

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

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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		10744
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		134.6
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		10471
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	131.2
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		79.8
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	480V	7.01
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	480V	0.918
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3045±175	3115
		4 steps	3045±100	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		82.2
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		9
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		95
IES Rcs,h1 (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-12%
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		0.181
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		79.8
(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 / 3000K 480	231101004-S1
2	Goniophotometer Test	2023-11-08	WPX2 @ 80W / 3000K 480	231101004-S1
3	THD and PF Test	2023-11-08	WPX2 @ 80W / 3000K 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 / 3000K 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 / 3000K 480	Sample ID	231101004-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

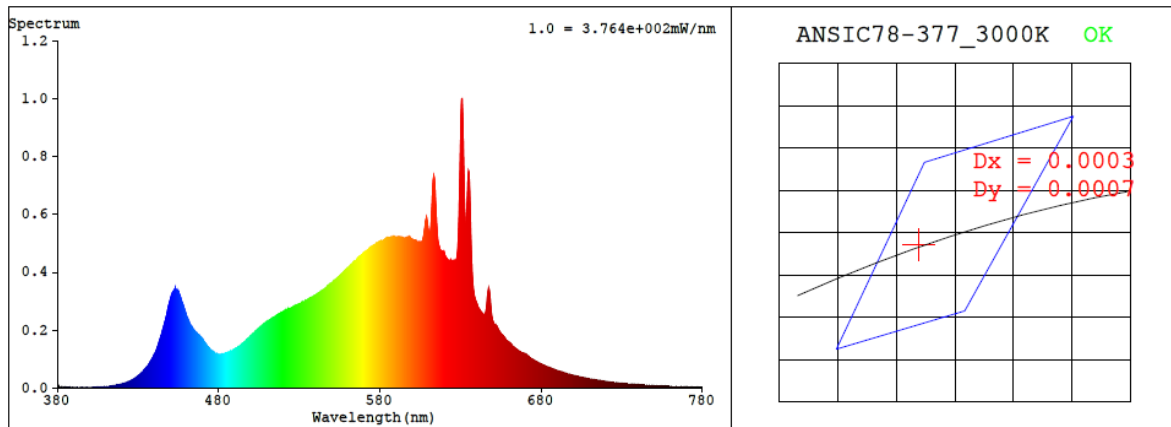
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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	0.181	79.8	0.918

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
3115	82.2	9	0.0002	84	95	-12%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.4293$ $y = 0.4019$ / $u' = 0.2466$ $v' = 0.5194$ ($duv=2.23e-04$)

CCT= 3115K Prcp WL: Ld=582.3nm Purity=49.5%

Peak WL: Lp=631nm FWHM: =8.4nm Ratio:R=22.2% G=75.1% B=2.7%

Render Index: Ra = 82.2 AvgR = 76.2 TM30:Rf=83 Rg=95

EEL: 0.10298 A++ Highest

R1 =80	R2 =90	R3 =97	R4 =79	R5 =80	R6 =88	R7 =83
R8 =60	R9 =9	R10=77	R11=77	R12=67	R13=82	R14=99 R15=74

4.1 Integrating Sphere Test

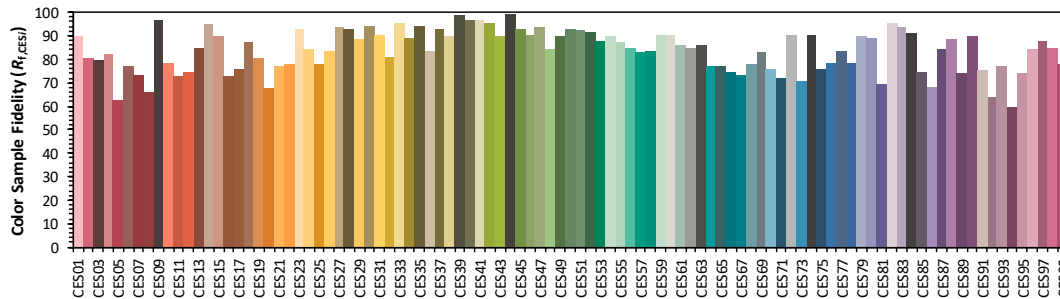
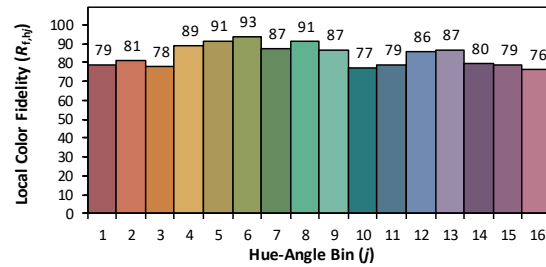
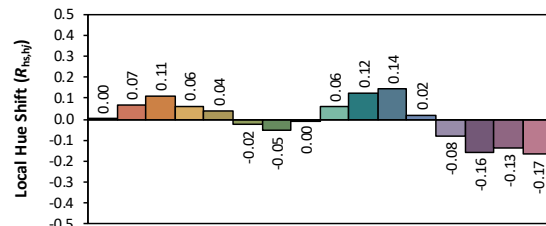
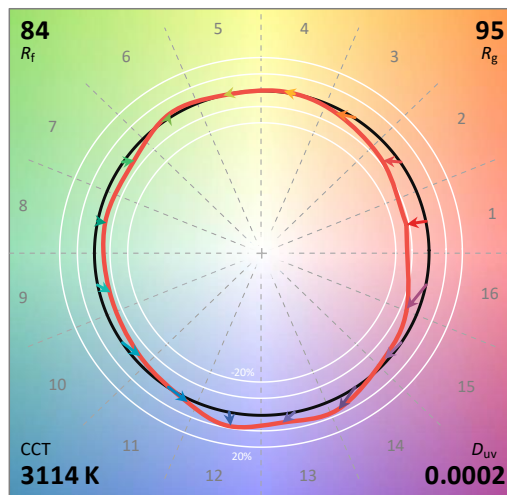
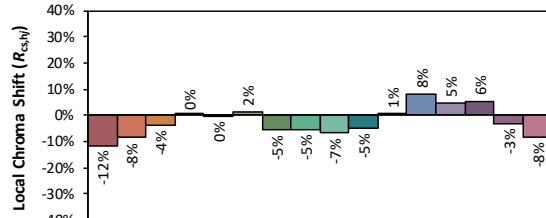
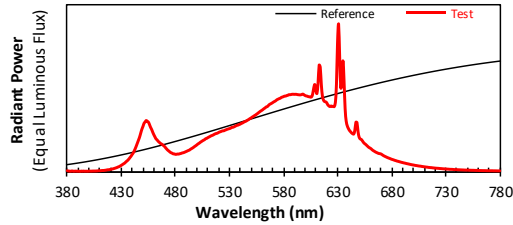
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/11/16

Model: WPX2 @ 80W / 3000K 480



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

x 0.4293
 y 0.4017
 u' 0.2466
 v' 0.5193

CIE 13.3-1995
(CRI)

