

Photometric Test Report

Relevant Standards

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

Prepared For

RAB Lighting Inc.

Prepared By

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Issue Date: 2023-11-16
Revised Date: N/A

1.0 Test Summary

DLC Technical Requirements V5.1

Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires				
Requirement Category	Test Method	Requirements		Test Value
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		11353
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		148.2
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		11076
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	144.6
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		76.6
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	120V	2.48
			277V	3.66
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	120V	0.997
			277V	0.950
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3985±275	3954
		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%		2.8%
Input Voltage (V)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Cast		120.0
(Goniophotometer – Section 4.2)		Non-Worst Case		277.0
Input Current (A)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		0.640
(Goniophotometer – Section 4.2)		Non-Worst Case		0.284
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		76.6
(Goniophotometer – Section 4.2)		Non-Worst Case		74.8

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-11-02	WPX2 @ 80W / 4000K	231101003-S1
2	Goniophotometer Test	2023-11-02	WPX2 @ 80W / 4000K	231101003-S1
3	THD and PF Test	2023-11-02	WPX2 @ 80W / 4000K	231101003-S1

Remark (If any)

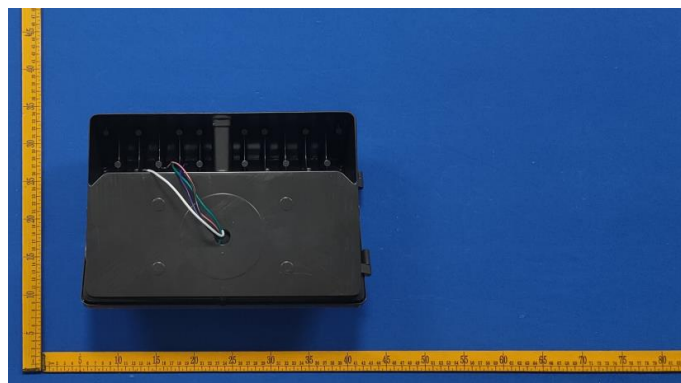
1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd.
3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency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

3.0 Product Description

Luminaire Description: Model No. WPX2 @ 80W / 4000K, color tunable from 3000K, 4000K and 5000K.

Electrical Specification: 120-277Vac, 50/60Hz

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	WPX2 @ 80W / 4000K	Sample ID	231101003-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

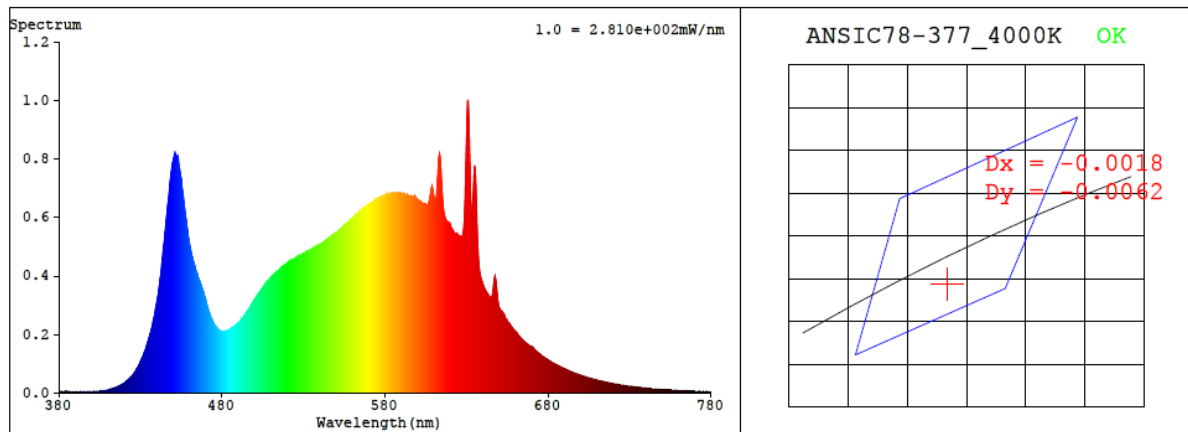
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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
120.0	60	0.640	76.6	0.997
277.0	60	0.284	74.8	0.950

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
3954	84.3	17	-0.0024	84	96	-11%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3808$ $y = 0.3718$ / $u' = 0.2273$ $v' = 0.4994$ ($duv = -2.42e-03$)

CCT= 3954K Prcp WL: Ld=580.7nm Purity=25.8%

Peak WL: Lp=631nm FWHM: =99.9nm Ratio: R=18.9% G=77.4% B=3.7%

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

EEI: 0.09237 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

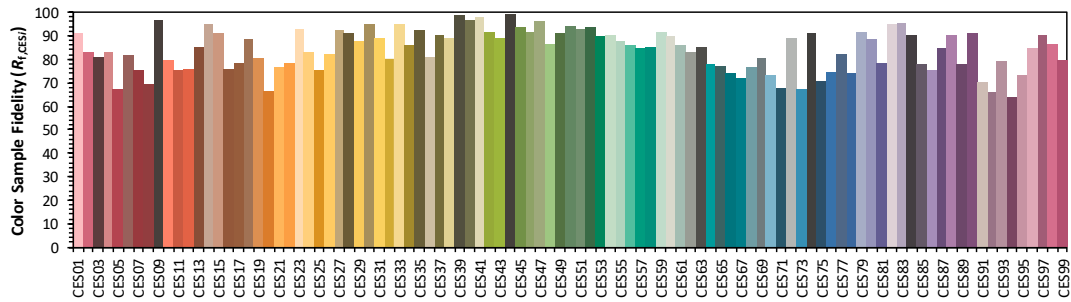
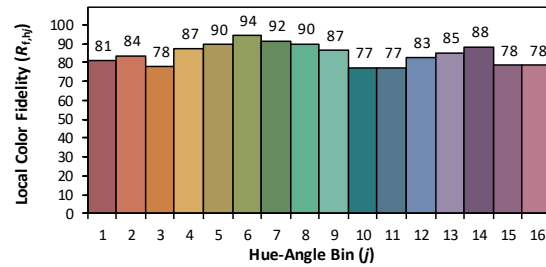
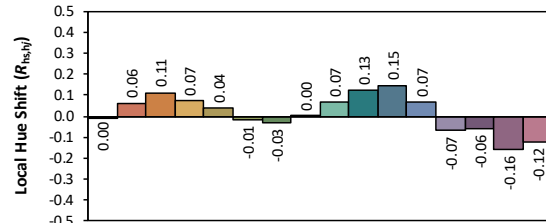
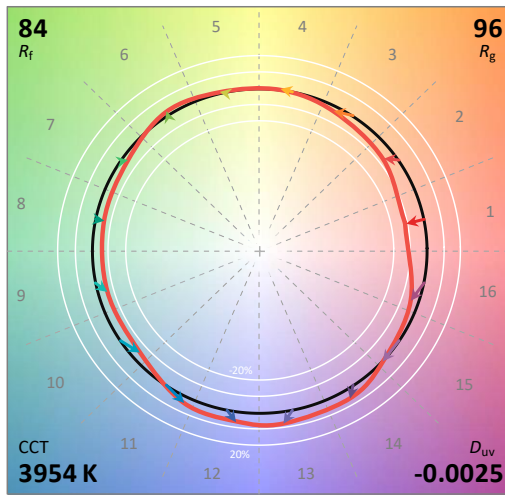
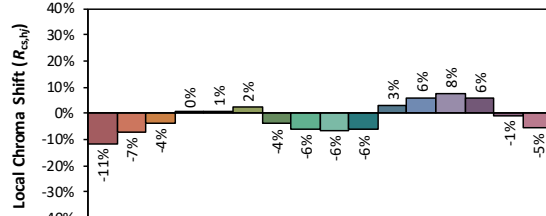
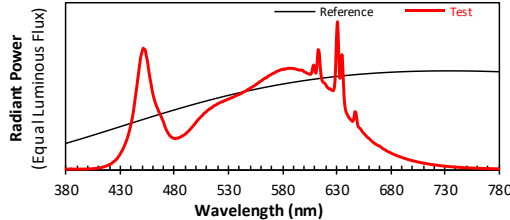
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/11/16

