

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: 2023-10-30

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		10384
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		150.5
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		10109
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	146.5
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		69.0
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	480V	17.69
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	480V	0.802
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	5029±283	5179
		4 steps	5029±220	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		85.1
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		15
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		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%		2.1%
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		0.179
(Goniophotometer – Section 4.2)		Non-Worst Case		N/A
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		69.0
(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 @ 65W / 5000K 480	231020002-S1
2	Goniophotometer Test	2023-10-23	WPX3 @ 65W / 5000K 480	231020002-S1
3	THD and PF Test	2023-10-23	WPX3 @ 65W / 5000K 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 @ 65W / 5000K 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 @ 65W / 5000K 480	Sample ID	231020002-S1
Operate time (Min.)	10	Stabilization time (Min.)	60
Temperature (°C)	25.4	Humidity (%RH)	41.0

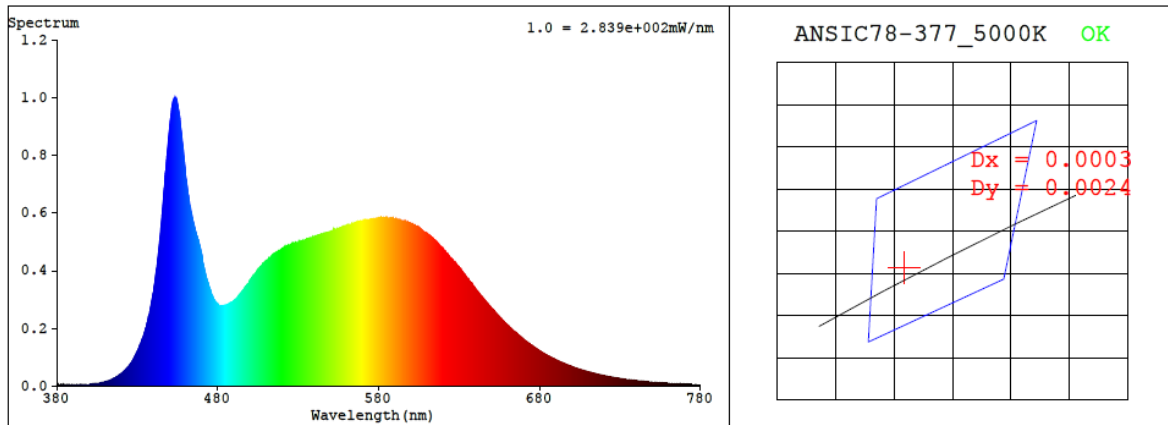
Test Method
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using 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. 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	0.179	69.0	0.802

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
5179	85.1	15	0.0011	85	95	-12%

4.1 Integrating Sphere Test



Colorimetric Parameters

Chromaticity Coordinate: $x = 0.3406$ $y = 0.3501$ / $u' = 0.2089$ $v' = 0.4833$ ($duv=1.09e-03$)

CCT= 5179K Prcp WL: $L_d=568.5nm$ Purity=7.2%

Peak WL: $L_p=454nm$ FWHM: $=24.2nm$ Ratio:R=15.7% G=79.2% B=5.1%

Render Index: $R_a = 85.1$ AvgR = 79.0 TM30:Rf=85 Rg=95

EEL: 0.09230 A++ Highest

R1 =84 R2 =91 R3 =95 R4 =84 R5 =84 R6 =87 R7 =87

R8 =69 R9 =15 R10=78 R11=83 R12=64 R13=86 R14=97 R15=79

4.1 Integrating Sphere Test

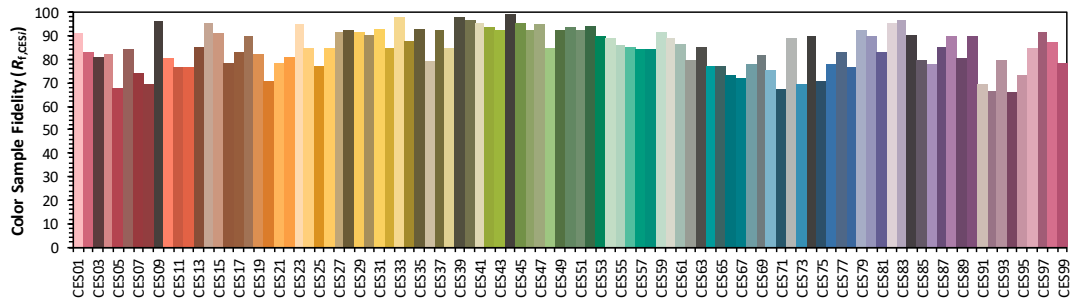
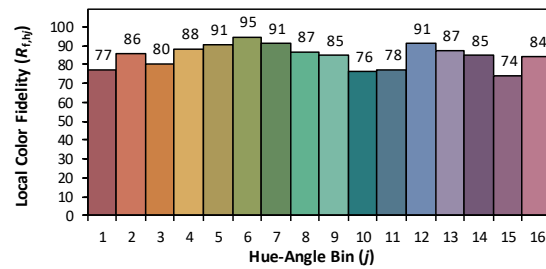
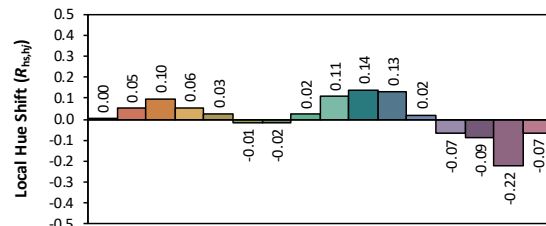
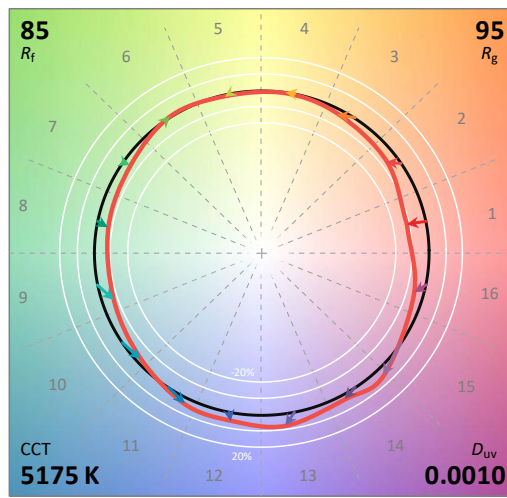
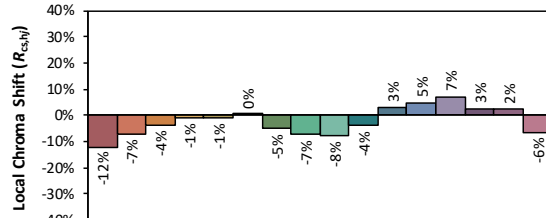
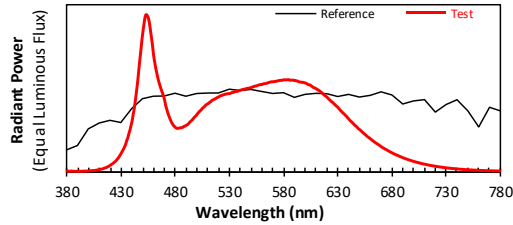
ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/10/30

