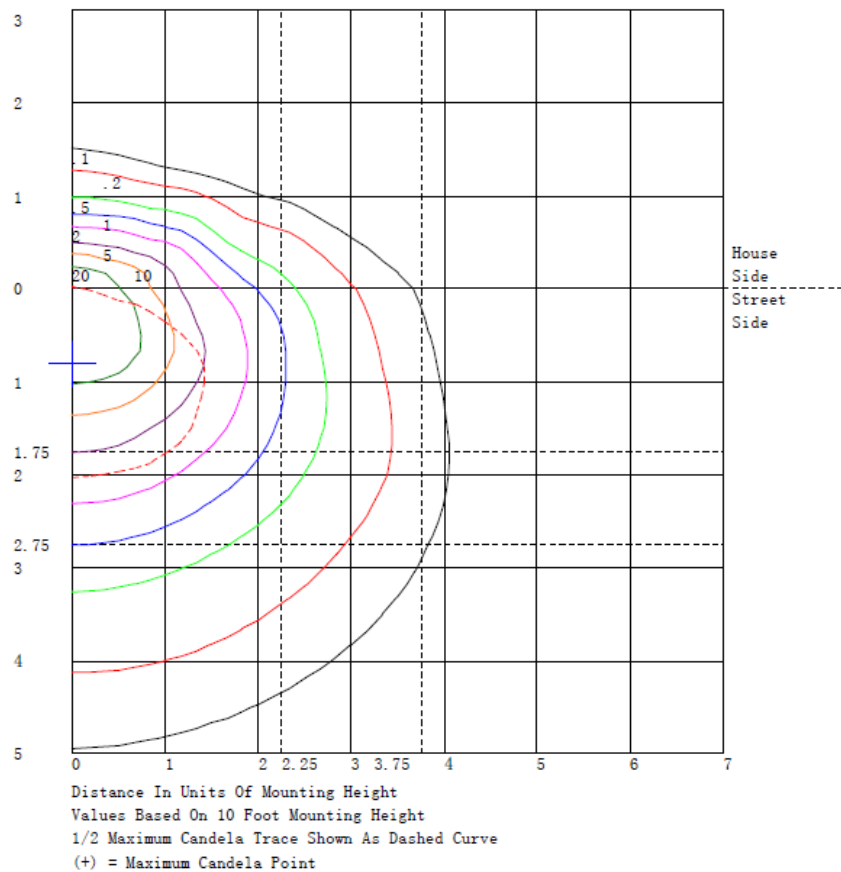
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1857.9	N.A.	16.2
FM - Front-Medium (30-60)	5224.9	N.A.	45.6
FH - Front-High (60-80)	2085.0	N.A.	18.2
FVH - Front-Very High (80-90)	306.9	N.A.	2.7
BL - Back-Low (0-30)	843.4	N.A.	7.4
BM - Back-Medium (30-60)	726.7	N.A.	6.3
BH - Back-High (60-80)	122.5	N.A.	1.1
BVH - Back-Very High (80-90)	13.5	N.A.	0.1
UL - Uplight-Low (90-100)	130.4	N.A.	1.1
UH - Uplight-High (100-180)	154.1	N.A.	1.3
Total	11465.3	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

C (DEG)																	UNIT: cd			
y	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	
0	3553	3556	3560	3563	3566	3569	3572	3574	3577	3580	3583	3587	3590	3593	3596	3598	3601	3603	3605	
5	3526	3498	3497	3522	3609	3697	3758	3687	3597	3520	3563	3632	3705	3727	3736	3736	3733	3727	3720	
10	3400	3498	3573	3627	3630	3633	3657	3777	3923	4075	4206	4315	4392	4395	4369	4328	4298	4272	4255	
15	3285	3288	3340	3441	3638	3850	4044	4120	4162	4187	4238	4287	4329	4362	4384	4394	4378	4355	4332	
20	3119	3197	3308	3452	3663	3882	4086	4207	4298	4367	4409	4460	4540	4750	4973	5171	5236	5252	5236	
25	2928	3161	3377	3577	3756	3923	4080	4208	4352	4535	4849	5191	5528	5806	6032	6191	6203	6165	6111	
30	2738	3101	3407	3655	3780	3896	4054	4435	4854	5261	5503	5704	5887	6143	6377	6562	6602	6591	6554	
35	2485	2884	3242	3557	3787	4008	4253	4633	5044	5457	5832	6167	6445	6612	6719	6780	6818	6830	6821	
40	2237	2663	3062	3433	3741	4047	4377	4854	5334	5775	6038	6238	6397	6589	6749	6862	6858	6818	6767	
45	2012	2367	2744	3142	3581	4027	4466	4896	5281	5598	5763	5857	5902	5944	5961	5958	5923	5884	5851	
50	1716	1997	2344	2760	3321	3892	4413	4727	4949	5094	5166	5198	5215	5288	5357	5407	5392	5361	5331	
55	1464	1722	2040	2417	2924	3439	3908	4191	4390	4519	4599	4631	4623	4571	4504	4442	4437	4446	4460	
60	1192	1534	1875	2216	2581	2927	3237	3463	3639	3765	3823	3856	3887	3990	4091	4172	4160	4127	4092	
65	1001	1330	1632	1908	2150	2371	2574	2790	2979	3129	3185	3205	3209	3239	3269	3296	3319	3337	3348	
70	733	905	1094	1300	1547	1794	2021	2188	2317	2407	2435	2438	2430	2451	2472	2488	2486	2480	2476	