R_a 82
 R_g 9

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	4.80E-06	447	2.36E-04	514	2.44E-04	581	5.10E-04	648	3.30E-04	715	2.66E-05
381	2.80E-06	448	2.61E-04	515	2.47E-04	582	5.10E-04	649	2.68E-04	716	2.58E-05
382	2.00E-06	449	2.86E-04	516	2.51E-04	583	5.14E-04	650	2.32E-04	717	2.53E-05
383	1.00E-06	450	3.05E-04	517	2.55E-04	584	5.15E-04	651	2.20E-04	718	2.42E-05
384	2.60E-06	451	3.26E-04	518	2.57E-04	585	5.19E-04	652	2.17E-04	719	2.35E-05
385	2.30E-06	452	3.35E-04	519	2.60E-04	586	5.19E-04	653	2.07E-04	720	2.26E-05
386	8.00E-07	453	3.45E-04	520	2.64E-04	587	5.21E-04	654	1.96E-04	721	2.19E-05
387	1.70E-06	454	3.39E-04	521	2.67E-04	588	5.22E-04	655	1.89E-04	722	2.13E-05
388	1.80E-06	455	3.34E-04	522	2.70E-04	589	5.22E-04	656	1.83E-04	723	2.09E-05
389	1.20E-06	456	3.18E-04	523	2.73E-04	590	5.22E-04	657	1.76E-04	724	2.01E-05
390	1.40E-06	457	2.99E-04	524	2.75E-04	591	5.22E-04	658	1.69E-04	725	1.94E-05
391	1.00E-06	458	2.85E-04	525	2.76E-04	592	5.22E-04	659	1.63E-04	726	1.89E-05
392	4.00E-07	459	2.66E-04	526	2.80E-04	593	5.20E-04	660	1.58E-04	727	1.81E-05
393	2.00E-06	460	2.49E-04	527	2.82E-04	594	5.19E-04	661	1.54E-04	728	1.75E-05
394	1.20E-06	461	2.35E-04	528	2.85E-04	595	5.18E-04	662	1.47E-04	729	1.71E-05
395	2.10E-06	462	2.21E-04	529	2.88E-04	596	5.19E-04	663	1.41E-04	730	1.63E-05
396	1.00E-06	463	2.14E-04	530	2.90E-04	597	5.21E-04	664	1.37E-04	731	1.58E-05
397	1.30E-06	464	2.05E-04	531	2.93E-04	598	5.23E-04	665	1.32E-04	732	1.55E-05
398	1.40E-06	465	1.98E-04	532	2.98E-04	599	5.19E-04	666	1.28E-04	733	1.49E-05
399	1.00E-06	466	1.91E-04	533	2.99E-04	600	5.14E-04	667	1.25E-04	734	1.41E-05
400	2.00E-06	467	1.86E-04	534	3.01E-04	601	5.11E-04	668	1.22E-04	735	1.40E-05
401	1.80E-06	468	1.81E-04	535	3.05E-04	602	5.09E-04	669	1.20E-04	736	1.37E-05
402	1.60E-06	469	1.75E-04	536	3.09E-04	603	5.06E-04	670	1.19E-04	737	1.32E-05
403	2.20E-06	470	1.69E-04	537	3.12E-04	604	5.05E-04	671	1.15E-04	738	1.24E-05
404	2.40E-06	471	1.59E-04	538	3.14E-04	605	5.03E-04	672	1.09E-04	739	1.22E-05
405	2.50E-06	472	1.51E-04	539	3.17E-04	606	5.05E-04	673	1.05E-04	740	1.19E-05
406	2.50E-06	473	1.43E-04	540	3.20E-04	607	5.24E-04	674	1.01E-04	741	1.16E-05
407	3.00E-06	474	1.38E-04	541	3.25E-04	608	5.65E-04	675	9.78E-05	742	1.11E-05
408	3.40E-06	475	1.31E-04	542	3.28E-04	609	5.88E-04	676	9.42E-05	743	1.08E-05
409	4.50E-06	476	1.26E-04	543	3.32E-04	610	5.48E-04	677	9.13E-05	744	1.04E-05
410	4.30E-06	477	1.23E-04	544	3.36E-04	611	5.29E-04	678	8.85E-05	745	1.01E-05
411	5.00E-06	478	1.19E-04	545	3.39E-04	612	6.01E-04	679	8.55E-05	746	9.80E-06
412	5.80E-06	479	1.18E-04	546	3.43E-04	613	7.19E-04	680	8.23E-05	747	9.50E-06
413	6.20E-06	480	1.16E-04	547	3.48E-04	614	7.05E-04	681	8.01E-05	748	9.00E-06
414	6.40E-06	481	1.16E-04	548	3.53E-04	615	5.89E-04	682	7.76E-05	749	9.00E-06
415	7.90E-06	482	1.18E-04	549	3.58E-04	616	5.11E-04	683	7.48E-05	750	8.50E-06
416	8.60E-06	483	1.17E-04	550	3.62E-04	617	4.83E-04	684	7.28E-05	751	8.40E-06
417	1.07E-05	484	1.20E-04	551	3.68E-04	618	4.73E-04	685	7.00E-05	752	8.00E-06
418	1.10E-05	485	1.21E-04	552	3.72E-04	619	4.71E-04	686	6.83E-05	753	8.00E-06
419	1.23E-05	486	1.24E-04	553	3.77E-04	620	4.65E-04	687	6.61E-05	754	7.60E-06
420	1.37E-05	487	1.26E-04	554	3.81E-04	621	4.51E-04	688	6.41E-05	755	7.60E-06
421	1.52E-05	488	1.28E-04	555	3.87E-04	622	4.44E-04	689	6.17E-05	756	7.40E-06
422	1.70E-05	489	1.32E-04	556	3.92E-04	623	4.39E-04	690	6.02E-05	757	7.00E-06
423	1.91E-05	490	1.35E-04	557	3.98E-04	624	4.43E-04	691	5.81E-05	758	6.80E-06
424	2.14E-05	491	1.38E-04	558	4.04E-04	625	4.40E-04	692	5.65E-05	759	6.60E-06
425	2.39E-05	492	1.42E-04	559	4.09E-04	626	4.41E-04	693	5.48E-05	760	6.30E-06
426	2.66E-05	493	1.45E-04	560	4.14E-04	627	4.39E-04	694	5.28E-05	761	5.90E-06
427	3.01E-05	494	1.50E-04	561	4.19E-04	628	4.66E-04	695	5.14E-05	762	5.80E-06
428	3.27E-05	495	1.55E-04	562	4.25E-04	629	5.89E-04	696	4.97E-05	763	5.70E-06
429	3.69E-05	496	1.59E-04	563	4.30E-04	630	8.71E-04	697	4.79E-05	764	5.40E-06
430	4.14E-05	497	1.64E-04	564	4.37E-04	631	9.97E-04	698	4.64E-05	765	5.30E-06
431	4.62E-05	498	1.70E-04	565	4.39E-04	632	7.68E-04	699	4.47E-05	766	5.30E-06
432	5.13E-05	499	1.75E-04	566	4.46E-04	633	5.69E-04	700	4.36E-05	767	5.10E-06
433	5.58E-05	500	1.81E-04	567	4.53E-04	634	6.28E-04	701	4.21E-05	768	4.80E-06
434	6.29E-05	501	1.87E-04	568	4.57E-04	635	7.49E-04	702	4.05E-05	769	4.60E-06
435	6.95E-05	502	1.91E-04	569	4.61E-04	636	6.17E-04	703	3.96E-05	770	4.60E-06
436	7.58E-05	503	1.97E-04	570	4.66E-04	637	4.27E-04	704	3.82E-05	771	4.40E-06
437	8.43E-05	504	2.02E-04	571	4.71E-04	638	3.42E-04	705	3.69E-05	772	4.30E-06
438	9.40E-05	505	2.07E-04	572	4.75E-04	639	3.09E-04	706	3.59E-05	773	4.50E-06
439	1.03E-04	506	2.11E-04	573	4.80E-04	640	2.91E-04	707	3.51E-05	774	4.00E-06
440	1.15E-04	507	2.15E-04	574	4.86E-04	641	2.78E-04	708	3.35E-05	775	4.00E-06
441	1.25E-04	508	2.21E-04	575	4.89E-04	642	2.69E-04	709	3.26E-05	776	3.90E-06
442	1.40E-04	509	2.24E-04	576	4.93E-04	643	2.61E-04	710	3.14E-05	777	3.80E-06
443	1.57E-04	510	2.29E-04	577	4.96E-04	644	2.55E-04	711	3.05E-05	778	3.50E-06
444	1.76E-04	511	2.33E-04	578	5.01E-04	645	2.53E-04	712	2.94E-05	779	3.60E-06
445	1.95E-04	512	2.37E-04	579	5.04E-04	646	2.77E-04	713	2.87E-05	780	3.60E-06
446	2.15E-04	513	2.41E-04	580	5.06E-04	647	3.33E-04	714	2.73E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	WPX2 @ 80W / 3000K 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±1°C, measured at a point not more than 1 m from the sample and at the same height as the sample.</p> <p>The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.</p> <p>The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1.0° vertical intervals and 15° horizontal intervals.</p>