Model: WPX3 @ 65W / 5000K 480



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

x 0.3405
 y 0.3499
 u' 0.2090
 v' 0.4832

CIE 13.3-1995
(CRI)

R_a 85
 R_g 15

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	4.20E-06	447	7.04E-04	514	4.54E-04	581	5.84E-04	648	2.85E-04	715	4.24E-05
381	5.30E-06	448	7.67E-04	515	4.57E-04	582	5.84E-04	649	2.76E-04	716	4.12E-05
382	3.40E-06	449	8.35E-04	516	4.62E-04	583	5.84E-04	650	2.71E-04	717	4.00E-05
383	5.10E-06	450	8.92E-04	517	4.64E-04	584	5.85E-04	651	2.66E-04	718	3.86E-05
384	5.60E-06	451	9.41E-04	518	4.69E-04	585	5.85E-04	652	2.59E-04	719	3.76E-05
385	4.30E-06	452	9.84E-04	519	4.72E-04	586	5.81E-04	653	2.52E-04	720	3.63E-05
386	4.10E-06	453	9.99E-04	520	4.76E-04	587	5.82E-04	654	2.46E-04	721	3.51E-05
387	4.10E-06	454	9.91E-04	521	4.80E-04	588	5.82E-04	655	2.40E-04	722	3.41E-05
388	3.50E-06	455	9.76E-04	522	4.84E-04	589	5.82E-04	656	2.35E-04	723	3.29E-05
389	4.20E-06	456	9.43E-04	523	4.86E-04	590	5.79E-04	657	2.28E-04	724	3.21E-05
390	4.40E-06	457	8.94E-04	524	4.88E-04	591	5.80E-04	658	2.23E-04	725	3.10E-05
391	4.40E-06	458	8.46E-04	525	4.90E-04	592	5.78E-04	659	2.17E-04	726	3.02E-05
392	4.20E-06	459	7.91E-04	526	4.93E-04	593	5.76E-04	660	2.13E-04	727	2.92E-05
393	3.90E-06	460	7.32E-04	527	4.93E-04	594	5.73E-04	661	2.07E-04	728	2.82E-05
394	4.50E-06	461	6.91E-04	528	4.96E-04	595	5.71E-04	662	2.01E-04	729	2.74E-05
395	5.10E-06	462	6.52E-04	529	4.97E-04	596	5.70E-04	663	1.96E-04	730	2.63E-05
396	5.30E-06	463	6.21E-04	530	4.97E-04	597	5.68E-04	664	1.91E-04	731	2.57E-05
397	4.60E-06	464	5.89E-04	531	4.99E-04	598	5.69E-04	665	1.86E-04	732	2.48E-05
398	5.70E-06	465	5.64E-04	532	5.02E-04	599	5.66E-04	666	1.81E-04	733	2.40E-05
399	5.70E-06	466	5.42E-04	533	5.05E-04	600	5.64E-04	667	1.76E-04	734	2.31E-05
400	5.90E-06	467	5.20E-04	534	5.05E-04	601	5.62E-04	668	1.72E-04	735	2.24E-05
401	6.70E-06	468	5.02E-04	535	5.09E-04	602	5.58E-04	669	1.67E-04	736	2.18E-05
402	7.50E-06	469	4.80E-04	536	5.10E-04	603	5.54E-04	670	1.62E-04	737	2.12E-05
403	8.00E-06	470	4.57E-04	537	5.11E-04	604	5.53E-04	671	1.58E-04	738	2.03E-05
404	8.40E-06	471	4.21E-04	538	5.13E-04	605	5.49E-04	672	1.53E-04	739	1.99E-05
405	9.30E-06	472	3.99E-04	539	5.17E-04	606	5.44E-04	673	1.49E-04	740	1.94E-05
406	9.80E-06	473	3.74E-04	540	5.18E-04	607	5.40E-04	674	1.45E-04	741	1.87E-05
407	1.12E-05	474	3.55E-04	541	5.20E-04	608	5.35E-04	675	1.41E-04	742	1.80E-05
408	1.24E-05	475	3.38E-04	542	5.22E-04	609	5.32E-04	676	1.38E-04	743	1.74E-05
409	1.38E-05	476	3.21E-04	543	5.24E-04	610	5.29E-04	677	1.33E-04	744	1.67E-05
410	1.49E-05	477	3.08E-04	544	5.25E-04	611	5.24E-04	678	1.30E-04	745	1.63E-05
411	1.70E-05	478	2.97E-04	545	5.26E-04	612	5.21E-04	679	1.26E-04	746	1.55E-05
412	1.81E-05	479	2.89E-04	546	5.30E-04	613	5.15E-04	680	1.23E-04	747	1.53E-05
413	2.02E-05	480	2.82E-04	547	5.30E-04	614	5.10E-04	681	1.19E-04	748	1.48E-05
414	2.27E-05	481	2.77E-04	548	5.31E-04	615	5.05E-04	682	1.15E-04	749	1.44E-05
415	2.56E-05	482	2.76E-04	549	5.33E-04	616	5.00E-04	683	1.12E-04	750	1.39E-05
416	2.75E-05	483	2.77E-04	550	5.35E-04	617	4.92E-04	684	1.09E-04	751	1.35E-05
417	3.16E-05	484	2.79E-04	551	5.37E-04	618	4.86E-04	685	1.06E-04	752	1.30E-05
418	3.44E-05	485	2.79E-04	552	5.41E-04	619	4.82E-04	686	1.03E-04	753	1.27E-05
419	3.85E-05	486	2.82E-04	553	5.42E-04	620	4.76E-04	687	1.00E-04	754	1.22E-05
420	4.32E-05	487	2.83E-04	554	5.45E-04	621	4.69E-04	688	9.72E-05	755	1.19E-05
421	4.84E-05	488	2.89E-04	555	5.46E-04	622	4.62E-04	689	9.46E-05	756	1.15E-05
422	5.23E-05	489	2.91E-04	556	5.48E-04	623	4.56E-04	690	9.12E-05	757	1.10E-05
423	5.83E-05	490	2.96E-04	557	5.51E-04	624	4.48E-04	691	8.89E-05	758	1.08E-05
424	6.40E-05	491	2.99E-04	558	5.53E-04	625	4.43E-04	692	8.59E-05	759	1.06E-05
425	7.05E-05	492	3.05E-04	559	5.55E-04	626	4.37E-04	693	8.34E-05	760	1.02E-05
426	7.87E-05	493	3.13E-04	560	5.54E-04	627	4.31E-04	694	8.11E-05	761	9.80E-06
427	8.68E-05	494	3.20E-04	561	5.57E-04	628	4.24E-04	695	7.87E-05	762	9.50E-06
428	9.68E-05	495	3.26E-04	562	5.60E-04	629	4.17E-04	696	7.63E-05	763	9.10E-06
429	1.08E-04	496	3.33E-04	563	5.60E-04	630	4.12E-04	697	7.41E-05	764	9.10E-06
430	1.19E-04	497	3.42E-04	564	5.62E-04	631	4.04E-04	698	7.18E-05	765	8.60E-06
431	1.33E-04	498	3.50E-04	565	5.63E-04	632	3.96E-04	699	6.97E-05	766	8.30E-06
432	1.45E-04	499	3.55E-04	566	5.67E-04	633	3.87E-04	700	6.76E-05	767	8.10E-06
433	1.60E-04	500	3.66E-04	567	5.69E-04	634	3.82E-04	701	6.55E-05	768	7.80E-06
434	1.76E-04	501	3.74E-04	568	5.70E-04	635	3.74E-04	702	6.34E-05	769	7.70E-06
435	1.99E-04	502	3.82E-04	569	5.72E-04	636	3.69E-04	703	6.17E-05	770	7.50E-06
436	2.17E-04	503	3.88E-04	570	5.72E-04	637	3.61E-04	704	5.98E-05	771	7.30E-06
437	2.43E-04	504	3.95E-04	571	5.73E-04	638	3.55E-04	705	5.82E-05	772	7.00E-06
438	2.66E-04	505	4.04E-04	572	5.73E-04	639	3.46E-04	706	5.62E-05	773	6.90E-06
439	2.95E-04	506	4.09E-04	573	5.76E-04	640	3.39E-04	707	5.46E-05	774	6.70E-06
440	3.25E-04	507	4.16E-04	574	5.76E-04	641	3.30E-04	708	5.28E-05	775	6.40E-06
441	3.67E-04	508	4.23E-04	575	5.78E-04	642	3.24E-04	709	5.12E-05	776	6.30E-06
442	4.05E-04	509	4.28E-04	576	5.80E-04	643	3.17E-04	710	4.94E-05	777	6.10E-06
443	4.56E-04	510	4.33E-04	577	5.81E-04	644	3.11E-04	711	4.83E-05	778	5.90E-06
444	5.10E-04	511	4.37E-04	578	5.81E-04	645	3.04E-04	712	4.70E-05	779	5.90E-06
445	5.67E-04	512	4.44E-04	579	5.81E-04	646	2.96E-04	713	4.51E-05	780	5.90E-06
446	6.36E-04	513	4.47E-04	580	5.84E-04	647	2.90E-04	714	4.40E-05	N/A	N/A

