

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

Prepared By

Dongguan New Testing Centre Co., Ltd.

Prepare by:

Alan Wang

Engineer: Alan Wang

Date: 2023-10-30

Review by:

Vincent Yuan

Technical Lead: Vincent Yuan

Issue Date: 2023-10-30

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		15111
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		152.0
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		14713
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	148.0
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		99.4
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	480V	14.56
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	480V	0.870
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3985±275	4095
		4 steps	3985±154	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		85.7
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		20
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		85
Minimum Rg (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥89		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%		2.1%
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		0.238
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		99.4
(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	2023-10-23	WPX3 @ 100W / 4000K 480	231020002-S1
2	Goniophotometer Test	2023-10-23	WPX3 @ 100W / 4000K 480	231020002-S1
3	THD and PF Test	2023-10-23	WPX3 @ 100W / 4000K 480	231020002-S1

Remark (If any)

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

3.0 Product Description

Luminaire Description: Model No. WPX3 @ 100W / 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.	WPX3 @ 100W / 4000K 480	Sample ID	231020002-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

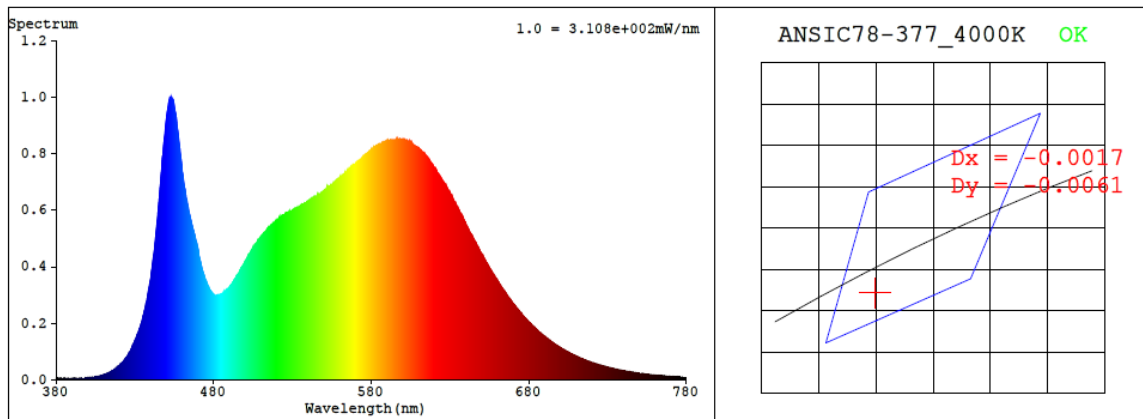
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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	0.238	99.4	0.870

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
4095	85.7	20	-0.0024	85	96	-11%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3747$ $y = 0.3681$ / $u' = 0.2248$ $v' = 0.4968$ ($duv = -2.40e-03$)

CCT= 4095K Prcp WL: Ld=580.2nm Purity=22.9%

Peak WL: Lp=453nm FWHM: =25.3nm Ratio:R=18.6% G=77.3% B=4.1%

Render Index: Ra = 85.7 AvgR = 80.1 TM30:Rf=85 Rg=96

EEL: 0.09093 A++ Highest

R1 =85	R2 =93	R3 =96	R4 =84	R5 =85	R6 =89	R7 =86
R8 =68	R9 =20	R10=82	R11=83	R12=66	R13=87	R14=98 R15=80

4.1 Integrating Sphere Test

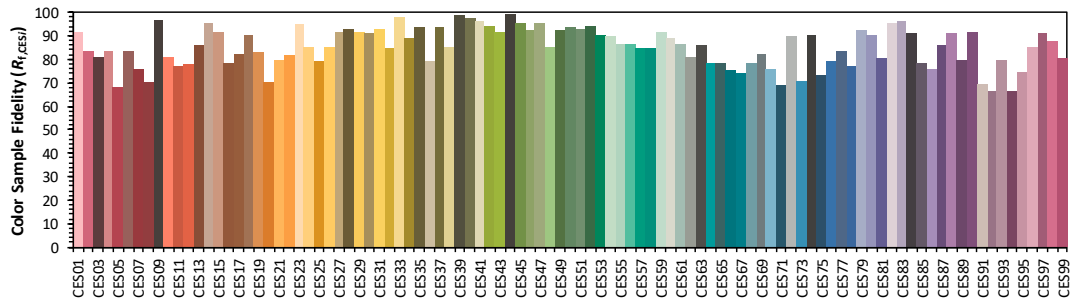
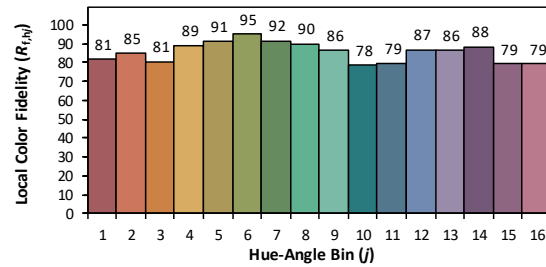
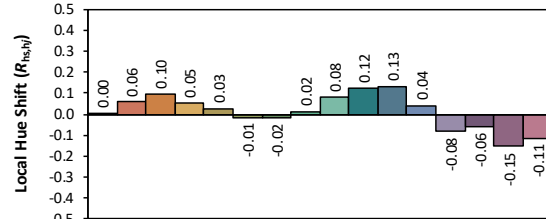
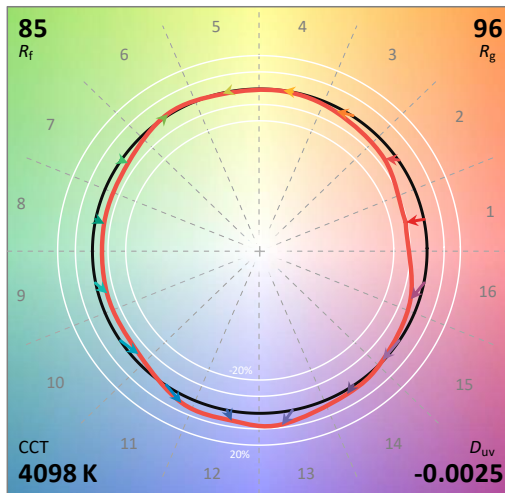
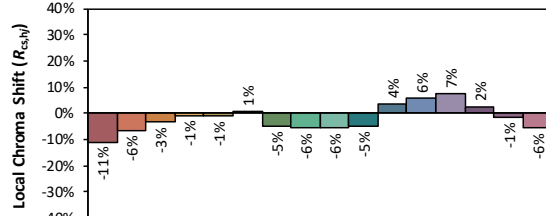
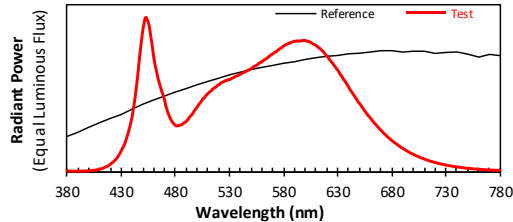
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/10/30