Model: WPX2 @ 80W / 4000K



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

x 0.3807
 y 0.3717
 u' 0.2273
 v' 0.4994

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	2.90E-06	447	6.59E-04	514	4.15E-04	581	6.79E-04	648	3.82E-04	715	3.73E-05
381	3.20E-06	448	7.16E-04	515	4.20E-04	582	6.75E-04	649	3.26E-04	716	3.61E-05
382	1.10E-06	449	7.63E-04	516	4.27E-04	583	6.80E-04	650	2.93E-04	717	3.48E-05
383	3.70E-06	450	7.91E-04	517	4.31E-04	584	6.81E-04	651	2.81E-04	718	3.36E-05
384	4.20E-06	451	8.18E-04	518	4.34E-04	585	6.83E-04	652	2.76E-04	719	3.26E-05
385	5.10E-06	452	8.12E-04	519	4.39E-04	586	6.83E-04	653	2.65E-04	720	3.18E-05
386	2.90E-06	453	8.08E-04	520	4.44E-04	587	6.83E-04	654	2.54E-04	721	3.05E-05
387	2.60E-06	454	7.66E-04	521	4.48E-04	588	6.84E-04	655	2.46E-04	722	2.95E-05
388	2.90E-06	455	7.34E-04	522	4.50E-04	589	6.82E-04	656	2.38E-04	723	2.92E-05
389	1.60E-06	456	6.83E-04	523	4.54E-04	590	6.82E-04	657	2.30E-04	724	2.79E-05
390	3.10E-06	457	6.34E-04	524	4.57E-04	591	6.81E-04	658	2.23E-04	725	2.68E-05
391	3.40E-06	458	5.94E-04	525	4.59E-04	592	6.79E-04	659	2.15E-04	726	2.60E-05
392	2.30E-06	459	5.52E-04	526	4.64E-04	593	6.76E-04	660	2.10E-04	727	2.50E-05
393	3.70E-06	460	5.14E-04	527	4.66E-04	594	6.75E-04	661	2.03E-04	728	2.44E-05
394	3.00E-06	461	4.84E-04	528	4.69E-04	595	6.71E-04	662	1.96E-04	729	2.35E-05
395	3.00E-06	462	4.57E-04	529	4.73E-04	596	6.71E-04	663	1.88E-04	730	2.30E-05
396	3.00E-06	463	4.38E-04	530	4.76E-04	597	6.71E-04	664	1.83E-04	731	2.21E-05
397	3.30E-06	464	4.18E-04	531	4.78E-04	598	6.72E-04	665	1.77E-04	732	2.15E-05
398	3.40E-06	465	4.02E-04	532	4.83E-04	599	6.67E-04	666	1.72E-04	733	2.07E-05
399	3.40E-06	466	3.83E-04	533	4.84E-04	600	6.60E-04	667	1.68E-04	734	1.99E-05
400	3.60E-06	467	3.70E-04	534	4.87E-04	601	6.57E-04	668	1.64E-04	735	1.94E-05
401	4.00E-06	468	3.54E-04	535	4.91E-04	602	6.54E-04	669	1.61E-04	736	1.90E-05
402	5.00E-06	469	3.35E-04	536	4.95E-04	603	6.48E-04	670	1.58E-04	737	1.82E-05
403	4.90E-06	470	3.20E-04	537	4.98E-04	604	6.46E-04	671	1.52E-04	738	1.76E-05
404	5.50E-06	471	2.95E-04	538	5.02E-04	605	6.44E-04	672	1.46E-04	739	1.70E-05
405	6.60E-06	472	2.77E-04	539	5.04E-04	606	6.42E-04	673	1.41E-04	740	1.67E-05
406	6.60E-06	473	2.61E-04	540	5.07E-04	607	6.55E-04	674	1.37E-04	741	1.60E-05
407	7.80E-06	474	2.48E-04	541	5.12E-04	608	6.89E-04	675	1.32E-04	742	1.55E-05
408	8.10E-06	475	2.36E-04	542	5.14E-04	609	7.05E-04	676	1.28E-04	743	1.49E-05
409	8.90E-06	476	2.26E-04	543	5.20E-04	610	6.69E-04	677	1.23E-04	744	1.47E-05
410	1.02E-05	477	2.21E-04	544	5.22E-04	611	6.52E-04	678	1.20E-04	745	1.39E-05
411	1.19E-05	478	2.15E-04	545	5.27E-04	612	7.14E-04	679	1.17E-04	746	1.39E-05
412	1.33E-05	479	2.12E-04	546	5.30E-04	613	8.08E-04	680	1.12E-04	747	1.31E-05
413	1.45E-05	480	2.09E-04	547	5.35E-04	614	7.89E-04	681	1.09E-04	748	1.29E-05
414	1.73E-05	481	2.09E-04	548	5.40E-04	615	6.89E-04	682	1.06E-04	749	1.25E-05
415	1.89E-05	482	2.12E-04	549	5.44E-04	616	6.22E-04	683	1.02E-04	750	1.19E-05
416	2.13E-05	483	2.10E-04	550	5.49E-04	617	5.95E-04	684	9.92E-05	751	1.15E-05
417	2.38E-05	484	2.15E-04	551	5.52E-04	618	5.87E-04	685	9.64E-05	752	1.13E-05
418	2.70E-05	485	2.17E-04	552	5.57E-04	619	5.83E-04	686	9.34E-05	753	1.09E-05
419	3.01E-05	486	2.22E-04	553	5.61E-04	620	5.73E-04	687	9.06E-05	754	1.07E-05
420	3.35E-05	487	2.25E-04	554	5.66E-04	621	5.60E-04	688	8.80E-05	755	1.06E-05
421	3.77E-05	488	2.30E-04	555	5.72E-04	622	5.52E-04	689	8.53E-05	756	9.90E-06
422	4.16E-05	489	2.33E-04	556	5.77E-04	623	5.45E-04	690	8.27E-05	757	9.80E-06
423	4.74E-05	490	2.39E-04	557	5.82E-04	624	5.45E-04	691	7.98E-05	758	9.40E-06
424	5.33E-05	491	2.45E-04	558	5.87E-04	625	5.38E-04	692	7.74E-05	759	9.20E-06
425	5.91E-05	492	2.53E-04	559	5.93E-04	626	5.35E-04	693	7.51E-05	760	8.80E-06
426	6.65E-05	493	2.58E-04	560	5.97E-04	627	5.33E-04	694	7.28E-05	761	8.60E-06
427	7.41E-05	494	2.67E-04	561	6.02E-04	628	5.54E-04	695	7.04E-05	762	8.40E-06
428	8.39E-05	495	2.75E-04	562	6.08E-04	629	6.58E-04	696	6.79E-05	763	8.20E-06
429	9.46E-05	496	2.83E-04	563	6.12E-04	630	8.95E-04	697	6.60E-05	764	7.70E-06
430	1.07E-04	497	2.92E-04	564	6.19E-04	631	9.95E-04	698	6.33E-05	765	7.60E-06
431	1.19E-04	498	3.00E-04	565	6.18E-04	632	7.90E-04	699	6.22E-05	766	7.10E-06
432	1.33E-04	499	3.09E-04	566	6.25E-04	633	6.21E-04	700	6.03E-05	767	7.10E-06
433	1.47E-04	500	3.19E-04	567	6.33E-04	634	6.74E-04	701	5.83E-05	768	6.70E-06
434	1.65E-04	501	3.28E-04	568	6.34E-04	635	7.75E-04	702	5.65E-05	769	6.70E-06
435	1.83E-04	502	3.36E-04	569	6.39E-04	636	6.55E-04	703	5.48E-05	770	6.40E-06
436	2.01E-04	503	3.44E-04	570	6.44E-04	637	4.90E-04	704	5.30E-05	771	6.30E-06
437	2.25E-04	504	3.52E-04	571	6.48E-04	638	4.17E-04	705	5.13E-05	772	6.10E-06
438	2.51E-04	505	3.59E-04	572	6.51E-04	639	3.87E-04	706	4.99E-05	773	6.10E-06
439	2.80E-04	506	3.66E-04	573	6.54E-04	640	3.70E-04	707	4.79E-05	774	5.70E-06
440	3.12E-04	507	3.75E-04	574	6.61E-04	641	3.56E-04	708	4.65E-05	775	5.70E-06
441	3.46E-04	508	3.82E-04	575	6.62E-04	642	3.46E-04	709	4.50E-05	776	5.30E-06
442	3.90E-04	509	3.87E-04	576	6.67E-04	643	3.38E-04	710	4.36E-05	777	5.00E-06
443	4.39E-04	510	3.94E-04	577	6.68E-04	644	3.30E-04	711	4.26E-05	778	5.00E-06
444	4.95E-04	511	4.01E-04	578	6.72E-04	645	3.25E-04	712	4.07E-05	779	4.80E-06
445	5.46E-04	512	4.06E-04	579	6.74E-04	646	3.43E-04	713	3.96E-05	780	4.80E-06
446	6.04E-04	513	4.11E-04	580	6.75E-04	647	3.90E-04	714	3.85E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	WPX2 @ 80W / 4000K	Sample ID	231101003-S1
Operate time (Min.)	30	Stabilization time (Min.)	60
Temperature (°C)	24.8	Humidity (%RH)	42.9