75	543	619	722	851	1039	1230	1401	1483	1531	1557	1575	1587	1599	1632	1668	1703	1730	1749	1759	
80	390	391	420	477	582	702	822	912	987	1043	1066	1075	1079	1094	1110	1127	1148	1166	1178	
85	148	150	170	208	275	352	433	502	565	621	661	694	722	753	779	800	809	813	814	
90	36.9	57.1	80.7	108	139	174	210	246	282	321	362	404	443	477	506	530	546	556	561	
95	30.7	42.4	54.9	68.3	82.3	97.3	114	130	150	172	202	235	269	304	337	364	383	395	400	
100	31.7	33.6	36.4	39.9	41.5	46.0	55.6	74.4	101	136	184	239	298	360	420	471	505	526	534	
105	20.8	22.8	24.8	26.7	27.2	28.5	31.6	40.4	50.6	61.0	66.6	72.5	79.9	93.0	108	126	151	172	183	
110	21.8	17.1	17.3	22.2	37.9	54.0	65.8	55.1	41.7	31.3	44.2	61.5	78.6	82.3	82.9	81.9	84.0	85.9	87.0	
115	21.6	14.5	13.0	17.1	31.2	47.7	63.1	70.2	72.5	69.6	54.0	37.8	25.7	34.5	48.5	64.1	73.2	79.1	81.1	
120	15.3	9.30	8.70	13.5	27.1	43.7	60.7	72.9	82.8	89.9	94.3	94.9	90.7	75.6	58.4	42.6	37.4	36.0	37.5	
125	11.8	6.48	6.14	10.8	23.1	38.4	54.6	67.6	79.2	88.8	95.6	99.9	102	99.9	96.4	92.2	88.7	85.9	84.5	
130	8.72	4.43	4.25	8.19	18.4	31.1	44.7	55.7	65.8	74.9	83.2	89.8	94.3	94.8	93.5	91.3	89.7	88.4	87.7	
135	2.87	0.00	0.00	1.83	11.7	23.7	36.4	45.3	53.3	60.7	68.8	75.9	81.4	83.0	83.1	82.4	82.6	82.7	82.9	
140	2.77	4.27	6.78	10.3	15.1	20.8	26.9	33.5	40.1	46.6	52.6	58.0	62.5	65.4	67.4	68.8	70.3	71.4	72.0	
145	2.53	2.95	4.26	6.46	9.79	13.8	18.5	23.6	28.9	33.9	38.0	41.5	44.6	47.2	49.4	51.4	53.5	55.3	56.5	
150	1.81	1.76	1.71	1.67	0.57	0.27	1.58	8.11	15.7	23.1	26.7	29.1	30.8	32.6	34.1	35.4	36.9	38.1	38.9	
155	1.99	1.73	1.80	2.19	2.82	3.85	5.35	7.84	10.6	13.5	16.1	18.4	20.3	21.7	22.8	23.6	24.6	25.4	25.9	
160	2.19	2.06	2.03	2.09	2.38	2.67	2.85	2.19	1.72	1.82	3.98	6.69	9.51	11.5	13.1	14.4	15.1	15.5	15.6	
165	2.34	2.35	2.35	2.33	2.25	2.20	2.21	2.39	2.69	3.11	4.00	4.79	5.22	4.32	3.14	1.99	1.77	1.79	1.95	
170	2.52	2.53	2.54	2.54	2.53	2.51	2.48	2.43	2.36	2.31	2.25	2.23	2.25	2.42	2.62	2.79	2.81	2.79	2.76	
175	2.66	2.68	2.70	2.70	2.70	2.69	2.67	2.66	2.65	2.64	2.62	2.60	2.58	2.54	2.51	2.47	2.41	2.37	2.35	
180	3.06	3.07	3.08	3.08	3.06	3.05	3.02	3.01	2.99	2.96	2.92	2.87	2.82	2.78	2.73	2.68	2.62	2.57	2.54	