Model: WPX3 @ 100W / 4000K 480



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

x 0.3747
 y 0.3679
 u' 0.2248
 v' 0.4968

CIE 13.3-1995
(CRI)

R_a 86
 R_g 20

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	6.40E-06	447	7.52E-04	514	5.34E-04	581	8.18E-04	648	4.67E-04	715	7.12E-05
381	5.80E-06	448	8.13E-04	515	5.38E-04	582	8.23E-04	649	4.54E-04	716	6.91E-05
382	5.30E-06	449	8.72E-04	516	5.44E-04	583	8.27E-04	650	4.46E-04	717	6.70E-05
383	5.90E-06	450	9.25E-04	517	5.49E-04	584	8.29E-04	651	4.37E-04	718	6.55E-05
384	3.80E-06	451	9.61E-04	518	5.53E-04	585	8.34E-04	652	4.27E-04	719	6.28E-05
385	5.00E-06	452	9.96E-04	519	5.61E-04	586	8.33E-04	653	4.16E-04	720	6.09E-05
386	3.30E-06	453	1.00E-03	520	5.64E-04	587	8.39E-04	654	4.06E-04	721	5.96E-05
387	4.10E-06	454	9.84E-04	521	5.68E-04	588	8.41E-04	655	3.96E-04	722	5.71E-05
388	3.80E-06	455	9.67E-04	522	5.76E-04	589	8.43E-04	656	3.87E-04	723	5.55E-05
389	4.00E-06	456	9.36E-04	523	5.79E-04	590	8.45E-04	657	3.77E-04	724	5.37E-05
390	4.10E-06	457	8.88E-04	524	5.83E-04	591	8.46E-04	658	3.68E-04	725	5.21E-05
391	4.40E-06	458	8.43E-04	525	5.85E-04	592	8.49E-04	659	3.59E-04	726	5.08E-05
392	4.80E-06	459	7.93E-04	526	5.90E-04	593	8.48E-04	660	3.52E-04	727	4.92E-05
393	4.50E-06	460	7.41E-04	527	5.91E-04	594	8.47E-04	661	3.43E-04	728	4.76E-05
394	4.70E-06	461	7.00E-04	528	5.96E-04	595	8.46E-04	662	3.34E-04	729	4.60E-05
395	5.80E-06	462	6.67E-04	529	5.96E-04	596	8.50E-04	663	3.25E-04	730	4.46E-05
396	5.60E-06	463	6.35E-04	530	5.99E-04	597	8.49E-04	664	3.16E-04	731	4.32E-05
397	5.80E-06	464	6.03E-04	531	6.00E-04	598	8.51E-04	665	3.10E-04	732	4.18E-05
398	6.00E-06	465	5.79E-04	532	6.05E-04	599	8.51E-04	666	3.01E-04	733	4.02E-05
399	6.10E-06	466	5.54E-04	533	6.08E-04	600	8.51E-04	667	2.93E-04	734	3.93E-05
400	7.00E-06	467	5.31E-04	534	6.11E-04	601	8.49E-04	668	2.86E-04	735	3.77E-05
401	7.90E-06	468	5.09E-04	535	6.16E-04	602	8.47E-04	669	2.78E-04	736	3.68E-05
402	8.30E-06	469	4.88E-04	536	6.20E-04	603	8.43E-04	670	2.70E-04	737	3.53E-05
403	9.10E-06	470	4.65E-04	537	6.21E-04	604	8.44E-04	671	2.64E-04	738	3.44E-05
404	9.10E-06	471	4.31E-04	538	6.25E-04	605	8.40E-04	672	2.56E-04	739	3.34E-05
405	1.10E-05	472	4.08E-04	539	6.29E-04	606	8.34E-04	673	2.49E-04	740	3.25E-05
406	1.14E-05	473	3.84E-04	540	6.33E-04	607	8.30E-04	674	2.42E-04	741	3.14E-05
407	1.24E-05	474	3.67E-04	541	6.35E-04	608	8.26E-04	675	2.37E-04	742	3.02E-05
408	1.42E-05	475	3.50E-04	542	6.40E-04	609	8.23E-04	676	2.28E-04	743	2.91E-05
409	1.52E-05	476	3.37E-04	543	6.44E-04	610	8.20E-04	677	2.23E-04	744	2.86E-05
410	1.75E-05	477	3.25E-04	544	6.45E-04	611	8.13E-04	678	2.17E-04	745	2.75E-05
411	1.97E-05	478	3.15E-04	545	6.49E-04	612	8.07E-04	679	2.10E-04	746	2.71E-05
412	2.07E-05	479	3.09E-04	546	6.56E-04	613	8.03E-04	680	2.04E-04	747	2.58E-05
413	2.37E-05	480	3.01E-04	547	6.57E-04	614	7.97E-04	681	1.99E-04	748	2.52E-05
414	2.71E-05	481	2.98E-04	548	6.60E-04	615	7.90E-04	682	1.93E-04	749	2.39E-05
415	3.04E-05	482	2.99E-04	549	6.64E-04	616	7.84E-04	683	1.88E-04	750	2.33E-05
416	3.25E-05	483	3.00E-04	550	6.67E-04	617	7.77E-04	684	1.83E-04	751	2.27E-05
417	3.65E-05	484	3.03E-04	551	6.73E-04	618	7.67E-04	685	1.78E-04	752	2.23E-05
418	3.99E-05	485	3.04E-04	552	6.80E-04	619	7.61E-04	686	1.72E-04	753	2.14E-05
419	4.54E-05	486	3.07E-04	553	6.83E-04	620	7.51E-04	687	1.68E-04	754	2.07E-05
420	5.02E-05	487	3.11E-04	554	6.87E-04	621	7.45E-04	688	1.63E-04	755	1.97E-05
421	5.68E-05	488	3.18E-04	555	6.90E-04	622	7.32E-04	689	1.58E-04	756	1.93E-05
422	6.13E-05	489	3.21E-04	556	6.95E-04	623	7.24E-04	690	1.53E-04	757	1.87E-05
423	6.70E-05	490	3.27E-04	557	7.01E-04	624	7.15E-04	691	1.49E-04	758	1.82E-05
424	7.51E-05	491	3.35E-04	558	7.06E-04	625	7.07E-04	692	1.45E-04	759	1.77E-05
425	8.13E-05	492	3.43E-04	559	7.11E-04	626	6.98E-04	693	1.40E-04	760	1.71E-05
426	9.06E-05	493	3.53E-04	560	7.12E-04	627	6.89E-04	694	1.37E-04	761	1.67E-05
427	1.01E-04	494	3.62E-04	561	7.20E-04	628	6.79E-04	695	1.33E-04	762	1.61E-05
428	1.12E-04	495	3.70E-04	562	7.25E-04	629	6.69E-04	696	1.28E-04	763	1.56E-05
429	1.24E-04	496	3.77E-04	563	7.29E-04	630	6.61E-04	697	1.24E-04	764	1.50E-05
430	1.38E-04	497	3.90E-04	564	7.33E-04	631	6.49E-04	698	1.21E-04	765	1.46E-05
431	1.52E-04	498	4.00E-04	565	7.38E-04	632	6.38E-04	699	1.17E-04	766	1.44E-05
432	1.65E-04	499	4.08E-04	566	7.45E-04	633	6.27E-04	700	1.14E-04	767	1.37E-05
433	1.81E-04	500	4.19E-04	567	7.50E-04	634	6.18E-04	701	1.10E-04	768	1.33E-05
434	2.00E-04	501	4.29E-04	568	7.55E-04	635	6.06E-04	702	1.07E-04	769	1.29E-05
435	2.24E-04	502	4.40E-04	569	7.61E-04	636	5.96E-04	703	1.04E-04	770	1.27E-05
436	2.43E-04	503	4.47E-04	570	7.63E-04	637	5.85E-04	704	1.01E-04	771	1.22E-05
437	2.72E-04	504	4.58E-04	571	7.70E-04	638	5.76E-04	705	9.81E-05	772	1.17E-05
438	2.97E-04	505	4.69E-04	572	7.74E-04	639	5.63E-04	706	9.49E-05	773	1.13E-05
439	3.28E-04	506	4.75E-04	573	7.77E-04	640	5.54E-04	707	9.23E-05	774	1.12E-05
440	3.60E-04	507	4.82E-04	574	7.83E-04	641	5.40E-04	708	8.86E-05	775	1.07E-05
441	4.05E-04	508	4.93E-04	575	7.90E-04	642	5.28E-04	709	8.70E-05	776	1.04E-05
442	4.45E-04	509	4.99E-04	576	7.95E-04	643	5.18E-04	710	8.36E-05	777	1.00E-05
443	4.98E-04	510	5.07E-04	577	8.00E-04	644	5.09E-04	711	8.11E-05	778	9.70E-06
444	5.54E-04	511	5.13E-04	578	8.04E-04	645	4.98E-04	712	7.90E-05	779	9.70E-06
445	6.16E-04	512	5.21E-04	579	8.08E-04	646	4.87E-04	713	7.61E-05	780	9.70E-06
446	6.84E-04	513	5.24E-04	580	8.16E-04	647	4.77E-04	714	7.41E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	WPX3 @ 100W / 4000K 480	Sample ID	231020002-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	0.238	99.4	0.870
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