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	480.0	60	0.181	79.8	0.918
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

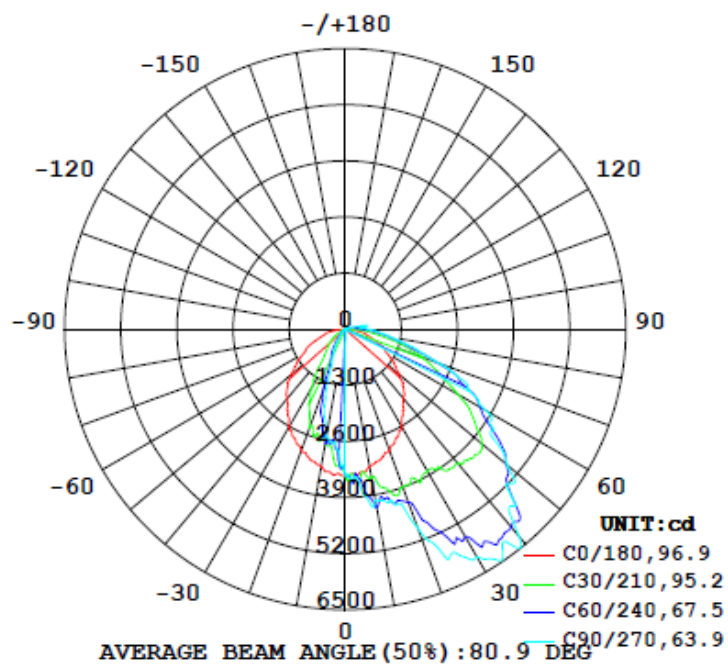
Test Result

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	10744	114.0	146.9	65.1	96.7	134.6	2.8%	B2-U3-G3
0°-90° zones	10471	114.0	146.9	65.1	96.7	131.2	2.9%	B2-U3-G3

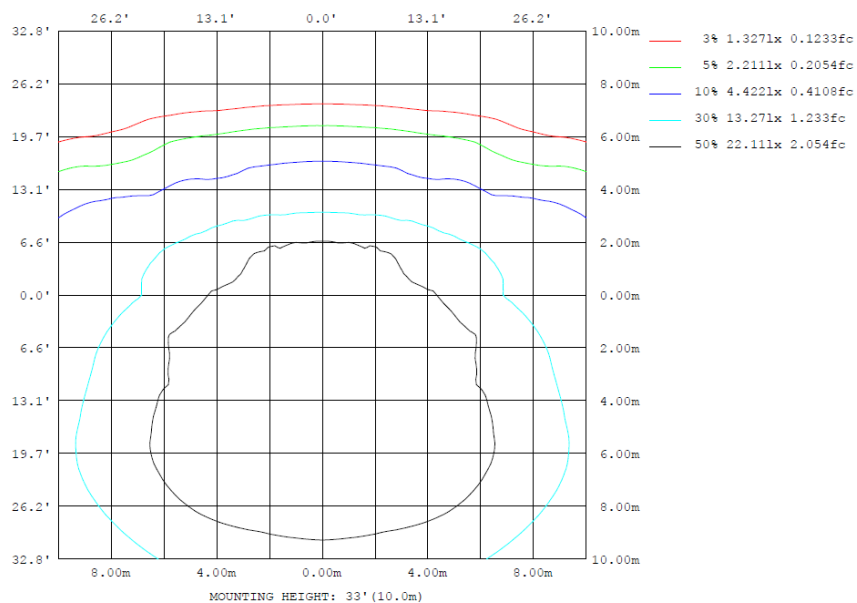
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