C (DEG)																			UNIT: cd	
y	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	
0	3603	3601	3598	3596	3593	3590	3587	3583	3580	3577	3574	3572	3569	3566	3563	3560	3556	3553	3572	
5	3727	3733	3736	3736	3727	3705	3632	3563	3520	3597	3687	3758	3697	3609	3522	3497	3498	3526	3455	
10	4272	4298	4328	4369	4395	4392	4315	4206	4075	3923	3777	3657	3633	3630	3627	3573	3498	3400	3282	
15	4355	4378	4394	4384	4362	4329	4287	4238	4187	4162	4120	4044	3850	3638	3441	3340	3288	3285	3046	
20	5252	5236	5171	4973	4750	4540	4460	4409	4367	4298	4207	4086	3882	3663	3452	3308	3197	3119	2830	
25	6165	6203	6191	6032	5806	5528	5191	4849	4535	4352	4208	4080	3923	3756	3577	3377	3161	2928	2806	
30	6591	6602	6562	6377	6143	5887	5704	5503	5261	4854	4435	4054	3896	3780	3655	3407	3101	2738	2698	
35	6830	6818	6780	6719	6612	6445	6167	5832	5457	5044	4633	4253	4008	3787	3557	3242	2884	2485	2508	
40	6818	6858	6862	6749	6589	6397	6238	6038	5775	5334	4854	4377	4047	3741	3433	3062	2663	2237	2214	
45	5884	5923	5958	5961	5944	5902	5857	5763	5598	5281	4896	4466	4027	3581	3142	2744	2367	2012	1924	
50	5361	5392	5407	5357	5288	5215	5198	5166	5094	4949	4727	4413	3892	3321	2760	2344	1997	1716	1526	
55	4446	4437	4442	4504	4571	4623	4631	4599	4519	4390	4191	3908	3439	2924	2417	2040	1722	1464	1191	
60	4127	4160	4172	4091	3990	3887	3856	3823	3765	3639	3463	3237	2927	2581	2216	1875	1534	1192	885	
65	3337	3319	3296	3269	3239	3209	3205	3185	3129	2979	2790	2574	2371	2150	1908	1632	1330	1001	737	
70	2480	2486	2488	2472	2451	2430	2438	2435	2407	2317	2188	2021	1794	1547	1300	1094	905	733	551	
75	1749	1730	1703	1668	1632	1599	1587	1575	1557	1531	1483	1401	1230	1039	851	722	619	543	390	
80	1166	1148	1127	1110	1094	1079	1075	1066	1043	987	912	822	702	582	477	420	391	390	266	
85	813	809	800	779	753	722	694	661	621	565	502	433	352	275	208	170	150	148	107	
90	556	546	530	506	477	443	404	362	321	282	246	210	174	139	108	80.7	57.1	36.9	33.9	
95	395	383	364	337	304	269	235	202	172	150	130	114	97.3	82.3	68.3	54.9	42.4	30.7	26.4	
100	526	505	471	420	360	298	239	184	136	101	74.4	55.6	46.0	41.5	39.9	36.4	33.6	31.7	25.3	