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	120.0	60	0.640	76.6	0.997
NON-WORST CASE	277.0	60	0.284	74.8	0.950

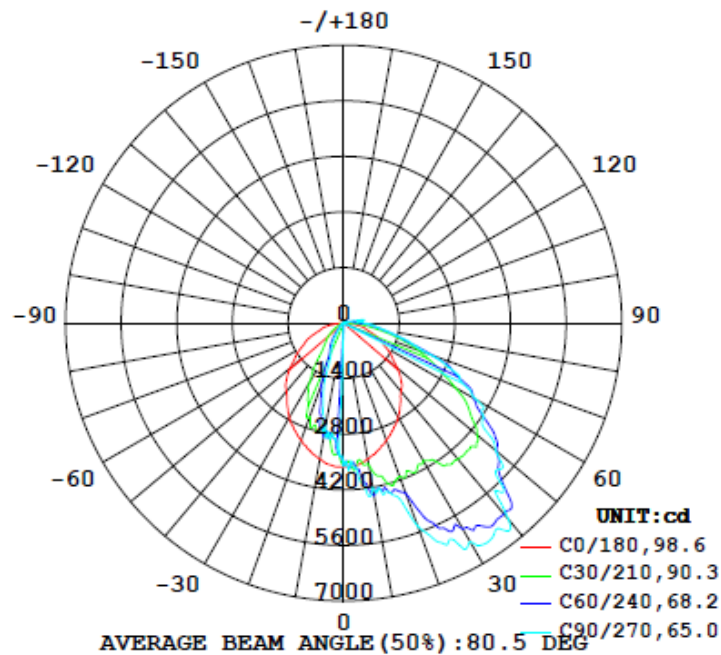
Test Result

Result Type	Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement (80°-90°)	BUG
		C0-180	C90-270	C0-180	C90-270			
0°-180° zones	11353	114.0	147.8	65.6	98.5	148.2	2.7%	B2-U3-G3
0°-90° zones	11076	114.0	147.8	65.6	98.5	144.6	2.8%	B2-U3-G3

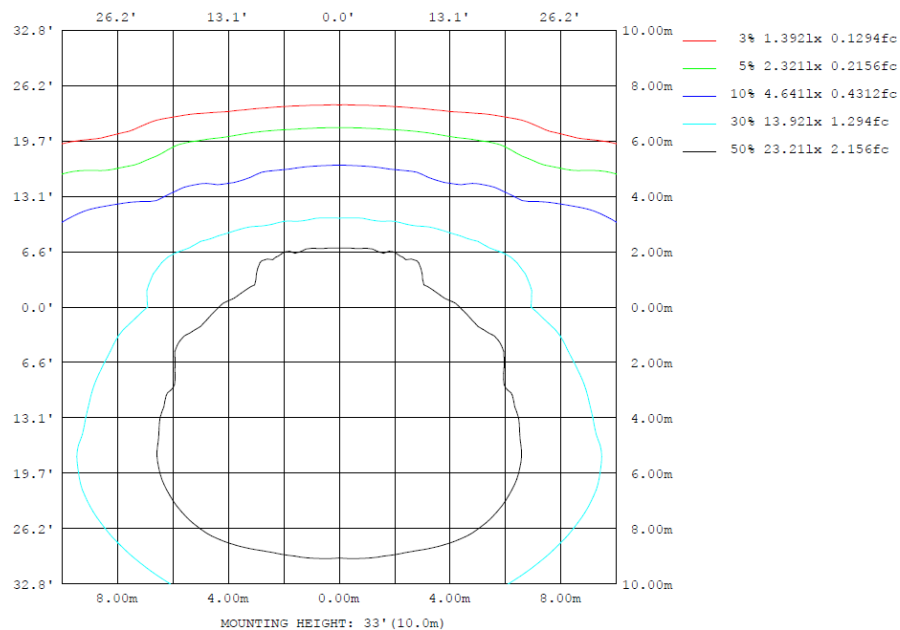
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