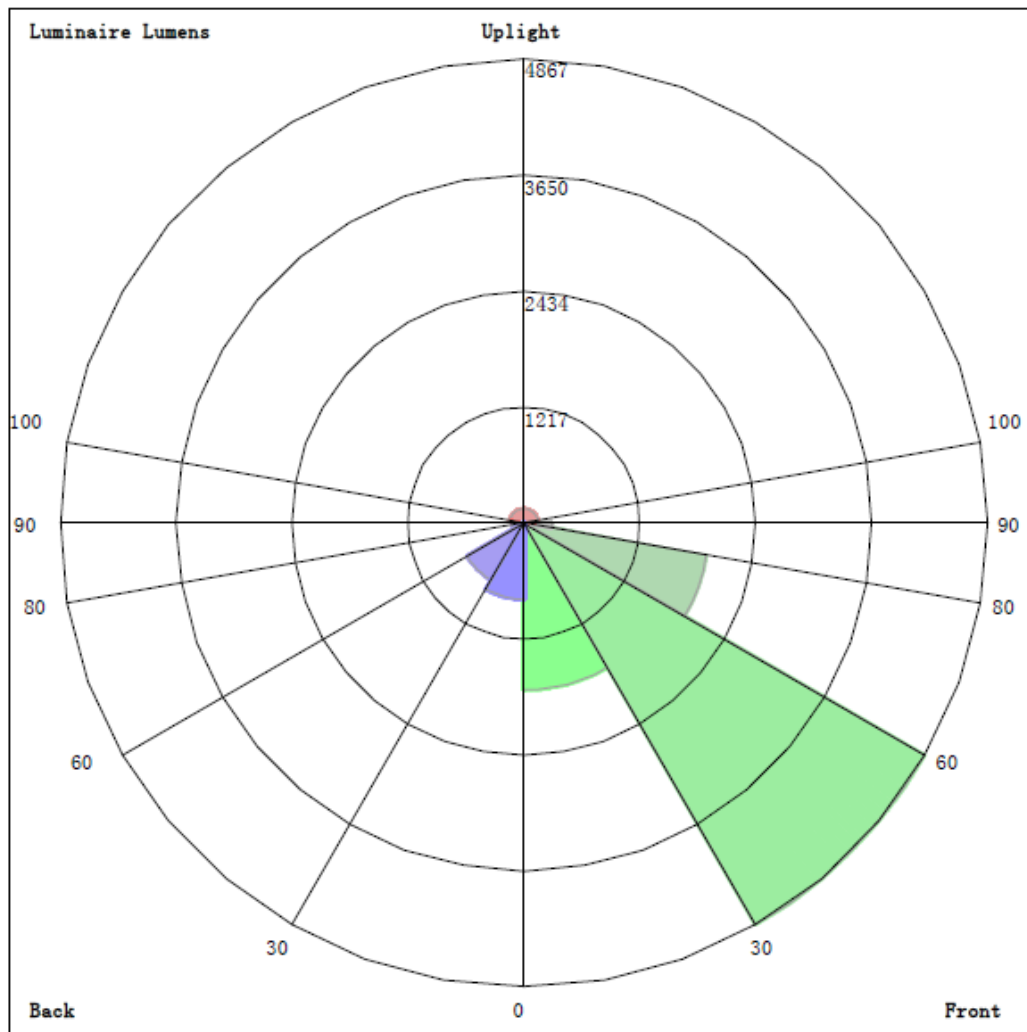
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	3229	3850	4024	3850	3229	2624	2518	2624	0- 10	308.5	308.5	2.87,2.87
20	3000	4127	4881	4127	3000	1968	973.1	1968	10- 20	870.3	1179	11,11
30	2597	5000	6088	5000	2597	769.5	490.9	769.5	20- 30	1375	2554	23.8,23.8
40	2093	5413	6269	5413	2093	453.5	155.3	453.5	30- 40	1830	4384	40.8,40.8
50	1634	4701	4893	4701	1634	187.6	87.38	187.6	40- 50	1977	6360	59.2,59.2
60	1111	3494	3749	3494	1111	81.63	30.19	81.63	50- 60	1744	8105	75.4,75.4
70	687.7	2242	2311	2242	687.7	10.13	1.680	10.13	60- 70	1328	9433	87.8,87.8
80	362.2	986.7	1100	986.7	362.2	4.332	2.360	4.332	70- 80	732.7	10166	94.6,94.6
90	34.34	314.5	534.7	314.5	34.34	2.904	2.572	2.904	80- 90	305.5	10471	97.5,97.5
100	29.70	133.1	527.4	133.1	29.70	3.662	3.285	3.662	90-100	125.2	10596	98.6,98.6
110	20.34	30.13	81.71	30.13	20.34	2.947	3.682	2.947	100-110	58.40	10655	99.2,99.2
120	14.47	84.83	34.40	84.83	14.47	2.850	3.603	2.850	110-120	25.74	10681	99.4,99.4
130	8.181	70.67	82.15	70.67	8.181	3.003	4.198	3.003	120-130	28.29	10709	99.7,99.7
140	2.569	43.65	67.41	43.65	2.569	3.293	4.296	3.293	130-140	19.99	10729	99.9,99.9
150	1.690	21.49	36.31	21.49	1.690	3.712	4.318	3.712	140-150	10.20	10739	100,100
160	2.051	1.707	14.54	1.707	2.051	3.865	3.846	3.865	150-160	3.676	10743	100,100
170	2.367	2.172	2.615	2.172	2.367	3.014	2.936	3.014	160-170	1.004	10744	100,100
180	2.886	2.789	2.379	2.789	2.886	2.642	2.524	2.642	170-180	0.2549	10744	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

	Zonal (lm)		Total (lm)	Percent
0-10	308.46	0-10	308.46	2.87%
10-20	870.34	0-20	1178.80	10.97%
20-30	1374.72	0-30	2553.52	23.77%
30-40	1830.06	0-40	4383.58	40.80%
40-50	1976.77	0-50	6360.35	59.20%
50-60	1744.39	0-60	8104.74	75.44%
60-70	1328.28	0-70	9433.02	87.80%
70-80	732.68	0-80	10165.70	94.62%
80-90	305.49	0-90	10471.19	97.46%
90-100	125.20	0-100	10596.39	98.63%
100-110	58.40	0-110	10654.79	99.17%
110-120	25.74	0-120	10680.53	99.41%
120-130	28.29	0-130	10708.82	99.68%
130-140	19.99	0-140	10728.81	99.86%
140-150	10.20	0-150	10739.01	99.96%
150-160	3.68	0-160	10742.69	99.99%
160-170	1.00	0-170	10743.69	100.00%
170-180	0.25	0-180	10743.94	100.00%