105	172	151	126	108	93.0	79.9	72.5	66.6	61.0	50.6	40.4	31.6	28.5	27.2	26.7	24.8	22.8	20.8	16.3	
110	85.9	84.0	81.9	82.9	82.3	78.6	61.5	44.2	31.3	41.7	55.1	65.8	54.0	37.9	22.2	17.3	17.1	21.8	16.7	
115	79.1	73.2	64.1	48.5	34.5	25.7	37.8	54.0	69.6	72.5	70.2	63.1	47.7	31.2	17.1	13.0	14.5	21.6	15.9	
120	36.0	37.4	42.6	58.4	75.6	90.7	94.9	94.3	89.9	82.8	72.9	60.7	43.7	27.1	13.5	8.70	9.30	15.3	11.9	
125	85.9	88.7	92.2	96.4	99.9	102	99.9	95.6	88.8	79.2	67.6	54.6	38.4	23.1	10.8	6.14	6.48	11.8	9.34	
130	88.4	89.7	91.3	93.5	94.8	94.3	89.8	83.2	74.9	65.8	55.7	44.7	31.1	18.4	8.19	4.25	4.43	8.72	7.15	
135	82.7	82.6	82.4	83.1	83.0	81.4	75.9	68.8	60.7	53.3	45.3	36.4	23.7	11.7	1.83	0.00	0.00	2.87	3.62	
140	71.4	70.3	68.8	67.4	65.4	62.5	58.0	52.6	46.6	40.1	33.5	26.9	20.8	15.1	10.3	6.78	4.27	7.77	6.35	
145	55.3	53.5	51.4	49.4	47.2	44.6	41.5	38.0	33.9	28.9	23.6	18.5	13.8	9.79	6.46	4.26	2.95	2.53	2.96	
150	38.1	36.9	35.4	34.1	32.6	30.8	29.1	26.7	23.1	15.7	8.11	1.58	0.27	0.57	1.67	1.71	1.76	1.81	2.56	
155	25.4	24.6	23.6	22.8	21.7	20.3	18.4	16.1	13.5	10.6	7.84	5.35	3.85	2.82	1.19	1.80	1.73	1.99	2.85	
160	15.5	15.1	14.4	13.1	11.5	9.51	6.69	3.98	1.82	1.72	2.19	2.85	2.67	2.38	2.09	2.03	2.06	2.19	3.13	
165	1.79	1.77	1.99	3.14	4.32	5.22	4.79	4.00	3.11	2.69	2.39	2.21	2.20	2.25	2.33	2.35	2.35	2.34	3.27	
170	2.79	2.81	2.79	2.62	2.42	2.25	2.23	2.25	2.31	2.36	2.43	2.48	2.51	2.53	2.54	2.54	2.53	2.52	3.35	
175	2.37	2.41	2.47	2.51	2.54	2.58	2.60	2.62	2.64	2.65	2.66	2.67	2.69	2.70	2.70	2.70	2.68	2.66	3.02	
180	2.57	2.62	2.68	2.73	2.78	2.82	2.87	2.92	2.96	2.99	3.01	3.02	3.05	3.06	3.08	3.08	3.07	3.06	3.15	

Table--3

UNIT: cd

C (DEG) γ (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	3587	3598	3603	3605	3605	3606	3607	3607	3609	3611	3612	3611	3610	3608	3607	3606	3605	3606	3607
5	3389	3330	3285	3240	3188	3093	3001	2924	2920	2932	2948	2929	2902	2871	2837	2809	2792	2809	2837
10	3167	3055	2931	2822	2739	2723	2734	2761	2800	2829	2834	2746	2645	2559	2577	2616	2654	2616	2577
15	2859	2723	2659	2632	2630	2641	2647	2629	2526	2399	2266	2159	2066	1991	1945	1919	1912	1919	1945