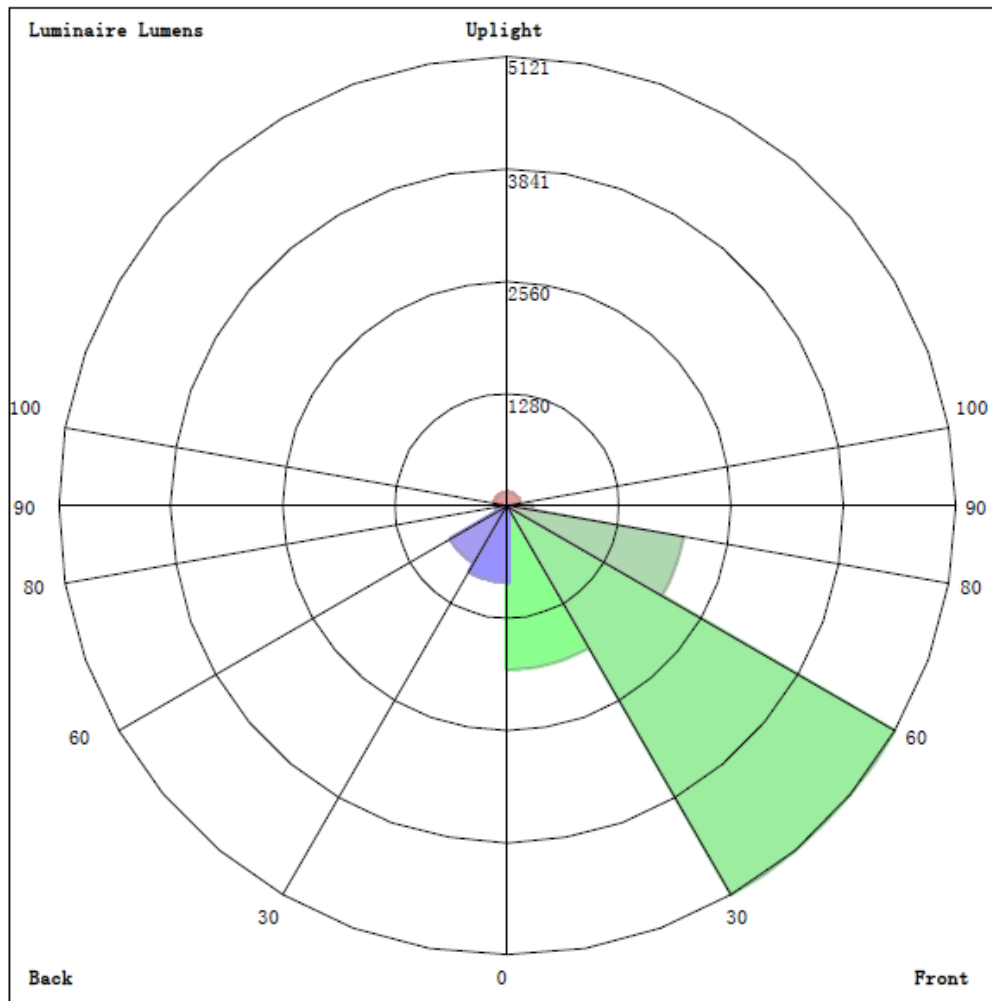
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	φ zone	φ total	%lum, lamp
10	3472	4075	4208	4075	3472	2951	2627	2951	0- 10	326.3	326.3	2.87, 2.87
20	3134	4307	5436	4307	3134	2016	1104	2016	10- 20	931.2	1258	11.1, 11.1
30	2747	5320	6352	5320	2747	836.5	534.1	836.5	20- 30	1472	2730	24, 24
40	2248	5663	6448	5663	2248	493.5	160.9	493.5	30- 40	1940	4669	41.1, 41.1
50	1759	4904	4993	4904	1759	201.2	92.04	201.2	40- 50	2080	6749	59.5, 59.5
60	1235	3659	3846	3659	1235	91.33	38.87	91.33	50- 60	1848	8598	75.7, 75.7
70	763.2	2372	2283	2372	763.2	11.34	1.762	11.34	60- 70	1405	10003	88.1, 88.1
80	405.4	1011	1078	1011	405.4	4.623	2.445	4.623	70- 80	763.6	10766	94.8, 94.8
90	38.14	313.9	525.8	313.9	38.14	2.985	2.823	2.985	80- 90	310.0	11076	97.6, 97.6
100	32.07	130.5	513.2	130.5	32.07	3.820	3.520	3.820	90-100	126.7	11203	98.7, 98.7
110	26.57	29.15	87.72	29.15	26.57	2.996	3.849	2.996	100-110	55.80	11259	99.2, 99.2
120	15.50	89.14	40.19	89.14	15.50	2.902	3.726	2.902	110-120	26.76	11285	99.4, 99.4
130	8.539	74.17	89.45	74.17	8.539	3.108	4.332	3.108	120-130	30.37	11316	99.7, 99.7
140	2.685	45.85	72.38	45.85	2.685	3.428	4.523	3.428	130-140	21.39	11337	99.9, 99.9
150	2.085	22.27	37.78	22.27	2.085	3.853	4.513	3.853	140-150	10.85	11348	100, 100
160	2.151	1.814	14.67	1.814	2.151	4.078	3.999	4.078	150-160	3.798	11352	100, 100
170	2.514	2.387	2.576	2.387	2.514	3.327	3.111	3.327	160-170	1.040	11353	100, 100
180	3.059	2.956	2.432	2.956	3.059	2.806	2.657	2.806	170-180	0.2732	11353	100, 100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

	Zonal (lm)		Total (lm)	Percent
0-10	326.26	0-10	326.26	2.87%
10-20	931.24	0-20	1257.50	11.08%
20-30	1472.04	0-30	2729.54	24.04%
30-40	1939.95	0-40	4669.49	41.13%
40-50	2079.94	0-50	6749.43	59.45%
50-60	1848.30	0-60	8597.73	75.73%
60-70	1404.83	0-70	10002.56	88.11%
70-80	763.64	0-80	10766.20	94.83%
80-90	309.98	0-90	11076.18	97.56%
90-100	126.65	0-100	11202.83	98.68%
100-110	55.80	0-110	11258.63	99.17%
110-120	26.76	0-120	11285.39	99.41%
120-130	30.37	0-130	11315.76	99.67%
130-140	21.39	0-140	11337.15	99.86%
140-150	10.85	0-150	11348.00	99.96%
150-160	3.80	0-160	11351.80	99.99%
160-170	1.04	0-170	11352.84	100.00%
170-180	0.27	0-180	11353.11	100.00%