4.2 Goniophotometer Test

LCS/BUG

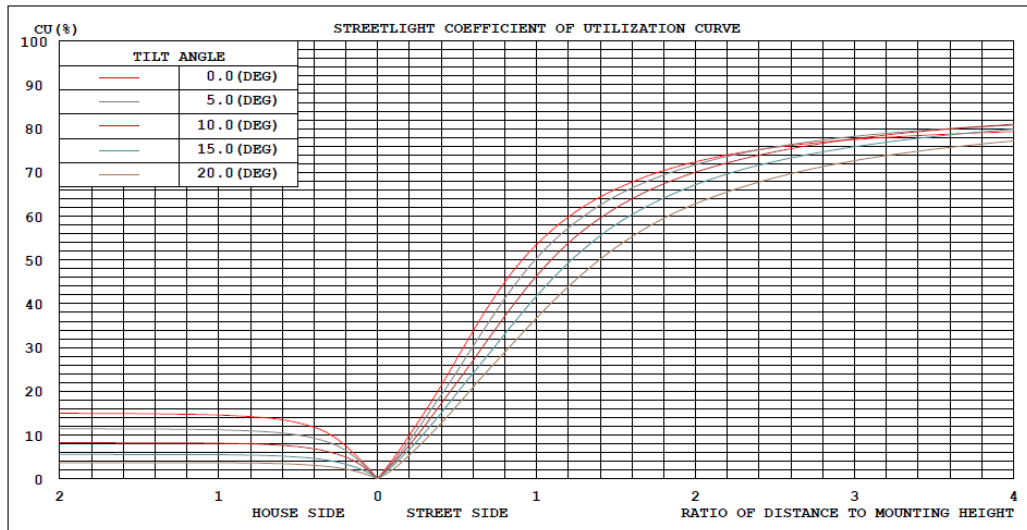


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

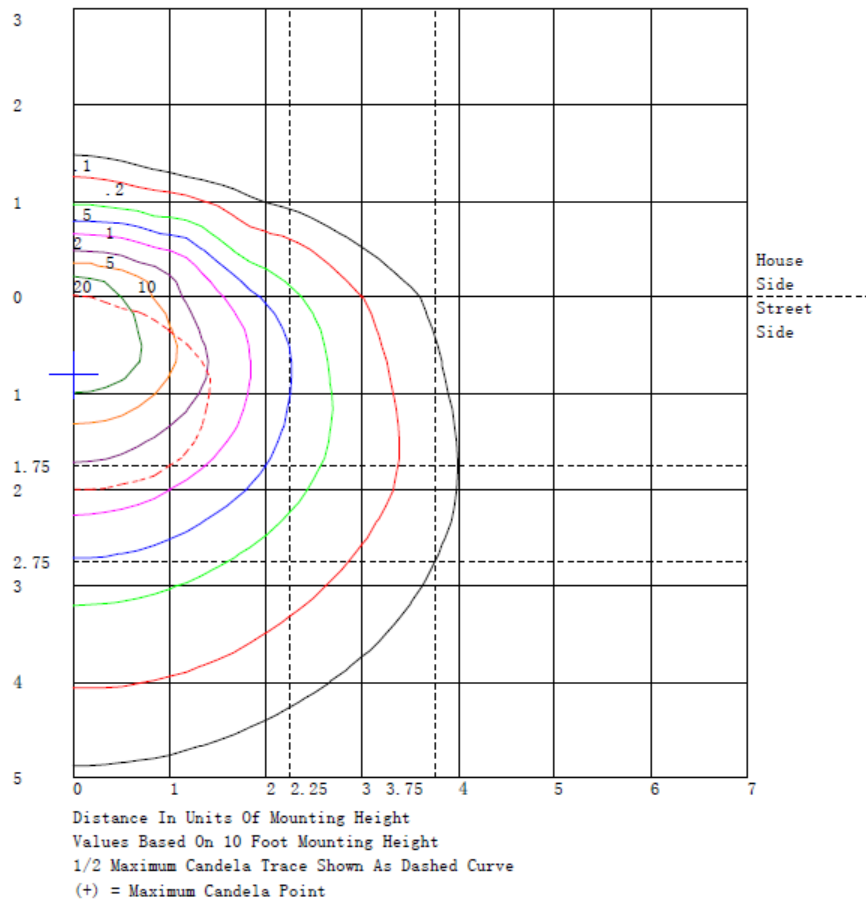
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1752.2	N.A.	16.3
FM - Front-Medium (30-60)	4867.2	N.A.	45.3
FH - Front-High (60-80)	1946.6	N.A.	18.1
FVH - Front-Very High (80-90)	293.0	N.A.	2.7
BL - Back-Low (0-30)	801.3	N.A.	7.5
BM - Back-Medium (30-60)	684.0	N.A.	6.4
BH - Back-High (60-80)	114.3	N.A.	1.1
BVH - Back-Very High (80-90)	12.5	N.A.	0.1
UL - Uplight-Low (90-100)	125.2	N.A.	1.2
UH - Uplight-High (100-180)	147.5	N.A.	1.4
Total	10743.8	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) y	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	3368	3369	3370	3372	3374	3377	3380	3381	3383	3385	3387	3389	3392	3395	3397	3400	3402	3405	3407
5	3385	3349	3344	3368	3462	3557	3621	3537	3430	3333	3353	3404	3469	3517	3558	3586	3579	3561	3540
10	3229	3299	3358	3408	3429	3454	3495	3596	3718	3850	3992	4116	4203	4179	4122	4055	4032	4022	4024
15	3136	3123	3163	3256	3449	3660	3852	3915	3944	3961	4028	4093	4144	4141	4124	4102	4099	4099	4099
20	3000	3081	3190	3326	3519	3718	3901	4002	4074	4127	4161	4204	4275	4464	4664	4841	4892	4900	4891
25	2784	2981	3168	3347	3515	3676	3829	3948	4080	4247	4541	4859	5169	5407	5599	5738	5783	5788	5771
30	2597	2940	3227	3457	3563	3662	3804	4183	4600	5000	5225	5400	5549	5745	5921	6060	6105	6110	6088
35	2310	2723	3083	3389	3594	3782	3989	4329	4703	5089	5471	5818	6104	6239	6308	6334	6362	6373	6369
40	2093	2525	2914	3261	3518	3767	4046	4505	4978	5413	5664	5847	5986	6142	6266	6350	6343	6309	6269
45	1903	2235	2588	2961	3374	3793	4202	4596	4944	5225	5356	5422	5449	5496	5526	5534	5498	5451	5410
50	1634	1883	2198	2577	3098	3627	4108	4385	4577	4701	4781	4827	4857	4916	4965	4996	4968	4928	4893
55	1390	1637	1935	2284	2744	3211	3637	3908	4100	4222	4271	4271	4238	4191	4137	4091	4093	4106	4118
60	1111	1436	1758	2077	2413	2730	3012	3219	3378	3494	3546	3576	3604	3700	3793	3864	3839	3793	3749
65	944	1246	1524	1778	2004	2209	2397	2591	2761	2895	2945	2963	2967	2997	3027	3056	3087	3111	3124
70	688	850	1027	1219	1449	1677	1887	2041	2159	2242	2270	2275	2272	2301	2329	2350	2340	2325	2311
75	506	577	673	796	974	1154	1316	1389	1430	1452	1476	1495	1515	1548	1581	1611	1632	1646	1650
80	362	366	395	451	549	661	773	859	931	987	1014	1029	1035	1045	1053	1062	1078	1092	1100
85	136	138	158	196	263	340	420	488	549	601	633	658	679	707	733	755	763	765	764
90	34.3	53.0	75.2	101	131	164	200	237	276	315	353	390	425	457	485	507	522	531	535
95	28.6	39.5	51.2	63.8	76.8	91.0	107	124	144	167	197	229	261	295	326	353	370	381	385
100	29.7	31.5	34.0	37.4	38.8	43.2	52.7	71.4	98.1	133	182	237	295	357	415	465	499	520	527
105	19.7	21.6	23.4	25.1	25.6	26.8	29.8	38.2	47.9	57.8	62.5	67.8	75.8	92.7	112	134	160	180	189
110	20.3	15.9	16.0	20.7	35.6	50.8	62.1	52.2	39.7	30.1	42.1	58.3	74.2	77.7	78.2	77.3	79.2	80.8	81.7
115	20.6	13.7	12.1	15.9	29.3	44.9	59.4	66.1	68.2	65.5	50.8	35.4	24.1	32.6	46.0	60.8	69.5	75.2	77.1
120	14.5	8.73	8.12	12.7	25.4	41.0	57.1	68.7	78.1	84.8	88.9	89.3	85.1	70.3	53.6	38.3	33.7	32.7	34.4
125	11.1	6.13	5.81	10.2	21.7	36.1	51.3	63.6	74.5	83.7	90.2	94.4	96.3	94.5	91.2	87.2	83.7	80.9	79.3
130	8.18	4.17	4.00	7.69	17.2	29.1	41.9	52.3	62.0	70.7	78.3	84.4	88.5	88.7	87.4	85.3	83.8	82.7	82.2
135	2.67	0.00	0.00	1.65	10.8	22.0	33.8	42.3	49.9	56.9	64.5	71.2	76.3	77.7	77.7	77.0	77.2	77.4	77.7
140	2.57	3.92	6.22	9.49	14.0	19.3	25.1	31.3	37.5	43.6	49.2	54.2	58.4	61.1	63.0	64.3	65.7	66.8	67.4
145	2.38	2.77	3.99	6.05	9.15	12.9	17.2	22.0	26.9	31.6	35.3	38.7	41.6	44.0	46.1	47.9	49.9	51.6	52.7
150	1.69	1.64	1.59	1.55	0.52	0.24	1.46	7.53	14.6	21.5	24.8	27.1	28.6	30.3	31.7	33.0	34.4	35.6	36.3
155	1.86	1.63	1.70	2.06	2.60	3.52	4.89	7.23	9.89	12.6	15.0	17.1	18.9	20.2	21.2	22.1	23.0	23.7	24.2
160	2.05	1.93	1.90	1.96	2.24	2.51	2.69	2.07	1.62	1.71	3.71	6.22	8.84	10.7	12.2	13.4	14.1	14.4	14.5
165	2.19	2.20	2.20	2.19	2.11	2.06	2.08	2.25	2.54	2.94	3.75	4.47	4.85	4.01	2.92	1.86	1.65	1.68	1.83
170	2.37	2.38	2.38	2.38	2.37	2.36	2.33	2.28	2.22	2.17	2.12	2.10	2.12	2.29	2.48	2.65	2.67	2.64	2.61
175	2.50	2.52	2.53	2.54	2.53	2.52	2.51	2.50	2.49	2.48	2.46	2.44	2.42	2.39	2.35	2.31	2.26	2.22	2.21
180	2.89	2.90	2.90	2.90	2.88	2.87	2.85	2.83	2.81	2.79	2.75	2.71	2.66	2.61	2.57	2.52	2.46	2.41	2.38