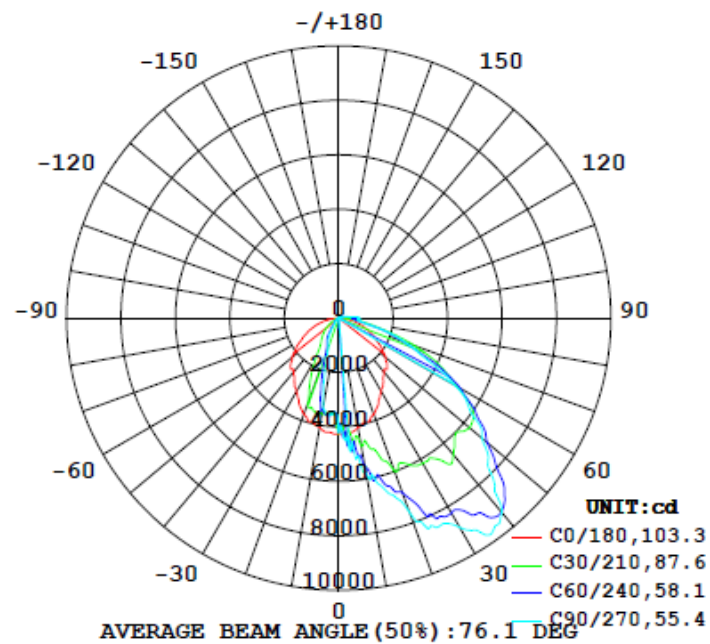
Test Result

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	15111	107.1	145.7	54.8	101.4	152.0	2.0%	B3-U3-G3
0°-90° zones	14713	107.1	145.7	54.8	101.4	148.0	2.1%	B3-U3-G3

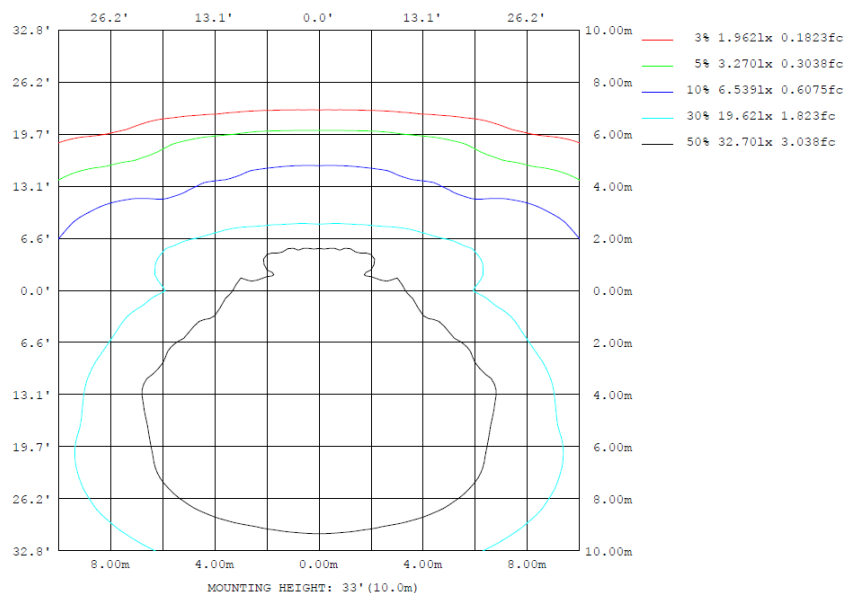
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