4.2 Goniophotometer Test

LCS/BUG

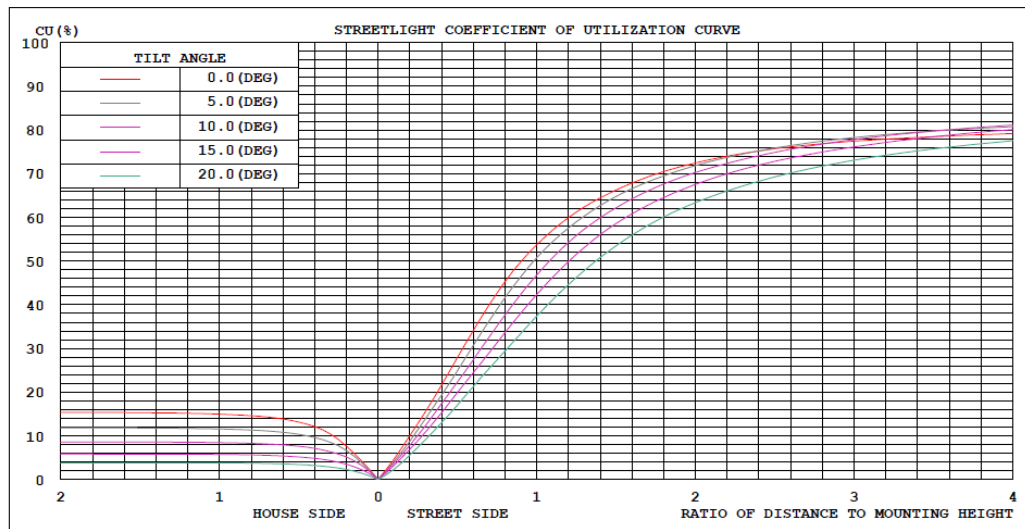


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

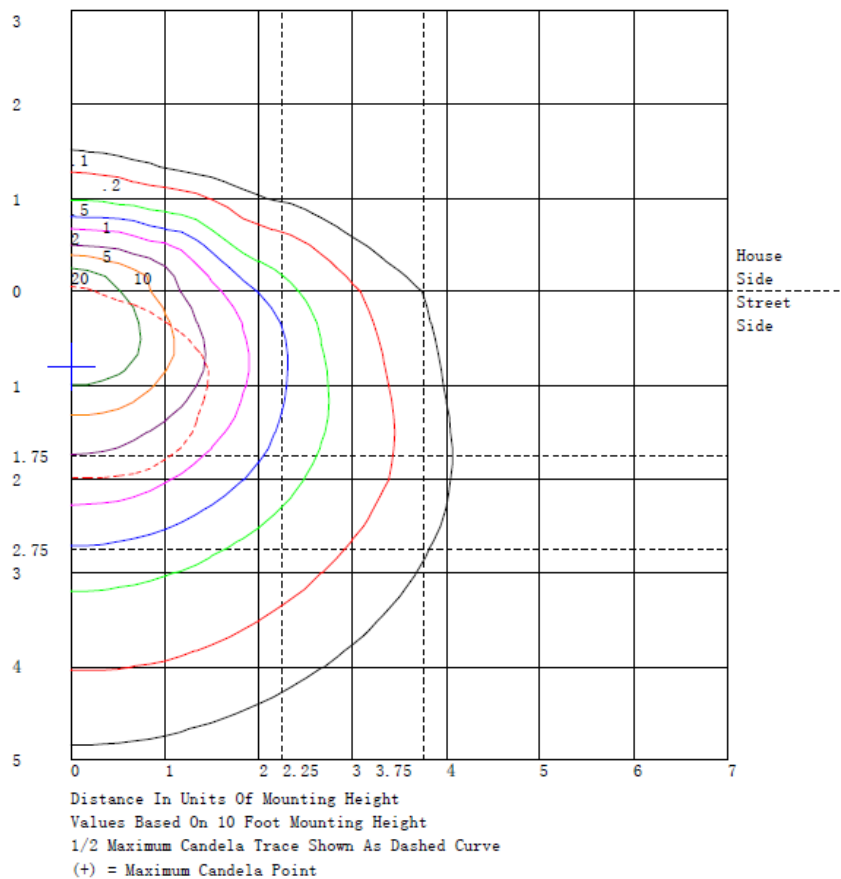
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1866.4	N.A.	16.4
FM - Front-Medium (30-60)	5120.7	N.A.	45.1
FH - Front-High (60-80)	2041.3	N.A.	18.0
FVH - Front-Very High (80-90)	296.0	N.A.	2.6
BL - Back-Low (0-30)	863.2	N.A.	7.6
BM - Back-Medium (30-60)	747.5	N.A.	6.6
BH - Back-High (60-80)	127.2	N.A.	1.1
BVH - Back-Very High (80-90)	14.0	N.A.	0.1
UL - Uplight-Low (90-100)	126.7	N.A.	1.1
UH - Uplight-High (100-180)	150.3	N.A.	1.3
Total	11353.3	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