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	WPX3 @ 65W / 5000K 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	0.179	69.0	0.802
NON-WORST CASE	N/A	N/A	N/A	N/A	N/A

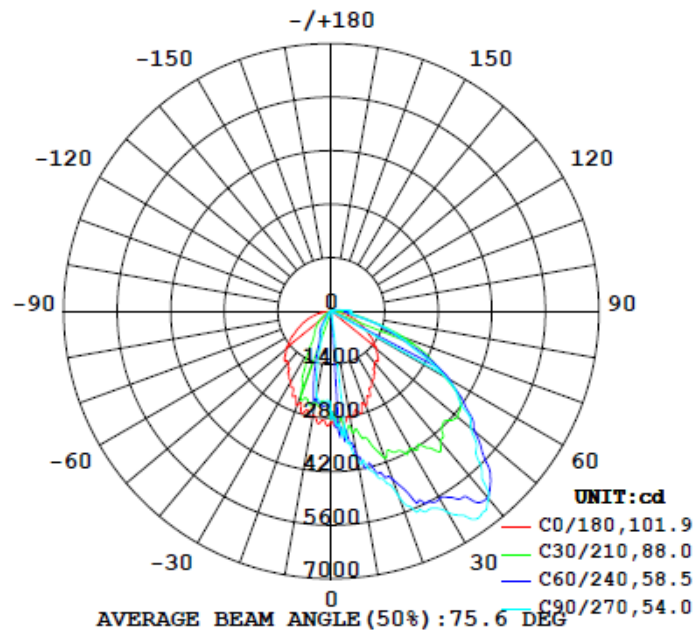
Test Result

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	10384	107.0	145.5	54.9	101.2	150.5	2.0%	B2-U3-G2
0°-90° zones	10109	107.0	145.5	54.9	101.2	146.5	2.1%	B2-U3-G2