C (DEG)																			UNIT: cd
γ	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	3405	3402	3400	3397	3395	3392	3389	3387	3385	3383	3381	3380	3377	3374	3372	3370	3369	3368	3389
5	3561	3579	3586	3558	3517	3469	3404	3353	3333	3430	3537	3621	3557	3462	3368	3344	3349	3385	3301
10	4022	4032	4055	4122	4179	4203	4116	3992	3850	3718	3596	3495	3454	3429	3408	3358	3299	3229	3109
15	4099	4099	4102	4124	4141	4144	4093	4028	3961	3944	3915	3852	3660	3449	3256	3163	3123	3136	2909
20	4900	4892	4841	4664	4464	4275	4204	4161	4127	4074	4002	3901	3718	3519	3326	3190	3081	3000	2714
25	5788	5783	5738	5599	5407	5169	4859	4541	4247	4080	3948	3829	3676	3515	3347	3168	2981	2784	2644
30	6110	6105	6060	5921	5745	5549	5400	5225	5000	4600	4183	3804	3662	3563	3457	3227	2940	2597	2554
35	6373	6362	6334	6308	6239	6104	5818	5471	5089	4703	4329	3989	3782	3594	3389	3083	2723	2310	2360
40	6309	6343	6350	6266	6142	5986	5847	5664	5413	4978	4505	4046	3767	3518	3261	2914	2525	2093	2067
45	5451	5498	5534	5526	5496	5449	5422	5356	5225	4944	4596	4202	3793	3374	2961	2588	2235	1903	1816
50	4928	4968	4996	4965	4916	4857	4782	4781	4701	4577	4385	4108	3627	3098	2577	2198	1883	1634	1455
55	4106	4093	4091	4137	4191	4238	4271	4271	4222	4100	3908	3637	3211	2744	2284	1935	1637	1390	1126
60	3793	3839	3864	3793	3700	3604	3576	3546	3494	3378	3219	3012	2730	2413	2077	1758	1436	1111	828
65	3111	3087	3056	3027	2997	2967	2963	2945	2895	2761	2591	2397	2209	2004	1778	1524	1246	944	694
70	2325	2340	2350	2329	2301	2272	2275	2270	2242	2159	2041	1887	1677	1449	1219	1027	850	688	516
75	1646	1632	1611	1581	1548	1515	1495	1476	1452	1430	1389	1316	1154	974	796	673	577	506	363
80	1092	1078	1062	1053	1045	1035	1029	1014	987	931	859	773	661	549	451	395	366	362	247
85	765	763	755	733	707	679	658	633	601	549	488	420	340	263	196	158	138	136	98.6
90	531	522	507	485	457	425	390	353	315	276	237	200	164	131	101	75.2	53.0	34.3	31.5
95	381	370	353	326	295	261	229	197	167	144	124	107	91.0	76.8	63.8	51.2	39.5	28.6	24.6
100	520	499	465	415	357	295	237	182	133	98.1	71.4	52.7	43.2	38.8	37.4	34.0	31.5	29.7	23.6
105	180	160	134	112	92.7	75.8	67.8	62.5	57.8	47.9	38.2	29.8	26.8	25.6	25.1	23.4	21.6	19.7	15.3
110	80.8	79.2	77.3	78.2	77.7	74.2	58.3	42.1	30.1	39.7	52.2	62.1	50.8	35.6	20.7	16.0	15.9	20.3	15.5
115	75.2	69.5	60.8	46.0	32.6	24.1	35.4	50.8	65.5	68.2	66.1	59.4	44.9	29.3	15.9	12.1	13.7	20.6	15.0
120	32.7	33.7	38.3	53.6	70.3	85.1	89.3	88.9	84.8	78.1	68.7	57.1	41.0	25.4	12.7	8.12	8.73	14.5	11.1
125	80.9	83.7	87.2	91.2	94.5	96.3	94.4	90.2	83.7	74.5	63.6	51.3	36.1	21.7	10.2	5.81	6.13	11.1	8.76
130	82.7	83.8	85.3	87.4	88.7	88.5	84.4	78.3	70.7	62.0	52.3	41.9	29.1	17.2	7.69	4.00	4.17	8.18	6.68
135	77.4	77.2	77.0	77.7	77.7	76.3	71.2	64.5	56.9	49.9	42.3	33.8	22.0	10.8	1.65	0.00	0.00	2.67	3.35
140	66.6	65.7	64.3	63.0	61.1	58.4	54.2	49.2	43.6	37.5	31.3	25.1	19.3	14.0	9.49	6.22	3.92	2.57	3.02
145	51.6	49.7	47.9	46.1	44.0	41.0	38.7	35.3	31.6	26.9	22.0	17.2	12.9	9.15	6.05	3.99	2.77	2.38	2.76
150	35.6	34.4	33.0	31.7	30.3	28.6	27.1	24.8	21.5	14.6	7.53	1.46	0.24	0.52	1.55	1.59	1.64	1.69	2.38
155	23.7	23.0	22.1	21.2	20.2	18.9	17.1	15.0	12.6	9.89	7.23	4.89	3.52	2.60	2.06	1.70	1.63	1.86	2.66
160	14.4	14.1	13.4	12.2	10.7	8.84	6.22	3.71	1.71	1.62	2.07	2.69	2.51	2.24	1.96	1.90	1.93	2.05	2.93
165	1.68	1.65	1.86	2.92	4.01	4.85	4.47	3.75	2.94	2.84	2.25	2.08	2.06	2.11	2.19	2.20	2.20	2.19	3.06
170	2.64	2.67	2.65	2.48	2.29	2.12	2.10	2.12	2.17	2.22	2.28	2.33	2.36	2.37	2.38	2.38	2.38	2.37	3.04
175	2.22	2.26	2.31	2.35	2.39	2.42	2.44	2.46	2.48	2.49	2.50	2.51	2.52	2.53	2.54	2.53	2.52	2.50	2.92
180	2.41	2.46	2.52	2.57	2.61	2.66	2.71	2.75	2.79	2.81	2.83	2.85	2.87	2.88	2.90	2.90	2.90	2.89	2.87