Table--1

UNIT: cd

C (DEG) y (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	3601	3601	3602	3602	3602	3602	3601	3600	3600	3599	3601	3602	3603	3602	3601	3600	3601	3602	3602
5	3594	3598	3506	3499	3538	3585	3623	3585	3540	3508	3556	3619	3678	3680	3669	3655	3661	3669	3676
10	3472	3465	3470	3487	3505	3543	3611	3750	3911	4075	4221	4341	4419	4395	4338	4269	4239	4219	4208
15	3319	3303	3349	3457	3684	3930	4153	4223	4252	4262	4322	4377	4419	4408	4386	4363	4378	4397	4408
20	3134	3205	3313	3457	3677	3904	4109	4200	4260	4307	4369	4449	4560	4773	5000	5210	5335	5411	5436
25	2957	3165	3370	3572	3779	3979	4163	4274	4399	4571	4949	5347	5705	5835	5898	5929	6028	6112	6164
30	2747	3185	3532	3788	3860	3911	4012	4413	4870	5320	5600	5820	5990	6132	6239	6311	6347	6358	6352
35	2487	2882	3246	3580	3862	4130	4402	4732	5071	5406	5730	6024	6272	6429	6532	6589	6603	6591	6561
40	2248	2649	3038	3415	3768	4118	4474	4891	5296	5663	5916	6116	6273	6425	6538	6605	6574	6514	6448
45	2044	2394	2768	3163	3607	4055	4487	4886	5229	5497	5601	5638	5637	5681	5706	5704	5613	5514	5434
50	1759	2083	2452	2866	3393	3913	4376	4632	4801	4904	4970	5005	5023	5065	5097	5113	5079	5035	4993
55	1481	1798	2148	2530	2999	3459	3871	4121	4295	4403	4464	4481	4461	4403	4334	4269	4259	4259	4260
60	1235	1591	1939	2278	2631	2958	3242	3430	3565	3659	3709	3743	3776	3877	3972	4039	3988	3915	3846
65	1027	1350	1646	1916	2158	2376	2571	2757	2915	3040	3097	3125	3137	3161	3180	3196	3213	3224	3228
70	763	945	1137	1340	1574	1804	2013	2170	2290	2372	2395	2392	2376	2383	2388	2384	2350	2313	2283
75	579	647	744	867	1050	1236	1402	1476	1515	1532	1541	1544	1548	1577	1607	1632	1634	1629	1619
80	405	411	442	498	597	708	819	899	964	1011	1029	1033	1032	1042	1051	1060	1059	1076	1078
85	163	157	170	205	273	352	433	496	552	600	639	672	698	721	738	750	765	756	754
90	38.1	55.8	77.3	103	132	165	201	237	275	314	354	393	429	459	484	503	517	524	526
95	30.0	40.2	51.4	63.5	75.9	89.7	105	123	144	167	196	227	259	291	320	344	360	369	371
100	32.1	33.1	35.2	38.4	40.3	45.2	54.8	72.2	97.1	130	179	233	291	350	406	455	487	507	513
105	23.9	24.5	25.2	26.0	25.6	26.3	29.2	38.4	49.2	60.1	66.7	72.5	77.8	82.9	89.3	97.8	115	132	147
110	26.6	18.5	16.2	19.7	35.5	52.1	64.7	53.6	39.7	29.2	42.7	60.8	78.6	82.1	82.3	81.0	83.6	86.0	87.7
115	22.8	14.3	11.9	15.5	29.7	46.5	62.4	69.9	72.4	69.6	53.7	36.7	23.5	29.9	41.6	55.3	64.8	71.5	73.9
120	15.5	8.81	7.80	12.5	26.3	43.3	60.6	72.6	82.1	89.1	94.1	95.5	92.6	79.7	64.7	50.3	43.2	39.8	40.2
125	11.6	6.07	5.60	10.2	22.5	37.8	54.1	67.2	78.9	88.7	95.6	100	102	101	98.1	94.3	90.6	87.6	85.9
130	8.54	4.64	4.69	8.69	18.7	31.1	44.4	55.2	65.1	74.2	82.4	89.2	94.0	95.2	94.7	93.3	91.6	90.2	89.5
135	2.79	0.00	0.00	1.32	10.9	22.8	35.4	44.4	52.7	60.4	68.8	76.2	82.0	84.1	84.5	84.1	84.2	84.1	84.0
140	2.68	4.72	7.49	11.0	15.3	20.3	25.9	32.4	39.2	45.9	52.1	57.8	62.6	65.6	67.7	69.2	70.8	71.9	72.4
145	2.63	3.07	4.33	6.41	9.47	13.2	17.6	22.7	27.9	33.0	37.1	40.7	43.9	46.7	49.1	51.2	53.4	55.1	56.0
150	2.08	1.81	1.83	2.15	2.17	2.94	4.89	10.3	16.4	22.3	25.6	28.0	29.9	31.8	33.3	34.7	36.1	37.2	37.8
155	1.95	1.92	2.00	2.17	2.08	2.37	3.29	6.01	9.25	12.6	15.3	17.6	19.6	21.0	22.0	22.8	23.7	24.4	24.8
160	2.15	2.05	2.02	2.08	2.32	2.56	2.72	2.12	1.70	1.81	3.79	6.28	8.89	10.8	12.4	13.7	14.3	14.6	14.7
165	2.33	2.34	2.34	2.33	2.25	2.20	2.22	2.44	2.74	3.09	3.60	4.01	4.18	3.54	2.74	1.98	1.83	1.85	1.98
170	2.51	2.53	2.54	2.54	2.53	2.51	2.48	2.45	2.42	2.39	2.36	2.33	2.33	2.36	2.40	2.45	2.48	2.52	2.58
175	2.71	2.73	2.74	2.75	2.74	2.73	2.72	2.70	2.68	2.66	2.63	2.60	2.57	2.54	2.50	2.46	2.41	2.37	2.35
180	3.06	3.08	3.09	3.09	3.07	3.05	3.03	3.01	2.99	2.96	2.90	2.84	2.78	2.75	2.72	2.69	2.59	2.50	2.43

C (DEG)		UNIT: cd																	
γ (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	3602	3601	3600	3601	3602	3603	3602	3601	3599	3600	3600	3601	3602	3602	3602	3602	3601	3601	3604
5	3669	3661	3655	3669	3680	3678	3619	3556	3508	3540	3585	3623	3585	3538	3499	3506	3538	3594	3446
10	4219	4239	4269	4338	4395	4419	4341	4221	4075	3911	3750	3611	3543	3505	3487	3470	3465	3472	3357
15	4397	4378	4363	4386	4408	4419	4377	4322	4262	4252	4223	4153	3930	3684	3457	3349	3303	3319	3085
20	5411	5335	5210	5000	4773	4560	4449	4369	4307	4260	4200	4109	3904	3677	3457	3313	3205	3134	2881
25	6112	6028	5929	5898	5835	5705	5347	4949	4571	4399	4274	4163	3979	3779	3572	3370	3165	2957	2851
30	6358	6347	6311	6239	6132	5990	5820	5600	5320	4870	4413	4012	3911	3860	3788	3532	3185	2747	2696
35	6591	6603	6589	6532	6429	6272	6024	5730	5406	5071	4732	4402	4130	3862	3580	3246	2882	2487	2518
40	6514	6574	6605	6538	6425	6273	6116	5916	5663	5296	4891	4474	4118	3768	3415	3038	2649	2248	2262
45	5514	5613	5704	5706	5681	5637	5638	5601	5497	5229	4886	4487	4055	3607	3163	2768	2394	2044	1970
50	5035	5079	5113	5097	5065	5023	5005	4970	4904	4801	4632	4376	3913	3393	2866	2452	2083	1759	1587
55	4259	4259	4269	4334	4403	4461	4481	4464	4403	4295	4121	3871	3459	2999	2530	2148	1798	1481	1223
60	3915	3988	4039	3972	3877	3776	3743	3709	3659	3565	3430	3242	2958	2631	2278	1939	1591	1235	930
65	3224	3213	3196	3180	3161	3137	3125	3097	3040	2915	2757	2571	2376	2158	1916	1646	1350	1027	749
70	2313	2350	2384	2388	2383	2376	2392	2395	2372	2290	2170	2013	1804	1574	1340	1137	945	763	576
75	1629	1634	1632	1607	1577	1548	1544	1541	1532	1515	1476	1402	1236	1050	867	744	647	579	414
80	1076	1069	1060	1051	1042	1032	1033	1029	1011	964	899	819	708	597	498	442	411	405	276
85	756	755	750	738	721	698	672	639	600	552	496	433	352	273	205	170	157	163	117
90	524	517	503	484	459	429	393	354	314	275	237	201	165	132	103	77.3	55.8	38.1	34.8
95	369	360	344	320	291	259	227	196	167	144	123	105	89.7	75.9	63.5	51.4	40.2	30.0	26.3
100	507	487	455	406	350	291	233	179	130	97.1	72.2	54.8	45.2	40.3	38.4	35.2	33.1	32.1	25.4
105	132	115	97.8	89.3	82.9	77.8	72.5	66.7	60.1	49.2	38.4	29.2	26.3	25.6	26.0	25.2	24.5	23.9	18.4
110	86.0	83.6	81.0	82.3	82.1	78.6	60.8	42.7	29.2	39.7	53.6	64.7	52.1	35.5	19.7	16.2	18.5	26.6	18.6
115	71.5	64.8	55.3	41.6	29.9	23.5	36.7	53.7	69.6	72.4	69.9	62.4	46.5	29.7	15.5	11.9	14.3	22.8	16.2
120	39.8	43.2	50.3	64.7	79.7	92.6	95.5	94.1	89.1	82.1	72.6	60.6	43.3	26.3	12.5	7.80	8.81	15.5	11.8
125	87.6	90.6	94.3	98.1	101	102	100	95.6	88.7	78.9	67.2	54.1	37.8	22.5	10.2	5.60	6.07	11.6	9.15
130	90.2	91.6	93.3	94.7	95.2	94.0	89.2	82.4	74.2	65.1	55.2	44.4	31.1	18.7	8.69	4.69	4.64	8.54	6.96
135	84.1	84.2	84.1	84.5	84.1	82.0	76.2	68.8	60.4	52.7	44.4	35.4	22.8	10.9	1.32	0.00	0.72	2.79	3.49
140	71.9	70.8	69.2	67.7	65.6	62.6	57.8	52.1	45.9	39.2	32.4	25.9	20.3	15.3	11.0	7.49	4.20	2.68	3.15
145	55.1	53.4	51.5	49.1	46.7	43.9	40.7	37.1	33.0	27.9	22.7	17.6	13.2	9.47	6.41	4.33	3.07	2.63	2.98
150	37.2	36.1	34.7	33.3	31.8	29.9	28.0	25.6	22.3	16.4	10.3	4.89	2.94	2.17	1.25	1.83	1.81	2.02	2.66
155	24.4	23.7	22.8	22.0	21.0	19.6	17.6	15.3	12.6	9.25	6.01	3.29	2.07	1.28	0.72	1.10	1.92	1.95	2.78
160	14.6	14.3	13.7	12.4	10.8	8.89	6.28	3.79	1.81	1.70	2.12	2.72	2.56	2.32	2.08	2.02	2.05	2.15	3.07
165	1.85	1.89	1.98	2.74	3.54	4.18	4.01	3.60	3.09	2.74	2.44	2.22	2.20	2.25	2.35	2.34	2.54	2.53	3.23
170	2.52	2.48	2.45	2.40	2.36	2.33	2.33	2.36	2.39	2.42	2.45	2.48	2.51	2.53	2.54	2.54	2.53	2.51	3.21
175	2.37	2.41	2.46	2.50	2.54	2.57	2.60	2.63	2.66	2.68	2.70	2.72	2.73	2.74	2.75	2.74	2.73	2.71	3.17
180	2.50	2.59	2.69	2.72	2.75	2.78	2.84	2.90	2.96	2.99	3.01	3.03	3.05	3.07	3.09	3.09	3.08	3.06	3.30