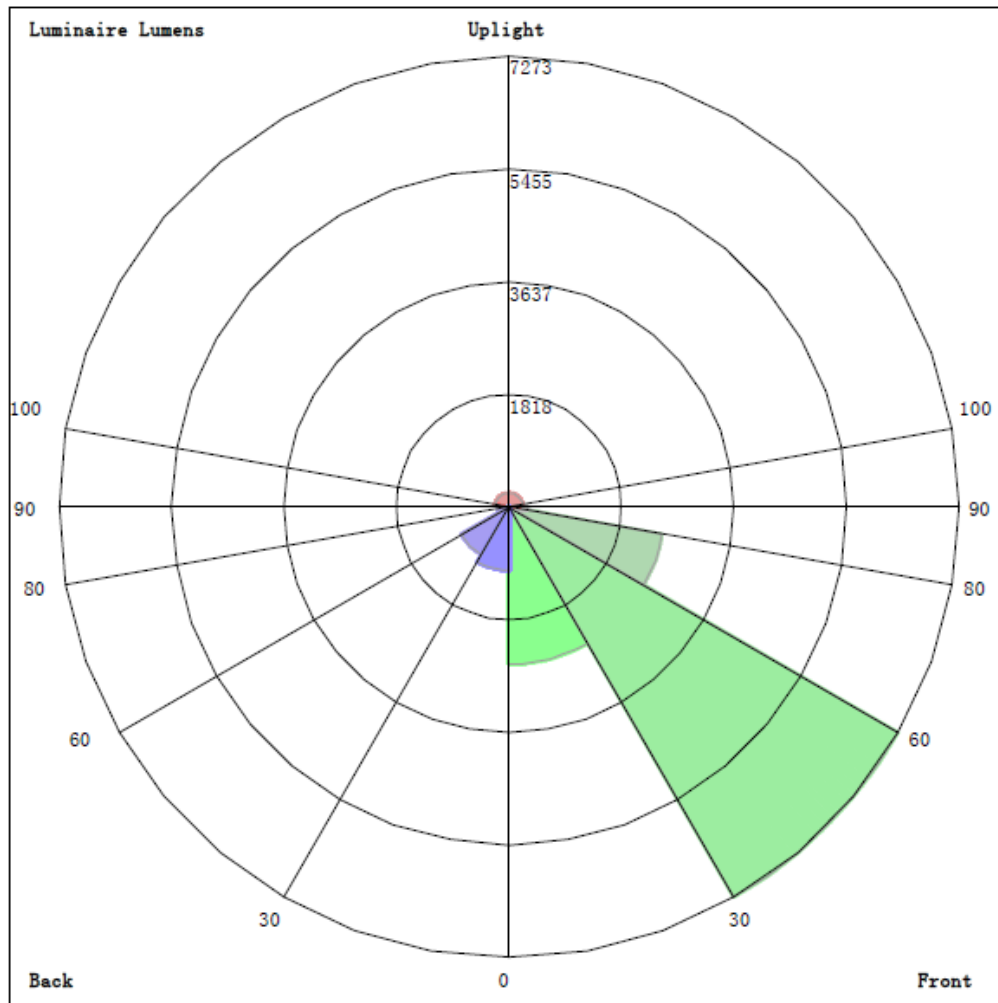
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	4067	5194	5786	5194	4067	3557	3335	3557	0- 10	390.9	390.9	2.59, 2.59
20	3766	6437	7581	6437	3766	2140	1145	2140	10- 20	1202	1593	10.5, 10.5
30	3126	7791	8875	7791	3126	1040	637.5	1040	20- 30	1970	3563	23.6, 23.6
40	2563	7796	9321	7796	2563	603.5	214.8	603.5	30- 40	2652	6215	41.1, 41.1
50	2238	7535	6876	7535	2238	267.0	100.3	267.0	40- 50	2906	9121	60.4, 60.4
60	1562	5370	4892	5370	1562	134.1	38.21	134.1	50- 60	2598	11719	77.6, 77.6
70	1006	2698	2590	2698	1006	23.27	3.044	23.27	60- 70	1823	13542	89.6, 89.6
80	421.6	880.6	852.3	880.6	421.6	9.056	3.970	9.056	70- 80	863.8	14405	95.3, 95.3
90	37.90	322.5	755.4	322.5	37.90	6.697	5.258	6.697	80- 90	307.7	14713	97.4, 97.4
100	39.27	241.9	323.7	241.9	39.27	7.073	6.245	7.073	90-100	174.4	14887	98.5, 98.5
110	26.01	82.27	109.7	82.27	26.01	4.664	7.601	4.664	100-110	67.37	14955	99, 99
120	24.01	152.3	91.50	152.3	24.01	4.343	5.149	4.343	110-120	46.32	15001	99.3, 99.3
130	12.60	122.9	148.5	122.9	12.60	4.353	5.984	4.353	120-130	48.55	15050	99.6, 99.6
140	2.780	71.92	142.5	71.92	2.780	4.686	6.330	4.686	130-140	36.15	15086	99.8, 99.8
150	2.456	32.10	66.12	32.10	2.456	5.163	5.937	5.163	140-150	17.94	15104	100, 100
160	2.876	2.333	20.73	2.333	2.876	5.321	5.172	5.321	150-160	5.535	15109	100, 100
170	3.374	3.182	3.349	3.182	3.374	4.324	3.754	4.324	160-170	1.409	15111	100, 100
180	3.932	3.814	3.246	3.814	3.932	3.715	3.432	3.715	170-180	0.3559	15111	100, 100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Zonal (lm)		Total (lm)		Percent
0-10	390.91	0-10	390.91	2.59%
10-20	1201.60	0-20	1592.51	10.54%
20-30	1970.30	0-30	3562.81	23.58%
30-40	2652.09	0-40	6214.90	41.13%
40-50	2905.90	0-50	9120.80	60.36%
50-60	2597.86	0-60	11718.66	77.55%
60-70	1822.87	0-70	13541.53	89.62%
70-80	863.79	0-80	14405.32	95.33%
80-90	307.72	0-90	14713.04	97.37%
90-100	174.43	0-100	14887.47	98.52%
100-110	67.37	0-110	14954.84	98.97%
110-120	46.32	0-120	15001.16	99.27%
120-130	48.55	0-130	15049.71	99.60%
130-140	36.15	0-140	15085.86	99.84%
140-150	17.94	0-150	15103.80	99.95%
150-160	5.53	0-160	15109.33	99.99%
160-170	1.41	0-170	15110.74	100.00%
170-180	0.36	0-180	15111.10	100.00%