20	2618	2482	2487	2520	2532	2368	2165	1953	1816	1693	1575	1426	1284	1161	1089	1046	1032	1046	1089
25	2676	2537	2398	2244	2069	1841	1603	1369	1166	992	855	793	765	757	741	732	729	732	741
30	2601	2446	2206	1928	1631	1325	1045	815	725	687	676	633	595	564	544	531	527	531	544
35	2431	2254	1897	1498	1117	911	765	663	574	506	454	404	364	333	314	303	300	303	314
40	2102	1902	1532	1134	769	618	532	482	398	324	263	223	196	180	170	166	166	166	170
45	1778	1575	1256	922	617	467	371	311	248	201	169	154	147	146	141	138	136	138	141
50	1330	1127	898	678	483	356	263	200	161	140	129	115	105	98.4	94.7	93.4	93.7	93.4	94.7
55	952	748	582	447	340	254	190	143	111	92.1	81.3	73.4	69.5	68.1	66.3	65.5	65.6	65.5	66.3
60	637	446	334	264	220	165	121	87.5	66.9	54.4	47.6	42.9	40.6	39.7	36.6	34.2	32.9	34.2	36.6
65	520	351	245	175	131	91.9	63.8	44.0	25.4	11.7	2.56	0.00	0.00	1.06	1.06	1.20	1.40	1.20	1.06
70	398	274	186	123	78.8	45.5	23.8	11.0	3.61	0.89	1.06	0.48	0.66	1.25	1.42	1.61	1.81	1.61	1.42
75	264	166	104	63.1	38.7	20.8	11.0	6.75	3.03	1.48	1.32	0.98	1.07	1.41	1.65	1.92	2.20	1.92	1.65
80	167	92.7	52.6	31.2	22.2	12.4	7.03	4.69	2.62	1.75	1.63	1.41	1.44	1.65	1.92	2.24	2.54	2.24	1.92
85	74.1	48.2	31.6	20.7	14.0	8.62	5.29	3.51	2.36	1.93	1.95	1.82	1.82	1.94	2.15	2.40	2.65	2.40	2.15
90	30.3	26.1	20.5	14.9	9.79	6.69	4.53	3.15	2.46	2.24	2.29	2.23	2.24	2.32	2.44	2.59	2.77	2.59	2.44
95	22.3	18.5	14.6	11.1	8.01	5.87	4.31	3.27	2.78	2.62	2.66	2.62	2.64	2.71	2.77	2.86	3.01	2.86	2.77
100	19.7	15.0	11.3	8.46	6.36	5.08	4.34	3.98	3.71	3.59	3.55	3.45	3.37	3.33	3.34	3.40	3.54	3.40	3.34
105	12.4	9.12	6.36	4.25	2.86	2.69	3.01	3.56	3.70	3.79	3.84	3.82	3.78	3.75	3.78	3.86	4.00	3.86	3.78
110	12.5	9.12	6.90	5.40	4.45	3.75	3.36	3.22	3.24	3.37	3.57	3.72	3.86	3.97	3.99	3.98	3.99	3.98	3.99
115	11.2	7.66	5.60	4.40	3.81	3.36	3.18	3.19	3.25	3.37	3.51	3.56	3.59	3.62	3.67	3.72	3.77	3.72	3.67
120	8.98	6.68	5.07	3.96	3.29	3.00	2.97	3.10	3.22	3.37	3.52	3.61	3.67	3.72	3.79	3.85	3.90	3.85	3.79
125	7.29	5.65	4.47	3.65	3.15	2.97	2.99	3.15	3.31	3.50	3.69	3.78	3.86	3.92	4.01	4.10	4.16	4.10	4.01
130	5.83	4.76	3.94	3.36	3.00	2.95	3.05	3.25	3.40	3.57	3.74	3.90	4.05	4.19	4.33	4.44	4.52	4.44	4.33