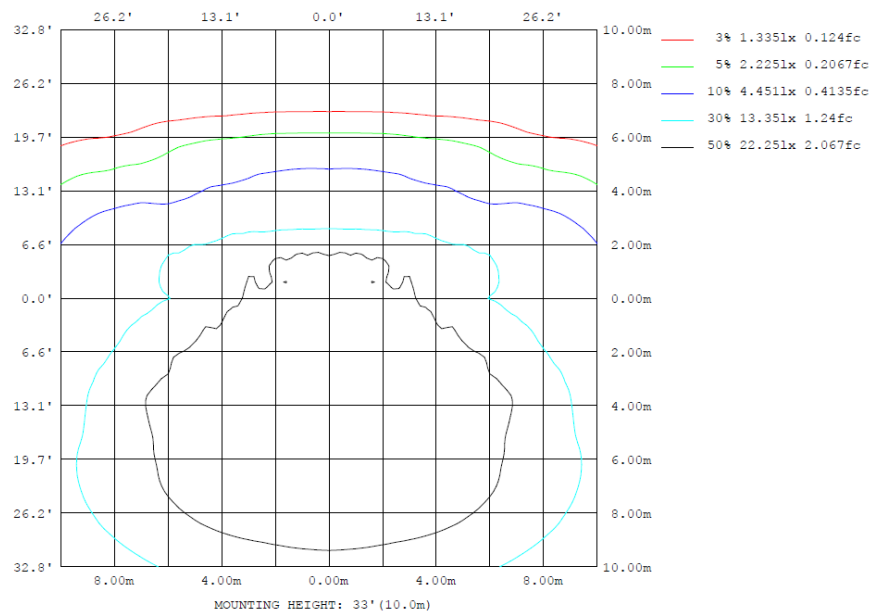
4.2 Goniophotometer Test

Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

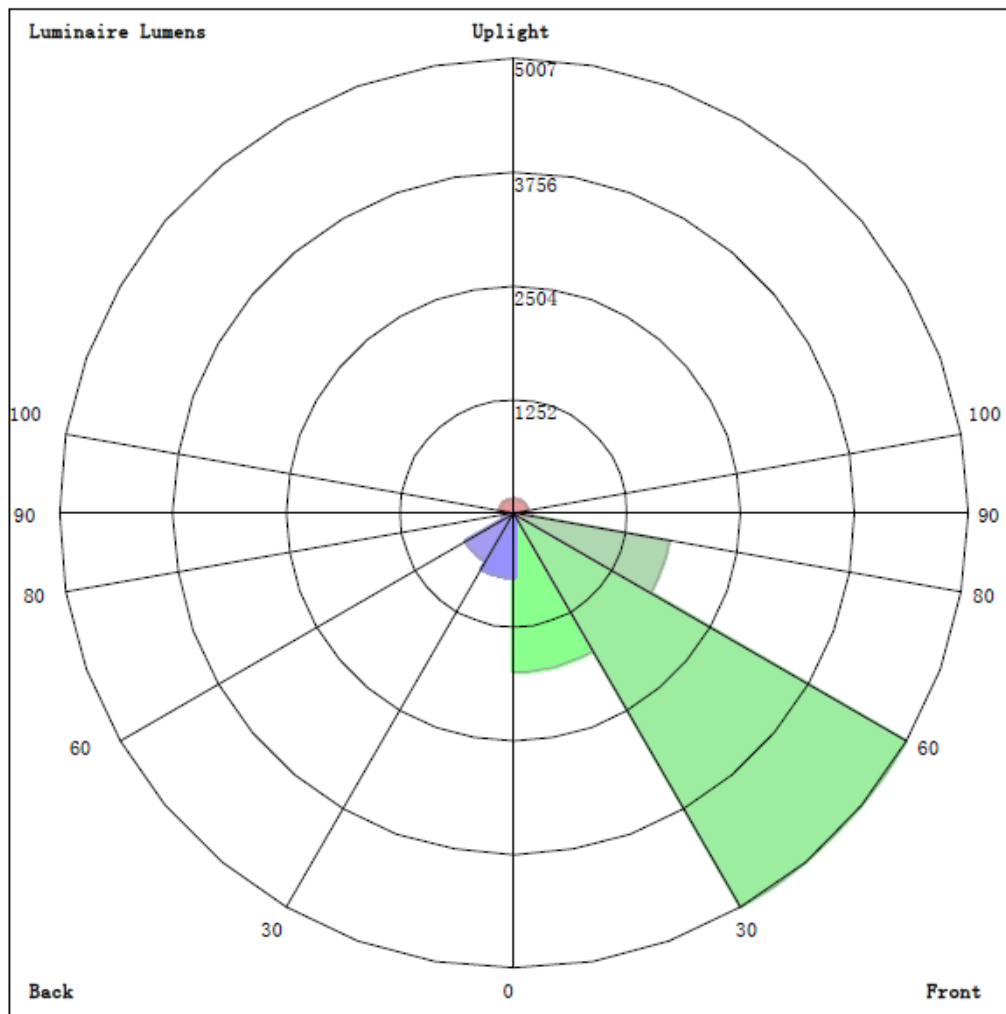
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	zone	total	lum, lamp
10	2762	3594	3942	3594	2762	2482	2249	2482	0- 10	269.0	269.0	2.59,2.59
20	2625	4370	5154	4370	2625	1464	781.5	1464	10- 20	824.2	1093	10.5,10.5
30	2126	5293	6071	5293	2126	708.7	436.9	708.7	20- 30	1350	2444	23.5,23.5
40	1770	5294	6401	5294	1770	410.9	147.1	410.9	30- 40	1812	4256	41,41
50	1540	5133	4771	5133	1540	181.2	69.34	181.2	40- 50	1991	6247	60.2,60.2
60	1075	3687	3434	3687	1075	91.48	26.48	91.48	50- 60	1789	8036	77.4,77.4
70	694.8	1857	1830	1857	694.8	12.96	2.173	12.96	60- 70	1260	9296	89.5,89.5
80	290.7	581.4	569.4	581.4	290.7	6.282	2.807	6.282	70- 80	600.1	9896	95.3,95.3
90	26.48	225.5	522.4	225.5	26.48	4.661	3.706	4.661	80- 90	212.8	10109	97.4,97.4
100	26.89	166.8	225.4	166.8	26.89	4.915	4.389	4.915	90-100	121.1	10230	98.5,98.5
110	16.02	57.37	74.57	57.37	16.02	3.250	5.269	3.250	100-110	46.66	10277	99,99
120	16.41	104.6	62.08	104.6	16.41	3.018	3.570	3.018	110-120	31.67	10308	99.3,99.3
130	8.659	84.06	102.6	84.06	8.659	3.016	4.126	3.016	120-130	33.43	10342	99.6,99.6
140	1.924	49.57	98.25	49.57	1.924	3.241	4.357	3.241	130-140	24.88	10367	99.8,99.8
150	1.697	22.08	45.86	22.08	1.697	3.561	4.079	3.561	140-150	12.33	10379	100,100
160	1.980	1.607	14.37	1.607	1.980	3.669	3.549	3.669	150-160	3.818	10383	100,100
170	2.320	2.189	2.321	2.189	2.320	2.973	2.583	2.973	160-170	0.9672	10384	100,100
180	2.701	2.601	2.268	2.601	2.701	2.556	2.359	2.556	170-180	0.2448	10384	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Zonal (lm)	Total (lm)	Percent
0-10	268.98	2.59%
10-20	824.16	10.53%
20-30	1350.40	23.53%
30-40	1812.35	40.99%
40-50	1991.13	60.16%
50-60	1788.69	77.39%
60-70	1260.10	89.52%
70-80	600.12	95.30%
80-90	212.81	97.35%
90-100	121.12	98.52%
100-110	46.66	98.97%
110-120	31.67	99.27%
120-130	33.43	99.60%
130-140	24.88	99.84%
140-150	12.33	99.95%
150-160	3.82	99.99%
160-170	0.97	100.00%
170-180	0.24	100.00%

4.2 Goniophotometer Test

LCS/BUG

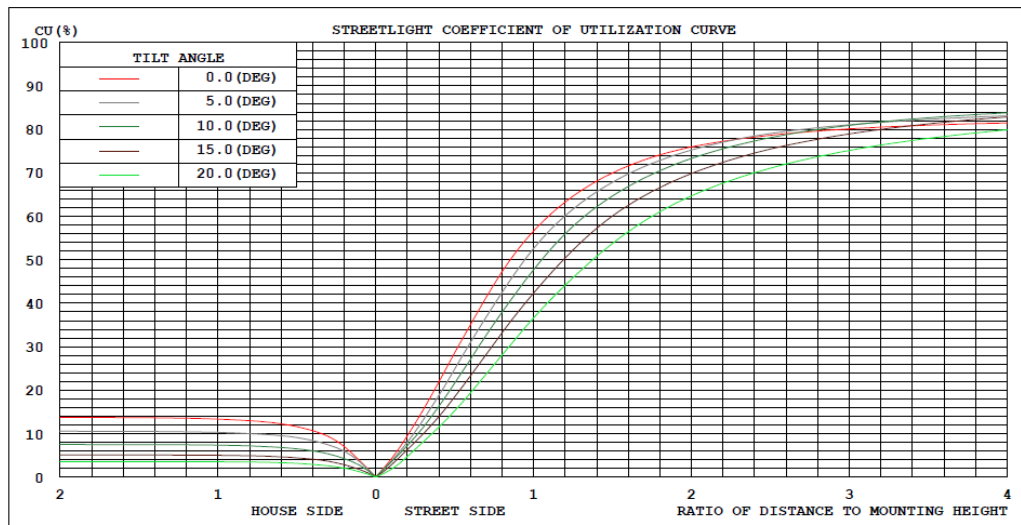


LUMINAIRE CLASSIFICATION SYSTEM (LCS)