4.2 Goniophotometer Test

LCS/BUG

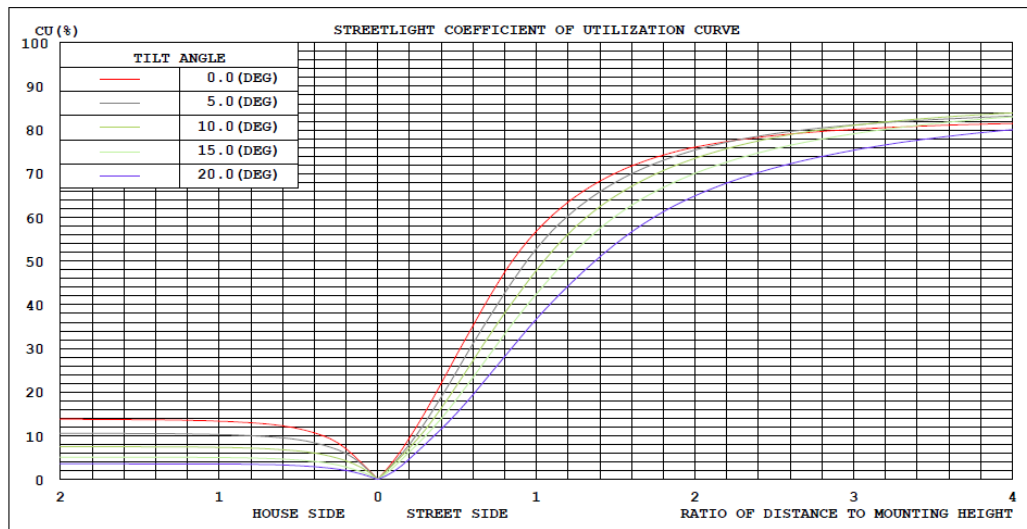


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

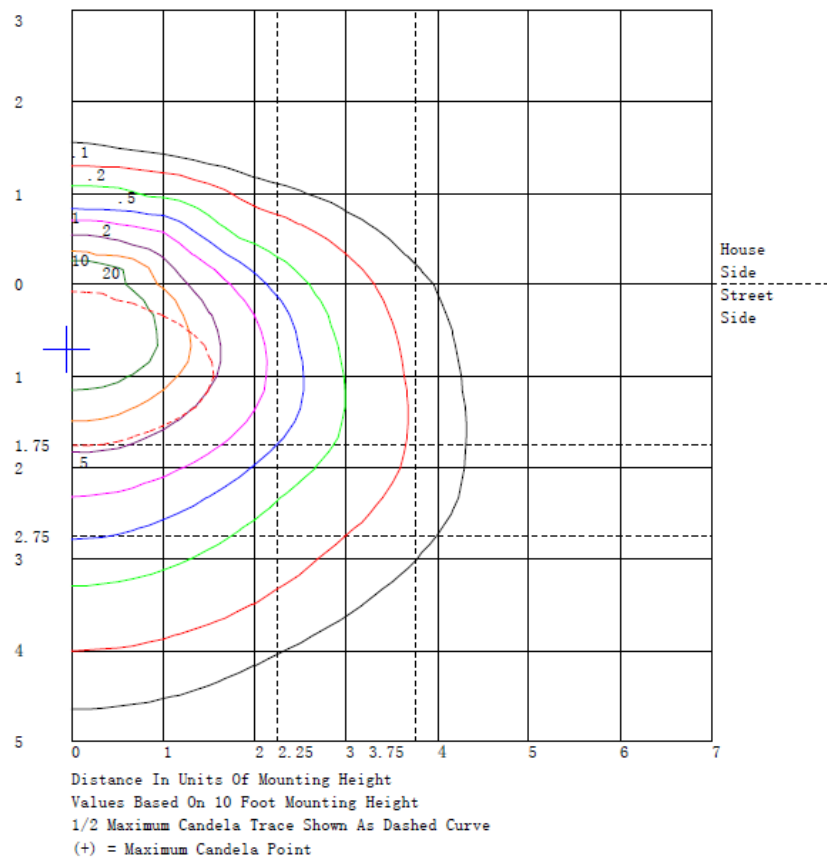
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	2540.5	N.A.	16.8
FM - Front-Medium (30-60)	7273.4	N.A.	48.1
FH - Front-High (60-80)	2516.4	N.A.	16.7
FVH - Front-Very High (80-90)	290.2	N.A.	1.9
BL - Back-Low (0-30)	1022.3	N.A.	6.8
BM - Back-Medium (30-60)	882.4	N.A.	5.8
BH - Back-High (60-80)	170.2	N.A.	1.1
BVH - Back-Very High (80-90)	17.6	N.A.	0.1
UL - Uplight-Low (90-100)	174.4	N.A.	1.2
UH - Uplight-High (100-180)	223.6	N.A.	1.5
Total	15111.0	N.A.	100.0
BUG Rating	B3-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)	4251	4248	4246	4245	4246	4247	4248	4245	4241	4235	4227	4219	4212	4209	4207	4205	4201	4196	4194
5	4215	4168	4132	4108	4072	4063	4099	4287	4484	4641	4561	4445	4350	4456	4605	4762	4850	4908	4934
10	4067	3988	3988	4067	4274	4524	4778	4934	5068	5194	5360	5513	5635	5661	5660	5652	5701	5750	5786
15	3933	3978	4075	4223	4428	4679	4973	5362	5741	6063	6168	6204	6211	6283	6355	6420	6466	6495	6505
20	3766	3918	4156	4478	4972	5486	5955	6182	6331	6437	6566	6691	6820	6985	7150	7303	7439	7536	7581
25	3469	3740	4067	4447	4931	5432	5917	6274	6596	6903	7266	7614	7926	8160	8339	8461	8507	8511	8489
30	3126	3560	4022	4514	5049	5603	6164	6765	7321	7791	8028	8176	8273	8407	8527	8634	8745	8829	8875
35	2867	3487	4089	4674	5250	5802	6325	6796	7236	7650	8064	8451	8803	9115	9376	9575	9669	9707	9705
40	2563	3166	3794	4447	5179	5896	6557	7010	7409	7796	8356	8882	9309	9419	9418	9355	9336	9320	9321
45	2520	3244	3915	4532	5046	5544	6064	6802	7519	8134	8419	8550	8554	8451	8286	8099	7944	7826	7767
50	2238	2866	3512	4175	4906	5617	6273	6828	7259	7535	7487	7326	7127	7079	7052	7033	6965	6907	6876
55	1937	2446	3024	3671	4519	5337	6027	6280	6364	6337	6315	6256	6177	6107	6038	5975	5920	5883	5873
60	1562	2050	2575	3135	3825	4481	5033	5269	5369	5370	5328	5248	5154	5106	5063	5024	4963	4914	4892
65	1283	1738	2198	2661	3198	3688	4079	4205	4218	4152	4071	3963	3846	3752	3668	3598	3544	3512	3507
70	1006	1266	1552	1863	2279	2662	2953	2948	2846	2698	2618	2550	2503	2505	2524	2552	2563	2576	2590
75	719	862	1019	1191	1421	1631	1787	1758	1678	1586	1584	1596	1613	1607	1599	1593	1594	1601	1614
80	422	481	556	647	786	917	1016	998	945	881	854	836	827	828	835	844	847	850	852
85	148	194	247	305	382	456	517	533	537	540	566	598	634	671	708	742	774	798	811
90	37.9	74.2	109	143	177	209	239	259	285	322	403	492	579	640	689	725	744	753	755
95	31.6	51.1	71.7	93.5	113	137	166	211	260	310	358	401	434	444	446	444	448	453	457
100	39.3	41.4	45.7	52.4	56.4	66.4	86.2	137	192	242	257	263	265	279	293	306	315	321	324
105	29.5	29.3	34.0	43.6	63.6	84.5	102	103	99.3	94.0	94.0	94.9	96.7	99.0	102	105	108	111	113
110	26.0	22.4	28.4	43.9	81.8	120	148	131	106	82.3	93.6	111	129	130	127	121	116	111	110
115	31.6	20.5	19.8	29.5	57.6	90.0	121	139	147	144	113	77.8	46.7	46.5	54.4	65.8	70.3	73.0	73.7
120	24.0	11.6	9.69	18.2	43.9	75.0	106	127	143	152	153	149	141	130	119	108	99.1	93.1	91.5
125	17.5	7.04	5.53	12.9	34.1	60.5	88.5	111	130	144	152	155	155	153	149	145	143	143	143
130	12.6	2.57	0.37	6.02	23.5	45.9	70.0	89.4	107	123	137	147	155	155	152	149	148	148	148
135	3.04	0.40	2.03	7.93	19.6	34.5	51.2	68.1	85.2	102	117	130	141	147	152	154	157	159	159
140	2.78	6.88	11.7	17.3	23.2	30.2	38.3	48.7	60.1	71.9	83.7	95.0	105	113	119	125	133	139	143
145	2.56	4.62	7.36	10.8	14.7	19.5	25.1	32.0	39.8	48.4	58.8	69.1	78.6	85.1	90.2	94.2	97.8	100	101
150	2.46	4.41	5.55	5.86	3.31	1.47	1.89	10.7	21.5	32.1	37.1	40.8	44.2	49.6	54.9	59.7	63.1	65.3	66.1
155	2.60	2.03	2.06	2.70	4.09	5.98	8.28	10.7	13.5	16.6	20.5	24.4	28.1	30.9	33.1	34.8	35.8	36.3	36.3
160	2.88	2.72	2.69	2.79	3.19	3.57	3.82	2.90	2.23	2.33	5.18	8.77	12.6	15.4	17.8	19.7	20.5	20.8	20.7
165	3.11	3.14	3.15	3.13	3.01	2.93	2.96	3.25	3.69	4.26	5.32	6.22	6.67	5.48	3.96	2.50	2.24	2.29	2.33
170	3.37	3.40	3.42	3.42	3.40	3.37	3.31	3.25	3.18	3.10	3.04	3.01	3.07	3.16	3.25	3.29	3.32	3.35	
175	3.57	3.62	3.65	3.66	3.65	3.62	3.58	3.55	3.51	3.47	3.42	3.37	3.32	3.26	3.20	3.15	3.09	3.04	3.03
180	3.93	3.95	3.95	3.95	3.93	3.90	3.88	3.87	3.85	3.81	3.73	3.63	3.55	3.52	3.49	3.47	3.37	3.29	3.25