Table--3

UNIT: cd

C (DBG) y	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
0	3606	3607	3606	3605	3604	3603	3603	3603	3602	3601	3600	3601	3602	3603	3603	3603	3602	3603	3603
5	3337	3266	3267	3280	3278	3165	3038	2924	2902	2907	2925	2926	2926	2925	2919	2913	2909	2913	2919
10	3246	3139	3016	2910	2837	2856	2901	2951	2961	2953	2924	2851	2769	2692	2655	2634	2627	2634	2655
15	2844	2709	2675	2685	2714	2715	2702	2667	2577	2468	2352	2247	2152	2074	2031	2008	2003	2008	2031
20	2688	2554	2528	2526	2509	2365	2192	2016	1898	1790	1683	1544	1408	1285	1195	1133	1104	1133	1195
25	2733	2604	2471	2322	2153	1934	1701	1466	1235	1030	864	798	771	768	750	740	736	740	750
30	2597	2451	2245	2002	1729	1406	1097	836	737	694	682	638	601	571	551	538	534	538	551
35	2450	2283	1944	1561	1188	964	796	672	580	515	467	415	373	339	318	307	303	307	318
40	2174	1983	1598	1177	789	631	543	493	408	333	270	227	197	177	165	161	161	161	165
45	1831	1627	1295	946	626	473	377	319	252	201	166	149	143	143	138	134	133	134	138
50	1399	1196	950	710	494	360	265	201	161	139	129	115	105	98.3	94.1	92.2	92.0	92.2	94.1
55	993	791	618	472	353	262	194	145	112	93.0	82.7	75.1	71.4	70.3	68.1	66.8	66.3	66.8	68.1
60	679	484	362	282	228	170	125	91.3	70.4	57.8	51.0	45.6	42.7	41.5	40.0	39.1	38.9	39.1	40.0
65	523	348	242	176	136	97.1	68.9	48.8	30.8	17.5	8.43	3.54	1.39	1.03	0.66	0.87	1.36	0.87	0.66
70	418	290	197	130	82.7	47.5	24.7	11.3	3.61	0.79	1.01	0.41	0.60	1.20	1.37	1.57	1.76	1.57	1.37
75	280	175	109	65.6	40.1	21.3	11.1	6.70	2.88	1.34	1.24	0.90	1.00	1.35	1.59	1.86	2.13	1.86	1.59
80	173	96.2	54.4	32.1	22.6	12.5	6.96	4.62	2.52	1.64	1.54	1.31	1.35	1.56	1.83	2.15	2.44	2.15	1.83
85	79.3	50.1	32.1	20.8	14.3	8.62	5.18	3.37	2.20	1.79	1.84	1.70	1.71	1.83	2.07	2.35	2.63	2.35	2.07
90	31.0	26.5	20.8	15.0	9.78	6.61	4.39	2.99	2.30	2.09	2.16	2.09	2.11	2.20	2.38	2.60	2.82	2.60	2.38
95	22.5	18.8	14.8	11.0	7.74	5.57	4.02	3.02	2.55	2.42	2.49	2.46	2.48	2.55	2.68	2.85	3.04	2.85	2.68
100	19.7	15.0	11.4	8.63	6.61	5.23	4.34	3.82	3.49	3.34	3.31	3.20	3.14	3.14	3.21	3.34	3.52	3.34	3.21
105	13.7	9.76	6.55	4.17	2.64	2.54	3.00	3.68	3.74	3.72	3.66	3.61	3.57	3.56	3.63	3.75	3.92	3.75	3.63
110	12.4	7.83	5.59	4.56	4.26	3.60	3.19	3.00	3.09	3.30	3.56	3.64	3.69	3.73	3.76	3.80	3.85	3.80	3.76
115	11.0	7.07	5.03	4.00	3.63	3.20	3.01	2.98	3.03	3.14	3.27	3.32	3.36	3.40	3.46	3.52	3.57	3.52	3.46
120	8.78	6.40	4.81	3.76	3.15	2.85	2.80	2.90	3.01	3.16	3.31	3.39	3.46	3.51	3.60	3.67	3.73	3.67	3.60
125	7.12	5.49	4.33	3.52	3.02	2.82	2.83	2.96	3.12	3.30	3.48	3.57	3.64	3.70	3.81	3.90	3.97	3.90	3.81
130	5.64	4.57	3.77	3.22	2.89	2.84	2.93	3.11	3.23	3.37	3.52	3.68	3.83	3.99	4.13	4.25	4.33	4.25	4.13
135	3.92	4.08	3.78	3.35	2.94	2.95	3.07	3.26	3.42	3.59	3.75	3.88	3.99	4.10	4.22	4.32	4.38	4.32	4.22
140	3.47	3.62	3.51	3.32	3.14	3.18	3.29	3.43	3.54	3.66	3.78	3.91	4.05	4.18	4.32	4.43	4.52	4.43	4.32
145	3.24	3.42	3.46	3.44	3.42	3.47	3.54	3.64	3.76	3.90	4.02	4.10	4.18	4.25	4.38	4.50	4.59	4.50	4.38
150	3.11	3.43	3.56	3.61	3.62	3.69	3.77	3.85	3.93	3.99	4.06	4.11	4.16	4.22	4.33	4.43	4.51	4.43	4.33
155	3.42	3.85	4.02	4.05	4.00	3.97	3.93	3.90	3.92	3.96	4.02	4.10	4.18	4.25	4.34	4.42	4.49	4.42	4.42
160	3.77	4.23	4.39	4.38	4.27	4.21	4.14	4.08	4.07	4.08	4.08	4.03	3.97	3.93	3.95	3.97	4.00	3.97	3.95
165	3.90	4.33	4.43	4.37	4.22	4.14	4.06	3.98	3.94	3.91	3.86	3.73	3.61	3.50	3.53	3.58	3.63	3.58	3.53
170	3.71	4.02	4.05	3.95	3.77	3.62	3.46	3.33	3.27	3.25	3.23	3.18	3.14	3.11	3.11	3.11	3.11	3.11	3.11
175	3.51	3.71	3.74	3.68	3.54	3.35	3.16	2.99	2.97	2.98	3.00	2.92	2.83	2.76	2.78	2.83	2.88	2.83	2.78
180	3.03	3.01	3.00	2.99	2.97	2.92	2.87	2.81	2.74	2.68	2.62	2.58	2.55	2.54	2.57	2.61	2.66	2.61	2.57