135	4.06	4.23	3.91	3.45	3.01	3.02	3.16	3.37	3.55	3.73	3.91	4.05	4.18	4.29	4.40	4.48	4.53	4.48	4.40
140	3.57	3.73	3.60	3.40	3.21	3.27	3.39	3.54	3.67	3.79	3.92	4.06	4.19	4.32	4.43	4.54	4.62	4.54	4.43
145	3.28	3.50	3.55	3.54	3.51	3.58	3.66	3.77	3.90	4.03	4.16	4.22	4.28	4.34	4.46	4.58	4.67	4.58	4.46
150	3.14	3.54	3.71	3.77	3.77	3.84	3.91	3.98	4.05	4.12	4.19	4.24	4.29	4.35	4.44	4.54	4.62	4.54	4.44
155	3.52	3.98	4.17	4.21	4.15	4.11	4.06	4.01	4.03	4.07	4.12	4.19	4.26	4.32	4.33	4.33	4.33	4.33	4.33
160	3.85	4.33	4.50	4.50	4.40	4.31	4.21	4.12	4.12	4.14	4.16	4.12	4.07	4.03	4.04	4.06	4.09	4.06	4.04
165	3.96	4.41	4.52	4.46	4.31	4.22	4.12	4.02	3.93	3.85	3.77	3.68	3.60	3.54	3.57	3.62	3.67	3.62	3.57
170	3.77	4.09	4.12	4.01	3.80	3.60	3.39	3.21	3.18	3.19	3.21	3.18	3.15	3.13	3.12	3.12	3.12	3.12	3.12
175	3.45	3.67	3.72	3.68	3.57	3.39	3.19	3.01	2.98	2.99	2.99	2.90	2.81	2.75	2.79	2.86	2.93	2.86	2.79
180	3.04	3.03	3.02	3.01	2.98	2.93	2.88	2.81	2.75	2.68	2.63	2.59	2.57	2.57	2.60	2.64	2.68	2.64	2.60

C (DEG) γ (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	3608	3610	3611	3612	3611	3609	3607	3607	3606	3605	3605	3603	3598	3587	3572				
5	2871	2902	2929	2948	2932	2920	2924	3001	3093	3188	3240	3285	3330	3389	3455				
10	2559	2645	2746	2834	2829	2800	2761	2734	2723	2739	2822	2931	3055	3167	3282				
15	1991	2066	2159	2266	2399	2526	2629	2647	2641	2630	2632	2659	2723	2859	3046				
20	1161	1284	1426	1575	1693	1816	1953	2165	2368	2532	2520	2487	2482	2618	2830				
25	757	765	793	855	992	1166	1369	1603	1841	2069	2244	2398	2537	2676	2806				
30	564	595	633	676	687	725	815	1045	1325	1631	1928	2206	2446	2601	2698				
35	333	364	404	454	506	574	663	765	911	1117	1498	1897	2254	2431	2508				
40	180	196	223	263	324	398	482	532	618	769	1134	1532	1902	2102	2214				
45	146	147	154	169	201	248	311	371	467	617	922	1256	1575	1778	1924				
50	98.4	105	115	129	140	161	200	263	356	483	678	898	1127	1330	1526				
55	68.1	69.5	73.4	81.3	92.1	111	143	190	254	340	447	582	748	952	1191				
60	39.7	40.6	42.9	47.6	54.4	66.9	87.5	121	165	220	264	334	446	637	885				
65	1.06	0.00	0.00	2.56	11.7	25.4	44.0	63.8	91.9	131	175	245	351	520	737				