C (DBG)		UNIT: cd																		
γ	(DBG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0		4196	4201	4205	4207	4210	4212	4219	4227	4235	4241	4245	4248	4247	4246	4245	4246	4248	4251	4239
5		4908	4850	4762	4605	4456	4350	4445	4561	4641	4484	4287	4099	4063	4072	4108	4132	4168	4215	3909
10		5750	5701	5652	5660	5661	5635	5513	5360	5194	5068	4934	4778	4524	4274	4067	3988	3988	4067	3762
15		6495	6466	6420	6355	6283	6211	6204	6168	6063	5741	5362	4973	4679	4428	4223	4075	3978	3933	3706
20		7536	7439	7303	7150	6985	6820	6691	6566	6437	6331	6182	5955	5486	4972	4478	4156	3918	3766	3689
25		8511	8507	8461	8339	8160	7926	7614	7266	6903	6596	6274	5917	5432	4931	4447	4067	3740	3469	3592
30		8829	8745	8634	8527	8407	8273	8176	8028	7791	7321	6765	6164	5603	5049	4514	4022	3560	3126	3353
35		9707	9669	9575	9376	9115	8803	8451	8064	7650	7236	6796	6325	5802	5250	4674	4089	3487	2867	3059
40		9320	9336	9355	9418	9419	9309	8882	8356	7796	7409	7010	6557	5896	5179	4447	3794	3166	2563	2551
45		7826	7944	8099	8286	8451	8554	8550	8419	8134	7519	6802	6064	5544	5046	4532	3915	3244	2520	2287
50		6907	6965	7033	7052	7079	7127	7326	7487	7535	7259	6828	6273	5617	4906	4175	3512	2866	2238	1814
55		5883	5920	5975	6038	6107	6177	6256	6315	6337	6364	6280	6027	5337	4519	3671	3024	2446	1937	1489
60		4914	4963	5024	5063	5106	5154	5248	5328	5370	5369	5269	5033	4481	3825	3135	2575	2050	1562	1164
65		3512	3544	3598	3668	3752	3846	3963	4071	4152	4218	4205	4079	3688	3198	2661	2198	1738	1283	947
70		2576	2563	2552	2524	2505	2503	2550	2618	2698	2846	2948	2953	2662	2279	1863	1552	1266	1006	766
75		1601	1594	1593	1599	1607	1613	1596	1584	1586	1678	1758	1787	1631	1421	1191	1019	862	719	541
80		850	847	844	835	828	827	836	854	881	945	998	1016	917	786	647	556	481	422	310
85		798	774	742	708	671	634	598	566	540	537	533	517	456	382	305	247	194	148	120
90		753	744	725	689	640	579	492	403	322	285	259	239	209	177	143	109	74.2	37.9	39.0
95		453	448	444	446	444	434	404	358	310	260	211	166	137	113	93.5	71.7	51.1	31.6	29.4
100		321	315	306	293	279	265	263	257	242	192	137	86.2	66.4	56.4	52.4	45.7	41.4	39.3	32.4
105		111	108	105	102	99.0	96.7	94.9	94.0	94.0	99.3	103	102	84.5	63.6	43.6	34.0	29.3	29.5	24.4
110		111	116	121	127	130	129	111	93.6	82.3	106	131	148	120	81.8	43.9	28.4	22.4	26.0	19.2
115		73.0	70.3	65.8	54.4	46.5	46.7	77.8	113	144	147	139	121	90.0	57.6	29.5	19.8	20.5	31.6	23.1
120		93.1	99.1	108	119	130	141	149	153	152	143	127	106	75.0	43.9	18.2	9.69	11.6	24.0	18.4
125		143	143	145	149	153	155	155	152	144	130	111	88.5	60.5	34.1	12.9	5.53	7.04	17.5	14.3
130		148	148	149	152	155	155	147	137	123	107	89.4	70.0	45.9	23.5	6.02	0.37	2.57	12.6	11.0
135		159	157	154	152	147	141	130	117	102	85.2	68.1	51.2	34.5	19.6	7.93	2.03	0.40	3.04	3.84
140		139	133	125	119	113	105	95.0	83.7	71.9	60.1	48.7	38.3	30.2	23.2	17.3	11.7	6.88	2.78	4.36
145		100	97.8	94.2	90.2	85.1	78.6	69.1	58.8	48.8	39.8	32.0	25.1	19.5	14.7	10.8	7.36	4.62	2.56	3.82
150		65.3	63.1	59.7	54.9	49.6	44.2	40.8	37.1	32.1	21.5	10.7	1.89	1.47	0.31	5.86	5.55	4.41	2.46	3.49
155		36.3	35.8	34.8	33.1	30.8	28.1	24.4	20.5	16.6	13.5	10.7	8.28	5.98	4.09	2.70	2.06	2.03	0.60	3.71
160		20.8	20.5	19.7	17.8	15.4	12.6	8.77	5.18	2.38	2.23	2.29	2.82	3.57	3.19	2.79	2.69	2.72	2.88	4.10
165		2.29	2.24	2.50	3.96	5.48	6.67	6.22	5.32	4.26	3.69	3.25	2.96	2.93	3.01	3.13	3.15	3.14	3.11	4.31
170		3.32	3.29	3.25	3.16	3.07	3.01	3.04	3.10	3.18	3.25	3.31	3.37	3.40	3.42	3.42	3.42	3.40	3.37	4.31
175		3.04	3.09	3.15	3.20	3.26	3.32	3.37	3.42	3.47	3.51	3.55	3.58	3.62	3.65	3.66	3.65	3.62	3.57	4.23
180		3.29	3.37	3.47	3.49	3.52	3.55	3.63	3.73	3.81	3.85	3.87	3.88	3.90	3.93	3.95	3.95	3.95	3.93	3.93