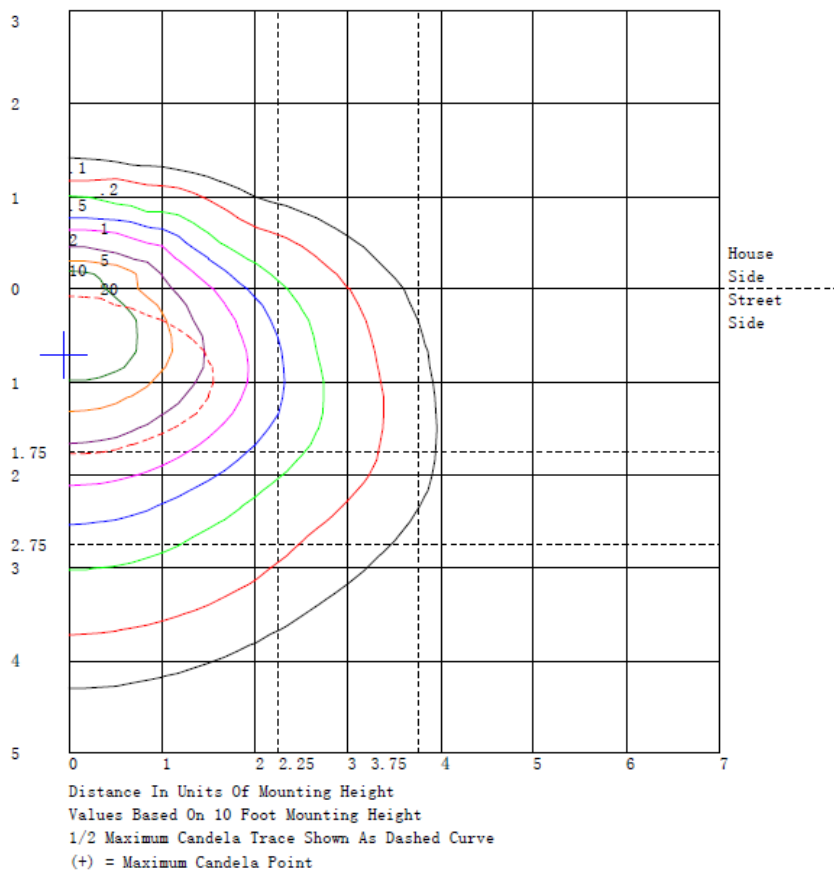
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1748.7	N.A.	16.8
FM - Front-Medium (30-60)	5007.5	N.A.	48.1
FH - Front-High (60-80)	1741.8	N.A.	16.7
FVH - Front-Very High (80-90)	200.3	N.A.	1.9
BL - Back-Low (0-30)	704.9	N.A.	6.8
BM - Back-Medium (30-60)	607.4	N.A.	5.8
BH - Back-High (60-80)	117.1	N.A.	1.1
BVH - Back-Very High (80-90)	12.2	N.A.	0.1
UL - Uplight-Low (90-100)	120.8	N.A.	1.2
UH - Uplight-High (100-180)	154.4	N.A.	1.5
Total	10415.1	N.A.	100.0
BUG Rating	B2-U3-G2		