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	3404	3415	3418	3417	3415	3417	3418	3418	3416	3414	3412	3411	3411	3411	3410	3408	3407	3408	3410
5	3229	3168	3133	3099	3056	2956	2854	2768	2755	2763	2779	2778	2770	2754	2707	2662	2628	2662	2707
10	2998	2894	2788	2697	2628	2606	2607	2624	2668	2703	2713	2613	2500	2404	2426	2472	2518	2472	2426
15	2729	2597	2526	2491	2481	2499	2512	2499	2383	2245	2109	2034	1983	1951	1944	1947	1955	1947	1944
20	2505	2372	2375	2410	2431	2310	2149	1968	1808	1650	1496	1343	1205	1091	1024	985	973	985	1024
25	2507	2373	2260	2137	1991	1764	1522	1285	1092	931	806	745	715	705	690	682	681	682	690
30	2458	2306	2075	1808	1525	1241	982	769	685	648	636	595	558	527	507	495	491	495	507
35	2308	2154	1820	1442	1075	872	725	620	534	471	424	378	341	313	294	283	279	283	294
40	1960	1773	1431	1064	727	585	502	453	375	306	249	211	185	168	159	155	155	155	159
45	1676	1482	1180	865	578	437	347	291	232	189	160	145	138	137	132	129	127	129	132
50	1268	1074	853	640	451	331	245	188	151	131	121	108	98.4	92.2	88.7	87.2	87.4	87.2	88.7
55	897	701	544	418	318	238	177	133	104	86.2	76.1	68.6	64.8	63.5	61.8	61.0	61.0	61.0	61.8
60	598	421	314	245	202	152	112	81.6	62.9	51.3	44.4	37.9	33.6	31.1	29.6	29.4	30.2	29.4	29.6
65	489	330	229	163	122	84.8	58.8	40.7	23.4	10.6	2.17	0.00	0.00	1.00	1.01	1.13	1.31	1.13	1.01
70	372	256	174	114	73.0	42.0	21.8	10.1	3.30	0.81	0.99	0.46	0.63	1.17	1.32	1.49	1.68	1.49	1.32
75	246	155	96.8	58.8	35.9	19.3	10.2	6.21	2.78	1.36	1.24	0.92	1.00	1.32	1.53	1.78	2.04	1.78	1.53
80	155	86.3	49.2	29.4	21.0	11.7	6.62	4.33	2.40	1.60	1.52	1.31	1.34	1.54	1.79	2.08	2.36	2.08	1.79
85	68.1	44.3	29.1	19.1	13.0	8.02	4.92	3.24	2.18	1.79	1.81	1.69	1.69	1.80	2.00	2.23	2.46	2.23	2.00
90	28.1	24.2	19.0	13.8	9.08	6.21	4.19	2.90	2.27	2.06	2.12	2.06	2.08	2.16	2.27	2.41	2.57	2.41	2.27
95	20.8	17.2	13.6	10.3	7.43	5.44	3.99	3.02	2.56	2.42	2.45	2.42	2.45	2.51	2.56	2.65	2.78	2.65	2.56
100	18.4	14.0	10.5	7.84	5.86	4.67	3.99	3.66	3.41	3.31	3.28	3.19	3.12	3.09	3.09	3.16	3.28	3.16	3.09
105	11.5	8.40	5.82	3.89	2.63	2.46	2.74	3.24	3.38	3.47	3.53	3.51	3.48	3.45	3.49	3.56	3.69	3.56	3.49
110	11.6	8.46	6.38	4.98	4.09	3.44	3.08	2.95	2.96	3.08	3.26	3.41	3.55	3.67	3.68	3.68	3.68	3.68	3.68
115	10.5	7.10	5.15	4.04	3.51	3.09	2.92	2.92	2.98	3.09	3.22	3.27	3.30	3.33	3.38	3.43	3.48	3.43	3.38
120	8.38	6.18	4.67	3.65	3.03	2.76	2.73	2.85	2.96	3.10	3.24	3.32	3.38	3.43	3.50	3.56	3.60	3.56	3.50
125	6.79	5.22	4.12	3.36	2.91	2.74	2.76	2.90	3.05	3.23	3.40	3.49	3.56	3.62	3.71	3.80	3.85	3.80	3.71
130	5.42	4.39	3.63	3.09	2.77	2.72	2.82	3.00	3.14	3.30	3.46	3.61	3.75	3.88	4.01	4.12	4.20	4.12	4.01
135	3.76	3.92	3.61	3.19	2.78	2.80	2.93	3.13	3.29	3.46	3.62	3.75	3.87	3.98	4.08	4.16	4.21	4.16	4.08
140	3.31	3.46	3.34	3.16	2.98	3.03	3.15	3.29	3.41	3.53	3.65	3.77	3.90	4.01	4.13	4.22	4.30	4.22	4.13
145	3.05	3.24	3.29	3.29	3.27	3.33	3.41	3.51	3.63	3.76	3.88	3.94	3.99	4.05	4.16	4.27	4.36	4.27	4.16
150	2.92	3.30	3.46	3.51	3.51	3.58	3.65	3.71	3.78	3.85	3.91	3.96	4.01	4.06	4.15	4.24	4.32	4.24	4.15
155	3.28	3.71	3.89	3.93	3.88	3.84	3.79	3.75	3.77	3.81	3.86	3.93	4.00	4.05	4.07	4.07	4.06	4.07	4.07
160	3.60	4.05	4.20	4.20	4.10	4.03	3.94	3.87	3.87	3.89	3.90	3.86	3.82	3.78	3.80	3.82	3.85	3.82	3.80
165	3.70	4.12	4.22	4.17	4.03	3.95	3.86	3.77	3.69	3.61	3.54	3.45	3.38	3.33	3.36	3.40	3.45	3.40	3.36
170	3.52	3.82	3.85	3.74	3.55	3.36	3.17	3.01	2.98	2.99	3.01	2.99	2.96	2.94	2.93	2.93	2.94	2.93	2.93
175	3.23	3.43	3.48	3.45	3.34	3.17	2.99	2.83	2.80	2.81	2.81	2.73	2.64	2.58	2.62	2.68	2.75	2.68	2.62
180	2.85	2.84	2.83	2.82	2.80	2.75	2.70	2.64	2.58	2.52	2.47	2.44	2.41	2.41	2.44	2.48	2.52	2.48	2.44