Table--3

UNIT: cd

C (DBG) γ (DBG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	4229	4221	4215	4211	4207	4202	4197	4193	4190	4189	4189	4195	4201	4206	4203	4198	4194	4198	4203
5	3678	3522	3473	3474	3500	3489	3484	3487	3526	3567	3599	3582	3555	3527	3531	3540	3549	3540	3531
10	3546	3419	3427	3488	3567	3582	3579	3557	3494	3427	3374	3395	3428	3456	3417	3371	3335	3371	3417
15	3543	3444	3459	3500	3527	3439	3307	3140	2934	2719	2515	2369	2249	2153	2065	2003	1972	2003	2065
20	3611	3531	3490	3416	3276	2930	2535	2140	1858	1626	1445	1331	1259	1215	1176	1153	1145	1153	1176
25	3597	3486	3212	2856	2453	2035	1642	1310	1158	1078	1044	1005	980	964	940	921	911	921	940
30	3393	3247	2786	2234	1688	1392	1182	1040	954	902	869	809	752	704	670	648	637	648	670
35	3061	2872	2337	1728	1161	978	899	871	762	657	561	490	434	391	363	346	341	346	363
40	2438	2224	1820	1382	974	792	679	604	493	396	316	269	240	224	215	213	215	213	215
45	2032	1755	1419	1089	794	613	482	390	312	258	224	212	212	216	209	203	199	203	209
50	1453	1155	942	776	642	493	366	267	227	210	202	172	144	119	107	101	100	101	107
55	1122	834	655	534	450	354	274	209	164	131	108	93.2	84.0	79.3	75.1	73.2	73.1	73.2	75.1
60	841	594	450	361	306	237	180	134	101	78.1	62.9	54.5	50.5	48.8	44.0	40.2	38.2	40.2	44.0
65	673	460	330	246	193	139	98.0	67.9	43.8	26.4	14.7	7.13	3.05	1.50	1.06	1.58	2.47	1.58	1.06
70	563	397	276	186	122	74.1	42.5	23.3	10.2	3.70	1.61	0.26	0.56	1.76	2.26	2.74	3.04	2.74	2.26
75	391	268	175	107	59.3	32.0	18.1	12.8	6.32	2.92	1.66	0.95	1.12	1.82	2.44	3.04	3.43	3.04	2.44
80	218	143	92.1	56.3	33.1	18.9	11.8	9.06	5.30	3.06	2.00	1.56	1.72	2.25	2.92	3.56	3.97	3.56	2.92
85	93.8	70.9	50.4	33.3	19.9	12.9	9.10	7.27	4.98	3.46	2.60	2.29	2.41	2.83	3.58	4.30	4.76	4.30	3.58
90	38.1	35.2	28.9	21.8	14.8	11.1	8.50	6.70	5.17	4.13	3.50	3.19	3.18	3.42	4.13	4.81	5.26	4.81	4.13
95	26.9	24.0	20.4	16.7	13.1	10.3	7.89	6.02	4.88	4.18	3.83	3.59	3.58	3.78	4.47	5.15	5.58	5.15	4.47
100	26.3	21.2	17.0	13.7	11.1	9.31	8.01	7.07	6.17	5.48	4.99	4.64	4.49	4.56	5.18	5.82	6.24	5.82	5.18
105	19.7	15.4	11.0	7.26	4.53	4.15	4.65	5.61	6.06	6.47	6.77	6.71	6.59	6.53	7.01	7.48	7.77	7.48	7.01
110	13.9	10.2	8.85	8.48	8.48	7.14	5.79	4.66	4.41	4.51	4.87	5.37	5.95	6.55	7.04	7.41	7.60	7.41	7.04
115	16.5	11.5	8.94	7.61	7.02	6.00	5.25	4.75	4.66	4.74	4.90	4.91	4.92	4.93	5.00	5.06	5.09	5.06	5.00
120	13.9	10.3	8.04	6.58	5.70	4.95	4.52	4.34	4.42	4.62	4.87	4.92	4.95	4.97	5.06	5.12	5.15	5.12	5.06
125	11.6	9.29	7.46	6.04	5.02	4.45	4.20	4.40	4.69	5.00	5.12	5.19	5.25	5.36	5.44	5.48	5.44	5.36	5.06
130	9.47	8.08	6.70	5.51	4.60	4.28	4.22	4.35	4.52	4.76	5.03	5.26	5.46	5.65	5.81	5.93	5.98	5.93	5.81
135	4.42	4.77	4.77	4.65	4.47	4.43	4.45	4.53	4.77	5.04	5.31	5.47	5.61	5.72	5.86	5.96	6.03	5.96	5.86
140	5.41	5.95	5.65	5.07	4.45	4.41	4.50	4.69	4.85	5.04	5.25	5.48	5.71	5.92	6.10	6.24	6.33	6.24	6.10
145	4.71	5.24	5.18	4.92	4.61	4.64	4.76	4.93	5.09	5.27	5.47	5.69	5.90	6.09	6.23	6.32	6.36	6.32	6.23
150	4.26	4.77	4.89	4.84	4.75	4.86	5.01	5.16	5.26	5.37	5.49	5.70	5.90	6.06	6.06	6.01	5.94	6.01	6.06
155	4.55	5.12	5.32	5.33	5.24	5.20	5.16	5.14	5.21	5.31	5.43	5.61	5.77	5.87	5.77	5.63	5.49	5.63	5.77
160	5.02	5.63	5.81	5.77	5.61	5.51	5.40	5.32	5.36	5.42	5.47	5.44	5.39	5.33	5.27	5.22	5.17	5.22	5.27
165	5.19	5.75	5.87	5.77	5.56	5.47	5.37	5.28	5.21	5.13	5.03	4.84	4.66	4.51	4.51	4.55	4.59	4.55	4.51
170	4.98	5.39	5.44	5.30	5.05	4.80	4.55	4.32	4.23	4.16	4.11	4.01	3.92	3.83	3.78	3.76	3.75	3.76	3.78
175	4.71	4.99	5.03	4.93	4.71	4.42	4.11	3.85	3.79	3.78	3.78	3.65	3.52	3.42	3.43	3.48	3.54	3.48	3.43
180	3.96	3.96	3.97	3.96	3.94	3.88	3.80	3.71	3.61	3.51	3.42	3.37	3.34	3.33	3.35	3.39	3.43	3.39	3.35