4.2 Goniophotometer Test

Coefficients of Utilization



Isolines



4.2 Goniophotometer Test

Luminous Distribution Intensity Data

Table--1

UNIT: cd

C (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
γ (DEG)	0	2846	2845	2844	2843	2843	2843	2842	2841	2840	2838	2836	2834	2830	2827	2825	2828	2831	2834
5	2866	2834	2809	2791	2761	2753	2778	2919	3070	3194	3155	3088	3031	3103	3196	3287	3309	3312	3301
10	2762	2710	2710	2763	2896	3060	3234	3366	3487	3594	3688	3768	3834	3883	3918	3941	3946	3945	3942
15	2725	2732	2781	2874	3020	3202	3413	3679	3937	4155	4228	4255	4261	4312	4359	4396	4400	4393	4379
20	2625	2669	2792	2996	3355	3738	4088	4231	4315	4370	4470	4571	4672	4771	4865	4953	5047	5118	5154
25	2420	2620	2849	3107	3422	3744	4051	4271	4472	4672	4938	5200	5440	5611	5739	5822	5836	5821	5795
30	2126	2435	2754	3084	3425	3776	4138	4555	4951	5293	5472	5588	5667	5765	5850	5923	5994	6046	6071
35	1994	2404	2808	3207	3615	4006	4367	4650	4907	5152	5431	5704	5962	6201	6406	6563	6626	6644	6631
40	1770	2190	2621	3060	3540	4007	4438	4745	5022	5294	5688	6060	6362	6438	6436	6394	6389	6388	6401
45	1748	2235	2687	3103	3451	3788	4139	4634	5114	5530	5734	5836	5854	5789	5682	5561	5470	5404	5377
50	1540	1958	2394	2849	3362	3864	4322	4685	4960	5133	5110	5016	4900	4883	4879	4876	4833	4794	4771
55	1336	1693	2094	2538	3112	3665	4129	4300	4358	4343	4336	4305	4262	4226	4190	4156	4122	4100	4094
60	1075	1406	1761	2143	2614	3063	3442	3607	3680	3697	3668	3624	3571	3549	3530	3511	3476	3447	3434
65	884	1193	1506	1822	2186	2520	2790	2888	2910	2878	2826	2754	2676	2618	2568	2525	2485	2458	2450
70	695	969	1062	1275	1562	1827	2030	2027	1957	1857	1807	1767	1743	1754	1778	1805	1815	1822	1830
75	490	589	697	816	976	1122	1231	1213	1160	1099	1102	1115	1131	1131	1130	1128	1131	1137	1146
80	291	333	385	448	546	636	702	680	634	581	566	559	558	561	567	572	571	569	569
85	104	135	171	212	265	316	359	371	375	377	396	418	443	466	490	511	532	548	557
90	26.5	51.8	76.3	100	123	145	166	181	199	226	281	342	401	443	476	500	514	521	522
95	21.8	35.3	49.6	64.7	78.6	94.8	115	146	180	215	250	281	305	311	311	307	309	312	314
100	26.9	29.3	32.3	36.1	35.7	39.6	51.1	88.3	129	167	178	183	185	194	204	212	219	223	225
105	20.2	20.1	23.4	30.0	43.9	58.3	70.4	70.8	68.0	64.1	63.9	64.5	66.0	68.2	71.3	75.1	80.4	86.1	91.8
110	16.0	14.3	19.0	30.0	56.1	82.2	102	90.4	73.2	57.4	65.1	77.1	89.0	89.3	86.7	82.6	78.7	75.7	74.6
115	21.5	14.0	13.6	20.2	39.5	61.8	82.9	95.0	101	98.4	78.0	54.3	32.7	29.9	32.4	37.6	40.3	42.8	44.6
120	16.4	7.97	6.68	12.5	30.2	51.5	73.0	87.3	97.9	105	105	102	96.7	89.7	82.0	74.6	67.9	63.4	62.1
125	12.0	4.86	3.82	8.87	23.4	41.5	60.6	75.7	88.7	99.0	104	107	107	106	103	101	99.3	98.4	98.4
130	8.66	1.81	0.32	4.20	16.2	31.5	48.0	61.2	73.3	84.1	93.6	101	106	107	105	103	103	103	103
135	2.16	0.24	1.30	5.33	13.4	23.7	35.3	46.9	58.5	69.7	79.9	88.9	96.3	101	104	106	108	110	110
140	1.92	4.74	8.06	11.9	16.0	20.8	26.4	33.6	41.4	49.6	57.6	65.3	72.3	77.3	81.6	85.5	91.0	95.5	98.3
145	1.77	3.17	5.05	7.41	10.2	13.5	17.4	22.1	27.5	33.4	40.5	47.6	54.0	58.4	61.8	64.4	67.0	68.9	69.8
150	1.70	3.05	3.83	4.05	2.28	1.01	1.29	7.38	14.8	22.1	25.5	28.1	30.4	34.1	37.8	41.1	43.5	45.2	45.9
155	1.79	1.39	1.40	1.85	2.82	4.14	5.76	7.53	9.52	11.7	14.3	16.9	19.3	21.2	22.8	24.0	24.7	25.1	25.2
160	1.98	1.87	1.85	1.92	2.20	2.48	2.65	2.01	1.54	1.61	3.59	6.09	8.73	10.7	12.3	13.6	14.2	14.4	14.4
165	2.14	2.16	2.17	2.16	2.07	2.02	2.04	2.24	2.55	2.95	3.69	4.31	4.63	3.80	2.74	1.72	1.52	1.54	1.69
170	2.32	2.34	2.35	2.36	2.35	2.34	2.32	2.28	2.24	2.19	2.13	2.09	2.07	2.12	2.19	2.26	2.28	2.30	2.32
175	2.45	2.48	2.51	2.51	2.51	2.49	2.47	2.44	2.42	2.39	2.36	2.32	2.28	2.24	2.20	2.17	2.12	2.09	2.08
180	2.70	2.71	2.71	2.71	2.69	2.67	2.65	2.64	2.62	2.60	2.57	2.53	2.49	2.45	2.41	2.38	2.33	2.29	2.27

UNIT: cd																			
C (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
γ (DEG)	0	2831	2828	2825	2827	2830	2834	2836	2838	2840	2841	2842	2843	2843	2843	2844	2845	2846	2846
5	3312	3309	3287	3196	3103	3031	3088	3155	3194	3070	2919	2778	2753	2761	2791	2809	2834	2866	2652
10	3945	3946	3941	3918	3883	3834	3768	3688	3594	3487	3366	3234	3060	2896	2763	2710	2710	2762	2547
15	4393	4400	4396	4359	4312	4261	4255	4228	4155	3937	3679	3413	3202	3020	2874	2781	2732	2725	2554
20	5118	5047	4953	4865	4771	4672	4571	4470	4370	4315	4231	4088	3738	3355	2996	2792	2669	2625	2526
25	5821	5836	5822	5739	5611	5440	5200	4938	4672	4472	4271	4051	3744	3422	3107	2849	2620	2420	2552
30	6046	5994	5923	5850	5765	5667	5588	5472	5293	4951	4555	4138	3776	3425	3084	2754	2435	2126	2261
35	6644	6626	6563	6406	6201	5962	5704	5431	5152	4907	4650	4367	4006	3615	3207	2808	2404	1994	2083
40	6388	6389	6394	6436	6438	6362	6060	5688	5294	5022	4745	4438	4007	3540	3060	2621	2190	1770	1760
45	5404	5470	5561	5682	5789	5854	5836	5734	5530	5114	4634	4139	3788	3451	3103	2687	2235	1748	1582
50	4794	4833	4876	4879	4883	4900	5016	5110	5133	4960	4685	4322	3864	3362	2849	2394	1958	1540	1245
55	4100	4122	4156	4190	4226	4262	4305	4336	4343	4358	4300	4129	3665	3112	2538	2094	1693	1336	1025
60	3447	3476	3511	3530	3549	3571	3624	3668	3687	3680	3607	3442	3063	2614	2143	1761	1406	1075	800
65	2458	2485	2525	2568	2618	2676	2754	2826	2878	2910	2888	2790	2520	2186	1822	1506	1193	884	651
70	1822	1815	1805	1778	1754	1743	1767	1807	1857	1957	2027	2030	1827	1562	1275	1062	869	695	528
75	1137	1131	1128	1130	1131	1131	1115	1102	1099	1160	1213	1231	1122	976	816	697	589	490	369
80	569	571	572	567	561	558	559	566	581	634	680	702	636	546	448	385	333	291	214
85	548	532	511	490	466	443	418	396	377	375	371	359	316	265	212	171	135	104	83.2
90	521	514	500	476	443	401	342	281	226	199	181	166	145	123	100	76.3	51.8	26.5	27.2
95	312	309	307	311	311	305	281	250	215	180	146	115	94.8	78.6	64.7	49.6	35.3	21.8	20.3
100	223	219	212	204	194	185	183	178	167	129	88.3	51.1	39.6	35.7	36.1	32.3	29.3	26.9	22.2
105	86.1	80.4	75.1	71.3	68.2	66.0	64.5	63.9	64.1	68.0	70.8	70.4	58.3	43.9	30.0	23.4	20.1	20.2	16.7
110	75.7	78.7	82.6	86.7	89.3	89.0	77.1	65.1	57.4	73.2	90.4	102	82.2	56.1	30.0	19.0	14.3	16.0	12.2
115	42.8	40.3	37.6	32.4	29.9	32.7	54.3	78.0	98.4	101	95.0	82.9	61.8	39.5	20.2	13.6	14.0	21.5	15.8
120	63.4	67.9	74.6	82.0	89.7	96.7	102	105	105	97.9	87.3	73.0	51.5	30.2	12.5	6.68	7.97	16.4	12.6
125	98.4	99.3	101	103	106	107	107	104	99.0	88.7	75.7	60.6	41.5	23.4	8.87	3.82	4.86	12.0	9.84
130	103	103	103	105	107	106	101	93.6	84.1	73.3	61.2	48.0	31.5	16.2	4.20	0.32	1.81	8.66	7.56
135	110	108	106	104	101	96.3	88.9	79.9	69.7	58.5	46.9	35.3	23.7	13.4	5.33	1.30	0.24	2.16	2.70
140	95.5	91.0	85.5	81.6	77.3	72.3	65.3	57.6	49.6	41.4	33.6	26.4	20.8	16.0	11.9	8.06	4.74	1.92	3.30
145	68.9	67.0	64.4	61.8	58.4	54.0	47.6	40.5	33.4	27.5	22.1	17.4	13.5	10.2	7.41	5.05	3.17	1.77	2.60
150	45.2	43.5	41.1	37.8	34.1	30.4	28.1	25.5	22.1	14.8	7.38	1.29	1.01	2.28	4.05	3.83	3.05	1.70	2.45
155	25.5	24.3	24.0	22.8	21.2	19.3	16.9	14.3	11.7	9.52	7.53	5.76	4.14	2.82	1.85	1.40	1.39	1.79	2.54
160	14.4	14.2	13.6	12.3	10.7	8.73	6.09	3.59	1.61	1.54	2.01	2.65	2.48	2.20	1.92	1.85	1.87	1.98	2.80
165	1.54	1.52	1.72	2.74	3.80	4.63	4.31	3.69	2.95	2.55	2.24	2.04	2.02	2.07	2.16	2.17	2.16	2.14	2.99
170	2.30	2.28	2.26	2.19	2.12	2.07	2.09	2.13	2.19	2.25	2.28	2.32	2.34	2.35	2.36	2.35	2.34	2.32	2.99
175	2.09	2.12	2.17	2.20	2.24	2.28	2.32	2.36	2.39	2.42	2.44	2.47	2.49	2.51	2.51	2.51	2.48	2.45	2.99
180	2.29	2.33	2.38	2.41	2.45	2.49	2.53	2.57	2.60	2.62	2.64	2.65	2.67	2.69	2.71	2.71	2.71	2.70	2.70