C (DEG) γ (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	3411	3411	3411	3412	3414	3416	3418	3418	3417	3415	3417	3418	3415	3404	3389				
5	2754	2770	2778	2779	2763	2755	2768	2854	2956	3056	3099	3133	3168	3229	3301				
10	2404	2500	2613	2713	2703	2668	2624	2607	2606	2628	2697	2788	2894	2998	3109				
15	1951	1983	2034	2109	2245	2383	2499	2512	2499	2481	2491	2526	2597	2729	2909				
20	1091	1205	1343	1496	1650	1808	1968	2149	2310	2431	2410	2375	2372	2505	2714				
25	705	715	745	806	931	1092	1285	1522	1764	1991	2137	2260	2373	2507	2644				
30	527	558	595	636	648	685	769	982	1241	1525	1808	2075	2306	2458	2554				
35	313	341	378	424	471	534	620	725	872	1075	1442	1820	2154	2308	2360				
40	168	185	211	249	306	375	453	502	585	727	1064	1431	1773	1960	2067				
45	137	138	145	160	189	232	291	347	437	578	865	1180	1482	1676	1816				
50	92.2	98.4	108	121	131	151	188	245	331	451	640	853	1074	1268	1455				
55	63.5	64.8	68.6	76.1	86.2	104	133	177	238	318	418	544	701	897	1126				
60	31.1	33.6	37.9	44.4	51.3	62.9	81.6	112	152	202	245	314	421	598	828				
65	1.00	0.00	0.00	2.17	10.6	23.4	40.7	58.8	84.8	122	163	229	330	489	694				
70	1.17	0.63	0.46	0.99	0.81	3.30	10.1	21.8	42.0	73.0	114	174	256	372	516				
75	1.32	1.00	0.92	1.24	1.36	2.78	6.21	10.2	19.3	35.9	58.8	96.8	155	246	363				
80	1.54	1.34	1.31	1.52	1.60	2.40	4.33	6.62	11.7	21.0	29.4	49.2	86.3	155	247				
85	1.80	1.69	1.69	1.81	1.79	2.18	3.24	4.92	8.02	13.0	19.1	29.1	44.3	68.1	98.6				
90	2.16	2.08	2.06	2.12	2.06	2.27	2.90	4.19	6.21	9.08	13.8	19.0	24.2	28.1	31.5				
95	2.51	2.45	2.42	2.45	2.42	2.56	3.02	3.99	5.44	7.43	10.3	13.6	17.2	20.8	24.6				
100	3.09	3.12	3.19	3.28	3.31	3.41	3.66	3.99	4.67	5.86	7.84	10.5	14.0	18.4	23.6				
105	3.45	3.48	3.51	3.53	3.47	3.38	3.24	2.74	2.46	2.63	3.89	5.82	8.40	11.5	15.3				
110	3.67	3.55	3.41	3.26	3.08	2.96	2.95	3.08	3.44	4.09	4.98	6.38	8.46	11.6	15.5				
115	3.33	3.30	3.27	3.22	3.09	2.98	2.92	2.92	3.09	3.51	4.04	5.15	7.10	10.5	15.0				
120	3.43	3.38	3.32	3.24	3.10	2.96	2.85	2.73	2.76	3.03	3.65	4.67	6.18	8.38	11.1				
125	3.62	3.56	3.49	3.40	3.23	3.05	2.90	2.76	2.74	2.91	3.36	4.12	5.22	6.79	8.76				
130	3.88	3.75	3.61	3.46	3.30	3.14	3.00	2.82	2.72	2.77	3.09	3.63	4.39	5.42	6.68				
135	3.98	3.87	3.75	3.62	3.46	3.29	3.13	2.93	2.80	2.78	3.19	3.61	3.92	3.76	3.35				
140	4.01	3.90	3.77	3.65	3.53	3.41	3.29	3.15	3.03	2.98	3.16	3.34	3.46	3.31	3.02				
145	4.05	3.99	3.94	3.88	3.76	3.63	3.51	3.41	3.33	3.27	3.29	3.29	3.24	3.05	2.76				
150	4.06	4.01	3.96	3.91	3.85	3.78	3.71	3.65	3.58	3.51	3.51	3.46	3.30	2.92	2.38				
155	4.05	4.00	3.93	3.86	3.81	3.77	3.75	3.79	3.84	3.88	3.93	3.89	3.71	3.28	2.66				
160	3.78	3.82	3.86	3.90	3.89	3.87	3.87	3.94	4.03	4.10	4.20	4.20	4.05	3.60	2.93				
165	3.33	3.38	3.45	3.54	3.61	3.69	3.77	3.86	3.95	4.03	4.17	4.22	4.12	3.70	3.06				
170	2.94	2.96	2.99	3.01	2.99	2.98	3.01	3.17	3.36	3.55	3.74	3.85	3.82	3.52	3.04				
175	2.58	2.64	2.73	2.81	2.81	2.80	2.83	2.99	3.17	3.34	3.45	3.48	3.43	3.23	2.92				
180	2.41	2.41	2.44	2.47	2.52	2.58	2.64	2.70	2.75	2.80	2.82	2.83	2.84	2.85	2.87				

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	WPX2 @ 80W / 3000K 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	0.181	79.8	0.918	7.01

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*****