Table--4

UNIT: cd

C (DEG)																	C (DEG)			
γ (DEG)		285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0		4206	4201	4195	4189	4189	4190	4193	4197	4202	4207	4211	4215	4221	4229	4239				
5		3527	3555	3582	3599	3567	3526	3487	3484	3489	3500	3474	3473	3522	3678	3909				
10		3456	3428	3395	3374	3427	3494	3557	3579	3582	3567	3488	3427	3419	3546	3762				
15		2153	2249	2369	2515	2719	2934	3140	3307	3439	3527	3500	3459	3444	3543	3706				
20		1215	1259	1331	1445	1626	1858	2140	2535	2930	3276	3416	3490	3531	3611	3689				
25		964	980	1005	1044	1078	1158	1310	1642	2035	2453	2856	3212	3486	3597	3592				
30		704	752	809	869	902	954	1040	1182	1392	1688	2234	2786	3247	3393	3353				
35		391	434	490	561	657	762	871	899	978	1161	1728	2337	2872	3061	3059				
40		224	240	269	316	396	493	604	679	792	974	1382	1820	2224	2438	2551				
45		216	212	212	224	258	312	390	482	613	794	1089	1419	1755	2032	2287				
50		119	144	172	202	210	227	267	366	493	642	776	942	1155	1453	1814				
55		79.3	84.0	93.2	108	131	164	209	274	354	450	534	655	834	1122	1489				
60		48.8	50.5	54.5	62.9	78.1	101	134	180	237	306	361	450	594	841	1164				
65		1.50	3.05	7.13	14.7	26.4	43.8	67.9	98.0	139	193	246	330	460	673	947				
70		1.76	0.56	0.26	1.61	3.70	10.2	23.3	42.5	74.1	122	186	276	397	563	766				
75		1.82	1.12	0.95	1.66	2.92	6.32	12.8	18.1	32.0	59.3	107	175	268	391	541				
80		2.25	1.72	1.56	2.00	3.06	5.30	9.06	11.8	18.9	33.1	56.3	92.1	143	218	310				
85		2.83	2.41	2.29	2.60	3.46	4.98	7.27	9.10	12.9	19.9	33.3	50.4	70.9	93.8	120				
90		3.42	3.18	3.19	3.50	4.13	5.17	6.70	8.50	11.1	14.8	21.8	28.9	35.2	38.1	39.0				
95		3.78	3.58	3.59	3.83	4.18	4.88	6.02	7.89	10.3	13.1	16.7	20.4	24.0	26.9	29.4				
100		4.56	4.49	4.64	4.99	5.48	6.17	7.07	8.01	9.31	11.1	13.7	17.0	21.2	26.3	32.4				
105		6.53	6.59	6.71	6.77	6.47	6.06	5.61	4.65	4.15	4.53	7.26	11.0	15.4	19.7	24.4				
110		6.55	5.95	5.37	4.87	4.51	4.41	4.66	5.79	7.14	8.48	8.48	8.85	10.2	13.9	19.2				
115		4.93	4.92	4.91	4.90	4.74	4.66	4.75	5.25	6.00	7.02	7.61	8.94	11.5	16.5	23.1				
120		4.97	4.95	4.92	4.87	4.62	4.42	4.34	4.52	4.95	5.70	6.58	8.04	10.3	13.9	18.4				
125		5.25	5.19	5.12	5.00	4.69	4.40	4.20	4.20	4.45	5.02	6.04	7.46	9.29	11.6	14.3				
130		5.65	5.46	5.26	5.03	4.76	4.52	4.35	4.22	4.28	4.60	5.51	6.70	8.08	9.47	11.0				
135		5.72	5.61	5.47	5.31	5.04	4.77	4.53	4.45	4.43	4.47	4.65	4.77	4.77	4.42	3.84				
140		5.92	5.71	5.48	5.25	5.04	4.85	4.69	4.50	4.41	4.45	5.07	5.65	5.95	5.41	4.36				
145		6.09	5.90	5.69	5.47	5.27	5.09	4.93	4.76	4.64	4.61	4.92	5.18	5.24	4.71	3.82				
150		6.06	5.90	5.70	5.49	5.37	5.26	5.16	5.01	4.86	4.75	4.84	4.89	4.77	4.26	3.49				
155		5.87	5.77	5.61	5.43	5.31	5.21	5.14	5.16	5.20	5.24	5.33	5.32	5.12	4.55	3.71				
160		5.33	5.39	5.44	5.47	5.42	5.36	5.32	5.40	5.51	5.61	5.77	5.81	5.63	5.02	4.10				
165		4.51	4.66	4.84	5.03	5.13	5.21	5.28	5.37	5.47	5.56	5.77	5.87	5.75	5.19	4.31				
170		3.83	3.92	4.01	4.11	4.16	4.23	4.32	4.55	4.80	5.05	5.30	5.44	5.39	4.98	4.31				
175		3.42	3.52	3.65	3.78	3.78	3.79	3.85	4.11	4.42	4.71	4.93	5.03	4.99	4.71	4.23				
180		3.33	3.34	3.37	3.42	3.51	3.61	3.71	3.80	3.88	3.94	3.96	3.97	3.96	3.96	3.95				

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	WPX3 @ 100W / 4000K 480	Sample ID	231020002-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	0.238	99.4	0.870	14.56

5.0 Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2022-11-09	2023-11-08
NTC-F01-006	2.0 meter Integrating Sphere	2022-11-09	2023-11-08
NTC-F01-012	Standard Lamp	2022-11-09	2023-11-08
NTC-F01-013	Standard Lamp	2022-11-09	2023-11-08
NTC-F01-031	Digital Power Meter	2023-08-25	2024-08-24
NTC-F01-019	Temperature & Humidity Meter	2022-11-12	2023-11-11

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