Table--3

UNIT: cd

C (DBG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
y (DBG)	0	2828	2823	2821	2821	2820	2816	2811	2808	2812	2817	2822	2824	2825	2826	2829	2832	2834	2832
5	2490	2378	2339	2336	2353	2352	2357	2373	2417	2462	2501	2506	2497	2477	2444	2411	2381	2411	2444
10	2394	2302	2301	2340	2399	2440	2471	2482	2427	2363	2309	2334	2371	2399	2349	2292	2249	2292	2349
15	2428	2349	2348	2369	2389	2350	2285	2192	2054	1903	1753	1629	1526	1447	1416	1408	1415	1408	1416
20	2445	2381	2382	2366	2300	2050	1758	1464	1268	1111	990	914	865	835	807	789	782	789	807
25	2579	2501	2267	1967	1641	1354	1098	888	788	737	716	692	677	668	649	632	622	632	649
30	2277	2173	1869	1506	1148	949	806	709	652	620	600	558	519	484	460	444	437	444	460
35	2056	1914	1560	1162	794	671	615	592	517	446	381	333	296	268	249	239	235	239	249
40	1679	1529	1246	940	657	534	459	411	338	273	219	187	165	153	147	145	147	145	147
45	1402	1208	975	747	543	418	329	265	212	175	153	146	146	151	149	147	146	147	149
50	994	788	642	529	438	336	249	181	154	142	137	117	98.0	81.4	73.6	69.8	69.3	69.8	73.6
55	770	570	447	364	308	242	188	144	112	89.5	73.9	63.5	57.4	54.3	51.6	50.4	50.5	50.4	51.6
60	577	406	308	247	210	162	123	91.5	69.1	53.3	43.1	37.4	34.6	33.5	30.3	27.8	26.5	27.8	30.3
65	461	314	225	167	132	95.1	67.4	46.7	28.8	15.6	6.56	2.28	0.79	1.04	0.97	1.31	1.75	1.31	0.97
70	387	272	189	127	83.6	49.9	27.1	13.0	4.80	1.43	1.12	0.37	0.55	1.22	1.59	1.94	2.17	1.94	1.59
75	266	182	119	72.9	41.0	22.4	12.7	8.86	4.40	2.04	1.16	0.66	0.78	1.26	1.71	2.14	2.42	2.14	1.71
80	149	98.3	63.2	39.0	23.3	13.5	8.35	6.28	3.66	2.12	1.40	1.09	1.20	1.57	2.05	2.51	2.81	2.51	2.05
85	65.0	49.0	34.6	22.7	13.5	8.76	6.22	5.05	3.49	2.43	1.82	1.60	1.68	1.97	2.51	3.03	3.37	3.03	2.51
90	26.5	24.5	20.1	15.1	10.3	7.70	5.89	4.66	3.60	2.88	2.44	2.22	2.21	2.38	2.89	3.38	3.71	3.38	2.89
95	18.6	16.6	14.1	11.5	9.09	7.13	5.48	4.19	3.40	2.92	2.67	2.50	2.49	2.64	3.14	3.63	3.94	3.63	3.14
100	18.1	14.6	11.8	9.47	7.70	6.45	5.56	4.92	4.30	3.82	3.48	3.23	3.12	3.17	3.62	4.08	4.39	4.08	3.62
105	13.5	10.6	7.55	5.01	3.15	2.89	3.24	3.89	4.21	4.49	4.70	4.65	4.57	4.53	4.88	5.22	5.44	5.22	4.88
110	9.19	7.06	6.26	5.98	5.88	4.96	4.03	3.25	3.07	3.14	3.38	3.72	4.12	4.52	4.87	5.13	5.27	5.13	4.87
115	11.3	7.93	6.19	5.28	4.87	4.17	3.65	3.30	3.24	3.30	3.41	3.41	3.42	3.42	3.48	3.53	3.55	3.53	3.48
120	9.54	7.12	5.58	4.57	3.95	3.44	3.14	3.02	3.07	3.21	3.38	3.42	3.44	3.45	3.50	3.55	3.57	3.55	3.50
125	7.98	6.42	5.16	4.18	3.48	3.09	2.92	2.91	3.05	3.25	3.47	3.55	3.60	3.63	3.70	3.76	3.79	3.76	3.70
130	6.54	5.59	4.64	3.82	3.19	2.97	2.93	3.02	3.13	3.30	3.48	3.63	3.78	3.90	4.01	4.09	4.13	4.09	4.01
135	3.11	3.35	3.34	3.23	3.10	3.07	3.08	3.14	3.30	3.48	3.67	3.78	3.87	3.94	4.03	4.11	4.15	4.11	4.03
140	3.74	4.11	3.91	3.51	3.08	3.05	3.12	3.24	3.35	3.48	3.63	3.78	3.93	4.08	4.20	4.30	4.36	4.30	4.20
145	3.25	3.61	3.58	3.40	3.18	3.21	3.29	3.40	3.51	3.64	3.77	3.92	4.06	4.19	4.28	4.35	4.37	4.35	4.28
150	2.94	3.30	3.38	3.35	3.28	3.36	3.46	3.56	3.63	3.70	3.78	3.92	4.06	4.17	4.16	4.13	4.08	4.13	4.16
155	3.14	3.53	3.67	3.68	3.62	3.59	3.56	3.55	3.59	3.66	3.74	3.86	3.97	4.04	3.97	3.87	3.77	3.87	3.97
160	3.46	3.88	4.01	3.98	3.87	3.80	3.73	3.67	3.69	3.73	3.76	3.74	3.71	3.66	3.62	3.58	3.55	3.58	3.62
165	3.57	3.96	4.04	3.97	3.82	3.76	3.69	3.63	3.58	3.53	3.46	3.33	3.20	3.10	3.10	3.12	3.15	3.12	3.10
170	3.42	3.70	3.74	3.64	3.46	3.30	3.13	2.97	2.91	2.86	2.83	2.76	2.69	2.64	2.60	2.58	2.58	2.58	2.60
175	3.24	3.44	3.46	3.39	3.24	3.04	2.83	2.65	2.61	2.61	2.60	2.52	2.43	2.35	2.36	2.40	2.40	2.40	2.36
180	2.72	2.72	2.73	2.72	2.71	2.67	2.62	2.56	2.49	2.42	2.35	2.32	2.29	2.29	2.30	2.33	2.36	2.33	2.30