C (DBG) y	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	3603	3602	3601	3600	3601	3602	3603	3603	3603	3604	3605	3606	3607	3606	3604				
5	2925	2926	2926	2925	2907	2902	2924	3038	3165	3278	3280	3267	3266	3337	3446				
10	2692	2769	2851	2924	2953	2961	2951	2901	2856	2837	2910	3016	3139	3246	3357				
15	2074	2152	2247	2352	2468	2577	2667	2702	2715	2714	2685	2675	2709	2844	3048				
20	1285	1408	1544	1683	1790	1898	2016	2192	2365	2509	2526	2528	2554	2688	2881				
25	768	771	798	864	1030	1235	1466	1701	1934	2153	2322	2471	2604	2733	2851				
30	571	601	638	682	694	737	836	1097	1406	1729	2002	2245	2451	2597	2696				
35	339	373	415	467	515	580	672	796	964	1188	1561	1944	2283	2450	2518				
40	177	197	227	270	333	408	493	543	631	789	1177	1598	1983	2174	2262				
45	143	143	149	166	201	252	319	377	473	626	946	1295	1627	1831	1970				
50	98.3	105	115	129	139	161	201	265	360	494	710	950	1196	1399	1587				
55	70.3	71.4	75.1	82.7	93.0	112	145	194	262	353	472	618	791	993	1223				
60	41.5	42.7	45.6	51.0	57.8	70.4	91.3	125	170	228	282	362	484	679	930				
65	1.03	1.39	3.54	8.43	17.5	30.8	48.8	68.9	97.1	136	176	242	348	523	749				
70	1.20	0.60	0.41	1.01	0.79	3.61	11.3	24.7	47.5	82.7	130	197	290	418	576				
75	1.35	1.00	0.90	1.24	1.34	2.88	6.70	11.1	21.3	40.1	65.6	109	175	280	414				
80	1.56	1.35	1.31	1.54	1.64	2.52	4.62	6.96	12.5	22.6	32.1	54.4	96.2	173	276				
85	1.83	1.71	1.70	1.84	1.79	2.20	3.37	5.18	8.62	14.3	20.8	32.1	50.1	79.3	117				
90	2.20	2.11	2.09	2.16	2.09	2.30	2.99	4.39	6.61	9.78	15.0	20.8	26.5	31.0	34.8				
95	2.55	2.48	2.46	2.49	2.42	2.55	3.02	4.02	5.57	7.74	11.0	14.8	18.8	22.5	26.3				
100	3.14	3.14	3.20	3.31	3.34	3.49	3.82	4.34	5.23	6.61	8.63	11.4	15.0	19.7	25.4				
105	3.56	3.57	3.61	3.66	3.72	3.74	3.68	3.00	2.54	2.64	4.17	6.55	9.76	13.7	18.4				
110	3.73	3.69	3.64	3.56	3.30	3.09	3.00	3.19	3.60	4.26	4.56	5.59	7.83	12.4	18.6				
115	3.40	3.36	3.32	3.27	3.14	3.03	2.98	3.01	3.20	3.63	4.00	5.03	7.07	11.0	16.2				
120	3.51	3.46	3.39	3.31	3.16	3.01	2.90	2.80	2.85	3.15	3.76	4.81	6.40	8.78	11.8				
125	3.70	3.64	3.57	3.48	3.30	3.12	2.96	2.83	2.82	3.02	3.52	4.33	5.49	7.12	9.15				
130	3.99	3.83	3.68	3.52	3.37	3.23	3.11	2.93	2.84	2.89	3.22	3.77	4.57	5.64	6.96				
135	4.10	3.99	3.88	3.75	3.59	3.42	3.26	3.07	2.95	2.94	3.35	3.78	4.08	3.92	3.49				
140	4.18	4.05	3.91	3.78	3.66	3.54	3.43	3.29	3.18	3.14	3.32	3.51	3.62	3.47	3.15				
145	4.25	4.18	4.10	4.02	3.90	3.76	3.64	3.54	3.47	3.42	3.44	3.46	3.42	3.24	2.98				
150	4.22	4.16	4.11	4.06	3.99	3.93	3.85	3.77	3.69	3.62	3.61	3.56	3.43	3.11	2.66				
155	4.25	4.18	4.10	4.02	3.96	3.92	3.90	3.93	3.97	4.00	4.05	4.02	3.85	3.42	2.78				
160	3.93	3.97	4.03	4.08	4.08	4.07	4.08	4.14	4.21	4.27	4.38	4.39	4.23	3.77	3.07				
165	3.50	3.61	3.73	3.86	3.91	3.94	3.98	4.06	4.14	4.22	4.37	4.43	4.33	3.90	3.23				
170	3.11	3.14	3.18	3.23	3.25	3.27	3.33	3.46	3.62	3.77	3.95	4.05	4.02	3.71	3.21				
175	2.76	2.83	2.92	3.00	2.98	2.97	2.99	3.16	3.35	3.54	3.68	3.74	3.71	3.51	3.17				
180	2.64	2.55	2.58	2.62	2.68	2.74	2.81	2.87	2.92	2.97	3.08	3.00	3.01	3.03	3.04				

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	WPX2 @ 80W / 4000K	Sample ID	231101003-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(%)
120.0	60	0.640	76.6	0.997	2.48
277.0	60	0.284	74.8	0.950	3.66

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*****