70	1.25	0.66	0.48	1.06	0.89	3.61	11.0	23.8	45.5	78.8	123	186	274	398	551				
75	1.41	1.07	0.98	1.32	1.48	3.03	6.75	11.0	20.8	38.7	63.1	104	166	264	390				
80	1.65	1.44	1.41	1.63	1.75	2.62	4.69	7.03	12.4	22.2	31.2	52.6	92.7	167	266				
85	1.94	1.82	1.82	1.95	1.93	2.36	3.51	5.29	8.62	14.0	20.7	31.6	48.2	74.1	107				
90	2.32	2.24	2.23	2.29	2.24	2.46	3.15	4.53	6.69	9.79	14.9	20.5	26.1	30.3	33.9				
95	2.71	2.64	2.62	2.66	2.62	2.78	3.27	4.31	5.87	8.01	11.1	14.6	18.5	22.3	26.4				
100	3.33	3.37	3.45	3.55	3.59	3.71	3.98	4.34	5.08	6.36	8.46	11.3	15.0	19.7	25.3				
105	3.75	3.78	3.82	3.84	3.79	3.70	3.56	3.01	2.69	2.86	4.25	6.36	9.12	12.4	16.3				
110	3.97	3.86	3.72	3.57	3.37	3.24	3.22	3.36	3.75	4.45	5.40	6.90	9.12	12.5	16.7				
115	3.62	3.59	3.56	3.51	3.37	3.25	3.19	3.18	3.36	3.81	4.40	5.60	7.66	11.2	15.9				
120	3.72	3.67	3.61	3.52	3.37	3.22	3.10	2.97	3.00	3.29	3.96	5.07	6.68	8.98	11.9				
125	3.92	3.86	3.78	3.69	3.50	3.31	3.15	2.99	2.97	3.15	3.65	4.47	5.65	7.29	9.34				
130	4.19	4.05	3.90	3.74	3.57	3.40	3.25	3.05	2.95	3.00	3.36	3.94	4.76	5.83	7.15				
135	4.29	4.18	4.05	3.91	3.73	3.55	3.37	3.16	3.02	3.01	3.45	3.91	4.23	4.06	3.61				
140	4.32	4.19	4.06	3.92	3.79	3.67	3.54	3.39	3.27	3.21	3.40	3.60	3.73	3.57	3.25				
145	4.34	4.28	4.22	4.16	4.03	3.90	3.77	3.66	3.58	3.51	3.54	3.55	3.50	3.28	2.96				
150	4.35	4.29	4.24	4.19	4.12	4.05	3.98	3.91	3.84	3.77	3.77	3.71	3.54	3.14	2.56				
155	4.32	4.26	4.19	4.12	4.07	4.03	4.01	4.06	4.11	4.15	4.21	4.17	3.98	3.52	2.85				
160	4.03	4.07	4.12	4.16	4.14	4.12	4.12	4.21	4.31	4.40	4.50	4.50	4.33	3.85	3.13				
165	3.54	3.60	3.68	3.77	3.85	3.93	4.02	4.12	4.22	4.31	4.46	4.52	4.41	3.96	3.27				
170	3.13	3.15	3.18	3.21	3.19	3.18	3.21	3.39	3.60	3.80	4.01	4.12	4.09	3.77	3.25				
175	2.75	2.81	2.90	2.99	2.99	2.98	3.01	3.19	3.39	3.57	3.68	3.72	3.67	3.45	3.12				
180	2.57	2.57	2.59	2.63	2.68	2.75	2.81	2.88	2.93	2.98	3.01	3.02	3.03	3.04	3.05				

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	WPX2 @ 80W / 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	0.176	77.2	0.913	7.23

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*****