C (DBG)																UNIT: cd			
y (DBG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
0	2826	2825	2824	2822	2817	2812	2808	2811	2816	2820	2821	2821	2823	2828	2836				
5	2477	2497	2506	2501	2462	2417	2373	2357	2352	2353	2336	2339	2378	2490	2652				
10	2399	2371	2334	2309	2363	2427	2482	2471	2440	2399	2340	2301	2302	2394	2547				
15	1447	1526	1629	1753	1903	2054	2192	2285	2350	2389	2369	2348	2349	2428	2554				
20	835	865	914	990	1111	1268	1464	1758	2050	2300	2366	2382	2381	2445	2526				
25	668	677	692	716	737	788	888	1098	1354	1641	1967	2267	2501	2579	2552				
30	484	519	558	600	620	652	709	806	949	1148	1506	1869	2173	2277	2261				
35	268	296	333	381	446	517	592	615	671	794	1162	1560	1914	2056	2083				
40	153	165	187	219	273	338	411	459	534	657	940	1246	1529	1679	1760				
45	151	146	146	153	175	212	265	329	418	543	747	975	1208	1402	1582				
50	81.4	98.0	117	137	142	154	181	249	336	438	529	642	788	994	1245				
55	54.3	57.4	63.5	73.9	89.5	112	144	188	242	308	364	447	570	770	1025				
60	33.5	34.6	37.4	43.1	53.3	69.1	91.5	123	162	210	247	308	406	577	800				
65	1.04	0.79	2.28	6.56	15.6	28.8	46.7	67.4	95.1	132	167	225	314	461	651				
70	1.22	0.55	0.37	1.12	1.43	4.80	13.0	27.1	49.9	83.6	127	189	272	387	528				
75	1.26	0.78	0.66	1.16	2.04	4.40	8.86	12.7	22.4	41.0	72.9	119	182	266	369				
80	1.57	1.20	1.09	1.40	2.12	3.66	6.28	8.35	13.5	23.3	39.0	63.2	98.3	149	214				
85	1.97	1.68	1.60	1.82	2.43	3.49	5.05	6.22	8.76	13.5	22.7	34.6	49.0	65.0	83.2				
90	2.38	2.21	2.22	2.44	2.88	3.60	4.66	5.89	7.70	10.3	15.1	20.1	24.5	26.5	27.2				
95	2.64	2.49	2.50	2.67	2.92	3.40	4.19	5.48	7.13	9.09	11.5	14.1	16.6	18.6	20.3				
100	3.17	3.12	3.23	3.48	3.82	4.30	4.92	5.56	6.45	7.70	9.47	11.8	14.6	18.1	22.2				
105	4.53	4.57	4.65	4.70	4.49	4.21	3.89	3.24	2.89	3.15	5.01	7.55	10.6	13.5	16.7				
110	4.52	4.12	3.72	3.38	3.14	3.07	3.25	4.03	4.96	5.88	5.98	6.26	7.06	9.19	12.2				
115	3.42	3.42	3.41	3.41	3.30	3.24	3.30	3.65	4.17	4.87	5.28	6.19	7.93	11.3	15.8				
120	3.45	3.44	3.42	3.38	3.21	3.07	3.02	3.14	3.44	3.95	4.57	5.58	7.12	9.54	12.6				
125	3.63	3.60	3.55	3.47	3.25	3.05	2.91	2.92	3.09	3.48	4.18	5.16	6.42	7.98	9.84				
130	3.90	3.78	3.63	3.48	3.30	3.13	3.02	2.93	2.97	3.19	3.82	4.64	5.59	6.54	7.56				
135	3.94	3.87	3.78	3.67	3.48	3.30	3.14	3.08	3.07	3.10	3.23	3.34	3.35	3.11	2.72				
140	4.08	3.93	3.78	3.63	3.48	3.35	3.24	3.12	3.05	3.08	3.51	3.91	4.11	3.74	3.01				
145	4.19	4.06	3.92	3.77	3.64	3.51	3.40	3.29	3.21	3.18	3.40	3.58	3.61	3.25	2.64				
150	4.17	4.06	3.92	3.78	3.70	3.63	3.56	3.46	3.36	3.28	3.35	3.38	3.30	2.94	2.41				
155	4.04	3.97	3.86	3.74	3.66	3.59	3.55	3.56	3.59	3.62	3.68	3.67	3.53	3.14	2.56				
160	3.66	3.71	3.74	3.76	3.73	3.69	3.67	3.73	3.80	3.87	3.98	4.01	3.88	3.46	2.83				
165	3.10	3.20	3.33	3.46	3.53	3.58	3.63	3.69	3.76	3.82	3.97	4.04	3.96	3.57	2.96				
170	2.64	2.69	2.76	2.83	2.86	2.91	2.97	3.13	3.30	3.46	3.64	3.74	3.70	3.42	2.96				
175	2.35	2.43	2.52	2.60	2.61	2.61	2.65	2.83	3.04	3.24	3.39	3.46	3.44	3.24	2.91				
180	2.29	2.29	2.32	2.35	2.42	2.49	2.56	2.62	2.67	2.71	2.72	2.73	2.72	2.72	2.71				

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	WPX3 @ 65W / 5000K 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	0.179	69.0	0.802	17.69

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*****